

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)

FUEL INJECTION (FUEL SYSTEM)

FU(H4SO)

	Page
1. General Description	2
2. Throttle Body	13
3. Intake Manifold	14
4. Engine Coolant Temperature Sensor	25
5. Crankshaft Position Sensor	26
6. Camshaft Position Sensor	27
7. Knock Sensor	28
8. Throttle Position Sensor	29
9. Manifold Absolute Pressure Sensor	31
10. Intake Air Temperature Sensor	32
11. Idle Air Control Solenoid Valve	33
12. EGR Valve	34
13. Fuel Injector	35
14. Front Oxygen (A/F) Sensor	40
15. Rear Oxygen Sensor	42
16. Engine Control Module (ECM)	44
17. Main Relay	45
18. Fuel Pump Relay	46
19. Fuel	47
20. Fuel Tank	48
21. Fuel Filler Pipe	51
22. Fuel Pump	55
23. Fuel Level Sensor	57
24. Fuel Sub Level Sensor	58
25. Fuel Filter	60
26. Fuel Cut Valve	61
27. Fuel Damper Valve	62
28. Fuel Delivery, Return and Evaporation Lines	63
29. Fuel System Trouble in General	66

General Description

FUEL INJECTION (FUEL SYSTEM)

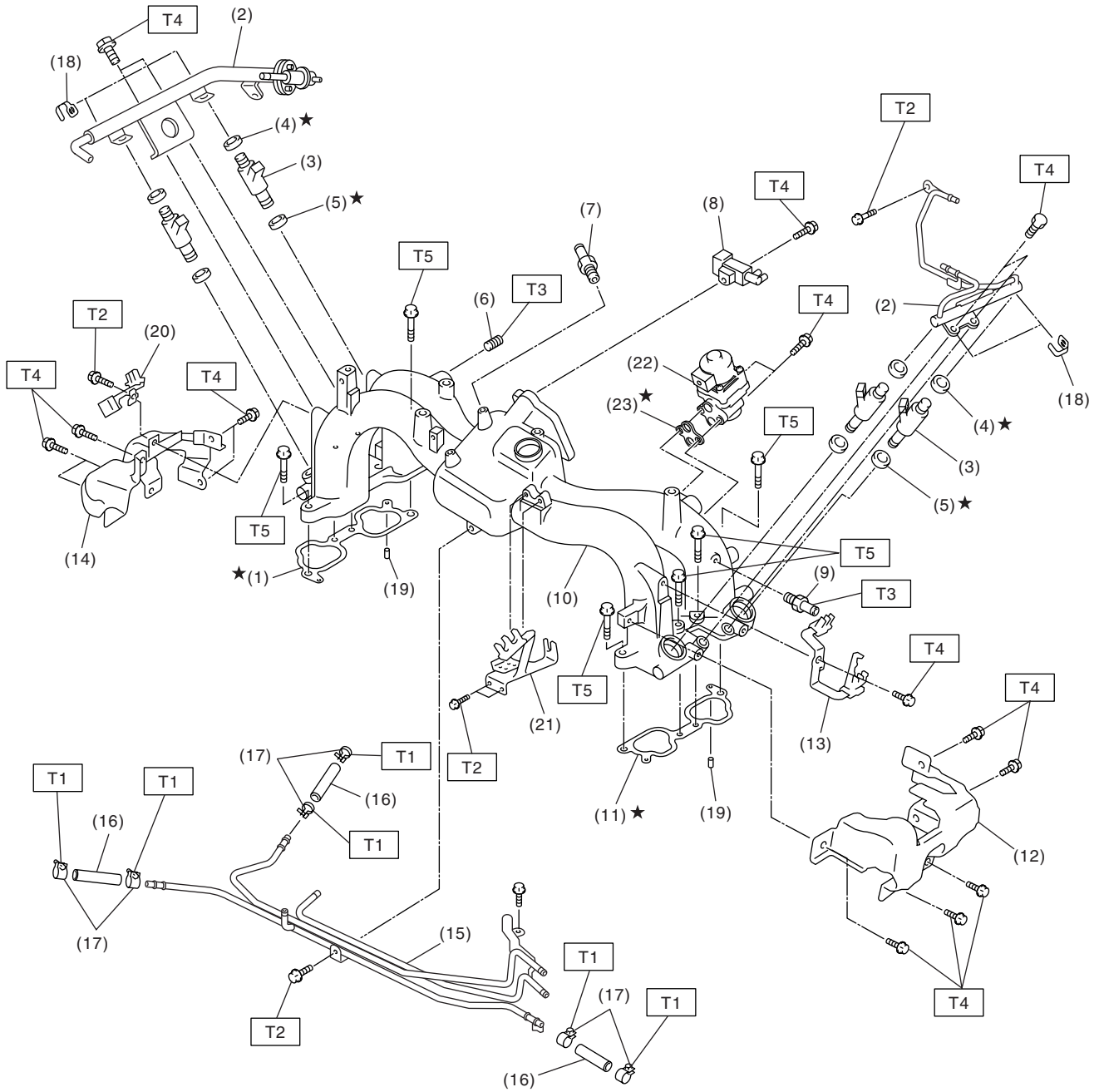
1. General Description

A: SPECIFICATION

Model		Specification
Fuel tank	Capacity	60 ℓ (15.9 US gal, 13.2 Imp gal)
	Location	Under rear seat
Fuel pump	Type	Impeller
	Shutoff discharge pressure	370 — 677 kPa (3.77 — 6.9 kg/cm ² , 53.6 — 98 psi)
	Discharge flow	More than 65 ℓ (17.2 US gal, 14.3 Imp gal) /h [12 V at 300 kPa (3.06 kg/cm ² , 43.5 psi)]
Fuel filter		Cartridge type

B: COMPONENT

1. INTAKE MANIFOLD



General Description

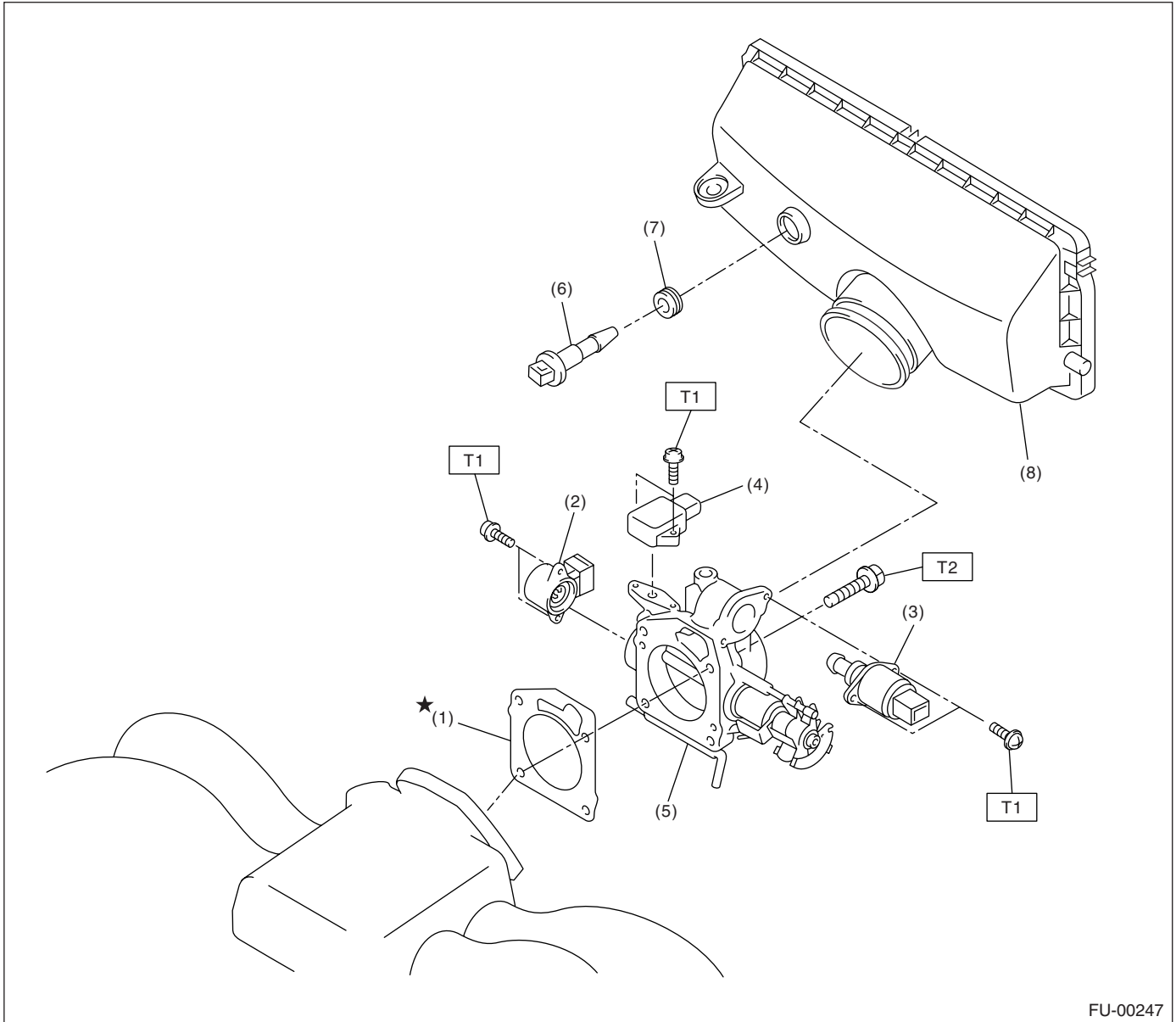
FUEL INJECTION (FUEL SYSTEM)

(1) Intake manifold gasket RH	(11) Intake manifold gasket LH	(21) Accelerator cable bracket
(2) Fuel injector pipe	(12) Fuel pipe protector LH	(22) EGR valve
(3) Fuel injector	(13) Plug cord holder LH	(23) Gasket
(4) O-ring	(14) Fuel pipe protector RH	
(5) O-ring	(15) Fuel pipe ASSY	<hr/>
(6) Plug	(16) Fuel hose	Tightening torque: N·m (kgf-m, ft-lb)
(7) PCV valve	(17) Clip	T1: 1.5 (0.15, 1.1)
(8) Purge control solenoid valve	(18) Clip	T2: 6.4 (0.7, 4.7)
(9) Nipple	(19) Guide pin	T3: 17 (1.7, 12.5)
(10) Intake manifold	(20) Plug cord holder RH	T4: 19 (1.9, 13.7)
		T5: 25 (2.5, 18.1)

General Description

FUEL INJECTION (FUEL SYSTEM)

2. AIR INTAKE SYSTEM



- | | |
|---------------------------------------|-----------------------------------|
| (1) Gasket | (5) Throttle body |
| (2) Throttle position sensor | (6) Intake air temperature sensor |
| (3) Idle air control solenoid valve | (7) Grommet |
| (4) Manifold absolute pressure sensor | (8) Air cleaner case |

Tightening torque: N·m (kgf·m, ft·lb)

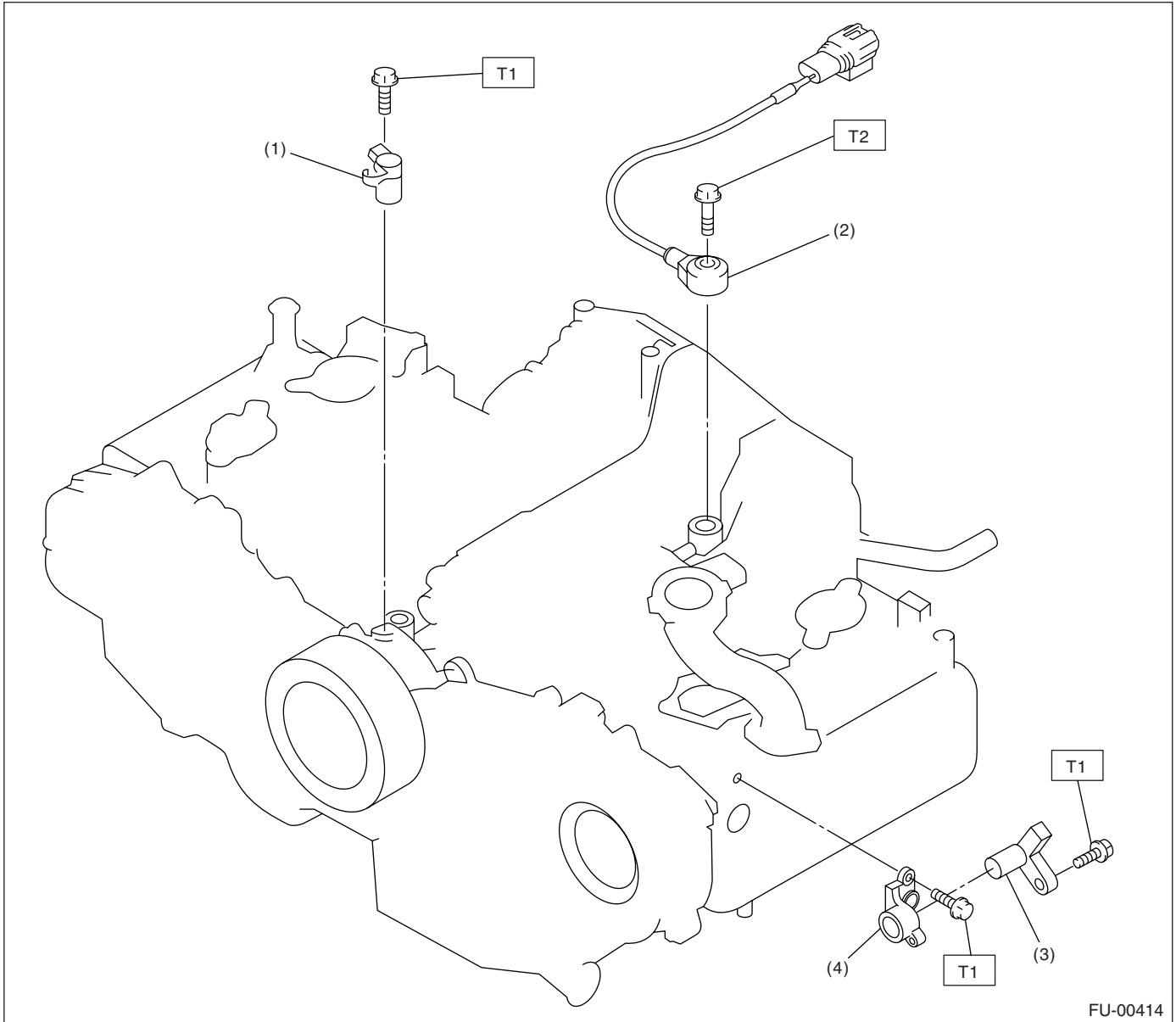
T1: 1.6 (0.16, 1.2)

T2: 22 (2.2, 15.9)

General Description

FUEL INJECTION (FUEL SYSTEM)

3. CRANKSHAFT POSITION, CAMSHAFT POSITION AND KNOCK SENSORS



- (1) Crankshaft position sensor
- (2) Knock sensor
- (3) Camshaft position sensor

- (4) Camshaft position sensor support

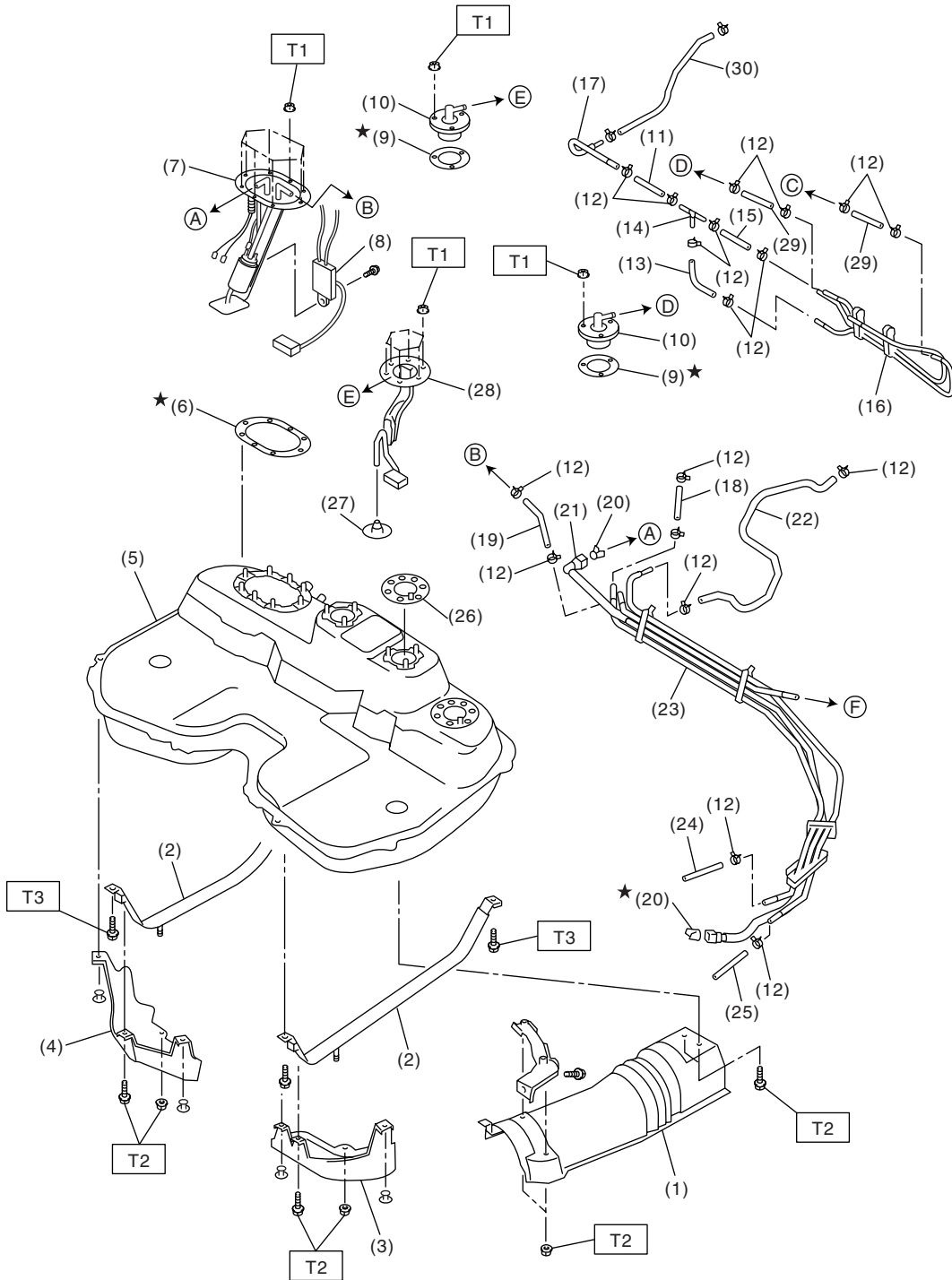
Tightening torque: N·m (kgf·m, ft·lb)

T1: 6.4 (0.65, 4.7)

T2: 24 (2.4, 17.4)

General Description

4. FUEL TANK



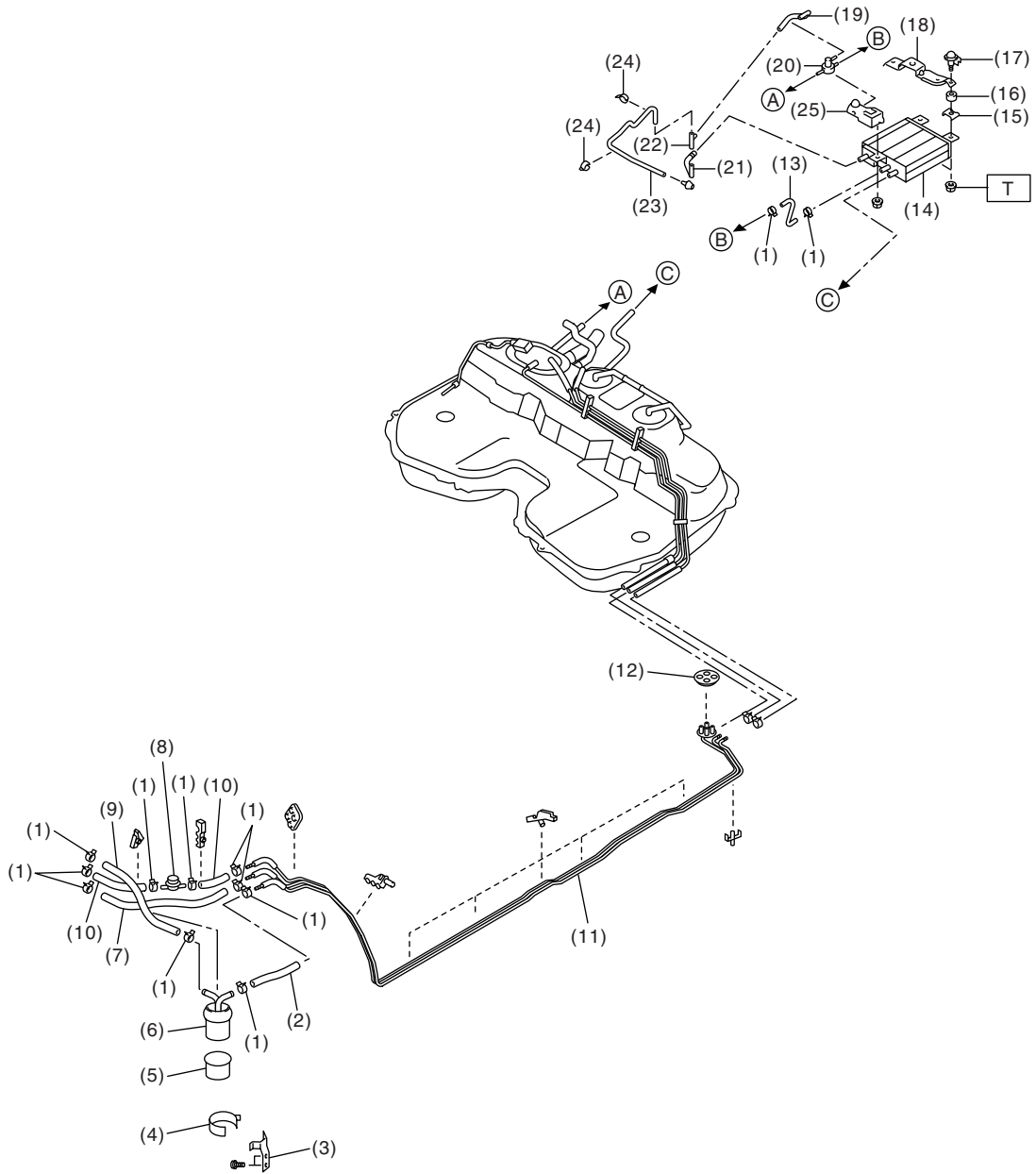
FU-02083

General Description

FUEL INJECTION (FUEL SYSTEM)

(1) Heat shield cover	(13) Evaporation hose B	(25) Fuel return hose B
(2) Fuel tank band	(14) Joint pipe	(26) Fuel sub level sensor gasket
(3) Protector LH	(15) Evaporation hose C	(27) Jet pump filter
(4) Protector RH	(16) Evaporation pipe ASSY	(28) Fuel sub level sensor
(5) Fuel tank	(17) Evaporation pipe	(29) Evaporation hose G
(6) Fuel pump gasket	(18) Evaporation hose D	(30) Evaporation hose H
(7) Fuel pump ASSY	(19) Fuel return hose A	
(8) Fuel level sensor	(20) Retainer	<hr/> Tightening torque: N·m (kgf·m, ft·lb)
(9) Fuel cut valve gasket	(21) Quick connector	T1: 4.4 (0.45, 3.3)
(10) Fuel cut valve	(22) Evaporation hose E	T2: 7.4 (0.75, 5.4)
(11) Evaporation hose A	(23) Fuel pipe ASSY	T3: 33 (3.4, 24.3)
(12) Clip	(24) Evaporation hose F	<hr/>

5. FUEL LINE



FU-00516

General Description

FUEL INJECTION (FUEL SYSTEM)

- | | | |
|--------------------------|--------------------------------|---------------------------------|
| (1) Clip | (11) Fuel pipe ASSY | (21) Two-way valve drain hose A |
| (2) Fuel delivery hose A | (12) Grommet | (22) Connector |
| (3) Fuel filter bracket | (13) Canister hose A | (23) Two-way valve drain hose B |
| (4) Fuel filter holder | (14) Canister | (24) Clamp |
| (5) Fuel filter cup | (15) Canister bracket plate | (25) Front canister bracket |
| (6) Fuel filter | (16) Cushion | |
| (7) Evaporation hose | (17) Canister bracket spacer | |
| (8) Fuel damper valve | (18) Rear canister bracket | |
| (9) Fuel delivery hose B | (19) Two-way valve return hose | |
| (10) Fuel return hose | (20) Two-way valve | |

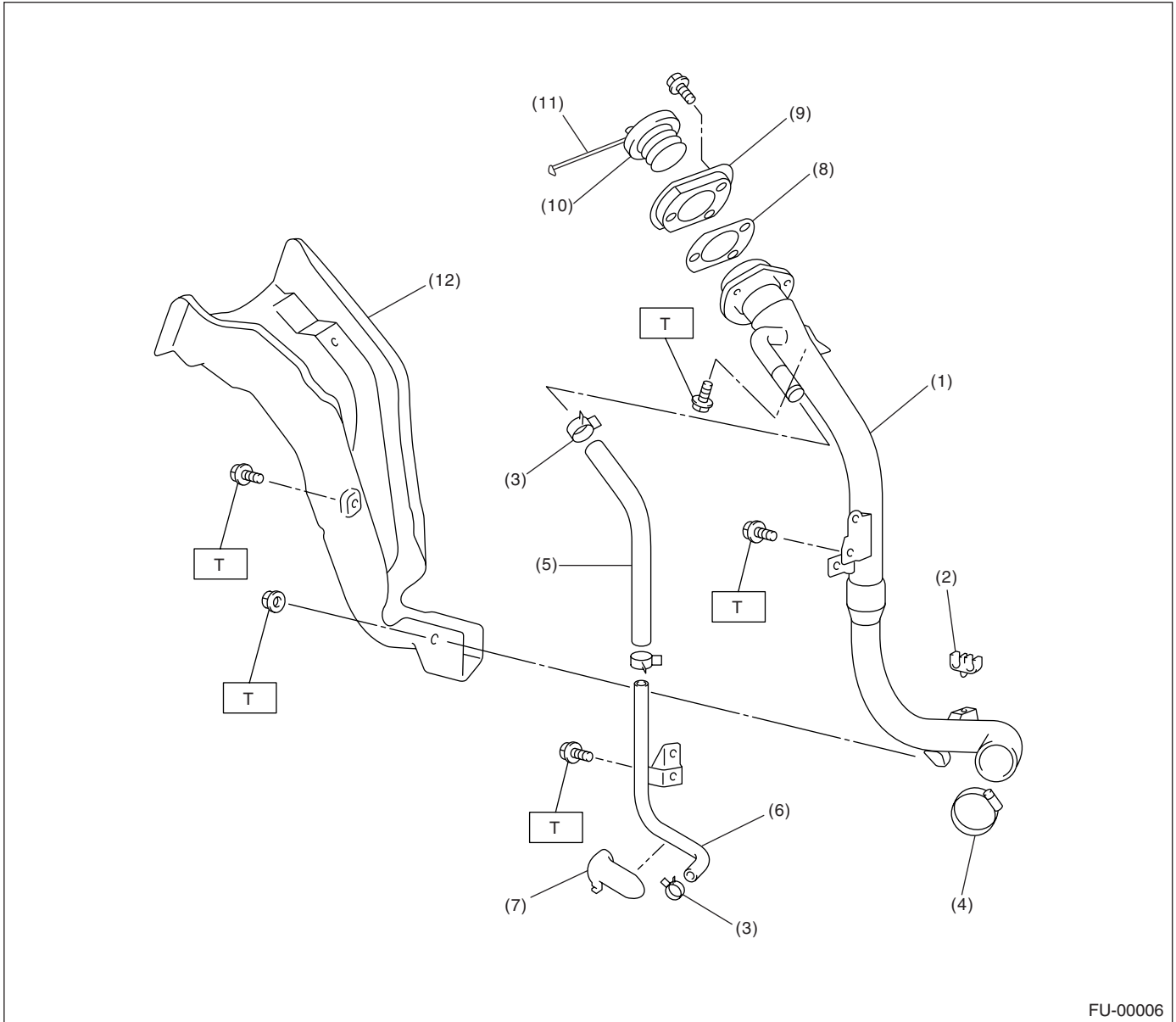
Tightening torque: N·m (kgf·m, ft·lb)

T: 23 (2.3, 17.0)

General Description

FUEL INJECTION (FUEL SYSTEM)

6. FUEL FILLER PIPE



FU-00006

- | | | |
|-----------------------------|------------------------------|---------------------------------|
| (1) Fuel filler pipe ASSY | (6) Air vent pipe | (11) Fuel filler cap tether |
| (2) Evaporation hose holder | (7) Air vent pipe holder | (12) Fuel filler pipe protector |
| (3) Clip | (8) Fuel filler pipe packing | |
| (4) Clamp | (9) Fuel filler ring | |
| (5) Air vent hose | (10) Fuel filler cap | |

Tightening torque: N·m (kgf·m, ft·lb)

T: 7.5 (0.76, 5.5)

General Description

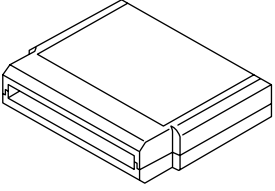

FUEL INJECTION (FUEL SYSTEM)

C: 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 negative terminal from battery.
- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.

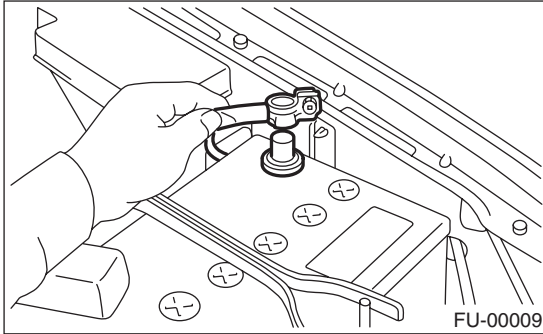
D: PREPARATION TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST24082AA230	24082AA230 (Newly adopted tool)	CARTRIDGE	Troubleshooting for electrical system.
 ST22771AA030	22771AA030	SUBARU SELECT MONITOR KIT	Troubleshooting for electrical systems. <ul style="list-style-type: none"> • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

2. Throttle Body

A: REMOVAL

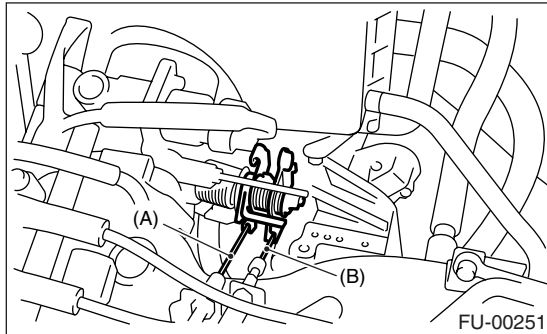
1) Disconnect the ground cable from battery.



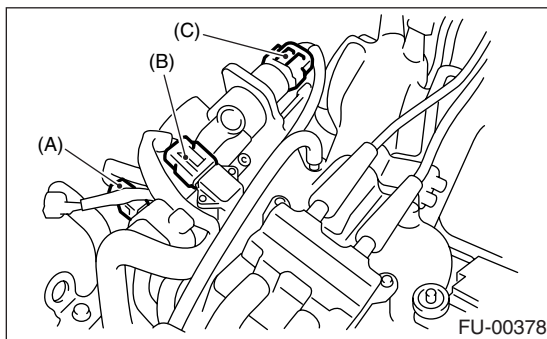
2) Remove the air cleaner case. <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>

3) Disconnect the accelerator cable (A).

4) Disconnect the cruise control cable (B). (With cruise control model)



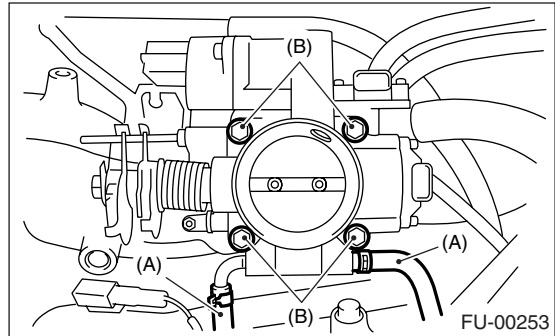
5) Disconnect the connectors from idle air control solenoid valve, throttle position sensor and manifold absolute pressure sensor.



- (A) Throttle position sensor
- (B) Manifold absolute pressure sensor
- (C) Idle air control solenoid valve

6) Disconnect the engine coolant hoses (A) from the throttle body.

7) Remove the bolts (B) which install throttle body to the intake manifold.



B: INSTALLATION

1) Install in the reverse order of removal.

NOTE:

Replace the gasket with a new one.

Tightening torque:

THROTTLE BODY;

22 N·m (2.2 kgf-m, 15.9 ft-lb)

2) Adjust the accelerator cable play. <Ref. to SP(H4SO)-7, ADJUSTMENT, Accelerator Pedal.>

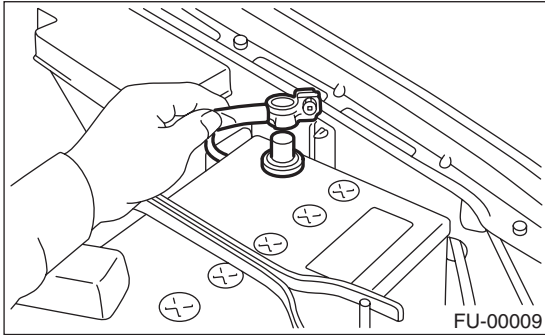
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

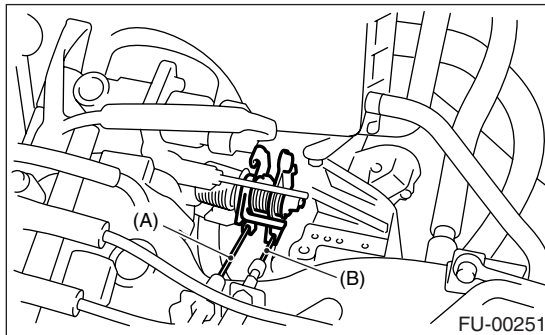
3. Intake Manifold

A: REMOVAL

- 1) Release the fuel pressure. <Ref. to FU(H4SO)-47, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel flap lid, and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.



- 4) Remove the air intake duct and air cleaner case. <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Duct.> <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>
- 5) Disconnect the accelerator cable (A).
- 6) Disconnect the cruise control cable (B). (With cruise control model)

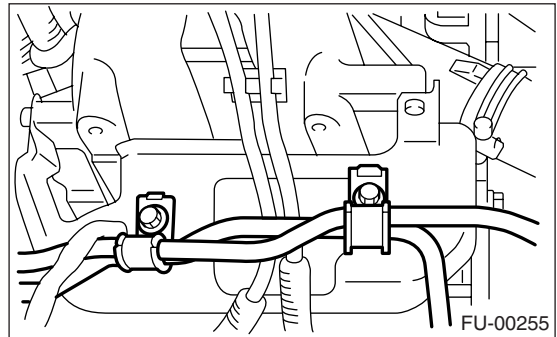


- 7) Remove the power steering pump and reservoir tank from bracket.
 - (1) Remove the resonator chamber. <Ref. to IN(H4SO)-8, REMOVAL, Resonator Chamber.>
 - (2) Remove the front side V-belt. <Ref. to ME(H4SO)-43, REMOVAL, V-belt.>

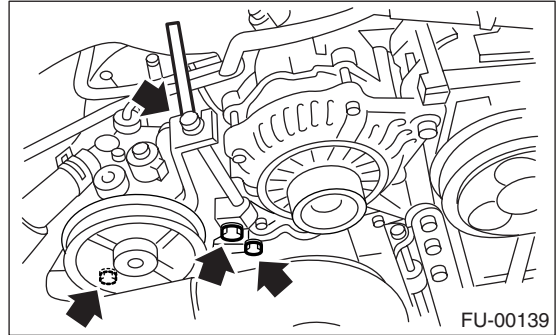
- (3) Remove the bolts which hold power steering pipes onto the intake manifold protector.

NOTE:

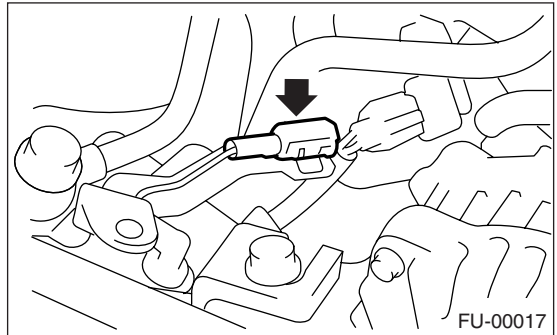
Do not disconnect the power steering hose.



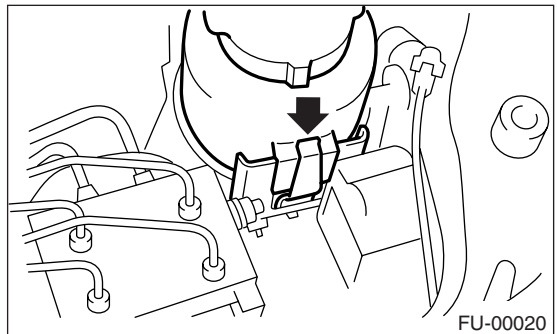
- (4) Remove the bolts which install power steering pump bracket.



- (5) Disconnect the connector from the power steering pump switch.



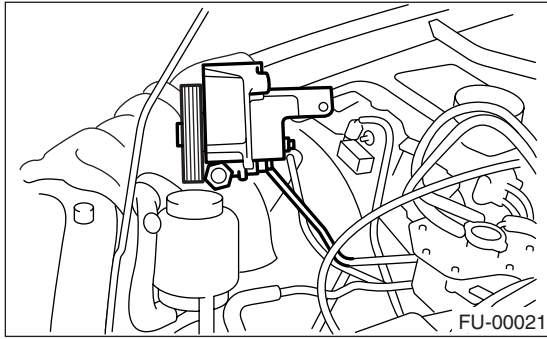
- (6) Remove the power steering tank from the bracket by pulling it upwards.



Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

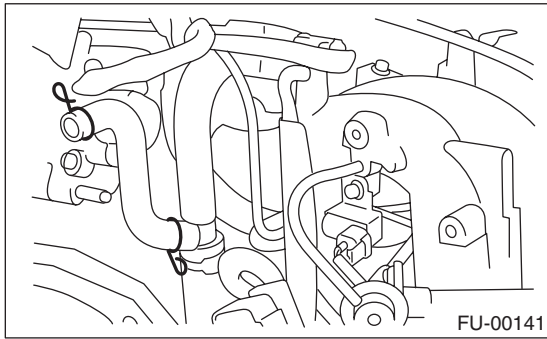
(7) Place the power steering pump on the right side wheel apron.



FU-00021

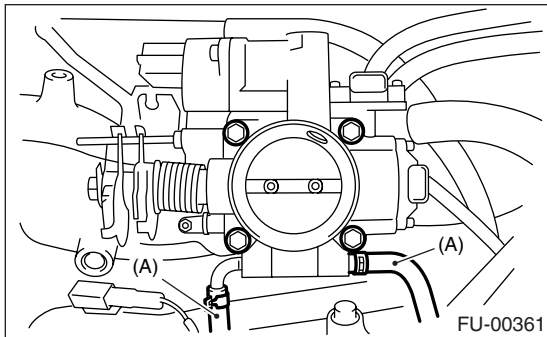
8) Disconnect the spark plug cords from the spark plugs.

9) Disconnect the PCV hose from the intake manifold.



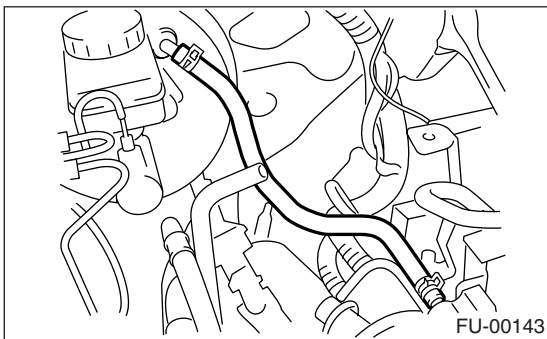
FU-00141

10) Disconnect the engine coolant hose (A) from the throttle body.



FU-00361

11) Disconnect the brake booster hose.



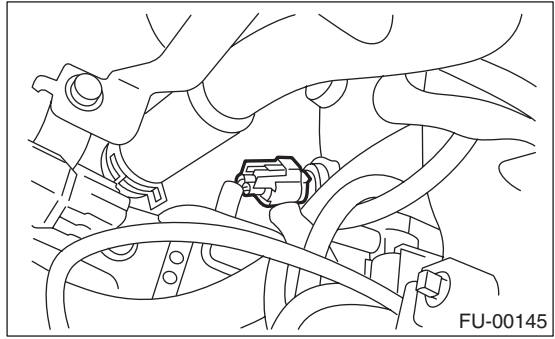
FU-00143

12) Remove the air cleaner case stay RH and engine harness bracket, and disconnect the engine harness connectors from the bulkhead harness connectors.



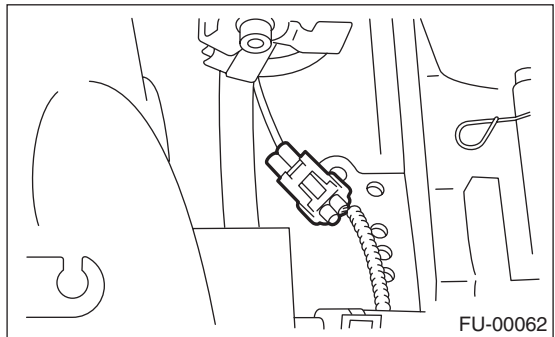
FU-00258

13) Disconnect the connectors from the engine coolant temperature sensor.



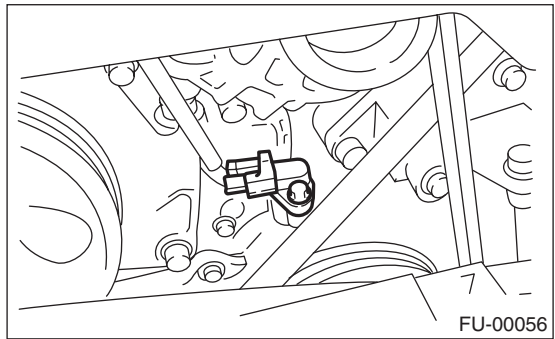
FU-00145

14) Disconnect the knock sensor connector.



FU-00062

15) Disconnect the connector from the crankshaft position sensor.

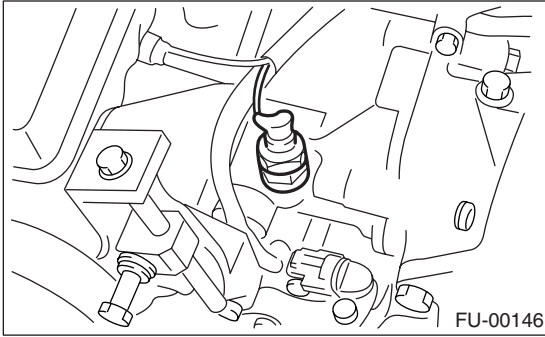


FU-00056

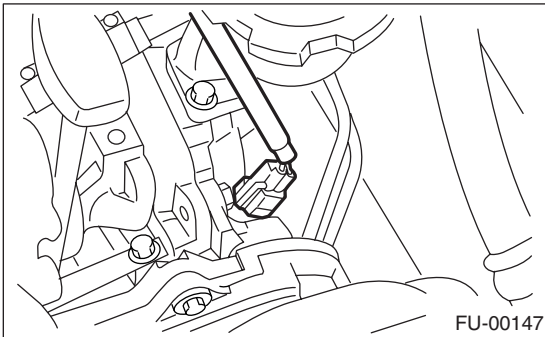
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

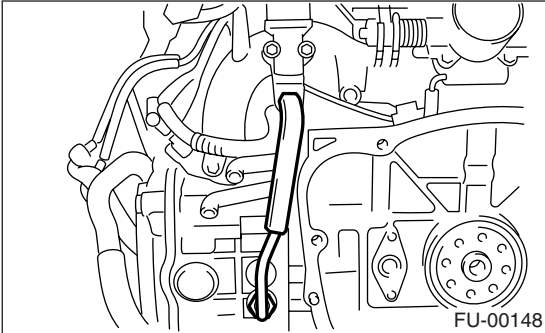
16) Disconnect the connector from the oil pressure switch.



17) Disconnect the connector from the camshaft position sensor.



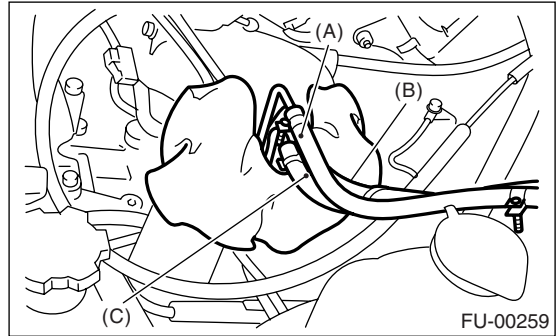
18) Remove the EGR pipe from intake manifold.



19) Disconnect the fuel hoses from the fuel pipes.

WARNING:

- Do not spill fuel.
- Catch fuel from hoses in a container or cloth.

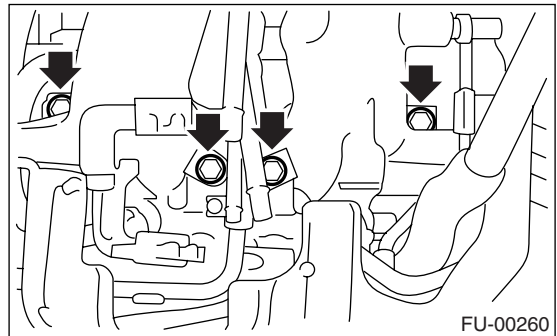


(A) Fuel delivery hose

(B) Fuel return hose

(C) Evaporation hose

20) Remove the bolts which hold intake manifold onto the cylinder heads.



21) Remove the intake manifold.

B: INSTALLATION

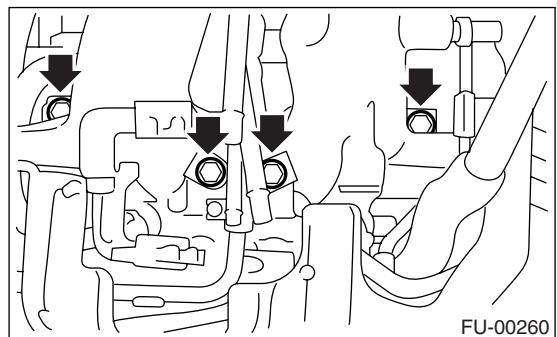
1) Install the intake manifold onto the cylinder heads.

NOTE:

Replace the gaskets with new ones.

Tightening torque:

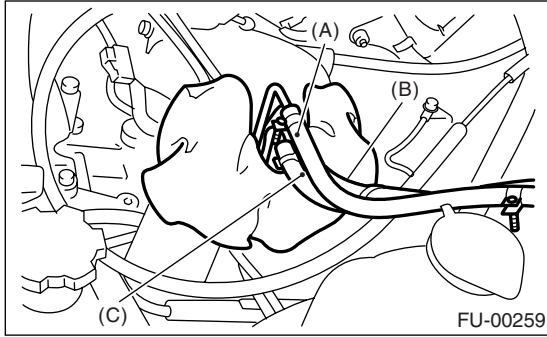
25 N·m (2.5 kgf·m, 18.1 ft·lb)



Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

2) Connect the fuel hoses.

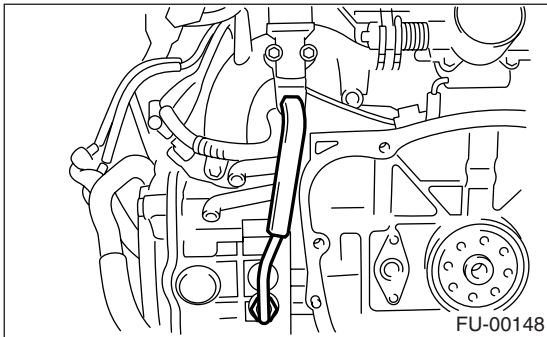


- (A) Fuel delivery hose
- (B) Fuel return hose
- (C) Evaporation hose

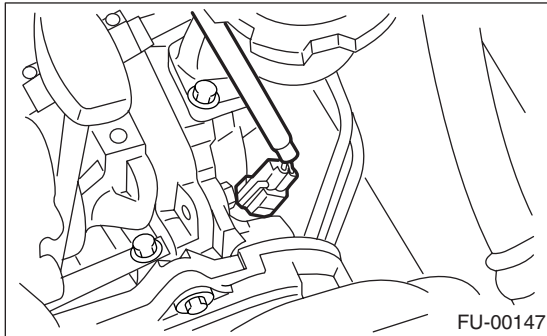
3) Connect the EGR pipe to intake manifold.

Tightening torque:

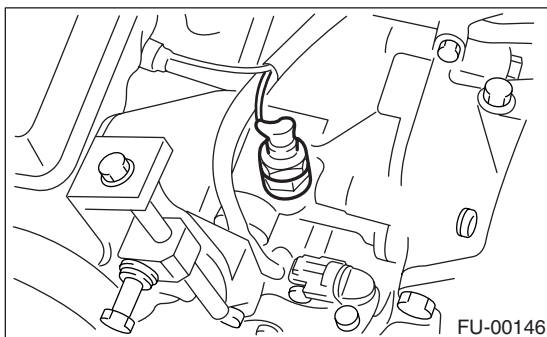
34 N·m (3.4 kgf-m, 24.6 ft-lb)



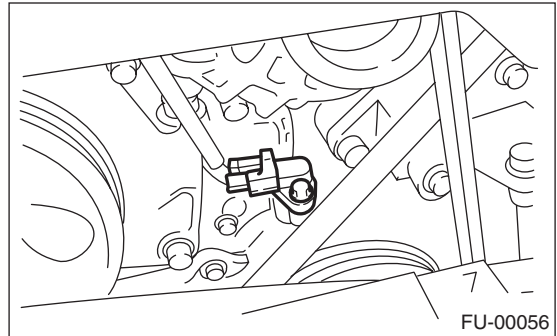
4) Connect the connector to the camshaft position sensor.



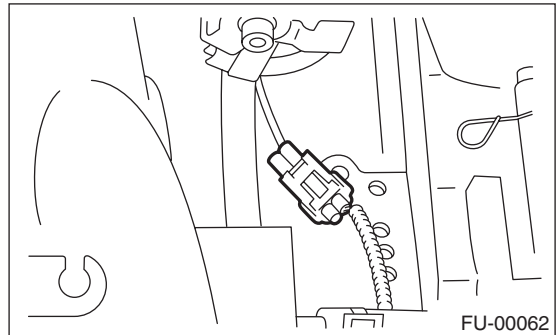
5) Connect the connector to the oil pressure switch.



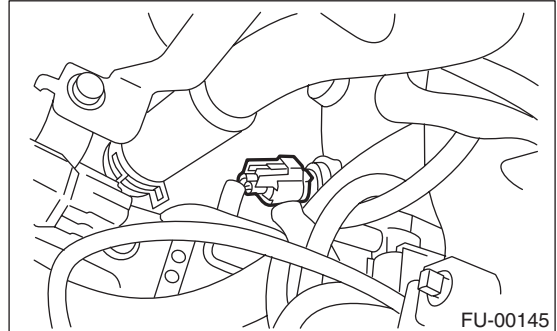
6) Connect the connector to the crankshaft position sensor.



7) Connect the knock sensor connector.



8) Connect the connectors to the engine coolant temperature sensor.



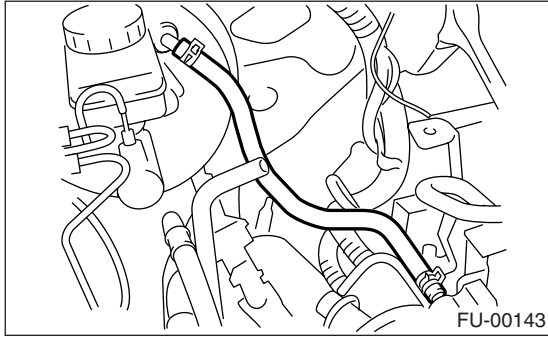
9) Install the air cleaner case stay RH and engine harness bracket, and connect the engine harness connectors to the bulkhead connectors.



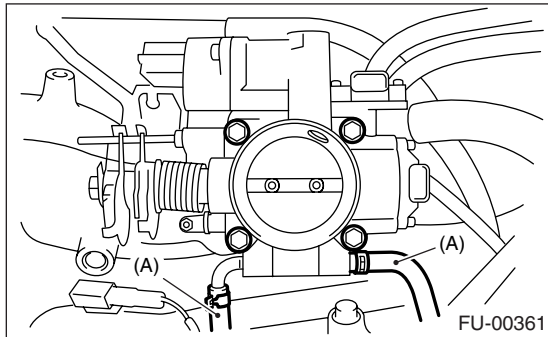
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

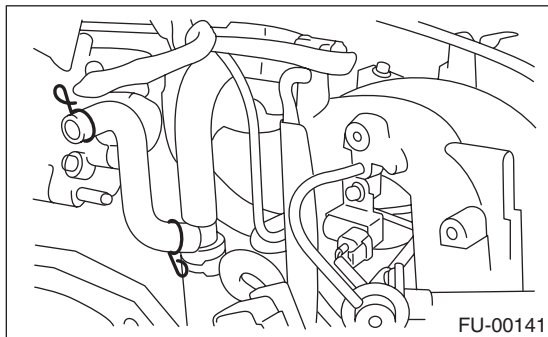
10) Connect the brake booster hose.



11) Connect the engine coolant hose (A) to the throttle body.



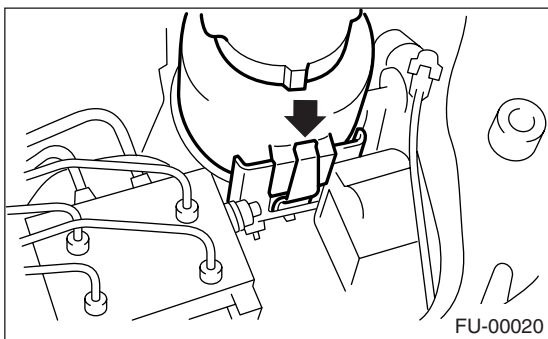
12) Connect the PCV hose to the intake manifold.



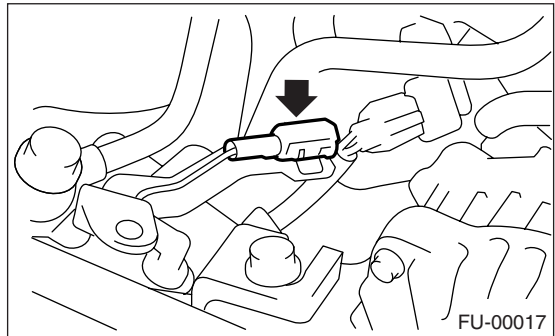
13) Connect the spark plug cords to the spark plugs.

14) Install the power steering pump and reservoir tank to bracket.

(1) Install the reservoir tank to bracket.

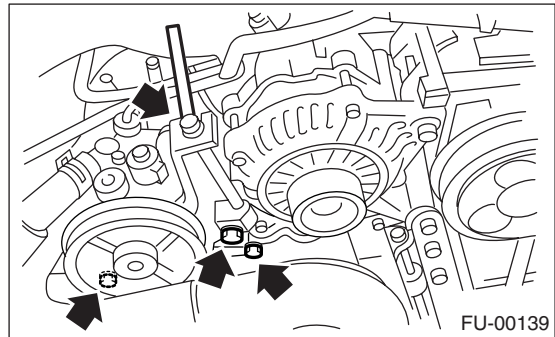


(2) Connect the connector to the power steering pump switch.

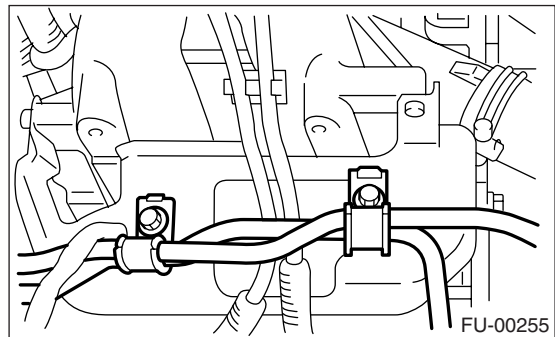


(3) Tighten the bolts which install power steering pump bracket.

Tightening torque:
22 N·m (2.2 kgf-m, 15.9 ft-lb)



(4) Install the power steering pipes onto the right side intake manifold protector.

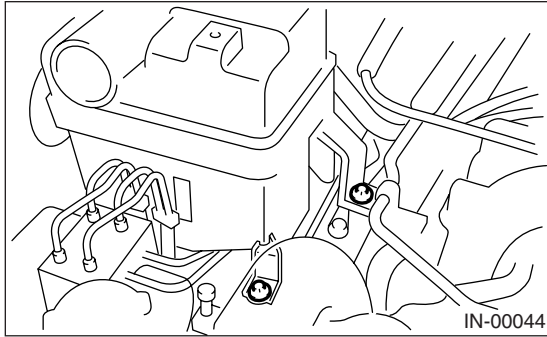


(5) Install the front side V-belt. <Ref. to ME(H4SO)-43, INSTALLATION, V-belt.>

(6) Install the resonator chamber.

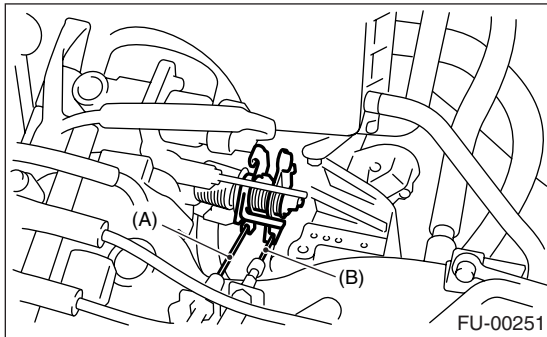
Tightening torque:

33 N·m (3.4 kgf·m, 24.3 ft·lb)



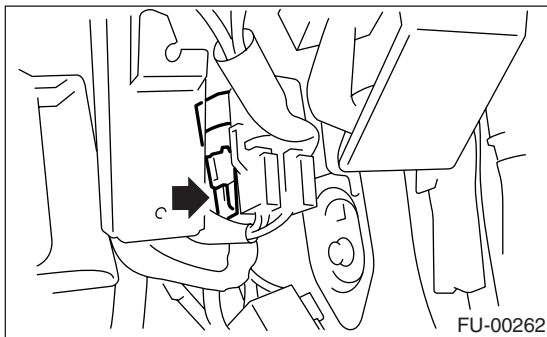
15) Connect the accelerator cable (A). <Ref. to SP(H4SO)-9, INSTALLATION, Accelerator Control Cable.>

16) Connect the cruise control cable (B). (With cruise control models)

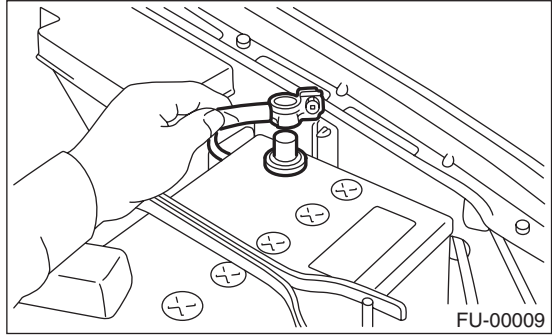


17) Install the air intake duct and air cleaner case. <Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Duct.> <Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>

18) Connect the connector to the fuel pump relay.

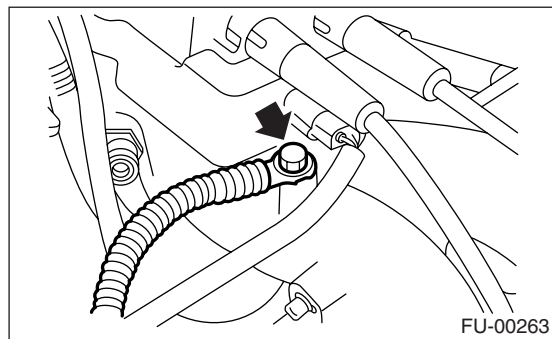


19) Connect the battery ground cable to battery.

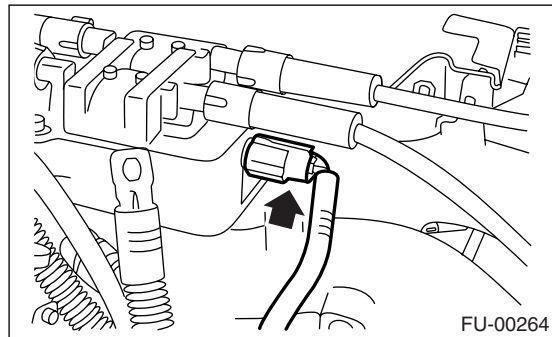


C: DISASSEMBLY

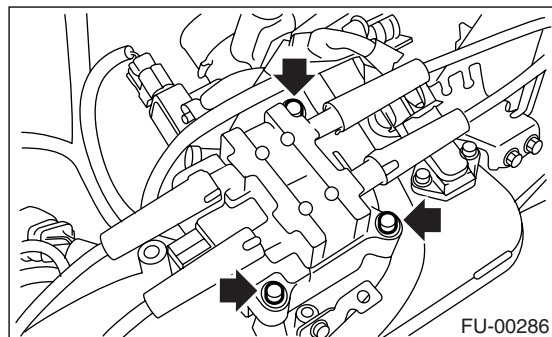
1) Disconnect the engine ground terminal from the intake manifold.



2) Disconnect the connector from the ignition coil & ignitor assembly.



3) Remove the ignition coil & ignitor assembly.



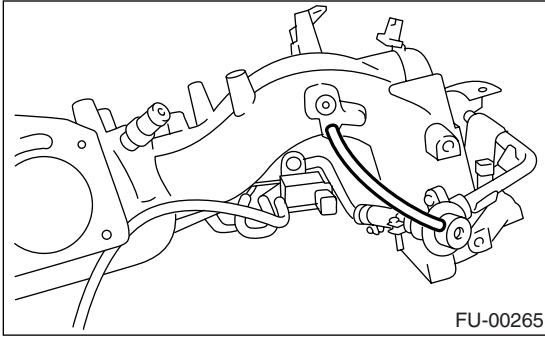
4) Remove the throttle body. <Ref. to FU(H4SO)-13, REMOVAL, Throttle Body.>

5) Remove the EGR valve. <Ref. to FU(H4SO)-34, REMOVAL, EGR Valve.>

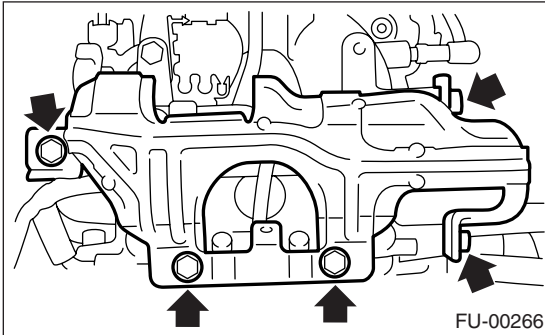
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

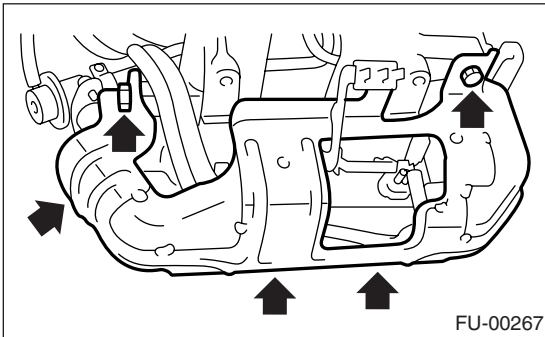
6) Disconnect the pressure regulator vacuum hose from the intake manifold.



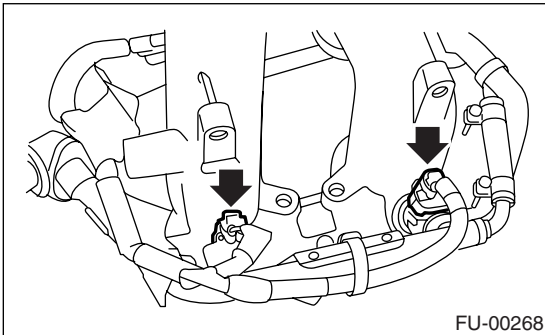
7) Remove the fuel pipe protector LH.



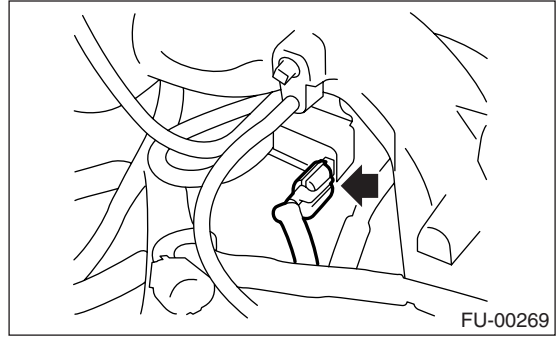
8) Remove the fuel pipe protector RH.



9) Disconnect the connectors from the fuel injectors.

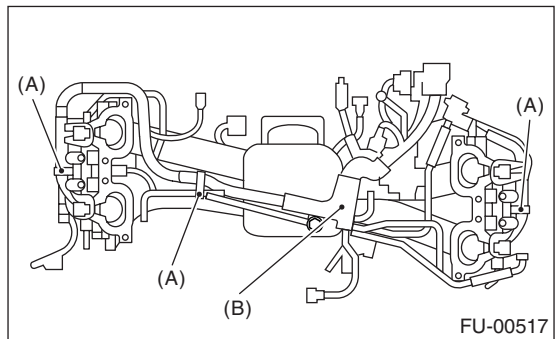


10) Disconnect the connector from the purge control solenoid valve.



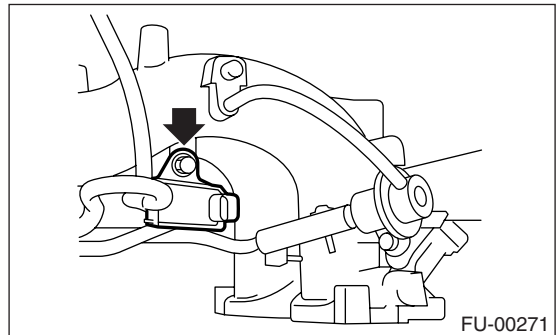
11) Disconnect the air by-pass hose from the purge control solenoid valve.

12) Remove the harness bands (A) and harness bracket (B) which hold engine harness onto the intake manifold.

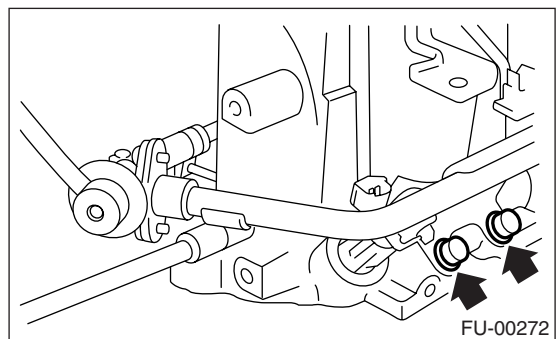


13) Remove the engine harness from the intake manifold.

14) Remove the purge control solenoid valve.



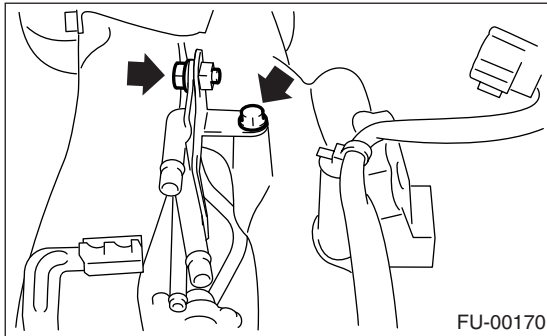
15) Remove the bolt which installs injector pipe on the intake manifold as shown in figure.



Intake Manifold

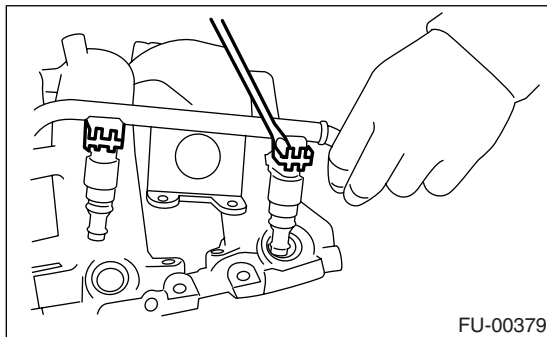
FUEL INJECTION (FUEL SYSTEM)

16) Remove the two bolts which hold fuel pipe assembly on the left side of intake manifold.

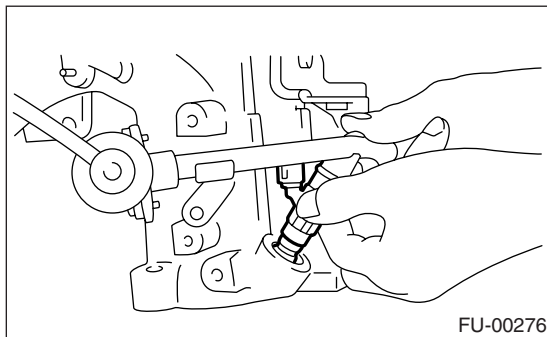


17) Remove the fuel injectors.

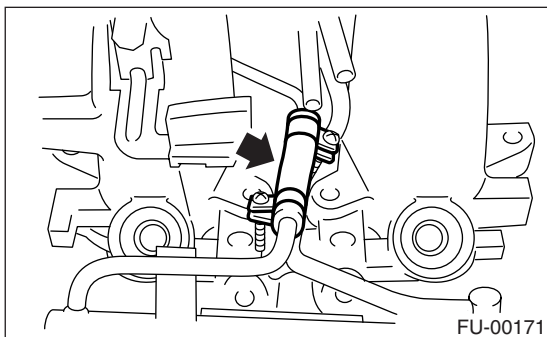
(1) Remove the fuel injector securing clip.



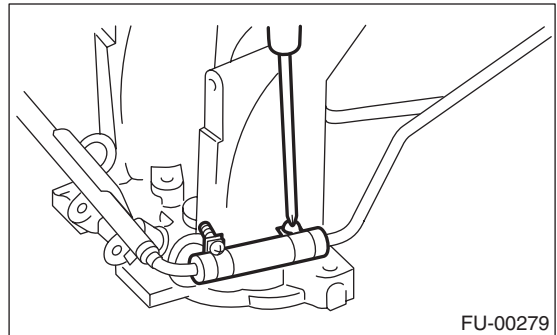
(2) Remove the fuel injector while lifting up the fuel injector pipe.



18) Loosen the clamp which holds the front left side fuel hose to the injector pipe and remove the pipe.

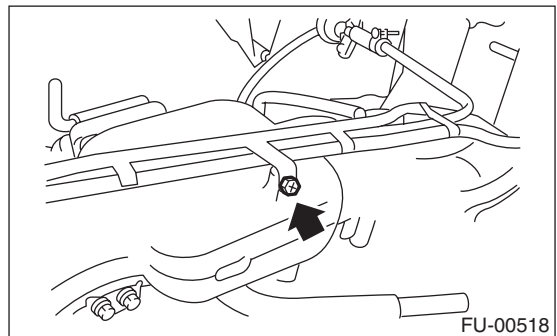


19) Loosen the clamp which holds the front right side fuel hose to the injector pipe and remove the pipe.



20) Remove the fuel injector pipe.

21) Remove the bolt which installs the fuel pipes on the intake manifold.



22) Remove the fuel pipe assembly and pressure regulator, from the intake manifold.

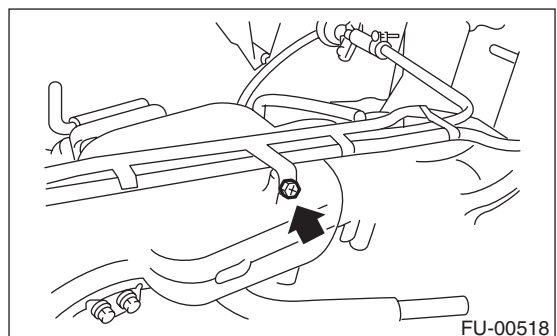
D: ASSEMBLY

1) Install the fuel pipe assembly and pressure regulator, etc. to the intake manifold.

2) Tighten the bolt which installs the fuel pipes on the intake manifold.

Tightening torque:

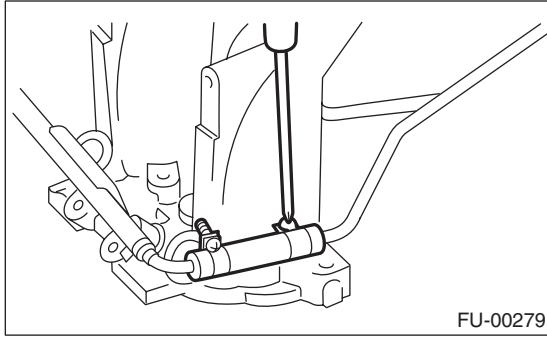
6.4 N·m (0.7 kgf·m, 4.7 ft·lb)



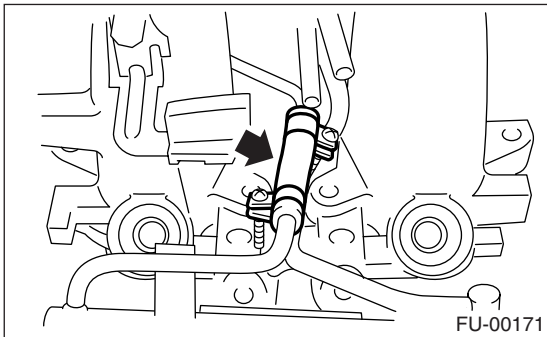
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

3) Connect the right side fuel hose to the injector pipe, and tighten the clamp screw.

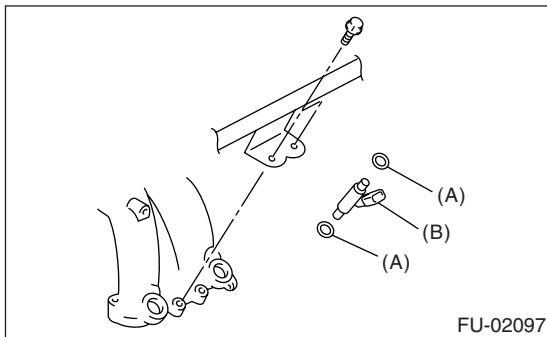


4) Install the fuel injector pipe.
5) Connect the left side fuel hose to the injector pipe, and tighten the clamp screw.



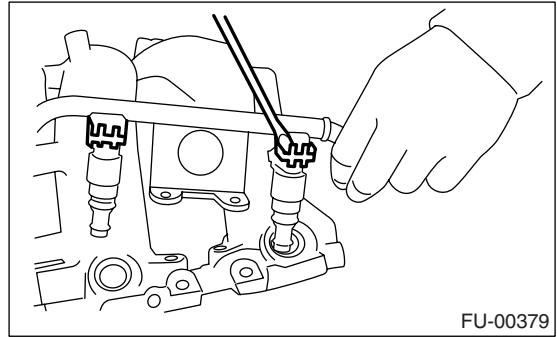
6) Install the fuel injectors.

NOTE:
Replace the O-rings with new ones.



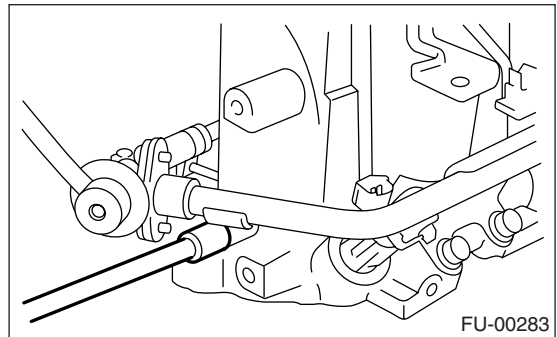
- (A) O-ring
- (B) Fuel injector

NOTE:
Do not forget to install the fuel injector securing clip.

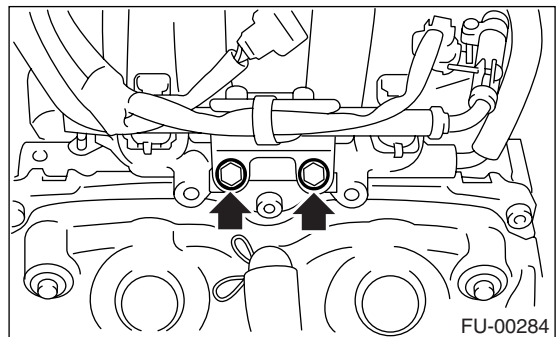


7) Tighten the bolt which installs the injector pipe on the intake manifold.

Tightening torque:
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



Tightening torque:
19 N·m (1.9 kgf-m, 13.7 ft-lb)



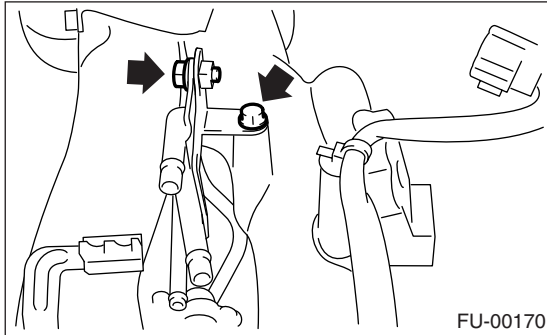
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

8) Tighten the two bolts which install the fuel pipe assembly on the left side of intake manifold.

Tightening torque:

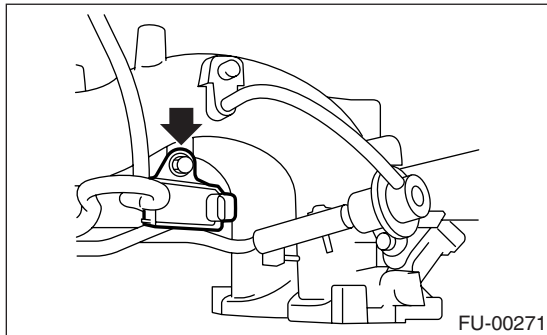
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



9) Install the purge control solenoid valve.

Tightening torque:

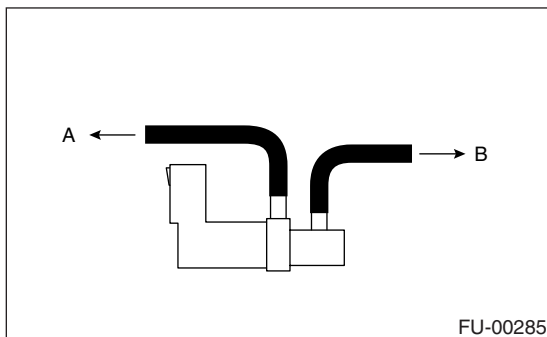
19 N·m (1.9 kgf-m, 13.7 ft-lb)



10) Connect the hoses to the purge control solenoid valve.

NOTE:

Connect the evaporation hose as shown in the figure.



- (A) To fuel pipe
- (B) To intake manifold

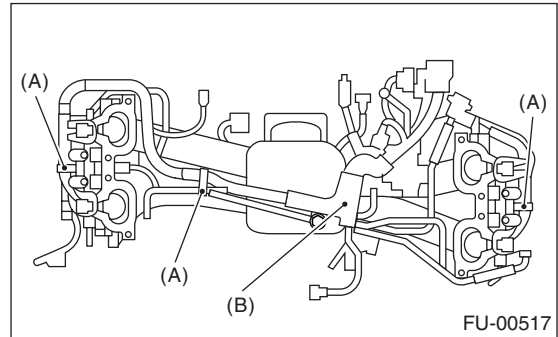
11) Install the engine harness onto the intake manifold.

Tightening torque:

16 N·m (1.6 kgf-m, 11.8 ft-lb)

12) Connect the connectors to the fuel injectors and purge control solenoid valve.

13) Hold the engine harness by harness band (A) and harness bracket (B).



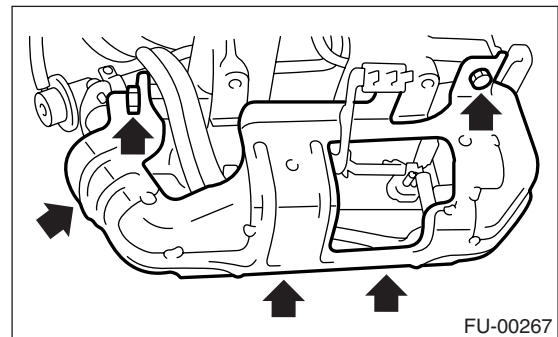
NOTE:

Do not use harness band on harnesses where they are supposed to be protected by the fuel pipe protector.

14) Install the fuel pipe protector RH.

Tightening torque:

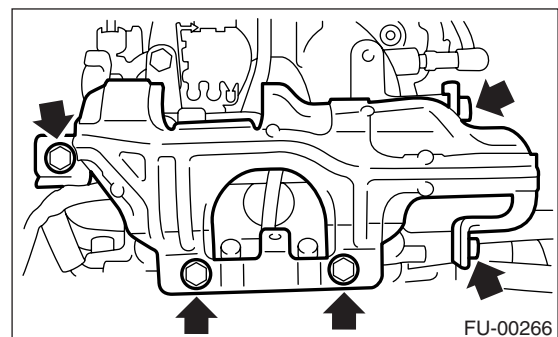
19 N·m (1.9 kgf-m, 13.7 ft-lb)



15) Install the fuel pipe protector LH.

Tightening torque:

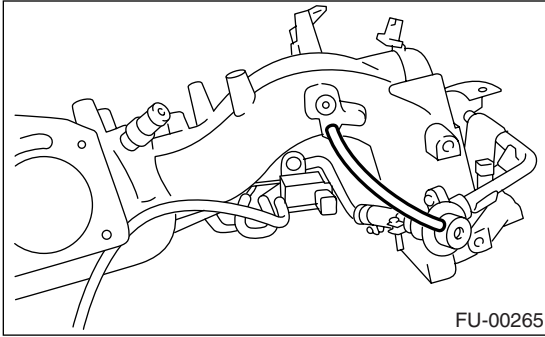
19 N·m (1.9 kgf-m, 13.7 ft-lb)



Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

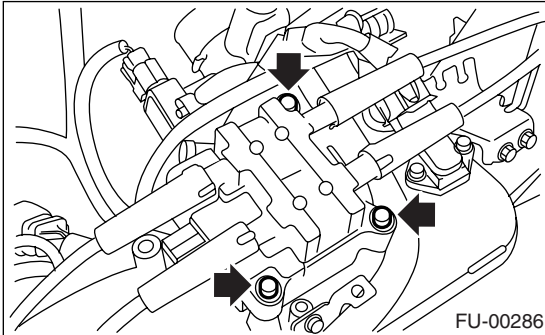
16) Connect the pressure regulator vacuum hose to the intake manifold.



17) Install the EGR valve. <Ref. to FU(H4SO)-34, INSTALLATION, EGR Valve.>

18) Install the throttle body to the intake manifold. <Ref. to FU(H4SO)-13, INSTALLATION, Throttle Body.>

19) Install the ignition coil and ignitor assembly.

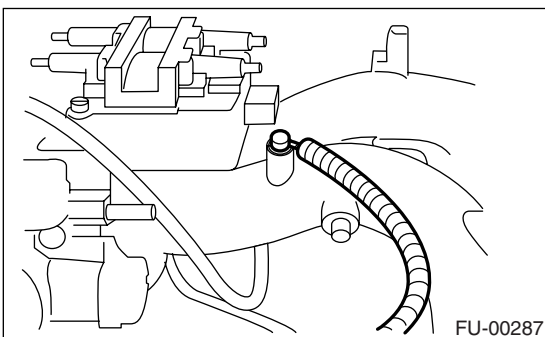


20) Connect the connector to the ignition coil and ignitor assembly.

21) Install the engine ground terminal to the intake manifold.

Tightening torque:

19 N·m (1.9 kgf-m, 13.7 ft-lb)



E: INSPECTION

Make sure the fuel pipe and fuel hoses are not cracked and that connections are tight.

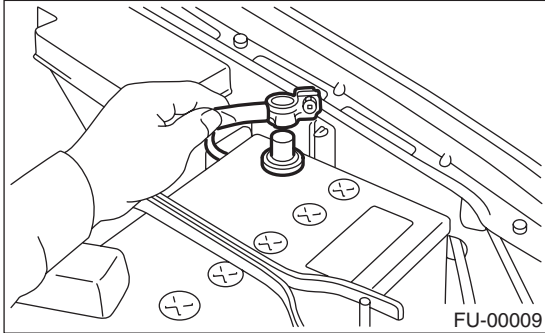
Engine Coolant Temperature Sensor

FUEL INJECTION (FUEL SYSTEM)

4. Engine Coolant Temperature Sensor

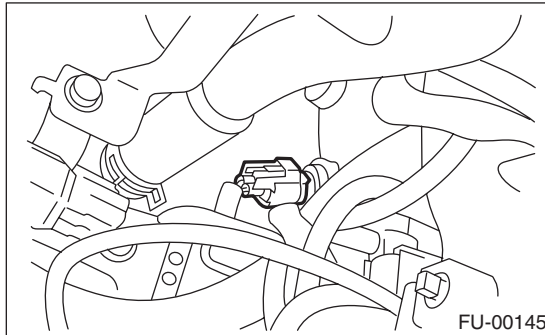
A: REMOVAL

1) Disconnect the ground cable from battery.



2) Remove the air intake duct and air cleaner assembly. <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Duct.> <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>

3) Disconnect the connector from the engine coolant temperature sensor.



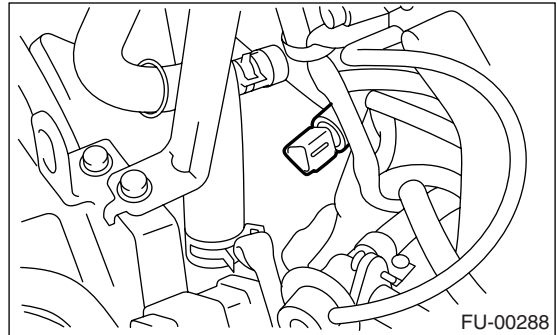
4) Remove the engine coolant temperature sensor.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

18 N·m (1.8 kgf-m, 13.0 ft-lb)



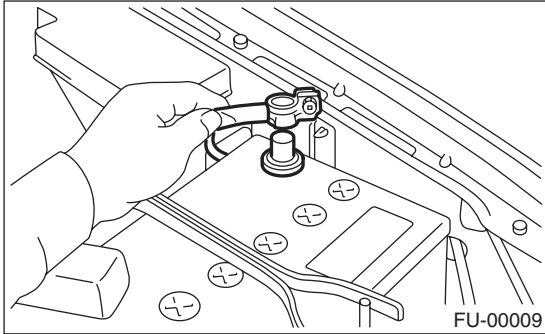
Crankshaft Position Sensor

FUEL INJECTION (FUEL SYSTEM)

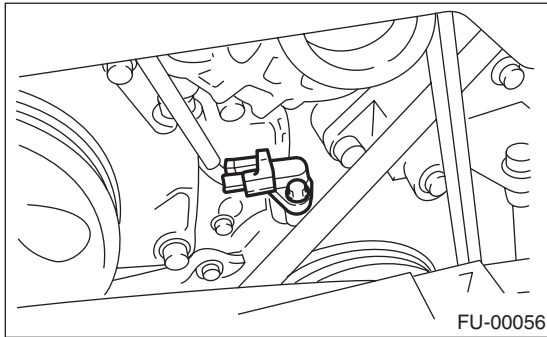
5. Crankshaft Position Sensor

A: REMOVAL

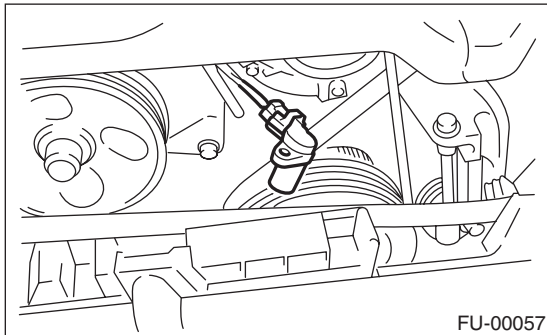
1) Disconnect the ground cable from battery.



2) Remove the bolt which install crankshaft position sensor to the cylinder block.



3) Remove the crankshaft position sensor, and disconnect the connector from it.

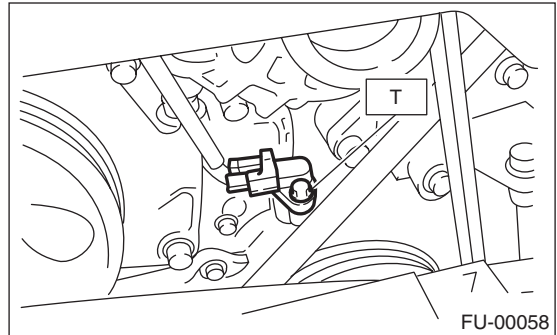


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

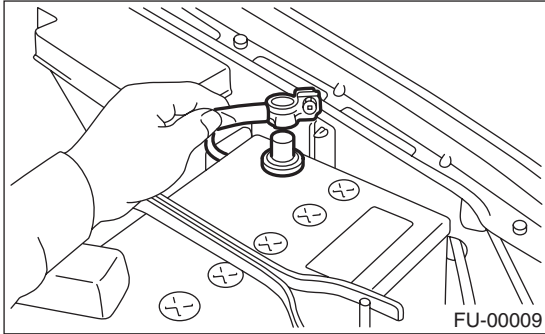
T: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



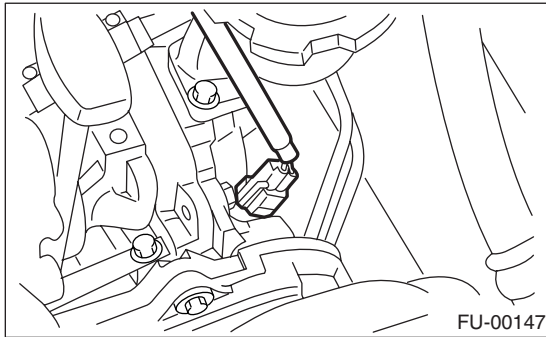
6. Camshaft Position Sensor

A: REMOVAL

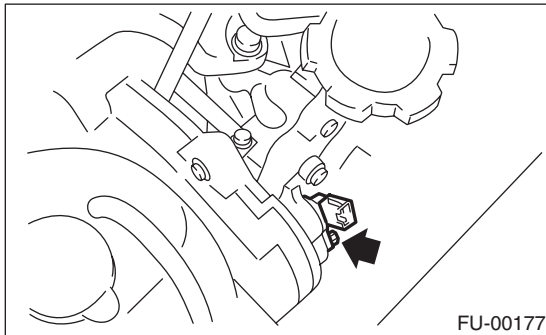
1) Disconnect the ground cable from battery.



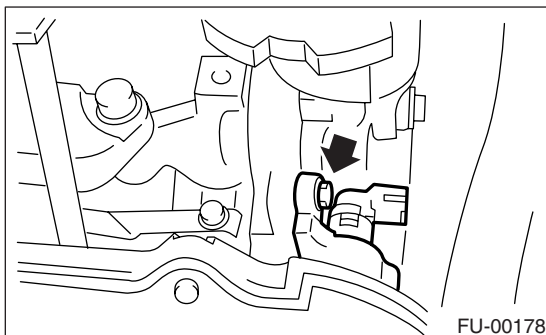
2) Disconnect the connector from the camshaft position sensor.



3) Remove the bolt which installs camshaft position sensor to the camshaft position sensor support.

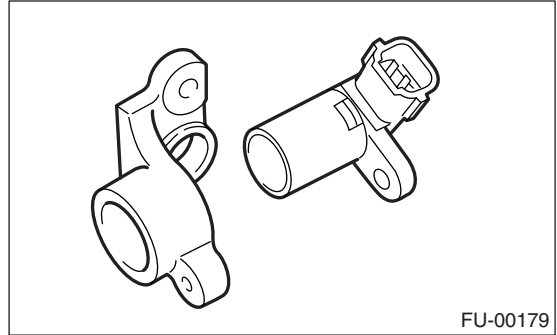


4) Remove the bolt which installs camshaft position sensor support to the camshaft cap LH.



5) Remove the camshaft position sensor and camshaft position sensor support as a unit.

6) Remove the camshaft position sensor itself.



B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

Camshaft position sensor support;

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

Camshaft position sensor;

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

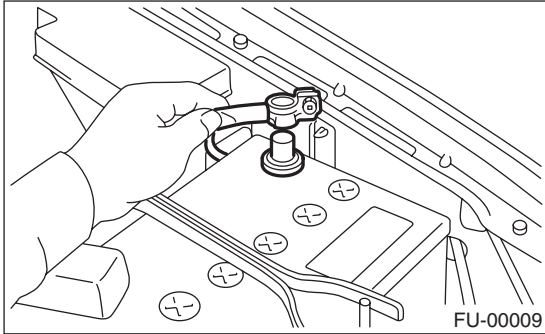
Knock Sensor

FUEL INJECTION (FUEL SYSTEM)

7. Knock Sensor

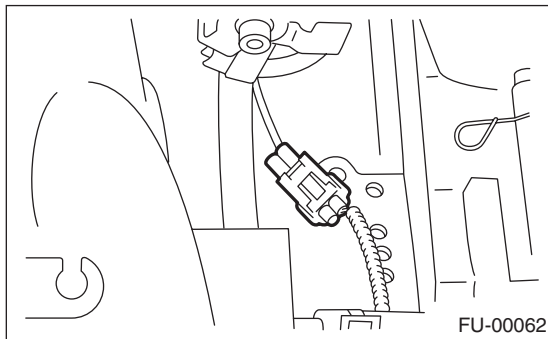
A: REMOVAL

1) Disconnect the ground cable from battery.

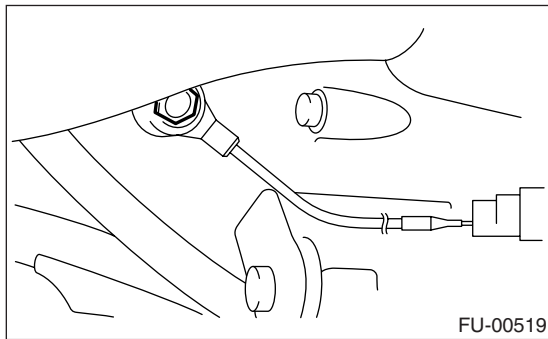


2) Remove the air cleaner case. <Ref. to IN(H4SO)-6, REMOVAL, Air Cleaner Case.>

3) Disconnect the knock sensor connector.



4) Remove the knock sensor from the cylinder block.



B: INSTALLATION

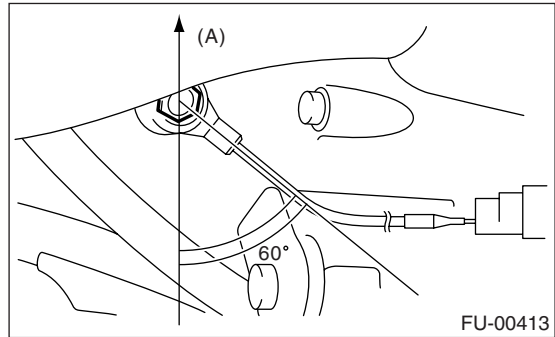
1) Install the knock sensor to the cylinder block.

Tightening torque:

24 N·m (2.4 kgf-m, 17.4 ft-lb)

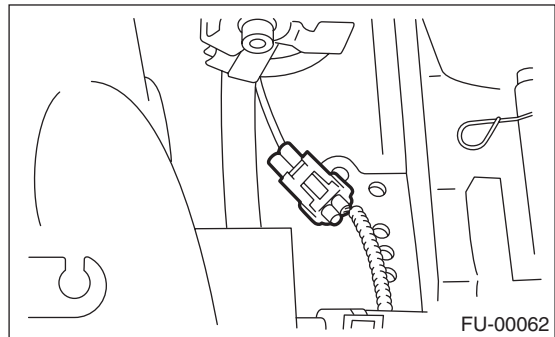
NOTE:

The extraction area of the knock sensor cord must be positioned at a 60° angle relative to the engine rear.



(A) Front side

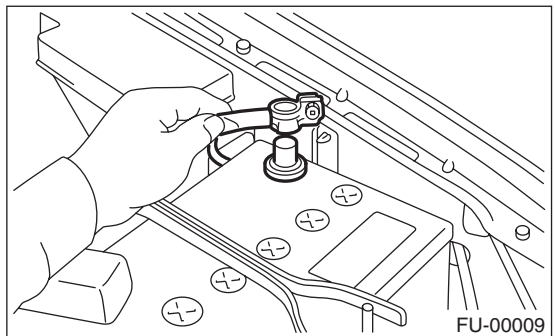
2) Connect the knock sensor connector.



3) Install the air cleaner case.

<Ref. to IN(H4SO)-6, INSTALLATION, Air Cleaner Case.>

4) Connect the battery ground cable to battery.



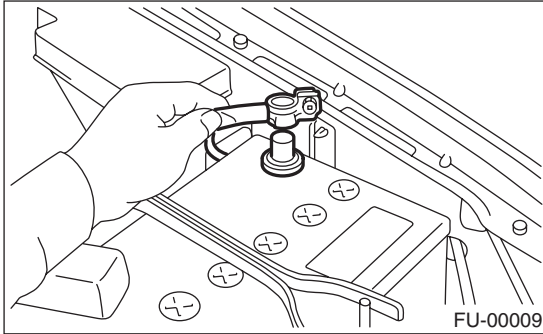
Throttle Position Sensor

FUEL INJECTION (FUEL SYSTEM)

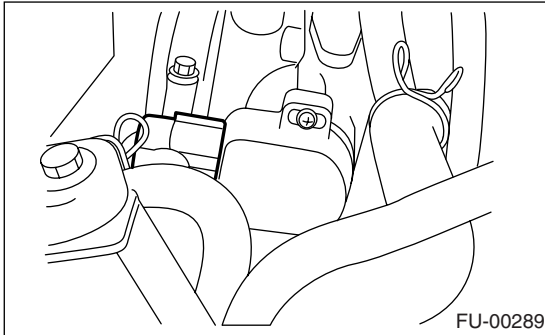
8. Throttle Position Sensor

A: REMOVAL

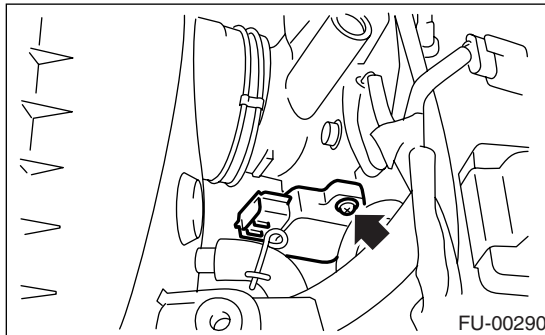
1) Disconnect the ground cable from battery.



2) Disconnect the connector from the throttle position sensor.



3) Remove the throttle position sensor holding screws, and remove it.



B: INSTALLATION

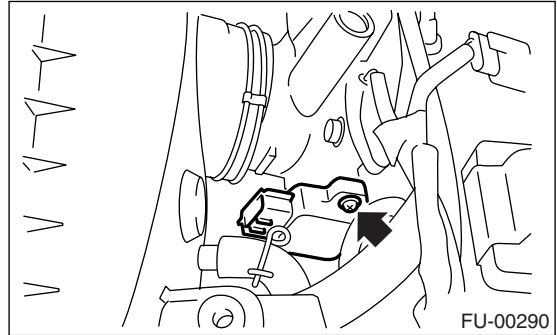
Install in the reverse order of removal.

Tightening torque:

1.6 N·m (0.16 kgf-m, 1.2 ft-lb)

CAUTION:

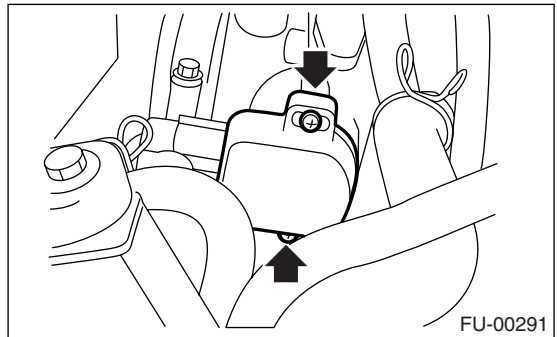
When installing throttle position sensor, adjust to the specified data.



C: ADJUSTMENT

1) Turn the ignition switch to OFF.

2) Loosen the throttle position sensor holding screws.



3) When using voltage meter;

(1) Take out the ECM.

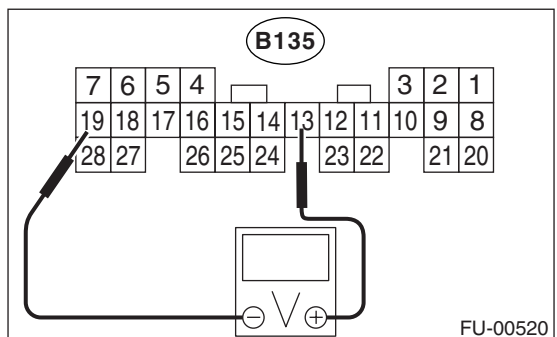
(2) Turn the ignition switch to ON.

(3) Adjust the throttle position sensor to the proper position to allow the voltage signal to the ECM to be in specification.

Connector & terminal / Specified voltage

(B135) No. 13 (+) — (B135) No. 19 (–) / 0.45 — 0.55 V

[Fully closed.]



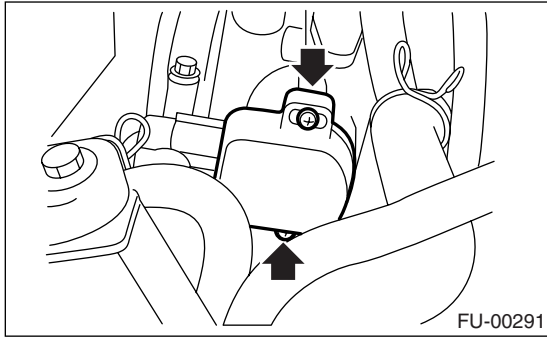
Throttle Position Sensor

FUEL INJECTION (FUEL SYSTEM)

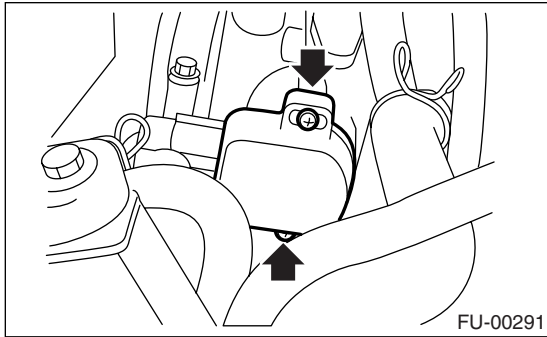
(4) Tighten the throttle position sensor holding screws.

Tightening torque:

1.6 N·m (0.16 kgf-m, 1.2 ft-lb)



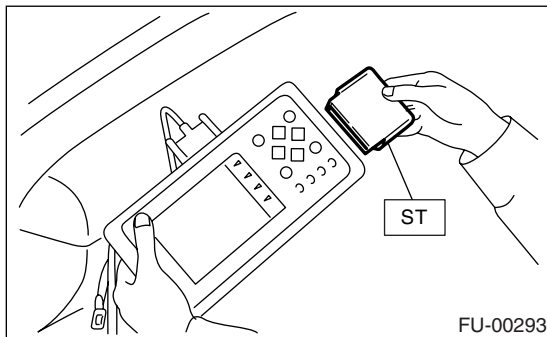
4) When using Subaru Select Monitor;
(1) Turn the ignition switch to OFF.
(2) Loosen the throttle position sensor holding screws.



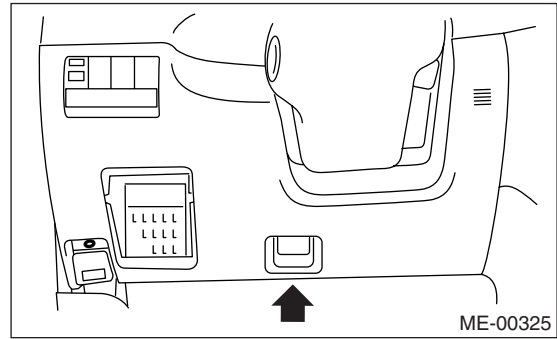
NOTE:

For detailed operation procedures, refer to the SUBARU SELECT MONITOR OPERATION MANUAL.

(3) Insert the cartridge to the Subaru Select Monitor.



(4) Connect the Subaru Select Monitor to the data link connector.



5) Turn the ignition switch to ON, and the Subaru Select Monitor switch to ON.

6) Select the {2. Each System Check} in Main Menu.

7) Select the {Engine Control System} in Selection Menu.

8) Select the {1. Current Data Display & Save} in Engine Control System Diagnosis.

9) Select the {1.12 Data Display} in Data Display Menu.

10) Adjust the throttle position sensor to the proper position to match with the following specifications.

Condition: Throttle fully closed

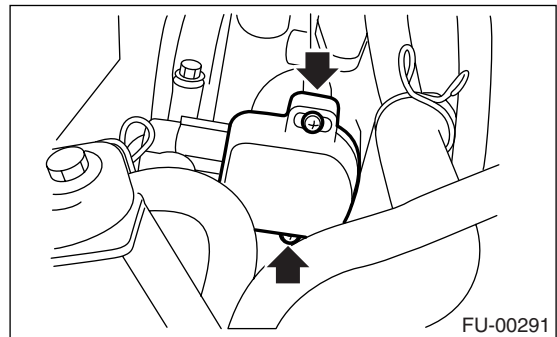
Throttle opening angle 0.00%

Throttle sensor voltage 0.50 V

11) Tighten the throttle position sensor holding screws.

Tightening torque:

1.6 N·m (0.16 kgf-m, 1.2 ft-lb)



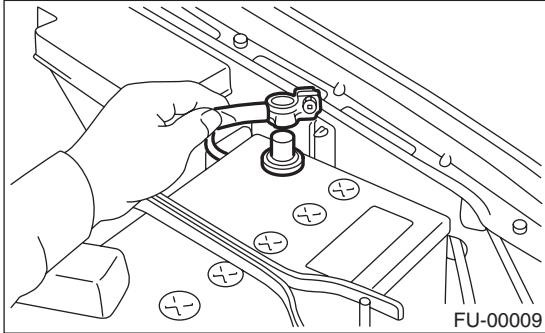
Manifold Absolute Pressure Sensor

FUEL INJECTION (FUEL SYSTEM)

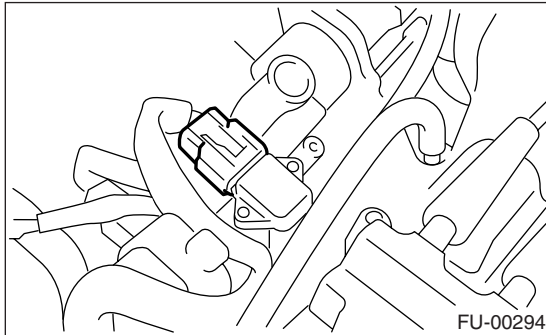
9. Manifold Absolute Pressure Sensor

A: REMOVAL

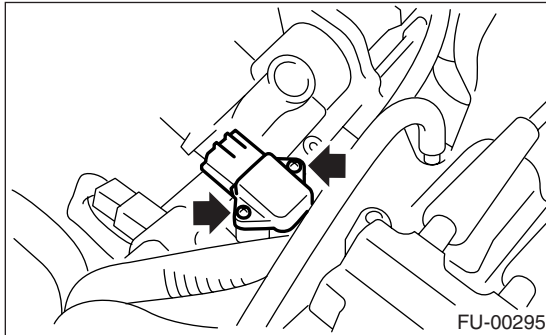
1) Disconnect the ground cable from battery.



2) Disconnect the connector from the manifold absolute pressure sensor.



3) Remove the manifold absolute pressure sensor.

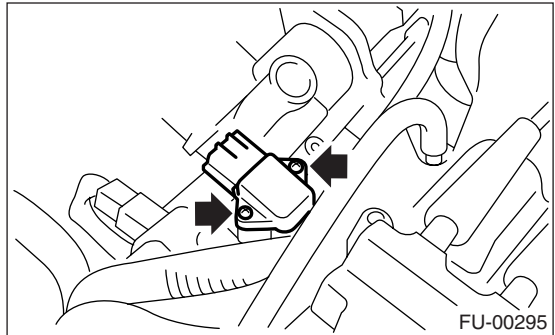


B: INSTALLATION

Install in the reverse order of removal.

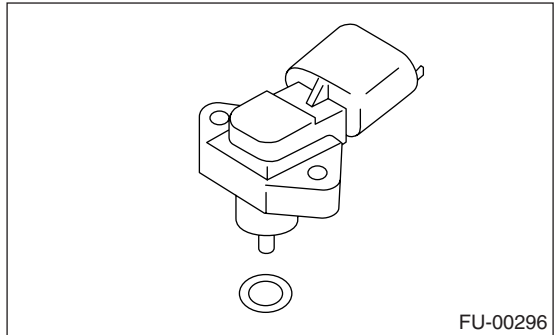
Tightening torque:

1.6 N·m (0.16 kgf-m, 1.2 ft-lb)



NOTE:

Replace the O-ring with a new one.



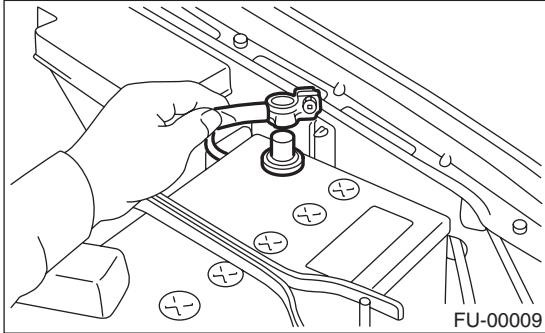
Intake Air Temperature Sensor

FUEL INJECTION (FUEL SYSTEM)

10. Intake Air Temperature Sensor

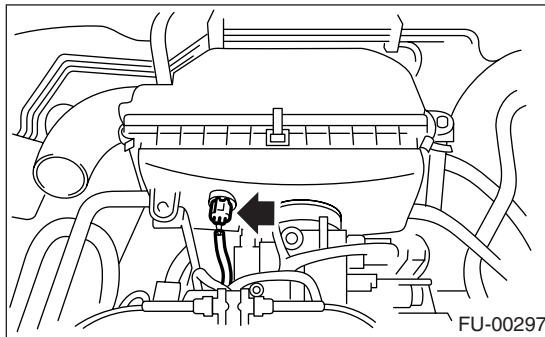
A: REMOVAL

1) Disconnect the ground cable from battery.



2) Disconnect the connector from the intake air temperature sensor.

3) Remove the intake air temperature sensor from air cleaner case.



B: INSTALLATION

Install in the reverse order of removal.

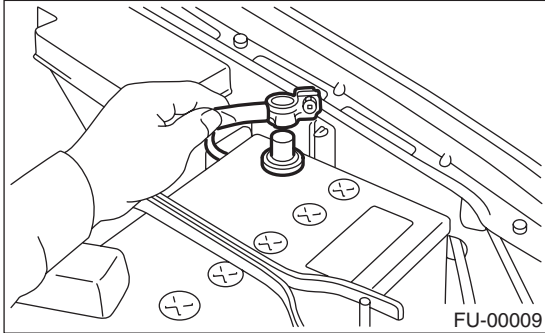
Idle Air Control Solenoid Valve

FUEL INJECTION (FUEL SYSTEM)

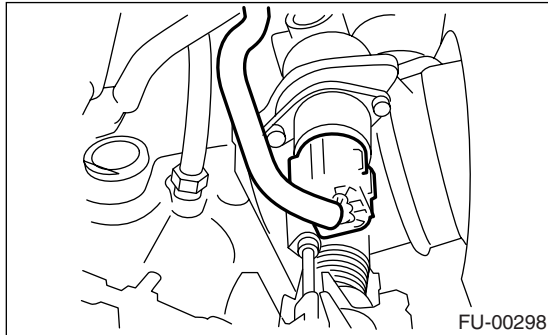
11. Idle Air Control Solenoid Valve

A: REMOVAL

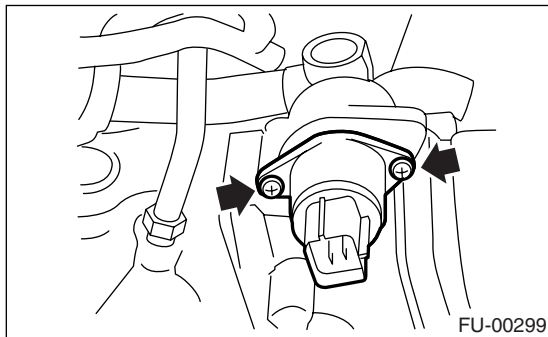
- 1) Disconnect the ground cable from battery.



- 2) Disconnect the connector from the idle air control solenoid valve.



- 3) Remove the idle air control solenoid valve from the throttle body.



B: INSTALLATION

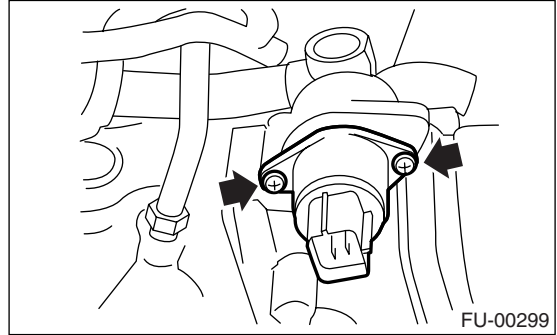
Install in the reverse order of removal.

NOTE:

Always use new gasket.

Tightening torque:

1.6 N·m (0.16 kgf-m, 1.2 ft-lb)



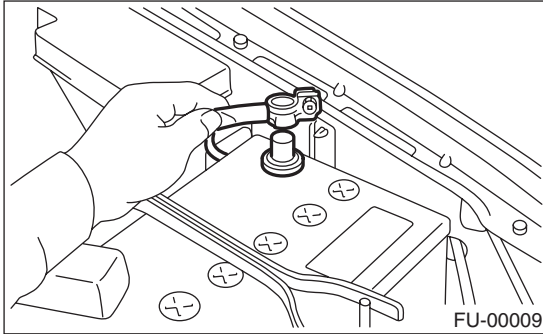
EGR Valve

FUEL INJECTION (FUEL SYSTEM)

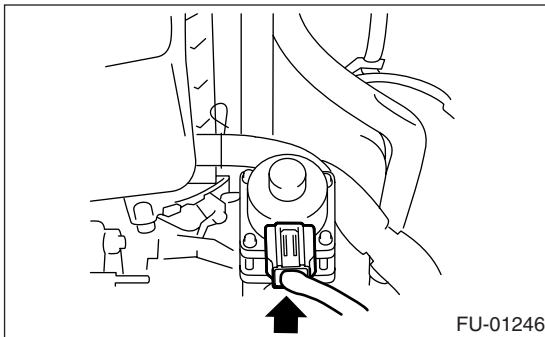
12.EGR Valve

A: REMOVAL

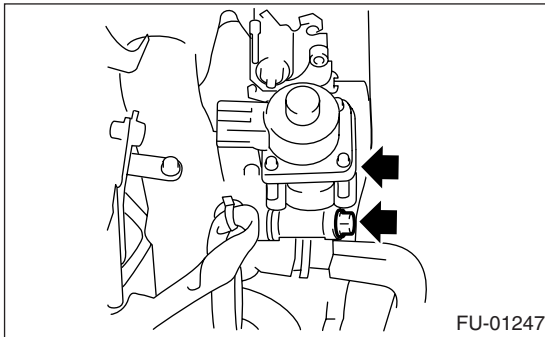
1) Disconnect the ground cable from battery.



2) Disconnect the connector from EGR valve.



3) Remove the EGR valve from intake manifold.



B: INSTALLATION

Install in the reverse order of removal.

NOTE:

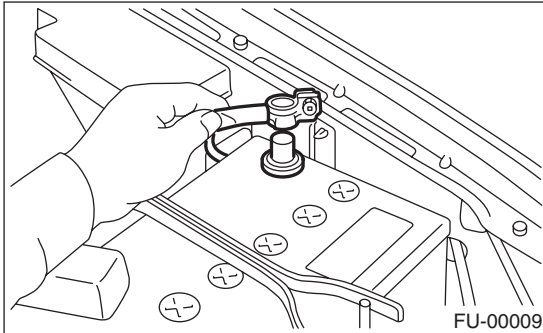
For tightening torque, refer to "COMPONENT". <Ref. to FU(H4SO)-3, COMPONENT, General Description.>

13. Fuel Injector

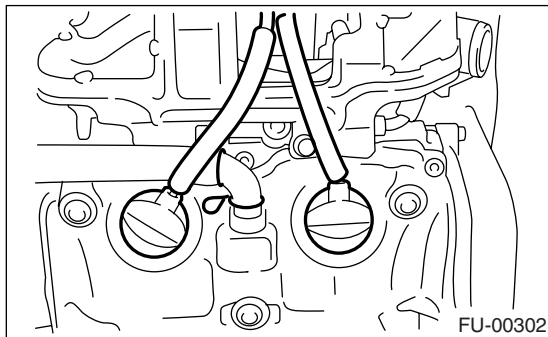
A: REMOVAL

1. RH SIDE

- 1) Release the fuel pressure.
<Ref. to FU(H4SO)-47, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel flap lid, and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.

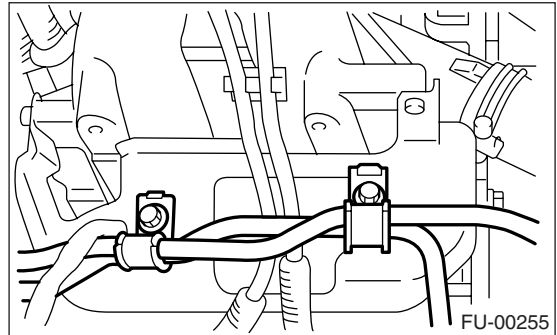


- 4) Remove the resonator chamber. <Ref. to IN(H4SO)-8, REMOVAL, Resonator Chamber.>
- 5) Remove the spark plug cords from the spark plugs (#1 and #3 cylinders).

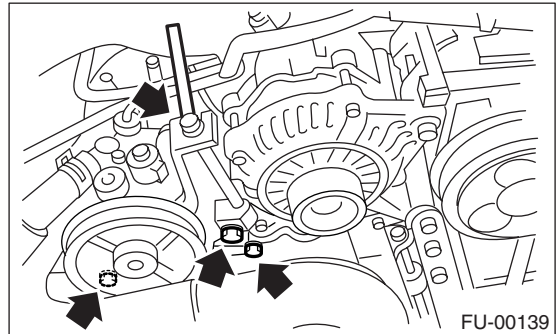


- 6) Remove the power steering pump and reservoir tank from the brackets.

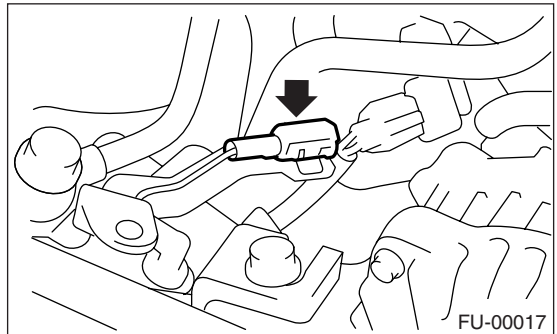
- (1) Remove the front side V-belt. <Ref. to ME(H4SO)-43, REMOVAL, V-belt.>
- (2) Remove the bolts which hold the power steering pipes onto the intake manifold protector.



- (3) Remove the bolts which install the power steering pump to the bracket.



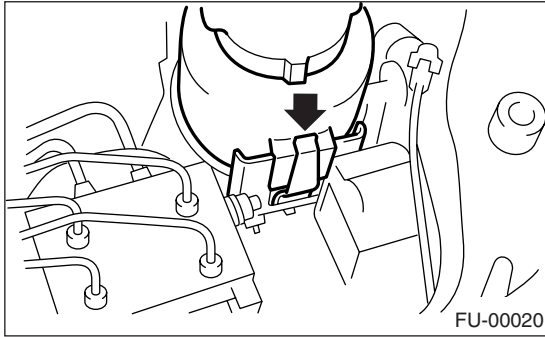
- (4) Disconnect the connector from the power steering pump switch.



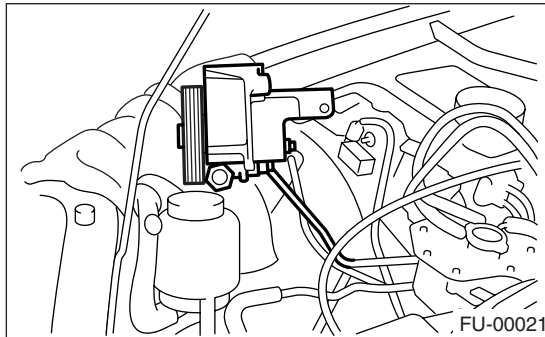
Fuel Injector

FUEL INJECTION (FUEL SYSTEM)

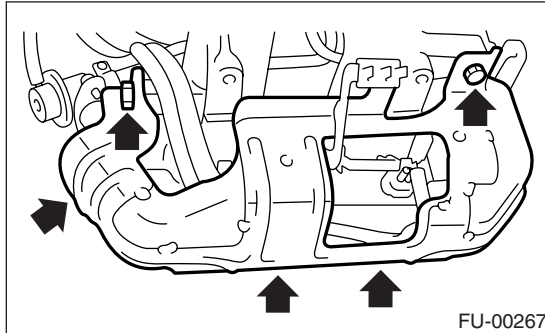
(5) Remove the power steering tank from the bracket by pulling it upwards.



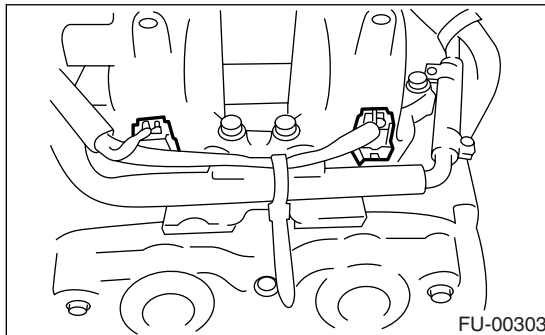
(6) Place the power steering pump and reservoir tank on the right side wheel apron.



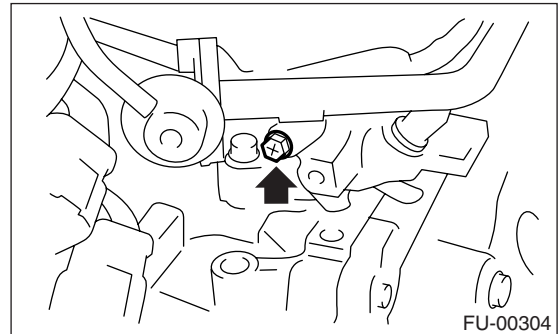
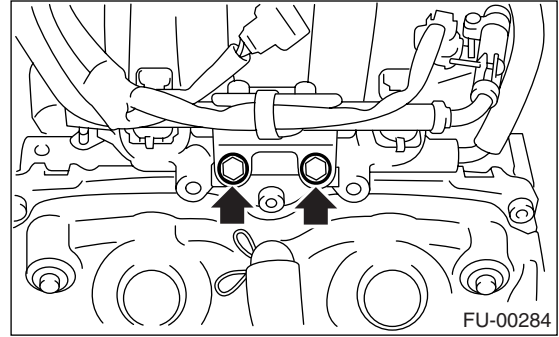
7) Remove the fuel pipe protector RH.



8) Disconnect the connector from fuel injector.

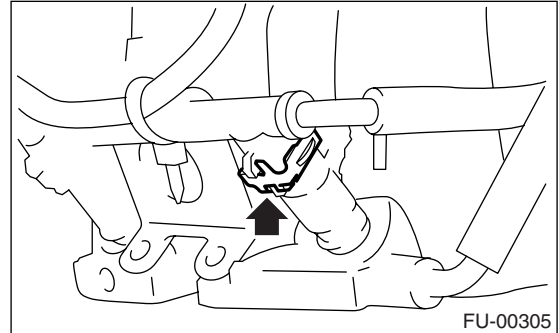


9) Remove the bolts which holds the fuel injector pipe to the intake manifold.

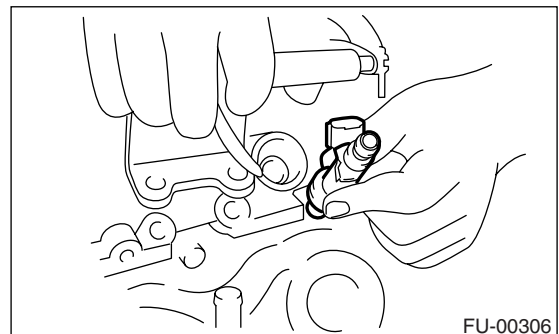


10) Remove the fuel injector from the intake manifold.

(1) Remove the fuel injector securing clip.



(2) Remove the fuel injector while lifting up the fuel injector pipe.

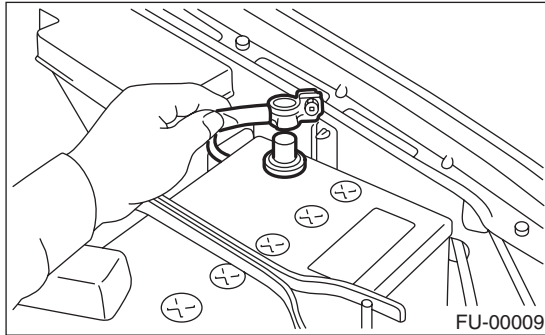


Fuel Injector

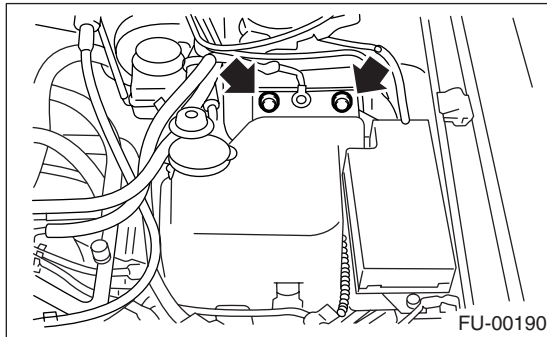
FUEL INJECTION (FUEL SYSTEM)

2. LH SIDE

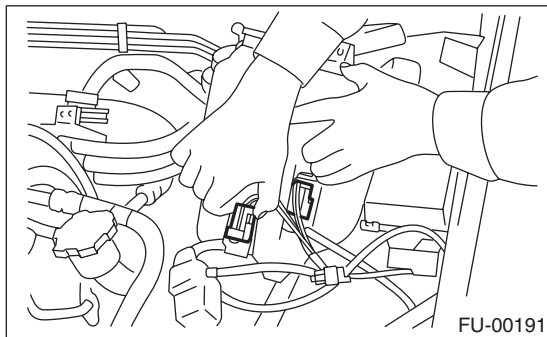
- 1) Release the fuel pressure. <Ref. to FU(H4SO)-47, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel flap lid, and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.



- 4) Remove the two bolts which install the washer tank on the body.

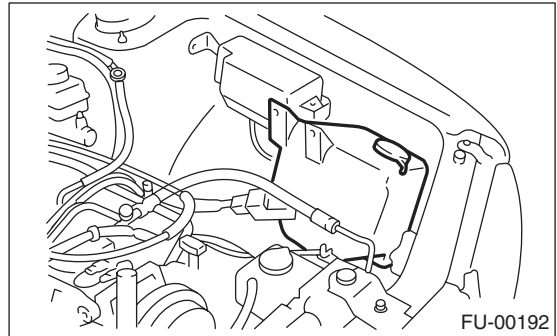


- 5) Disconnect the connector from the front window washer motor.
- 6) Disconnect the connector from the rear gate glass washer motor.

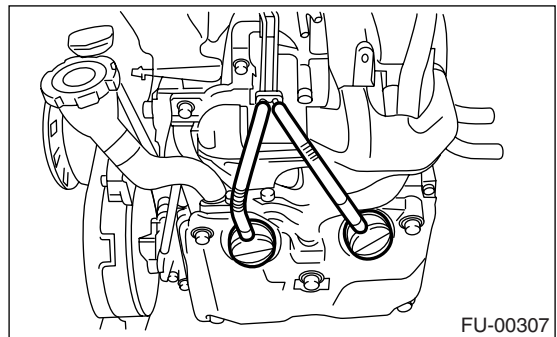


- 7) Disconnect the rear window glass washer hose from the washer motor, then plug the connection with a suitable cap.

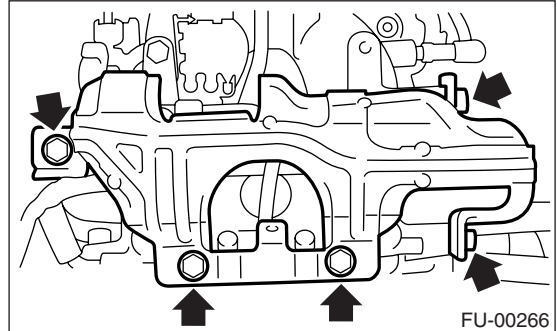
- 8) Move the washer tank, and secure it away from the working area.



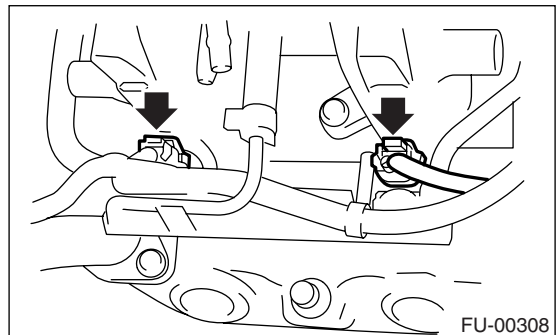
- 9) Remove the spark plug cords from the spark plugs (#2 and #4 cylinders).



- 10) Remove the fuel pipe protector LH.



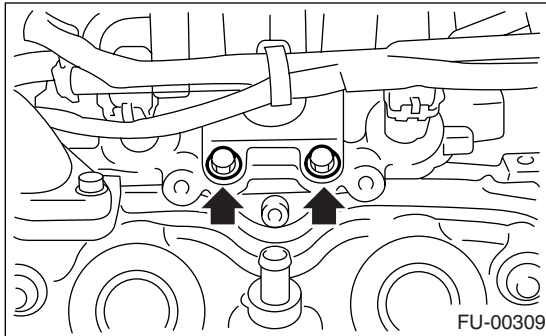
- 11) Disconnect the connector from the fuel injector.



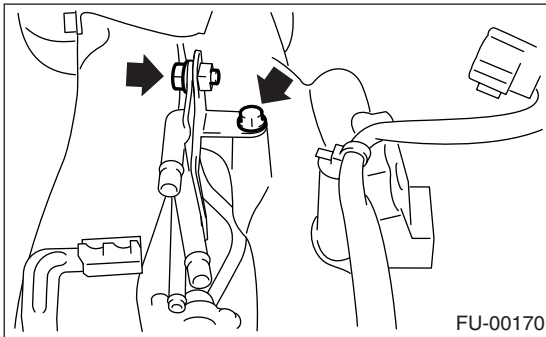
Fuel Injector

FUEL INJECTION (FUEL SYSTEM)

12) Remove the bolt which holds the injector pipe to the intake manifold.

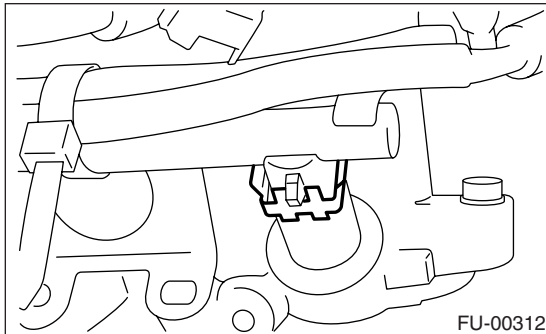


13) Remove the bolt which holds the fuel pipe on the left side intake manifold.

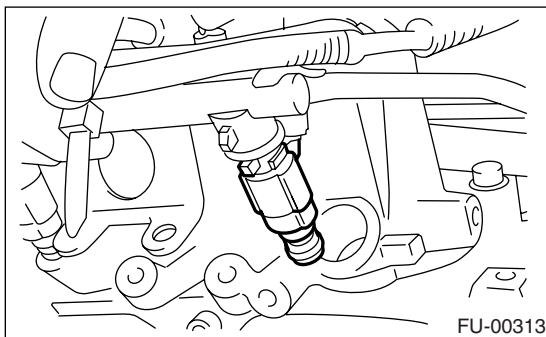


14) Remove the fuel injector from the intake manifold.

(1) Remove the fuel injector securing clip.



(2) Remove the fuel injector while lifting up the fuel injector pipe.



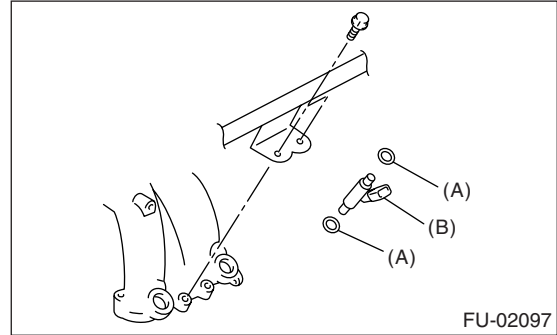
B: INSTALLATION

1. RH SIDE

Install in the reverse order of removal.

NOTE:

Replace O-rings with new ones.

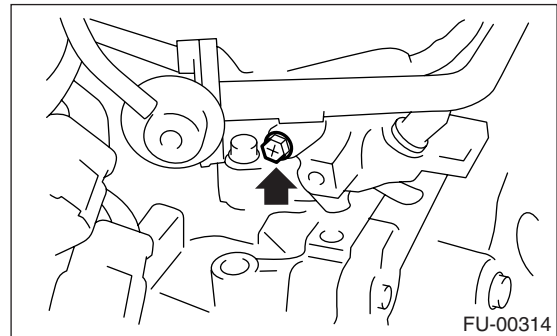


(A) O-ring

(B) Fuel injector

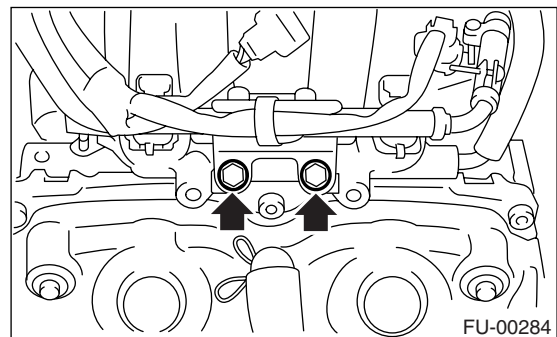
Tightening torque:

5 N·m (0.5 kgf-m, 3.7 ft-lb)



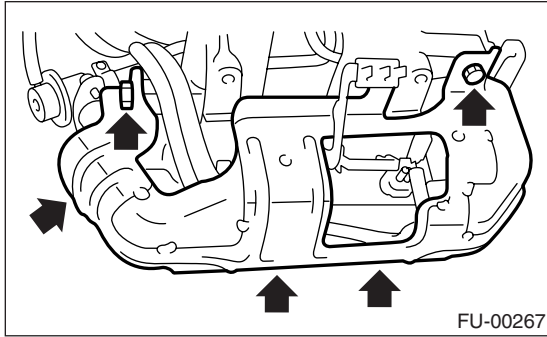
Tightening torque:

19 N·m (1.9 kgf-m, 13.7 ft-lb)

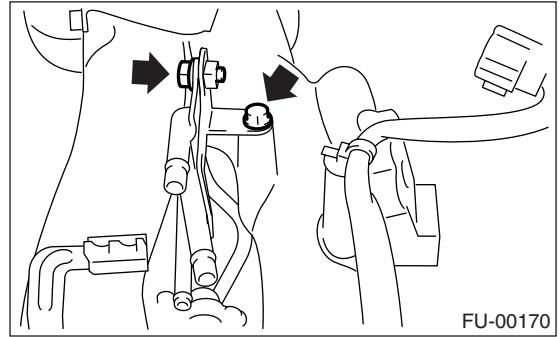


Fuel Injector

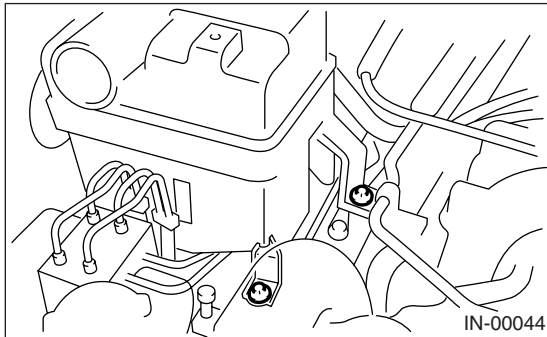
Tightening torque:
19 N·m (1.9 kgf-m, 13.7 ft-lb)



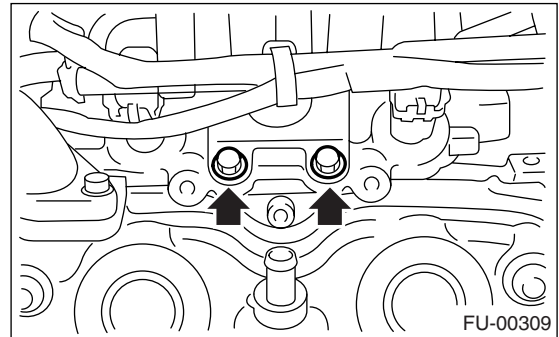
Tightening torque:
5 N·m (0.5 kgf-m, 3.7 ft-lb)



Tightening torque:
33 N·m (3.4 kgf-m, 24.3 ft-lb)



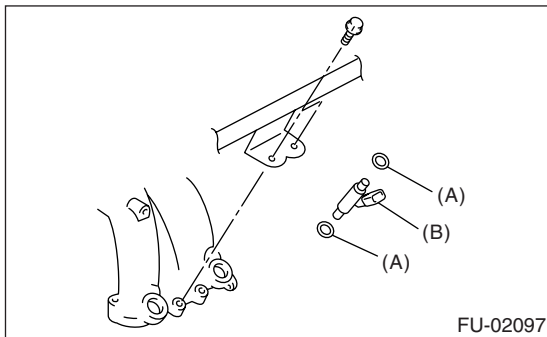
Tightening torque:
19 N·m (1.9 kgf-m, 13.7 ft-lb)



2. LH SIDE

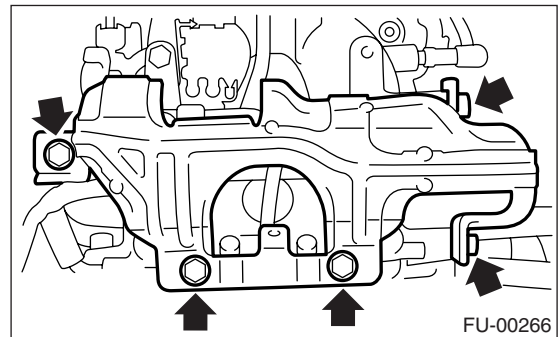
Install in the reverse order of removal.

CAUTION:
Replace O-rings with new ones.



- (A) O-ring
- (B) Fuel injector

Tightening torque:
19 N·m (1.9 kgf-m, 13.7 ft-lb)



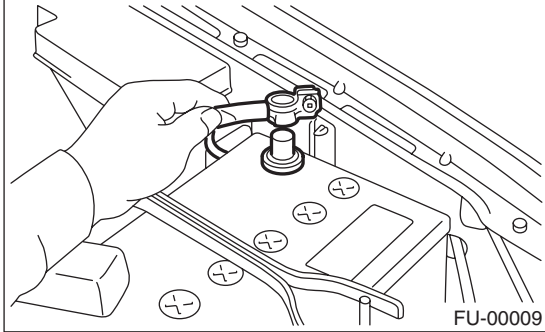
Front Oxygen (A/F) Sensor

FUEL INJECTION (FUEL SYSTEM)

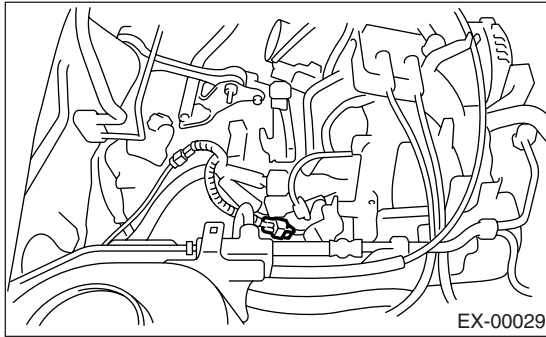
14. Front Oxygen (A/F) Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Disconnect the connector from engine hanger, and then disconnect the connector from front oxygen (A/F) sensor.



3) Lift-up the vehicle.

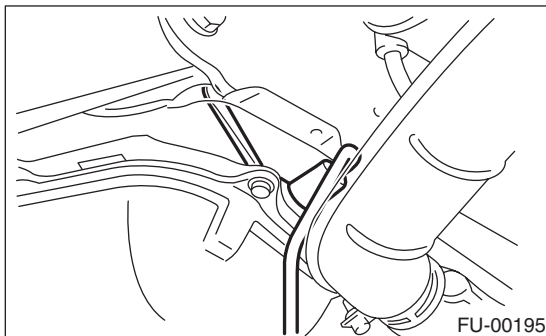
4) Apply SUBARU CRC or its equivalent to the threaded portion of front oxygen (A/F) sensor, and leave it for one minute or more.

SUBARU CRC (Part No. 004301003)

5) Remove the front oxygen (A/F) sensor.

CAUTION:

When removing the oxygen (A/F) sensor, wait until exhaust pipe cools, otherwise it will damage exhaust pipe.



B: INSTALLATION

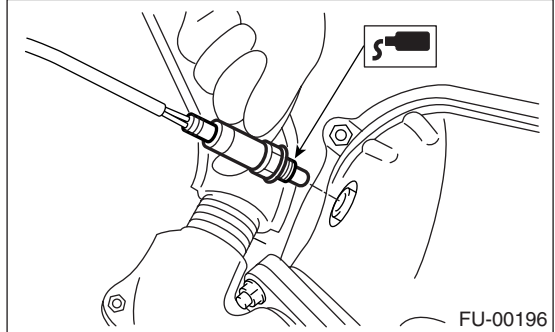
1) Before installing front oxygen (A/F) sensor, apply the anti-seize compound only to the threaded portion of front oxygen (A/F) sensor to make the next removal easier.

Anti-seize compound:

SS-30 JET LUBE

CAUTION:

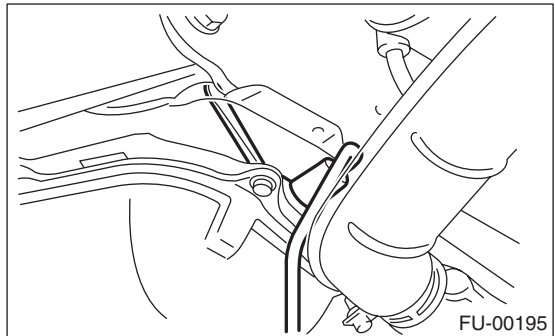
Never apply anti-seize compound to protector of front oxygen (A/F) sensor.



2) Install the front oxygen (A/F) sensor.

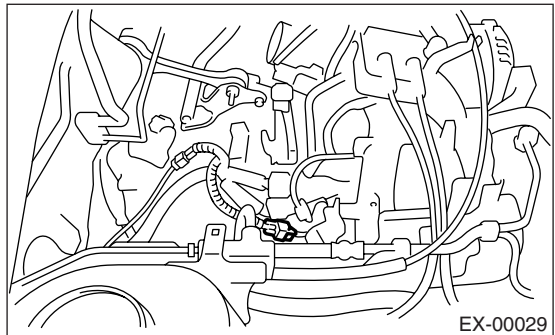
Tightening torque:

21 N·m (2.1 kgf·m, 15.2 ft·lb)



3) Lower the vehicle.

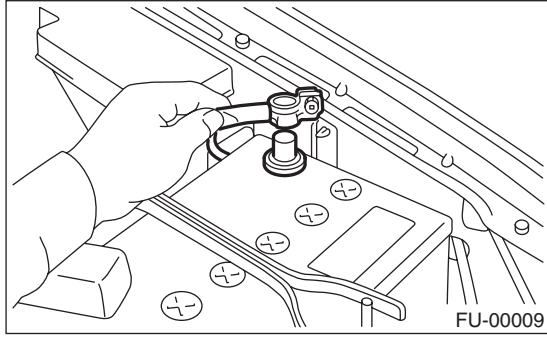
4) Connect the connector to front oxygen (A/F) sensor, and then connect the connector to engine hanger.



Front Oxygen (A/F) Sensor

FUEL INJECTION (FUEL SYSTEM)

5) Connect the battery ground cable to battery.



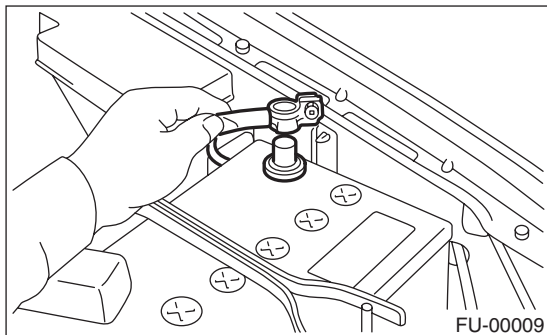
Rear Oxygen Sensor

FUEL INJECTION (FUEL SYSTEM)

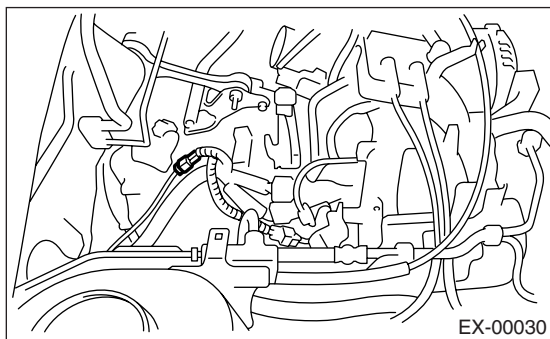
15. Rear Oxygen Sensor

A: REMOVAL

- 1) Disconnect the ground cable from battery.



- 2) Lift-up the vehicle.
- 3) Disconnect the connector from the rear oxygen sensor.



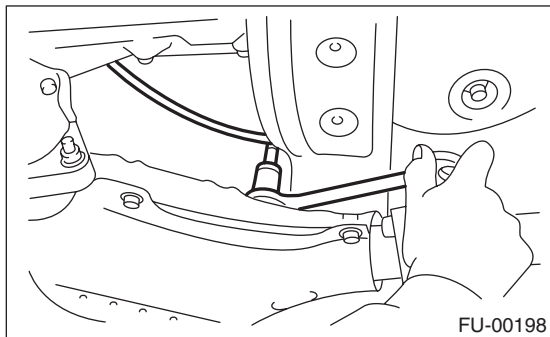
- 4) Apply SUBARU CRC or its equivalent to the threaded portion of rear oxygen sensor, and leave it for one minute or more.

SUBARU CRC (Part No. 004301003)

- 5) Remove the rear oxygen sensor.

CAUTION:

When removing the oxygen sensor, wait until exhaust pipe cools, otherwise it will damage exhaust pipe.



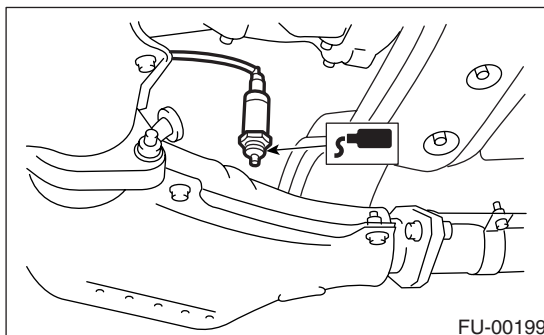
B: INSTALLATION

- 1) Before installing rear oxygen sensor, apply the anti-seize compound only to the threaded portion of rear oxygen sensor to make the next removal easier.

**Anti-seize compound:
SS-30 JET LUBE**

CAUTION:

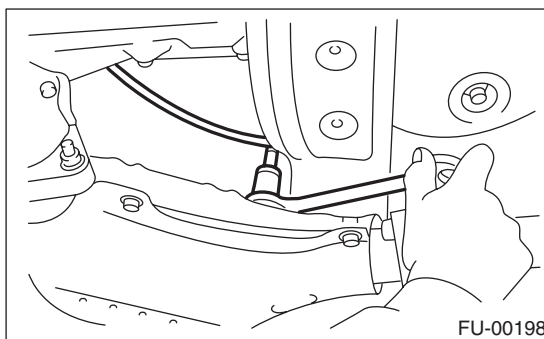
Never apply anti-seize compound to protector of rear oxygen sensor.



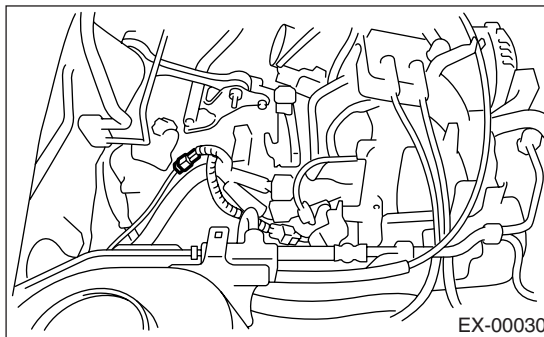
- 2) Install the rear oxygen sensor.

Tightening torque:

21 N·m (2.1 kgf·m, 15.2 ft·lb)

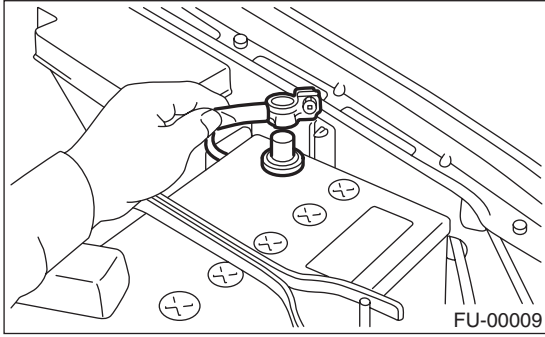


- 3) Connect the connector to the rear oxygen sensor.



- 4) Lower the vehicle.

5) Connect the battery ground cable to battery.



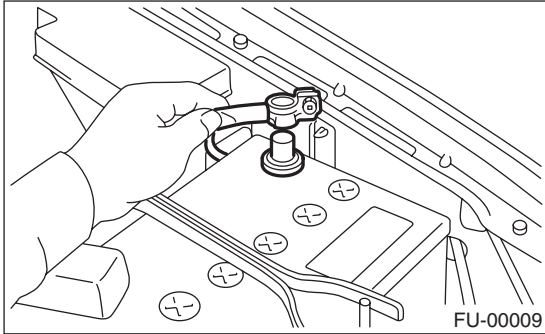
Engine Control Module (ECM)

FUEL INJECTION (FUEL SYSTEM)

16.Engine Control Module (ECM)

A: REMOVAL

1) Disconnect the ground cable from battery.

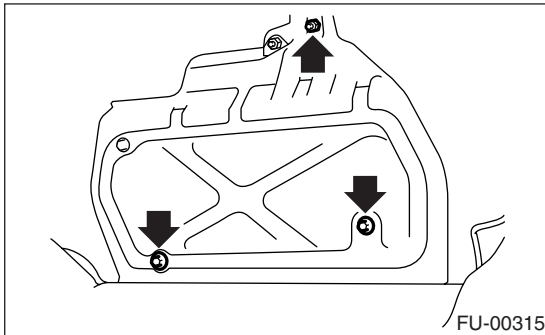


2) Remove the lower inner trim of passenger side.

<Ref. to EI-44, REMOVAL, Lower Inner Trim.>

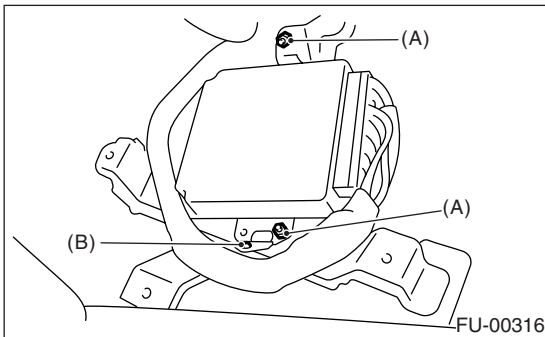
3) Detach the floor mat of front passenger seat.

4) Remove the protect cover.



5) Remove the nuts (A) which hold ECM to the bracket.

6) Remove the clip (B) from the bracket.



7) Disconnect the ECM connectors and take out the ECM.

B: INSTALLATION

Install in the reverse order of removal.

CAUTION:

When replacing ECM, be careful not to use the wrong spec. ECM to avoid any damage to the fuel injection system.

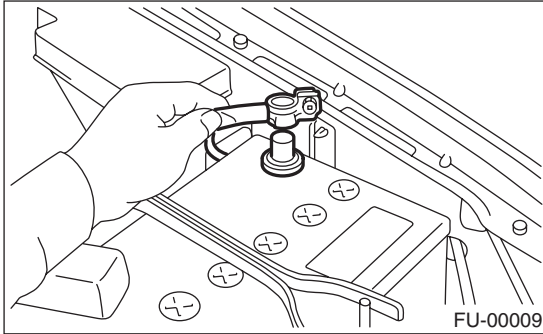
Tightening torque:

5 N·m (0.51 kgf-m, 3.7 ft-lb)

17.Main Relay

A: REMOVAL

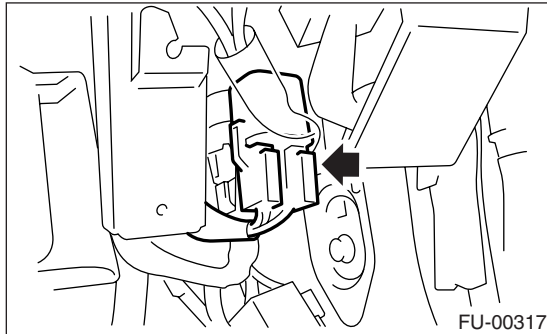
1) Disconnect the ground cable from battery.



2) Remove the passenger's side front side sill cover.

3) Remove the bolt which holds main bracket on the body.

4) Disconnect the connectors from the main relay.



B: INSTALLATION

Install in the reverse order of removal.

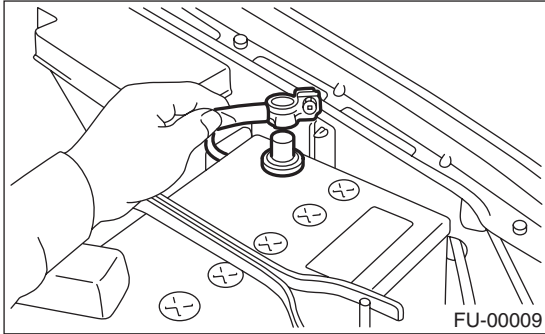
Fuel Pump Relay

FUEL INJECTION (FUEL SYSTEM)

18. Fuel Pump Relay

A: REMOVAL

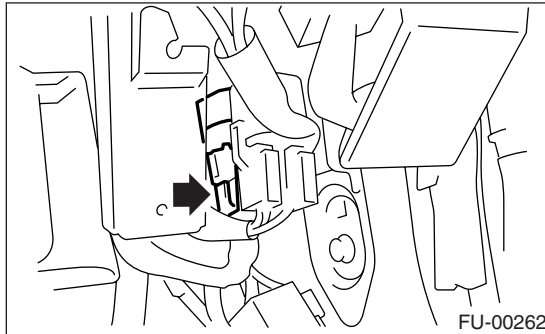
1) Disconnect the ground cable from battery.



2) Remove the passenger's side front side sill cover.

3) Remove the bolt which holds fuel pump relay bracket on the body.

4) Disconnect the connector from the fuel pump.



5) Remove the fuel pump relay from the mounting bracket.

B: INSTALLATION

Install in the reverse order of removal.

19. Fuel

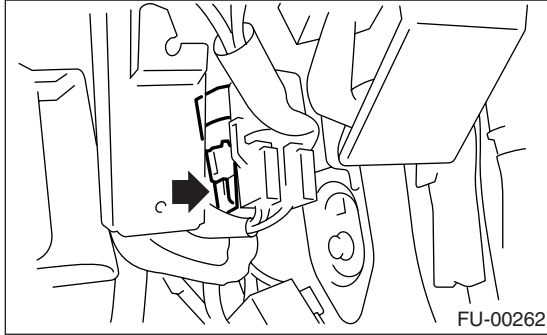
A: OPERATION

1. RELEASING OF FUEL PRESSURE

WARNING:

- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel.

1) Disconnect the connector from fuel pump relay.



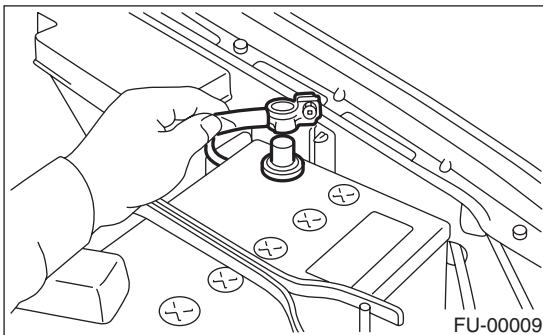
- 2) Start the engine and run it until it stalls.
- 3) After the engine stalls, crank it for 5 more seconds.
- 4) Turn the ignition switch to OFF.

2. DRAINING FUEL

WARNING:

- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel.

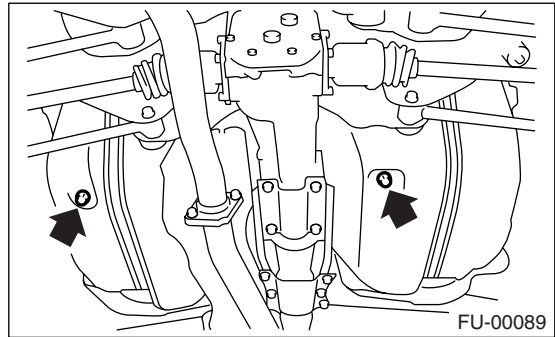
- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.



- 3) Open the fuel filler flap lid and remove fuel filler cap.
- 4) Lift-up the vehicle.

5) Drain fuel from the fuel tank.

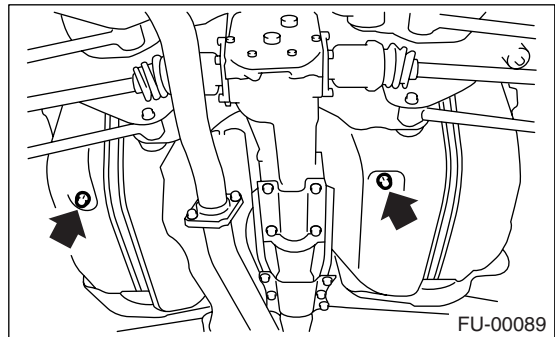
Set a container under the vehicle and remove the drain plug from fuel tank.



6) Tighten the fuel drain plug.

Tightening torque:

26 N·m (2.7 kgf-m, 19.2 ft-lb)



Fuel Tank

FUEL INJECTION (FUEL SYSTEM)

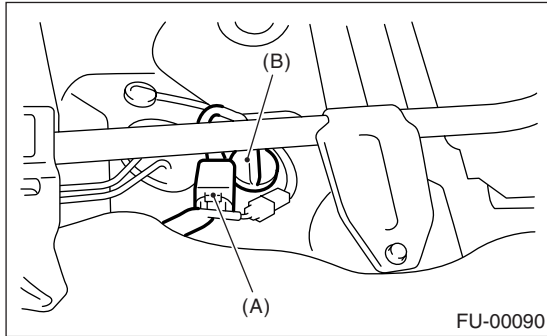
20. Fuel Tank

A: REMOVAL

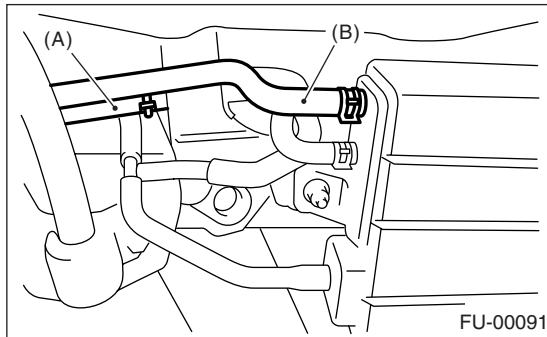
WARNING:

- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel.

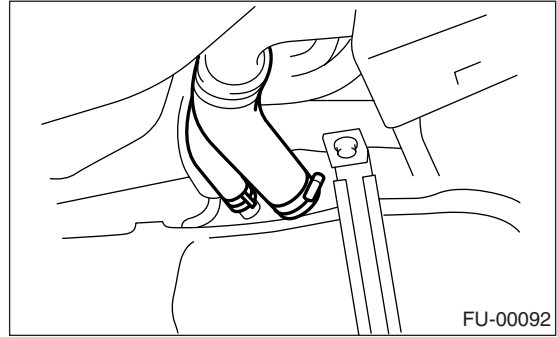
- 1) Set the vehicle on a lift.
- 2) Release the fuel pressure. <Ref. to FU(H4SO)-47, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 3) Drain fuel from the fuel tank. <Ref. to FU(H4SO)-47, DRAINING FUEL, OPERATION, Fuel.>
- 4) Remove the rear seat.
- 5) Disconnect the connector (A) of fuel tank cord to rear harness.
- 6) Push the grommet (B) which holds fuel tank cord on floor panel into under the body.



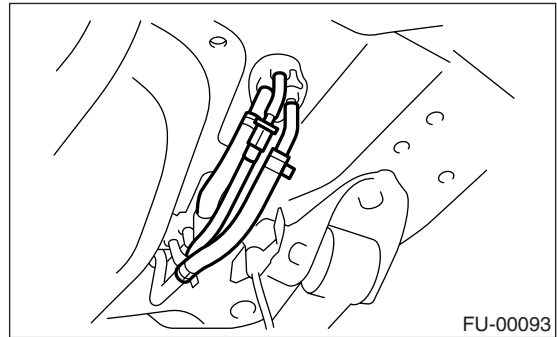
- 7) Remove the rear crossmember. <Ref. to RS-18, REMOVAL, Rear Crossmember.>
- 8) Disconnect the two-way valve hose (A) from two-way valve and disconnect the canister hose (B) from canister.



- 9) Loosen the clamp and disconnect the fuel filler hose and air vent hose from fuel filler pipe.



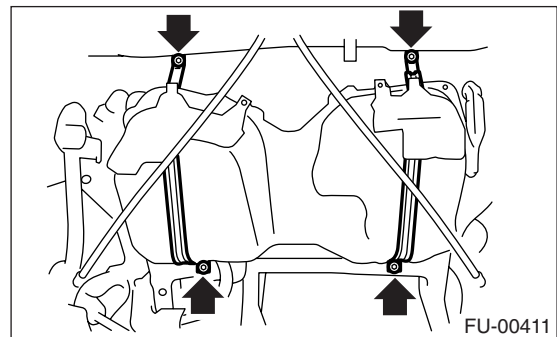
- 10) Move the clips, and disconnect quick connector. <Ref. to FU(H4SO)-63, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>
- 11) Disconnect the fuel hoses.



- 12) Support the fuel tank with transmission jack, and remove the bolts from bands and dismount fuel tank from the vehicle.

WARNING:

A helper is required to perform this work.



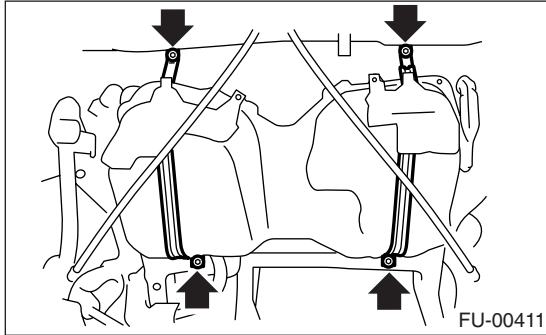
B: INSTALLATION

1) Support the fuel tank with transmission jack and push the fuel tank harness into access hole with grommet.

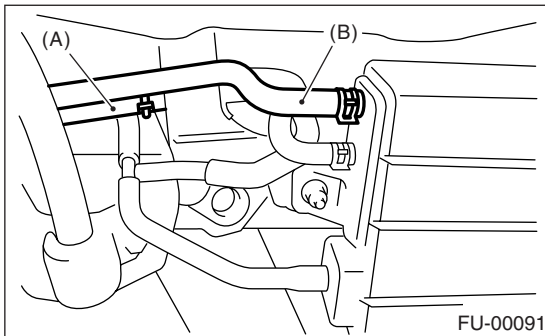
2) Set the fuel tank and temporarily tighten the bolts of fuel tank bands.

WARNING:

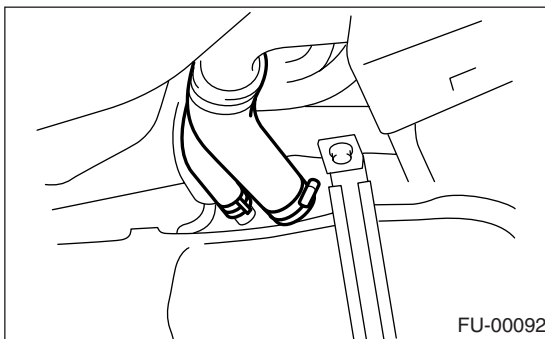
A helper is required to perform this work.



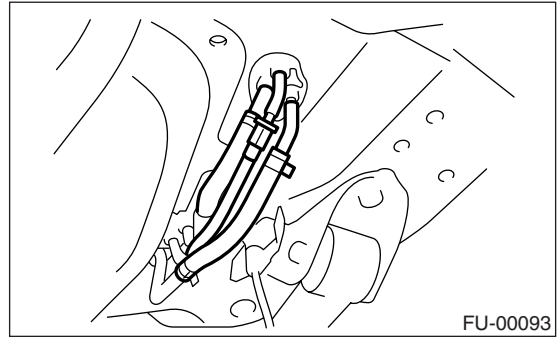
3) Connect the two-way valve hose (A) to two-way valve and connect the canister hose (B) to canister.



4) Connect the fuel filler hose and air vent hose.



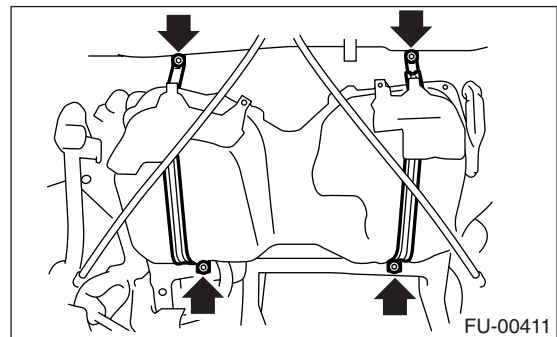
5) Connect the fuel hoses, and secure them with clips and quick connector. <Ref. to FU(H4SO)-64, INSTALLATION, Fuel Delivery, Return and Evaporation Lines.>



6) Tighten the band mounting bolts.

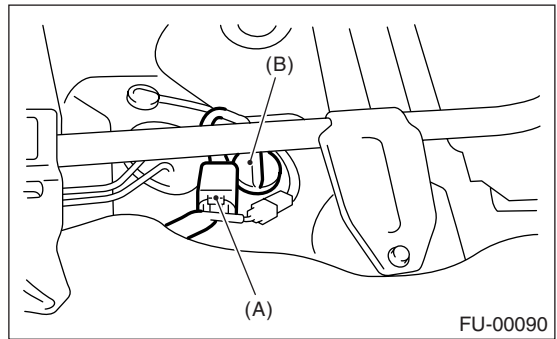
Tightening torque:

33 N·m (3.4 kgf-m, 24.3 ft-lb)



7) Install the rear crossmember. <Ref. to RS-18, INSTALLATION, Rear Crossmember.>

8) Connect the connector (A) to fuel tank cord and plug the service hole with grommet (B).

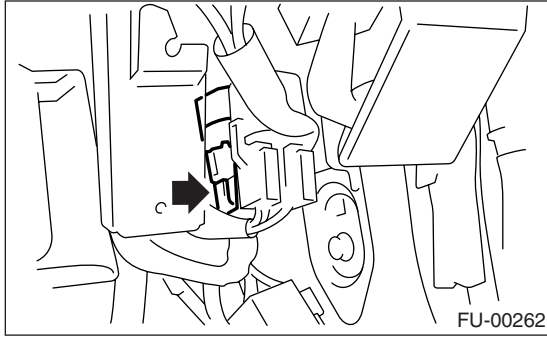


9) Set the rear seat and floor mat.

Fuel Tank

FUEL INJECTION (FUEL SYSTEM)

10) Connect the connector to fuel pump relay.



C: INSPECTION

- 1) Make sure there are no cracks, holes, or other damage on the fuel tank.
- 2) Make sure that the fuel hoses and fuel pipes are not cracked and that connections are tight.

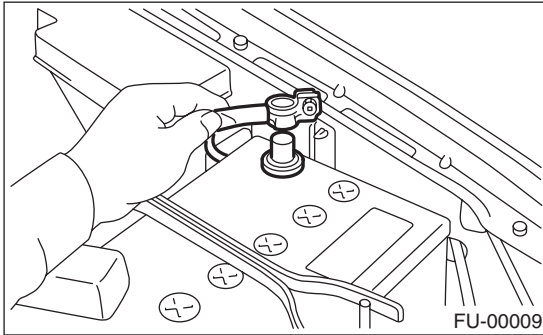
21. Fuel Filler Pipe

A: REMOVAL

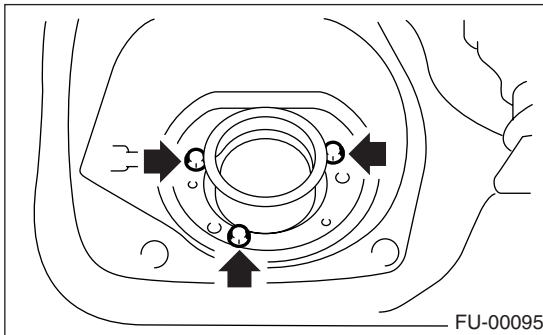
WARNING:

- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel.

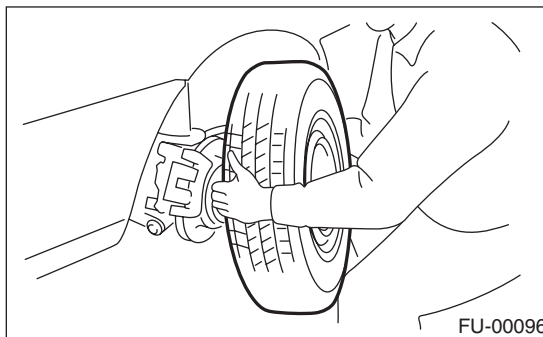
- 1) Set the vehicle on a lift.
- 2) Release the fuel pressure. <Ref. to FU(H4SO)-47, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 3) Open the fuel filler flap lid and remove fuel filler cap.
- 4) Disconnect the ground cable from battery.



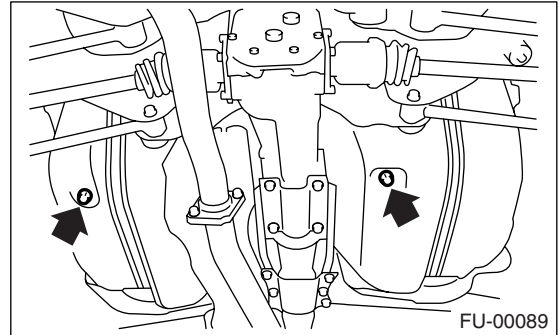
- 5) Remove the screws holding packing in place.



- 6) Loosen the rear right side wheel nuts.
- 7) Lift-up the vehicle.
- 8) Remove the rear right side wheel.



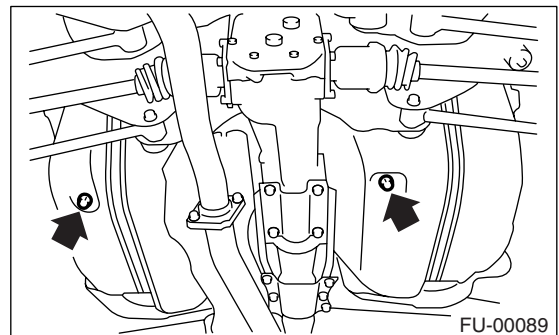
- 9) Drain fuel from the fuel tank. Set a container under the vehicle and remove the drain plug from fuel tank.



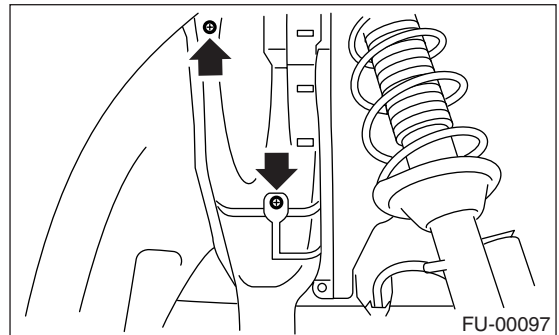
- 10) Tighten the fuel drain plug and then install the front right side tank cover.

Tightening torque:

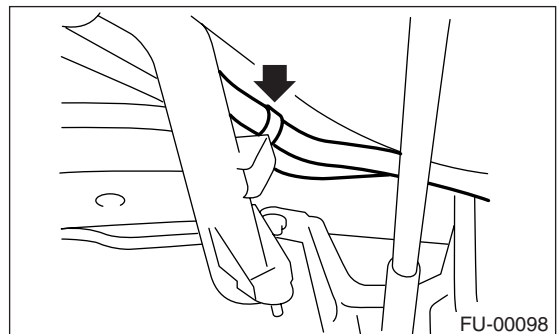
26 N·m (2.7 kgf-m, 19.2 ft-lb)



- 11) Remove the fuel filler pipe protector.



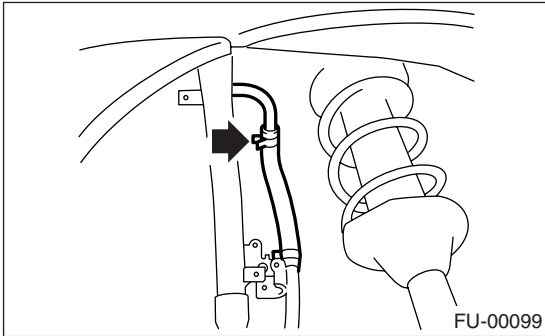
- 12) Separate the evaporation hoses from clip of fuel filler pipe.



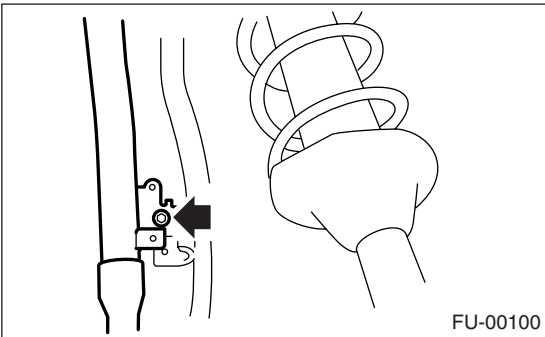
Fuel Filler Pipe

FUEL INJECTION (FUEL SYSTEM)

- 13) Disconnect the air vent hose from fuel filler pipe.

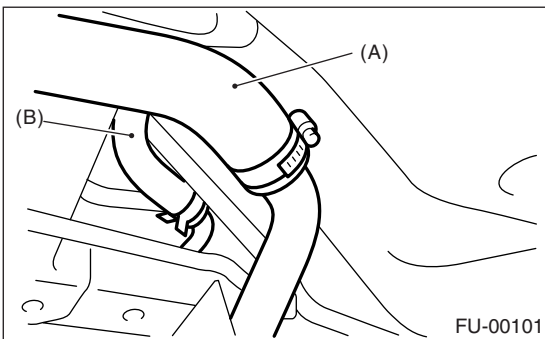


- 14) Remove the bolts which hold fuel filler pipe bracket on body.



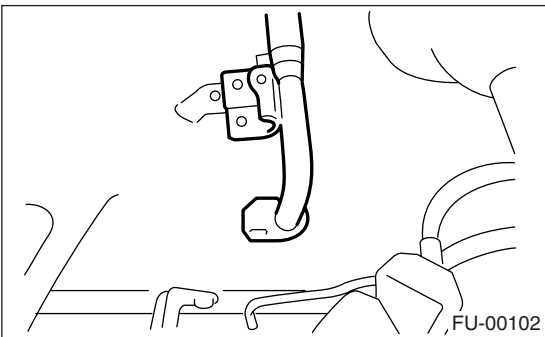
- 15) Loosen the clamp and separate fuel filler hose (A) from fuel filler pipe.

- 16) Move the clip and separate air vent hose (B).



- 17) Remove the fuel filler pipe to under side of the vehicle.

- 18) Remove the air vent pipe together with clip from body.

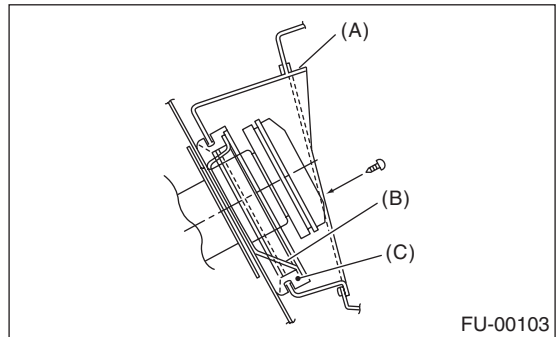


B: INSTALLATION

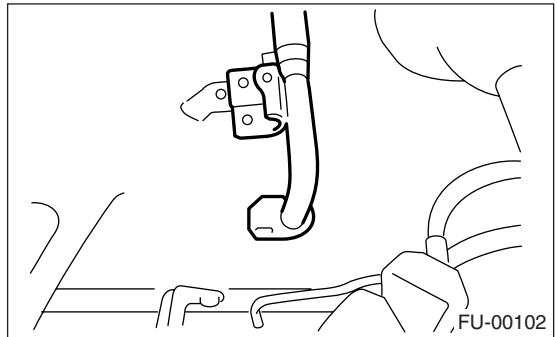
- 1) Hold the fuel filler flap open.
- 2) Set the fuel saucer (A) with rubber packing (C) and insert the fuel filler pipe into hole from the inner side of apron.
- 3) Align the holes in fuel filler pipe neck and set cup (B), and tighten the screws.

NOTE:

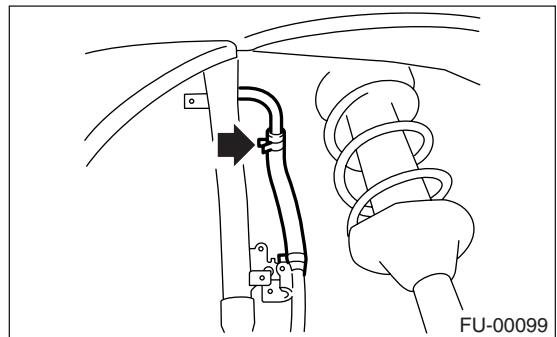
If the edges of rubber packing are folded toward inside, straighten it with a screwdriver.



- 4) Install the air vent pipe.



- 5) Connect the air vent hose to fuel filler pipe.



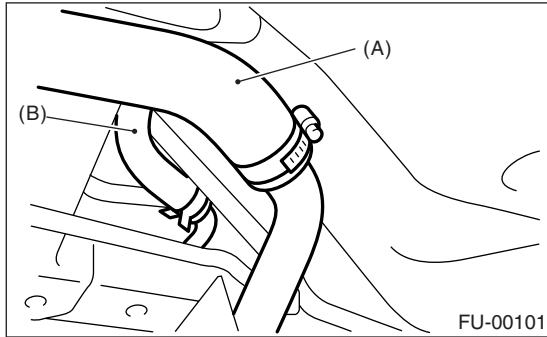
Fuel Filler Pipe

FUEL INJECTION (FUEL SYSTEM)

6) Insert the fuel filler hose (A) approx. 35 to 40 mm (1.38 to 1.57 in) over the lower end of fuel filler pipe and tighten the clamp.

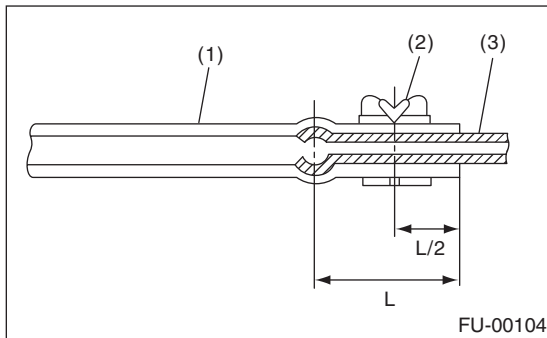
CAUTION:

Do not allow clips to touch the air vent hose (B) and rear suspension crossmember.



7) Insert the air vent hose approx. 25 to 30 mm (0.98 to 1.18 in) into the lower end of evaporation pipe and hold clip.

$L = 27.5 \pm 2.5 \text{ mm (1.083 \pm 0.098 in)}$

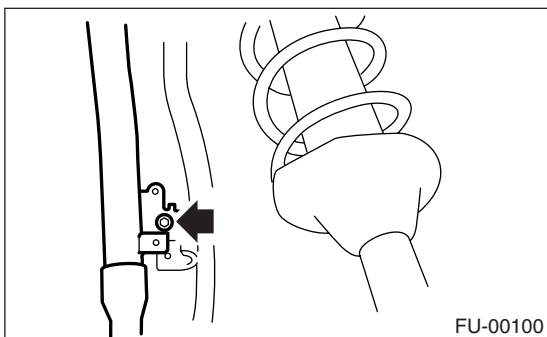


- (1) Hose
- (2) Clip
- (3) Pipe

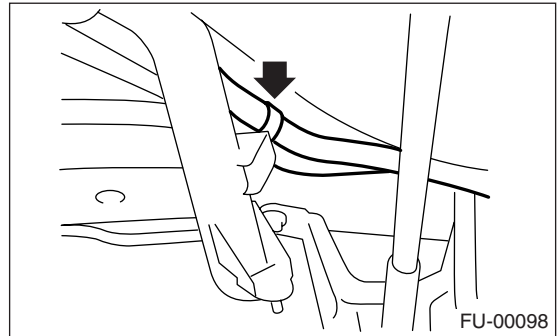
8) Tighten the bolt which holds fuel filler pipe bracket on body.

Tightening torque:

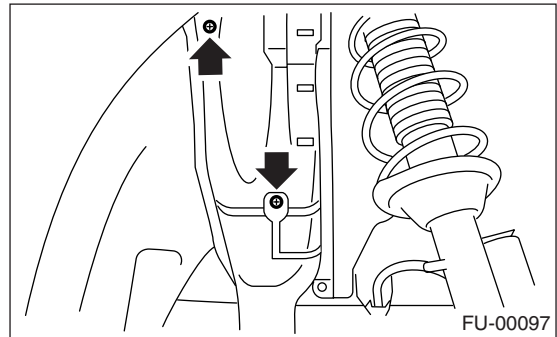
$7.5 \text{ N}\cdot\text{m (0.76 kgf}\cdot\text{m, 5.5 ft}\cdot\text{lb)}$



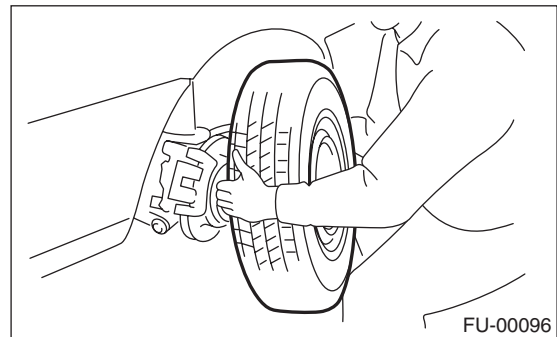
9) Hold the evaporation hoses onto clip of fuel filler pipe.



10) Install the fuel filler pipe protector.



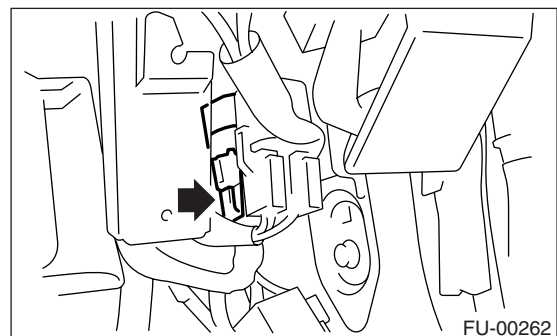
11) Install the rear right wheel.



12) Lower the vehicle.

13) Tighten the wheel nuts.

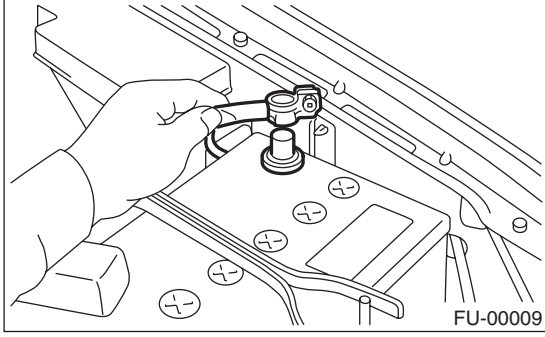
14) Connect the connector to fuel pump relay.



Fuel Filler Pipe

FUEL INJECTION (FUEL SYSTEM)

15) Connect the battery ground cable to battery.



22. Fuel Pump

A: REMOVAL

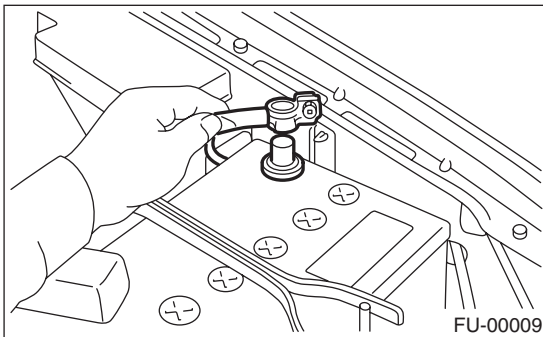
WARNING:

- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel.

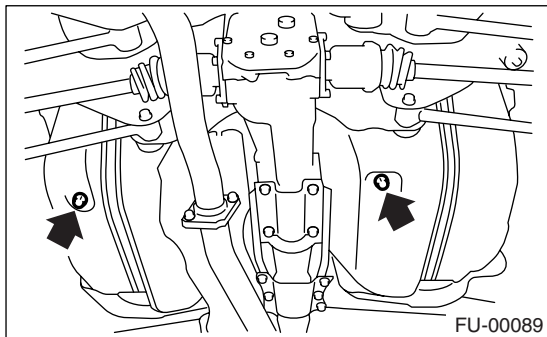
NOTE:

Fuel pump assembly consists of fuel pump and fuel level sensor.

- 1) Release the fuel pressure. <Ref. to FU(H4SO)-47, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel filler flap lid and remove fuel filler cap.
- 3) Disconnect the ground cable from battery.



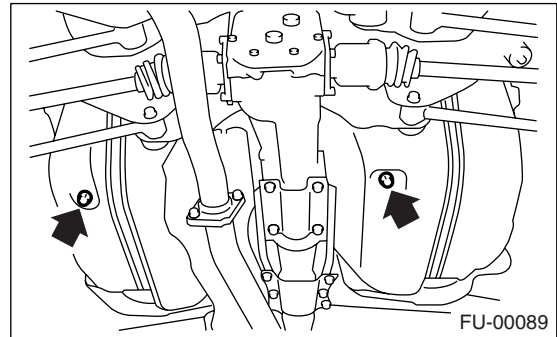
- 4) Lift-up the vehicle.
- 5) Drain fuel from the fuel tank. Set a container under the vehicle and remove the drain plug from fuel tank.



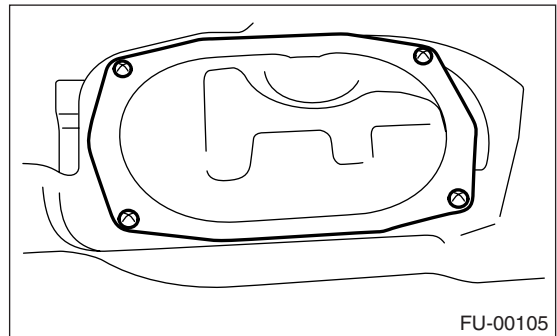
- 6) Tighten the fuel drain plug.

Tightening torque:

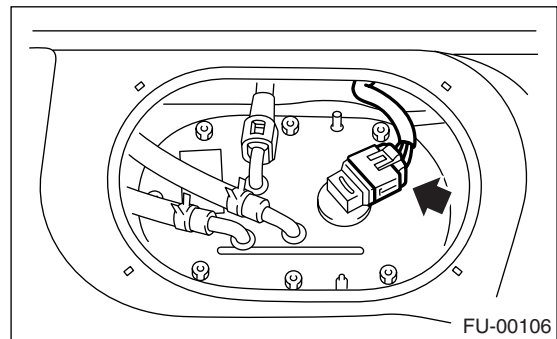
26 N·m (2.7 kgf·m, 19.2 ft·lb)



- 7) Raise the rear seat and turn floor mat up.
- 8) Remove the access hole lid.



- 9) Disconnect the connector from fuel pump.

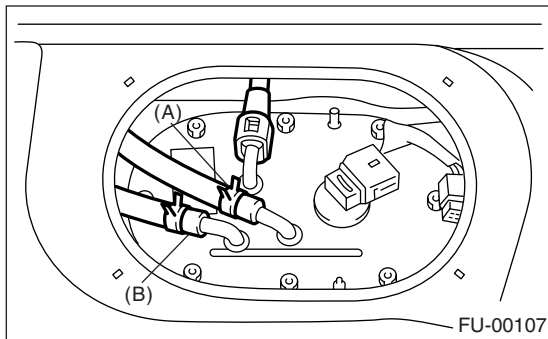


- 10) Disconnect the quick connector and then disconnect fuel delivery hose. <Ref. to FU(H4SO)-63, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>

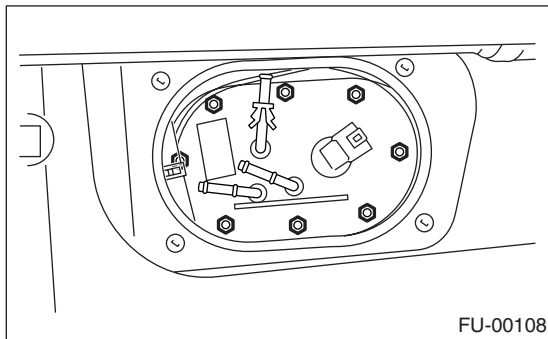
Fuel Pump

FUEL INJECTION (FUEL SYSTEM)

11) Move the clips, and then disconnect the fuel return hose (A) and jet pump hose (B).



12) Remove the nuts which install fuel pump assembly onto fuel tank.



13) Take off the fuel pump assembly from fuel tank.

B: INSTALLATION

Install in the reverse order of removal. Do the following:

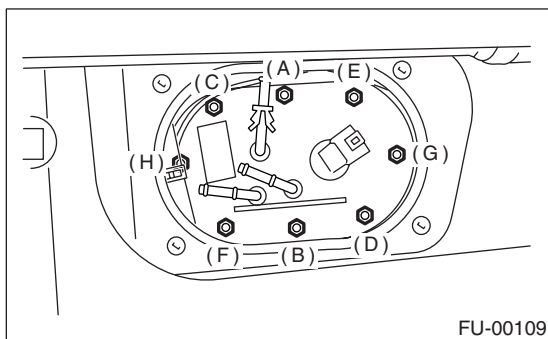
NOTE:

Always use new gaskets.

- (1) Ensure sealing portion is free from fuel or foreign particles before installation.
- (2) Tighten the nuts in alphabetical sequence shown in the figure to specified torque.

Tightening torque:

4.4 N·m (0.45 kgf·m, 3.3 ft·lb)

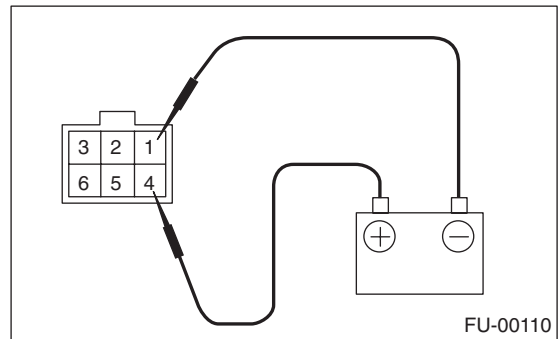


C: INSPECTION

Connect the lead harness to connector terminal of fuel pump and apply battery power supply to check whether the pump operates.

WARNING:

- Wipe off the fuel completely.
- Keep the battery as far apart from fuel pump as possible.
- Be sure to turn the battery supply ON and OFF on battery side.
- Do not run the fuel pump for a long time under non-load condition.



23. Fuel Level Sensor

A: REMOVAL

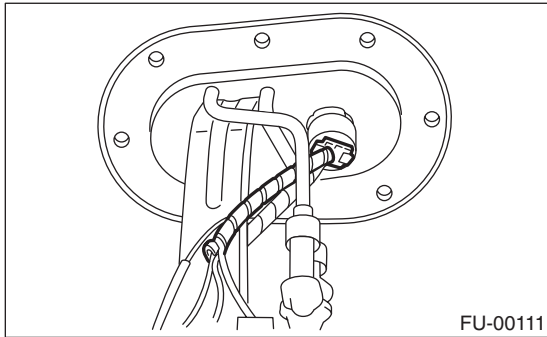
WARNING:

- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel.

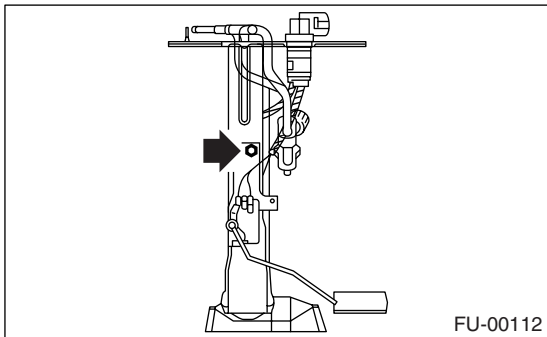
NOTE:

Fuel level sensor is built in fuel pump assembly.

- 1) Remove the fuel pump assembly. <Ref. to FU(H4SO)-55, REMOVAL, Fuel Pump.>
- 2) Disconnect the connector from fuel pump bracket.



- 3) Remove the bolt which installs fuel level sensor on mounting bracket.



B: INSTALLATION

Install in the reverse order of removal.

Fuel Sub Level Sensor

FUEL INJECTION (FUEL SYSTEM)

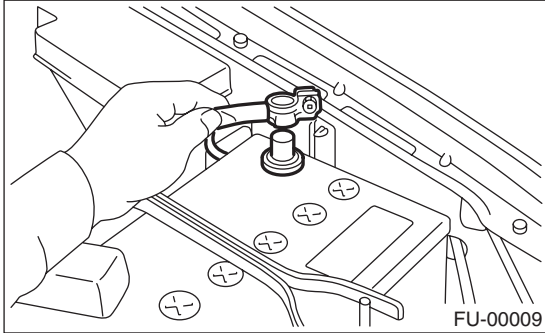
24. Fuel Sub Level Sensor

A: REMOVAL

WARNING:

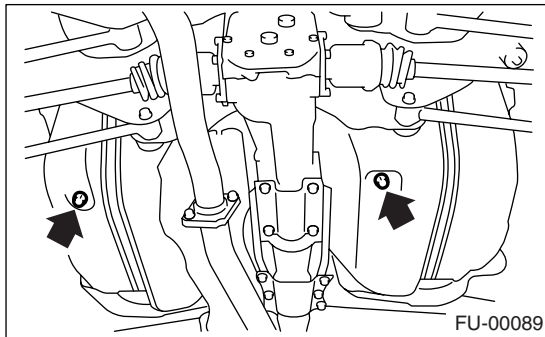
- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel.

1) Disconnect the ground cable from battery.



2) Lift-up the vehicle.

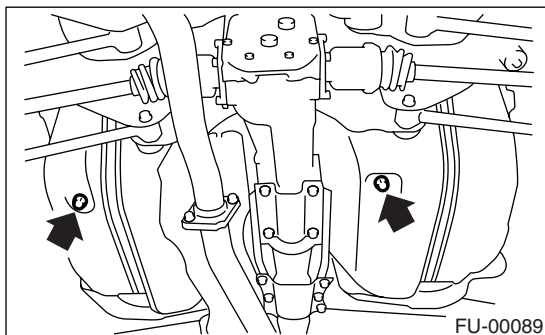
3) Drain fuel from the fuel tank. Set a container under the vehicle and remove the drain plug from fuel tank.



4) Tighten the fuel drain plug.

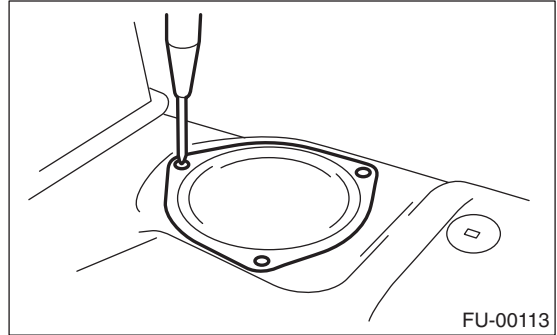
Tightening torque:

26 N·m (2.7 kgf·m, 19.2 ft·lb)



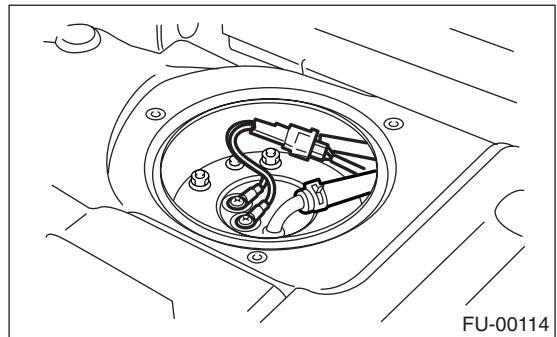
5) Remove the rear seat.

6) Remove the service hole cover.

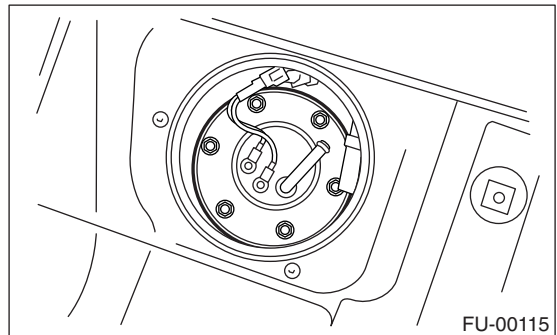


7) Disconnect the connector from fuel sub level sensor.

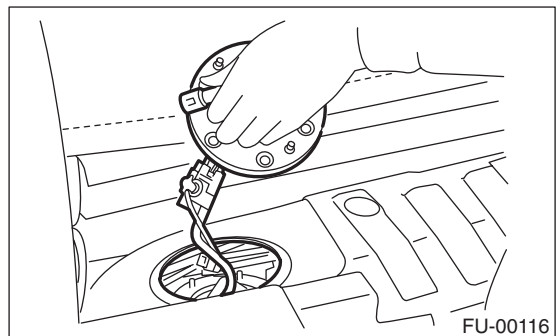
8) Disconnect the fuel jet pump hose.



9) Remove the bolts which install fuel sub level sensor on fuel tank.



10) Remove the fuel sub level sensor.

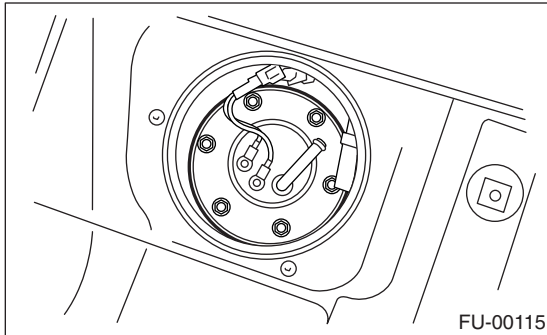


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



Fuel Filter

FUEL INJECTION (FUEL SYSTEM)

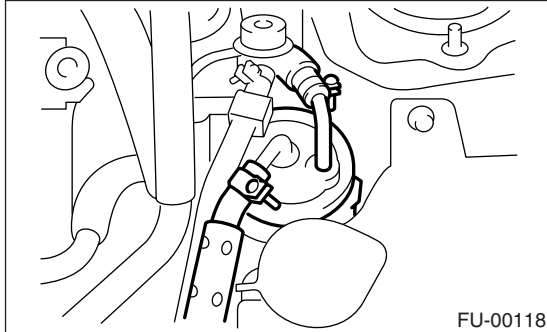
25. Fuel Filter

A: REMOVAL

WARNING:

- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel.

- 1) Release the fuel pressure. <Ref. to FU(H4SO)-47, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Disconnect the fuel delivery hoses from fuel filter.



- 3) Remove the filter from holder.

B: INSTALLATION

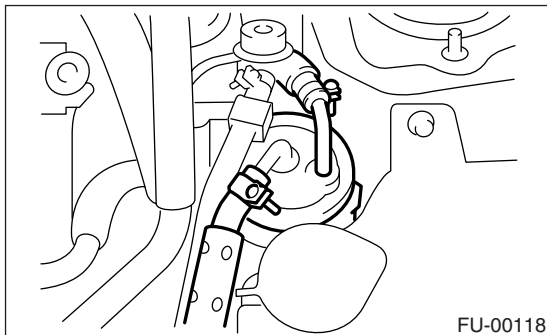
CAUTION:

- If fuel hoses are damaged at the connecting portion, replace it with a new one.
- If clamps are badly damaged, replace with new ones.

- 1) Install in the reverse order of removal.
- 2) Tighten the hose clamp screws.

Tightening torque:

1.25 N·m (0.13 kgf-m, 0.94 ft-lb)



C: INSPECTION

- 1) Check the inside of fuel filter for dirt and water sediment.
- 2) If it is clogged or if replacement interval has been reached, replace it.
- 3) If water is found in it, shake and expel the water from inlet port.

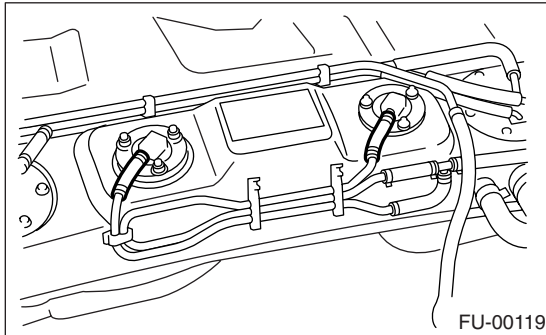
26. Fuel Cut Valve

A: REMOVAL

WARNING:

- Place “NO FIRE” signs near the working area.
- Be careful not to spill fuel.

- 1) Remove the fuel tank. <Ref. to FU(H4SO)-48, REMOVAL, Fuel Tank.>
- 2) Move the clip and disconnect the evaporation hose from fuel cut valve.



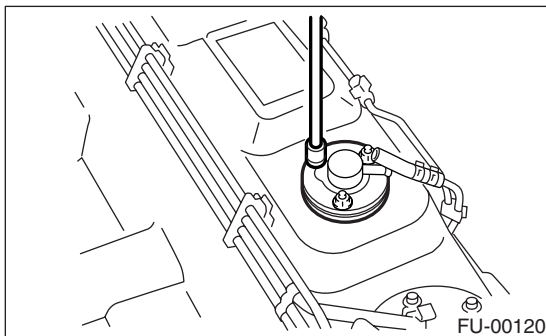
- 3) Remove the bolts which install fuel cut valve.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



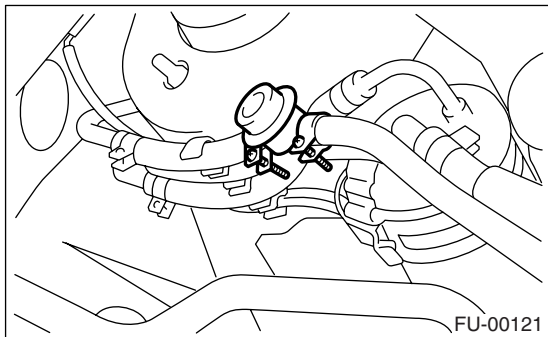
Fuel Damper Valve

FUEL INJECTION (FUEL SYSTEM)

27. Fuel Damper Valve

A: REMOVAL

- 1) Release the fuel pressure. <Ref. to FU(H4SO)-47, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Remove the fuel damper valve from fuel return hose.



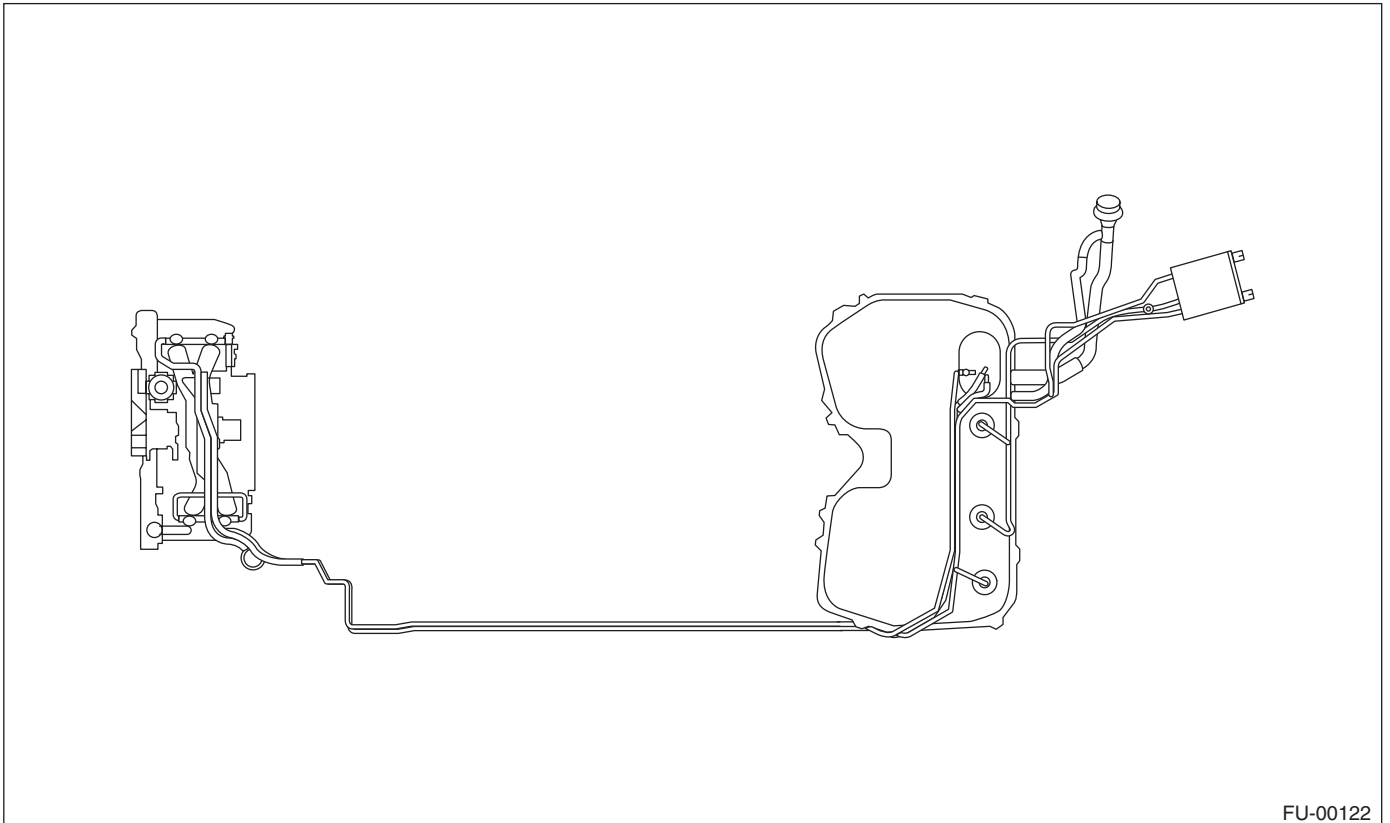
B: INSTALLATION

Install in the reverse order of removal.

28. Fuel Delivery, Return and Evaporation Lines

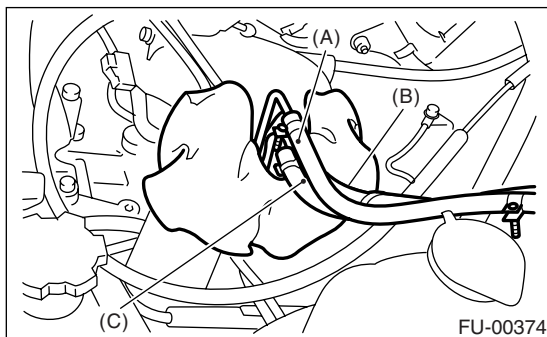
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Release the fuel pressure. <Ref. to FU(H4SO)-47, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 3) Open the fuel filler flap lid and remove fuel filler cap.
- 4) Remove the floor mat. <Ref. to EI-49, REMOVAL, Floor Mat.>
- 5) Remove the fuel delivery pipes and hoses, fuel return pipes and hoses, evaporation pipes and hoses.



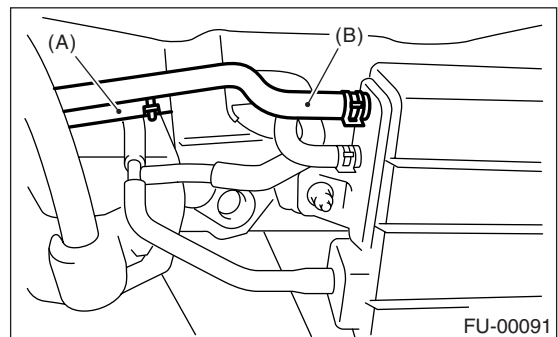
FU-00122

6) In the engine compartment, detach the fuel delivery hose (A), return hose (B) and evaporation hose (C).



FU-00374

8) Disconnect the two-way valve hose (A) from two-way valve and disconnect the canister hose (B) from canister.



FU-00091

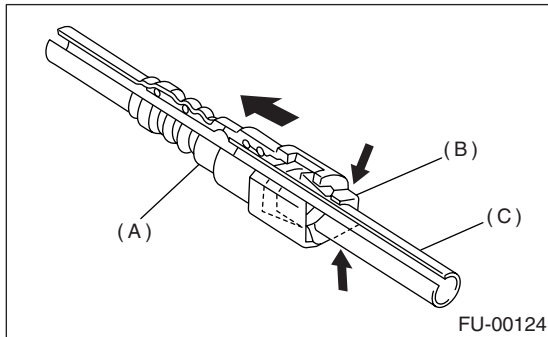
7) Lift-up the vehicle.

Fuel Delivery, Return and Evaporation Lines

FUEL INJECTION (FUEL SYSTEM)

9) Separate the quick connector on fuel delivery line.

- (1) Clean the pipe and connector, if they are covered with dust.
- (2) Hold the connector (A) and push retainer (B) down.
- (3) Pull out the connector (A) from retainer (B).



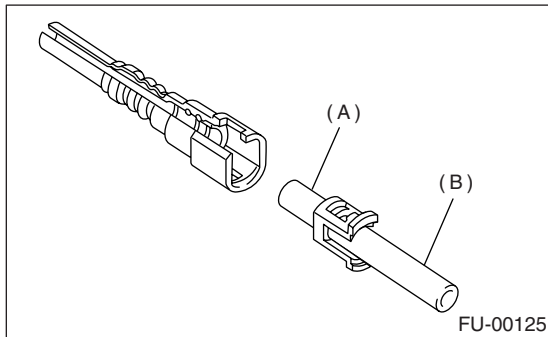
- (A) Connector
- (B) Retainer
- (C) Pipe

B: INSTALLATION

1) Connect the quick connector on fuel delivery line.

NOTE:

- Always use a new retainer.
- Make sure that the connected portion is not damaged or has dust. If necessary, clean the seal surface of pipe.



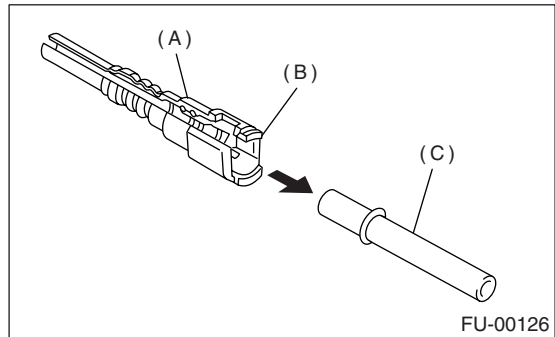
- (A) Seal surface
- (B) Pipe

(1) Set the new retainer (B) to connector (A).

(2) Push the pipe into connector completely.

NOTE:

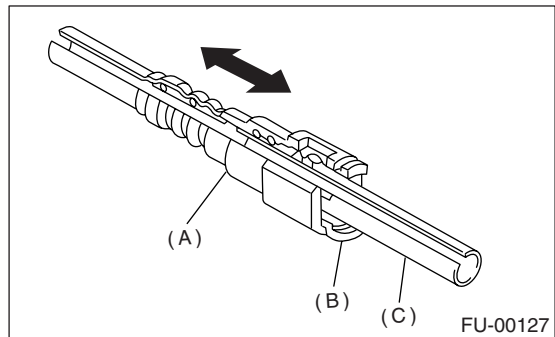
At this time, two clicking sounds are heard.



- (A) Connector
- (B) Retainer
- (C) Pipe

CAUTION:

- Pull the connector to ensure it is connected securely.
- Ensure the two retainer pawls are engaged in their mating positions in the connector.
- Be sure to inspect the hoses and their connections for any leakage of fuel.



- (A) Connector
- (B) Retainer
- (C) Pipe

Fuel Delivery, Return and Evaporation Lines

FUEL INJECTION (FUEL SYSTEM)

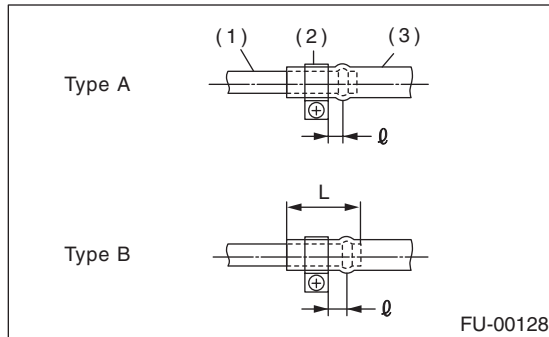
2) Connect the fuel delivery hose to pipe with an overlap of 20 to 25 mm (0.79 to 0.98 in).

Type A: When the fitting length is specified.

Type B: When the fitting length is not specified.

$\varnothing : 2.5 \pm 1.5 \text{ mm } (0.098 \pm 0.059 \text{ in})$

$L : 22.5 \pm 2.5 \text{ mm } (0.886 \pm 0.098 \text{ in})$



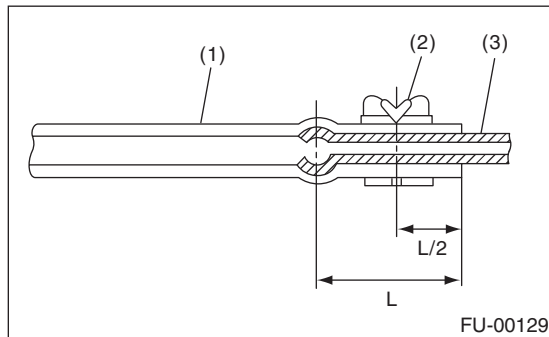
- (1) Fitting
- (2) Clamp
- (3) Hose

3) Connect the evaporation hose to pipe by approx. 15 — 20 mm (0.59 — 0.79 in) from the hose end.

$L = 17.5 \pm 2.5 \text{ mm } (0.689 \pm 0.098 \text{ in})$

CAUTION:

Be sure to inspect the hoses and their connections for any leakage of fuel.



- (1) Hose
- (2) Clip
- (3) Pipe

C: INSPECTION

1) Make sure that there are no cracks on the fuel pipes and fuel hoses.

2) Make sure that the fuel pipe and fuel hose connections are tight.

Fuel System Trouble in General

FUEL INJECTION (FUEL SYSTEM)

29. Fuel System Trouble in General

A: INSPECTION

Trouble and possible cause		Corrective action
1. Insufficient fuel supply to the injector		
1)	Fuel pump will not operate.	
	○ Defective terminal contact.	Inspect connections, especially ground, and tighten securely.
	○ Trouble in electromagnetic or electronic circuit parts.	Replace fuel pump.
2)	Lowering of fuel pump function.	Replace fuel pump.
3)	Clogged dust or water in the fuel filter.	Replace fuel filter, clean or replace fuel tank.
4)	Clogged or bent fuel pipe or hose.	Clean, correct or replace fuel pipe or hose.
5)	Air is mixed in the fuel system.	Inspect or retighten each connection part.
6)	Clogged or bent breather tube or pipe.	Clean, correct or replace air breather tube or pipe.
7)	Damaged diaphragm of pressure regulator.	Replace.
2. Leakage or blow out fuel		
1)	Loosened joints of the fuel pipe.	Retightening.
2)	Cracked fuel pipe, hose and fuel tank.	Replace.
3)	Defective welding part on the fuel tank.	Replace.
4)	Defective drain packing of the fuel tank.	Replace.
5)	Clogged or bent air breather tube or air vent tube.	Clean, correct or replace air breather tube or air vent tube.
3. Gasoline smell inside of compartment		
1)	Loose joints at air breather tube, air vent tube and fuel filler pipe.	Retightening.
2)	Defective packing air tightness on the fuel saucer.	Correct or replace packing.
3)	Cracked fuel separator.	Replace separator.
4)	Inoperative fuel pump modulator or circuit.	Replace.
4. Defective fuel meter indicator		
1)	Defective operation of fuel level sensor.	Replace.
2)	Defective operation of fuel meter.	Replace.
5. Noise		
1)	Large operation noise or vibration of fuel pump.	Replace.

NOTE:

- When the vehicle is left unattended for an extended period of time, water may accumulate in the fuel tank.

To prevent water condensation.

(1) Top off the fuel tank or drain the fuel completely.

(2) Drain the water condensation from the fuel filter.

- Refilling the fuel tank.

Refill the fuel tank while there is still some fuel left in the tank.

- Protecting the fuel system against freezing and water condensation.

(3) Cold areas :

In snow-covered areas, mountainous areas, skiing areas, etc. where ambient temperatures drop below 0°C (32°F) throughout the winter season, use an anti-freeze solution in the fuel tank. Refueling will also complement the effect of anti-freeze solution each time the fuel level

drops to about one-half. After the winter season, drain the water which may have accumulated in the fuel filter and fuel tank in the manner same as that described under "Affected areas" below.

(4) Affected areas :

When the water condensation is notched in the fuel filter, drain the water from both the fuel filter and fuel tank or use a water removing agent (or anti-freeze solution) in the fuel tank.

- Observe the instructions, notes, etc., indicated on the label affixed to the anti-freeze solution (water removing agent) container before use.