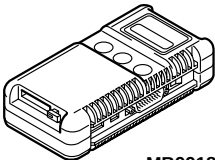
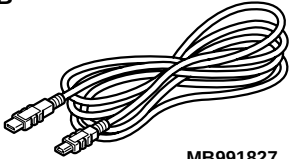
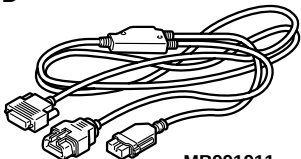
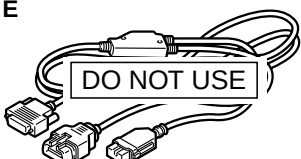
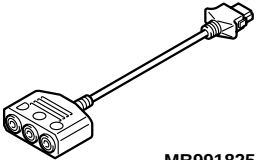
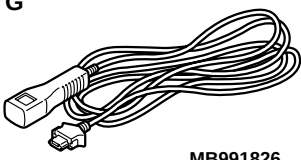
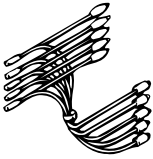
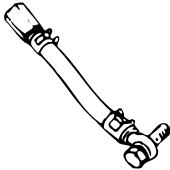


SPECIAL TOOLS

M1131000600676

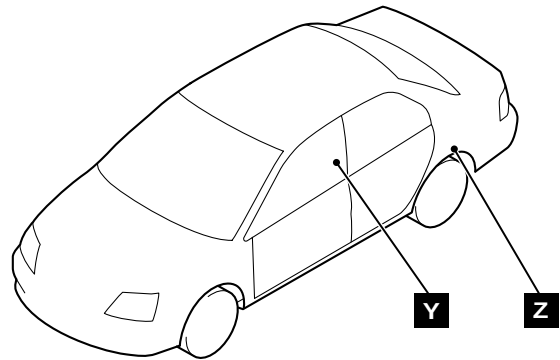
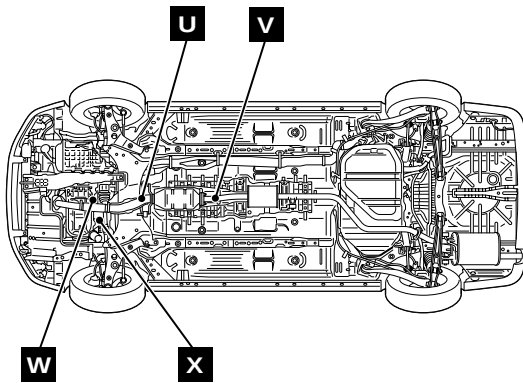
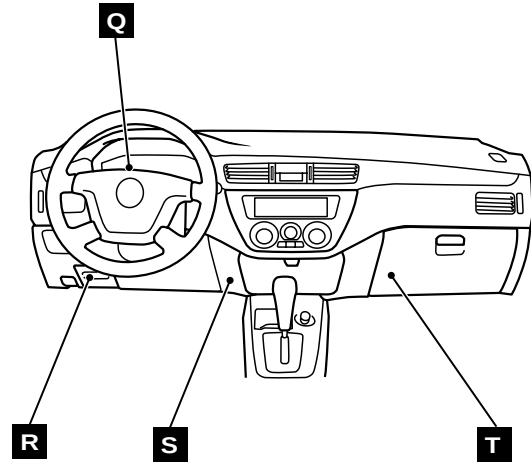
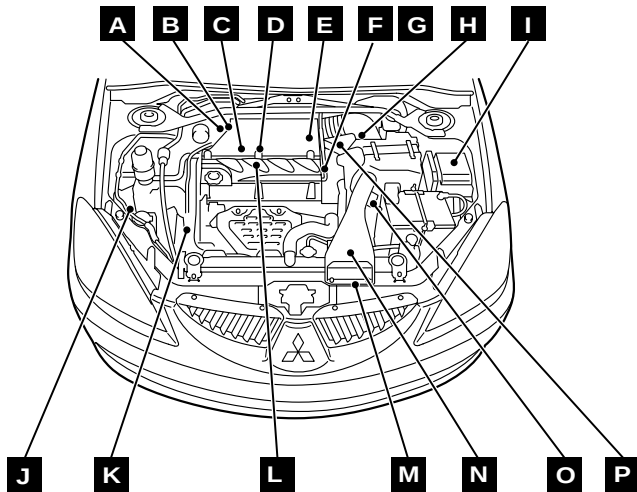
TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991914 F  MB991825 G  MB991826 MB991958	MB991958 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826 MUT-III sub assembly A: Vehicle communication interface (V.C.I.) B: MUT-III USB cable C: MUT-III main harness A (Vehicles with CAN communication system) D: MUT-III main harness B (Vehicles without CAN communication system) E: MUT-III main harness C (for Daimler Chrysler models only) F: MUT-III adapter harness G: MUT-III trigger harness	MB991824-KIT <i>NOTE: G: MB991826 MUT-III Trigger Harness is not necessary when pushing V.C.I. ENTER key.</i>	• Reading diagnostic trouble code • MFI system inspection • Measurement of fuel pressure CAUTION MUT-III Main Harness B (MB991911) should be used. MUT-III main harness A and C should not be used for this vehicle.
	MB991709 Test harness	MB991709-01	Inspection using an oscilloscope

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 MB991658	MB991658 Test harness	Tool not available	• Inspection using an oscilloscope • Adjustment of accelerator pedal position sensor and accelerator pedal position switch • Inspection of heated oxygen sensor
 MB991637	MB991637 Fuel pressure gauge set	Tool not available	Measurement of fuel pressure
	MD998709 Adaptor hose	MIT210196	Measurement of fuel pressure
	MD998742 Hose adaptor	MD998742-01	Measurement of fuel pressure

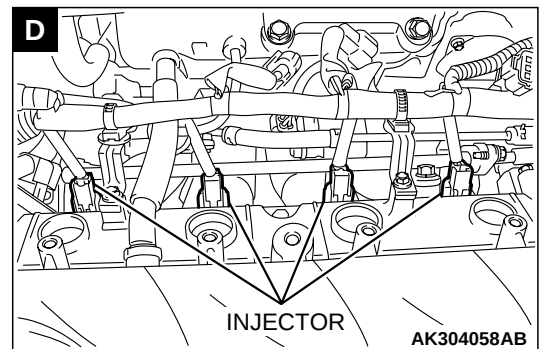
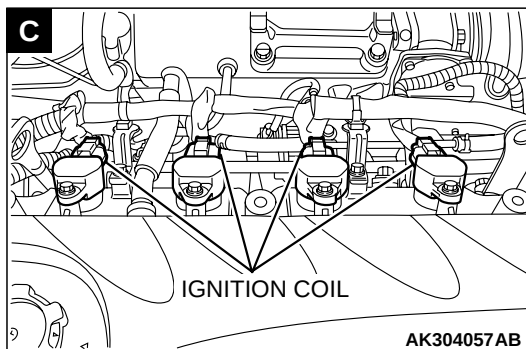
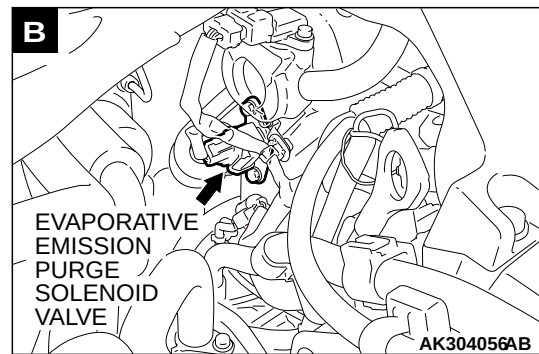
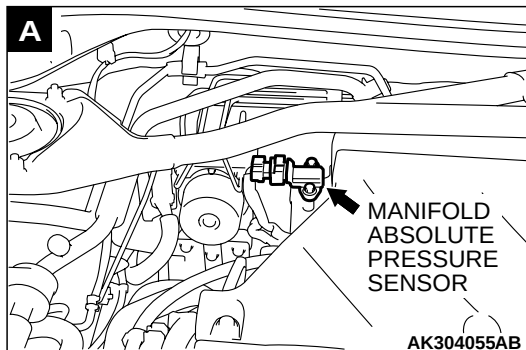
ON-VEHICLE SERVICE**COMPONENT LOCATION**

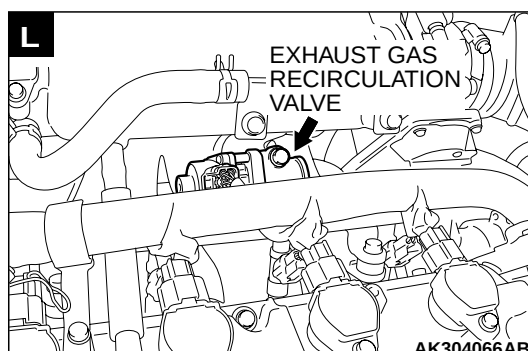
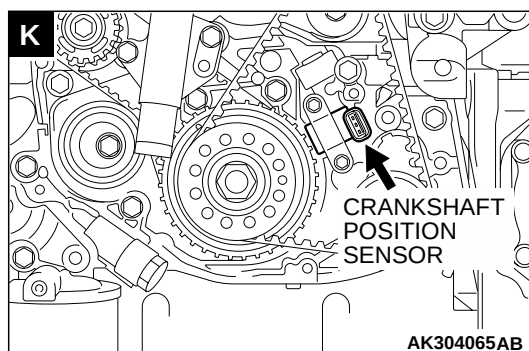
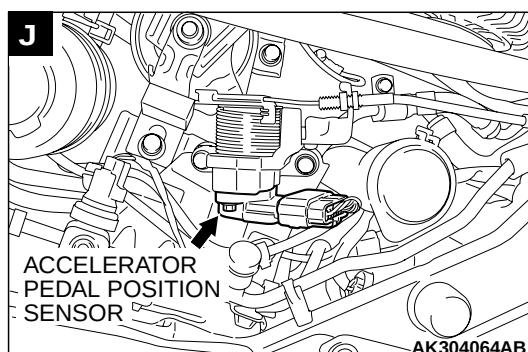
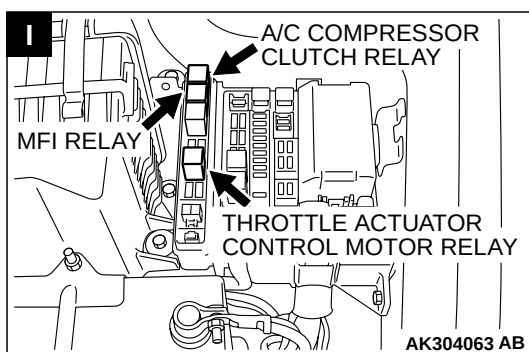
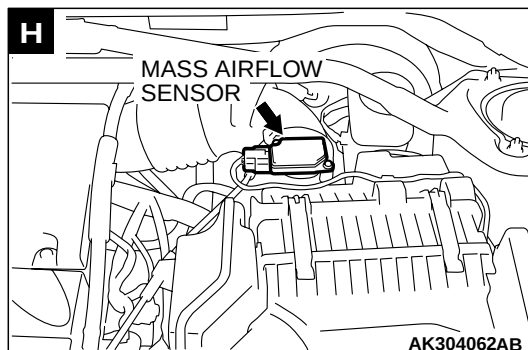
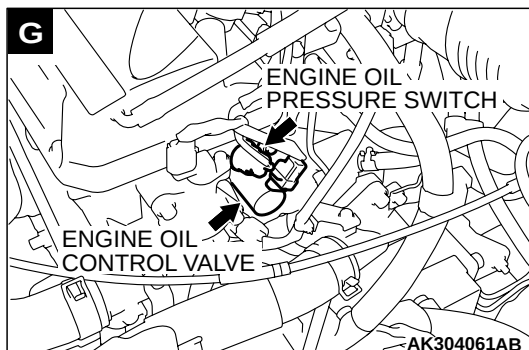
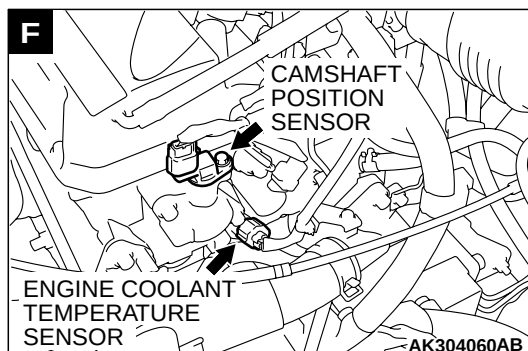
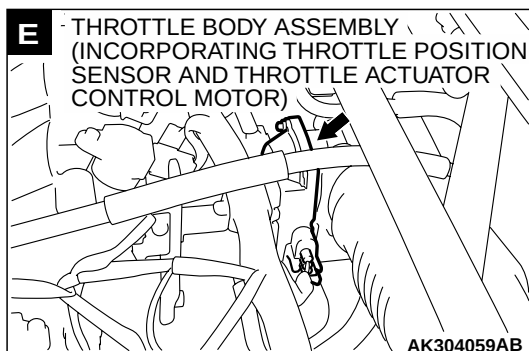
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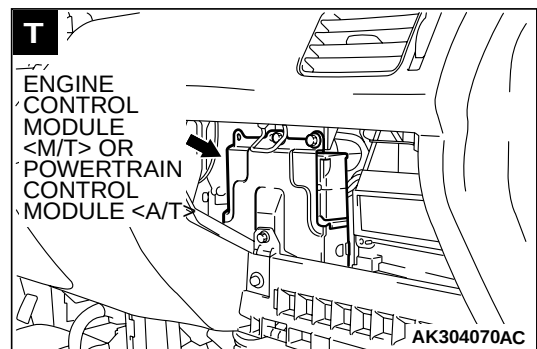
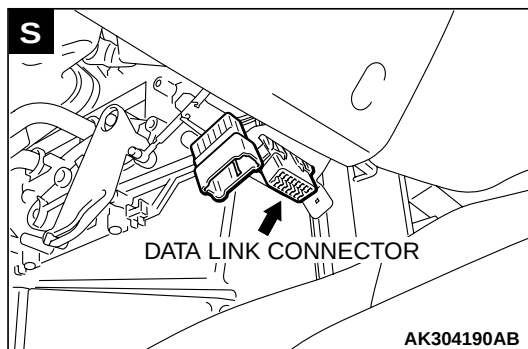
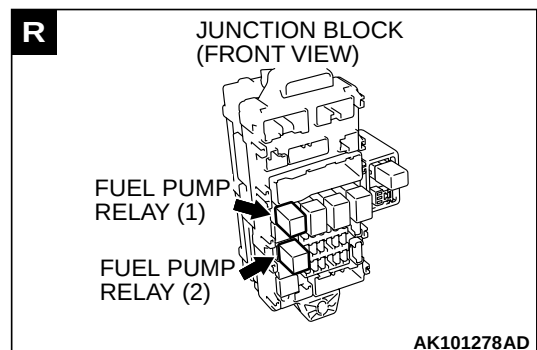
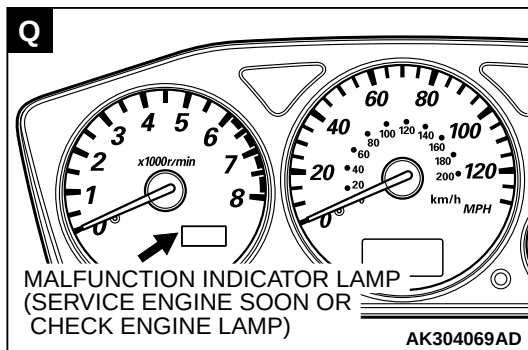
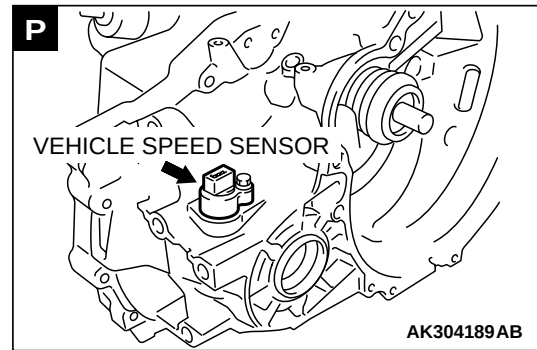
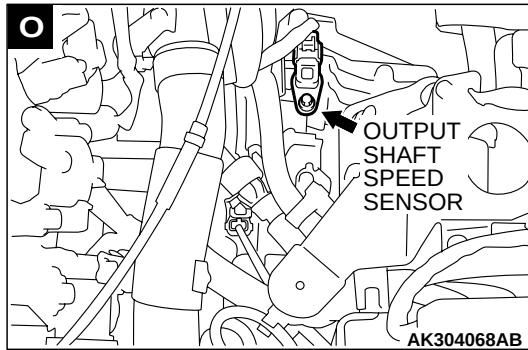
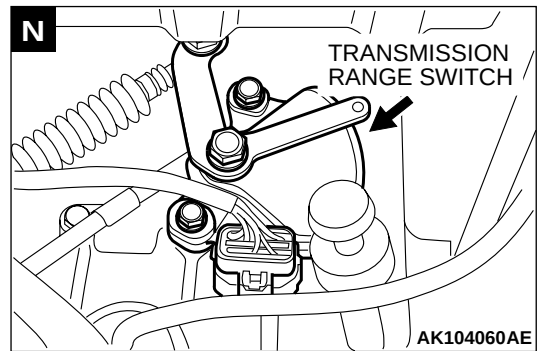
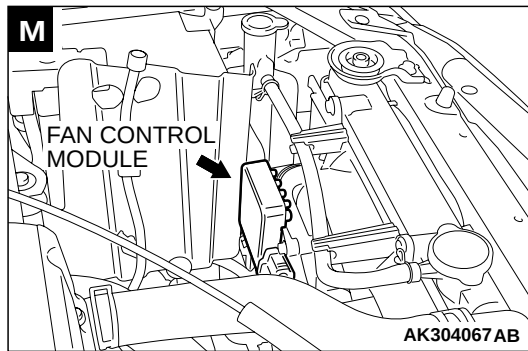
NAME	SYMBOL	NAME	SYMBOL
Accelerator pedal position sensor (with built-in accelerator pedal position switch)	J	Heated oxygen sensor (front)	U
Air conditioning compressor clutch relay	I	Heated oxygen sensor (rear)	V
Camshaft position sensor	F	Ignition coil	C
Crankshaft position sensor	K	Injector	D
Data link connector	S	Knock sensor	W
Engine control module (ECM) <M/T>	T	Malfunction indicator lamp (SERVICE ENGINE SOON or Check Engine Lamp)	Q
Engine coolant temperature sensor	F	Manifold absolute pressure sensor	A
Engine oil control valve	G	Mass airflow sensor (with built-in intake air temperature sensor)	H
Engine oil pressure switch	G	Multiport fuel injection (MFI) relay	I
Evaporative emission purge solenoid	B	Output shaft speed sensor	O
Evaporative emission ventilator solenoid	Z	Power steering pressure switch	X
Exhaust gas recirculation valve	L	Powertrain control module (PCM) <A/T>	T
Fan control module	M	Throttle actuator control motor	E
Fuel level sensor	Y	Throttle actuator control motor relay	I
Fuel pump relay	R	Throttle position sensor	E
Fuel tank differential pressure sensor	Y	Transmission range switch <A/T>	N
Fuel tank temperature sensor	Y	Vehicle speed sensor <M/T>	P

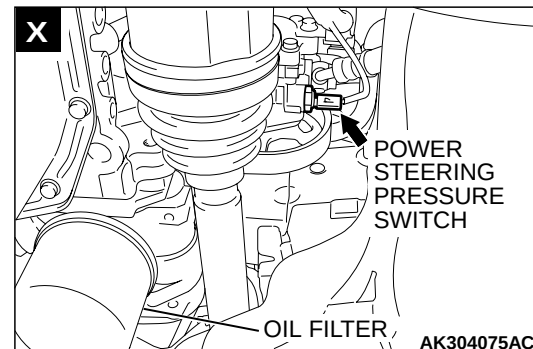
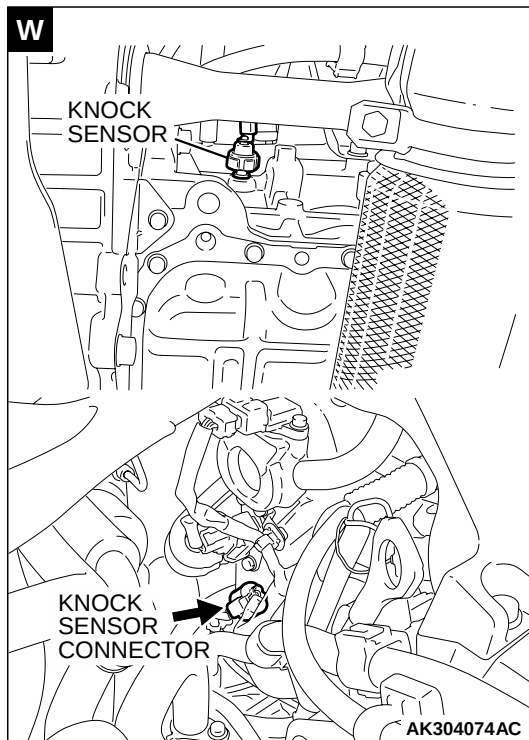
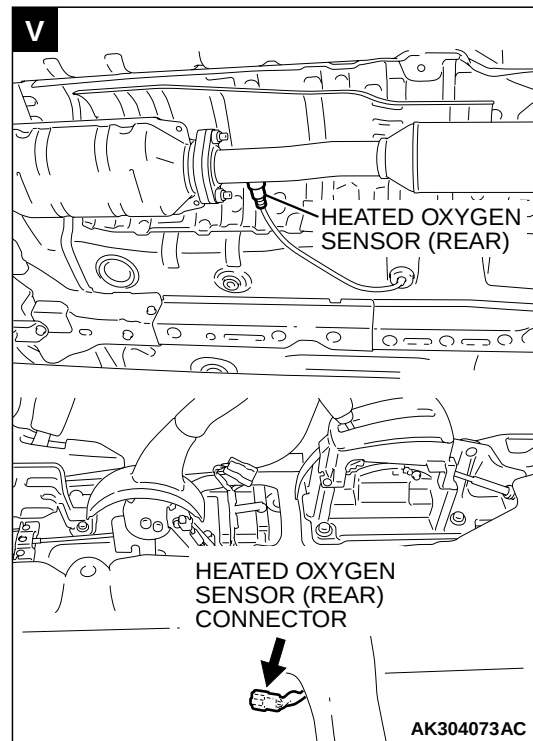
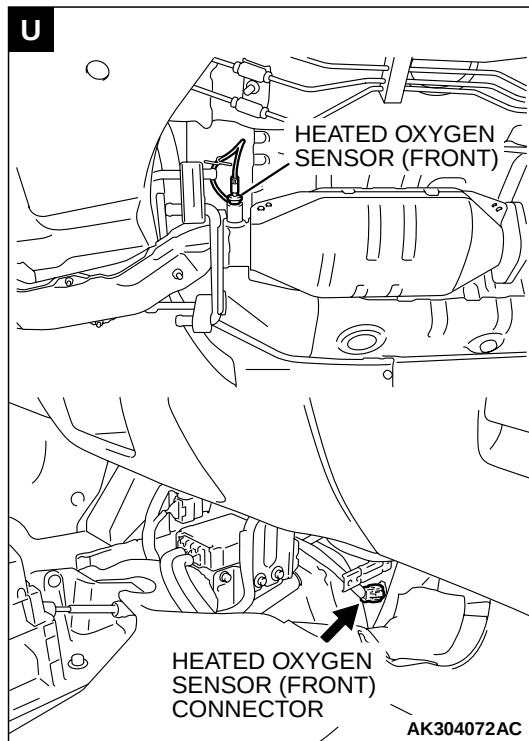


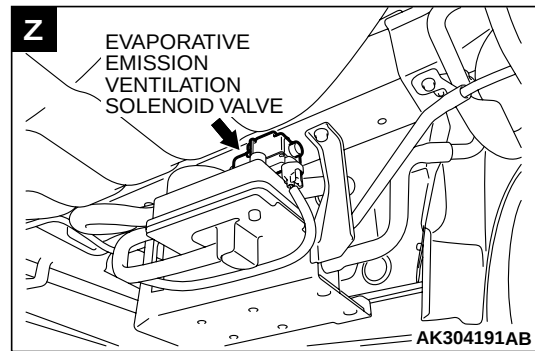
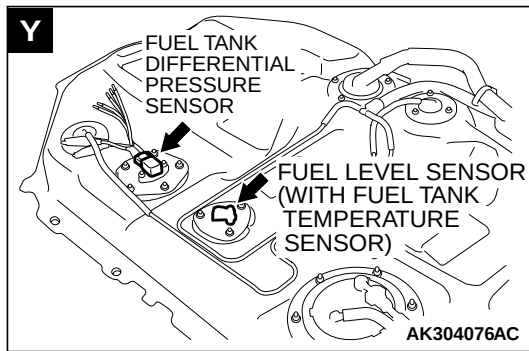
AK304183AB











THROTTLE BODY (THROTTLE VALVE AREA) CLEANING

M1131001000558

1. Remove the throttle body.

⚠ CAUTION

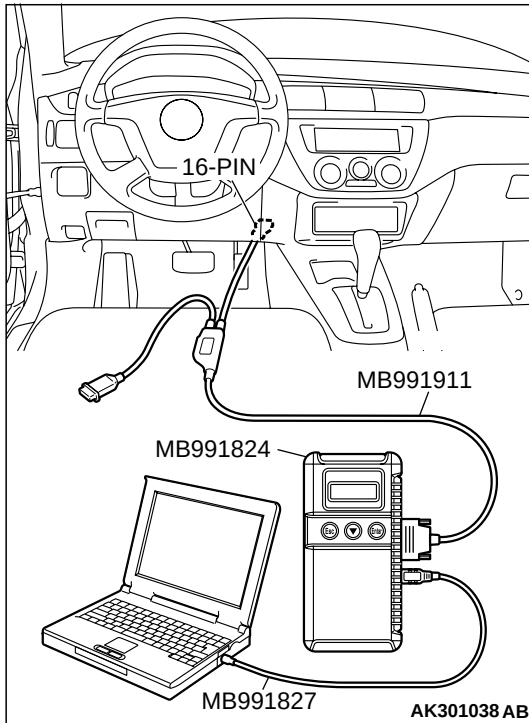
- Do not spray the cleaning solvent directly to the throttle valve.
 - Make sure the cleaning solvent does not enter the motor and the sensor through the shaft.
2. Spray cleaning solvent on a clean cloth.
 3. Wipe off the dirt around the throttle valve with the cloth sprayed with cleaning solvent.
 4. Attach the air intake hose.

ACCELERATOR PEDAL POSITION SWITCH AND ACCELERATOR PEDAL POSITION SENSOR (APS) ADJUSTMENT

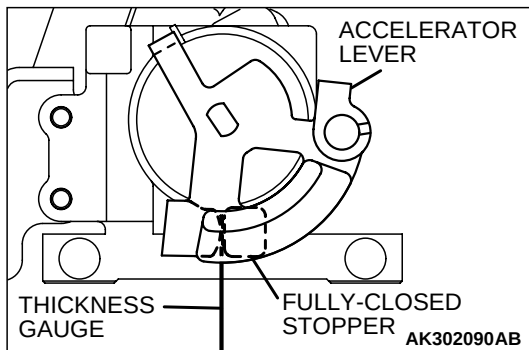
M1131053400029

Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B
- MB991658: Test Harness

**⚠ CAUTION**

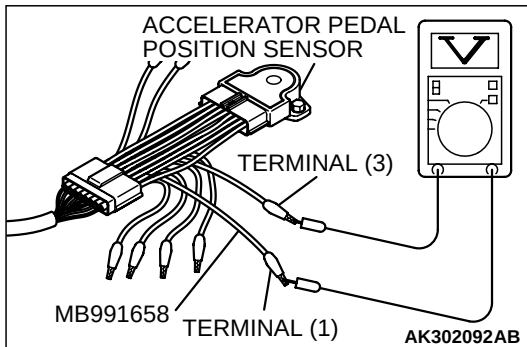
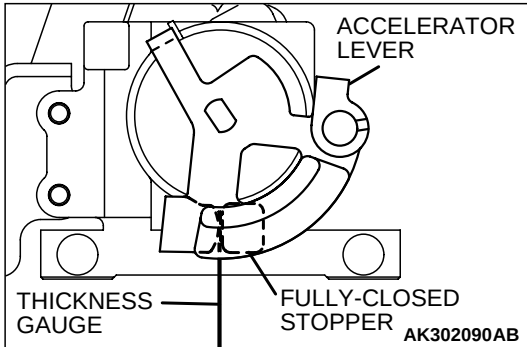
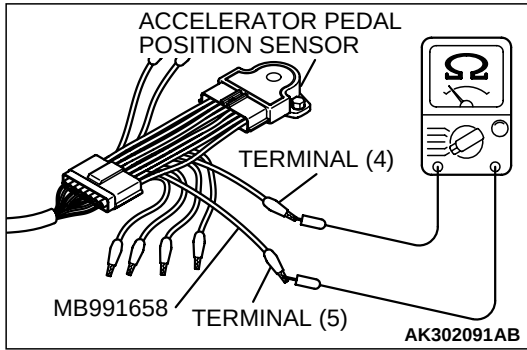
1. The accelerator pedal position sensor should not be moved unnecessarily; it has been precisely adjusted by the manufacture.
2. If the adjustment is disturbed for any reason, readjust as follows.

**<When using the scan tool MB991958>**

1. Connect the scan tool MB991958 to the diagnosis connector.
2. Remove the two accelerator pedal position sensor assembly mounting bolts (M8 bolt), and then insert a thickness gauge with a thickness of 0.60 mm (0.024 in.) in between the accelerator lever and the fully-closed stopper.
3. Turn the ignition switch to the "ON" position (without starting the engine).
4. Loosen the accelerator pedal position sensor mounting bolt, and then turn the accelerator pedal position sensor anti-clockwise as far as it will go.
5. Check that the accelerator pedal position switch turns on at this time.
6. Turn the accelerator pedal position sensor clockwise until the point is found where the accelerator pedal position switch turns off. Securely tighten the accelerator pedal position sensor mounting bolt at this point.
7. Check that the accelerator pedal position sensor (main) output at this time is within the standard value range.

Standard value: 0.5 – 0.9 volt

8. Turn the ignition switch to the "LOCK" (OFF) position.
9. Remove the thickness gauge and then install the accelerator pedal position sensor assembly.
10. Remove the scan tool MB991958.



<When not using the scan tool MB991958>

1. Remove the two accelerator pedal position sensor assembly mounting bolts.
2. Disconnect the accelerator pedal position sensor connector. Connect the special tool (test harness: MB991658) between the disconnected connectors. (All the terminals should be connected. Pay attention to the terminal numbers to avoid wrong connection.)
3. Connect the ohm meter between terminal No. 4 and No. 5 of the accelerator pedal position sensor.
4. Insert a thickness gauge with a thickness of 0.60 mm (0.024 in.) in between the accelerator lever and the fully closed stopper.
5. Loosen the accelerator pedal position sensor mounting bolt, and then turn the accelerator pedal position sensor anti-clockwise as far as it will go.
6. Check at this time that continuity is present.
7. Turn the accelerator pedal position sensor clockwise until the points is found where the accelator pedal position switch turns off. Securely tighten the accelerator pedal position sensor mounting bolt at this point.
8. Remove the ohm meter.
9. Connect the digital voltmeter between terminal No. 3 [accelerator pedal position sensor (main) output] and terminal No. 1 [accelerator pedal position sensor (main) earth].
10. Turn the ignition switch to the "ON" position. (without starting the engine)
11. Check that the accelerator pedal position sensor (main) output meets the standard value.
Standard value: 0.5 – 0.9 volt
12. Turn the ignition switch to the "LOCK" (OFF) position.
13. Remove the thickness gauge and the special tool and install the accelerator pedal position sensor assembly.

FUEL PRESSURE TEST

M1131001900647

Required Special Tools:

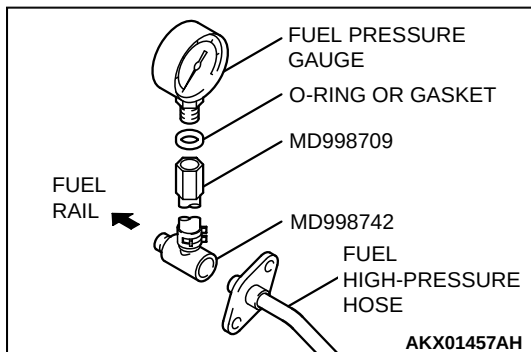
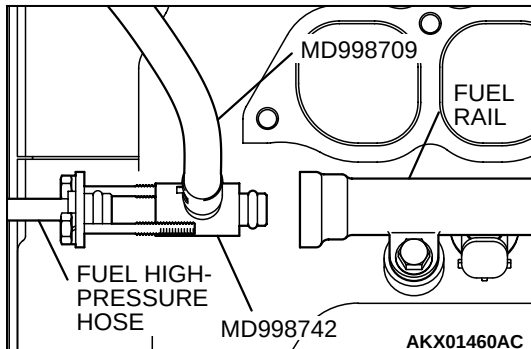
- MB991958: Scan tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B
- MB991637: Fuel Pressure Gauge Set
- MD998709: Adaptor Hose
- MD998742: Hose Adaptor

1. Release residual pressure from the fuel line to prevent fuel spray. (Refer to [P.13B-906](#).)

⚠ WARNING

To prevent a fire, cover the hose connection with shop towels to prevent splashing of fuel that could be caused by some residual pressure in the fuel pipe line.

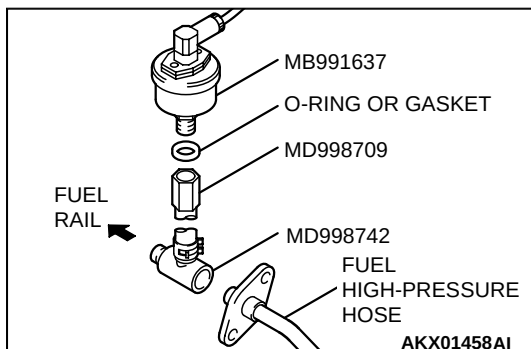
2. Disconnect the fuel high-pressure hose at the fuel rail side.
3. Assemble the fuel pressure measurement tools as follows.

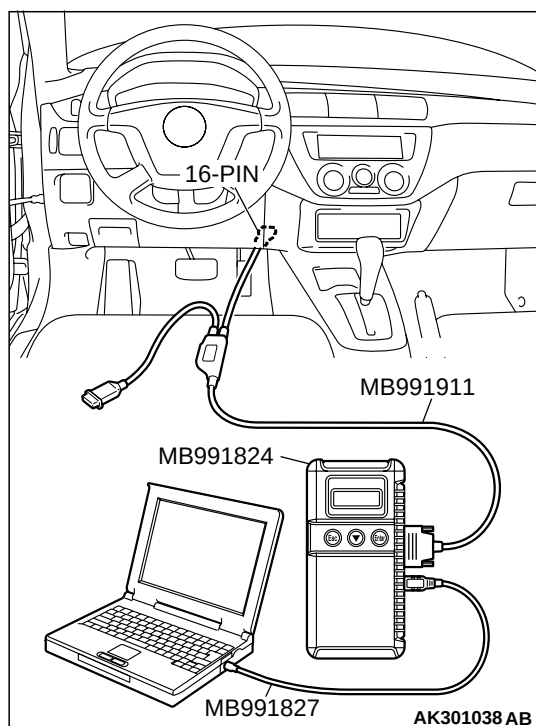
**<When using the fuel pressure gauge>**

1. Remove the union joint and bolt from special tool MD998709 (adapter hose) and instead attach special tool MD998742 (hose adapter) to the adapter hose.
2. Place a suitable O-ring or gasket on the assembled special tools MD998709 and MD998742 and install the fuel pressure gauge.
3. Install the assembled fuel pressure measurement tools between the fuel rail and fuel high-pressure hose.

<When using special tool MB991637 (fuel pressure gauge set)>

1. Remove the union joint and bolt from special tool MD998709 (adapter hose) and instead attach special tool MD998742 (hose adapter) to the adapter hose.
2. Install special tool MB991637 (fuel pressure gauge set) into assembled special tools MD998709 and MD998742 via a gasket.
3. Install the assembled fuel pressure measurement tools between the fuel rail and fuel high-pressure hose.





⚠ CAUTION

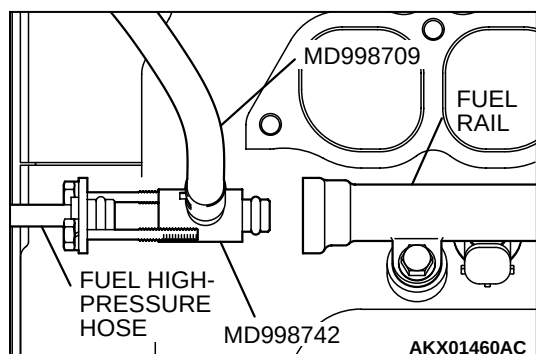
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

4. Connect scan tool MB991958 to the data link connector.
5. Use Actuator test 07 to drive the fuel pump. Check that there is no fuel leaking from any section when the fuel pump is operating.
6. Stop the fuel pump.
7. Start the engine and run at idle.
8. Measure fuel pressure while the engine is running at idle.
Standard value: Approximately 324 kPa (95.7 in.Hg) at curb idle
9. Check to see that fuel pressure at idle does not drop even after the engine has been revved several times.
10. If any of fuel pressure measured in steps 8 to 9 is out of specification, troubleshoot and repair according to the table below.

SYMPTOM	PROBABLE CAUSE	REMEDY
- Fuel pressure too low - Fuel pressure drops after racing	Clogged fuel filter	Replace fuel filter
	Fuel leaking to return side due to poor fuel regulator valve seating or settled spring	Replace fuel pressure regulator
	Low fuel pump delivery pressure	Replace fuel pump
Fuel pressure too high	Binding valve in fuel pressure regulator	Replace fuel pressure regulator

11. Stop the engine and observe fuel pressure gauge reading. It is normal if the reading does not drop within two minutes. If it does, observe the rate of drop and troubleshoot and repair according to the table below. Start, then stop the engine.
 - (1) Squeeze the fuel supply line closed to confirm leak-down occurs from defective fuel pump check valve.
 - (2) If pressure continues to drop with both fuel lines squeezed closed, injector(s) are leaking.

SYMPTOM	PROBABLE CAUSE	REMEDY
Fuel pressure drops gradually after engine is stopped	Leaky injector	Replace injector
	Leaky fuel regulator valve seat	Replace fuel pressure regulator
Fuel pressure drops sharply immediately after engine is stopped	Check valve in fuel pump is held open	Replace fuel pump



12. Release residual pressure from the fuel pipe line. (Refer to [P.13B-906.](#))

⚠ WARNING

Cover the hose connection with shop towels to prevent splash of fuel that could be caused by some residual pressure in the fuel pipe line.

13. Remove the fuel pressure gauge, and special tools MD998709, MD998742 and MB991637 from the fuel rail.

14. Replace the O-ring at the end of the fuel high-pressure hose with a new one.

15. Fit the fuel high-pressure hose into the fuel rail and tighten the bolts to specified torque.

Tightening torque: 5.0 ± 1.0 N·m (44 ± 8 in·lb)

16. Check for fuel leaks.

(1) Use scan tool MB991958 to operate the fuel pump.

(2) Check the fuel line for leaks and repair as needed.

17. Disconnect scan tool MB991958.

FUEL PUMP CONNECTOR DISCONNECTION (HOW TO REDUCE PRESSURIZED FUEL LINES)

M1131000900666

Refer to GROUP 13A, On-vehicle Service – Fuel Pump Relay Disconnection (How to Reduce Pressurized Fuel Lines)

[P.13A-908.](#)

FUEL PUMP OPERATION CHECK

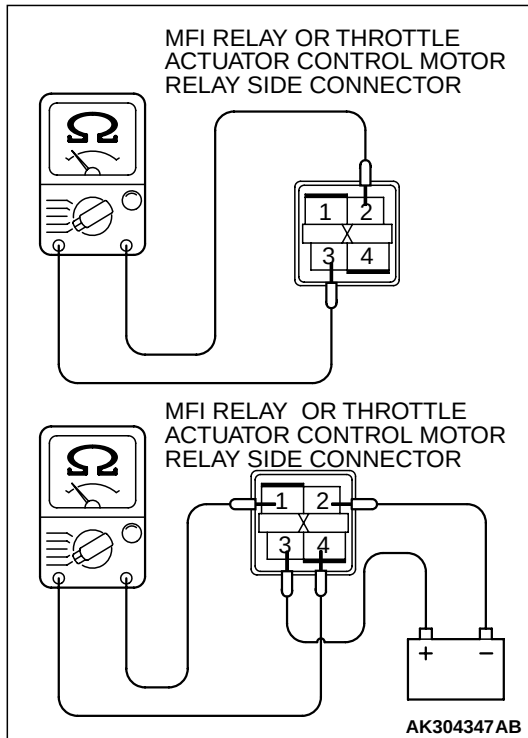
M1131002000733

Refer to GROUP 13A, On-vehicle Service – Fuel Pump Operation Check [P.13A-909.](#)

MULTIPOINT FUEL INJECTION (MFI) RELAY AND THROTTLE ACTUATOR CONTROL MOTOR RELAY CONTINUITY CHECK

M1131050000389

Inspect the MFI relay and throttle actuator control motor relay for continuity in accordance with the chart shown below.

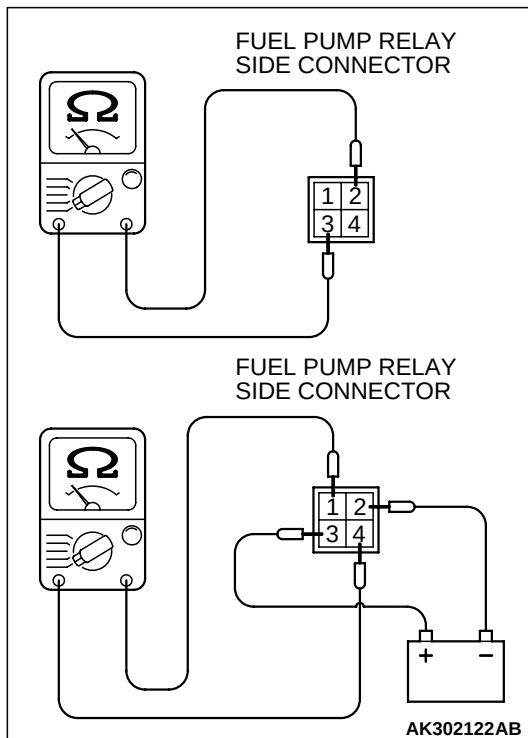


BATTERY VOLTAGE	TERMINAL NO. TO BE CONNECTED TO BATTERY	TERMINAL NO. TO BE CONDUCTED
Not supplied	–	2 – 3
Supplied	2 – 3	1 – 4

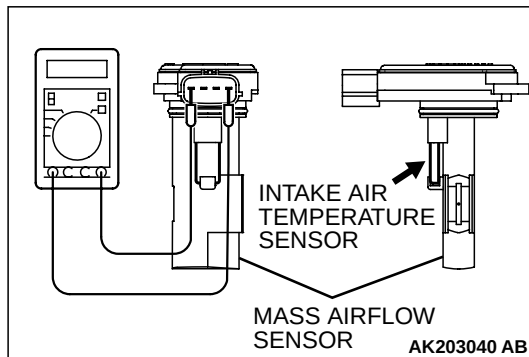
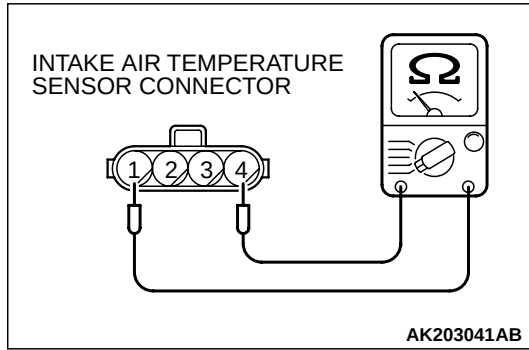
FUEL PUMP RELAY CONTINUITY CHECK

M1131033000397

Inspect the fuel pump relay for continuity in accordance with the chart shown below.



BATTERY VOLTAGE	TERMINAL NO. TO BE CONNECTED TO BATTERY	TERMINAL NO. TO BE CONDUCTED
Not supplied	–	2 – 3
Supplied	2 – 3	1 – 4

**INTAKE AIR TEMPERATURE SENSOR CHECK**

M1131002800609

1. Disconnect the mass airflow sensor connectors.
2. Measure resistance between terminal No. 1 and No. 4.

Standard value:

13 – 17 kΩ [at –20°C (–4°F)]
5.3 – 6.7 kΩ [at 0°C (32°F)]
2.3 – 3.0 kΩ [at 20°C (68°F)]
1.0 – 1.5 kΩ [at 40°C (104°F)]
0.56 – 0.76 kΩ [at 60°C (140°F)]
0.30 – 0.45 kΩ [at 80°C (176°F)]

3. If not within specifications, replace the mass airflow sensor.
4. Measure resistance while heating the sensor using a hair dryer.

Normal condition:

TEMPERATURE	RESISTANCE (kΩ)
Higher	Smaller

5. If resistance does not decrease as heat increases, replace the mass airflow sensor.

ENGINE COOLANT TEMPERATURE SENSOR CHECK

M1131003100562

CAUTION

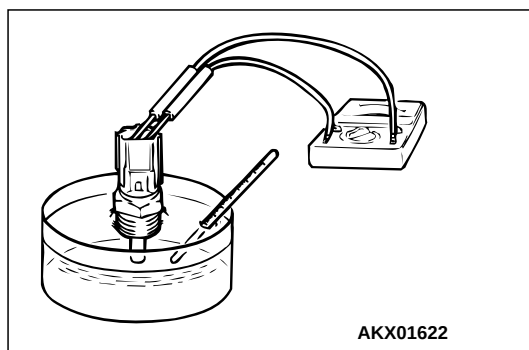
Be careful not to touch the connector (resin section) with the tool when removing and installing.

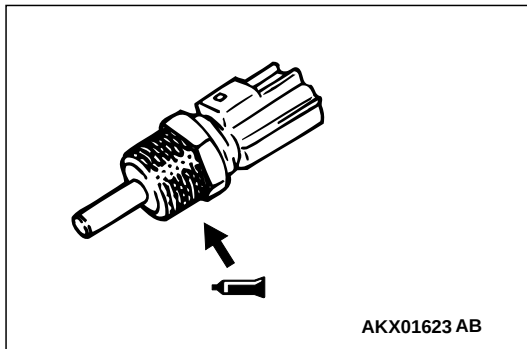
1. Drain engine coolant, then remove the engine coolant temperature sensor.
2. With the temperature sensing portion of engine coolant temperature sensor immersed in hot water, check the resistance.

Standard value:

14 – 17 kΩ [at –20°C (–4°F)]
5.1 – 6.5 kΩ [at 0°C (32°F)]
2.1 – 2.7 kΩ [at 20°C (68°F)]
0.9 – 1.3 kΩ [at 40°C (104°F)]
0.48 – 0.68 kΩ [at 60°C (140°F)]
0.26 – 0.36 kΩ [at 80°C (176°F)]

3. If resistance deviates from the standard value greatly, replace the sensor.



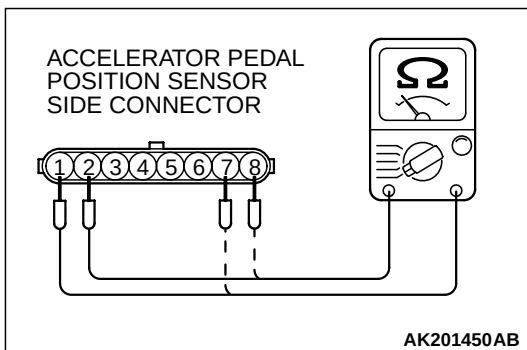


4. Apply 3M™ AAD part number 8731 or equivalent to threaded portion.
5. Install the engine coolant temperature sensor and tighten it to the specified torque.

Tightening torque: 30 ± 9 N·m (22 ± 7 ft-lb)

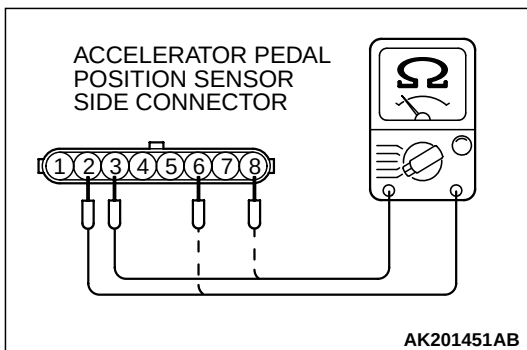
ACCELERATOR PEDAL POSITION SENSOR CHECK

M1131003400068



1. Disconnect the accelerator pedal position sensor connector.
2. Measure the resistance between accelerator pedal position sensor connector terminal No. 1 [accelerator pedal position sensor (main) earth] and terminal No. 2 [accelerator pedal position sensor (main) power supply], and between terminal No. 7 [accelerator pedal position sensor (sub) earth] and terminal No. 8 [accelerator pedal position sensor (sub) power supply].

Standard value: 3.5 – 6.5 kΩ



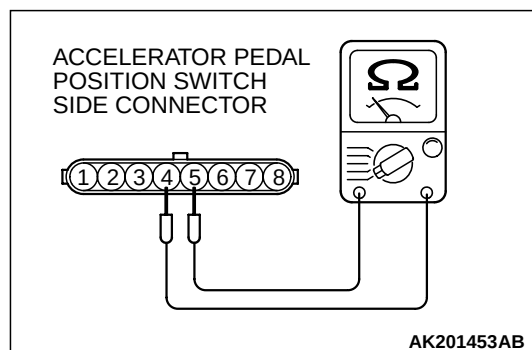
3. Measure the resistance between accelerator pedal position sensor connector terminal No. 2 [accelerator pedal position sensor (main) power supply] and terminal No. 3 [accelerator pedal position sensor (main) output]; and between terminal No. 8 [accelerator pedal position sensor (sub) power supply] and terminal No. 6 [accelerator pedal position sensor (sub) output].

Normal condition:

When accelerator pedal is gently depressed	Changes comparatively smoothly in proportion to the accelerator pedal depression amount.
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4. If the measured values are outside the standard value range, or if the resistance does not change smoothly, replace the accelerator pedal position sensor.

NOTE: After replacement, adjust the accelerator pedal position switch and accelerator pedal position sensor. (Refer to P.13B-901.)



ACCELERATOR PEDAL POSITION SWITCH CHECK

M1131052500067

1. Disconnect the accelerator pedal position sensor connector.
2. Check continuity between terminal No. 4 (accelerator pedal position switch) and No. 5 (sensor earth) of the connector.

Normal condition:

Accelerator pedal	Continuity
Depressed	No continuity
Released	Continuity (0 kΩ)

3. If defective, replace the accelerator pedal position sensor assembly.

NOTE: After replacement, adjust the accelerator pedal position switch and accelerator pedal position sensor. (Refer to P.13B-901.)

HEATED OXYGEN SENSOR CHECK

M1131005000743

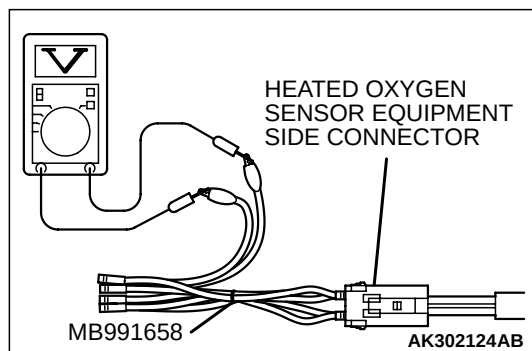
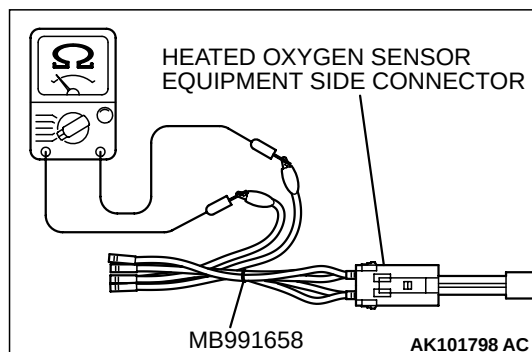
Required Special Tools:

- MB991958: Scan Tool (MUT-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: USB Cable
 - MB991911: Main Harness B
- MB991658: Test Harness

<Heated oxygen sensor (rear)>

1. Using the scan tool MB991958, observe HO₂S reading. If values are unsatisfactory, or if Scan tool is not available, use the following procedure:
 - (1) Disconnect the heated oxygen sensor connector and connect special tool MB991658 to the connector on the heated oxygen sensor side.
 - (2) Make sure that there is continuity [11 – 18 ohms at 20°C (68° F)] between terminal No. 1 and terminal No. 3 on the heated oxygen sensor connector.
 - (3) If there is no continuity, replace the heated oxygen sensor.
 - (4) Warm up the engine until engine coolant is 80° C (176°F) or higher.
 - (5) Perform a revving for 5 minutes or more with the engine speed of 4,500 r/min.
 - (6) Connect a digital voltage meter between terminal No. 4 and terminal No. 2.
2. While repeatedly revving the engine, measure the heated oxygen sensor output voltage.

Standard value:



ENGINE	HEATED OXYGEN SENSOR OUTPUT VOLTAGE	REMARKS
When revving engine	0.6 – 1.0 volt	If you make the air/fuel ratio rich by revving the engine repeatedly, a normal heated oxygen sensor will output a voltage of 0.6 – 1.0 volt.

⚠ CAUTION

- Be very careful when connecting the jumper wire; incorrect connection can damage the heated oxygen sensor.
- Be careful the heater is broken when voltage of beyond 12 volts is applied to the heated oxygen sensor heater.

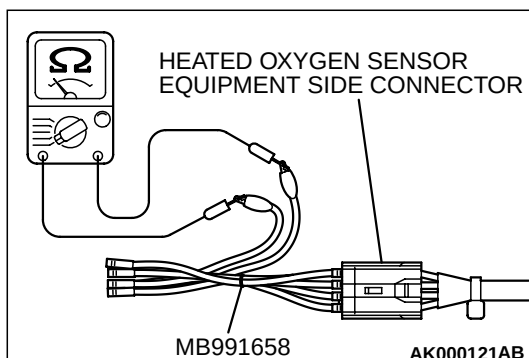
NOTE: If the sufficiently high temperature [of approximate 400°C (752°F) or more] is not reached although the heated oxygen sensor is normal, the output voltage would be possibly low although the rich air/fuel ratio. Therefore, if the output voltage is low, use jumper wires to connect the terminal No. 1 and the terminal No. 3 of the heated oxygen sensor with a (+) terminal and (-) terminal of 12 volts power supply respectively, then check again.

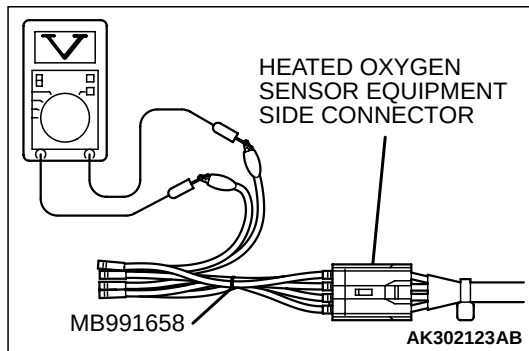
3. If the output voltage is not within the standard value, replace the heated oxygen sensor.

NOTE: For removal and installation of the heated oxygen sensor, refer to GROUP 15, Exhaust Pipe and Main Muffler P.15-13.

<Heated oxygen sensor (front)>

1. Using the scan tool MB991958, observe HO₂S reading. If values are unsatisfactory, or if Scan tool is not available, use the following procedure:
 - (1) Disconnect the heated oxygen sensor connector and connect special tool MB991658 to the connector on the heated oxygen sensor side.
 - (2) Make sure that there is continuity [4.5 – 8.0 ohms at 20°C (68°F)] between terminal No. 3 and terminal No. 4 on the heated oxygen sensor connector.
 - (3) If there is no continuity, replace the heated oxygen sensor.
 - (4) Warm up the engine until engine coolant is 80°C (176°F) or higher.





- (5) Perform a revving for 5 minutes or more with the engine speed of 4,500 r/min.
- (6) Connect a digital voltage meter between terminal No. 1 and terminal No. 2.

2. While repeatedly revving the engine, measure the heated oxygen sensor output voltage.

Standard value:

ENGINE	HEATED OXYGEN SENSOR OUTPUT VOLTAGE	REMARKS
When revving engine	0.6 – 1.0 volt	If you make the air/fuel ratio rich by revving the engine repeatedly, a normal heated oxygen sensor will output a voltage of 0.6 – 1.0 volt.

⚠ CAUTION

- Be very careful when connecting the jumper wire; incorrect connection can damage the heated oxygen sensor.
- Be careful the heater is broken when voltage of beyond 8 volts is applied to the heated oxygen sensor heater.

NOTE: If the sufficiently high temperature [of approximate 400°C (752°F) or more] is not reached although the heated oxygen sensor is normal, the output voltage would be possibly low although the rich air/fuel ratio. Therefore, if the output voltage is low, use jumper wires to connect the terminal No. 4 and the terminal No. 3 of the heated oxygen sensor with a (+) terminal and (-) terminal of 8 volts power supply respectively, then check again.

3. If the output voltage is not within the standard value, replace the heated oxygen sensor.

NOTE: For removal and installation of the heated oxygen sensor, refer to GROUP 15, Exhaust Pipe and Main Muffler

[P.15-13.](#)

INJECTOR CHECK

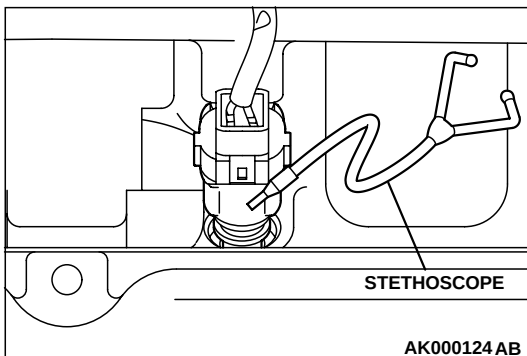
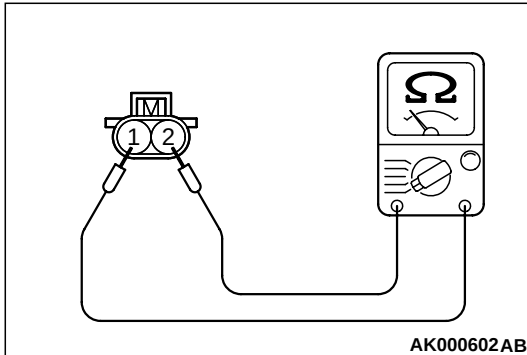
M1131005200576

Measurement of Resistance between Terminals

1. Disconnect the injector connector.
2. Measure resistance between terminals.

Standard value: 10.5 – 13.5 ohms [at 20°C (68°F)]

3. If not within specification, replace the injector.
4. Install the injector connector.



Checking operation sound

Using a stethoscope or long blade screwdriver, check the operation sound ("tick-tick-tick") of injectors during idling or during cranking. Check that as the engine speed increases, the frequency of the operating sound also increases.

1. If the injector you are checking is not operating, you may hear the operating sound of the other injectors.
2. If no operating sound is heard from the injector that is being checked, check the injector drive circuit. If there is nothing wrong with the circuit, a defective injector or engine control module (ECM) <M/T> or powertrain control module (PCM) <A/T> is suspected.

THROTTLE ACTUATOR CONTROL MOTOR CHECK

M1131051000111

<Operation Inspection>

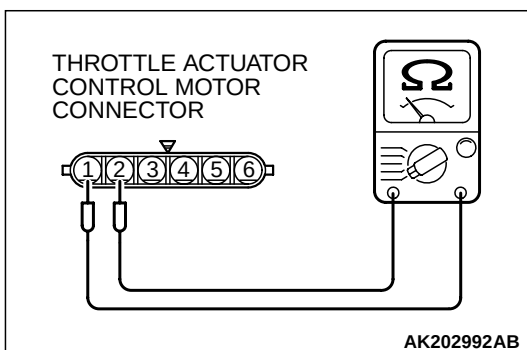
1. Disconnect the air intake hose from the throttle body.
2. Set the ignition switch to the "ON" position.
3. Operate the accelerator pedal and confirm that the throttle valve is opening and closing accordingly.

<Checking the Terminal Resistance>

1. Disconnect the throttle position sensor connector.
2. Measure the resistance between terminal No. 1 and No. 2.

Standard value: 0.3 – 80 ohms [at 20°C (68°F)]

3. If resistance is outside the standard value, replace the throttle body assembly.



ENGINE OIL CONTROL VALVE CHECK

M1131053200081

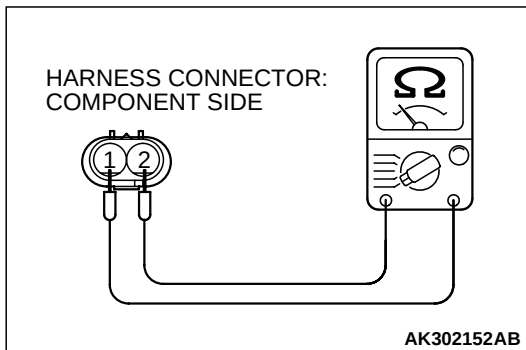
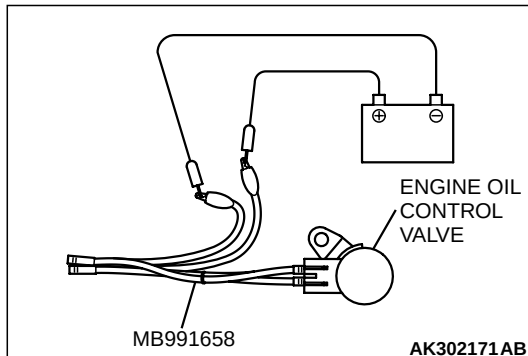
Checking the Operation Sound

1. Disconnect the engine oil control valve connector.

⚠ CAUTION

To prevent the coil from burning, keep the duration of the voltage application as short as possible.

2. Check that the operation sound of the engine oil control valve can be heard when the positive battery voltage is supplied to the engine oil control valve. (Use the jumper wires to connect terminal No. 2 of the engine oil control valve connector to the positive battery terminal and terminal No. 1 to the negative battery terminal.)
3. If the operation sound cannot be heard, replace the engine oil control valve.

**Checking the Coil Resistance**

1. Disconnect the engine oil control valve connector.
2. Measure resistance between terminal No. 1 and terminal No. 2 of the connector at the engine oil control valve side.

Standard value: 6.9 – 7.9 ohms [at 20°C (68°F)]

3. If resistance is not within the standard value, replace the engine oil control valve.

EVAPORATIVE EMISSION PURGE SOLENOID CHECK

M1131005600284

Refer to GROUP 17, Emission Control System – Evaporative Emission Control System – Evaporative Emission Purge Solenoid Check [P.17-218](#).

EVAPORATIVE EMISSION VENTILATION SOLENOID CHECK

M1131012800268

Refer to GROUP 17, Emission Control System – Evaporative Emission Canister and Fuel Tank Pressure Relief Valve – Evaporative Emission Canister and Fuel Tank Pressure Relief Valve Inspection [P.17-231](#).

EGR VALVE CHECK

M1131051500064

Refer to GROUP 17, Emission Control System – Exhaust Gas Recirculation (EGR) System – EGR Valve Check. [P.17-226](#)

INJECTOR

REMOVAL AND INSTALLATION

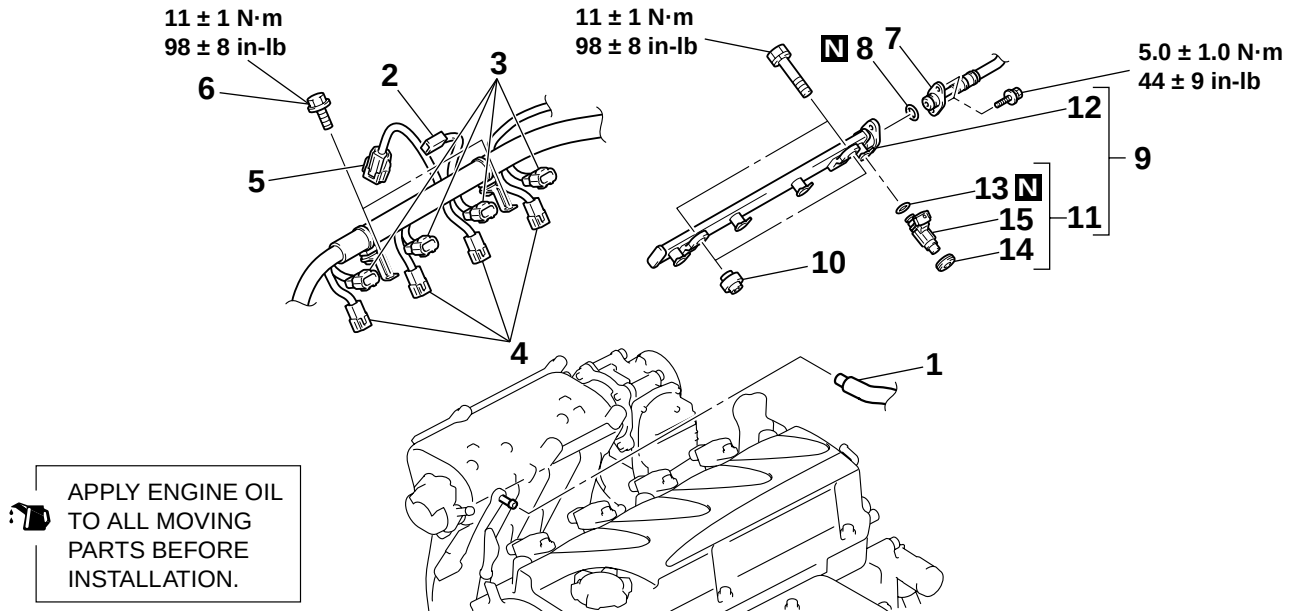
M1131007100780

Pre-removal Operation

- Fuel Discharge Prevention (Refer to P.13B-906).
- Air Cleaner Removal (Refer to GROUP 15, Air Cleaner P.15-4).

Post-installation Operation

- Air Cleaner Installation (Refer to GROUP 15, Air Cleaner P.15-4).
- Fuel Leakage Inspection.



AC304160AB

REMOVAL STEPS

- PCV HOSE CONNECTION
- CAPACITOR CONNECTOR
- IGNITION COIL CONNECTORS
- INJECTOR CONNECTORS
- EGR VALVE CONNECTOR
- ROCKER COVER BRACKET
INSTALLATION BOLTS
- FUEL HIGH-PRESSURE HOSE
CONNECTION
- O-RING

<<A>>

>>B<<

>>A<<

REMOVAL STEPS (Continued)

- FUEL RAIL AND INJECTOR
ASSEMBLY
- INSULATORS
- INJECTOR ASSEMBLY
- FUEL RAIL
- O-RING
- GROMMETS
- INJECTORS

REMOVAL SERVICE POINT

<<A>> FUEL RAIL AND INJECTOR ASSEMBLY REMOVAL

⚠ CAUTION

Do not drop the injector.

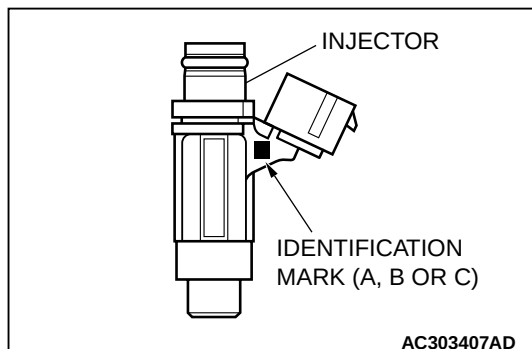
Remove the fuel rail with the injectors attached to it.

INSTALLATION SERVICE POINT

>>A<< INJECTORS INSTALLATION

 CAUTION

- The injectors are classified into A, B and C by the injection quantity. When replacing one of injectors, use a same identification mark injector as the other injectors.
- When replacing the injectors of all cylinders, use the same identification mark injectors.



>>B<< INJECTOR ASSEMBLY/FUEL HIGH-PRESSURE HOSE INSTALLATION

 CAUTION

- Do not kink the fuel high-pressure hose as it is made of plastics.
 - Do not let the engine oil get into the fuel rail.
1. Apply a drop of new engine oil to the O-ring.
 2. Turn the injector to the right and left to install to the fuel rail. Repeat for fuel high-pressure hose. Be careful not to damage the O-ring. After installing, check that the item turns smoothly.
 3. If it does not turn smoothly, the O-ring may be trapped, remove the item, re-install it into the fuel rail and check again.
 4. Tighten the fuel high-pressure hose to the specified torque.

Tightening torque: 5.0 ± 1.0 N·m (44 ± 9 in-lb)

THROTTLE BODY ASSEMBLY

REMOVAL AND INSTALLATION

M1131007700685

CAUTION

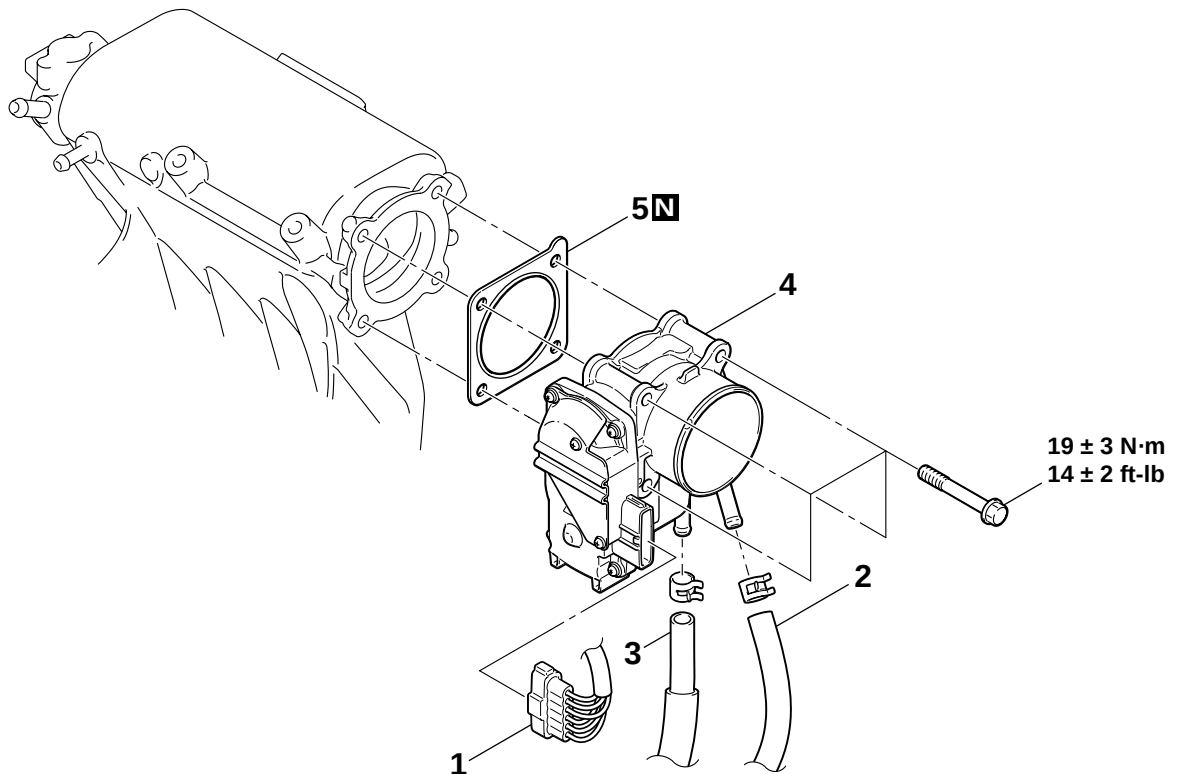
Do not loosen the fixing screws for the resin cover of throttle body assembly. If the screws are loosened, the sensor incorporated in the resin cover becomes misaligned and the throttle body can not work normally.

Pre-removal Operation

- Engine Coolant Draining [Refer to GROUP 00, Maintenance Service – Engine Coolant (Change) [P.00-56](#)].
- Air Cleaner Removal (Refer to GROUP 15, Air Cleaner [P.15-4](#)).

Post-installation Operation

- Air Cleaner Installation (Refer to GROUP 15, Air Cleaner [P.15-4](#)).
- Engine Coolant Refilling [Refer to GROUP 00, Maintenance Service – Engine Coolant (Change) [P.00-56](#)].



AC304161AB

REMOVAL STEPS

1. THROTTLE POSITION SENSOR CONNECTOR
2. WATER RETURN HOSE CONNECTION

REMOVAL STEPS (Continued)

3. WATER FEED HOSE CONNECTION
4. THROTTLE BODY ASSEMBLY
5. THROTTLE BODY GASKET

>>A<<

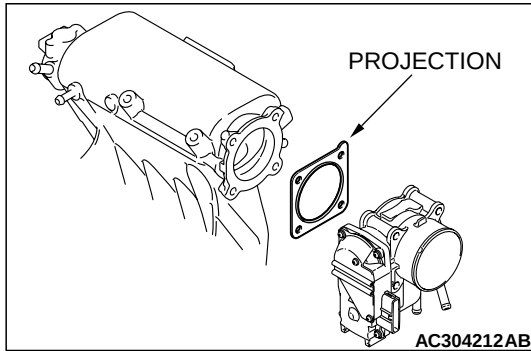
INSTALLATION SERVICE POINT

>>A<< THROTTLE BODY GASKET INSTALLATION

 CAUTION

Poor idling etc. may result if the throttle body gasket is installed incorrectly.

Install the gasket as its protrusion is in the direction shown.



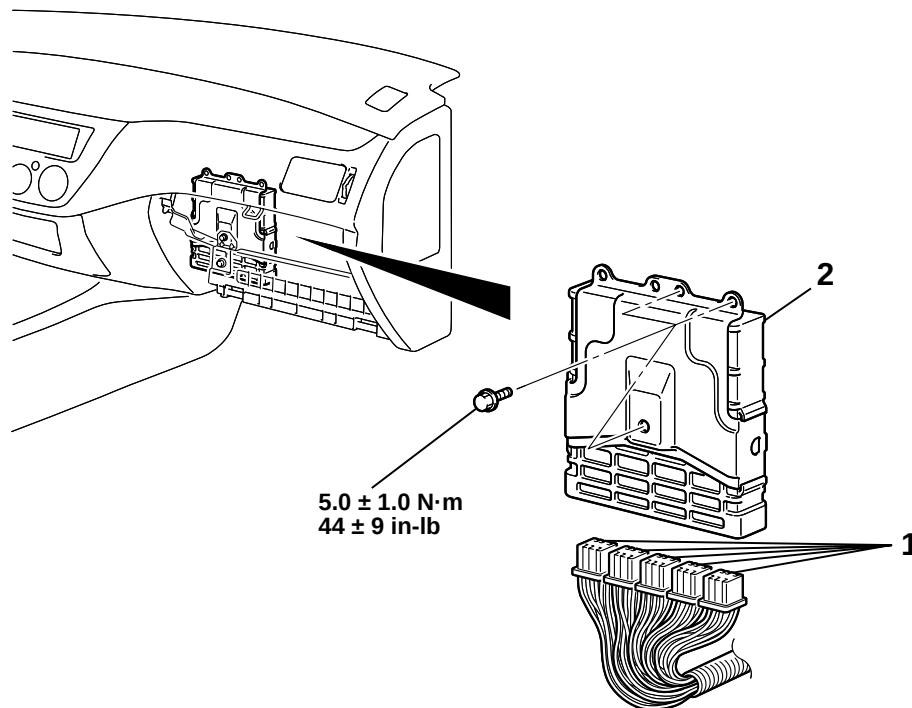
ENGINE CONTROL MODULE (ECM) AND POWERTRAIN CONTROL MODULE (PCM)

REMOVAL AND INSTALLATION

M1131022500031

Pre-removal and Post-installation Operation

- Glove Box Assembly Removal and Installation (Refer to GROUP 52A, INTERIOR P.52A-3.)
- Harness Cover Removal and Installation (Refer to GROUP 52A, INTERIOR P.52A-3.)



AC305536AB

REMOVAL STEPS

1. ECM <M/T> OR PCM <A/T>
CONNECTORS
2. ECM <M/T> OR PCM <A/T>

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATION S

M1131011600540

ITEM	SPECIFICATION
Fuel rail mounting bolt	11 ± 1 N·m (98 ± 8 in-lb)
Fuel high-pressure hose bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)
Rocker cover bracket bolt	11 ± 1 N·m (98 ± 8 in-lb)
Throttle body mounting bolt	19 ± 3 N·m (14 ± 2 ft-lb)
ECM (M/T) or PCM (A/T) bracket bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)

GENERAL SPECIFICATION(S)

M1131000200623

ITEM	SPECIFICATION
Throttle body	Throttle bore mm (in.)
	60 (2.4)
	Throttle position sensor
Engine control module (ECM) <M/T>	Throttle actuator control motor
	Hall element type
	DC motor type, having brushes
Powertrain control module (PCM) <A/T>	Identification model No.
	E6T34885
	E6T37976
Sensors	Identification model No.
	Mass airflow sensor
	Heat sensitizing type
	Barometric pressure sensor
	Semiconductor type
	Intake air temperature sensor
	Thermistor type
	Engine coolant temperature sensor
	Thermistor type
	Heated oxygen sensor
	Zirconia type
	Accelerator pedal position sensor
	Variable resistor type
	Accelerator pedal position switch
	Contact switch type
Actuators	Transmission range switch
	Contact switch type
	Camshaft position sensor
	Magneto resistance element type
	Crankshaft position sensor
	Magneto resistance element type
	Knock sensor
	Piezoelectric type
	Power steering pressure switch
	Contact switch type
	Manifold absolute pressure sensor
	Semiconductor type
	Engine oil pressure switch
	Contact switch type
	Multiport fuel injection (MFI) relay
	Contact switch type
	Fuel pump relay
	Contact switch type
	Throttle actuator control motor relay
	Contact switch type
	Injector type and number
	Electromagnetic type, 4
	Injector identification mark
	HDA305E
	Engine oil control valve
	Duty cycle type solenoid valve
	Exhaust gas recirculation valve
	Stepper motor type
	Evaporative emission purge solenoid
	Duty cycle type solenoid valve

SERVICE SPECIFICATIONS

M1131000300749

ITEM		STANDARD VALUE
Fuel pressure kPa (in.Hg)		Approximately 324 (95.7) at curb idle
Intake air temperature sensor resistance kΩ	−20°C (−4°F)	13 – 17
	0°C (32°F)	5.3 – 6.7
	20°C (86°F)	2.3 – 3.0
	40°C (104°F)	1.0 – 1.5
	60°C (140°F)	0.56 – 0.76
	80°C (176°F)	0.30 – 0.45
Engine coolant temperature sensor resistance kΩ	−20°C (−4°F)	14 – 17
	0°C (32°F)	5.1 – 6.5
	20°C (86°F)	2.1 – 2.7
	40°C (104°F)	0.9 – 1.3
	60°C (140°F)	0.48 – 0.68
	80°C (176°F)	0.26 – 0.36
Accelerator pedal position sensor resistance kΩ		3.5 – 6.5 [at 20°C (68°F)]
Heated oxygen sensor output voltage V		0.6 – 1.0
Heated oxygen sensor heater resistance Ω	<Front>	4.5 – 8.0 [at 20°C (68°F)]
	<Rear>	11 – 18 [at 20°C (68°F)]
Injector coil resistance Ω		10.5 – 13.5 [at 20°C (68°F)]
Throttle actuator control motor coil resistance Ω		0.3 – 80 [at 20°C (68°F)]
Engine oil control valve coil resistance Ω		6.9 – 7.9 [at 20°C (68°F)]

SEALANT AND ADHESIVE

M1131000500475

ITEM	SPECIFIED SEALANT
Engine coolant temperature sensor threaded portion	3M™ AAD part number 8731 or equivalent

NOTES