

## GENERAL INFORMATION

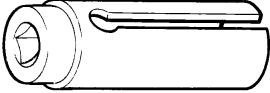
The intake manifold is made of an aluminium alloy, and the shape provides an increased intake inertia effect and has a good volumetric efficiency.

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

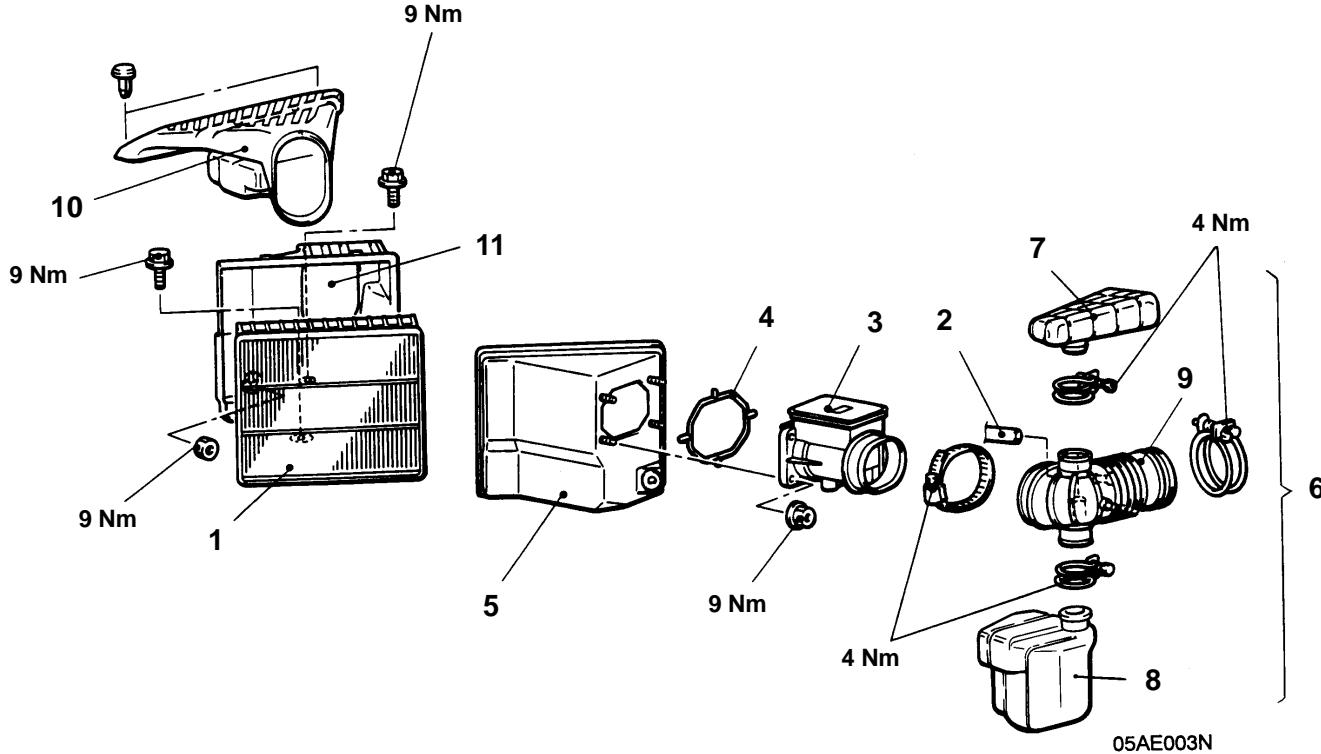
## SPECIAL TOOL

Tool	Tool number and name	Supersession	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	

# INTAKE MANIFOLD PLENUM

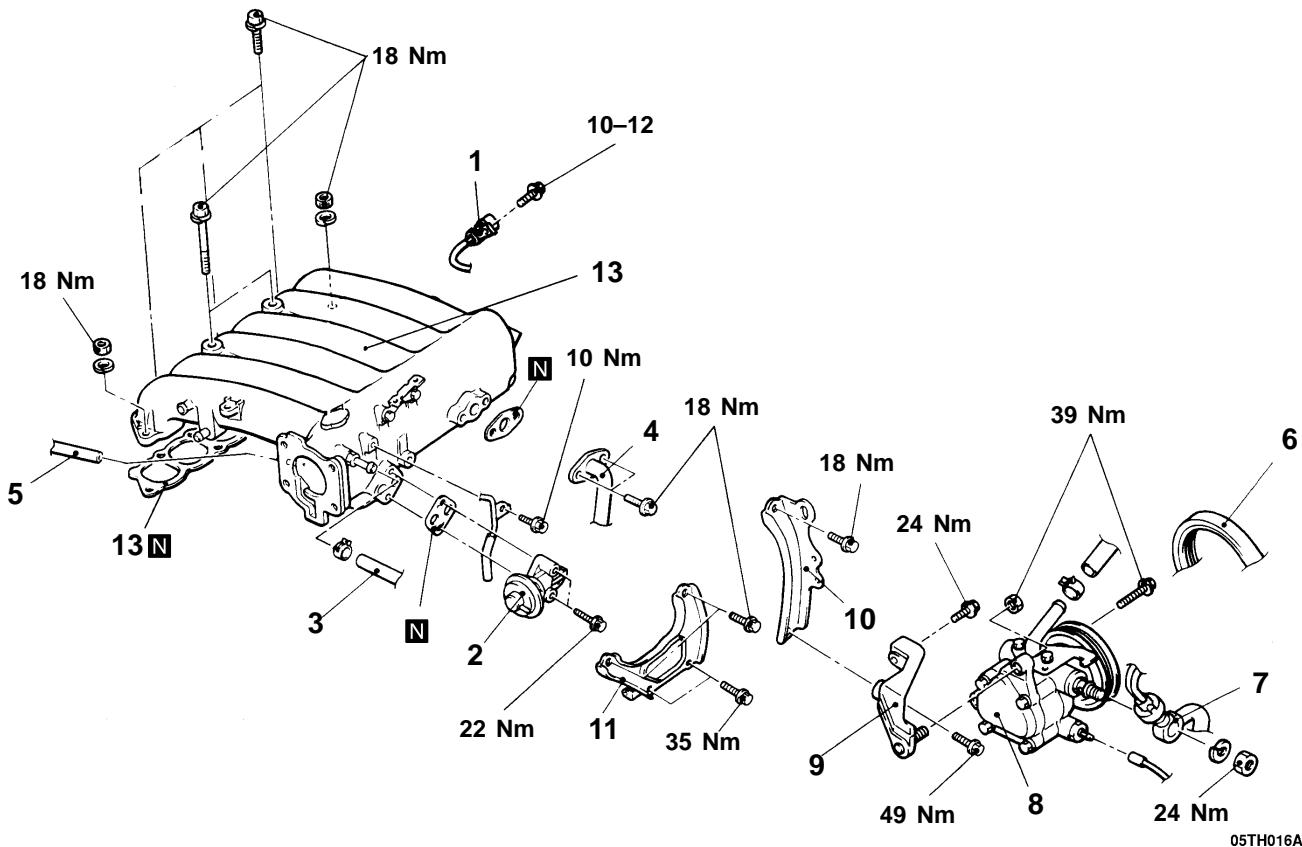
## REMOVAL AND INSTALLATION

**Pre-removal Operation**

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

**Post-installation Operation**

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

**Removal steps**

1. Crank 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. Intake manifold plenum

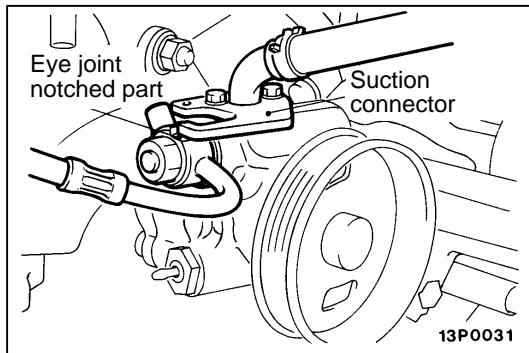
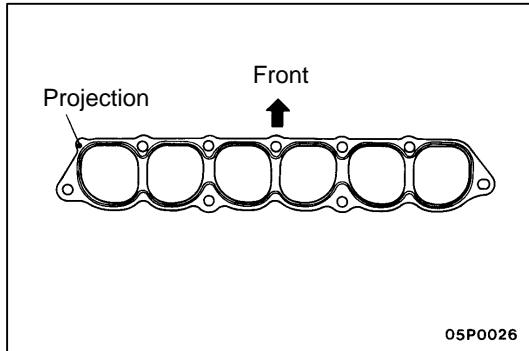
►A◄ 13. Intake manifold plenum gasket

**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**

**INSTALLATION SERVICE POINT****►A◀ INTAKE MANIFOLD PLENUM GASKET**

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

**►B◀ PRESSURE HOSE**

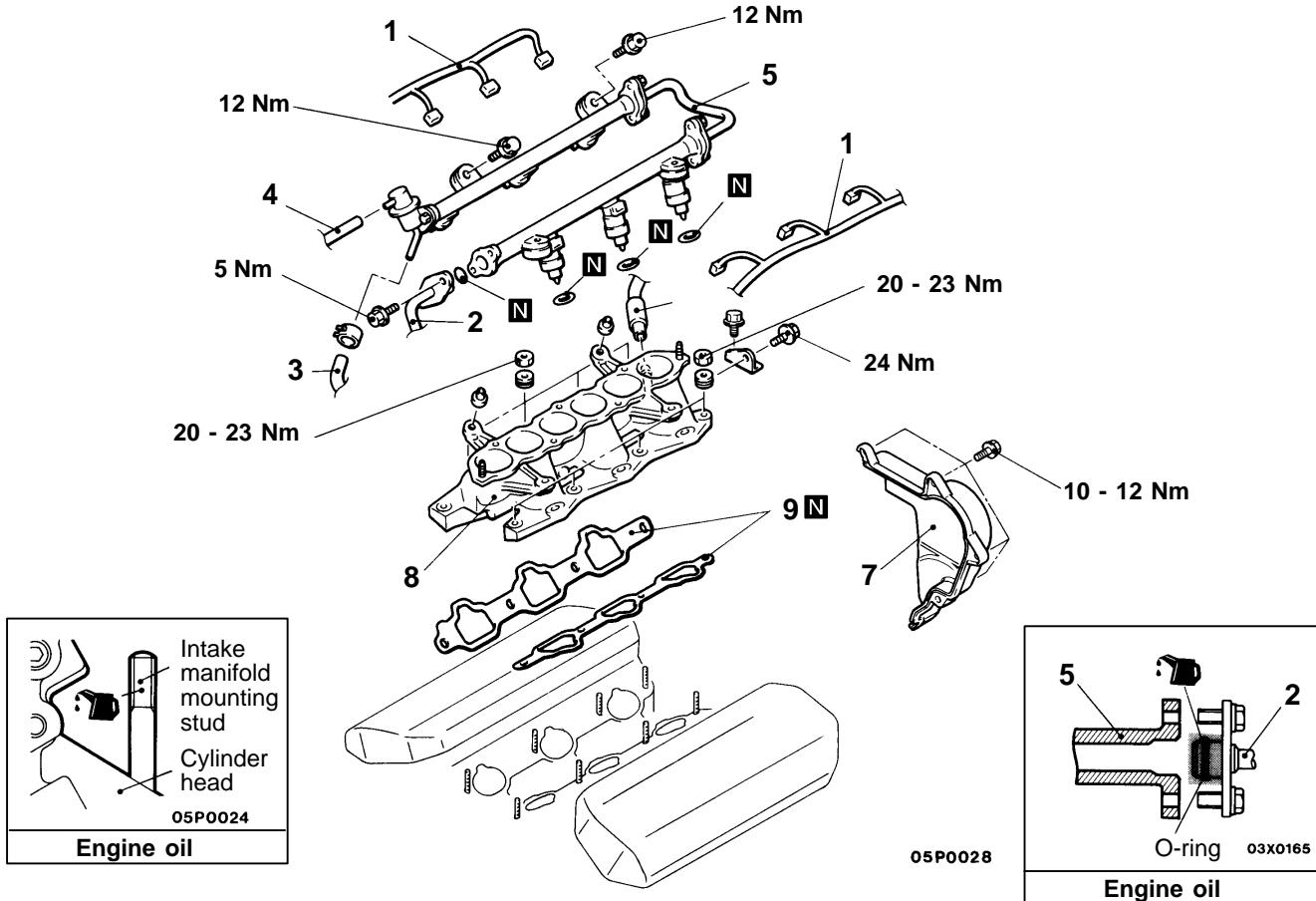
Secure the notched part of the pressure hose eye joint at the position where it contacts the oil pump suction connector.

# 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.13 – On-vehicle service)



### Removal steps

►C◀ 1. Injector connector  
 2. Fuel high pressure hose connection  
 3. Return hose connection  
 4. Vacuum hose connection  
 5. Injector and delivery pipe assembly

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

## REMOVAL SERVICE POINT

### ◀A▶ INJECTOR AND DELIVERY PIPE ASSEMBLY

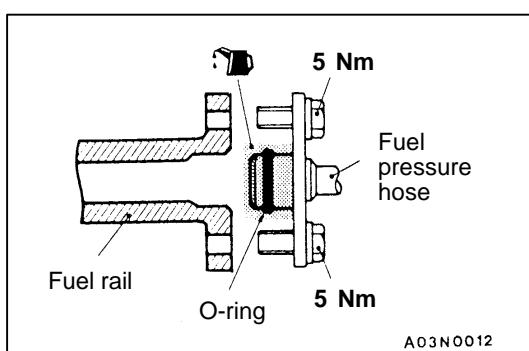
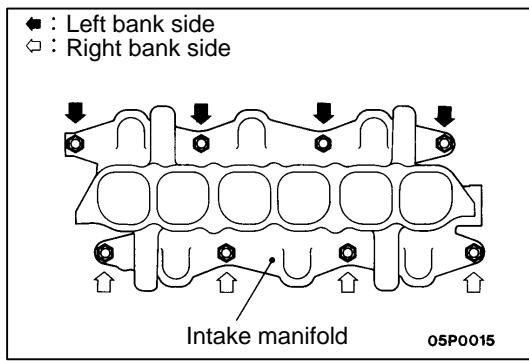
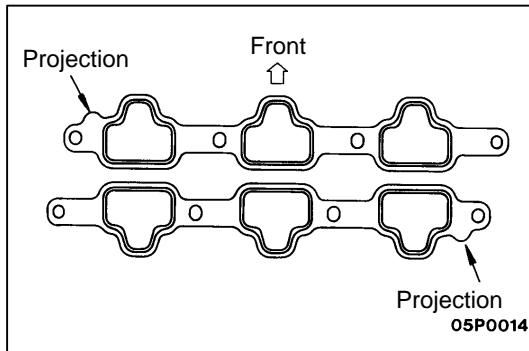
Remove the delivery pipe with the injectors fitted to the delivery pipe.

#### Caution

Do not drop the injectors when removing the delivery pipe.

**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****INSTALLATION SERVICE POINT****►A◀ INTAKE MANIFOLD GASKET**

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

**►B◀ INTAKE MANIFOLD**

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
1	Left bank side nuts	7
2	Right bank side nuts	20 to 23
3	Left bank side nuts	20 to 23
4	Right bank side nuts	20 to 23
5	Left bank side nuts	20 to 23

**INSTALLATION SERVICE POINT****►C◀ FUEL HIGH PRESSURE 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.**

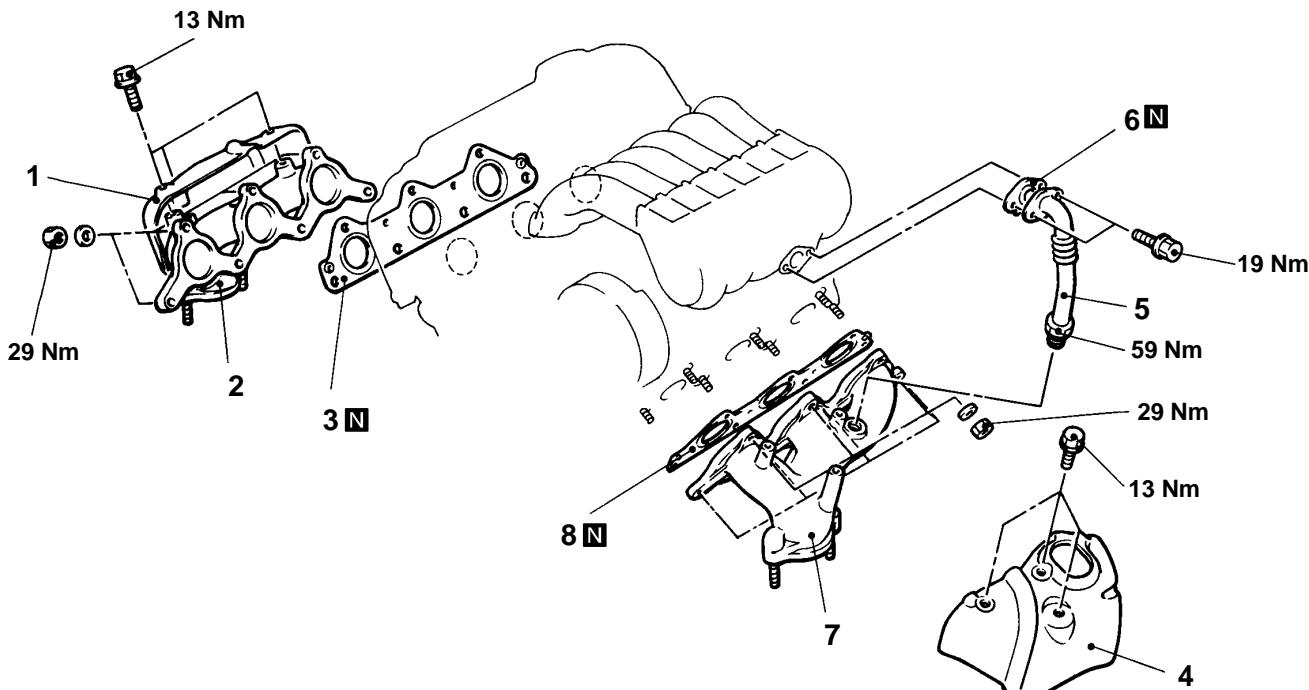
2. Check that the high-pressure fuel hose turns smoothly. If not, remove the hose and then re-insert it into the fuel rail and check again.
3. Tighten the bolts to the specified torque.

## 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 Procedure for Front Bank

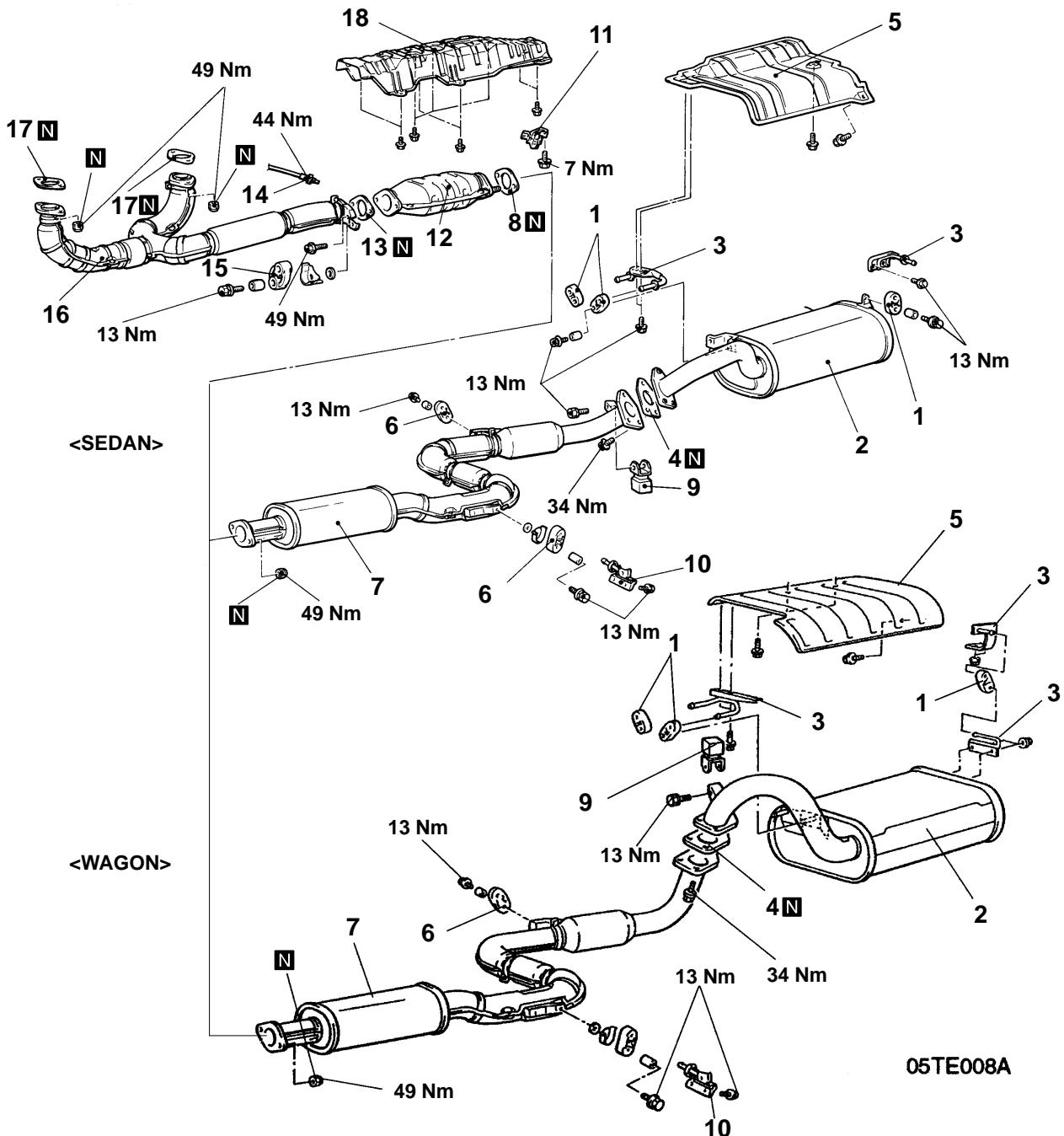
1. Heat protector
2. Exhaust manifold
3. Exhaust manifold gasket

## Removal Procedure for 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**



## 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