
INTAKE AND EXHAUST

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GENERAL INFORMATION

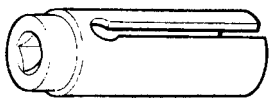
The intake manifold is made of an aluminium alloy, and the shape provides an increased intake inertia effect and has a good volumetric efficiency.

The exhaust pipe is divided into four parts.

SERVICE SPECIFICATIONS

Items		Standard value	Limit
Intake manifold	Distortion of the installation surface mm	0.15 or less	0.2

SPECIAL TOOL

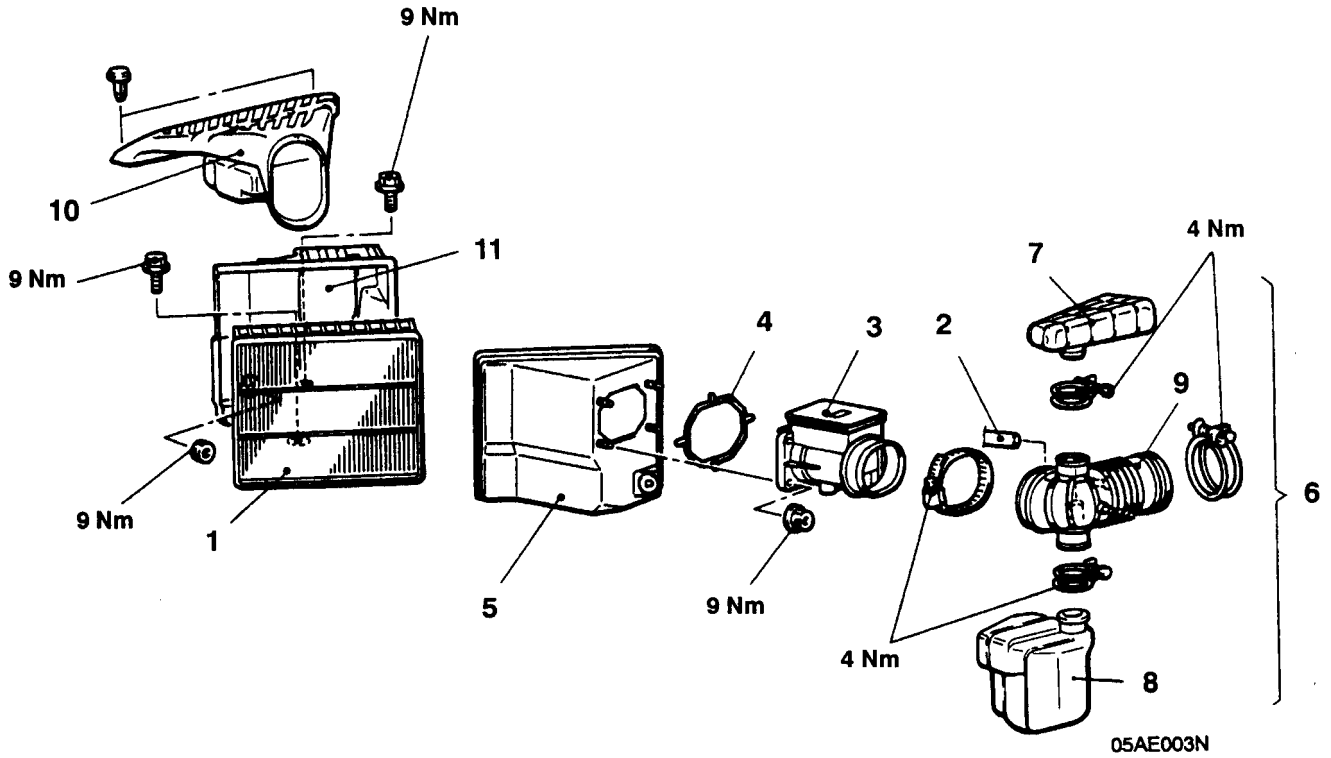
Tool	Number	Name	Application
	MD998770	Oxygen sensor wrench	Removal/Installation of oxygen sensor <Vehicles with catalytic converter>

ON-VEHICLE SERVICE

INTAKE MANIFOLD VACUUM CHECK

Refer to Group 11 – On-vehicle Service

**AIR CLEANER
REMOVAL AND INSTALLATION**



Removal steps

- | | |
|-----------------------------|----------------------|
| 1. Air cleaner element | 7. Resonator A |
| 2. Breather hose | 8. Resonator B |
| 3. Air flow sensor | 9. Air intake hose |
| 4. Gasket | 10. Air duct |
| 5. Air cleaner cover | 11. Air cleaner body |
| 6. Air intake hose assembly | |

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INTAKE MANIFOLD PLENUM

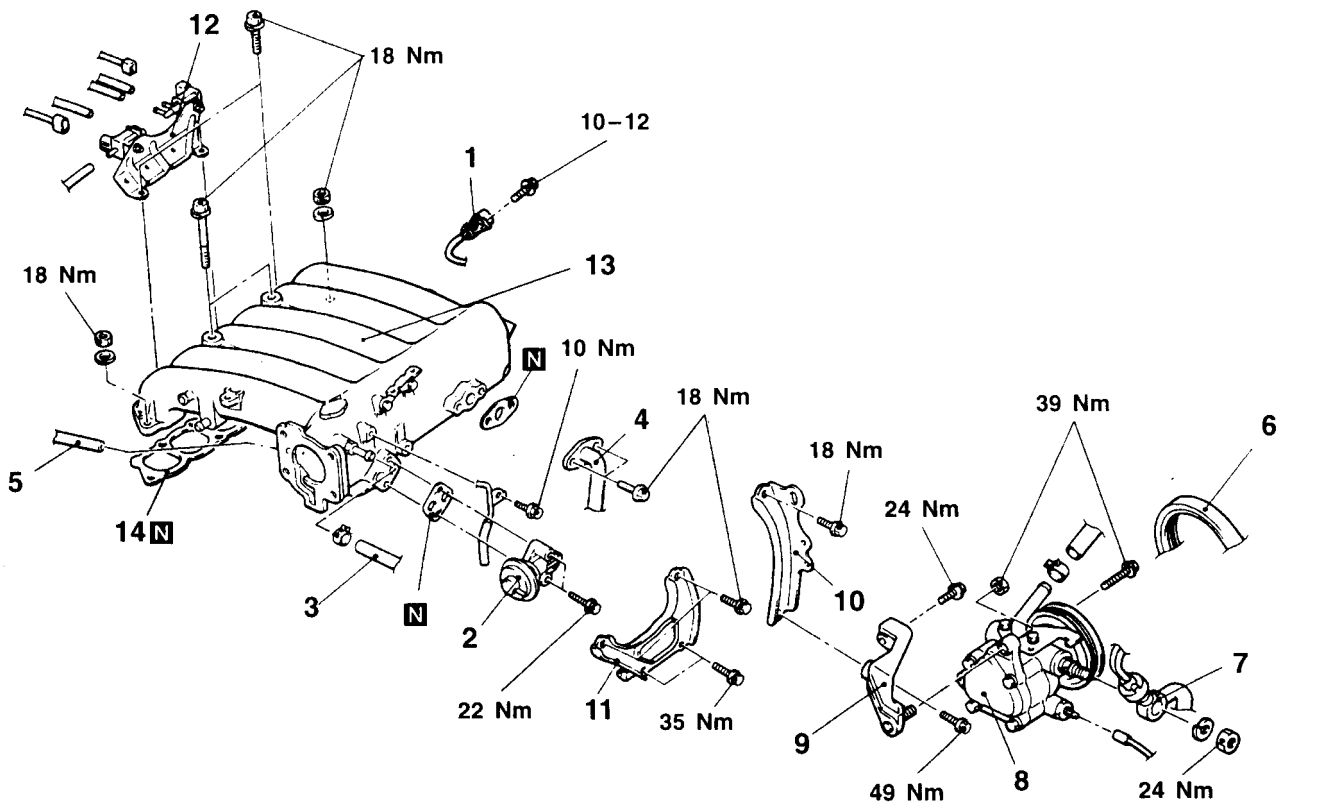
REMOVAL AND INSTALLATION

Pre-removal Operation

- Remove the engine cover (Refer to GROUP 11 – Intake manifold plenum and throttle body.)
- Remove the throttle body (Refer to GROUP 13A – Fuel)
- Drain the power steering fluid (Refer to GROUP 37A – On-vehicle service)

Post-installation Operation

- Install the throttle body (Refer to GROUP 13A – Fuel)
- Install the engine cover (Refer to GROUP 11 – Intake manifold plenum and throttle body.)
- Add power steering fluid and bleed (Refer to GROUP 37A – On-vehicle service.)
- Adjust the tension of the oil pump belt (Refer to GROUP 11 – On-vehicle service.)

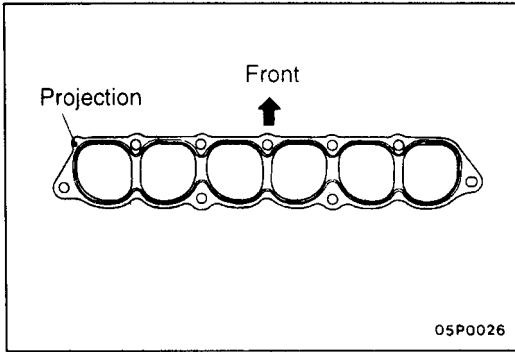


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Removal steps

1. Crankshaft angle sensor connector
2. EGR valve assembly
3. Brake booster vacuum hose connection
4. EGR pipe assembly connection
5. Fuel pressure regulator vacuum hose connection
6. Oil pump belt

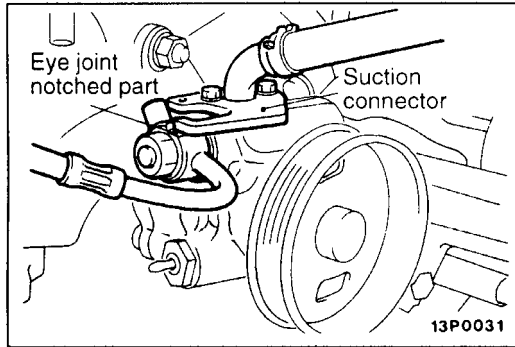
- B◄
7. Pressure hose
 8. Power steering oil pump
 9. Pump bracket
 10. Intake manifold plenum stay, front
 11. Intake manifold plenum stay, rear
 12. Solenoid valve assembly
 13. Intake manifold plenum
- A◄
14. Intake manifold plenum gasket



INSTALLATION SERVICE POINT

▶A◀ INTAKE MANIFOLD PLENUM GASKET INSTALLATION

Install so that the projection on the gasket is as shown in the diagram.



▶B◀ PRESSURE HOSE INSTALLATION

Secure the notched part of the pressure hose eye joint at the position where it contacts the oil pump suction connector.

INSPECTION

INTAKE MANIFOLD PLENUM

1. Check that the intake manifold plenum is not damaged or cracked.
2. Check that the vacuum extraction port is not clogged. If faulty, clean.
3. Using a straight edge and thickness gauge, check the mounting surface for distortion.

Standard value: 0.15 mm or less

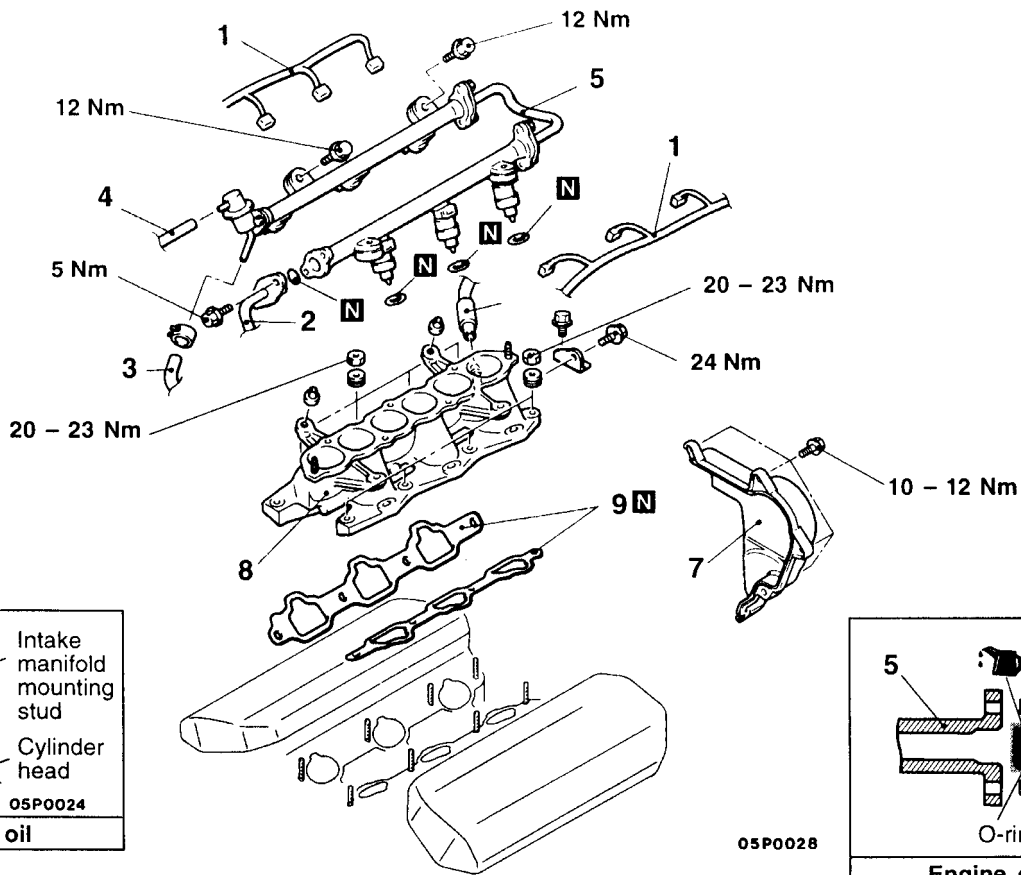
Limit: 0.2 mm

INTAKE MANIFOLD

REMOVAL AND INSTALLATION

Pre-removal and Post-Installation Operations

- Remove or install the intake manifold plenum (Refer to P.15-4.)
- Fuel discharge prevention (Refer to GROUP 13A – On-vehicle service)



Removal steps

- ▶C◀ 1. Injector connector
- ▶C◀ 2. High-pressure fuel hose connection
- ▶C◀ 3. Return hose connection
- ▶C◀ 4. Vacuum hose connection
- ▶A▶ 5. Injector and delivery pipe assembly

- ▶B◀ 6. PCV hose connection
- ▶B◀ 7. Timing belt cover(Front upper)
- ▶A▶ 8. Intake manifold
- ▶A▶ 9. Intake manifold gasket

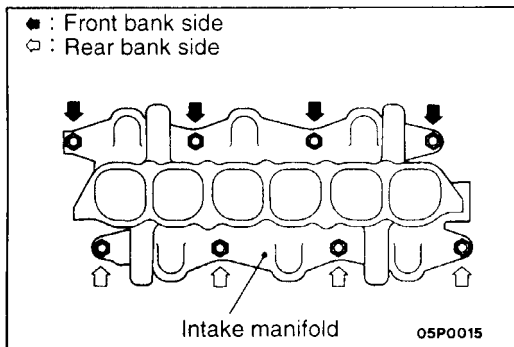
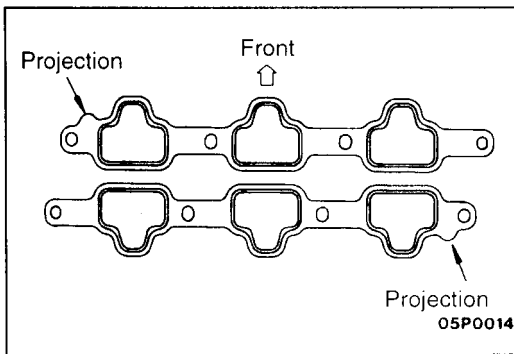
REMOVAL SERVICE POINT

▶A▶ INJECTOR AND DELIVERY PIPE ASSEMBLY REMOVAL

Remove the delivery pipe with the injectors fitted to the delivery pipe.

Caution

Do not drop the injectors when removing the delivery pipe.



INSTALLATION SERVICE POINT

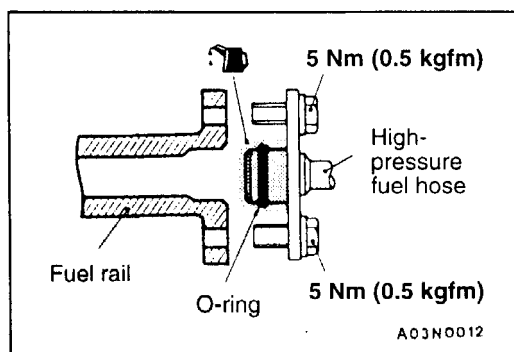
▶A◀ INTAKE MANIFOLD GASKET INSTALLATION

Install so that the projection on the gaskets is as shown in the diagram.

▶B◀ INTAKE MANIFOLD INSTALLATION

1. Coat the intake manifold mounting studs with engine oil.
2. Tighten the intake manifold mounting nuts in the following sequence.

Sequence	Tightening nuts	Tightening Torque Nm (kgfm)
1	Front bank side nuts	7 (0.7)
2	Rear bank side nuts	20 – 23 (2.0 – 2.3)
3	Front bank side nuts	20 – 23 (2.0 – 2.3)
4	Rear bank side nuts	20 – 23 (2.0 – 2.3)
5	Front bank side nuts	20 – 23 (2.0 – 2.3)



▶C◀ HIGH-PRESSURE FUEL HOSE CONNECTION

1. When connecting the high-pressure fuel hose to the fuel rail, apply a drop of new engine oil to the O-ring, and then insert, being careful not to damage the O-ring.

Caution

Do not let engine oil in the fuel rail.

2. Check that the high-pressure fuel hose turns smoothly. If not, remove the hose and then re-insert it into the fuel rail and check again.
3. Tighten the bolts to the specified torque.

INSPECTION

INTAKE MANIFOLD

1. Check that the intake manifold is not damaged or cracked. If faulty, replace.
2. Check that the vacuum extraction port is not clogged. If faulty, clean.
3. Using a straight edge and thickness gauge, check the mounting surface for distortion.

Standard value: 0.15 mm or less

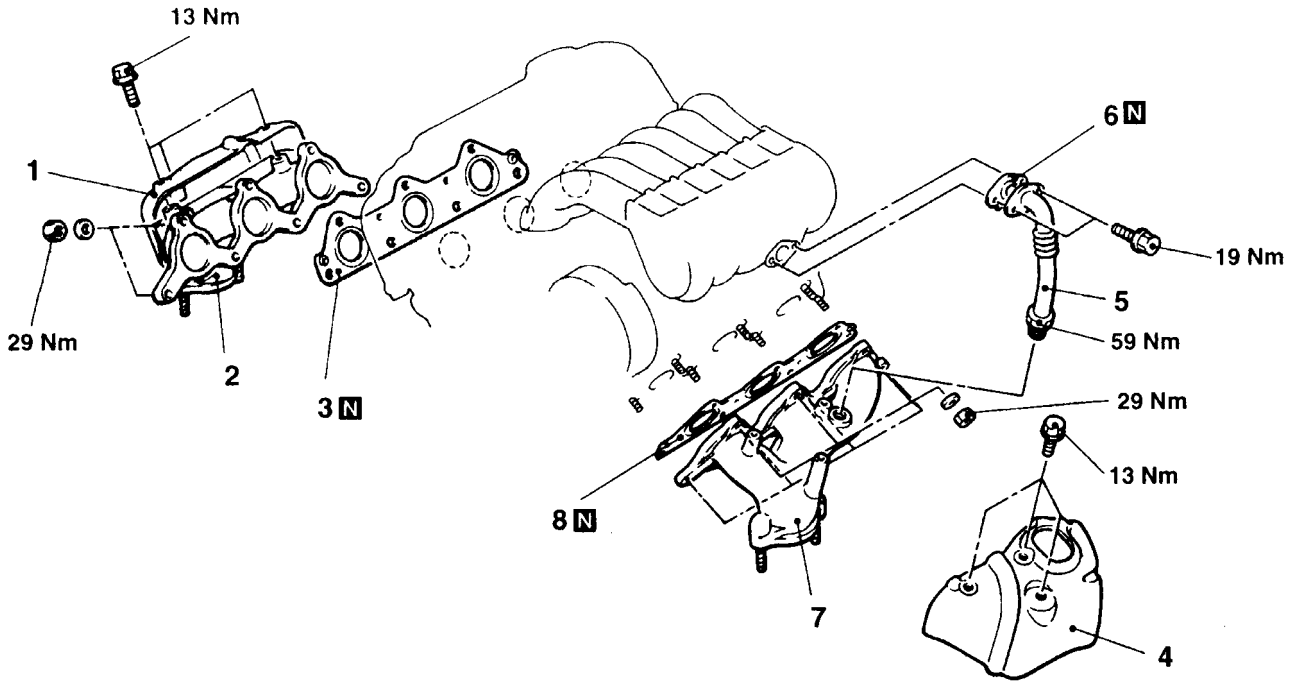
Limit: 0.2 mm

EXHAUST MANIFOLD

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operations

- Remove or install the front exhaust pipe (Refer to P.15-9.)
- Remove or install the radiator (Front bank only) (Refer to GROUP 14)
- Remove or install the alternator (Front bank only) (Refer to GROUP 16)



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**Removal steps
<Front Bank>**

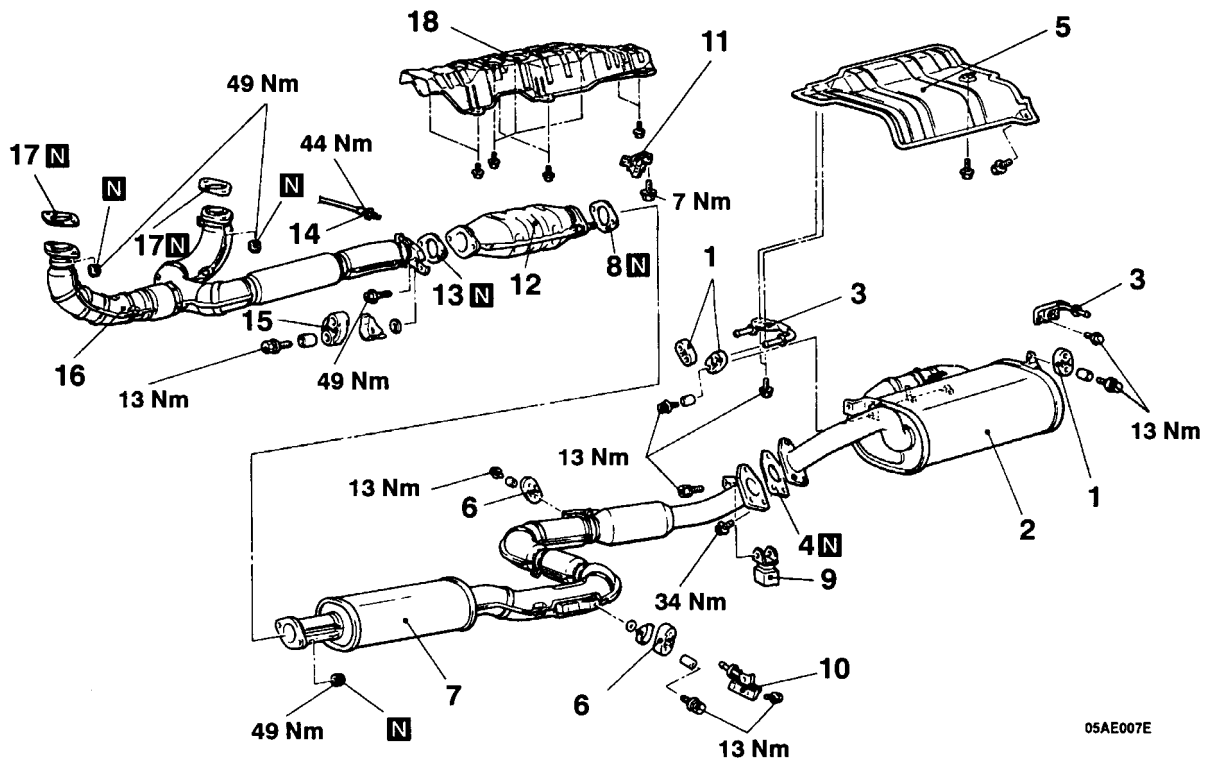
1. Heat protector
2. Exhaust manifold
3. Exhaust manifold gasket

**Removal steps
<Rear Bank>**

4. Heat protector
5. EGR pipe
6. EGR pipe gasket
7. Exhaust manifold
8. Exhaust manifold gasket

EXHAUST PIPE AND MAIN MUFFLER

REMOVAL AND INSTALLATION



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Main muffler removal steps

1. Hanger
2. Main muffler assembly
3. Hanger bracket
4. Gasket
5. Rear floor heat protector panel

Centre exhaust pipe removal steps

6. Hanger
7. Centre exhaust pipe
8. Gasket
9. Damper

10. Hanger bracket
11. Harness protector
12. Catalytic converter or pre-muffler
13. Gasket

Front exhaust pipe removal steps

14. Oxygen sensor
15. Hanger
16. Front exhaust pipe
17. Gasket
18. Front floor heat protector