

GROUP 15

INTAKE AND EXHAUST

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GENERAL DESCRIPTION

M1151000100446

The exhaust pipe is divided into four parts.

INTAKE AND EXHAUST DIAGNOSIS

INTRODUCTION

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Intake leaks usually create driveability issues that are not obviously related to the intake system. Exhaust leaks or abnormal noise is caused by cracks, gaskets and fittings, or by exhaust pipe or muffler damage due to impacts during travel. The exhaust leaks from these sections and causes the exhaust noise to increase. There may be cases when the system contacts the body and vibration noise is generated.

TROUBLESHOOTING STRATEGY

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Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find an intake or exhaust system fault.

1. Gather information from the customer.

2. Verify that the condition described by the customer exists.
3. Find the malfunction by following the Symptom Chart.
4. Verify malfunction is eliminated.

SYMPTOM CHART

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SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Exhaust Leakage	1	P.15-2
Abnormal Noise	2	P.15-3

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: Exhaust Leakage

DIAGNOSIS

STEP 1. Start the engine. Have an assistant stay in the driver's seat. Raise the vehicle on a hoist. Have the assistant rev the engine while searching for exhaust leaks.

Q: Is the exhaust leaking?

YES : Go to Step 2.

NO : The procedure is complete.

STEP 2. Check the gasket for cracks, damage.

Q: Is the gasket damaged?

YES : Replace the gasket, then go to Step 1.

NO : Go to Step 3.

STEP 3. Check for loosening in each coupling section.

Q: Is there any loosening in any section?

YES : Tighten, then go to Step 1.

NO : There is no action to be taken.

INSPECTION PROCEDURE 2: Abnormal Noise

DIAGNOSIS

STEP 1. Start the engine. Have an assistant stay in the drivers seat. Raise the vehicle on a hoist. Have the assistant rev the engine while searching for exhaust leaks.

Q: Is any abnormal noise generated?
YES : Go to Step 2.
NO : The procedure is complete.

STEP 2. Check for missing parts in the muffler. Tap the muffler lightly to check for loose baffles, etc.

Q: Are there any missing parts in the muffler?
YES : Replace, then go to Step 1.
NO : Go to Step 3.

STEP 3. Check the hanger for cracks.

Q: Is the hanger cracked?
YES : Replace, then go to Step 1.
NO : Go to Step 4.

STEP 4. Check for interference of the pipes and muffler with the body.

Q: Are the pipes and muffler interfering with the body?
YES : Repair, then go to Step 1.
NO : Go to Step 5.

STEP 5. Check the heat protectors.

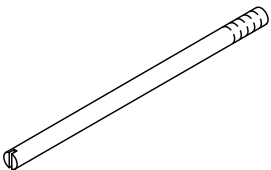
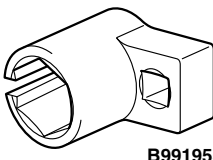
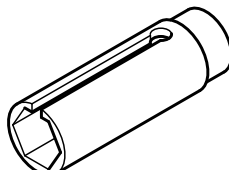
Q: Are any heat protectors loose or damaged?
YES : Tighten or replace, then go to Step 1.
NO : Go to Step 6.

STEP 6. Check the pipes and muffler for damage.

Q: Are the pipes and muffler damaged?
YES : Replace, then go to Step 1.
NO : There is no action to be taken.

SPECIAL TOOLS

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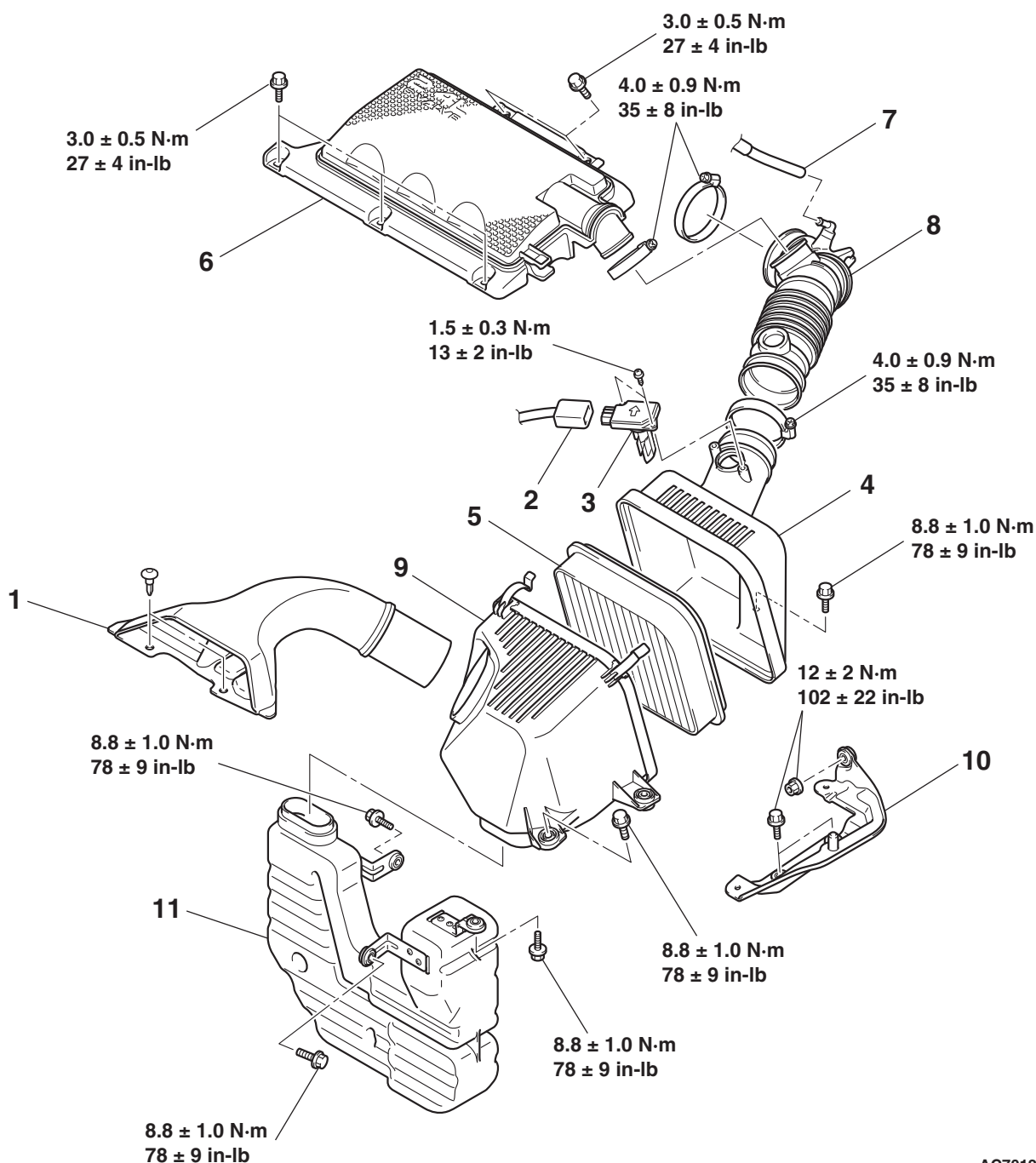
TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
	MD998412 Guide	MD998412	Installation of intake manifold plenum
	MB991953 Oxygen sensor wrench	-	Removal and installation of heated oxygen sensor
	MD998770 Oxygen sensor wrench	MD998770-01 or General service tool	Removal and installation of heated oxygen sensor

AIR CLEANER

REMOVAL AND INSTALLATION

M1151002102998

<2.4L ENGINE>



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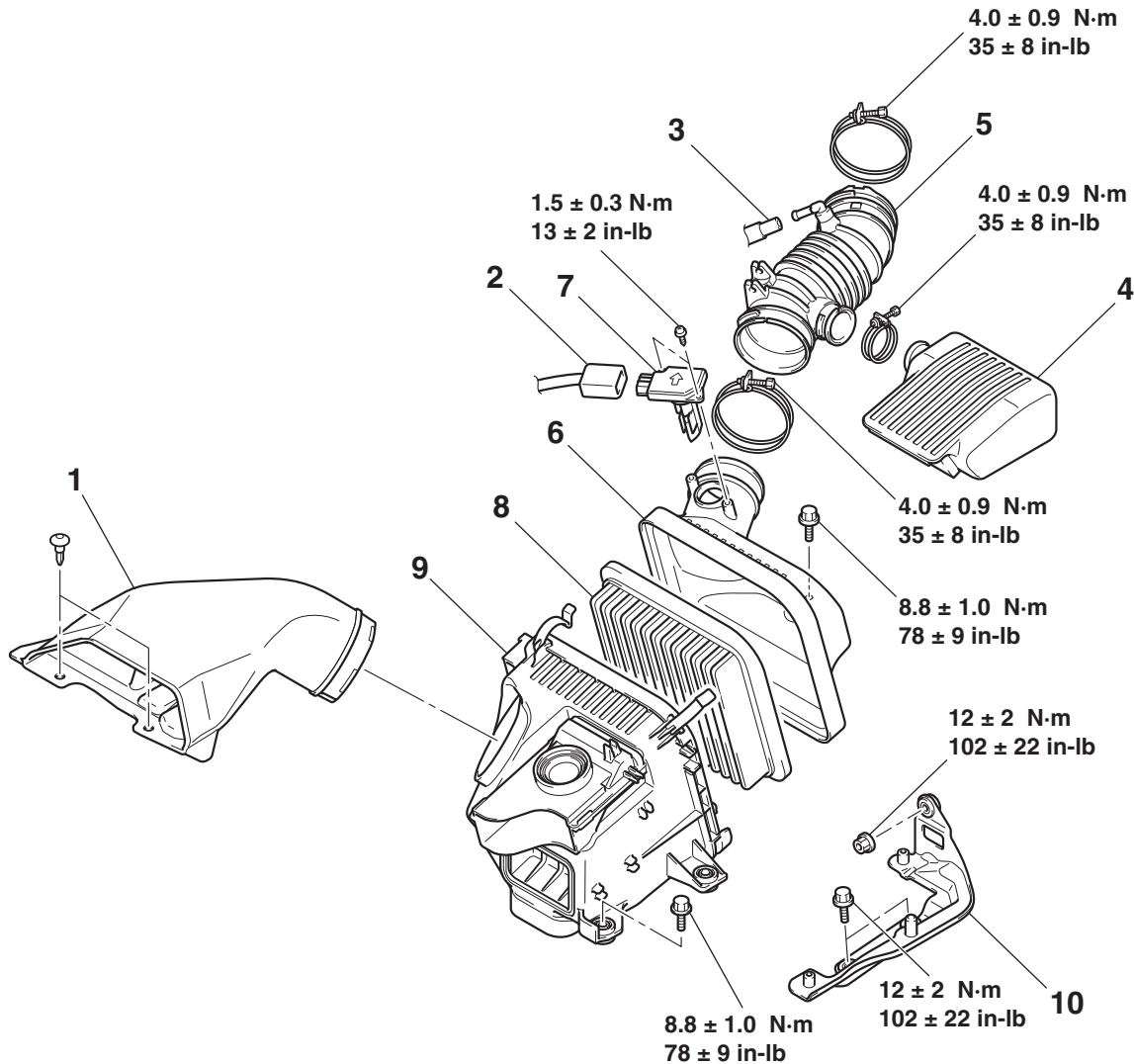
REMOVAL STEPS

1. AIR CLEANER INTAKE DUCT
2. MASS AIRFLOW SENSOR CONNECTOR
3. MASS AIRFLOW SENSOR
4. AIR CLEANER COVER
5. AIR CLEANER ELEMENT
6. AIR CLEANER RESONATOR
7. BREATHER HOSE CONNECTION
8. AIR INTAKE HOSE

REMOVAL STEPS (Continued)

- POWERTRAIN CONTROL MODULE (PCM) [REFER TO GROUP 13A, POWERTRAIN CONTROL MODULE (PCM) [P.13A-1236](#)].
- 9. AIR CLEANER BODY
- 10. AIR CLEANER BRACKET
- UNDER COVER (LH)
- 11. AIR CLEANER RESONATOR

<3.8L ENGINE>



AC708766AD

REMOVAL STEPS

1. AIR CLEANER INTAKE DUCT
2. MASS AIRFLOW SENSOR CONNECTOR
3. BREATHER HOSE CONNECTION
4. AIR CLEANER RESONATOR
5. AIR CLEANER TO THROTTLE BODY DUCT

REMOVAL STEPS (Continued)

- POWERTRAIN CONTROL MODULE (PCM) [REFER TO GROUP 13B, POWERTRAIN CONTROL MODULE (PCM) [P.13B-1264](#)].
- 6. AIR CLEANER COVER
- 7. MASS AIRFLOW SENSOR
- 8. AIR CLEANER ELEMENT
- 9. AIR CLEANER BODY
- 10. AIR CLEANER BRACKET

REMOVAL AND INSTALLATION <3.8L ENGINE>

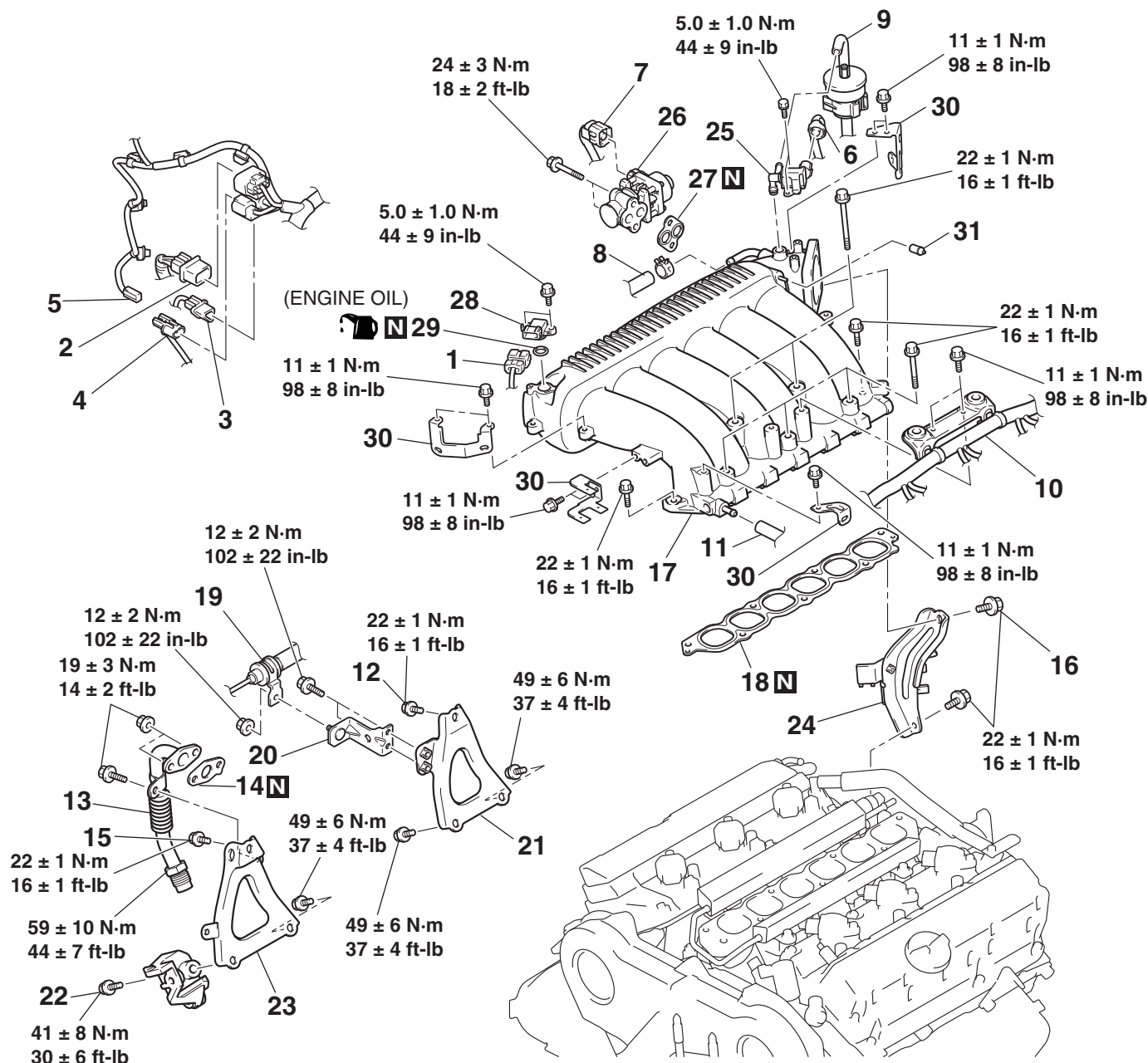
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Pre-removal Operation

- Engine Coolant Draining (Refer to GROUP 14, On-vehicle Service –Engine Coolant Replacement [P.14-7](#)).
- Engine Cover Removal (Refer to GROUP 11E, Engine Assembly [P.11E-22](#)).
- Strut Tower Bar Removal (Refer to GROUP 42, Strut Tower Bar [P.42-14](#)).
- Air Cleaner Cover and Air Cleaner to Throttle Body Duct Removal (Refer to [P.15-4](#)).
- Throttle Body Removal (Refer to GROUP 13B, Throttle Body [P.13B-1263](#)).

Post-installation Operation

- Throttle Body Installation (Refer to GROUP 13B, Throttle Body [P.13B-1263](#)).
- Air Cleaner Cover and Air Cleaner to Throttle Body Duct Installation (Refer to [P.15-4](#)).
- Strut Tower Bar Installation (Refer to GROUP 42, Strut Tower Bar [P.42-14](#)).
- Engine Cover Installation (Refer to GROUP 11E, Engine Assembly [P.11E-22](#)).
- Engine Coolant Supplying (Refer to GROUP 14, On-vehicle Service –Engine Coolant Replacement [P.14-7](#)).



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- | REMOVAL STEPS | | REMOVAL STEPS (Continued) |
|---|----------------|--|
| 1. MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR | >> B << | 17. INTAKE MANIFOLD PLENUM |
| 2. CONTROL WIRING HARNESS AND INJECTOR WIRING HARNESS COMBINATION CONNECTOR | | 18. INTAKE MANIFOLD PLENUM GASKET |
| 3. CRANKSHAFT POSITION SENSOR CONNECTOR | | 19. POWER STEERING PRESSURE HOSE CLAMP |
| 4. KNOCK SENSOR CONNECTOR | | 20. POWER STEERING PRESSURE HOSE CLAMP BRACKET |
| 5. POWER STEERING PRESSURE SWITCH CONNECTOR | | 21. INTAKE MANIFOLD PLENUM STAY (REAR) |
| 6. EVAPORATIVE EMISSION PURGE SOLENOID CONNECTOR | | • STEERING GEAR AND LINKAGE PROTECTOR (REFER TO GROUP 37, STEERING GEAR BOX AND LINKAGE P.37-35). |
| 7. EGR VALVE CONNECTOR | | • POWER STEERING OIL PUMP (REFER TO GROUP 37, POWER STEERING OIL PUMP ASSEMBLY P.37-57). |
| 8. BRAKE BOOSTER VACUUM HOSE CONNECTION | | 22. POWER STEERING OIL PUMP BRACKET CONNECTING BOLT |
| 9. EVAPORATIVE EMISSION PURGE HOSE CONNECTION | | 23. INTAKE MANIFOLD PLENUM STAY (FRONT) |
| 10. CONTROL WIRING HARNESS AND ENGINE COVER BRACKET ASSEMBLY | | 24. THROTTLE BODY STAY |
| 11. PCV HOSE CONNECTION | | 25. EVAPORATIVE EMISSION PURGE SOLENOID |
| 12. INTAKE MANIFOLD PLENUM STAY (REAR) CONNECTING BOLT | >> A << | 26. EGR VALVE |
| 13. EGR PIPE | | 27. EGR VALVE GASKET |
| 14. EGR PIPE GASKET | | 28. MANIFOLD ABSOLUTE PRESSURE SENSOR |
| 15. INTAKE MANIFOLD PLENUM STAY (FRONT) CONNECTING BOLT | | 29. O-RING |
| 16. THROTTLE BODY STAY CONNECTING BOLT | | 30. HARNESS BRACKET |
| | | 31. CAP |

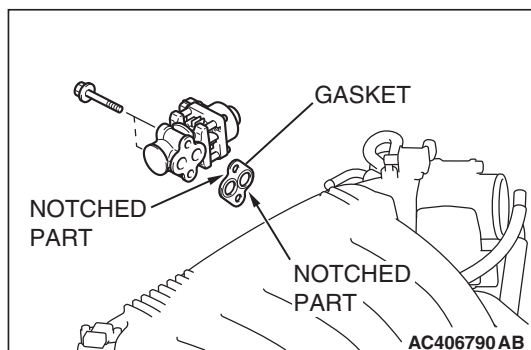
Required Special Tool:

- MD998412: Guide

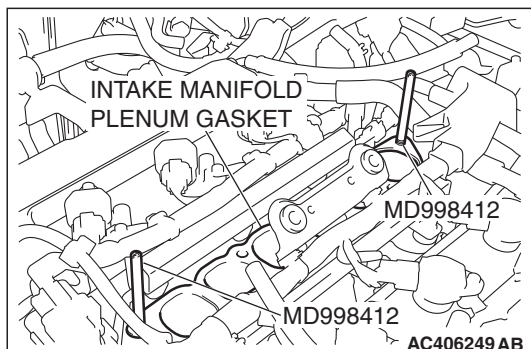
INSTALLATION SERVICE POINTS

>>A<< EGR VALVE GASKET INSTALLATION

Install the EGR valve gasket as shown in the illustration.

>>B<< INTAKE MANIFOLD PLENUM
INSTALLATION

Use special tool MD998412 to install the intake manifold plenum.



REMOVAL AND INSTALLATION <2.4L ENGINE>

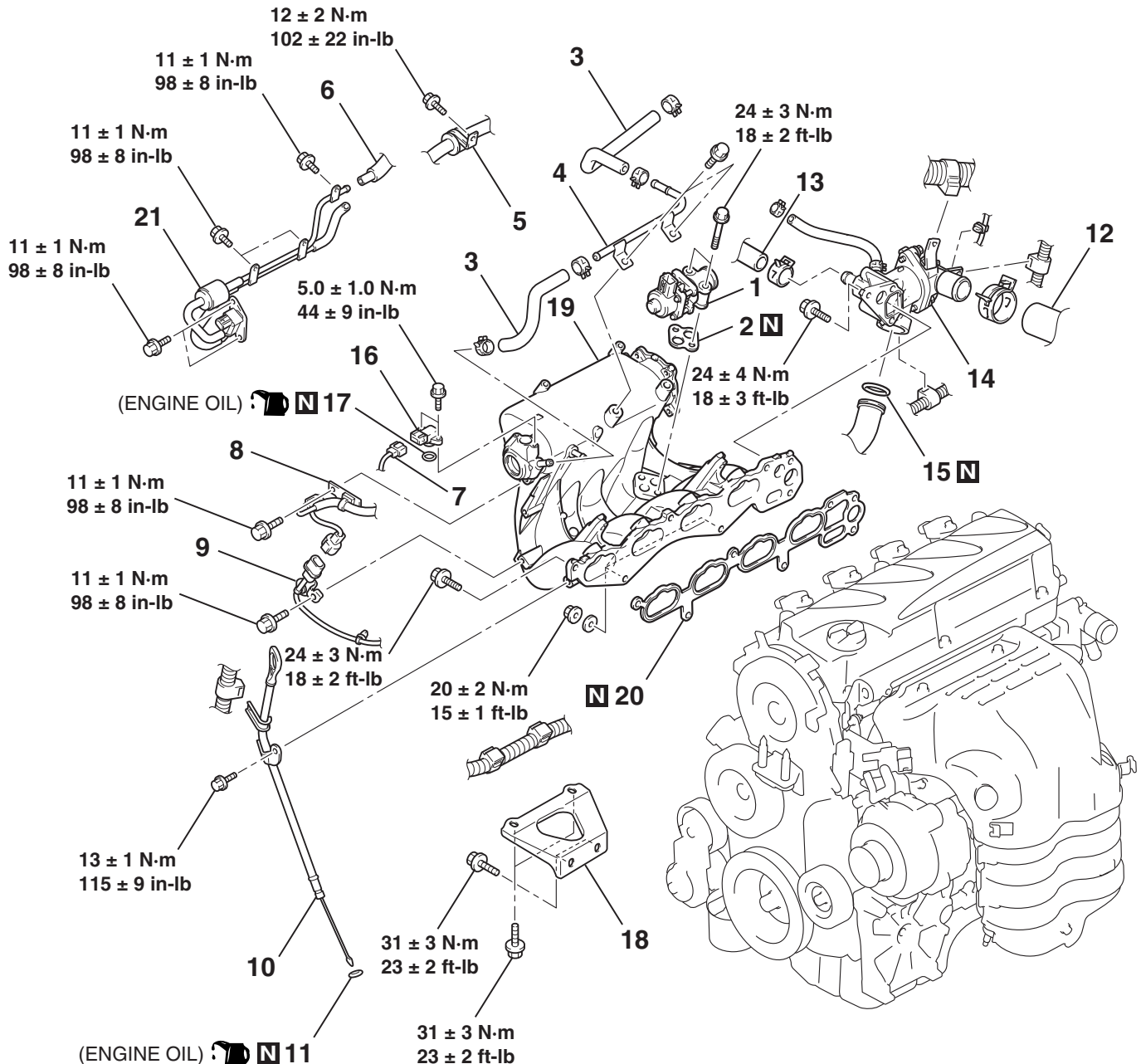
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Pre-removal Operation

- Fuel Line Pressure Reduction (Refer to GROUP 13A, On-vehicle Service –Reduce Pressurized Fuel Lines [P.13A-1220](#)).
- Engine Coolant Draining (Refer to GROUP 14, On-vehicle Service –Engine Coolant Replacement [P.14-7](#)).
- Air Cleaner Cover and Air Intake Hose Removal (Refer to [P.15-4](#)).
- Throttle Body Removal (Refer to GROUP 13A, Throttle Body [P.13A-1234](#)).
- Fuel Rail and Fuel Injector Assembly Removal (Refer to GROUP 13A, Injector [P.13A-1231](#)).

Post-installation Operation

- Fuel Rail and Fuel Injector Assembly Installation (Refer to GROUP 13A, Injector [P.13A-1231](#)).
- Throttle Body Installation (Refer to GROUP 13A, Throttle Body [P.13A-1234](#)).
- Air Cleaner Cover and Air Intake Hose Installation (Refer to [P.15-4](#)).
- Engine Coolant Refilling (Refer to GROUP 14, On-vehicle Service –Engine Coolant Replacement [P.14-7](#)).



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REMOVAL STEPS

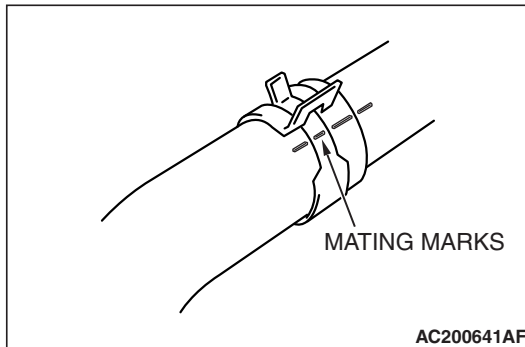
1. EGR VALVE
- >>D<< 2. EGR VALVE GASKET
- >>C<< 3. BRAKE BOOSTER VACUUM HOSE
4. BRAKE BOOSTER VACUUM PIPE
5. PRESSURE HOSE CLAMP
6. EVAPORATIVE EMISSION VACUUM HOSE CONNECTION
7. MANIFOLD ABSOLUTE PRESSURE SENSOR CONNECTOR
8. HARNESS CRAMP
9. KNOCK SENSOR CONNECTOR BRACKET
10. ENGINE OIL DIPSTICK AND DIPSTICK GUIDE
11. O-RING

REMOVAL STEPS (Continued)

- <<A>> >>B<< 12. RADIATOR LOWER HOSE CONNECTION
13. HEATER WATER HOSE CONNECTION
- >>A<< 14. THERMOSTAT CASE ASSEMBLY
15. O-RING
16. MANIFOLD ABSOLUTE PRESSURE SENSOR
17. O-RING
18. INTAKE MANIFOLD STAY
19. INTAKE MANIFOLD
20. INTAKE MANIFOLD GASKET
21. EVAPORATIVE EMISSION PURGE SOLENOID VALVE, EVAPORATIVE EMISSION VACUUM HOSE AND PIPE ASSEMBLY

REMOVAL SERVICE POINT**<<A>> RADIATOR LOWER HOSE DISCONNECTION**

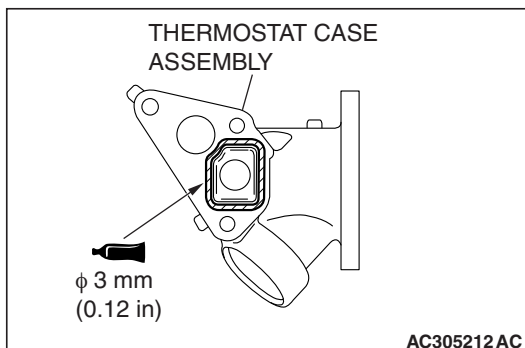
Make mating marks on the radiator lower hose and the hose clip as shown to install them in the original position. Disconnect the radiator lower hose.

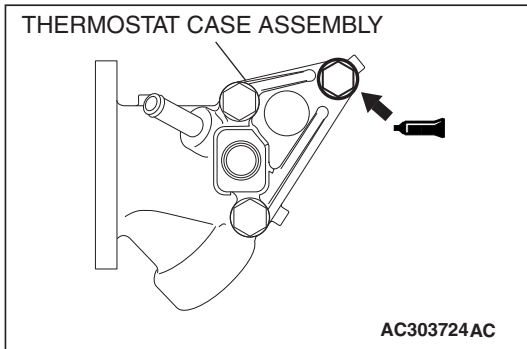
**INSTALLATION SERVICE POINTS****>>A<< THERMOSTAT CASE ASSEMBLY INSTALLATION**

1. Use a gasket scraper or wire brush to completely eliminate all gasket material on the gasket mounting surface.
2. Apply a bead of the sealant to the cylinder head mating surface of the thermostat case assembly as shown.

Specified Sealant: 3M™ AAD Part No.8672, 3M™ AAD part No.8679/8678 or equivalent

NOTE: Install the thermostat case assembly immediately after applying sealant.





3. Apply sealant to the thread of the thermostat case assembly mounting bolt as shown.

Specified Sealant: 3M™ AAD Part No.8730, 8731 or equivalent

NOTE: Install the thermostat case assembly mounting bolt immediately after applying sealant.

⚠ CAUTION

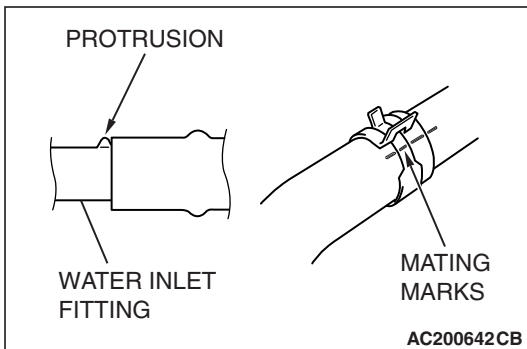
After the installation, until a sufficient period of time (one hour or more) elapses, do not apply the engine oil or water to the sealant application area or start the engine.

4. Tighten the thermostat case assembly mounting bolts to the specified torque.

Tightening torque: 24 ± 4 N·m (18 ± 3 ft-lb)

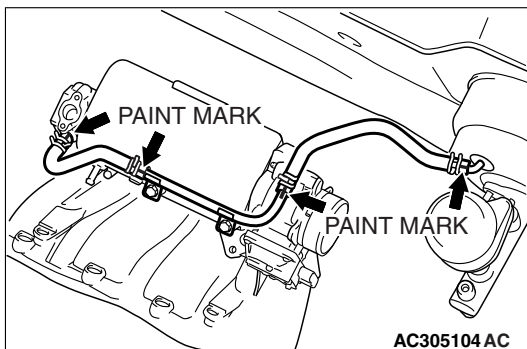
>>B<< RADIATOR LOWER HOSE CONNECTION

1. Insert radiator lower hose as far as the protrusion of the water inlet fitting.
2. Align the mating marks on the radiator lower hose and hose clip, and then connect the radiator lower hose.



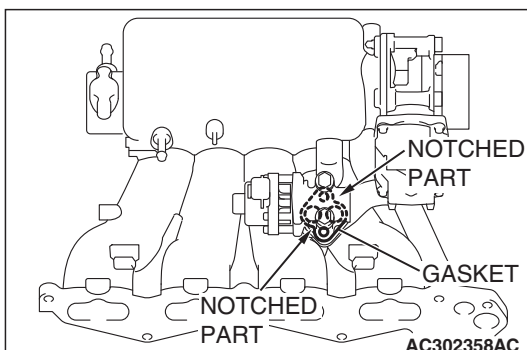
>>C<< BRAKE BOOSTER VACUUM HOSE CONNECTION

Insert vacuum hose with its paint mark facing upward.



>>D<< EGR VALVE GASKET INSTALLATION

Install the EGR valve gasket as shown in the illustration.



REMOVAL AND INSTALLATION <3.8L ENGINE>

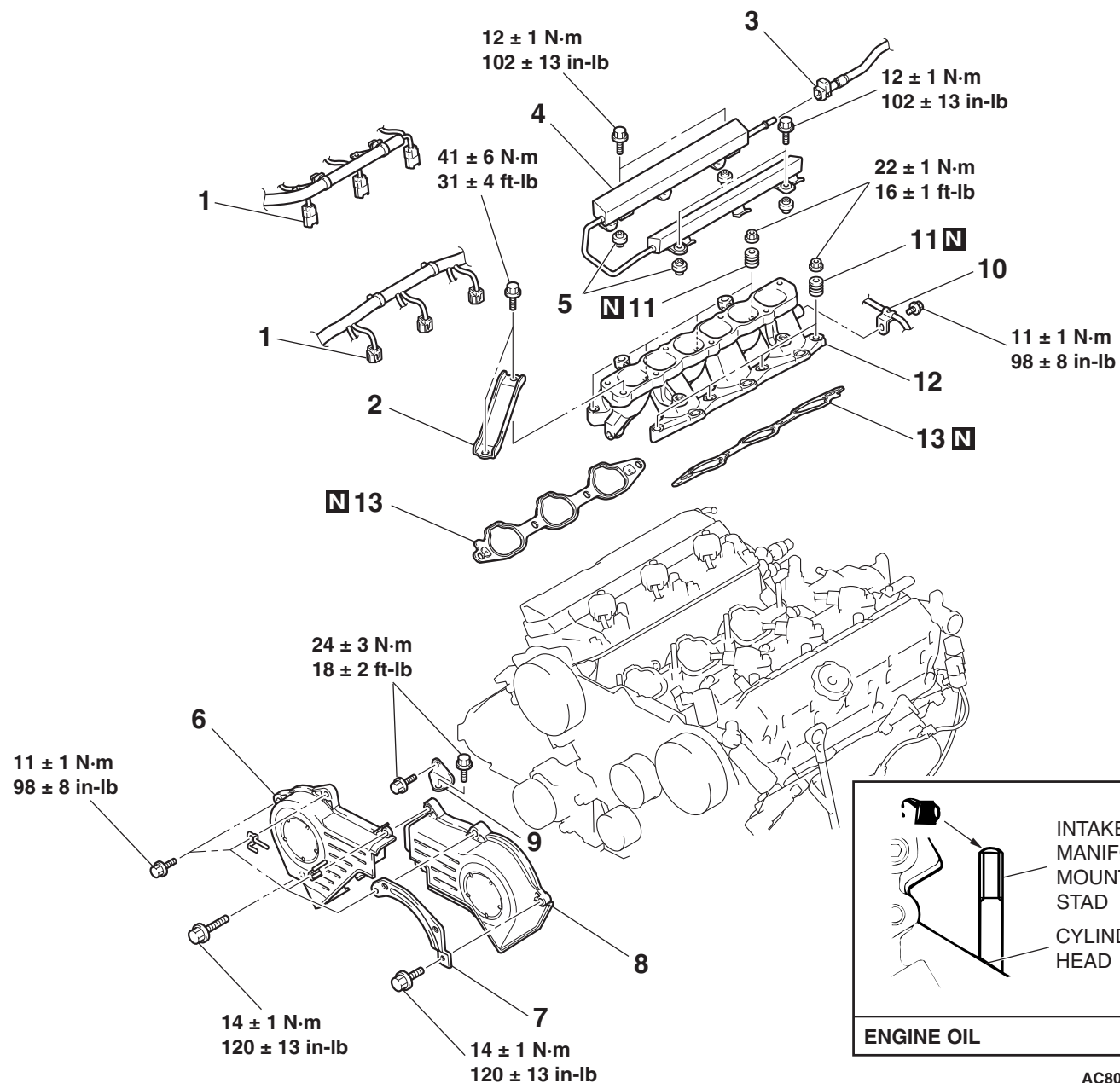
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Pre-removal Operation

- Fuel Line Pressure Reduction (Refer to GROUP 13B, On-vehicle Service –Reduce Pressurized Fuel Lines P.13B-1252).
- Intake Manifold Plenum Removal (Refer to P.15-6).

Post-installation Operation

- Intake Manifold Plenum Installation (Refer to P.15-6).
- Fuel Leakage Inspection



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REMOVAL STEPS

- <<A>> >>D<<
<> >>C<<
1. INJECTOR CONNECTOR
 2. ENGINE MOUNTING STAY
 3. FUEL HIGH-PRESSURE HOSE CONNECTION
 4. FUEL RAIL AND FUEL INJECTOR ASSEMBLY
 5. INSULATOR
 6. TIMING BELT FRONT UPPER COVER, RIGHT
 7. HARNESS BRACKET

REMOVAL STEPS (Continued)

- >>B<<
>>A<<
8. TIMING BELT FRONT UPPER COVER, LEFT
 9. WATER PUMP BRACKET
 10. OIL FEEDER CONTROL VALVE PIPE CONNECTION
 11. INTAKE MANIFOLD DISC SPRING
 12. INTAKE MANIFOLD
 13. INTAKE MANIFOLD GASKET

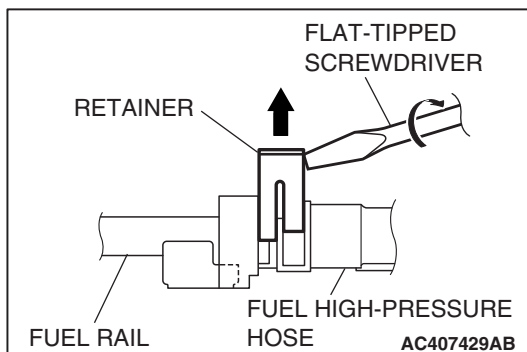
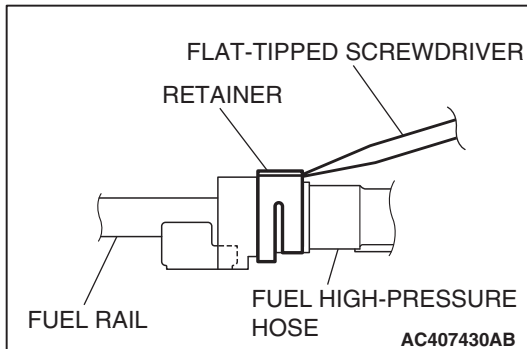
REMOVAL SERVICE POINTS

<<A>> FUEL HIGH-PRESSURE HOSE DISCONNECTION

CAUTION

Do not kink the fuel high-pressure hose as it is made of plastic and will become damaged.

1. Insert a flat-tipped screwdriver [width 6 mm (0.24 inch), thickness 1 mm (0.04 inch)] to the retainer.
2. Turn the flat-tipped screwdriver approximately 90 degrees to the arrowed direction, and lift the retainer to unlock and disconnect the fuel high-pressure hose.



<> FUEL RAIL AND FUEL INJECTOR ASSEMBLY REMOVAL

CAUTION

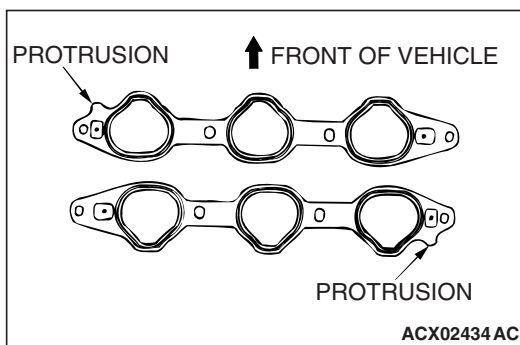
Care must be taken when removing the fuel rail not to drop the injector.

Remove the fuel rail with the injectors attached to it.

INSTALLATION SERVICE POINTS

>>A<< INTAKE MANIFOLD GASKET INSTALLATION

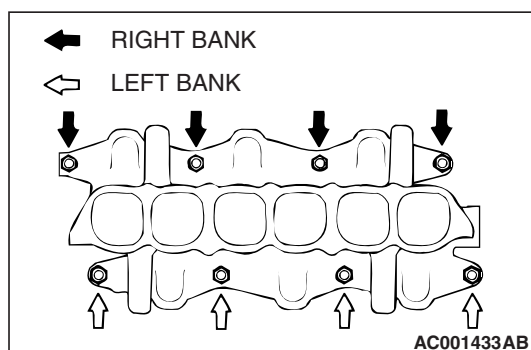
Install the gasket with the protrusions in the position illustrated.



>>B<< INTAKE MANIFOLD INSTALLATION

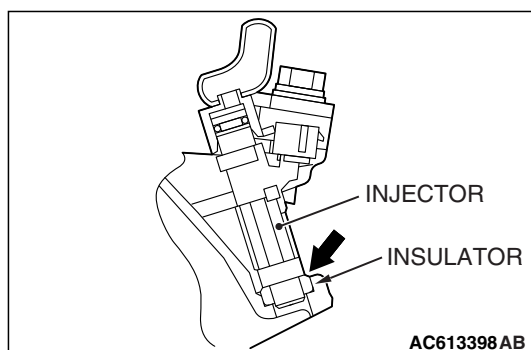
1. Coat the intake manifold mounting studs with engine oil.
2. Tighten the intake manifold mounting nuts by the following procedure.

ORDER	MOUNTING NUTS	TIGHTENING TORQUE
1st	Right-bank nuts	$6.5 \pm 1.5 \text{ N} \cdot \text{m}$ ($58 \pm 13 \text{ in-lb}$)
2nd	Left-bank nuts	$22 \pm 1 \text{ N} \cdot \text{m}$ ($16 \pm 1 \text{ ft-lb}$)
3rd	Right-bank nuts	$22 \pm 1 \text{ N} \cdot \text{m}$ ($16 \pm 1 \text{ ft-lb}$)
4th	Left-bank nuts	$22 \pm 1 \text{ N} \cdot \text{m}$ ($16 \pm 1 \text{ ft-lb}$)
5th	Right-bank nuts	$22 \pm 1 \text{ N} \cdot \text{m}$ ($16 \pm 1 \text{ ft-lb}$)

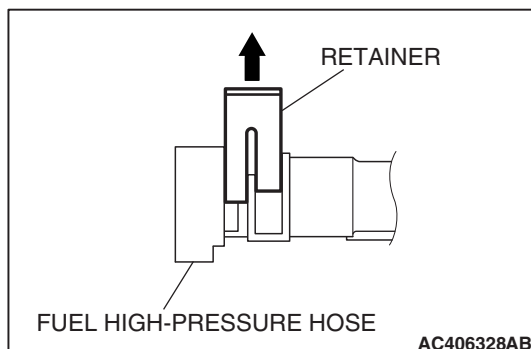
>>C<< FUEL RAIL AND FUEL INJECTOR
ASSEMBLY INSTALLATION**⚠ CAUTION**

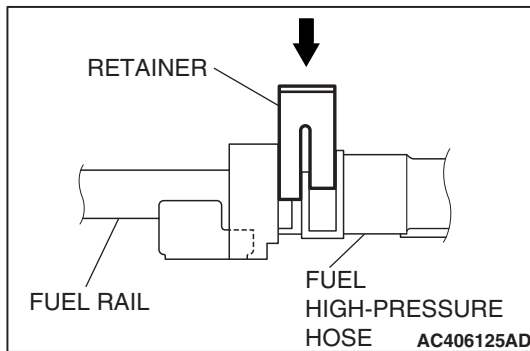
Securely bring the insulator into contact with the injector to prevent air leak from the insulator area.

Be sure that there is no clearance between the insulator area and the injector, and install them to the intake manifold.

>>D<< FUEL HIGH-PRESSURE HOSE
CONNECTION

1. Pull up the lock of fuel high-pressure hose to unlock before installing.





2. Install the fuel high-pressure hose to the fuel rail securely and push the lock of fuel high-pressure hose downward and lock thoroughly.
3. After installing, slightly pull the fuel high-pressure hose and ensure that there is no disengaged fuel high-pressure hose. Also confirm that there is approximately 1 mm (0.04 inch) play at this time.

INSPECTION

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Check the following points; replace the part if a problem is found.

Intake Manifold Check

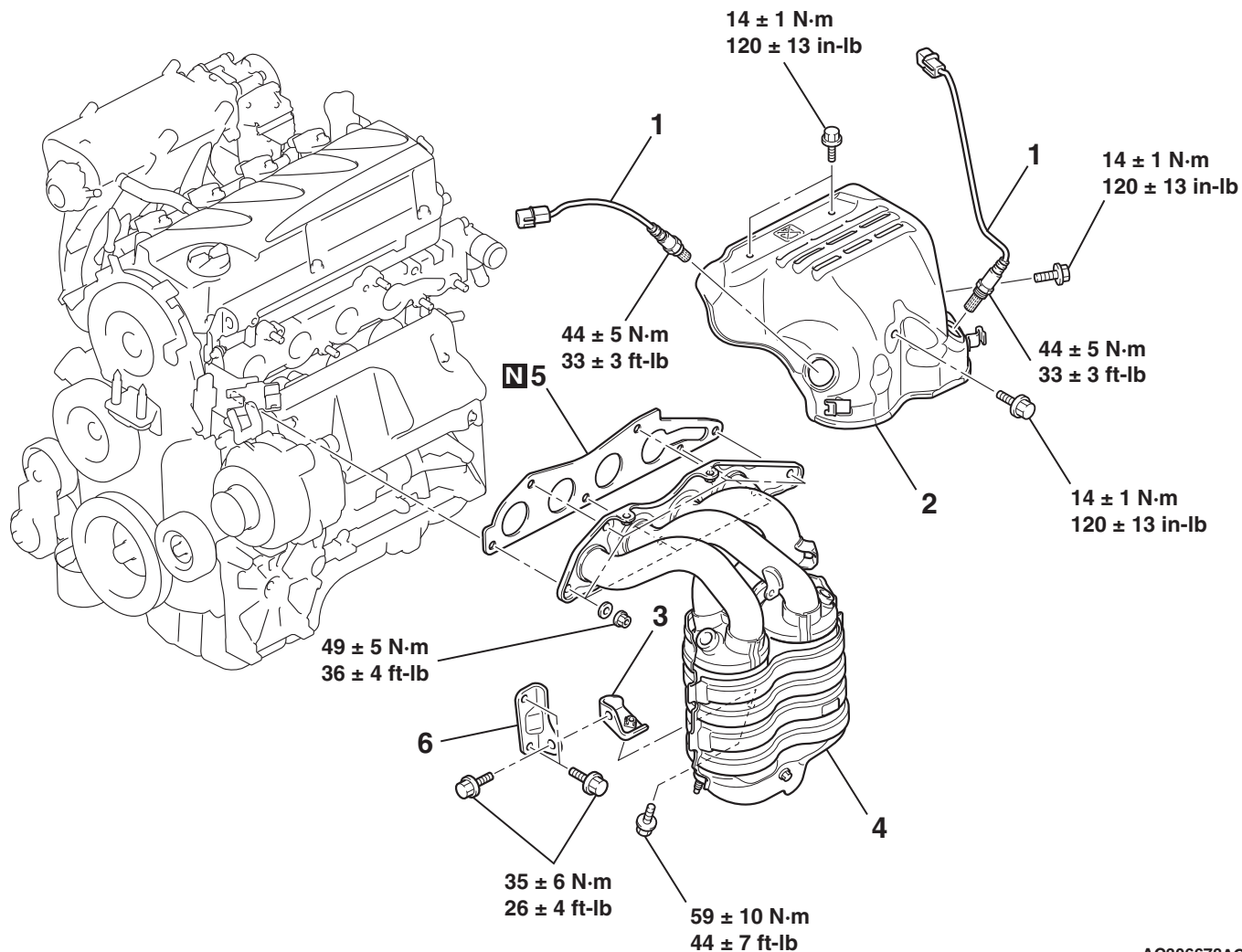
1. Check for damage or cracking of any part.
2. Clogging of the negative pressure (vacuum) outlet port, or clogging of the exhaust gas recirculation passages.
3. Using a straight edge and feeler gauge, check for distortion of the cylinder head installation surface.

Standard value: 0.15 mm (0.006 inch) or less

Limit: 0.20 mm (0.008 inch)

EXHAUST MANIFOLD**REMOVAL AND INSTALLATION <2.4L ENGINE>**

M1151003301237



AC306678AC

REMOVAL STEPS

- <<A>> >>A<<
1. HEATED OXYGEN SENSOR
 2. EXHAUST MANIFOLD COVER
 - FRONT NO.1 EXHAUST PIPE (REFER TO [P.15-22](#)).
 3. EXHAUST MANIFOLD BRACKET B

REMOVAL STEPS (Continued)

4. EXHAUST MANIFOLD
5. EXHAUST MANIFOLD GASKET
6. EXHAUST MANIFOLD BRACKET A

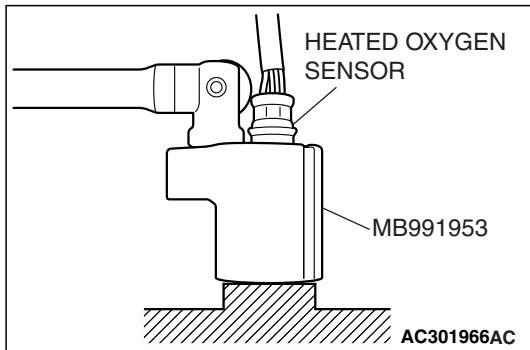
Required Special Tool:

- MB991953: Oxygen Sensor Wrench

REMOVAL SERVICE POINT

<<A>> HEATED OXYGEN SENSOR REMOVAL

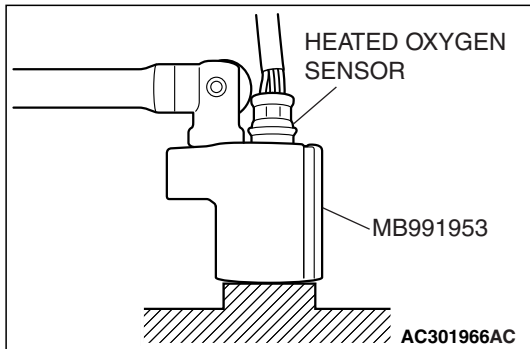
Use special tool MB991953 to remove the heated oxygen sensor.



INSTALLATION SERVICE POINT

>>A<< HEATED OXYGEN SENSOR INSTALLATION

Use special tool MB991953 to install the heated oxygen sensor.



REMOVAL AND INSTALLATION <3.8L ENGINE>

M1151003302575

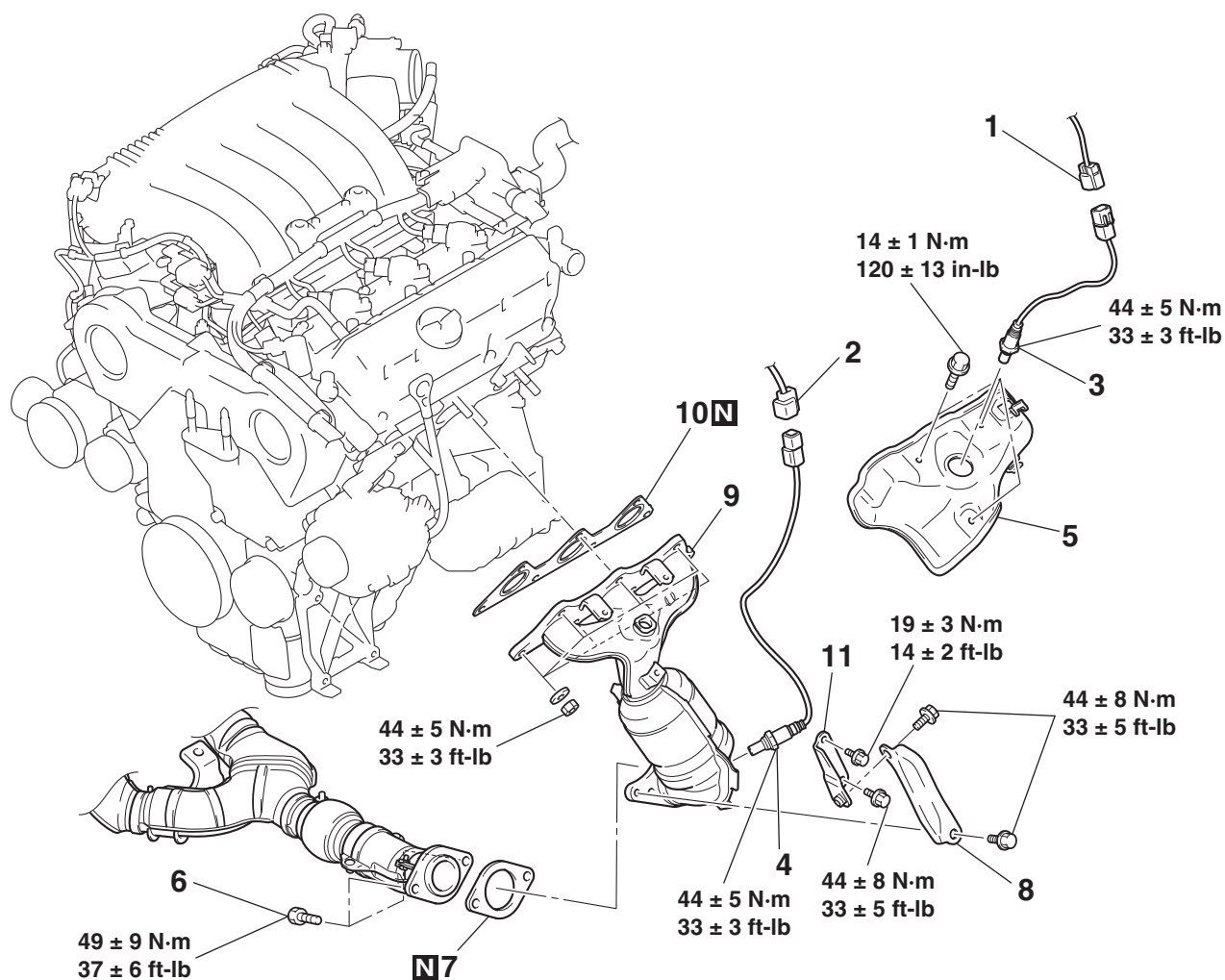
<LEFT BANK>

Pre-removal Operation

- Front Bumper Under Cover Removal (Refer to GROUP 51, Front Bumper P.51-2).
- Air Cleaner Intake Duct Removal (Refer to P.15-4).

Post-installation Operation

- Air Cleaner Intake Duct Installation (Refer to P.15-4).
- Front Bumper Under Cover Installation (Refer to GROUP 51, Front Bumper P.51-2).



AC406190AB

REMOVAL STEPS

1. LEFT BANK HEATED OXYGEN SENSOR (FRONT) CONNECTOR
2. LEFT BANK HEATED OXYGEN SENSOR (REAR) CONNECTOR
- <<A>> >>B<< 3. LEFT BANK HEATED OXYGEN SENSOR (FRONT)
- <> >>A<< 4. LEFT BANK HEATED OXYGEN SENSOR (REAR)
5. HEAT PROTECTOR

REMOVAL STEPS (Continued)

6. FRONT EXHAUST PIPE CONNECTING BOLTS
7. FRONT EXHAUST PIPE GASKET
8. EXHAUST MANIFOLD STAY, LEFT B
9. EXHAUST MANIFOLD
10. EXHAUST MANIFOLD GASKET
11. EXHAUST MANIFOLD STAY, LEFT A

Required Special Tools:

- MB991953: Oxygen Sensor Wrench
- MD998770: Oxygen Sensor Wrench

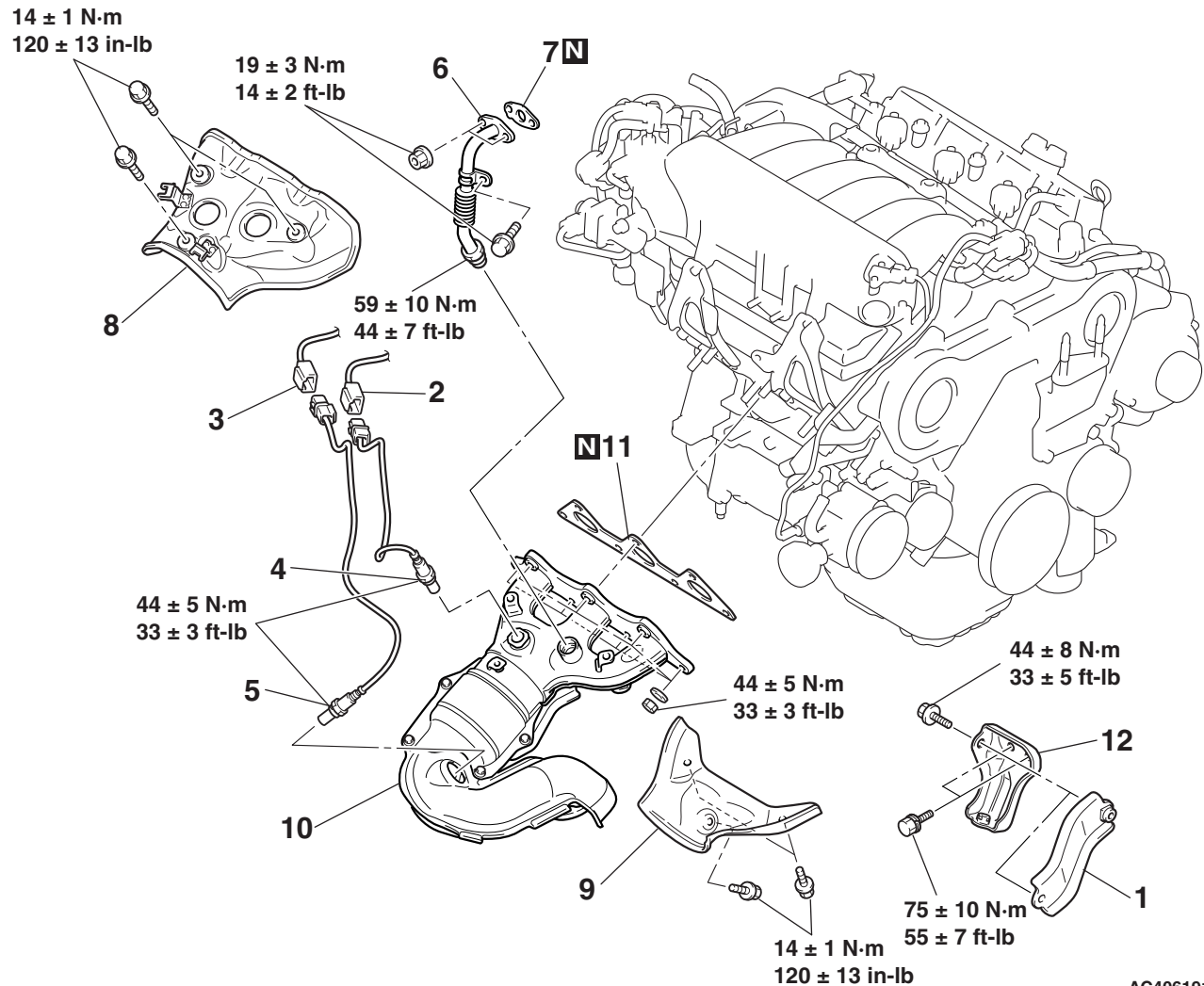
<RIGHT BANK>

Pre-removal Operation

- Air Cleaner Cover and Air Cleaner Air Intake Duct Removal (Refer to P.15-4).
- Battery Removal
- Front Exhaust Pipe, Center Exhaust Pipe Removal (Refer to P.15-22).
- Strut Tower Bar Removal (Refer to GROUP 42, Strut Tower Bar P.42-14).
- Engine Coolant Draining (Refer to GROUP 14, On-vehicle Service –Engine Coolant Replacement P.14-7).

Post-installation Operation

- Engine Coolant Refilling (Refer to GROUP 14, On-vehicle Service –Engine Coolant Replacement P.14-7).
- Strut Tower Bar Installation (Refer to GROUP 42, Strut Tower Bar P.42-14).
- Front Exhaust Pipe, Center Exhaust Pipe Installation (Refer to P.15-22).
- Battery Installation
- Air Cleaner Cover and Air Cleaner Air Intake Duct Installation (Refer to P.15-4).



AC406191AB

REMOVAL STEPS

- STEERING GEAR AND LINKAGE PROTECTOR (REFER TO GROUP 37, POWER STEERING GEAR BOX AND LINKAGE P.37-35).
- CENTER UNDER FLOOR HEAT PROTECTOR (REFER TO P.15-22).
- FRONT UNDER FLOOR HEAT PROTECTOR (REFER TO P.15-22).

REMOVAL STEPS (Continued)

1. EXHAUST MANIFOLD STAY, RIGHT B
2. RIGHT BANK HEATED OXYGEN SENSOR (FRONT) CONNECTOR
3. RIGHT BANK HEATED OXYGEN SENSOR (REAR) CONNECTOR
4. RIGHT BANK HEATED OXYGEN SENSOR (FRONT)
5. RIGHT BANK HEATED OXYGEN SENSOR (REAR)
6. EGR PIPE
7. EGR PIPE GASKET

<<A>> >>B<<

<> >>A<<

REMOVAL STEPS (Continued)

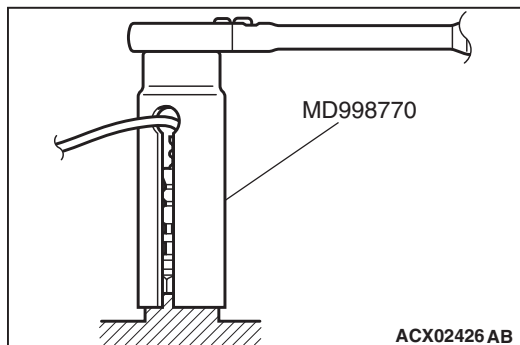
8. UPPER HEAT PROTECTOR
9. LOWER HEAT PROTECTOR
10. EXHAUST MANIFOLD
11. EXHAUST MANIFOLD GASKET
12. EXHAUST MANIFOLD STAY,
RIGHT A

Required Special Tools:

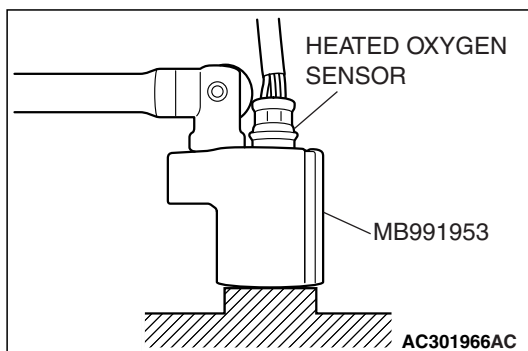
- MB991953: Oxygen Sensor Wrench
- MD998770: Oxygen Sensor Wrench

REMOVAL SERVICE POINTS**<<A>> LEFT BANK HEATED OXYGEN SENSOR (FRONT)/RIGHT BANK HEATED OXYGEN SENSOR (FRONT) REMOVAL**

Use special tool MD998770 to remove the heated oxygen sensor.

**<> LEFT BANK HEATED OXYGEN SENSOR (REAR)/RIGHT BANK HEATED OXYGEN SENSOR (REAR) REMOVAL**

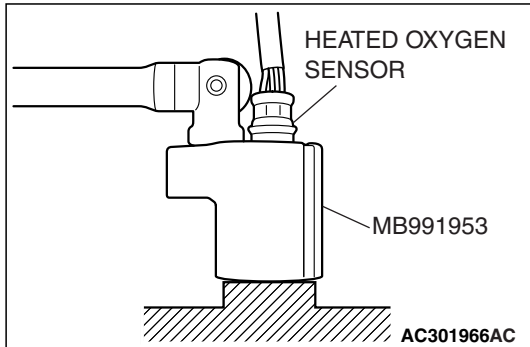
Use special tool MB991953 to remove the heated oxygen sensor.



INSTALLATION SERVICE POINTS

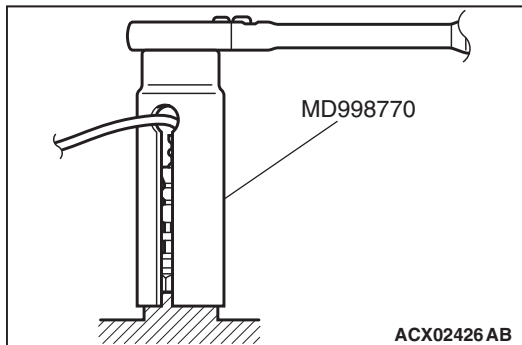
>>A<< RIGHT BANK HEATED OXYGEN SENSOR (REAR)/LEFT BANK HEATED OXYGEN SENSOR (REAR) INSTALLATION

Use special tool MB991953 to install the heated oxygen sensor.



>>B<< RIGHT BANK HEATED OXYGEN SENSOR (FRONT)/LEFT BANK HEATED OXYGEN SENSOR (FRONT) INSTALLATION

Use special tool MD998770 to install the heated oxygen sensor.



INSPECTION

M1151003400587

Check the following points; replace the part if a problem is found.

Exhaust Manifold Check

1. Check for damage or cracking of any part.
2. Using a straight edge and a feeler gauge, check for distortion of the cylinder head installation surface.

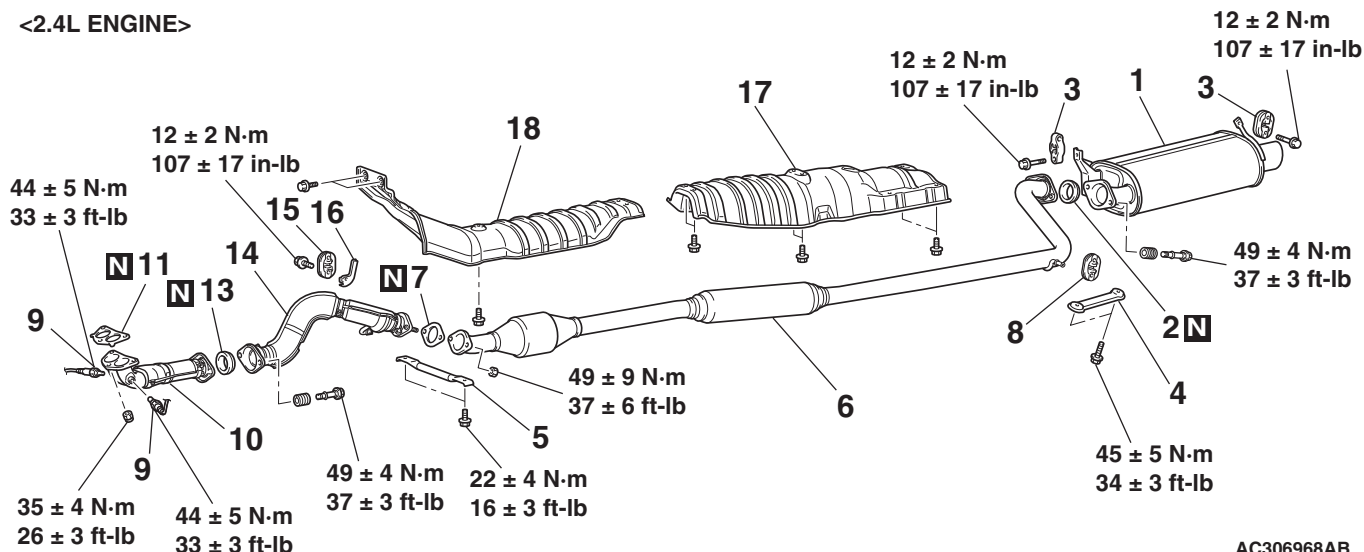
Standard value: 0.15 mm (0.006 inch) or less

Limit: 0.20 mm (0.008 inch)

EXHAUST PIPE AND MAIN MUFFLER**REMOVAL AND INSTALLATION**

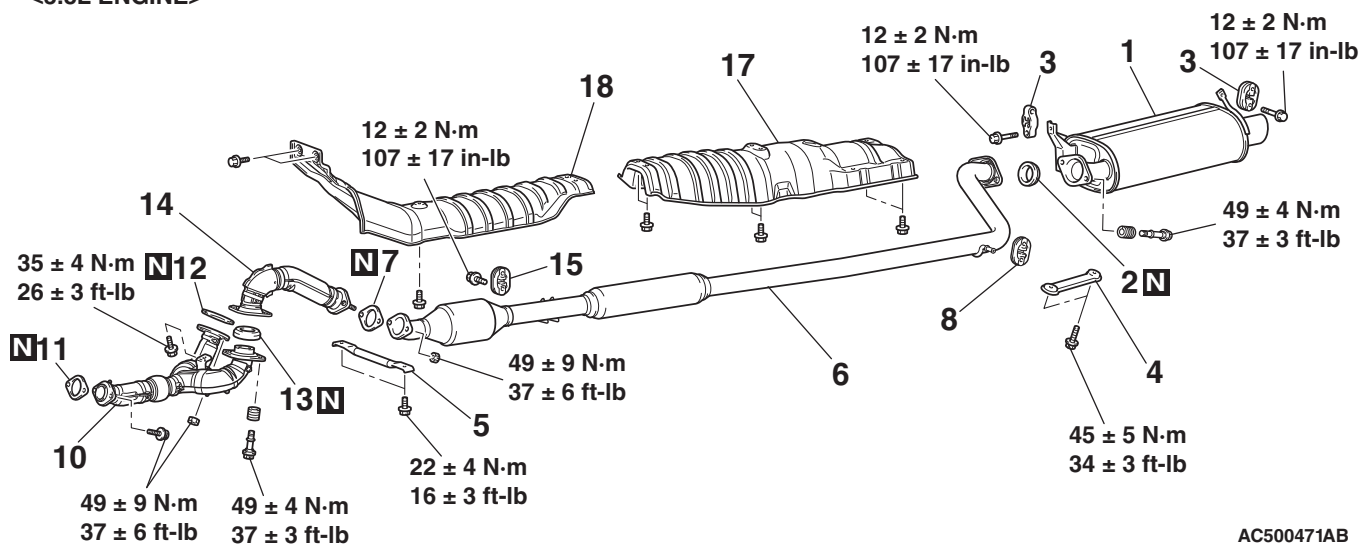
M1151008700851

<2.4L ENGINE>



AC306968AB

<3.8L ENGINE>



AC500471AB

MAIN MUFFLER REMOVAL STEPS

1. MAIN MUFFLER
2. SEAL RING
3. HANGER

CENTER EXHAUST PIPE REMOVAL STEPS

4. CROSSMEMBER STAY
5. FRONT FLOOR BACKBONE BRACE
6. CENTER EXHAUST PIPE
2. SEAL RING
7. GASKET
8. HANGER

FRONT EXHAUST PIPE REMOVAL STEPS

- <<A>> >>A<<
9. HEATED OXYGEN SENSOR <2.4L ENGINE>
 10. FRONT NO.1 EXHAUST PIPE
 11. GASKET
 12. GASKET <3.8L ENGINE>
 13. SEAL RING
 14. FRONT NO.2 EXHAUST PIPE
 7. GASKET
 15. HANGER
 16. PROTECTOR <2.4L ENGINE>
 17. CENTER UNDER FLOOR HEAT PROTECTOR
 18. FRONT UNDER FLOOR HEAT PROTECTOR

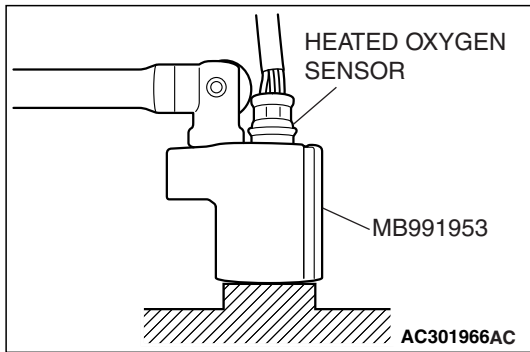
Required Special Tool:

- MB991953: Oxygen Sensor Wrench

REMOVAL SERVICE POINT

<<A>> HEATED OXYGEN SENSOR REMOVAL

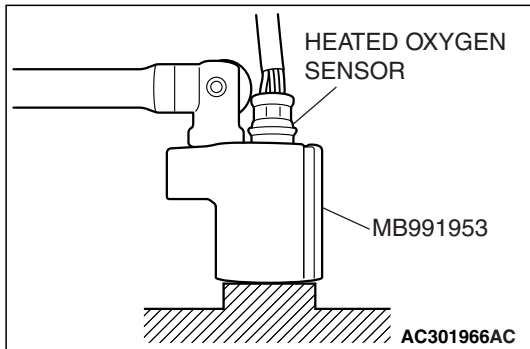
Use special tool MB991953 to remove the heated oxygen sensor.



INSTALLATION SERVICE POINT

>>A<< HEATED OXYGEN SENSOR INSTALLATION

Use special tool MB991953 to install the heated oxygen sensor.



SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1151006800755

ITEM		SPECIFICATION
Air cleaner		
Air cleaner bolt		8.8 ± 1.0 N· m (78 ± 9 in-lb)
Air cleaner bracket bolt and nut		12 ± 2 N· m (102 ± 22 in-lb)
Air cleaner resonator bolt <2.4L ENGINE>	M6 × 19.5	3.0 ± 0.5 N· m (27 ± 4 in-lb)
	M6 × 25	8.8 ± 1.0 N· m (78 ± 9 in-lb)
Air intake hose clamp bolt		4.0 ± 0.9 N· m (35 ± 8 in-lb)
Mass airflow sensor screw		1.5 ± 0.3 N· m (13 ± 2 in-lb)
Exhaust manifold <2.4L ENGINE>		
Exhaust manifold bracket A bolt		35 ± 6 N· m (26 ± 4 ft-lb)
Exhaust manifold bracket B bolt		59 ± 10 N· m (44 ± 7 ft-lb)
Exhaust manifold cover bolt		14 ± 1 N· m (120 ± 13 in-lb)
Exhaust manifold nut		49 ± 5 N· m (36 ± 4 ft-lb)
Heated oxygen sensor		44 ± 5 N· m (33 ± 3 ft-lb)
Exhaust manifold <Left bank> <3.8L ENGINE>		
Exhaust manifold nut		44 ± 5 N· m (33 ± 3 ft-lb)
Front exhaust pipe bolt		49 ± 9 N· m (37 ± 6 ft-lb)
Exhaust manifold stay, left A bolt	M8	19 ± 3 N· m (14 ± 2 ft-lb)
	M10	44 ± 8 N· m (33 ± 5 ft-lb)
Exhaust manifold stay, left B bolt		44 ± 8 N· m (33 ± 5 ft-lb)
Heat protector bolt		14 ± 1 N· m (120 ± 13 in-lb)
Heated oxygen sensor		44 ± 5 N· m (33 ± 3 ft-lb)
Exhaust manifold <Right bank> <3.8L ENGINE>		
EGR pipe		59 ± 10 N· m (44 ± 7 ft-lb)
EGR pipe clamp bolt		19 ± 3 N· m (14 ± 2 ft-lb)
EGR pipe connecting nut		19 ± 3 N· m (14 ± 2 ft-lb)
Exhaust manifold nut		44 ± 5 N· m (33 ± 3 ft-lb)
Exhaust manifold stay, right A bolt		75 ± 10 N· m (55 ± 7 ft-lb)
Exhaust manifold stay, right B bolt		44 ± 8 N· m (33 ± 5 ft-lb)
Heat protector bolt		14 ± 1 N· m (120 ± 13 in-lb)
Heated oxygen sensor		44 ± 5 N· m (33 ± 3 ft-lb)

ITEM		SPECIFICATION
Exhaust pipe and main muffler		
Crossmember stay bolt		45 ± 5 N· m (34 ± 3 ft-lb)
Center exhaust pipe nut		49 ± 9 N· m (37 ± 6 ft-lb)
Front floor backbone brace bolt		22 ± 4 N· m (16 ± 3 ft-lb)
Front no.1 exhaust pipe nut <2.4L ENGINE>		35 ± 4 N· m (26 ± 3 ft-lb)
Front no.2 exhaust pipe bolt <2.4L ENGINE>		49 ± 4 N· m (37 ± 3 ft-lb)
Front no.1 exhaust pipe bolt <3.8L ENGINE>		35 ± 4 N· m (26 ± 3 ft-lb)
Front no.1 exhaust pipe to front no.2 exhaust pipe bolt <3.8L ENGINE>		49 ± 4 N· m (37 ± 3 ft-lb)
Front no.1 exhaust pipe to right bank exhaust manifold nut <3.8L ENGINE>		49 ± 9 N· m (37 ± 6 ft-lb)
Front no.1 exhaust pipe to left bank exhaust manifold bolt <3.8L ENGINE>		49 ± 9 N· m (37 ± 6 ft-lb)
Hanger bolt		12 ± 2 N· m (107 ± 17 in-lb)
Heated oxygen sensor <2.4L ENGINE>		44 ± 5 N· m (33 ± 3 ft-lb)
Main muffler bolt		49 ± 4 N· m (37 ± 3 ft-lb)
Intake manifold <2.4L ENGINE>		
Engine oil dipstick guide bolt		13 ± 1 N· m (115 ± 9 in-lb)
Evaporative emission purge solenoid valve bolt		11 ± 1 N· m (98 ± 8 in-lb)
Evaporative emission vacuum pipe bolt		11 ± 1 N· m (98 ± 8 in-lb)
EGR valve bolt		24 ± 3 N· m (18 ± 2 ft-lb)
Harness clamp bolt		11 ± 1 N· m (98 ± 8 in-lb)
Intake manifold bolt		24 ± 3 N· m (18 ± 2 ft-lb)
Intake manifold nut		20 ± 2 N· m (15 ± 1 ft-lb)
Intake manifold stay bolt		31 ± 3 N· m (23 ± 2 ft-lb)
Knock sensor connector bracket bolt		11 ± 1 N· m (98 ± 8 in-lb)
Manifold absolute pressure sensor bolt		5.0 ± 1.0 N· m (44 ± 9 in-lb)
Pressure hose clamp bolt		12 ± 2 N· m (102 ± 22 in-lb)
Thermostat case assembly bolt		24 ± 4 N· m (18 ± 3 ft-lb)
Intake manifold <3.8L ENGINE>		
Engine mounting stay bolt		41 ± 6 N· m (31 ± 4 ft-lb)
Fuel rail and injector bolt		12 ± 1 N· m (102 ± 13 in-lb)
Intake manifold bolt		22 ± 1 N· m (16 ± 1 ft-lb)
Oil feeder control valve pipe bolt		11 ± 1 N· m (98 ± 8 in-lb)
Timing belt front upper cover bolt	M6	11 ± 1 N· m (98 ± 8 in-lb)
	M8	14 ± 1 N· m (120 ± 13 in-lb)
Water pump bracket bolt		24 ± 3 N· m (18 ± 2 ft-lb)

ITEM		SPECIFICATION
Intake manifold plenum <3.8L ENGINE>		
EGR valve bolt		24 ± 3 N· m (18 ± 2 ft-lb)
EGR pipe		59 ± 10 N· m (44 ± 7 ft-lb)
EGR pipe clamp bolt		19 ± 3 N· m (14 ± 2 ft-lb)
EGR pipe connection nut		19 ± 3 N· m (14 ± 2 ft-lb)
Engine cover bracket bolt		11 ± 1 N· m (98 ± 8 in-lb)
Evaporative emission purge solenoid bolt		5.0 ± 1.0 N· m (44 ± 9 in-lb)
Harness bracket bolt		11 ± 1 N· m (98 ± 8 in-lb)
Intake manifold plenum bolt		22 ± 1 N· m (16 ± 1 ft-lb)
Intake manifold plenum stay bolt	M8	22 ± 1 N· m (16 ± 1 ft-lb)
	M10	49 ± 6 N· m (37 ± 4 ft-lb)
Manifold absolute pressure sensor bolt		5.0 ± 1.0 N· m (44 ± 9 in-lb)
Power steering oil pump bracket connecting bolt		41 ± 8 N· m (30 ± 6 ft-lb)
Power steering pressure hose clamp nut		12 ± 2 N· m (102 ± 22 in-lb)
Power steering pressure hose clamp bracket bolt		12 ± 2 N· m (102 ± 22 in-lb)
Throttle body stay bolt		22 ± 1 N· m (16 ± 1 ft-lb)

SERVICE SPECIFICATIONS

M1151000301830

ITEM	STANDARD VALUE	LIMIT
Manifold distortion of the installation surface mm (in)	0.15 (0.006) or less	0.20 (0.008)

SEALANTS

M1151000500187

ITEM	SPECIFIED SEALANT
Thermostat case assembly	3M™ AAD Part No.8672, 3M™ AAD Part No.8679/8678 or equivalent
Thermostat case assembly bolt	3M™ AAD Part No. 8730, 8731 or equivalent