
GROUP 15

INTAKE AND EXHAUST

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GENERAL INFORMATION

M1151000100521

The exhaust pipe is divided into four parts.

SERVICE SPECIFICATION

M1151000300525

| Item | Standard value | Limit |
|--|----------------|-------|
| Manifold distortion of the installation surface mm | 0.15 or less | 0.20 |

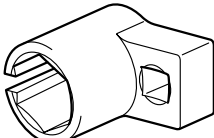
SEALANTS

M1151000500295

| Item | Specified sealant |
|-------------------------------|---|
| Thermostat case assembly | mitsubishi GENUINE Part No.MD970389 or equivalent |
| Thermostat case assembly bolt | 3M Stud Locking 4170 or equivalent |

SPECIAL TOOL

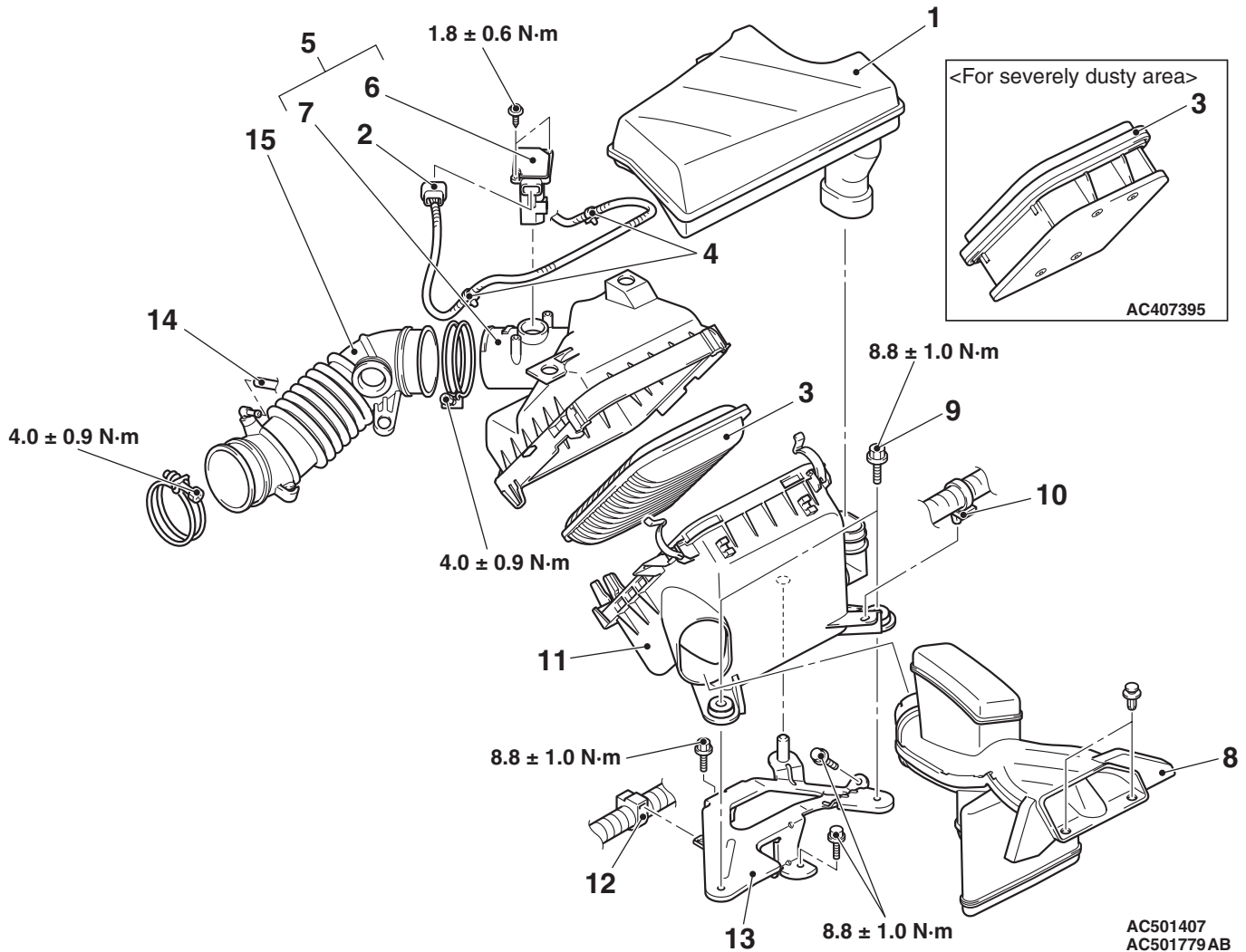
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| Tool | Number | Name | Use |
|--|----------|----------------------|---|
|  B991953 | MB991953 | Oxygen sensor wrench | Removal and installation of oxygen sensor |

AIR CLEANER

REMOVAL AND INSTALLATION

M1151002100970



Air cleaner removal steps

1. Air cleaner resonator
2. Air cleaner air flow sensor connector
3. Air cleaner element
4. Harness clamp
5. Air cleaner air flow sensor and air cleaner cover assembly
6. Air cleaner air flow sensor assembly
7. Air cleaner cover
8. Air cleaner intake duct
9. Air cleaner body assembly bolts
- Battery terminal connection
10. Harness clamp
11. Air cleaner body assembly

<<A>>

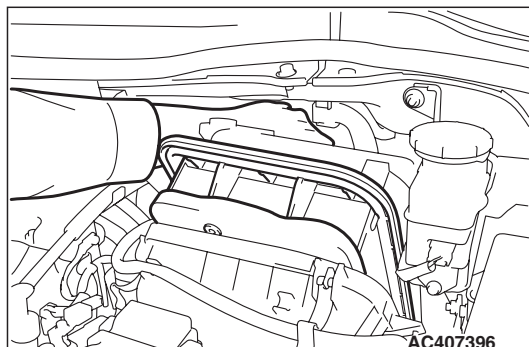
<<A>>

Air cleaner removal steps

12. Harness clamp
13. Air cleaner bracket
14. Breather hose connection
- Engine cover (Refer to GROUP 11A, Camshaft and Valve Stem Seal P.11A-17.)
15. Air intake hose

Air cleaner element removal steps

1. Air cleaner resonator
8. Air cleaner intake duct <For severely dusty area only>
9. Air cleaner assembly bolts <For severely dusty area only>
3. Air cleaner element

REMOVAL SERVICE POINT**<<A>> AIR CLEANER INTAKE DUCT/AIR
CLEANER ASSEMBLY BOLTS REMOVAL
<FOR SEVERELY DUSTY AREA ONLY>**

Push rearward the air cleaner cover as shown in the illustration, and spread wide the opening area.

INLET MANIFOLD**REMOVAL AND INSTALLATION**

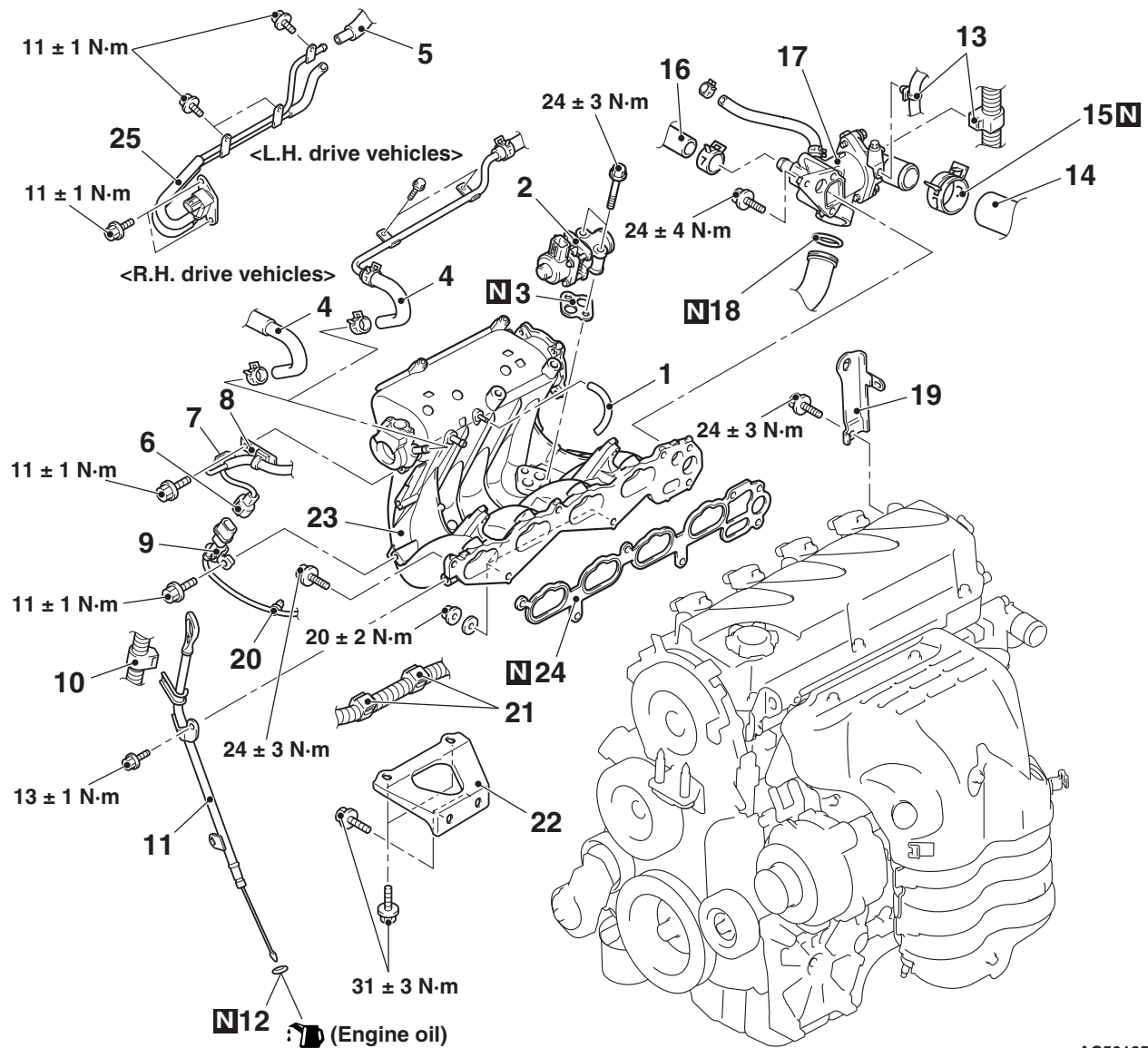
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Pre-removal Operation

- Engine Cover and Engine Cover Bracket Removal (Refer to GROUP 11A, Camshaft and Valve Stem Seal [P.11A-17](#)).
- Engine Coolant Draining (Refer to GROUP 14, On-vehicle Service –Engine Coolant Replacement [P.14-18](#)).
- Air Cleaner Assembly Removal (Refer to [P.15-3](#)).
- Cowl Top Panel Front Removal (Refer to GROUP 42, Loose Panel [P.42-80](#)).
- Throttle Body Removal (Refer to GROUP 13A, Throttle Body <Except Vehicles for Hong Kong, Singapore, Australia and New Zealand> [P.13A-321](#)).
- Throttle Body Removal (Refer to GROUP 13B, Throttle Body <Vehicles for Hong Kong and Singapore> [P.13B-295](#)).
- Throttle Body Removal (Refer to GROUP 13C, Throttle Body <Vehicles for Australia and New Zealand> [P.13C-348](#)).
- Fuel Delivery Pipe and Fuel Injector Assembly Removal (Refer to GROUP 13A, Injector <Except Vehicles for Hong Kong, Singapore, Australia and New Zealand> [P.13A-319](#)).
- Fuel Delivery Pipe and Fuel Injector Assembly Removal (Refer to GROUP 13B, Injector <Vehicles for Hong Kong and Singapore> [P.13B-293](#)).
- Fuel Delivery Pipe and Fuel Injector Assembly Removal (Refer to GROUP 13C, Injector <Vehicles for Australia and New Zealand> [P.13C-346](#)).

Post-installation Operation

- Fuel Delivery Pipe and Fuel Injector Assembly Installation (Refer to GROUP 13A, Injector <Except Vehicles for Hong Kong, Singapore, Australia and New Zealand> [P.13A-319](#)).
- Fuel Delivery Pipe and Fuel Injector Assembly Installation (Refer to GROUP 13B, Injector <Vehicles for Hong Kong and Singapore> [P.13B-293](#)).
- Fuel Delivery Pipe and Fuel Injector Assembly Installation (Refer to GROUP 13C, Injector <Vehicles for Australia and New Zealand> [P.13C-346](#)).
- Throttle Body Installation (Refer to GROUP 13A, Throttle Body <Except Vehicles for Hong Kong, Singapore, Australia and New Zealand> [P.13A-321](#)).
- Throttle Body Installation (Refer to GROUP 13B, Throttle Body <Vehicles for Hong Kong and Singapore> [P.13B-295](#)).
- Throttle Body Installation (Refer to GROUP 13C, Throttle Body <Vehicles for Australia and New Zealand> [P.13C-348](#)).
- Cowl Top Panel Front Installation (Refer to GROUP 42, Loose Panel [P.42-80](#)).
- Air Cleaner Assembly Installation (Refer to [P.15-3](#)).
- Engine Coolant Refilling (Refer to GROUP 14, On-vehicle Service –Engine Coolant Replacement [P.14-18](#)).
- Engine Cover and Engine Cover Bracket Installation (Refer to GROUP 11A, Camshaft and Valve Stem Seal [P.11A-17](#)).



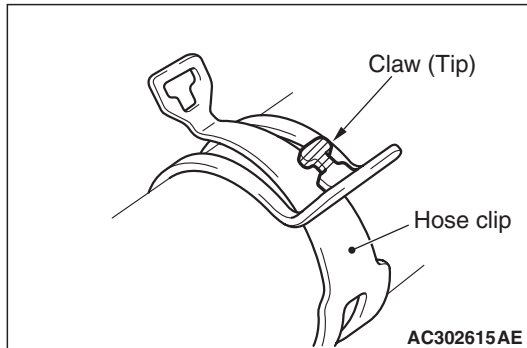
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Removal steps

1. Emission control equipment hose
2. EGR valve
- >>C<< 3. EGR valve gasket
4. Brake booster vacuum hose connection
5. Evaporative emission vacuum hose connection
6. Detonation sensor connector
7. Evaporative emission purge solenoid valve connector
8. Harness clamp
9. Detonation sensor connector clamp
10. Harness clamp
11. Oil level gauge and guide
12. O-ring
13. Harness clamp

Removal steps (Continued)

- | | | |
|-------|-------|---|
| <<A>> | >>B<< | 14. Radiator lower hose connection |
| <<A>> | >>B<< | 15. Hose clip |
| | >>A<< | 16. Heater water hose connection |
| | | 17. Thermostat case assembly |
| | | 18. O-ring |
| | | 19. Engine hanger |
| | | 20. Detonation sensor harness clamp |
| | | 21. Harness clamp |
| | | 22. Inlet manifold stay |
| | | 23. Inlet manifold |
| | | 24. Inlet manifold gasket |
| | | 25. Evaporative emission purge solenoid valve, evaporative emission vacuum hose and pipe assembly |

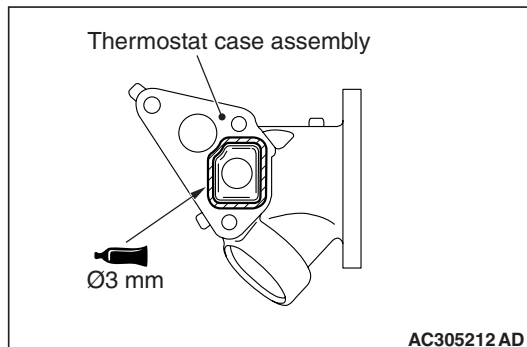
REMOVAL SERVICE POINT**<<A>> RADIATOR LOWER HOSE/HOSE CLIP DISCONNECTION**

Break off the tip of hose clip claw and spread out the hose clip, then disconnect the radiator lower hose.

NOTE: If there is a hose clip claw, the hose clip cannot spread to capacity.

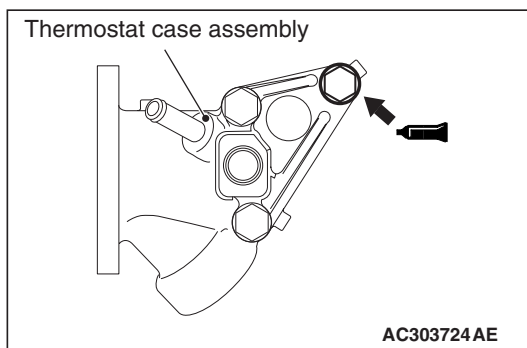
INSTALLATION SERVICE POINTS**>>A<< THERMOSTAT CASE ASSEMBLY INSTALLATION**

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: MITSUBISHI GENUINE PART No.MD970389 or equivalent



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

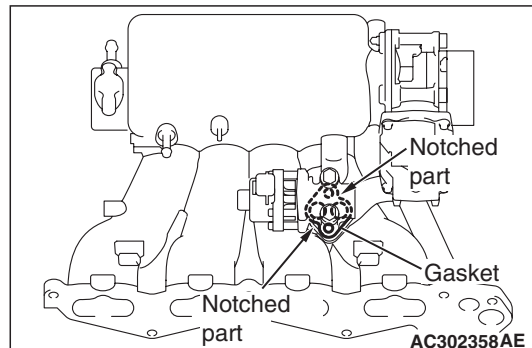
Specified Sealant: 3M Stud Locking 4170 or equivalent

4. With the sealant still wet (within 15 minutes after the sealant is applied), install the thermostat case assembly. Do not apply the sealant in an area more than the required.

>>B<< HOSE CLIP/RADIATOR LOWER HOSE CONNECTION**⚠ CAUTION**

Never reuse the hose clip whose claw is broken off to prevent the rusting.

1. Insert a new hose clip into the radiator lower hose.
2. Insert the radiator lower hose to the protrusion of the water inlet hose fitting.
3. Remove the hose clip claw and shorten the hose clip, then install the radiator lower hose.

>>C<< EGR VALVE GASKET INSTALLATION

Install the EGR valve gasket as shown in the illustration.

INSPECTION

M1151003100713

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

INLET 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 or less

Limit: 0.20 mm

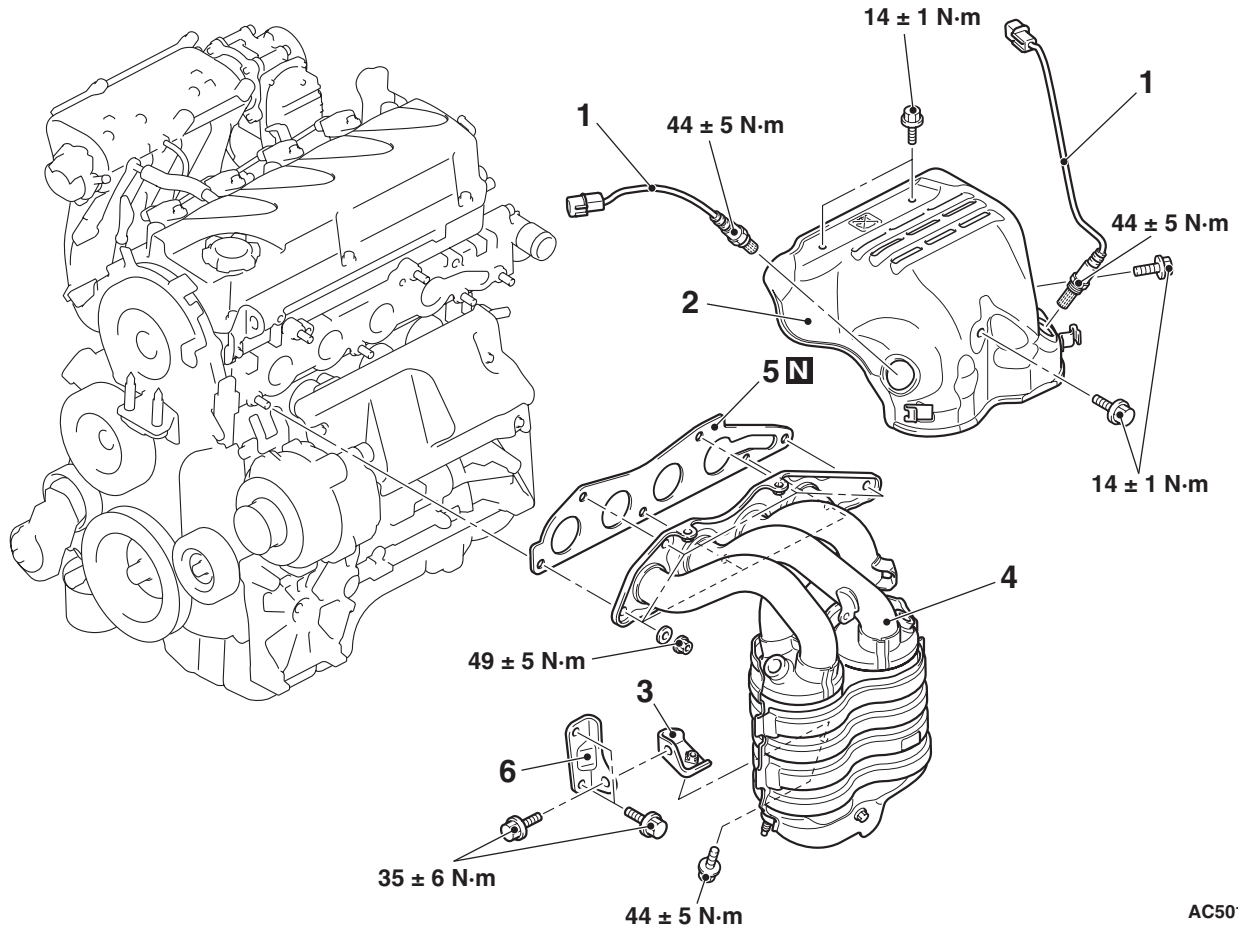
EXHAUST MANIFOLD

REMOVAL AND INSTALLATION

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Pre-removal and Post-installation Operation

Air Cleaner Intake Duct Removal and Installation (Refer to [P.15-3](#)).



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Removal steps

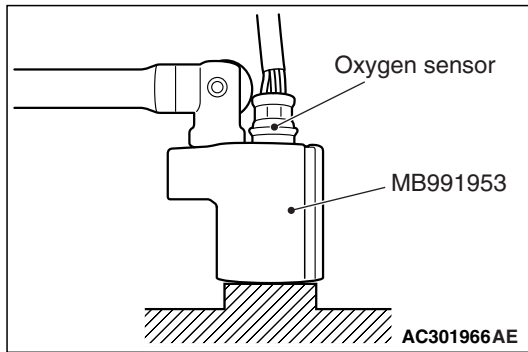
- <<A>> >>A<<
1. Oxygen sensors
 2. Exhaust manifold cover
- <>
- Front exhaust pipe (Refer to [P.15-9](#).)
3. Exhaust manifold bracket B

Removal steps (Continued)

4. Exhaust manifold assembly
5. Exhaust manifold gasket
6. Exhaust manifold bracket A

REMOVAL SERVICE POINTS

<<A>> OXYGEN SENSORS REMOVAL



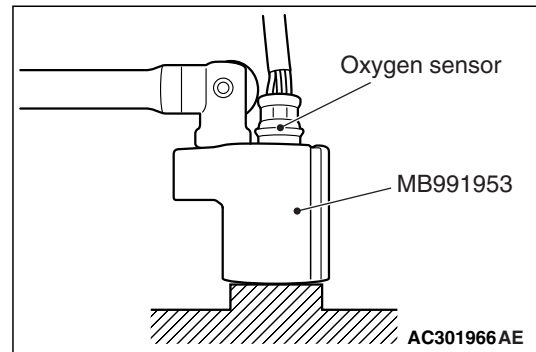
Remove the connection and clamp of oxygen sensor connector, and then use special tool oxygen sensor wrench (MB991953) to remove the oxygen sensor.

<> FRONT EXHAUST PIPE REMOVAL

Remove the connection and clamp of oxygen sensor connector, and then remove the front exhaust pipe with the oxygen sensor.

INSTALLATION SERVICE POINT

>>A<< OXYGEN SENSORS INSTALLATION



1. Tighten the oxygen sensor to the specified torque by using special tool oxygen sensor wrench (MB991953).

Tightening torque: 44 ± 5 N·m

2. Connect the oxygen sensor connector and install the connector bracket.

INSPECTION

M1151003400480

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.

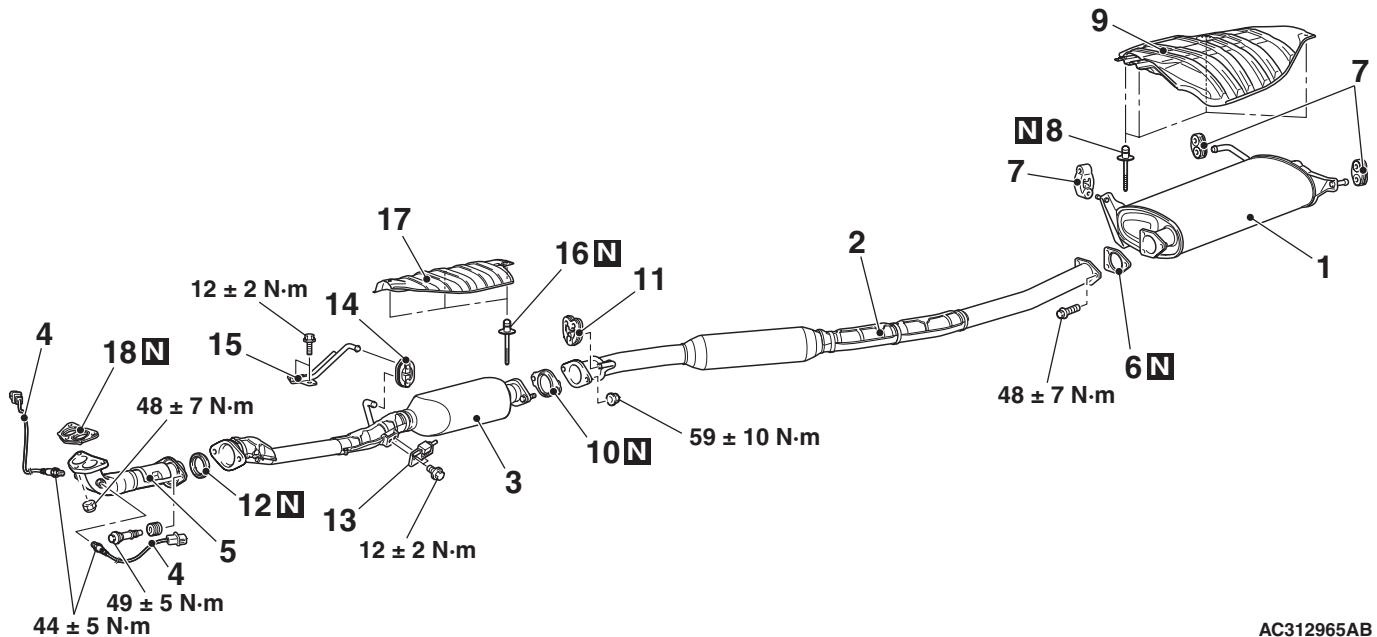
Standard value: 0.15 mm or less

Limit: 0.20 mm

EXHAUST PIPE AND MAIN MUFFLER

REMOVAL AND INSTALLATION

M1151008700884



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Exhaust main muffler and heat protector removal steps

1. Exhaust main muffler
6. Exhaust pipe gasket
7. Exhaust muffler hangers

<<A>> >>B<<
<<A>> >>B<<

Centre exhaust pipe removal steps

2. Centre exhaust pipe
6. Exhaust pipe gasket
10. Exhaust pipe gasket
11. Exhaust muffler hanger

Exhaust pre-muffler, catalytic converter and heat protector removal steps

3. Exhaust pre-muffler*¹ or catalytic converter*²
10. Exhaust pipe gasket
12. Seal ring
13. Exhaust pipe damper

Exhaust pre-muffler, catalytic converter and heat protector removal steps (Continued)

14. Exhaust muffler hanger
15. Exhaust pipe hanger bracket
16. Rivets
17. Heat protector

<<A>> >>B<<
<<A>> >>B<<

Front exhaust pipe removal steps

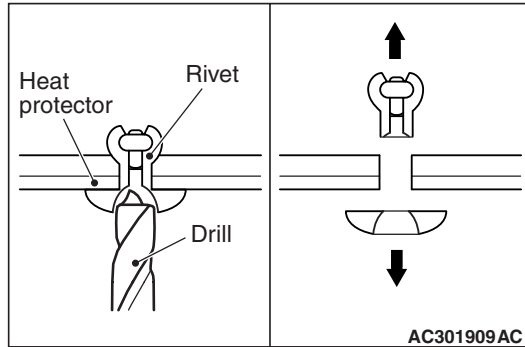
- <> >>A<< 4. Oxygen sensors*³
5. Front exhaust pipe
12. Seal ring
18. Exhaust pipe gasket

NOTE:

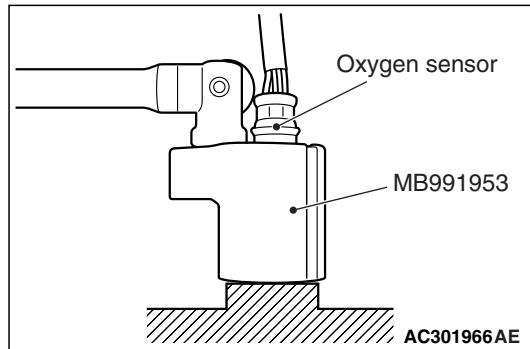
- *¹: Except vehicles for Hong Kong, Singapore, Brazil, Australia and New Zealand
- *²: Vehicles for Hong Kong, Singapore, Brazil, Australia and New Zealand
- *³: Vehicles for Hong Kong, Singapore, Australia and New Zealand

REMOVAL SERVICE POINTS**<<A>> RIVETS/HEAT PROTECTOR
REMOVAL****⚠ CAUTION**

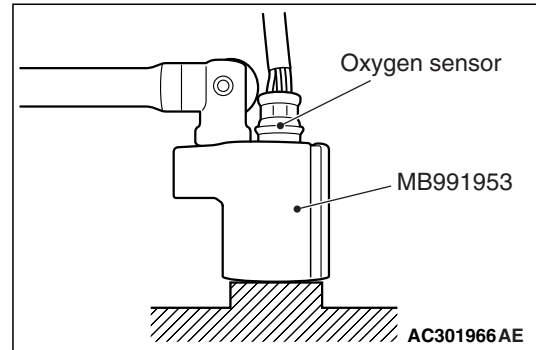
Be careful not to score the heat protector by drill.



1. Use a 6.0 / diameter / mm drill to make a hole in the flange of rivet as shown.
2. Break the rivet, and remove the rivet and heat protector.

<> OXYGEN SENSORS REMOVAL

Remove the connection and clamp of oxygen sensor connector, and then use special tool oxygen sensor wrench (MB991953) to remove the oxygen sensor.

INSTALLATION SERVICE POINTS**>>A<< OXYGEN SENSORS INSTALLA-
TION**

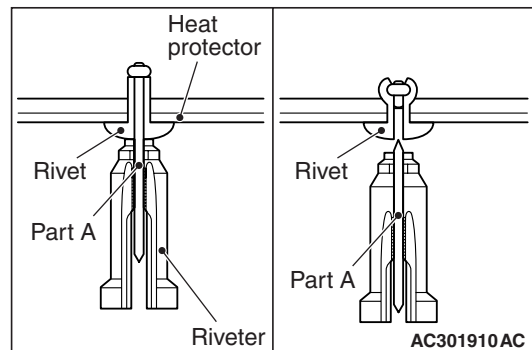
1. Tighten the oxygen sensor to the specified torque by using special tool oxygen sensor wrench (MB991953).

Tightening torque: $44 \pm 5 \text{ N} \cdot \text{m}$

2. Connect the oxygen sensor connector and install the connector bracket.

**>>B<< HEAT PROTECTOR/RIVETS
INSTALLATION**

Use a riveter to tighten the rivet by the following procedure.



1. Insert part A of rivet into the riveter, and insert the rivet into the assembling area.
2. Operate the tool's handle while pushing the flange surface of rivet by riveter. Part A of rivet is cut and the rivet is tightened.