

ENGINE SECTION 3

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUEL INJECTION (FUEL SYSTEMS) FU(H4DOSTC)

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES) EC(H4DOSTC)

INTAKE (INDUCTION) IN(H4DOSTC)

MECHANICAL ME(H4DOSTC)

EXHAUST EX(H4DOSTC)

COOLING CO(H4DOSTC)

LUBRICATION LU(H4DOSTC)

SPEED CONTROL SYSTEMS SP(H4DOSTC)

IGNITION IG(H4DOSTC)

STARTING/CHARGING SYSTEMS SC(H4DOSTC)

ENGINE (DIAGNOSTICS) EN(H4DOSTC)

EXHAUST

EX(H4DOSTC)

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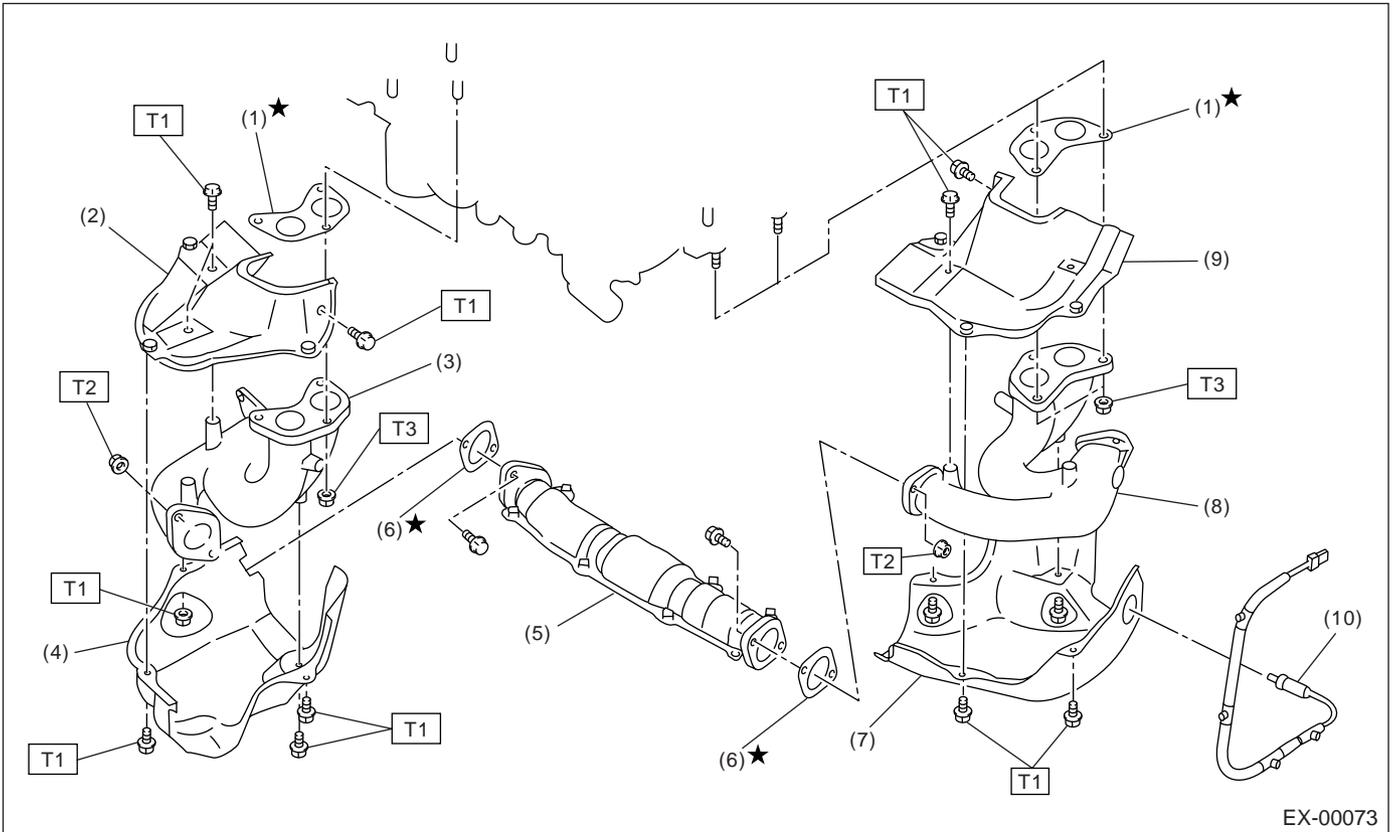
GENERAL DESCRIPTION

EXHAUST

1. General Description

A: COMPONENT

1. FRONT EXHAUST PIPE



- | | |
|---------------------------------------|---------------------------------------|
| (1) Gasket | (6) Gasket |
| (2) Upper exhaust manifold cover (RH) | (7) Lower exhaust manifold cover (LH) |
| (3) Exhaust manifold (RH) | (8) Exhaust manifold (LH) |
| (4) Lower exhaust manifold cover (RH) | (9) Upper exhaust manifold cover (LH) |
| (5) Front exhaust pipe | (10) Front oxygen (A/F) sensor |

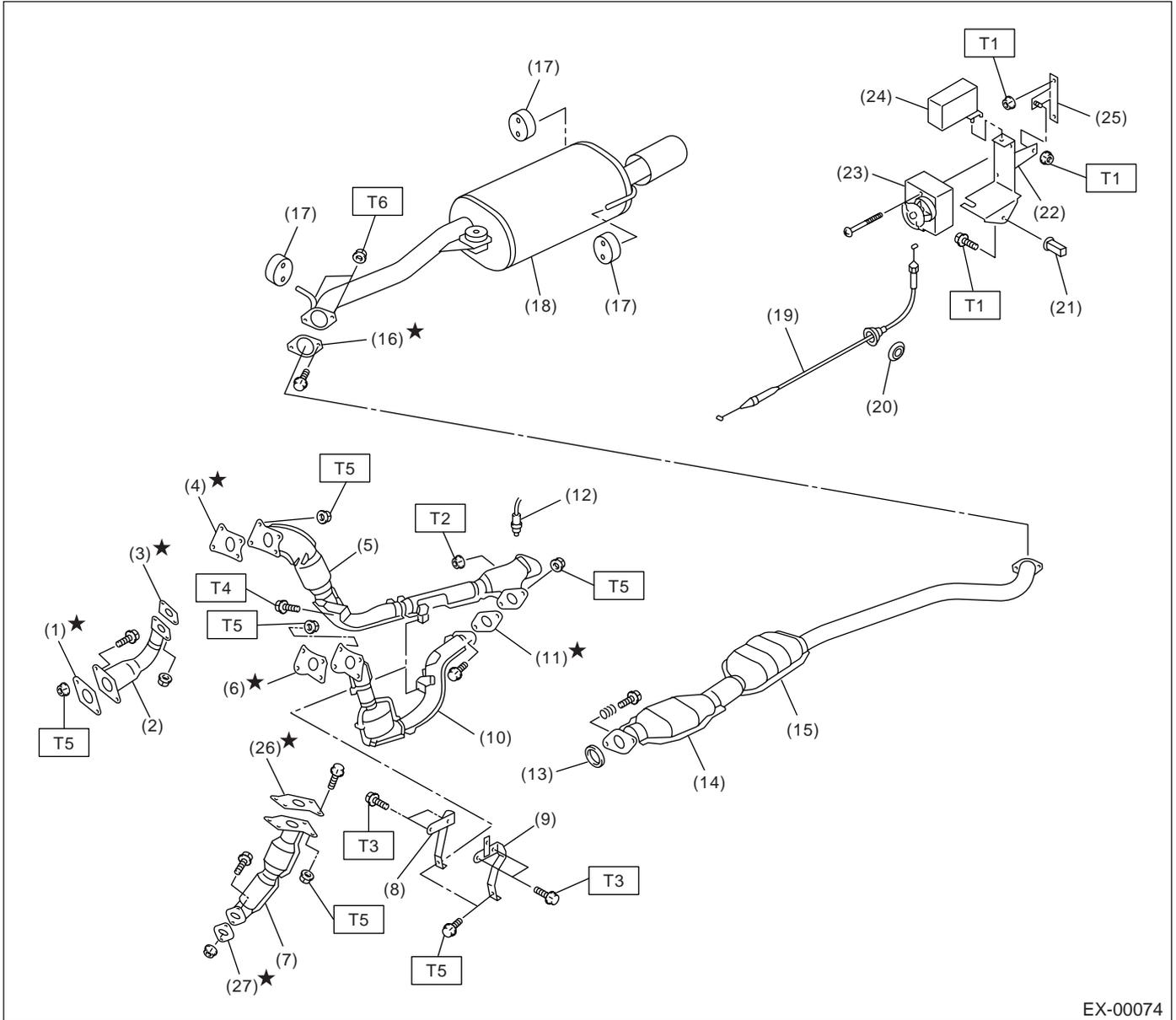
Tightening torque: N·m (kgf·m, ft·lb)

T1: 19 (1.9, 13.7)

T2: 35 (3.6, 26.0)

T3: 39 (4.0, 28.9)

2. CENTER AND REAR EXHAUST PIPE, AND MUFFLER



EX-00074

- | | | |
|-------------------------------|-------------------------------------|----------------------------|
| (1) Gasket | (13) Gasket | (25) Bracket (MT vehicles) |
| (2) Joint pipe (RH) | (14) Rear catalytic converter | (26) Gasket |
| (3) Gasket | (15) Rear exhaust pipe | (27) Gasket |
| (4) Gasket | (16) Gasket | |
| (5) Center exhaust pipe (RH) | (17) Cushion | |
| (6) Gasket | (18) Muffler | |
| (7) Joint pipe (LH) | (19) Control cable (MT vehicles) | |
| (8) Hanger bracket (RH) | (20) Plug (AT vehicles) | |
| (9) Hanger bracket (LH) | (21) Grommet | |
| (10) Center exhaust pipe (LH) | (22) Actuator bracket (MT vehicles) | |
| (11) Gasket | (23) Actuator (MT vehicles) | |
| (12) Rear oxygen sensor | (24) Controller (MT vehicles) | |

Tightening torque: N-m (kgf-m, ft-lb)

T1: 4.5 (0.46, 3.3)

T2: 18 (1.8, 13.0)

T3: 23 (2.3, 16.6)

T4: 30 (3.0, 21.7)

T5: 35 (3.6, 26.0)

T6: 48 (4.9, 35.4)

GENERAL DESCRIPTION

EXHAUST

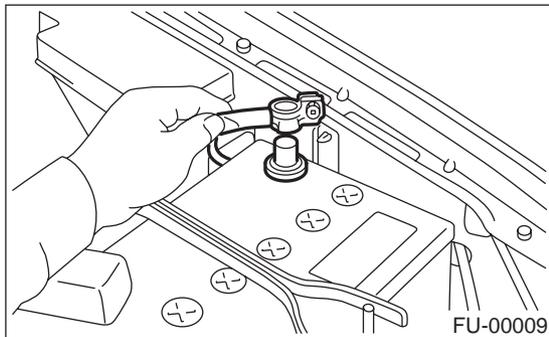
B: CAUTION

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.
- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect the ground cable from battery.

2. Front Exhaust Pipe

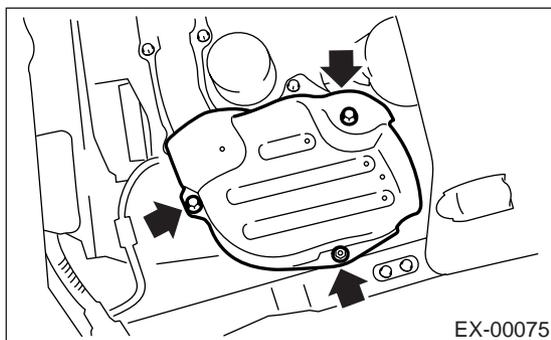
A: REMOVAL

1) Disconnect the ground cable from battery.

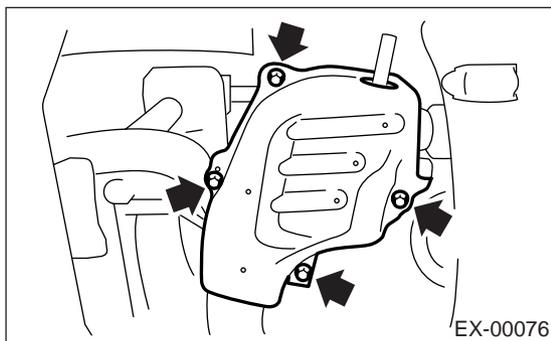


2) Disconnect the connector from front oxygen (A/F) sensor.

3) Remove the exhaust manifold cover (RH).

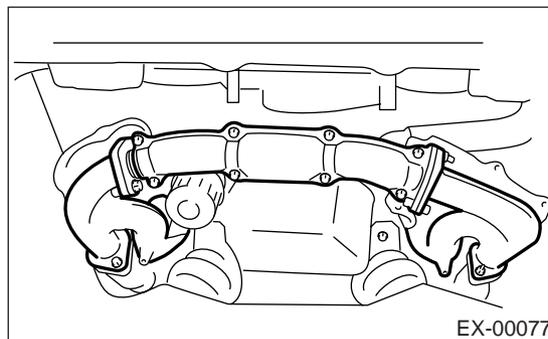


4) Remove the exhaust manifold covers (LH).



5) Remove the bolts and nuts which hold front exhaust pipe assembly to turbocharger joint pipe.

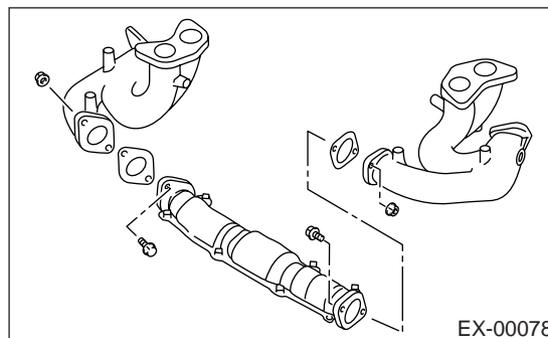
6) While holding the front exhaust pipe assembly with one hand, remove the nuts which hold front exhaust pipe assembly to cylinder head exhaust port.



7) Remove the front exhaust pipe assembly.

8) Remove the covers from the exhaust manifold and front exhaust pipe.

9) Separate the front exhaust pipe from exhaust manifolds.



B: INSTALLATION

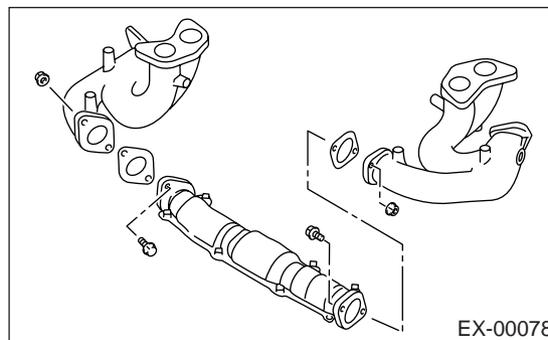
NOTE:

Replace the gaskets with new ones.

1) Assemble the front exhaust pipe and exhaust manifolds.

Tightening torque:

35 N·m (3.6 kgf-m, 26.0 ft-lb)



2) Install the front exhaust pipe assembly.

Tightening torque:

40 N·m (4.0 kgf-m, 28.9 ft-lb)

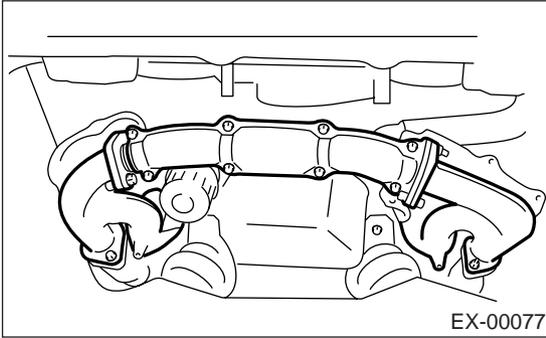
FRONT EXHAUST PIPE

EXHAUST

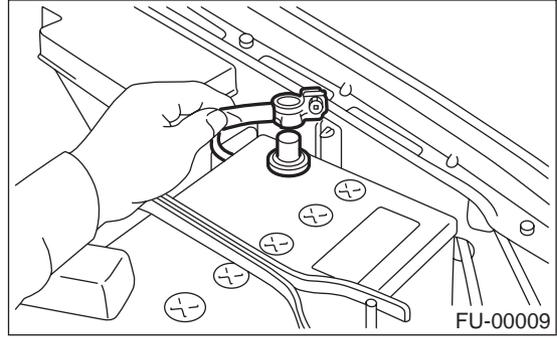
3) Connect the exhaust manifold to turbocharger joint pipe.

Tightening torque:

35 N·m (3.6 kgf-m, 26.0 ft-lb)



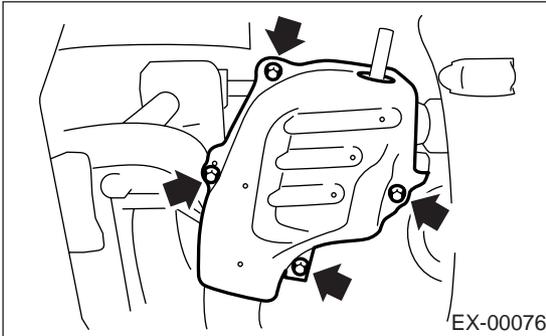
8) Connect the battery ground cable to battery.



4) Install the exhaust manifold covers (LH).

Tightening torque:

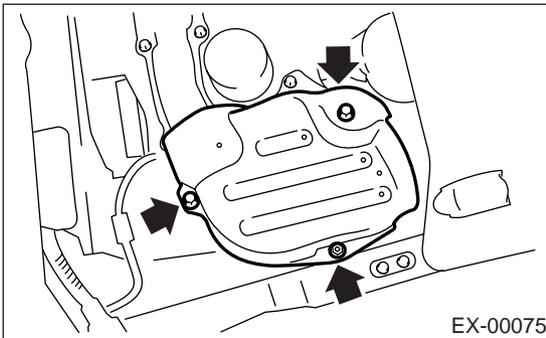
19 N·m (1.9 kgf-m, 13.7 ft-lb)



5) Install the lower exhaust manifold cover (RH).

Tightening torque:

19 N·m (1.9 kgf-m, 13.7 ft-lb)



6) Connect the connector to front oxygen (A/F) sensor.

7) Install the under cover.

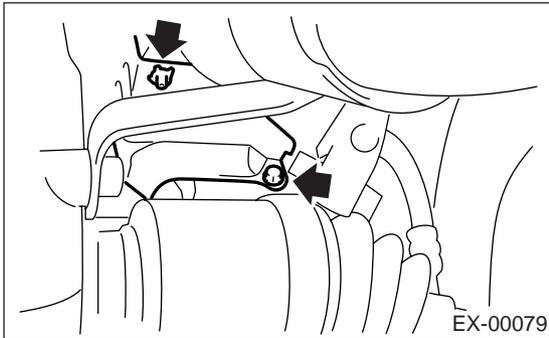
3. Center Exhaust Pipe

A: REMOVAL

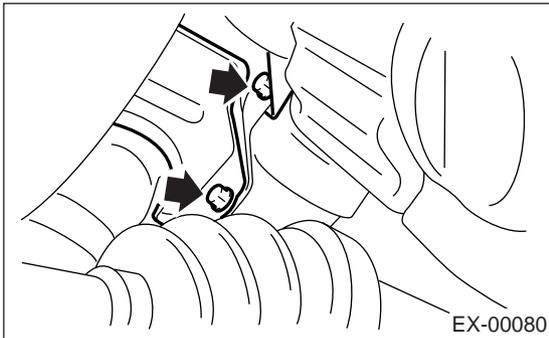
- 1) Set the vehicle on the lift.
- 2) Disconnect the ground cable from battery.
- 3) Remove the intercooler. <Ref. to IN(H4DOSTC)-13, REMOVAL, Intercooler.>
- 4) Lift-up the vehicle.
- 5) Remove the under cover.
- 6) Remove the bolts which install lower side of turbocharger cover (RH).

CAUTION:

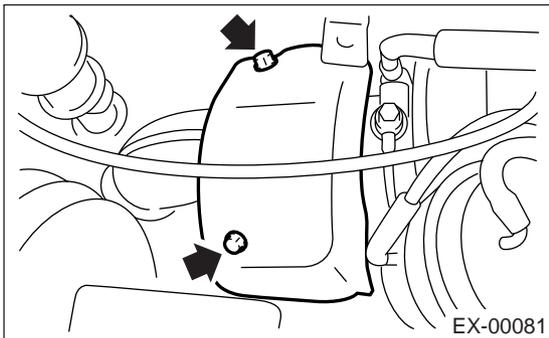
Be careful, the turbocharger cover and exhaust pipe are hot.



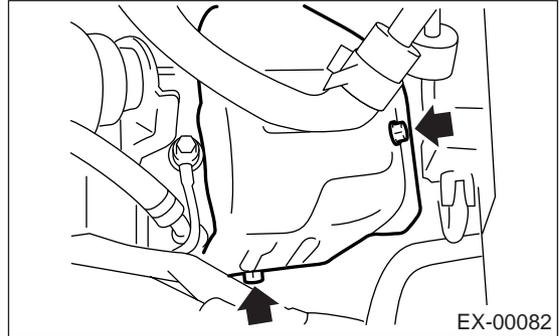
- 7) Remove the bolts which install lower side of turbocharger cover (LH).



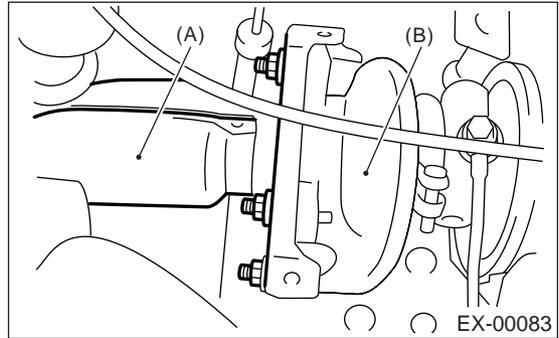
- 8) Lower the vehicle.
- 9) Remove the turbocharger cover (RH).



- 10) Remove the turbocharger cover (LH).

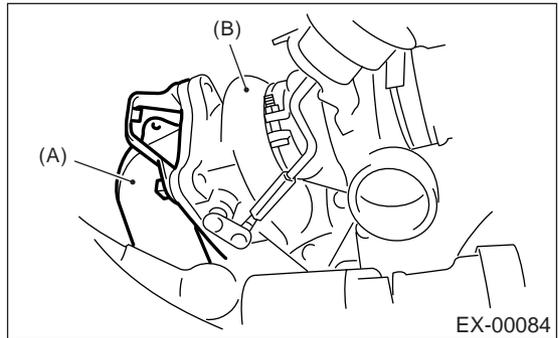


- 11) Separate the center exhaust pipe (RH) from secondary turbocharger.



- (A) Center exhaust pipe (RH)
- (B) Secondary turbocharger

- 12) Separate the center exhaust pipe (LH) from primary turbocharger.



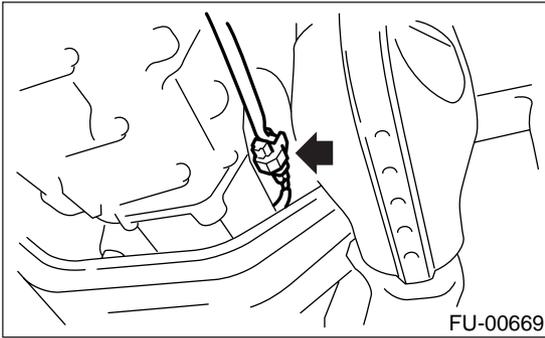
- (A) Center exhaust pipe (LH)
- (B) Primary turbocharger

- 13) Lift-up the vehicle.

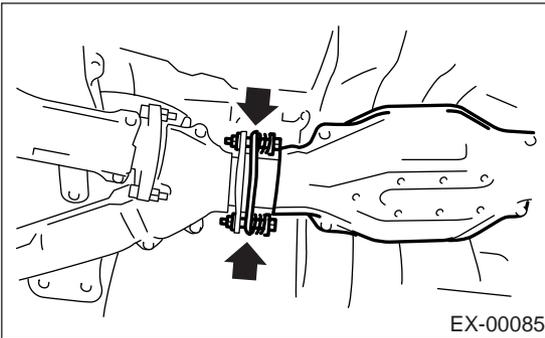
CENTER EXHAUST PIPE

EXHAUST

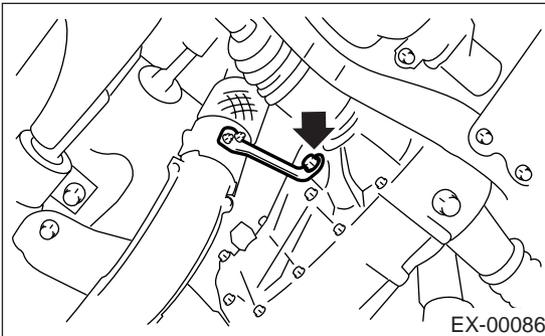
14) Disconnect the connector from rear oxygen sensor.



15) Vertically draw out the clip from crossmember.
16) Separate the center exhaust pipe from rear exhaust pipe.



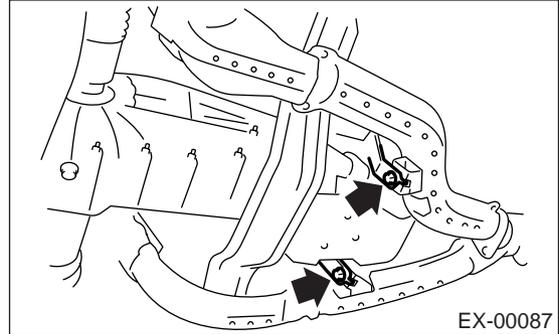
17) Remove the bolt which holds center exhaust pipe bracket to transmission.



18) Remove the bolts which hold center exhaust pipe to hanger bracket.

CAUTION:

Be careful not to pull down the center exhaust pipe.



19) Remove the center exhaust pipe.

B: INSTALLATION

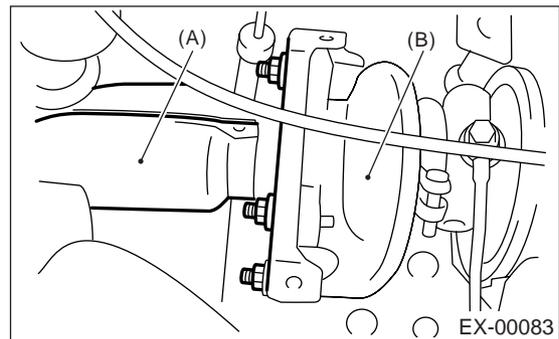
NOTE:

Replace the gaskets with new ones.

- 1) Install the center exhaust pipe and temporarily tighten the bolt which holds center exhaust pipe to hanger bracket.
- 2) Temporarily tighten the bolt which holds center exhaust pipe to transmission.
- 3) Connect the center exhaust pipe (RH) to secondary turbocharger.

Tightening torque:

35 N·m (3.6 kgf·m, 26.0 ft·lb)

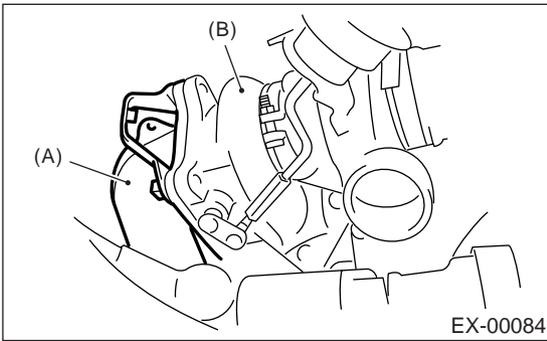


(A) Center exhaust pipe (RH)

(B) Secondary turbocharger

4) Connect the center exhaust pipe (LH) to primary turbocharger.

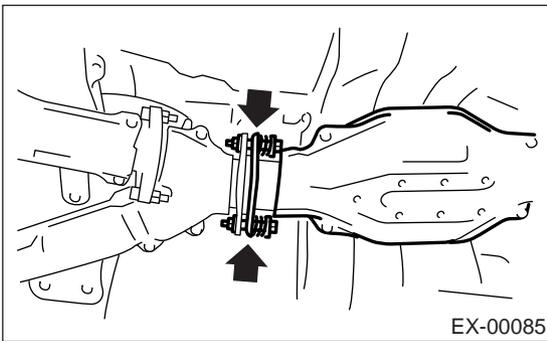
Tightening torque:
35 N·m (3.6 kgf·m, 26.0 ft·lb)



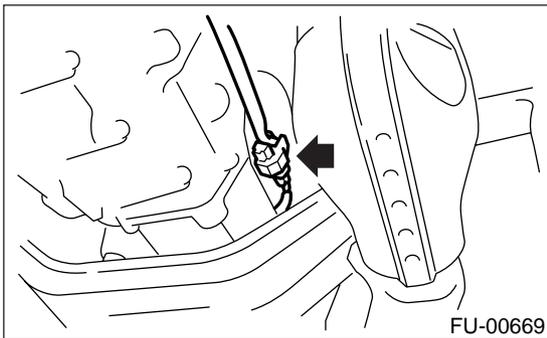
- (A) Center exhaust pipe (LH)
- (B) Primary turbocharger

5) Install the center exhaust pipe to rear exhaust pipe.

Tightening torque:
18 N·m (1.8 kgf·m, 13.0 ft·lb)



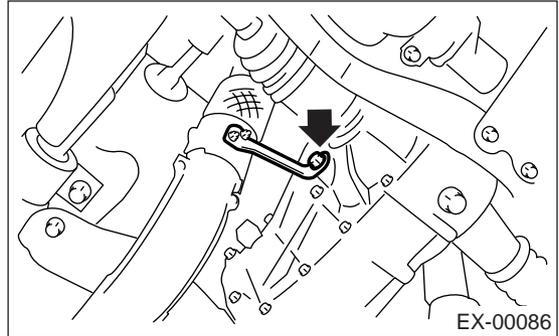
6) Connect the connector to rear oxygen sensor.



7) Secure clip on the crossmember.

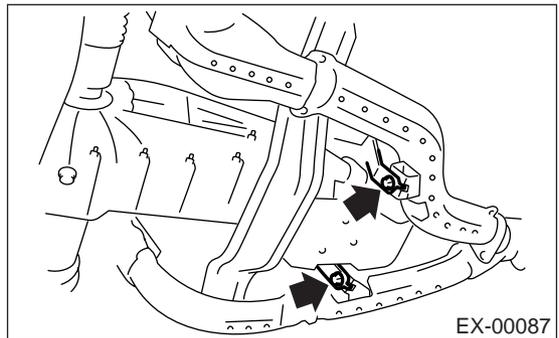
8) Tighten the bolt which holds center exhaust pipe bracket to transmission.

Tightening torque:
30 N·m (3.1 kgf·m, 22.4 ft·lb)



9) Tighten the bolts which hold center exhaust pipe to hanger bracket.

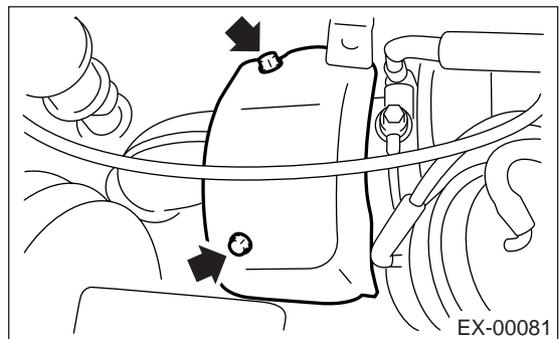
Tightening torque:
35 N·m (3.6 kgf·m, 26.0 ft·lb)



10) Lower the vehicle.

11) Place the turbocharger cover (RH), and then tighten the bolts which install turbocharger cover (RH).

Tightening torque:
7.4 N·m (0.75 kgf·m, 5.4 ft·lb)



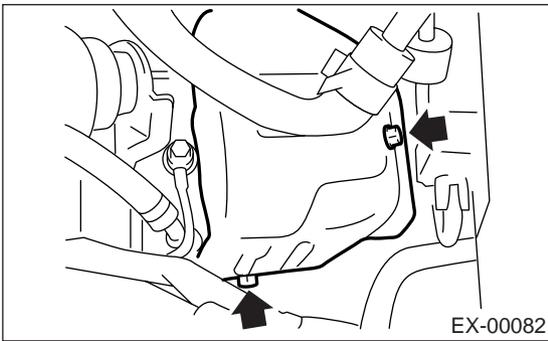
CENTER EXHAUST PIPE

EXHAUST

12) Place the turbocharger cover (LH), and tighten the bolts which install turbocharger cover (LH).

Tightening torque:

7.4 N·m (0.75 kgf-m, 5.4 ft-lb)

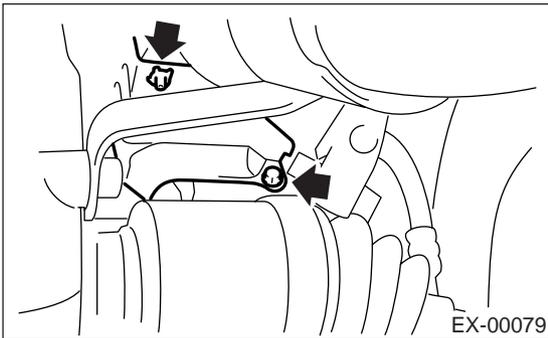


13) Lift-up the vehicle.

14) Tighten the bolts which install under side of turbocharger cover (RH).

Tightening torque:

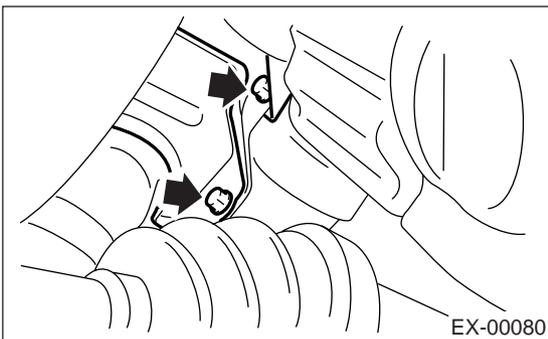
7.4 N·m (0.75 kgf-m, 5.4 ft-lb)



15) Tighten the bolts which install under side of turbocharger cover (LH).

Tightening torque:

7.4 N·m (0.75 kgf-m, 5.4 ft-lb)



16) Install the under cover.

17) Lower the vehicle.

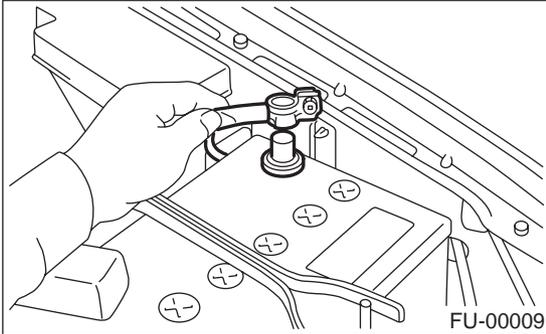
18) Install the intercooler. <Ref. to IN(H4DOSTC)-14, INSTALLATION, Intercooler.>

4. Joint Pipe

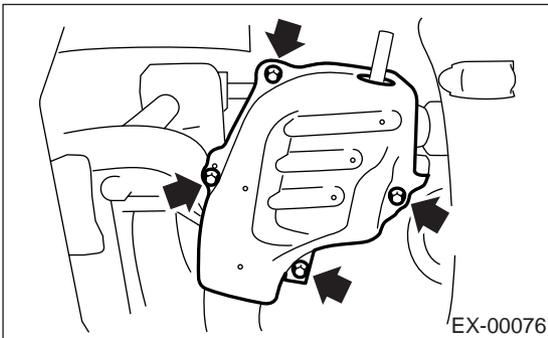
A: REMOVAL

1. PRIMARY SIDE

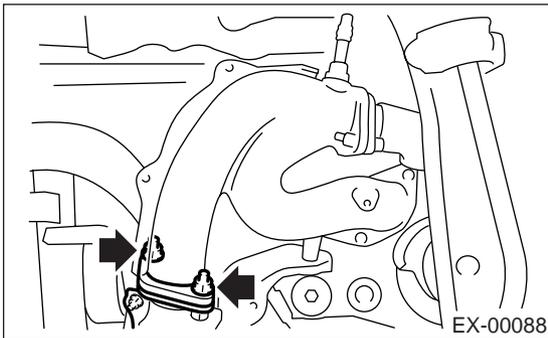
- 1) Disconnect the ground cable from battery.



- 2) Remove the under cover.
- 3) Remove the lower exhaust manifold cover (LH).



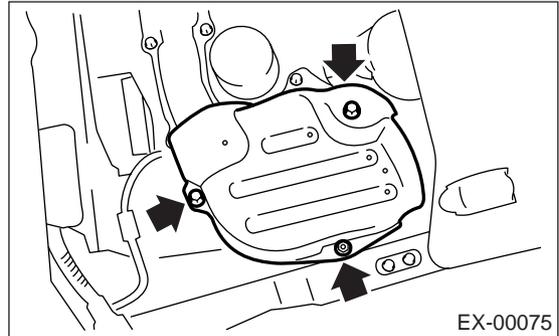
- 4) Remove the nuts which hold front exhaust manifold to joint pipe.



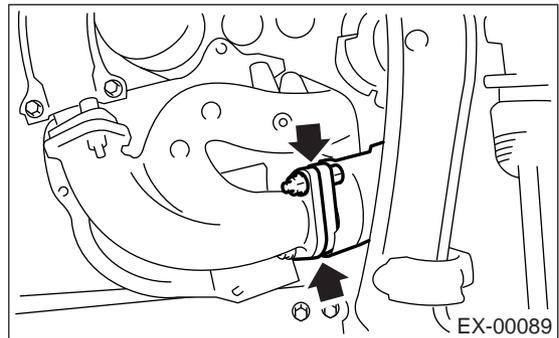
- 5) Remove the center exhaust pipe. <Ref. to EX(H4DOSTC)-7, REMOVAL, Center Exhaust Pipe.>
- 6) Remove the turbocharger. <Ref. to IN(H4DOSTC)-15, REMOVAL, Turbocharger.>
- 7) Take off the joint pipe in the upward direction.

2. SECONDARY SIDE

- 1) Remove the under cover.
- 2) Remove the lower exhaust manifold cover (RH).



- 3) Remove the nuts which hold front exhaust manifold to joint pipe.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:

Replace the gaskets with new ones.

Tightening torque:

T: 35 N·m (3.6 kgf-m, 26.0 ft-lb)

REAR EXHAUST PIPE

EXHAUST

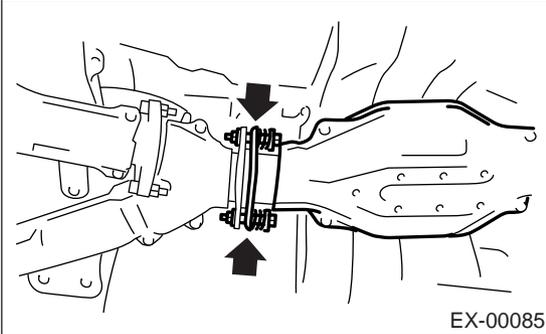
5. Rear Exhaust Pipe

A: REMOVAL

- 1) Lift-up the vehicle.
- 2) Separate the rear exhaust pipe from center exhaust pipe.

CAUTION:

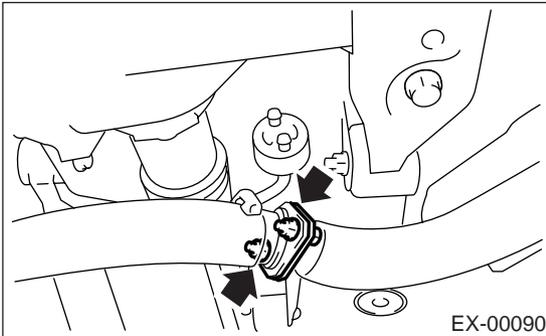
Be careful, the exhaust pipe is hot.



- 3) Separate the rear exhaust pipe from muffler.

CAUTION:

Be careful not to pull down the rear exhaust pipe.



- 4) Remove the rear exhaust pipe.

B: INSTALLATION

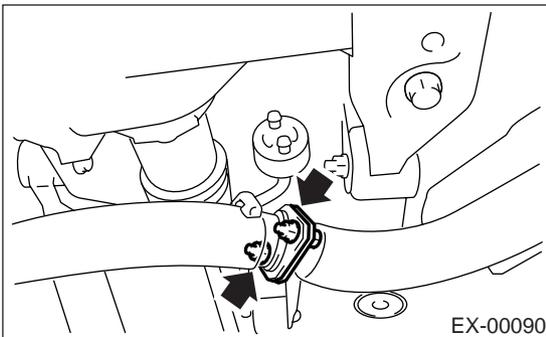
NOTE:

Replace the gaskets with new ones.

- 1) Install the rear exhaust pipe to muffler.

Tightening torque:

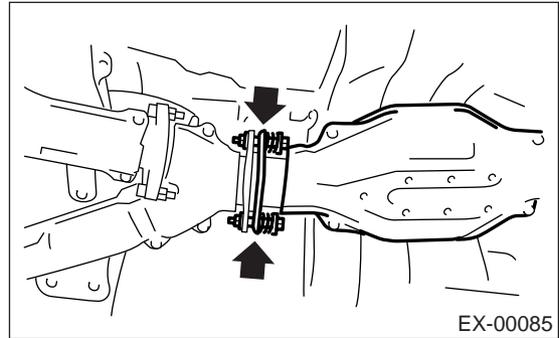
48 N·m (4.9 kgf·m, 35.4 ft·lb)



- 2) Install the rear exhaust pipe to center exhaust pipe.

Tightening torque:

18 N·m (1.8 kgf·m, 13.0 ft·lb)



- 3) Lower the vehicle.

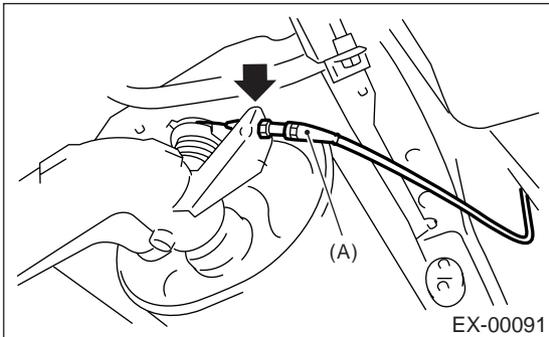
C: INSPECTION

- 1) Make sure there are no exhaust leaks from connections and welds.
- 2) Make sure there are no holes or rusting.
- 3) Make sure the cushion rubber is not worn or cracked.

6. Muffler

A: REMOVAL

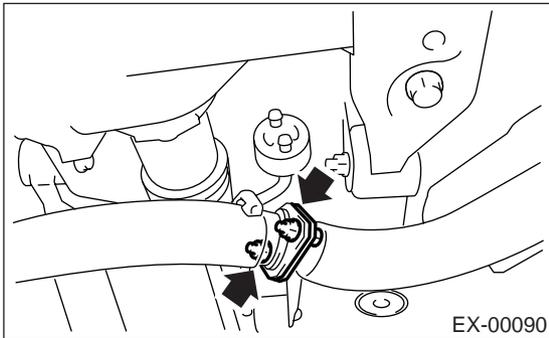
1) Disconnect the cable (A) for variable muffler from joint part of muffler. (MT vehicles)



2) Separate the muffler from rear exhaust pipe.

CAUTION:

Be careful, the exhaust pipe is hot.



3) Remove the rubber cushions, and then detach the muffler.

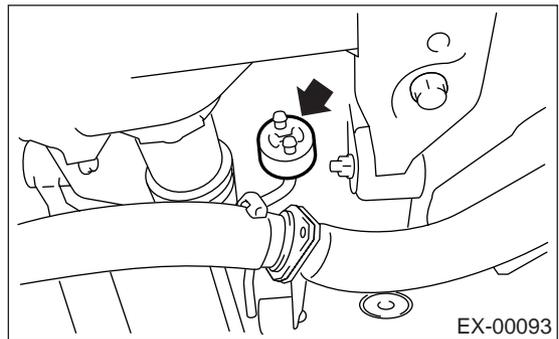
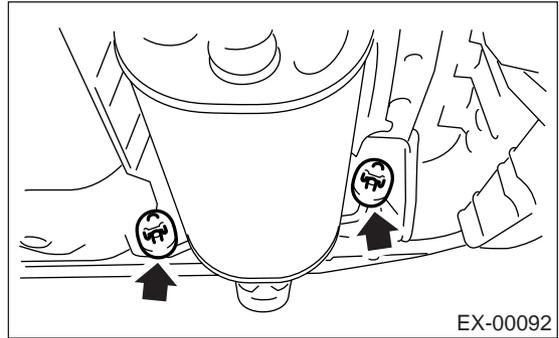
CAUTION:

Be careful not to drop the muffler during removal.

NOTE:

To facilitate removal, apply a coat of SUBARU CRC to the mating area of rubber cushions in advance.

SUBARU CRC (Part No. 004301003)



B: INSTALLATION

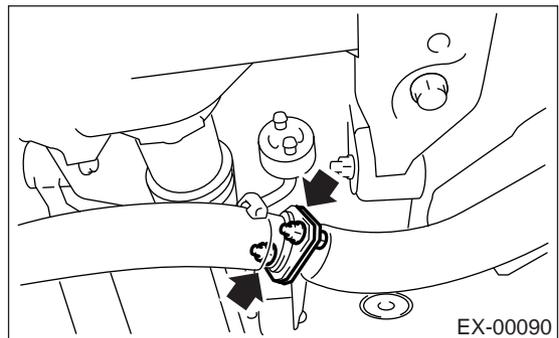
1) Install in the reverse order of removal.

CAUTION:

Replace the gasket with a new one.

Tightening torque:

48 N·m (4.9 kgf·m, 35.4 ft·lb)



C: INSPECTION

- 1) Make sure there are no exhaust leaks from connections and welds.
- 2) Make sure there are no holes or rusting.
- 3) Make sure the cushion rubber is not worn or cracked.

VARIABLE MUFFLER CONTROL UNIT

EXHAUST

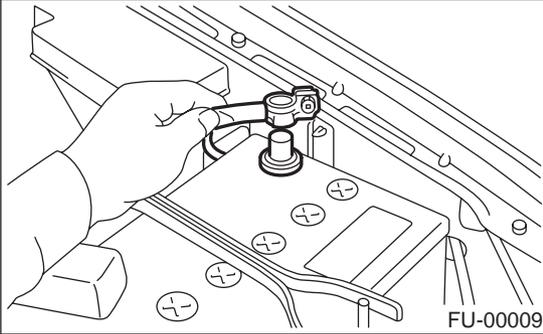
7. Variable Muffler Control Unit

A: REMOVAL

NOTE:

This unit is equipped only for MT vehicles.

1) Disconnect the ground cable from battery.

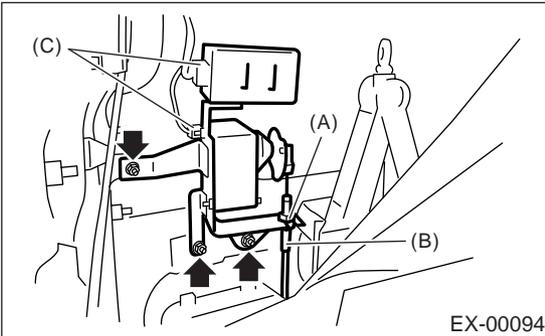


2) Remove the rear quarter trim. <Ref. EI-42 REMOVAL, Rear QUARTER Trim.>

3) Loosen the lock nut (A) which holds control cable, and then remove the cable (B).

4) Disconnect the variable muffler control unit and connector (C) of actuator.

5) Remove the variable muffler control unit, actuator and bracket as a unit.



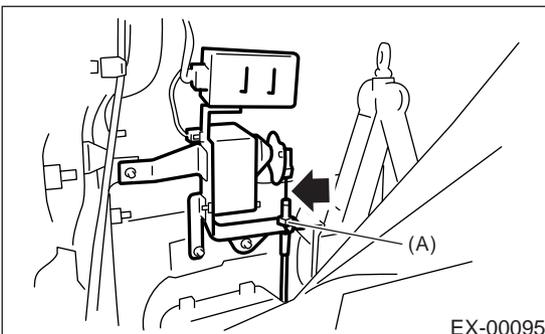
B: INSTALLATION

Install in the reverse order of removal.

C: ADJUSTMENT

Adjust the free play of control cable with lock nut (A).

**Inner cable free play when pressed with finger:
2.0 mm (0.08 in)**



D: INSPECTION

Turn the ignition switch ON (engine OFF), and then check that the actuator moves smoothly and does not make abnormal noise.