GROUP 15

INTAKE AND EXHAUST

CONTENTS

GENERAL DESCRIPTION

M1151000101386

The exhaust pipe is divided into four parts <2.0L ENGINE> or three parts <2.4L ENGINE>.

SERVICE SPECIFICATIONS

M1151000301722

Item			Standard value	Limit
Intake charge pressure kPa (psi)			68 –122 (9.9 –17.6)	–
Turbocharger wastegate actuator pressure kPa (psi)			78 –82 (11.4 –11.8)	–
Turbocharger wastegate solenoid terminal resistance [at 20° C (68° F)] Ω			29 –35	–
Exhaust manifold distortion of the installation surface mm (in)	2.0L ENGINE	Cylinder head side	–	0.70 (0.028)
		Turbocharger side	–	0.40 (0.016)
	2.4L ENGINE		–	0.70 (0.028)

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

M1151007000417

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

M1151007100414

Symptom	Inspection procedure	Reference page
Exhaust Leakage	1	P.15-3
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 (Refer to P.15-20 <2.0L ENGINE>, P.15-26 <2.4L ENGINE> or P.15-28 <2.0L ENGINE>, P.15-31 <2.4L ENGINE>). Then go to Step 4.
NO : Go to Step 3.

STEP 3. Check for loosening in each coupling section.

Q: Is there any loosening in any section?

YES : Tighten the loosening section (Refer to P.15-20 <2.0L ENGINE>, P.15-26 <2.4L ENGINE> or P.15-28 <2.0L ENGINE>, P.15-31 <2.4L ENGINE>). Then go to Step 4.
NO : There is no action to be taken.

STEP 4. 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 : Return to Step 2.
NO : The procedure is complete.

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 abnormal noise.

Q: Is any abnormal noise generated?

YES : Go to Step 2.
NO : The procedure is complete.

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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 the muffler (Refer to P.15-28 <2.0L ENGINE>, P.15-31 <2.4L ENGINE>). Then go to Step 7 .

NO : Go to Step 3.

STEP 3. Check the hanger for cracks.

Q: Is the hanger cracked?

YES : Replace the hanger (Refer to P.15-28 <2.0L ENGINE>, P.15-31 <2.4L ENGINE>). Then go to Step 7.

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 the pipes or muffler. Then go to Step 7.

NO : Go to Step 5.

STEP 5. Check the heat protectors.

Q: Are any heat protectors loose or damaged?

YES : Tighten or replace the heat protector (Refer to P.15-28 <2.0L ENGINE>, P.15-31 <2.4L ENGINE>). Then go to Step 7.

NO : Go to Step 6.

STEP 6. Check the pipes and muffler for damage.

Q: Are the pipes and muffler damaged?

YES : Replace the pipes or muffler (Refer to P.15-28 <2.0L ENGINE>, P.15-31 <2.4L ENGINE>). Then go to Step 7.

NO : There is no action to be taken.

STEP 7. 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 abnormal noise.

Q: Is any abnormal noise generated?

YES : Return to Step 2.

NO : The procedure is complete.

SPECIAL TOOLS

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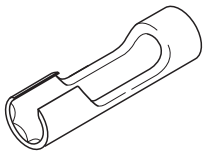
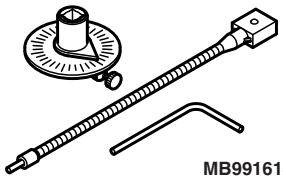
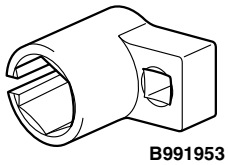
Tool	Tool number and name	Supersession	Application
	MB992188 Fuel injection pipe wrench	MB992188-01	Removal and installation of number 2 air temperature sensor <2.0L ENGINE>
 MB991614	MB991614 Angle gauge	General service tool	Installation of turbocharger assembly coupling bolt <2.0L ENGINE>
 B991953	MB991953 Oxygen sensor wrench	MB991953-01	Removal and installation of heated oxygen sensor

TROUBLESHOOTING

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Symptom	Probable cause	Remedy
Exhaust gas leakage	Loose joints	Retighten
	Broken pipe or muffler	Repair or replace
Abnormal noise	Broken baffle in muffler	Replace
	Broken rubber hangers	Replace
	Interference of pipe or muffler with vehicle body	Correct
	Broken pipe or muffler	Repair or replace

ON-VEHICLE SERVICE <2.0L ENGINE>

INTAKE CHARGE PRESSURE CHECK

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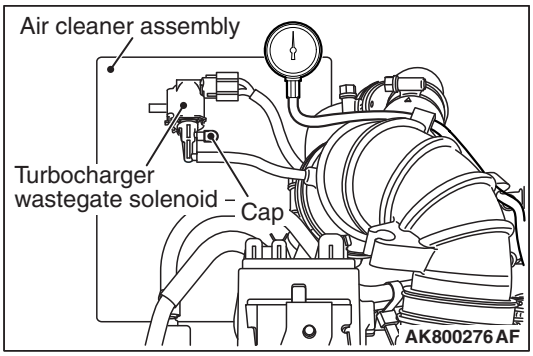

1. Disconnect the hose (black) from the turbocharger wastegate solenoid, and connect the pressure gauge to the hose. Cap the solenoid valve nipple after the hose (black) was disconnected.

⚠ CAUTION

Two persons should be in the vehicle when the test is conducted; the person in the passenger seat should read the indications shown by the pressure meter.

2. Drive at full-throttle acceleration in second gear and then measure the intake charge pressure when the engine speed is about 3,000 r/min or more.

   Standard value: 68 –122 kPa (9.9 –17.6 psi)

3. If the intake charge pressure is lower than the standard value, check the following items for possible causes.
   - Turbocharger wastegate actuator malfunction
   - Turbocharger wastegate regulating valve malfunction
   - Intake charge pressure leakage
   - Turbocharger malfunction
   - Turbocharger bypass valve malfunction
4. When the intake charge pressure is higher than standard value, the intake charge control may be faulty. Therefore check the followings:
   - Turbocharger wastegate actuator malfunction
   - Turbocharger wastegate regulating valve malfunction
   - Rubber hose of turbocharger wastegate actuator disconnected or cracked

TURBOCHARGER WASTEGATE ACTUATOR CHECK

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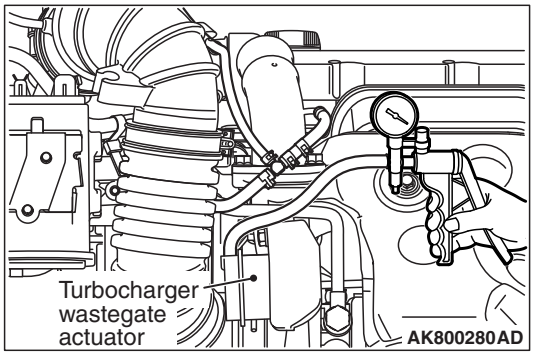

1. Connect a hand vacuum pump (pressure-application type) to nipple.

⚠ CAUTION

In order to avoid damage to the diaphragm, do not apply a pressure of 94 kPa (13.6 psi) or higher.

2. While gradually applying pressure, check the pressure that begins to activate (approximately 1 mm stroke) the turbocharger wastegate actuator rod.

   Standard value: 78 –82 kPa (11.4 –11.8 psi)

3. If there is a significant deviation from the standard value, check the actuator or the turbocharger wastegate regulating valve: replace if necessary.

INTAKE CHARGE PRESSURE CONTROL SYSTEM CHECK

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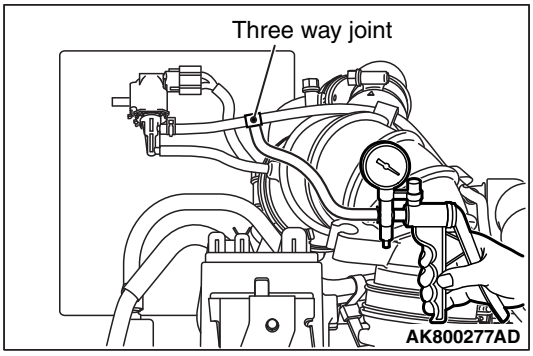
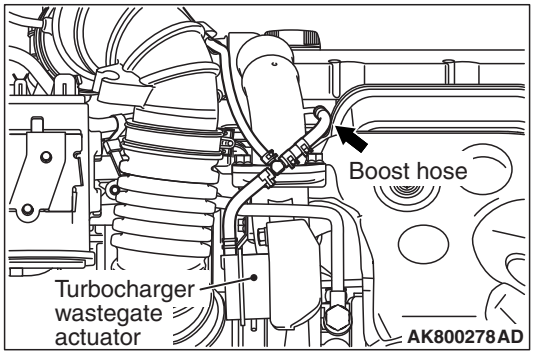


1. Disconnect the hose (black) from the turbocharger wastegate solenoid and connect a three way joint between the hose and the solenoid valve.
2. Connect a hand pump (pressurized type) to the three-way joint.



3. Use the turbocharger wastegate actuator control boost nipple of air outlet fitting to disconnect the boost hose. Plug this nipple.

⚠ CAUTION

Do not apply the pressure of 94 kPa or more to prevent the diaphragm damage.

4. Applying a pressure with the hand pump, check tightness both when the hose end is closed and when it is open.

Engine state	Hose end	Normal state
Stop (Ignition switch: ON position)	Opened	Pressure leaks.
	Closed	Pressure is maintained.
Rapid racing		Pressure leaks.

5. Turn the ignition switch to "LOCK" (OFF) position.

TURBOCHARGER WASTEGATE SOLENOID CHECK

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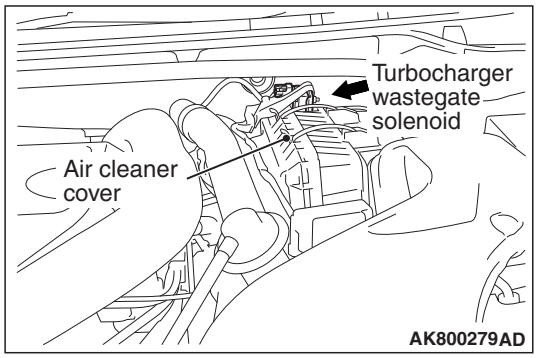
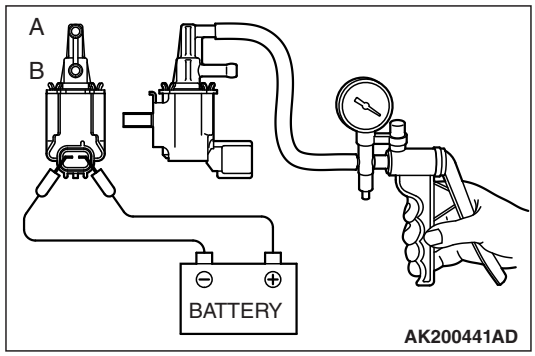
A Operation check

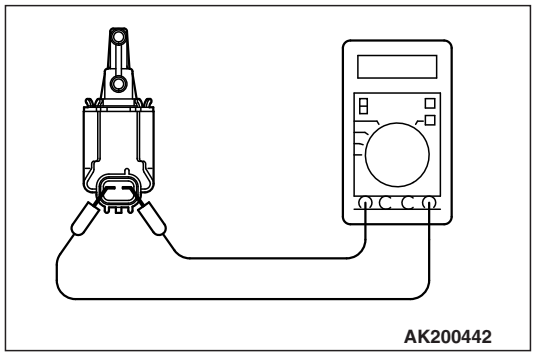


1. Install the hand vacuum pump to the nipple "A" of solenoid.
2. Use the jumper wire to connect the solenoid terminal with the battery terminal.
3. Disconnecting the jumper wire at the negative (−) battery side, apply the vacuum pressure. Check the airtightness.

Jumper wire	Nipple "B" state	Normal state
Connected	Opened	Negative pressure leaks
	Closed	Negative pressure maintained
Disconnected	Opened	Negative pressure maintained



B Check of coil resistance



1. Measure the resistance between the solenoid terminals.
   Standard value: 29 – 35 Ω at 20° C (68° F)

TURBOCHARGER BYPASS VALVE CHECK

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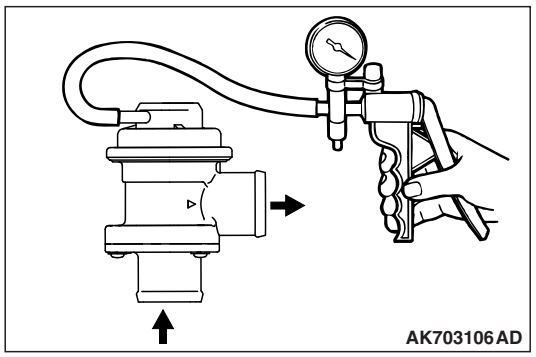

1. Remove the turbocharger bypass valve.
2. Connect the hand vacuum pump to the nipple of the turbocharger bypass valve.
3. Apply a negative pressure of approximately 50 kPa (14.8 in.Hg) and check that air tightness is maintained.
4. Also check operation of the valve.

Negative pressure	Valve operation
50.8 – 66.8 kPa (15.01 – 19.72 in.Hg)	It starts opening

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AIR CLEANER

REMOVAL AND INSTALLATION <2.0L ENGINE>

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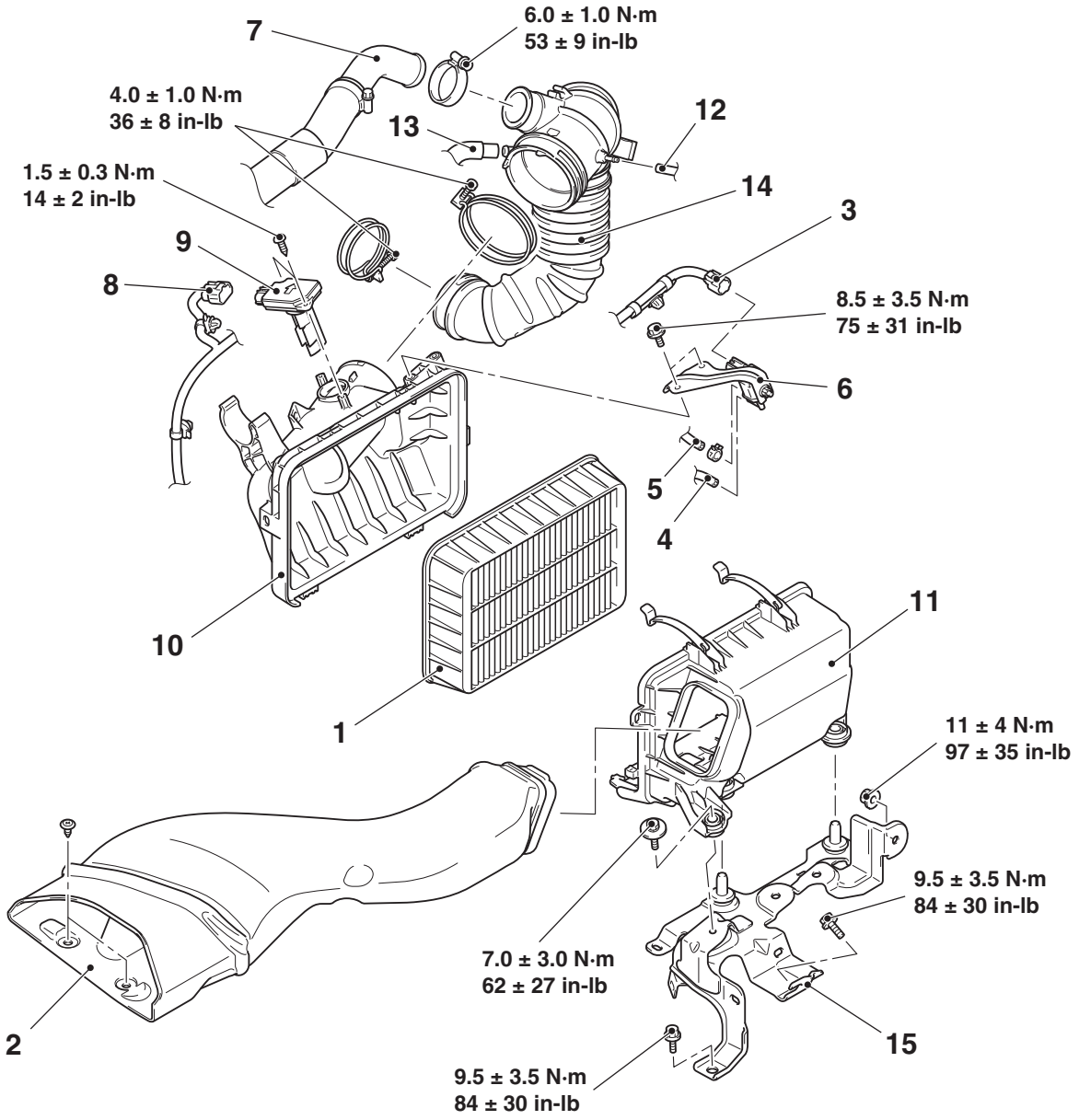

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Removal steps

1. Air cleaner element
2. Air cleaner intake duct
3. Turbocharger wastegate solenoid connector connection
4. Vacuum hose connection
5. Vacuum hose connection
6. Turbocharger wastegate solenoid assembly
7. Charge air cooler outlet pipe connection
8. Mass airflow sensor connector connection

Removal steps (Continued)

>>A<< 9. Mass airflow sensor
10. Air cleaner cover
11. Air cleaner body
12. Vacuum hose connection
13. Breather hose connection
14. Air cleaner to turbocharger duct
- Engine control module (ECM) [Refer to GROUP 13A, Engine Control Module (ECM) P.13A-895]

15. Air cleaner bracket

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INSTALLATION SERVICE POINT

>>A<< MASS AIRFLOW SENSOR INSTALLATION

⚠ CAUTION
Do not over-tighten. If the mass airflow sensor installation screw is over-tightened, the air cleaner support thread may be damaged.

REMOVAL AND INSTALLATION <2.4L ENGINE>

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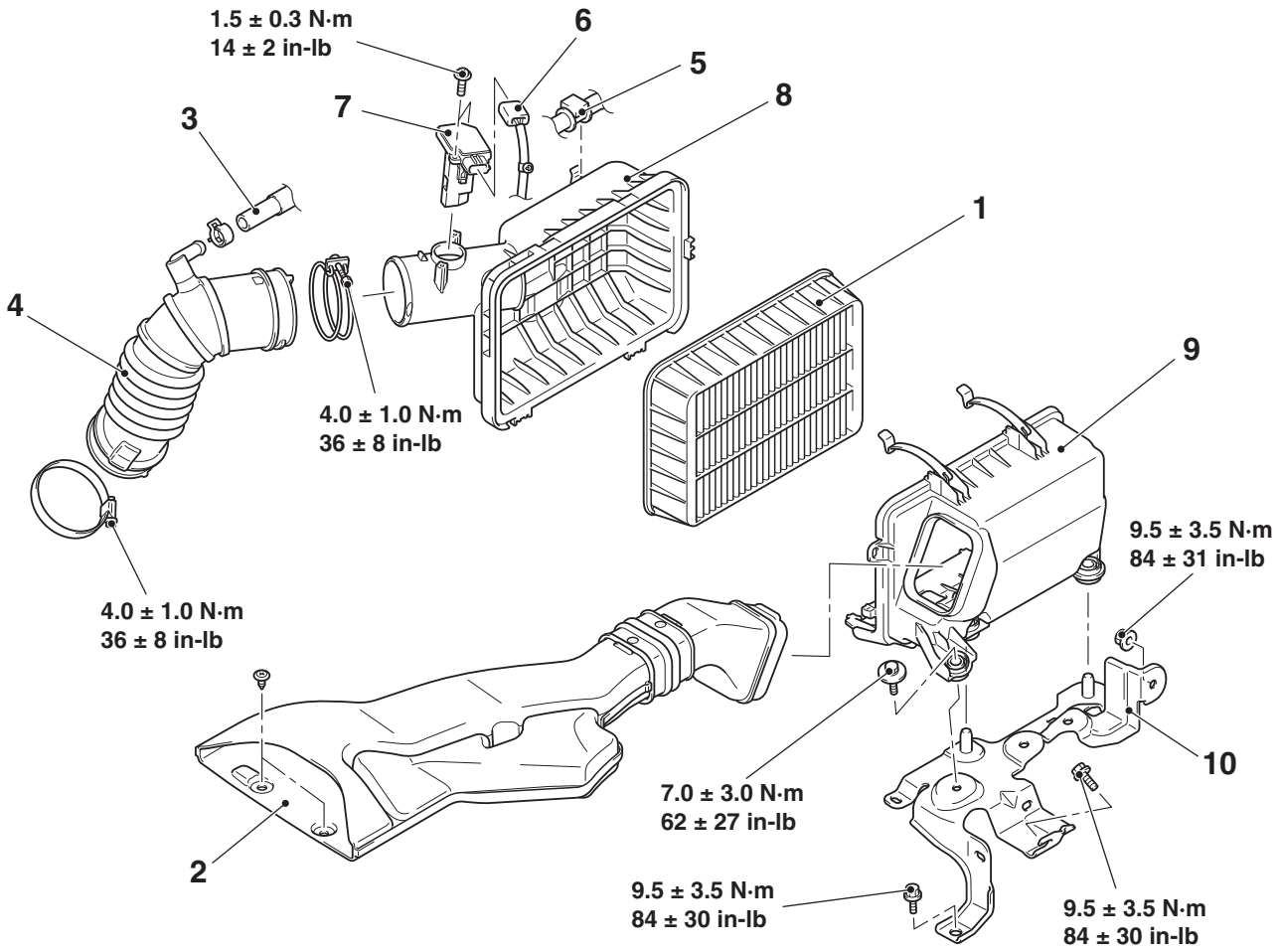

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Removal steps
1. Air cleaner element
2. Air cleaner intake duct
3. Breather hose connection
4. Air cleaner to throttle body duct
5. Brake booster vacuum hose clamp connection
6. Mass airflow sensor connector connection

>>A<< 7. Mass airflow sensor

Removal steps (Continued)
8. Air cleaner cover
9. Air cleaner body
   - Engine control module (ECM) [Refer to GROUP 13B, Engine Control Module (ECM) P.13B-1022]
10. Air cleaner bracket

TSB Revision

INSTALLATION SERVICE POINT

>>A<< MASS AIRFLOW SENSOR INSTALLATION

⚠ CAUTION
Do not over-tighten. If the mass airflow sensor mounting screw is over-tightened, the air cleaner support thread can be damaged.

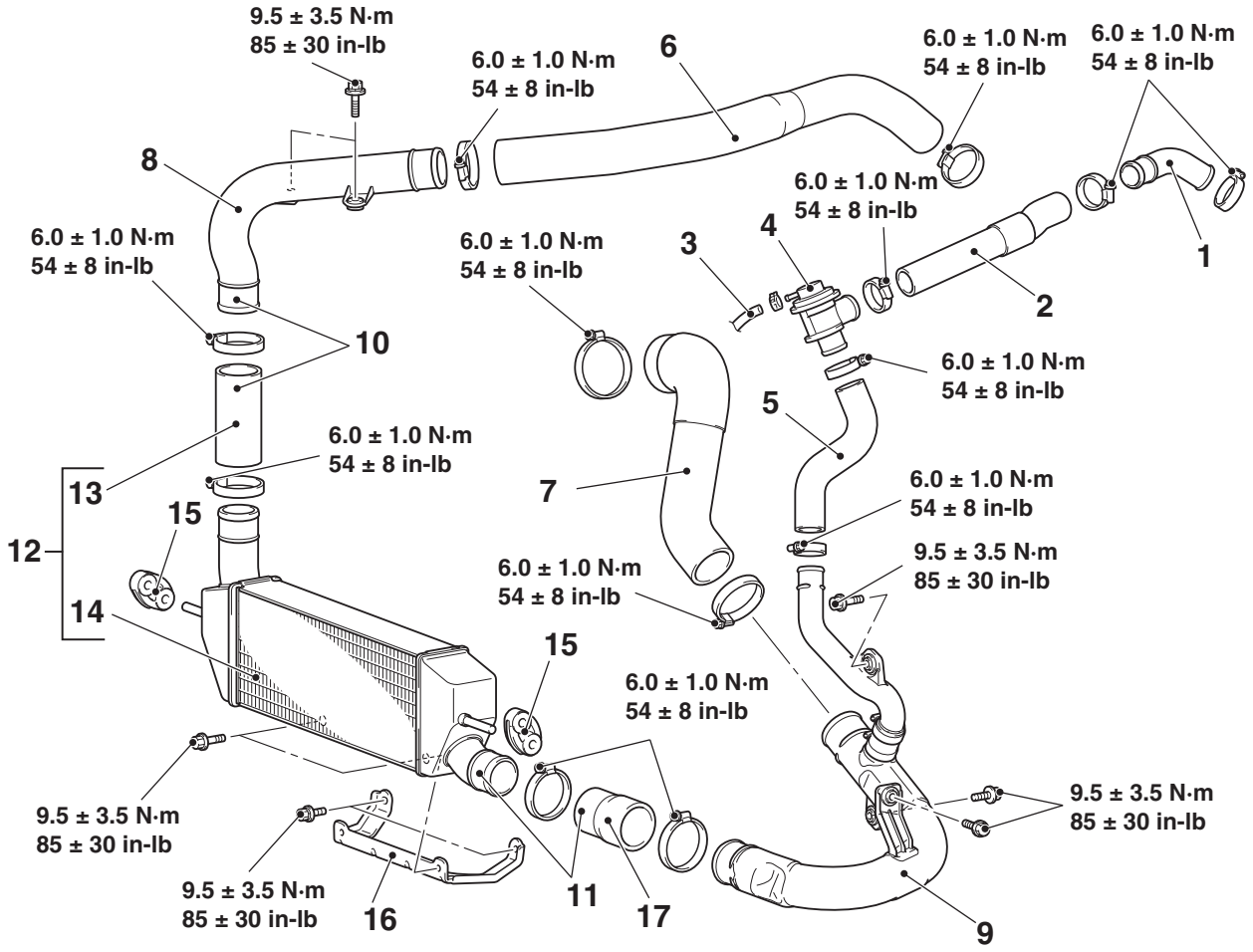
CHARGE AIR COOLER <2.0L ENGINE>

REMOVAL AND INSTALLATION

M1151002400971

⚠ CAUTION

- **Degrease the air hose and air pipe by isopropyl alcohol, parts cleaner (MZ100387) or equivalent.**
- **As for the parts cleaner, use the petroleum cleaner whose major component is aliphatic hydrocarbon.**
- **Working area should be airy and kept from flame.**



AC800108 AC

Charge air cooler hose and pipe removal steps

1. Charge air cooler outlet air pipe
2. Charge air cooler outlet air hose
3. Turbocharger by-pass valve vacuum hose connection

<<A>> >>A<<

Charge air cooler hose and pipe removal steps (Continued)

4. Turbocharger by-pass valve
5. Charge air cooler outlet air hose
6. Charge air cooler intake air hose A

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Charge air cooler hose and pipe removal steps (Continued)

- Air cleaner intake duct (Refer to P.15-9)
- Battery and battery tray (Refer to GROUP 54A, Battery P.54A-10)

<<A>> >>A<< 7. Charge air cooler outlet air hose E
- Headlight support panel cover (Refer to GROUP 51, Front Bumper and Radiator Grille Assembly P.51-5)

<<A>> >>A<< 8. Charge air cooler intake air pipe B
- Front bumper and radiator grille assembly (Refer to GROUP 51, Front Bumper and Radiator Grille Assembly P.51-5)
- Transmission oil cooler duct (Refer to GROUP 22C, Oil Cooler P.22C-513)

<<A>> >>A<< 9. Charge air cooler outlet air pipe C

<<A>> >>A<< 17. Charge air cooler outlet air hose C

Charge air cooler assembly removal steps

- Front bumper and radiator grille assembly (Refer to GROUP 51, Front Bumper and Radiator Grille Assembly P.51-5)

<<A>> >>A<< 10. Charge air cooler intake air hose D and charge air cooler intake air pipe B connection

<<A>> >>A<< 11. Charge air cooler outlet air hose C and charge air cooler connection

12. Charge air cooler and charge air cooler intake air hose D assembly

<<A>> >>A<< 13. Charge air cooler intake air hose D

14. Charge air cooler assembly

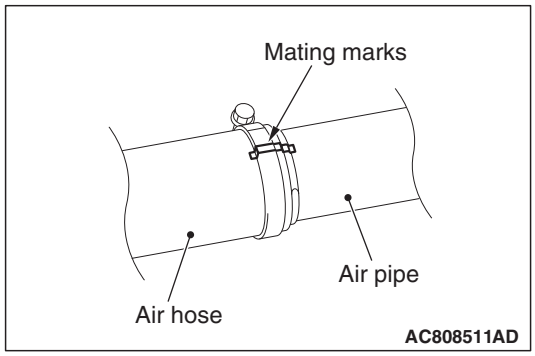
15. Charge air cooler hanger

16. Charge air cooler bracket

REMOVAL SERVICE POINT

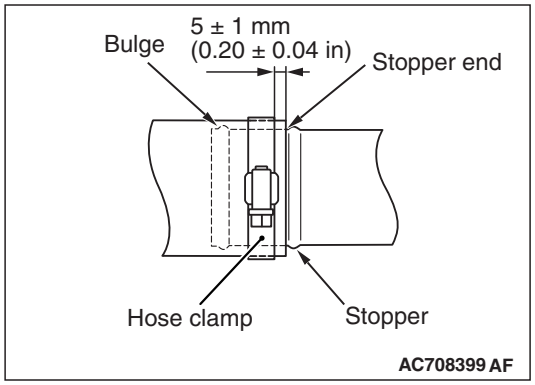
<<A>> AIR HOSE/AIR PIPE REMOVAL

Put mating marks on the air hose, air pipe, and hose clamp, and remove them.



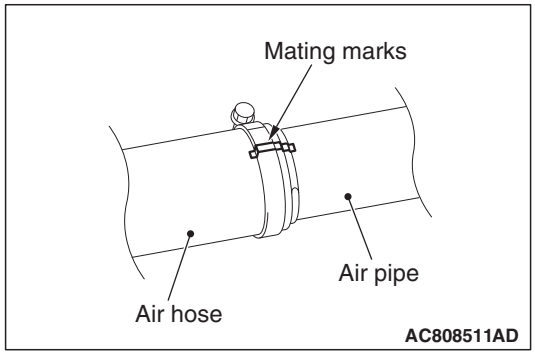
INSTALLATION SERVICE POINT

>>A<< AIR HOSE/AIR PIPE INSTALLATION



1. Insert hose to stopper end and not overlap with stopper.
2. Place the hose clamp as shown in the figure so that it does not overlap with the bulge and the stopper end. Then, set the hose clamp 5 ± 1 mm (0.20 ± 0.04 inch) away from the stopper.

⚠ CAUTION
Do not use an electric screwdriver or air tool. Manually tighten the hose clamp.



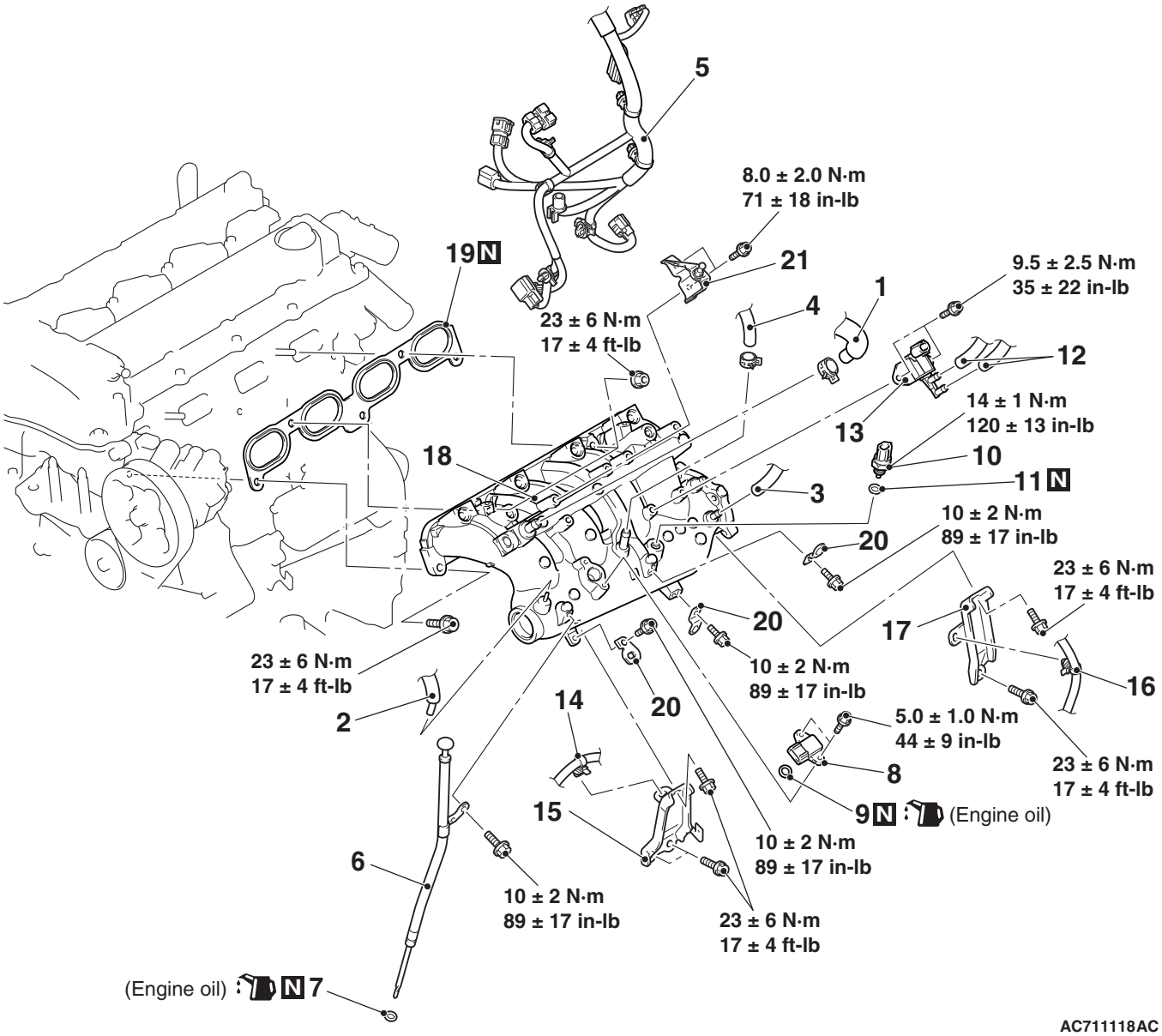
3. Align the mating marks on the air hose, air pipe, and hose clamp. Then, tighten the hose clamp to the specified torque.
   Tightening torque: 6.0 ± 1.0 N· m (54 ± 8 in-lb)

INTAKE MANIFOLD

REMOVAL AND INSTALLATION <2.0L ENGINE>

M1151003003481

Pre-removal Operation	Post-installation Operation
• Charge Air Cooler Intake Air Hose A Removal (Refer to P.15-11.) • Air Cleaner Assembly Removal (Refer to P.15-9.) • Throttle Body Removal (Refer to GROUP 13A, Throttle Body P.13A-892.) • Fuel Rail Assembly Removal (Refer to GROUP 13A, Injector P.13A-887.)	• Fuel Rail Assembly Installation (Refer to GROUP 13A, Injector P.13A-887.) • Throttle Body Installation (Refer to GROUP 13A, Throttle Body P.13A-892.) • Air Cleaner Assembly Installation (Refer to P.15-9.) • Charge Air Cooler Intake Air Hose A Installation (Refer to P.15-11.)



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Removal steps

1. Rocker cover PCV hose
2. Emission control equipment vacuum hose connection
3. Emission vacuum hose connection
4. Brake booster vacuum hose connection
5. Control wiring harness connection

<<A>>

>>B<<

>>A<<

Removal steps (Continued)

6. Engine oil dipstick and guide assembly
7. O-ring
8. Manifold absolute pressure sensor
9. O-ring
10. Number 2 Intake air temperature sensor

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Removal steps (Continued)

11. Gasket
12. Vacuum hose connection
13. Purge control solenoid valve
14. Starter wiring harness clamp
15. Intake manifold stay (front)
16. Starter wiring harness clamp
17. Intake manifold stay (rear)
18. Intake manifold
19. Intake manifold gasket
20. Harness bracket
21. Engine upper cover bracket (front)

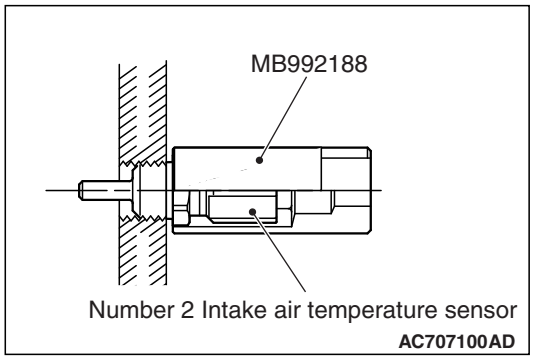
Required Special Tool:

- MB992188: Fuel Injection Pipe Wrench

REMOVAL SERVICE POINT

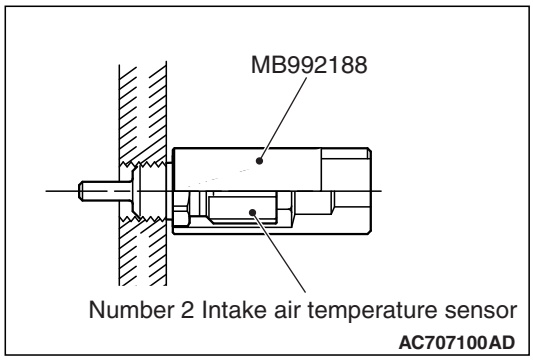
<<A>> NUMBER 2 INTAKE AIR TEMPERATURE SENSOR REMOVAL

Use special tool MB992188 to remove the number 2 intake air temperature sensor.



INSTALLATION SERVICE POINTS

>>A<< NUMBER 2 INTAKE AIR TEMPERATURE SENSOR INSTALLATION



Tighten the number 2 intake air temperature sensor to the specified torque by using special tool MB992188.

Tightening torque: 14 ±1 N· m (120 ±13 in-lb)

>>B<< O-RING/MANIFOLD ABSOLUTE PRESSURE SENSOR INSTALLATION

⚠ CAUTION

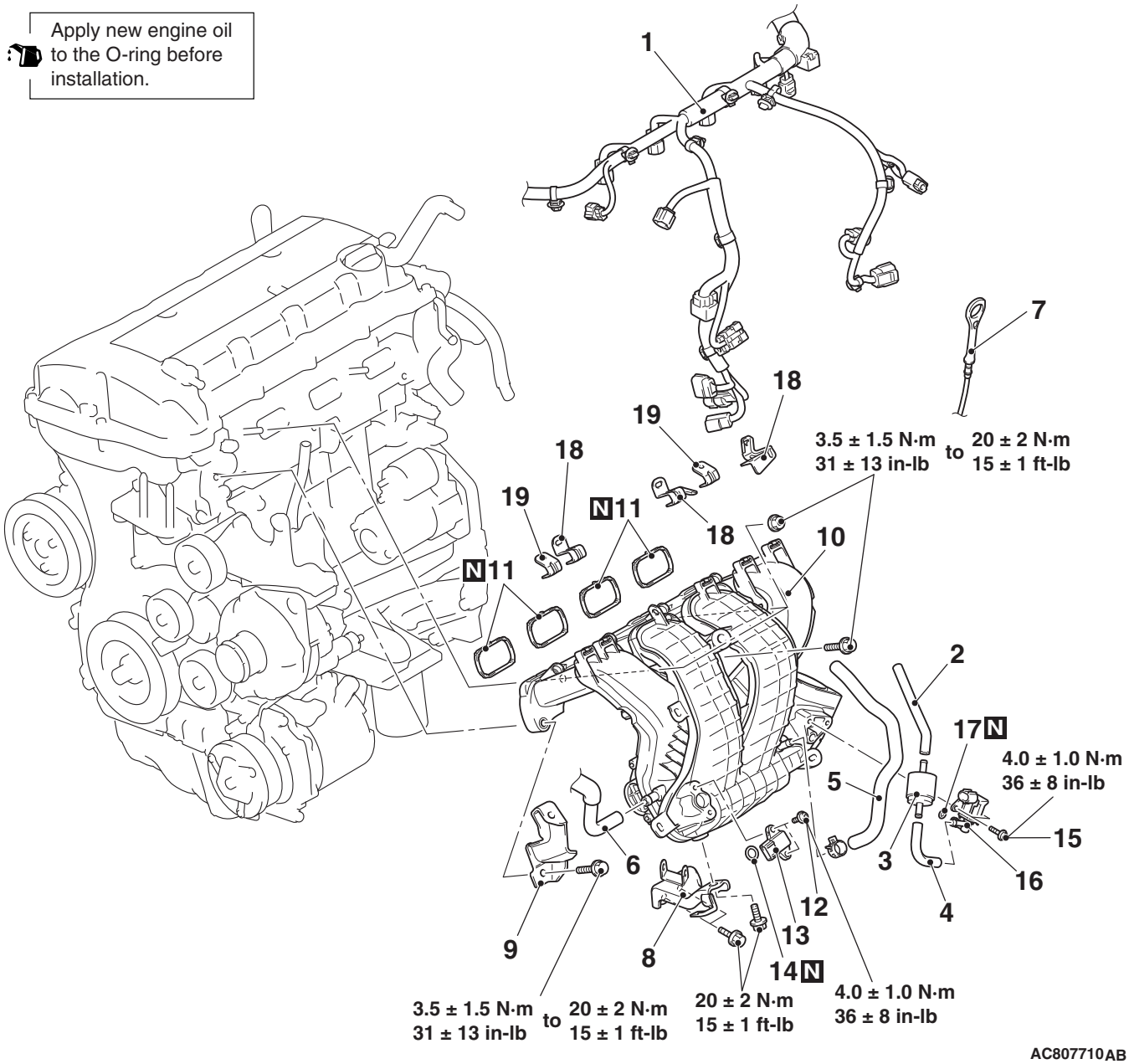
- **Install the manifold absolute pressure sensor, taking care that no shock is applied to it.**
- **Do not use a manifold absolute pressure sensor that has been dropped.**

1. Apply a small amount of new engine oil to the O-ring.
2. Install the manifold absolute pressure sensor to the intake manifold with care not to damage the O-ring.

REMOVAL AND INSTALLATION <2.4L ENGINE>

M1151003003492

Pre-removal Operation	Post-installation Operation
• Air Cleaner Assembly Removal (Refer to P.15-10.) • Throttle Body Removal (Refer to GROUP 13B, Throttle Body P.13B-1020.) • Fuel Rail Assembly Removal (Refer to GROUP 13B, Injector P.13B-1015.) • EGR Valve and EGR Valve Stay Removal (Refer to GROUP 17, Emission Control –EGR Valve P.17-106.)	• EGR Valve and EGR Valve Stay Installation (Refer to GROUP 17, Emission Control –EGR Valve P.17-106.) • Fuel Rail Assembly Installation (Refer to GROUP 13B, Injector P.13B-1015.) • Throttle Body Installation (Refer to GROUP 13B, Throttle Body P.13B-1020.) • Air Cleaner Assembly Installation (Refer to P.15-10.)



Removal steps

1. Control wiring harness connection
2. Emission vacuum hose
3. Emission vacuum control chamber
4. Emission vacuum hose
5. Brake booster vacuum hose
6. Rocker cover PCV hose connection
7. Engine oil dipstick

Removal steps (Continued)

8. Intake manifold stay
>>C<< 9. Injector protector front
>>C<< 10. Intake manifold assembly
11. Intake manifold gasket
>>B<< 12. Screw
>>A<< 13. Manifold absolute pressure sensor
>>A<< 14. O-ring

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Removal steps (Continued)

>>**B**<< 15. Screw
>>**A**<< 16. Purge control solenoid valve
>>**A**<< 17. O-ring
18. Intake manifold harness bracket
19. Engine cover bracket

INSTALLATION SERVICE POINTS

>>A<< O-RING/PURGE CONTROL SOLENOID VALVE/O-RING/MANIFOLD ABSOLUTE PRESSURE SENSOR INSTALLATION

⚠ CAUTION

- **When applying the engine oil, make sure not to allow the engine oil to enter the intake manifold inside.**
- **Install the manifold absolute pressure sensor, taking care that no shock is applied to it.**
- **Do not use a manifold absolute pressure sensor that has been dropped.**

1. Apply a small amount of new engine oil to the O-ring.
2. While turning the purge control solenoid valve or manifold absolute pressure sensor to right and left, install the O-ring to the purge control solenoid valve or manifold absolute pressure sensor with care to avoid damage to the O-ring.
3. Turning the purge control solenoid valve or manifold absolute pressure sensor to right and left, install it to the intake manifold with care not to damage the O-ring. After the installation, check for its smooth rotation.

>>B<< SCREW INSTALLATION

⚠ CAUTION

Do not over-tighten. As the self-forming-type screw is used, the excessive torque can damage the intake manifold threads.

>>C<< INTAKE MANIFOLD ASSEMBLY/INJECTOR PROTECTOR FRONT INSTALLATION

Install the intake manifold assembly and the injector protector front, and tighten mounting bolts and nuts temporarily.

NOTE: The tightening of the fuel rail assembly, the intake manifold assembly and the injector protector front has the specified order. Temporarily tighten the intake manifold assembly and injector protector front mounting bolts and nuts (Refer to GROUP 13B, Injector P.13B-1015.)

INSPECTION

M1151003101341

INTAKE MANIFOLD CHECK

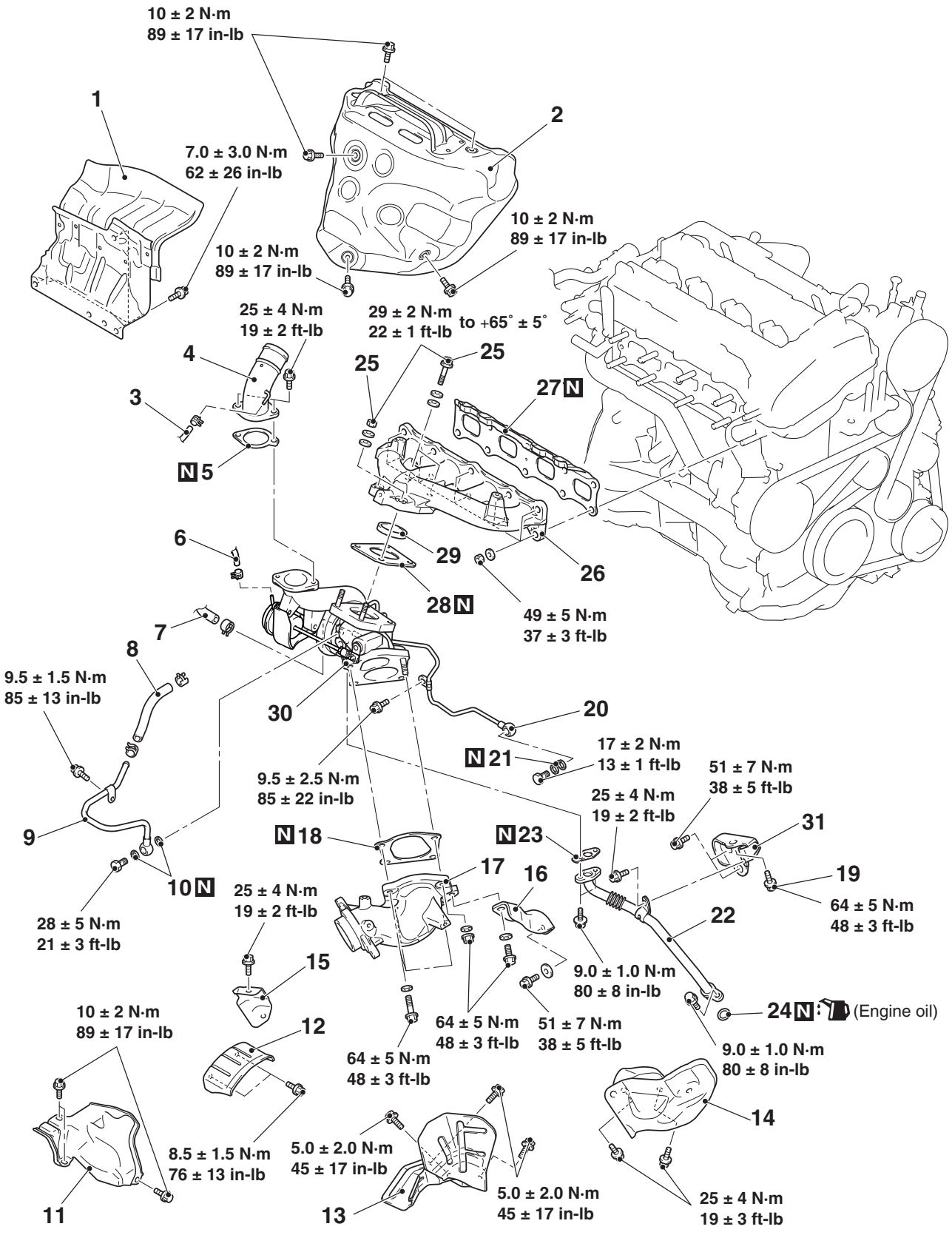
1. Check the intake manifold for damage and cracks, and replace it if necessary.
2. Check the vacuum outlet port for clogging, and clean it if necessary.

EXHAUST MANIFOLD AND TURBOCHARGER <2.0L ENGINE>

REMOVAL AND INSTALLATION

M1151008900907

Pre-removal Operation	Post-installation Operation
• Engine Room Under Cover Front A, B and Engine Room Side Cover (RH) Removal (Refer to GROUP 51, Under Cover P.51-20.) • Engine Coolant Draining (Refer to GROUP 14, On-vehicle Service –Engine Coolant Replacement P.14-24.) • Engine Oil Draining (Refer to GROUP 12, On-vehicle Service –Engine Oil Replacement P.12-5.) • Engine Upper Cover Removal (Refer to GROUP 16, Ignition System –Ignition Coil P.16-50.) • Charge Air Cooler Intake Air Hose A Removal (Refer to P.15-11.) • Air Cleaner Assembly Removal (Refer to P.15-9.) • Front Exhaust Pipe Removal (Refer to P.15-28.) • Strut Tower Bar Removal (Refer to GROUP 42A, Strut Tower Bar P.42A-15.) • Cowl Top Panel Removal (Refer to GROUP 42A, Loose Panel P.42A-15.)	• Cowl Top Panel Installation (Refer to GROUP 42A, Loose Panel P.42A-15.) • Strut Tower Bar Installation (Refer to GROUP 42A, Strut Tower Bar P.42A-15.) • Front Exhaust Pipe Installation (Refer to P.15-28.) • Air Cleaner Assembly Installation (Refer to P.15-9.) • Charge Air Cooler Intake Air Hose A Installation (Refer to P.15-11.) • Engine Oil Refilling (Refer to GROUP 12, On-vehicle Service –Engine Oil Replacement P.12-5.) • Engine Coolant Refilling (Refer to GROUP 14, On-vehicle Service –Engine Coolant Replacement P.14-24.) • Engine Upper Cover Installation (Refer to GROUP 16, Ignition System –Ignition Coil P.16-50.) • Engine Room Under Cover Front A, B and Engine Room Side Cover (RH) Installation (Refer to GROUP 51, Under Cover P.51-20.)



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Removal steps

1. Dash panel heat protector
2. Exhaust manifold cover

Removal steps (Continued)

3. Emission vacuum control hose connection
4. Turbocharger air outlet fitting

TSB Revision

Removal steps (Continued)

5. Turbocharger air outlet fitting gasket
6. Emission vacuum control hose connection
7. Turbocharger water return hose connection
8. Turbocharger water feed hose
9. Turbocharger water feed pipe
10. Gasket
11. Transfer heat protector
12. Drive shaft heat protector
13. Steering gear and linkage heat protector
14. Turbocharger protector A
15. Turbocharger protector B

>>E<<

16. Turbocharger exhaust outlet fitting bracket
17. Turbocharger exhaust outlet fitting
18. Turbocharger exhaust outlet fitting gasket

Removal steps (Continued)

>>B<<

19. Turbocharger bracket and turbocharger assembly coupling bolt
20. Turbocharger oil feed tube connection
21. Gasket
22. Turbocharger oil return tube

>>D<<

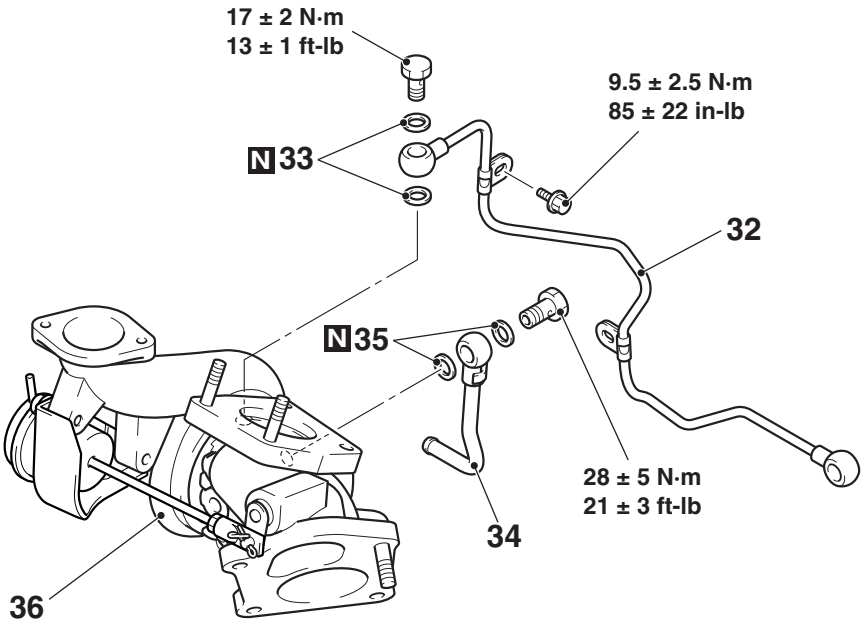
23. Turbocharger oil return tube gasket
24. O-ring

>>C<<

25. Exhaust manifold and turbocharger assembly coupling bolt and nut
26. Exhaust manifold
27. Exhaust manifold gasket
28. Turbocharger gasket
29. Turbocharger seal ring
30. Turbocharger assembly
    - Transfer assembly (Refer to GROUP 22C, Transfer Assembly P.22C-495)

>>B<<

31. Turbocharger bracket



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Removal steps (Continued)

<<A>>

32. Turbocharger oil feed tube
33. Gasket
34. Turbocharger water return pipe

Removal steps (Continued)

35. Gasket

>>A<<

36. Turbocharger

Required Special Tool:

- MB991614: Angle Gauge

TSB Revision

REMOVAL SERVICE POINT

<<A>> TURBOCHARGER OIL FEED TUBE REMOVAL

⚠ CAUTION

Take care not to allow foreign objects to get into the oil passage hole of the turbocharger assembly after the turbocharger oil feed tube is removed.

INSTALLATION SERVICE POINTS

>>A<< TURBOCHARGER INSTALLATION

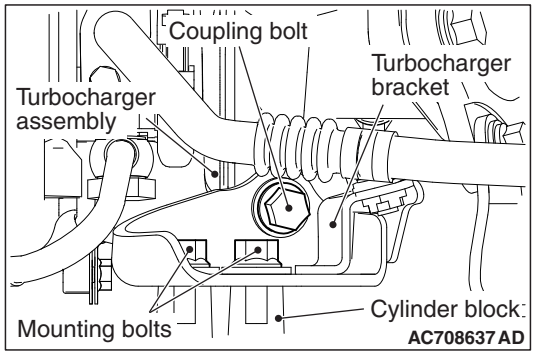
1. Clean the fitting between turbocharger oil tube and turbocharger water pipe, the inside of eye bolts, the inside of tube and the inside of pipe for clogs.

⚠ CAUTION

Take care not to allow foreign objects to get into the turbocharger.

2. Clean or use compressed air to remove any carbon particles stuck to the oil passage of the turbocharger.
3. Refill new engine oil at the turbocharger oil feed tube fitting hole of the turbocharger.

>>B<< TURBOCHARGER BRACKET/TURBOCHARGER BRACKET AND TURBOCHARGER ASSEMBLY COUPLING BOLT INSTALLATION

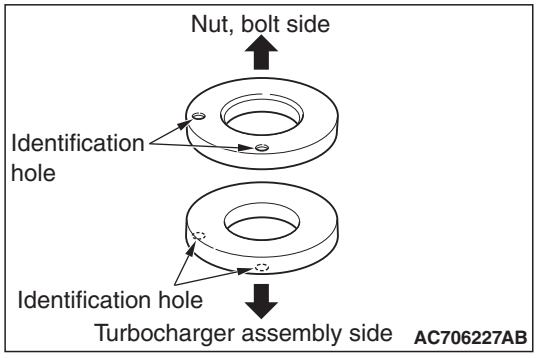


1. Check that the turbocharger bracket is in close contact with the turbocharger assembly and with the cylinder block. Then, temporarily tighten the turbocharger bracket mounting bolts, the turbocharger bracket and the turbocharger assembly coupling bolts.
2. Tighten the turbocharger bracket mounting bolts to the specified torque.

   Tightening torque: 51 ± 7 N· m (38 ± 5 ft-lb)

3. Tighten the turbocharger bracket and turbocharger assembly coupling bolt to the specified torque.

   Tightening torque: 64 ± 5 N· m (48 ± 3 ft-lb)



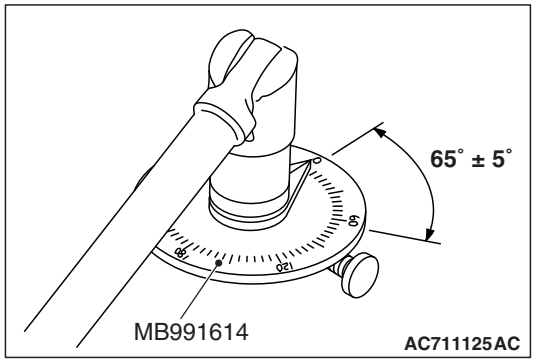
>>C<< EXHAUST MANIFOLD AND TURBOCHARGER ASSEMBLY COUPLING BOLT AND NUT INSTALLATION

1. Tighten the bolts and nuts according to the procedure below.
   (1) Install two washers with their identification holes facing outside as shown in the figure.
   (2) Tighten the bolts and nuts to the specified torque.
   Tightening torque: 29 ± 2 N· m (22 ± 1 ft-lb)

⚠ CAUTION

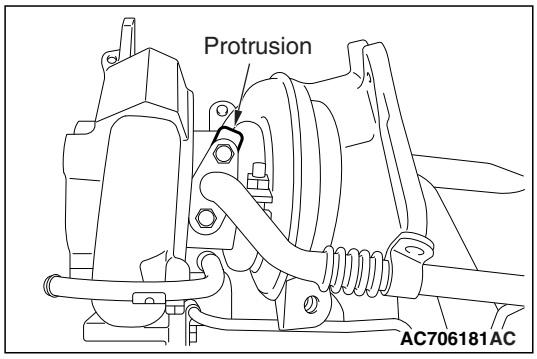
- **When the tightening angle is smaller than the specified tightening angle, the appropriate tightening capacity cannot be secured.**
- **When the tightening angle is larger than the specified tightening angle, remove the bolt and nut to start from the beginning again according to the procedure.**

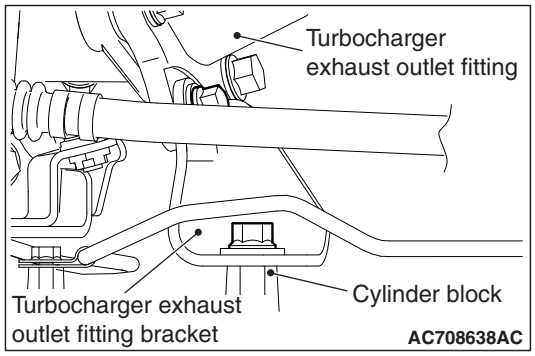
   (3) Use special tool MB991614 to tighten bolts and nuts 65 ± 5 degrees angle.



>>D<< TURBOCHARGER OIL RETURN TUBE GASKET INSTALLATION

Install the gasket as its protrusion is in the direction shown. Install the gasket so that its protrusion faces in the direction shown in the illustration.





>>E<< TURBOCHARGER EXHAUST OUTLET FITTING BRACKET INSTALLATION

1. Check that the turbocharger exhaust outlet fitting bracket is in close contact with the turbocharger exhaust outlet fitting and with the cylinder block, and then temporarily tighten the turbocharger exhaust outlet fitting bracket mounting bolts.
2. Tighten the bolt of the cylinder block side to the specified torque.

   Tightening torque: 51 ± 7 N· m (38 ± 5 ft-lb)
3. Tighten the bolt of the turbocharger exhaust outlet fitting bracket side to the specified torque.

   Tightening torque: 64 ± 5 N· m (48 ± 3 ft-lb)

INSPECTION

M1151009400239

EXHAUST MANIFOLD CHECK

1. Check the exhaust manifold for damage and cracks, and replace it if necessary.
2. Using a straight edge and a thickness gauge, check for distortion of the cylinder head and turbocharger installation surface. If it exceeds the limit value, replace it.

   Limit <Cylinder head assembly side>: 0.70 mm (0.028 inch)
   Limit <Turbocharger assembly side>: 0.40 mm (0.016 inch)

TURBOCHARGER ASSEMBLY CHECK

1. Visually check the turbine wheel and the compressor wheel for cracking or other damage.
2. Check whether the turbine wheel and the compressor wheel can be easily turned by hand.
3. Check for oil leakage from the turbocharger assembly.
4. Check whether or not the turbocharger waste gate regulating valve remains open. If any problem is found, replace the part after disassembly.

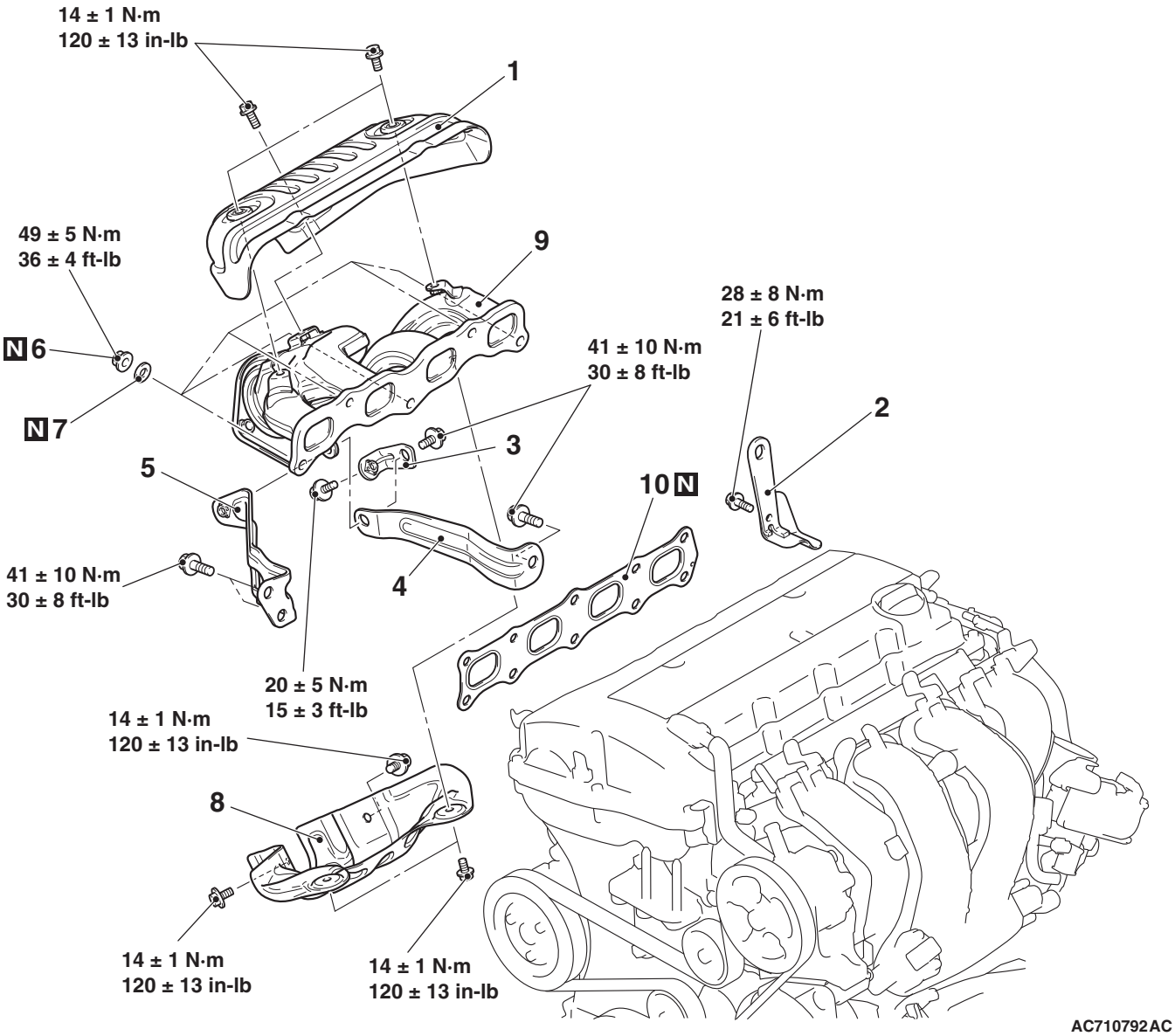
EXHAUST MANIFOLD <2.4L ENGINE>

REMOVAL AND INSTALLATION

M1151003302445

Pre-removal Operation	Post-installation Operation
• Front Exhaust Pipe Removal (Refer to P.15-31.) • Strut Tower Bar Removal (Refer to GROUP 42A, Strut Tower Bar P.42A-15.)	• Strut Tower Bar Installation (Refer to GROUP 42A, Strut Tower Bar P.42A-15.) • Front Exhaust Pipe Installation (Refer to P.15-31.)

<Except vehicles for California>



Removal steps

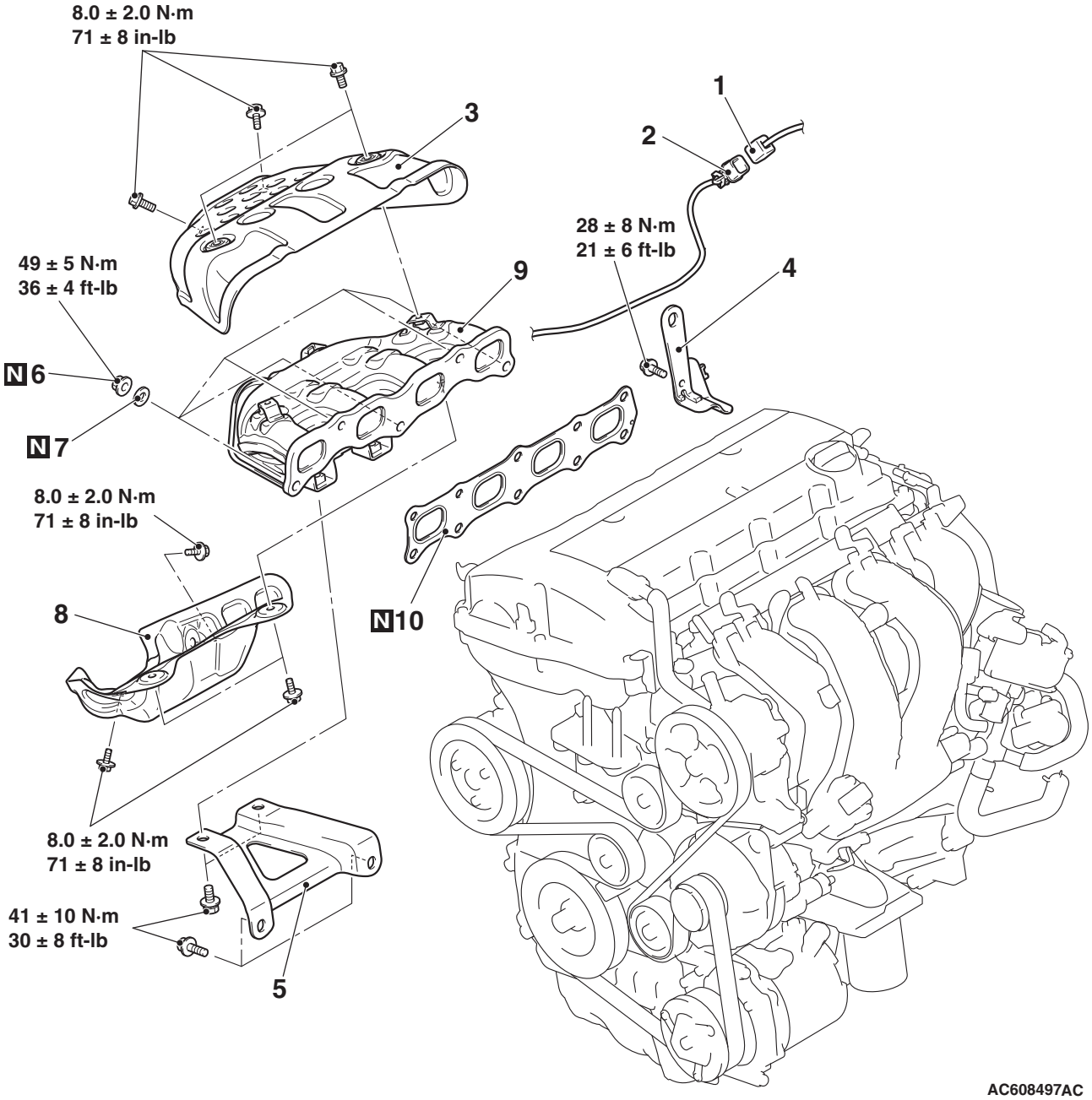
1. Exhaust manifold cover (upper)
2. Engine hanger
3. Exhaust manifold bracket D
4. Exhaust manifold bracket B
5. Exhaust manifold bracket A

Removal steps (Continued)

6. Exhaust manifold nut
7. Exhaust manifold washer
8. Exhaust manifold cover (lower)
9. Exhaust manifold
10. Exhaust manifold gasket

TSB Revision

<Vehicles for California>



Removal steps

1. Heated oxygen sensor (front) connector connection
2. Heated oxygen sensor (front) harness clamp connection
3. Exhaust manifold cover (upper)
4. Engine hanger

Removal steps (Continued)

5. Exhaust manifold bracket
6. Exhaust manifold nut
7. Exhaust manifold washer
8. Exhaust manifold cover (lower)
9. Exhaust manifold
10. Exhaust manifold gasket

TSB Revision

INSPECTION

M1151003401375

EXHAUST MANIFOLD CHECK

1. Check the exhaust manifold for damage and cracks, and replace it if necessary.
2. Using a straight edge and a thickness gauge, check for distortion of the cylinder head installation surface. If it exceeds the limit value, replace it.

Limit: 0.70 mm (0.028 inch)

EXHAUST PIPE, MAIN MUFFLER AND CATALYTIC CONVERTER <2.0L ENGINE>

REMOVAL AND INSTALLATION

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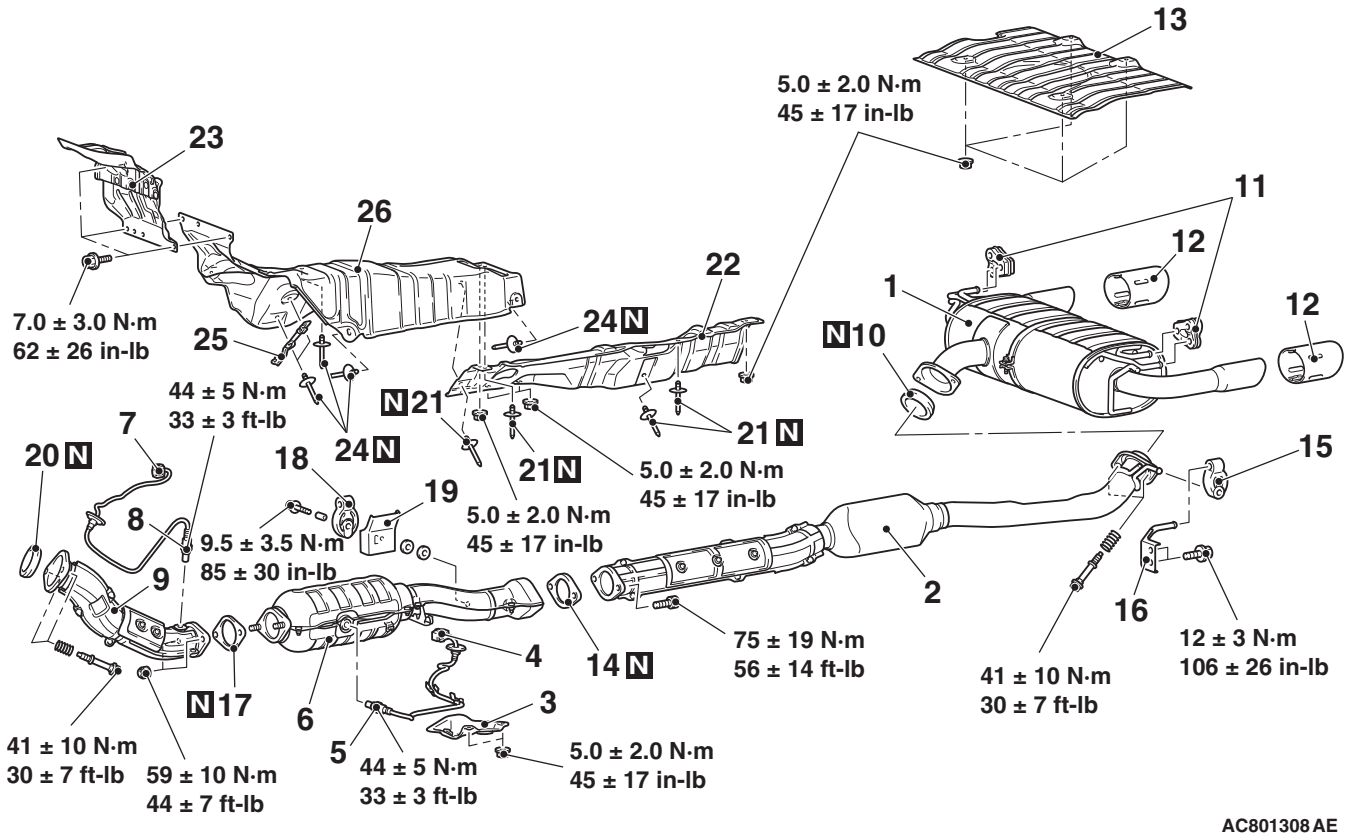


AC801308 AE

Exhaust main muffler and rear floor panel heat protector removal steps

1. Exhaust main muffler
10. Seal ring
11. Exhaust muffler hanger
12. Exhaust tail pipe diffuser
13. Rear floor panel heat protector

Center exhaust pipe removal steps

2. Center exhaust pipe
10. Seal ring
14. Exhaust pipe gasket
15. Exhaust muffler hanger
16. Exhaust pipe hanger bracket

TSB Revision

Catalytic converter removal steps

3. Harness cover
4. Heated oxygen sensor (rear) connector connection

<<A>> >>B<< 5. Heated oxygen sensor (rear)

6. Catalytic converter
14. Exhaust pipe gasket
17. Exhaust pipe gasket
18. Exhaust muffler hanger
19. Exhaust muffler hanger protector

Front exhaust pipe removal steps

- Cowl side trim (RH) (Refer to GROUP 52A, Trims P.52A-11)
- Floor console side cover (RH) (Refer to GROUP 52A, Front Floor Console Assembly P.52A-9)
- Turn up the passenger side floor carpet.
- Front floor backbone brace A (Refer to GROUP 42A, Loose Panel P.42A-221)

7. Heated oxygen sensor (front) connector connection

<<A>> >>B<< 8. Heated oxygen sensor (front)

9. Front exhaust pipe
17. Exhaust pipe gasket
20. Seal ring

Front floor panel front heat protector and front floor panel rear heat protector removal steps

2. Center exhaust pipe
3. Harness cover
4. Heated oxygen sensor (rear) connector connection
6. Catalytic converter

- Cowl side trim (RH) (Refer to GROUP 52A, Trims P.52A-11)
- Floor console side cover (RH) (Refer to GROUP 52A, Front Floor Console Assembly P.52A-9)
- Turn up the passenger side floor carpet.
- Front floor backbone brace A (Refer to GROUP 42A, Loose Panel P.42A-221)

7. Heated oxygen sensor (front) connector connection
9. Front exhaust pipe
10. Seal ring
14. Exhaust pipe gasket
17. Exhaust pipe gasket
20. Seal ring

- Propeller shaft assembly (Refer to GROUP 25, Propeller Shaft P.25-7)

<<B>> >>A<< 21. Rivet

22. Front floor rear panel heat protector
23. Dash panel heat protector

<<B>> >>A<< 24. Rivet

25. Heated oxygen sensor clip
26. Front floor front panel heat protector

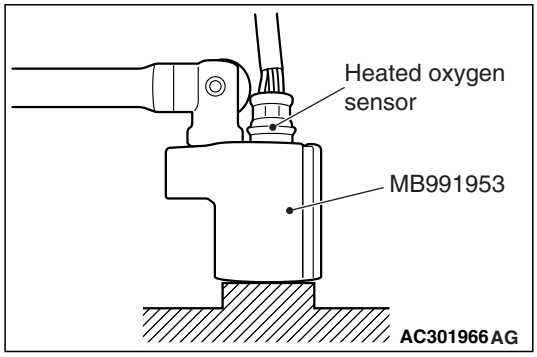
Required Special Tool:

- MB991953: Oxygen Sensor Wrench

REMOVAL SERVICE POINTS

<<A>> HEATED OXYGEN SENSOR REMOVAL

Use special tool MB991953 to remove the heated oxygen sensor.

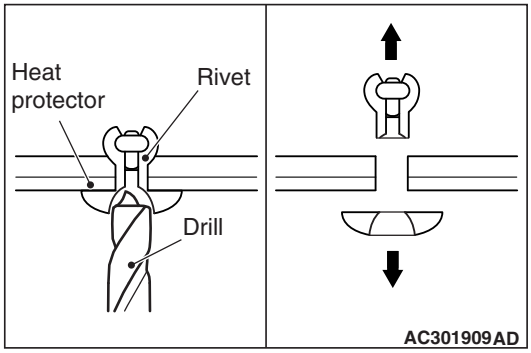


<<B>> RIVET REMOVAL

⚠ CAUTION

Be careful not to score the heat protector by drill.

Use a 6.0 / diameter / mm drill to make a hole in the rivet to break it, and then remove the rivet.

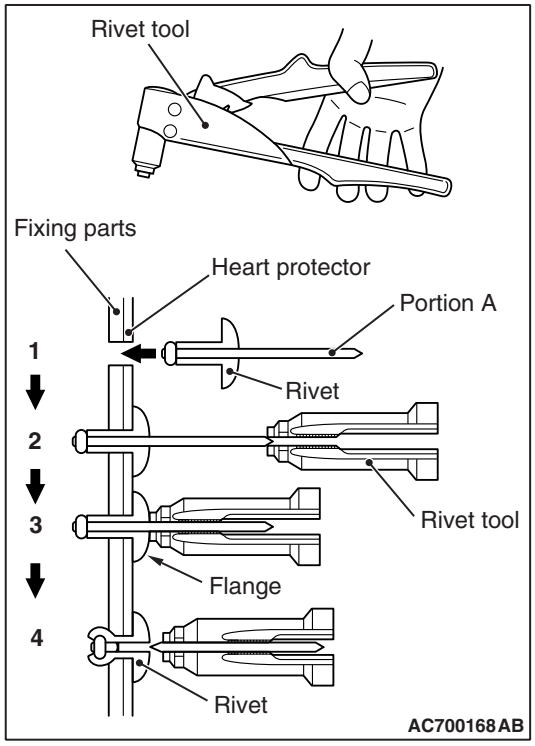


INSTALLATION SERVICE POINTS

>>A<< RIVET INSTALLATION

Use a rivet tool shown in the illustration to connect the parts with rivets by the following procedures.

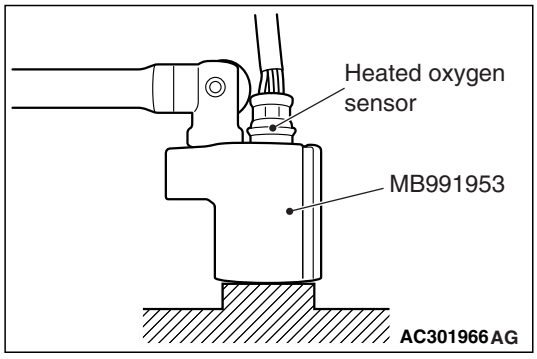
1. Insert the rivet into a corresponding location.
2. Set the rivet tool at a portion A of rivet.
3. While pushing the flange surface of the rivet onto parts to be fixed with the rivet tool, press the handle of the tool.
4. Thin part of portion A of the rivet will be cut off and the parts is fixed in position.



>>B<< HEATED OXYGEN SENSOR INSTALLATION

Tighten the heated oxygen sensor to the specified torque by using special tool MB991953.

Tightening torque: 44 ± 5 N· m (33 ± 3 ft-lb)



EXHAUST PIPE AND MAIN MUFFLER <2.4L ENGINE>

REMOVAL AND INSTALLATION

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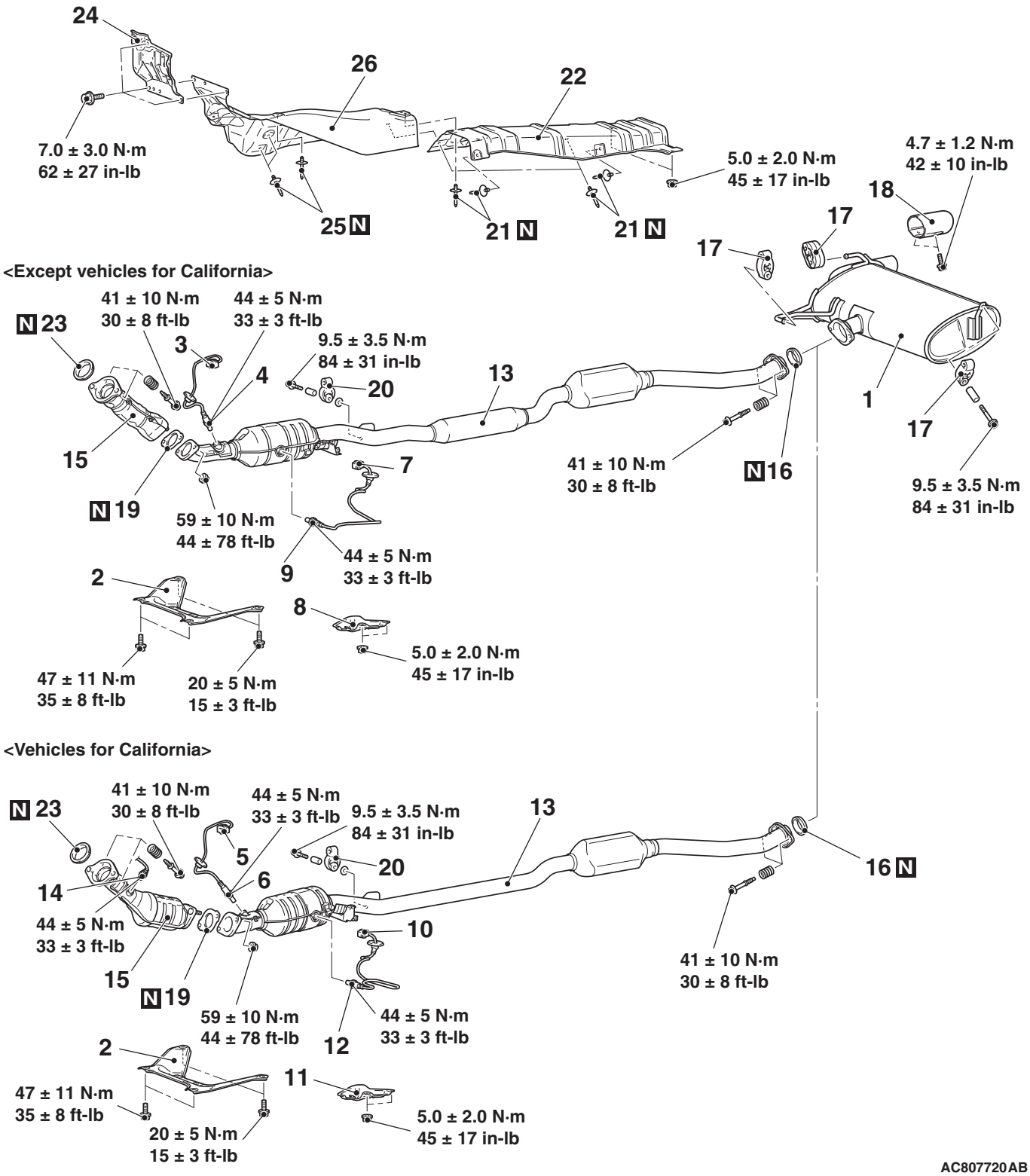

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Exhaust main muffler removal steps

1. Exhaust main muffler
16. Seal ring

Exhaust main muffler removal steps (Continued)

17. Exhaust muffler hanger
18. Exhaust tail pipe diffuser

TSB Revision

Center exhaust pipe and front floor panel rear heat protector removal steps

2. Front floor backbone brace A
   - Cowl side trim (LH) (Refer to GROUP 52A, Trims P.52A-11)
   - Footrest
   - Floor console side cover (LH) (Refer to GROUP 52A, Front Floor Console Assembly P.52A-9)
   - Turn up the driver's side floor carpet.
3. Heated oxygen sensor (front) connector connection <except vehicles for California>

<<A>> >>B<< 4. Heated oxygen sensor (front) <except vehicles for California>

5. Heated oxygen sensor (rear) connector connection <vehicles for California>

<<A>> >>B<< 6. Heated oxygen sensor (rear) <vehicles for California>

7. Heated oxygen sensor (rear) connector connection <except vehicles for California>
8. Harness cover <except vehicles for California>

Center exhaust pipe and front floor panel rear heat protector removal steps (Continued)

<<A>> >>B<< 9. Heated oxygen sensor (rear) <except vehicles for California>

10. Heated oxygen sensor (3rd) connector connection <vehicles for California>
11. Harness cover <vehicles for California>

<<A>> >>B<< 12. Heated oxygen sensor (3rd) <vehicles for California>

13. Center exhaust pipe
19. Exhaust pipe gasket
20. Exhaust muffler hanger

<<B>> >>A<< 21. Rivet

22. Front floor rear panel heat protector

Front exhaust pipe and front floor panel front heat protector removal steps

<<A>> >>B<< 14. Heated oxygen sensor (front) <vehicles for California>

15. Front exhaust pipe
19. Exhaust pipe gasket
23. Seal ring
24. Dash panel heat protector

<<B>> >>A<< 25. Rivet

26. Front floor front panel heat protector

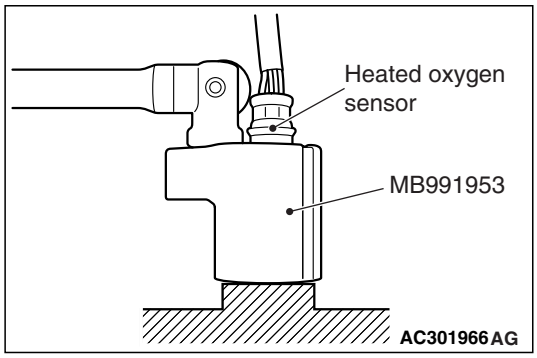
Required Special Tool:

- MB991953: Oxygen Sensor Wrench

REMOVAL SERVICE POINTS

<<A>> HEATED OXYGEN SENSOR REMOVAL

Use special tool MB991953 to remove the heated oxygen sensor.

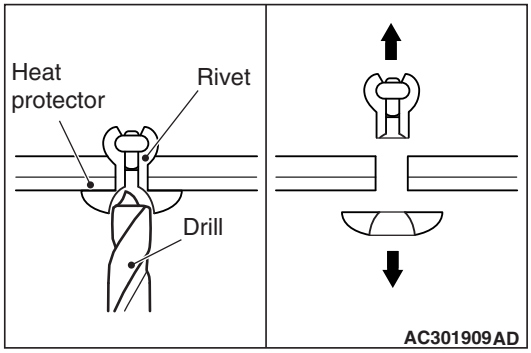


<<B>> RIVET REMOVAL

⚠ CAUTION

Be careful not to score the heat protector by drill.

Use a 6.0 / diameter / mm drill to make a hole in the rivet to break it, and then remove the rivet.

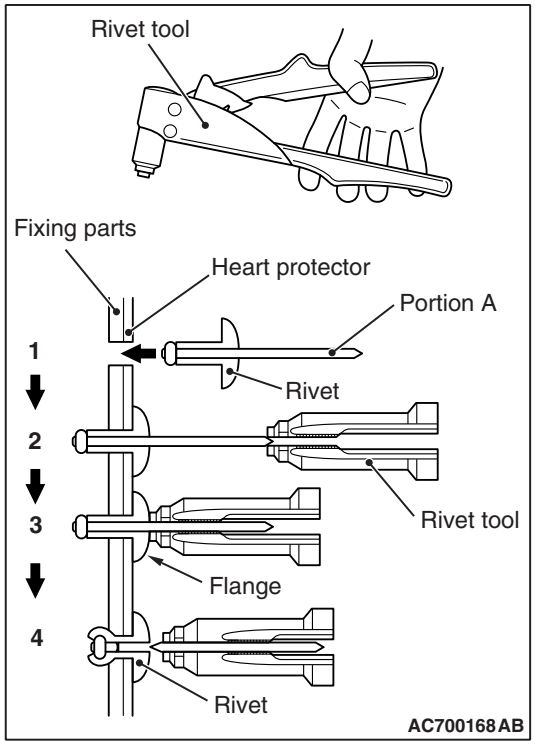


INSTALLATION SERVICE POINTS

>>A<< RIVET INSTALLATION

Use a rivet tool shown in the illustration to connect the parts with rivets by the following procedures.

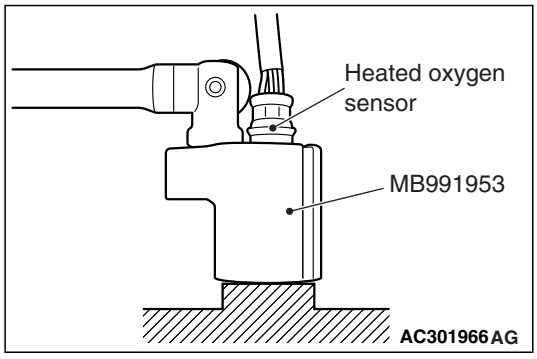
1. Insert the rivet into a corresponding location.
2. Set the rivet tool at a portion A of rivet.
3. While pushing the flange surface of the rivet onto parts to be fixed with the rivet tool, press the handle of the tool.
4. Thin part of portion A of the rivet will be cut off and the parts is fixed in position.



>>B<< HEATED OXYGEN SENSOR INSTALLATION

Tighten the heated oxygen sensor to the specified torque by using special tool MB991953.

Tightening torque: 44 ± 5 N· m (33 ± 3 ft-lb)



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