

Mazda6 Workshop Manual Supplement

FOREWORD

This manual contains on-vehicle service and diagnosis for the Mazda6.

For proper repair and maintenance, a thorough familiarization with this manual is important, and it should always be kept in a handy place for quick and easy reference.

All the contents of this manual, including drawings and specifications, are the latest available at the time of printing. As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Mazda dealers. This manual should be kept up-to-date.

Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

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Mazda Motor Corporation
HIROSHIMA, JAPAN

APPLICATION:

This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN), and related materials shown on the following page.

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There are explanation given only for the sections marked with shadow (■).

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VEHICLE IDENTIFICATION NUMBERS (VIN)

European (L.H.D. U.K.) specs.

JMZ GG12R20#	100001—
JMZ GG12T20#	100001—
JMZ GG14R20#	100001—
JMZ GG14T20#	100001—
JMZ GY19R20#	100001—
JMZ GY19T20#	100001—

RELATED MATERIALS

Mazda6 Training Manual	
(European (L.H.D. U.K.), GCC specs.)	3359-1*-02C
Mazda6 Workshop Manual	
(European (L.H.D. U.K.), GCC specs.)	1730-1*-02C
Mazda6 Workshop Manual Supplement	
(European (L.H.D. U.K.), GCC specs.)	1749-1*-02G
Mazda6 Workshop Manual Supplement	
(European (L.H.D. U.K.), GCC specs.)	1776-10-03G
Engine Workshop Manual MZR-CD (RF Turbo)	1744-1E-02D
Manual Transaxle Workshop Manual A65M-R	1739-1E-02D
Mazda6 Wiring Diagram	
(European (L.H.D.), GCC specs.)	5558-1*-02G
Mazda6 Wiring Diagram Supplement	
(European (L.H.D.), GCC specs.)	5575-10-03A
Mazda6 Wiring Diagram	
(U.K. specs.)	5559-1*-02G
Mazda6 Wiring Diagram Supplement	
(U.K. specs.)	5576-10-03A
Mazda6 Bodyshop Manual	
(European (L.H.D. U.K.), GCC specs.)	3360-1*-02C
Mazda6 Bodyshop Manual Supplement Wagon	
(European (L.H.D. U.K.), Australian, General (L.H.D. R.H.D.) specs.)	3368-1*-02I
EOBD Training Manual	
(General (L.H.D. R.H.D.) specs.)	3345-1*-00B

* : Indicates the printing location
E: Europe
0: Japan

WARNING

Servicing a vehicle can be dangerous. If you have not received service-related training, the risks of injury, property damage, and failure of servicing increase. The recommended servicing procedures for the vehicle in this workshop manual were developed with Mazda-trained technicians in mind. This manual may be useful to non-Mazda trained technicians, but a technician with our service-related training and experience will be at less risk when performing service operations. However, all users of this manual are expected to at least know general safety procedures.

This manual contains "Warnings" and "Cautions" applicable to risks not normally encountered in a general technician's experience. They should be followed to reduce the risk of injury and the risk that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that the "Warnings" and "Cautions" are not exhaustive. It is impossible to warn of all the hazardous consequences that might result from failure to follow the procedures.

The procedures recommended and described in this manual are effective methods of performing service and repair. Some require tools specifically designed for a specific purpose. Persons using procedures and tools which are not recommended by Mazda Motor Corporation must satisfy themselves thoroughly that neither personal safety nor safety of the vehicle will be jeopardized.

The contents of this manual, including drawings and specifications, are the latest available at the time of printing, and Mazda Motor Corporation reserves the right to change the vehicle designs and alter the contents of this manual without notice and without incurring obligation.

Parts should be replaced with genuine Mazda replacement parts or with parts which match the quality of genuine Mazda replacement parts. Persons using replacement parts of lesser quality than that of genuine Mazda replacement parts must satisfy themselves thoroughly that neither personal safety nor safety of the vehicle will be jeopardized.

Mazda Motor Corporation is not responsible for any problems which may arise from the use of this manual. The cause of such problems includes but is not limited to insufficient service-related training, use of improper tools, use of replacement parts of lesser quality than that of genuine Mazda replacement parts, or not being aware of any revision of this manual.

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GI

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HOW TO USE THIS MANUAL

HOW TO USE THIS MANUAL

RANGE OF TOPICS

B6E201000001101

- This manual indicates only changes/additions, as it is supplemental to the related materials. Therefore it may not contain the necessary reference service procedures to perform the service indicated in this manual.

VIN CODE

VIN CODE

VIN CODE

European (L.H.D. U.K.) specs.

B6E200800021101

GI

J	M	Z	GG	1	2	3	2	0	#	1	2	3	4	5	6	
																Serial No.
																0=Hiroshima
																1=Hofu
																Plant
																0
																3 to 9 (same as Model year-Israel)
																3=2003, 4=2004
																Dummy
																Dummy
																For Others (Israel etc.) : Model year
																Transaxle
																2=5MTX
																5=4ATX
																7=5ATX
																3=2.3L (L3)
																8=1.8L (L8)
																F=2.0L (LF)
																R=MZR-CD (RF-Turbo)-Hi
																T=MZR-CD (RF-Turbo)-Low
																Engine
																2=4SD
																4=5HB
																9=WAGON
																Body style
																8=4WD
																1=2WD
																Remarks
																GG=MAZDA6 (4SD, 5HB)
																GY=MAZDA6 (WAGON)
																Vehicle type
																World manufacturer identification
																JMZ=Europe (L.H.D. U.K.)

B6E2008W001

NEW STANDARDS

NEW STANDARDS

NEW STANDARDS TABLE

B6E202800020101

- The following is a comparison of the previous standard and the new standard.

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
AP	Accelerator Pedal	—	Accelerator Pedal	
ACL	Air Cleaner	—	Air Cleaner	
A/C	Air Conditioning	—	Air Conditioning	
BARO	Barometric Pressure	—	Atmospheric Pressure	
B+	Battery Positive Voltage	V _B	Battery Voltage	
—	Brake Switch	—	Stoplight Switch	
—	Calibration Resistor	—	Corrected Resistance	#6
CMP sensor	Camshaft Position Sensor	—	Crank Angle Sensor	
CAC	Charge Air Cooler	—	Intercooler	
CLS	Closed Loop System	—	Feedback System	
CTP	Closed Throttle Position	—	Fully Closed	
—	Closed Throttle Position Switch	—	Idle Switch	
CPP	Clutch Pedal Position	—	Clutch Position	
CIS	Continuous Fuel Injection System	EGL	Electronic Gasoline Injection System	
CS sensor	Control Sleeve Sensor	CSP sensor	Control Sleeve Position Sensor	#6
CKP sensor	Crankshaft Position Sensor	—	Crank Angle Sensor 2	
DLC	Data Link Connector	—	Diagnosis Connector	
DTM	Diagnostic Test Mode	—	Test Mode	#1
DTC	Diagnostic Trouble Code	—	Service Code(s)	
DI	Distributor Ignition	—	Spark Ignition	
DLI	Distributorless Ignition	—	Direct Ignition	
EI	Electronic Ignition	—	Electronic Spark Ignition	#2
ECT	Engine Coolant Temperature	—	Water Thermo	
EM	Engine Modification	—	Engine Modification	
—	Engine Speed Input Signal	—	Engine RPM Signal	
EVAP	Evaporative Emission	—	Evaporative Emission	
EGR	Exhaust Gas Recirculation	—	Exhaust Gas Recirculation	
FC	Fan Control	—	Fan Control	
FF	Flexible Fuel	—	Flexible Fuel	
4GR	Fourth Gear	—	Overdrive	
—	Fuel Pump Relay	—	Circuit Opening Relay	#3
FSO solenoid	Fuel Shut Off Solenoid	FCV	Fuel Cut Valve	#6
GEN	Generator	—	Alternator	
GND	Ground	—	Ground/Earth	
HO2S	Heated Oxygen Sensor	—	Oxygen Sensor	With heater
IAC	Idle Air Control	—	Idle Speed Control	
—	IDM Relay	—	Spill Valve Relay	#6
—	Incorrect Gear Ratio	—	—	
—	Injection Pump	FIP	Fuel Injection Pump	#6
—	Input/Turbine Speed Sensor	—	Pulse Generator	
IAT	Intake Air Temperature	—	Intake Air Thermo	
KS	Knock Sensor	—	Knock Sensor	
MIL	Malfunction Indicator Lamp	—	Malfunction Indicator Light	
MAP	Manifold Absolute Pressure	—	Intake Air Pressure	
MAF sensor	Mass Air Flow Sensor	—	Airflow Sensor	
MFI	Multiport Fuel Injection	—	Multiport Fuel Injection	
OBD	On Board Diagnostic	—	Diagnosis/Self Diagnosis	

NEW STANDARDS

New Standard		Previous Standard		Remark
Abbreviation	Name	Abbreviation	Name	
OL	Open Loop	—	Open Loop	
—	Output Speed Sensor	—	Vehicle Speed Sensor 1	
OC	Oxidation Catalytic Converter	—	Catalytic Converter	
O2S	Oxygen Sensor	—	Oxygen Sensor	
PNP	Park/Neutral Position	—	Park/Neutral Range	
—	PCM Control Relay	—	Main Relay	#6
PSP	Power Steering Pressure	—	Power Steering Pressure	
PCM	Powertrain Control Module	ECU	Engine Control Unit	#4
—	Pressure Control Solenoid	—	Line Pressure Solenoid Valve	
PAIR	Pulsed Secondary Air Injection	—	Secondary Air Injection System	Pulsed injection
—	Pump Speed Sensor	—	NE Sensor	#6
AIR	Secondary Air Injection	—	Secondary Air Injection System	Injection with air pump
SAPV	Secondary Air Pulse Valve	—	Reed Valve	
SFI	Sequential Multiport Fuel Injection	—	Sequential Fuel Injection	
—	Shift Solenoid A	—	1–2 Shift Solenoid Valve	
		—	Shift A Solenoid Valve	
—	Shift Solenoid B	—	2–3 Shift Solenoid Valve	
		—	Shift B Solenoid Valve	
—	Shift Solenoid C	—	3–4 Shift Solenoid Valve	
3GR	Third Gear	—	3rd Gear	
TWC	Three Way Catalytic Converter	—	Catalytic Converter	
TB	Throttle Body	—	Throttle Body	
TP sensor	Throttle Position Sensor	—	Throttle Sensor	
TCV	Timer Control Valve	TCV	Timing Control Valve	#6
TCC	Torque Converter Clutch	—	Lockup Position	
TCM	Transmission (Transaxle) Control Module	—	EC-AT Control Unit	
—	Transmission (Transaxle) Fluid Temperature Sensor	—	ATF Thermosensor	
TR	Transmission (Transaxle) Range	—	Inhibitor Position	
TC	Turbocharger	—	Turbocharger	
VSS	Vehicle Speed Sensor	—	Vehicle Speed Sensor	
VR	Voltage Regulator	—	IC Regulator	
VAF sensor	Volume Air Flow Sensor	—	Airflow Meter	
WU-TWC	Warm Up Three Way Catalytic Converter	—	Catalytic Converter	#5
WOT	Wide Open Throttle	—	Fully Open	

#1 : Diagnostic trouble codes depend on the diagnostic test mode.

#2 : Controlled by the PCM

#3 : In some models, there is a fuel pump relay that controls pump speed. That relay is now called the fuel pump relay (speed).

#4 : Device that controls engine and powertrain

#5 : Directly connected to exhaust manifold

#6 : Part name of diesel engine

ABBREVIATIONS

ABBREVIATIONS

ABBREVIATIONS TABLE

B6E203000011101

CAN	Controller Area Network
IDM	Injector Driver Module
KOEO	Key On Engine Off
KOER	Key Off Engine Running
OFF	Switch Off
ON	Switch On
PID	Parameter Identification
SW	Switch
TCV	Timer Control Valve
VBC	Variable Boost Control
VSC	Variable Swirl Control
WDS	Worldwide Diagnostic System

SCHEDULED MAINTENANCE

SCHEDULED MAINTENANCE

SCHEDULED MAINTENANCE TABLE

B6E203400013101

For Europe (L.H.D. U.K.)

Chart symbols:

I : Inspect and clean, repair, adjust, or replace if necessary.

R : Replace

C : Clean

Remarks:

- The ignition and fuel systems are highly important to the emission control system and to efficient engine operation. All inspections and adjustments must be made by an expert repairer, we recommend an Authorized Mazda Repairer.
 - After the described period, continue to follow the described maintenance at the recommended intervals.
 - Refer below for a description of items marked* in the maintenance chart.
- *1: If the vehicle is operated under any of the following conditions, change the engine oil and oil filter every 10,000 km (6,250 miles) or shorter.
- a. Driving in dusty conditions.
 - b. Extended periods of idling or low speed operation.
 - c. Driving for long period in cold temperatures or driving regularly at short distance only.
- *2: Also inspect and adjust the power steering and air conditioner drive belts, if installed.
- *3: If the brakes are used extensively (for example, continuous hard driving or mountain driving) or if the vehicle is operated in extremely humid climates, change the brake fluid annually.
- *4: If the vehicle is operated in very dusty or sandy areas, clean and if necessary, replace the air cleaner element more often than the recommended intervals.
- *5: Replacement of the timing belt is required at every 100,000 km (62,500 miles). Failure to replace the timing belt may result in damage to the engine.
- *6: Replacement of the timing belt is required at every 120,000 km (75,000 miles). Failure to replace the timing belt may result in damage to the engine.
- *7: If the vehicle is operated under any of the following conditions, change the rear differential oil every 45,000 km (27,000 miles).
- a. Towing a trailer or using a car - top carrier
 - b. Driving in dusty, sandy or wet condition
 - c. Extended periods of idling or low speed operation
 - d. Repeated short trips of less than 16 km (10 miles)
- *8: If this component has been submerged in water, the oil should be changed.

Maintenance Item	Maintenance Interval (Number of months or km (miles), whichever comes first)									
	Months	12	24	36	48	60	72	84	96	108
	×1000 km	20	40	60	80	100	120	140	160	180
	×1000 miles	12.5	25	37.5	50	62.5	75	87.5	100	112.5
GASOLINE ENGINE										
Engine valve clearance	Audible inspect every 120,000 km (75,000 miles), if noisy, adjust									
Spark plugs	Replace every 100,000 km (62,500 miles)									
Air cleaner element	*4			R			R			R
Evaporative system (if installed)				I			I			I
DIESEL ENGINE										
Engine valve clearance		I					I			
Engine timing belt	Finland, Sweden, Norway*5	Replace every 100,000 km (62,500 miles)								
	Others*6	Replace every 120,000 km (75,000 miles)								
Fuel filter				R			R			R
Fuel injection system		I		I			I			I
Air cleaner element	*4	C	C	R	C	C	R	C	C	R
E.G.R. system				I			I			I
GASOLINE and DIESEL ENGINE										
Engine oil	*1	R	R	R	R	R	R	R	R	R
Engine oil filter	*1	R	R	R	R	R	R	R	R	R
Drive belts	*2			I			I			I
Cooling system (including coolant level adjustment)			I		I		I		I	
Engine coolant		Replace at first 4 years or 100,000 km (62,500 miles); after that, every 2 years								

SCHEDULED MAINTENANCE

Maintenance Item	Maintenance Interval (Number of months or km (miles), whichever comes first)									
	Months	12	24	36	48	60	72	84	96	108
	×1000 km	20	40	60	80	100	120	140	160	180
	×1000 miles	12.5	25	37.5	50	62.5	75	87.5	100	112.5
Fuel lines & hoses			I		I		I		I	
Battery electrolyte level & specific gravity		I	I	I	I	I	I	I	I	I
Brake fluid	*3		R		R		R		R	
Brake lines, hoses & connections		I	I	I	I	I	I	I	I	I
Parking brake		I	I	I	I	I	I	I	I	I
Power brake unit & hoses		I	I	I	I	I	I	I	I	I
Disc brakes		I	I	I	I	I	I	I	I	I
Power steering fluid, lines, hoses, and connections		I	I	I	I	I	I	I	I	I
Steering operation & linkages			I		I		I		I	
Manual transaxle oil						R				
Automatic transaxle fluid level				I			I			I
Rear differential oil (for 4WD)		*7 8								
Transfer oil (for 4WD)		*8								
Front & rear suspension & ball joints			I		I		I		I	
Drive shaft dust boots			I		I		I		I	
Exhaust system and heat shields					I				I	
Cabin air filter (if installed) (pollen filter)			R		R		R		R	
Body condition (for rust, corrosion & perforation)		Inspect annually								
Tires (including spare tyre) (with inflation pressure adjustment)		I	I	I	I	I	I	I	I	I

Scheduled Maintenance Service (Specific Work Required)

- The specific work required for each maintenance item is listed in the following table. (Please refer to the section applicable to the model serviced.)

For Europe (L.H.D. U.K.)

Bold frames: New item

Maintenance Item	Specific Work Required
ENGINE	
Engine valve clearance	Measure clearance
Drive belts	Inspect for wear, cracks and fraying, and check tension. Replace drive belt.
Engine timing belt	Replace engine timing belt.
Engine oil	Replace engine oil and inspect for leakage.
Oil filter	Replace oil filter and inspect for leakage.
COOLING SYSTEM	
Cooling system (including coolant level adjustment)	Check coolant level and quality, and inspect for leakage.
Engine coolant	Replace coolant.
FUEL SYSTEM	
Air cleaner element	Inspect for dirt, oil and damage. Clean air cleaner element (by blowing air). Replace air cleaner element.
Fuel filter	Replace fuel filter.
Fuel lines & hoses	Inspect for cracks, leakage and loose connection.
Fuel injection system (for MZR-CD (RF Turbo))	Update to injection amount correction with WDS. (see W/M)
IGNITION SYSTEM (FOR GASOLINE)	
Spark plugs	Inspect for wear, damage, carbon, high-tension lead condition and measure plug gap. Replace spark plugs.
EMISSION CONTROL SYSTEM	
Evaporative system (for gasoline)	Check system operation (see W/M), vapor lines, vacuum fitting hoses and connection.
E.G.R. system (MZR-CR (RF Turbo))	Check system operation (see W/M), vacuum fitting hoses and connection. Update to MAF correction for E.G.R control with WDS. (see W/M)

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SCHEDULED MAINTENANCE

Maintenance Item	Specific Work Required
ELECTRICAL SYSTEM	
Battery electrolyte level & specific gravity	Check level and specific gravity.
CHASSIS & BODY	
Brake fluid	Check fluid level and inspect for leakage. Replace brake fluid.
Brake lines, hoses & connections	Inspect for cracks, damage, chafing, corrosion, scars, swelling and fluid leakage.
Parking brake	Check lever stroke.
Power brake unit & hoses	Check vacuum lines, connections and check valve for improper attachment, air tightness, cracks chafing and deterioration.
Disc brakes	Test for judder and noise. Inspect caliper for correct operation and fluid leakage, brake pads for wear. Check disc plate condition and thickness.
Power steering fluid & lines	Check fluid level and lines for improper attachment, leakage, cracks, damage, loose connections, chafing and deterioration.
Power steering fluid	Check fluid level.
Power steering system & hoses	Check lines for improper attachment, leakage, cracks, damage, loose connections, chafing and deterioration.
Steering operation & gear housing	Check that the steering wheel has the specified play. Be sure to check for changes, such as excessive play, hard steering or strange noises. Check gear housing and boots for looseness, damage and grease/gear oil leakage.
Steering linkages tie rod ends & arms	Check ball joint, dust cover and other components for looseness, wear, damage and grease leakage.
Front & rear suspension ball joints	Inspect for grease leakage, cracks, damage and looseness.
Manual transmission/transaxle oil	Check oil level and inspect for leakage. Replace manual transmission/transaxle oil.
Automatic transmission/transaxle fluid level	Check fluid level.
Rear differential oil	Check oil level and inspect for leakage. Replace rear differential oil.
Transfer oil (for 4x4)	Check oil level and inspect for leakage. Replace transfer oil.
Drive shaft dust boots	Inspect for grease leakage, cracks, damage and looseness.
Body condition (for rust, corrosion & perforation)	Inspect body surface for paint damage, rust, corrosion and perforation.
Exhaust system and heat shields	Inspect for damage, corrosion, looseness of connections and gas leakage.
Tires (including spare tire) (with inflation pressure adjustment)	Check air pressure and inspect tires for tread wear, damage and cracks; and wheels for damage and corrosion.
AIR CONDITIONER SYSTEM (IF EQUIPPED)	
Cabin air filter	Replace cabin air filter.

GI

FUEL AND EMISSION CONTROL SYSTEMS

[MZR-CD (RF Turbo)]

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NO.6 CRANKS NORMALLY BUT WILL NOT START.....	F2-209
NO.8 ENGINE RUNS ROUGH/ROLLING IDLE	F2-212
NO.10 LOW IDLE/STALLS DURING DECELERATION	F2-214
NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/LERK, HESITATION/STUMBLE.....	F2-217
NO.12 LACK/LOSS OF POWER- ACCELERATION/CRUISE.....	F2-220
NO.13 KNOCKING/PINGING	F2-224
NO.15 EMISSION COMPLIANCE	F2-227
NO.19 EXCESSIVE BLACK SMOKE.....	F2-230
ENGINE CONTROL SYSTEM OPERATION INSPECTION	F2-232

OUTLINE

OUTLINE

OUTLINE OF CONSTRUCTION

- The fuel and emission control system is essentially carried over from that of the previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine models, except for the following features. (See Mazda6 Workshop Manual Supplement 1749-1*-02G.)

B6E400218881101

FEATURES

Improved Emission Performance

- A EGR valve position sensor has been adopted.

B6E400218881102

Improved Serviceability

- The number of DTCs has been increased to provide more detail information.
- The DTC troubleshooting procedures have been renewed due to the adoption of the diagnostic test mode and OBD drive mode.
- The PID item has been added.
- The simulation item has been added.

F2

SPECIFICATIONS

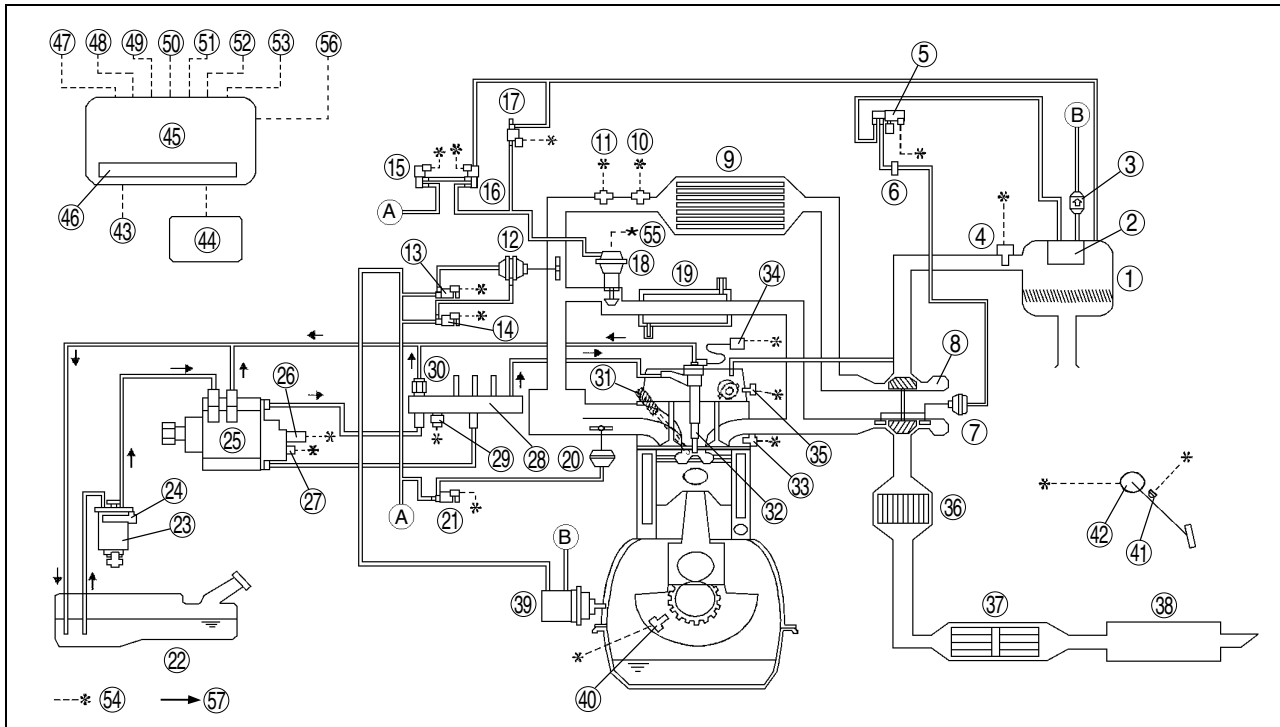
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Item		New Mazda6 (GG, GY)	Previous Mazda6 (GG, GY)
		MZR-CD (RF Turbo)	
Air cleaner element	Type	Non woven fabric (dry)	
Supercharger	Type	Turbocharger	
Glow plug	Type	Metal	
Pump	Type	Supply pump	
Fuel tank	Capacity (L {US gal, Imp gal})	64 {17, 14}	
Catalyst	Type	Warm up oxidation catalyst, Oxidation catalyst	
EGR control	Type	Duty control	
PCV system	Type	Closed	

OUTLINE

CONTROL SYSTEM DIAGRAM

B6E400218881104



B6E4002W002

1	Air cleaner
2	Vacuum chamber
3	VBC check valve
4	MAF/IAT sensor
5	VBC solenoid valve
6	Vacuum damper
7	Guide blade actuator
8	Turbocharger
9	Charge air cooler
10	IAT sensor No.2
11	Boost sensor
12	Intake shutter valve actuator
13	Intake shutter solenoid valve (half)
14	Intake shutter solenoid valve (full)
15	EGR solenoid valve (vacuum)
16	EGR solenoid valve (vent)
17	EGR control solenoid valve
18	EGR valve
19	EGR water cooler
20	VSC valve actuator
21	VSC solenoid valve
22	Fuel tank
23	Fuel filter
24	Fuel warmer
25	Supply pump
26	Suction control valve
27	Fuel temperature sensor
28	Common rail
29	Fuel pressure sensor
30	Fuel pressure limiter

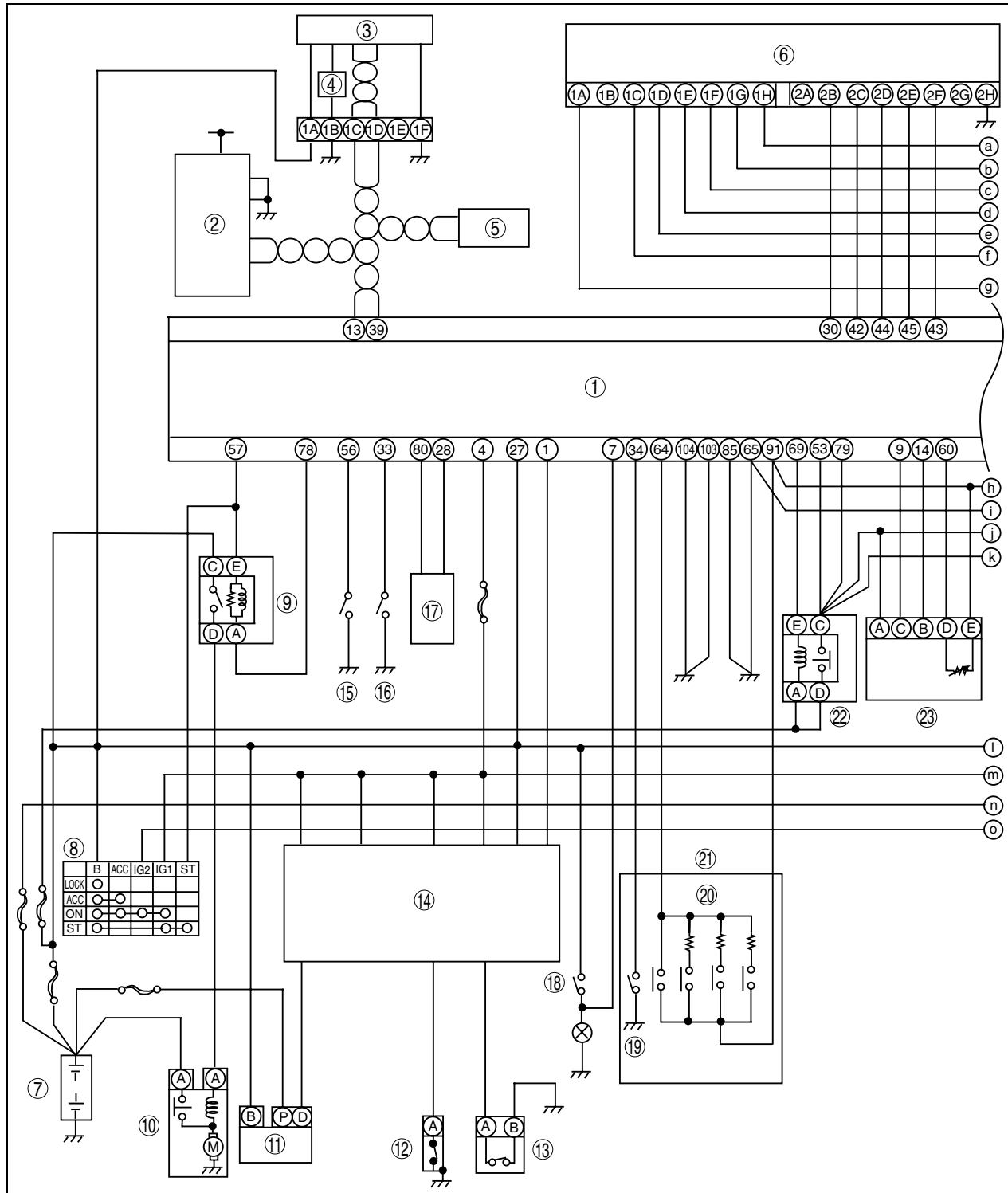
OUTLINE

31	Glow plug
32	Fuel injector
33	ECT sensor
34	Calibration resistor
35	CMP sensor
36	Warm up oxidation catalytic converter
37	Oxidation catalytic converter
38	Silencer
39	Vacuum pump
40	CKP sensor
41	Idle switch
42	APP sensor
43	Glow plug relay
44	IDM
45	PCM
46	BARO sensor
47	PCM control relay
48	Engine switch
49	Starter (starter signal)
50	Neutral switch
51	Clutch switch
52	A/C switch
53	CAN bus
54	To PCM
55	EGR valve position sensor
56	DLC-2
57	Fuel flow

OUTLINE

CONTROL SYSTEM WIRING DIAGRAM

B6E400218881105



A6E40022002

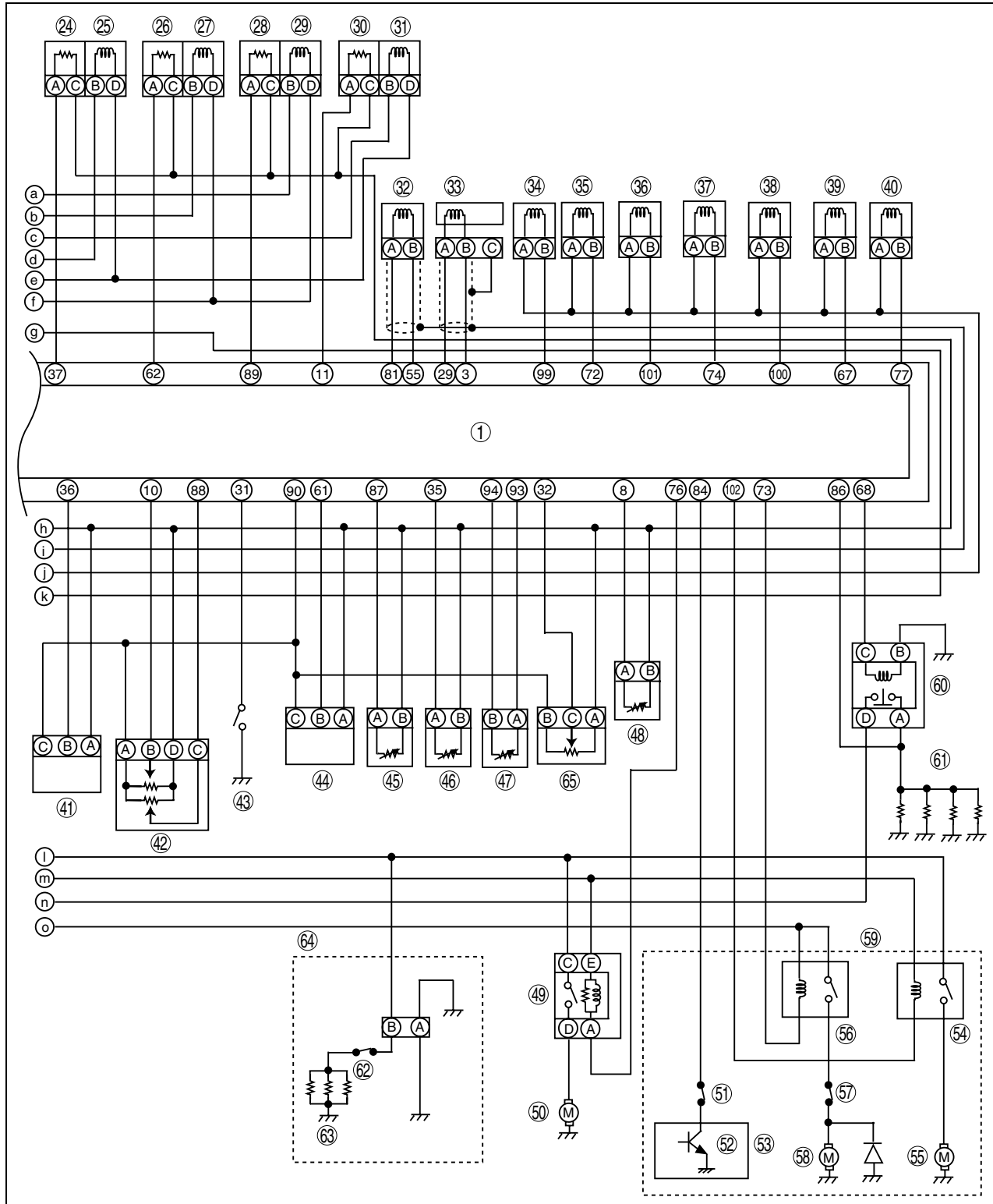
1	PCM
2	DLC-2
3	Water heater unit
4	Fuel pump
5	Other unit
6	IDM

7	Battery
8	Engine switch
9	Starter relay
10	Starter
11	Generator
12	Oil pressure switch

OUTLINE

13	Sedimentor switch
14	Instrument cluster
15	Neutral switch
16	Clutch switch
17	Coil
18	Brake switch
19	Brake switch 2
20	Cruise control switch
21	With cruise control system
22	PCM control relay
23	MAF/IAT sensor

OUTLINE



B6E4002W001

24	Calibration resistor No.1
25	Fuel injector No.1
26	Calibration resistor No.2
27	Fuel injector No.2
28	Calibration resistor No.3
29	Fuel injector No.3

OUTLINE

30	Calibration resistor No.4
31	Fuel injector No.4
32	CMP sensor
33	CKP sensor
34	EGR solenoid valve (vacuum)
35	EGR solenoid valve (vent)
36	VSC solenoid valve
37	Intake shutter solenoid valve (half)
38	Intake shutter solenoid valve (full)
39	VBC solenoid valve
40	EGR control solenoid valve
41	Boost sensor
42	APP sensor
43	Idle switch
44	Fuel pressure sensor
45	ECT sensor
46	Fuel temperature sensor
47	Suction control valve
48	IAT sensor No.2
49	Cooling fan relay No.2
50	Cooling fan No.1
51	Refrigerant pressure switch (middle)
52	A/C switch
53	A/C amplifier
54	Cooling fan relay No.1
55	Cooling fan No.2
56	A/C relay
57	Refrigerant pressure switch (HI and LO)
58	Magnetic clutch
59	With A/C
60	Glow plug relay
61	Glow plug
62	Vacuum switch
63	Fuel warmer
64	With fuel warmer
65	EGR valve position sensor

CONTROL SYSTEM

CONTROL SYSTEM

CONTROL SYSTEM OUTLINE

B6E404018881101

- The control system is essentially carried over from that of the previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine models. (See Mazda6 Workshop Manual Supplement 1749-1*-02G.)

Input Device

×:Applicable –: Not applicable

Item	New Mazda6 (GG, GY)	Previous Mazda6 (GG, GY)	Remark for new model
	MZR-CD (RF Turbo)		
Battery	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Starter (starter signal)	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Starter relay	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Clutch switch	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Neutral switch	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Brake switch	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Idle switch	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
A/C switch	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Refrigerant pressure switch	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Cruise control switch	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Accelerator position sensor	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
MAF/IAT sensor	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
IAT sensor No.2	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
ECT sensor	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Fuel temperature sensor	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
BARO sensor (integrated in PCM)	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Boost sensor	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Fuel pressure sensor	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
CMP sensor	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
CKP sensor	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
VSS	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Calibration resistor	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Immobilizer unit (integrated in PCM)	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
EGR valve position sensor	×	—	Same function as previous Mazda PREMACY (CP) RF Turbo engine model

CONTROL SYSTEM

Output Device

×:Applicable –: Not applicable

Item	New Mazda6 (GG, GY)	Previous Mazda6 (GG, GY)	Remark for new model
	MZR-CD (RF Turbo)		
Suction control valve	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
IDM	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
VSC solenoid valve	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
VBC solenoid valve	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
EGR control solenoid valve	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
EGR solenoid valve (vacuum)	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
EGR solenoid valve (vent)	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Intake shutter solenoid valve (half)	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Intake shutter solenoid valve (full)	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Glow indicator light	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Cruise main indicator light	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Cruise set indicator light	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Glow plug relay	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Cooling fan relay No.1	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Cooling fan relay No.2	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
A/C relay	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model

F2

Control System

×:Applicable –: Not applicable

Item	New Mazda6 (GG, GY)	Previous Mazda6 (GG, GY)	Remark for new model
	MZR-CD (RF Turbo)		
Idle speed control	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Glow control	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
VSC	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Boost pressure control	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Fuel injection amount control	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Fuel injection timing control	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Multiple fuel injection control	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Fuel pressure control	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model

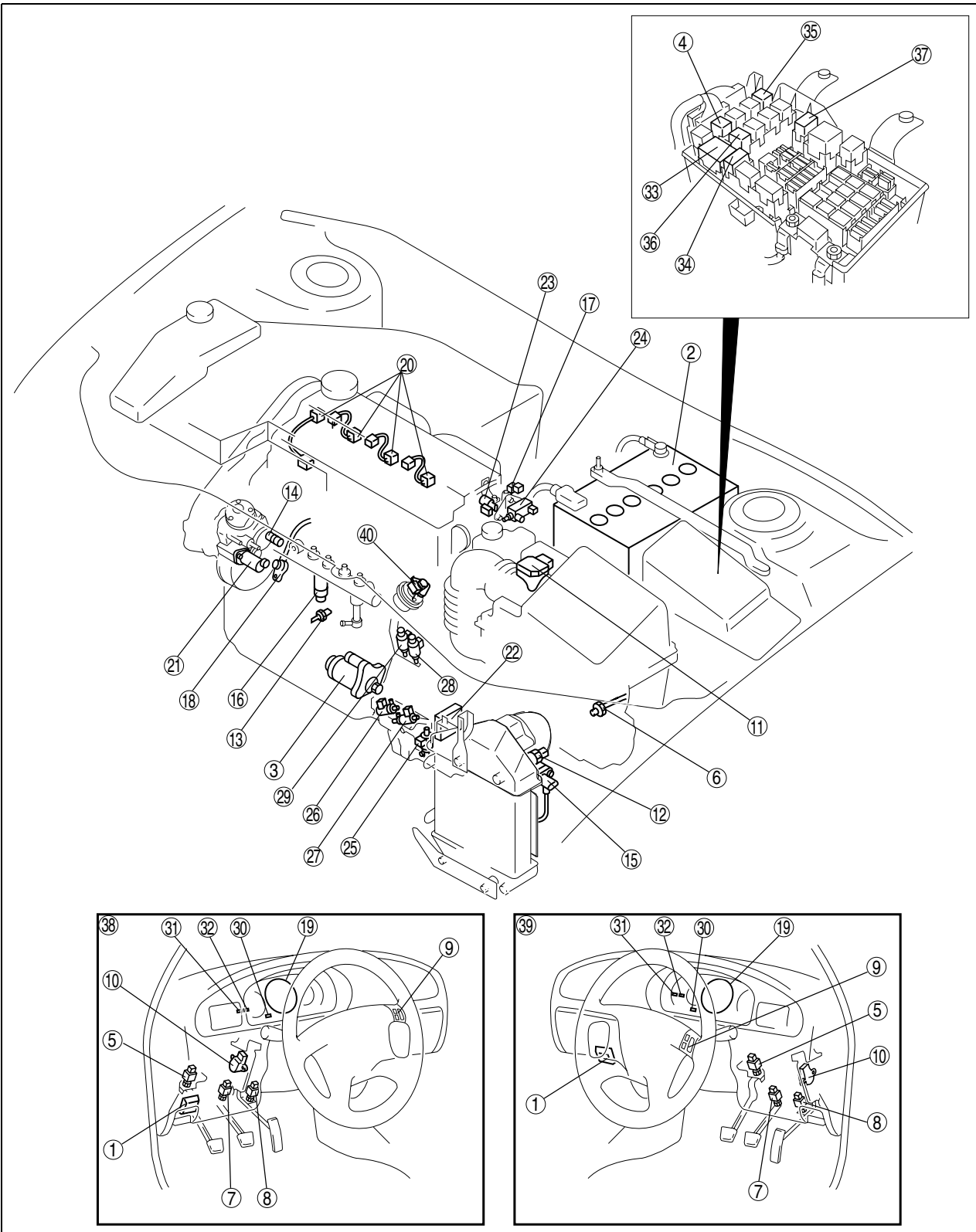
CONTROL SYSTEM

Item	New Mazda6 (GG, GY)	Previous Mazda6 (GG, GY)	Remark for new model
	MZR-CD (RF Turbo)		
EGR control	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Cruise control system	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Electrical fan control	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
A/C cut-off control	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model
Immobilizer system	×		Same function as previous Mazda6 (GG, GY) MZR-CD (RF Turbo) engine model

CONTROL SYSTEM

STRUCTURAL VIEW

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F2

B6E4040W001

1	PCM (with built-in BARO sensor and immobilizer unit)
2	Battery
3	Starter

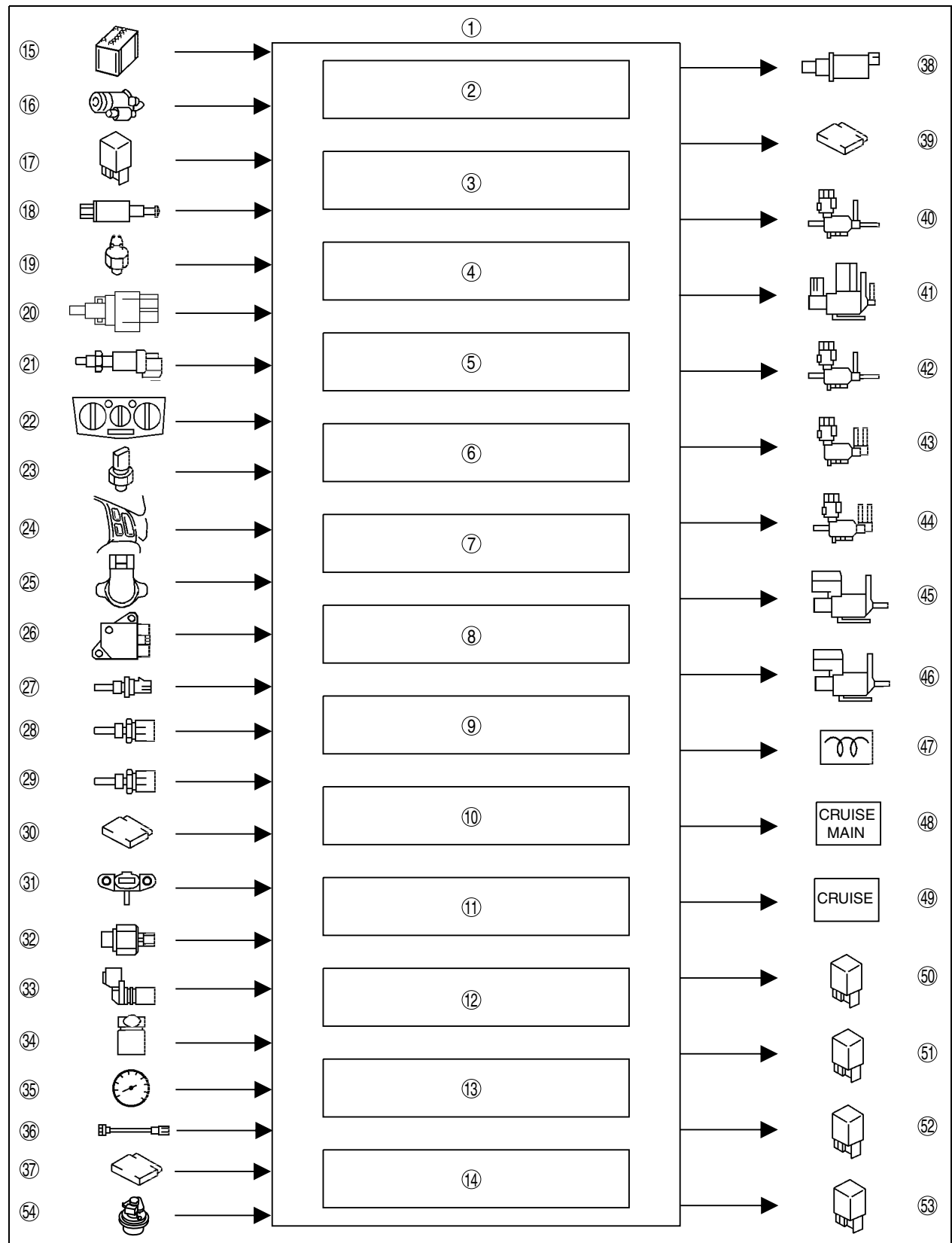
CONTROL SYSTEM

4	Starter relay
5	Clutch switch
6	Neutral switch
7	Brake switch
8	Idle switch
9	Cruise control switch
10	Accelerator position sensor
11	MAF/IAT sensor
12	IAT sensor No.2
13	ECT sensor
14	Fuel temperature sensor
15	Boost sensor
16	Fuel pressure sensor
17	CMP sensor
18	CKP sensor
19	VSS
20	Calibration resistor
21	Suction control valve
22	IDM
23	VSC solenoid valve
24	VBC solenoid valve
25	EGR control solenoid valve
26	EGR solenoid valve (vacuum)
27	EGR solenoid valve (vent)
28	Intake shutter solenoid valve (half)
29	Intake shutter solenoid valve (full)
30	Glow indicator light
31	Cruise main indicator light
32	Cruise set indicator light
33	Glow plug relay
34	Cooling fan relay No.1
35	Cooling fan relay No.2
36	A/C relay
37	PCM control relay
38	L.H.D.
39	R.H.D.
40	EGR valve position sensor

CONTROL SYSTEM

BLOCK DIAGRAM

B6E404018881103



F2

1	PCM
2	Idle speed control

B6E4040W002

CONTROL SYSTEM

3	Glow control
4	VSC
5	Boost pressure control
6	Fuel injection amount control
7	Fuel injection timing control
8	Multiple fuel injection control
9	Fuel pressure control
10	EGR control
11	Cruise control system
12	Electrical fan control
13	A/C cut-off control
14	Immobilizer system
15	Battery
16	Starter (starter signal)
17	Starter relay
18	Clutch switch
19	Neutral switch
20	Brake switch
21	Idle switch
22	A/C switch
23	Refrigerant pressure switch
24	Cruise control switch
25	Accelerator position sensor
26	MAF/IAT sensor
27	IAT sensor No.2
28	ECT sensor
29	Fuel temperature sensor
30	BARO sensor (integrated in PCM)
31	Boost sensor
32	Fuel pressure sensor
33	CMP sensor
34	CKP sensor
35	VSS
36	Calibration resistor
37	Immobilizer unit (integrated in PCM)
38	Suction control valve
39	IDM
40	VSC solenoid valve
41	VBC solenoid valve
42	EGR control solenoid valve
43	EGR solenoid valve (vacuum)
44	EGR solenoid valve (vent)
45	Intake shutter solenoid valve (half)
46	Intake shutter solenoid valve (full)
47	Glow indicator light
48	Cruise main indicator light
49	Cruise set indicator light
50	Glow plug relay
51	Cooling fan relay No.1
52	Cooling fan relay No.2
53	A/C relay
54	EGR valve position sensor

CONTROL SYSTEM

CONTROL DEVICE AND CONTROL RELATIONSHIP CHART

B6E404018881104

×: Applicable

Item	Idle speed control	Glow control	VSC	Boost pressure control	Fuel injection amount control	Fuel injection timing control	Multiple fuel injection control	Fuel pressure control	EGR control	Cruise control system	Electrical fan control	A/C cut-off control	Immobilizer system
Input device													
Battery				×							×		
Starter (starter signal)	×	×	×	×	×	×	×	×	×			×	
Starter relay	×	×	×	×	×	×	×	×	×			×	
Clutch switch	×		×		×	×	×		×	×		×	
Neutral switch	×		×		×	×	×		×	×		×	
Brake switch										×			
Idle switch	×		×		×	×	×		×			×	
A/C switch	×				×				×		×	×	
Refrigerant pressure switch	×				×				×		×	×	
Cruise control switch										×			
Accelerator position sensor	×		×	×	×		×		×		×	×	
MAF/IAT sensor			×			×	×	×	×				
IAT sensor No.2					×		×						
ECT sensor	×	×	×		×	×	×	×	×		×	×	
Fuel temperature sensor							×						
BARO sensor (integrated in PCM)				×				×	×				
Boost sensor		×		×	×				×				
Fuel pressure sensor					×	×		×	×				
CMP sensor			×	×	×	×	×						
CKP sensor	×		×	×	×	×	×	×	×			×	
VSS	×	×	×		×	×	×		×	×			
Calibration resistor					×		×						
Immobilizer unit (integrated in PCM)													×
EGR valve position sensor									×				
Output device													
Suction control valve								×					×
IDM	×				×	×	×			×			×
VSC solenoid valve			×										
VBC solenoid valve				×									
EGR control solenoid valve									×				
EGR solenoid valve (vacuum)									×				
EGR solenoid valve (vent)									×				
Intake shutter solenoid valve (half)									×				
Intake shutter solenoid valve (full)									×				
Glow indicator light		×											
Cruise main indicator light										×			
Cruise set indicator light										×			
Glow plug relay		×											
Cooling fan relay No.1											×		
Cooling fan relay No.2											×		
A/C relay												×	

F2

ON-BOARD DIAGNOSTIC

ON-BOARD DIAGNOSTIC

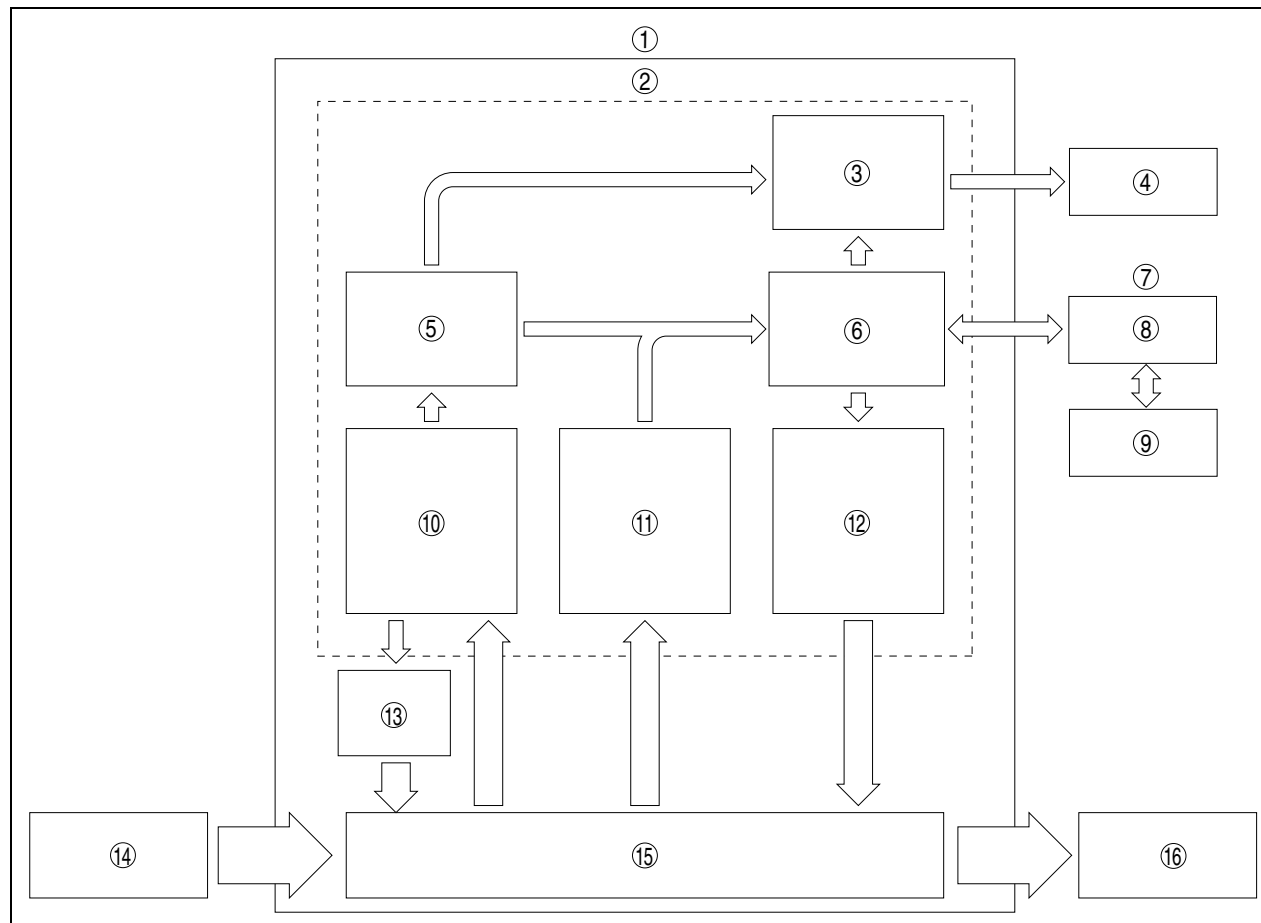
ON-BOARD DIAGNOSTIC OUTLINE

B6E407000102101

Features

To meet the EOBD regulations	Diagnostic test modes adopted
Improved serviceability	- DTC troubleshooting modified - PID/DATA monitor items added - Simulation items added - OBD drive mode adopted

Block Diagram



BHE0102T001

1	PCM
2	OBD system
3	Malfunction indication function
4	MIL
5	Memory function
6	Tester communication function
7	DLC-2
8	CAN

9	WDS or equivalent
10	Detection function
11	PID data monitor function
12	Simulation test function
13	Fail-safe function
14	Input device
15	Engine control system
16	Output device

DIAGNOSTIC TEST MODE

- To meet EOBD regulations, the following diagnostic test modes have been adopted.

B6E407000102102

ON-BOARD DIAGNOSTIC

Diagnostic test mode	Item
Mode 01	Sending diagnostic data (PID data monitor/On-board system readiness test)
Mode 02	Sending freeze frame data
Mode 03	Sending emission-related malfunction code (DTC)
Mode 04	Clearing/resetting emission-related malfunction information
Mode 07	Sending continuous monitoring system test results (pending code)
Mode 09	Request vehicle information

Sending Diagnostic Data

PID data monitor

- The PID data monitor items are shown below.

PID data monitor table

—: Not applicable

Full names	Unit	
Monitor status since DTCs cleared	—	
Calculated LOAD value	%	
Engine coolant temperature	°C	°F
Intake manifold absolute pressure	kPa	
Engine speed	rpm	
Vehicle speed	km/h	mph
Intake air temperature	°C	°F
Air flow rate from mass air flow sensor	g/s	
OBD requirement according to vehicle design	—	
Distance travelled while MIL is activated	km	miles
Fuel rail pressure	kPa	

F2

Sending Freeze Frame Data

- The Freeze Frame Data monitor items are shown below.

Freeze Frame Data monitor table

—: Not applicable

Full names	Unit	
DTC that caused required Freeze Frame Data storage	—	
Calculated LOAD value	%	
Engine coolant temperature	°C	°F
Intake manifold absolute pressure	kPa	
Engine speed	rpm	
Vehicle speed	km/h	mph
Intake air temperature	°C	°F
Air flow rate from mass air flow sensor	g/s	
Fuel rail pressure	kPa	

Sending Emission-related Malfunction Code

- The DTCs are shown below.

ON-BOARD DIAGNOSTIC

DTC Table

DTC No.	Condition	MIL	DC	Memory function
P0016	Crankshaft position-camshaft position correlation malfunction	OFF	2	×
P0045	Variable boost control (VBC) solenoid valve control circuit low input	ON	2	×
P0088	Fuel pressure system too high	—	—	×
P0093	Fuel system leak detection	ON	1	×
P0096	Intake air temperature (IAT) sensor No.2 range/performance problem	ON	2	×
P0097	Intake air temperature (IAT) sensor No.2 circuit low input	ON	1	×
P0098	Intake air temperature (IAT) sensor No.2 circuit high input	ON	1	×
P0101	Mass air flow (MAF) sensor range/performance problem	ON	2	×
P0102	Mass air flow (MAF) sensor circuit low input	ON	1	×
P0103	Mass air flow (MAF) sensor circuit high input	ON	1	×
P0106	Boost sensor range/performance problem	ON	2	×
P0107	Boost sensor circuit low input	ON	1	×
P0108	Boost sensor circuit high input	ON	1	×
P0111	Intake air temperature (IAT) sensor No.1 range/performance problem	ON	2	×
P0112	Intake air temperature (IAT) sensor No.1 circuit low input	ON	1	×
P0113	Intake air temperature (IAT) sensor No.1 circuit high input	ON	1	×
P0116	Engine coolant temperature (ECT) sensor range/performance problem	ON	2	×
P0117	Engine coolant temperature (ECT) sensor circuit low input	ON	1	×
P0118	Engine coolant temperature (ECT) sensor circuit high input	ON	1	×
P0122	Accelerator pedal position (APP) sensor No.1 circuit low input	ON	1	×
P0123	Accelerator pedal position (APP) sensor No.1 circuit high input	ON	1	×
P0182	Fuel temperature sensor circuit low input	ON	1	×
P0183	Fuel temperature sensor circuit high input	ON	1	×
P0191	Fuel pressure sensor range/performance problem	OFF	2	×
P0192	Fuel pressure sensor circuit low input	ON	1	×
P0193	Fuel pressure sensor circuit high input	ON	1	×
P0200	Fuel injector operation identified	ON	1	×
P0201	Fuel injector No.1 operation identified	ON	1	×
P0202	Fuel injector No.2 operation identified	ON	1	×
P0203	Fuel injector No.3 operation identified	ON	1	×
P0204	Fuel injector No.4 operation identified	ON	1	×
P0222	Accelerator pedal position (APP) sensor No.2 circuit low input	ON	1	×
P0223	Accelerator pedal position (APP) sensor No.2 circuit high input	ON	1	×
P0225	Idle switch circuit malfunction	ON	2	×
P0301	Cylinder No.1 misfire detection	ON	1	×
P0302	Cylinder No.2 misfire detection	ON	1	×
P0303	Cylinder No.3 misfire detection	ON	1	×
P0304	Cylinder No.4 misfire detection	ON	1	×
P0336	CKP sensor range/performance problem	OFF	2	×
P0337	CKP sensor circuit low input	ON	1	×
P0341	CMP sensor range/performance problem	OFF	2	×
P0342	CMP sensor circuit low input	ON	1	×
P0401	EGR flow insufficient detected	ON	2	×
P0402	EGR flow excessive detected	ON	2	×
P0404	EGR valve stuck	ON	2	×
P0406	EGR valve position sensor circuit high input	ON	1	×
P0489	EGR solenoid valve (vacuum) control circuit low input	ON	2	×
P0490	EGR solenoid valve (vacuum) control circuit high input	ON	2	×
P0500	Vehicle speed signal problem	ON	2	×
P0504	Brake switch signal correlation malfunction	OFF	2	×
P0512	Engine switch circuit high input	ON	1	×
P0562	Battery voltage low input	ON	1	×
P0563	Battery voltage high input	ON	1	×

ON-BOARD DIAGNOSTIC

DTC No.	Condition	MIL	DC	Memory function
P0564	Cruise control signal malfunction	OFF	2	×
P0602	PCM programming error	ON	1	×
P0606	PCM malfunction	ON	1	×
P0610	Control module vehicle options error	ON	1	×
P0627	Suction control valve circuit open	ON	1	×
P0628	Suction control valve circuit low input	ON	1	×
P0629	Suction control valve circuit high input	ON	1	×
P0661	Intake shutter solenoid valve (half) circuit low input	ON	2	×
P0662	Intake shutter solenoid valve (half) circuit high input	ON	2	×
P0664	Intake shutter solenoid valve (full) circuit voltage low input	ON	2	×
P0665	Intake shutter solenoid valve (full) circuit voltage high input	ON	2	×
P0704	Clutch switch circuit malfunction	ON	2	×
P0850	Neutral switch circuit malfunction	ON	2	×
P1190	Calibration resistor circuit malfunction	ON	2	×
P1211	Fuel pressure higher or lower than desired pressure	ON	2	×
P1391	Glow plug circuit low input	OFF	2	×
P1392	Glow plug circuit high input	OFF	2	×
P2009	Variable swirl control (VSC) solenoid valve circuit high input	ON	2	×
P2010	Variable swirl control (VSC) solenoid valve circuit low input	ON	2	×
P2135	Accelerator pedal position (APP) sensor No.1/No.2 voltage correlation	ON	1	×
P2136	Accelerator pedal position (APP) sensor No.1/idle switch correlation	ON	1	×
P2141	EGR solenoid valve (vent) circuit low input	ON	2	×
P2142	EGR solenoid valve (vent) circuit high input	ON	2	×
P2144	EGR solenoid valve circuit low input	ON	2	×
P2145	EGR solenoid valve circuit high input	ON	2	×
P2146	Fuel injector No.1/No.4 circuit malfunction	ON	1	×
P2149	Fuel injector No.2/No.3 circuit malfunction	ON	1	×
P2227	BARO sensor range/performance problem	ON	2	×
P2228	BARO sensor circuit low input	ON	1	×
P2229	BARO sensor circuit high input	ON	1	×

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Sending Continuous Monitoring System Test Results

- These appear when a problem is detected in a monitored system.

1-drive cycle type

- If any problems are detected in the first drive cycle, pending codes will be stored in the PCM memory, as well as DTCs.
- After pending codes are stored, if the PCM determines that the system is normal in any future drive cycle, the PCM deletes the pending codes.

2-drive cycle type

- The code for a failed system is stored in the PCM memory in the first drive cycle. If the problem is not found in the second drive cycle, the PCM determines that the system returned to normal or the problem was mistakenly detected, and deletes the pending code. If the problem is found in the second drive cycle too, the PCM determines that the system has failed, and stores the pending codes, and the DTCs.
- After pending codes are stored, if the PCM determines that the system is normal in any future drive cycle, the PCM deletes the pending codes.

DTC DETECTION LOGIC AND CONDITIONS

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P0016 Crankshaft position-camshaft position correlation malfunction

- The PCM monitors the input signals from the CKP sensor and CMP sensor while engine is running. If the input signals from the CKP sensor and the CMP sensor do not correspond, the PCM determines that there is a correlation malfunction between crankshaft and camshaft position.

P0045 Variable boost control (VBC) solenoid valve control circuit low input

- The PCM monitors the output signal when the PCM controls the variable boost control solenoid valve **between 30 and 70%**. If the current of the variable boost control solenoid valve is **less than 0.8 A** during variable boost control solenoid valve control, the PCM determines that there is a malfunction in the variable boost control solenoid valve control circuit.

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ON-BOARD DIAGNOSTIC

P0088 Fuel pressure system too high

- The PCM monitors the fuel pressure in the common rail from the fuel pressure sensor while the engine running. If the fuel pressure is **more than 188 MPa {1,917 kgf/cm², 27,267 psi}**, the PCM determines that the fuel pressure is too high.

P0093 Fuel system leak detection

- The PCM monitors the fuel pressure in the common rail from the fuel pressure sensor while the engine running. If the fuel pressure is lower after the fuel injection than the preprogrammed criteria, the PCM determines fuel system leakage.

P0096 Intake air temperature (IAT) sensor No.2 range/performance problem

- The PCM monitors the input signal from intake air temperature sensor No.2. If the difference between the maximum and minimum value of the intake air temperature sensor No.2 is **less than 1 °C {1.8 °F}**, the PCM determines that there is a malfunction in intake air temperature sensor No.2.

P0097 Intake air temperature (IAT) sensor No.2 circuit low input

- The PCM monitors the input signal from intake air temperature sensor No.2. If the voltage from intake air temperature sensor No.2 is **less than 0.14 V**, the PCM determines that there is a malfunction in the intake air temperature sensor No.2 circuit.

P0098 Intake air temperature (IAT) sensor No.2 circuit high input

- The PCM monitors the input signal from intake air temperature sensor No.2. If the voltage from intake air temperature sensor No.2 is **more than 4.92 V**, the PCM determines that there is a malfunction in the intake air temperature sensor No.2 circuit.

P0101 Mass air flow (MAF) sensor range/performance problem

- The PCM monitors the input signal from the mass air flow sensor when the engine speed is **between 600 rpm and 2,100 rpm**. If the voltage characteristic of the air flow sensor signal is out of the threshold, the PCM determines that there is a malfunction in the mass air flow sensor.

P0102 Mass air flow (MAF) sensor circuit low input

- The PCM monitors the input signal from the air flow sensor. If the voltage from the air flow sensor is **less than 0.15 V**, the PCM determines that there is a malfunction in the air flow sensor circuit.

P0103 Mass air flow (MAF) sensor circuit high input

- The PCM monitors the input signal from the air flow sensor. If the voltage from the air flow sensor is **more than 4.9 V**, the PCM determines that there is a malfunction in the intake air temperature sensor No. 2 circuit.

P0106 Boost sensor range/performance problem

- The PCM monitors the vacuum inside the intake manifold. If the difference of the vacuum inside the intake manifold during middle engine speed and low engine speed is less than the threshold, the PCM determines that there is a malfunction in the manifold absolute pressure sensor characteristic.

P0107 Boost sensor circuit low input

- The PCM monitors the input signal from the manifold absolute pressure. If the voltage from the manifold absolute pressure sensor is **less than 0.4 V**, the PCM determines that there is a malfunction in the manifold absolute pressure sensor circuit.

P0108 Boost sensor circuit high input

- The PCM monitors the input signal from the manifold absolute pressure sensor. If the voltage from the manifold absolute pressure sensor is **more than 4.8 V**, the PCM determines that there is a malfunction in the manifold absolute pressure sensor circuit.

P0111 Intake air temperature (IAT) sensor No.1 range/performance problem

- The PCM monitors the input signal from intake air temperature sensor No.1. If the difference between the maximum and minimum value of the intake air temperature sensor No.1 is **less than 1 °C {1.8 °F}**, the PCM determines that there is a malfunction in intake air temperature sensor No.1.

P0112 Intake air temperature (IAT) sensor No.1 circuit low input

- The PCM monitors the input signal from intake air temperature sensor No.1. If the voltage from intake air temperature sensor No.1 is **less than 0.14 V**, the PCM determines that there is a malfunction in the intake air temperature sensor No.1 circuit.

P0113 Intake air temperature (IAT) sensor No.1 circuit high input

- The PCM monitors the input signal from intake air temperature sensor No.1. If the voltage from intake air temperature sensor No.1 is **more than 4.92 V**, the PCM determines that there is a malfunction in the intake air temperature sensor No.1 circuit.

P0116 Engine coolant temperature (ECT) sensor range/performance problem

- The PCM monitors the input signal from the engine coolant temperature sensor. If the difference between the maximum and minimum value of the engine coolant temperature is **less than 3 °C {5.4 °F}**, the PCM determines that there is a malfunction in the engine coolant temperature sensor characteristic.

P0117 Engine coolant temperature (ECT) sensor circuit low input

- The PCM monitors the input signal from the engine coolant temperature sensor. If the voltage from the engine coolant temperature sensor is **less than 0.14 V**, the PCM determines that there is a malfunction in the engine coolant temperature sensor circuit.

P0118 Engine coolant temperature (ECT) sensor circuit high input

- The PCM monitors the input signal from the engine coolant temperature sensor. If the voltage from the engine coolant temperature sensor is **more than 4.92 V**, the PCM determines that there is a malfunction in the engine

coolant temperature sensor circuit.

P0122 Accelerator pedal position (APP) sensor No.1 circuit low input

- The PCM monitors the input signal from accelerator pedal position sensor No.1. If the voltage from accelerator pedal position sensor No.1 is **less than 0.3 V**, the PCM determines that there is a malfunction in the accelerator pedal position sensor No.1 circuit.

P0123 Accelerator pedal position (APP) sensor No.1 circuit high input

- The PCM monitors the input signal from accelerator pedal position sensor No.1. If the voltage from accelerator pedal position sensor No.1 is **more than 4.7 V**, the PCM determines that there is a malfunction in the accelerator pedal position sensor No.1 circuit.

P0182 Fuel temperature sensor circuit low input

- The PCM monitors the input signal from the fuel temperature sensor. If the voltage from the fuel temperature sensor is **less than 0.14 V**, the PCM determines that there is a malfunction in the fuel temperature sensor circuit.

P0183 Fuel temperature sensor circuit high input

- The PCM monitors the input signal from the fuel temperature sensor. If the voltage from the fuel temperature sensor is **more than 4.92 V**, the PCM determines that there is a malfunction in the fuel temperature sensor circuit.

P0191 Fuel pressure sensor range/performance problem

- The PCM monitors the fuel pressure in the common rail and input signal from the fuel pressure sensor while the engine is running. If any one of the following conditions is met, the PCM determines that there is malfunction in the fuel pressure sensor range/performance problem.
 - The PCM calculates the difference between the actual fuel pressure and the target fuel pressure. If the pressure difference **more than 2 MPa {20 kgf/cm², 290 psi}**, the PCM determines that there is a malfunction in fuel pressure sensor range/performance problem.
 - The PCM monitors the input signal from fuel pressure sensor. If the difference between the maximum and minimum value of the fuel pressure sensor is **less than 0.015 V**, the PCM determines that there is a malfunction in fuel pressure sensor range/performance problem.

P0192 Fuel pressure sensor circuit low input

- PCM monitors input voltage from fuel pressure sensor while engine is running. If input voltage from fuel pressure sensor is **less than 0.4 V**, PCM determines fuel pressure sensor circuit low input.

P0193 Fuel pressure sensor circuit high input

- PCM monitors input voltage from fuel pressure sensor while engine is running. If input voltage from fuel pressure sensor is **more than 4.86 V**, PCM determines fuel pressure sensor circuit high input.

P0200 Fuel injector operation identified

- The PCM monitors each cylinder injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for unspecified cylinder normally, the PCM determines that the unspecified cylinder fuel injector operation is not verified.

P0201 Fuel injector No.1 operation identified

- The PCM monitors each cylinder injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.1 cylinder normally, PCM determines that the fuel injector No.1 operation is not verified.

P0202 Fuel injector No.2 operation identified

- The PCM monitors each cylinder injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.2 cylinder normally, the PCM determines that the fuel injector No.2 operation is not verified.

P0203 Fuel injector No.3 operation identified

- The PCM monitors each cylinder's injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.3 cylinder normally, the PCM determines that the fuel injector No.3 operation is not verified.

P0204 Fuel injector No.4 operation identified

- The PCM monitors each cylinder injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.4 cylinder normally, the PCM determines that the fuel injector No.4 operation is not verified.

P0222 Accelerator pedal position (APP) sensor No.2 circuit low input

- The PCM monitors the input signal from accelerator pedal position sensor No.2. If the voltage from accelerator pedal position sensor No.2 is **less than 0.3 V**, the PCM determines that there is a malfunction in the accelerator pedal position sensor No.2 circuit.

P0223 Accelerator pedal position (APP) sensor No.2 circuit high input

- The PCM monitors the input signal from accelerator pedal position sensor No.2. If the voltage from accelerator pedal position sensor No.2 is **more than 4.7 V**, the PCM determines that there is a malfunction in the accelerator pedal position sensor No.2 circuit.

P0225 Idle switch circuit malfunction

- The PCM monitors the input signals from the accelerator pedal position sensor and the idle switch. If the idle switch is off even if the voltage from the accelerator pedal position sensor No.2 is **less than 0.75 V**, the PCM determines that there is a malfunction in the idle switch circuit.

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P0301, P0302, P0303, P0304 Cylinder No.1/No.2/No.3/No.4 misfire detection

- The PCM monitors the CKP sensor input signal interval time. The PCM calculates the deviation of the interval time for each cylinder. If the deviation of interval time exceeds the preprogrammed criteria, the PCM detects a misfire in the corresponding cylinder. While the engine is running, the PCM counts the number of misfires and calculates misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, the PCM determines that a misfire, which can affect emission performance, has occurred.

P0336 CKP sensor range/performance problem

- The PCM monitors input signal from the CKP sensor while the engine is running. If the input signal from the CKP sensor does not correspond with the proper pulse number, the PCM determines CKP sensor performance problem.

P0337 CKP sensor circuit low input

- The PCM monitors the input signal from the CKP sensor and the CMP sensor while the engine is running. If the input signal from the CKP sensor is not input while the PCM detects **28 pulses** from the CMP sensor, the PCM determines that there is a malfunction in the CKP sensor circuit.

P0341 CMP sensor range/performance problem

- The PCM monitors the input signal from the CMP sensor while the engine is running. If the input signal from the CMP sensor does not correspond with the proper pulse number, the PCM determines CMP sensor performance problem.

P0342 CMP sensor circuit low input

- The PCM monitors the input signal from the CMP sensor and the CKP sensor while the engine is running. If the input signal from the CMP sensor is not input while the PCM detects **255 pulses** from the CKP sensor, the PCM determines that there is a malfunction in the CMP sensor circuit.

P0401 EGR flow insufficient detected

- The PCM monitors the difference between the target air amount and intake air amount while the EGR system is operating. If the difference between the target air amount and the intake air amount is less than the threshold, the PCM determines that there is a malfunction in the EGR system.

P0402 EGR flow excessive detected

- The PCM monitors the difference between the target air amount and intake air amount while the EGR system is operating. If the difference between the target air amount and the intake air amount is more than the threshold, the PCM determines that there is a malfunction in the EGR system.

P0404 EGR valve stuck

- The PCM monitors the input signal from the EGR valve position sensor while the EGR system is operating. If the output voltage difference is less than threshold when the EGR flow amount changes, the PCM determines that there is a malfunction in the EGR valve.

P0406 EGR valve position sensor circuit high input

- The PCM monitors the input signal from the EGR valve position sensor. If the voltage from the EGR valve position sensor is **more than 4.75 V**, the PCM determines that there is a malfunction in the EGR valve position sensor circuit.

P0489 EGR solenoid valve (vacuum) control circuit low input

- The PCM monitors the output signal to the EGR solenoid valve (vacuum). If the EGR solenoid valve (vacuum) voltage is low even if the EGR solenoid valve (vacuum) is off, the PCM determines that there is a malfunction in the intake shutter solenoid valve control circuit.

P0490 EGR solenoid valve (vacuum) control circuit high input

- The PCM monitors the output signal to the EGR solenoid valve (vacuum). If the EGR solenoid valve (vacuum) voltage is high even if the EGR solenoid valve (vacuum) is on, the PCM determines that there is a malfunction in the EGR solenoid valve (vacuum) control circuit.

P0500 Vehicle speed signal problem

- The PCM monitors the CAN input signal from the DSC HU/CM. If the input signal is not correct, the PCM determines that there is a CAN input signal.

P0504 Brake switch signal correlation malfunction

- The PCM monitors the input signal from brake switch 1 and brake switch 2 while the engine is running. The PCM determines the brake switch signal correlation malfunction if the input signal from brake switch 1 brake switch 2 is as follows:
 - Brake switch 1 is on and brake switch 2 is off.
 - Brake switch 1 is off and brake switch 2 is on.

P0512 Engine switch circuit high input

- The PCM monitors the engine speed and the starter signal. If the engine speed is **more than 700 rpm** and the starter switch ON signal is input, the PCM determines that there is a malfunction in the starter switch circuit.

P0562 Battery voltage low input

- The PCM monitors the battery voltage. If the battery voltage is **less than 8 V**, the PCM determines that there is a malfunction in the battery and the battery signal system.

P0563 Battery voltage high input

- The PCM monitors the battery voltage. If the battery voltage is **more than 16 V**, the PCM determines that there is a malfunction in the battery charging system.

P0564 Cruise control signal malfunction

- The PCM monitors the input voltage from the cruise control switch while the engine is running. PCM determines cruise control signal malfunction if the input voltage from the cruise control switch is as follows for 120 s:
 - Below 0.1 V.
 - 1.4—1.9 V.
 - 3.7—3.9 V.
 - 4.5—4.6 V.

P0602 PCM programming error

- No configuration data in PCM

P0606 PCM malfunction

- PCM does not read DTC from output devices.

P0610 Control module vehicle options error

- PCM data configuration error

P0627 Suction control valve circuit open

- The PCM monitors the suction control valve operation circuit signal frequency at PCM terminal 94. If the difference between the suction control valve operation frequency at PCM terminal 93 and the monitored suction control valve operation circuit signal frequency at PCM terminal 94 exceeds the threshold, the PCM determines that suction control valve open circuit.

P0628 Suction control valve circuit low input

- The PCM monitors the suction control valve circuit current while the engine is running. If the PCM detects the circuit current is **less than 1 A** when the suction control valve is on, the PCM determines that there is a malfunction in the suction control valve circuit.

P0629 Suction control valve circuit high input

- The PCM monitors the suction control valve circuit current while the engine is running. If the PCM detects circuit current **more than 1 A** when the suction control valve is off, the PCM determines that there is a malfunction in the suction control valve circuit.

P0661 Intake shutter solenoid valve (half) circuit low input

- The PCM monitors the output signal to the intake shutter solenoid valve when the intake shutter solenoid valve is off. If the intake shutter solenoid valve voltage is **less than 7.8 V** when the intake shutter solenoid valve off, the PCM determines that there is a malfunction in the intake shutter solenoid valve control circuit.

P0662 Intake shutter solenoid valve (half) circuit high input

- The PCM monitors the output signal to the intake shutter solenoid valve when the intake shutter solenoid valve is on. If the intake shutter solenoid valve voltage is **more than 7.8 V** when the intake shutter solenoid valve on, the PCM determines that there is a malfunction in the intake shutter solenoid valve control circuit.

P0664 Intake shutter solenoid valve (full) circuit voltage low input

- The PCM monitors the output signal to the intake shutter solenoid valve. If the intake shutter solenoid valve voltage is **less than 7.8 V** when the intake shutter solenoid valve is on, the PCM determines that there is a malfunction in the intake shutter solenoid valve control system.

P0665 Intake shutter solenoid valve (full) circuit voltage high input

- The PCM monitors the output signal to the intake shutter solenoid valve when intake shutter solenoid valve is on. If the intake shutter solenoid valve voltage is **more than 7.8 V** when the intake shutter solenoid valve is on, the PCM determines that there is a malfunction in the intake shutter solenoid valve control circuit.

P0704 Clutch switch circuit malfunction

- The PCM monitors input voltage from the clutch pedal position switch while the engine running. If the input voltage from the clutch pedal position switch does not change when the vehicle stops after accelerating to **more than 30 km/h {18.6 mph}** and decelerating to **0 km/h {0 mph}**, the PCM determines that clutch pedal position switch circuit has a malfunction.

P0850 Neutral switch circuit malfunction

- The PCM monitors the input signal from the neutral switch when shifting. If the neutral switch signal is not input even once even when vehicle speed is **more than 10 km/h {6.2 mph}** the shift lever is operated **more than five times**, the PCM determines that there is a malfunction in the neutral switch circuit.

P1190 Calibration resistor circuit malfunction

- The PCM monitors the input voltage from the calibration resistor. If the PCM detects that the input voltage for any cylinder is **more than 4.8 V or less than 0.2 V**, the PCM determines calibration resistor malfunction.

P1211 Fuel pressure higher or lower than desired pressure

- The PCM monitors the fuel pressure and calculates the fuel supply volume to the common rail using the fuel pressure sensor input signal while the engine is running. If the fuel pressure or fuel supply volume to the common rail is as follows, the PCM determines that the fuel pressure is higher or lower than the desired pressure.
 - Supply pump actual pressure is higher than threshold.
 - Difference between two consecutive fuel supply to common rail volume from supply pump is more than one fuel injection volume by fuel injector.

P1391 Glow plug circuit low input

- The PCM monitors the output signal to the glow relay when the glow relay is on. If the glow relay voltage is **1.0**

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V or less when the glow relay is operating, The PCM determines that there is a malfunction in the glow relay circuit.

P1392 Glow plug circuit high input

- The PCM monitors the output signal to the glow relay when the glow relay is off. If the glow relay voltage is **4.0 V or more** when the glow relay is off, The PCM determines that there is a malfunction in the glow relay circuit.

P2009 Variable swirl control (VSC) solenoid valve circuit high input

- The PCM monitors the output signal to the variable swirl control solenoid valve. If the voltage of the variable swirl control solenoid valve is high even if the variable swirl control solenoid valve is on, the PCM determines that there is a malfunction in the variable swirl control solenoid valve control system.

P2010 Variable swirl control (VSC) solenoid valve circuit low input

- The PCM monitors the output signal to the variable swirl control solenoid valve. If the voltage of the variable swirl control solenoid valve is low even if the variable swirl control solenoid valve is off, the PCM determines that there is a malfunction in the variable swirl control solenoid valve control system.

P2135 Accelerator pedal position (APP) sensor No.1/No.2 voltage correlation

- The PCM monitors the input signals from accelerator pedal position sensor No.1 and accelerator pedal position sensor No.2. If the difference between accelerator pedal position sensor No.1 and accelerator pedal position sensor No.2 is **more than 0.9 V**, the PCM determines that there is a malfunction in the accelerator pedal position sensor characteristic.

P2136 Accelerator pedal position (APP) sensor No.1/idle switch correlation

- The PCM monitors the input signal from accelerator pedal position sensor No.1. If the voltage from accelerator pedal position sensor No.1 is **more than 1.25 V** during idle, the PCM determines that there is a malfunction in the accelerator pedal position sensor No.1 characteristic.

P2141 EGR solenoid valve (vent) circuit low input

- The PCM monitors the output signal to the EGR solenoid valve (vent). If the EGR solenoid valve (vent) voltage is low even if the EGR solenoid valve (vent) is off, the PCM determines that there is a malfunction in the intake shutter solenoid valve control system.

P2142 EGR solenoid valve (vent) circuit high input

- The PCM monitors the output signal to the EGR solenoid valve (vent). If the EGR solenoid valve (vent) voltage is high even if the EGR solenoid valve (vent) is on, the PCM determines that there is a malfunction in the EGR solenoid valve (vent) control system.

P2144 EGR control solenoid valve circuit low input

- The PCM monitors the output signal to the EGR control solenoid valve. If the EGR control solenoid valve voltage is low even if the EGR control solenoid valve is off, the PCM determines that there is a malfunction in the EGR control solenoid valve control circuit.

P2145 EGR control solenoid valve circuit high input

- The PCM monitors the output signal to the EGR control solenoid valve. If the EGR control solenoid valve voltage is high even if the EGR control solenoid valve is on, the PCM determines that there is a malfunction in the EGR control solenoid valve control circuit.

P2146 Fuel injector No.1/No.4 circuit malfunction

- The PCM monitors each cylinder injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.1 and No.4 cylinder normally, the PCM determines that the fuel injector No.1 and No.4 operation is not verified.

P2149 Fuel injector No.2/No.3 circuit malfunction

- The PCM monitors each cylinder's injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.2 and No.3 cylinder normally, the PCM determines that the fuel injector No.2 and No.3 operation is not verified.

P2227 BARO sensor range/performance problem

- The PCM monitors the input signal from the barometric pressure sensor. If the difference between the barometric pressure input from the barometric pressure sensor and the manifold absolute pressure is **more than 75 mmHg**, the PCM determines that there is a malfunction in the barometric pressure sensor.

P2228 BARO sensor circuit low input

- The PCM monitors the input signal from the barometric pressure sensor. If the voltage from the barometric pressure sensor is **less than 0.4 V**, the PCM determines that there is a malfunction in the barometric pressure sensor signal system.

P2229 BARO sensor circuit high input

- The PCM monitors the input signal from the barometric pressure sensor. If the voltage from the barometric pressure sensor is **more than 4.7 V**, the PCM determines that there is a malfunction in the barometric pressure sensor signal system.

PID/DATA MONITOR AND RECORD

- The PID/DATA monitor items are shown below.

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PID/DATA monitor item table

Monitor item	Unit/Condition			Definition
AC_REQ	On/Off			A/C request signal.
ACCS	On/Off			Air conditioning compressor cycling switch
ACR	On/Off			A/C relay
APS1	V			Accelerator position sensor No.1 - voltage
APS2	V			Accelerator position sensor No.2 - voltage
ARPMDES	RPM			Target engine speed
BARO	kPa	psi	Bar	Barometric pressure
	V			
BOO	On/Off			Brake switch
BOOST_DSD	kPa	psi	Bar	Desired boost pressure
CPP	On/Off			Clutch switch
CPP/PNP	Neutral/Drive			Neutral switch
CR_1	V			Calibration resistor voltage 1
CR_2	V			Calibration resistor voltage 2
CR_3	V			Calibration resistor voltage 3
CR_4	V			Calibration resistor voltage 4
CRUISESW	On/Off			Cruise control switch
DEC_CMP	mm ³ par stroke			Desired fuel for torque down control
DSC_ACT	Enabled/ Disabled			DSC control enable/disable
DTCCNT	—			DTC count
ECT	°C		°F	Engine coolant temperature
	V			
EGRA	%			Exhaust gas recirculation solenoid valve (vent)
EGRV	%			Exhaust gas recirculation solenoid valve (vacuum)
EGRV2	On/Off			Exhaust gas recirculation control solenoid valve
EGRVP	V			Exhaust gas recirculation valve position sensor
FAN1	On/Off			Cooling fan relay No.2 (Main fan relay)
FAN3	On/Off			Cooling fan relay No.1 (Add fan relay)
FFH_STAT	Active/Inactive			FFH status
FIP_FL	Current			FIP flow control
	%			
FIP_FL_DSD	mm ³ par stroke			FIP flow desired
FIP_LRN	Current			FIP learning amount
FIP_MODE	Normal/Fixed_1/ Fixed_2/ Disabled			FIP duty control status
FIP_SCV	Current			FIP suction control valve
	V			
FLT	°C		°F	Fuel temperature
FLTV	V			FLT signal voltage
FRP	V			Fuel rail pressure
	kPa	psi	Bar	
FRP_A	kPa	psi	Bar	FRP after fuel injection
GLWPG V	V			Glow plugs
GPC	On/off			Glow plug control
IASV	On/Off			intake shutter solenoid valve (full) control
IASV2	On/Off			intake shutter solenoid valve (full) control
IAT	V			Intake air temperature
	°C		°F	
IAT2	V			Intake air temperature No.2
	°C		°F	
ICP	kPa	psi	Bar	Injector control pressure
IMRC	On/Off			VSC solenoid valve control

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Monitor item	Unit/Condition		Definition
INGEAR	On/Off		Load/no load condition
INJ_LRN_DIS	km	mile	Distance from the last injector learning
INJ_MODE	Normal/ Disabled/ Splitted/Fixed		Fuel injection timing control status
INJ_TIM	°		Fuel injection timing
INJ1_CMP	mm ³ par stroke		Injector 1 correction value
INJ2_CMP			Injector 2 correction value
INJ3_CMP			Injector 3 correction value
INJ4_CMP			Injector 4 correction value
ISC_CMP	mm ³ par stroke		Fuel correction for idle speed control
IVS	Idle/Off Idle		Idle switch
MAF	g/s		Mass air flow amount
	V		
MAF_C	g		MAF per cylinder
MAF_C_DSD	g		MAF per cylinder desired
MAF_LRN_DIS	km	mile	Distance from the last MAF learning
MAINRLY	On/Off		PCM control relay
MAP	kPa	psi	Manifold absolute pressure
	V		
MIL	On/Off		Malfunction indicator lamp
MULTI_INJ	1_INJ/2_INJ/ 3_INJ/4_INJ/ 5_INJ/6_INJ/ Disabled		Multiple fuel injection control status
NUMKEYS	—		Number of keys stored in module
RPM	RPM		Engine speed
SC_BOO	On/Off		Brake switch for cruise
	Applied/Not Applied		
SC_CANCEL	Active/Inactive		Cruise cancel switch
SC_COAST	Active/Inactive		Cruise coast switch
SC_MAIN	Active/Inactive		Cruise main switch
SC_RES	Active/Inactive		Cruise resume switch
START_SW	On/Off		Starter switch value
TC_CMP	mm ³ par stroke		Fuel correction when torque down control
VBCV	%		VBC solenoid valve control
VFDES	mm ³ par stroke		Volume fuel desired
VPWR	V		Battery positive voltage
VSS	km/h	mph	Vehicle speed sensor.

SIMULATION TEST

- The simulation items are shown below.

B6E407000102105

Simulation item table

×: Applicable
—: Not applicable

Item	Applicable component	Unit/condition	Test condition		PCM terminal
			KOEO	KOER	
ACCS	Air conditioning compressor cycling switch	ON/OFF	×	×	73
EGRA	EGR solenoid valve (vent)	Any Duty (%)	×	×	72
EGRV	EGR solenoid valve (vacuum)	Any Duty (%)	×	×	99
EGRV2	EGR control solenoid valve	ON/OFF	×	×	77
FAN1	Cooling fan relay No.2 (Main fan relay)	ON/OFF	×	×	76
FAN3	Cooling fan relay No.1 (Add fan relay)	ON/OFF	×	×	102
GP_LMP	Glow plug lamp	ON/OFF	×	×	—

ON-BOARD DIAGNOSTIC

Item	Applicable component	Unit/condition	Test condition		PCM terminal
			KOEO	KOER	
FUEL_PRIME	Fuel pump priming command	ON/---	×	×	—
GPC	Glow plug relay	ON/OFF	×	×	68
IASV	Intake shutter solenoid valve (half)	ON/OFF	×	×	74
IASV2	Intake shutter solenoid valve (full)	ON/OFF	×	×	100
IMRC	VSC solenoid valve	ON/OFF	×	×	101
VBCV	VBC solenoid valve	Any Duty (%)	×	×	67

OUTLINE

OUTLINE

SUPPLEMENTAL SERVICE INFORMATION

B6E400218881106

- The following changes and/or additions have been made since publication of the Mazda6 Workshop Manual (1749-1*-02G).

PCM

- PCM inspection has been modified.

EGR valve position sensor

- Inspection procedure has been added.

On-board diagnostic

- Inspection procedure has been modified.

Troubleshooting

- Inspection procedure has been modified.

CONTROL SYSTEM

CONTROL SYSTEM

PCM INSPECTION

B6E404018881105

Using WDS or Equivalent

Caution

- The PCM terminal voltage vary with change in measuring conditions and vehicle conditions. Always carry out a total inspection of the input systems, output systems, and PCM to determine the cause of trouble. Otherwise, diagnosis will be incorrect.

Note

- For replace the PCM, setup the WDS and perform the following.
 - “PCM configuration”
 - “Correction after Parts Installation”
1. Connect the WDS or equivalent to the DLC-2. (See [F2-38 ON-BOARD DIAGNOSTIC TEST.](#))
 2. Turn the engine switch to ON.
 3. Measure the PID value.
 - If PID value is not within the specification, follow the instructions in ACTION column.

F2

CONTROL SYSTEM

PID Monitor Table

Monitor item (Definition)	Unit/Condition			Condition/Specification (Reference)		Inspection item	PCM terminal
AC_REQ (A/C request signal)	On/Off			KOER	A/C switch ON: On A/C switch OFF: Off	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, ECT, RPM.	84
ACCS (Air conditioning compressor cycling switch)	On/Off			KOER	A/C switch ON and fan switch ON at idle: On Other: Off	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, ECT, RPM.	73
ACR (A/C relay)	On/Off			KOER	A/C switch ON and fan switch ON at idle: On Other: Off	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, ECT, RPM. Inspect A/C relay	73
APS1 (Accelerator position sensor No.1 - voltage)	V			KOEO/ KOER	Accelerator pedal released: Approx. 0.6 V Accelerator pedal fully depressed: Approx. 3.6 V	Inspect Accelerator position sensor No.1	10
APS2 (Accelerator position sensor No.2 - voltage)	V			KOEO/ KOER	Accelerator pedal released: Approx. 0.6 V Accelerator pedal fully depressed: Approx. 3.6 V	Inspect Accelerator position sensor No.2	88
ARPMDES (Target engine speed)	RPM			KOER (Idle)	No load: 725—825 rpm E/L operating: 725—825 rpm P/S operating: 725—825 rpm A/C ON: 725—825 rpm	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, IAT2, ECT, BOOST_DSD, FRP, FRP_A, RPM, VSS.	—
BARO (Barometric pressure)	kPa	psi	Bar	KOEO/ KOER	Indicate Barometric pressure	Inspect BARO sensor.	—
	V				BARO 101.3 kPa: Approx. 4 V		
BOO (Brake switch)	On/Off			KOEO/ KOER	Brake pedal released: Off Brake pedal depressed: On	Inspect brake switch.	7
BOOST_DSD (Desired boost pressure)	kPa	psi	Bar	Desired boost pressure is displayed		Perform applicable DTC troubleshooting.	—
CPP (Clutch switch)	On/Off			KOEO/ KOER	Clutch pedal released: Off Clutch pedal depressed: On	Inspect clutch switch.	33
CPP/PNP (Neutral switch)	Neutral/Drive			KOEO/ KOER	Neutral position: Neutral Others: Drive	Inspect neutral switch.	56
CR_1 (Calibration resistor voltage 1)	V			KOEO/ KOER	Calibration resistor voltage is displayed	Inspect neutral calibration resistor.	37
CR_2 (Calibration resistor voltage 2)							62
CR_3 (Calibration resistor voltage 3)							89
CR_4 (Calibration resistor voltage 4)							11
CRUISESW (Cruise control switch)	On/Off			KOEO/ KOER	Cruise control switch OFF: Off Cruise control switch ON: On	Inspect cruise control switch	64
DEC_CMP (Fuel correction for deceleration)	mm ³ per stroke			Fuel correction for deceleration is displayed.		—	—

CONTROL SYSTEM

Monitor item (Definition)	Unit/Condition		Condition/Specification (Reference)		Inspection item	PCM terminal
DSC_ACT (DSC control enable/ disable)	Enabled/ Disabled		KOEO	Disable	—	—
			KOER	Idle: Enabled		
DTCCNT (DTC count)	—		Number of DTCs stored in the PCM is displayed.		Perform applicable DTC troubleshooting.	—
ECT (Engine coolant temperature)	°C	°F	KOEO/ KOER	Engine coolant temperature is displayed	Inspect ECT sensor.	87
	V			ECT 25 °C {77 °F}: Approx. 2.85 V ECT 80 °C {176 °F}: Approx. 0.89 V		
EGRA (Exhaust gas recirculation solenoid valve (vent))	%		KOEO	Approx. 0 %	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, MAF, APS1, APS2, ECT, BARO, BOOST_DSD, FRP, FRP_A, RPM, VSS. Inspect EGR solenoid valve (vent).	72
			KOER	Idle: Approx. 100 %		
EGRV (Exhaust gas recirculation solenoid valve (vacuum))	%		KOEO	Approx. 0 %	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, MAF, APS1, APS2, ECT, BARO, BOOST_DSD, FRP, FRP_A, RPM, VSS. Inspect EGR solenoid valve (vacuum).	99
			KOER	Idle: Approx. 75—79 %		
EGRV2 (Exhaust gas recirculation control solenoid valve)	On/Off		KOEO	Off	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, MAF, APS1, APS2, ECT, BARO, BOOST_DSD, FRP, FRP_A, RPM, VSS. Inspect EGR solenoid valve.	77
			KOER	Idle: On		
EGRVP (Exhaust gas recirculation valve position sensor)	V		See F2-37 EGR VALVE POSITION SENSOR INSPECTION .			32
FAN1 (Cooling fan relay No.2 (Main fan relay))	On/Off		KOER (Idle)	ECT below 100 °C {212 °F}: Off Others: On	Inspect following PIDs: VPWR, AC_REQ, APS1, APS2, ECT Inspect cooling fan relay.	76
FAN3 (Cooling fan relay No.1 (Add fan relay))	On/Off		KOER (Idle)	ECT below 100 °C {212 °F}: Off A/C operating, refrigerant pressure switch (middle) is ON, and ECT below 108 °C {226 °F}: Off Other: On	Inspect following PIDs: VPWR, AC_REQ, APS1, APS2, ECT Inspect cooling fan relay.	102
FFH_STAT (FFH status)	Active/Inactive		KOER (Idle)	Inactive	—	—
FIP_FL (FIP flow control)	Current		KOER (Idle)	Approx. 1.8 A	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, IAT2, ECT, BOOST_DSD, FRP, FRP_A, RPM, VSS. Inspect IDM.	30
	%			Approx. 44.4 %		
FIP_FL_DSD (FIP flow desired)	mm ³ per stroke		KOEO	Approx. 0 mm ³ /stroke	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, IAT2, ECT, BOOST_DSD, FRP, FRP_A, RPM, VSS.	—
			KOER (Idle)	Approx. 55 mm ³ /stroke		

F2

CONTROL SYSTEM

Monitor item (Definition)	Unit/Condition			Condition/Specification (Reference)		Inspection item	PCM terminal
FIP_LRN (FIP learning amount)	Current			KOEO	Approx. 64 mA	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, IAT2, ECT, BOOST_DSD, FRP, FRP_A, RPM, VSS.	—
				KOER (Idle)	Approx. 77 mA		
FIP_MODE (FIP duty control status)	Normal/ Fixed_1/ Fixed_2/ Disabled			KOEO	Disabled	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, IAT2, ECT, BOOST_DSD, FRP, FRP_A, RPM, VSS.	—
				KOER	Normal		
FIP_SCV (Suction control valve)	Current			KOEO	Approx. 24 mA	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, IAT2, ECT, BOOST_DSD, FRP, FRP_A, RPM, VSS.	93, 94
				KOER	1.5—2.2 A		
	V			KOEO	Approx. 0.02 V		
				KOER	1.6—2.2 V		
FLT (Fuel temperature)	°C	°F		KOEO/ KOER	Fuel temperature is displayed.	Inspect fuel temperature sensor	35
FLTV (FLT signal voltage)	V			KOEO/ KOER	FLT 23 °C {73 °F}: Approx. 2.23 V		
FRP (Fuel pressure sensor)	V			KOEO	Approx. 1 V	Inspect fuel pressure sensor	61
				KOER	Idle: Approx. 1.54 V 2,000 rpm: Approx. 1.7 V		
	kPa	psi	Bar	KOEO	0 kPa {0 psi, 0 Bar}		
				KOER	Idle: Approx. 34 MPa {4,931 psi, 340 Bar} 2,000 rpm: Approx. 43 MPa {6,237 psi, 430 Bar}		
FRP_A (FRP after fuel injection)	kPa	psi	Bar	KOEO	0 kPa {0 psi, 0 Bar}		
				KOER	Idle: Approx. 34 MPa {4,931 psi, 340 Bar} 2,000 rpm: Approx.43 MPa {6,237 psi, 430 Bar}		
GLWPG V (Glow plugs)	V			KOEO	Approx. 0 V	Inspect following PIDs: START_SW, ECT, BOOST_DSD, VSS	86
				KOER	Cranking: Approx. 10 V Idle: Approx. 0 V		
GPC (Glow plug control)	On/Off			KOEO	Off		
				KOER	Cranking: On Idle: Off		
IASV (intake shutter solenoid valve (half) control)	On/Off			KOEO	Off	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, APS1, APS2, IAT2, MAF, ECT, BOOST_DSD, RPM, VSS. Inspect intake shutter solenoid valve (half).	74
				KOER	Idle: On		
					1,100 rpm or more: On		
IASV2 (intake shutter solenoid valve (full) control)	On/Off			KOEO	Off	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, APS1, APS2, IAT2, MAF, ECT, BOOST_DSD, RPM, VSS. Inspect intake shutter solenoid valve (full).	100
				KOER	Idle: Off		
IAT (Intake air temperature)	V		KOEO/ KOER	30°C {86 °F}: Approx. 1.9 V	Inspect IAT sensor.No.1	60	
	°C	°F		Intake air temperature is display			
IAT2 (Intake air temperature No.2)	V		KOEO/ KOER	23 °C {73 °F}: Approx. 2.2 V	Inspect IAT sensor.No.2	8	
	°C	°F		Intake air temperature is display			

CONTROL SYSTEM

Monitor item (Definition)	Unit/Condition			Condition/Specification (Reference)		Inspection item	PCM terminal	
ICP (Injector control pressure)	kPa	psi	Bar	KOEO	35 MPa {5,076 psi, 350 Bar}	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, IAT2, ECT, BOOST_DSD, FRP, FRP_A, RPM, VSS.	—	
				KOER	Idle: Approx.35 MPa {5,076 psi, 350 Bar} 2,000 rpm: Approx.45 MPa {6,526.7 psi, 450 Bar}			
IMRC (VSC solenoid valve control)	On/Off			KOEO	Off	Inspect following PIDs: CPP, CPP/PNP, APS1, APS2, IVS, MAF, ECT, RPM. Inspect VSC solenoid valve.	101	
				KOER	Idle: On 1,900 rpm or more: Off			
INGEAR (Load/no load condition)	On/Off			KOEO/ KOER	CPP or CPP/PNP is on: On Others: Off	Inspect following PIDs: CPP, CPP/PNP.	—	
INJ_LRN_DIS (Distance from the last injector learning)	km	mile		KOEO/ KOER	Distance from the last injector learning	Distance from the last injector learning is display.	—	
INJ_MODE (Fuel injection timing control status)	Normal/ Disabled/ Splitted/Fixed			KOEO	Disabled	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, MAF, ECT, FRP, FRP_A, RPM, VSS.	—	
				KOER	Idle: Normal			
INJ_TIM (Fuel injection timing)	°			KOEO	Approx. 30°	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, MAF, ECT, FRP, FRP_A, RPM, VSS.	42, 43, 44, 45	
				KOER	Idle: Approx. 30° 2,000 rpm: Approx. 30°			
INJ1_CMP (Injector 1 correction value)	mm ³ per stroke			KOEO/ KOER	Injector correction value is displayed	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, APS1, APS2, IAT2, ECT, BOOST_DSD, FRP, FRP_A, RPM, VSS.	42	
INJ2_CMP (Injector 2 correction value)							45	
INJ3_CMP (Injector 3 correction value)							43	
INJ4_CMP (Injector 4 correction value)							44	
ISC_CMP (Fuel correction for idle speed control)	mm ³ per stroke			KOEO/ KOER	Fuel correction for idle speed control is displayed	—	—	
IVS (Idle switch)	Idle/Off Idle			KOEO/ KOER	CTP: Idle Others: Off Idle	Inspect Idle switch	31	
MAF (Mass air flow amount)	g/s			KOEO	0 g/s	Inspect MAF sensor.	9	
				KOER	Idle: Approx. 13 g/s 2,000 rpm: Approx. 21 g/s			
	V			KOEO	Less than 1V			
				KOER	Idle: Approx. 2.1 V 2,000 rpm: Approx. 2.4 V			
MAF_C (MAF per cylinder)	g			KOEO	Approx. 78.44 mg	Inspect MAF sensor.	—	
				KOER	Idle: Approx. 590 mg 2,000 rpm: Approx. 400 mg			
MAF_C_DSD (MAF per cylinder desired)	g			KOEO	Approx. 1.01 mg	Inspect MAF sensor.	—	
				KOER	Idle: Approx. 358 mg 2,000 rpm: Approx. 320 mg			
MAF_LRN_DIS (Distance from the last MAF learning)	km	mile		KOEO/ KOER	Distance from the last MAF learning is displayed	—	—	
MAINRLY (PCM control relay)	On/Off			KOEO	On	—	69	
				KOER	Idle: On			

F2

CONTROL SYSTEM

Monitor item (Definition)	Unit/Condition			Condition/Specification (Reference)		Inspection item	PCM terminal
MAP (Manifold absolute pressure)	kPa	psi	Bar	KOER	Manifold absolute pressure is displayed	Inspect MAP sensor.	36
	V			KOEO	Approx. 4.1 V (at sea level)		
MIL (Malfunction indicator lamp)	On/Off			KOEO	On	Perform applicable DTC troubleshooting.	—
				KOER (Idle)	Off		
MULTI_INJ (Multiple fuel injection control status)	1_INJ/2_INJ/ 3_INJ/4_INJ/ 5_INJ/6_INJ/ Disabled			KOEO	Disabled	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, MAF, IAT2, ECT, FLT, RPM, VSS.	—
				KOER	Idle: 4_INJ As increase the engine speed: 4_INJ→ 3_INJ→ 2_INJ→ 1_INJ Release the accelerator pedal while the engine speed is high: Disabled		
NUMKEYS (Number of keys stored in module)	—			KOEO/ KOER	Number of keys stored in module	—	—
RPM (Engine speed)	RPM			KOER	0 RPM	Inspect CKP sensor.	3, 29
				KOER	No load: 725—825 RPM E/L operating: 725—825 RPM P/S operating: 725—825 RPM A/C ON: 725—825 RPM		
SC_BOO (Brake switch for cruise)	On/Off			KOEO/ KOER	Brake pedal released: Off Brake pedal depressed: On	Inspect brake switch	34
	Applied/Not Applied				Brake pedal released: Not Applied Brake pedal depressed: Applied		
SC_CANCEL (Cruise cancel switch)	Active/Inactive			KOEO/ KOER	Cruise cancel switch released: Inactive Cruise cancel switch depressed: Active	Inspect cruise cancel switch	64
SC_COAST (Cruise coast switch)	Active/Inactive			KOEO/ KOER	Cruise coast switch released: Inactive Cruise coast switch depressed: Active	Inspect cruise cancel switch	64
SC_MAIN (Cruise main switch)	Active/Inactive			KOEO/ KOER	Cruise control switch OFF: Inactive Cruise control switch ON: Active	Inspect cruise cancel switch	64
SC_RES (Cruise resume switch)	Active/Inactive			KOEO/ KOER	Cruise resume switch released: Inactive Cruise resume switch depressed: Active	Inspect cruise cancel switch	64
START_SW (Starter switch value)	On/Off			KOEO	Off	Inspect cruise cancel switch	57
				KOER	Cranking: On Idle: Off		
TC_CMP (Fuel correction for traction control)	mm ³ per stroke			KOEO/ KOER	Fuel correction for traction control is display.	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, IAT2, ECT, BOOST_DSD, FRP, FRP_A, RPM, VSS.	—
VBCV (VBC solenoid valve control)	%			KOEO	0 %	Inspect following PIDs: CPP, CPP/PNP, APS1, APS2, IVS, MAF, ECT, RPM. Inspect VBC solenoid valve.	67
				KOER	Idle: Approx. 51 % 2,000 rpm: Approx. 50 %		

CONTROL SYSTEM

Monitor item (Definition)	Unit/Condition		Condition/Specification (Reference)		Inspection item	PCM terminal
VFDES (Volume fuel desired)	mm ³ per stroke		KOEO/ KOER	Volume fuel desired is displayed	Inspect following PIDs: START_SW, CPP, CPP/PNP, IVS, AC_REQ, APS1, APS2, IAT2, ECT, BOOST_DSD, FRP, FRP_A, RPM, VSS.	—
VPWR (Battery positive voltage)	V		KOEO	Battery positive voltage is displayed	Inspect PCM control relay. Inspect battery.	27, 53, 79
VSS (Vehicle speed)	km/h	mph	KOER	Vehicle speed is displayed	Perform applicable DTC troubleshooting.	—

EGR VALVE POSITION SENSOR INSPECTION

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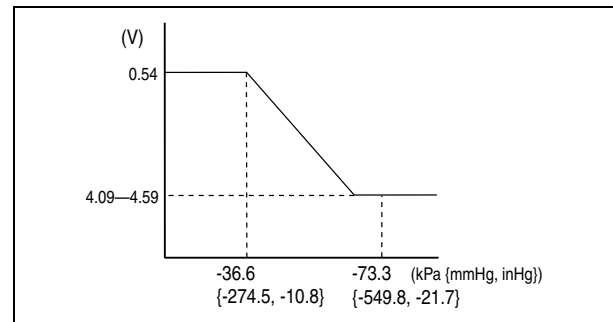
F2

Voltage Inspection

1. Disconnect the vacuum hose from the EGR valve position sensor and connect the vacuum pump to the EGR valve.
2. Turn the engine switch to the ON position.
3. Verify that the voltage at terminal B changes while applying the vacuum to the EGR valve as show in the graph.
 - If not as specified, replace the EGR valve.

Specification

Vacuum	Voltage
0— -36.6 kPa {0— -274.5 mmHg, 0— -10.8 inHg} or above	4.09—4.59 V
-73.3 {-549.8 mmHg, -21.7 inHg} or below	Approx. 0.54 V

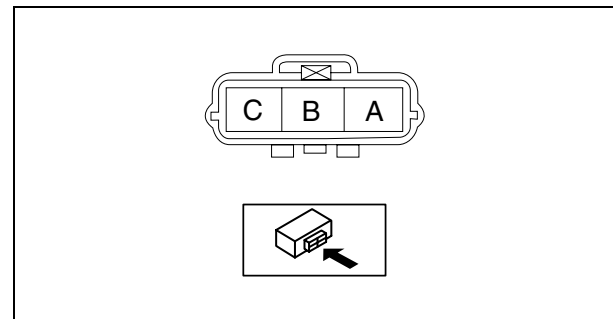


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Resistance Inspection

1. Disconnect the EGR valve position sensor connector.
2. Measure the resistance between terminal A and C.
 - If not as specified, replace the EGR valve.

EGR valve position sensor resistance
Approx. 5 kilohms



B6E4040W003

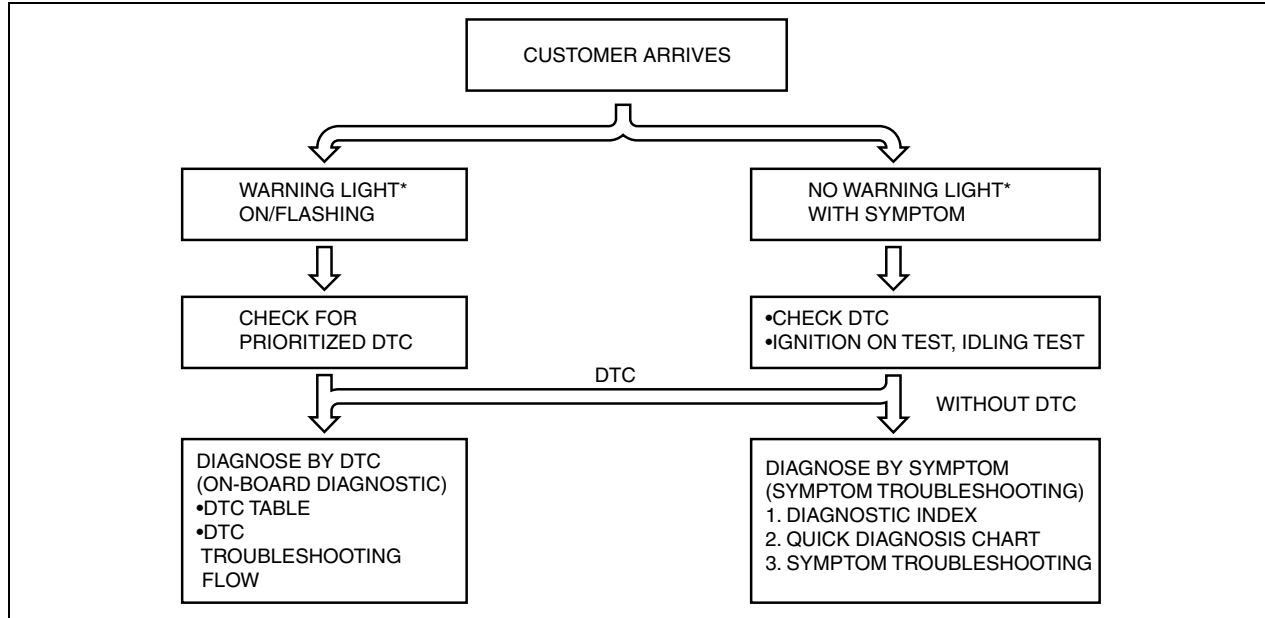
ON-BOARD DIAGNOSTIC

ON-BOARD DIAGNOSTIC

FOREWORD

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- When the customer reports a vehicle malfunction, check the malfunction indicator light (MIL) indication and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
 - If the DTC exists, diagnose the applicable DTC inspection. (See [F2-40 DTC TABLE](#).)
 - If the DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting.



B6U0102W301

* : Malfunction Indicator Light (MIL), Generator Warning Light, Security Light

OBD PENDING TROUBLE CODES

B6E407018881102

- These appear when a problem is detected in a monitored system. The MIL is illuminated when a problem is detected in two consecutive drive cycles. The code for a failed system is stored in the PCM memory in the first drive cycle. This code is called the pending code. If the problem is not found in the second drive cycle, the PCM judges that the system returned to normal or the problem was mistakenly detected, and deletes the pending code. If the problem is found in the second drive cycle too, the PCM judges that the system has failed, deletes the pending code, illuminates the MIL and stores the DTC.

OBD FREEZE FRAME DATA

B6E407018881103

- This is the technical data which indicates the engine's condition at the time of the first malfunction. This data will remain in the memory even if another emission-related DTC is stored, with the exception of Misfire or Fuel System DTCs. Once freeze frame data for a Misfire or Fuel System DTC is stored, it will overwrite any previous data and the freeze frame will not be overwritten again.

OBD READ/CLEAR DIAGNOSTIC TEST RESULTS

B6E407018881104

- This retrieves all stored DTCs in the PCM and clears the DTC, Freeze Frame Data, On-Board Readiness Test Results, Diagnostic Monitoring Test Results and Pending Trouble Codes.

OBD PARAMETER IDENTIFICATION (PID) ACCESS

B6E407018881105

- The PID mode allows access to certain data values, analog and digital inputs and outputs, calculated values and system status information. Since PID values for output devices are PCM internal data values, inspect each device to identify which output devices are malfunctioning.

ON-BOARD DIAGNOSTIC TEST

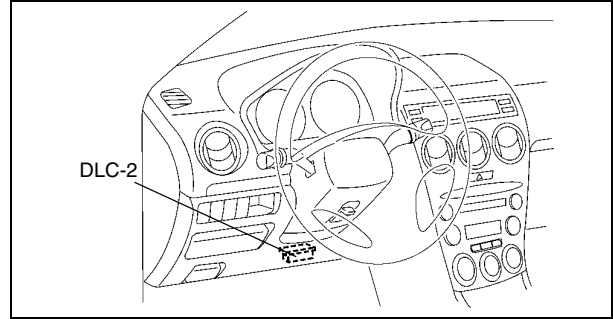
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DTCs Retrieving Procedure

- Perform the necessary vehicle preparation and visual inspection.

ON-BOARD DIAGNOSTIC

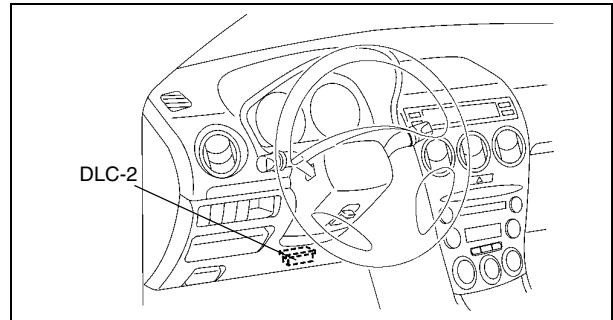
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve DTC using WDS or equivalent.



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Pending Trouble Code Access Procedure

1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve pending trouble code using WDS or equivalent.

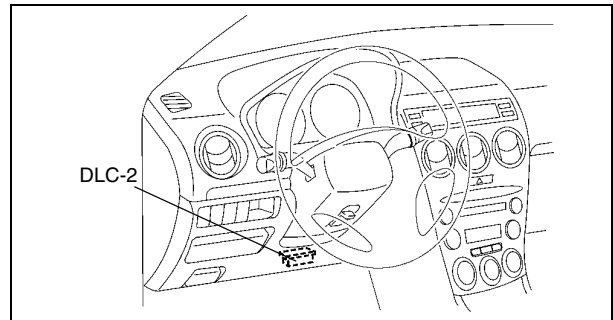


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F2

Freeze Frame PID Data Access Procedure

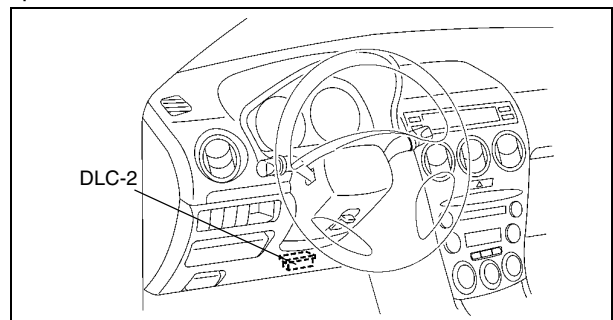
1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Retrieve FREEZE FRAME PID DATA using WDS or equivalent.



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PID/DATA Monitor and Record Procedure

1. Perform the necessary vehicle preparation and visual inspection.
2. Connect WDS or equivalent to the vehicle DLC-2 16-pin connector located on the left side of the steering column.
3. Access and monitor PIDs using WDS or equivalent.



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OBD DRIVE MODE

- Performing the Drive Mode inspects the OBD system for proper operation and must be performed to ensure that no additional DTCs are present.

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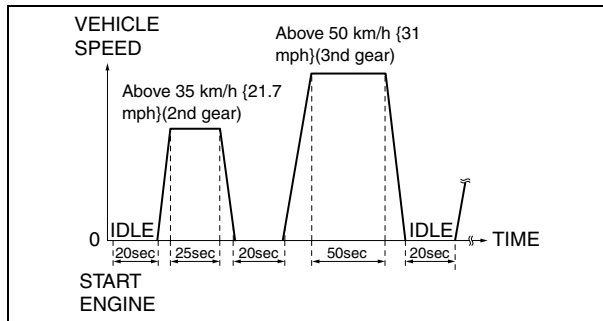
ON-BOARD DIAGNOSTIC

- During Drive Mode, the following systems are inspected:
 - P0101 MAF sensor circuit range/performance problem
 - P0106 Boost sensor circuit range/performance problem
 - P0401 EGR flow insufficient detected
 - P0402 EGR flow excessive detected
 - P0404 EGR valve stuck
 - P2227 BARO sensor circuit range/performance problem

Caution

- While performing the Drive Mode, always operate the vehicle in a safe and lawful manner.
- When the WDS or equivalent is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the WDS or equivalent using the PID/DATA MONITOR AND RECORD function and inspect later.

1. Warm up the engine to normal operating temperature.
2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Drive the vehicle five times in the driving mode indicated in the figure on a road with a 0% gradient.
4. Stop the vehicle.
5. Verify no DTCs are available.



B6E4070W078

DTC TABLE

B6E407018881108

DTC No.	Condition	MIL	DC	Memory function	Page
P0016	Crankshaft position-camshaft position correlation malfunction	OFF	2	×	(See F2-42 DTC P0016.)
P0045	Variable boost control (VBC) solenoid valve control circuit low input	ON	2	×	(See F2-43 DTC P0045.)
P0088	Fuel pressure system too high	—	—	×	(See F2-46 DTC P0088.)
P0093	Fuel system leak detection	ON	1	×	(See F2-47 DTC P0093.)
P0096	Intake air temperature (IAT) sensor No.2 range/performance problem	ON	2	×	(See F2-48 DTC P0096.)
P0097	Intake air temperature (IAT) sensor No.2 circuit low input	ON	1	×	(See F2-49 DTC P0097.)
P0098	Intake air temperature (IAT) sensor No.2 circuit high input	ON	1	×	(See F2-51 DTC P0098.)
P0101	Mass air flow (MAF) sensor range/performance problem	ON	2	×	(See F2-54 DTC P0101.)
P0102	Mass air flow (MAF) sensor circuit low input	ON	1	×	(See F2-55 DTC P0102.)
P0103	Mass air flow (MAF) sensor circuit high input	ON	1	×	(See F2-58 DTC P0103.)
P0106	Boost sensor range/performance problem	ON	2	×	(See F2-60 DTC P0106.)
P0107	Boost sensor circuit low input	ON	1	×	(See F2-61 DTC P0107.)
P0108	Boost sensor circuit high input	ON	1	×	(See F2-64 DTC P0108.)
P0111	Intake air temperature (IAT) sensor No.1 range/performance problem	ON	2	×	(See F2-66 DTC P0111.)
P0112	Intake air temperature (IAT) sensor No.1 circuit low input	ON	1	×	(See F2-67 DTC P0112.)
P0113	Intake air temperature (IAT) sensor No.1 circuit high input	ON	1	×	(See F2-69 DTC P0113.)
P0116	Engine coolant temperature (ECT) sensor range/performance problem	ON	2	×	(See F2-72 DTC P0116.)
P0117	Engine coolant temperature (ECT) sensor circuit low input	ON	1	×	(See F2-74 DTC P0117.)

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ON-BOARD DIAGNOSTIC

DTC No.	Condition	MIL	DC	Memory function	Page
P0118	Engine coolant temperature (ECT) sensor circuit high input	ON	1	×	(See F2-75 DTC P0118.)
P0122	Accelerator pedal position (APP) sensor No.1 circuit low input	ON	1	×	(See F2-78 DTC P0122.)
P0123	Accelerator pedal position (APP) sensor No.1 circuit high input	ON	1	×	(See F2-80 DTC P0123.)
P0182	Fuel temperature sensor circuit low input	ON	1	×	(See F2-82 DTC P0182.)
P0183	Fuel temperature sensor circuit high input	ON	1	×	(See F2-84 DTC P0183.)
P0191	Fuel pressure sensor range/performance problem	OFF	2	×	(See F2-86 DTC P0191.)
P0192	Fuel pressure sensor circuit low input	ON	1	×	(See F2-87 DTC P0192.)
P0193	Fuel pressure sensor circuit high input	ON	1	×	(See F2-90 DTC P0193.)
P0200	Fuel injector operation identified	ON	1	×	(See F2-92 DTC P0200.)
P0201	Fuel injector No.1 operation identified	ON	1	×	(See F2-95 DTC P0201.)
P0202	Fuel injector No.2 operation identified	ON	1	×	(See F2-98 DTC P0202.)
P0203	Fuel injector No.3 operation identified	ON	1	×	(See F2-101 DTC P0203.)
P0204	Fuel injector No.4 operation identified	ON	1	×	(See F2-104 DTC P0204.)
P0222	Accelerator pedal position (APP) sensor No.2 circuit low input	ON	1	×	(See F2-107 DTC P0222.)
P0223	Accelerator pedal position (APP) sensor No.2 circuit high input	ON	1	×	(See F2-110 DTC P0223.)
P0225	Idle switch circuit malfunction	ON	2	×	(See F2-112 DTC P0225.)
P0301	Cylinder No.1 misfire detection	ON	1	×	(See F2-114 DTC P0301, P0302, P0303, P0304.)
P0302	Cylinder No.2 misfire detection	ON	1	×	(See F2-114 DTC P0301, P0302, P0303, P0304.)
P0303	Cylinder No.3 misfire detection	ON	1	×	(See F2-114 DTC P0301, P0302, P0303, P0304.)
P0304	Cylinder No.4 misfire detection	ON	1	×	(See F2-114 DTC P0301, P0302, P0303, P0304.)
P0336	CKP sensor range/performance problem	OFF	2	×	(See F2-116 DTC P0336.)
P0337	CKP sensor circuit low input	ON	1	×	(See F2-117 DTC P0337.)
P0341	CMP sensor range/performance problem	OFF	2	×	(See F2-120 DTC P0341.)
P0342	CMP sensor circuit low input	ON	1	×	(See F2-121 DTC P0342.)
P0401	EGR flow insufficient detected	ON	2	×	(See F2-124 DTC P0401.)
P0402	EGR flow excessive detected	ON	2	×	(See F2-125 DTC P0402.)
P0404	EGR valve stuck	ON	2	×	(See F2-126 DTC P0404.)
P0406	EGR valve position sensor circuit high input	ON	1	×	(See F2-127 DTC P0406.)
P0489	EGR solenoid valve (vacuum) control circuit low input	ON	2	×	(See F2-130 DTC P0489.)
P0490	EGR solenoid valve (vacuum) control circuit high input	ON	2	×	(See F2-132 DTC P0490.)
P0500	Vehicle speed signal problem	ON	2	×	(See F2-134 DTC P0500.)
P0504	Brake switch signal correlation malfunction	OFF	2	×	(See F2-134 DTC P0504.)
P0512	Engine switch circuit high input	ON	1	×	(See F2-137 DTC P0512.)
P0562	Battery voltage low input	ON	1	×	(See F2-140 DTC P0562.)
P0563	Battery voltage high input	ON	1	×	(See F2-141 DTC P0563.)
P0564	Cruise control signal malfunction	OFF	2	×	(See F2-144 DTC P0564.)
P0602	PCM programming error	ON	1	×	(See F2-146 DTC P0602.)
P0606	PCM malfunction	ON	1	×	(See F2-146 DTC P0606.)
P0610	Control module vehicle options error	ON	1	×	(See F2-147 DTC P0610.)
P0627	Suction control valve circuit open	ON	1	×	(See F2-147 DTC P0627.)
P0628	Suction control valve circuit low input	ON	1	×	(See F2-150 DTC P0628.)
P0629	Suction control valve circuit high input	ON	1	×	(See F2-152 DTC P0629.)
P0661	Intake shutter solenoid valve circuit (half) low input	ON	2	×	(See F2-154 DTC P0661.)
P0662	Intake shutter solenoid valve circuit (half) high input	ON	2	×	(See F2-156 DTC P0662.)
P0664	Intake shutter solenoid valve (full) circuit voltage low input	ON	2	×	(See F2-158 DTC P0664.)

ON-BOARD DIAGNOSTIC

DTC No.	Condition	MIL	DC	Memory function	Page
P0665	Intake shutter solenoid valve (full) circuit voltage high input	ON	2	×	(See F2-160 DTC P0665.)
P0704	Clutch switch circuit malfunction	ON	2	×	(See F2-162 DTC P0704.)
P0850	Neutral switch circuit malfunction	ON	2	×	(See F2-164 DTC P0850.)
P1190	Calibration resistor circuit malfunction	ON	2	×	(See F2-166 DTC P1190.)
P1211	Fuel pressure higher or lower than desired pressure	ON	2	×	(See F2-169 DTC P1211.)
P1391	Glow plug circuit low input	OFF	2	×	(See F2-170 DTC P1391.)
P1392	Glow plug circuit high input	OFF	2	×	(See F2-173 DTC P1392.)
P2009	Variable swirl control (VSC) solenoid valve circuit high input	ON	2	×	(See F2-178 DTC P2010.)
P2010	Variable swirl control (VSC) solenoid valve circuit low input	ON	2	×	(See F2-176 DTC P2009.)
P2135	Accelerator pedal position (APP) sensor No.1/No.2 voltage correlation	ON	1	×	(See F2-180 DTC P2135.)
P2136	Accelerator pedal position (APP) sensor No.1/idle switch correlation	ON	1	×	(See F2-180 DTC P2136.)
P2141	EGR solenoid valve (vent) circuit low input	ON	2	×	(See F2-182 DTC P2141.)
P2142	EGR solenoid valve (vent) circuit high input	ON	2	×	(See F2-185 DTC P2142.)
P2144	EGR control solenoid valve circuit low input	ON	2	×	(See F2-187 DTC P2144.)
P2145	EGR control solenoid valve circuit high input	ON	2	×	(See F2-189 DTC P2145.)
P2146	Fuel injector No.1/No.4 circuit malfunction	ON	1	×	(See F2-191 DTC P2146.)
P2149	Fuel injector No.2/No.3 circuit malfunction	ON	1	×	(See F2-194 DTC P2149.)
P2227	BARO sensor range/performance problem	ON	2	×	(See F2-197 DTC P2227.)
P2228	BARO sensor circuit low input	ON	1	×	(See F2-197 DTC P2228.)
P2229	BARO sensor circuit high input	ON	1	×	(See F2-198 DTC P2229.)

DTC P0016

B6E407000001101

DTC P0016	Crankshaft position-camshaft position correlation malfunction
DETECTION CONDITION	- The PCM monitors the input signals from the CKP sensor and the CMP sensor while the engine is running. If the input signals from the CKP sensor and the CMP sensor do not correspond, the PCM determines that there is a correlation malfunction between crankshaft and camshaft positions. Diagnostic support note - The MIL does not illuminate. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- CKP sensor malfunction - CMP sensor malfunction - Loose timing belt - PCM malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is P0336, P0337, P0341 or P0342 on FREEZE FRAME DATA?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE)
		No Go to the next step.
5	INSPECT CKP SENSOR - Inspect the CKP sensor. - Is there any malfunction?	Yes Replace the CKP sensor, go to Step 8.
		No Go to the next step.
6	INSPECT CMP SENSOR - Inspect the CMP sensor. - Is there any malfunction?	Yes Replace the CMP sensor, go to Step 8.
		No Go to the next step.
7	INSPECT TIMING BELT - Inspect the timing belt installation. - Is any malfunction?	Yes Reinstall the timing belt, go to the next step.
		No Go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P0016 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, go to the next step.
		No Go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE)
		No Troubleshooting completed.

F2

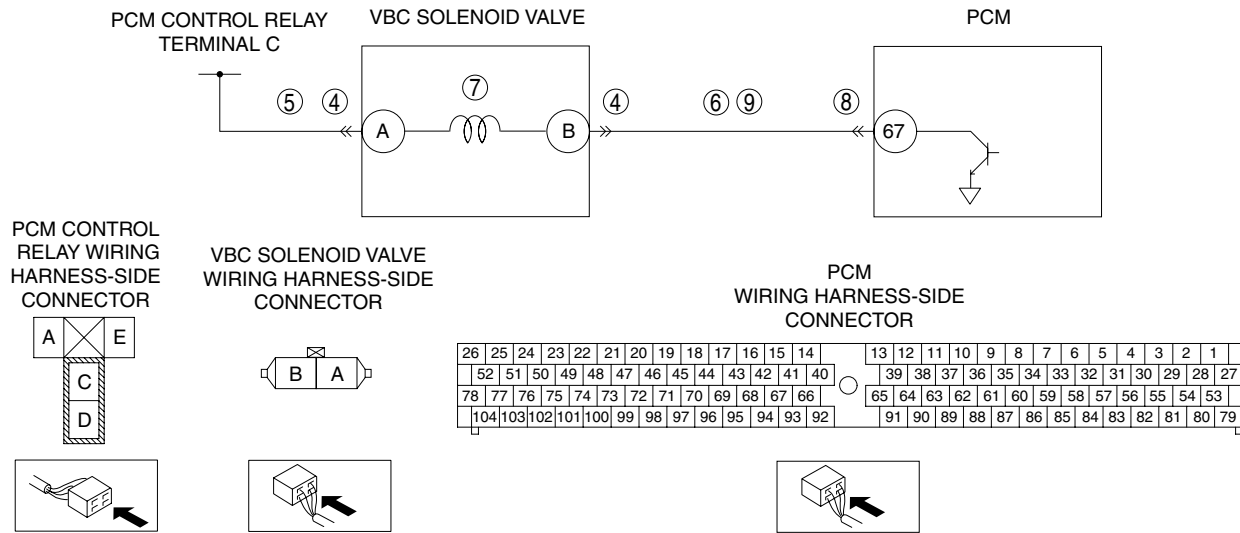
DTC P0045

B6E407000001102

DTC P0045	Variable boost control (VBC) solenoid valve control circuit low input
DETECTION CONDITION	- The PCM monitors the output signal when the PCM controls the variable boost control solenoid valve between 30 and 70%. If the current of the variable boost control solenoid valve is less than 0.8 A during variable boost control solenoid valve control, the PCM determines that there is a malfunction in the variable boost control solenoid valve control circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- VBC solenoid valve malfunction - Connector or terminal malfunction - Open circuit in wiring harness between PCM control relay terminal C and VBC solenoid valve terminal A - Open circuit in wiring harness between VBC solenoid valve terminal B and PCM terminal 67 - Short to GND in wiring harness between VBC solenoid valve terminal B and PCM terminal 67 - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0045 Variable boost control (VBC) solenoid valve control circuit low input



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No
4	INSPECT VBC SOLENOID VALVE CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the VBC solenoid valve connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT VBC SOLENOID VALVE POWER CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch to the ON position (Engine off). - Measure the voltage between VBC solenoid valve terminal A (wiring harness-side) and body GND. - Is the voltage B+?	Yes
		No
6	INSPECT VBC SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between VBC solenoid valve terminal B (wiring harness-side) and body GND. - Is there continuity?	Yes
		No
7	INSPECT VBC SOLENOID VALVE - Inspect the VBC solenoid valve. - Is there any malfunction?	Yes
		No
8	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT VBC SOLENOID VALVE CONTROL CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between VBC solenoid valve terminal B (wiring harness-side) and PCM terminal 67 (wiring harness-side). - Is there continuity?	Yes
		No
10	VERIFY TROUBLESHOOTING OF DTC P0045 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No

F2

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No DTC troubleshooting completed.

DTC P0088

B6E40700001103

DTC P0088	Fuel pressure system too high
DETECTION CONDITION	The PCM monitors the fuel pressure in the common rail from the fuel pressure sensor while the engine running. If the fuel pressure is more than 188 MPa {1,917 kgf/cm², 27,267 psi}, the PCM determines that the fuel pressure is too high.
POSSIBLE CAUSE	- Suction control valve malfunction - Fuel pressure sensor malfunction - Fuel pressure limiter malfunction - PCM malfunction

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is P0627, P0628, P0629, P0191, P0192 or P0193 on FREEZE FRAME DATA?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE)
		No Go to the next step.
5	INSPECT SUCTION CONTROL VALVE - Inspect the suction control valve. - Is there any malfunction?	Yes Repair the supply pump, go to Step 8.
		No Go to the next step.
6	INSPECT FUEL PRESSURE SENSOR - Inspect the fuel pressure sensor. - Is there any malfunction?	Yes Replace the common rail, go to Step 8.
		No Go to the next step.
7	INSPECT COMMON RAIL - Inspect the common rail. - Is there any malfunction?	Yes Replace the common rail, go to the next step.
		No Go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P0088 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, go to the next step.
		No Go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE)
		No Troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC P0093

B6E40700001104

DTC P0093	Fuel system leak detection
DETECTION CONDITION	- The PCM monitors the fuel pressure in the common rail from the fuel pressure sensor while the engine running. If the fuel pressure is lower after the fuel injection than the preprogrammed criteria, the PCM determines fuel system leakage. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Fuel leakage or clogged fuel line - Suction control valve malfunction - Fuel pressure sensor malfunction - Fuel injector malfunction - PCM malfunction

Diagnostic procedure

F2

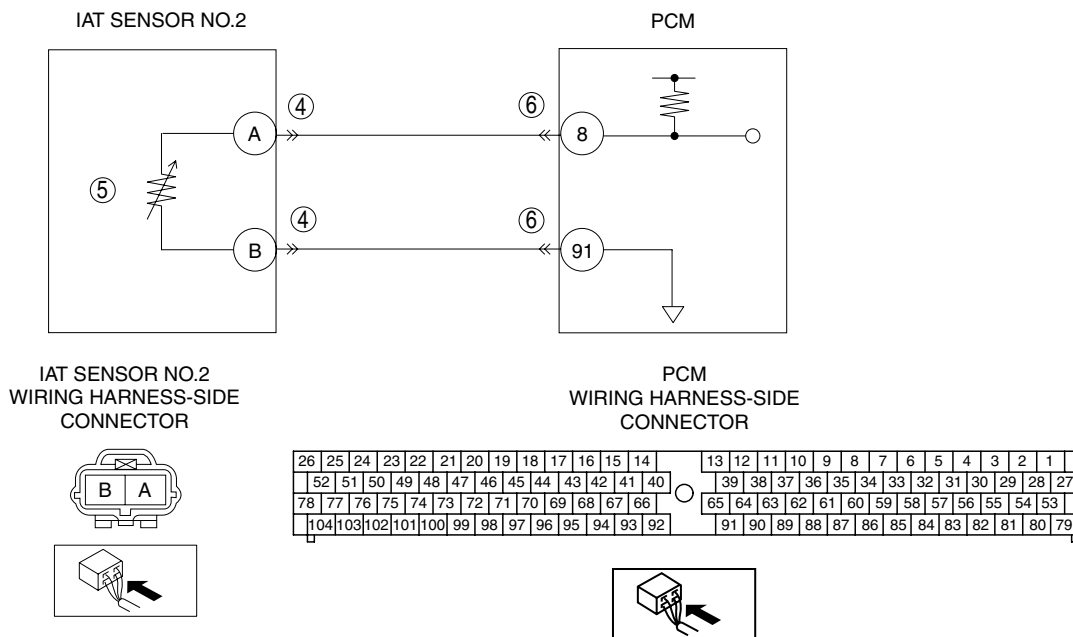
STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available Service Information. • If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is P0192, P0193 or P1190 on FREEZE FRAME DATA?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE)
		No Go to the next step.
5	INSPECT FUEL LINE - Turn the engine switch off. - Inspect for fuel leakage or clogging in the following fuel lines for each cylinder: - Supply pump and Common rail. - Common rail and fuel injector. - Is there any malfunction?	Yes Repair or replace the suspected fuel line, go to Step 9.
		No Go to the next step.
6	INSPECT SUCTION CONTROL VALVE - Inspect the suction control valve. - Is there any malfunction?	Yes Repair the supply pump, go to Step 9.
		No Go to the next step.
7	INSPECT FUEL PRESSURE SENSOR - Inspect the fuel pressure sensor. - Is there any malfunction?	Yes Replace the common rail, go to Step 9.
		No Go to the next step.
8	INSPECT FUEL INJECTOR - Inspect the fuel injector. - Is there any malfunction?	Yes Replace the fuel injector, go to the next step.
		No Go to the next step.
9	VERIFY TROUBLESHOOTING OF DTC P0093 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, go to the next step.
		No Go to the next step.
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE)
		No Troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC P0096

B6E407000001105

DTC P0096	Intake air temperature (IAT) sensor No.2 circuit range/performance problem
DETECTION CONDITION	- The PCM monitors the input signal from intake air temperature sensor No.2. If the difference between the maximum and minimum value of the intake air temperature sensor No.2 is less than 1 °C {1.8 °F}, the PCM determines that there is a malfunction in intake air temperature sensor No.2. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- IAT sensor No.2 malfunction - Connector or terminal malfunction - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT IAT SENSOR No.2 CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the IAT sensor No.2 connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to Step 7.
		No Go to the next step.
5	INSPECT IAT SENSOR NO.2 - Inspect the IAT sensor No.2. - Is there any malfunction?	Yes Replace the IAT sensor No.2, then go to Step 7.
		No Go to the next step.
6	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to the next step.
		No Go to the next step.
7	VERIFY TROUBLESHOOTING OF DTC P0096 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
8	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No DTC troubleshooting completed.

F2

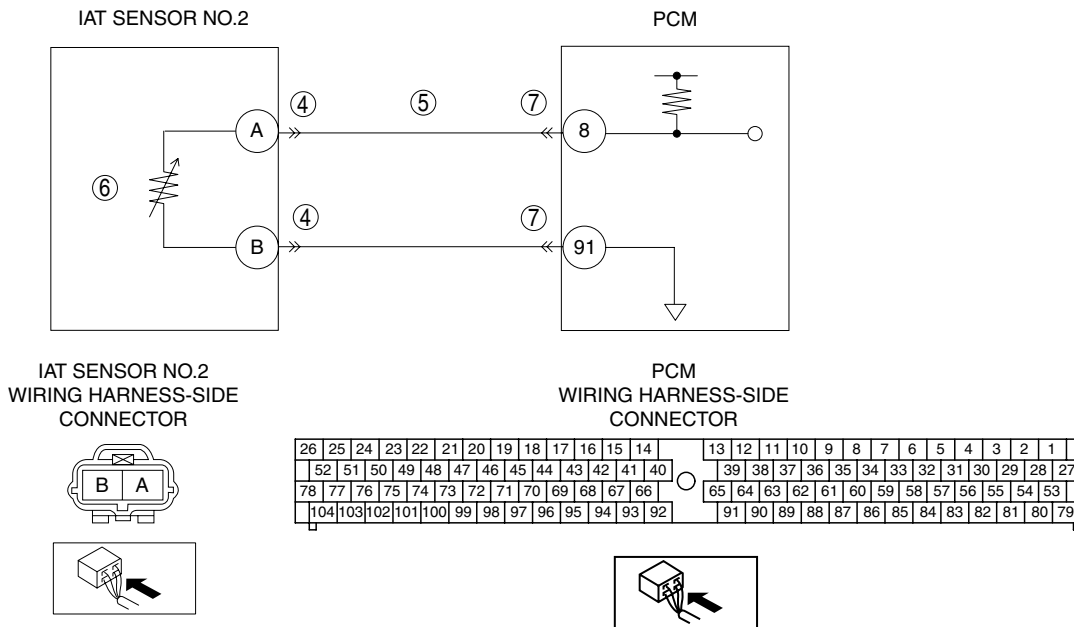
DTC P0097

B6E407000001106

DTC P0097	Intake air temperature (IAT) sensor No.2 circuit low input
DETECTION CONDITION	- The PCM monitors the input signal from intake air temperature sensor No.2. If the voltage from intake air temperature sensor No.2 is less than 0.14 V, the PCM determines that there is a malfunction in the intake air temperature sensor No.2 circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- IAT sensor No.2 malfunction - Connector or terminal malfunction - Short to GND in wiring harness between IAT sensor No.2 terminal A and PCM terminal 8 - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0097 Intake air temperature (IAT) sensor No.2 circuit low input



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT IAT SENSOR NO.2 CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the IAT sensor No.2 connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT IAT SENSOR NO.2 SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between IAT sensor No.2 terminal A (wiring harness-side) and body GND. - Is there continuity?	Yes
		No
6	INSPECT IAT SENSOR NO.2 - Inspect the IAT sensor No.2. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	VERIFY TROUBLESHOOTING OF DTC P0097 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

F2

DTC P0098

B6E407000001107

DTC P0098	IAT sensor No.2 circuit high input
DETECTION CONDITION	- The PCM monitors the input signal from intake air temperature sensor No.2. If the voltage from intake air temperature sensor No.2 is more than 4.92 V, the PCM determines that there is a malfunction in the intake air temperature sensor No.2 circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.

ON-BOARD DIAGNOSTIC

DTC P0098	IAT sensor No.2 circuit high input
POSSIBLE CAUSE	- IAT sensor No.2 malfunction - Connector or terminal malfunction - Open circuit in wiring harness between IAT sensor No.2 terminal A and PCM terminal 8 - Short to power supply in wiring harness between IAT sensor No.2 terminal A and PCM terminal 8 - Open circuit in wiring harness between IAT sensor No.2 terminal B and PCM terminal 91 - PCM malfunction

IAT SENSOR NO.2

IAT SENSOR NO.2
WIRING HARNESS-SIDE
CONNECTOR

PCM

PCM
WIRING HARNESS-SIDE
CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT IAT SENSOR NO.2 CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the IAT sensor No.2 connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT IAT SENSOR NO.2 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between IAT sensor No.2 terminal A (wiring harness-side) and body GND. - Is the voltage B+?	Yes
		No
6	INSPECT IAT SENSOR NO.2 - Inspect the IAT sensor No.2. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT IAT SENSOR NO.2 CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between the following terminals: - IAT sensor No.2 terminal A (wiring harness-side) and PCM terminal 8 (wiring harness-side) - IAT sensor No.2 terminal B (wiring harness-side) and PCM terminal 91 (wiring harness-side) - Is there continuity?	Yes
		No
9	VERIFY TROUBLESHOOTING OF DTC P0098 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

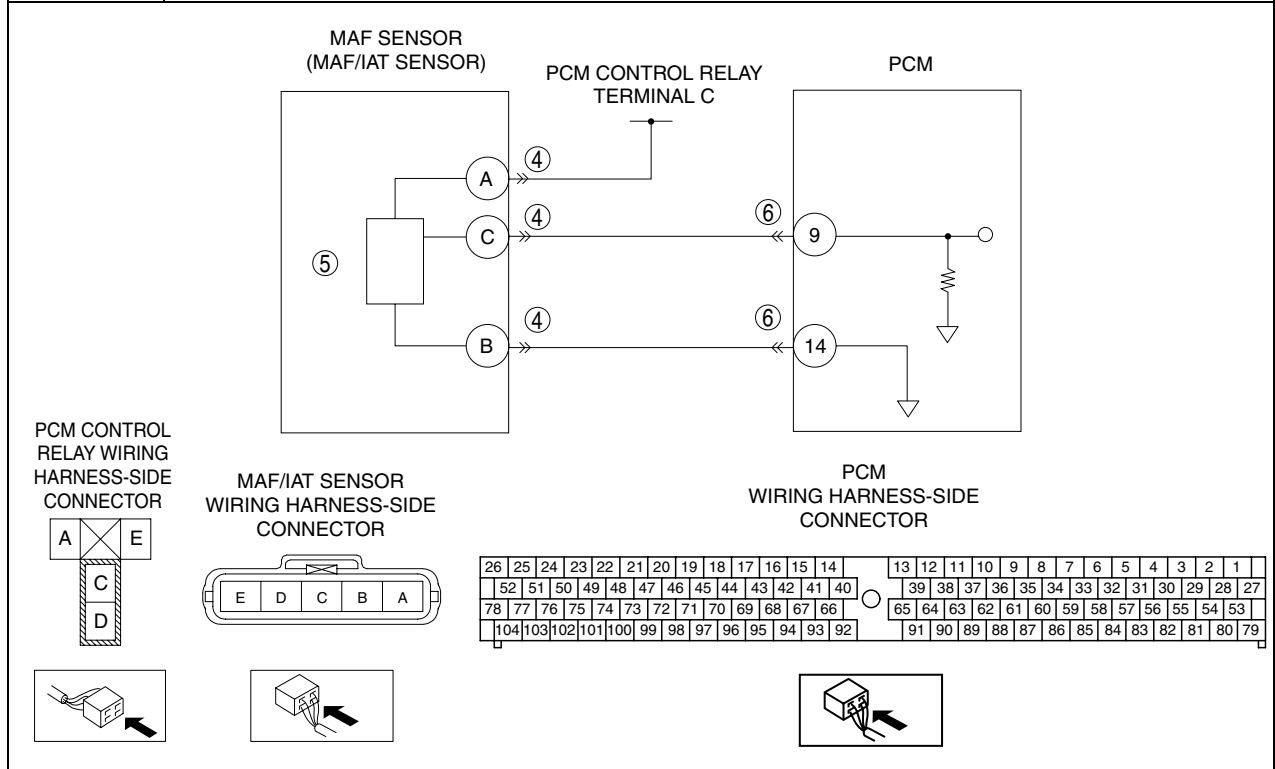
F2

ON-BOARD DIAGNOSTIC

DTC P0101

B6E407000100101

DTC P0101	Mass air flow (MAF) sensor range/performance problem
DETECTION CONDITION	- The PCM monitors the input signal from the mass air flow sensor when the engine speed is between 600 rpm and 2,100 rpm. If the voltage characteristic of the air flow sensor signal is out of the threshold, the PCM determines that there is a malfunction in the mass air flow sensor. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- MAF sensor malfunction - Connector or terminal malfunction - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT MAF SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the MAF sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to Step 7.
		No Go to the next step.
5	INSPECT MAF SENSOR - Inspect the MAF sensor. - Is there any malfunction?	Yes Replace the MAF/IAT sensor, then go to Step 7.
		No Go to the next step.
6	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to the next step.
		No Go to the next step.
7	VERIFY TROUBLESHOOTING OF DTC P0101 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
8	VERIFY AFTER REPAIR PROCEDURE - Perform the "AFTER REPAIR PROCEDURE". - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No DTC troubleshooting completed.

F2

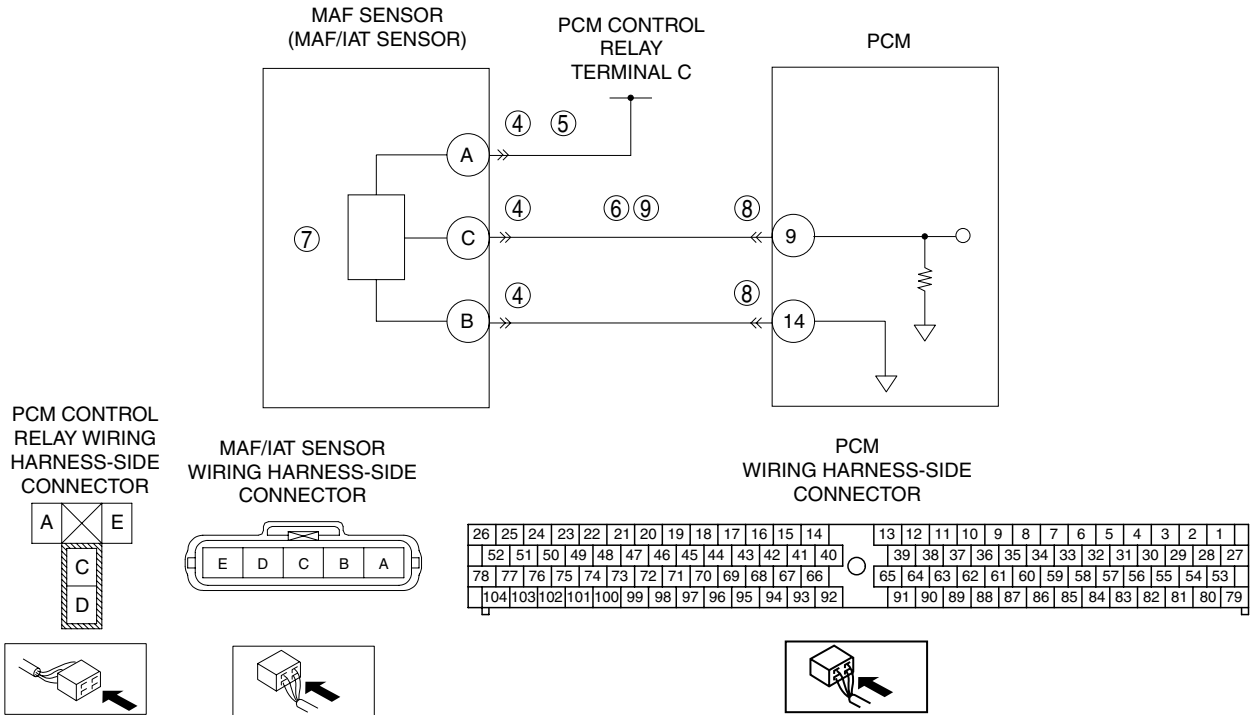
DTC P0102

B6E407000100102

DTC P0102	Mass air flow (MAF) sensor circuit low input
DETECTION CONDITION	- The PCM monitors the input signal from the air flow sensor. If the voltage from the air flow sensor is less than 0.15 V, the PCM determines that there is a malfunction in the air flow sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- MAF sensor malfunction - Connector or terminal malfunction - Open circuit in wiring harness between PCM control relay terminal C and MAF/IAT sensor terminal A - Open circuit in wiring harness between MAF/IAT sensor terminal C and PCM terminal 9 - Short to GND in wiring harness between MAF/IAT sensor terminal C and PCM terminal 9 - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0102 Mass air flow (MAF) sensor circuit low input



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT MAF/IAT SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the MAF/IAT sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT MAF SENSOR POWER CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch to the ON position (Engine off). - Measure the voltage between MAF/IAT sensor terminal A (wiring harness-side) and body GND. - Is the voltage B+?	Yes
		No
6	INSPECT MAF SENSOR SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between MAF/IAT sensor terminal C (wiring harness-side) and body GND. - Is there continuity?	Yes
		No
7	INSPECT MAF SENSOR - Inspect the MAF sensor. - Is there any malfunction?	Yes
		No
8	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT MAF SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between MAF/IAT sensor terminal C (wiring harness-side) and PCM terminal 9 (wiring harness-side). - Is there continuity?	Yes
		No
10	VERIFY TROUBLESHOOTING OF DTC P0102 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No

F2

STEP	INSPECTION	ACTION
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No DTC troubleshooting completed.

B6E407000100103

MAF SENSOR
(MAF/IAT SENSOR)

PCM CONTROL
RELAY
TERMINAL C

PCM

PCM CONTROL
RELAY WIRING
HARNESS-SIDE
CONNECTOR

MAF/IAT SENSOR
WIRING HARNESS-SIDE
CONNECTOR

PCM
WIRING HARNESS-SIDE
CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1	
52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27	
78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53	
104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79	

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT MAF/IAT SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the MAF/IAT sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT MAF SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between MAF/IAT sensor terminal C (wiring harness-side) and body GND. - Is the voltage more than 4.9 V?	Yes
		No
6	INSPECT MAF SENSOR - Inspect the MAF sensor. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT MAF SENSOR GND CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between MAF/IAT sensor terminal B (wiring harness-side) and PCM terminal 14 (wiring harness-side). - Is there continuity?	Yes
		No
9	VERIFY TROUBLESHOOTING OF DTC P0103 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

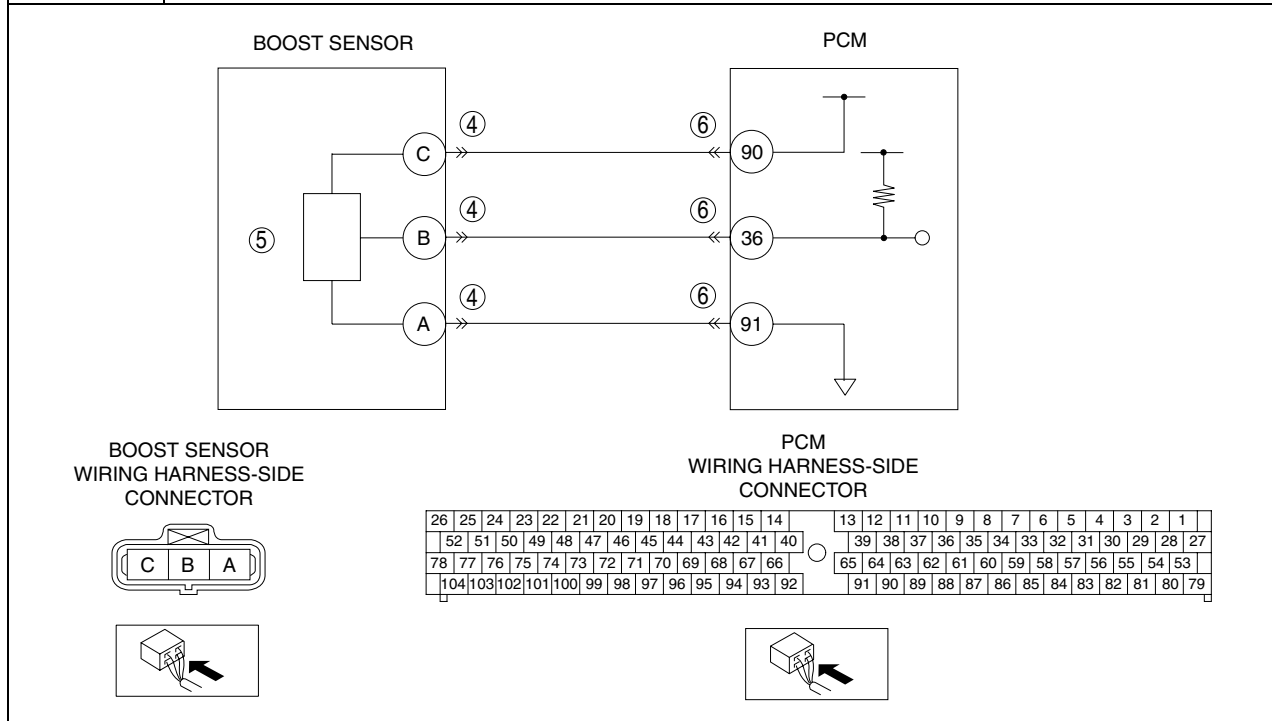
F2

ON-BOARD DIAGNOSTIC

DTC P0106

B6E407000100104

DTC P0106	Boost sensor range/performance problem
DETECTION CONDITION	- The PCM monitors the vacuum inside the intake manifold. If the difference of the vacuum inside the intake manifold during middle engine speed and low engine speed is less than the threshold, the PCM determines that there is a malfunction in the manifold absolute pressure sensor characteristic. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Boost sensor malfunction - Connector or terminal malfunction - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT BOOST SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the boost sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to Step 7.
		No Go to the next step.
5	INSPECT BOOST SENSOR - Inspect the boost sensor. - Is there any malfunction?	Yes Replace the boost sensor, then go to Step 7.
		No Go to the next step.
6	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to the next step.
		No Go to the next step.
7	VERIFY TROUBLESHOOTING OF DTC P0106 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
8	VERIFY AFTER REPAIR PROCEDURE Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No DTC troubleshooting completed.

F2

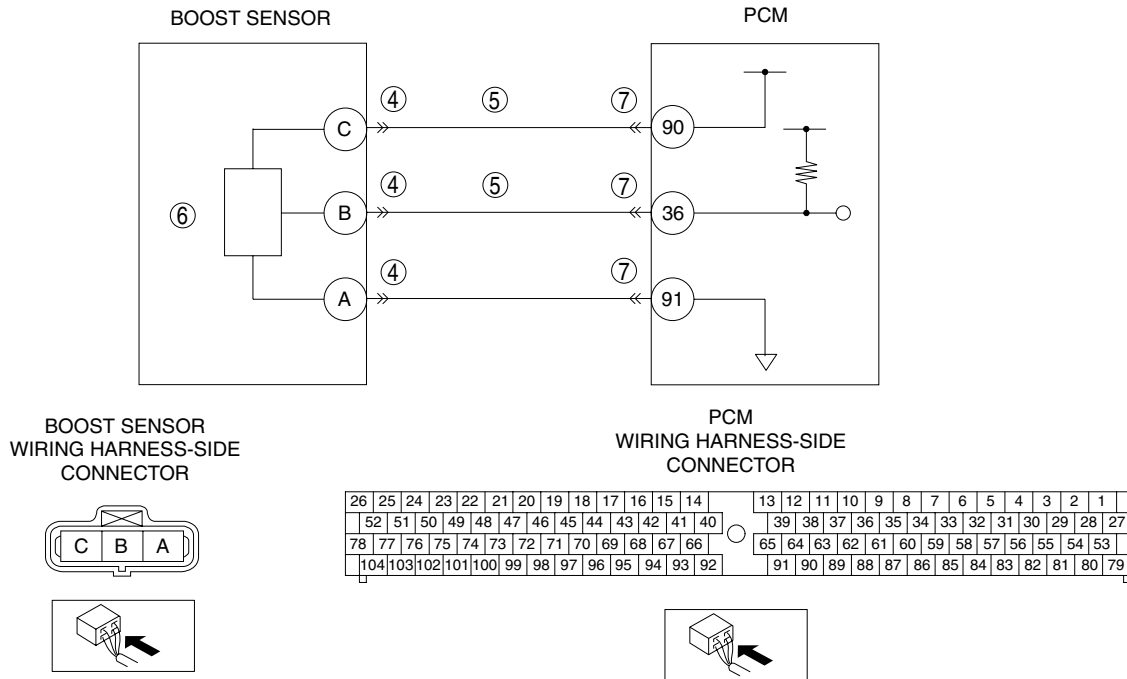
DTC P0107

B6E407000100105

DTC P0107	Boost sensor circuit low input
DETECTION CONDITION	The PCM monitors the input signal from the manifold absolute pressure. If the voltage from the manifold absolute pressure sensor is less than 0.4 V, the PCM determines that there is a malfunction in the manifold absolute pressure sensor circuit.
	Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Boost sensor malfunction - Connector or terminal malfunction - Short to GND in wiring harness between boost sensor terminal C and PCM terminal 90 - Short to GND in wiring harness between boost sensor terminal B and PCM terminal 36 - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0107 Boost sensor circuit low input



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT BOOST SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the boost sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to Step 8.
		No Go to the next step.
5	INSPECT BOOST SENSOR CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between the following terminals and body GND: - Boost sensor terminal C (wiring harness-side) and body GND - Boost sensor terminal B (wiring harness-side) and body GND - Is there continuity?	Yes Repair or replace the wiring harness for a possible short to GND, then go to Step 8.
		No Go to the next step.
6	INSPECT BOOST SENSOR - Inspect the boost sensor. - Is there any malfunction?	Yes Replace the boost sensor, then go to Step 8.
		No Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to Step 8.
		No Go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P0107 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No DTC troubleshooting completed.

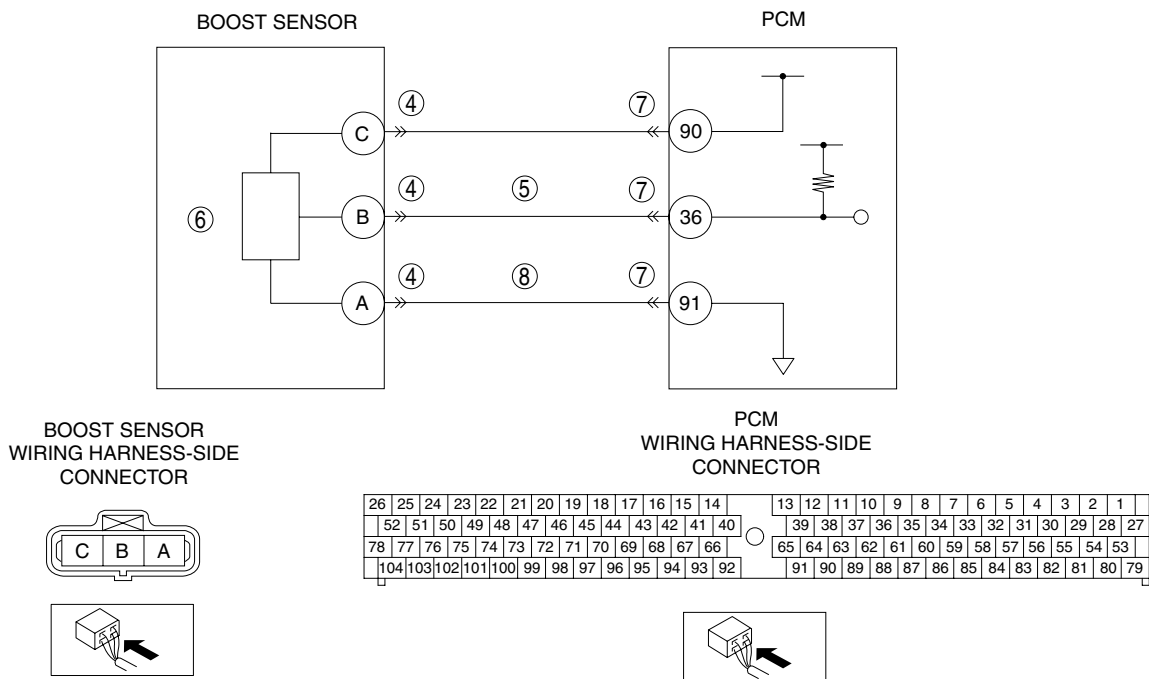
F2

ON-BOARD DIAGNOSTIC

DTC P0108

B6E407000100106

DTC P0108	Boost sensor circuit high input
DETECTION CONDITION	- The PCM monitors the input signal from the manifold absolute pressure sensor. If the voltage from the manifold absolute pressure sensor is more than 4.8 V, the PCM determines that there is a malfunction in the manifold absolute pressure sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Boost sensor malfunction - Connector or terminal malfunction - Short to power supply in wiring harness between boost sensor terminal B and PCM terminal 36 - Short to power supply in wiring harness between boost sensor terminal C and PCM terminal 90 - Open circuit in wiring harness between boost sensor terminal A and PCM terminal 91 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT BOOST SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the boost sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT BOOST SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between the following terminals: - Boost sensor terminal B (wiring harness-side) and body GND - Boost sensor terminal C (wiring harness-side) and body GND - Is the voltage more than 4.8 V?	Yes
		No
6	INSPECT BOOST SENSOR - Turn the engine switch off. - Inspect the boost sensor. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT BOOST SENSOR GND CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between boost sensor terminal A and PCM terminal 91. - Is there continuity?	Yes
		No
9	VERIFY TROUBLESHOOTING OF DTC P0108 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

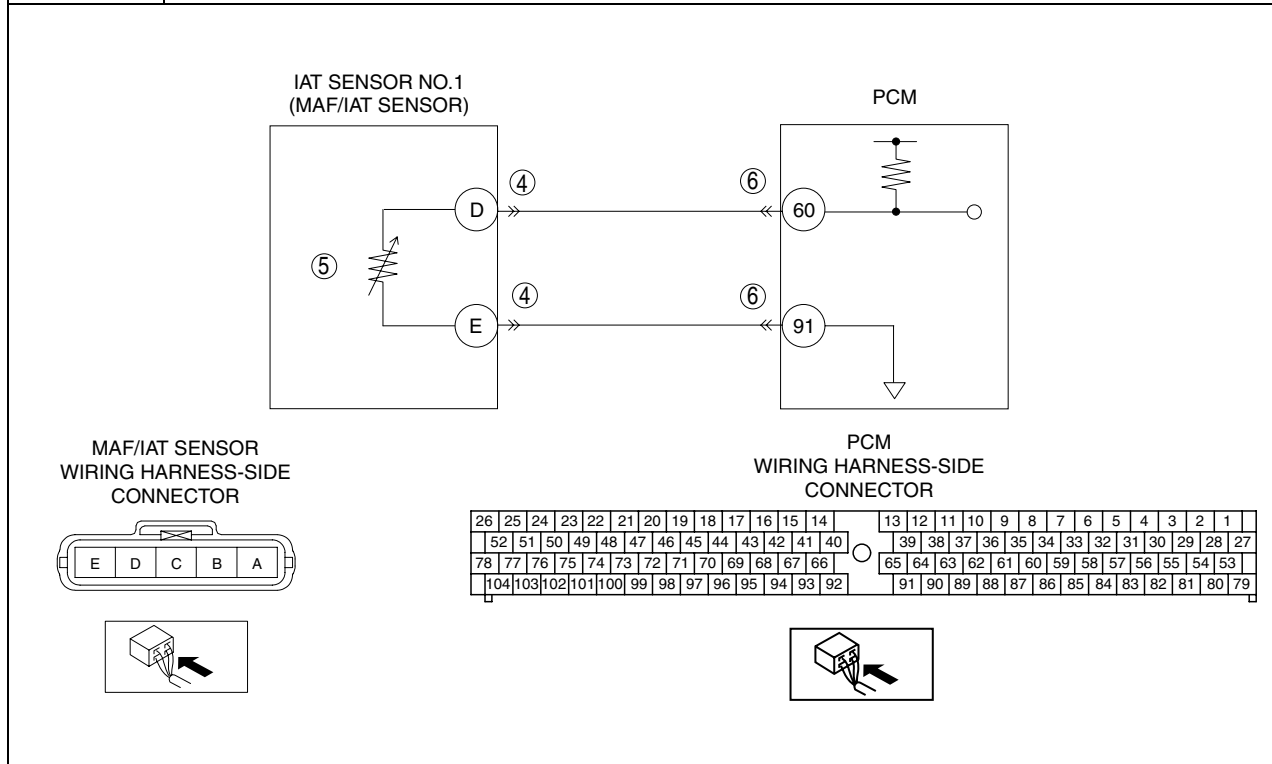
F2

ON-BOARD DIAGNOSTIC

DTC P0111

B6E407000100107

DTC P0111	Intake air temperature (IAT) sensor No.1 range/performance problem
DETECTION CONDITION	- The PCM monitors the input signal from intake air temperature sensor No.1. If the difference between the maximum and minimum value of the intake air temperature sensor No.1 is less than 1 °C {1.8 °F}, the PCM determines that there is a malfunction in intake air temperature sensor No.1. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- IAT sensor No.1 malfunction - Connector or terminal malfunction - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT MAF/IAT SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the MAF/IAT sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to Step 7.
		No Go to the next step.
5	INSPECT IAT SENSOR NO.1 - Inspect the IAT sensor No.1. - Is there any malfunction?	Yes Replace the MAF/IAT sensor, then go to Step 7.
		No Go to the next step.
6	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to the next step.
		No Go to the next step.
7	VERIFY TROUBLESHOOTING OF DTC P0111 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine and warm it up completely. - Is the PENDING CODE for this DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
8	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No DTC troubleshooting completed.

F2

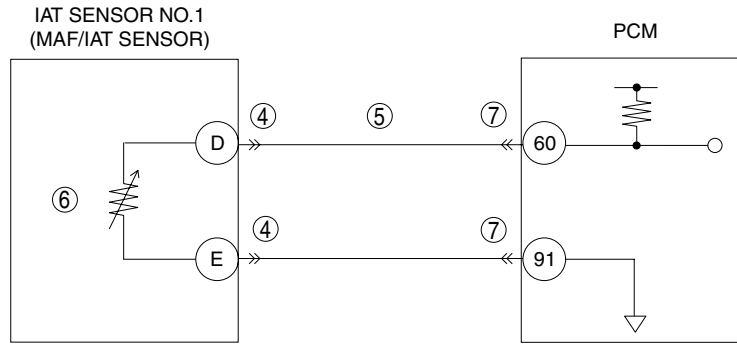
DTC P0112

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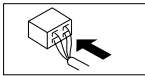
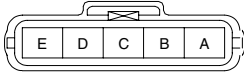
DTC P0112	Intake air temperature (IAT) sensor No.1 circuit low input
DETECTION CONDITION	- The PCM monitors the input signal from intake air temperature sensor No.1. If the voltage from intake air temperature sensor No.1 is less than 0.14 V, the PCM determines that there is a malfunction in the intake air temperature sensor No.1 circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- IAT sensor No.1 malfunction - Connector or terminal malfunction - Short to GND in wiring harness between MAF/IAT sensor terminal D and PCM terminal 60 - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0112 Intake air temperature (IAT) sensor No.1 circuit low input

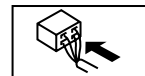


MAF/IAT SENSOR
WIRING HARNESS-SIDE
CONNECTOR



PCM
WIRING HARNESS-SIDE
CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT MAF/IAT SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the MAF/IAT sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT IAT SENSOR NO.1 SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between MAF/IAT sensor terminal D (wiring harness-side) and body GND. - Is there continuity?	Yes
		No
6	INSPECT IAT SENSOR NO.1 - Inspect the IAT sensor No.1. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	VERIFY TROUBLESHOOTING OF DTC P0112 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

F2

DTC P0113

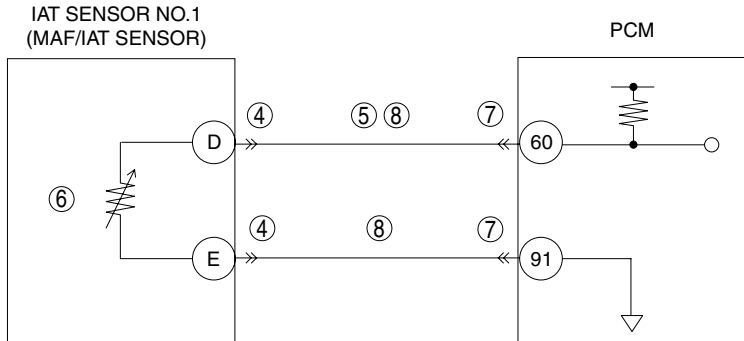
B6E407000100109

DTC P0113	Intake air temperature (IAT) sensor No.1 circuit high input
DETECTION CONDITION	- The PCM monitors the input signal from intake air temperature sensor No.1. If the voltage from intake air temperature sensor No.1 is more than 4.92 V, the PCM determines that there is a malfunction in the intake air temperature sensor No.1 circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.

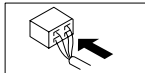
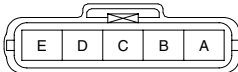
ON-BOARD DIAGNOSTIC

DTC P0113	Intake air temperature (IAT) sensor No.1 circuit high input
POSSIBLE CAUSE	- IAT sensor No.1 malfunction - Connector or terminal malfunction - Open circuit in wiring harness between MAF/IAT sensor terminal D and PCM terminal 60 - Short to power supply in wiring harness between MAF/IAT sensor terminal D and PCM terminal 60 - Open circuit in wiring harness between MAF/IAT sensor terminal E and PCM terminal 91 - PCM malfunction

IAT SENSOR NO.1
(MAF/IAT SENSOR)

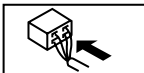


MAF/IAT SENSOR
WIRING HARNESS-SIDE
CONNECTOR



PCM
WIRING HARNESS-SIDE
CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1	
	52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53	
104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79	



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT MAF/IAT SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the MAF/IAT sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT IAT SENSOR NO.1 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between MAF/IAT sensor terminal D (wiring harness-side) and body GND. - Is the voltage more than 4.92 V?	Yes
		No
6	INSPECT IAT SENSOR NO.1 - Inspect the IAT sensor No. 1. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT IAT SENSOR NO.1 CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between the following terminals: - MAF/IAT sensor terminal D (wiring harness-side) and PCM terminal 60 (wiring harness-side) - MAF/IAT sensor terminal E (wiring harness-side) and PCM terminal 91 (wiring harness-side) - Is there continuity?	Yes
		No
9	VERIFY TROUBLESHOOTING OF DTC P0113 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

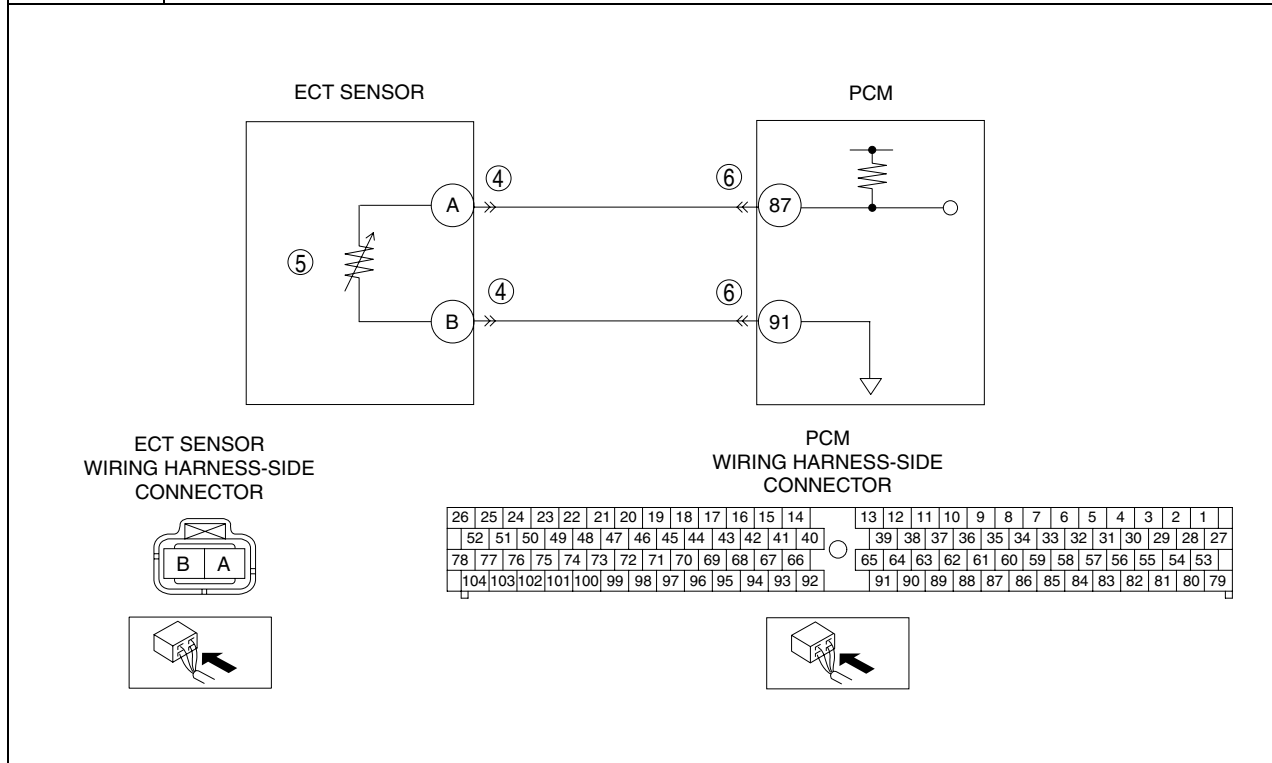
F2

ON-BOARD DIAGNOSTIC

DTC P0116

B6E407000100110

DTC P0116	Engine coolant temperature (ECT) sensor range/performance problem
DETECTION CONDITION	- The PCM monitors the input signal from the engine coolant temperature sensor. If the difference between the maximum and the minimum value of the ECT is less than 3 °C {5.4 °F}, the PCM determines that there is a malfunction in the engine coolant temperature sensor characteristic. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- ECT sensor malfunction - Connector or terminal malfunction - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine and warm it up completely. - Is the same DTC present?	Yes
		No
4	INSPECT ECT SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the ECT sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT ECT SENSOR - Inspect the ECT sensor. - Is there any malfunction?	Yes
		No
6	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
7	COMPARE ECT PID VALUE - Prepare a new ECT sensor. - Clear the DTC from the PCM memory using the WDS or equivalent. - Connect the ECT sensor connector to the new ECT sensor without installing to the engine. - Turn the engine switch to the ON position and record the ECT PID value. - Replace the malfunctioning ECT sensor with new one. - Start the engine and wait for 5 min. - Record the ECT PID value. - Is the difference between ECT PID values more than 3°C {5.4 °F}?	Yes
		No
8	VERIFY TROUBLESHOOTING OF DTC P0116 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine and warm it up completely. - Is the PENDING CODE for this DTC present?	Yes
		No
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

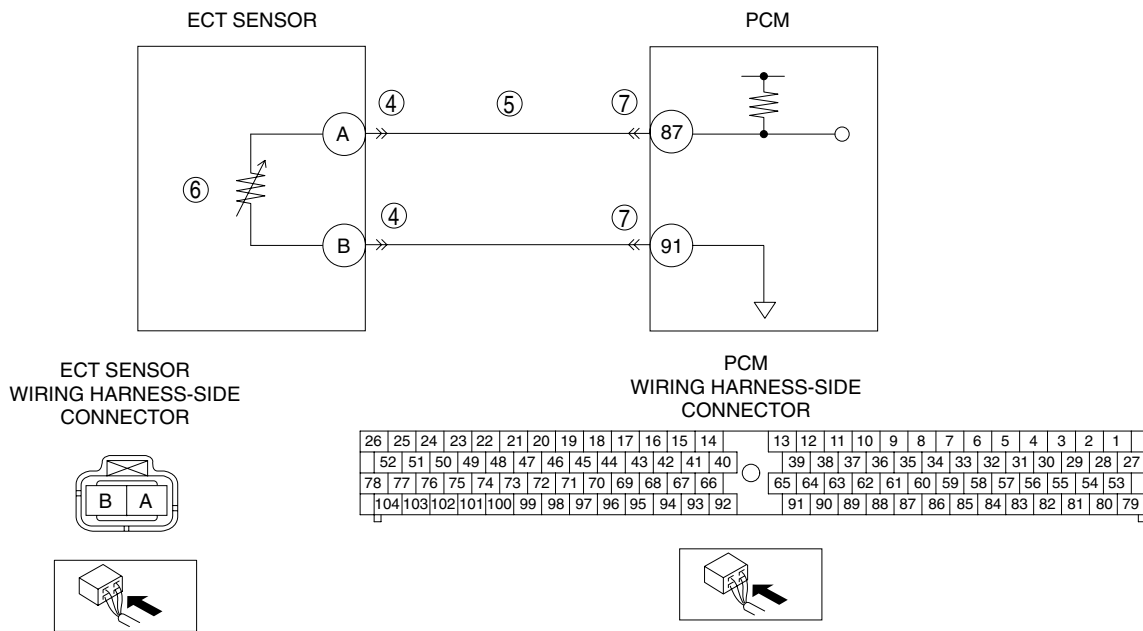
F2

ON-BOARD DIAGNOSTIC

DTC P0117

B6E407000100111

DTC P0117	Engine coolant temperature (ECT) sensor circuit low input
DETECTION CONDITION	- The PCM monitors the input signal from the engine coolant temperature sensor. If the voltage from the engine coolant temperature sensor is less than 0.14 V, the PCM determines that there is a malfunction in the engine coolant temperature sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- ECT sensor malfunction - Connector or terminal malfunction - Short to GND in wiring harness between ECT sensor terminal A and PCM terminal 87 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT ECT SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the ECT sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT ECT SENSOR SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Disconnect the ECT sensor connector. - Inspect for continuity between ECT sensor terminal A (wiring harness-side) and body GND. - Is there continuity?	Yes
		No
6	INSPECT ECT SENSOR - Inspect the ECT sensor. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	VERIFY TROUBLESHOOTING OF DTC P0117 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

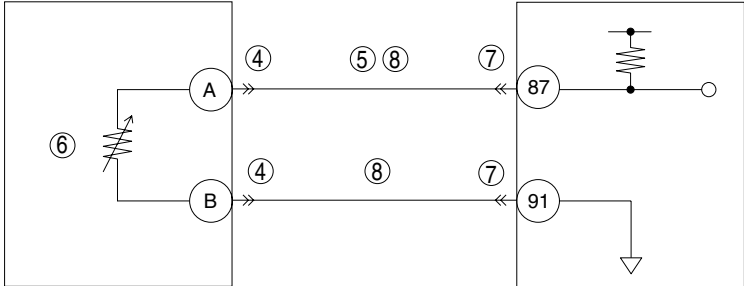
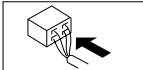
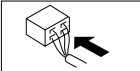
F2

DTC P0118

B6E407000100112

DTC P0118	Engine coolant temperature (ECT) sensor circuit high input
DETECTION CONDITION	- The PCM monitors the input signal from the engine coolant temperature sensor. If the voltage from the engine coolant temperature sensor is more than 4.92 V, the PCM determines that there is a malfunction in the engine coolant temperature sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.

ON-BOARD DIAGNOSTIC

DTC P0118	Engine coolant temperature (ECT) sensor circuit high input																																																																																																																
POSSIBLE CAUSE	- ECT sensor malfunction - Connector or terminal malfunction - Open circuit in wiring harness between ECT sensor terminal A and PCM terminal 87 - Short to power supply in wiring harness between ECT sensor terminal A and PCM terminal 87 - Open circuit in wiring harness between ECT sensor terminal B and PCM terminal 91 - PCM malfunction																																																																																																																
ECT SENSOR  ECT SENSOR WIRING HARNESS-SIDE CONNECTOR   PCM WIRING HARNESS-SIDE CONNECTOR <table border="1" data-bbox="584 863 1365 949"><tr><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td><td>16</td><td>15</td><td>14</td><td></td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td></td></tr><tr><td>52</td><td>51</td><td>50</td><td>49</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td></td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td></td></tr><tr><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td></td><td>65</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td><td></td></tr><tr><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td></td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td><td>80</td><td>79</td><td></td></tr></table> 		26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1		52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27		78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53		104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79	
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ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT ECT SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the ECT sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT ECT SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between ECT sensor terminal A (wiring harness-side) and body GND. - Is the voltage more than 4.92 V?	Yes
		No
6	INSPECT ECT SENSOR - Inspect the ECT sensor. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT ECT SENSOR CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between the following terminals: - ECT sensor terminal A (wiring harness-side) and PCM terminal 87 (wiring harness-side) - ECT sensor terminal B (wiring harness-side) and PCM terminal 91 (wiring harness-side) - Is there continuity?	Yes
		No
9	VERIFY TROUBLESHOOTING OF DTC P0118 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

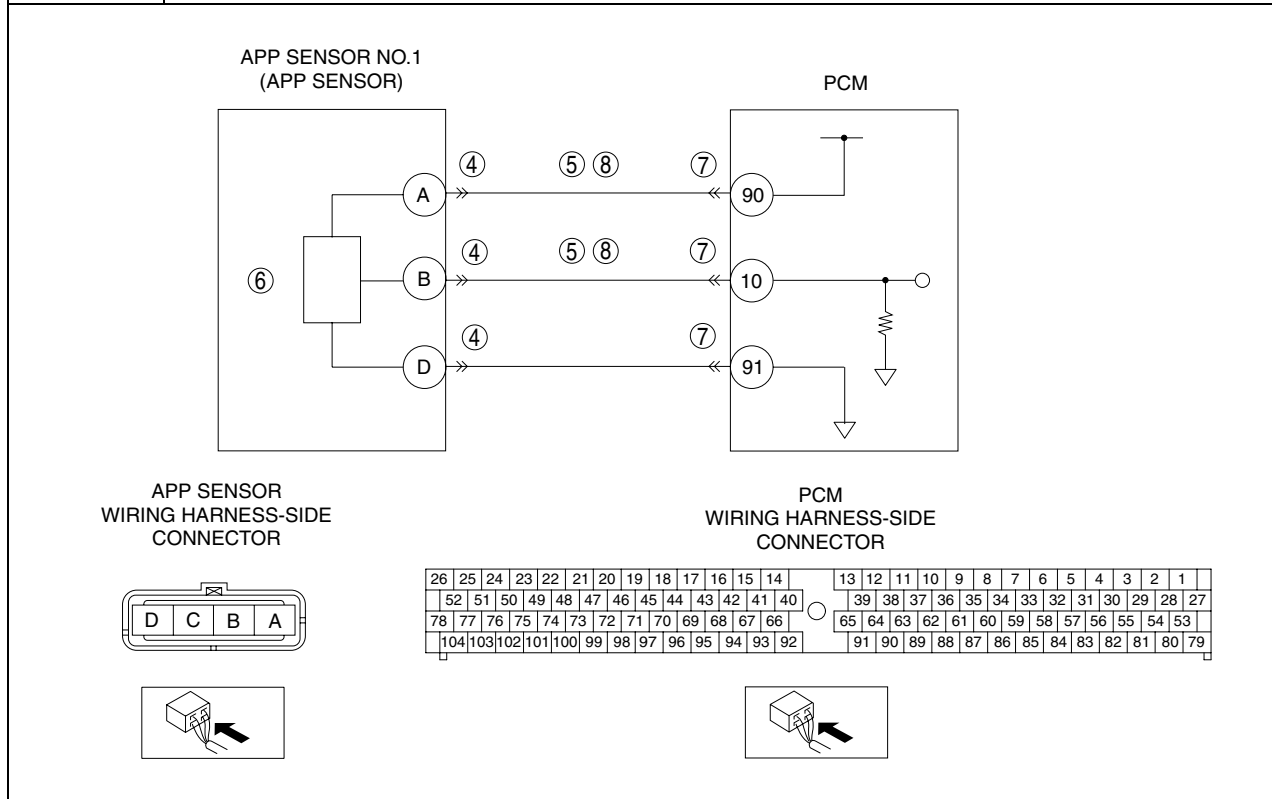
F2

ON-BOARD DIAGNOSTIC

DTC P0122

B6E407000100113

DTC P0122	Accelerator pedal position (APP) sensor No.1 circuit low input
DETECTION CONDITION	- The PCM monitors the input signal from accelerator pedal position sensor No.1. If the voltage from accelerator pedal position sensor No.1 is less than 0.3 V, the PCM determines that there is a malfunction in the accelerator pedal position sensor No.1 circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- APP sensor No.1 malfunction - Connector or terminal malfunction - Open circuit in wiring harness between APP sensor terminal A and PCM terminal 90 - Short to GND in wiring harness between APP sensor terminal A and PCM terminal 90 - Open circuit in wiring harness between APP sensor terminal B and PCM terminal 10 - Short to GND in wiring harness between APP sensor terminal B and PCM terminal 10 - Short to GND in wiring harness between APP sensor terminal D and PCM terminal 91 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT APP SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the APP sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT APP SENSOR NO.1 CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between the following terminals and body GND: - APP sensor terminal A (wiring harness-side) and body GND - APP sensor terminal B (wiring harness-side) and body GND - Is there continuity?	Yes
		No
6	INSPECT APP SENSOR NO.1 - Inspect the APP sensor No.1. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT APP SENSOR NO.1 CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between the following terminals: - APP sensor terminal A (wiring harness-side) and PCM terminal 90 (wiring harness-side) - APP sensor terminal B (wiring harness-side) and PCM terminal 10 (wiring harness-side) - Is there continuity?	Yes
		No
9	VERIFY TROUBLESHOOTING OF DTC P0122 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

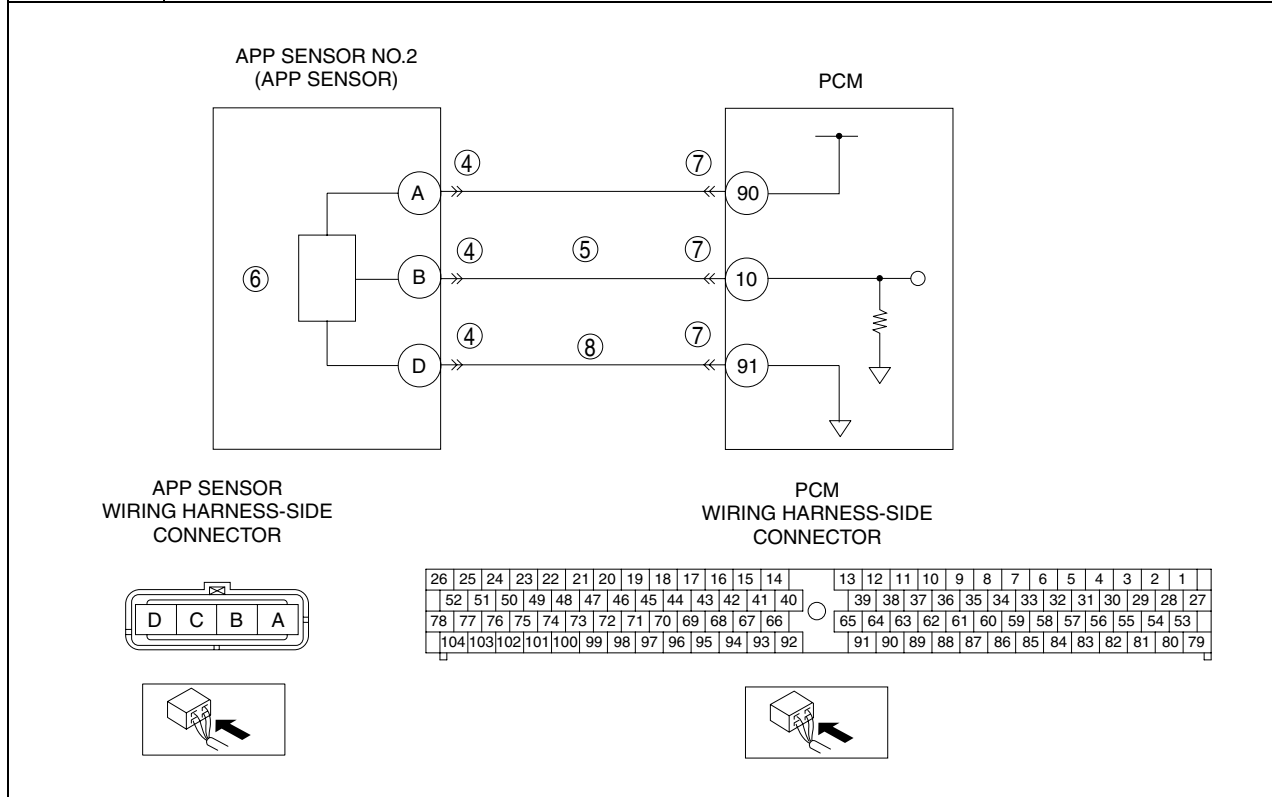
F2

ON-BOARD DIAGNOSTIC

DTC P0123

B6E407000100114

DTC P0123	Accelerator pedal position (APP) sensor No.1 circuit high input
DETECTION CONDITION	- The PCM monitors the input signal from accelerator pedal position sensor No.1. If the voltage from accelerator pedal position sensor No.1 is more than 4.7 V, the PCM determines that there is a malfunction in the accelerator pedal position sensor No.1 circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- APP sensor No.1 malfunction - Connector or terminal malfunction - Short to power supply in wiring harness between APP sensor terminal B and PCM terminal 10 - Open circuit in wiring harness between APP sensor terminal D and PCM terminal 91 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION	
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT APP SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the APP sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 9.
		No	Go to the next step.
5	INSPECT APP SENSOR NO.1 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between APP sensor terminal B (wiring harness-side) and body GND. - Is the voltage more than 4.7 V?	Yes	Repair or replace the wiring harness for a possible short to power supply, then go to Step 9.
		No	Go to the next step.
6	INSPECT APP SENSOR NO.1 - Inspect the APP sensor No.1. - Is there any malfunction?	Yes	Replace the APP sensor, then go to Step 9.
		No	Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 9.
		No	Go to the next step.
8	INSPECT APP SENSOR NO.1 GND CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between APP sensor terminal D (wiring harness-side) and PCM terminal 91 (wiring harness-side). - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a possible open circuit, then go to the next step.
9	VERIFY TROUBLESHOOTING OF DTC P0123 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No	DTC troubleshooting completed.

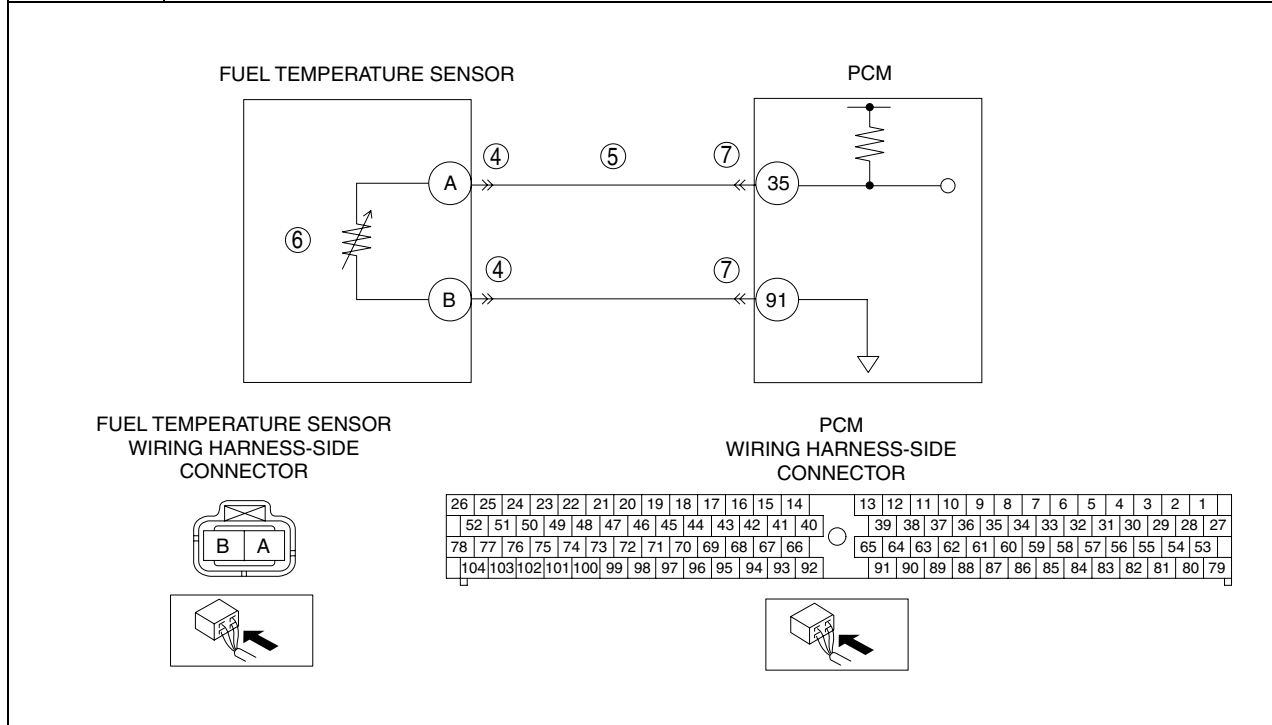
F2

ON-BOARD DIAGNOSTIC

DTC P0182

B6E407000100115

DTC P0182	Fuel temperature sensor circuit low input
DETECTION CONDITION	- The PCM monitors the input signal from the fuel temperature sensor. If the voltage from the fuel temperature sensor is less than 0.14 V, the PCM determines that there is a malfunction in the fuel temperature sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Fuel temperature sensor malfunction - Connector or terminal malfunction - Short to GND in wiring harness between fuel temperature sensor terminal A and PCM terminal 35 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT FUEL TEMPERATURE SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the fuel temperature sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to Step 8.
		No Go to the next step.
5	INSPECT FUEL TEMPERATURE SENSOR SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Disconnect the fuel temperature sensor connector. - Inspect for continuity between fuel temperature sensor terminal A (wiring harness-side) and body GND. - Is there continuity?	Yes Repair or replace the wiring harness for a possible short to GND, then go to Step 8.
		No Go to the next step.
6	INSPECT FUEL TEMPERATURE SENSOR - Inspect the fuel temperature sensor. - Is there any malfunction?	Yes Replace the fuel temperature sensor, then go to Step 8.
		No Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to the next step.
		No Go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P0182 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No DTC troubleshooting completed.

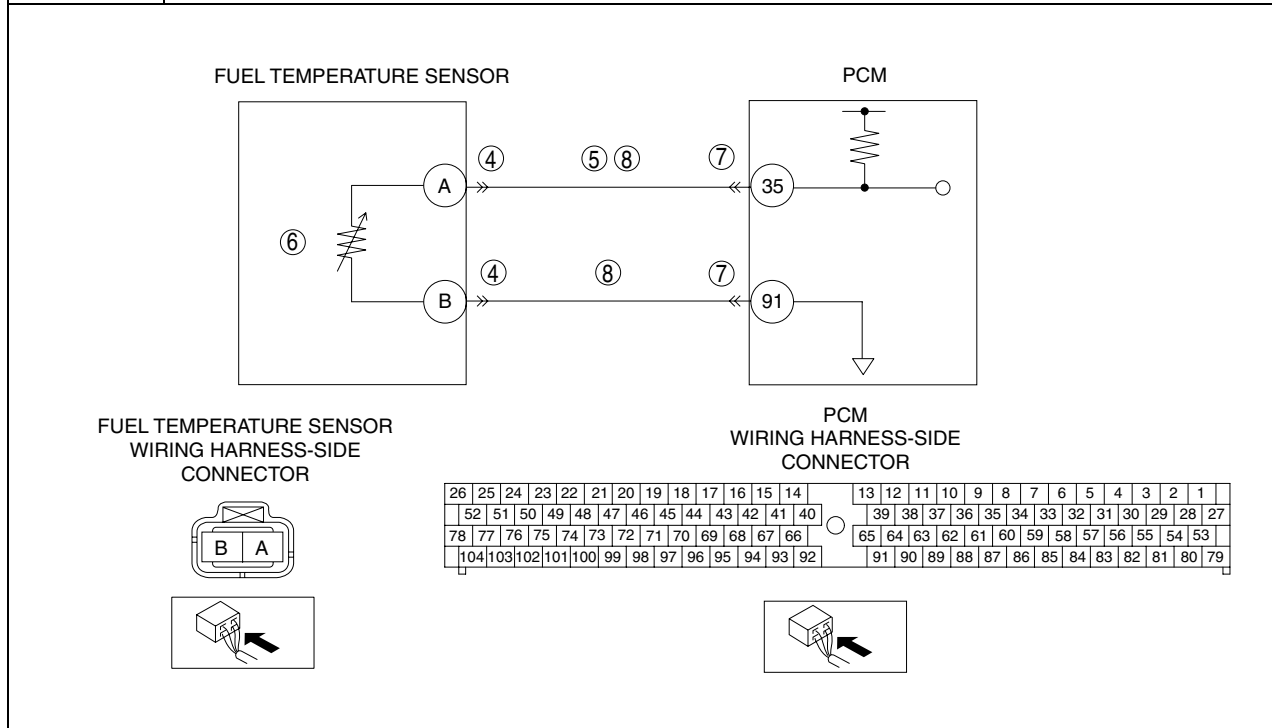
F2

ON-BOARD DIAGNOSTIC

DTC P0183

B6E407000100116

DTC P0183	Fuel temperature sensor circuit high input
DETECTION CONDITION	- The PCM monitors the input signal from the fuel temperature sensor. If the voltage from the fuel temperature sensor is more than 4.92 V, the PCM determines that there is a malfunction in the fuel temperature sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Fuel temperature sensor malfunction - Connector or terminal malfunction - Open circuit in wiring harness between fuel temperature sensor terminal A and PCM terminal 35 - Short to power supply in wiring harness between fuel temperature sensor terminal A and PCM terminal 35 - Open circuit in wiring harness between fuel temperature sensor terminal B and PCM terminal 91 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT FUEL TEMPERATURE SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the fuel temperature sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT FUEL TEMPERATURE SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between fuel temperature sensor terminal A (wiring harness-side) and body GND. - Is the voltage more than 4.92 V?	Yes
		No
6	INSPECT FUEL TEMPERATURE SENSOR - Inspect the fuel temperature sensor. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT FUEL TEMPERATURE SENSOR CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between the following terminals: - Fuel temperature sensor terminal A (wiring harness-side) and PCM terminal 35 (wiring harness-side) - Fuel temperature sensor terminal B (wiring harness-side) and PCM terminal 91 (wiring harness-side) - Is there continuity?	Yes
		No
9	VERIFY TROUBLESHOOTING OF DTC P0183 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No

F2

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No DTC troubleshooting completed.

DTC P0191

B6E407000100117

DTC P0191	Fuel pressure sensor range/performance problem
DETECTION CONDITION	- The PCM monitors the fuel pressure in the common rail and input signal from the fuel pressure sensor while the engine is running. If any one of the following conditions is met, the PCM determines that there is malfunction in the fuel pressure sensor range/performance problem. - The PCM calculates the difference between the actual fuel pressure and the target fuel pressure. If the pressure difference more than 2 MPa {20 kgf/cm², 290 psi}, the PCM determines that there is a malfunction in fuel pressure sensor range/performance problem. - The PCM monitors the input signal from fuel pressure sensor. If the difference between the maximum and minimum voltage of the fuel pressure sensor is less than 0.015 V, the PCM determines that there is a malfunction in fuel pressure sensor range/performance problem. Diagnostic support note - The MIL does not illuminates. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Fuel pressure sensor malfunction - Suction control valve malfunction - Clogged fuel line - PCM malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT FUEL PRESSURE SENSOR - Inspect the fuel pressure sensor. - Is there any malfunction?	Yes Replace the common rail, go to Step 7.
		No Go to the next step.
5	INSPECT SUCTION CONTROL VALVE - Inspect the suction control valve. - Is there any malfunction?	Yes Repair the supply pump, go to Step 7.
		No Go to the next step.
6	INSPECT FUEL LINE - Turn the engine switch off. - Inspect for clogging in the following fuel lines for each cylinder: - Common rail and fuel injector. - Common rail and fuel tank. - Is there any malfunction?	Yes Repair or replace the suspected fuel line, go to the next step.
		No Go to the next step.
7	VERIFY TROUBLESHOOTING OF DTC P0191 COMPLETED - Make sure to reconnect all disconnected connectors. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, go to the next step.
		No Go to the next step.
8	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE)
		No Troubleshooting completed.

F2

DTC P0192

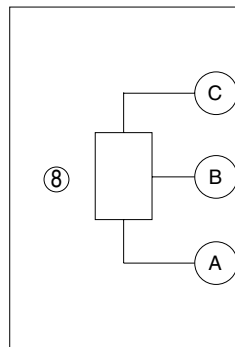
B6E407000100118

DTC P0192	Fuel pressure sensor circuit low input
DETECTION CONDITION	- The PCM monitors the input voltage from the fuel pressure sensor while the engine is running. If the input voltage from the fuel pressure sensor is less than 0.4 V, the PCM determines there is a malfunction in the fuel pressure sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Fuel pressure sensor malfunction - Connector or terminal malfunction - Short to GND in wiring harness between fuel pressure sensor terminal C and PCM terminal 90 - Open circuit in wiring harness between fuel pressure sensor terminal C and PCM terminal 90 - Short to GND in wiring harness between fuel pressure sensor terminal B and PCM terminal 61 - Fuel pressure sensor signal and GND circuits are shorted each other. - PCM malfunction

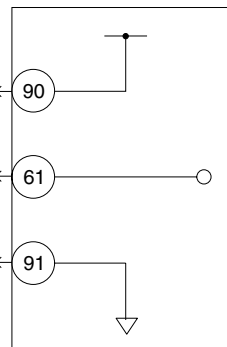
ON-BOARD DIAGNOSTIC

DTC P0192 Fuel pressure sensor circuit low input

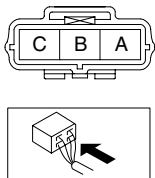
FUEL PRESSURE SENSOR



PCM

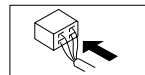


FUEL PRESSURE SENSOR
WIRING HARNESS-SIDE
CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT FUEL PRESSURE SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes Repair or replace the suspected terminal, go to Step 11.
		No Go to the next step.
5	INSPECT FUEL PRESSURE SENSOR SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between the following terminals and body GND: - Fuel pressure sensor terminal C - Fuel pressure sensor terminal B - Is there continuity?	Yes Repair or replace the wiring harness for a short to GND, go to Step 11.
		No Go to the next step.
6	INSPECT FUEL PRESSURE SENSOR POWER CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch to the ON position. (Engine off) - Inspect the voltage at fuel pressure sensor terminal C (wiring harness side). - Is the voltage below 1.0 V?	Yes Repair or replace the wiring harness for an open circuit, go to Step 11.
		No Go to the next step.
7	INSPECT FUEL PRESSURE SENSOR CIRCUIT FOR SHORT - Turn the engine switch off. - Inspect for continuity between fuel pressure sensor terminals B and A. - Is there continuity?	Yes Repair or replace wiring harness for a short, go to Step 11.
		No Go to the next step.
8	INSPECT FUEL TEMPERATURE SENSOR - Inspect the fuel temperature sensor. - Is there any malfunction?	Yes Repair the supply pump, go to Step 11.
		No Go to the next step.
9	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes Repair or replace the suspected terminal, go to Step 11.
		No Go to the next step.
10	INSPECT FUEL PRESSURE SENSOR CIRCUIT FOR OPEN - Turn the ignition switch off. - Inspect continuity between fuel pressure sensor terminal B and PCM terminal 61. - Is there continuity?	Yes Repair or replace suspected terminal, go to the next step.
		No Go to the next step.
11	VERIFY TROUBLESHOOTING OF DTC P0192 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, go to the next step.
		No Go to the next step.

F2

ON-BOARD DIAGNOSTIC

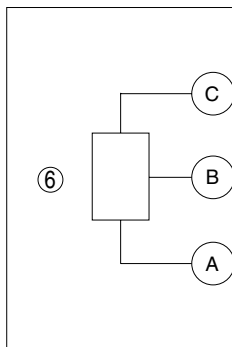
STEP	INSPECTION	ACTION
12	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No Troubleshooting completed.

DTC P0193

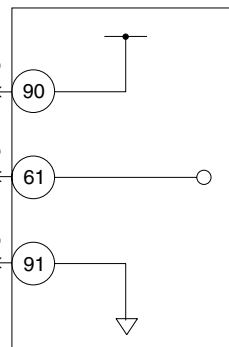
B6E407000100119

DTC P0193	Fuel pressure sensor circuit high input
DETECTION CONDITION	- The PCM monitors the input voltage from the fuel pressure sensor while the engine is running. If the input voltage from the fuel pressure sensor is more than 4.86 V, the PCM determines that there is a malfunction in the fuel pressure sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Fuel pressure sensor malfunction - Connector or terminal malfunction - Fuel pressure sensor power and signal circuits are shorted to each other. - Short to power supply in wiring between fuel pressure sensor terminal B and PCM terminal 61 - Open circuit in wiring between fuel pressure sensor terminal A and PCM terminal 91 - PCM malfunction

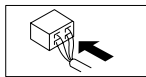
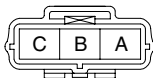
FUEL PRESSURE SENSOR



PCM

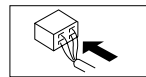


FUEL PRESSURE SENSOR
WIRING HARNESS-SIDE
CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27
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104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION	
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the “INTERMITTENT CONCERNS TROUBLESHOOTING”.
4	INSPECT FUEL PRESSURE SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 9.
		No	Go to the next step.
5	INSPECT FUEL PRESSURE SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between fuel pressure sensor terminal B (wiring harness-side) and body GND - Is the voltage more than 4.86 V	Yes	Repair or replace harness for short with each other, go to Step 9.
		No	Go to the next step.
6	INSPECT FUEL TEMPERATURE SENSOR - Inspect the fuel temperature sensor. - Is there any malfunction?	Yes	Repair the supply pump, go to Step 9.
		No	Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 9.
		No	Go to the next step.
8	INSPECT FUEL PRESSURE SENSOR FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between fuel pressure sensor terminal A and PCM terminal 91. - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, go to the next step.
9	VERIFY TROUBLESHOOTING OF DTC P0193 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Replace the PCM, go to the next step.
		No	Go to the next step.
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No	Troubleshooting completed.

F2

ON-BOARD DIAGNOSTIC

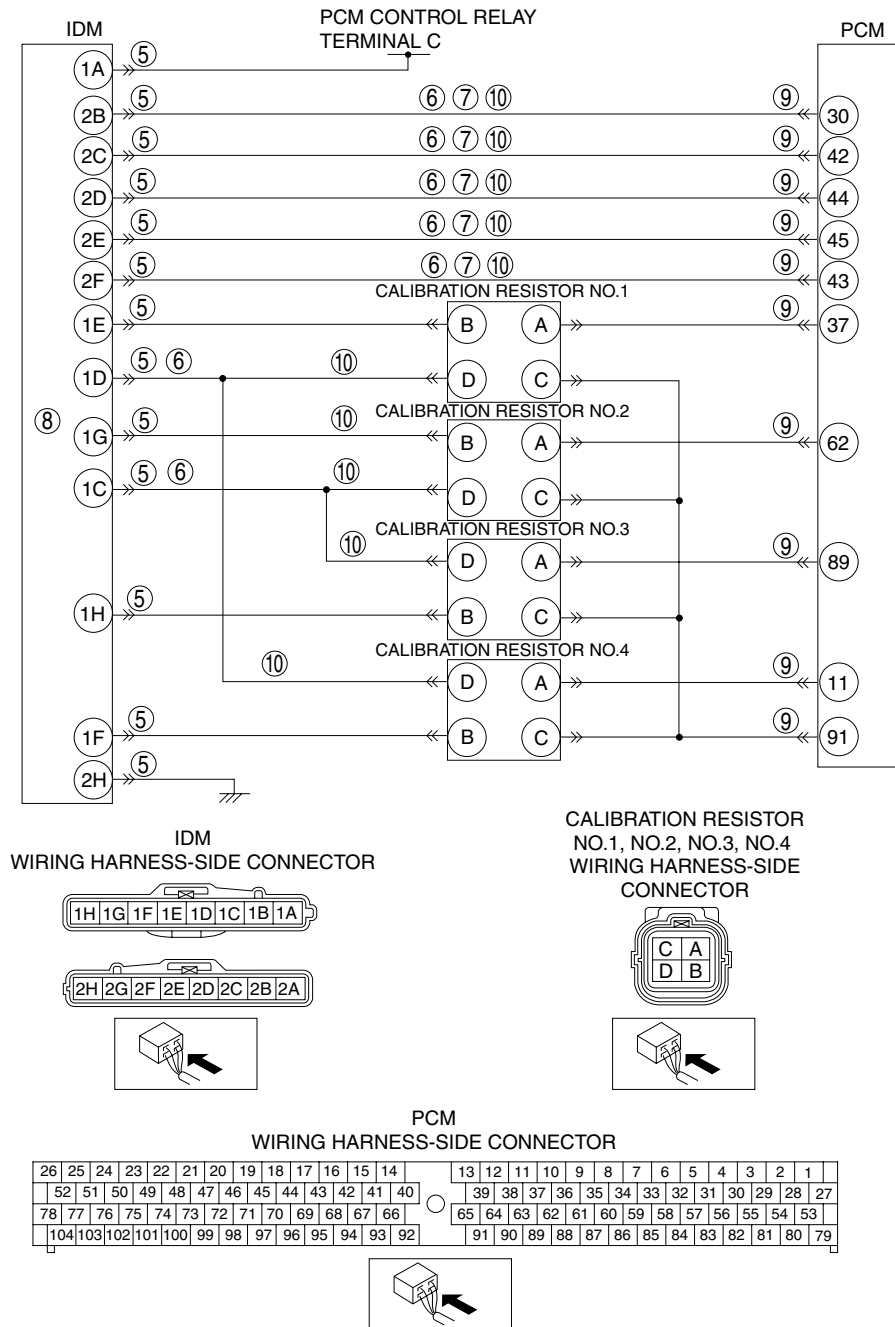
DTC P0200

B6E407000200101

DTC P0200	Fuel injector operation identified
DETECTION CONDITION	- The PCM monitors each cylinder injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for unspecified cylinder normally, the PCM determines that the unspecified cylinder fuel injector operation is not verified. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- IDM malfunction - Connector or terminal malfunction - Short to GND in wiring harness between IDM terminal 2B and PCM terminal 30 - Short to GND in wiring harness between IDM terminal 2C and PCM terminal 42 - Short to GND in wiring harness between IDM terminal 2D and PCM terminal 44 - Short to GND in wiring harness between IDM terminal 2E and PCM terminal 45 - Short to GND in wiring harness between IDM terminal 2F and PCM terminal 43 - Short to GND in wiring harness between fuel injector No.1 or No.4 terminal D and IDM terminal 1D - Short to GND in wiring harness between fuel injector No.2 or No.3 terminal D and IDM terminal 1C - Short to power supply in wiring harness between IDM terminal 2B and PCM terminal 30 - Short to power supply in wiring harness between IDM terminal 2C and PCM terminal 42 - Short to power supply in wiring harness between IDM terminal 2D and PCM terminal 44 - Short to power supply in wiring harness between IDM terminal 2E and PCM terminal 45 - Short to power supply in wiring harness between IDM terminal 2F and PCM terminal 43 - Open circuit in wiring harness between IDM terminal 2B and PCM terminal 30 - Open circuit in wiring harness between IDM terminal 2C and PCM terminal 42 - Open circuit in wiring harness between IDM terminal 2D and PCM terminal 44 - Open circuit in wiring harness between IDM terminal 2E and PCM terminal 45 - Open circuit in wiring harness between IDM terminal 2F and PCM terminal 43 - Open circuit in wiring harness between fuel injector No.1 or No.4 terminal D and IDM terminal 1D - Open circuit in wiring harness between fuel injector No.2 or No.3 terminal D and IDM terminal 1C - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0200 Fuel injector operation identified



F2

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is DTC P0200 on the FREEZE FRAME DATA?	Yes	Go to the next step.
		No	Go to troubleshooting procedures for the DTC in the FREEZE FRAME DATA.
5	INSPECT IDM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 11.
		No	Go to the next step.
6	INSPECT IDM CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between the following terminals and body GND: - IDM terminal 2B (wiring harness-side) - IDM terminal 2C (wiring harness-side) - IDM terminal 2D (wiring harness-side) - IDM terminal 2E (wiring harness-side) - IDM terminal 2F (wiring harness-side) - IDM terminal 1D (wiring harness-side) - IDM terminal 1C (wiring harness-side) - Is there continuity?	Yes	Repair or replace the wiring harness for a short to GND, then go to Step 11.
		No	Go to the next step.
7	INSPECT IDM FOR SHORT TO POWER SUPPLY - Turn the engine switch off. - Inspect the voltage between following harnesses and body GND: - IDM terminal 2B (wiring harness-side) - IDM terminal 2C (wiring harness-side) - IDM terminal 2D (wiring harness-side) - IDM terminal 2E (wiring harness-side) - IDM terminal 2F (wiring harness-side) - Is voltage B+?	Yes	Repair or replace the wiring harness for a short to GND, then go to Step 11.
		No	Go to the next step.
8	INSPECT IDM - Inspect the IDM. - Is there any malfunction?	Yes	Replace the IDM, then go to Step 11.
		No	Go to the next step.
9	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 11.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
10	INSPECT IDM FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between the following terminals: - IDM terminal 2B and PCM terminal 30 - IDM terminal 2C and PCM terminal 42 - IDM terminal 2D and PCM terminal 44 - IDM terminal 2E and PCM terminal 45 - IDM terminal 2F and PCM terminal 43 - IDM terminal 1D and fuel injector No.1 and No.4 terminal D - IDM terminal 1C and fuel injector terminal No.2 and No.3 terminal D - Is there continuity?	Yes Go to the next step.
		No Repair or replace the wiring harness for an open circuit, then go to the next step.
11	VERIFY TROUBLESHOOTING OF DTC P0200 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
12	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC troubleshooting. (See F2-40 DTC TABLE .)
		No Troubleshooting completed.

F2

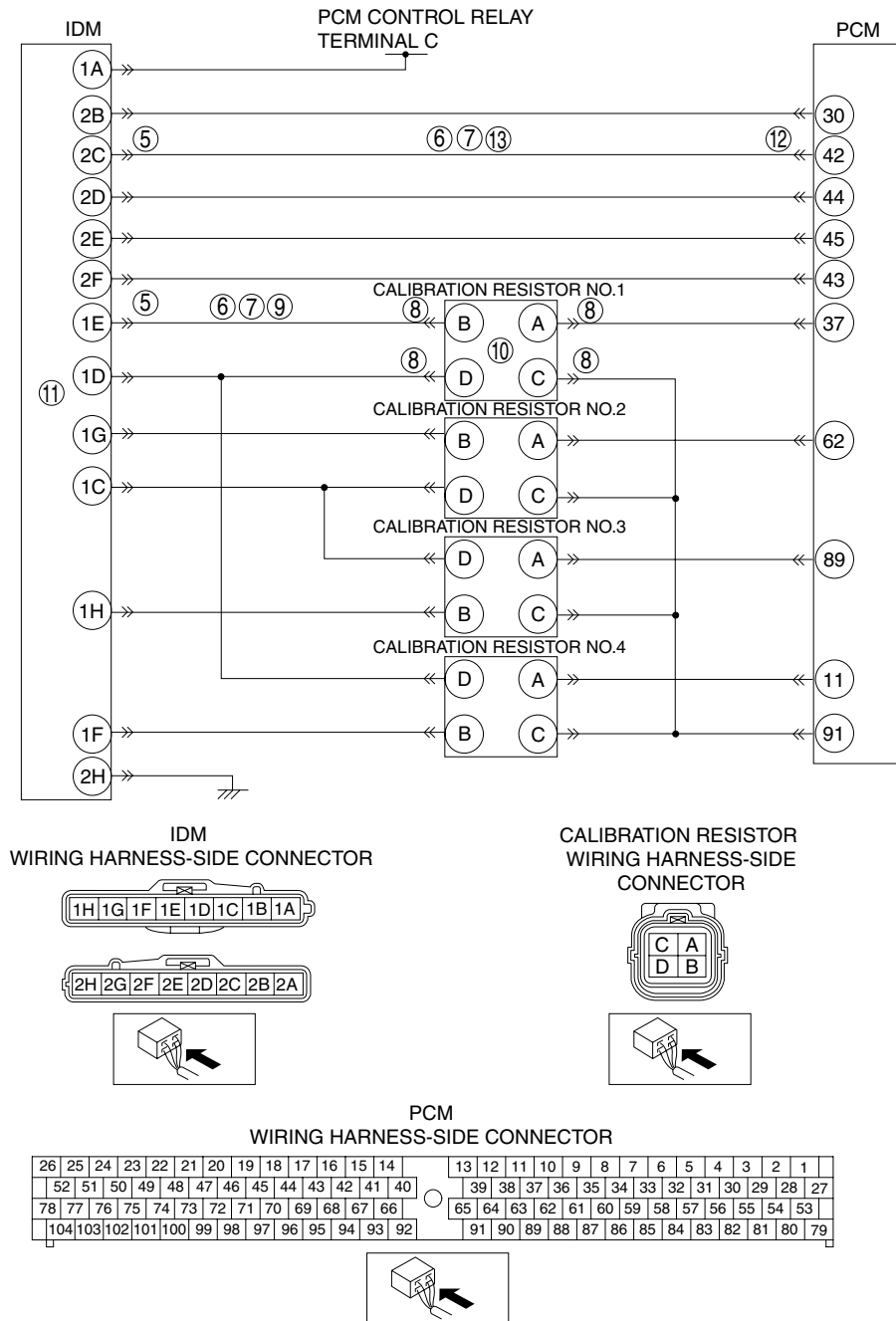
DTC P0201

B6E407000200102

DTC P0201	Fuel injector No.1 operation identified
DETECTION CONDITION	- The PCM monitors each cylinder injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.1 cylinder normally, PCM determines that the fuel injector No.1 operation is not verified. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- IDM malfunction - Connector or terminal malfunction - Short to GND in wiring harness between IDM terminal 2C and PCM terminal 42 - Short to power supply in wiring harness between IDM terminal 2C and PCM terminal 42 - Open circuit in wiring harness between IDM terminal 2C and PCM terminal 42 - Fuel injector No.1 malfunction - Short to GND in wiring harness between fuel injector No.1 terminal B and IDM terminal 1E - Short to power supply in wiring harness between fuel injector No.1 terminal B and IDM terminal 1E - Open circuit in wiring harness between fuel injector No.1 terminal B and IDM terminal 1E - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0201 Fuel injector No.1 operation identified



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is DTC P0201 on FREEZE FRAME DATA?	Yes
		No
5	INSPECT IDM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
6	INSPECT IDM FOR SHORT TO GND - Turn the engine switch off. - Inspect continuity between the following connector terminals and body GND. - IDM terminal 2C (wiring harness-side) - IDM terminal 1E (wiring harness-side) - Is there continuity?	Yes
		No
7	INSPECT IDM FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Inspect the voltage between following terminals and body GND. - IDM terminal 2C (wiring harness-side) - IDM terminal 1E (wiring harness-side) - Is the voltage B+?	Yes
		No
8	INSPECT FUEL INJECTOR NO.1 CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT FOR OPEN CIRCUIT BETWEEN IDM AND FUEL INJECTOR NO.1 - Turn the engine switch off. - Inspect for continuity between IDM terminal 1E (wiring harness-side) and fuel injector No.1 terminal B (wiring harness-side). - Is there continuity?	Yes
		No
10	INSPECT FUEL INJECTOR - Inspect fuel injector No.1. - Is there any malfunction?	Yes
		No
11	INSPECT IDM - Inspect the IDM. - Is there any malfunction?	Yes
		No

F2

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
12	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes Repair or replace the suspected terminal, then go to Step 14.
		No Go to the next step.
13	INSPECT FOR OPEN CIRCUIT BETWEEN IDM AND PCM - Turn the engine switch off. - Inspect for continuity between IDM terminal 2C (wiring harness-side) and PCM terminal 42 (wiring harness-side). - Is there continuity?	Yes Go to the next step.
		No Repair or replace the wiring harness for an open circuit, then go to the next step.
14	VERIFY TROUBLESHOOTING OF DTC P0201 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
15	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC troubleshooting. (See F2-40 DTC TABLE.)
		No Troubleshooting completed.

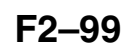
DTC P0202

B6E407000200103

DTC P0202	Fuel injector No.2 operation identified
DETECTION CONDITION	- The PCM monitors each cylinder injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.2 cylinder normally, the PCM determines that the fuel injector No.2 operation is not verified. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- IDM malfunction - Connector or terminal malfunction - Short to GND in wiring harness between IDM terminal 2F and PCM terminal 43 - Short to power supply in wiring harness between IDM terminal 2F and PCM terminal 43 - Open circuit in wiring harness between IDM terminal 2F and PCM terminal 43 - Fuel injector No.2 malfunction - Short to GND in wiring harness between fuel injector No.2 terminal B and IDM terminal 1G - Short to power supply in wiring harness between fuel injector No.2 terminal B and IDM terminal 1G - Open circuit in wiring harness between fuel injector No.2 terminal B and IDM terminal 1G - PCM malfunction

F2

F2



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is DTC P0202 on FREEZE FRAME DATA?	Yes	Go to the next step.
		No	Go to the troubleshooting procedures for the DTC in the FREEZE FRAME DATA.
5	INSPECT IDM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 14.
		No	Go to the next step.
6	INSPECT IDM FOR SHORT TO GND - Turn the engine switch off. - Inspect the continuity between the following terminals and body GND. - IDM terminal 2F (wiring harness-side) - IDM terminal 1G (wiring harness-side) - Is there continuity?	Yes	Repair or replace the wiring harness for a short to GND, then go to Step 14.
		No	Go to the next step.
7	INSPECT IDM FOR SHORT TO POWER - Turn the engine switch to the ON position (Engine off). - Inspect the voltage between the following terminals and body GND. - IDM terminal 2F (wiring harness-side) - IDM terminal 1G (wiring harness-side) - Is the voltage B+?	Yes	Repair or replace the wiring harness for a short to power, then go to Step 14.
		No	Go to the next step.
8	INSPECT FUEL INJECTOR NO.2 CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 14.
		No	Go to the next step.
9	INSPECT FOR OPEN CIRCUIT BETWEEN IDM AND FUEL INJECTOR NO.2 - Turn the engine switch off. - Inspect for continuity between IDM terminal 1G (wiring harness-side) and fuel injector No.2 terminal B (wiring harness-side). - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit then go to Step 14.
10	INSPECT FUEL INJECTOR - Inspect fuel injector No.2. - Is there any malfunction?	Yes	Replace fuel injector No.2, then go to Step 14.
		No	Go to the next step.
11	INSPECT IDM - Inspect the IDM. - Is there any malfunction?	Yes	Replace the IDM, then go to step 14.
		No	Go to the next step.
12	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 14.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
13	INSPECT FOR OPEN CIRCUIT BETWEEN IDM AND PCM - Turn the engine switch off. - Inspect the continuity between IDM terminal 2F (wiring harness-side) and PCM terminal 43 (wiring harness-side). - Is there continuity?	Yes Go to the next step.
		No Repair or replace the wiring harness for an open circuit, then go to the next step.
14	VERIFY TROUBLESHOOTING OF DTC P0202 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
15	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC troubleshooting. (See F2-40 DTC TABLE.)
		No Troubleshooting completed.

F2

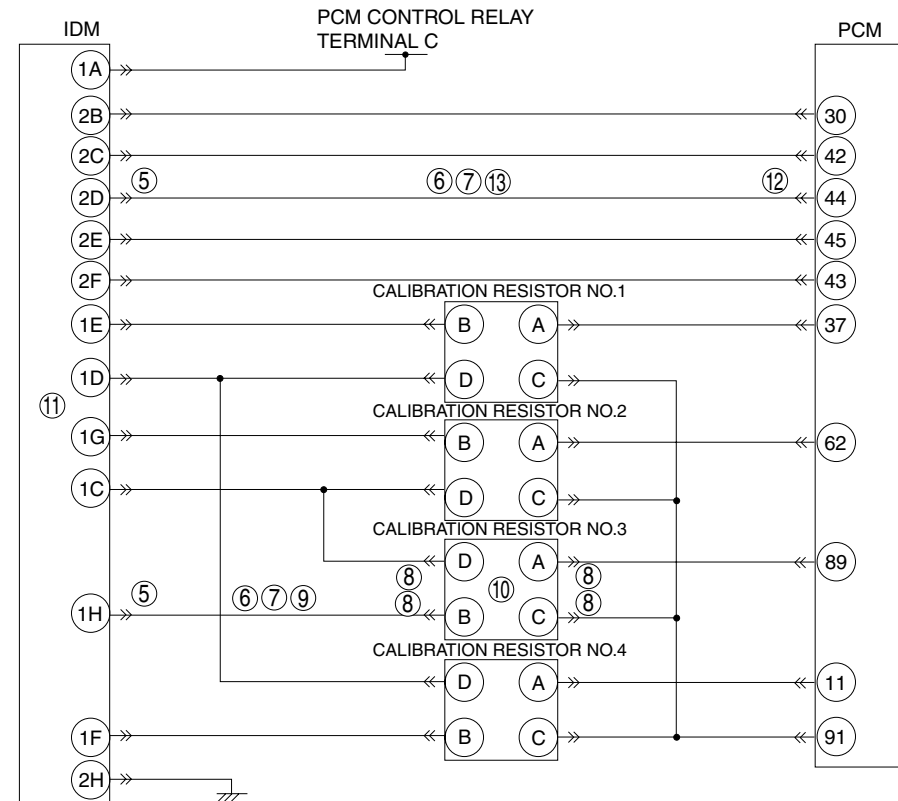
DTC P0203

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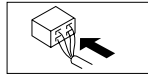
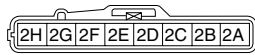
DTC P0203	Fuel injector No.3 operation identified
DETECTION CONDITION	- The PCM monitors each cylinder's injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.3 cylinder normally, the PCM determines that the fuel injector No.3 operation is not verified. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- IDM malfunction - Connector or terminal malfunction - Short to GND in wiring harness between IDM terminal 2D and PCM terminal 44 - Short to power supply in wiring harness between IDM terminal 2D and PCM terminal 44 - Open circuit in wiring harness between IDM terminal 2D and PCM terminal 44 - Fuel injector No.3 malfunction - Short to GND in wiring harness between fuel injector No.3 terminal B and IDM terminal 1H - Short to power supply in wiring harness between fuel injector No.3 terminal B and IDM terminal 1H - Open circuit in wiring harness between fuel injector No.3 terminal B and IDM terminal 1H - PCM malfunction

ON-BOARD DIAGNOSTIC

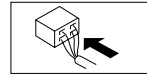
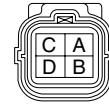
DTC P0203 Fuel injector No.3 operation identified



**IDM
WIRING HARNESS-SIDE CONNECTOR**

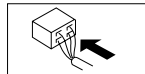


**CALIBRATION RESISTOR
WIRING HARNESS-SIDE
CONNECTOR**



**PCM
WIRING HARNESS-SIDE CONNECTOR**

26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is DTC P0203 on the FREEZE FRAME DATA?	Yes
		No
5	INSPECT IDM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
6	INSPECT IDM FOR SHORT TO GND - Turn the engine switch off. - Inspect the continuity between the following terminals and body GND: - IDM terminal 2D (wiring harness-side) - IDM terminal 1H (wiring harness-side) - Is there continuity?	Yes
		No
7	INSPECT IDM FOR SHORT TO POWER - Turn the engine switch to the ON position (Engine off). - Inspect the voltage between the following terminals and body GND: - IDM terminal 2D (wiring harness-side) - IDM terminal 1H (wiring harness-side) - Is voltage B+?	Yes
		No
8	INSPECT FUEL INJECTOR NO.3 CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT FOR OPEN CIRCUIT BETWEEN IDM AND FUEL INJECTOR NO.3 - Turn the engine switch off. - Inspect for continuity between IDM terminal 1H (wiring harness-side) and fuel injector No.3 terminal B (wiring harness-side). - Is there continuity?	Yes
		No
10	INSPECT FUEL INJECTOR - Inspect fuel injector No.3. - Is there any malfunction?	Yes
		No
11	INSPECT IDM - Inspect the IDM. - Is there any malfunction?	Yes
		No
12	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No

F2

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION	
13	INSPECT FOR OPEN CIRCUIT BETWEEN IDM AND PCM - Turn the engine switch off. - Inspect for continuity between IDM terminal 2D (wiring harness-side) and PCM terminal 44 (wiring harness-side). - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, then go to the next step.
14	VERIFY TROUBLESHOOTING OF DTC P0203 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.
15	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See F2-40 DTC TABLE.)
		No	Troubleshooting completed.

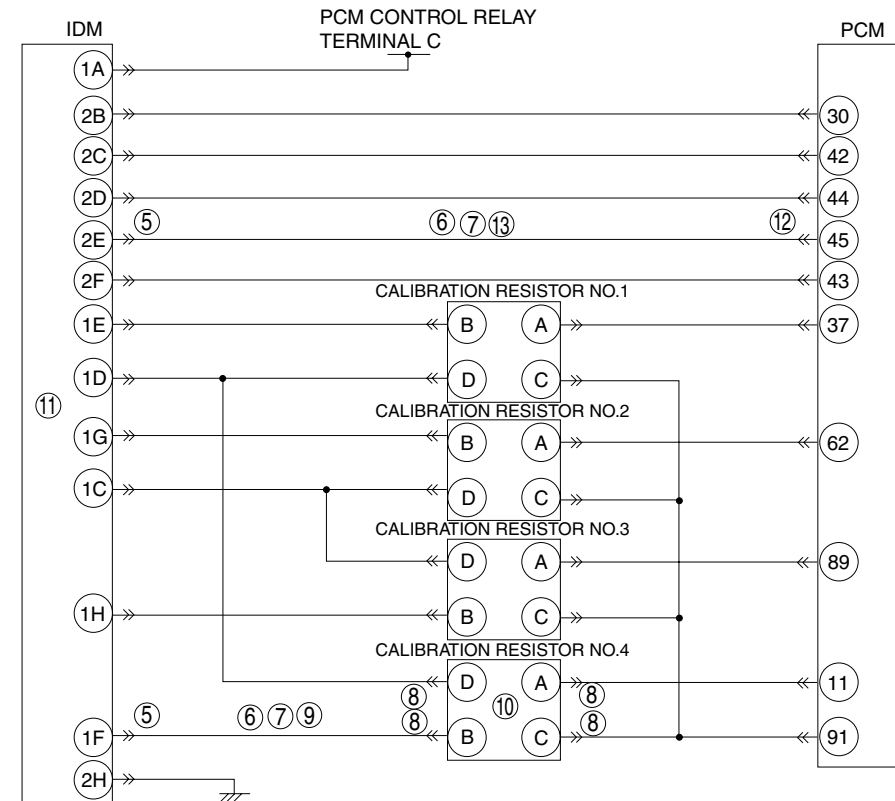
DTC P0204

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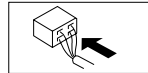
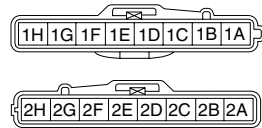
DTC P0204	Fuel injector No.4 operation identified
DETECTION CONDITION	- The PCM monitors each cylinder injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.4 cylinder normally, the PCM determines that the fuel injector No.4 operation is not verified. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- IDM malfunction - Connector or terminal malfunction - Short to GND in wiring harness between IDM terminal 2E and PCM terminal 45 - Short to power supply in wiring harness between IDM terminal 2E and PCM terminal 45 - Open circuit in wiring harness between IDM terminal 2E and PCM terminal 45 - Fuel injector No.4 malfunction - Short to GND in wiring harness between fuel injector No.4 terminal B and IDM terminal 1F - Short to power supply in wiring harness between fuel injector No.4 terminal B and IDM terminal 1F - Open circuit in wiring harness between fuel injector No.4 terminal B and IDM terminal 1F - PCM malfunction

ON-BOARD DIAGNOSTIC

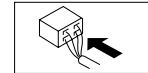
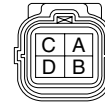
DTC P0204 Fuel injector No.4 operation identified



IDM
WIRING HARNESS-SIDE CONNECTOR

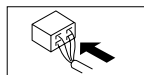


CALIBRATION RESISTOR
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79



F2

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is DTC P0204 on FREEZE FRAME DATA?	Yes	Go to the next step.
		No	Go to the troubleshooting procedures for the DTC in the FREEZE FRAME DATA.
5	INSPECT IDM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 14.
		No	Go to the next step.
6	INSPECT IDM FOR SHORT TO GND - Turn the engine switch off. - Inspect the continuity between the following terminals and body GND. - IDM terminal 2E (wiring harness-side) - IDM terminal 1F (wiring harness-side) - Is there continuity?	Yes	Repair or replace the wiring harness for a short to GND, then go to Step 14.
		No	Go to the next step.
7	INSPECT IDM FOR SHORT TO POWER - Turn the engine switch to the ON position (Engine off). - Inspect the voltage between the following terminals and body GND. - IDM terminal 2E (wiring harness-side) - IDM terminal 1F (wiring harness-side) - Is the voltage B+?	Yes	Repair or replace the wiring harness for a short to power, then go to Step 14.
		No	Go to the next step.
8	INSPECT FUEL INJECTOR NO.4 CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 14.
		No	Go to the next step.
9	INSPECT FOR OPEN CIRCUIT BETWEEN IDM AND FUEL INJECTOR NO.4 - Turn the engine switch off. - Inspect for continuity between IDM terminal 1F (wiring harness-side) and fuel injector terminal B (wiring harness-side). - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, then go to Step 14.
10	INSPECT FUEL INJECTOR - Inspect fuel injector No.4. - Is there any malfunction?	Yes	Replace fuel injector No.4, then go to Step 14.
		No	Go to the next step.
11	INSPECT IDM - Inspect the IDM. - Is there any malfunction?	Yes	Replace the IDM, then go to step 14.
		No	Go to the next step.
12	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 14.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
13	INSPECT FOR OPEN CIRCUIT BETWEEN IDM AND PCM - Turn the engine switch off. - Inspect for continuity between IDM terminal 2E (wiring harness-side) and PCM terminal 45 (wiring harness-side). - Is there continuity?	Yes Go to the next step.
		No Repair or replace the wiring harness for an open circuit, then go to the next step.
14	VERIFY TROUBLESHOOTING OF DTC P0204 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
15	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC troubleshooting. (See F2-40 DTC TABLE.)
		No Troubleshooting completed.

F2

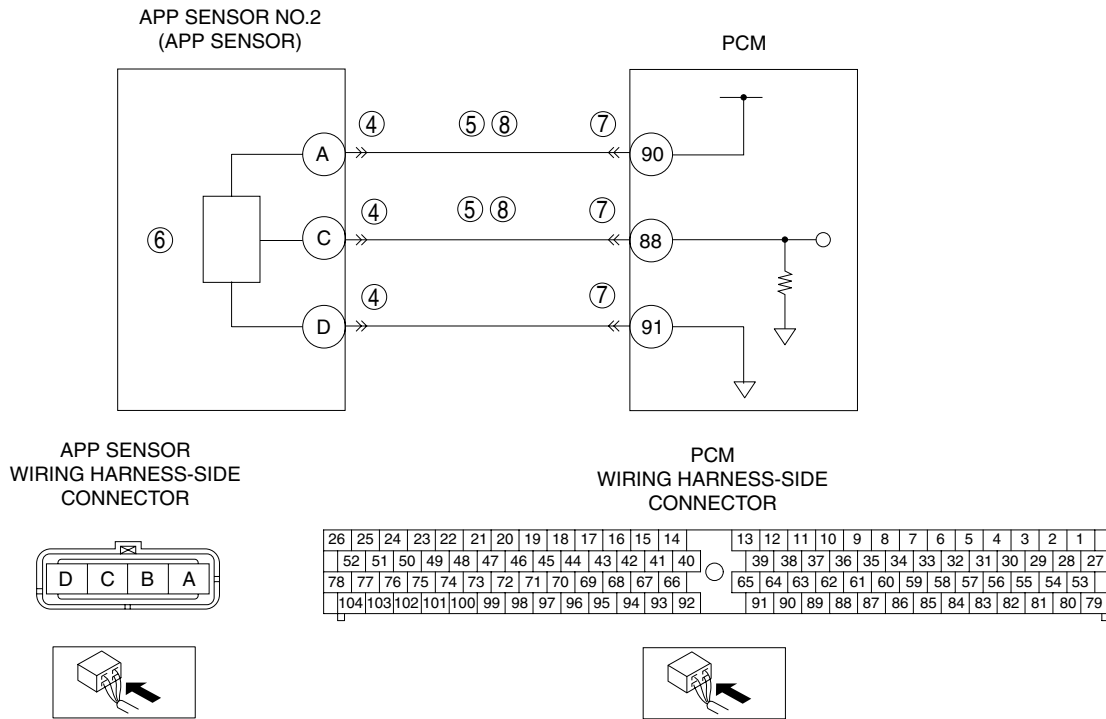
DTC P0222

B6E407000200106

DTC P0222	Accelerator pedal position (APP) sensor No.2 circuit low input
DETECTION CONDITION	- The PCM monitors the input signal from accelerator pedal position sensor No.2. If the voltage from accelerator pedal position sensor No.2 is less than 0.3 V, the PCM determines that there is a malfunction in the accelerator pedal position sensor No.2 circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- APP sensor No.2 malfunction - Connector or terminal malfunction - Open circuit in wiring harness between APP sensor terminal A and PCM terminal 90 - Short to GND in wiring harness between APP sensor terminal A and PCM terminal 90 - Open circuit in wiring harness between APP sensor terminal C and PCM terminal 88 - Short to GND in wiring harness between APP sensor terminal C and PCM terminal 88 - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0222 Accelerator pedal position (APP) sensor No.2 circuit low input



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT APP SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the APP sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT APP SENSOR NO.2 CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between the following terminals and body GND: - APP sensor terminal A (wiring harness-side) and body GND - APP sensor terminal C (wiring harness-side) and body GND - Is there continuity?	Yes
		No
6	INSPECT APP SENSOR NO.2 - Inspect the APP sensor No.2. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT APP SENSOR NO.2 CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between the following terminals: - APP sensor terminal A (wiring harness-side) and PCM terminal 90 (wiring harness-side) - APP sensor terminal C (wiring harness-side) and PCM terminal 88 (wiring harness-side) - Is there continuity?	Yes
		No
9	VERIFY TROUBLESHOOTING OF DTC P0222 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

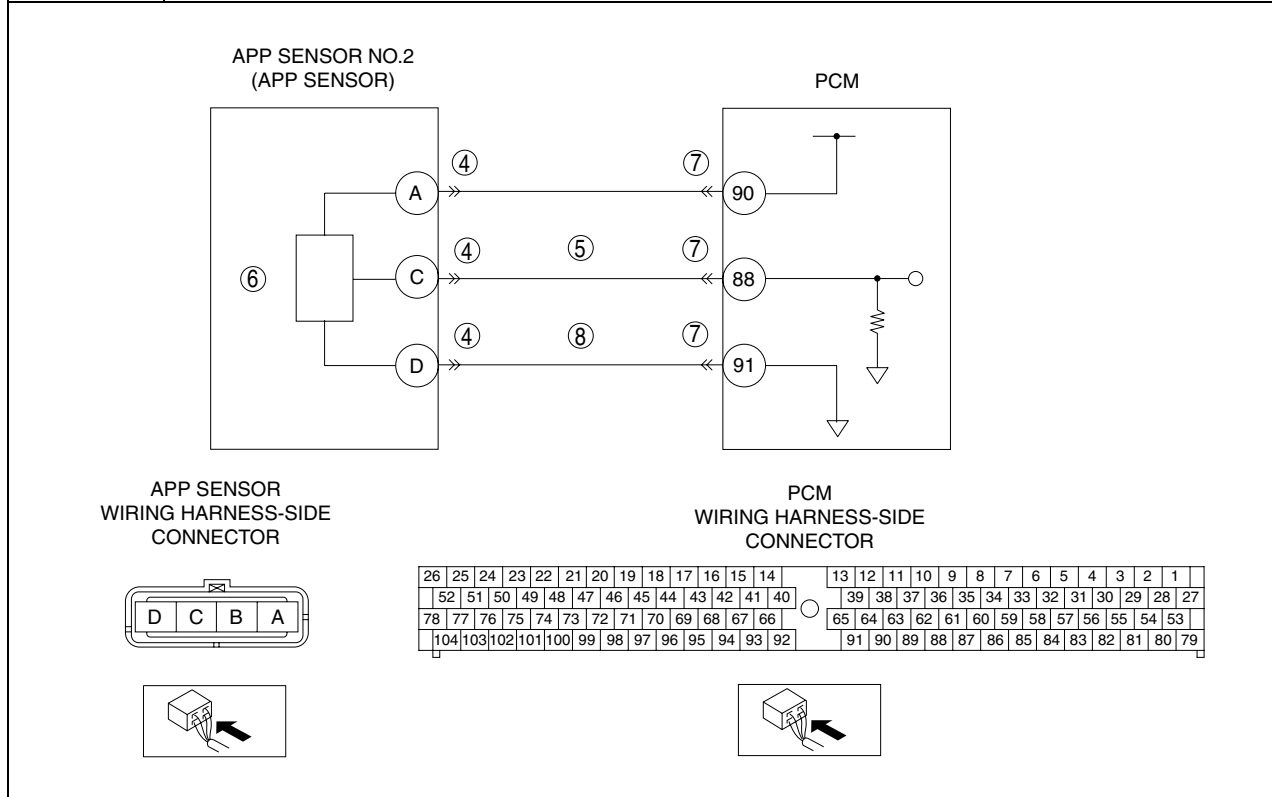
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ON-BOARD DIAGNOSTIC

DTC P0223

B6E407000200107

DTC P0223	Accelerator pedal position (APP) sensor No.2 circuit high input
DETECTION CONDITION	- The PCM monitors the input signal from accelerator pedal position sensor No.2. If the voltage from accelerator pedal position sensor No.2 is more than 4.7 V, the PCM determines that there is a malfunction in the accelerator pedal position sensor No.2 circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- APP sensor No.2 malfunction - Connector or terminal malfunction - Short to power supply in wiring harness between APP sensor terminal C and PCM terminal 88 - Open circuit in wiring harness between APP sensor terminal D and PCM terminal 91 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT APP SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the APP sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT APP SENSOR NO.2 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between APP sensor terminal C (wiring harness-side) and body GND. - Is the voltage more than 4.7 V?	Yes
		No
6	INSPECT APP SENSOR NO.2 - Inspect the APP sensor. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT APP SENSOR NO.2 GND CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between APP sensor terminal D (wiring harness-side) and PCM terminal 91 (wiring harness-side). - Is there continuity?	Yes
		No
9	VERIFY TROUBLESHOOTING OF DTC P0223 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

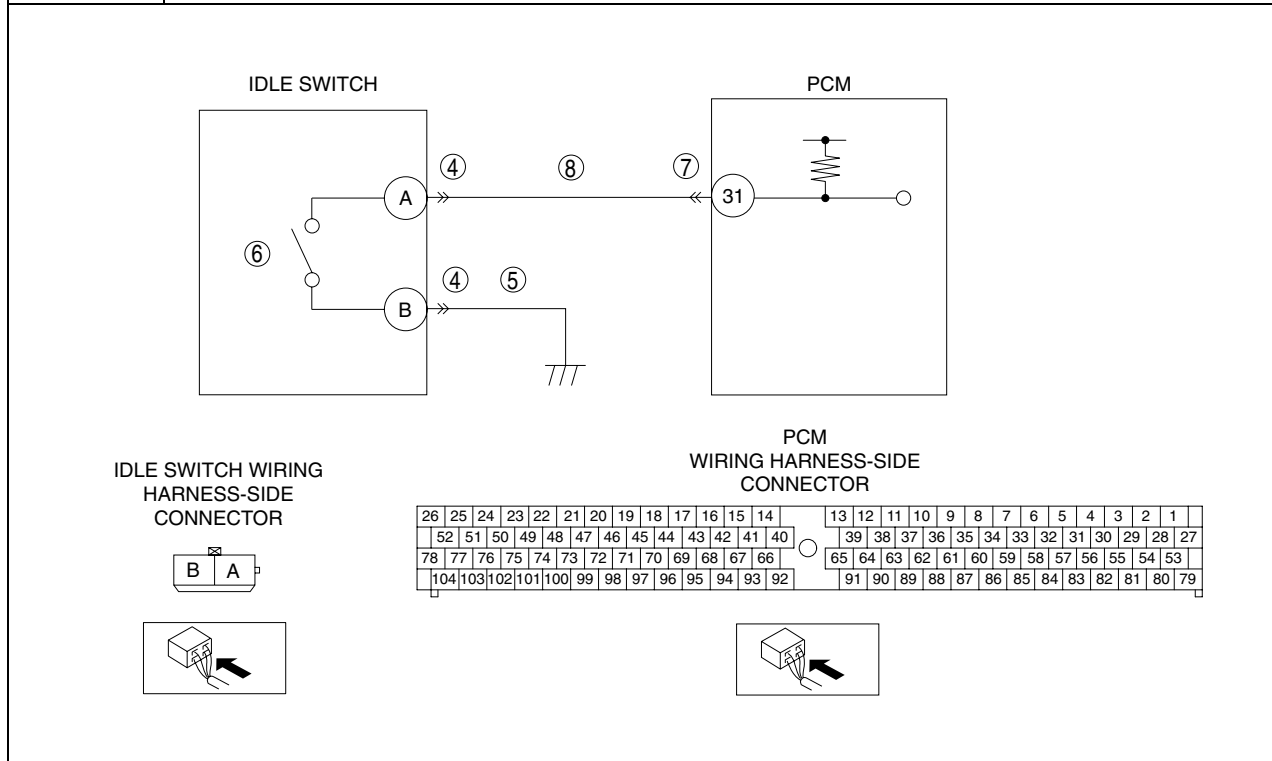
F2

ON-BOARD DIAGNOSTIC

DTC P0225

B6E407000200108

DTC P0225	Idle switch circuit malfunction
DETECTION CONDITION	- The PCM monitors the input signals from the accelerator pedal position sensor and the idle switch. If the idle switch is off even if the voltage from the accelerator pedal position sensor is less than 0.75 V, the PCM determines that there is a malfunction in the idle switch circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Idle switch malfunction - Connector or terminal malfunction - Open circuit in wiring harness between idle switch terminal B and GND - Open circuit in wiring harness between idle switch terminal A and PCM terminal 31 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT IDLE SWITCH CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to Step 9.
		No Go to the next step.
5	INSPECT IDLE SWITCH GND CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between idle switch terminal B and body GND. - Is there continuity?	Yes Go to the next step.
		No Repair or replace the wiring harness for an open circuit, then go to Step 9.
6	INSPECT IDLE SWITCH - Inspect the idle switch. - Is there any malfunction?	Yes Replace the accelerator pedal component, then go to Step 9.
		No Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to Step 9.
		No Go to the next step.
8	INSPECT IDLE SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between idle switch terminal A and PCM terminal 31. - Is there continuity?	Yes Go to the next step.
		No Repair or replace the wiring harness for an open circuit, then go to the next step.
9	VERIFY TROUBLESHOOTING OF DTC P0225 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No Troubleshooting completed.

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ON-BOARD DIAGNOSTIC

DTC P0301, P0302, P0303, P0304

B6E407000300101

DTC P0301 DTC P0302 DTC P0303 DTC P0304	Cylinder No.1 misfire detection Cylinder No.2 misfire detection Cylinder No.3 misfire detection Cylinder No.4 misfire detection
DETECTION CONDITION	• The PCM monitors the CKP sensor input signal interval time. The PCM calculates the deviation of the interval time for each cylinder. If the deviation of the interval time exceeds the preprogrammed criteria, the PCM detects a misfire in the corresponding cylinder. While the engine is running, the PCM counts the number of misfires and calculates misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, the PCM determines that a misfire, which can affect emission performance, has occurred. Diagnostic support note • The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. • FREEZE FRAME DATA is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• Fuel injector malfunction • CKP sensor malfunction • CMP sensor malfunction • Inadequate engine compression due to engine internal malfunction • Related connector or terminal malfunction • Related wiring harness malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is DTC P0301, P0302, P0303 or P0304 on FREEZE FRAME DATA?	Yes
		No
5	INSPECT FUEL LINE - Turn the engine switch off. - Inspect the fuel lines of the suspected cylinder for fuel leakage or clogging.	Yes
		No
6	VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLESHOOTING CONDITION - Access the BOO, ECT, IAT, MAF, RPM, APP, EGR PS and VSS PIDs using the WDS or equivalent. - Is any signal that is far out of specification when the engine switch is at the ON position and the engine idles?	Yes
		No
7	VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION - Inspect the same PIDs as in Step 6 while simulating the FREEZE FRAME DATA condition. - Is there any signal which cause drastic changes?	Yes
		No
8	INSPECT CKP SENSOR - Inspect the CKP sensor and the pulse wheel. - Is there any malfunction?	Yes
		No
9	INSPECT CMP SENSOR - Inspect the CMP sensor. - Is there any malfunction?	Yes
		No
10	INSPECT ENGINE COOLANT PASSAGE FOR ENGINE COOLANT LEAKAGE - Perform the engine coolant leakage inspection. - Is there any malfunction?	Yes
		No
11	INSPECT ENGINE COMPRESSION - Inspect the engine compression for the suspected cylinder. - Is the engine compression normal?	Yes
		No
12	INSPECT FUEL INJECTOR - Inspect the fuel injector and the related circuit for the suspected cylinder. - Is there any malfunction?	Yes
		No

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ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
13	VERIFY TROUBLESHOOTING OF MISFIRE DTC COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
14	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC troubleshooting. (See F2-40 DTC TABLE.)
		No Troubleshooting completed.

DTC P0336

B6E407000300102

DTC P0336	CKP sensor range/performance problem
DETECTION CONDITION	- The PCM monitors the input signal from the CKP sensor while the engine is running. If the input signal from the CKP sensor does not correspond with the proper pulse number, the PCM determines CKP sensor performance problem. Diagnostic support note - The MIL does not illuminate. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- CKP sensor malfunction - Connector or terminal malfunction - CKP sensor pulser malfunction - PCM malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION	
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the “INTERMITTENT CONCERNS TROUBLESHOOTING”.
4	INSPECT CKP SENSOR PULSAR - Inspect the CKP sensor pulsar for damage and/or cracks. - Is there any malfunction?	Yes	Replace the CKP sensor pulsar, then go to Step 8.
		No	Go to the next step.
5	INSPECT CKP SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 8.
		No	Go to the next step.
6	INSPECT CKP SENSOR - Inspect the CKP sensor. - Is there any malfunction?	Yes	Replace the CKP sensor, go to Step 8.
		No	Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to the next step.
		No	Go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P0336 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Replace the PCM, go to the next step.
		No	Go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No	Troubleshooting completed.

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DTC P0337

B6E407000300103

DTC P0337	CKP sensor circuit low input
DETECTION CONDITION	- The PCM monitors the input signal from the CKP sensor and the CMP sensor while the engine is running. If the input signal from the CKP sensor is not input while the PCM detects 28 pulses from the CMP sensor, the PCM determines that there is a malfunction in the CKP sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.

ON-BOARD DIAGNOSTIC

DTC P0337	CKP sensor circuit low input																																																																																																																
POSSIBLE CAUSE	• CKP sensor malfunction • Connector or terminal malfunction • Short to GND in wiring harness between CKP sensor terminal C and PCM terminal 29 • Short to GND in wiring harness between CKP sensor terminal B and PCM terminal 3 • Open circuit in wiring harness between CKP sensor terminal C and PCM terminal 29 • Open circuit in wiring harness between CKP sensor terminal B and PCM terminal 3 • Improper CKP sensor air gap • CKP sensor pulsar malfunction • PCM malfunction																																																																																																																
CKP SENSOR PCM CKP SENSOR WIRING HARNESS-SIDE CONNECTOR PCM WIRING HARNESS-SIDE CONNECTOR <table><tr><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td><td>16</td><td>15</td><td>14</td><td></td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td></td></tr><tr><td>52</td><td>51</td><td>50</td><td>49</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td></td><td></td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td></tr><tr><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td></td><td></td><td>65</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td></tr><tr><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td></td><td></td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td><td>80</td><td>79</td></tr></table>		26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1		52	51	50	49	48	47	46	45	44	43	42	41	40			39	38	37	36	35	34	33	32	31	30	29	28	27	78	77	76	75	74	73	72	71	70	69	68	67	66			65	64	63	62	61	60	59	58	57	56	55	54	53	104	103	102	101	100	99	98	97	96	95	94	93	92			91	90	89	88	87	86	85	84	83	82	81	80	79
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ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION	
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT CKP SENSOR AIR GAP - Measure the CKP sensor air gap. - Is the CKP sensor air gap normal? Specification 1.5—2.5 mm {0.059—0.098 in}	Yes	Go to the next step.
		No	Replace the CKP sensor, then go to Step 11.
5	INSPECT CKP SENSOR PULSAR - Inspect the CKP sensor pulsar for damage and/or cracks. - Is there any malfunction?	Yes	Replace the CKP sensor pulsar, then go to Step 11.
		No	Go to the next step.
6	INSPECT CKP SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 11.
		No	Go to the next step.
7	INSPECT CKP SENSOR FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between the following terminals and body GND: — CKP sensor terminal B and body GND — CKP sensor terminal C and body GND - Is there continuity?	Yes	Repair or replace the wiring harness for a short to GND, go to Step 11.
		No	Go to the next step.
8	INSPECT CKP SENSOR - Inspect the CKP sensor. - Is there any malfunction?	Yes	Replace the CKP sensor, go to Step 11.
		No	Go to the next step.
9	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 11.
		No	Go to the next step.
10	INSPECT CKP SENSOR FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between the following terminals: — CKP sensor terminal B and PCM terminal 3 — CKP sensor terminal C and PCM terminal 29 - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, go to the next step.
11	VERIFY TROUBLESHOOTING OF DTC P0337 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine and idle it. - Is the same DTC present?	Yes	Replace the PCM, go to the next step.
		No	Go to the next step.

F2

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
12	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE)
		No Troubleshooting completed.

DTC P0341

B6E407000300104

DTC P0341	CMP sensor range/performance problem
DETECTION CONDITION	- The PCM monitors the input signal from the CMP sensor while the engine is running. If the input signal from the CMP sensor does not correspond with the proper pulse number, the PCM determines CMP sensor performance problem. Diagnostic support note - The MIL does not illuminates. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- CMP sensor malfunction - Connector or terminal malfunction - CMP sensor pulsar malfunction - PCM malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT CMP SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes Repair or replace the suspected terminal, go to Step 8.
		No Go to the next step.
5	INSPECT CMP SENSOR - Inspect the CMP sensor. - Is there any malfunction?	Yes Replace the CMP sensor, go to Step 8.
		No Go to the next step.
6	INSPECT CMP SENSOR PULSAR - Inspect the CMP sensor pulsar for damage and/or cracks. - Is there any malfunction?	Yes Replace the camshaft, then go to Step 8.
		No Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes Repair or replace the suspected terminal, go to the next step.
		No Go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P0341 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, go to the next step.
		No Go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No Troubleshooting completed.

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DTC P0342

B6E407000300105

DTC P0342	CMP sensor circuit low input
DETECTION CONDITION	- The PCM monitors the input signal from the CMP sensor and the CKP sensor while the engine is running. If the input signal from the CMP sensor is not input while the PCM detects 255 pulses from the CKP sensor, the PCM determines that there is a malfunction in the CMP sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.

ON-BOARD DIAGNOSTIC

DTC P0342	CMP sensor circuit low input
POSSIBLE CAUSE	• CMP sensor malfunction • Connector or terminal malfunction • Short to GND in wiring harness between CMP sensor terminal A and PCM terminal 81 • Short to GND in wiring harness between CMP sensor terminal B and PCM terminal 55 • Open circuit in wiring harness between CMP sensor terminal A and PCM terminal 81 • Open circuit in wiring harness between CMP sensor terminal B and PCM terminal 55 • Improper CMP sensor air gap • CMP sensor pulsar malfunction • PCM malfunction

CMP SENSOR

PCM

**CMP SENSOR
WIRING HARNESS-SIDE CONNECTOR**

**PCM
WIRING HARNESS-SIDE CONNECTOR**

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1	
52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27	
78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53	
104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79	

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT CMP SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT CMP SENSOR CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between the following terminals and body GND: — CMP sensor terminal A and body GND. — CMP sensor terminal B and body GND. - Is there continuity?	Yes
		No
6	INSPECT CMP SENSOR - Inspect the CMP sensor. - Is there any malfunction?	Yes
		No
7	INSPECT CMP SENSOR AIR GAP - Measure the CMP sensor air gap. - Is the CMP sensor air gap normal? Specification 0.5—1.5 mm {0.020—0.059 in}	Yes
		No
8	INSPECT CMP SENSOR PULSAR - Inspect the CMP sensor pulsar for damage and/or cracks. - Is there any malfunction?	Yes
		No
9	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
10	INSPECT CMP SENSOR FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between the following terminals: — CMP sensor terminal A and PCM terminal 81. — CMP sensor terminal B and PCM terminal 55. - Is there continuity?	Yes
		No
11	VERIFY TROUBLESHOOTING OF DTC P0342 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine and idle it. - Is the same DTC present?	Yes
		No

F2

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
12	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No Troubleshooting completed.

DTC P0401

B6E407000400101

DTC P0401	EGR flow insufficient detected
DETECTION CONDITION	- The PCM monitors the difference between the target air amount and intake air amount while the EGR system is operating. If the difference between the target air amount and the intake air amount is less than the threshold, the PCM determines that there is a malfunction in the EGR system. Diagnostic support note - MIL illuminates if PCM detects above malfunction condition in two consecutive drive cycles or in one drive cycle while DTC for the same malfunction has been stored in PCM. - PENDING CODE is available if PCM detects the above malfunction condition during first drive cycle. - FREEZE FRAME DATA is available. - DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Vacuum hose malfunction - EGR valve malfunction - EGR boost sensor malfunction - EGR gasket malfunction - PCM malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record FREEZE FRAME DATA on repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	INSPECT FOR OTHER DTCS - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Turn the engine switch to the ON position. (Engine off). - Have other DTCS been stored?	Yes Repair the circuit malfunction for the applicable DTCS.
		No Go to the next step.
4	INSPECT VACUUM HOSE CONDITION - Inspect the vacuum hoses for clogging, damage, freezing, or vacuum leakage. - Is there any malfunction?	Yes Replace the vacuum hoses, then go to Step 8.
		No Go to the next step.
5	INSPECT EGR VALVE MALFUNCTION - Inspect the EGR valve. - Is the EGR valve okay?	Yes Go to the next step.
		No Replace the EGR valve, then go to Step 8.
6	INSPECT EGR BOOST SENSOR MALFUNCTION - Inspect the EGR boost sensor. - Is the EGR boost sensor okay?	Yes Go to the next step.
		No Replace the EGR boost sensor, then go to Step 8.
7	INSPECT EGR VALVE PASSAGE - Turn the engine switch off. - Remove the EGR valve. - Is gasket installation normal?	Yes Go to the next step.
		No Install the gasket correctly, then go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P0401 COMPLETED - Make sure to reconnect all disconnected connectors. - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes Go to the next step.
		No Replace the PCM, then go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE Are any DTCS present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No Troubleshooting completed.

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DTC P0402

B6E407000400102

DTC P0402	EGR flow excessive detected
DETECTION CONDITION	- The PCM monitors the difference between the target air amount and intake air amount while the EGR system is operating. If the difference between the target air amount and the intake air amount is more than the threshold, the PCM determines that there is a malfunction in the EGR system. Diagnostic support note - The MIL illuminates if the PCM detects above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- The EGR valve gasket is not installed. - The EGR valve gasket has been damaged. - PCM malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	INSPECT FOR OTHER DTCs - Turn the engine switch to the ON position. (Engine off). - Have other DTCs been stored?	Yes	Repair circuit malfunction for the applicable DTCs.
		No	Go to the next step.
4	INSPECT EGR VALVE GASKET HAS INSTALLED - Turn the engine switch off. - Remove the EGR valve. - Is the EGR valve gasket installed?	Yes	Go to the next step.
		No	Install the EGR valve gasket, then go to Step 6.
5	INSPECT EGR VALVE GASKET MALFUNCTION Inspect if there is any crack or damage on the EGR valve gasket?	Yes	Replace the EGR valve gasket, then next step.
		No	Go to the next step.
6	VERIFY TROUBLESHOOTING OF DTC P0402 COMPLETED - Make sure to reconnect all disconnected connectors. - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Replace the PCM, then go to the next step.
7	VERIFY AFTER REPAIR PROCEDURE Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No	Troubleshooting completed.

DTC P0404

B6E407000400103

DTC P0404	EGR valve stuck
DETECTION CONDITION	- The PCM monitors the input signal from the EGR valve position sensor while the EGR system is operating. If the output voltage difference is less than threshold when the EGR flow amount changes, the PCM determines that there is a malfunction in the EGR valve. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	EGR valve malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Perform the Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT EGR VALVE - Inspect the EGR valve. - Is there any malfunction?	Yes Replace the EGR valve, then go to Step the next step.
		No Go to the next step.
5	VERIFY TROUBLESHOOTING OF DTC P0404 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
6	VERIFY AFTER REPAIR PROCEDURE Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No DTC troubleshooting completed.

F2

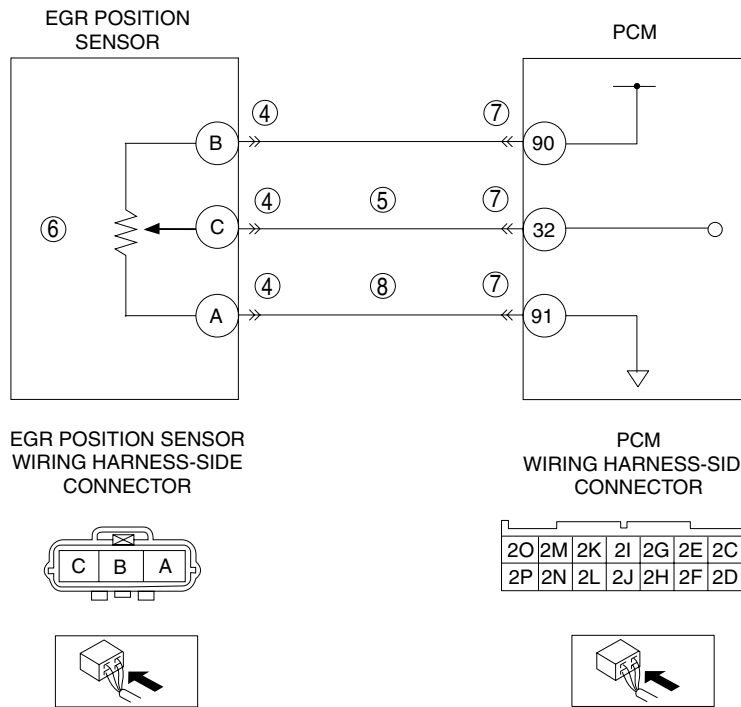
DTC P0406

B6E407000400104

DTC P0406	EGR valve position sensor circuit high input
DETECTION CONDITION	- The PCM monitors the input signal from the EGR valve position sensor. If the voltage from the EGR valve position sensor is more than 4.75 V, the PCM determines that there is a malfunction in the EGR valve position sensor circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- EGR valve position sensor malfunction - Connector or terminal malfunction - Short to power supply in wiring harness between EGR valve position sensor terminal C and PCM terminal 32 - Open circuit in wiring harness between EGR valve position sensor terminal A and PCM terminal 91 - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0406 | **EGR valve position sensor circuit high input**



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT EGR VALVE POSITION SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the EGR valve position sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT EGR VALVE POSITION SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between EGR valve position sensor terminal C (wiring harness-side) and body GND. - Is the voltage more than 4.75 V?	Yes
		No
6	INSPECT EGR VALVE POSITION SENSOR - Inspect the EGR valve position sensor. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT EGR VALVE POSITION SENSOR GND CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between EGR valve position sensor terminal A (wiring harness-side) and PCM terminal 91 (wiring harness-side). - Is there continuity?	Yes
		No
9	VERIFY TROUBLESHOOTING OF DTC P0406 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
10	VERIFY AFTER REPAIR PROCEDURE Are any DTCs present?	Yes
		No

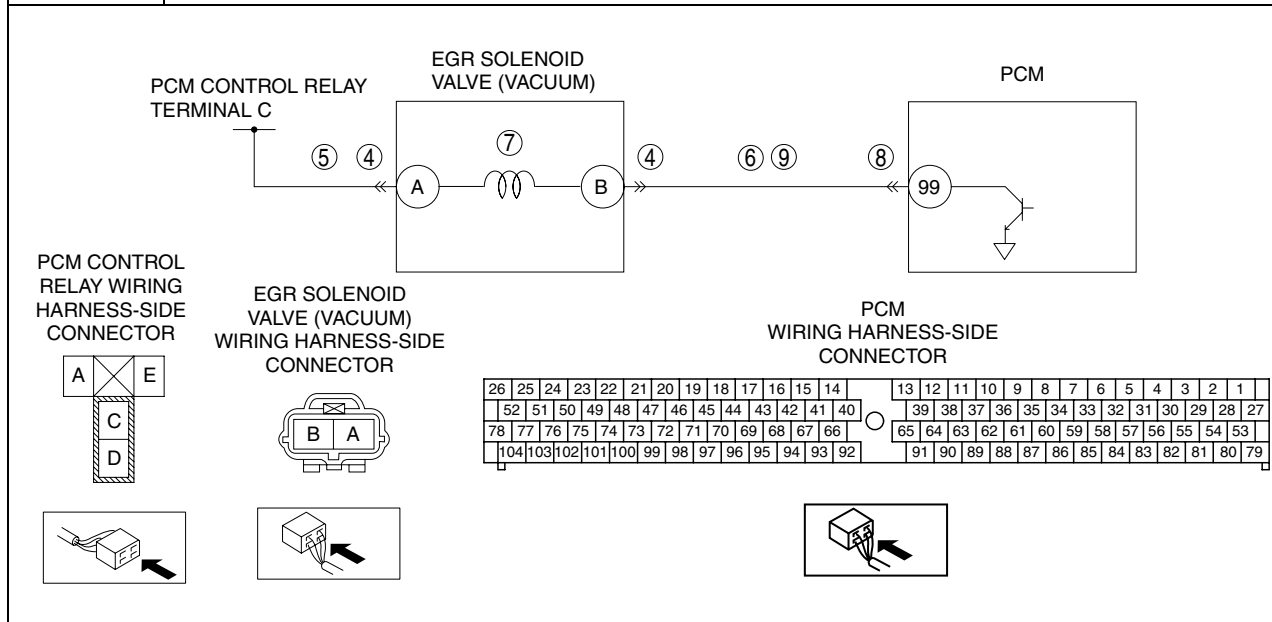
F2

ON-BOARD DIAGNOSTIC

DTC P0489

B6E407000400105

DTC P0489	EGR solenoid valve (vacuum) control circuit low input
DETECTION CONDITION	- The PCM monitors the output signal to the EGR solenoid valve (vacuum). If the EGR solenoid valve (vacuum) voltage is low even if the EGR solenoid valve (vacuum) is off, the PCM determines that there is a malfunction in the intake shutter solenoid valve control circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- EGR solenoid valve (vacuum) malfunction - Connector or terminal malfunction - Open circuit in wiring harness between PCM control relay terminal C and EGR solenoid valve (vacuum) terminal A - Open circuit in wiring harness between EGR solenoid valve (vacuum) terminal B and PCM terminal 99 - Short to GND in wiring harness between EGR solenoid valve (vacuum) terminal B and PCM terminal 99 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Perform the Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes
		No
4	INSPECT EGR SOLENOID VALVE (VACUUM) CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the EGR solenoid valve (vacuum) connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT EGR SOLENOID VALVE (VACUUM) POWER CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch to the ON position (Engine off). - Measure the voltage between EGR solenoid valve (vacuum) terminal A (wiring harness-side) and body GND. - Is the voltage B+?	Yes
		No
6	INSPECT EGR SOLENOID VALVE (VACUUM) CONTROL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between EGR solenoid valve (vacuum) terminal B (wiring harness-side) and body GND. - Is there continuity?	Yes
		No
7	INSPECT EGR SOLENOID VALVE (VACUUM) - Inspect the EGR solenoid valve (vacuum). - Is there any malfunction?	Yes
		No
8	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT EGR SOLENOID VALVE (VACUUM) CONTROL CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between EGR solenoid valve (vacuum) terminal B (wiring harness-side) and PCM terminal 99 (wiring harness-side). - Is there continuity?	Yes
		No

F2

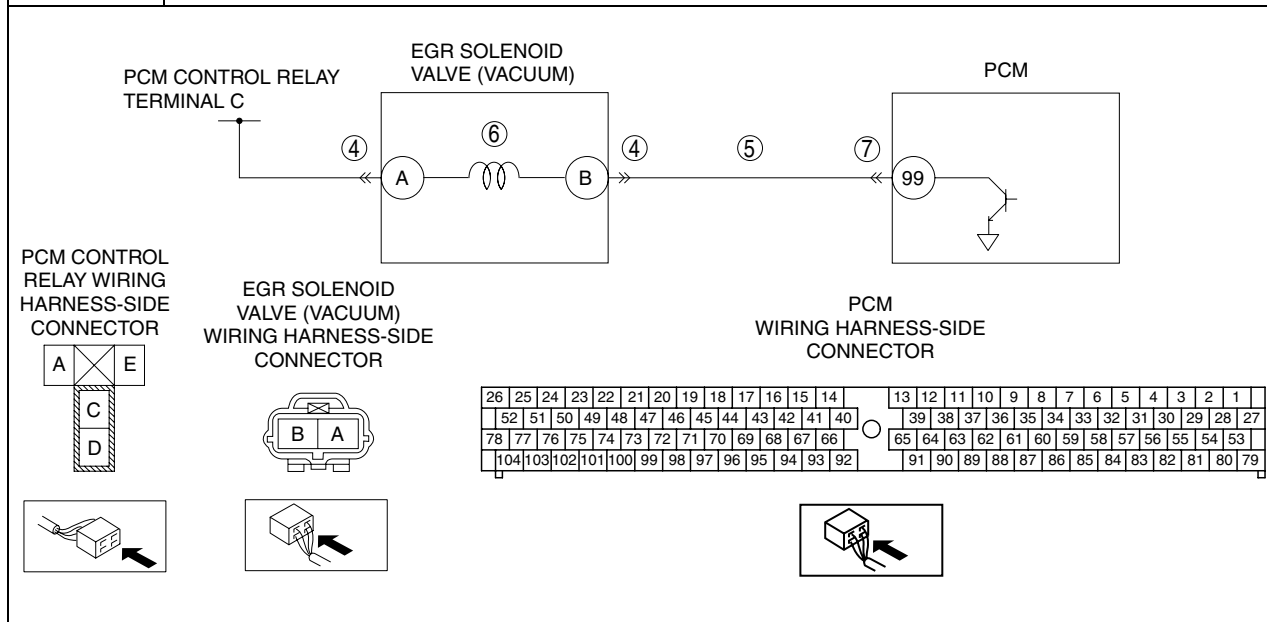
ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
10	VERIFY TROUBLESHOOTING OF DTC P0489 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
11	VERIFY AFTER REPAIR PROCEDURE Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No DTC troubleshooting completed.

DTC P0490

B6E407000400106

DTC P0490	EGR solenoid valve (vacuum) control circuit high input
DETECTION CONDITION	- The PCM monitors the output signal to the EGR solenoid valve (vacuum). If the EGR solenoid valve (vacuum) voltage is high even if the EGR solenoid valve (vacuum) is on, the PCM determines that there is a malfunction in the EGR solenoid valve (vacuum) control circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- EGR solenoid valve (vacuum) malfunction - Connector or terminal malfunction - Short to power supply in wiring harness between EGR solenoid valve (vacuum) terminal B and PCM terminal 99 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Perform the Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes
		No
4	INSPECT EGR SOLENOID VALVE (VACUUM) CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the EGR solenoid valve (vacuum) connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT EGR SOLENOID VALVE (VACUUM) CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between EGR solenoid valve (vacuum) terminal B (wiring harness-side) and body GND. - Is the voltage B+?	Yes
		No
6	INSPECT EGR SOLENOID VALVE (VACUUM) - Inspect the EGR solenoid valve (vacuum). - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
8	VERIFY TROUBLESHOOTING OF DTC P0490 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes
		No
9	VERIFY AFTER REPAIR PROCEDURE Are any DTCs present?	Yes
		No

F2

ON-BOARD DIAGNOSTIC

DTC P0500

B6E407000500101

DTC P0500	Vehicle speed signal
DETECTION CONDITION	- The PCM monitors the CAN input signal from DSC HU/CM. If the input signal is not correct, the PCM determines that there is a CAN input signal. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- DSC HU/CM malfunction - PCM malfunction

Diagnostic procedure

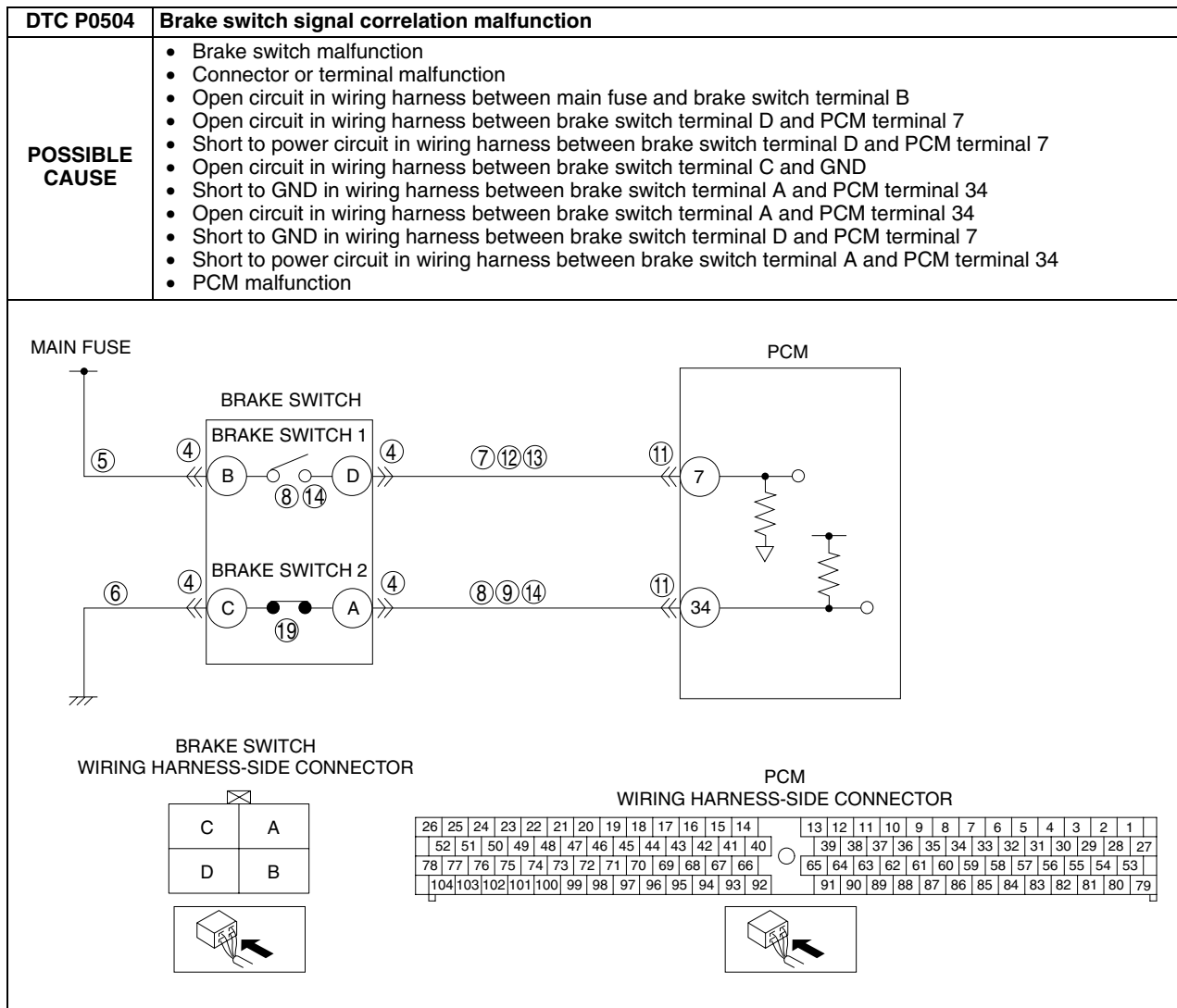
STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. • If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT INPUT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
		No Go to the next step.
4	INSPECT DSC HU/CM - Inspect the DSC HU/CM. - Is there any malfunction?	Yes Repair or replace the malfunctioning part, then go to the next step.
		No Go to the next step.
5	VERIFY TROUBLESHOOTING OF DTC P0500 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE same as the DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
6	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No DTC troubleshooting completed.

DTC P0504

B6E407000500102

DTC P0504	Brake switch signal correlation malfunction
DETECTION CONDITION	- The PCM monitors the input signal from brake switch 1 and brake switch 2 while the engine is running. The PCM determines the brake switch signal correlation malfunction if the input signal from brake switch 1 brake switch 2 is as follows: - Brake switch 1 is on and brake switch 2 is off. - Brake switch 1 is off and brake switch 2 is on. Diagnostic support note - The MIL does not illuminate. - The DTC is stored in the PCM memory.

ON-BOARD DIAGNOSTIC



F2

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Check for related Service Information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT BRAKE SWITCH CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 15.
		No	Go to the next step.
5	INSPECT BRAKE SWITCH 1 POWER SUPPLY CIRCUIT FOR OPEN - Turn the engine switch to the ON position (Engine off). - Inspect the voltage between brake switch terminal B and body GND. - Is the voltage B+?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open, go to Step 15.
6	INSPECT BRAKE SWITCH 2 GND CIRCUIT FOR OPEN - Turn the engine switch off. - Inspect for continuity between brake switch terminal C and body GND. - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open, go to Step 15.
7	INSPECT BRAKE SWITCH 1 SIGNAL CIRCUIT FOR SHORT TO POWER - Turn the engine switch to the ON position (Engine off). - Inspect the voltage between brake switch terminal D and body GND. - Is the voltage less than 1.0 V?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a short to power supply, go to Step 15.
8	INSPECT BRAKE SWITCH 2 SIGNAL CIRCUIT FOR OPEN - Turn the engine switch to the ON position (Engine off). - Inspect the voltage between brake switch terminal A and body GND. - Is the voltage less than 1.0 V?	Yes	Repair or replace the wiring harness for an open circuit, go to Step 15.
		No	Go to the next step.
9	INSPECT BRAKE SWITCH 2 SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between brake switch terminal A and body GND. - Is there continuity?	Yes	Repair or replace the wiring harness for a short to GND, go to Step 15.
		No	Go to the next step.
10	INSPECT BRAKE SWITCH - Inspect brake switch. - Is there any malfunction?	Yes	Replace the brake switch, go to Step 15.
		No	Go to the next step.
11	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 15.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
12	INSPECT BRAKE SWITCH 1 SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between brake switch terminal D and body GND. - Is there continuity?	Yes Repair or replace the wiring harness for a short to GND, go to Step 15.
		No Go to the next step.
13	INSPECT BRAKE SWITCH 1 SIGNAL CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between brake switch terminal D and PCM terminal 7. - Is there continuity?	Yes Go to the next step.
		No Repair or replace the wiring harness for an open circuit, go to Step 15.
14	INSPECT BRAKE SWITCH 2 SIGNAL CIRCUIT FOR SHORT TO POWER - Turn the engine switch to the ON position (Engine off). - Inspect the voltage between brake switch terminal D and body GND. - Is the voltage B+?	Yes Repair or replace the wiring harness for a short to power supply, go to the next step.
		No Go to the next step.
15	VERIFY TROUBLESHOOTING OF DTC P0504 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Depress and release the brake pedal for 10 times. - Is the same DTC present?	Yes Replace the PCM, go to the next step.
		No Go to the next step.
16	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No Troubleshooting completed.

F2

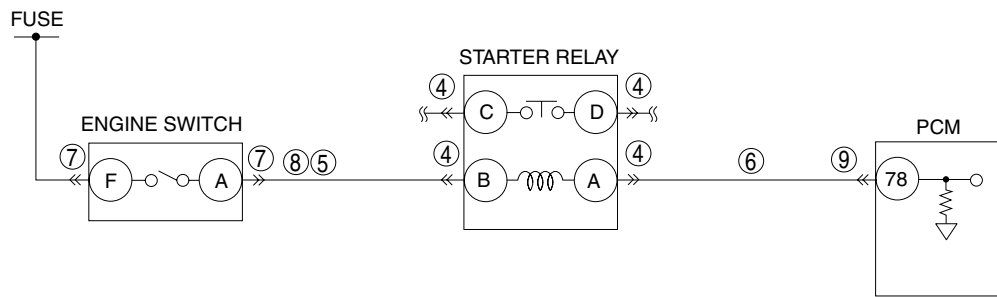
DTC P0512

B6E407000500103

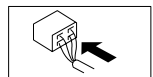
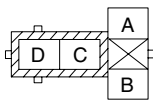
DTC P0512	Engine switch circuit high input
DETECTION CONDITION	- The PCM monitors the engine speed and the starter signal. If the engine speed is more than 700 rpm and the starter switch ON signal is input, the PCM determines that there is a malfunction in the starter switch circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Engine switch malfunction - Starter relay malfunction - Connector or terminal malfunction - Short to power supply in wiring harness between starter relay terminal A and PCM terminal 78 - Short to power supply in wiring harness between engine switch terminal A and starter relay terminal B - PCM malfunction

ON-BOARD DIAGNOSTIC

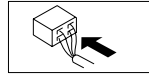
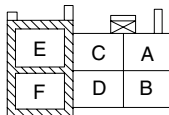
DTC P0512 Engine switch circuit high input



STARTER
RELAY WIRING
HARNESS-SIDE
CONNECTOR

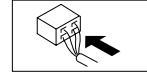


ENGINE SWITCH
WIRING
HARNESS-SIDE
CONNECTOR



PCM
WIRING HARNESS-SIDE
CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1	
52	51	50	49	48	47	46	45	44	43	42	41	40			39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66			65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92			91	90	89	88	87	86	85	84	83	82	81	80	79



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT STARTER RELAY CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
5	DETERMINE IF MALFUNCTION IS IN ENGINE SWITCH SIDE OR STARTER RELAY SIDE - Turn the engine switch to the ON position (Engine off). - Measure the voltage between starter relay terminal B and body GND. - Is the voltage B+?	Yes
		No
6	DETERMINE IF MALFUNCTION IS IN STARTER RELAY OR PCM SIDE - Turn the engine switch to the ON position (Engine off). - Measure the voltage between starter relay terminal A and body GND. - Is the voltage B+?	Yes
		No
7	INSPECT ENGINE SWITCH CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
8	INSPECT ENGINE SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Measure the voltage between engine switch terminal A and body GND. - Is the voltage B+?	Yes
		No
9	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
10	VERIFY TROUBLESHOOTING OF DTC P0512 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No

F2

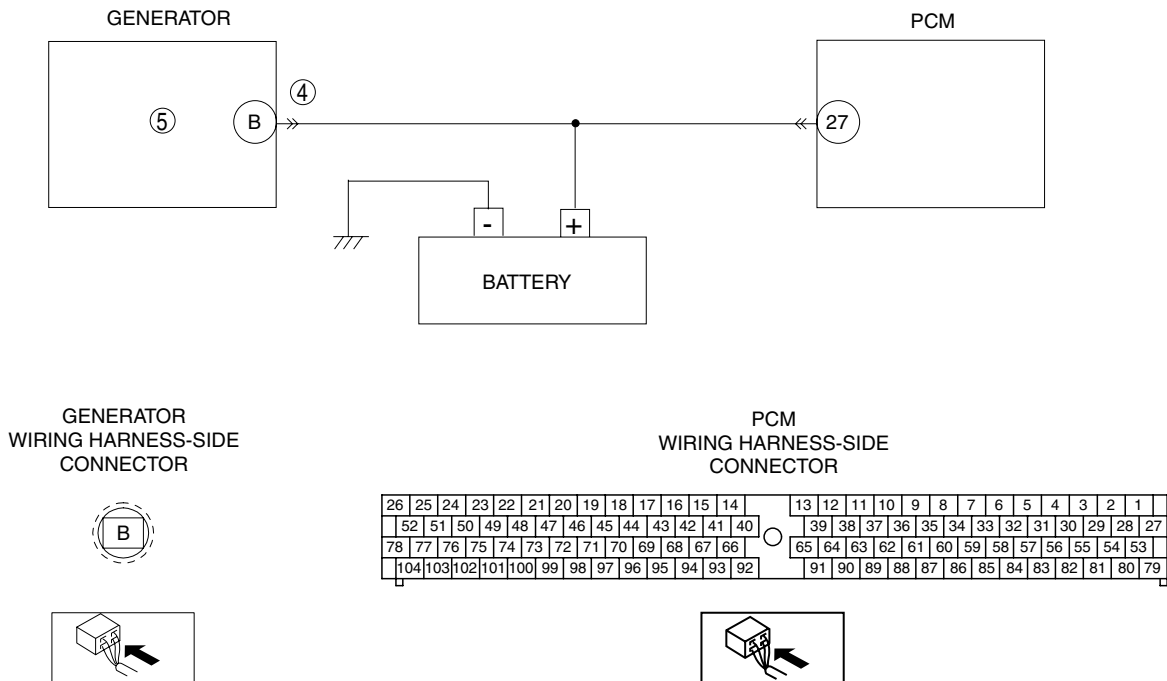
ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is there any DTC present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No Troubleshooting completed.

DTC P0562

B6E407000500104

DTC P0562	Battery voltage low input
DETECTION CONDITION	- The PCM monitors the battery voltage. If the battery voltage is less than 8 V, the PCM determines that there is a malfunction in the battery and the battery signal system. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Generator malfunction - Terminal malfunction - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT GENERATOR TERMINAL FOR POOR INSTALLATION - Turn the engine switch off. - Inspect generator terminal B for looseness. - Is there any malfunction?	Yes
		No
5	INSPECT GENERATOR - Inspect the generator. - Is there any malfunction?	Yes
		No
6	VERIFY TROUBLESHOOTING OF DTC P0562 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
7	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

F2

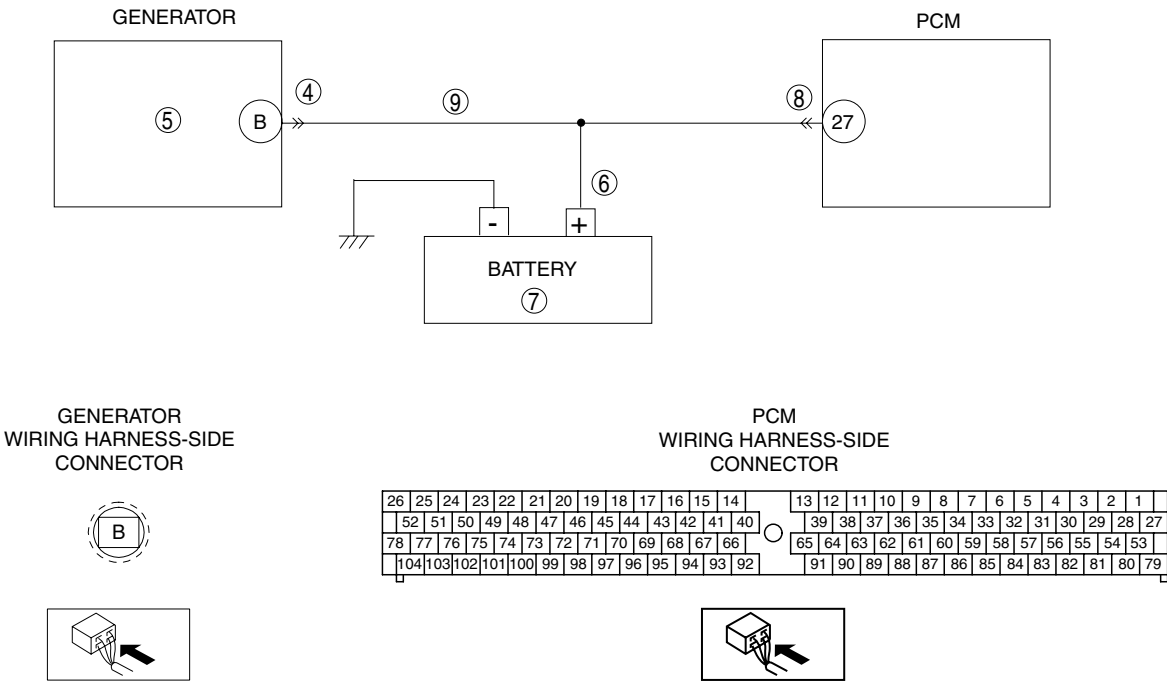
DTC P0563

B6E407000500105

DTC P0563	Battery voltage high input
DETECTION CONDITION	- The PCM monitors the battery voltage. If the battery voltage is more than 16 V, the PCM determines that there is a malfunction in the battery charging system. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Generator malfunction - Battery malfunction - Connector or terminal malfunction - Open circuit in wiring harness between battery positive terminal, generator terminal B and PCM terminal 27 - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0563 Battery voltage high input



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT GENERATOR TERMINAL FOR POOR INSTALLATION - Turn the engine switch off. - Inspect generator terminal B for looseness. - Is there any malfunction?	Yes
		No
5	INSPECT GENERATOR - Inspect the generator. - Is there any malfunction?	Yes
		No
6	INSPECT BATTERY POSITIVE TERMINAL FOR POOR INSTALLATION - Turn the engine switch off. - Inspect the battery positive terminal for looseness. - Is there any malfunction?	Yes
		No
7	INSPECT BATTERY - Inspect the battery. - Is there any malfunction?	Yes
		No
8	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT CHARGING CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between generator terminal B (wiring harness-side), PCM terminal 27 and the battery positive terminal (wiring harness-side). - Is there continuity?	Yes
		No
10	VERIFY TROUBLESHOOTING OF DTC P0563 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

F2

ON-BOARD DIAGNOSTIC

DTC P0564

B6E407000500106

DTC P0564	Cruise control signal malfunction
DETECTION CONDITION	- The PCM monitors the input voltage from the cruise control switch while the engine is running. The PCM determines cruise control signal malfunction if the input voltage from the cruise control switch is as follows for 120 s: — Less Than 0.1 V. — 1.4—1.9 V. — 3.7—3.9 V. — 4.5—4.6 V. Diagnostic support note - The MIL does not illuminates. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Cruise control switch malfunction - Connector or terminal malfunction - Short to GND in wiring harness between cruise control switch terminal B and PCM terminal 64 - Cruise control switch signal and GND circuits short each other - Open circuit in wiring harness between cruise control switch terminal B and PCM terminal 64 - Open circuit in wiring harness between cruise control switch terminal C and PCM terminal 91 - PCM malfunction

CRUISE CONTROL SWITCH

CRUISE CONTROL SWITCH
WIRING HARNESS-SIDE CONNECTOR

PCM
WIRING HARNESS-SIDE CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION	
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available Service Information. If vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT CRUISE CONTROL SWITCH CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 11.
		No	Go to the next step.
5	INSPECT CRUISE CONTROL SWITCH SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between cruise control switch terminal B and body GND. - Is there continuity?	Yes	Repair or replace the wiring harness for a short to GND, go to Step 11.
		No	Go to the next step.
6	INSPECT CRUISE CONTROL SWITCH WIRING HARNESSES FOR SHORT WITH EACH OTHER - Turn the engine switch off. - Inspect for continuity between cruise control switch terminals B and C. - Is there continuity?	Yes	Repair or replace the wiring harness for a short with each other, go to Step 11.
		No	Go to the next step.
7	INSPECT CRUISE CONTROL SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch to the ON position. (Engine off) - Inspect the voltage at cruise control switch terminal B (harness side). - Is the voltage below 1.0 V?	Yes	Repair or replace the wiring harness for an open circuit, go to Step 11.
		No	Go to the next step.
8	INSPECT CRUISE CONTROL SWITCH - Inspect the cruise control switch. - Is there any malfunction?	Yes	Replace the cruise control switch, go to Step 11.
		No	Go to the next step.
9	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 11.
		No	Go to the next step.
10	INSPECT CRUISE CONTROL SWITCH GND CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between cruise control switch terminal C and PCM terminal 91. - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, go to the next step.
11	VERIFY TROUBLESHOOTING OF DTC P0564 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine and idle it for 120 s or more. - Is the same DTC present?	Yes	Replace the PCM, go to the next step.
		No	Go to the next step.

F2

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
12	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No Troubleshooting completed.

DTC P0602

B6E407000600101

DTC P0602	PCM programming error
DETECTION CONDITION	- No configuration data in PCM Note - If "PCM CONFIGURATION" is successful, the PCM stored DTC P0602 and illuminates the MIL (System is normal). Clear the DTC P0602 using WDS or equivalent after "PCM CONFIGURATION". - MIL goes off after three drive cycles with no failure (DTCs remain in PCM). Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
	POSSIBLE CAUSE - Complete configuration has not been completed. - PCM malfunction

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Perform "PCM Configuration Procedure", then go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
2	VERIFY TROUBLESHOOTING OF DTC P0602 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace PCM, go to the next step.
		No Go to the next step.
3	VERIFY AFTER REPAIR PROCEDURE - Perform "After Repair Procedure". - Are any DTCs present?	Yes Go to applicable DTC inspection. (See F2-40 DTC TABLE .)
		No Troubleshooting completed.

DTC P0606

B6E407000600102

DTC P0606	PCM malfunction
DETECTION CONDITION	- PCM does not read DTC from output devices. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
	POSSIBLE CAUSE PCM internal malfunction

Diagnostic procedure

STEP	INSPECTION	ACTION
1	—	— Replace PCM.

ON-BOARD DIAGNOSTIC

DTC P0610

B6E407000600103

DTC P0610	Control module vehicle options error
DETECTION CONDITION	- PCM data configuration error Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Configuration procedure has not been completed - PCM malfunction

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Perform "PCM Configuration Procedure", then go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
2	VERIFY TROUBLESHOOTING OF DTC P0610 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, go to the next step.
		No Go to the next step.
3	VERIFY AFTER REPAIR PROCEDURE - Perform "After Repair Procedure". - Are any DTCs present?	Yes Go to applicable DTC inspection. (See F2-40 DTC TABLE .)
		No Troubleshooting completed.

F2

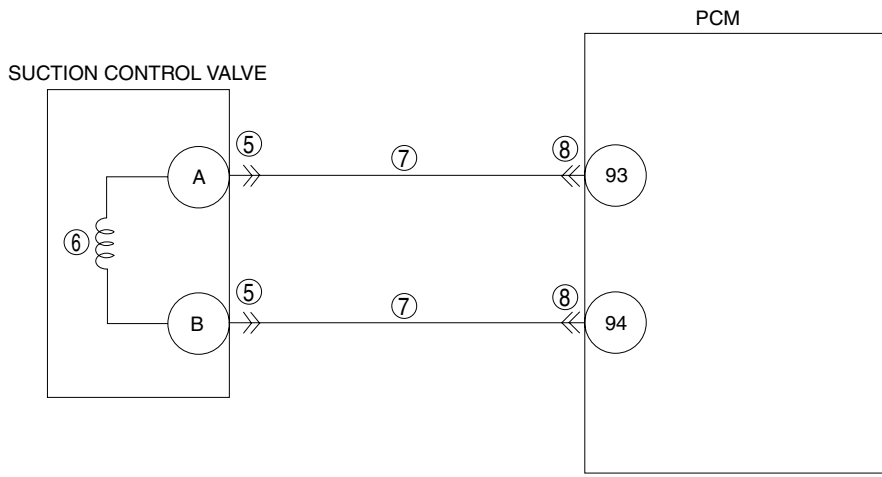
DTC P0627

B6E407000600104

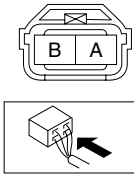
DTC P0627	Suction control valve circuit open
DETECTION CONDITION	- The PCM monitors the suction control valve operation circuit signal frequency at PCM terminal 94. If the difference between the suction control valve operation frequency at PCM terminal 93 and the monitored suction control valve operation circuit signal frequency at PCM terminal 94 exceeds the threshold, the PCM determines that suction control valve open circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Suction control valve malfunction - Connector or terminal malfunction - Short circuit in wiring harness between suction control valve terminal A and B - PCM malfunction

ON-BOARD DIAGNOSTIC

DTC P0627 Suction control valve circuit open

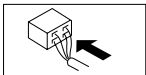


SUCTION CONTROL VALVE
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is DTC P0627 on the FREEZE FRAME DATA?	Yes
		No
5	INSPECT SUCTION CONTROL VALVE CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
6	INSPECT SUCTION CONTROL VALVE - Inspect the suction control valve. - Is the suction control valve normal?	Yes
		No
7	INSPECT SUCTION CONTROL VALVE FOR SHORT CIRCUIT - Turn the engine switch off. - Disconnect the PCM and the suction control valve connectors. - Inspect for continuity between suction control valve terminal A and B while slightly shaking each connectors and harnesses between the suction control valve and the PCM (including short wiring harness). - Is there continuity?	Yes
		No
8	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch to off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
9	VERIFY TROUBLESHOOTING OF MISFIRE DTC COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

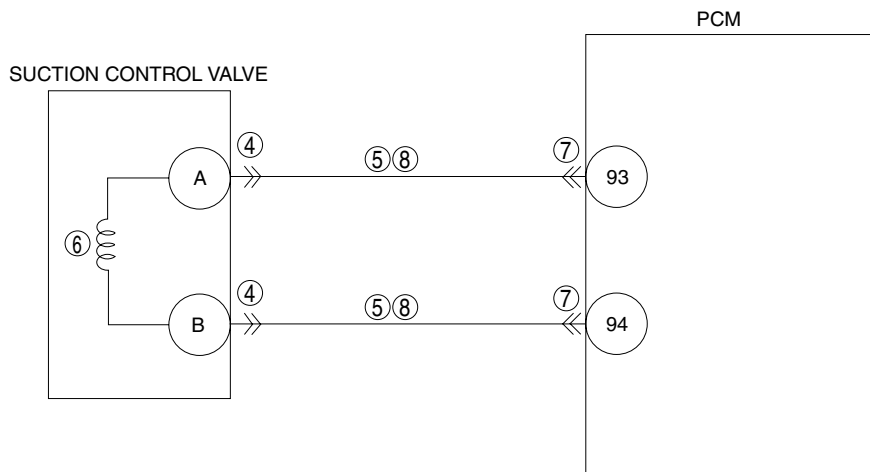
F2

ON-BOARD DIAGNOSTIC

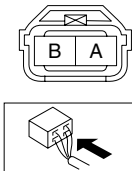
DTC P0628

B6E407000600105

DTC P0628	Suction control valve circuit low input
DETECTION CONDITION	- The PCM monitors the suction control valve circuit current while the engine is running. If the PCM detects the circuit current is less than 1 A when the suction control valve is on, the PCM determines that there is a malfunction in the suction control valve circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Suction control valve malfunction - Connector or terminal malfunction - Short to GND in wiring harness between suction control valve terminal A and PCM terminal 93 - Short to GND in wiring harness between suction control valve terminal B and PCM terminal 94 - Open circuit in wiring harness between suction control valve terminal A and PCM terminal 93 - Open circuit in wiring harness between suction control valve terminal B and PCM terminal 94 - PCM malfunction

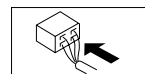


SUCTION CONTROL VALVE
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION	
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the “INTERMITTENT CONCERNS TROUBLESHOOTING”.
4	INSPECT POOR CONNECTION OF SUCTION CONTROL VALVE CONNECTOR - Turn the engine switch off. - Inspect for poor connection (such as damaged/ pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 9.
		No	Go to the next step.
5	INSPECT SUCTION CONTROL VALVE CIRCUIT FOR A SHORT TO GND - Turn the engine switch off. - Inspect for continuity between the following terminals and body GND: — Suction control valve terminal A and body GND. — Suction control valve terminal B and body GND. - Is there continuity?	Yes	Repair or replace the wiring harness for a short to GND, go to Step 9.
		No	Go to the next step.
6	INSPECT SUCTION CONTROL VALVE - Inspect the suction control valve. - Is there any malfunction?	Yes	Repair the supply pump, go to Step 9.
		No	Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/ pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 9.
		No	Go to the next step.
8	INSPECT SUCTION CONTROL VALVE CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between the following terminals: — Suction control valve terminal A and PCM terminal 93. — Suction control valve terminal B and PCM terminal 94. - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, go to the next step.
9	VERIFY TROUBLESHOOTING OF DTC P0628 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Replace the PCM, go to the next step.
		No	Go to the next step.
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No	Troubleshooting completed.

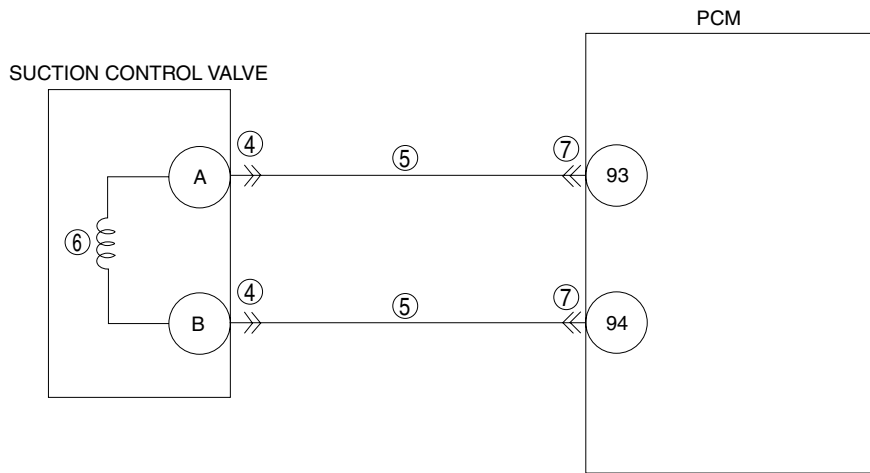
F2

ON-BOARD DIAGNOSTIC

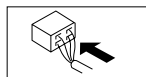
DTC P0629

B6E407000600106

DTC P0629	Suction control valve circuit high input
DETECTION CONDITION	- The PCM monitors the suction control valve circuit current while the engine is running. If the PCM detects circuit current is more than 1 A when the suction control valve is off, the PCM determines that there is the malfunction in the suction control valve circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Suction control valve malfunction - Connector or terminal malfunction - Short to power supply in wiring harness between suction control valve terminal A and PCM terminal 93 - Short to power supply in wiring harness between suction control valve terminal B and PCM terminal 94 - PCM malfunction

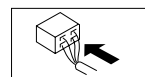


SUCTION CONTROL VALVE
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT SUCTION CONTROL VALVE CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT SUCTION CONTROL VALVE CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Inspected the voltage between the following terminals and body GND: - Suction control valve terminal A and body GND. - Suction control valve terminal B and body GND. - Is the voltage below 1.0 V?	Yes
		No
6	INSPECT SUCTION CONTROL VALVE - Inspect the suction control valve. - Is there any malfunction?	Yes
		No
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
8	VERIFY TROUBLESHOOTING OF DTC P0629 COMPLETED - Make sure to reconnect all disconnected connectors. - Start the engine. - Is the same DTC present?	Yes
		No
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OB D DRIVE MODE.) - Are any DTCs present?	Yes
		No

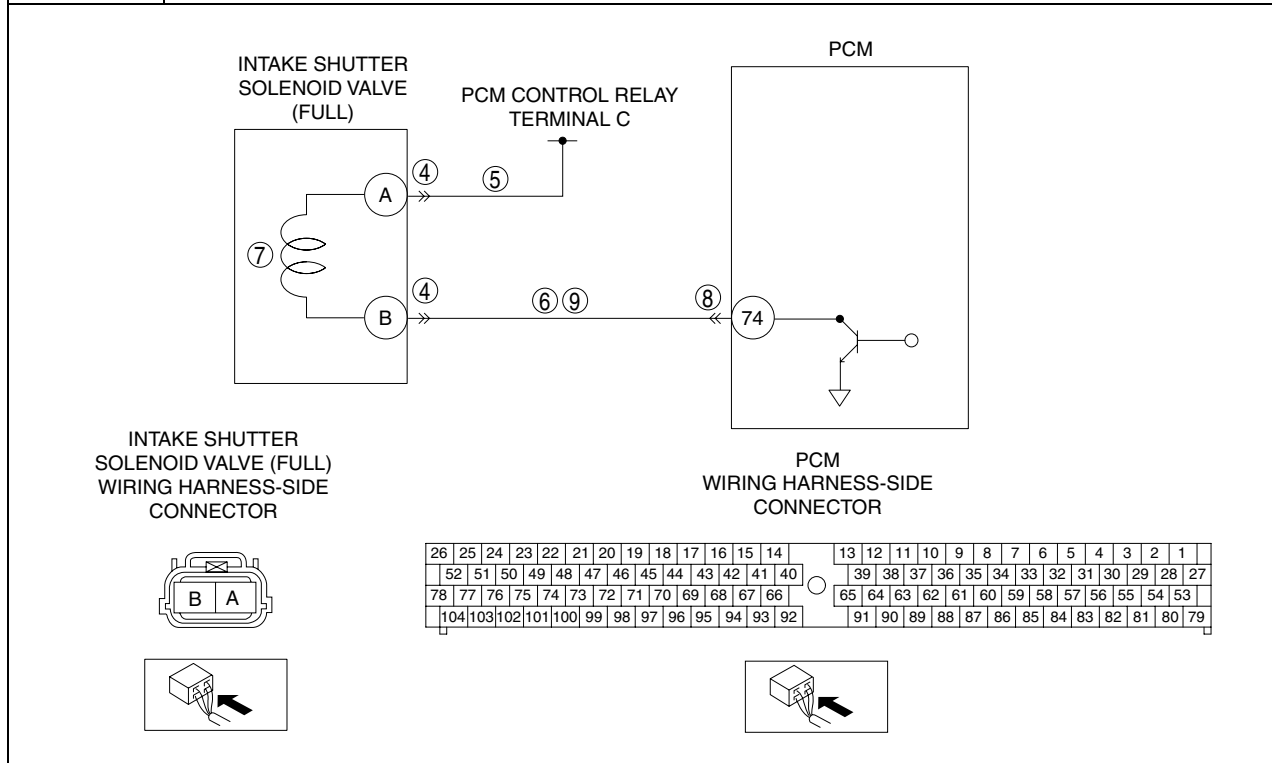
F2

ON-BOARD DIAGNOSTIC

DTC P0661

B6E407000600107

DTC P0661	Intake shutter solenoid valve (half) circuit low input
DETECTION CONDITION	- The PCM monitors the output signal to the intake shutter solenoid valve (half) when the intake shutter solenoid valve (half) is off. If the intake shutter solenoid valve (half) voltage is less than 7.8 V when the intake shutter solenoid valve (half) off, the PCM determines that there is a malfunction in the intake shutter solenoid valve control circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Intake shutter solenoid valve malfunction - Connector or terminal malfunction - Short to GND in wiring harness between intake shutter solenoid valve (half) terminal B and PCM terminal 74 - Open circuit in wiring harness between intake shutter solenoid valve (half) terminal A and PCM control relay terminal C - Open circuit in wiring harness between intake shutter solenoid valve (half) terminal B and PCM terminal 74 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No
4	INSPECT INTAKE SHUTTER SOLENOID VALVE (HALF) CONNECTOR FOR POOR CONNECTION - Turn the engine switch to the ON position. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is the voltage B+?	Yes
		No
5	INSPECT INTAKE SHUTTER SOLENOID VALVE (HALF) POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Measure the voltage at intake shutter solenoid valve (half) terminal A. - Is the voltage B+?	Yes
		No
6	INSPECT INTAKE SHUTTER SOLENOID VALVE (HALF) CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between Intake shutter solenoid valve (half) terminal B and GND. - Is there continuity?	Yes
		No
7	INSPECT INTAKE SHUTTER SOLENOID VALVE (HALF) - Inspect the intake shutter solenoid valve (half). - Is there any malfunction?	Yes
		No
8	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT INTAKE SHUTTER SOLENOID VALVE CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between intake shutter solenoid valve (half) terminal B and PCM terminal 74. - Is there continuity?	Yes
		No
10	VERIFY TROUBLESHOOTING OF DTC P0661 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

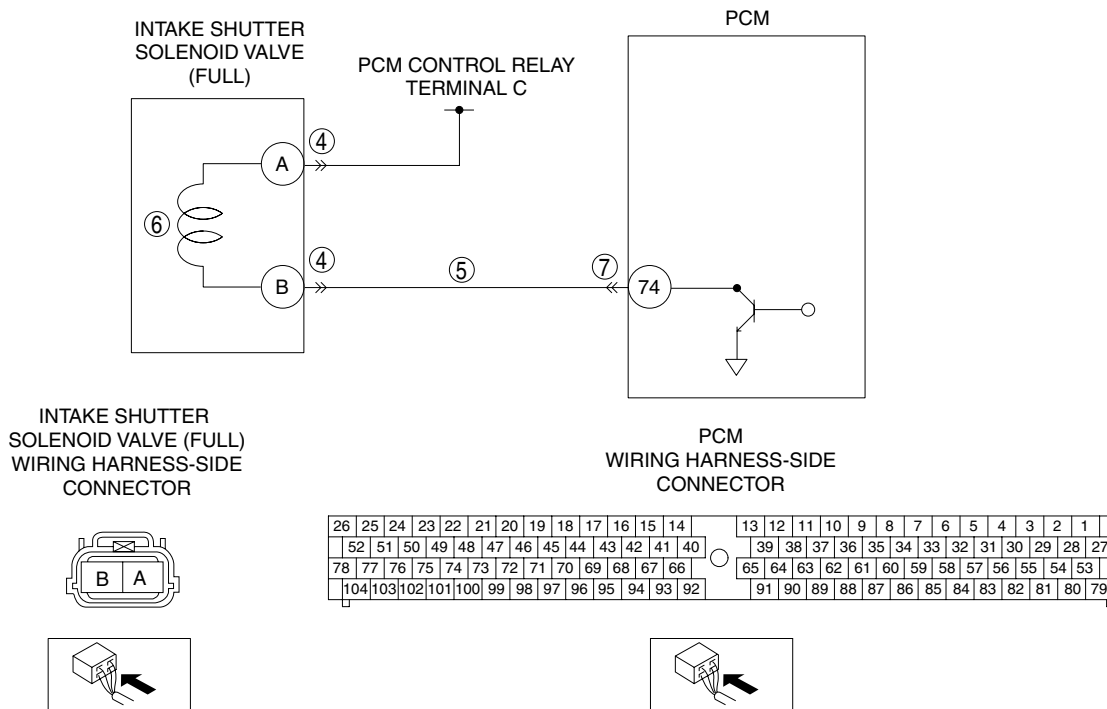
F2

ON-BOARD DIAGNOSTIC

DTC P0662

B6E407000600108

DTC P0662	Intake shutter solenoid valve (half) circuit high input
DETECTION CONDITION	- The PCM monitors the output signal to the intake shutter solenoid valve (half) when the intake shutter solenoid valve (half) is on. If the intake shutter solenoid valve (half) voltage is more than 7.8 V when the intake shutter solenoid valve (half) on, the PCM determines that there is a malfunction in the intake shutter solenoid valve (half) control circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Intake shutter solenoid valve (half) malfunction - Connector or terminal malfunction - Short to power circuit in wiring between intake shutter solenoid valve (half) terminal B and PCM terminal 74 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT INTAKE SHUTTER SOLENOID VALVE (HALF) CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to Step 8.
		No Go to the next step.
5	INSPECT INTAKE SHUTTER SOLENOID VALVE (HALF) CIRCUIT FOR SHORT TO POWER - Turn the engine switch off. - Inspect the voltage between intake shutter solenoid valve (half) terminal B and body GND. - Is the voltage B+?	Yes Repair or replace the wiring harness for a short to power supply, then go to Step 8.
		No Go to the next step.
6	INSPECT INTAKE SHUTTER SOLENOID VALVE (HALF) - Inspect the intake shutter solenoid valve (half). - Is there any malfunction?	Yes Replace the intake shutter solenoid valve, then go to Step 8.
		No Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes Repair or replace the terminal, then go to the next step.
		No Go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P0662 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No Troubleshooting completed.

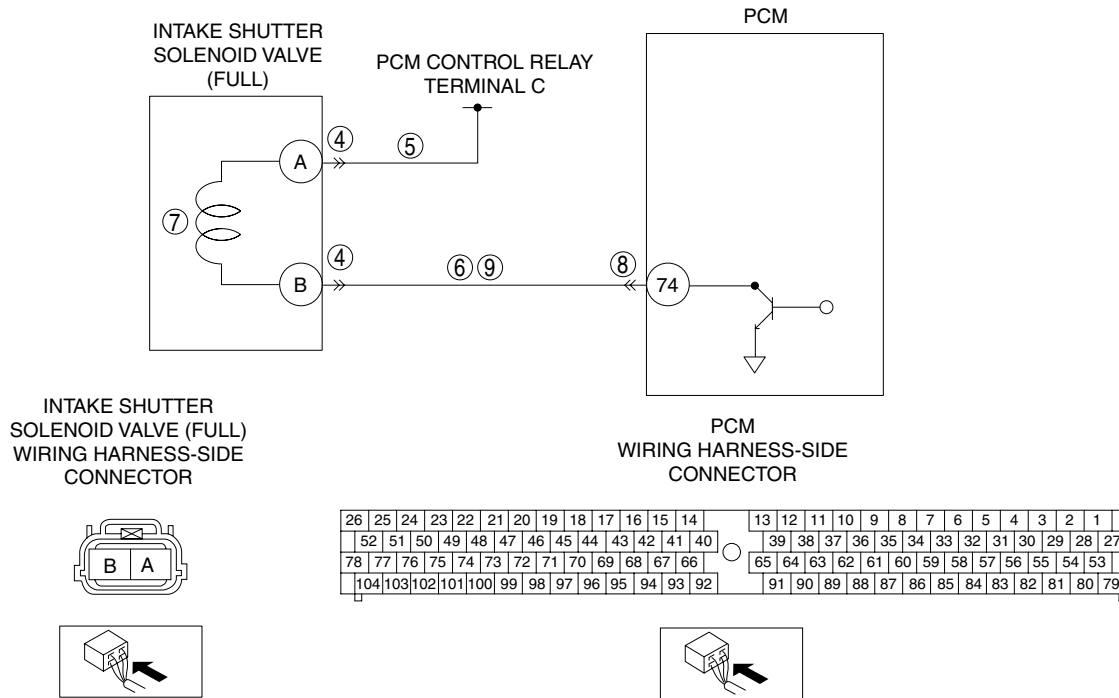
F2

ON-BOARD DIAGNOSTIC

DTC P0664

B6E407000600109

DTC P0664	Intake shutter solenoid valve (full) circuit voltage low input
DETECTION CONDITION	- The PCM monitors the output signal to the intake shutter solenoid valve (full). If the intake shutter solenoid valve (full) voltage is less than 7.8 V when the intake shutter solenoid valve (full) is off, the PCM determines that there is a malfunction in the intake shutter solenoid valve (full) control circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Intake shutter solenoid valve (full) malfunction - Connector or terminal malfunction - Short to GND in wiring harness between intake shutter solenoid valve (full) terminal B and PCM terminal 74 - Open circuit in wiring harness between intake shutter solenoid valve (full) terminal A and PCM control relay terminal C - Open circuit in wiring harness between intake shutter solenoid valve (full) terminal B and PCM terminal 74 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No
4	INSPECT INTAKE SHUTTER SOLENOID VALVE (FULL) CONNECTOR FOR POOR CONNECTION - Turn the engine switch to the ON position. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is the voltage B+?	Yes
		No
5	INSPECT INTAKE SHUTTER SOLENOID VALVE (FULL) POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Measure the voltage at intake shutter solenoid valve (full) terminal A. - Is the voltage B+?	Yes
		No
6	INSPECT INTAKE SHUTTER SOLENOID VALVE (FULL) CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between Intake shutter solenoid valve (full) terminal B and GND. - Is there continuity?	Yes
		No
7	INSPECT INTAKE SHUTTER SOLENOID VALVE (FULL) - Inspect the intake shutter solenoid valve (full). - Is there any malfunction?	Yes
		No
8	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT INTAKE SHUTTER SOLENOID VALVE (FULL) CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between intake shutter solenoid valve terminal B and PCM terminal 74. - Is there continuity?	Yes
		No
10	VERIFY TROUBLESHOOTING OF DTC P0664 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

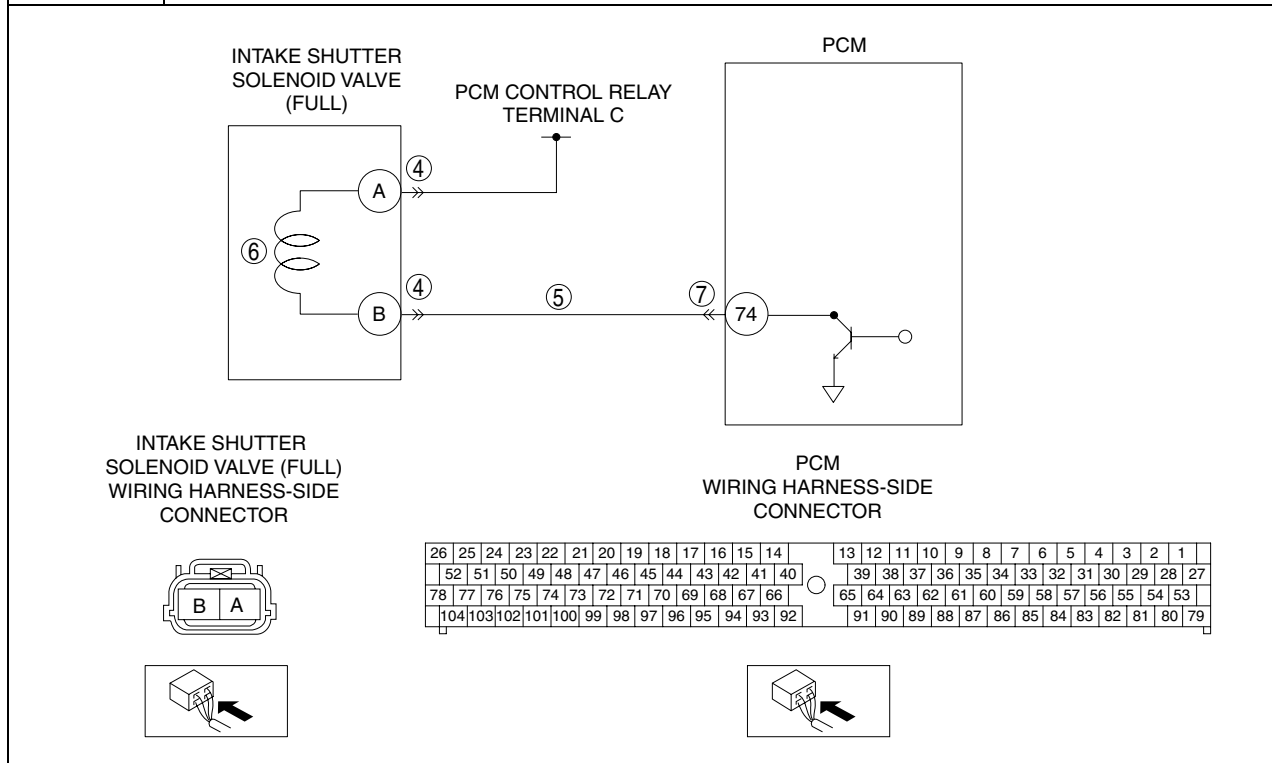
F2

ON-BOARD DIAGNOSTIC

DTC P0665

B6E407000600110

DTC P0665	Intake shutter solenoid valve (full) circuit voltage high input
DETECTION CONDITION	- The PCM monitors the output signal to the intake shutter solenoid valve (full) when intake shutter solenoid valve (full) is on. If the intake shutter solenoid valve (full) voltage is more than 7.8 V when the intake shutter solenoid valve (full) is on, the PCM determines that there is a malfunction in the intake shutter solenoid valve (full) control circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Intake shutter solenoid valve (full) malfunction - Connector or terminal malfunction - Short to power circuit in wiring harness between intake shutter solenoid valve (full) terminal B and PCM terminal 74 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION	
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the “INTERMITTENT CONCERNS TROUBLESHOOTING”.
4	INSPECT INTAKE SHUTTER SOLENOID VALVE (FULL) CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 8.
		No	Go to the next step.
5	INSPECT INTAKE SHUTTER SOLENOID VALVE (FULL) CIRCUIT FOR SHORT TO POWER - Turn the engine switch off. - Inspect the voltage between intake shutter solenoid valve (full) terminal B and body GND. - Is the voltage B+?	Yes	Repair or replace wiring harness for a short to power supply, then go to Step 8.
		No	Go to the next step.
6	INSPECT INTAKE SHUTTER SOLENOID VALVE (FULL) - Inspect the intake shutter solenoid valve (full). - Is there any malfunction?	Yes	Replace the intake shutter solenoid valve, then go to Step 8.
		No	Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to the next step.
		No	Go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P0665 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2–39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2–40 DTC TABLE.)
		No	Troubleshooting completed.

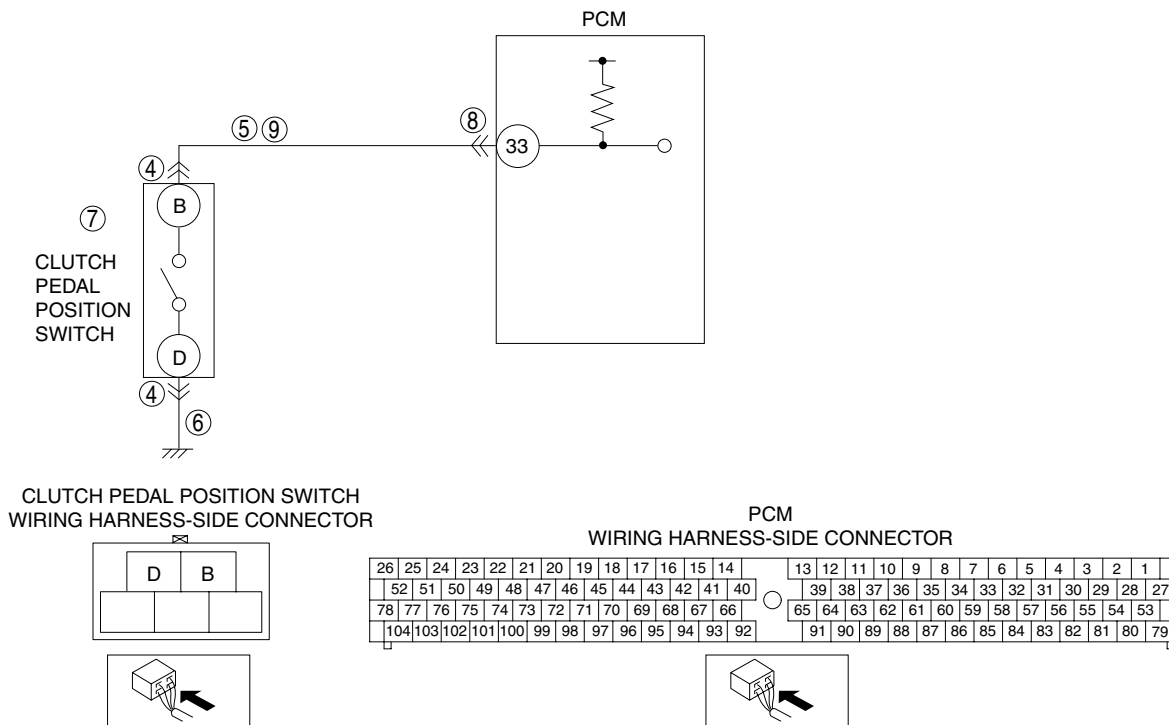
F2

ON-BOARD DIAGNOSTIC

DTC P0704

B6E407000700101

DTC P0704	Clutch switch circuit malfunction
DETECTION CONDITION	- The PCM monitors input voltage from the clutch pedal position switch while the engine running. If the input voltage from the clutch pedal position switch does not change when the vehicle stops after accelerating to more than 30 km/h {18.6 mph} and decelerating to 0 km/h {0 mph}, the PCM determines that the clutch pedal position switch circuit has a malfunction. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunctioning condition. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Clutch switch malfunction - Connector or terminal malfunction - Short to GND in wiring harness between clutch pedal position switch terminal B and PCM terminal 33 - Open circuit in wiring harness between clutch pedal position switch terminal D and GND - Open circuit in wiring harness between neutral switch terminal B and PCM terminal 33 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT INPUT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No
4	INSPECT CLUTCH PEDAL POSITION SWITCH CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect the clutch pedal position switch connector for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT CLUTCH PEDAL POSITION SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch to the ON position (Engine off). - Inspect the voltage at clutch pedal position switch terminal B (wiring harness-side). - Is the voltage below 1.0 V?	Yes
		No
6	INSPECT CLUTCH PEDAL POSITION SWITCH GND FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect continuity between clutch pedal position switch terminal D (wiring harness-side) and body GND. - Is there continuity?	Yes
		No
7	INSPECT CLUTCH PEDAL POSITION SWITCH - Inspect the clutch pedal position switch. - Is there any malfunction?	Yes
		No
8	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect the PCM connector for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT CLUTCH PEDAL POSITION SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect continuity between clutch pedal position switch terminal B (wiring harness-side) and PCM terminal 33 (wiring harness-side). - Is there continuity?	Yes
		No
10	VERIFY TROUBLESHOOTING OF DTC P0704 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

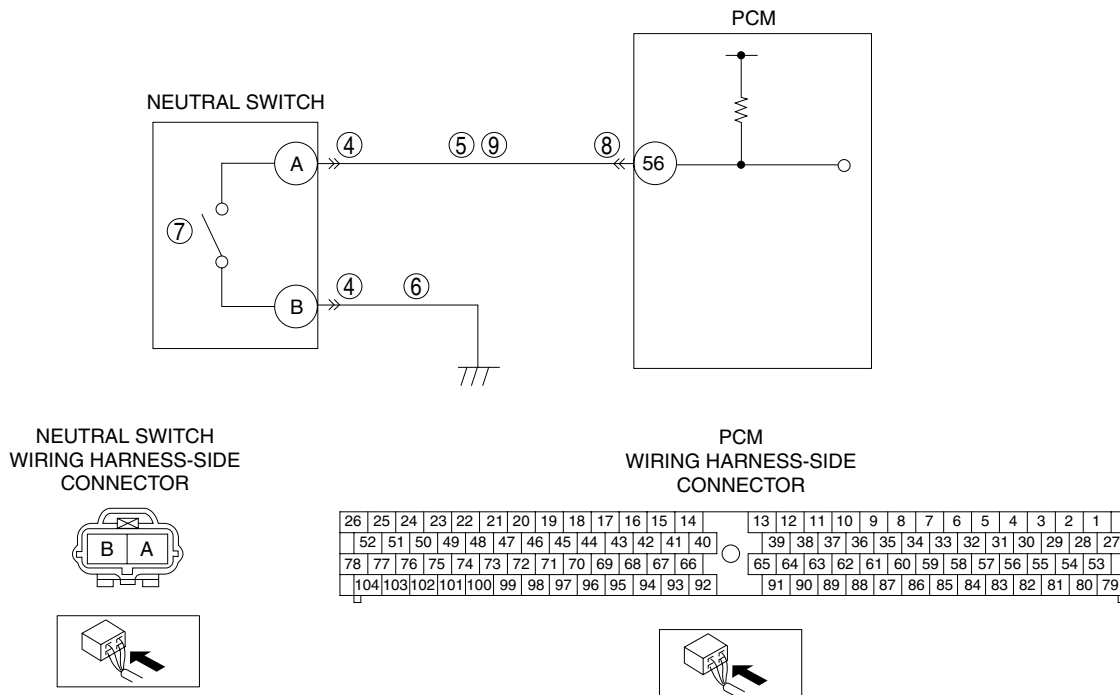
F2

ON-BOARD DIAGNOSTIC

DTC P0850

B6E407000800101

DTC P0850	Neutral switch circuit malfunction
DETECTION CONDITION	- The PCM monitors the input signal from the neutral switch when shifting. If the neutral switch signal is not input even once even when vehicle speed is more than 10 km/h {6.2 mph} the shift lever is operated more than five times, the PCM determines that there is a malfunction in the neutral switch circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Neutral switch malfunction - Connector or terminal malfunction - Short to GND in wiring harness between neutral switch terminal A and PCM terminal 56 - Open circuit in wiring harness between neutral switch terminal B and GND - Open circuit in wiring harness between neutral switch terminal A and PCM terminal 56 - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT NEUTRAL SWITCH CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT NEUTRAL SWITCH SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between neutral switch terminal A and body GND. - Is there continuity?	Yes
		No
6	INSPECT NEUTRAL SWITCH GND CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between neutral switch terminal B and body GND. - Is there continuity?	Yes
		No
7	INSPECT NEUTRAL SWITCH - Inspect the neutral switch. - Is there any malfunction?	Yes
		No
8	INSPECT PCM CONNECTO FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT NEUTRAL SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between neutral switch terminal A and PCM terminal 56. - Is there continuity?	Yes
		No
10	VERIFY TROUBLESHOOTING OF DTC P0850 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

F2

ON-BOARD DIAGNOSTIC

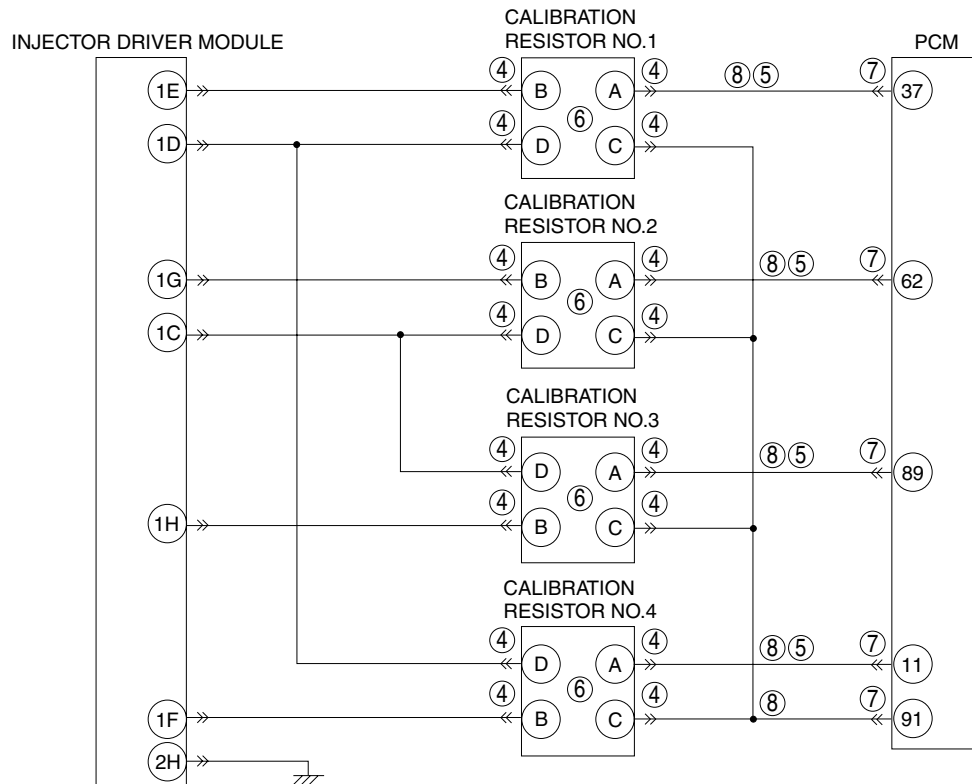
DTC P1190

B6E407001100101

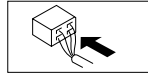
DTC P1190	Calibration resistor circuit malfunction
DETECTION CONDITION	- The PCM monitors the input voltage from the calibration resistor of each cylinder. If the PCM detects that the input voltage for any cylinder is more than 4.8 V or less than 0.2 V, the PCM determines calibration resistor malfunction. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Calibration resistor malfunction - Connector or terminal malfunction - Short to power supply in wiring harness between each cylinder calibration resistor terminal A and PCM terminal 37, 62, 89, 11 - Open circuit in wiring harness between each cylinder calibration resistor terminal A and PCM terminal 37, 62, 89, 11 - Open circuit in wiring harness between each cylinder calibration resistor terminal C and PCM terminal 91

ON-BOARD DIAGNOSTIC

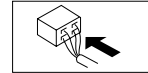
DTC P1190 Calibration resistor circuit malfunction



**INJECTOR DRIVER MODULE
WIRING HARNESS-SIDE CONNECTOR**

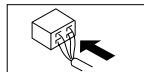


**CALIBRATION RESISTOR
WIRING HARNESS-SIDE
CONNECTOR**



**PCM
WIRING HARNESS-SIDE CONNECTOR**

26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79



F2

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available Service Information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT CALIBRATION RESISTOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection calibration resistor connector for each cylinder (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 9.
		No	Go to the next step.
5	INSPECT CALIBRATION RESISTOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY - Turn the engine switch to the ON position (Engine off). - Disconnect all cylinder's calibration resistor connectors. - Inspect the voltage at calibration resistor terminal A for each cylinder (wiring harness-side) and body GND. - Is the voltage B+?	Yes	Repair or replace the wiring harness for a short to power supply for the suspected cylinder, then go to Step 9.
		No	Go to the next step.
6	INSPECT CALIBRATION RESISTOR - Inspect the calibration resistor. - Is there any malfunction?	Yes	Replace the calibration resistor, then go to Step 9.
		No	Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 9.
		No	Go to the next step.
8	INSPECT CALIBRATION RESISTOR FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between following terminals (wiring harness-side harness): - No.1 cylinder calibration resistor terminal A and PCM terminal 37 - No.2 cylinder calibration resistor terminal A and PCM terminal 62 - No.3 cylinder calibration resistor terminal A and PCM terminal 89 - No.4 cylinder calibration resistor terminal A and PCM terminal 11 - Each cylinder calibration resistor terminal C and PCM terminal 91 - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for the suspected circuit, then go to the next step.
9	VERIFY TROUBLESHOOTING OF DTC P1190 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See F2-40 DTC TABLE .)
		No	Troubleshooting completed.

DTC P1211

B6E407001200101

DTC P1211	Fuel pressure higher or lower than desired pressure
DETECTION CONDITION	- The PCM monitors the fuel pressure and calculates the fuel supply volume to the common rail using the fuel pressure sensor input signal while the engine is running. If the fuel pressure or fuel supply volume to the common rail is as follows, the PCM determines that the fuel pressure is higher or lower than the desired pressure. - Supply pump actual pressure is higher than threshold. - Difference between two consecutive fuel supply to common rail volume from supply pump is more than one fuel injection volume by fuel injector. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Suction control valve malfunction - Fuel pressure sensor characteristic malfunction - Fuel pressure limiter malfunction - Supply pump malfunction - PCM malfunction

F2

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA Is DTC P0627 on the FREEZE FRAME DATA?	Yes	Go to the next step.
		No	Go to the troubleshooting procedures for the DTC in the FREEZE FRAME DATA.
5	INSPECT FUEL PRESSURE SENSOR - Inspect the fuel pressure sensor. - Is the fuel pressure sensor normal?	Yes	Go to the next step.
		No	Replace the common rail, then go to Step 9.
6	INSPECT SUCTION CONTROL VALVE - Inspect the suction control valve. - Is the suction control valve normal?	Yes	Go to the next step.
		No	Replace the supply pump, then go to Step 9.
7	VERIFY FUEL PRESSURE LIMITER MALFUNCTION - Replace the common rail. - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	This DTC cause is fuel pressure limiter malfunction, then go to Step 9.
8	VERIFY SUPPLY PUMP MALFUNCTION - Replace the supply pump. - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	The cause for this DTC is a supply pump malfunction, then go to the next step.
9	VERIFY TROUBLESHOOTING OF DTC P1211 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See F2-40 DTC TABLE.)
		No	Troubleshooting completed.

DTC P1391

B6E407001300101

DTC P1391	Glow plug circuit low input
DETECTION CONDITION	- The PCM monitors the output signal to the glow relay when the glow relay is on. If the glow relay voltage is 1.0 V or less when the glow relay is operating, The PCM determines that there is a malfunction in the glow relay circuit. Diagnostic support note - The MIL does not illuminates. - The DTC is stored in the PCM memory.

F2

F2-171

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	CHECK FUSE CONDITION - Turn the engine switch off. - Verify glow fuse conditions. - Is there any melt or burnt?	Yes	Go to symptom troubleshooting NO.1 MELTING OF MAIN OR OTHER FUSES.
		No	Go to the next step.
5	INSPECT GLOW PLUG RELAY CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the glow plug relay connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to the next step.
		No	Go to the next step.
6	INSPECT GLOW PLUG RELAY POWER SUPPLY FOR OPEN CIRCUIT - Turn the engine switch off. - Measure the voltage between glow plug relay terminal D and body GND. - Is the voltage B+?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, go to Step 14.
7	INSPECT GLOW PLUG RELAY GRAND FOR OPEN CIRCUIT - Turn the engine switch off. - Remove the glow plug relay. - Inspect for continuity between glow plug relay terminal B and GND. - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, go to Step 14.
8	INSPECT GLOW PLUG RELAY SIGNAL FOR OPEN CIRCUIT - Turn the engine switch to the ON position (Engine off). - Measure the voltage between glow plug relay terminal C. - Is voltage less than 1.0 V?	Yes	Repair or replace the wiring harness for an open circuit, go to Step 14.
		No	Go to the next step.
9	INSPECT GLOW PLUG RELAY SIGNAL CIRCUIT FOR SHORT TO GND - Turn the engine switch off. - Inspect for continuity between glow plug relay terminal C and body GND. - Is there continuity?	Yes	Repair or replace the wiring harness for a short to GND, go to Step 14.
		No	Go to the next step.
10	INSPECT GLOW PLUG RELAY - Inspect the glow plug relay. - Is there any malfunction?	Yes	Go to the next step.
		No	Replace the glow plug relay, go to Step 14.
11	INSPECT POOR CONNECTION OF PCM CONNECTOR - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, go to Step 14.
		No	Go to the next step.

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
12	INSPECT GLOW PLUG RELAY SIGNAL CIRCUIT FOR SHORT TO GRAND - Turn the engine switch off. - Remove the glow plug connector. - Inspect for continuity between glow plug relay terminal A and body GND. - Is there continuity?	Yes Repair or replace the wiring harness for a short to GND, then go to Step 12.
		No Go to the next step
13	INSPECT GLOW PLUG RELAY SIGNAL CIRCUIT FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between glow plug relay terminal A and PCM terminal 86. - Is there continuity?	Yes Go to the next step
		No Repair or replace the wiring harness for an open circuit, then go to the next step.
14	VERIFY TROUBLESHOOTING OF DTC P1391 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear DTC from PCM memory using WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, go to the next step.
		No Go to the next step.
15	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No Troubleshooting completed.

F2

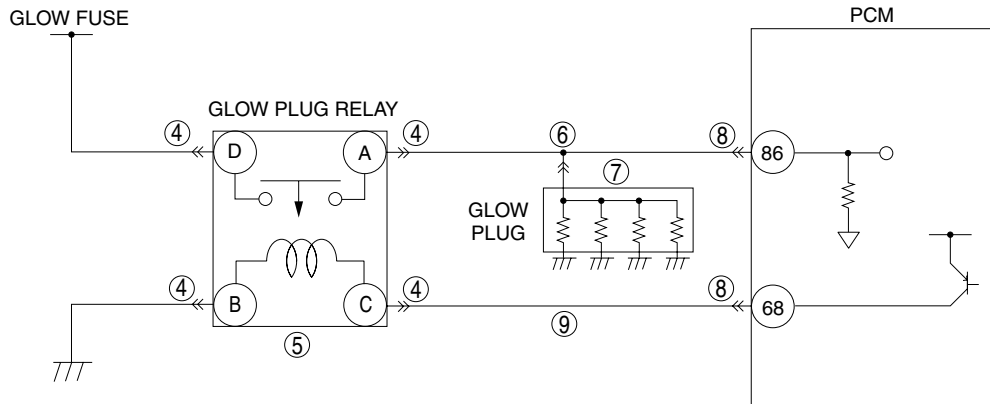
DTC P1392

B6E407001300102

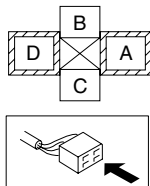
DTC P1392	Glow plug circuit high input
DETECTION CONDITION	- The PCM monitors the output signal to the glow relay when the glow relay is off. If the glow relay voltage is 4.0 V or more when the glow relay is off, The PCM determines that there is a malfunction in the glow relay control circuit. Diagnostic support note - The MIL does not illuminates. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- Glow plug relay malfunction - Glow plug malfunction - PCM malfunction - Connector or terminal malfunction - Short to power supply in wiring harness between glow plug relay terminal C and PCM terminal 68 - Short to power supply in wiring harness between glow plug relay terminal A and PCM terminal 86

ON-BOARD DIAGNOSTIC

DTC P1392 Glow plug circuit high input

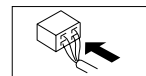


GLOW PLUG RELAY
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	INSPECT GLOW PLUG RELAY CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the glow plug relay connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT GLOW PLUG RELAY - Inspect glow plug relay. - Is there any malfunction?	Yes
		No
6	INSPECT GLOW PLUG RELAY SIGNAL CIRCUIT FOR SHORT TO POWER - Turn the engine switch to the ON position (Engine off). - Disconnect the PCM connector. - Measure the voltage between glow plug terminal A and body GND. - Is the voltage more than 4.0 V?	Yes
		No
7	INSPECT GLOW PLUG - Inspect glow plug. - Is there any malfunction?	Yes
		No
8	INSPECT POOR CONNECTION OF PCM CONNECTOR - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT GLOW PLUG RELAY GRAND CIRCUIT FOR SHORT TO POWER - Turn the engine switch to off. - Remove the glow plug relay. - Measure the voltage between glow plug relay terminal C and body GND. - Is the voltage B+?	Yes
		No
10	VERIFY TROUBLESHOOTING OF DTC P1392 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine and warm it up to the normal operating temperature. - Is the same DTC present?	Yes
		No
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is any DTC present?	Yes
		No

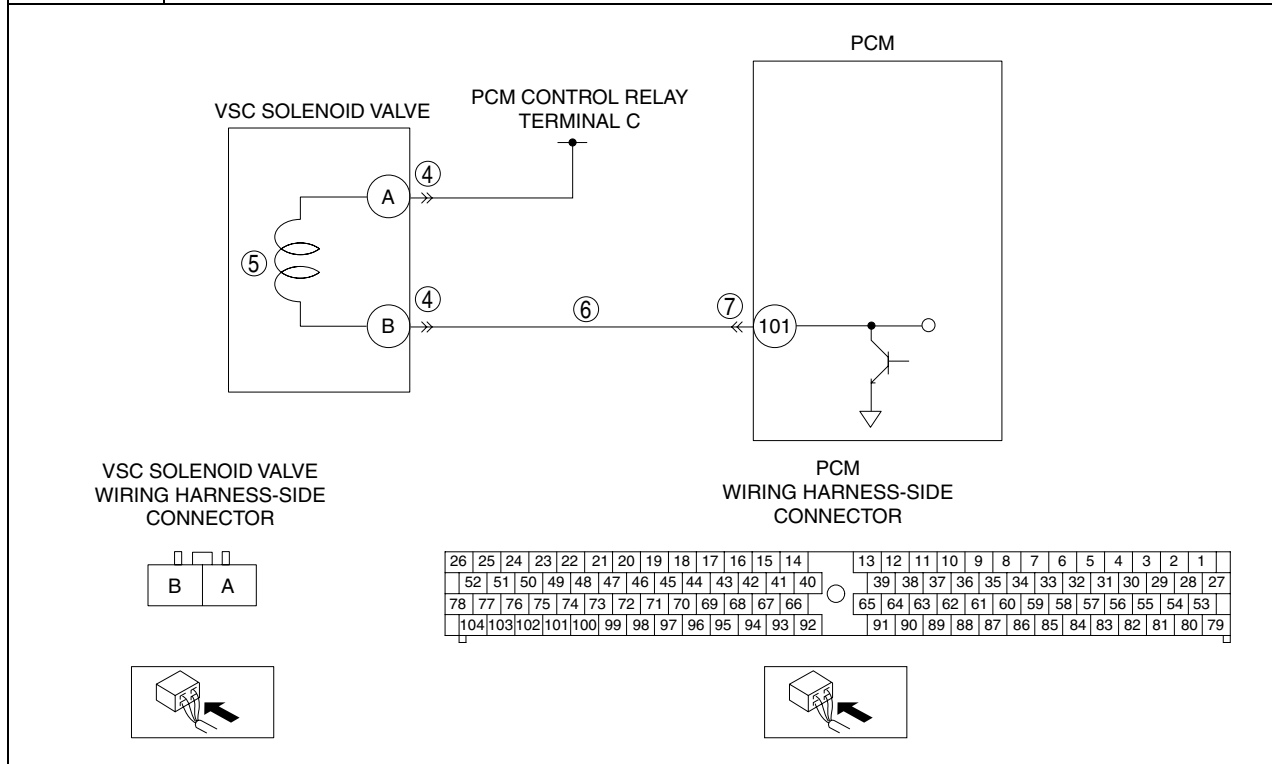
F2

ON-BOARD DIAGNOSTIC

DTC P2009

B6E407002000101

DTC P2009	Variable swirl control (VSC) solenoid valve circuit high input
DETECTION CONDITION	- The PCM monitors the output signal to the variable swirl control solenoid valve. If the voltage of the variable swirl control solenoid valve is high even if the variable swirl control solenoid valve is on, the PCM determines that there is a malfunction in the variable swirl control solenoid valve control circuit. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- VSC solenoid valve malfunction - Short to power supply between VSC solenoid valve terminal B and PCM terminal 101 - Connector or terminal malfunction - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No
4	INSPECT POOR CONNECTION OF VSC SOLENOID VALVE CONNECTOR - Turn the engine switch off. - Disconnect the VSC solenoid valve connector. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT VSC SOLENOID VALVE - Inspect the VSC solenoid valve. - Is the VSC solenoid valve normal?	Yes
		No
6	INSPECT VSC SOLENOID VALVE FOR SHORT TO POWER - Turn the engine switch to the ON position (Engine off). - Measure the voltage between VSC solenoid valve terminal B (wiring harness-side) and body ground. - Is the voltage B+?	Yes
		No
7	INSPECT POOR CONNECTION OF PCM CONNECTOR - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
8	VERIFY TROUBLESHOOTING OF DTC P2009 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

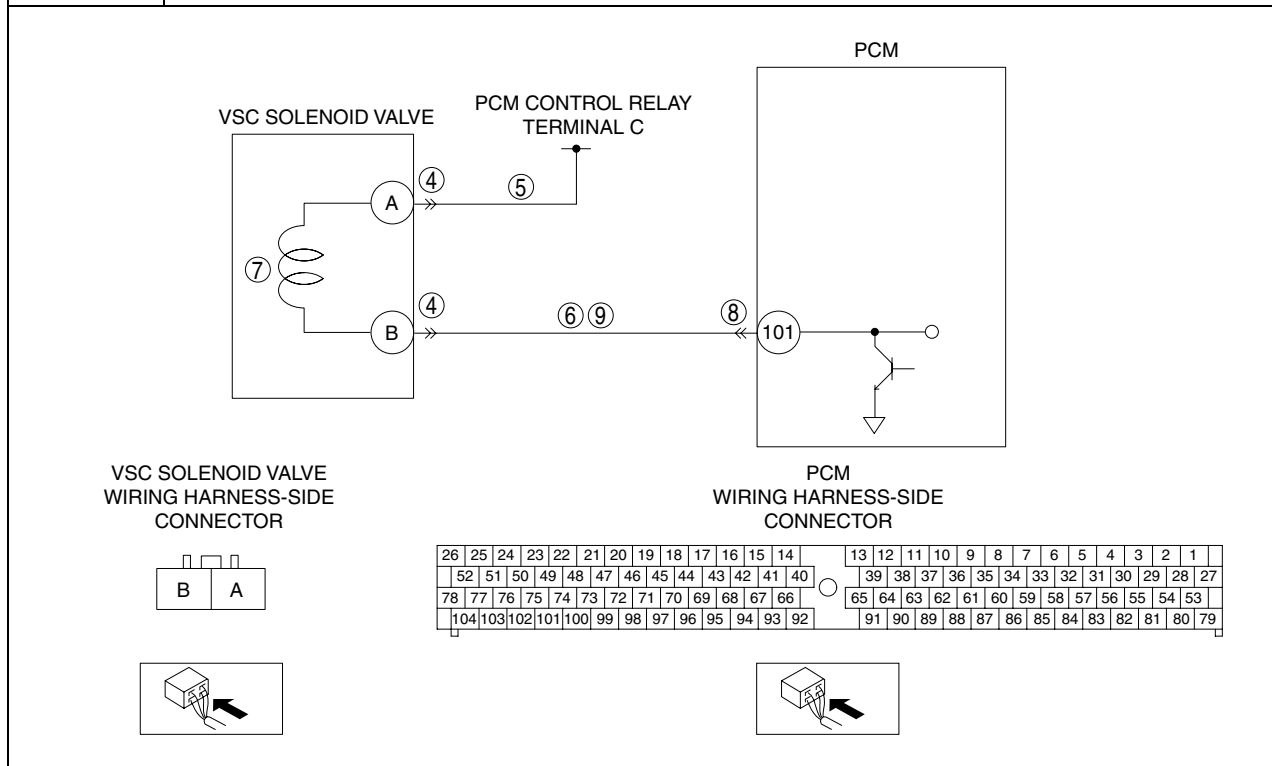
F2

ON-BOARD DIAGNOSTIC

DTC P2010

B6E407002000102

DTC P2010	Variable swirl control (VSC) solenoid valve circuit low input
DETECTION CONDITION	- The PCM monitors the output signal to the variable swirl control solenoid valve. If the voltage of the variable swirl control solenoid valve is low even if the variable swirl control solenoid valve is off, the PCM determines that there is a malfunction in the variable swirl control solenoid valve control system. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- VSC solenoid valve malfunction - Open circuit in wiring harness between VSC solenoid valve terminal A and PCM control relay terminal C - Open circuit in wiring harness between VSC solenoid valve terminal B and PCM terminal 101 - Short to GND in wiring harness between VSC solenoid valve terminal B and PCM terminal 101 - Connector or terminal malfunction - PCM malfunction



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No
4	INSPECT POOR CONNECTION OF VSC SOLENOID VALVE CONNECTOR - Turn engine switch to off. - Disconnect the VSC solenoid valve connector. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
5	INSPECT VSC SOLENOID VALVE POWER SUPPLY FOR OPEN CIRCUIT - Turn the engine switch to the ON position (Engine off). - Measure the voltage between VSC solenoid valve terminal A (harness-side) and body ground - Is the voltage B+?	Yes
		No
6	INSPECT VSC SOLENOID VALVE CONTROL FOR SHORT TO GROUND - Turn the engine switch off. - Inspect for continuity between VSC solenoid valve terminal B (wiring harness-side) and body ground. - Is there continuity?	Yes
		No
7	INSPECT VSC SOLENOID VALVE - Inspect the VSC solenoid valve. - Is there any malfunction?	Yes
		No
8	INSPECT POOR CONNECTION OF PCM CONNECTOR - Turn the engine switch off. - Disconnect PCM connector. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes
		No
9	INSPECT VSC SOLENOID VALVE CONTROL FOR OPEN CIRCUIT - Turn the engine switch off. - Inspect for continuity between VSC solenoid valve terminal B (wiring harness-side) and PCM terminal 101 (wiring harness-side). - Is there continuity?	Yes
		No
10	VERIFY TROUBLESHOOTING OF DTC P2010 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes
		No

F2

ON-BOARD DIAGNOSTIC

STEP	INSPECTION	ACTION
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No Troubleshooting completed.

DTC P2135

B6E407002100101

DTC P2135	Accelerator pedal position (APP) sensor No.1/No.2 voltage correlation
DETECTION CONDITION	- The PCM monitors the input signals from accelerator pedal position sensor No.1 and accelerator pedal position sensor No.2. If the difference between accelerator pedal position sensor No.1 and accelerator pedal position sensor No.2 is more than 0.9 V, the PCM determines that there is a malfunction in the accelerator pedal position sensor characteristic. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- APP sensor No.1 malfunction - APP sensor No.2 malfunction - PCM malfunction

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT APP SENSOR - Inspect the APP sensor. - Is there any malfunction?	Yes Replace the APP sensor, then go to Step 5.
		No Go to the next step.
5	VERIFY TROUBLESHOOTING OF DTC P2135 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes Replace the PCM, then go to the next step.
		No Go to the next step.
6	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No DTC troubleshooting completed.

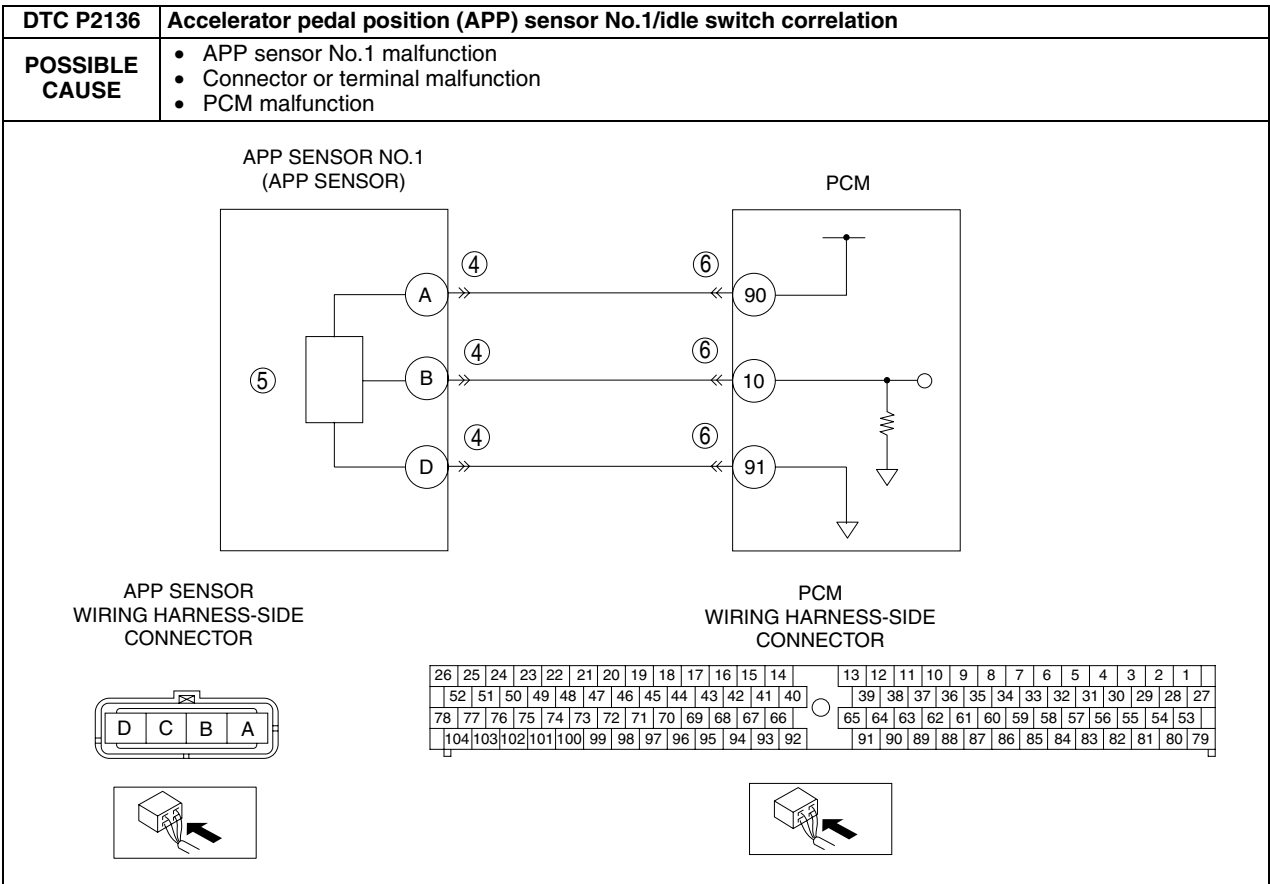
DTC P2136

B6E407002100102

DTC P2136	Accelerator pedal position (APP) sensor No.1/idle switch correlation
DETECTION CONDITION	- The PCM monitors the input signal from accelerator pedal position sensor No.1. If the voltage from accelerator pedal position sensor No.1 is more than 1.25 V during idle switch is on, the PCM determines that there is a malfunction in the accelerator pedal position sensor No.1 characteristic. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.

F2-180

ON-BOARD DIAGNOSTIC



F2

ON-BOARD DIAGNOSTIC

Diagnostic procedure

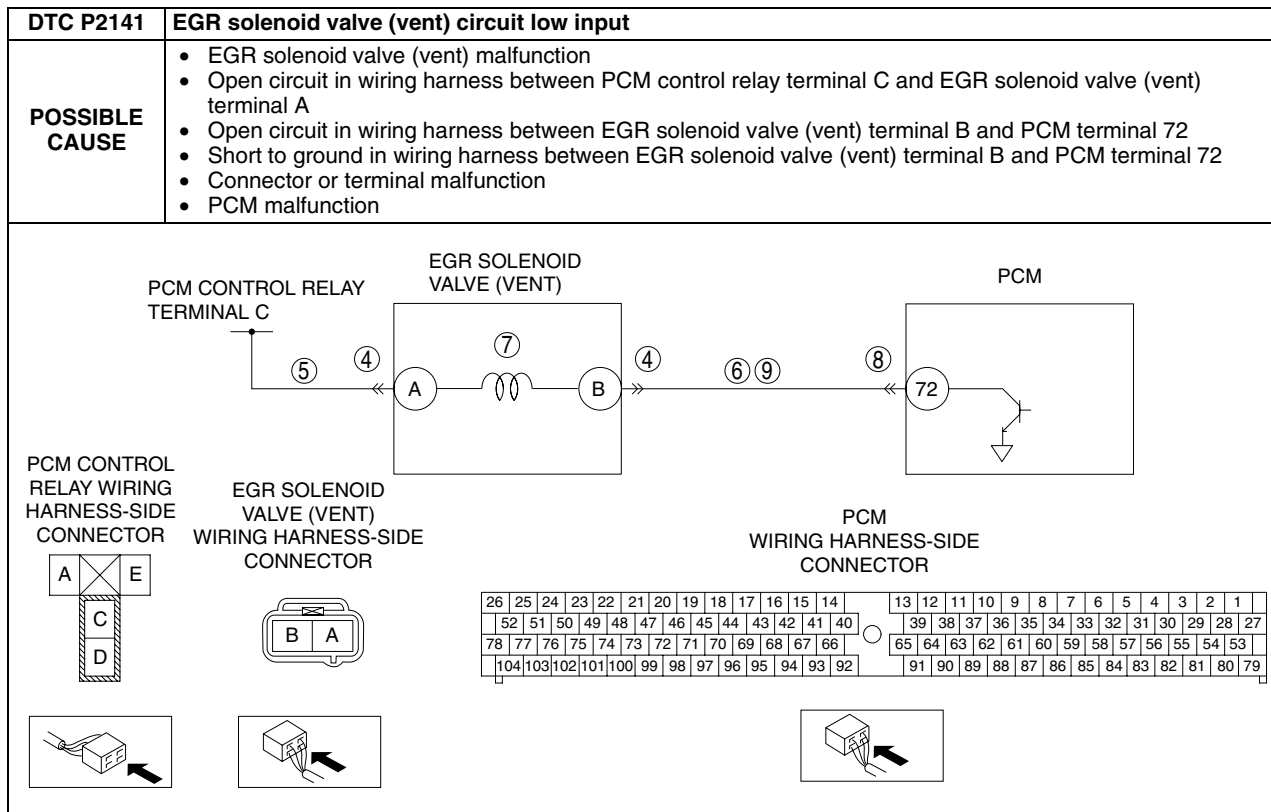
STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT APP SENSOR CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the APP sensor connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 7.
		No	Go to the next step.
5	INSPECT APP SENSOR - Inspect the APP sensor. - Is there any malfunction?	Yes	Replace the APP sensor, then go to Step 7.
		No	Go to the next step.
6	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to the next step.
		No	Go to the next step.
7	VERIFY TROUBLESHOOTING OF DTC P2136 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.
8	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No	DTC troubleshooting completed.

DTC P2141

B6E407002100103

DTC P2141	EGR solenoid valve (vent) circuit low input
DETECTION CONDITION	- The PCM monitors the output signal to the EGR solenoid valve (vent). If the EGR solenoid valve (vent) voltage is low even if the EGR solenoid valve (vent) is off, the PCM determines that there is a malfunction in the intake shutter solenoid valve control system. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.

ON-BOARD DIAGNOSTIC



F2

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT EGR SOLENOID VALVE (VENT) CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the EGR solenoid valve (vent) connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 10.
		No	Go to the next step.
5	INSPECT EGR SOLENOID VALVE (VENT) POWER SUPPLY FOR OPEN CIRCUIT - Turn the engine switch to the ON position (Engine off). - Measure the voltage between EGR solenoid valve (vent) terminal A (wiring harness-side) and body GND. - Is the voltage B+?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, then go to Step 10.
6	INSPECT EGR SOLENOID VALVE (VENT) CONTROL CIRCUIT FOR SHORT TO GROUND - Inspect continuity between EGR solenoid valve (vent) terminal B (wiring harness-side) and body ground. - Is there continuity	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 10.
		No	Go to the next step.
7	INSPECT EGR SOLENOID VALVE (VENT) - Inspect the EGR solenoid valve (vent). - Is there any malfunction?	Yes	Replace the EGR solenoid valve (vent), then go to Step 10.
		No	Go to the next step.
8	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 10.
		No	Go to the next step.
9	INSPECT EGR SOLENOID VALVE (VENT) CONTROL FOR OPEN CIRCUIT - Inspect continuity between EGR solenoid valve (vent) terminal B (wiring harness-side) and PCM terminal 72 (wiring harness-side). - Is there continuity	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, then go to the next step.
10	VERIFY TROUBLESHOOTING OF DTC P2141 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.

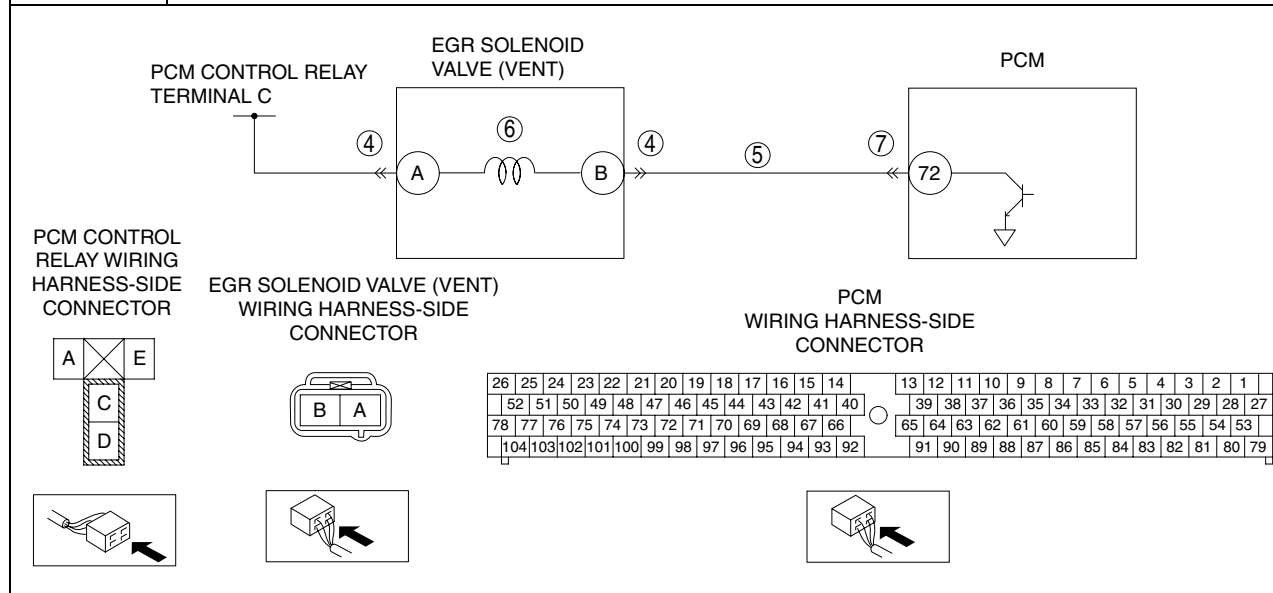
ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No	DTC troubleshooting completed.

DTC P2142

B6E407002100104

DTC P2142	EGR solenoid valve (vent) circuit high input
DETECTION CONDITION	- The PCM monitors the output signal to the EGR solenoid valve (vent). If the EGR solenoid valve (vent) voltage is high even if the EGR solenoid valve (vent) is on, the PCM determines that there is a malfunction in the EGR solenoid valve (vent) control system. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- EGR solenoid valve (vent) malfunction - Short to power supply between EGR solenoid valve (vent) terminal B and PCM terminal 72 - Connector or terminal malfunction - PCM malfunction



ON-BOARD DIAGNOSTIC

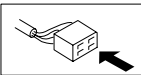
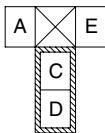
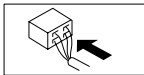
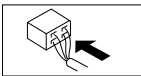
Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT EGR SOLENOID VALVE (VENT) CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the EGR solenoid valve (vent) connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 8.
		No	Go to the next step.
5	INSPECT EGR SOLENOID VALVE (VENT) POWER CIRCUIT FOR SHORT TO POWER - Turn the engine switch to the ON position (Engine off). - Measure the voltage between EGR solenoid valve (vent) terminal B (wiring harness-side) and body GND. - Is the voltage B+?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a short to power, then go to Step 8.
6	INSPECT EGR SOLENOID VALVE (VENT) - Inspect the EGR solenoid valve (vent). - Is there any malfunction?	Yes	Replace the EGR solenoid valve (vent), then go to Step 8.
		No	Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to the next step.
		No	Go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P2142 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC P2144

B6E407002100105

DTC P2144	EGR control solenoid valve control circuit low input																																																																																																												
DETECTION CONDITION	• The PCM monitors the output signal to the EGR control solenoid valve. If the EGR control solenoid valve voltage is low even if the EGR control solenoid valve is off, the PCM determines that there is a malfunction in the EGR control solenoid valve control system. Diagnostic support note • The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. • PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. • FREEZE FRAME DATA is available. • The DTC is stored in the PCM memory.																																																																																																												
POSSIBLE CAUSE	• EGR control solenoid valve malfunction • Open circuit in wiring harness between PCM control relay terminal C and EGR control solenoid valve terminal A • Open circuit in wiring harness between EGR control solenoid valve terminal B and PCM terminal 77 • Short to ground circuit in wiring harness between EGR control solenoid valve terminal B and PCM terminal 77 • Connector or terminal malfunction • PCM malfunction																																																																																																												
PCM CONTROL RELAY WIRING HARNESS-SIDE CONNECTOR  EGR CONTROL SOLENOID VALVE WIRING HARNESS-SIDE CONNECTOR  PCM WIRING HARNESS-SIDE CONNECTOR <table data-bbox="670 1098 1451 1190"><tr><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td><td>16</td><td>15</td><td>14</td><td></td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td></tr><tr><td>52</td><td>51</td><td>50</td><td>49</td><td>48</td><td>47</td><td>46</td><td>45</td><td>44</td><td>43</td><td>42</td><td>41</td><td>40</td><td></td><td>39</td><td>38</td><td>37</td><td>36</td><td>35</td><td>34</td><td>33</td><td>32</td><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td></tr><tr><td>78</td><td>77</td><td>76</td><td>75</td><td>74</td><td>73</td><td>72</td><td>71</td><td>70</td><td>69</td><td>68</td><td>67</td><td>66</td><td></td><td>65</td><td>64</td><td>63</td><td>62</td><td>61</td><td>60</td><td>59</td><td>58</td><td>57</td><td>56</td><td>55</td><td>54</td><td>53</td></tr><tr><td>104</td><td>103</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>97</td><td>96</td><td>95</td><td>94</td><td>93</td><td>92</td><td></td><td>91</td><td>90</td><td>89</td><td>88</td><td>87</td><td>86</td><td>85</td><td>84</td><td>83</td><td>82</td><td>81</td><td>80</td><td>79</td></tr></table>		26	25	24	23	22	21	20	19	18	17	16	15	14		13	12	11	10	9	8	7	6	5	4	3	2	1	52	51	50	49	48	47	46	45	44	43	42	41	40		39	38	37	36	35	34	33	32	31	30	29	28	27	78	77	76	75	74	73	72	71	70	69	68	67	66		65	64	63	62	61	60	59	58	57	56	55	54	53	104	103	102	101	100	99	98	97	96	95	94	93	92		91	90	89	88	87	86	85	84	83	82	81	80	79
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F2

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT EGR CONTROL SOLENOID VALVE CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the EGR control solenoid valve connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 10.
		No	Go to the next step.
5	INSPECT EGR CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN - Turn the engine switch to the ON position (Engine off). - Measure the voltage between EGR control solenoid valve terminal A (wiring harness-side) and body GND. - Is the voltage B+?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, then go to Step 10.
6	INSPECT EGR CONTROL SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GROUND - Inspect continuity between EGR control solenoid valve terminal B (wiring harness-side) and body ground. - Is there continuity	Yes	Repair or replace the wiring harness for a possible short to ground, then go to Step 10.
		No	Go to the next step.
7	INSPECT EGR CONTROL SOLENOID VALVE - Inspect the EGR control solenoid valve. - Is there any malfunction?	Yes	Replace the EGR control solenoid valve, then go to Step 10.
		No	Go to the next step.
8	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 10.
		No	Go to the next step.
9	INSPECT EGR CONTROL SOLENOID VALVE CONTROL CIRCUIT FOR OPEN - Inspect continuity between EGR control solenoid valve terminal B (wiring harness-side) and PCM terminal 77 (wiring harness-side). - Is there continuity	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, then go to the next step.
10	VERIFY TROUBLESHOOTING OF DTC P2144 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.

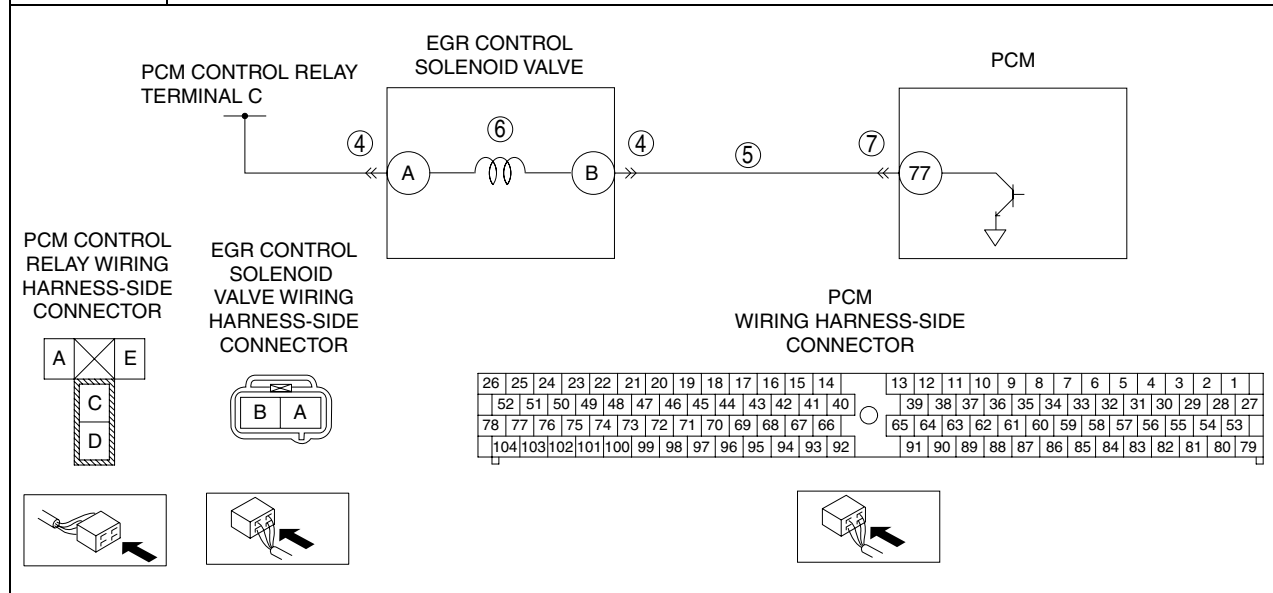
ON-BOARD DIAGNOSTIC

STEP	INSPECTION		ACTION
11	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No	DTC troubleshooting completed.

DTC P2145

B6E407002100106

DTC P2145	EGR control solenoid valve circuit high input
DETECTION CONDITION	- The PCM monitors the output signal to the EGR control solenoid valve. If the EGR control solenoid valve voltage is high even if the EGR control solenoid valve is on, the PCM determines that there is a malfunction in the EGR control solenoid valve control system. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- EGR control solenoid valve malfunction - Short to power circuit between EGR control solenoid valve terminal B and PCM terminal 77 - Short to EGR control solenoid valve or PCM connector - PCM malfunction



F2

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT EGR CONTROL SOLENOID VALVE CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the EGR control solenoid valve connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to Step 8.
		No	Go to the next step.
5	INSPECT EGR CONTROL SOLENOID VALVE POWER CIRCUIT FOR SHORT TO POWER - Turn the engine switch to the ON position (Engine off). - Measure the voltage between EGR control solenoid valve terminal B (wiring harness-side) and body GND. - Is the voltage B+?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for a short to power, then go to Step 8.
6	INSPECT EGR CONTROL SOLENOID VALVE - Inspect the EGR control solenoid valve. - Is there any malfunction?	Yes	Replace the EGR control solenoid valve, then go to Step 8.
		No	Go to the next step.
7	INSPECT PCM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Disconnect the PCM connector. - Inspect for poor connection (such as damaged/pulled-out pins, corrosion). - Is there any malfunction?	Yes	Repair or replace the terminal, then go to the next step.
		No	Go to the next step.
8	VERIFY TROUBLESHOOTING OF DTC P2145 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.
9	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No	DTC troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC P2146

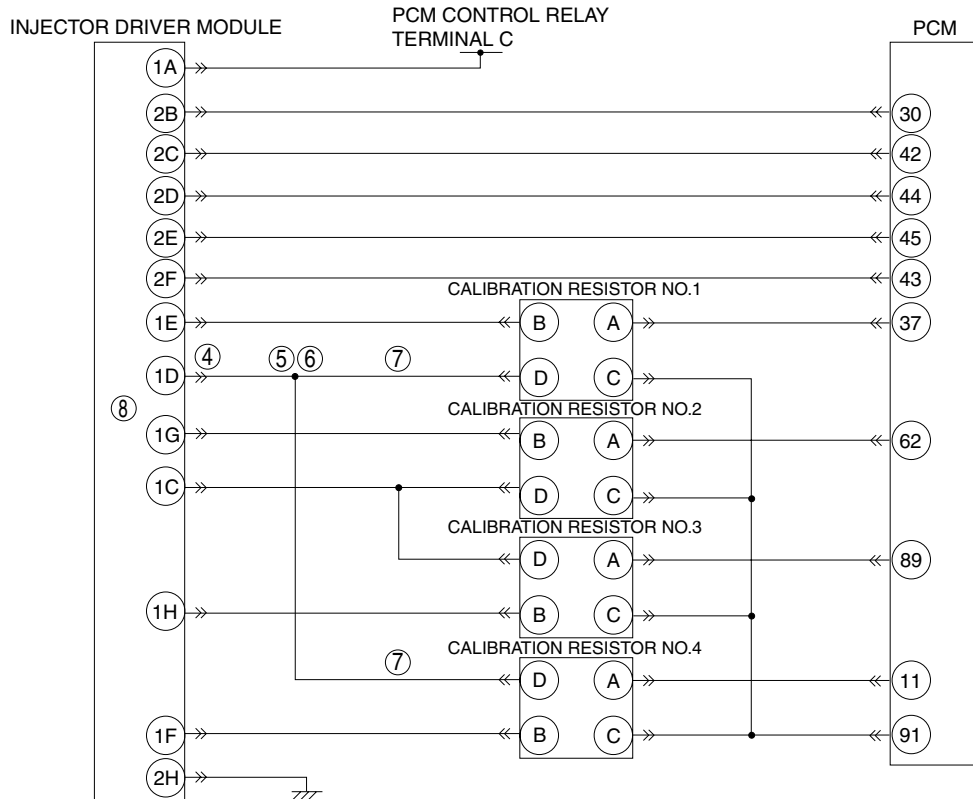
B6E407002100107

DTC P2146	Fuel injector No.1/No.4 circuit malfunction
DETECTION CONDITION	- The PCM monitors each cylinder injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.1 and No.4 cylinder normally, the PCM determines that the fuel injector No.1 and No.4 operation is not verified. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	- IDM malfunction - Connector or terminal malfunction - Short to GND in wiring harness between IDM terminal 1D and fuel injector No.1 terminal D - Short to power supply in wiring harness between IDM terminal 1D and fuel injector No.1 terminal D - Open circuit in wiring harness between IDM terminal 1D and fuel injector No.1 terminal D - Short to GND in wiring harness between fuel injector No.4 terminal D and IDM terminal 1D - Short to power supply in wiring harness between fuel injector No.4 terminal D and IDM terminal 1D - Open circuit in wiring harness between fuel injector No.4 terminal D and IDM terminal 1D - PCM malfunction

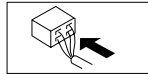
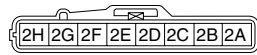
F2

ON-BOARD DIAGNOSTIC

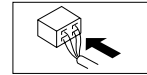
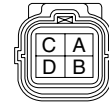
DTC P2146 Fuel injector No.1/No.4 circuit malfunction



**INJECTOR DRIVER MODULE
WIRING HARNESS-SIDE CONNECTOR**

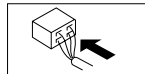


**CALIBRATION RESISTOR
WIRING HARNESS-SIDE
CONNECTOR**



**PCM
WIRING HARNESS-SIDE CONNECTOR**

26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79



ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION	
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT IDM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 9.
		No	Go to the next step.
5	INSPECT IDM FOR SHORT TO GND - Turn the engine switch off. - Inspect continuity between IDM terminal 1D and body GND. - Is there continuity?	Yes	Repair or replace the wiring harness for a short to GND, then go to Step 9.
		No	Go to the next step.
6	INSPECT IDM FOR SHORT TO POWER - Turn the engine switch off. - Inspect the voltage between IDM terminal 1D and body GND. - Is the voltage B+?	Yes	Repair or replace the wiring harness for a short to power, then go to Step 9.
		No	Go to the next step.
7	INSPECT FOR OPEN CIRCUIT BETWEEN IDM AND FUEL INJECTOR NO.1/NO.4 - Turn the engine switch off. - Inspect continuity between following wiring harnesses. - IDM terminal 1D and fuel injector No.1 terminal D - IDM terminal 1D and fuel injector No.4 terminal D - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, then go to Step 9.
8	INSPECT IDM - Inspect the IDM. - Is there any malfunction?	Yes	Replace the IDM, then go to step 9.
		No	Go to the next step.
9	VERIFY TROUBLESHOOTING OF DTC P2146 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See F2-40 DTC TABLE.)
		No	Troubleshooting completed.

F2

ON-BOARD DIAGNOSTIC

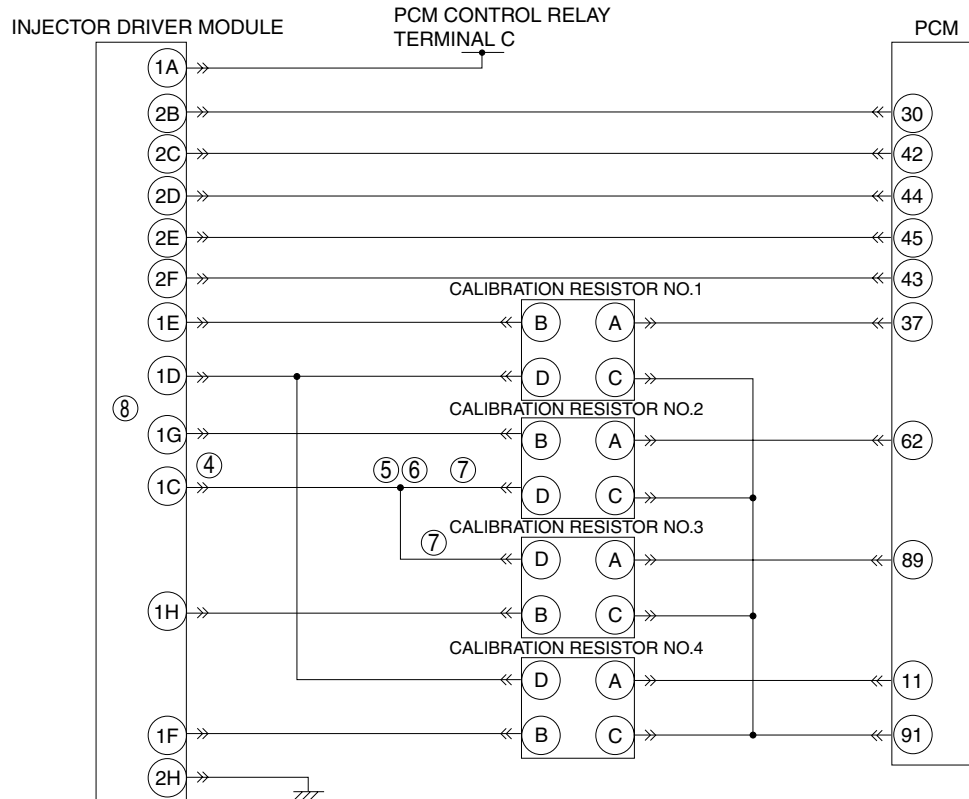
DTC P2149

B6E407002100108

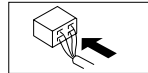
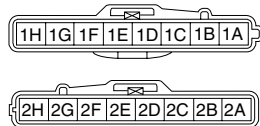
DTC P2149	Fuel injector No.2/No.3 circuit malfunction
DETECTION CONDITION	• The PCM monitors each cylinder's injection confirmation signal from the IDM while the engine is running. If the PCM does not receive the injection confirmation signal for No.2 and No.3 cylinder normally, the PCM determines that the fuel injector No.2 and No.3 operation is not verified. Diagnostic support note • The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle. • FREEZE FRAME DATA is available. • The DTC is stored in the PCM memory.
POSSIBLE CAUSE	• IDM malfunction • Connector or terminal malfunction • Short to GND in wiring harness between IDM terminal 1C and fuel injector No.2 terminal D • Short to power supply in wiring harness between IDM terminal 1C and fuel injector No.2 terminal D • Open circuit in wiring harness between IDM terminal 1C and fuel injector No.2 terminal D • Fuel injector No.3 malfunction • Short to GND in wiring harness between fuel injector No.3 terminal D and IDM terminal 1C • Short to power supply in wiring harness between fuel injector No.3 terminal D and IDM terminal 1C • Open circuit in wiring harness between fuel injector No.3 terminal D and IDM terminal 1C • PCM malfunction

ON-BOARD DIAGNOSTIC

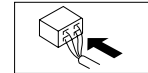
DTC P2149 Fuel injector No.2/No.3 circuit malfunction



**INJECTOR DRIVER MODULE
WIRING HARNESS-SIDE CONNECTOR**

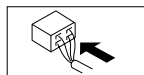


**CALIBRATION RESISTOR
WIRING HARNESS-SIDE CONNECTOR**



**PCM
WIRING HARNESS-SIDE CONNECTOR**

26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79



F2

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related Service Bulletins and/or on-line repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	INSPECT IDM CONNECTOR FOR POOR CONNECTION - Turn the engine switch off. - Inspect for poor connection (such as damaged/pulled-out terminals, corrosion). - Is there any malfunction?	Yes	Repair or replace the suspected terminal, then go to Step 9.
		No	Go to the next step.
5	INSPECT IDM FOR SHORT TO GND - Turn the engine switch off. - Inspect continuity between IDM terminal 1C and body GND. - IDM terminal 1C and fuel injector No.2 terminal D - IDM terminal 1C and fuel injector No.3 terminal D - Is there continuity?	Yes	Repair or replace the wiring harness for a short to GND, then go to Step 9.
		No	Go to the next step.
6	INSPECT IDM FOR SHORT TO POWER - Turn the engine switch off. - Inspect voltage between IDM terminal 1C and body GND. - Is voltage B+?	Yes	Repair or replace the wiring harness for a short to power, then go to Step 9.
		No	Go to the next step.
7	INSPECT FOR OPEN CIRCUIT BETWEEN IDM AND FUEL INJECTOR NO.2/NO.3 - Turn the engine switch off. - Inspect continuity between following wiring harness: - IDM terminal 1C and fuel injector No.2 terminal D - IDM terminal 1C and fuel injector No.3 terminal D - Is there continuity?	Yes	Go to the next step.
		No	Repair or replace the wiring harness for an open circuit, then go to Step 9.
8	INSPECT IDM - Inspect the IDM. - Is there any malfunction?	Yes	Replace the IDM, then go to step 9.
		No	Go to the next step.
9	VERIFY TROUBLESHOOTING OF DTC P2149 COMPLETED - Make sure to reconnect all disconnected connectors. - Clear the DTC using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Replace the PCM, then go to the next step.
		No	Go to the next step.
10	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC troubleshooting. (See F2-40 DTC TABLE.)
		No	Troubleshooting completed.

ON-BOARD DIAGNOSTIC

DTC P2227

B6E407002200101

DTC P2227	BARO sensor range/performance problem
DETECTION CONDITION	- The PCM monitors the input signal from the barometric pressure sensor. If the difference between the barometric pressure input from the barometric pressure sensor and the manifold absolute pressure is more than 75 mmHg, the PCM determines that there is a malfunction in the barometric pressure sensor. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM. - PENDING CODE is available if the PCM detects the above malfunction condition. - FREEZE FRAME DATA is available. - DTC is stored in the PCM memory.
POSSIBLE CAUSE	BARO sensor (integrated in PCM) malfunction

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes Go to the next step.
		No Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the PENDING CODE for this DTC present?	Yes Go to the next step.
		No Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	VERIFY TROUBLESHOOTING OF DTC P2227 COMPLETED - Make sure to reconnect all disconnected connectors. - Turn the engine switch to the ON position (Engine off). - Clear the DTC from the memory using the WDS or equivalent. - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Is the PENDING CODE for this DTC present?	Yes Replace the PCM, then go to the next step.
		No No concern is detected. Go to the next step.
6	VERIFY AFTER REPAIR PROCEDURE Are any DTCs present?	Yes Go to the applicable DTC inspection. (See F2-40 DTC TABLE .)
		No Troubleshooting completed.

F2

DTC P2228

B6E407002200102

DTC P2228	BARO sensor circuit low input
DETECTION CONDITION	- The PCM monitors the input signal from the barometric pressure sensor. If the voltage from the barometric pressure sensor is less than 0.4 V, the PCM determines that there is a malfunction in the barometric pressure sensor signal system. Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	BARO sensor (integrated in PCM) malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION		ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes	Go to the next step.
		No	Record the FREEZE FRAME DATA on the repair order, then go to the next step.
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes	Perform repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step.
		No	Go to the next step.
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes	Go to the next step.
		No	Intermittent concern exists. Perform the "INTERMITTENT CONCERNS TROUBLESHOOTING".
4	VERIFY TROUBLESHOOTING OF DTC P2228 COMPLETED - Make sure to reconnect all disconnected connectors. - Turn the engine switch to the ON position (Engine off). - Clear the DTC from the memory using the WDS or equivalent. - Start the engine. - Is same DTC present?	Yes	Replace PCM, then go to the next step.
		No	No concern is detected. Go to the next step.
5	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes	Go to the applicable DTC inspection. (See F2-40 DTC TABLE.)
		No	Troubleshooting completed.

DTC P2229

B6E407002200103

DTC P2229	BARO sensor circuit high input
DETECTION CONDITION	The PCM monitors the input signal from the barometric pressure sensor. If the voltage from the barometric pressure sensor is more than 4.7 V, the PCM determines that there is a malfunction in the barometric pressure sensor signal system.
	Diagnostic support note - The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle. - FREEZE FRAME DATA is available. - The DTC is stored in the PCM memory.
POSSIBLE CAUSE	BARO sensor (integrated in PCM) malfunction

ON-BOARD DIAGNOSTIC

Diagnostic procedure

STEP	INSPECTION	ACTION
1	VERIFY FREEZE FRAME DATA HAS BEEN RECORDED Has FREEZE FRAME DATA been recorded?	Yes
		No
2	VERIFY RELATED REPAIR INFORMATION AVAILABILITY - Verify related service repair information availability. - Is any related repair information available?	Yes
		No
3	VERIFY CURRENT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT? - Connect the WDS or equivalent to the DLC-2. - Clear the DTC from the PCM memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
4	VERIFY TROUBLESHOOTING OF DTC P2229 COMPLETED - Make sure to reconnect all disconnected connectors. - Turn the engine switch to the ON position (Engine off). - Clear the DTC from the memory using the WDS or equivalent. - Start the engine. - Is the same DTC present?	Yes
		No
5	VERIFY AFTER REPAIR PROCEDURE - Perform the Repair Verification Drive Mode. (See F2-39 OBD DRIVE MODE.) - Are any DTCs present?	Yes
		No

F2

TROUBLESHOOTING

TROUBLESHOOTING

SYMPTOM QUICK DIAGNOSIS CHART

B6E408018881101

×: Applicable

Troubleshooting item			Starter motor malfunction (Mechanical or electrical)	Starter circuit including engine switch is open	Improper engine oil level	Low or dead battery	Charging system malfunction	Low engine compression	Improper valve timing	Hydrolocked engine	Improper engine oil viscosity	Improper dipstick	Base engine malfunction	Seized flywheel	Improper tension or damaged drivebelts
1	Melting of main or other fuses														
2	MIL illuminates														
3	Will not crank		×	×		×	×			×				×	
4	Hard start/long crank/erratic start/erratic crank		×	×				×							
5	Engine stalls	After start/at idle						×	×						
6	Crank normally but will not start							×	×						
7	Slow return to idle														
8	Engine runs rough/rolling idle							×	×						
9	Fast idle/runs on														
10	Low idle/stalls during deceleration							×	×						
11	Engine stalls/quits	Acceleration/cruise						×	×						
	Engine runs rough	Acceleration/cruise						×	×						
	Misses	Acceleration/cruise						×	×						
	Buck/jerk	Acceleration/cruise/deceleration						×	×						
	Hesitation/stumble	Acceleration						×	×						
	Surges	Acceleration/cruise						×	×						
12	Lack/loss of power	Acceleration/cruise						×	×						
13	Knocking/pinging							×	×						
14	Poor fuel economy							×	×						
15	Emissions compliance							×	×				×		
16	High oil consumption/leakage				×						×	×	×		
17	Cooling system concerns	Overheating											×		×
18	Cooling system concerns	Runs cold													
19	Excessive black smoke												×		
20	Fuel odor (in engine compartment)														
21	Engine noise							×	×				×		×
22	Vibration concerns (engine)														×
23	A/C does not work sufficiently														
24	A/C always on or A/C compressor runs continuously														
25	A/C does not cut off under wide open throttle conditions														
26	Constant voltage														

TROUBLESHOOTING

×: Applicable

Troubleshooting item			Improper engine coolant level	Water and anti-freeze mixture is improper	Cooling system malfunction (Such as radiator, hose, over-flow system, thermostat)	Cooling fan system malfunction	Engine or transaxle mounts are improperly installed	Cooling fan No.1 or No.2 seat are improper	Fuel quality	Engine overheating	Intake-air system clogging or restriction	Air leakage from intake-air system	VSC system malfunction	Vacuum leakage
1	Melting of main or other fuses													
2	MIL illuminates													
3	Will not crank													
4	Hard start/long crank/erratic start/erratic crank								×	×	×			
5	Engine stalls	After start/at idle							×	×	×			
6	Crank normally but will not start								×		×			
7	Slow return to idle				×									
8	Engine runs rough/rolling idle								×	×	×	×		
9	Fast idle/runs on													×
10	Low idle/stalls during deceleration								×		×			
11	Engine stalls/quits	Acceleration/cruise						×		×	×		×	
	Engine runs rough	Acceleration/cruise						×	×	×	×		×	
	Misses	Acceleration/cruise						×	×	×	×	×	×	
	Buck/jerk	Acceleration/cruise/deceleration						×	×	×	×	×	×	
	Hesitation/stumble	Acceleration						×	×	×	×	×	×	
	Surges	Acceleration/cruise						×	×	×	×	×	×	
12	Lack/loss of power	Acceleration/cruise						×	×	×	×	×	×	×
13	Knocking/pinging				×				×		×	×	×	
14	Poor fuel economy				×				×		×			×
15	Emissions compliance				×				×	×	×	×	×	×
16	High oil consumption/leakage													
17	Cooling system concerns	Overheating	×	×	×	×								
18	Cooling system concerns	Runs cold			×	×								
19	Excessive black smoke										×	×	×	×
20	Fuel odor (in engine compartment)													
21	Engine noise											×		×
22	Vibration concerns (engine)						×	×						×
23	A/C does not work sufficiently													
24	A/C always on or A/C compressor runs continuously													
25	A/C does not cut off under wide open throttle conditions													
26	Constant voltage													

F2

TROUBLESHOOTING

×: Applicable

Troubleshooting item			Turbocharger malfunction	Charge air cooler malfunction	VBC system malfunction	Glow system malfunction	Incorrect fuel injection timing	Incorrect idle speed	CKP sensor is damaged (such as open or short circuits)	CKP sensor pulse wheel is damaged	Improper gap between CKP sensor and pulse wheel	Supply pump malfunction	Suction control valve malfunction	Fuel pressure limiter malfunction	Fuel line restriction or logging
1	Melting of main or other fuses														
2	MIL illuminates				×	×			×				×		
3	Will not crank														
4	Hard start/long crank/erratic start/erratic crank					×	×		×	×	×	×	×	×	×
5	Engine stalls	After start/at idle				×	×		×	×	×	×	×	×	×
6	Crank normally but will not start					×	×		×	×	×	×	×	×	×
7	Slow return to idle						×	×	×	×	×	×	×	×	
8	Engine runs rough/rolling idle						×	×	×	×	×	×	×	×	×
9	Fast idle/runs on												×		
10	Low idle/stalls during deceleration					×	×	×	×	×	×	×	×	×	×
11	Engine stalls/quits	Acceleration/cruise	×				×		×	×	×	×	×	×	×
	Engine runs rough	Acceleration/cruise	×			×	×	×	×	×	×	×	×	×	×
	Misses	Acceleration/cruise	×			×	×	×	×	×	×	×	×	×	×
	Buck/jerk	Acceleration/cruise/deceleration	×			×	×	×	×	×	×	×	×	×	×
	Hesitation/stumble	Acceleration	×			×	×	×	×	×	×	×	×	×	×
	Surges	Acceleration/cruise	×			×	×		×	×	×	×	×	×	×
12	Lack/loss of power	Acceleration/cruise	×	×	×		×	×	×	×	×	×	×	×	×
13	Knocking/pinging		×	×	×	×	×		×	×	×		×		×
14	Poor fuel economy		×	×	×		×	×	×	×	×	×			×
15	Emissions compliance		×	×	×	×	×	×	×	×	×	×	×	×	×
16	High oil consumption/leakage		×												
17	Cooling system concerns	Overheating	×												
18	Cooling system concerns	Runs cold													
19	Excessive black smoke		×	×	×		×		×	×	×		×	×	×
20	Fuel odor (in engine compartment)												×	×	
21	Engine noise						×		×	×	×		×		
22	Vibration concerns (engine)														
23	A/C does not work sufficiently														
24	A/C always on or A/C compressor runs continuously														
25	A/C does not cut off under wide open throttle conditions														
26	Constant voltage														

TROUBLESHOOTING

×: Applicable

Troubleshooting item			Fuel injectors malfunction (Leakage or clogging, inoperative)	Fuel leakage from fuel system (including insulator, fuel injector)	Fuel filter restriction or clogging	CMP sensor is damaged (such as open or short circuit)	CMP sensor pulse wheel is damaged	IDM or related circuit malfunction	Exhaust system restriction or clogging	Catalyst converter malfunction	EGR system malfunction	EGR water cooler malfunction	EGR valve position sensor malfunction	V-reference voltage supply circuit malfunction
1	Melting of main or other fuses													
2	MIL illuminates		×			×								
3	Will not crank													
4	Hard start/long crank/erratic start/erratic crank		×	×	×	×	×	×	×		×			
5	Engine stalls	After start/at idle	×	×	×	×	×	×	×		×		×	×
6	Crank normally but will not start		×	×	×	×	×	×			×		×	×
7	Slow return to idle		×			×	×	×						
8	Engine runs rough/rolling idle		×	×	×	×	×	×			×	×	×	
9	Fast idle/runs on		×					×						
10	Low idle/stalls during deceleration		×	×	×	×	×	×			×		×	
11	Engine stalls/quits	Acceleration/cruise	×		×	×	×	×	×		×		×	
	Engine runs rough	Acceleration/cruise	×		×	×	×	×	×		×		×	
	Misses	Acceleration/cruise	×		×	×	×	×	×		×		×	
	Buck/jerk	Acceleration/cruise/deceleration	×		×	×	×	×	×		×		×	
	Hesitation/stumble	Acceleration	×		×	×	×	×	×		×		×	
	Surges	Acceleration/cruise	×		×	×	×	×	×		×		×	
12	Lack/loss of power	Acceleration/cruise	×		×	×	×	×	×		×		×	
13	Knocking/pinging					×	×		×		×			
14	Poor fuel economy		×	×	×	×	×		×		×			
15	Emissions compliance		×			×	×	×	×	×	×	×	×	
16	High oil consumption/leakage													
17	Cooling system concerns	Overheating									×			
18	Cooling system concerns	Runs cold												
19	Excessive black smoke		×					×	×		×		×	
20	Fuel odor (in engine compartment)			×										
21	Engine noise		×			×	×				×			
22	Vibration concerns (engine)		×			×	×							
23	A/C does not work sufficiently													
24	A/C always on or A/C compressor runs continuously													
25	A/C does not cut off under wide open throttle conditions													
26	Constant voltage													×

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TROUBLESHOOTING

×: Applicable

Troubleshooting item			PCM control relay malfunction	ECT sensor or related circuit malfunction	Neutral switch or related circuit malfunction	MAF/IAT sensor or related circuit malfunction	IAT sensor No.2 or related circuit malfunction	Boost sensor or related circuit malfunction	Accelerator position sensor or related circuit malfunction	Accelerator position sensor misadjustment (including looseness)	Idle switch or related circuit malfunction	Idle switch misadjustment (including looseness)	Fuel pressure sensor or related circuit malfunction	Improper refrigerant charging amount
1	Melting of main or other fuses													
2	MIL illuminates			×	×	×	×	×	×	×	×	×	×	
3	Will not crank													
4	Hard start/long crank/erratic start/erratic crank			×		×			×	×			×	
5	Engine stalls	After start/at idle	×	×		×			×	×			×	×
6	Crank normally but will not start		×	×									×	
7	Slow return to idle			×	×	×			×	×	×	×	×	
8	Engine runs rough/rolling idle			×	×	×			×	×	×	×	×	×
9	Fast idle/runs on			×						×		×		
10	Low idle/stalls during deceleration			×	×	×			×	×	×	×	×	×
11	Engine stalls/quits	Acceleration/cruise		×		×			×	×	×	×	×	×
	Engine runs rough	Acceleration/cruise		×	×	×			×	×	×	×	×	×
	Misses	Acceleration/cruise		×		×			×	×	×	×	×	×
	Buck/jerk	Acceleration/cruise/deceleration		×		×	×	×	×	×	×	×	×	×
	Hesitation/stumble	Acceleration		×		×	×	×	×	×	×	×	×	×
	Surges	Acceleration/cruise		×		×	×	×	×	×	×	×	×	×
12	Lack/loss of power	Acceleration/cruise		×		×	×	×	×	×	×	×	×	×
13	Knocking/pinging			×		×	×	×					×	
14	Poor fuel economy			×		×	×	×				×	×	×
15	Emissions compliance			×	×	×	×	×		×	×	×	×	
16	High oil consumption/leakage													
17	Cooling system concerns	Overheating												×
18	Cooling system concerns	Runs cold												
19	Excessive black smoke						×	×					×	
20	Fuel odor (in engine compartment)												×	
21	Engine noise			×		×	×	×					×	
22	Vibration concerns (engine)			×		×			×	×	×	×		
23	A/C does not work sufficiently													×
24	A/C always on or A/C compressor runs continuously													
25	A/C does not cut off under wide open throttle conditions								×	×				
26	Constant voltage			×		×	×	×					×	

TROUBLESHOOTING

×: Applicable

Troubleshooting item			A/C relay (A/C control signal) circuit malfunction	A/C magnetic clutch or related circuit malfunction	Cooling fan No.1 system malfunction	Clutch slippage	Air in power steering fluid line	VSS or related circuit malfunction	Brake dragging	Loose parts	Improper balance of wheel or tires	Driveline malfunction	Suspension malfunction	Immobilizer system and/or circuit malfunction	Coolant heater system malfunction
1	Melting of main or other fuses														
2	MIL illuminates														
3	Will not crank													×	
4	Hard start/long crank/erratic start/erratic crank														
5	Engine stalls	After start/at idle	×	×										×	
6	Crank normally but will not start													×	
7	Slow return to idle														
8	Engine runs rough/rolling idle		×	×	×										
9	Fast idle/runs on														
10	Low idle/stalls during deceleration		×	×											
11	Engine stalls/quits	Acceleration/cruise	×	×		×		×							
	Engine runs rough	Acceleration/cruise	×	×		×		×							
	Misses	Acceleration/cruise	×	×		×		×							
	Buck/jerk	Acceleration/cruise/deceleration	×	×		×		×							
	Hesitation/stumble	Acceleration	×	×		×		×							
	Surges	Acceleration/cruise	×	×		×		×							
12	Lack/loss of power	Acceleration/cruise	×	×		×			×						
13	Knocking/pinging														
14	Poor fuel economy		×	×		×		×	×						×
15	Emissions compliance							×							
16	High oil consumption/leakage														
17	Cooling system concerns	Overheating	×	×	×										×
18	Cooling system concerns	Runs cold			×										×
19	Excessive black smoke														
20	Fuel odor (in engine compartment)														
21	Engine noise						×			×					
22	Vibration concerns (engine)									×	×	×	×		
23	A/C does not work sufficiently		×	×											
24	A/C always on or A/C compressor runs continuously		×	×											
25	A/C does not cut off under wide open throttle conditions														
26	Constant voltage														

NO.5 ENGINE STALLS-AFTER START/AT IDLE

B6E408018881102

5	ENGINE STALLS-AFTER START/AT IDLE
DESCRIPTION	Engine stops unexpectedly.

TROUBLESHOOTING

5	ENGINE STALLS-AFTER START/AT IDLE
POSSIBLE CAUSE	• Poor fuel quality • Intake-air system restriction or clogging • Engine overheating • A/C system improper operation • Immobilizer system and/or circuit malfunction (if equipped) • PCM control relay malfunction • Glow system malfunction • Inadequate fuel pressure • Fuel pressure sensor related circuit malfunction • Suction control valve malfunction (built-in supply pump) • Fuel pressure limiter malfunction (built-in common rail) • Fuel leakage • Fuel line clogging or restriction • Fuel filter clogging or restriction • Incorrect fuel injection timing • Erratic signal from CKP sensor • Erratic signal from CMP sensor • Supply pump malfunction • Fuel injector malfunction • Low engine compression • Improper valve timing • Exhaust system and/or catalyst converter restriction or clogging • EGR system malfunction • EGR valve position sensor malfunction • ECT sensor or related circuit malfunction • Accelerator positions sensor or related circuit malfunction • Accelerator positions sensor misadjustment • MAF/IAT sensor or related circuit malfunction • V-reference voltage supply circuit malfunction • IDM or related circuit malfunction Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.

TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	Note - The following test should be performed for vehicles with immobilizer system. Go to Step 10 for vehicles without immobilizer system. Connect the WDS or equivalent to the DLC-2. Do the following conditions appear? - The engine is not completely started. - DTC B1681 is displayed.	Yes	Both conditions appear: Go to Step 4.
		No	Either or other condition appears: Go to the next step.
2	Is the coil connector securely connected to the coil?	Yes	Go to the next step.
		No	Connect the coil connector securely. Return to Step 1.
3	Does the security light illuminate?	Yes	Go to the next step.
		No	Inspect the instrument cluster and the wiring harness.
4	Connect the WDS or equivalent to the DLC-2 and retrieve the DTC. DTC B1213, B1342, B1600, B1601, B1602, B1681, B2103, B2431	Yes	Go to the appropriate DTC test.
		No	Go to the next step.
5	Is there continuity between PCM GND terminals 65, 85, 103, 104 and GND?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
6	Measure the voltage between PCM GND terminals 65, 85, 103, 104 and coil terminal C. Is the voltage below 1.0V ?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
7	Turn the engine switch to the ON position. Access the VPWR PID. Is the VPWR PID normal? Specification Battery voltage	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
8	Disconnect the coil connector. Turn the engine switch to the ON position. Is there the battery voltage at coil connector terminal D (harness-side)?	Yes	Inspect for the following: - Open or short circuit between coil terminal A and PCM terminal 80 - Open or short circuit between coil terminal B and PCM terminal 28
		No	Repair or replace the wiring harness between coil connector terminal D and the fuse panel.
9	Is there continuity between PCM terminal 57 and the starter relay?	Yes	Go to the next step.
		No	Repair replace the wiring harness.
10	Inspect for the following: - Fuel quality (such as include water contamination, winter/summer blend) - Fuel line/fuel filter clogging - Intake-air system restriction Are all items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 10.
11	Is the engine overheating?	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS-OVERHEATING".
		No	Go to the next step.
12	Note Ignore DTC P0122, P0123, P0222 or P0223 while performing this test. Disconnect the accelerator position sensor connector. Measure the voltage at the accelerator position sensor connector VREF terminal (terminal D) with the engine switch at the ON position. Specification 4.5—5.5 V Is the voltage normal?	Yes	Go to the next step.
		No	Go to the symptom troubleshooting "NO.26 CONSTANT VOLTAGE".

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TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
13	Connect the WDS or equivalent to the DLC-2. Turn the engine switch to the ON position. Retrieve any DTC. Is the DTC displayed?	Yes	DTC is displayed: Go to the appropriate DTC test. Communication error message is displayed: Inspect for the following: • Open circuit between the PCM control relay and PCM terminal 53 or 79 • Open circuit between the PCM control relay and PCM terminal 69 • Stuck open PCM control relay • Open or poor GND circuit (PCM terminal 65, 85, 103 or 104) • Poor connection at vehicle body GND
		No	No DTC is displayed: Go to the next step.
14	Does the engine start normally after warm-up?	Yes	Inspect the glow system operation. Replace any malfunctioning part if necessary. If the glow system is normal, go to the next step.
		No	Go to the next step.
15	Is there any restriction in the exhaust system or the catalyst converter?	Yes	Repair or replace if necessary.
		No	Go to the next step.
16	Access the RPM PID. Is the RPM PID indicating the engine speed while cranking the engine?	Yes	Go to the next step.
		No	Go to Step 19.
17	Note • The following test should be performed on the vehicles with A/C system. If the following test cannot be performed due to the engine stall, go to the next step. • Go to next step for the vehicle without A/C system. Connect the pressure gauge to the A/C line. Turn the blower and A/C switches on. Is the pressure within specifications?	Yes	Go to the next step.
		No	A/C is always on: Go to the symptom troubleshooting "NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY". Other symptoms: Inspect the following: • Refrigerant charging amount • Cooling fan No.1 and/or cooling fan No.2 operation
18	Inspect the adjustment of the accelerator position sensor and the idle switch. Are the accelerator position sensor and the idle switch adjusted correctly?	Yes	Go to the next step.
		No	Adjust the accelerator position sensor and the idle switch correctly.
19	Depress the accelerator pedal slightly. Crank the engine. Does the engine start now?	Yes	Inspect the idle speed.
		No	Go to the next step.
20	Inspect the fuel pipe for fuel leakage. Is any fuel leakage found on the fuel pipe?	Yes	Repair or replace if necessary.
		No	Go to the next step.
21	Visually inspect the CKP sensor and the pulse wheel teeth. Are CKP sensor and the pulse wheel teeth normal?	Yes	Go to the next step.
		No	Replace the malfunctioning parts.
22	Measure the gap between the CKP sensor and the pulse wheel teeth. Specification 1.5—2.5 mm {0.059—0.098 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor position.
23	Visually inspect the CMP sensor and the pulse wheel teeth. Are the CMP sensor and the pulse wheel teeth normal?	Yes	Inspect the following PIDs: • ECT • IAT • MAF • RPM If the PID value is not as specified, repair or replace the malfunctioning parts. If the PID value is normal, go to the next step.
		No	Replace the malfunctioning parts.
24	Inspect the fuel pressure sensor. Is the fuel pressure normal?	Yes	Go to the next step.
		No	Replace the common rail.
25	Inspect the suction control valve. Is the suction control valve normal?	Yes	Go to the next step.
		No	Repair the supply pump.

TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
26	Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for the following: - Damaged valve seat - Worn valve stem and valve guide - Worn or stuck piston ring - Worn piston, piston ring or cylinder - Improper valve timing Service if necessary.
27	Inspect the fuel injector. Is the fuel injector normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
28	Inspect the IDM. Is the IDM normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
29	Inspect EGR system operation. Is EGR system operation normal?	Yes	Remove and inspect the supply pump and the common rail.
		No	Repair or replace the malfunctioning part according to the EGR control system inspection results.
30	Verify the test results. - If normal, return to the diagnostic index to service any additional symptoms. - If the malfunction remains, replace the PCM.		

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NO.6 CRANKS NORMALLY BUT WILL NOT START

B6E408018881103

6	CRANKS NORMALLY BUT WILL NOT START
DESCRIPTION	- The starter cranks the engine at normal speed but the engine will not run. - Refer to the symptom troubleshooting "No.5 Engine stalls" if this symptom appears after engine stall. - Fuel is in the fuel tank. - Battery is in normal condition.
POSSIBLE CAUSE	- Poor fuel quality - Intake-air system restriction - Fuel line restriction - EGR system malfunction - EGR valve position sensor malfunction - Glow system malfunction - Fuel pressure sensor or related circuit malfunction - Suction control valve malfunction (built-in supply pump) - Fuel pressure limiter malfunction (built-in common rail) - Fuel leakage - Fuel filter clogging - Incorrect fuel injection timing - Erratic signal from CKP sensor - Erratic signal from CMP sensor - V-reference supply circuit malfunction - ECT sensor or related circuit malfunction - Supply pump malfunction - Fuel injector malfunction - Immobilizer system and/or circuit malfunction (if equipped) - Low engine compression - Improper valve timing - IDM or related circuit malfunction - PCM control repay malfunction Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: - Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. - Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.

TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	Note - The following test should be performed for the vehicles with immobilizer system. Go to Step 10 for the vehicles without immobilizer system. Connect the WDS or equivalent to the DLC-2. Do the following conditions appear? - The engine is not completely started. - DTC B1681 is displayed.	Yes	Both conditions appear: Go to Step 4.
		No	Either or other condition appears: Go to the next step.
2	Is the coil connector securely connected to the coil?	Yes	Go to the next step.
		No	Connect the coil connector securely. Return to Step 1.
3	Does the security light illuminate?	Yes	Go to the next step.
		No	Inspect the instrument cluster and the wiring harness.
4	Connect the WDS or equivalent to the DLC-2 and retrieve the DTC. DTC B1213, B1342, B1600, B1601, B1602, B1681, B2103, B2431	Yes	Go to the appropriate DTC test.
		No	Go to the next step.
5	Is there continuity between PCM GND terminals 65, 85, 103, 104 and GND?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
6	Measure the voltage between PCM GND terminals 65, 85, 103, 104 and coil terminal C. Is the voltage below 1.0V ?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
7	Turn the engine switch to the ON position. Access the VPWR PID. Is the VPWR PID normal? Specification Battery voltage	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
8	Disconnect the coil connector. Turn the engine switch to the ON position. Is there battery voltage at coil connector terminal D (harness-side)?	Yes	Inspect for the following: - Open or short circuit between coil terminal A and PCM terminal 80 - Open or short circuit between coil terminal B and PCM terminal 28
		No	Repair or replace the wiring harness between coil connector terminal D and the fuse panel.
9	Is there continuity between PCM terminal 57 and the starter relay?	Yes	Go to the next step.
		No	Repair or replace the wiring harness.
10	Inspect for the following: - Fuel quality (such as water contamination, winter/summer blend) - Fuel line/fuel filter clogging - Intake-air system restriction Are all items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 10.
11	Note Ignore DTC P0122, P0123, P0222 or P0223 while performing this test. Disconnect the accelerator position sensor connector. Measure the voltage at the accelerator position sensor connector VREF terminal (terminal D) with the engine switch at ON position. Specification 4.5—5.5 V Is the voltage normal?	Yes	Go to the next step.
		No	Go to the symptom troubleshooting "NO.26 CONSTANT VOLTAGE".

TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
12	Connect the WDS or equivalent to the DLC-2. Turn the engine switch to the ON position. Retrieve any DTC. Is the DTC displayed?	Yes	DTC is displayed: Go to appropriate DTC test. Communication error message is displayed: Inspect for the following: • Open circuit between the PCM control relay and PCM terminal 53 or 79 • Open circuit between the PCM control relay and PCM terminal 69 • Stuck open PCM control relay • Open or poor GND circuit (PCM terminal 65, 85, 103 or 104) • Poor connection at vehicle body GND
		No	No DTC is displayed: Go to the next step.
13	Inspect glow system operation. Is glow system operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to glow system operation.
14	Inspect the fuel pipe for fuel leakage. Is any fuel leakage found on the fuel pipe?	Yes	Repair or replace as necessary.
		No	Go to the next step.
15	Visually inspect the CKP sensor and the pulse wheel teeth. Are the CKP sensor and the pulse wheel teeth normal?	Yes	Go to the next step.
		No	Replace the malfunctioning parts.
16	Measure the gap between the CKP sensor and the pulse wheel teeth. Specification 1.5—2.5 mm {0.059—0.098 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor position.
17	Visually inspect the CMP sensor and the pulse wheel teeth. Are the CMP sensor and the pulse wheel teeth normal?	Yes	Inspect the following PIDs: (See F2-31 PCM INSPECTION.) • ECT • RPM If the PID value is not as specified, repair or replace the malfunctioning parts. If the PID value is normal, go to the next step.
		No	Replace the malfunctioning parts.
18	Inspect the fuel pressure sensor. Is the fuel pressure normal?	Yes	Go to the next step.
		No	Replace the common rail.
19	Inspect the suction control valve. Is the suction control valve normal?	Yes	Go to the next step.
		No	Repair the supply pump.
20	Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for the following: • Damaged valve seat • Worn valve stem and valve guide • Worn or stuck piston ring • Worn piston, piston ring or cylinder • Improper valve timing Service if necessary.
21	Inspect the fuel injector. Is the fuel injector normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
22	Inspect the IDM. Is the IDM normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
23	Inspect the EGR system operation. (See F2-232 EGR Control System Inspection.) Is the EGR system operation normal?	Yes	Remove and inspect the supply pump and the common rail.
		No	Repair or replace the malfunctioning part according to the EGR control system inspection results.
24	Verify test results. • If normal, return to the diagnostic index to service any additional symptoms. • If the malfunction remains, replace the PCM.		

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TROUBLESHOOTING

NO.8 ENGINE RUNS ROUGH/ROLLING IDLE

B6E408018881104

8	ENGINE RUNS ROUGH/ROLLING IDLE
DESCRIPTION	• The engine speed fluctuates between the specified idle speed and the lower speed and the engine shakes excessively. • The idle speed is too slow and the engine shakes excessively.
POSSIBLE CAUSE	• Poor fuel quality • Air leakage from intake-air system • Intake-air system restriction • Incorrect idle speed • Engine overheating • Cooling fan No.1 system malfunction • A/C system improper operation • EGR system improper operation • EGR valve position sensor malfunction • EGR water cooler malfunction • Fuel leakage • Inadequate fuel pressure • Fuel pressure sensor or related circuit malfunction • Suction control valve malfunction (built-in supply pump) • Fuel pressure limiter malfunction (built-in common rail) • Fuel filter clogging • Fuel line restriction • Incorrect fuel injection timing • Erratic signal from CKP sensor • Erratic signal from CMP sensor • ECT sensor or related circuit malfunction • Idle switch misadjustment • Idle switch or related circuit malfunction • Accelerator position sensor misadjustment • Accelerator position sensor or related circuit malfunction • MAF/IAT sensor malfunction • Neutral switch or related circuit malfunction • Supply pump malfunction • Fuel injector malfunction • Low engine compression • Improper valve timing • Engine compression excessive unbalance for each cylinder • Unbalanced fuel injection amount for each cylinder • IDM or related circuit malfunction Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.

TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	Inspect for the following: - Fuel quality (such as water contamination, winter/summer blend) - Fuel line/fuel filter clogging - Loose bands on intake-air system - Cracks on intake-air system parts - Intake-air system restriction - Vacuum leakage - Cooling fan No.1 system operation Are all items normal?	Yes	Go to the next step.
		No	Service if necessary Repeat Step 1.
2	Is the engine overheating?	Yes	Go to the symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS—OVERHEATING."
		No	Go to the next step.
3	Connect the WDS or equivalent to the DLC-2. Turn the engine switch to the ON position. Retrieve any DTC. Is the DTC displayed?	Yes	DTC is displayed: Go to the appropriate DTC test. Communication error message is displayed: Inspect for the following: - Open circuit between the PCM control relay and PCM terminal 53 or 79 - Open circuit between the PCM control relay and PCM terminal 69 - Stuck open PCM control relay - Open or poor GND circuit (PCM terminal 65, 85, 103 or 104) - Poor connection at vehicle body GND
		No	No DTC is displayed: Go to the next step.
4	Note - The following test should be performed on the vehicles with A/C system. If the following test cannot be performed due to the engine stall, go to the next step. - Go to the next step for the vehicle without A/C system. Connect the pressure gauge to the A/C line. Turn the blower and the A/C switches on. Is the pressure within specifications?	Yes	Go to the next step.
		No	A/C is always on: Go to the symptom troubleshooting "NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY". Other symptoms: Inspect for the following: - Refrigerant charging amount - Cooling fan No.1 and/or cooling fan No.2 operation
5	Depress the accelerator pedal slightly. Crank the engine. Does the engine start now?	Yes	Inspect the idle speed.
		No	Go to the next step.
6	Inspect the adjustment of the accelerator position sensor and idle switch. Are the accelerator position sensor and the idle switch adjusted correctly?	Yes	Go to the next step.
		No	Adjust the accelerator position sensor and the idle switch correctly.
7	Inspect the fuel pipe for fuel leakage. Is any fuel leakage found on fuel pipe?	Yes	Repair or replace if necessary.
		No	Go to the next step.
8	Visually inspect the CKP sensor and the pulse wheel teeth. Are the CKP sensor and the pulse wheel teeth normal?	Yes	Go to the next step.
		No	Replace the malfunctioning parts.
9	Measure the gap between the CKP sensor and the pulse wheel teeth. Specification 1.5—2.5 mm {0.059—0.098 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor position.

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TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
10	Visually inspect the CMP sensor and the pulse wheel teeth. Are the CMP sensor and the pulse wheel teeth normal?	Yes	Inspect the following PIDs: (See F2-31 PCM INSPECTION.) - ECT - IAT - MAF - RPM If the PID value is not as specified, repair or replace the malfunctioning parts. If the PID value is normal, go to the next step.
		No	Replace the malfunctioning parts.
11	Inspect the fuel pressure sensor. Is the fuel pressure normal?	Yes	Go to the next step.
		No	Replace the common rail.
12	Inspect the suction control valve. Is the suction control valve normal?	Yes	Go to the next step.
		No	Repair the supply pump.
13	Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for the following: - Damaged valve seat - Worn valve stem and valve guide - Worn or stuck piston ring - Worn piston, piston ring or cylinder - Improper valve timing Service if necessary.
14	Inspect the fuel injector. Is fuel injector normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
15	Inspect the EGR system operation. (See F2-232 EGR Control System Inspection.) Is the EGR system operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the EGR control system inspection results.
16	Inspect the EGR water cooler for the following: - Coolant passage clogging/restriction - Exhaust gas clogging/restriction Is the EGR water cooler normal?	Yes	Go to the next step.
		No	Service if necessary.
17	Inspect the IDM. Is the IDM normal?	Yes	Remove and inspect the supply pump and the common rail.
		No	Repair or replace if necessary.
18	Verify the test results. - If normal, return to the diagnostic index to service any additional symptoms. - If the malfunction remains, replace the PCM.		

NO.10 LOW IDLE/STALLS DURING DECELERATION

B6E408018881105

10	LOW IDLE/STALLS DURING DECELERATION
DESCRIPTION	The engine stops unexpectedly at the beginning of deceleration or recovery from deceleration.

TROUBLESHOOTING

10	LOW IDLE/STALLS DURING DECELERATION
POSSIBLE CAUSE	• Intake-air system restriction or clogging • Poor fuel quality • A/C system improper operation • Inadequate fuel pressure • Suction control valve malfunction (built-in supply pump) • Fuel pressure limiter malfunction (built-in common rail) • Fuel leakage • Fuel line restriction or clogging • Fuel filter restriction or clogging • Incorrect fuel injection timing • Incorrect idle speed • Erratic signal from CKP sensor • Erratic signal from CMP sensor • Supply pump malfunction • Fuel injector malfunction • Low engine compression • Improper valve timing • Glow system malfunction • EGR system malfunction • EGR valve position sensor malfunction • MAF/IAT sensor or related circuit malfunction • ECT sensor or related circuit malfunction • Fuel pressure sensor or related circuit malfunction • Neutral switch malfunction or related circuit malfunction • Accelerator position sensor or related circuit malfunction • Idle switch or related circuit malfunction • Incorrect adjustment accelerator position sensor and/or idle switch • IDM or related circuit malfunction Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.

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TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	Does the engine idle rough?	Yes	Go to the symptom troubleshooting "NO.8 ENGINE RUNS ROUGH/ROLLING IDLE".
		No	Go to the next step.
2	Inspect for the following: - Fuel line/fuel filter clogging or restriction - Intake-air system restriction or clogging - Fuel quality (such as water contamination, winter/summer blend) Are all the items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 2.
3	Perform the self-test function using the WDS or equivalent. Turn the engine switch to the ON position. Retrieve any DTC. Is the DTC displayed?	Yes	DTC is displayed: Go to the appropriate DTC test. Communication error message is displayed: Inspect for the following: - Open circuit between the PCM control relay and PCM terminal 53 or 79 - Open circuit between the PCM control relay and PCM terminal 69 - Stuck open PCM control relay - Open or poor GND circuit (PCM terminal 65, 85, 103 or 104) - Poor connection at vehicle body GND
		No	No DTC is displayed: Go to the next step.
4	Inspect the idle speed. Is the idle speed correct?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the idle speed inspection results.
5	Inspect adjustment of the accelerator position sensor and the idle switch. Are the accelerator position sensor and the idle switch adjusted correctly?	Yes	Go to the next step.
		No	Adjust the accelerator position sensor and the idle switch correctly.
6	Measure the voltage PCM terminal 33 and 56. Is the voltage normal?	Yes	Go to the next step.
		No	PCM terminal 33 does not specified: Inspect the clutch pedal position switch and the related wiring harness. PCM terminal 56 does not specified: Inspect the neutral switch and the related wiring harness.
7	Visually inspect the CKP sensor and the pulse wheel teeth. Are the CKP sensor and the pulse wheel teeth normal?	Yes	Go to the next step.
		No	Replace the malfunctioning parts.
8	Measure gap between CKP sensor and the pulse wheel teeth. Specification 1.5—2.5 mm {0.059—0.098 in} Is gap within specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor position.
9	Visually inspect the CMP sensor and the pulse wheel teeth. Are the CMP sensor and the pulse wheel teeth normal?	Yes	Inspect the following PIDs: (See F2-31 PCM INSPECTION.) - ECT - IAT - MAF - RPM If the PID value is not as specified, repair or replace the malfunctioning parts. If the PID value is normal, go to the next step.
		No	Replace the malfunctioning parts.
10	Inspect the fuel pressure sensor. Is the fuel pressure normal?	Yes	Go to the next step.
		No	Replace the common rail.
11	Inspect the suction control valve. Is the suction control valve normal?	Yes	Go to the next step.
		No	Repair the supply pump.

TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
12	Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for the following: • Damaged valve seat • Worn valve stem and valve guide • Worn or stuck piston ring • Worn piston, piston ring or cylinder • Improper valve timing Service if necessary.
13	Inspect the fuel injector. Is the fuel injector normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
14	Note • The following test should be performed on the vehicles with A/C system. If the following test cannot be performed due to the engine stall, go to the next step. • Go to the next step for the vehicle without A/C system. Connect the pressure gauge to the A/C line. Turn the blower and the A/C switches on. Is the pressure within the specifications?	Yes	Go to the next step.
		No	A/C is always on: Go to the symptom troubleshooting "NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY". Other symptoms: Inspect the following: • Refrigerant charging amount • Cooling fan No.1 and/or cooling fan No.2 operation
15	Inspect the EGR system operation. (See F2-232 EGR Control System Inspection.) Is the EGR system operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the EGR control system inspection results.
16	Inspect the glow system operation. Is the glow system operation normal?	Yes	Go to the next step.
		No	Service if necessary.
17	Inspect the IDM. Is the IDM normal?	Yes	Remove and inspect the supply pump and the common rail.
		No	Repair or replace if necessary.
18	Verify the test results. • If normal, return to the diagnostic index to service any additional symptoms. • If the malfunction remains, replace the PCM.		

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NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/LERK, HESITATION/STUMBLE

B6E408018881106

11	ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES
DESCRIPTION	• The engine stops unexpectedly at the beginning of acceleration or during cruising. • The engine stops unexpectedly while cruising. • The engine speed fluctuates during acceleration or cruising. • The engine misses during acceleration or cruising. • The vehicle bucks/jerks during acceleration or deceleration. • Momentary pause at the beginning of acceleration or during acceleration. • Momentary minor irregularity in the engine output.

TROUBLESHOOTING

POSSIBLE CAUSE	• Poor fuel quality • Glow system malfunction • Air leakage from intake-air system • Intake-air system restriction or clogging • Engine overheating • A/C system improper operation • Turbocharger malfunction • Variable swirl control (VSC) system malfunction • EGR system malfunction • EGR valve position sensor malfunction • Neutral switch or related circuit malfunction • Improper cooling fan No.1 or cooling fan No.2 seat • Fuel line clogging or restriction • Fuel filter clogging or restriction • Incorrect fuel injection timing • Erratic signal from CKP sensor • Erratic signal from CMP sensor • ECT sensor or related circuit malfunction • Boost sensor or related circuit malfunction • Accelerator position sensor or related circuit malfunction • Idle switch or related circuit malfunction • MAF/IAT sensor or related circuit malfunction • IAT sensor No.2 or related circuit malfunction • VSS or related circuit malfunction • Incorrect adjustment accelerator position sensor and/or idle switch • Incorrect idle speed • Inadequate fuel pressure • Fuel pressure sensor or related circuit malfunction • Suction control valve malfunction (built-in supply pump) • Fuel pressure limiter malfunction (built-in common rail) • Supply pump malfunction • Fuel injector malfunction • Low engine compression • Improper valve timing • Exhaust system and/or catalyst converter restriction • Clutch slippage • IDM or related circuit malfunction Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.
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TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	Is the idle speed stable?	Yes	Go to the next step.
		No	Go to the symptom troubleshooting "NO.8 ENGINE RUNS ROUGH/ROLLING IDLE".
2	Is the engine overheating?	Yes	Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS—OVERHEATING".
		No	Go to the next step.
3	Perform the self-test function using the WDS or equivalent. Turn the engine switch to the ON position. Retrieve any DTC. Is the DTC displayed?	Yes	DTC is displayed: Go to the appropriate DTC test. Communication error message is displayed: Inspect for the following: • Open circuit between the PCM control relay and PCM terminal 53 or 79 • Open circuit between the PCM control relay and PCM terminal 69 • Stuck open PCM control relay • Open or poor GND circuit (PCM terminal 65, 85, 103 or 104) • Poor connection at vehicle body GND
		No	No DTC is displayed: Go to the next step.
4	Inspect for the following: • Fuel quality (such as water contamination, winter/summer blend) • Fuel line/fuel filter clogging and/or restriction • Intake-air system restriction or clogging • Exhaust system and/or catalyst converter restriction • Cooling fan No.1 or cooling fan No.2 seat Are all the items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 4.
5	Does the engine run normal after warm-up?	Yes	Inspect the glow system operation. Replace the any malfunctioning part if necessary. If the glow system is normal, go to the next step.
		No	Go to the next step.
6	Note • The following test should be performed on the vehicles with A/C system. If the following test cannot be performed due to the engine stalling, go to the next step. • Go to next step for the vehicle without A/C system. Connect the pressure gauge to the A/C line. Turn the blower and the A/C switches on. Is the pressure within the specifications?	Yes	Go to the next step.
		No	A/C is always on: Go to the symptom troubleshooting "NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUITY". Other symptoms: Inspect the following: • Refrigerant charging amount • Cooling fan No.1 and/or cooling fan No.2 operation
7	Inspect the hose bands between the following parts: • Turbocharger compressor housing and air cleaner • Turbocharger compressor housing and charge air cooler Are the hose bands loose?	Yes	Retighten the hose bands. If the concern is resolved, complete the inspection. If the concern still exists, go to the next step.
		No	Go to the next step.
8	Inspect for improper operation, kinks, clogging or disconnection on the guide blade actuator. Is the guide blade actuator normal?	Yes	Turbocharger is normal. Go to the next step.
		No	Repair or replace if necessary. If the concern is resolved, complete the inspection. If the concern still exists, turbocharger is normal. Go to the next step.
9	Inspect the EGR system operation. (See F2-232 EGR Control System Inspection.) Is the EGR system operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the EGR control system inspection results.
10	Inspect the idle speed. Is the idle speed correct?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the idle speed inspection results.

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TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
11	Inspect the adjustment of the accelerator position sensor and the idle switch. Are the accelerator position sensor and the idle switch adjusted correctly?	Yes	Go to the next step.
		No	Adjust the accelerator position sensor and the idle switch correctly.
12	Inspect the neutral switch adjustment. Is the neutral switch adjusted correctly?	Yes	Go to the next step.
		No	Adjust the neutral switch correctly.
13	Visually inspect the CKP sensor and the pulse wheel teeth. Are the CKP sensor and the pulse wheel teeth normal?	Yes	Go to the next step.
		No	Replace the malfunctioning parts.
14	Measure the gap between the CKP sensor and the pulse wheel teeth. Specification 1.5—2.5 mm {0.059—0.098 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor position.
15	Visually inspect the CMP sensor and the pulse wheel teeth. Are the CMP sensor and the pulse wheel teeth normal?	Yes	Inspect the following PIDs: (See F2-31 PCM INSPECTION.) - ECT - IAT - MAF - RPM If the PID value is not as specified, repair or replace the malfunctioning parts. If the PID value is normal, go to the next step.
		No	Replace the malfunctioning parts.
16	Inspect the fuel pressure sensor. Is the fuel pressure normal?	Yes	Go to the next step.
		No	Replace the common rail.
17	Inspect the suction control valve. Is the suction control valve normal?	Yes	Go to the next step.
		No	Repair the supply pump.
18	Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for the following: - Damaged valve seat - Worn valve stem and valve guide - Worn or stuck piston ring - Worn piston, piston ring or cylinder - Improper valve timing Service if necessary.
19	Inspect the fuel injector. Is fuel injector normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
20	Inspect the IDM. Is the IDM normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
21	Inspect the timing belt for the following: - Gear teeth chipping - Low tension - Breakage damage or cracks Is the timing belt normal?	Yes	Inspect the following: - Clutch slippage - CKP sensor - VSS If normal, remove and inspect the supply pump and the common rail.
		No	If the timing is incorrect, adjust the valve timing. If the timing belt is not normal, replace the timing belt.
22	Verify the test results. - If normal, return to the diagnostic index to service any additional symptoms. - If the malfunction remains, replace the PCM.		

NO.12 LACK/LOSS OF POWER-ACCELERATION/CRUISE

B6E408018881107

12	LACK/LOSS OF POWER-ACCELERATION CRUISE
DESCRIPTION	Performance is poor under load (such as power down when climbing hills).

TROUBLESHOOTING

12	LACK/LOSS OF POWER-ACCELERATION CRUISE
POSSIBLE CAUSE	• Poor fuel quality • Air leakage from intake-air system • Intake-air system restriction or clogging • Engine overheating • A/C system improper operation • Improper operation of A/C cut-off control • Variable boost control (VBC) system malfunction • Variable swirl control (VSC) system malfunction • EGR system malfunction • EGR valve position sensor malfunction • Vacuum leakage • Clutch slippage • Exhaust system and/or catalyst converter restriction • Fuel line or clogging or restriction • Fuel filter clogging or restriction • Incorrect fuel injection timing • Erratic signal from CKP sensor • Erratic signal from CMP sensor • ECT sensor or related circuit malfunction • Boost sensor or related circuit malfunction • Accelerator position sensor or related circuit malfunction • Idle switch or related circuit malfunction • MAF/IAT sensor or related circuit malfunction • IAT sensor No.2 or related circuit malfunction • Incorrect adjustment accelerator position sensor and/or idle switch • Incorrect idle speed • Inadequate fuel pressure • Fuel pressure sensor or related circuit malfunction • Suction control valve malfunction (built-in supply pump) • Fuel pressure limiter malfunction (built-in common rail) • Supply pump malfunction • Fuel injector malfunction • Low engine compression • Improper valve timing • Cooling fan No.1 or cooling fan No.2 seat are improper • Turbocharger malfunction • Charge air cooler malfunction • Brake system dragging • Intake shutter valve malfunction • Guide blade valve malfunction • IDM or related circuit malfunction Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.

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TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	Is the idle speed stable?	Yes	Go to the next step.
		No	Go to the symptom troubleshooting "NO.8 ENGINE RUNS ROUGH/ROLLING IDLE".
2	Is the engine overheating?	Yes	Go to the symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS—OVERHEATING".
		No	Go to the next step.
3	Perform the self-test function using the WDS or equivalent. Turn the engine switch to the ON position. Retrieve any DTC. Is the DTC displayed?	Yes	DTC is displayed: Go to the appropriate DTC test. Communication error message is displayed: Inspect for the following: • Open circuit between the PCM control relay and PCM terminal 53 or 79 • Open circuit between the PCM control relay and PCM terminal 69 • Stuck open PCM control relay • Open or poor GND circuit (PCM terminal 65, 85, 103 or 104) • Poor connection at vehicle body GND
		No	No DTC is displayed: Go to the next step.
4	Inspect for the following: • Fuel quality (such as water contamination, winter/summer blend) • Fuel line/fuel filter clogging and/or restriction • Intake-air system restriction • Exhaust system and/or catalyst converter restriction • Charge air cooler condition (restriction or damaged) • Vacuum leakage • Cooling fan No.1 and cooling fan No.2 seat Are all the items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 4.
5	Inspect the intake shutter valve and VSC valve operations. Is there any problem?	Yes	Repair or replace if necessary.
		No	Go to the next step.
6	Inspect the guide blade valve operation. Is there any problem?	Yes	Repair or replace if necessary.
		No	Go to the next step.
7	Inspect the A/C cut-off operation. Does the A/C cut-off work properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the A/C cut-off system inspection results.
8	Inspect the hose bands between the following parts: • Turbocharger compressor housing and air cleaner • Turbocharger compressor housing and charge air cooler Are hose bands loose?	Yes	Retighten the hose bands. If the concern is resolved, complete the inspection. If the concern still exists, go to the next step.
		No	Go to the next step.
9	Inspect improper operation, kinks, clogging or disconnection on guide blade actuator. Is the actuator normal?	Yes	Go to the next step.
		No	Repair or replace if necessary. If the concern is resolved, complete the inspection. If the concern still exists, the turbocharger is normal. Go to the next step.
10	Remove the parts necessary to inspect the turbocharger. Do not remove the turbocharger. Inspect if the turbocharger compressor wheel is bent, damaged, or interfering with the housing on the vehicle. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.
11	Inspect if the turbocharger compressor wheel locknut is loose or has fallen into the turbocharger. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.

TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
12	Inspect if the turbocharger compressor wheel by hand. Does the wheel turn easily and smoothly?	Yes	Go to the next step.
		No	Replace the turbocharger.
13	Inspect if the turbocharger turbine wheel is damaged, cracked or interfering with the housing on the vehicle. Note • Inspect all the fins on each turbine wheel. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.
14	Is any engine oil found inside the turbocharger turbine housing?	Yes	Excessive amount of oil is found: Replace the turbocharger. Small amount of oil is found: Wipe oil off vehicle, then go to the next step.
		No	Go to the next step.
15	Is any engine oil found inside the turbocharger compressor housing?	Yes	Wipe oil off vehicle and install all the removed parts in Step 10. Then, go to the next step.
		No	Turbocharger is normal. Install all the removed parts in Step 10. Then, go to the next step.
16	Inspect the EGR system operation. (See F2-232 EGR Control System Inspection.) Is the EGR system operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the EGR control system inspection results.
17	Inspect the idle speed. Is the idle speed correct?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the idle speed inspection results.
18	Inspect adjustment of the accelerator position sensor and the idle switch. Are the accelerator position sensor and the idle switch adjusted correctly?	Yes	Go to the next step.
		No	Adjust the accelerator position sensor and the idle switch correctly.
19	Visually inspect the CKP sensor and the pulse wheel teeth. Are the CKP sensor and the pulse wheel teeth normal?	Yes	Go to the next step.
		No	Replace the malfunctioning parts.
20	Measure the gap between the CKP sensor and the pulse wheel teeth. Specification 1.5—2.5 mm {0.059—0.098 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor position.
21	Visually inspect the CMP sensor and the pulse wheel teeth. Are the CMP sensor and the pulse wheel teeth normal?	Yes	Inspect the following PIDs: (See F2-31 PCM INSPECTION.) • ECT • IAT • MAF • MAP • RPM If the PID value is not as specified, repair or replace the malfunctioning parts. If the PID value is normal, go to the next step.
		No	Replace the malfunctioning parts.
22	Inspect the fuel pressure sensor. Is the fuel pressure normal?	Yes	Go to the next step.
		No	Replace the common rail.
23	Inspect the suction control valve. Is the suction control valve normal?	Yes	Go to the next step.
		No	Repair the supply pump.
24	Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for the following: • Damaged valve seat • Worn valve stem and valve guide • Worn or stuck piston ring • Worn piston, piston ring or cylinder • Improper valve timing Service if necessary.

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TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
25	Inspect the fuel injector. Is the fuel injector normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
26	Inspect the IDM. Is the IDM normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
27	Inspect the timing belt for the following: • Gear teeth chipping • Low tension • Breakage damage or cracks Is the timing belt normal?	Yes	Inspect following: • Clutch slippage • CKP sensor • Boost sensor and related circuit • Brake system for dragging If normal, remove and inspect the supply pump and the common rail.
		No	If the valve timing is incorrect, adjust the valve timing. If the timing belt is not normal, replace the timing belt.
28	Verify the test results. • If normal, return to the diagnostic index to service any additional symptoms. • If the malfunction remains, replace the PCM.		

NO.13 KNOCKING/PINGING

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13	KNOCKING/PINGING
DESCRIPTION	• Excessive shrilly knocking sound from the engine
POSSIBLE CAUSE	• Poor fuel quality • Air leakage from intake-air system • Intake-air system restriction or clogging • Variable swirl control (VSC) system malfunction • Variable boost control (VBC) system malfunction • Intake shutter valve stuck close • VSC valve stuck close • Glow system malfunction • Low engine compression • Improper valve timing • Low coolant temperature • Incorrect fuel injection timing • Erratic signal from CKP sensor • Erratic signal from CMP sensor • ECT sensor or related circuit malfunction • MAF/IAT sensor or related circuit malfunction • IAT sensor No.2 or related circuit malfunction • Boost sensor or related malfunction • Fuel pressure sensor or related circuit malfunction • Accelerator position sensor or related circuit malfunction • Excessive fuel pressure • Fuel return line clogging or restriction • EGR system malfunction • EGR valve position sensor malfunction • Exhaust system and/or catalyst converter restriction • Turbocharger malfunction • Charge air cooler malfunction • Suction control valve malfunction (built-in supply pump) Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.

TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	Does the engine run cold?	Yes	Go to the symptom troubleshooting "NO.18 COOLING SYSTEM CONCERNS—RUNS COLD".
		No	Go to the next step.
2	Inspect for the following: - Fuel quality (such as water contamination, winter/summer blend) - Fuel return line clogging and/or restriction - Intake-air system restriction or clogging - Exhaust system and/or catalyst converter restriction or clogging - Charge air cooler condition (restriction or damaged) Are all the items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 2.
3	Connect the WDS or equivalent to the DLC-2. Access the ECT PID. Verify the ECT PID is above 80 °C {176 °F} ?	Yes	Go to the next step.
		No	Inspect the ECT PID.
4	Perform the self-test function using the WDS or equivalent. Turn the engine switch to the ON position. Retrieve any DTC. Is the DTC displayed?	Yes	DTC is displayed: Go to the appropriate DTC test. Communication error message is displayed: Inspect for the following: - Open circuit between the PCM control relay and PCM terminal 53 or 79 - Open circuit between the PCM control relay and PCM terminal 69 - Stuck open PCM control relay - Open or poor GND circuit (PCM terminal 65, 85, 103 or 104) - Poor connection at vehicle body GND
		No	No DTC is displayed: Go to the next step.
5	Inspect the intake shutter valve and the VSC valve operations. Is there any problem?	Yes	Repair or replace if necessary.
		No	Go to the next step.
6	Inspect the guide blade valve operation. Is there any problem?	Yes	Repair or replace if necessary.
		No	Go to the next step.
7	Inspect the hose bands between the following parts: - Turbocharger compressor housing and air cleaner - Turbocharger compressor housing and charge air cooler Are the hose bands loose?	Yes	Retighten the hose bands. If the concern is resolved, complete the inspection. If the concern still exists, go to the next step.
		No	Go to the next step.
8	Inspect for improper operation, kinks, clogging or disconnection on guide blade actuator. Is the actuator normal?	Yes	Go to the next step.
		No	Repair or replace if necessary. If the concern is resolved, complete the inspection. If the concern still exists, the turbocharger is normal. Go to the next step.
9	Remove the parts necessary to inspect the turbocharger. Do not remove the turbocharger. Inspect if the turbocharger compressor wheel is bent, damaged, or interfering with the housing on the vehicle. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.
10	Inspect if the turbocharger compressor wheel locknut is loose or has fallen into the turbocharger. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.
11	Inspect the turbocharger compressor wheel by hand. Does the wheel turn easily and smoothly?	Yes	Go to the next step.
		No	Replace the turbocharger.

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TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
12	Inspect if the turbocharger turbine wheel is damaged, cracked or interfering with the housing on the vehicle. Note Inspect all the fins on each turbine wheel. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.
13	Is any engine oil found inside the turbocharger turbine housing?	Yes	Excessive amount of oil is found: Replace the turbocharger. Small amount of oil is found: Wipe oil off the vehicle, then go to the next step.
		No	Go to the next step.
14	Is any engine oil found inside the turbocharger compressor housing?	Yes	Wipe oil off vehicle and install all the removed parts in Step 10. Then, go to the next step.
		No	The turbocharger is normal. Install all the removed parts in Step 10. Then, go to the next step.
15	Inspect the EGR system operation. (See F2-232 EGR Control System Inspection.) Is the EGR system operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the EGR control system inspection results.
16	Inspect the glow system operation. Is the glow system operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the glow system operation results.
17	Visually inspect the CKP sensor and the pulse wheel teeth. Are the CKP sensor and the pulse wheel teeth normal?	Yes	Go to the next step.
		No	Replace the malfunctioning parts.
18	Measure the gap between the CKP sensor and the pulse wheel teeth. Specification 1.5—2.5 mm {0.059—0.098 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor position.
19	Visually inspect the CMP sensor and the pulse wheel teeth. Are the CMP sensor and the pulse wheel teeth normal?	Yes	Inspect the following PIDs: (See F2-31 PCM INSPECTION.) - ECT - IAT - MAF - MAP - RPM If the PID value is not as specified, repair or replace the malfunctioning parts. If the PID value is normal, go to the next step.
		No	Replace the malfunctioning parts.
20	Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for the following: - Damaged valve seat - Worn valve stem and valve guide - Worn or stuck piston ring - Worn piston, piston ring or cylinder - Improper valve timing Service if necessary.
21	Inspect the suction control valve. Is the suction control valve normal?	Yes	Inspect the following: - Boost sensor - MAF/IAT sensor - IAT sensor No.2 - Fuel pressure sensor - Accelerator position sensor
		No	Repair the supply pump.
22	Verify the test results. - If normal, return to the diagnostic index to service any additional symptoms. - If the malfunction remains, replace the PCM.		

TROUBLESHOOTING

NO.15 EMISSION COMPLIANCE

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15	EMISSION COMPLIANCE
DESCRIPTION	• Fails emissions test.
POSSIBLE CAUSE	• Poor fuel quality • Vacuum leakage • Air leakage from intake-air system • Intake-air system restriction or clogging • Variable swirl control (VSC) system malfunction • Variable boost control (VBC) system malfunction • Stuck closed intake shutter valve • Stuck closed VSC valve • Turbocharger malfunction • Guide blade valve malfunction • Charge air cooler malfunction • Glow system malfunction • EGR system malfunction • EGR valve position sensor malfunction • EGR water cooler malfunction • Low coolant temperature • Engine overheating • Inadequate fuel pressure • Fuel pressure limiter malfunction (built-in common rail) • Suction control valve inspection (built-in supply pump) • ECT sensor or related circuit malfunction • MAF/IAT sensor related circuit malfunction • IAT sensor No.2 or related circuit malfunction • Fuel pressure sensor or related circuit malfunction • Incorrect adjustment accelerator position sensor and/or idle switch • Accelerator position sensor or related circuit malfunction • Idle switch or related circuit malfunction • Fuel line clogging or restriction • Supply pump malfunction • Fuel injector malfunction • Incorrect fuel injection timing • Incorrect idle speed • Erratic signal from CKP sensor • Erratic signal from CMP sensor • Boost sensor or related circuit malfunction • Neutral switch or related circuit malfunction • VSS or related circuit malfunction • Low engine compression • Improper valve timing • Base engine malfunction • Exhaust system and/or catalyst converter restriction • Catalyst converter malfunction • IDM or related circuit malfunction Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.

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TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	Is the engine overheating?	Yes	Go to the symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS—OVERHEATING".
		No	Go to the next step.
2	Does the engine run cold?	Yes	Go to the symptom troubleshooting "NO.18 COOLING SYSTEM CONCERNS—RUNS COLD".
		No	Go to the next step.
3	Connect the WDS or equivalent to the DLC-2. Perform the self-test function using the WDS or equivalent. Turn the engine switch to the ON position. Retrieve any DTC. Is the DTC displayed?	Yes	DTC is displayed: Go to appropriate DTC test. Communication error message is displayed: Inspect for the following: • Open circuit between PCM control relay and PCM terminal 53 or 79 • Open circuit PCM control relay and PCM terminal 69 • PCM control relay stuck open • Open or poor GND circuit (PCM terminal 65, 85, 103 or 104) • Poor connection vehicle body GND
		No	No DTC is displayed: Go to the next step.
4	Inspect for the following: • Fuel quality (such as including water contamination, winter/summer blend) • Fuel return line clogging and/or restriction • Charge air cooler condition (restriction or damaged) • Intake-air system restriction • Exhaust system and/or catalyst converter restriction • Vacuum leakage Are all the items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 4.
5	Inspect the adjustment of the accelerator position sensor and the idle switch. Are the accelerator position sensor and the idle switch adjusted correctly?	Yes	Go to the next step.
		No	Adjust the accelerator position sensor and the idle switch correctly.
6	Inspect the neutral switch adjustment. Is the neutral switch adjusted correctly?	Yes	Go to the next step.
		No	Adjust the neutral switch correctly.
7	Inspect the intake shutter valve and the VSC valve operations. Is there any problem?	Yes	Repair or replace if necessary.
		No	Go to the next step.
8	Inspect the guide blade valve operation. Is there any problem?	Yes	Repair or replace if necessary.
		No	Go to the next step.
9	Inspect the hose bands between following parts: • Turbocharger compressor housing and air cleaner • Turbocharger compressor housing and charge air cooler Are the hose bands loose?	Yes	Retighten the hose bands. If the concern is resolved, complete the inspection. If the concern still exists, go to the next step.
		No	Go to the next step.
10	Inspect for improper operation, kinks, clogging or disconnection on the guide blade actuator. Is the actuator normal?	Yes	Go to the next step.
		No	Repair or replace if necessary. If the concern is resolved, complete the inspection. If the concern still exists, the turbocharger is normal. Go to the next step.
11	Remove the parts necessary to inspect the turbocharger. Do not remove the turbocharger. Inspect if the turbocharger compressor wheel is bent, damaged, or interfering with the housing on the vehicle. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.
12	Inspect if the turbocharger compressor wheel locknut is loose or has fallen into the turbocharger. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.

TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
13	Inspect the turbocharger compressor wheel by hand. Does the wheel turn easily and smoothly?	Yes	Go to the next step.
		No	Replace the turbocharger.
14	Inspect if the turbocharger turbine wheel is damaged, cracked or interfering with the housing on vehicle. Note Inspect all the fins on each turbine wheel. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.
15	Is any engine oil found inside the turbocharger turbine housing?	Yes	Excessive amount of oil is found: Replace the turbocharger. Small amount of oil is found: Wipe oil off vehicle, then go to the next step.
		No	Go to the next step.
16	Is any engine oil found inside the turbocharger compressor housing?	Yes	Wipe oil off vehicle and install all the removed parts in Step 10. Then, go to the next step.
		No	The turbocharger is normal. Install all the parts removed in Step 10. Then, go to the next step.
17	Inspect the EGR system operation. (See F2-232 EGR Control System Inspection.) Is the EGR system operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the EGR control system inspection results.
18	Inspect the EGR water cooler for the following: - Coolant passage clogging/restriction - Exhaust gas clogging/restriction Is the EGR water cooler normal?	Yes	Go to the next step.
		No	Service if necessary.
19	Inspect the glow system operation. Is the glow system operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the glow system operation results.
20	Visually inspect the CKP sensor and the pulse wheel teeth. Are CKP sensor and the pulse wheel teeth normal?	Yes	Go to the next step.
		No	Replace the malfunctioning parts.
21	Measure the gap between the CKP sensor and the pulse wheel teeth. Specification 1.5—2.5 mm {0.059—0.098 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor position.
22	Visually inspect the CMP sensor and the pulse wheel teeth. Are the CMP sensor and the pulse wheel teeth normal?	Yes	Inspect the following PIDs: (See F2-31 PCM INSPECTION.) - ECT - IAT - MAF - MAP - RPM - VSS If the PID value is not as specified, repair or replace the malfunctioning parts. If the PID value is normal, go to the next step.
		No	Replace the malfunctioning parts.
23	Inspect the fuel pressure sensor. Is the fuel pressure normal?	Yes	Go to the next step.
		No	Replace the common rail.
24	Inspect the suction control valve. Is the suction control valve normal?	Yes	Go to the next step.
		No	Repair the supply pump.
25	Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for the following: - Damaged valve seat - Worn valve stem and valve guide - Worn or stuck piston ring - Worn piston, piston ring or cylinder - Improper valve timing Service if necessary.

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TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
26	Inspect the fuel injector. Is the fuel injector normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
27	Inspect the IDM. Is the IDM normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
28	Inspect the timing belt for followings: • Gear teeth chipping • Low tension • Breakage damage or cracks Is the timing belt normal?	Yes	Inspect the following: • ECT sensor • Boost sensor • MAF/IAT sensor • Catalyst converter If normal, remove and inspect the supply pump and the common rail.
		No	If the timing is incorrect, adjust the valve timing. If the timing belt is not normal, replace timing belt.
29	Verify the test results. • If normal, return to the diagnostic index to service any additional symptoms. • If the malfunction remains, replace the PCM.		

NO.19 EXCESSIVE BLACK SMOKE

B6E408018881110

19	EXCESSIVE BLACK SMOKE
DESCRIPTION	• Excessive black smoke is observed in exhaust gas.
POSSIBLE CAUSE	• Intake-air system clogging or restriction • Air leakage from Intake-air system • Incorrect fuel injection timing • Erratic signal from CKP sensor • Fuel pressure sensor or related circuit malfunction • Boost sensor or related circuit malfunction • IAT sensor No.2 or related circuit malfunction • Fuel injector malfunction • Excessive fuel pressure • Suction control valve malfunction (built-in supply pump) • Fuel line clogging or restriction • Fuel pressure limiter malfunction (built-in common rail) • Low engine compression • Improper valve timing • Base engine malfunction • EGR system malfunction • EGR valve position sensor malfunction • Variable boost control (VBC) system malfunction • Vacuum leakage • Turbocharger malfunction • Charge air cooler malfunction • Intake shutter valve malfunction • Variable swirl control (VSC) system malfunction • VSC valve malfunction • IDM or related circuit malfunction • Exhaust system and/or catalyst converter restriction or clogging Warning The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services: • Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel. • Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.

TROUBLESHOOTING

Diagnostic Procedure

STEP	INSPECTION	RESULTS	ACTION
1	Inspect for the following: - Intake-air system clogging or restriction - Exhaust system and/or catalyst converter restriction or clogging - Charge air cooler condition (restriction or damaged) Are all the items normal?	Yes	Go to the next step.
		No	Service if necessary. Repeat Step 1.
2	Perform the self-test function using the WDS or equivalent. Turn the engine switch to the ON position. Retrieve any DTC. Is the DTC displayed?	Yes	DTC is displayed: Go to the appropriate DTC test. Communication error message is displayed: Inspect for the following: - Open circuit between the PCM control relay and PCM terminal 53 or 79 - Open circuit between the PCM control relay and PCM terminal 69 - Stuck open PCM control relay - Open or poor GND circuit (PCM terminal 65, 85, 103 or 104) - Poor connection at vehicle body GND
		No	No DTC is displayed: Go to the next step.
3	Does any other symptom exist?	Yes	Go to the appropriate flowchart.
		No	Go to the next step.
4	Inspect the air cleaner element for clogging. Is the air cleaner element normal?	Yes	Go to the next step.
		No	Repair or replace the air cleaner element.
5	Inspect the intake shutter valve and the VSC valve operations. Is there any problem?	Yes	Repair or replace if necessary.
		No	Go to the next step.
6	Inspect the guide blade valve operation. Is there any problem?	Yes	Repair or replace if necessary.
		No	Go to the next step.
7	Visually inspect the CKP sensor and the pulse wheel teeth. Are the CKP sensor and the pulse wheel teeth normal?	Yes	Go to the next step.
		No	Replace the malfunctioning parts.
8	Measure the gap between the CKP sensor and the pulse wheel teeth. Specification 1.5—2.5 mm {0.059—0.098 in} Is the gap within the specification?	Yes	Go to the next step.
		No	Adjust the CKP sensor position.
9	Visually inspect the CMP sensor and the pulse wheel teeth. Are the CMP sensor and the pulse wheel teeth normal?	Yes	Inspect the following PIDs: (See F2-31 PCM INSPECTION.) - IAT - MAP - RPM If the PID value is not as specified, repair or replace the malfunctioning parts. If PID value is normal, go to the next step.
		No	Replace the malfunctioning parts.
10	Inspect the EGR system operation. (See F2-232 EGR Control System Inspection.) Is the EGR system operation normal?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the EGR control system inspection results.
11	Inspect the VSC system operation. Does the VSC system operate properly?	Yes	Go to the next step.
		No	Repair or replace the malfunctioning part according to the VSC system operation inspection results.
12	Inspect the hose bands between the following parts: - Turbocharger compressor housing and air cleaner - Turbocharger compressor housing and charge air cooler Are the hose bands loose?	Yes	Retighten the hose bands. If the concern is resolved, complete the inspection. If the concern still exists, go to the next step.
		No	Go to the next step.

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TROUBLESHOOTING

STEP	INSPECTION	RESULTS	ACTION
13	Inspect for improper operation, kinks, clogging or disconnection on guide blade actuator. Is the actuator normal?	Yes	Go to the next step.
		No	Repair or replace if necessary. If the concern is resolved, complete the inspection. If the concern still exists, the turbocharger is normal. Go to the next step.
14	Remove the parts necessary to inspect the turbocharger. Do not remove the turbocharger. Inspect if the turbocharger compressor wheel is bent, damaged, or interfering with housing on the vehicle. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.
15	Inspect if the turbocharger compressor wheel locknut is loose or has fallen into the turbocharger. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.
16	Inspect if the turbocharger compressor wheel by hand. Does the wheel turn easily and smoothly?	Yes	Go to the next step.
		No	Replace the turbocharger.
17	Inspect if the turbocharger turbine wheel is damaged, cracked or interfering with the housing on the vehicle. Note • Inspect all the fins on each turbine wheel. Is there any problem?	Yes	Replace the turbocharger.
		No	Go to the next step.
18	Is any engine oil found inside the turbocharger compressor housing?	Yes	Wipe oil off vehicle and install all the removed parts in Step 15. Then, go to the next step.
		No	The turbocharger is normal. Install all the parts removed in Step 15. Then, go to the next step.
19	Inspect the suction control valve. Is the suction control valve normal?	Yes	Go to the next step.
		No	Repair the supply pump.
20	Is the engine compression correct?	Yes	Go to the next step.
		No	Inspect for the following: • Damaged valve seat • Worn valve stem and valve guide • Worn or stuck piston ring • Worn piston, piston ring or cylinder • Improper valve timing Service if necessary.
21	Inspect the IDM. Is the IDM normal?	Yes	Go to the next step.
		No	Repair or replace if necessary.
22	Inspect the fuel injector. Is the fuel injector normal?	Yes	Inspect following: • Boost sensor • Fuel pressure limiter (built-in common rail) • Fuel pressure sensor • Fuel return line restriction or clogging Service if necessary.
		No	Repair or replace if necessary.
23	Verify the test results. • If normal, return to the diagnostic index to service any additional symptoms. • If the malfunction remains, replace the PCM.		

ENGINE CONTROL SYSTEM OPERATION INSPECTION

EGR Control System Inspection

1. Perform the "Intake Shutter Valve Operation Inspection".
2. Make sure that all the hoses are securely connected in the proper position.
3. Connect the WDS or equivalent to the DLC-2.
4. Turn the engine switch to the ON position.
5. Access the EGRVP PID.
6. Verify that the PID value is within specification.

TROUBLESHOOTING

- If not as specified, inspect the following.
 - EGR valve (stuck open)
 - EGR valve position sensor (See [F2-37 EGR VALVE POSITION SENSOR INSPECTION.](#))

Specification:

0.4—0.6 V

7. Start the engine and run it at idle speed.
8. Verify that the EGRVP PID is within the specifications.
 - If not as specified, inspect the following:
 - EGR solenoid valve (vacuum)
 - EGR solenoid valve (vent)
 - EGR control solenoid valve
 - EGR valve position sensor (See [F2-37 EGR VALVE POSITION SENSOR INSPECTION.](#))

Specification:

1.3—1.6 V

9. Disconnect the vacuum hose from the EGR valve.
10. Connect the vacuum pump to the EGR valve.
11. Apply vacuum to the EGR valve and inspect if the engine speed becomes unstable or the engine stalls.
 - If the engine speed does not change, stop the engine and inspect the EGR valve.

F2

SPECIAL TOOLS

SPECIAL TOOLS ST-2
FUEL AND EMISSION CONTROL
SYSTEMS ST-2

ST

SPECIAL TOOLS

SPECIAL TOOLS

FUEL AND EMISSION CONTROL SYSTEMS

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WDS		-	-
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