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**GROUP 15**

# INTAKE AND EXHAUST

**CONTENTS**

<b>GENERAL INFORMATION</b> .....	<b>15-2</b>	REMOVAL AND INSTALLATION <4G63> .	15-5
		REMOVAL AND INSTALLATION <4G69> .	15-7
<b>SERVICE SPECIFICATION</b> .....	<b>15-2</b>	INSPECTION.....	15-9
<b>SEALANT</b> .....	<b>15-2</b>	<b>EXHAUST MANIFOLD</b> .....	<b>15-10</b>
		REMOVAL AND INSTALLATION <4G63> .	15-10
<b>SPECIAL TOOL</b> .....	<b>15-2</b>	REMOVAL AND INSTALLATION <4G69> .	15-11
		INSPECTION.....	15-12
<b>AIR CLEANER</b> .....	<b>15-3</b>	<b>EXHAUST PIPE AND MAIN</b>	
REMOVAL AND INSTALLATION <4G63> .	15-3	<b>MUFFLER</b> .....	<b>15-13</b>
REMOVAL AND INSTALLATION <4G69> .	15-4	REMOVAL AND INSTALLATION .....	15-13
<b>INTAKE MANIFOLD</b> .....	<b>15-5</b>		

## GENERAL INFORMATION

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The exhaust pipe is divided into three parts.

## SERVICE SPECIFICATION

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

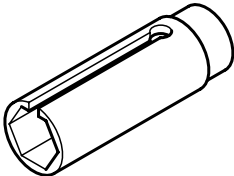
## SEALANT

M1151000500217

Item	Specified sealant
Thermostat case	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
	MD998770	Oxygen sensor wrench	Removal and installation of oxygen sensor

# AIR CLEANER

## REMOVAL AND INSTALLATION <4G63>

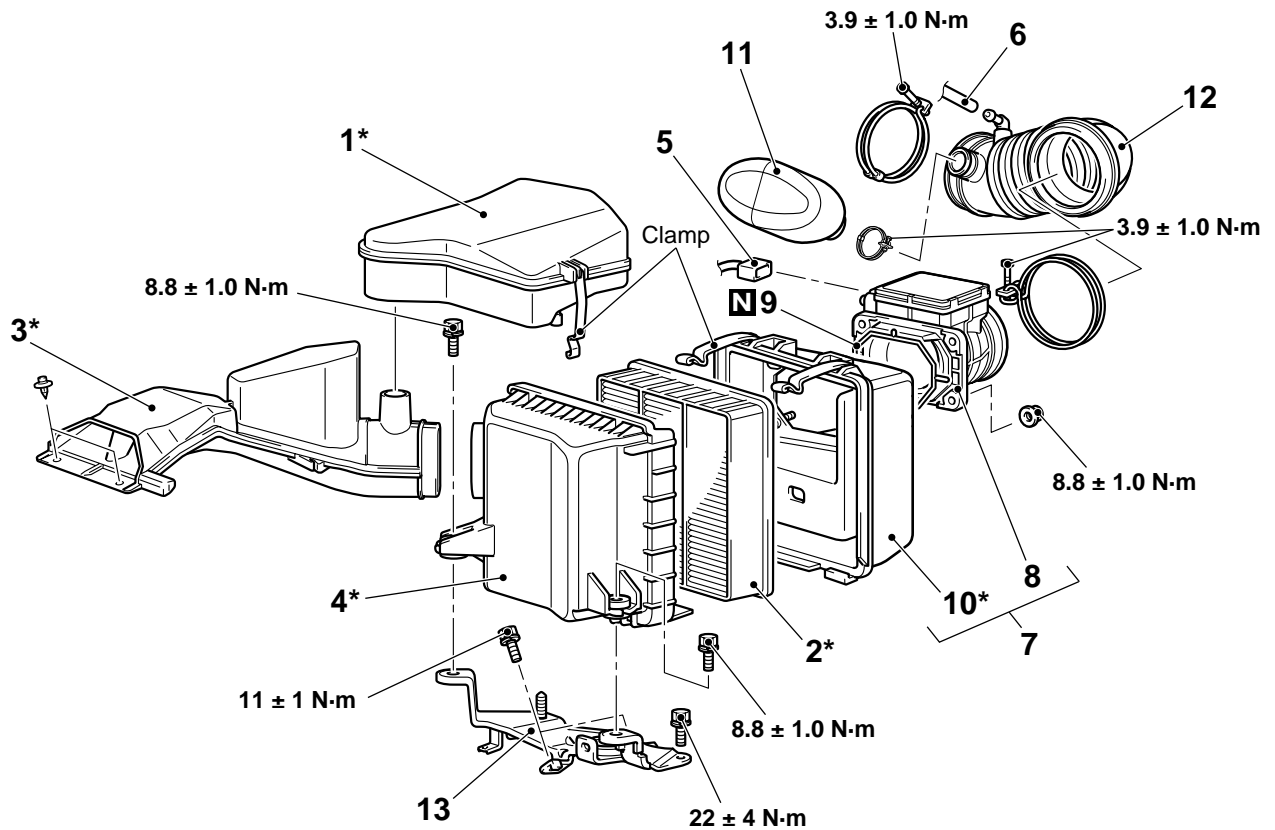
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### ⚠ CAUTION

Parts marked by \* are made of recycled-paper mixed plastic material, so observe the following precautions.

- Avoid any shock or load to these parts when removing and installing them.
- When installing, securely set the air cleaner cover and the resonator clamp to the air cleaner body.

*NOTE: Parts marked by \* are made of recycled-paper mixed plastic material. Dispose of according to state and local laws*



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### Removal steps

1. Resonator
2. Air cleaner element
3. Air duct
4. Air cleaner body
5. Air flow sensor connector
6. Breather hose connection
7. Air cleaner cover and air flow sensor assembly

### Removal steps (Continued)

8. Air flow sensor assembly
9. Gasket
10. Air cleaner cover
11. Resonator
12. Air intake hose
13. Air cleaner bracket

## REMOVAL AND INSTALLATION &lt;4G69&gt;

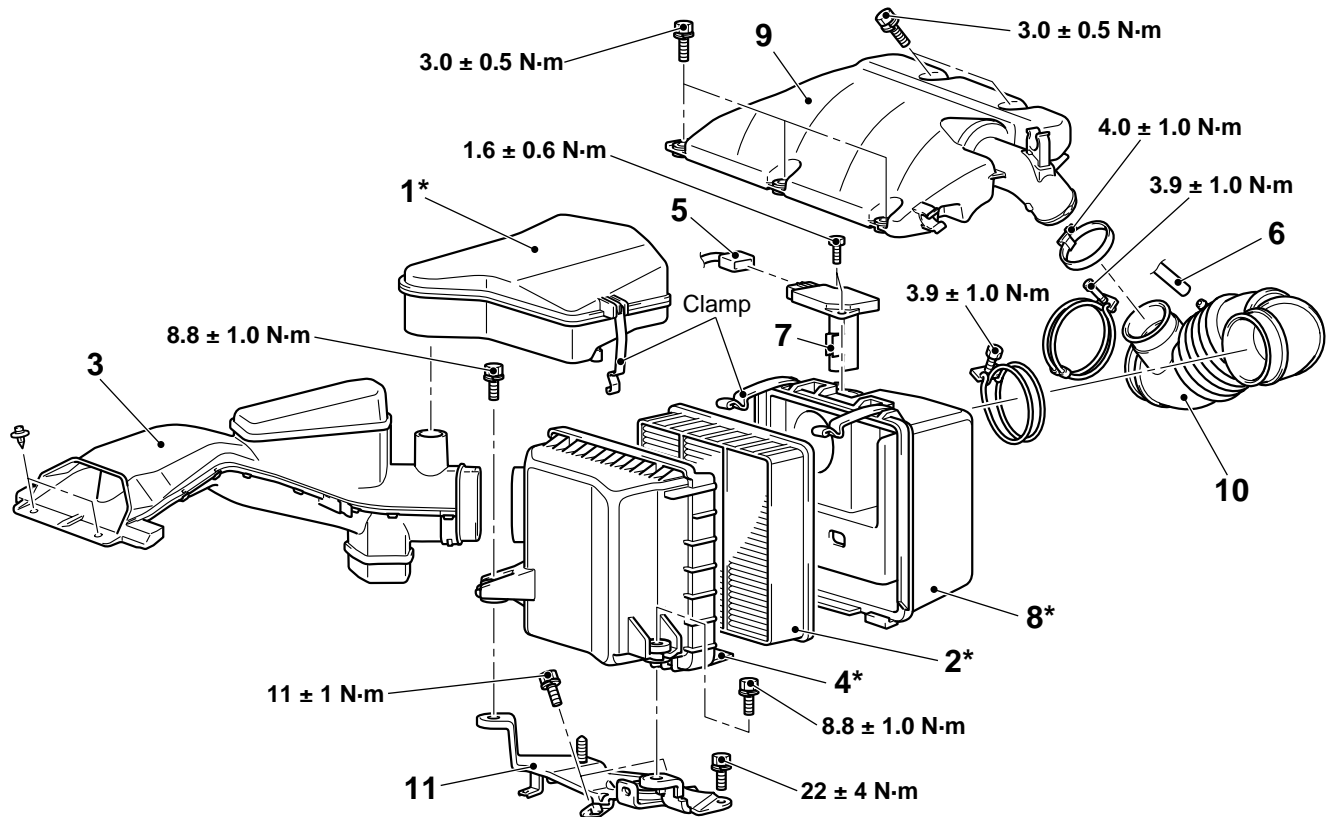
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**CAUTION**

Parts marked by \* are made of recycled-paper mixed plastic material, so observe the following precautions.

- Avoid any shock or load to these parts when removing and installing them.
- When installing, securely set the air cleaner cover and the resonator clamp to the air cleaner body.

*NOTE: Parts marked by \* are made of recycled-paper mixed plastic material. Dispose of according to state and local laws*



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**Removal steps**

1. Resonator
2. Air cleaner element
3. Air duct
4. Air cleaner body
5. Air flow sensor connector
6. Breather hose connection

**Removal steps (Continued)**

7. Air flow sensor assembly
8. Air cleaner cover
9. Resonator
10. Air intake hose
11. Air cleaner bracket

# INTAKE MANIFOLD

## REMOVAL AND INSTALLATION <4G63>

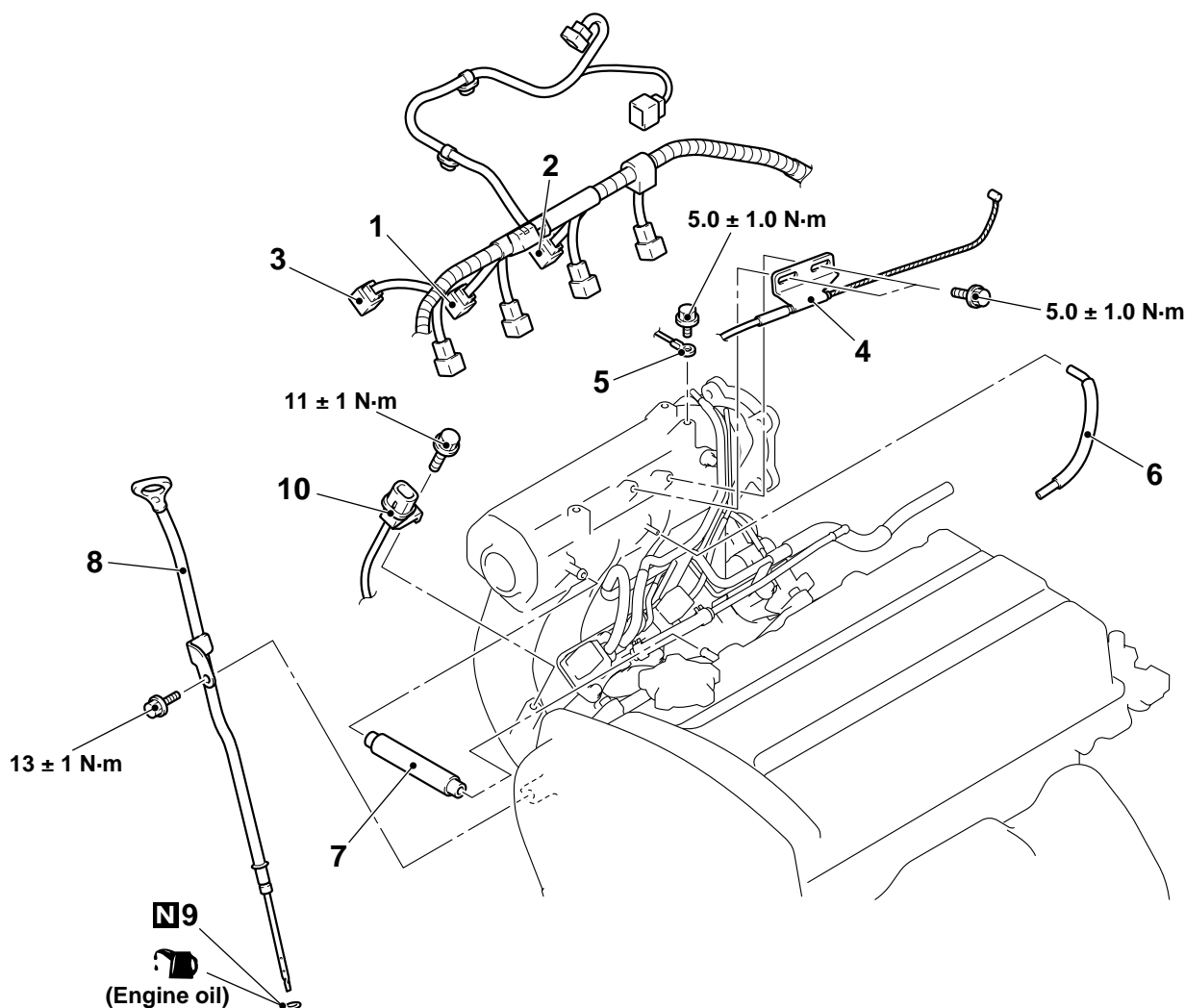
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### Pre-removal Operation

- Fuel Line Pressure Reduction [Refer to GROUP 13A, On-vehicle Service – Fuel Pump Connector Disconnection (How to Reduce Pressurized Fuel Lines) [P.13A-328](#).]
- Throttle Body Removal (Refer to GROUP 13A, Throttle Body [P.13A-340](#)).
- Fuel Delivery Pipe and Fuel Injector assembly Removal (Refer to GROUP 13A, Injector [P.13A-338](#)).

### Post-installation Operation

- Fuel Delivery Pipe and Fuel Injector assembly Installation (Refer to GROUP 13A, Injector [P.13A-338](#)).
- Throttle Body Installation (Refer to GROUP 13A, Throttle Body [P.13A-340](#)).
- Accelerator Cable Adjustment (Refer to GROUP 17, On-vehicle Service – Accelerator Cable Check and Adjustment [P.17-5](#)).
- Fuel Leak Check



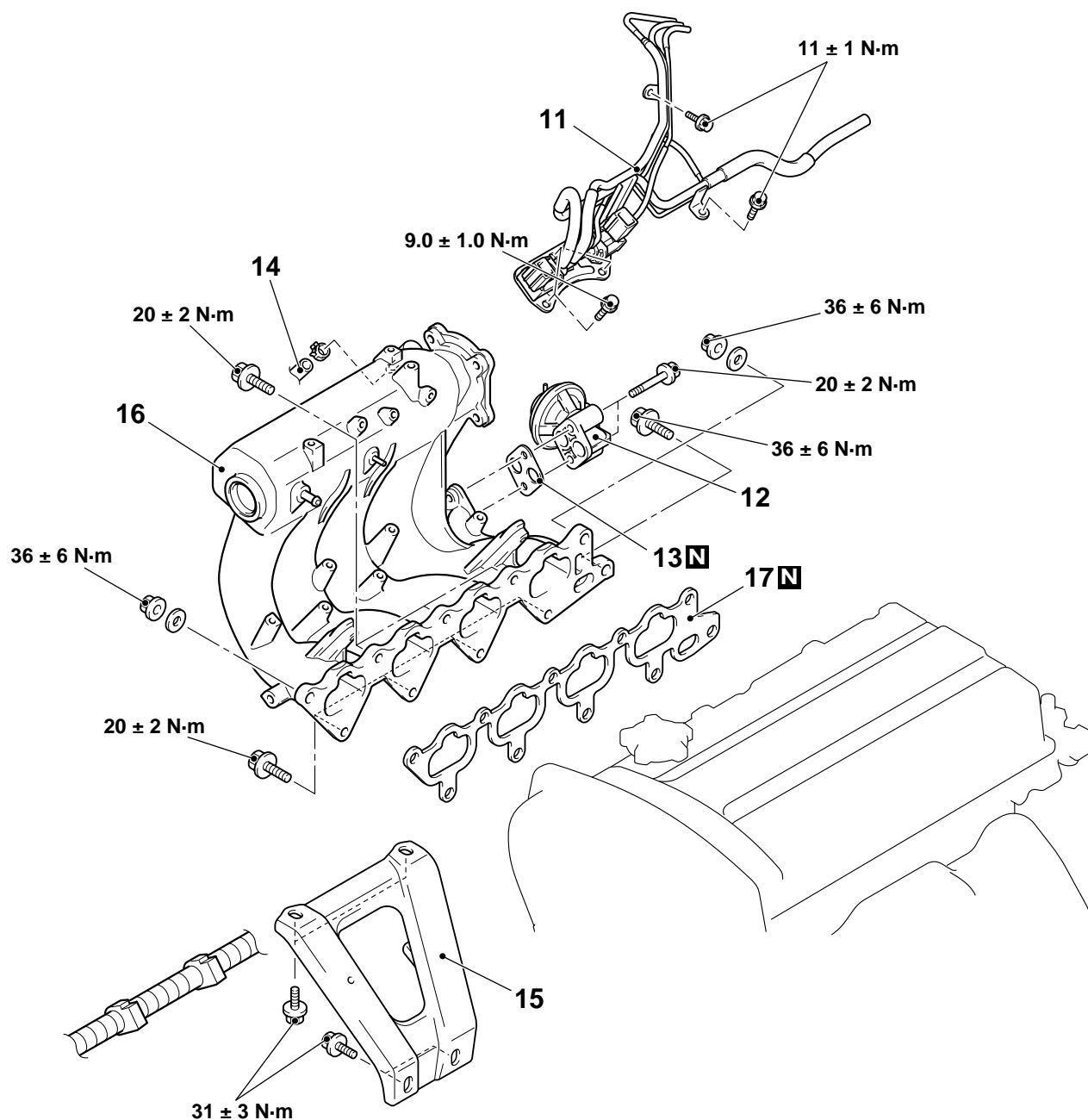
### Removal steps

1. Purge control solenoid valve connector
2. EGR control solenoid valve connector
3. Detonation sensor connector
4. Accelerator cable connection

### Removal steps (Continued)

5. Earth cable connection
6. Emission control equipment hose
7. PCV hose
8. Oil level gauge and guide
9. O-ring
10. Detonation sensor connector clamp

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**Removal steps**

11. Vacuum hose and pipe assembly
12. EGR valve
13. EGR valve gasket
14. Brake booster vacuum hose connection

**Removal steps (Continued)**

15. Intake manifold stay
16. Intake manifold assembly
17. Intake manifold gasket

## REMOVAL AND INSTALLATION <4G69>

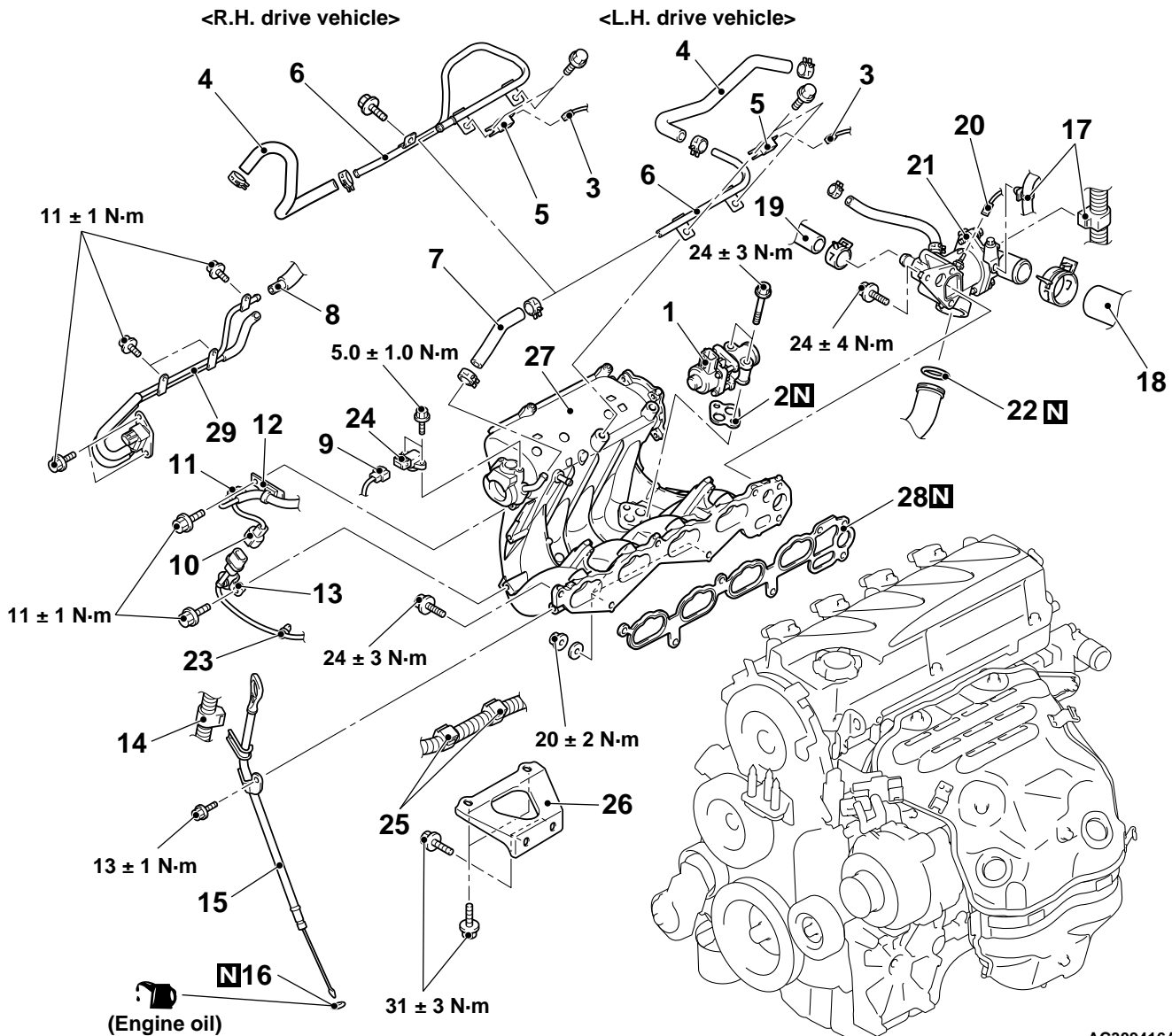
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### Pre-removal Operation

- Fuel Line Pressure Reduction [Refer to GROUP 13B, On-vehicle Service – Fuel Pump Connector Disconnection (How to Reduce Pressurized Fuel Lines) [P.13B-428](#)].
- Engine Coolant Draining (Refer to GROUP 14, On-vehicle Service – Engine Coolant Replacement [P.14-17](#)).
- Air Cleaner Cover and Air Intake Hose Removal (Refer to [P.15-4](#)).
- Throttle Body Removal (Refer to GROUP 13B, Throttle Body [P.13B-438](#)).
- Delivery Pipe and Injector Assembly Removal (Refer to GROUP 13B, Injector [P.13B-437](#)).

### Post-installation Operation

- Delivery Pipe and Injector Assembly Installation (Refer to GROUP 13B, Injector [P.13B-437](#)).
- Throttle Body Installation (Refer to GROUP 13B, Throttle Body [P.13B-438](#)).
- 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.14-17](#)).



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### Removal steps

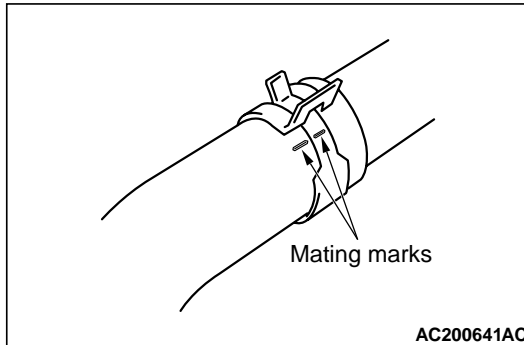
- >>C<<
- EGR valve
  - EGR valve gasket
  - Capacitor connector
  - Brake booster vacuum hose
  - Capacitor

### Removal steps (Continued)

- Brake booster vacuum pipe
- Brake booster vacuum hose
- Evaporative emission vacuum hose connection

**Removal steps (Continued)**

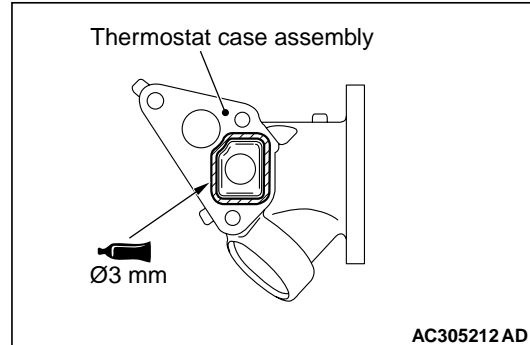
9. Manifold absolute pressure sensor connector  
 10. Detonation sensor connector  
 11. Evaporative emission purge solenoid valve connector  
 12. Harness clamp  
 13. Detonation sensor connector clamp  
 14. Harness clamp  
 15. Oil level gauge and guide  
 16. O-ring  
 17. Harness clamp  
 <<A>> >>B<< 18. Radiator lower hose connection  
 19. Heater water hose connection  
 20. Engine coolant temperature gauge unit connector  
 >>A<< 21. Thermostat housing assembly  
 22. O-ring  
 23. Detonation sensor harness clamp  
 24. Manifold absolute pressure sensor  
 25. Harness clamp  
 26. Intake manifold stay  
 27. Intake manifold  
 28. Intake manifold gasket  
 29. 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 hose and the hose clamp. Disconnect the radiator hose.

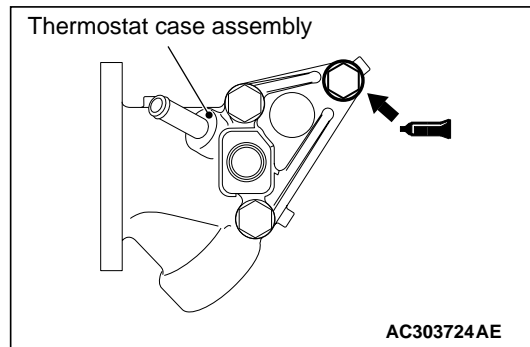
**INSTALLATION SERVICE POINTS****>>A<< THERMOSTAT CASE ASSEMBLY INSTALLATION**

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: MITSUBISHI GENUINE PART No.MD970389 or equivalent**



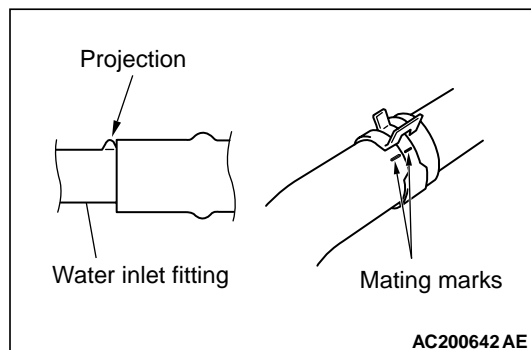
3. Apply sealant to the thread of the thermostat case assembly bolts as shown.

**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.

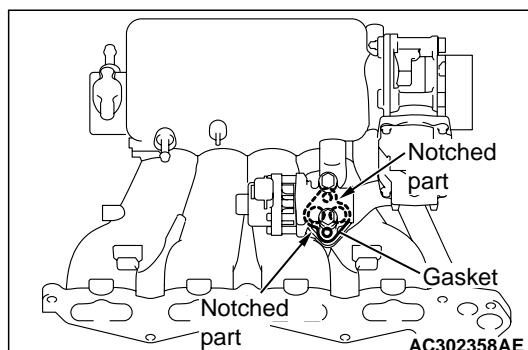


>>B<< RADIATOR LOWER HOSE CONNECTION



1. Insert each hose as far as the projection of the water inlet fitting.
2. Align the mating marks on the radiator hose and hose clamp, and then connect the radiator hose.

>>C<< EGR VALVE GASKET INSTALLATION



Install the EGR valve gasket as shown in the illustration.

**INSPECTION**

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

**Intake Manifold Check**

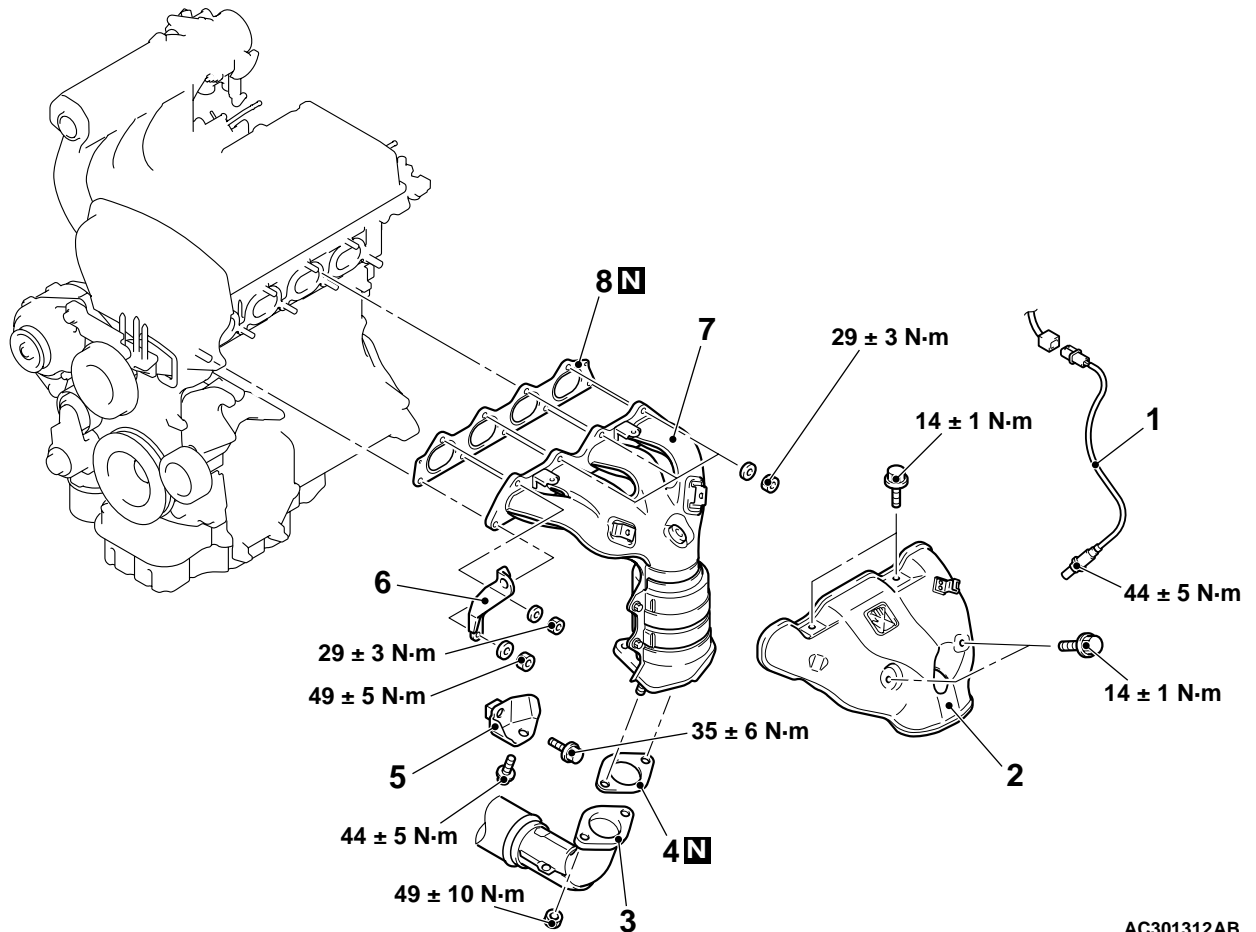
1. Check for damage or cracking of any part.
2. Clogging of the negative pressure (vacuum) outlet port, or clogging of the exhaust gas recirculation passages.
3. Using a straight edge and feeler gauge, check for distortion of the cylinder head installation surface.

**Standard value: 0.15 mm or less**

**Limit: 0.20 mm**

**EXHAUST MANIFOLD****REMOVAL AND INSTALLATION <4G63>**

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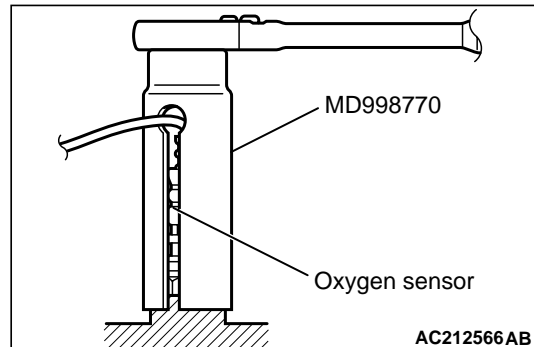


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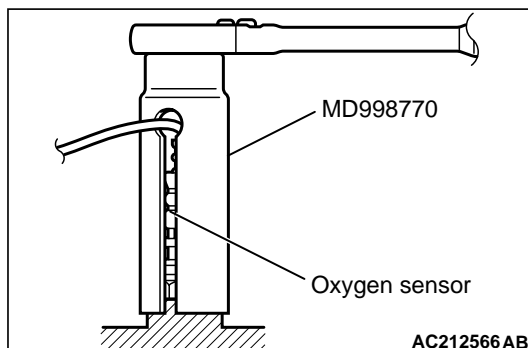
**Removal steps**

- <<A>> >>A<<
1. Oxygen sensor
  2. Exhaust manifold cover
  3. Front exhaust pipe connection
  4. Exhaust pipe gasket
  5. Exhaust manifold bracket
  6. Engine hanger
  7. Exhaust manifold
  8. Exhaust manifold gasket

Use special tool oxygen sensor wrench (MD998770) to remove the oxygen sensor.

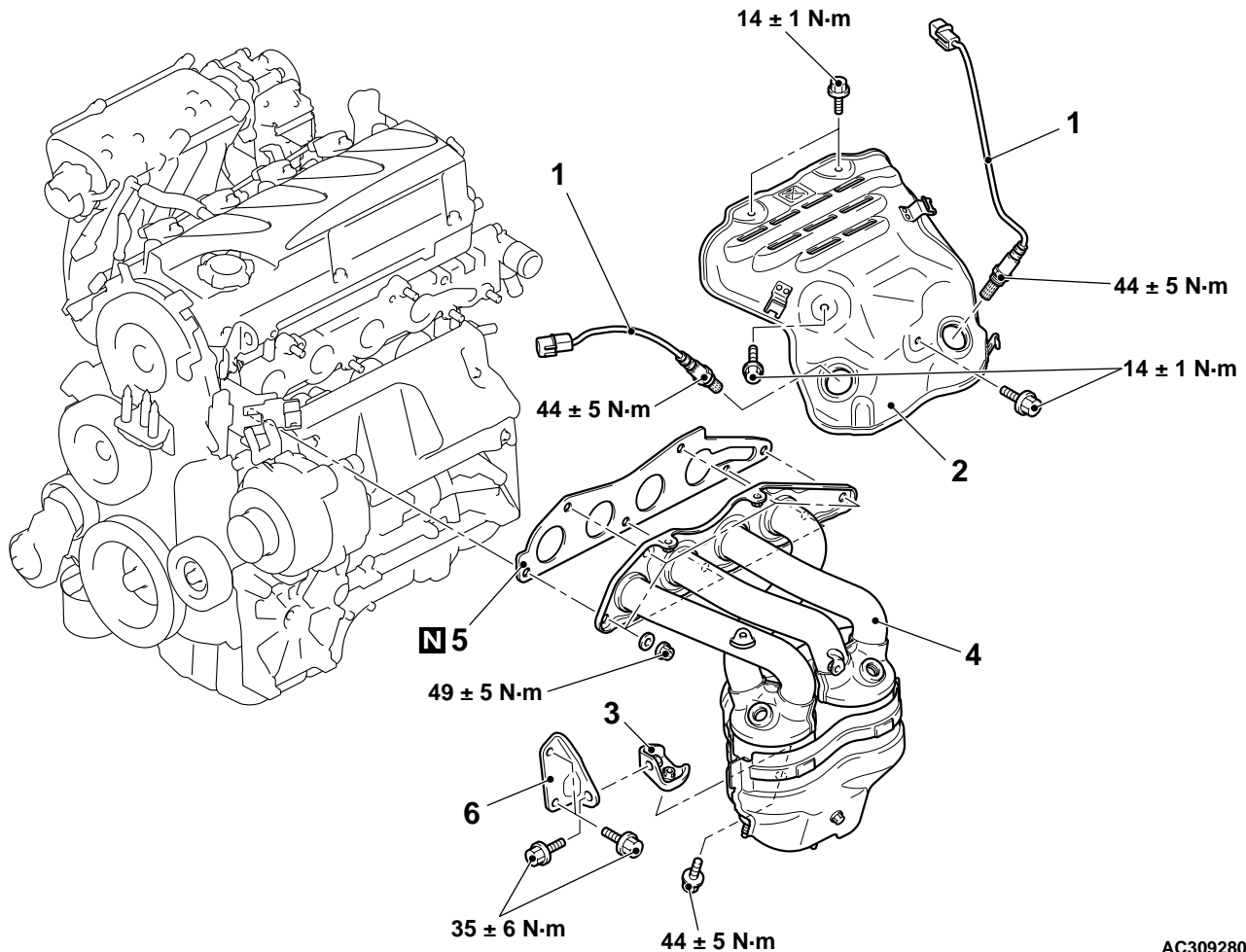
**INSTALLATION SERVICE POINT****>>A<< OXYGEN SENSOR INSTALLATION**

Use special tool oxygen sensor wrench (MD998770) to install the oxygen sensor.

**REMOVAL SERVICE POINT****<<A>> OXYGEN SENSOR REMOVAL**

## REMOVAL AND INSTALLATION <4G69>

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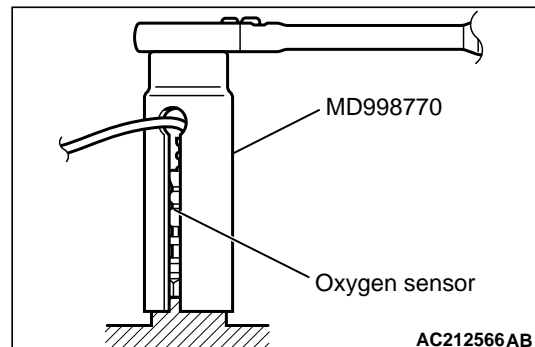
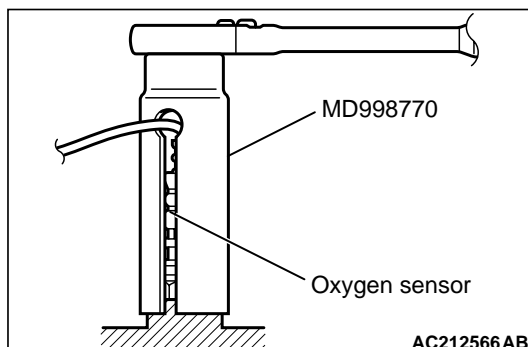
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- Removal steps**
- <<A>> >>A<<
1. Oxygen sensor
  2. Exhaust manifold cover
    - Front exhaust pipe (Refer to P.15-13.)
  3. Exhaust manifold bracket B
  4. Exhaust manifold
  5. Exhaust manifold gasket
  6. Exhaust manifold bracket A

Use special tool oxygen sensor wrench (MD998770) to remove the oxygen sensor.

## INSTALLATION SERVICE POINT

### >>A<< OXYGEN SENSOR INSTALLATION



Use special tool oxygen sensor wrench (MD998770) to install the oxygen sensor.

**INSPECTION**

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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**

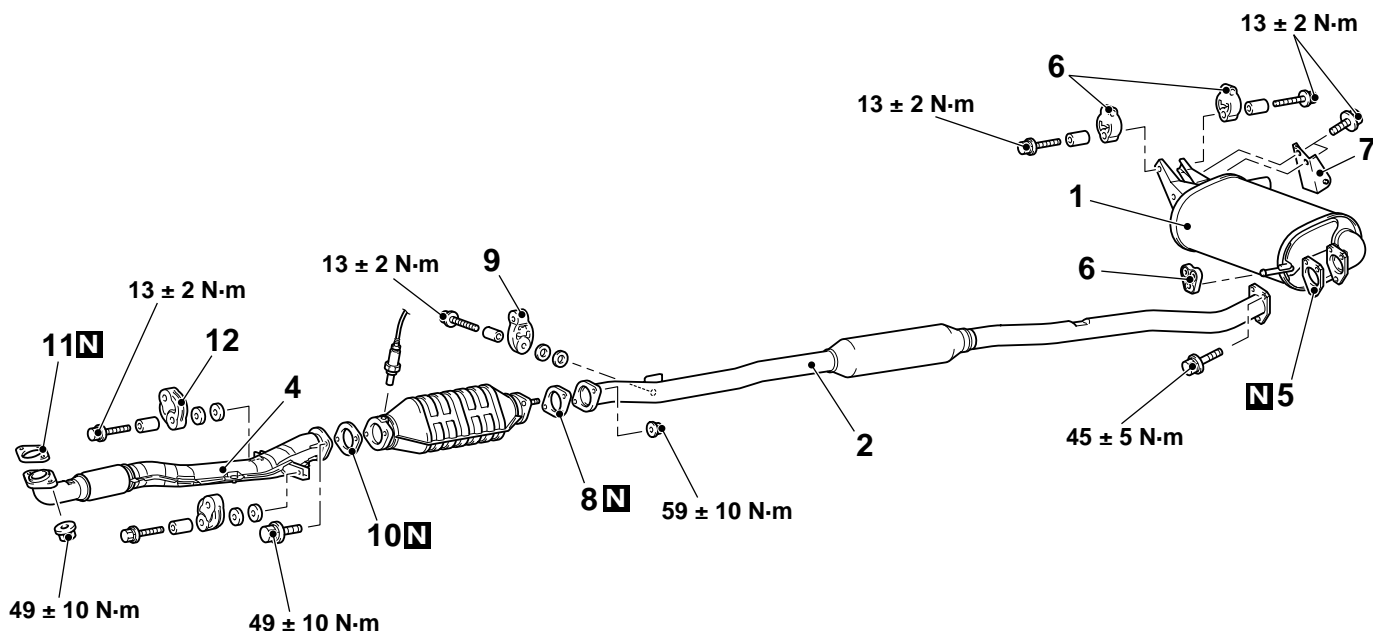
**Limit: 0.20 mm**

# EXHAUST PIPE AND MAIN MUFFLER

## REMOVAL AND INSTALLATION

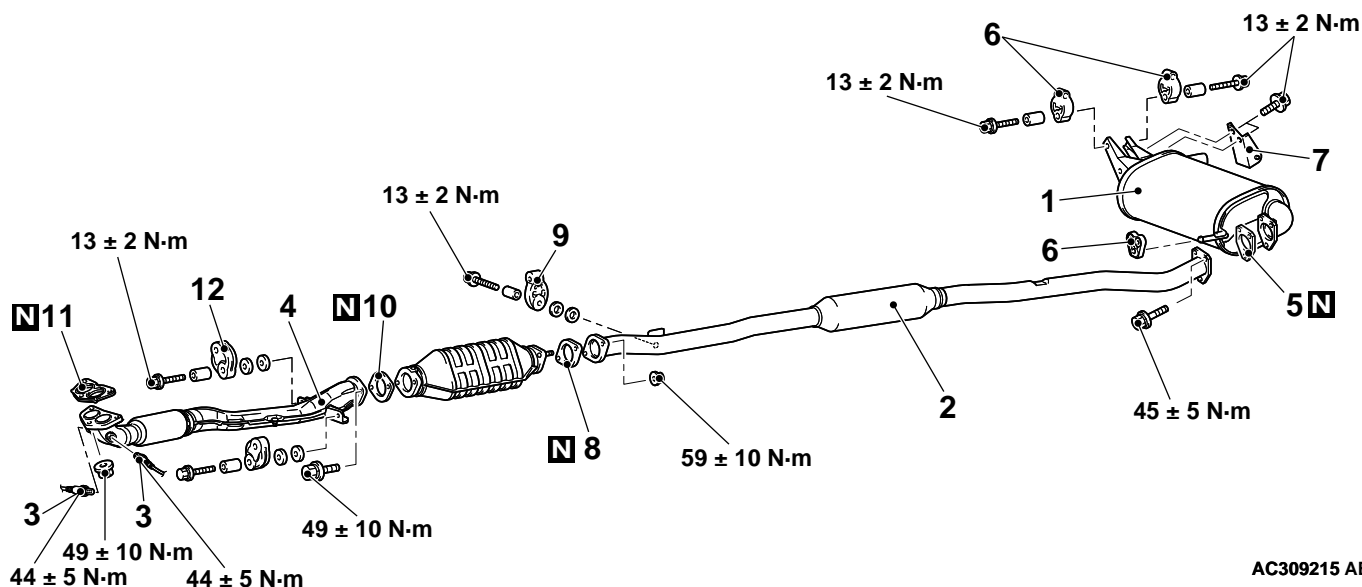
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<4G63>



AC301054 AC

<4G69>



AC309215 AB

### Exhaust main muffler removal steps

1. Exhaust main muffler
5. Exhaust pipe gasket
6. Hanger
7. Exhaust pipe damper

### Centre exhaust pipe removal steps

2. Centre exhaust pipe
5. Exhaust pipe gasket

### Centre exhaust pipe removal steps (Continued)

8. Exhaust pipe gasket
9. Hanger

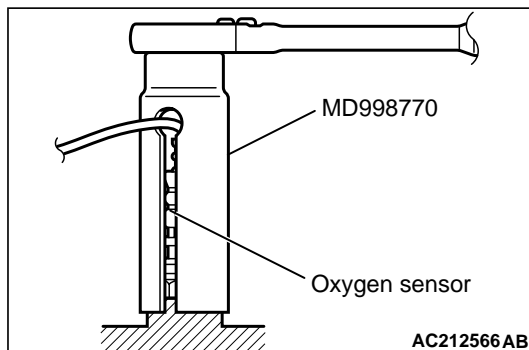
### Front exhaust pipe removal steps

- Centre under cover (front) (Refer to GROUP 51, Under Cover [P.51-19](#)).
- 3. Oxygen sensor <4G69>
- 4. Front exhaust pipe
- 10. Exhaust pipe gasket

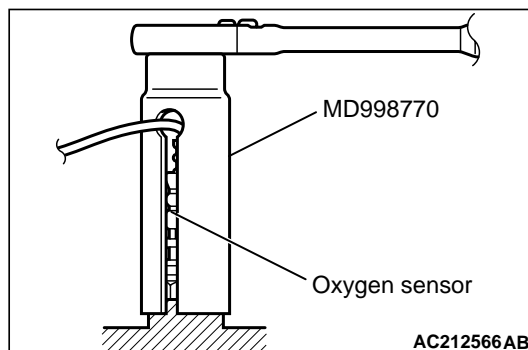
<<A>> >>A<<

**Front exhaust pipe removal  
steps (Continued)**

11. Exhaust pipe gasket
12. Hanger

**REMOVAL SERVICE POINT****<<A>> OXYGEN SENSOR REMOVAL**

Use special tool oxygen sensor wrench (MD998770) to remove the oxygen sensor.

**INSTALLATION SERVICE POINT****>>A<< OXYGEN SENSOR INSTALLATION**

Use special tool oxygen sensor wrench (MD998770) to install the oxygen sensor.