

Intake Exhaust

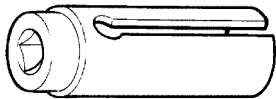
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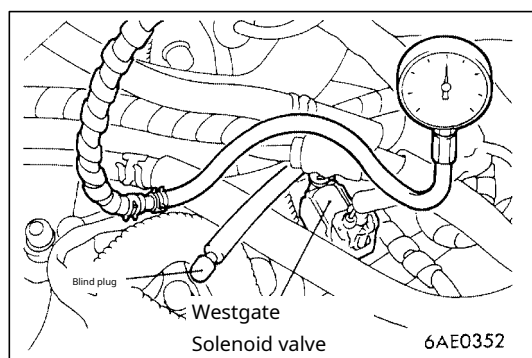
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Maintenance standard value

item	Standard value	Limit value
Turbocharger boost pressure (when the wastegate solenoid valve is not activated) kPa {kg / cm ² }	37 ~ 61 {0.38 ~ 0.63}	—
Wastegate actuator operating start pressure (about 1 mm during stroke) kPa {kg / cm ² }	about 53 {0.54}	—
Wastegate solenoid valve coil resistance value (20 °C when) Ω	28~36	—
Air bypass valve operation start pressure kPa {mmHg}	about 53 {400}	—
Solenoid valve coil resistance (20 °C when) Ω	28~36	—

Special tool

tool	number	name	Use
	MD998770	O2 Sensor wrench	O2 Removing and installing the sensor



Car maintenance

1. Inspection of turbocharger boost pressure

caution

The driving test should be conducted by two passengers in a place where full-throttle acceleration can be safely performed, and the passenger seat should read the pressure gauge readings.

- (1) Remove the hose (black) from the boost pressure control solenoid valve, and attach a pressure gauge to this hose.
Blind the solenoid valve nipple after disconnecting the hose (black).

(two) Fast <M / T> Or Fast <A / T> Accelerate the throttle fully open and reduce the engine speed. 3000 r / min Measure the boost pressure when the above is done.

Standard value: 37~61 kPa {0.38~0.63 kg / cm²}

- (3) If the boost pressure is lower than the standard value, check for the following possible causes.

- 1) Wastegate actuator malfunction

- 2) Supercharging pressure leak

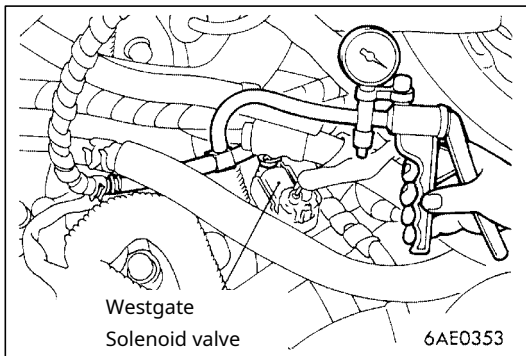
- 3) Defective turbocharger

- (Four) If the boost pressure is higher than the standard value, it is possible that the boost pressure control is abnormal, so check the following points.

- 1) Wastegate actuator malfunction

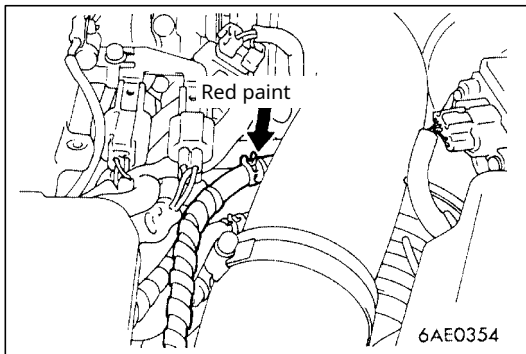
- 2) Wastegate valve malfunction

- 3) Wastegate actuator rubber hose detached or cracked



2. Inspection of boost pressure control system

- (1) Remove the hose (black) from the wastegate solenoid valve and connect a three-way joint between the hose and the solenoid valve.
- (2) Connect the hand vacuum pump to the three-way fitting.



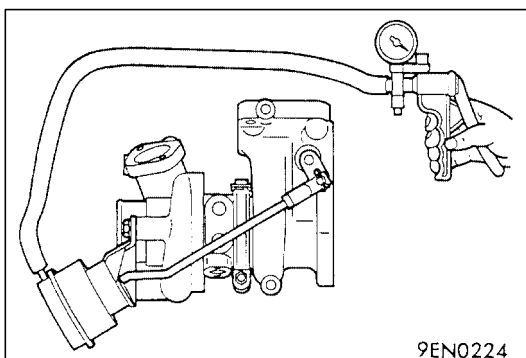
- (3) Remove the hose (red paint is applied to the end of the hose) from the wastegate actuator control booth nipple of the air fitting, and plug this nipple with a blind plug.

(Four) Check the condition of the negative pressure by applying negative pressure while closing or opening the tip of the vacuum hose (black) with your finger.

Engine condition	Hose (black) tip	Normal condition
<u>Stop</u> (Ignition open switch: ON)		Negative pressure leaks
	Blockage	Negative pressure is held NS
Idling after warming up drive		Negative pressure leaks

remarks

If the negative pressure condition is not normal, it is presumed that the wastegate actuator, wastegate solenoid valve or hose is defective.



3. Inspection of Westgate Actuator

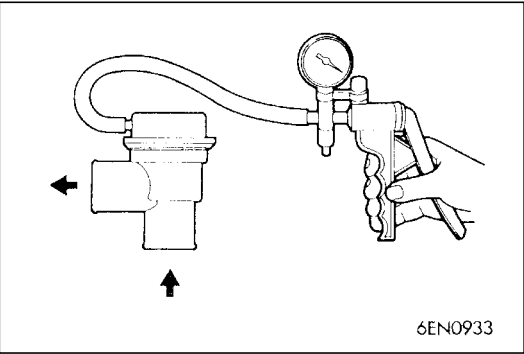
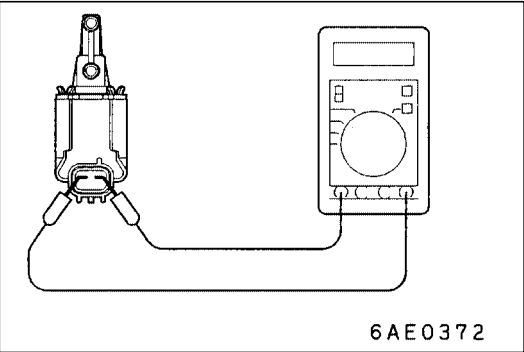
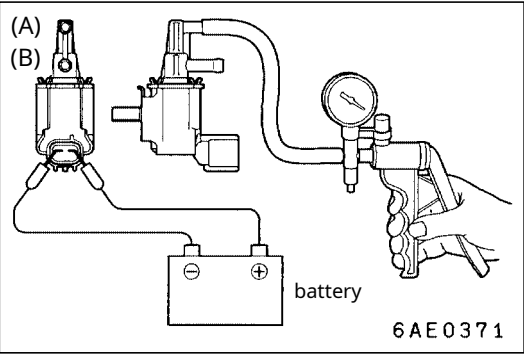
- (1) Connect the hand pump (pressurized type) to the nipple.
- (2) The wastegate actuator rod begins to move while gradually applying pressure (approx. 1 mm). Check the pressure of the stroke).

Standard value:: about 53 kPa {0.54 kg / cm²}

caution

To prevent damage to the diaphragm 95 kPa {0.97 kg / cm²} Do not apply more pressure than this.

- (3) Inspect the actuator or wastegate valve if it deviates significantly from the standard value, and if necessary, the actuator or turbocharger. Ass'y To replace.



Four. Inspection of Westgate solenoid valve

4-1 Operation check

- (1) Solenoid valveAConnect the hand vacuum pump to the nipple.
- (2) Use a jumper wire to connect the solenoid valve terminal to the battery terminal.
- (3) Intermittent the jumper wire on the battery (-) terminal side and apply negative pressure to check the airtightness.

Jumper wire BNipple condition	Normal condition
connectionOpen	Negative pressure leaks
	Blockage
Separate	Open
	Negative pressure is held NS
	Negative pressure is held NS

4-2 Check coil resistance

Measure the resistance between the solenoid valve terminals.

Standard value: 28~36Ω (20_CWhen)

Five. Inspection of air bypass valve

- (1) Remove the air bypass valve.
- (2) Connect the hand vacuum pump to the nipple of the air bypass valve.
- (3) about49 kPa {370 mmHg} Apply negative pressure to make sure that airtightness is maintained.
- (Four) Apply negative pressure and check the operation of the valve.

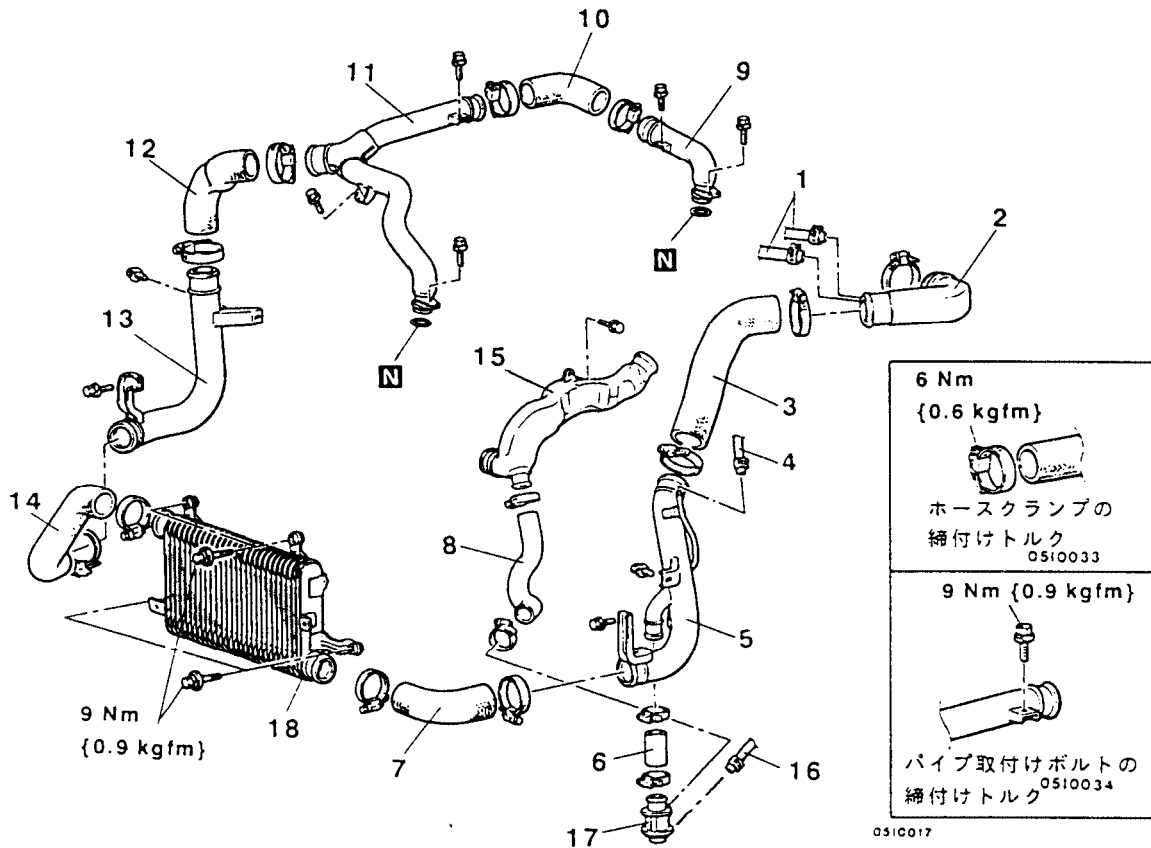
Negative pressure	Valve activation
about53 kPa {400 mmHg}	Start to open

Intercooler

Removal and installation

Work before removal and after installation

Removing and installing the strut tower bar
(group42reference)



Air hose Air pipe removal procedure

1. Vacuum hose
2. Air hoseA
3. Air hoseB
- Four. Installation of vacuum hose
- Five. Air pipeD
6. hose
7. Air hoseC
8. Air bypass hose
9. Air pipeB
- Ten. Air hoseF
11. 11. Air pipeA
12. Air hoseE
- D Washer tankAss'y (Ass'ygroup 51 – Windshield wiper See washer)
13. Air pipeC
14. Air hoseD

Air intake hoseCRemoval procedure

1. Vacuum hose
2. Air hoseA
3. Air hoseB
- D radiatorAss'y (Ass'ygroup14reference)
- D A / TOil filter (group23 – See on-board maintenance)
8. Air bypass hose
15. 15. Air intake hoseC

Air bypass valve removal procedure

6. hose
16. Vacuum hose connection
17. 17. Air bypass valve

IntercoolerAss'yRemoval procedure

- D Front bumper (group51reference)
- D Cooler pipe mounting bolt (group37A – See oil line)
7. Air hoseC
14. Air hoseD
18. 18. IntercoolerAss'y

Surge tank

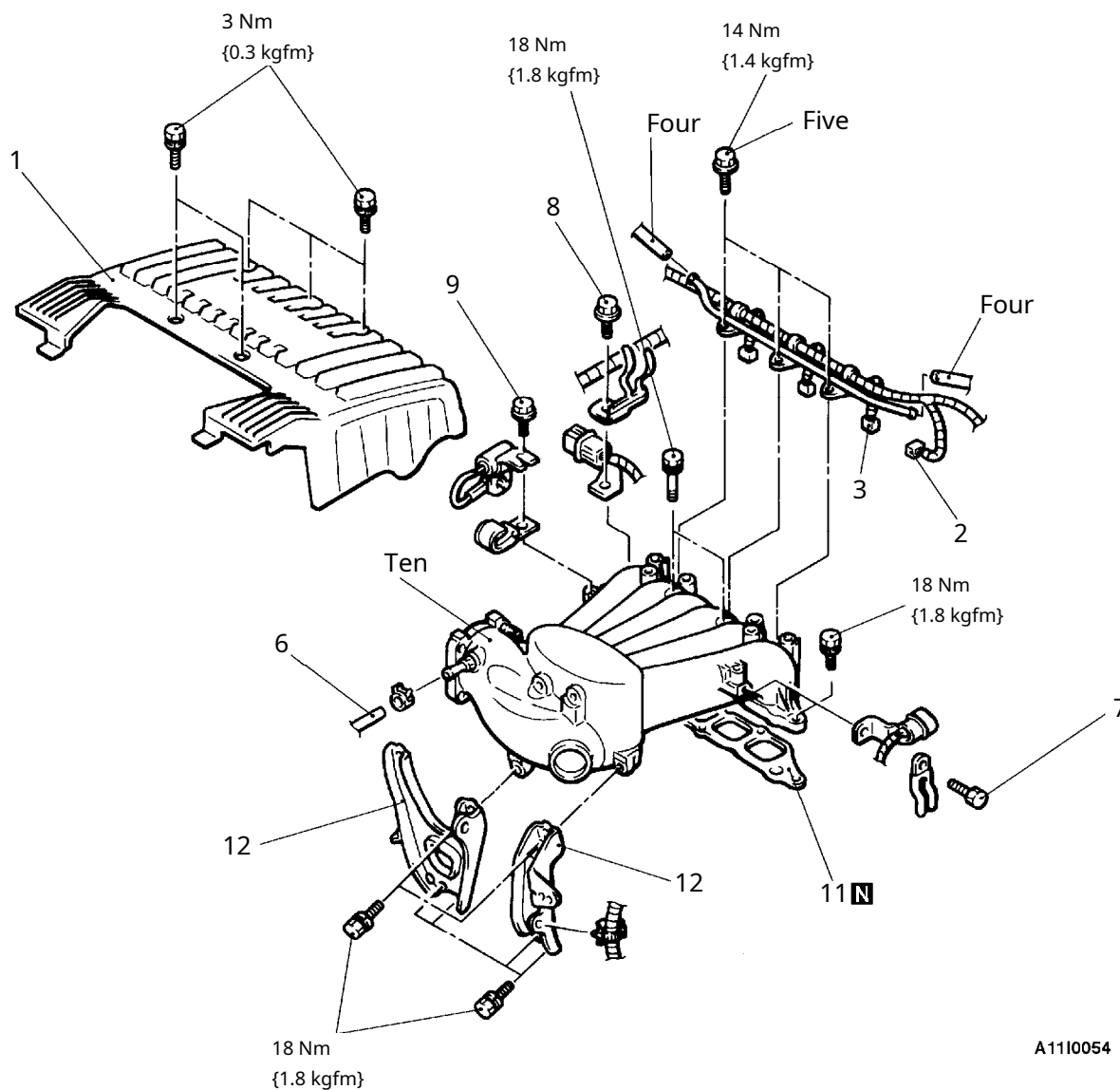
Removal / installation

Work before removal and after installation

D Extraction and injection of cooling water (group14 – See on-board maintenance)

D Air intake hoseAss'yRemoval and installation

D Throttle body removal and installation
(group13Arefernce)



A11I0054

Removal procedure

1. Engine cover
2. Crank angle sensor connector
3. Injector connector
- Four. Vacuum hose connection
- Five. Air pipeAss'yMounting bolt
6. Brake booster vacuum hose

Connection

7. Connector bracket mounting bolts
(Crank angle sensor)

8. Connector bracket mounting bolts
(Control harness)
9. Noise condenser mounting bolt
- Ten. Surge tank
11. 11. Surge tank gasket
12. Surge tank stay

"AA

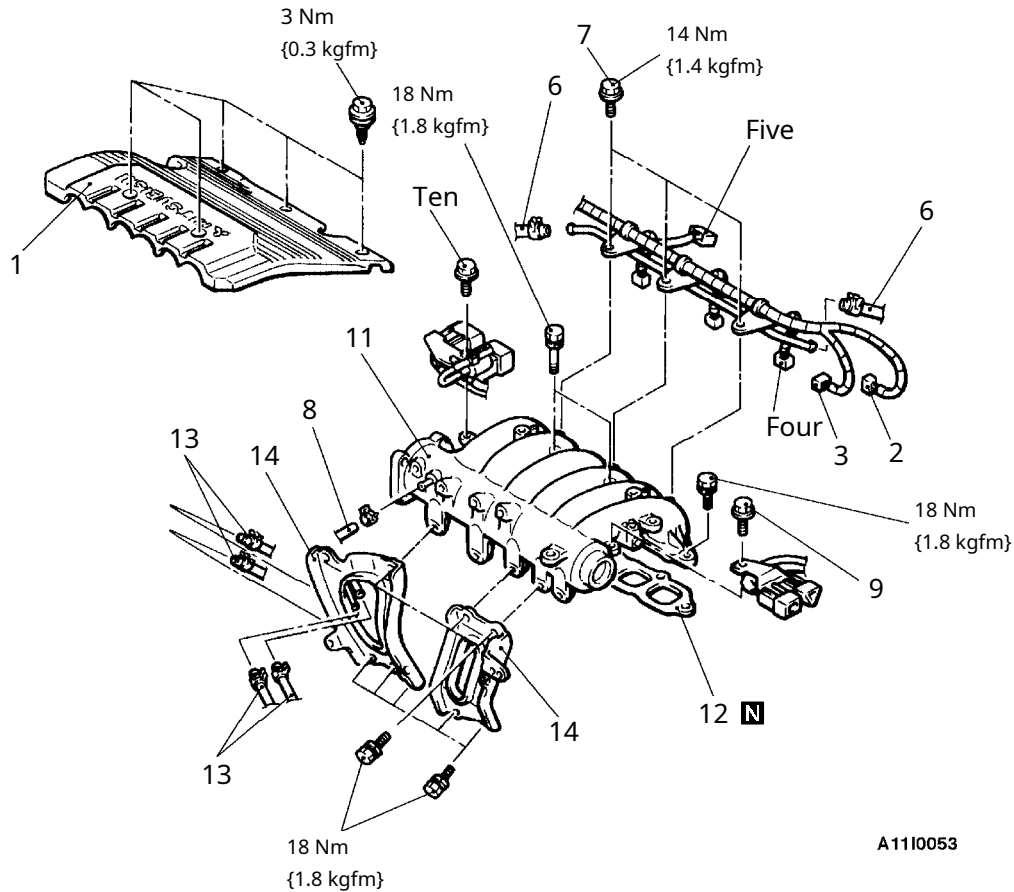
<DOHC>

Work before removal and after installation

D Extraction and injection of cooling water (group14 – See on-board maintenance)

D Removing and installing the strut tower bar
(group42reference)

D Air pipeAas well asBRemoval and installation (P.15-5reference)

D Air hoseA,Bas well asFRemoval and installation
(P.15-5reference)D Throttle body removal and installation
(group13Areference)

A11I0053

Removal procedure

1. Engine cover
2. Crank angle sensor connector
3. Cam position sensor connector
- Four. Injector connector
- Five. Ignition FERIA Sensor connector
6. Vacuum hose connection
7. Air pipeAss'yMounting bolt
8. Brake booster vacuum hose

9. Mounting bracket for connector bracket
(Crank angle sensor and
Cam position sensor)

- Ten. Mounting bracket for connector bracket
(Control harness and knock
sensor)

11. Surge tank

"AA 12. Surge tank gasket

13. Vacuum hose connection

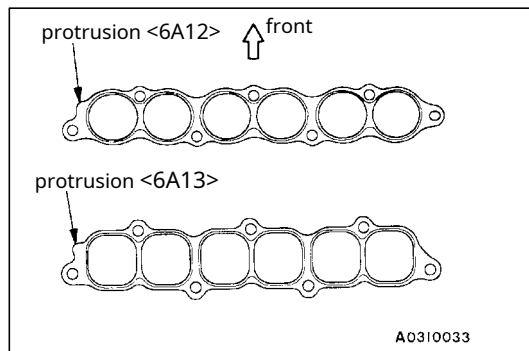
14. Surge tank stay

Connection

Installation points

"AA Installation of surge tank gasket

Install the gasket so that the protrusions are in the direction shown.



A03I0033

Intake manifold

Removal and installation

<4G9>

Work before removal and after installation

D Extraction and injection of cooling water (group14 – See on-board maintenance)

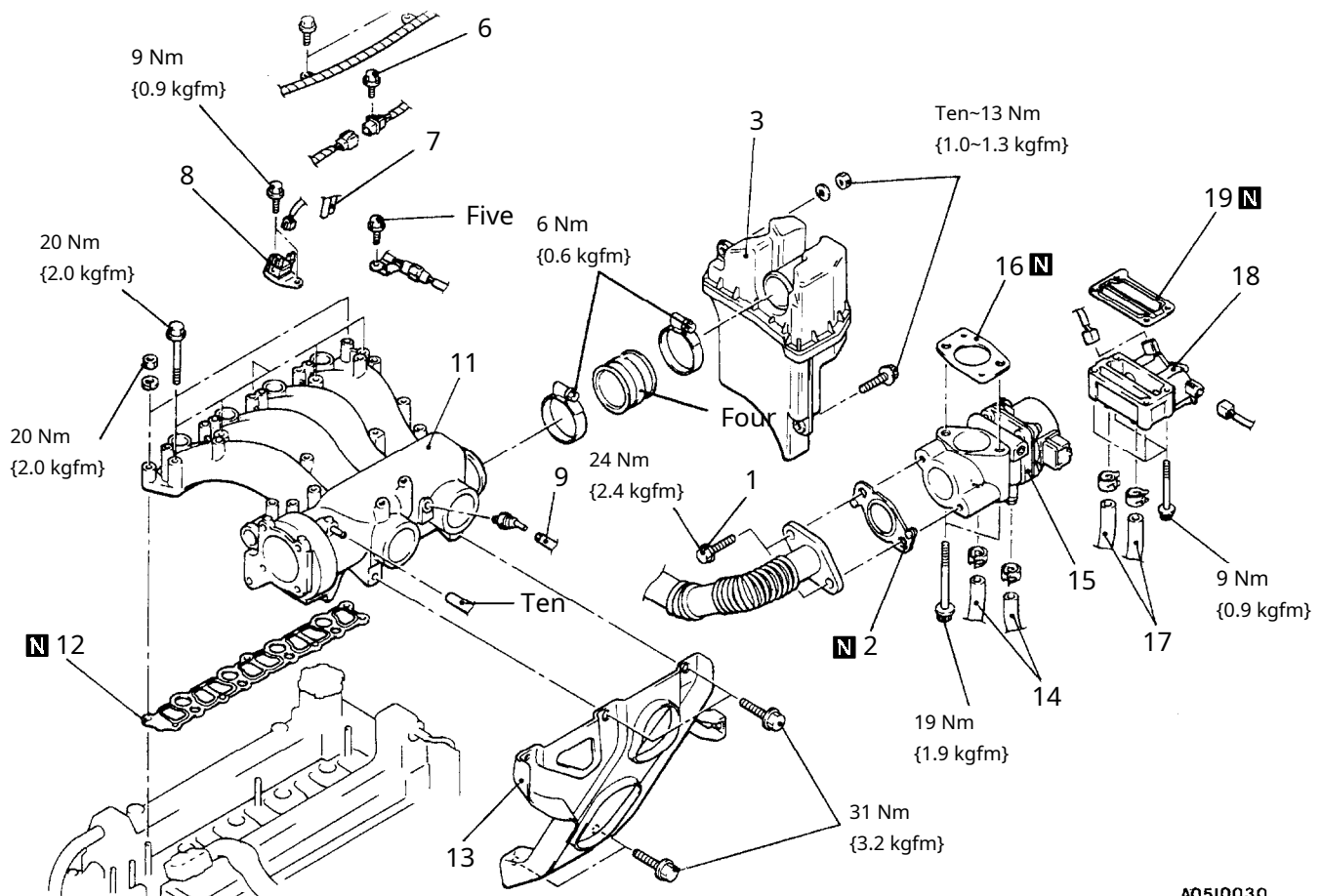
D Air intake hoseAss'yInstallation and removal

D Removing and installing the engine cover

D Removal and installation of ignition coil

D Throttle body removal and installation

(group13Areference)



A0510030

Intake manifold removal procedure

1. EGR Pipe mounting bolt
2. EGR Pipe gasket
3. Surge tank resonator
- Four. Air hose
- Five. Connector bracket mounting bolts
(Crank angle sensor)
6. Connector bracket mounting bolts
(Control harness)
7. Vacuum hose connection
8. Purge solenoid valve
9. Vacuum hose connection
- Ten. Brake booster vacuum hose

Connection

11. 11. Intake manifold
12. Intake manifold gasket
13. Intake manifold stay

EGR valveAss'y Removal procedure

11. 11. Intake manifold
14. Water hose connection
15. EGR valveAss'y
16. EGR gasket

Air bypass valve removal procedure

11. 11. Intake manifold
17. 17. Water hose connection
18. 18. Air bypass valve
19. Air bypass valve gasket

<6A1>

Work before removal and after installation

D Extraction and injection of cooling water

(group14 – See on-board maintenance)

D Fuel outflow prevention work <only before removal>

(group13A – On-board maintenance)

D Air intake hoseAss'yInstallation and removal

D Removing and installing the strut tower bar <DOHC>

(group42reference)

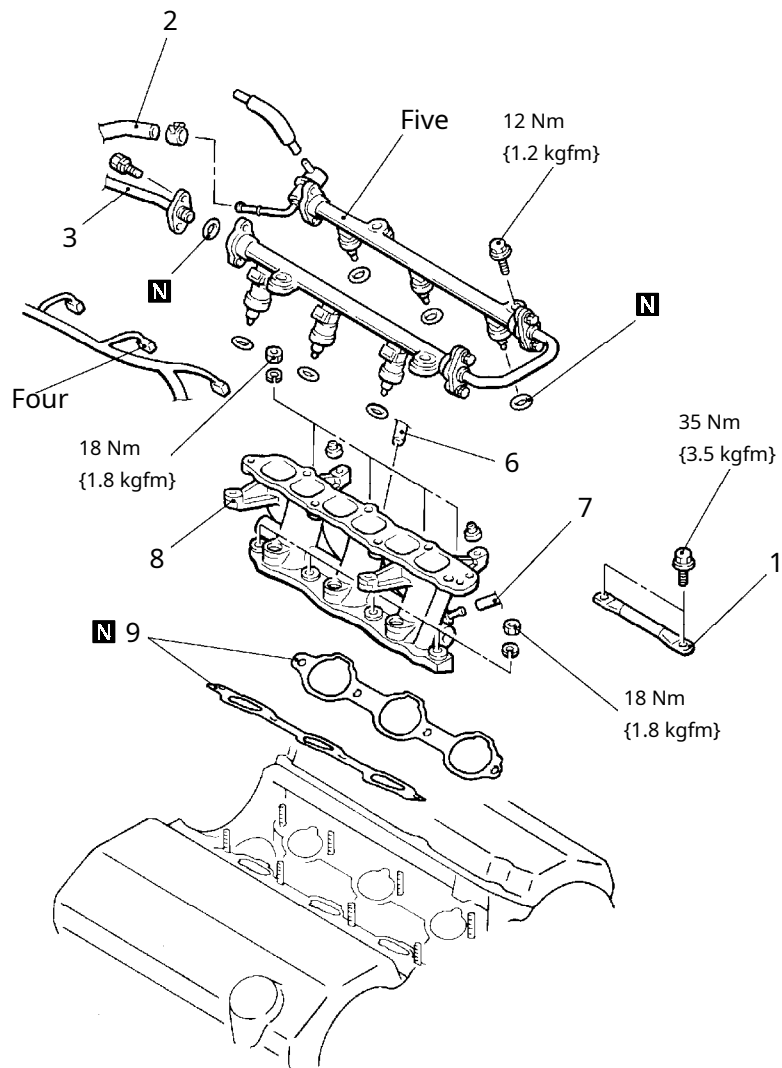
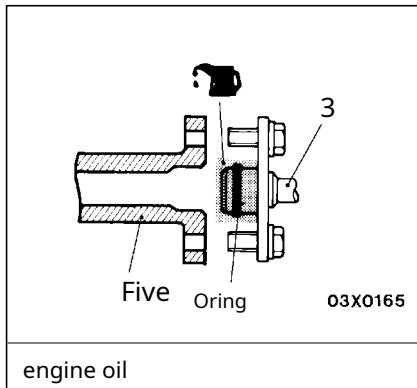
D Air pipeA,B, Air hoseA,Bas well asFRemoval,

Installation <DOHC> (P.15-5reference)

D Throttle body removal and installation

(group13Areference)

D Removing and installing the surge tank (P.15-6reference)



0510014 00005828

Removal procedure

1. Engine mount stay

2. Fuel return hose connection

"BA 3. Fuel high pressure hose

connection

Four. Injector connector

Five. Delivery pipe injector

Fuel pressure regulator

6. PCVHose connection

7. Vacuum hose

8. Intake manifold

"AA

9. Intake manifold gasket

AA"

Key points of removal

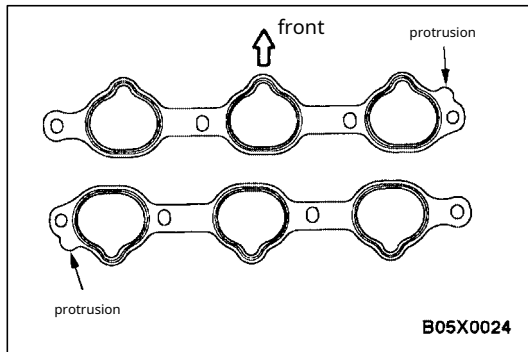
AA" Delivery pipe / injector / fuel pressure regulator

Remove

Remove the injector and fuel pressure regulator attached to the delivery pipe.

caution

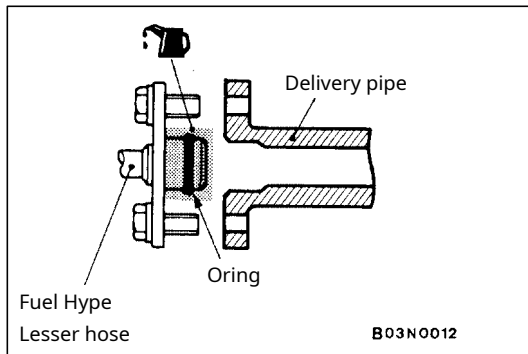
Be careful not to drop the injector when removing the delivery pipe.



Installation points

"AA Installation of intake manifold gasket

Install the gasket so that the protrusions are in the direction shown.



"BA Fuel high pressure hose connection

1. OApply a small amount of new engine oil to the ring andOInsert it into the delivery pipe without damaging the ring.

caution

Prevent engine oil from entering the delivery pipe.

2. Make sure the high pressure hose rotates smoothly. If it does not rotate smoothly,ORemove the high pressure hose because the ring may get caught.OAfter inspecting the ring for damage, reinsert it into the delivery pipe to check.
3. Tighten the mounting bolts to the specified torque.

inspection

Inspection of intake manifold

1. Inspect the intake manifold for damage and cracks, and replace it if it is defective.
2. Rocker cover <using straight edge and thickness gauge4G9> Or cylinder head <6A1> Check the mounting surface for distortion, and if it is defective, replace it.

Standard value: 0.15 mm

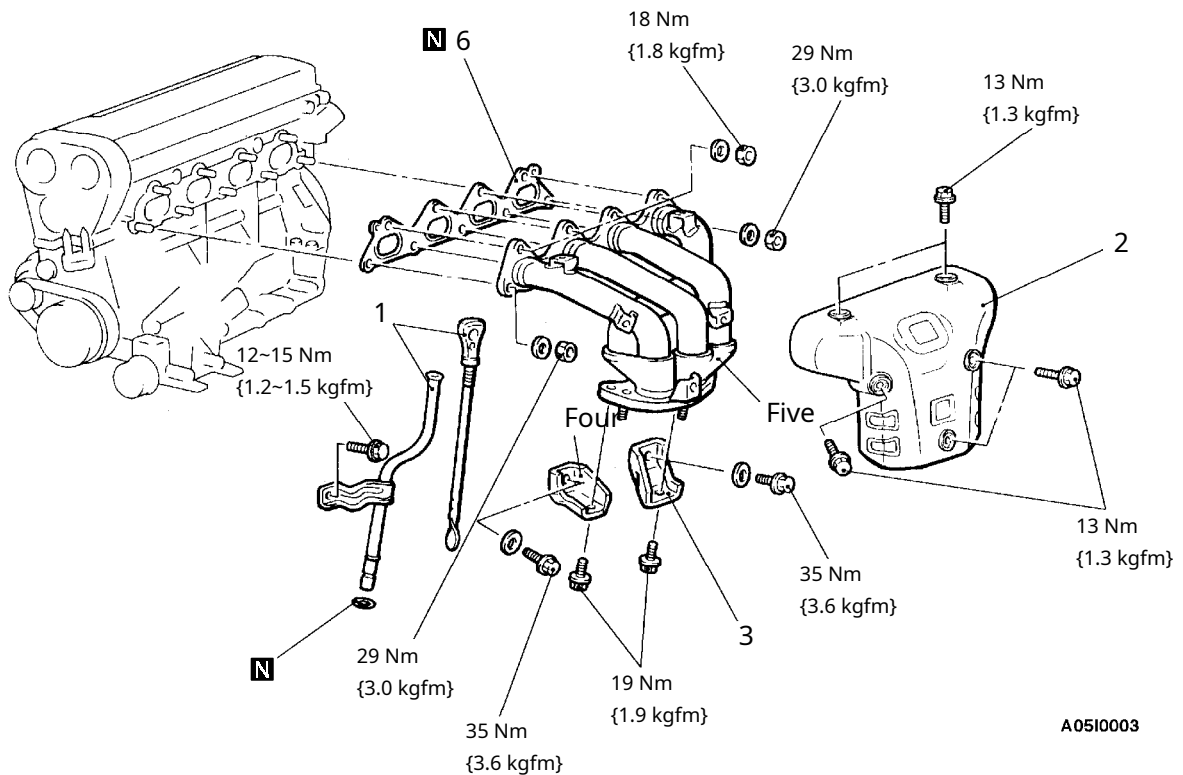
Within limit: 0.2 mm

exhaust manifold <4G9>

Removal / installation

Work before removal and after installation

Removing and installing the front exhaust pipe
(P.15-16reference)



A05I0003

Removal procedure

1. Oil level gauge guideAss'y
2. Heat protector
3. Exhaust manifold bracketA

- Four. Exhaust manifold bracketB
- Five. exhaust manifold
6. Exhaust manifold gasket

inspection

1. Check the exhaust manifold for damage and cracks, and if it is defective, replace it.
2. Use a straight edge and thickness gauge to check for strain on the cylinder head mounting surface, etc., and replace it if it is defective.

Standard value: 0.15mmWithin

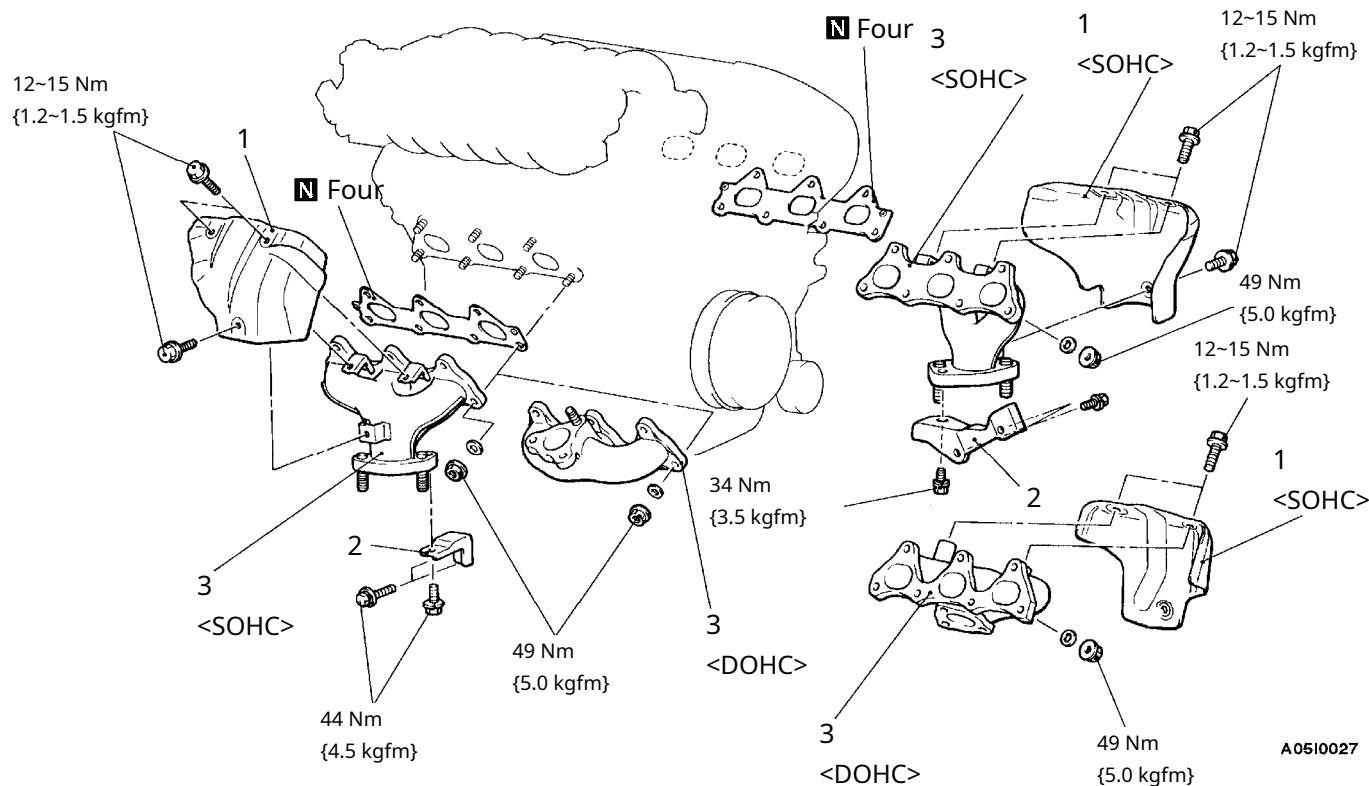
Limit value: 0.2mm

exhaust manifold <6A1>

Removal / installation

Work before removal and after installation

Removing and installing the front exhaust pipe
(P.15-17, 18reference)



A0510027

Front bank removal procedure

1. Heat protector
D TurbochargerAss'y <DOHC>
(P.15-13reference)
2. Exhaust manifold stay
<SOHC>
3. exhaust manifold
- Four. Exhaust manifold gasket

Rear bank side removal procedure

1. Heat protector
D TurbochargerAss'y <DOHC>
(P.15-13reference)
2. Exhaust manifold stay
<SOHC>
3. exhaust manifold
- Four. Exhaust manifold gasket

inspection

1. Check the exhaust manifold for damage and cracks, and if it is defective, replace it.
2. Use a straight edge and thickness gauge to check for strain on the cylinder head mounting surface, etc., and replace it if it is defective.

Standard value: 0.15 mm

Within limit: 0.2 mm

Turbocharger

Removal / installation

<Front bank side>

Work before removal and after installation

D Extraction and injection of cooling water (group14 – See on-board maintenance)

D Draining and injecting engine oil

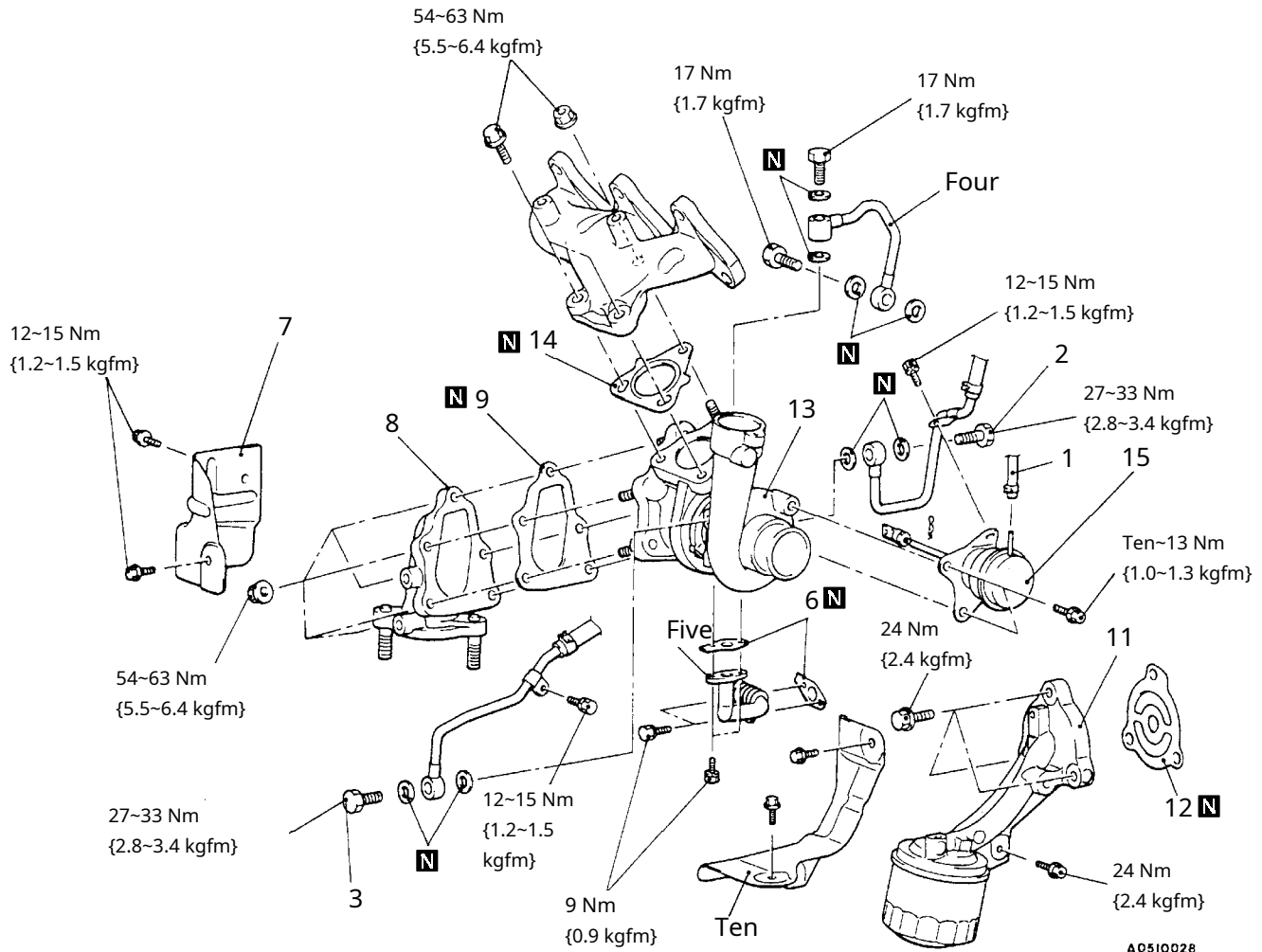
D radiatorAss'yRemoval and installation
(group14reference)

D Removing and installing the front exhaust pipe
(P.15-18reference)

D Removing and installing the starter

D Air hoseA, B, Air pipeA, DAnd air intake

hoseCRemoval and installation (P.15-5reference)



A0510028

Removal procedure

D Heat protector

1. Vacuum hose connection
2. Water pipeAss'yAConnection
3. Water pipeAss'yBConnection
- Four. Oil feed pipeAss'y
- Five. Oil return pipeAss'y
6. Oil return pipe gasket
7. Exhaust fitting cover
8. Exhaust fitting
9. Exhaust fitting gasket

D Transmission fluid cooler

Hose connection <A / T>

Ten. Heat protector

11. 11. Oil filter bracket
12. Oil filter bracket Gasket door

"AA

13. TurbochargerAss'y
14. Turbocharger gasket
15. 15. Westgate actuator

<Rear bank side>

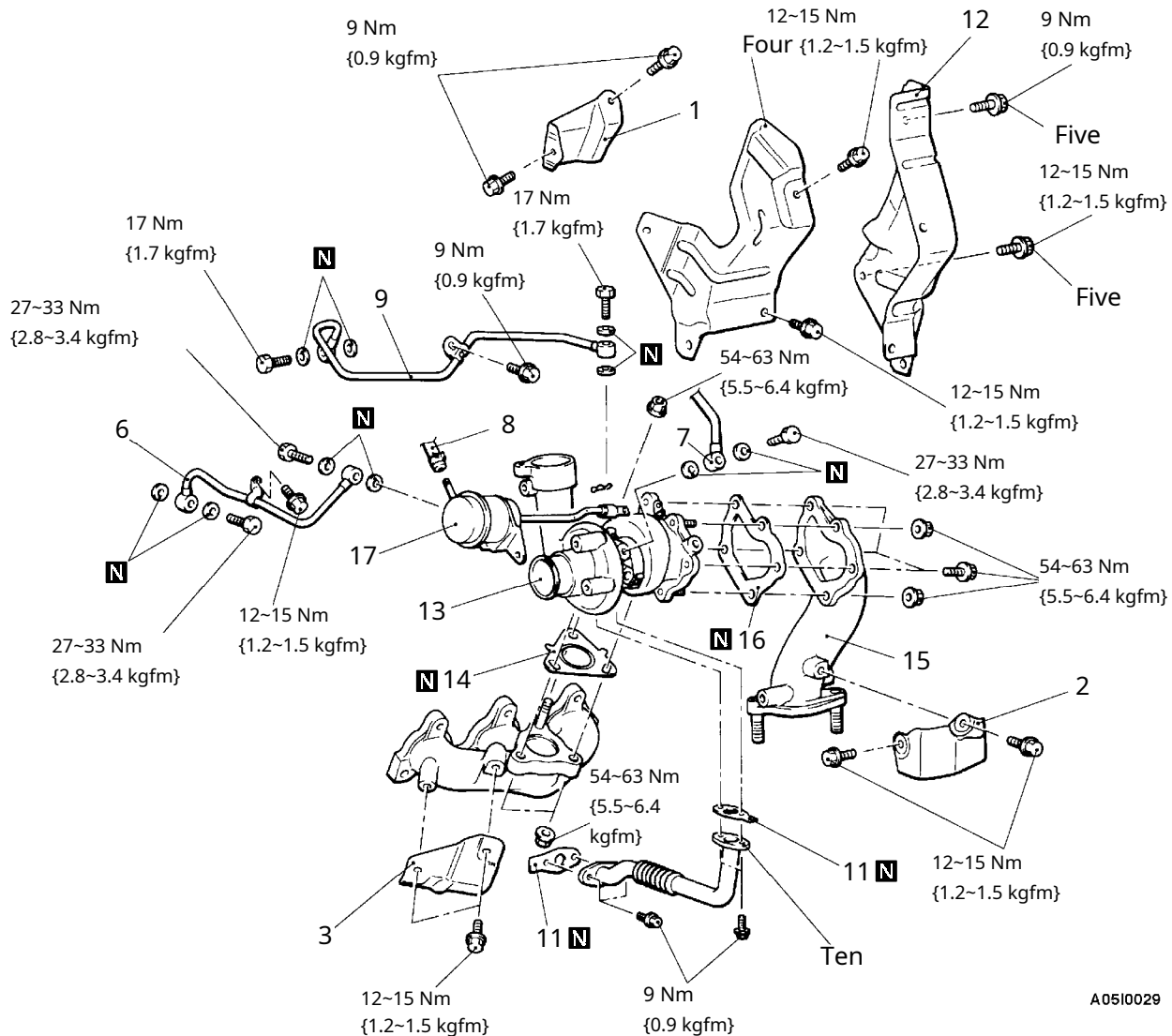
Work before removal and after installation

D Extraction and injection of cooling water (group14 – See on-board maintenance)

D Draining and injecting engine oil

D Removing and installing the front exhaust pipe
(P.15-18reference)D Removing and installing the strut tower bar
(group42reference)D Air hoseA,BAnd air pipeBRemoval and installation
(P.15-5reference)

D Air intake hoseAss'yRemoval and installation

D Accelerator cable adjustment <only after installation>
(group17 – See on-board maintenance)

A0510029

Removal procedure

D Accelerator cable bracket
(group13Areference)

1. Turbocharger cover back

2. Exhaust fitting cover

Wah

3. Exhaust manifold cover

Four. Turbocharger cover

Five. Exhaust fitting cover installation

Kebolt

6. Water pipeAss'yA

7. Water pipeAss'yB

8. Vacuum hose connection

9. Oil feed pipeAss'y

Ten. Oil return pipeAss'y

11. 11. Oil return pipe gasket

12. Exhaust fitting cover

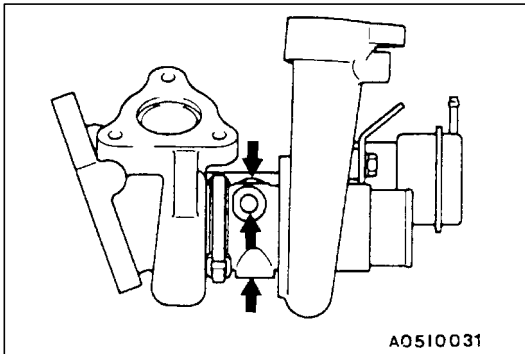
"AA 13. TurbochargerAss'y

14. Turbocharger gasket

15. 15. Exhaust fitting

16. Exhaust fitting gasket

17. 17. Westgate actuator



Installation points

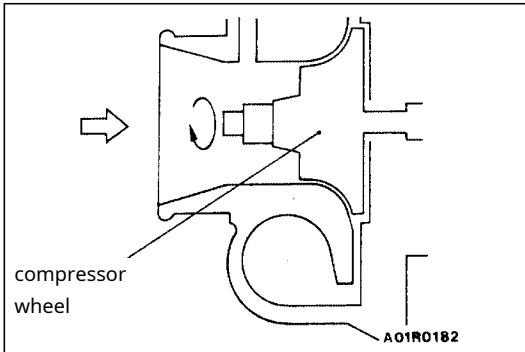
"AA Installation of turbocharger

1. Clean the oil pipe, oil return pipe and water pipe joints.

caution

Be careful not to let foreign matter get inside the turbocharger.

2. Replenish new engine oil from the oil pipe mounting hole of the turbocharger.



inspection

Inspection of turbocharger

1. Visually inspect the turbine wheel and compressor wheel for scratches and cracks.
2. Check that the turbine wheel or compressor wheel turns lightly by hand.
3. Check for oil leaks from the turbocharger.
- Four. Check that the wastegate valve is not left open. If there is any of the above problems, replace the defective parts after disassembling.

remarks

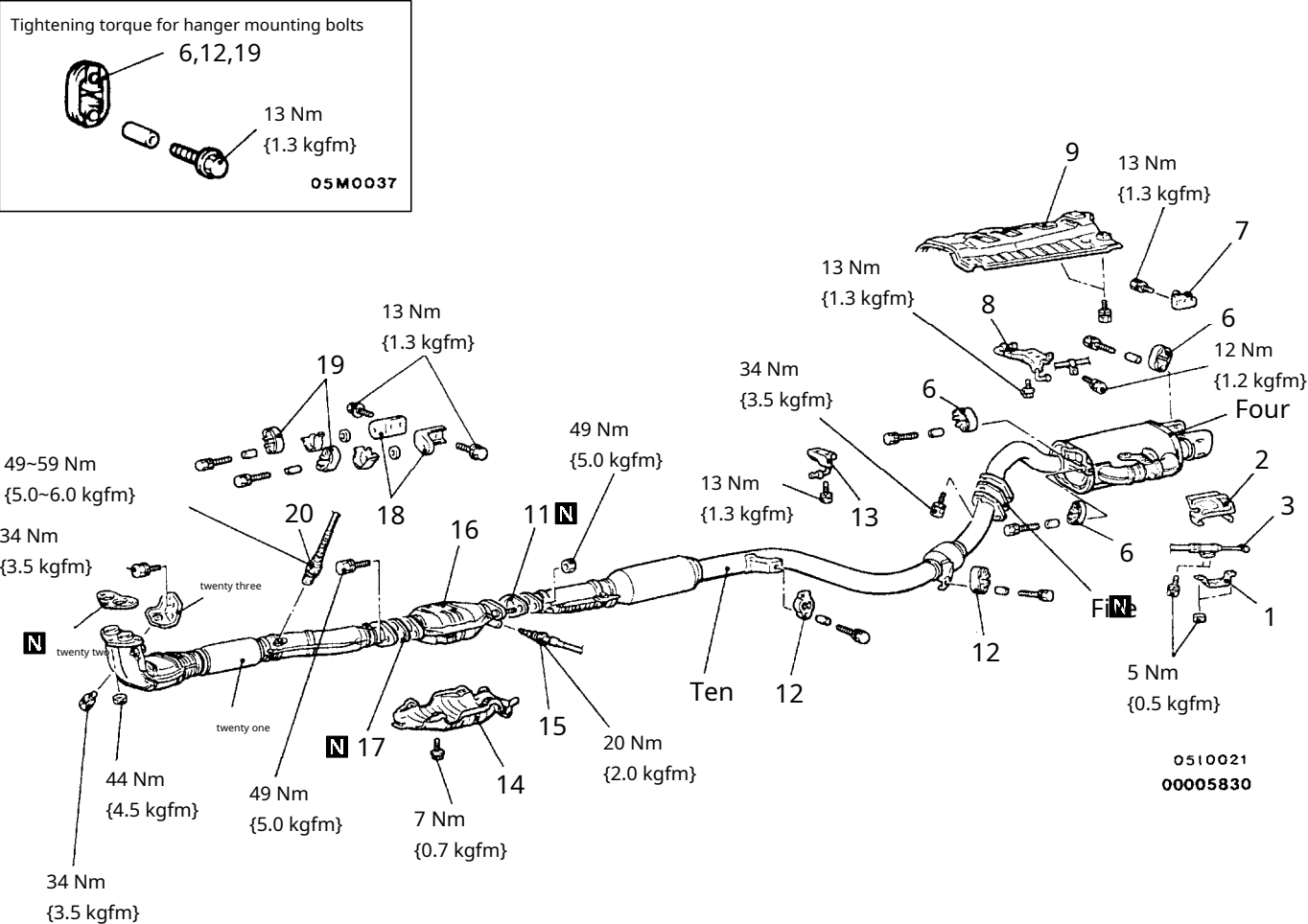
Refer to the engine maintenance manual for the disassembly procedure.

Exhaust pipe muffler

Removal / installation

Work before removal and after installation
Removing and installing the undercover

<4G9>



Procedure for removing the main muffler

- 1. Protector lower
- 2. Protector upper
- "BA 3. Cable connection
- Four. Main muffler
- Five. gasket
- 6. clothes hanger
- 7. Tail hanger
- 8. Rear hanger
- 9. Rear floor heat protector panel
- Center exhaust pipe remover

order

- Ten. Center exhaust pipe
- 11. 11. gasket
- 12. clothes hanger
- 13. Center hanger

Removing the catalytic converter

procedure

- 14. Heat protector
- 15. 15. High temperature sensor
- 16. Catalytic converter
- 17. 17. gasket
- 18. 18. Catalytic converter bra
- Ket
- 19. clothes hanger

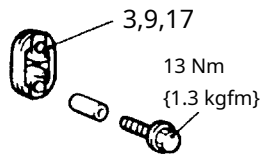
Front exhaust pipe remover

order

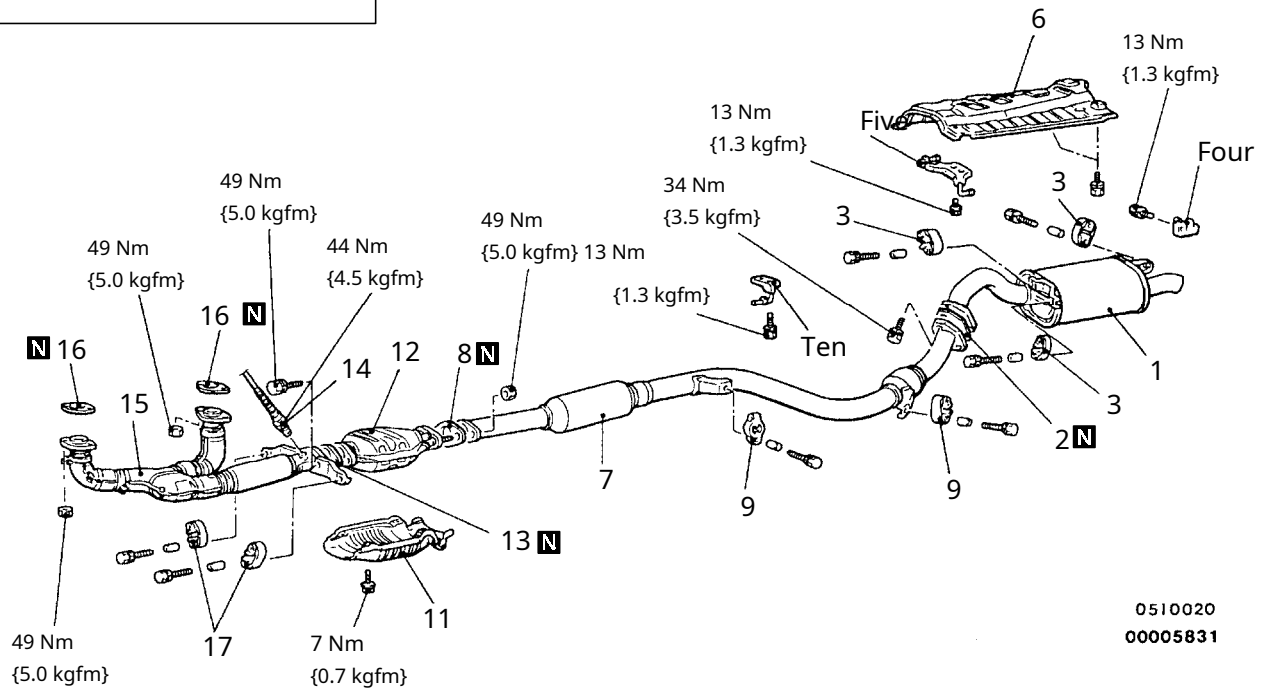
- AA" "AA 20. O2sensor
- twenty one. Front exhaust pipe
- twenty two. gasket
- twenty three. Front exhaust pipe bracket
- door

<6A1-2WD>

Tightening torque for hanger mounting bolts



05M0037

0510020
00005831

Procedure for removing the main muffler

1. Main muffler
2. gasket
3. clothes hanger
- Four. Tail hanger
- Five. Rear hanger
6. Rear floor heat protector panel
- Center exhaust pipe remover
7. Center exhaust pipe
8. gasket
9. clothes hanger
- Ten. Center hanger

Removing the catalytic converter

procedure

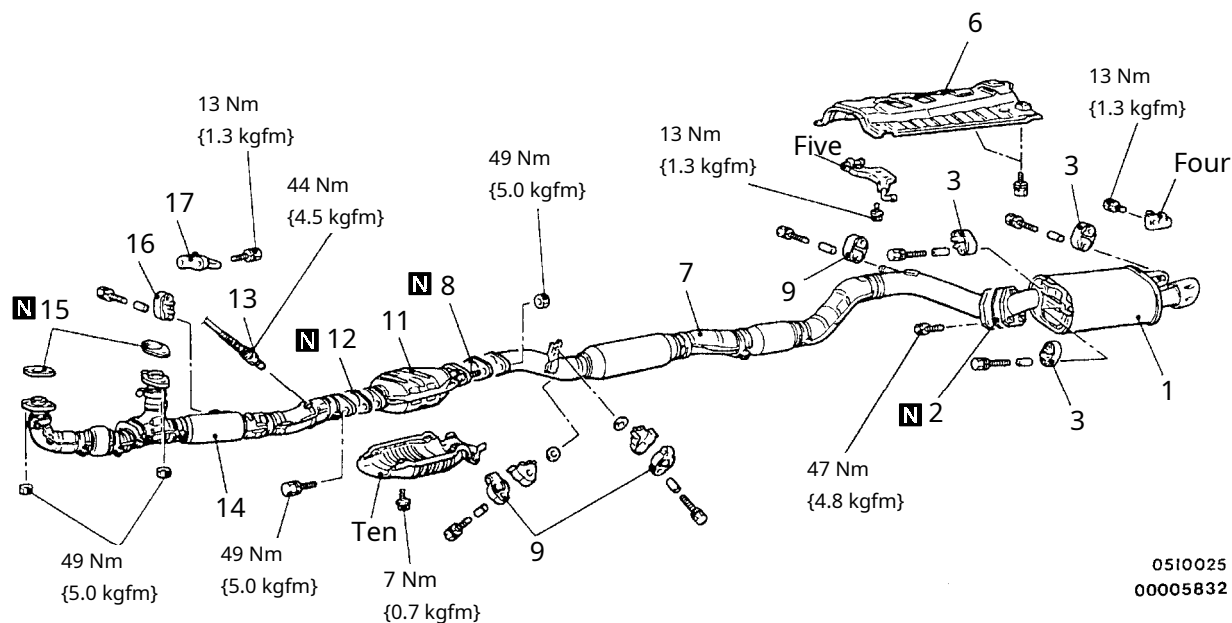
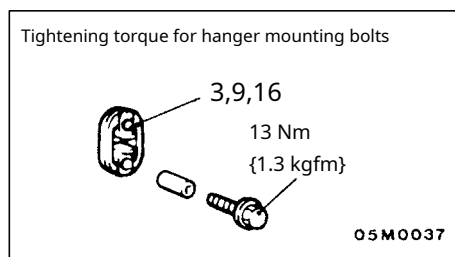
11. Heat protector
12. Catalytic converter
13. gasket

Front exhaust pipe remover

order

- | | | |
|-----|-----|------------------------|
| AA" | "AA | 14. O2sensor |
| | | 15. Front exhaust pipe |
| | | 16. gasket |
| | | 17. clothes hanger |

<6A1-4WD>



Procedure for removing the main muffler

1. Main muffler
 2. gasket
 3. clothes hanger
 - Four. Tail hanger
 - Five. Rear hanger
 6. Rear floor heat protector panel
 - Center exhaust pipe remover
- order*
7. Center exhaust pipe
 8. gasket
 9. clothes hanger

Removing the catalytic converter

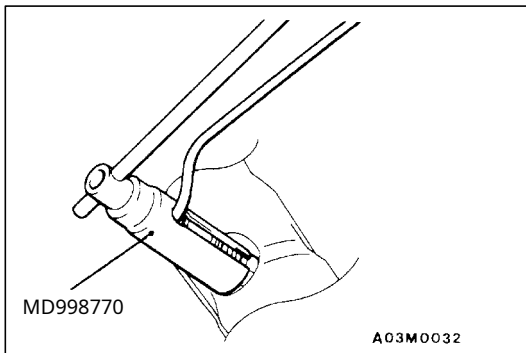
procedure

- Ten. Heat protector
11. Catalytic converter
12. gasket

Front exhaust pipe remover

order

- | AA" | "AA | |
|-----|-----|------------------------|
| | | 13. O2sensor |
| | | 14. Front exhaust pipe |
| | | 15. 15. gasket |
| | | 16. clothes hanger |
| | | 17. 17. Front hanger |

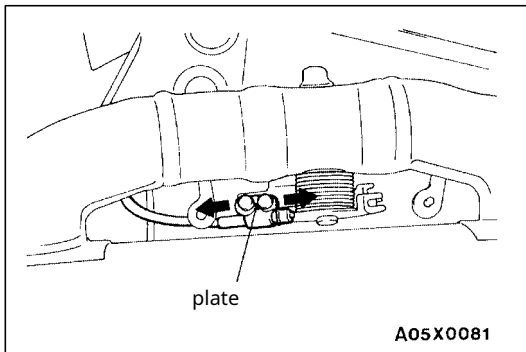


Key points of removal

AA" O₂ Removing the sensor

Installation points

"AA O₂ Sensor installation

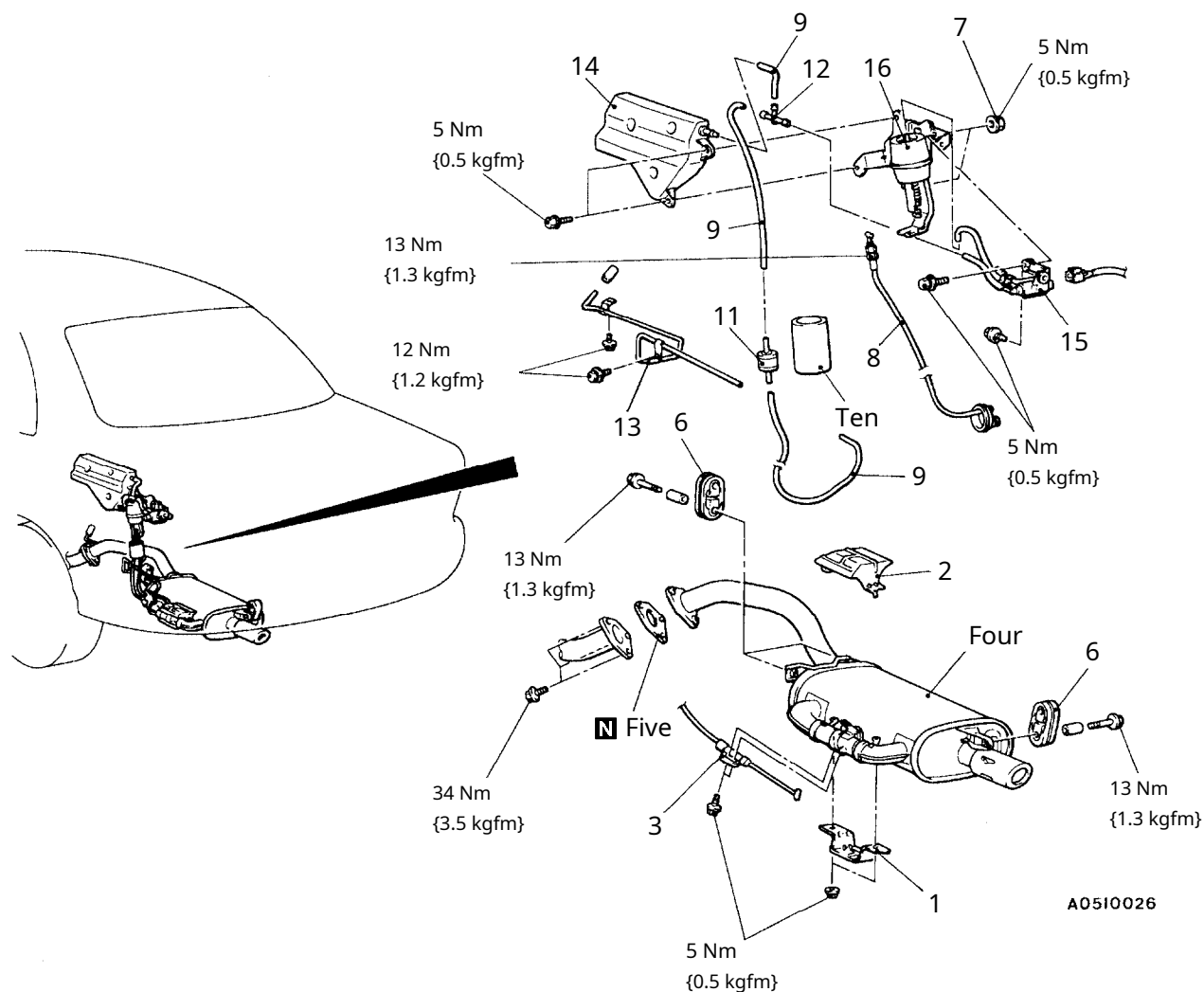


"BA Cable connection

The play of the inner cable 0~1 mm Adjust the plate by sliding it so that it becomes.

Dual mode muffler

Removal / installation



Procedure for removing the main muffler

1. Protector lower
2. Protector upper

"BA 3. Cable connection

- Four. Main muffler
- Five. gasket
6. clothes hanger

Actuator removal procedure

1. Protector lower
2. Protector upper

"BA 3. Cable connection

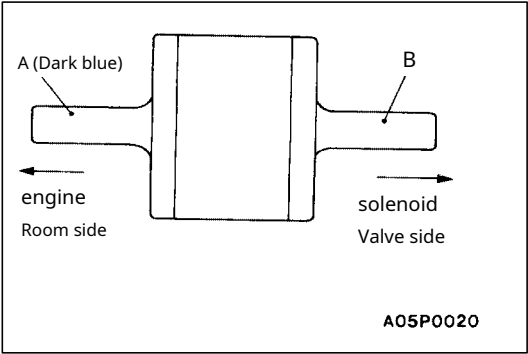
D Trunk side trim (LH) <Seda
>, Quarter lower trim (LH)
<Wagon> (Group52A – Trim reference)

7. nut
8. cableAss'y
9. Vacuum hose
- Ten. pad

"AA

11. 11. Check valve
12. Vacuum terminal
13. Air pipeAss'y
14. Vacuum tank
15. 15. Solenoid valve
16. Actuator

A0510026



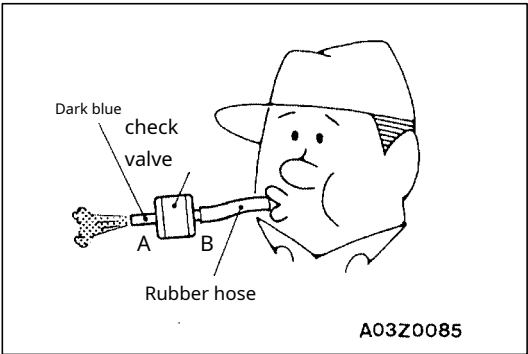
Installation points

"AA Check valve installation

AConnect the side nipple (dark blue) to the vacuum hose that connects to the engine room.BConnect the side nipple to the solenoid valve side vacuum hose.

"BA Cable connection

P.15-19reference

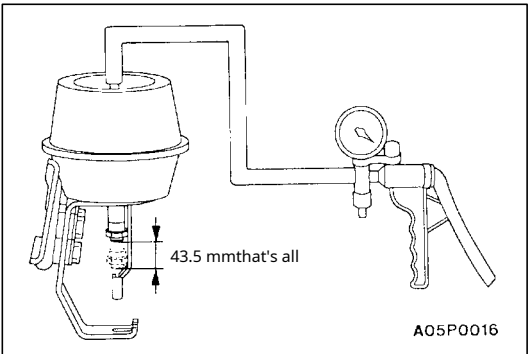


inspection

1. Simple inspection of check valve

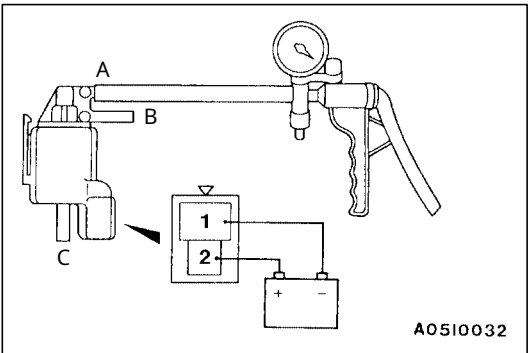
Install a clean rubber hose and check the operation of the check valve.

Inspection items	Normal condition
BBlow the side nipple	There is ventilation
ABlow the side nipple	No ventilation



2. Actuator inspection

Negative pressure is applied to the actuator using a vacuum pump, and the holder part is43.5 mmConfirm that it works. Also, make sure that the position of the holder does not change when the negative pressure is held in that state.



3. Inspection of solenoid valve

3-1 Operation check

- (1) Solenoid valveAConnect the vacuum pump to the nipple.
- (2) Use a jumper wire to connect the battery (+) terminal to the solenoid valve connector.No.2Attach the (-) terminal to the terminalNo.1Connect to the terminal.
- (3) Intermittent the jumper wire on the battery (-) terminal side and apply negative pressure to check the airtightness.

jumper BNipple condition wire		Normal condition
connectiondo	Open	Negative pressure leaks
	Blockage	Negative pressure is maintained
Disconnect	Open	Negative pressure is maintained

(Four) Disconnect the battery andBWith nipplesCCheck for ventilation between the nipples

3-2 Coil resistance check

Measure the resistance between the solenoid valve terminals.

Standard value: 28~36Ω (20_CWhen)

<Note>