INTAKE AND EXHAUST

CONTENTS

GENERAL INFORMATION

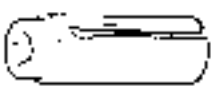
The intake manifold is made of an aluminium alloy. The shape provides an increased intake inertia effect and has good volumetric efficiency.

For 1.8L engine, the exhaust manifold is made of stainless steel. The exhaust pipe is divided into four parts for California and three parts for Federal respectively.

SERVICE SPECIFICATIONS

Item		Standard value	Limit
Intake manifold	Distortion of the installation surface mm (in)	0.15 (.006) or less	0.20 (.008)

SPECIAL TOOL

Tool	Tool number and name	Supersession	Application
	MB998770 Oxygen sensor wrench		Removal/installation of heated oxygen sensor

TROUBLESHOOTING

Symptom	Probable cause	Remedy
Exhaust gas leakage	Loose joints	Retighten
	Broken pipe or muffler	Repair or replace
Abnormal noise	Broken separation of 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

INTAKE MANIFOLD VACUUM CHECK

1.5L Engine: Refer to GROUP 11A - On-vehicle Service.
1.8L Engine: Refer to GROUP 11C - On-vehicle Service.

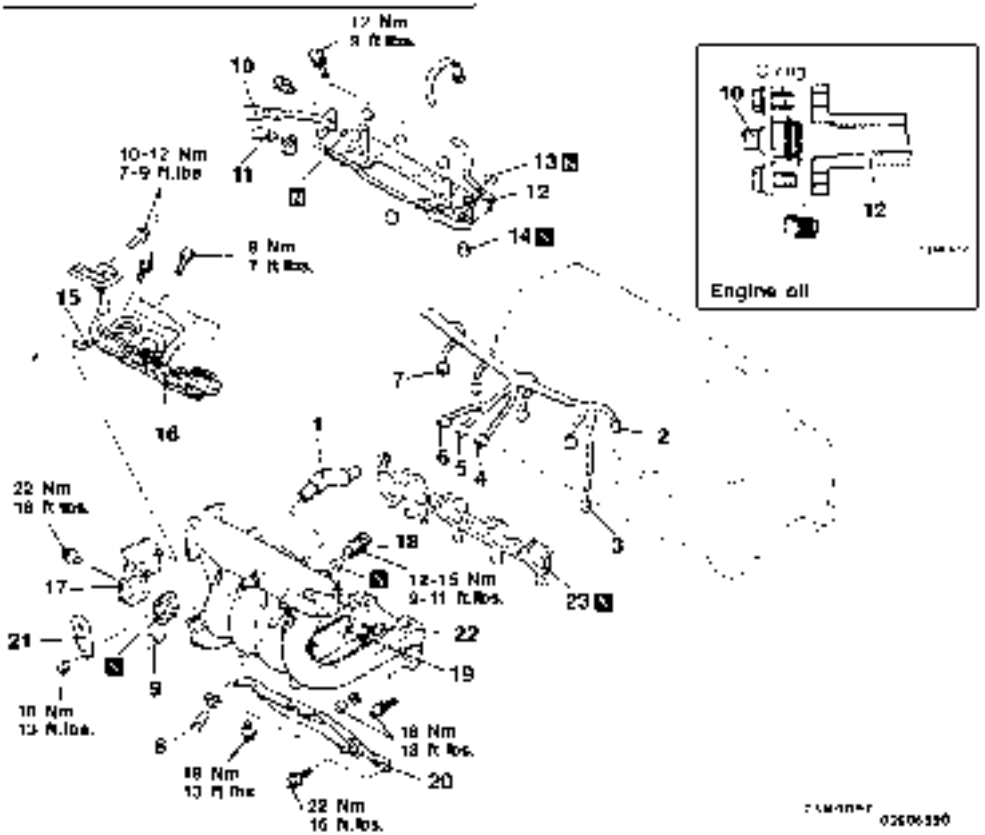
INTAKE MANIFOLD

REMOVAL AND INSTALLATION

<1.5L Engine>

Pre-removal Operation
(1) Fuel Discharge Prevention
(Refer to GROUP 13A - On-vehicle Service.)
(2) Thermostat Case Assembly Removal
(Refer to GROUP 14 - Water Hose and Water Pipe.)
(3) Throttle Body Removal (Refer to GROUP 13A.)

Post-installation Operation
(1) Throttle Body Installation (Refer to GROUP 13A.)
(2) Thermostat Case Assembly Installation
(Refer to GROUP 14 - Water Hose and Water Pipe.)



Removal steps

1. PCV hose
2. Crank angle sensor connector
3. Heated oxygen sensor connector
4. Intake air temperature sensor connector
5. Evaporative emission purge solenoid connector
6. EGR solenoid connector
7. Injector connector
8. Brake booster vacuum hose connection
9. Vacuum hose connection
10. High-pressure fuel hose connection
11. Fuel return hose connection

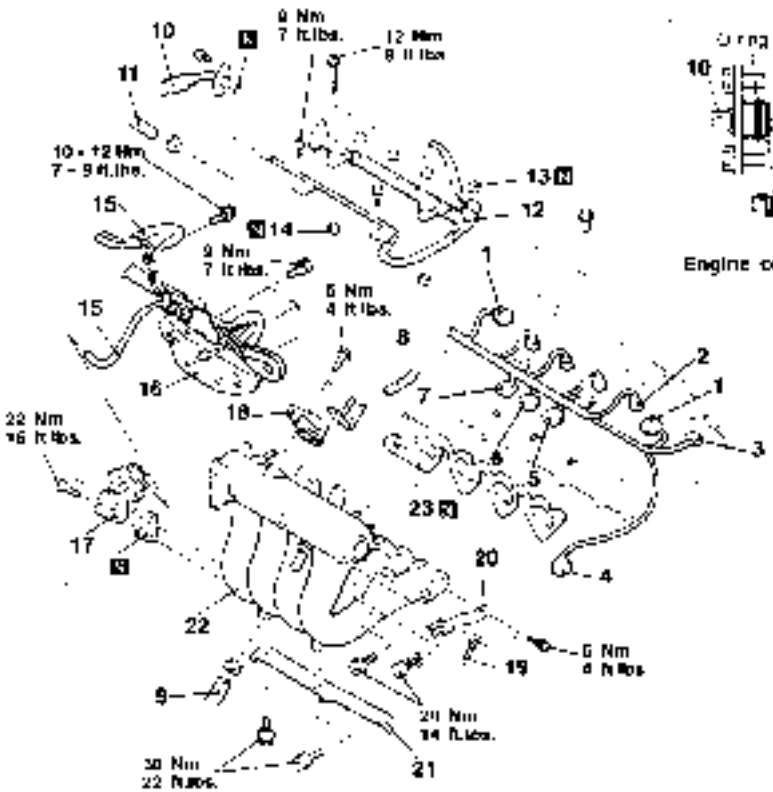
◀A▶

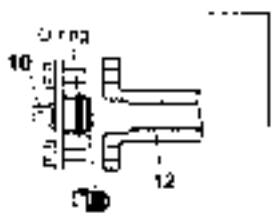
12. Fuel rail injector and pressure regulator assembly
13. Insulator
14. Insulator
15. Vacuum hose connection
16. Solenoid valve and vacuum hose assembly
17. EGR valve
18. Intake air temperature sensor
19. Ground cable
20. Intake manifold stay
21. Engine hanger
22. Intake manifold
23. Intake manifold gasket

<1.8L Engines>

Pre-removal Operation
(1) Fuel Discharge Prevention
(Refer to GROUP 13A - On-vehicle Service.)
(2) Engine Coolant Draining
(Refer to GROUP 00 - Maintenance Service.)
(3) Throttle Body Removal (Refer to GROUP 13A.)

Post-installation Operation
(1) Throttle Body Installation (Refer to GROUP 13A.)
(2) Engine Coolant Supplying
(Refer to GROUP 00 - Maintenance Service.)





Removal steps

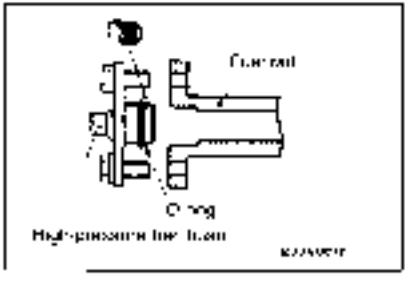
1. Ignition coil connector
2. Injector connector
3. Crank angle sensor connector
4. Heated oxygen sensor connector
5. Evaporative emission purge solenoid connector
6. EGR solenoid connector
7. Manifold differential pressure sensor connector
8. PCV hose connection
9. Brake booster vacuum hose connection
- ▶A◀ 10. High-pressure fuel hose connection
11. Fuel return hose connection
- ◀A▶ 12. Fuel rail, injector and pressure regulator assembly
13. Insulator
14. Insulator
15. Vacuum hose connection
16. Solenoid valve and vacuum hose assembly
17. EGR valve
18. Manifold differential pressure sensor
19. Ground cable
20. Bracket (vehicles with auto-cruise control system)
21. Intake manifold stay
22. Intake manifold
23. Intake manifold gasket

REMOVAL SERVICE POINT

«A» FUEL RAIL, INJECTOR AND PRESSURE REGULATOR REMOVAL

Remove the fuel rail (with the injectors and pressure regulator attached to it).

Caution
Care must be taken when removing the fuel rail not to drop the injector.



INSTALLATION SERVICE POINT

»A« HIGH-PRESSURE FUEL HOSE INSTALLATION

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

   Caution
   Be careful not to let any engine oil get into the fuel rail.

2. While turning the high-pressure fuel hose to the left and right, install it to the fuel rail.
3. Check to be sure that the injector turns smoothly. If it does not turn smoothly, the O-ring may be pinched. Remove the high-pressure fuel hose and then re-insert it into the fuel rail and check again.

INSPECTION

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. Check for obstruction of the negative pressure (vacuum) outlet port, and for obstruction of the water passage or gas passage.
3. Using a straight edge and feeler gauge, check for distortion of the cylinder head installation surface.

   Standard value: 0.15 mm (.006 in.) or less

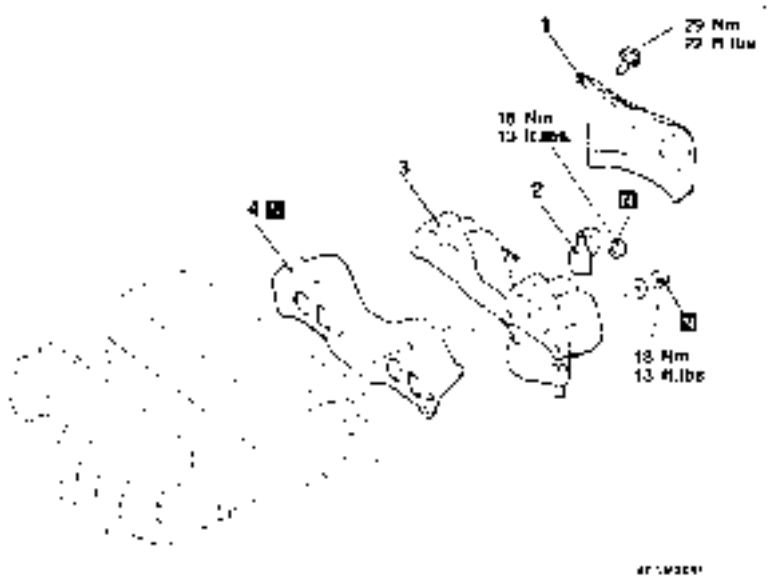
   Limit: 0.20 mm (.008 in.)

EXHAUST MANIFOLD

REMOVAL AND INSTALLATION

<1.5L Engine>

Pre-removal and Post-installation Operation
- Front Exhaust Pipe Removal and Installation (Refer to P.15-31)

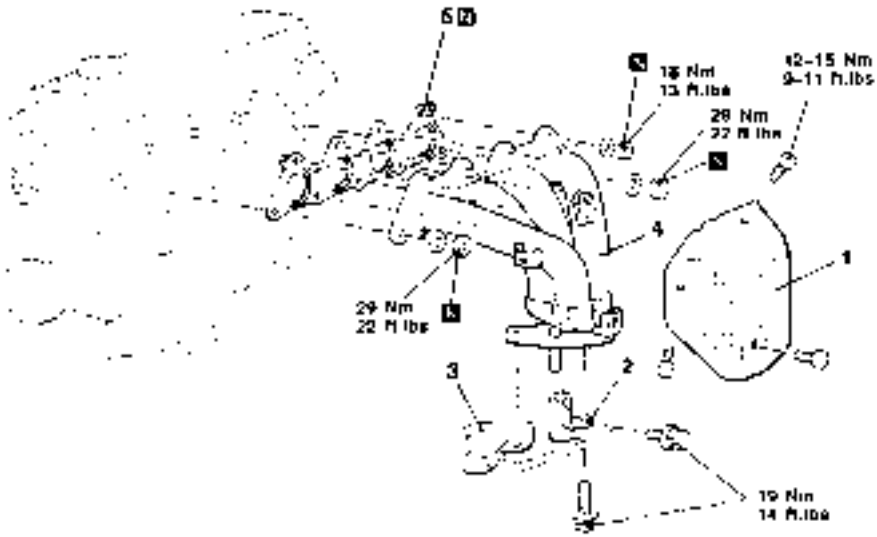


Removal steps

1. Exhaust manifold cover
2. Engine hanger
3. Exhaust manifold
4. Exhaust manifold gasket

1.8L Engines

Pre-removal and Post-installation Operation
- Front Exhaust Pipe Removal and Installation (Refer to P.15-8.)



Removal steps
1. Exhaust manifold cover
2. Exhaust manifold bracket (A)
3. Exhaust manifold bracket (B)
4. Exhaust manifold
5. Exhaust manifold gasket

INSPECTION

EXHAUST MANIFOLD CHECK

1. Check for damage or cracking of any part.
2. Using a straight edge and feeler gauge, check for distortion of the cylinder head installation surface.

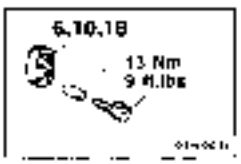
   Standard value: 0.15 mm (.006 in.) or less

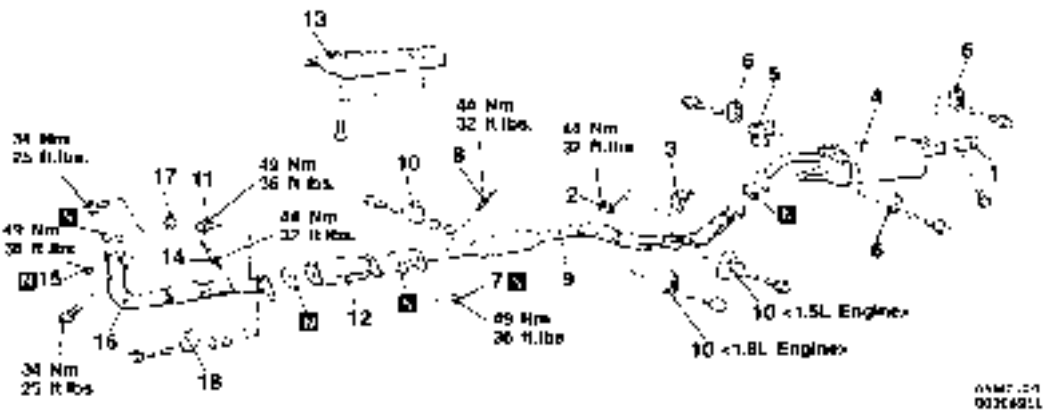
   Limit: 0.20 mm (.008 in.)

EXHAUST PIPE AND MAIN MUFFLER

REMOVAL AND INSTALLATION

<Vehicles for Federal>



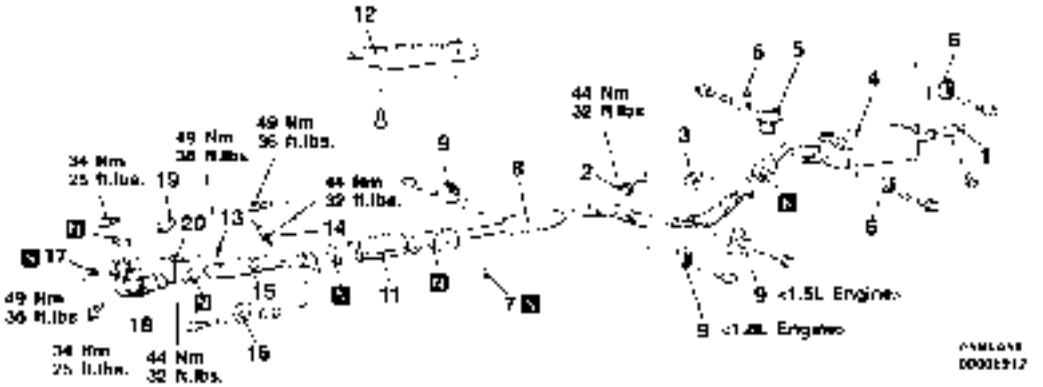


Main muffler removal steps
1. Muffler outlet <1.8L Engine>
2. Bolt
3. Protector
4. Main muffler
5. Dynamic damper <1.8L Engine>
6. Hanger

Center exhaust pipe removal steps
7. Bolt
8. Protector
9. Self-locking nuts
◀A▶ ▶A◀ 10. Heated oxygen sensor
11. Center exhaust pipe
12. Hanger
13. Bolts
14. Catalytic converter
15. Front floor heat protector panel

Front exhaust pipe removal steps
16. Bolts
◀A▶ ▶A◀ 17. Heated oxygen sensor
18. Self-locking nuts
19. Front exhaust pipe
20. Front exhaust pipe bracket
21. Hanger

<Vehicles for California>



Main muffler removal steps

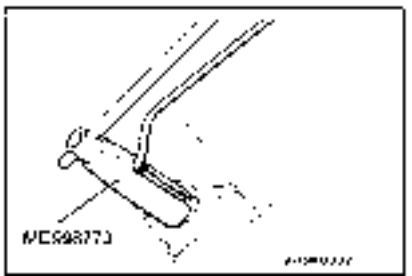
1 Muffler outlet <1.8L Engine>
2 Bolt
3 Protector
4 Main muffler
5 Dynamic damper <1.8L Engine>
6 Hanger

Center exhaust pipe removal steps

2 Bolt
3 Protector
7 Self locking nuts
8 Center exhaust pipe
9 Hanger
10 Bolts
11 Catalytic converter
12 Front floor heat protector panel

Front exhaust pipe removal steps

10 Bolts
13 Self locking nuts
◀A▶ ▶A◀ 14 Heated oxygen sensor
15 Front exhaust pipe
16 Hanger
17 Self locking nuts
18 Front catalytic converter
19 Front exhaust pipe bracket
◀A▶ ▶A◀ 20 Heated oxygen sensor



REMOVAL SERVICE POINT

◀A▶ HEATED OXYGEN SENSOR REMOVAL

INSTALLATION SERVICE POINT

◀A▶ HEATED OXYGEN SENSOR INSTALLATION