

INTAKE AND EXHAUST

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15109000168

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SERVICE SPECIFICATIONS

15100030128

Items		Standard value	Limit
Waste gate actuator activation pressure kPa		Approx. 83	–
Intake air temperature switch °C	OFF (no continuity)	55 or less	–
	ON (continuity)	57 or more	–
Manifold distortion of the installation surface mm		0.15 or less	0.20

SEALANT

15100050025

Item	Specified sealant	Remark
Water outlet fitting <4G6>	MITSUBISHI GENUINE PART MD970389 or equivalent	Semi-drying sealant

ON-VEHICLE SERVICE

15100180137

INTAKE MANIFOLD VACUUM CHECK <4G6>

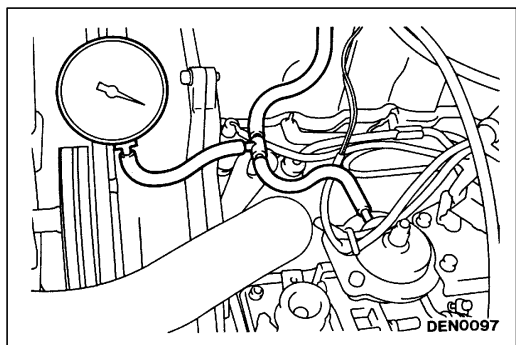
Refer to GROUP 11A – On-vehicle Service

TURBOCHARGER SUPERCHARGING CHECK
<4D56 with turbocharger>

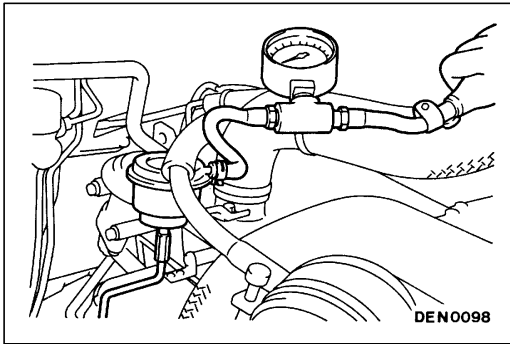
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Caution

Conduct the driving test in a location where driving at full acceleration can be done with safety. Two person should be in the vehicle when the test is conducted; the person in the passenger seat should read the indications shown by the pressure meter.



1. Remove the boost compensator hose from the fuel injection pump, and install a pressure gauge as shown in the illustration.
2. Drive at full-throttle acceleration in second gear and then measure the supercharging when the engine speed is about 3,000 r/min.
3. When the indicated supercharging does not become positive pressure, check the following items.
 - Malfunction of the waste gate actuator.
 - Leakage of supercharging pressure.
 - Malfunction of the turbocharger.
4. When the indicated supercharging is 84 kPa or more, supercharging control may be faulty, therefore check the followings.
 - Disconnection or cracks of the waste gate actuator rubber hose.
 - Malfunction of the waste gate actuator.
 - Malfunction of the waste gate valve.



WASTE GATE ACTUATOR CHECK <4D56-with turbocharger>

15100120023

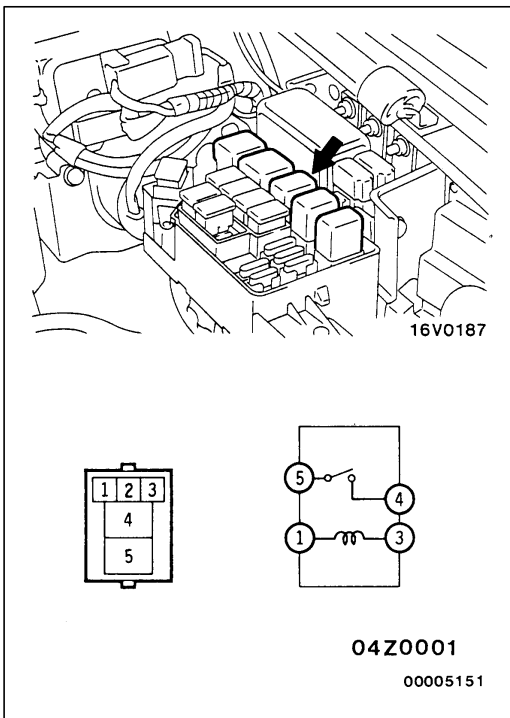
1. Connect a manual pump (pressure-application type) to nipple.
2. While gradually applying pressure, check the pressure that begins to activate (approx. 1 mm stroke) the waste gate actuator rod.

Standard value: Approx. 83 kPa

Caution

In order to avoid damage to the diaphragm, do not apply a pressure of 91 kPa or higher.

3. If there is a significant deviation from the standard value, check the actuator or the waste gate valve: replace if necessary.



POWER RELAY CHECK

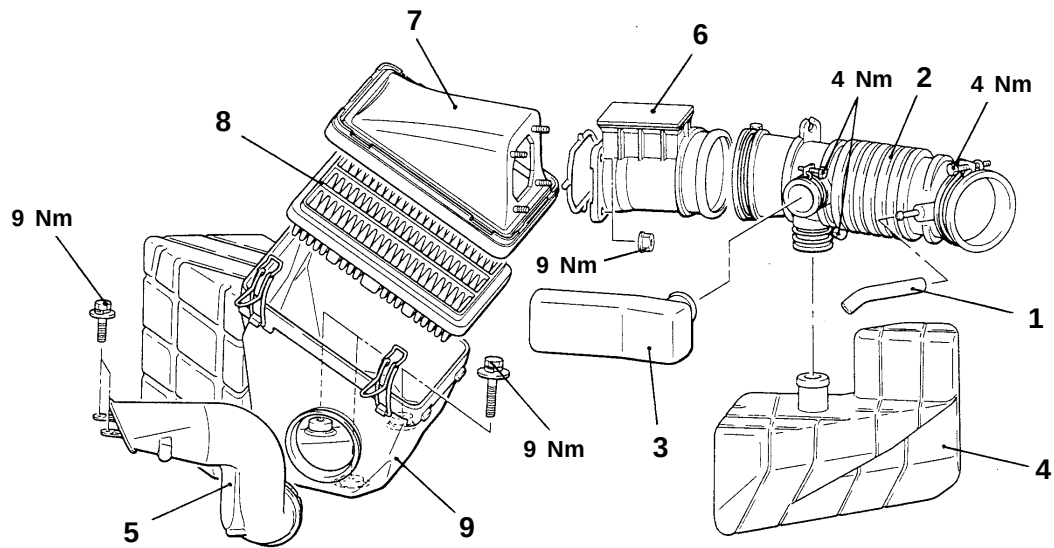
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INTERCOOLER FAN MOTOR RELAY CONTINUITY CHECK

Battery voltage	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

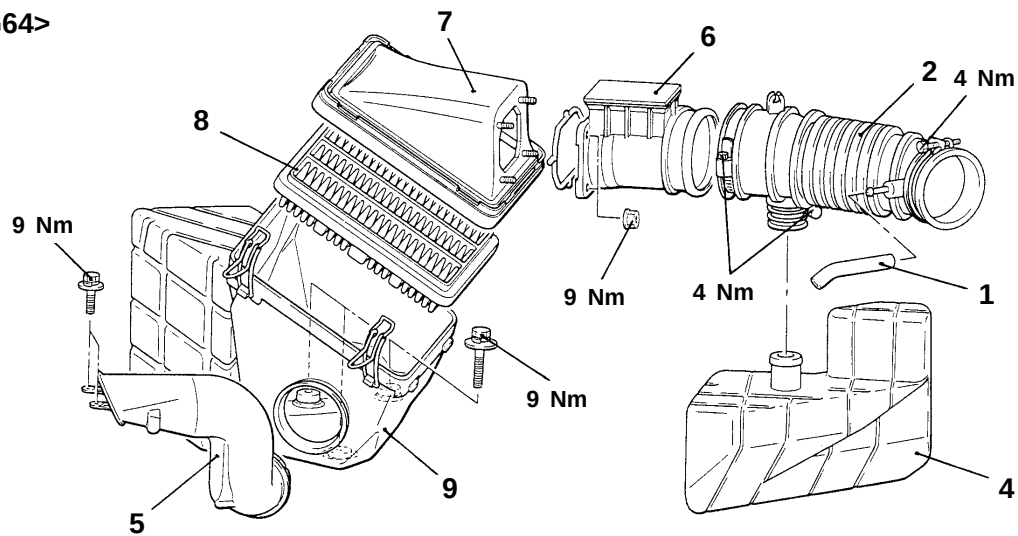
AIR CLEANER**REMOVAL AND INSTALLATION**

<4G63>



05V0012

<4G64>



05V0013

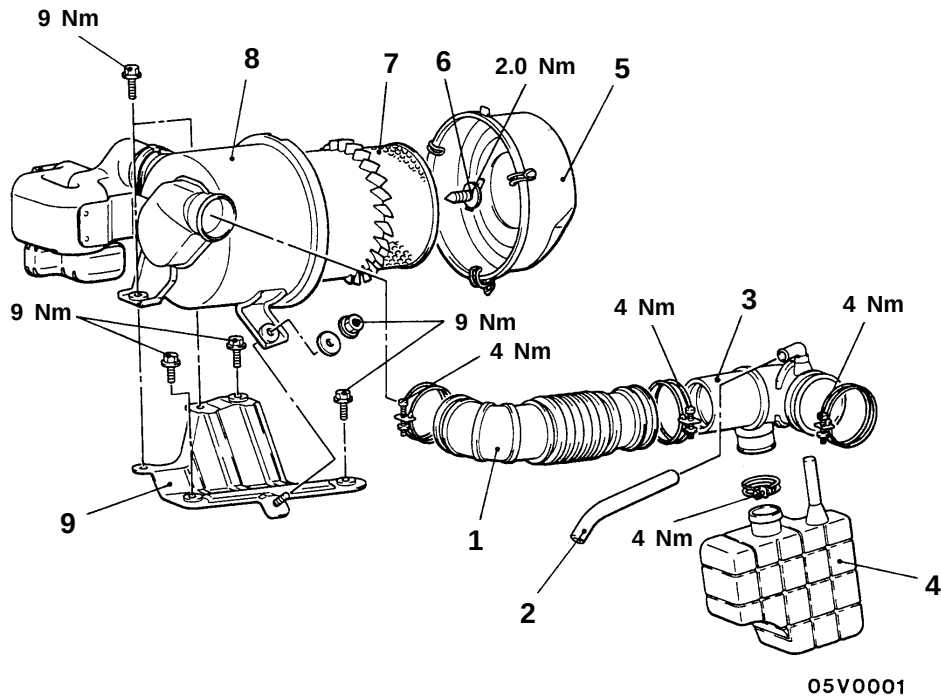
00005152

Removal steps

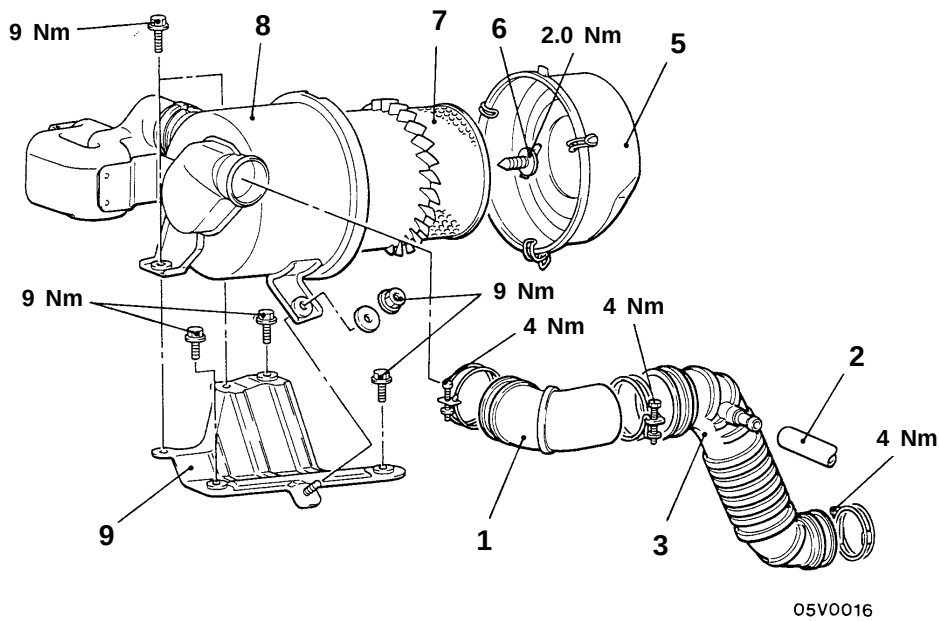
1. Breather hose connection
2. Air intake hose
3. Resonator <4G63>
4. Resonator
5. Air duct

6. Air flow sensor assembly
7. Air cleaner cover
8. Air cleaner element
9. Air cleaner body

<4D56-2WD>



<4D56-4WD>



00005153

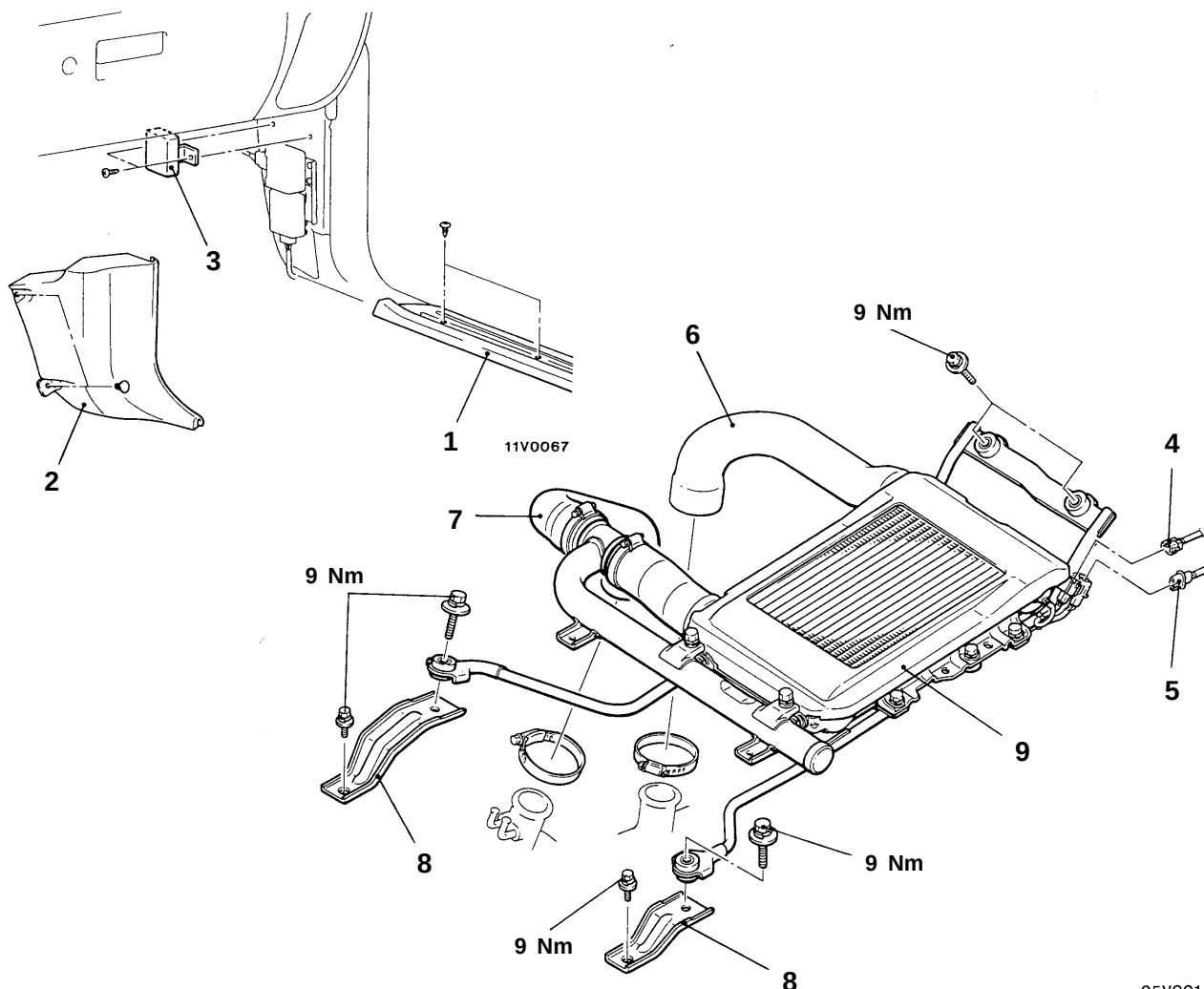
Removal steps

- | | |
|-----------------------------|------------------------|
| 1. Air intake hose A | 6. Bolt |
| 2. Breather hose connection | 7. Air cleaner element |
| 3. Air intake hose B | 8. Air cleaner body |
| 4. Resonator <2WD> | 9. Air cleaner bracket |
| 5. Air cleaner cover | |

INTERCOOLER AND INTERCOOLER FAN-ECU

15100420031

REMOVAL AND INSTALLATION

05V0011
00005154**Intercooler fan-ECU removal steps**

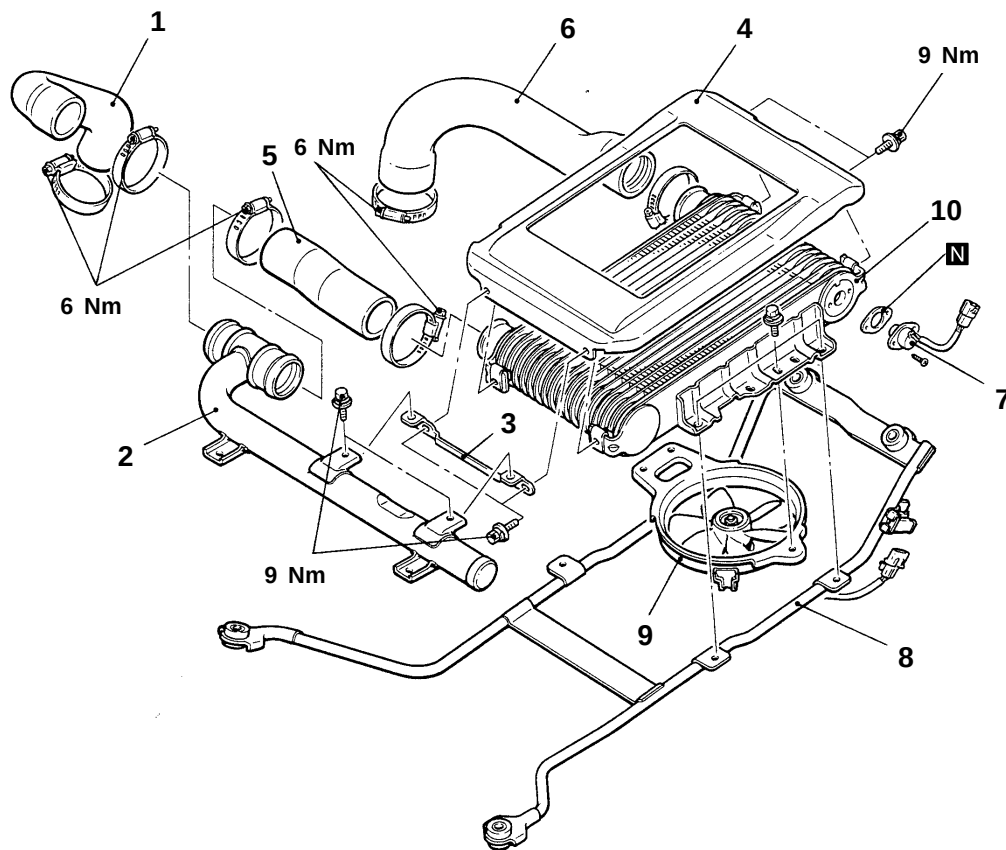
1. Scuff plate
2. Cowl side trim
3. Intercooler fan-ECU

Intercooler removal steps

4. Intake air temperature switch connector
5. Intercooler fan motor connector
6. Air hose B connection (Intake manifold side)
7. Air hose A-2 connection (Turbocharger side)
8. Front bracket
9. Intercooler and bracket assembly

DISASSEMBLY AND REASSEMBLY

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A05V0010

Disassembly steps

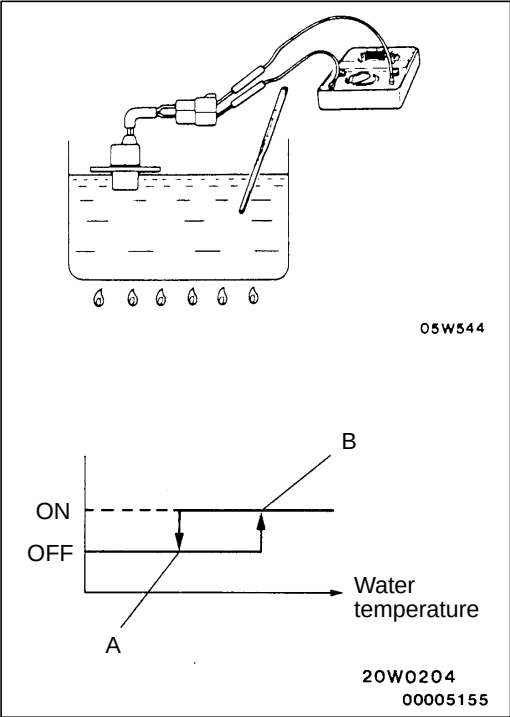
1. Air hose A-2
2. Blanch tube
3. Blanch tube bracket
4. Intercooler cover
5. Air hose A-1

6. Air hose B
7. Intake air temperature switch
8. Intercooler bracket
9. Fan and motor assembly
10. Intercooler

INSPECTION

15100430027

- Check the intercooler fins for bending damage or foreign matter.
- Check the intercooler hoses for cracking, damage or wear.



INTAKE AIR TEMPERATURE SWITCH CHECK

15100630014

1. Immerse the intake air temperature switch in the hot water shown in the figure.
2. When changing the water temperature, check for continuity between the terminals with the circuit tester.

Standard value:

Temperature	Continuity
Less than 55 °C (Temperature at point A)	OFF (No continuity)
More than 57 °C (Temperature at point B)	ON (Continuity)

INTAKE MANIFOLD <4G6>

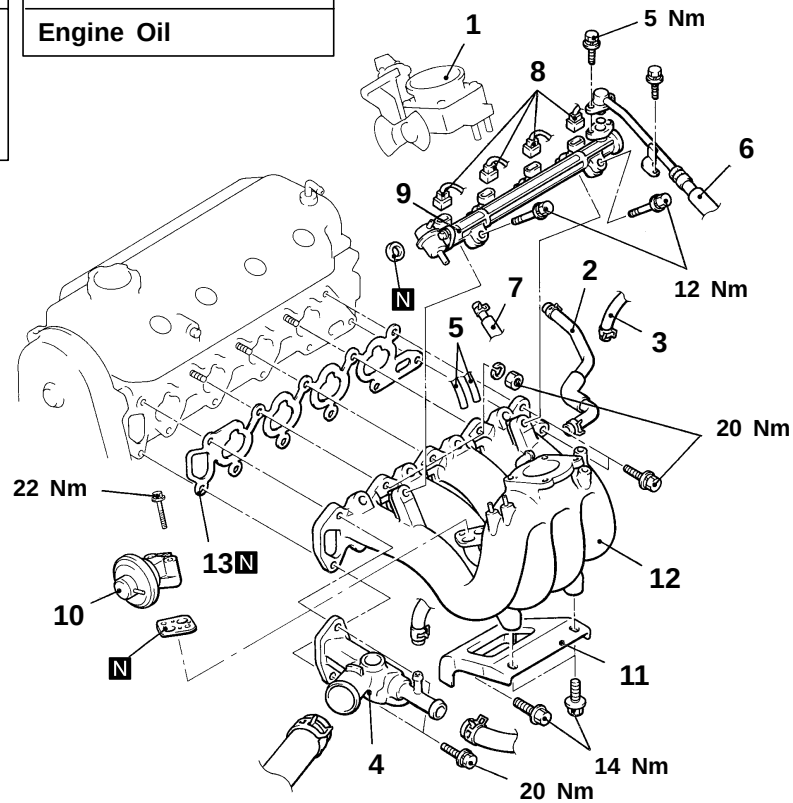
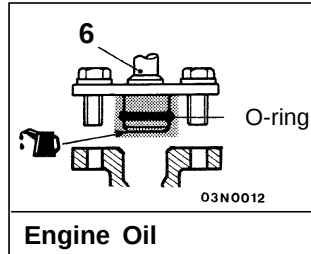
REMOVAL AND INSTALLATION

Pre-removal Operation

- Fuel Discharge Prevention (Refer to GROUP 13A – On-vehicle Service)
- Engine Coolant Draining
- Air Cleaner Removal (Refer to P. 15-4.)
- Battery and Battery Tray Removal

Post -installation Operation

- Engine Coolant Supplying
- Battery and Battery Tray Installation
- Air Cleaner Installation (Refer to P.15-4.)



05W0041

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Removal steps

1. Throttle body (Refer to GROUP 13A – Throttle Body.)
2. PCV hose
3. Brake booster vacuum hose connection
4. Water outlet fitting
5. Vacuum hose connection
6. High-pressure fuel hose connection



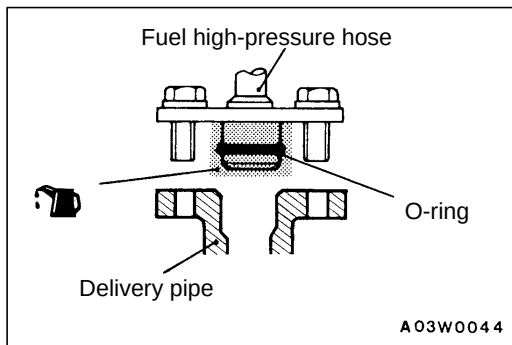
7. Fuel return hose connection
8. Injector connector
9. Injector and delivery pipe assembly
10. EGR valve
11. Intake manifold stay
12. Intake manifold
13. Intake manifold gasket

REMOVAL SERVICE POINT**◀A▶ DELIVERY PIPE AND INJECTOR REMOVAL**

Remove the delivery pipe (with the injectors and pressure regulator attached to it).

Caution

Care must be taken, when removing the delivery pipe, not to drop the injector.

**INSTALLATION SERVICE POINT****▶A◀ HIGH-PRESSURE FUEL HOSE INSTALLATION**

1. When connecting the high-pressure fuel hose to the delivery pipe, 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 delivery pipe.

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. 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 thickness gauge, check for distortion of the cylinder head installation surface.

Standard value: 0.15 mm or less

Limit: 0.20 mm

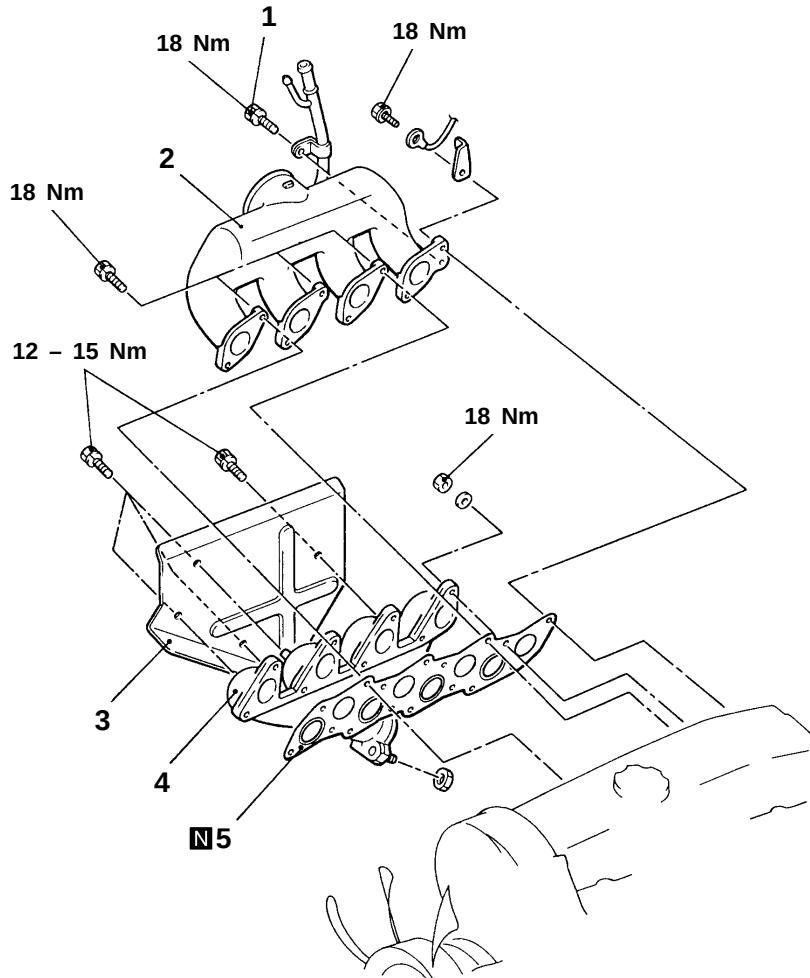
INTAKE AND EXHAUST MANIFOLD <4D56-2WD>

15100360029

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Front Exhaust Pipe Removal and Installation
 (Refer to P.15-19.)



A05V0003

Removal steps

1. Vacuum pipe attaching bolt
2. Intake manifold
3. Heat protector
4. Exhaust manifold
5. Intake and exhaust manifold gasket

INSPECTION

15100370022

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

INTAKE AND EXHAUST MANIFOLD CHECK

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

Standard valve: 0.15 mm or less

Limit: 0.20 mm

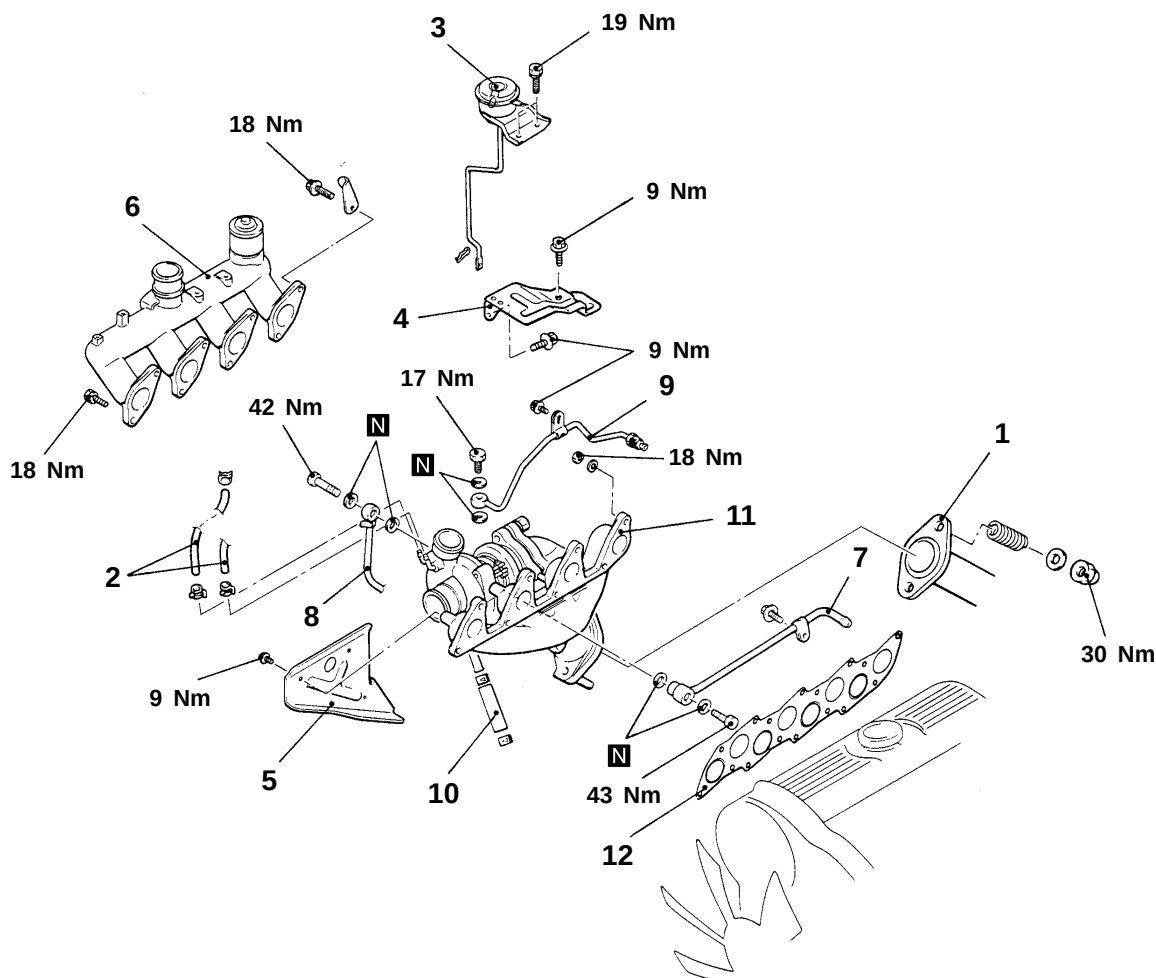
TURBOCHARGER AND EXHAUST MANIFOLD <4D56-4WD>

15100450023

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

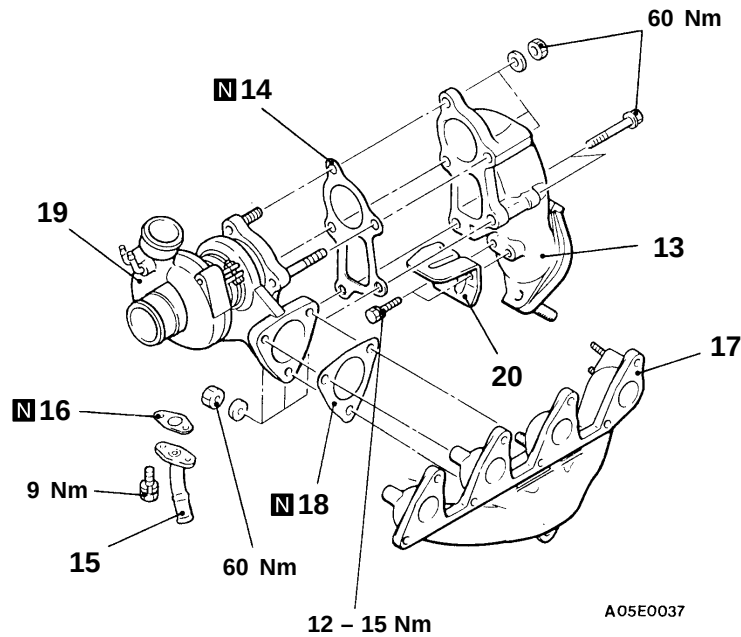
- Engine Coolant Draining and Supplying
- Air Cleaner Cover and Air Intake Hose Removal and Installation (Refer to P. 15-4.)
- Intercooler Removal and Installation (Refer to P. 15-6.)
- Brake Master Cylinder Heat Protector Removal and Installation



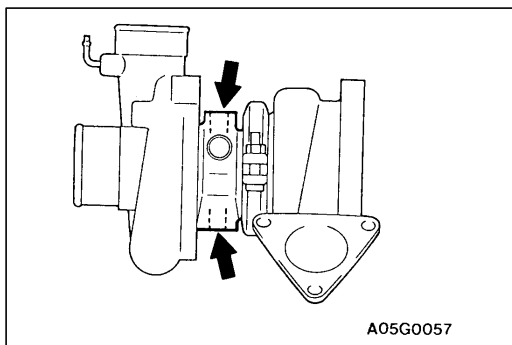
A05V0025

Removal steps

1. Front exhaust pipe connection
2. Boost hose
3. Waste gate actuator
4. Heat protector A
5. Heat protector
6. Intake manifold
7. Water pipe B
8. Water pipe A
9. Oil pipe
10. Oil return hose connection
11. Exhaust manifold and turbocharger assembly
12. Intake and exhaust manifold gasket



13. Exhaust fitting
14. Exhaust fitting gasket
15. Oil-return pipe
16. Oil-return pipe gasket
17. Exhaust manifold
18. Turbocharger gasket
▶A◀ 19. Turbocharger assembly
20. Heat protector



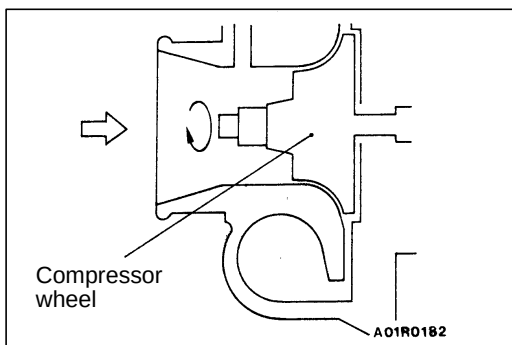
INSTALLATION SERVICE POINT

▶A◀ TURBOCHARGER ASSEMBLY INSTALLATION

1. Clean the alignment surfaces shown in the illustration.
2. Supply clean engine oil from the oil pipe mounting hole of the turbocharger assembly.

Caution

When cleaning, take care that no foreign material gets into the engine coolant or oil passages hole.



INSPECTION

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TURBOCHARGER ASSEMBLY CHECK

- Visually check the turbine wheel and the compressor wheel for cracking or other damage.
 - Check whether the turbine wheel and the compressor wheel can be easily turned by hand.
 - Check for oil leakage from the turbocharger assembly.
 - Check whether or not the waste gate valve remains open.
- If any problem is found, replace the part after disassembly.

OIL PIPE AND OIL RETURN PIPE CHECK

15100650010

Check the oil pipe and oil return pipe for clogging, bending, or other damage. If there is clogging, clean it.

EXHAUST MANIFOLD CHECK

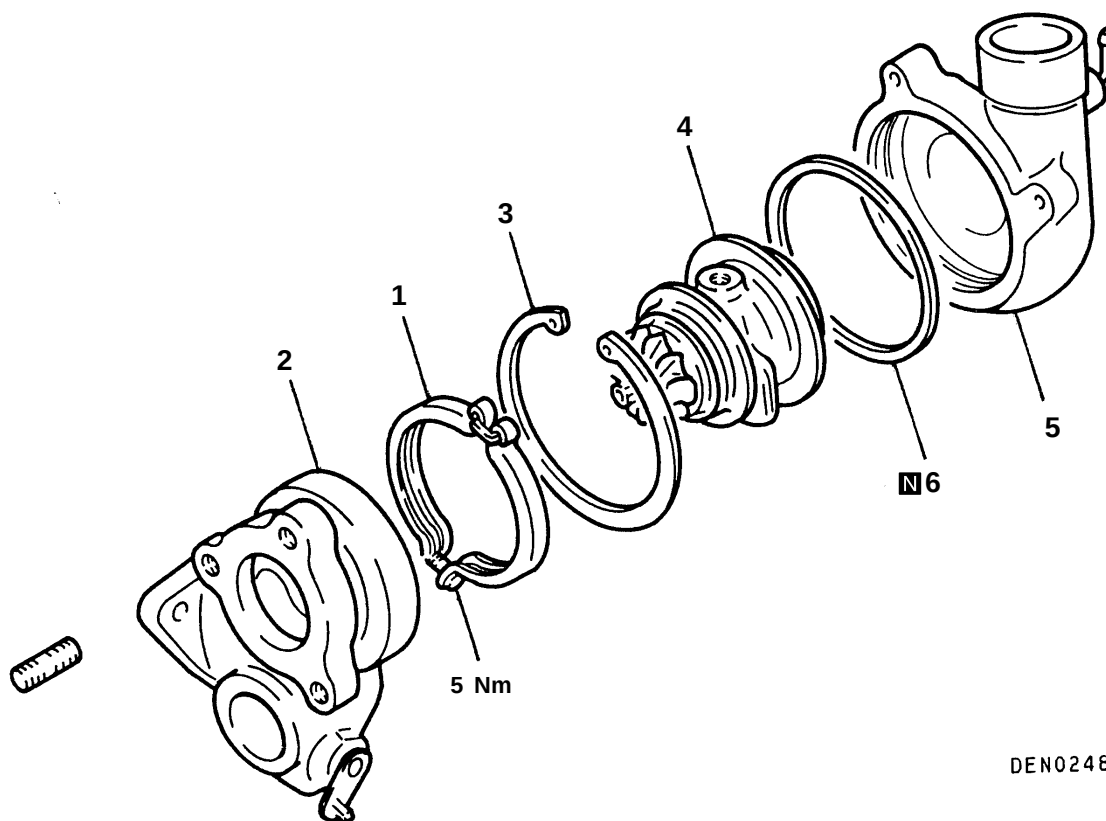
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Damage or cracking of any part.

TURBOCHARGER

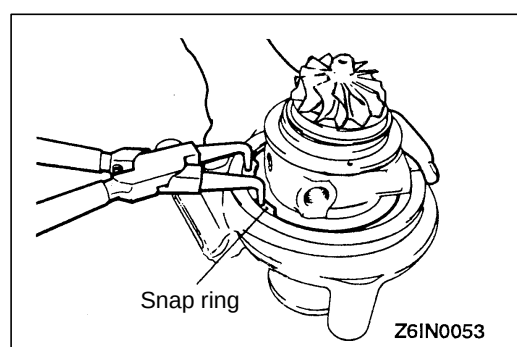
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DISASSEMBLY AND REASSEMBLY



Disassembly steps

- | | |
|-----|---------------------------|
| ▶E◀ | 1. Coupling |
| ▶D◀ | 2. Turbine housing |
| ▶C◀ | 3. Snap ring |
| ▶B◀ | 4. Turbine wheel assembly |
| ▶A◀ | 5. Compressor cover |
| ▶A◀ | 6. O-ring |



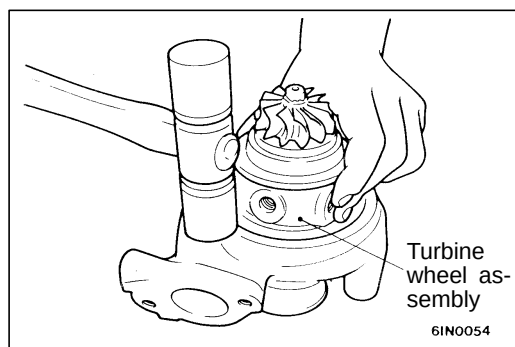
DISASSEMBLY SERVICE POINTS

◀A▶ SNAP RING REMOVAL

Lay the unit with the compressor cover side facing down and using snap ring pliers, remove the compressor cover attaching snap ring.

Caution

When removing the snap ring, hold it with fingers to prevent it from springing away.

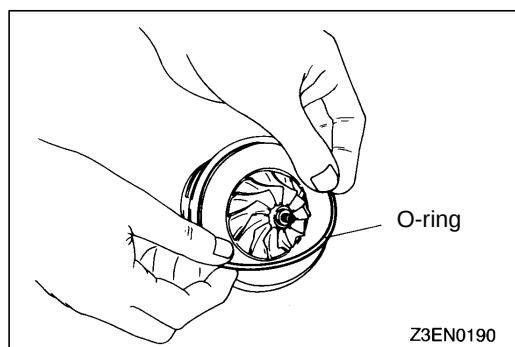


◀B▶ TURBINE WHEEL ASSEMBLY REMOVAL

Remove the turbine wheel assembly, striking the circumference of the compressor cover with a plastic hammer. The turbine wheel assembly may be a little hard to remove due to an O-ring put on the outer circumference.

CLEANING

- (1) Use a clean cleaning oil commercially available. Do not use corrosive cleaning oils as they could damage to some parts.
- (2) Use a plastic scraper or hard brush to clean aluminum parts.



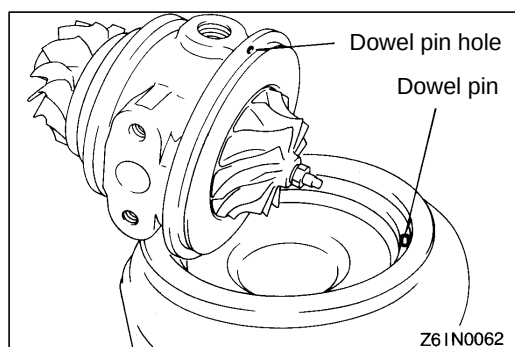
REASSEMBLY SERVICE POINTS

▶A◀ O-RING INSTALLATION

Apply a light coat of engine oil to a new O-ring and fit in the turbine wheel assembly groove.

Caution

When installing the O-ring, use care not to damage it. A damaged O-ring causes oil leaks.

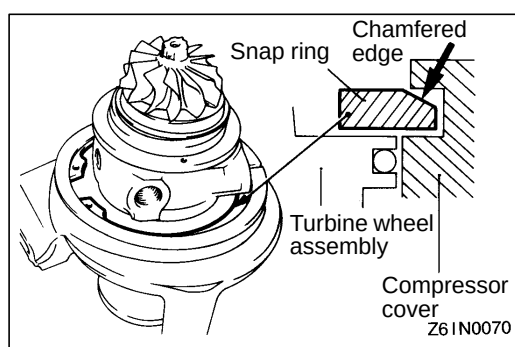


▶B◀ TURBINE WHEEL ASSEMBLY

1. Apply a light coat of engine oil to the periphery of the O-ring.
2. Install the turbine wheel assembly to the compressor cover in relation to the dowel pin.

Caution

Use care not to damage the blades of turbine wheel and compressor wheel.

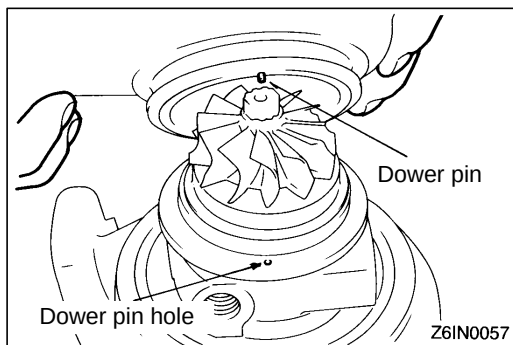


▶C◀ SNAP RING INSTALLATION

Lay the assembly with the compressor cover facing down and fit the snap ring.

Caution

Fit the snap ring with its chamfered side facing up.

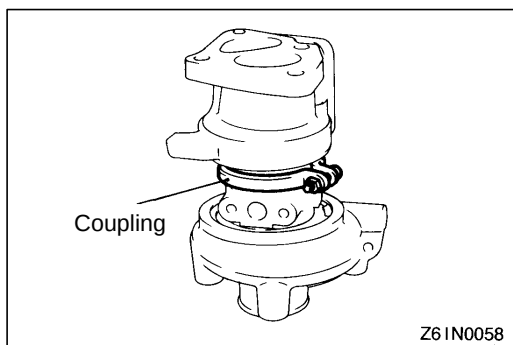


►D◄ TURBINE HOUSING INSTALLATION

Install the turbine housing in relation to the dowel pin.

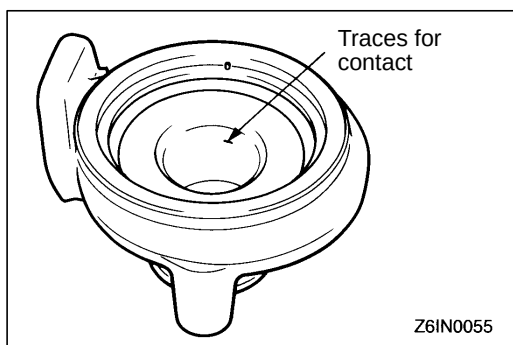
Caution

Use care not to damage the blades of turbine wheel.



►E◄ COUPLING INSTALLATION

Install the coupling and tighten to specified torque.

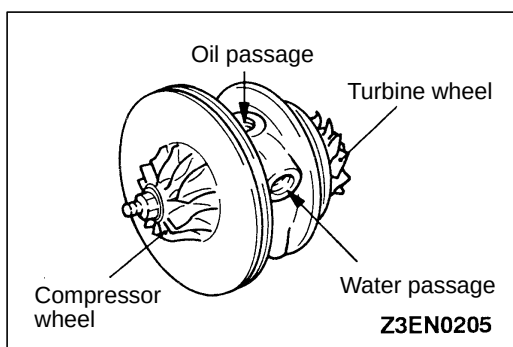


INSPECTION

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TURBINE HOUSING

1. Check the housing for traces of contact with the turbine wheel, cracks due to overheating, pitching, deformation and other damage. Replace with a new turbine housing if cracked.
2. Operate the waste gate valve lever manually to check that the gate can be operated and closed smoothly.



COMPRESSOR COVER

Check the compressor cover for traces of contact with the compressor wheel and other damage.

TURBINE WHEEL ASSEMBLY

1. Check the turbine and compressor wheel blades for bend, burr, damage, corrosion and traces of contact on the back side and replace if defective.
2. Check the oil passage of the turbine wheel assembly for deposit and clogging.
3. In the case of water cooled type, check also the water passage for deposit and clogging.
4. Check the turbine wheel and compressor wheel for light and smooth turning.

OIL PIPE/OIL RETURN PIPE

Correct or replace the oil pipe and oil return pipe if clogged, collapsed, deformed or otherwise damaged.

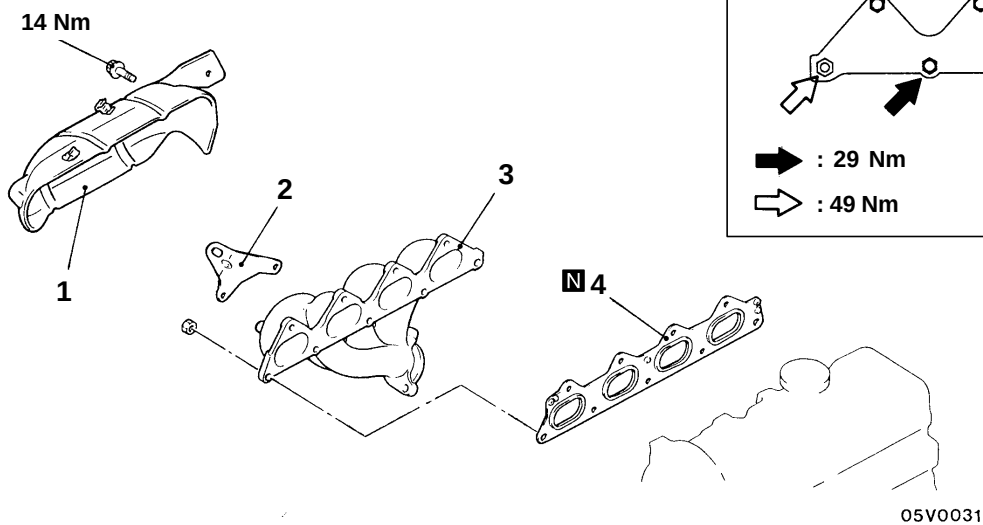
EXHAUST MANIFOLD <4G6>

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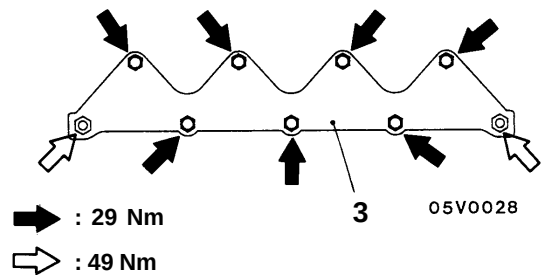
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Front Exhaust Pipe Removal and Installation (Refer to P. 15-19.)
- Air Cleaner Removal and Installation (Refer to P. 15-4.)



Exhaust Manifold mounting bolt tightening torque

**Removal steps**

1. Heat protector
2. Engine hanger
3. Exhaust manifold
4. Exhaust manifold gasket

INSPECTION

15100340115

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 thickness 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

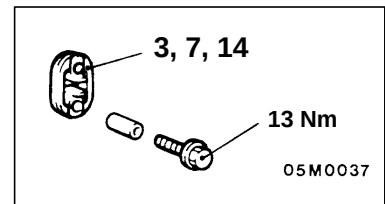
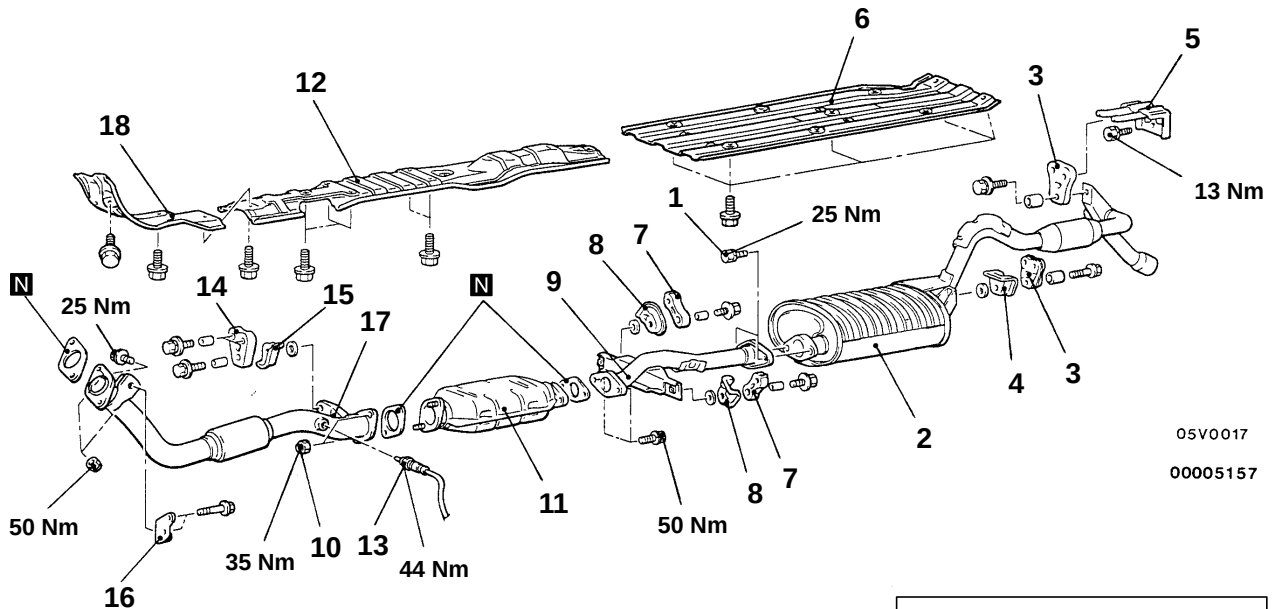
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REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Front Under Cover Removal and Installation <2WD>
- Front Under Cover and Transfer Case Protector Removal and Installation <4WD>

<4G63>



Main muffler removal steps

1. Bolt
2. Main muffler
3. Hanger
4. Heat protector
5. Hanger bracket
6. Rear body floor heat protector

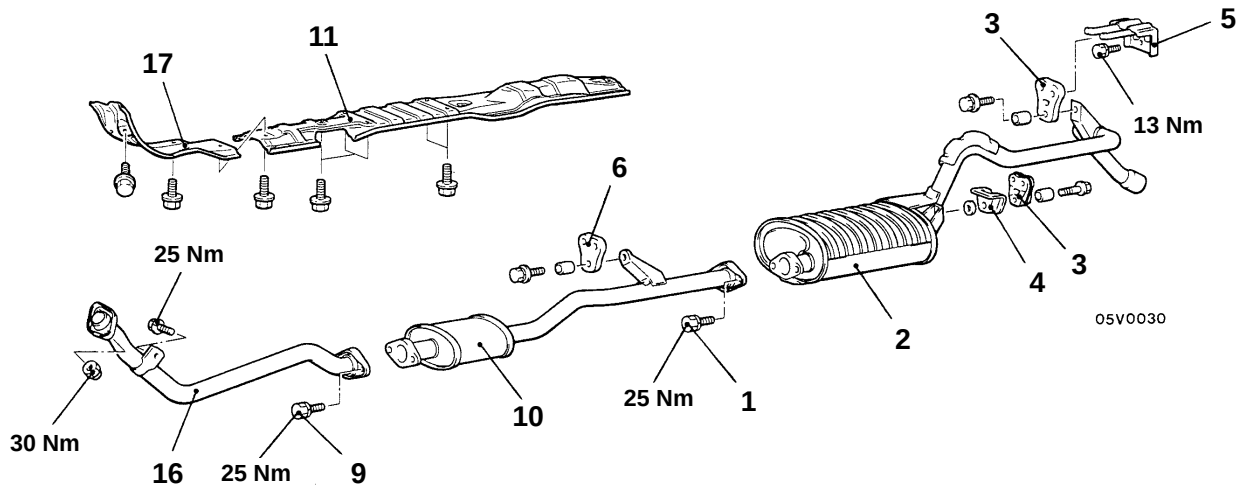
Front exhaust pipe removal steps

10. Nut
13. Oxygen sensor
14. Hanger
15. Heat protector
16. Exhaust support bracket
17. Front exhaust pipe
18. Front floor heat protector A

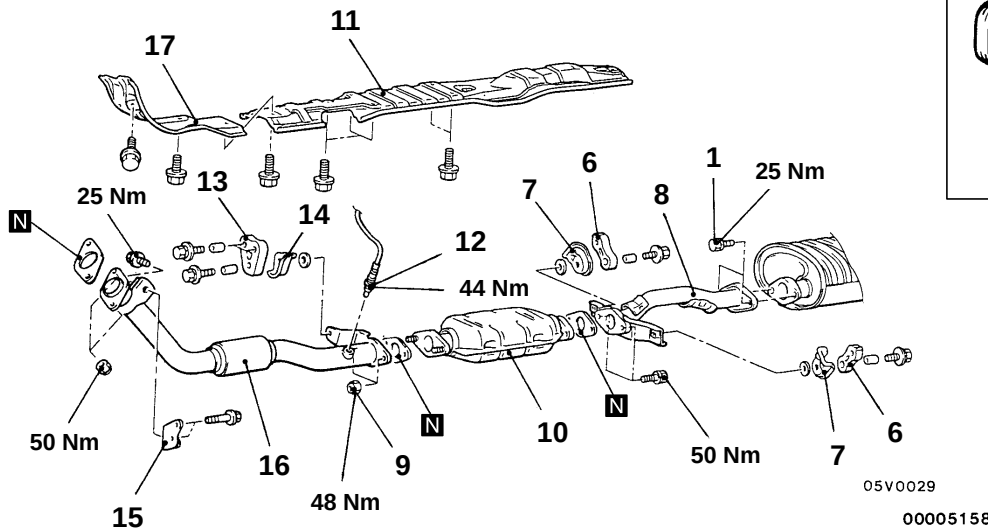
Main muffler removal steps

1. Bolt
7. Hanger
8. Heat protector
9. Center exhaust pipe
10. Nut
11. Catalytic converter
12. Front floor heat protector B

<4D56>



<4G64>

**Main muffler removal steps**

1. Bolt
2. Main muffler
3. Hanger
4. Heat protector
5. Hanger bracket

Center exhaust pipe removal steps

1. Bolt
6. Hanger
7. Heat protector
8. Center exhaust pipe
9. Bolt <4D56> or nut <4G64>
10. Catalytic converter
11. Front floor heat protector B

Front exhaust pipe removal steps

9. Bolt <4D56> or nut <4G64>
12. Oxygen sensor
13. Hanger
14. Heat protector
15. Exhaust support bracket
16. Front exhaust pipe
17. Front floor heat protector A