

ENGINE SECTION 1

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 SYSTEM) FU(H4SO)

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE) EC(H4SO)

INTAKE (INDUCTION) IN(H4SO)

MECHANICAL ME(H4SO)

EXHAUST EX(H4SO)

COOLING CO(H4SO)

LUBRICATION LU(H4SO)

SPEED CONTROL SYSTEM SP(H4SO)

IGNITION IG(H4SO)

STARTING/CHARGING SYSTEM SC(H4SO)

ENGINE (DIAGNOSTIC) EN(H4SO)

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE) *EC(H4SO)*

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General Description

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE)

1. General Description

A: 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 yourself, 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 rigid racks at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect the ground cable from battery.

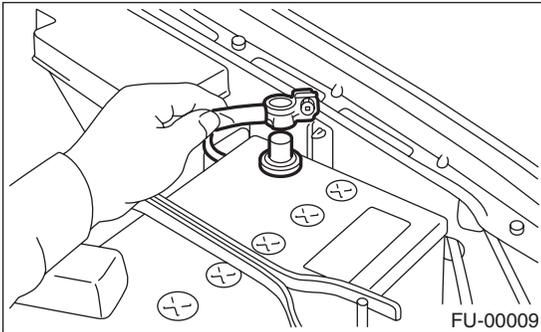
Front Catalytic Converter

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE)

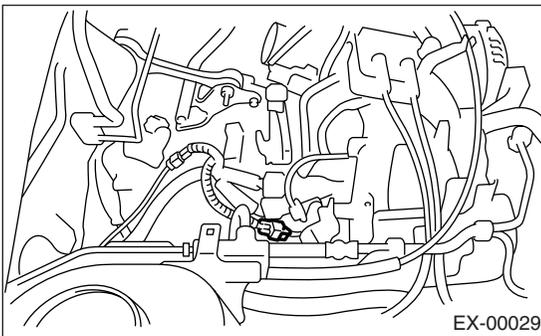
2. Front Catalytic Converter

A: REMOVAL

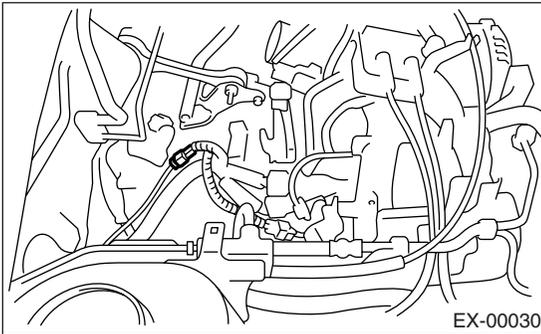
- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.



- 3) Disconnect the front oxygen (A/F) sensor connector.



- 4) Disconnect the connector from rear oxygen sensor connector.

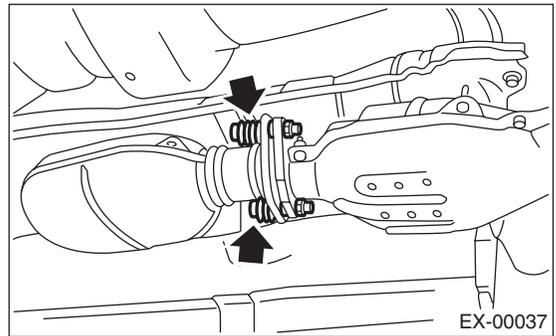


- 5) Lift-up the vehicle.
- 6) Remove the under cover.

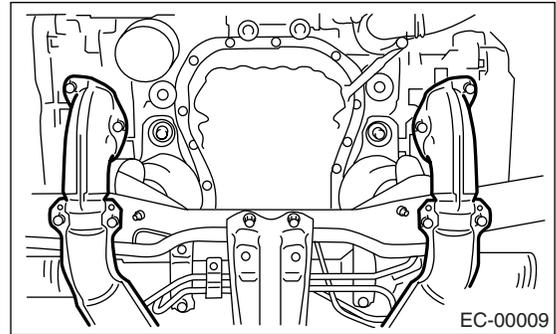
- 7) Separate the center exhaust pipe from rear exhaust pipe.

CAUTION:

Be careful, the exhaust pipe is hot.



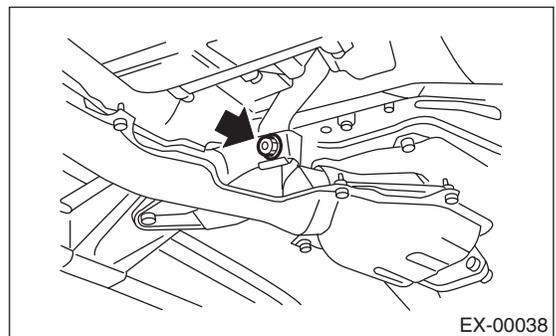
- 8) Remove the nuts which hold front exhaust pipe onto cylinder heads.



- 9) Remove the front and center exhaust pipe from hanger bracket.

CAUTION:

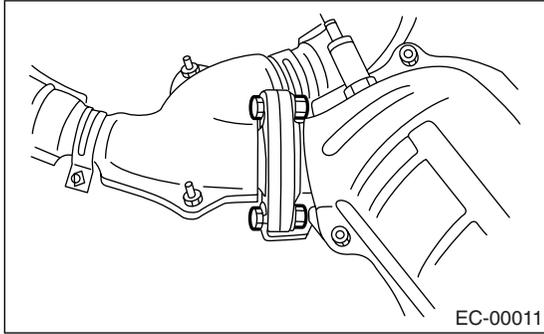
Be careful not to pull down the front exhaust pipe and center exhaust pipe.



Front Catalytic Converter

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE)

10) Separate the front catalytic converter from front exhaust pipe.



B: INSTALLATION

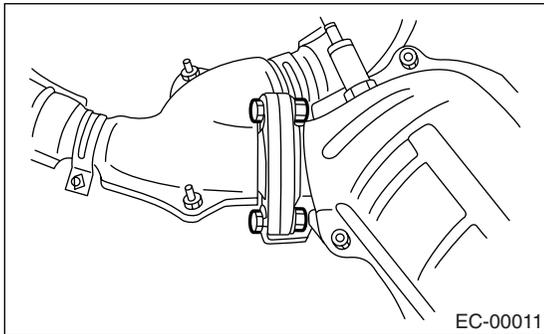
NOTE:

Replace gaskets with new ones.

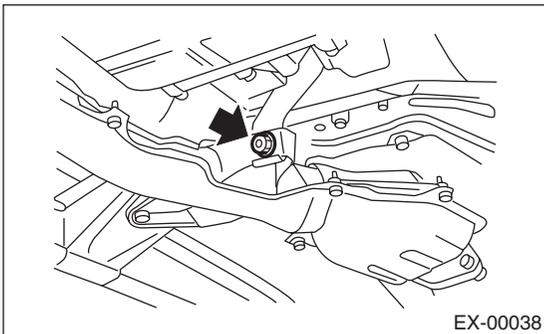
1) Install the front catalytic converter to front exhaust pipe.

Tightening torque:

30 N·m (3.1 kgf·m, 22.4 ft·lb)



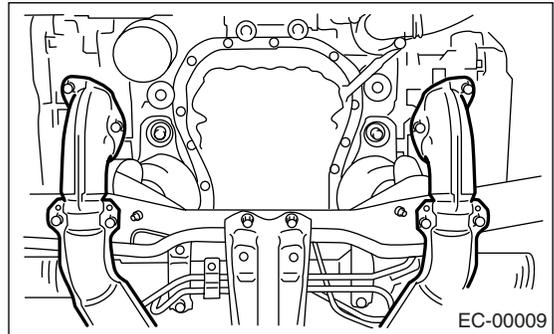
2) Install the front and center exhaust pipe assembly to the vehicle. And temporarily tighten the bolt which installs center exhaust pipe to hanger bracket.



3) Tighten the nuts which hold front exhaust pipe onto cylinder heads.

Tightening torque:

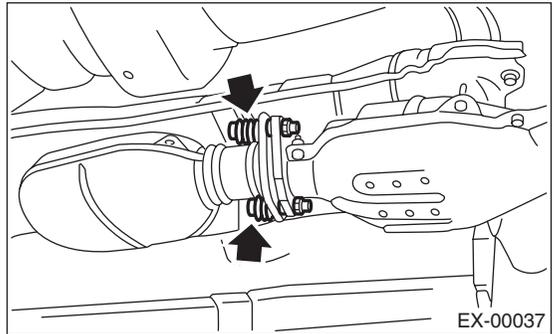
30 N·m (3.1 kgf·m, 22.4 ft·lb)



4) Tighten the bolts which install front and center exhaust pipe to rear exhaust pipe.

Tightening torque:

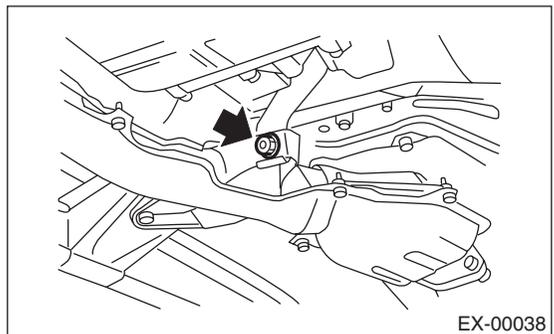
18 N·m (1.8 kgf·m, 13.0 ft·lb)



5) Tighten the bolt which holds front and center exhaust pipe assembly to hanger bracket.

Tightening torque:

35 N·m (3.6 kgf·m, 26.0 ft·lb)

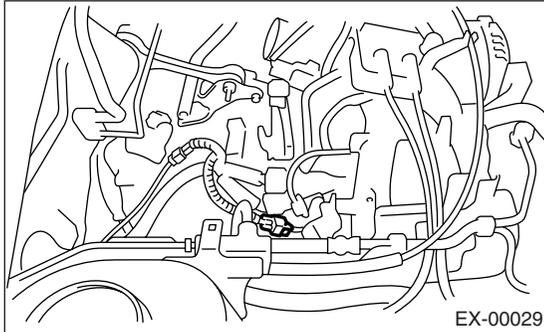


6) Install the under cover.

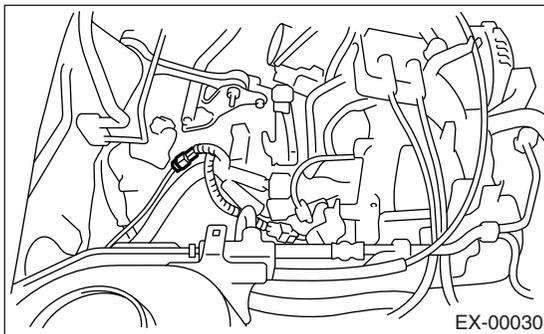
Front Catalytic Converter

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE)

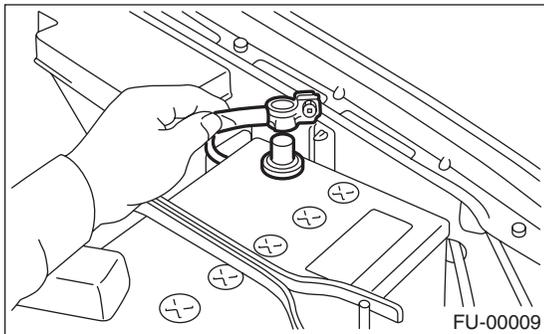
- 7) Lower the vehicle.
- 8) Connect the front oxygen (A/F) sensor connector.



- 9) Connect the connector to rear oxygen sensor connector.



- 10) Connect the battery ground cable to battery.



C: INSPECTION

- 1) Make sure there are no exhaust leaks from connections and welds.
- 2) Make sure there are no holes or rusting.

Rear Catalytic Converter

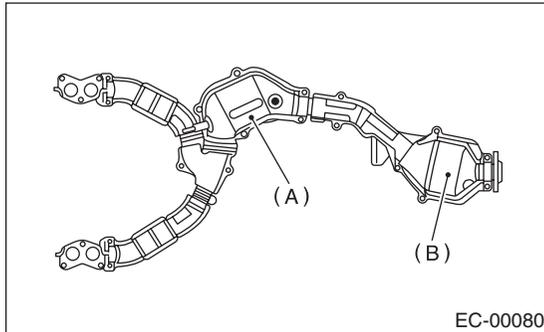
EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE)

3. Rear Catalytic Converter

A: REMOVAL

1. WITH OBD

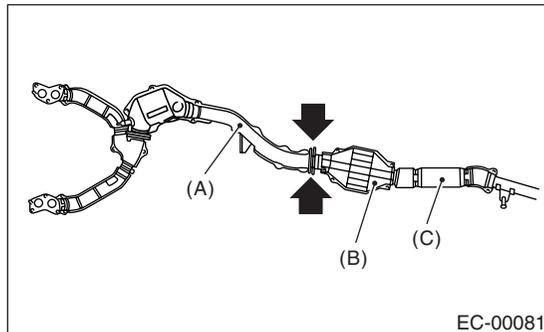
The front and rear catalytic converter and center exhaust pipe are integrated into one unit. Therefore, the removal and installation procedures are the same as the those for the front catalytic converter. <Ref. to EC(H4SO)-3, REMOVAL, Front Catalytic Converter.>



- (A) Front catalytic converter
- (B) Rear catalytic converter

2. WITHOUT OBD

Rear catalytic converter and rear exhaust pipe are integrated into one unit. Refer to Rear Exhaust Pipe for removal procedures. <Ref. to EX(H4SO)-11, REMOVAL, Rear Exhaust Pipe.>

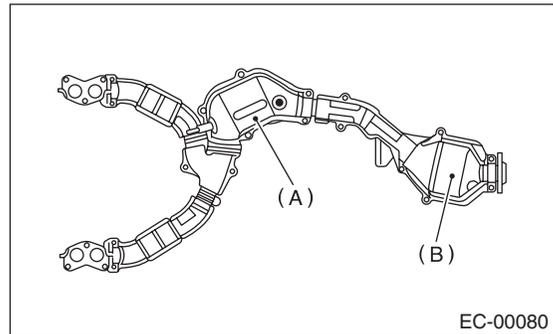


- (A) Front exhaust pipe
- (B) Rear catalytic converter
- (C) Rear exhaust pipe

B: INSTALLATION

1. WITH OBD

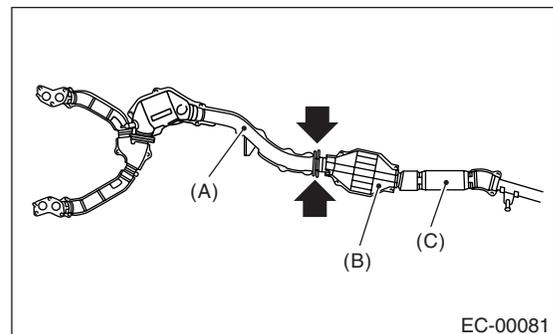
Install in the reverse order of removal.



- (A) Front catalytic converter
- (B) Rear catalytic converter

2. WITHOUT OBD

Install in the reverse order of removal.



- (A) Front exhaust pipe
- (B) Rear catalytic converter
- (C) Rear exhaust pipe

C: INSPECTION

1. WITH OBD

- 1) Make sure there are no exhaust leaks from connections and welds.
- 2) Make sure there are no holes or rusting.

2. WITHOUT OBD

Inspect in the same procedures as the vehicle with OBD.

EGR Valve

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE)

4. EGR Valve

A: PROCEDURE

For EGR valve removal and installation procedures, refer to FU section. <Ref. to FU(H4SO)-34, EGR Valve.>

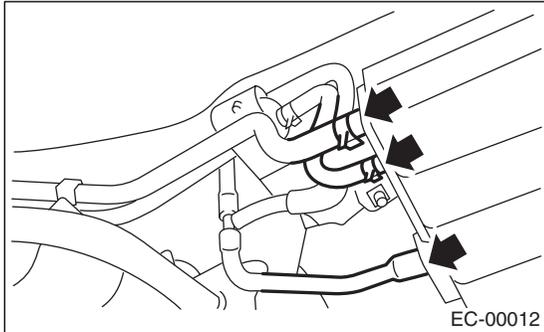
Canister

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE)

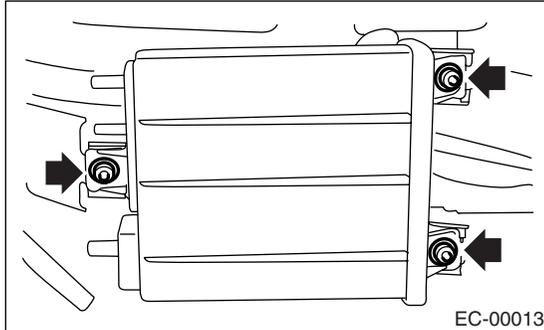
5. Canister

A: REMOVAL

- 1) Lift-up the vehicle.
- 2) Loosen the two clamps which hold two canister hoses, and disconnect the three evaporation hoses from canister.



- 3) Remove the canister from body.

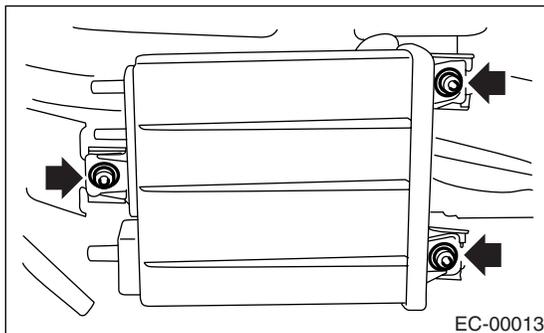


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

23 N·m (2.3 kgf·m, 17 ft·lb)



C: INSPECTION

Make sure the canister and canister hoses are not cracked or loose.

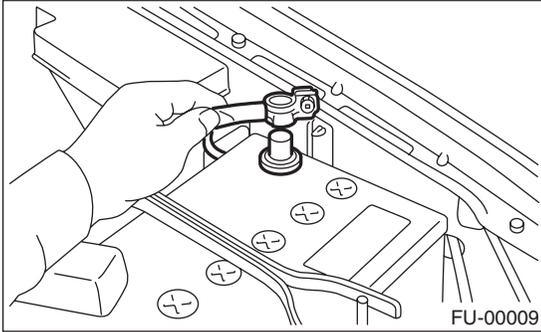
Purge Control Solenoid Valve

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE)

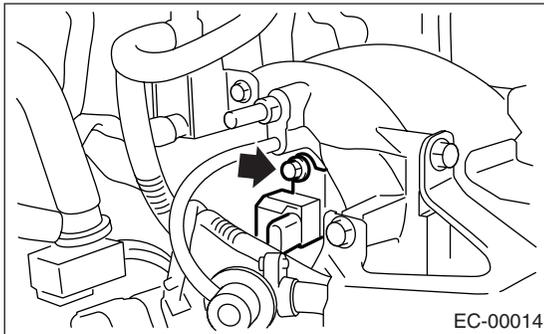
6. Purge Control Solenoid Valve

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Disconnect the connector and hoses from purge control solenoid valve, and then remove the purge control solenoid valve.

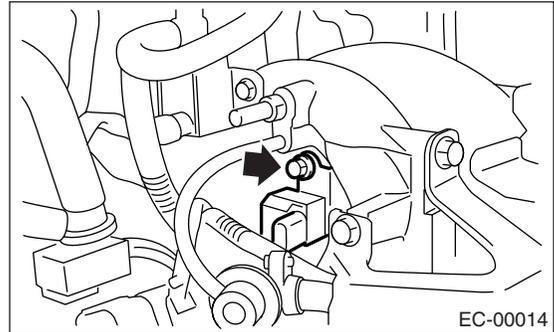


B: INSTALLATION

Install in the reverse order of removal.

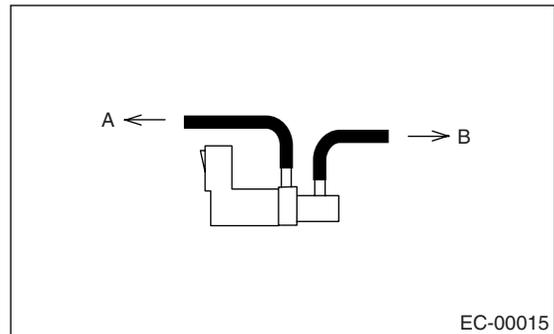
Tightening torque:

19 N·m (1.9 kgf-m, 13.7 ft-lb)



NOTE:

Connect the evaporation hoses as shown in the figure.



(A) To fuel pipe

(B) To intake manifold

C: INSPECTION

Make sure hoses are not cracked or loose.

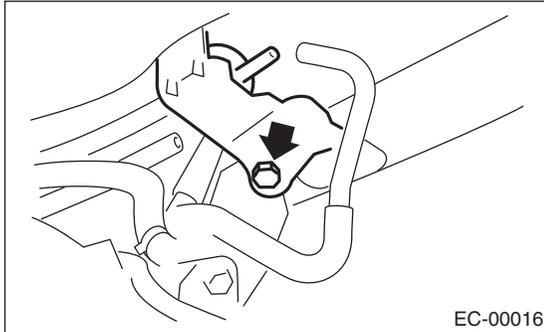
Two-way Valve

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE)

7. Two-way Valve

A: REMOVAL

- 1) Lift-up the vehicle.
- 2) Remove the canister from body. <Ref. to EC(H4SO)-8, REMOVAL, Canister.>
- 3) Remove the two-way valve with bracket as a single unit from body.



- 4) Remove the two-way valve from bracket.

B: INSTALLATION

Install in the reverse order of removal.

C: INSPECTION

Make sure that the hoses are not cracked or loose.