

ENGINE SECTION 2

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(H4DOTC)

EMISSION CONTROL (AUX. EMISSION CONTROL DEVICE) EC(H4DOTC)

INTAKE (INDUCTION) IN(H4DOTC)

MECHANICAL ME(H4DOTC)

EXHAUST EX(H4DOTC)

COOLING CO(H4DOTC)

LUBRICATION LU(H4DOTC)

SPEED CONTROL SYSTEM SP(H4DOTC)

IGNITION IG(H4DOTC)

STARTING/CHARGING SYSTEM SC(H4DOTC)

ENGINE (DIAGNOSTIC) EN(H4DOTC)

FUEL INJECTION (FUEL SYSTEM)

FU(H4DOTC)

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General Description

FUEL INJECTION (FUEL SYSTEM)

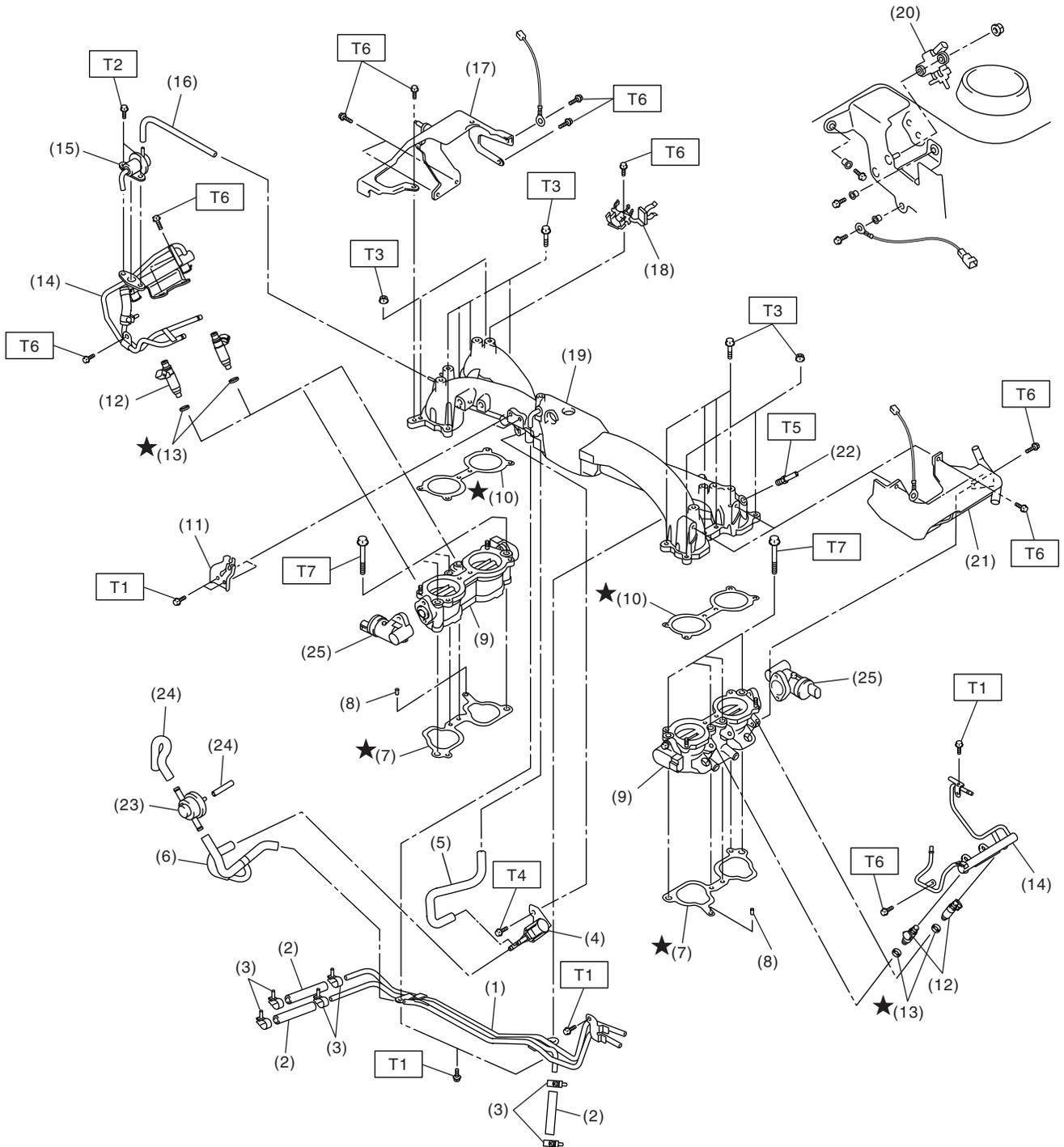
1. General Description

A: 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	450 — 677 kPa (4.59 — 6.9 kg/cm ² , 65.27 — 98.2 psi)
	Discharge flow	More than 130 ℓ (34.3 US gal, 28.6 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



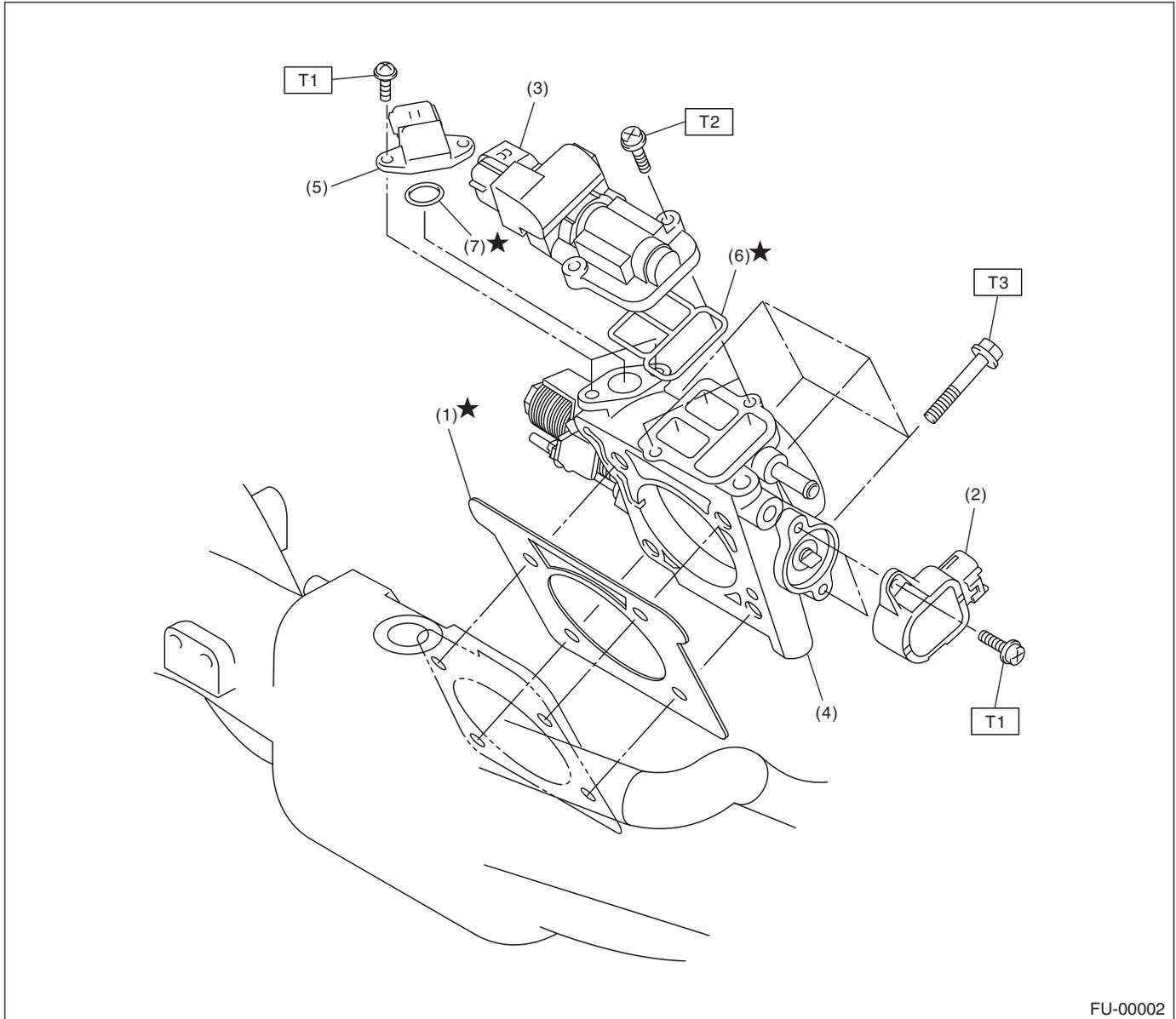
FU-02085

General Description

FUEL INJECTION (FUEL SYSTEM)

(1) Fuel pipe ASSY	(13) Insulator	(24) Purge hose
(2) Fuel hose	(14) Fuel injector pipe	(25) Tumble generator valve actuator
(3) Clamp	(15) Pressure regulator	
(4) Purge control solenoid valve	(16) Pressure regulator hose	<hr/>
(5) Vacuum hose	(17) Fuel pipe protector RH	Tightening torque: N·m (kgf·m, ft·lb)
(6) Vacuum control hose	(18) Blow-by hose stay	T1: 5 (0.5, 3.7)
(7) Intake manifold gasket	(19) Intake manifold	T2: 6.4 (0.65, 4.7)
(8) Guide pin	(20) Wastegate control solenoid valve ASSY	T3: 8.25 (0.84, 6.1)
(9) Tumble generator valve ASSY	(21) Fuel pipe protector LH	T4: 16 (1.6, 11.8)
(10) Gasket	(22) Nipple	T5: 17 (1.7, 12.5)
(11) Accelerator cable bracket	(23) Purge valve	T6: 19 (1.9, 14.0)
(12) Fuel injector		T7: 25 (2.5, 18.4)

2. AIR INTAKE SYSTEM



FU-00002

- (1) Gasket
- (2) Throttle position sensor
- (3) Idle air control solenoid valve
- (4) Throttle body

- (5) Manifold absolute pressure sensor
- (6) Gasket
- (7) O-ring

Tightening torque: N·m (kgf·m, ft·lb)

T1: 1.6 (0.16, 1.2)

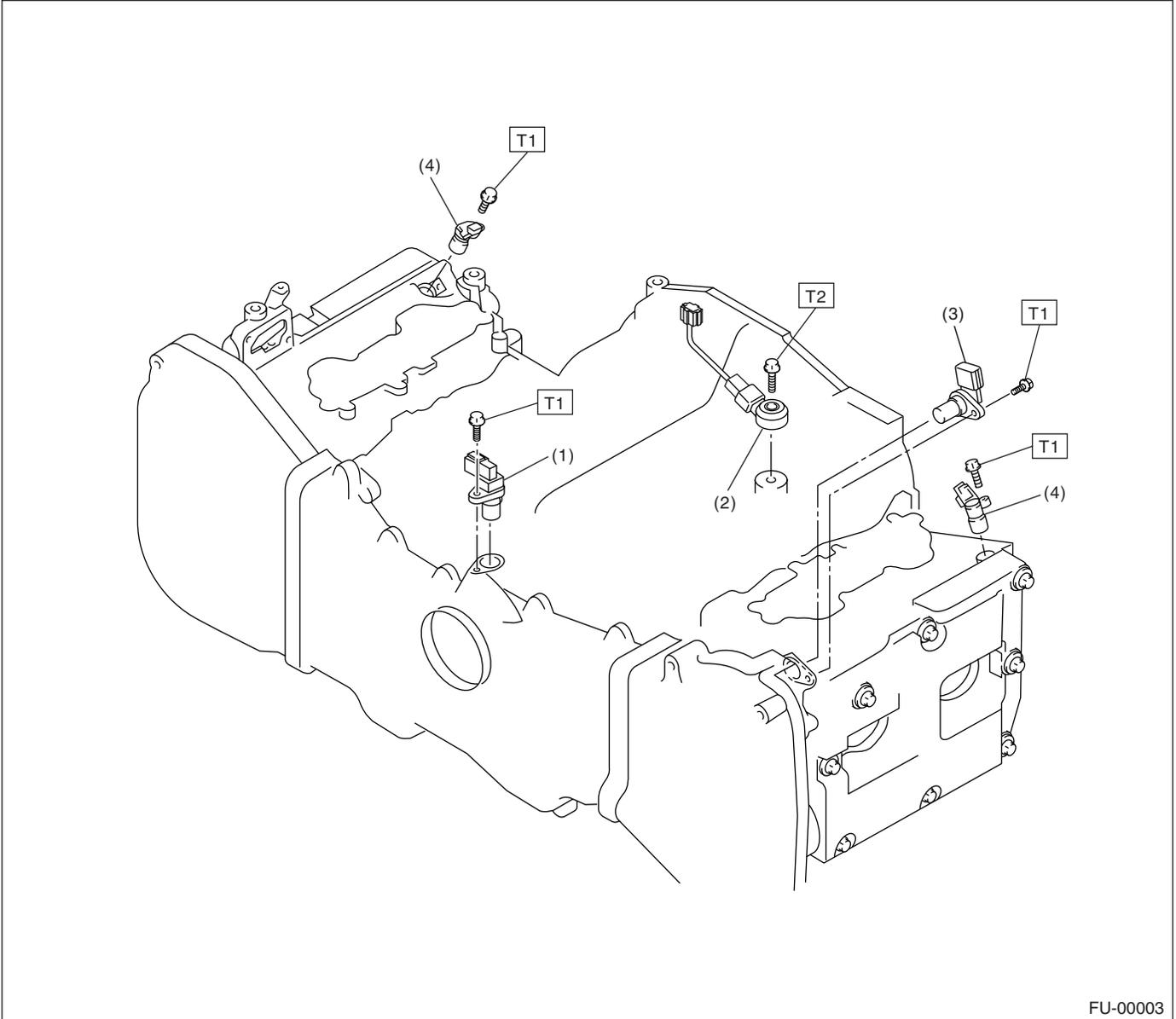
T2: 2.8 (0.29, 2.1)

T3: 22 (2.2, 16.2)

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) AVCS camshaft position sensor

Tightening torque: N·m (kgf·m, ft·lb)

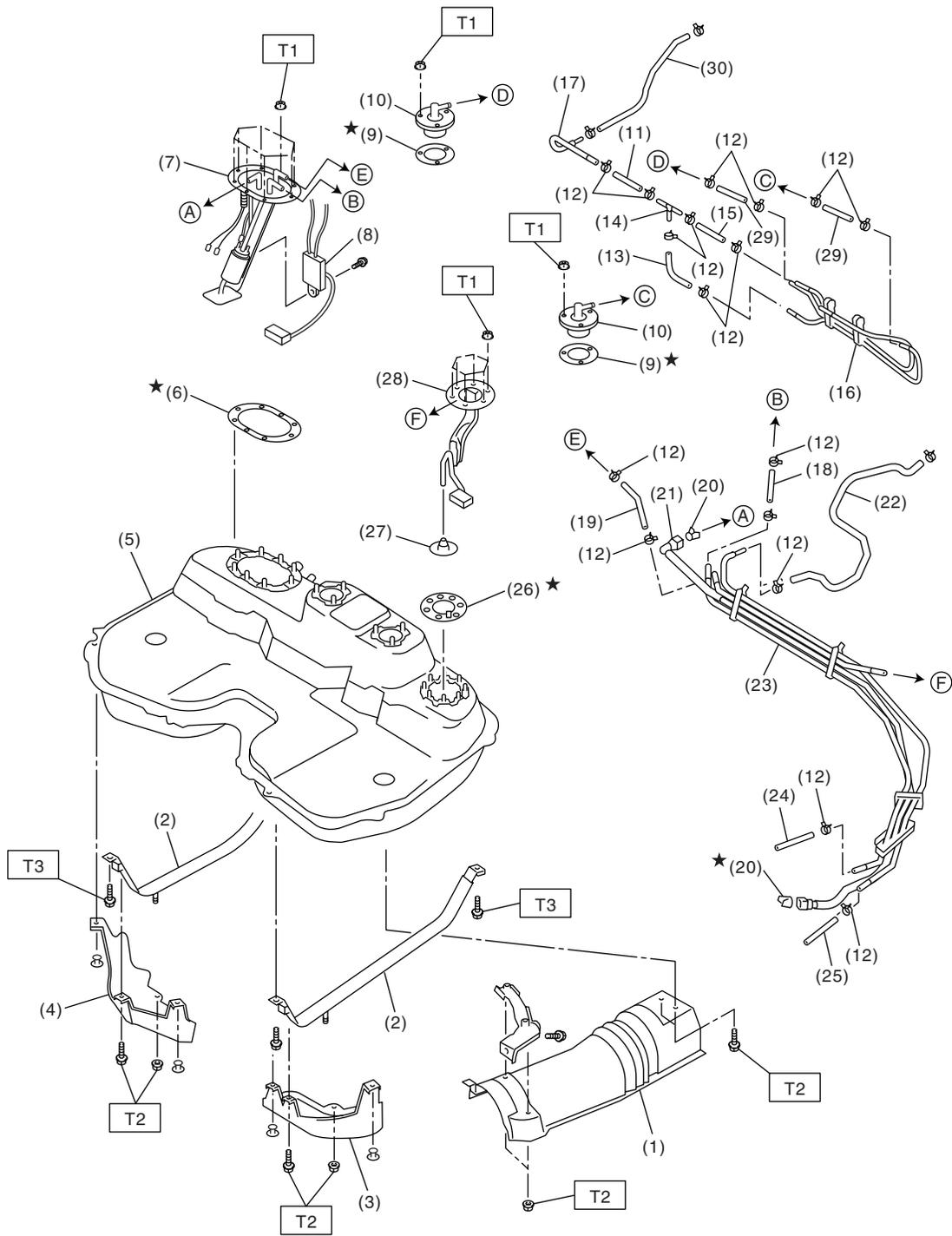
T1: 6.4 (0.65, 4.7)

T2: 24 (2.4, 17.4)

General Description

FUEL INJECTION (FUEL SYSTEM)

4. FUEL TANK



FU-00909

General Description

FUEL INJECTION (FUEL SYSTEM)

(1) Heat shield cover	(13) Evaporation hose B	(25) Evaporation hose E
(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 F
(6) Fuel pump gasket	(18) Fuel return hose A	(30) Evaporation hose G
(7) Fuel pump ASSY	(19) Jet pump hose	
(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 D	T2: 7.4 (0.75, 5.4)
(11) Evaporation hose A	(23) Fuel pipe ASSY	T3: 33 (3.4, 24.3)
(12) Clip	(24) Fuel return hose B	<hr/>

General Description

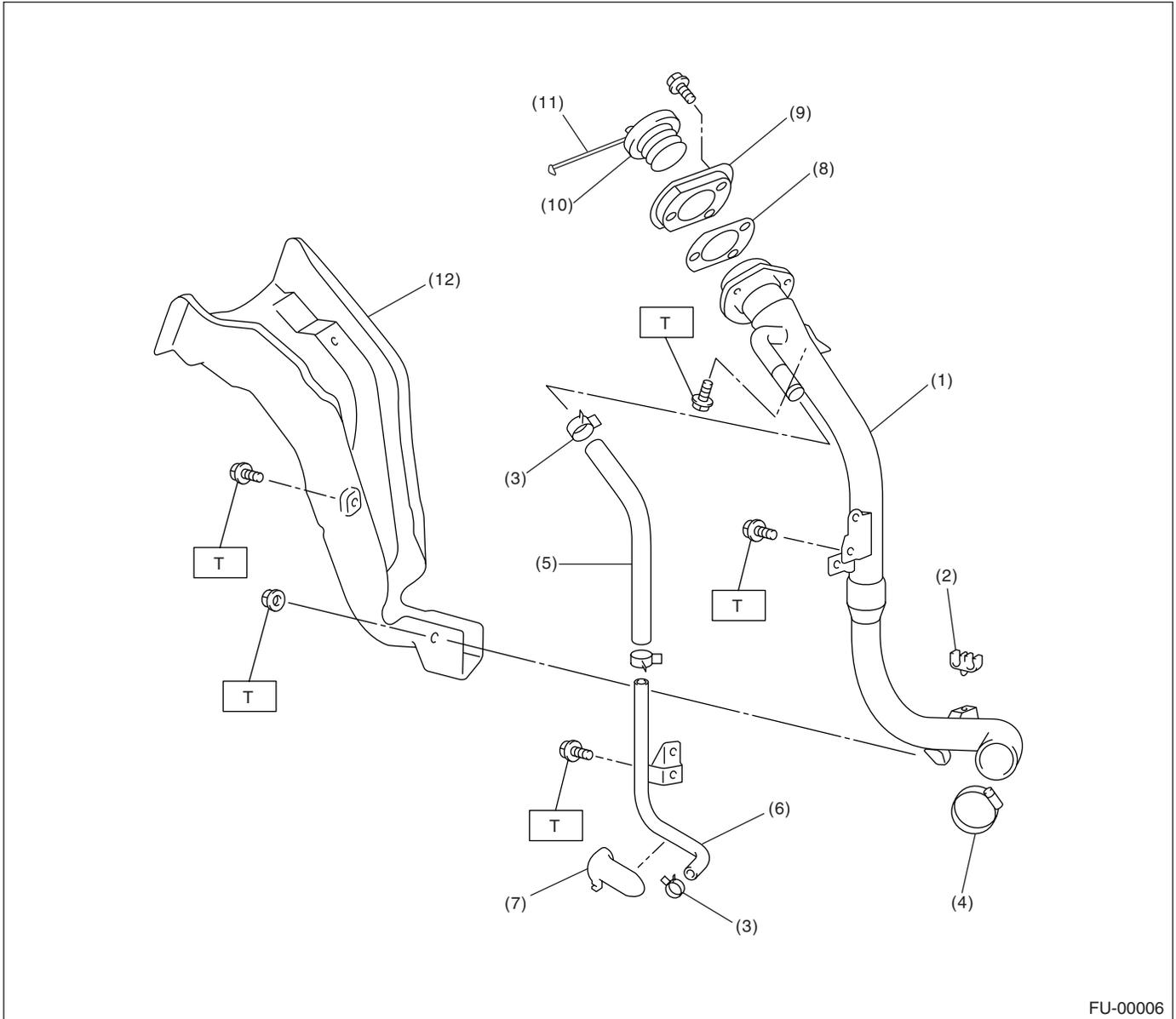
FUEL INJECTION (FUEL SYSTEM)

- | | | |
|--------------------------|--------------------------------|---------------------------------|
| (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)

6. FUEL FILLER PIPE



- | | | |
|-----------------------------|------------------------------|---------------------------------|
| (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

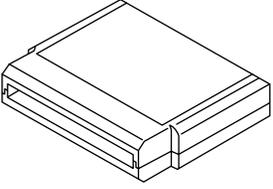
FUEL INJECTION (FUEL SYSTEM)

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 the ground cable from battery.
- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.

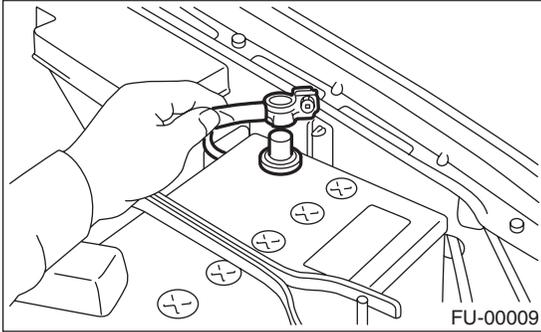
D: PREPARATION TOOL

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

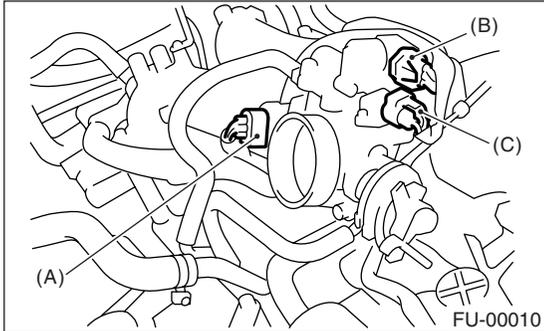
A: REMOVAL

1) Disconnect the ground cable from battery.

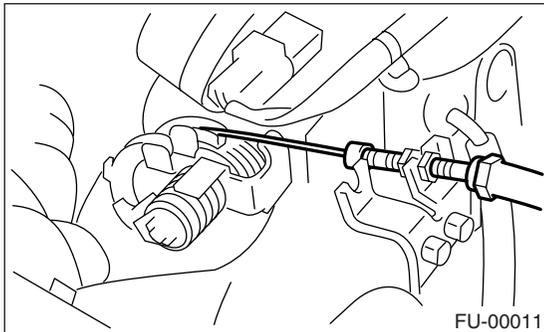


2) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>

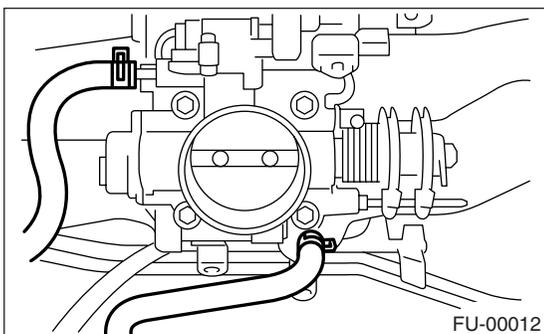
3) Disconnect the connector from the throttle position sensor (A) and idle air control solenoid valve (B) and manifold absolute pressure sensor (C).



4) Disconnect the accelerator cable.



5) Disconnect the engine coolant hoses from throttle body.



6) Remove the bolts which secure the throttle body to intake manifold.

B: INSTALLATION

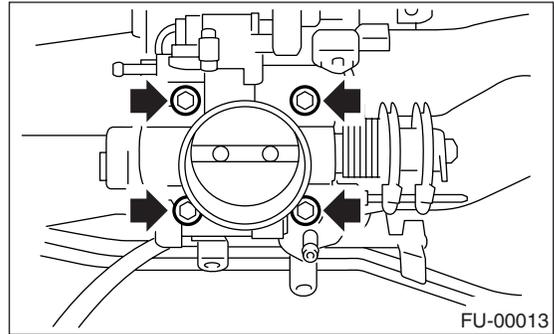
1) Install in the reverse order of removal.

NOTE:

Always use a new gasket.

Tightening torque:

22 N·m (2.2 kgf-m, 16.2 ft-lb)



2) Adjust the accelerator cable play. <Ref. to SP(H4SO)-9, INSTALLATION, Accelerator Control Cable.>

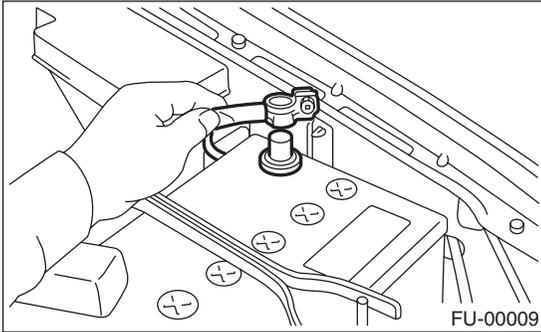
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

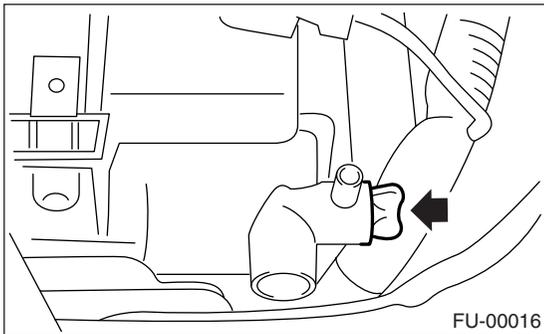
3. Intake Manifold

A: REMOVAL

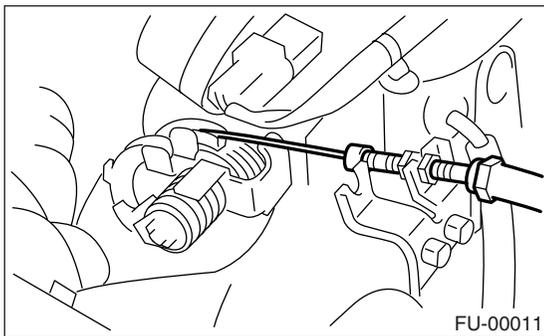
- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel filler flap lid and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.



- 4) Lift-up the vehicle.
- 5) Remove the under cover.
- 6) Drain the coolant about 3.0 ℓ (3.2 US qt, 2.6 Imp qt).

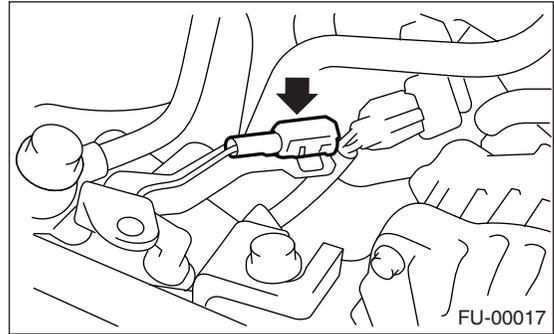


- 7) Remove the air cleaner upper cover and air intake boot. <Ref. to IN(H4DOTC)-7, REMOVAL, Air Cleaner.>
- 8) Remove the air cleaner element.
- 9) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 10) Disconnect the accelerator cable.



- 11) Remove the coolant filler tank. <Ref. to CO(H4SO)-42, REMOVAL, Coolant Filler Tank.>
- 12) Remove the power steering pump.

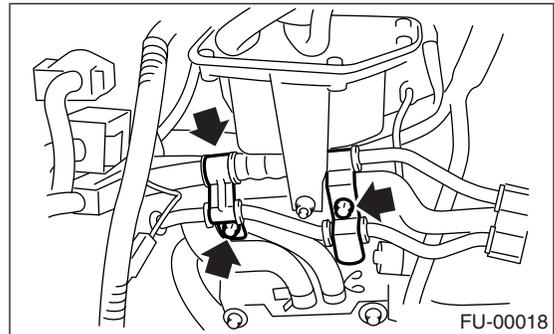
- (1) Remove the front side V-belt. <Ref. to ME(H4DOTC)-52, REMOVAL, V-belt.>
- (2) Disconnect the power steering switch connector.



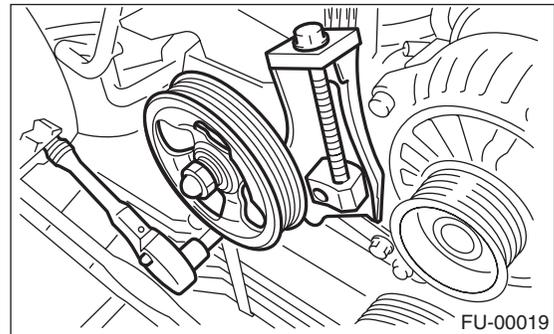
- (3) Remove the bolts which secure the power steering pipe brackets to intake manifold.

CAUTION:

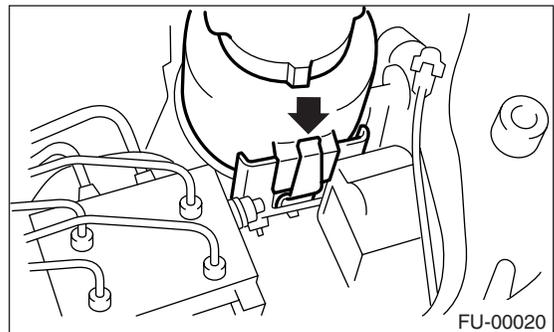
Do not disconnect the power steering hose.



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



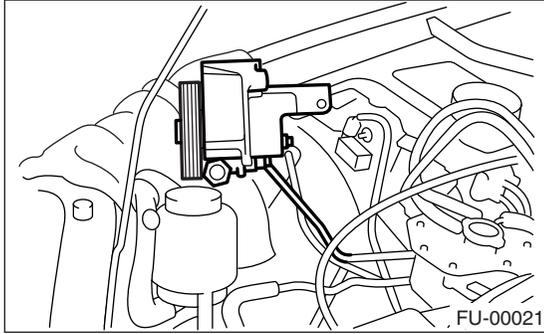
- (5) Remove the power steering tank from the bracket by pulling it upward.



Intake Manifold

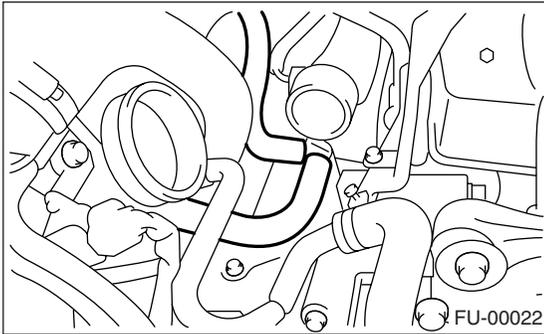
FUEL INJECTION (FUEL SYSTEM)

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



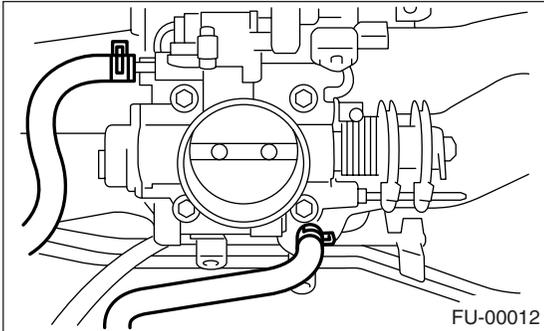
FU-00021

13) Disconnect the emission hose from PCV valve.



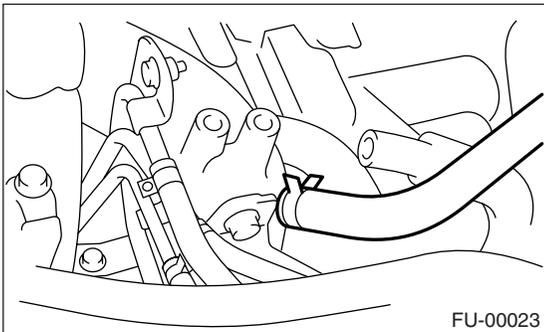
FU-00022

14) Disconnect the engine coolant hoses from throttle body.



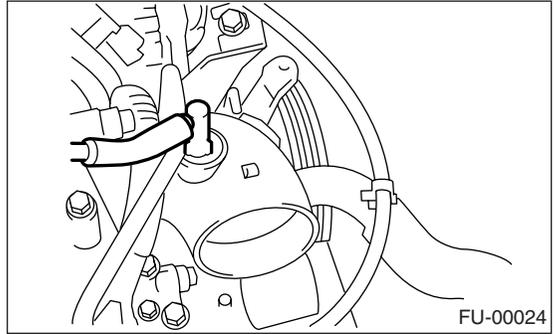
FU-00012

15) Disconnect the brake booster hose.



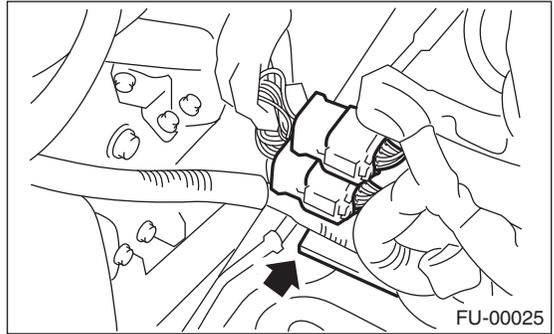
FU-00023

16) Disconnect the pressure hose from intake duct.

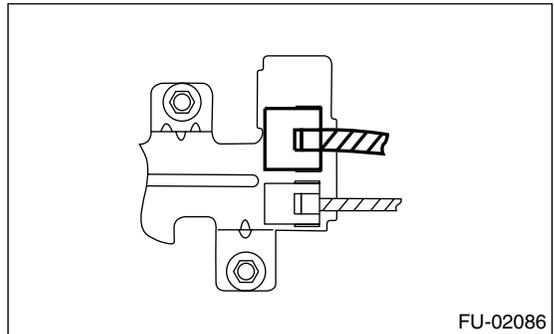


FU-00024

17) Disconnect the engine harness connectors from bulkhead harness connectors.

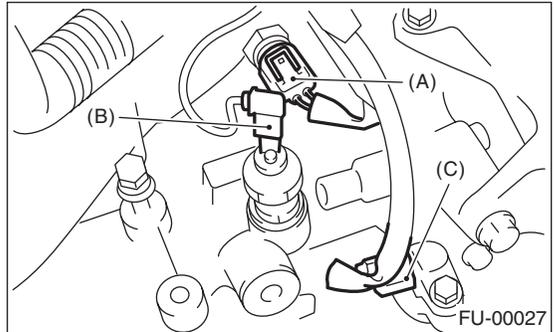


FU-00025



FU-02086

18) Disconnect the connectors from the engine coolant temperature sensor (A), oil pressure switch (B) and crankshaft position sensor (C).

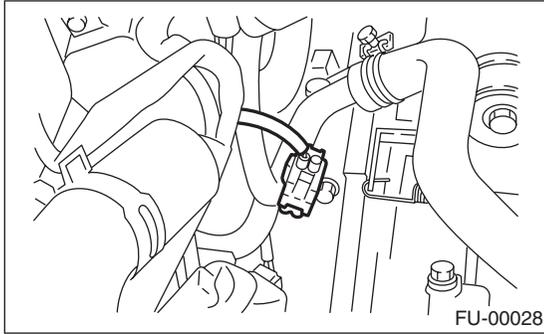


FU-00027

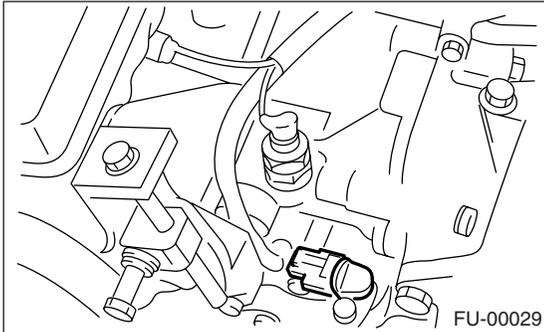
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

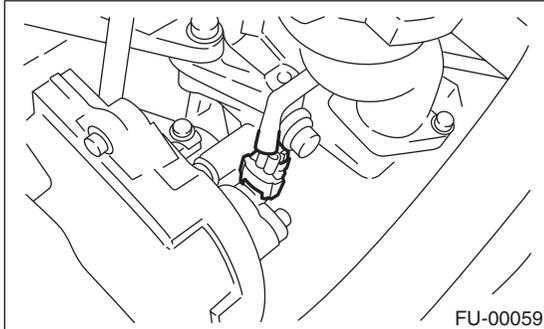
19) Disconnect the knock sensor connector.



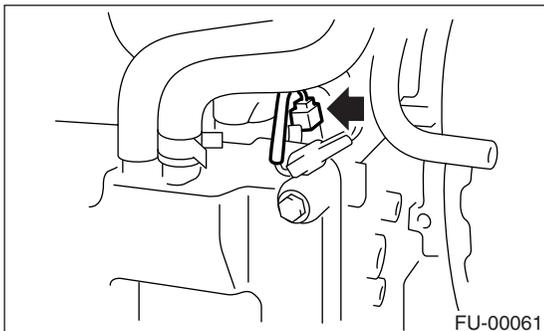
20) Disconnect the connector from crankshaft position sensor.



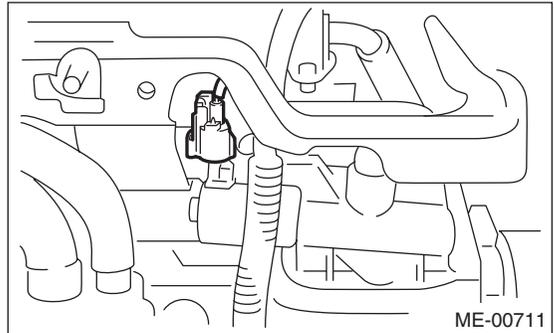
21) Disconnect the connector from camshaft position sensor.



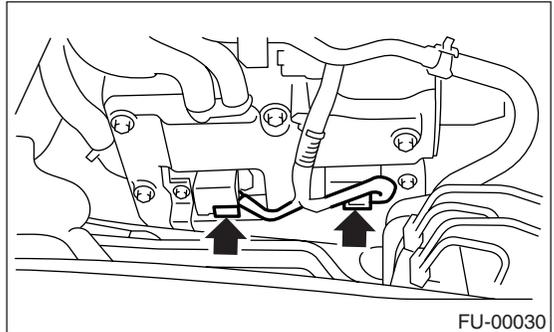
22) Disconnect the connector from AVCS camshaft position sensor.



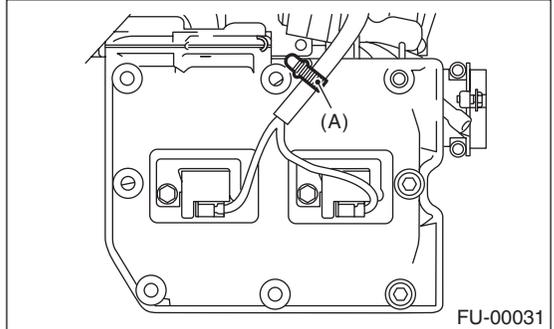
23) Disconnect the connector from oil flow control solenoid valve.



24) Disconnect the connector from ignition coil.



25) Disconnect the engine harness fixed by clip (A) from bracket.



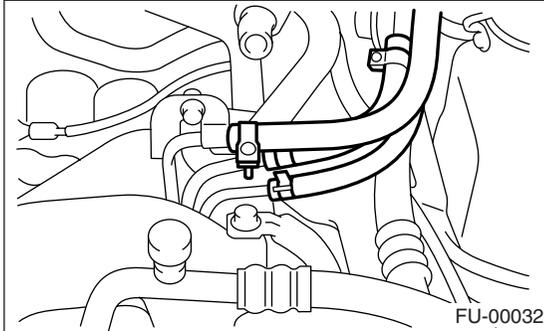
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

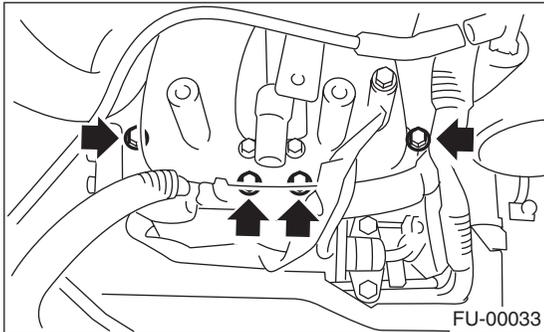
26) Disconnect the fuel delivery hose, return hose and evaporation hose.

CAUTION:

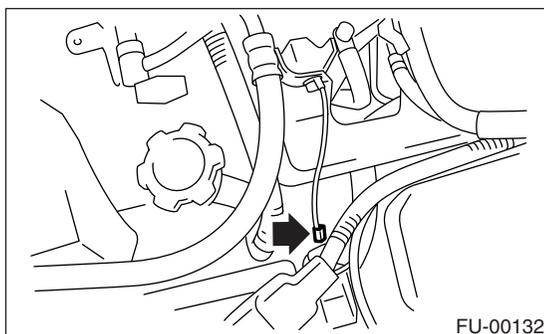
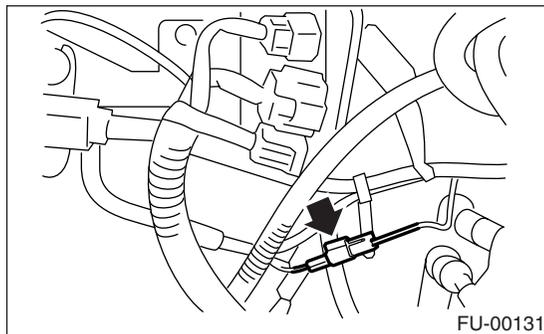
- Do not spill fuel.
- Catch the fuel from hoses in a container or cloth.



27) Remove the bolts which secure the intake manifold to cylinder heads.



28) Disconnect the ground cable connector.



29) Remove the intake manifold.

B: INSTALLATION

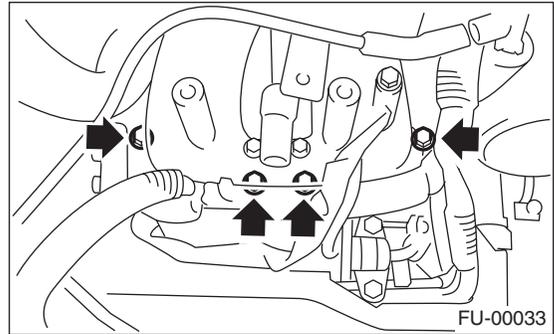
1) Install the intake manifold onto cylinder heads.

NOTE:

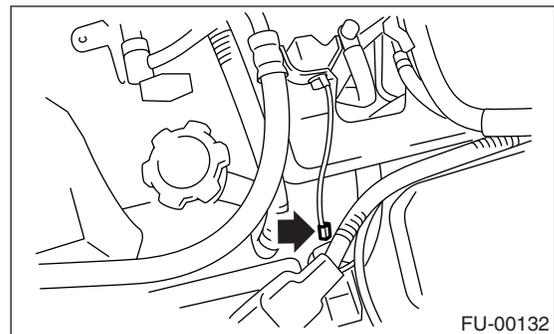
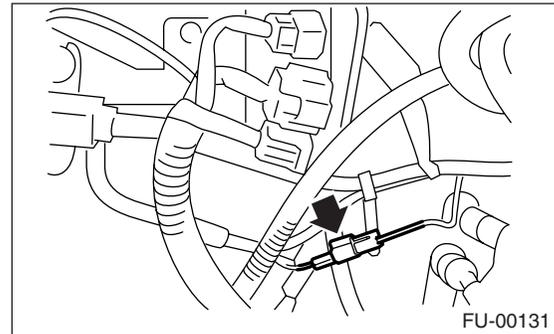
Always use new gaskets.

Tightening torque:

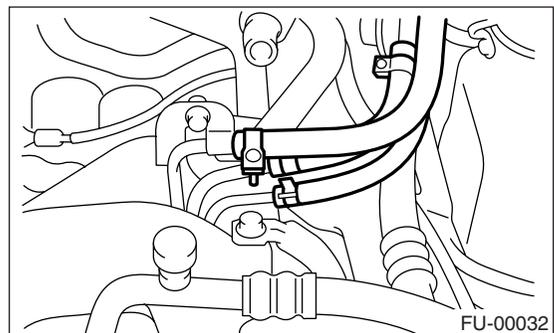
25 N·m (2.5 kgf-m, 18.4 ft-lb)



2) Connect the ground cable.



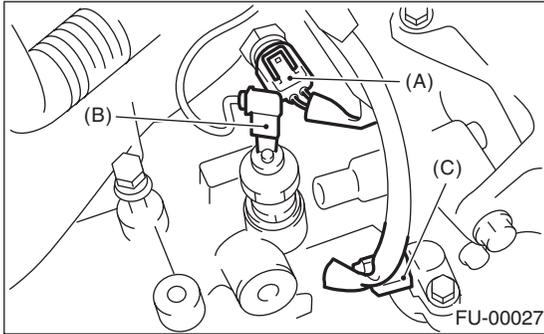
3) Connect the fuel delivery hose, return hose and evaporation hose.



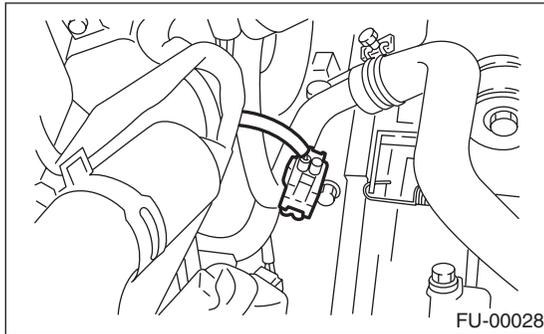
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

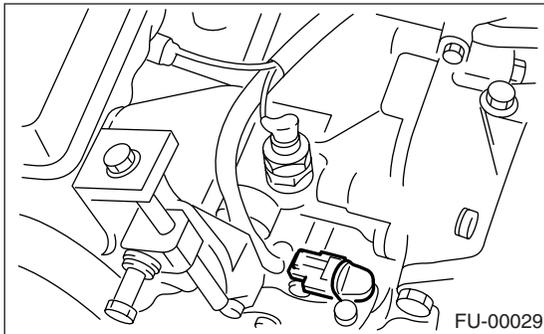
4) Connect the connector to the oil pressure switch (B), crankshaft position sensor (C) and engine coolant temperature sensor (A).



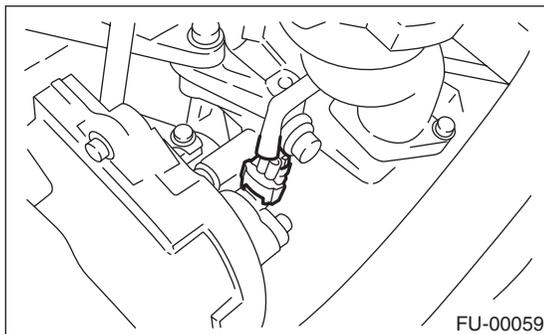
5) Connect the connector to knock sensor.



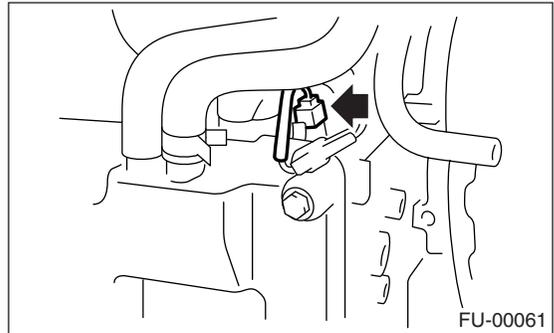
6) Connect the connector to crankshaft position sensor.



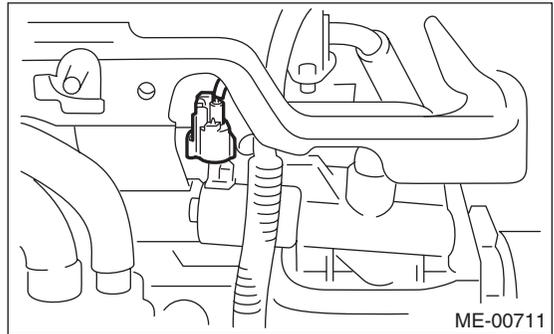
7) Connect the connector to camshaft position sensor.



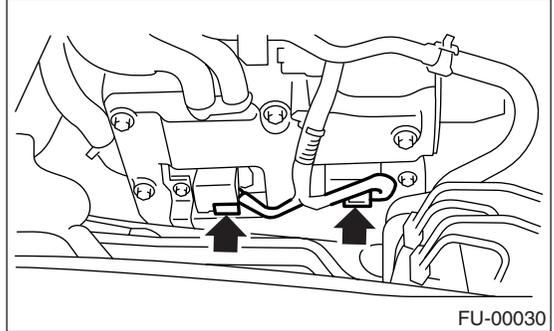
8) Connect the connector to AVCS camshaft position sensor.



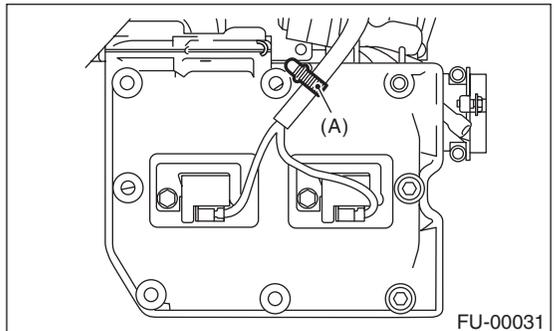
9) Connect the connector to oil flow control solenoid valve.



10) Connect the connector to ignition coil.



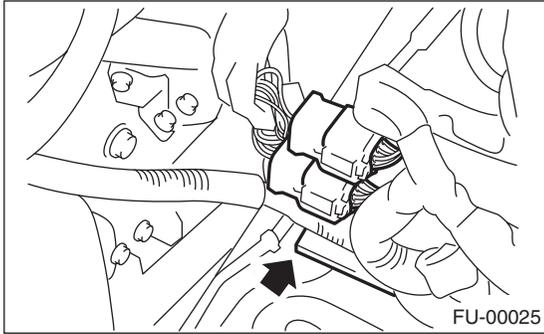
11) Connect the engine harness with clip (A) to the bracket.



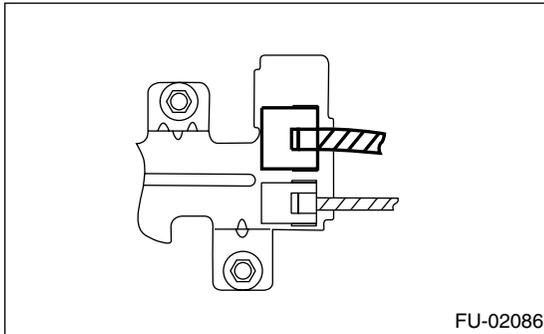
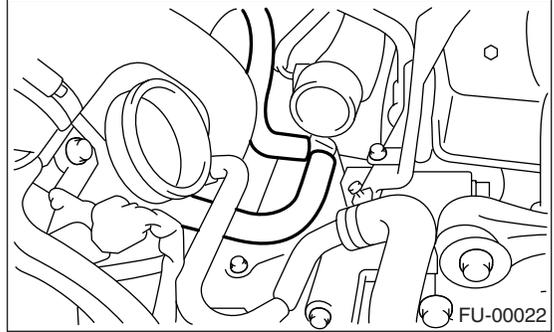
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

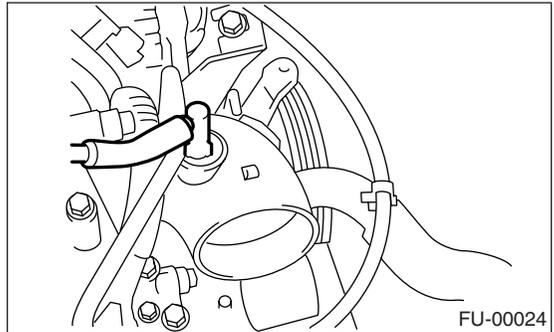
12) Connect the engine harness connector to bulk-head harness connectors.



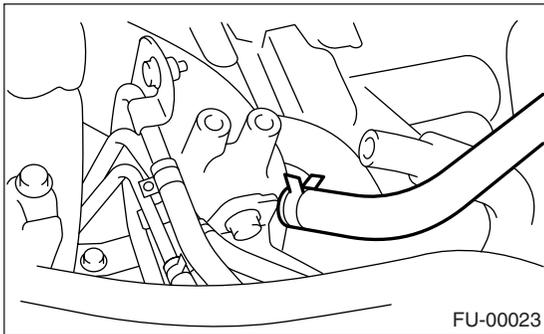
15) Connect the emission hose to PCV valve.



16) Connect the pressure hose to intake duct.

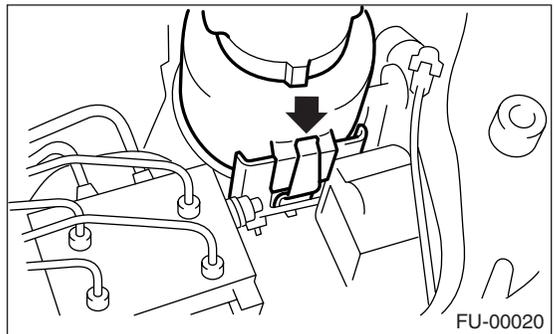


13) Connect the brake booster vacuum hose.

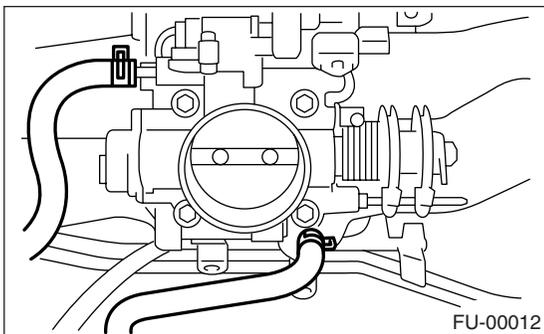


17) Install the power steering pump.

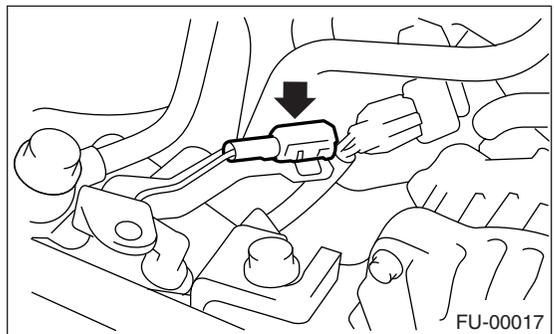
(1) Install the power steering tank on bracket.



14) Connect the engine coolant hoses to throttle body.



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



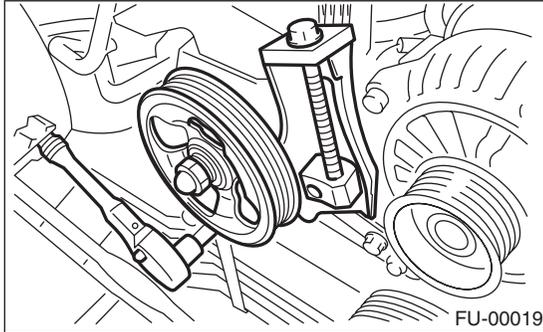
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

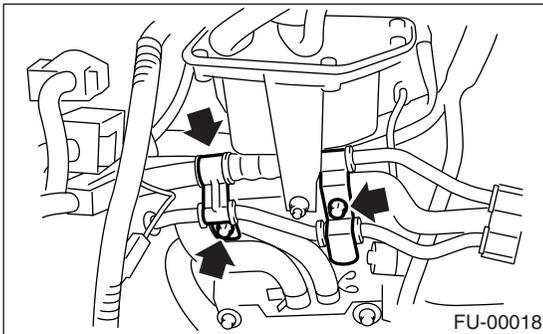
(3) Install the power steering pump, and then tighten the bolts.

Tightening torque:

22 N·m (2.2 kgf·m, 16.2 ft·lb)



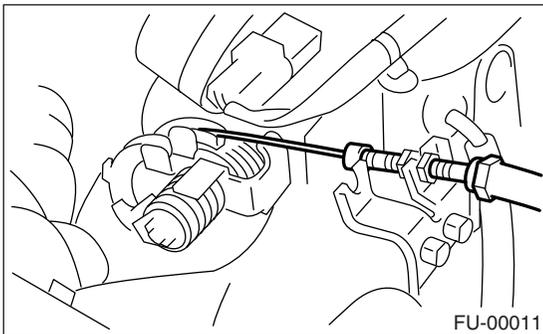
(4) Install the power steering pipe brackets on right side intake manifold.



(5) Install the front side V-belt. <Ref. to ME(H4DOTC)-52, REMOVAL, V-belt.>

18) Install the coolant filler tank. <Ref. to CO(H4SO)-42, INSTALLATION, Coolant Filler Tank.>

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

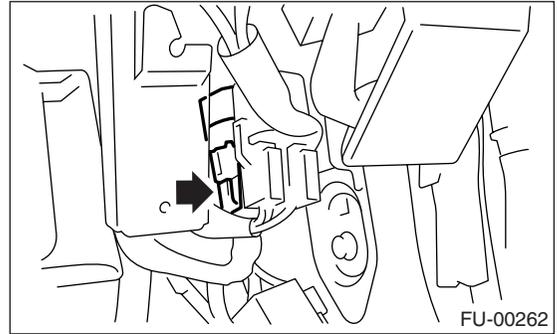


20) Install the intercooler. <Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>

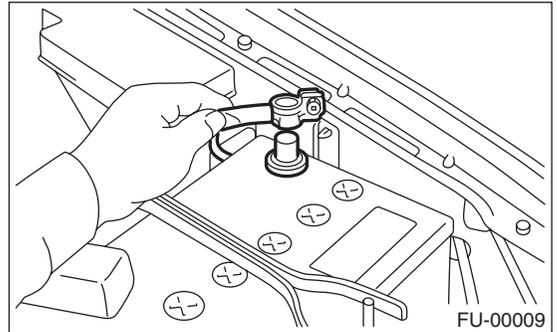
21) Install the air cleaner element.

22) Install the air cleaner upper cover and air intake duct as a unit. <Ref. to IN(H4DOTC)-7, INSTALLATION, Air Cleaner.>

23) Connect the connector to the fuel pump relay.



24) Connect the battery ground cable to battery.



25) Lift-up the vehicle.

26) Install the under cover.

27) Fill the coolant. <Ref. to CO(H4SO)-19, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

Intake Manifold

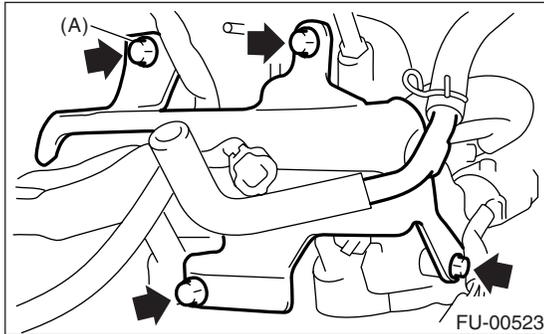
FUEL INJECTION (FUEL SYSTEM)

C: DISASSEMBLY

1) Remove the fuel pipe protector LH.

NOTE:

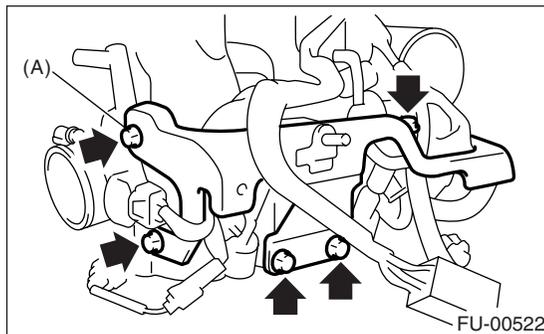
Bolt (A) is tightened together with ground cable.



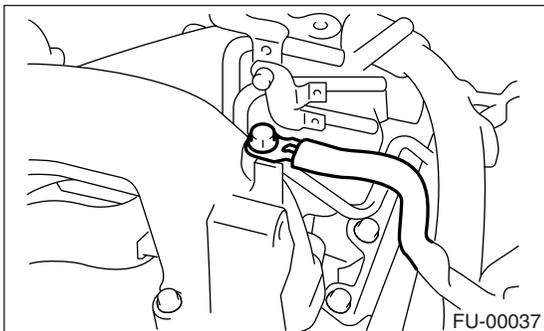
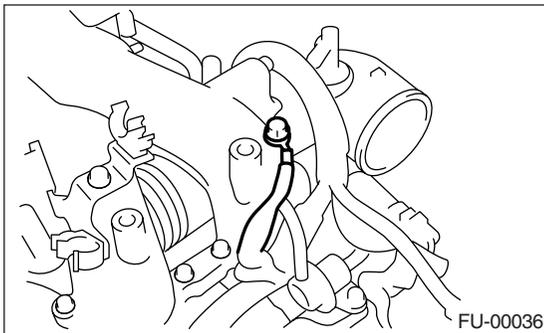
2) Remove the fuel pipe protector RH.

NOTE:

Bolt (A) is tightened together with ground cable.

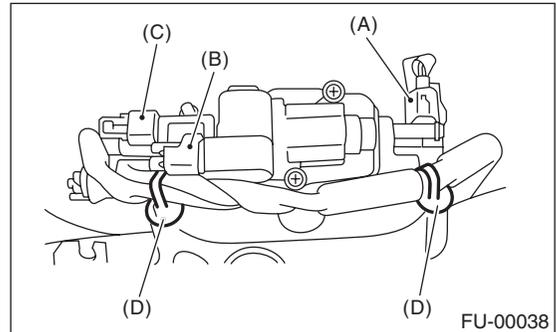


3) Remove the engine ground cable from intake manifold.

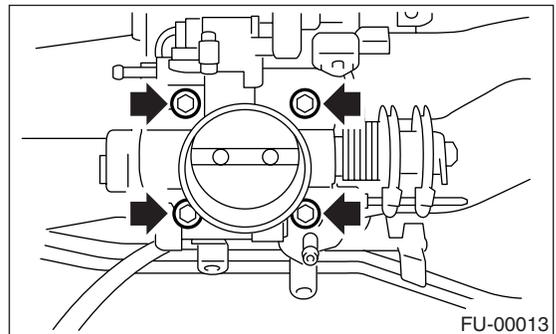


4) Disconnect the connector from the throttle position sensor (A), idle air control solenoid valve (B) and manifold absolute pressure sensor (C).

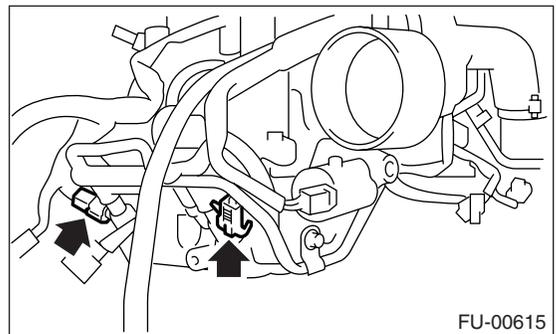
5) Disconnect the engine harness fixed by clip (D) from intake manifold.



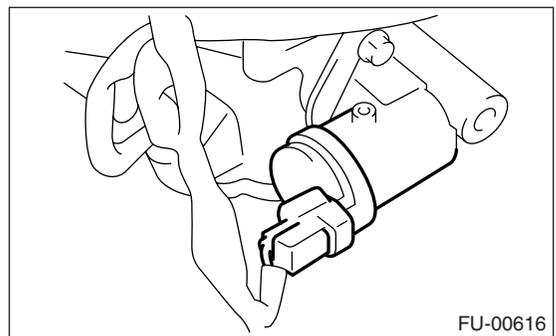
6) Remove the throttle body from intake manifold.



7) Disconnect the connector from fuel injector.



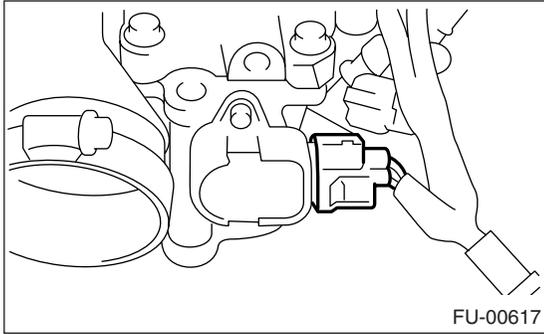
8) Disconnect the connector from tumble generator valve actuator.



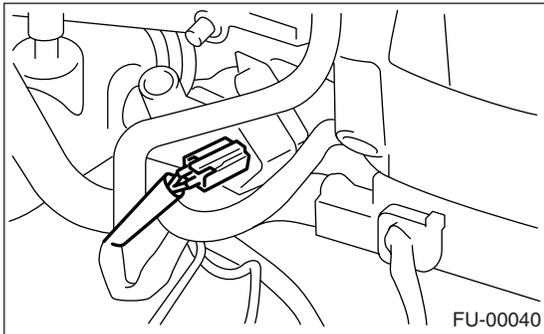
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

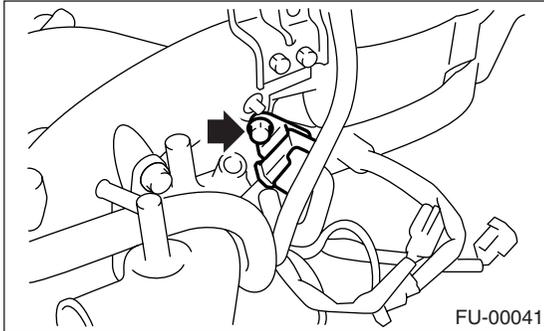
9) Disconnect the connector from tumble generator valve sensor.



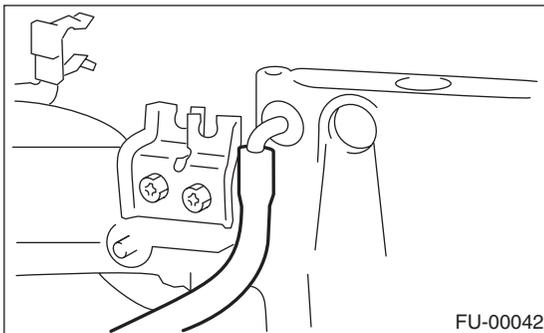
10) Disconnect the connector from purge control solenoid valve.



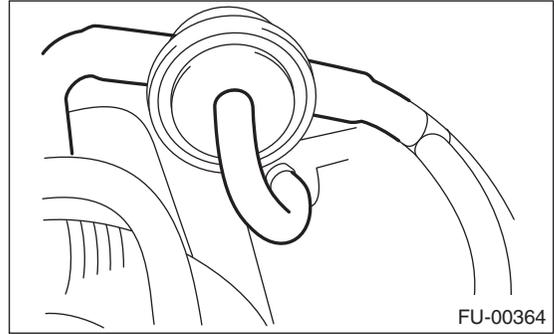
11) Remove the purge control solenoid valve.



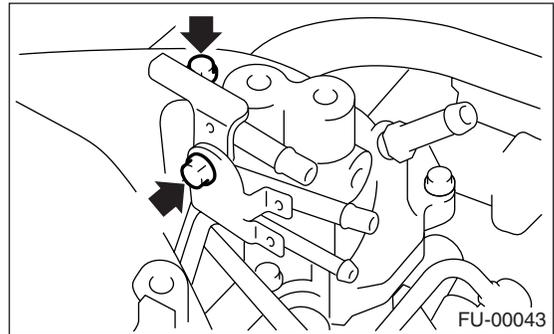
12) Disconnect the evaporation hose from intake manifold.



13) Disconnect the evaporation hose from purge valve.

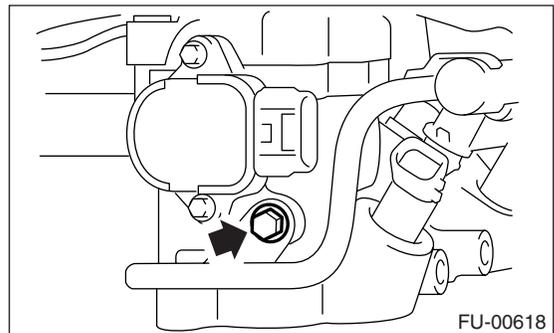
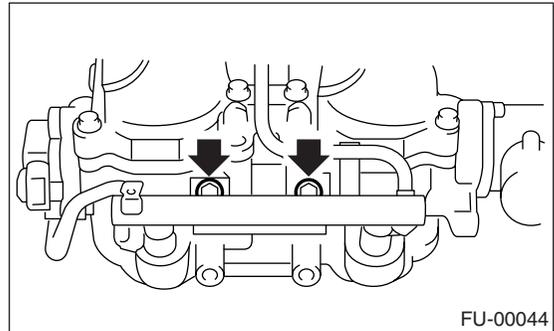


14) Remove the two bolts which hold the fuel pipes on the left side of intake manifold.



15) Remove the bolts which hold the fuel injector pipe onto intake manifold.

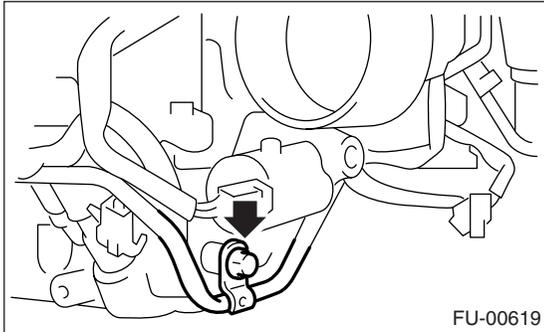
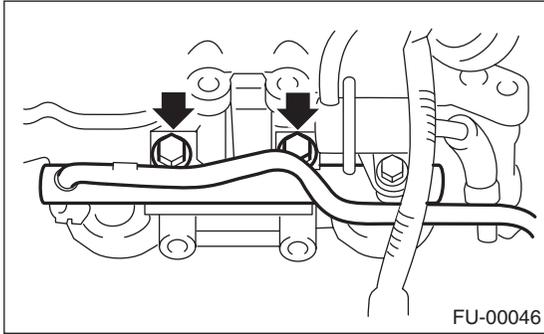
• LH SIDE



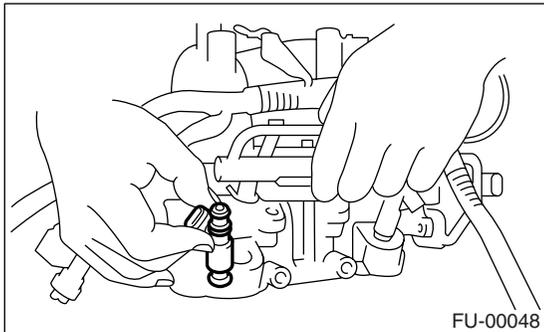
Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

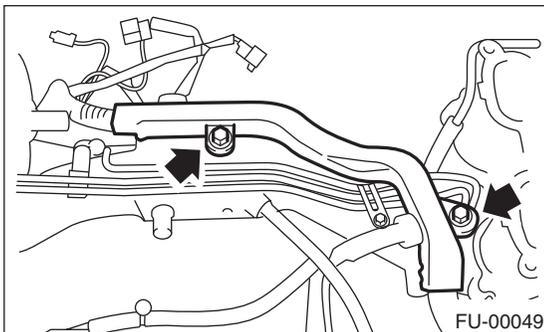
• RH SIDE



16) Remove the fuel injector.

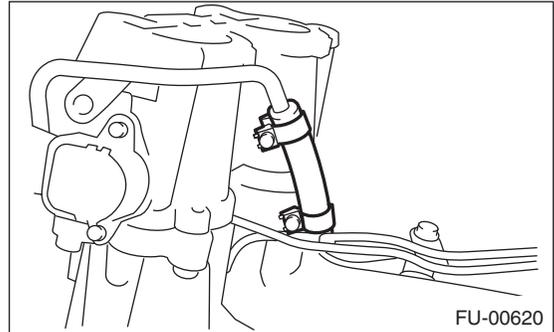


17) Remove the harness bracket which holds the engine harness onto intake manifold.



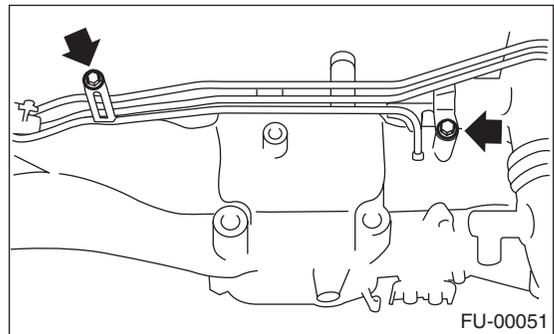
18) Remove the engine harness from intake manifold.

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



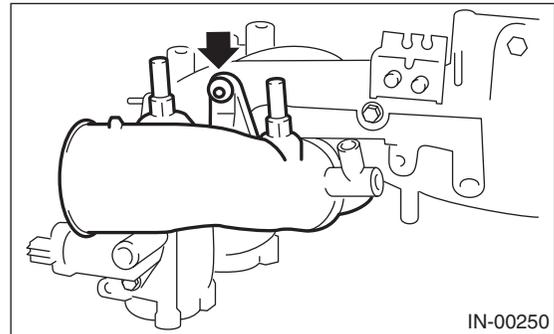
20) Remove the fuel injector pipe LH.

21) Remove the bolts which install the fuel pipe on intake manifold.

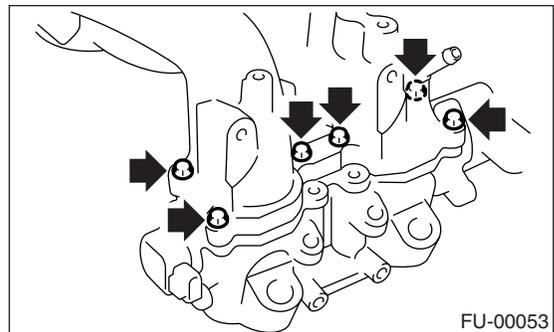


22) Remove the fuel pipe assembly and pressure regulator from intake manifold.

23) Remove the intake duct from intake manifold.



24) Remove the intake manifold.



Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

D: ASSEMBLY

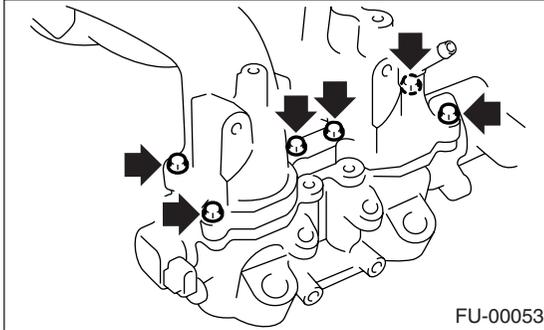
NOTE:

Replace the gasket with a new one.

1) Install the intake manifold.

Tightening torque:

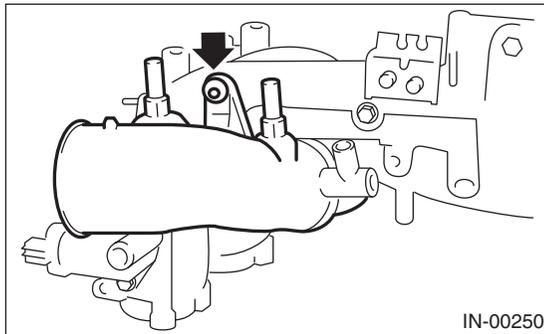
8.25 N·m (0.84 kgf-m, 6.1 ft-lb)



2) Install the air intake duct to intake manifold.

Tightening torque:

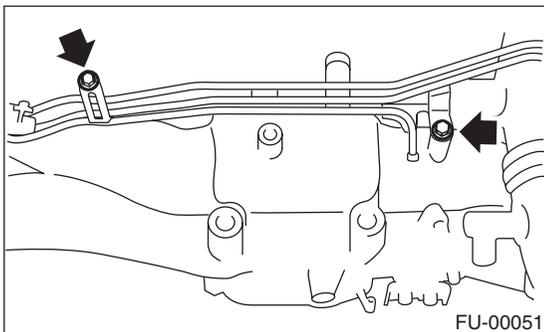
19 N·m (1.9 kgf-m, 14.0 ft-lb)



3) Install the fuel pipe assembly and pressure regulator to intake manifold.

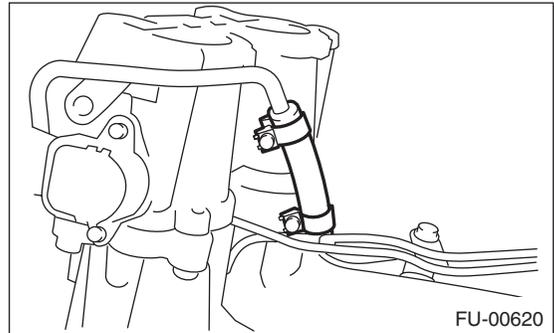
Tightening torque:

5 N·m (0.5 kgf-m, 3.7 ft-lb)



4) Install the fuel injector pipe LH.

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

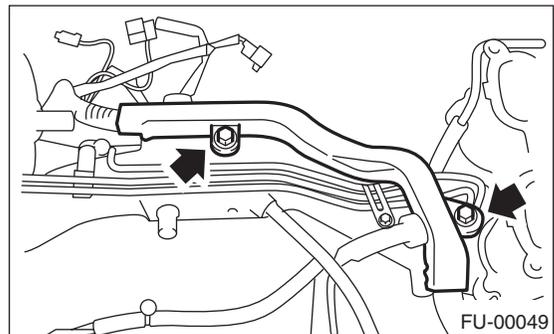


6) Install the engine harness to intake manifold.

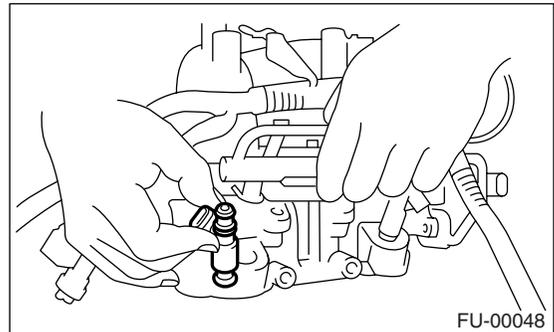
7) Install the harness bracket which holds the engine harness onto intake manifold.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



8) Install the fuel injector.



Intake Manifold

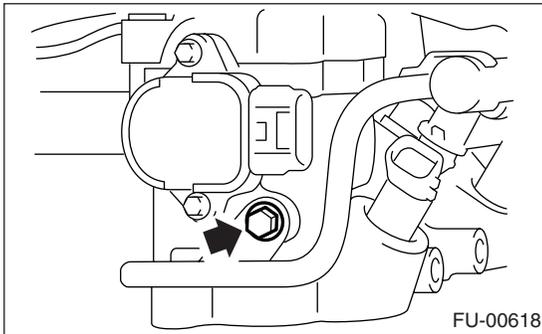
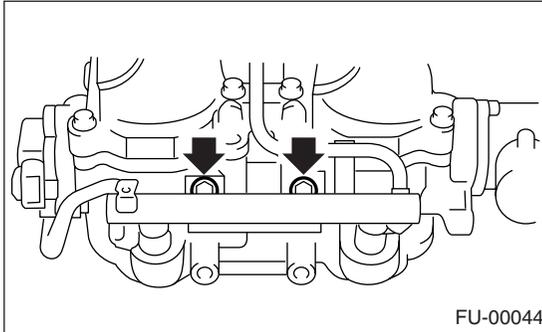
FUEL INJECTION (FUEL SYSTEM)

9) Tighten the bolts which install the fuel injector pipe onto intake manifold.

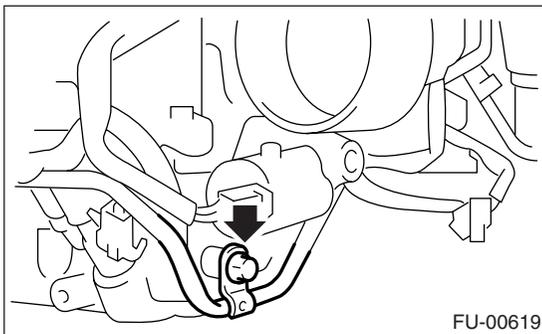
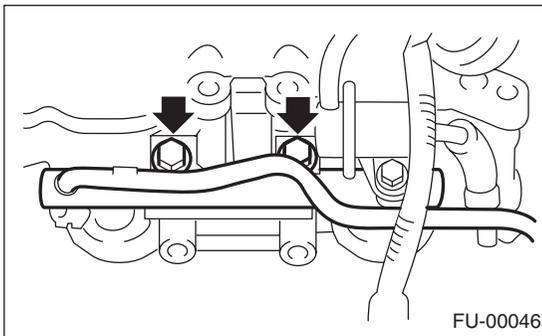
Tightening torque:

19 N·m (1.9 kgf·m, 14.0 ft·lb)

• LH SIDE



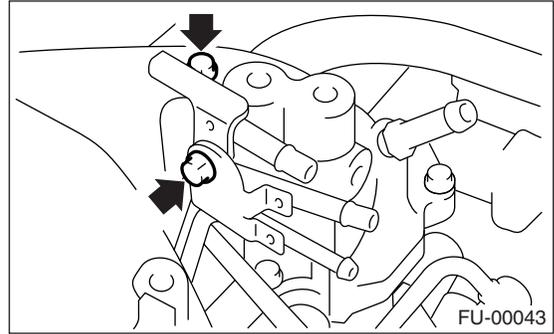
• RH SIDE



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

Tightening torque:

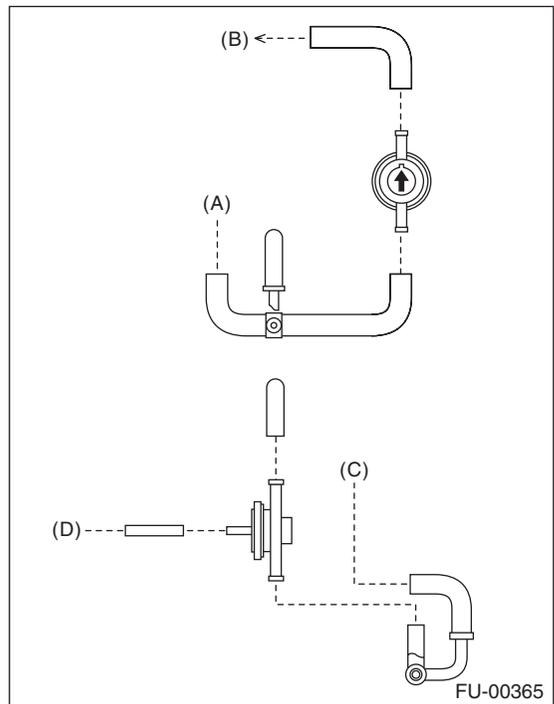
5 N·m (0.5 kgf·m, 3.7 ft·lb)



11) Connect the evaporation hoses to the purge valve. (Except Australia model)

NOTE:

Connect the evaporation hose as shown in the figure.

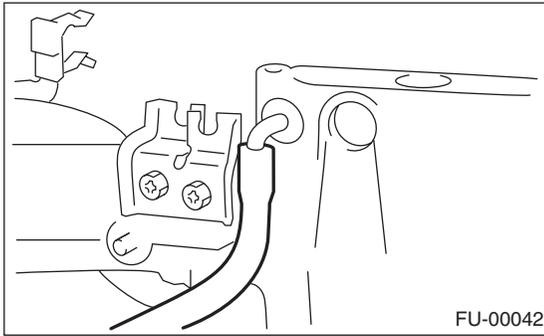


- (A) To fuel pipe ASSY
- (B) To intake duct
- (C) To purge control solenoid valve
- (D) To intake manifold

Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

12) Connect the evaporation hose to intake manifold.

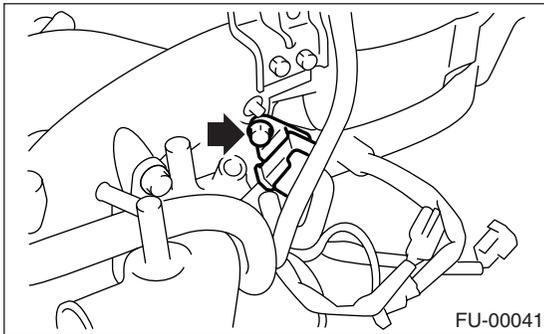


FU-00042

13) Install the purge control solenoid valve.

Tightening torque:

16 N·m (1.6 kgf-m, 11.8 ft-lb)

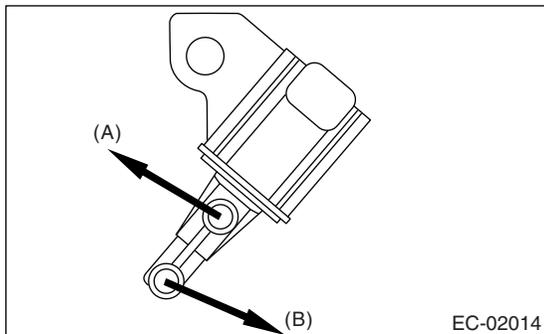


FU-00041

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

NOTE:

Connect the evaporation hose as shown in the figure.

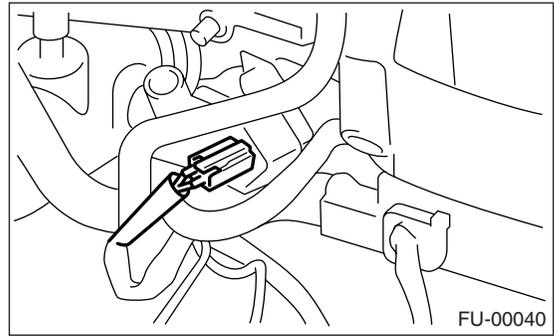


EC-02014

(A) To intake manifold

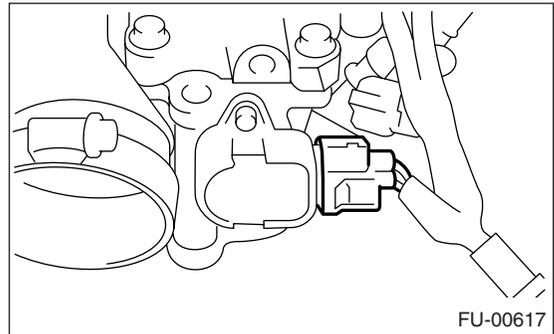
(B) To purge valve

15) Connect the connector to the purge control solenoid valve.



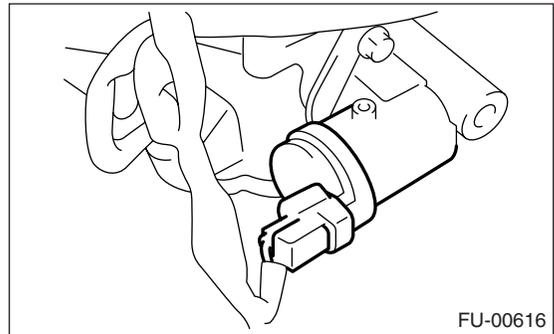
FU-00040

16) Connect the connector to the tumble generator valve sensor.



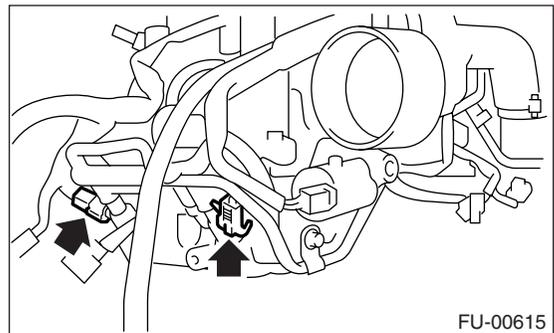
FU-00617

17) Connect the connector to the tumble generator valve actuator.



FU-00616

18) Connect the connector to fuel injector.



FU-00615

Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

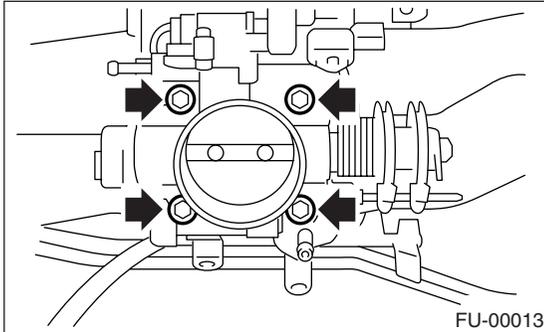
19) Install the throttle body to intake manifold.

NOTE:

Replace the gasket with a new one.

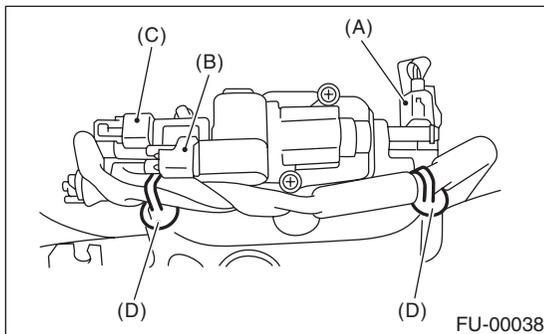
Tightening torque:

22 N·m (2.2 kgf-m, 16.2 ft-lb)



20) Connect the connector to the throttle position sensor (A), idle air control solenoid valve (B) and manifold absolute pressure sensor (C).

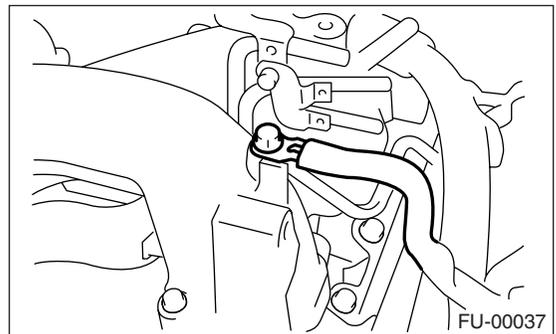
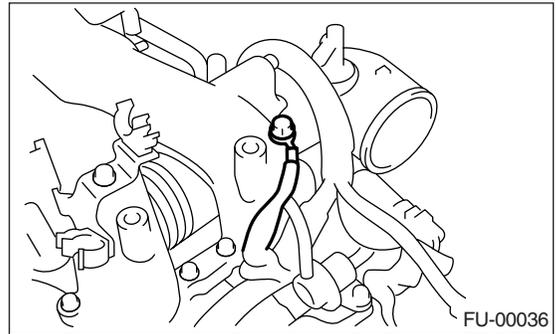
21) Connect the engine harness with clip (D) to intake manifold.



22) Install the engine ground cable to intake manifold.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



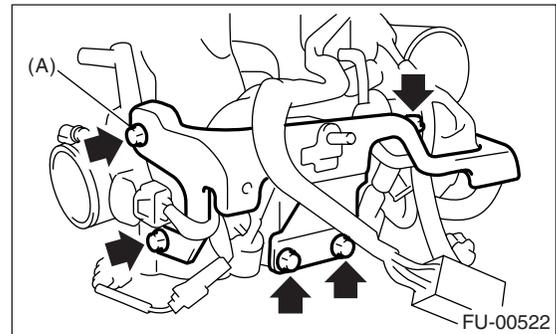
23) Install the fuel pipe protector RH.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

NOTE:

Bolt (A) is tightened together with ground cable. Tighten it securely.



Intake Manifold

FUEL INJECTION (FUEL SYSTEM)

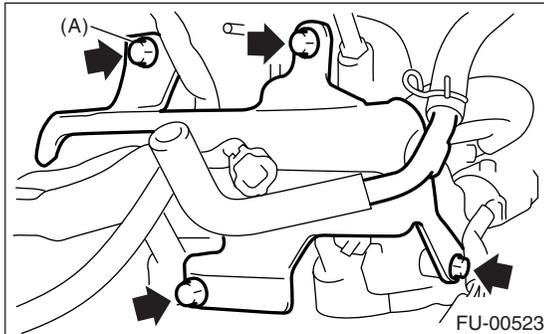
24) Install the fuel pipe protector LH.

NOTE:

Bolt (A) is tightened together with ground cable.
Tighten it securely.

Tightening torque:

19 N·m (1.9 kgf·m, 14.0 ft·lb)



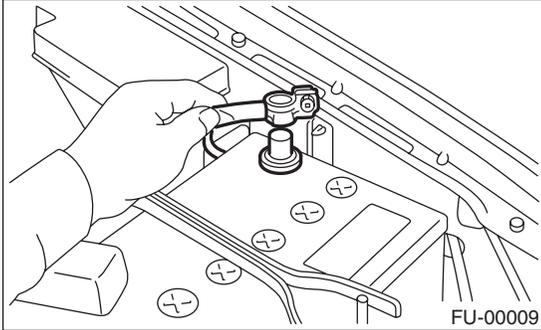
E: INSPECTION

Make sure the fuel pipe and fuel hoses are not cracked and the connections are tightened firmly.

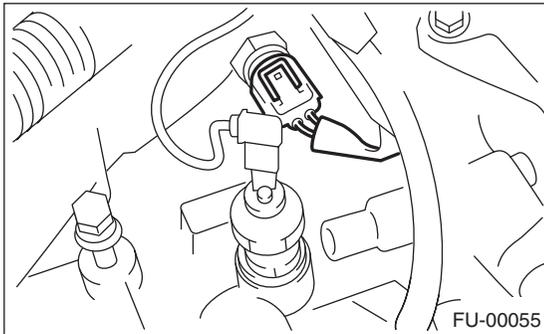
4. Engine Coolant Temperature Sensor

A: REMOVAL

- 1) Disconnect the ground cable from battery.



- 2) Remove the generator. <Ref. to SC(H4SO)-15, REMOVAL, Generator.>
- 3) Drain the engine coolant. <Ref. to CO(H4SO)-19, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
- 4) Disconnect the connector from engine coolant temperature sensor.



- 5) Remove the engine coolant temperature sensor.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

18 N·m (1.8 kgf·m, 13.3 ft·lb)

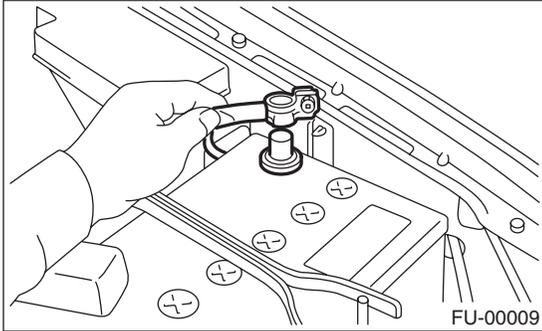
Crankshaft Position Sensor

FUEL INJECTION (FUEL SYSTEM)

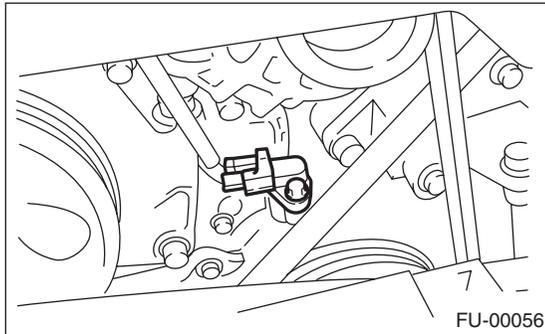
5. Crankshaft Position Sensor

A: REMOVAL

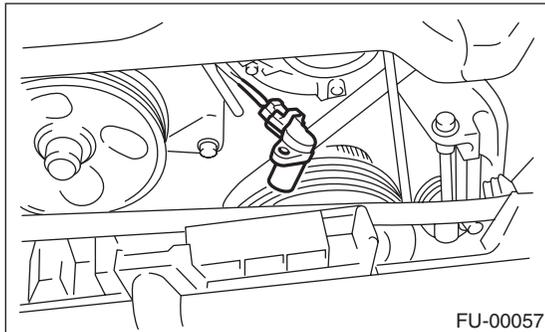
1) Disconnect the ground cable from battery.



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



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

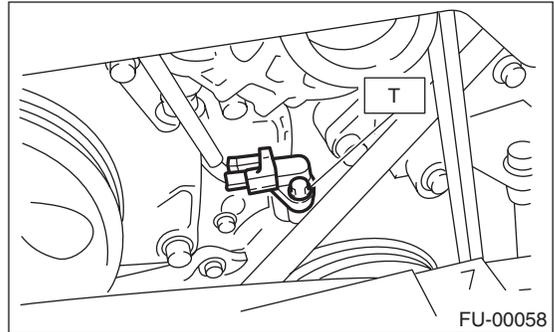


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

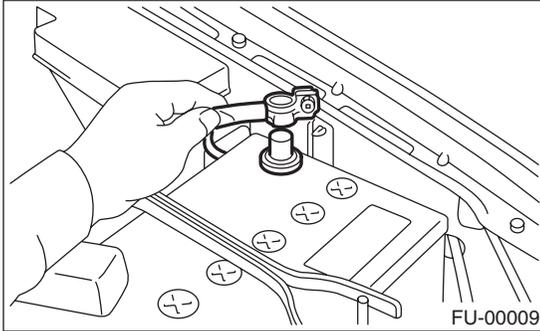
T: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



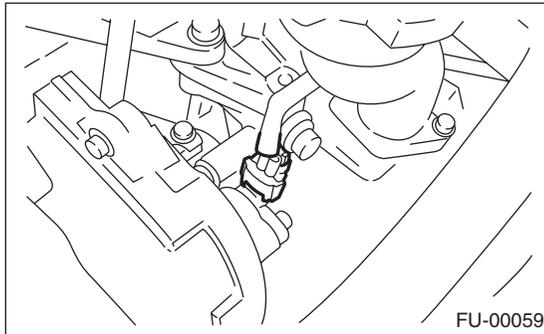
6. Camshaft Position Sensor

A: REMOVAL

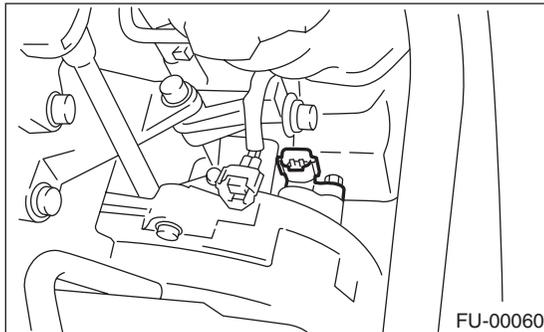
1) Disconnect the ground cable from battery.



2) Disconnect the connector from camshaft position sensor.



3) Remove the camshaft position sensor from camshaft support LH.

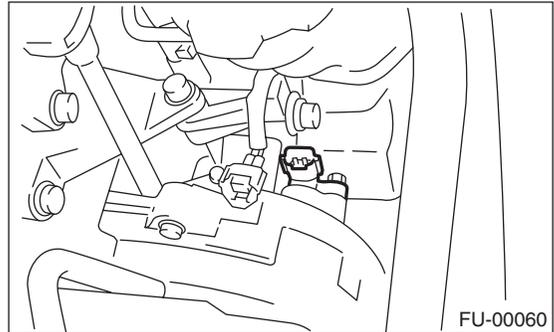


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

T: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



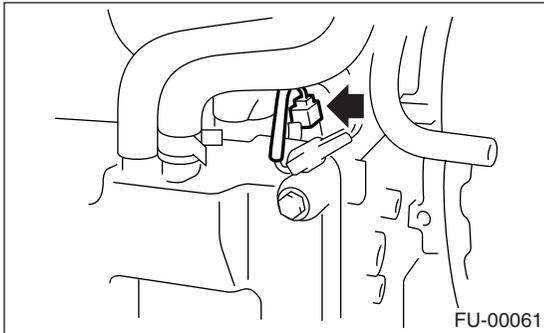
AVCS Camshaft Position Sensor

FUEL INJECTION (FUEL SYSTEM)

7. AVCS Camshaft Position Sensor

A: REMOVAL

- 1) Disconnect the ground cable from battery.
- 2) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 3) Remove the intake manifold. <Ref. to FU(H4DOTC)-14, REMOVAL, Intake Manifold.>
- 4) Disconnect the AVCS camshaft position sensor connector.
- 5) Remove the AVCS camshaft position sensor.



B: INSTALLATION

Install in the reverse order of removal.

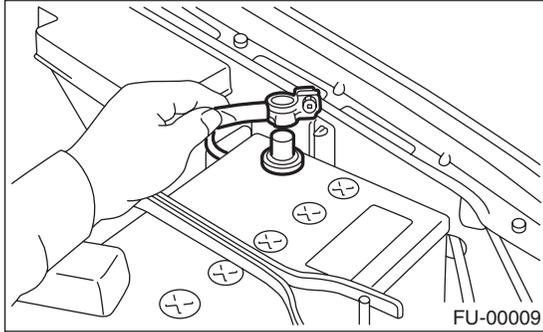
Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

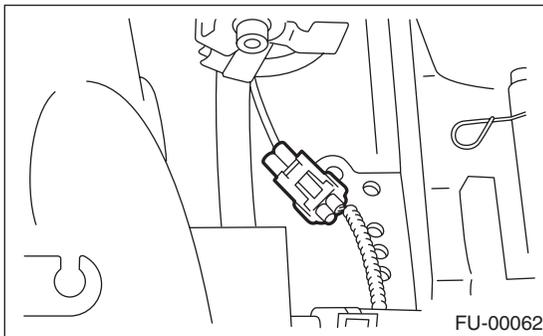
8. Knock Sensor

A: REMOVAL

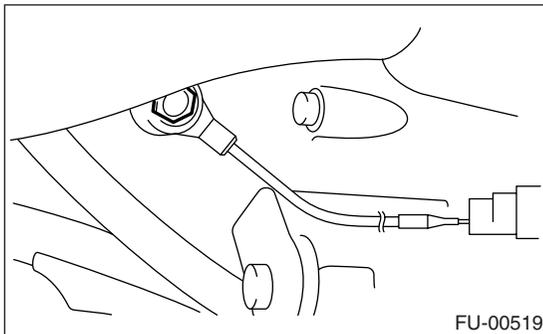
- 1) Disconnect the ground cable from battery.



- 2) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>
- 3) Disconnect the knock sensor connector.



- 4) Remove the knock sensor from cylinder block.



B: INSTALLATION

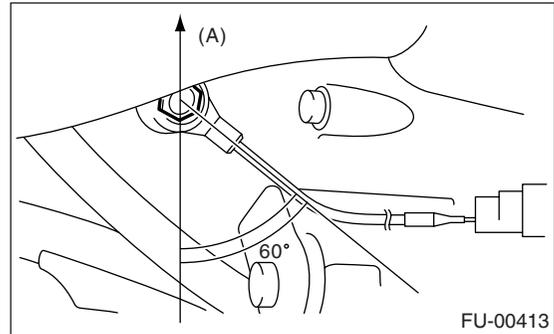
- 1) Install the knock sensor to cylinder block.

Tightening torque:

24 N·m (2.4 kgf-m, 17.4 ft-lb)

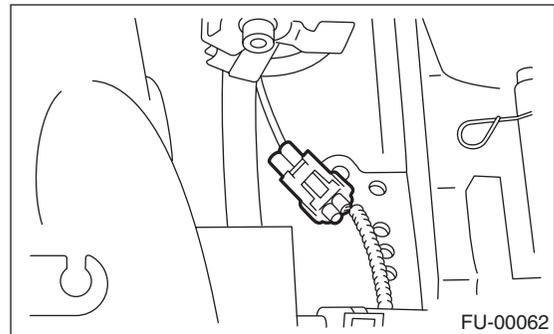
NOTE:

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

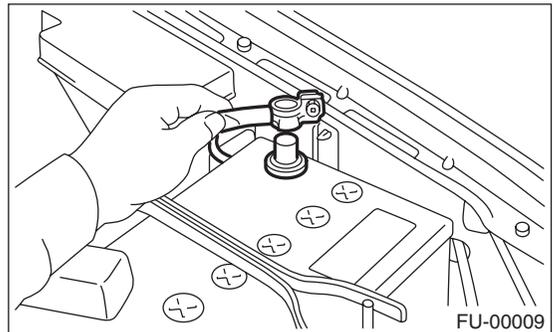


(A) Front side

- 2) Connect the knock sensor connector.



- 3) Install the intercooler. <Ref. to IN(H4DOTC)-11, INSTALLATION, Intercooler.>
- 4) Connect the battery ground cable to battery.



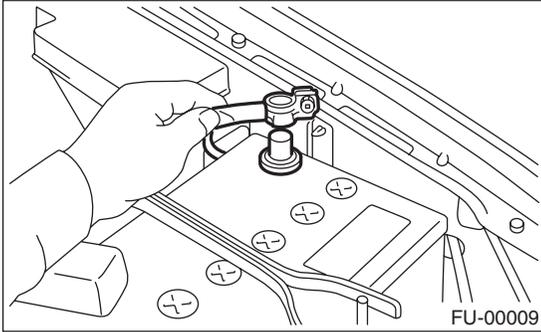
Throttle Position Sensor

FUEL INJECTION (FUEL SYSTEM)

9. Throttle Position Sensor

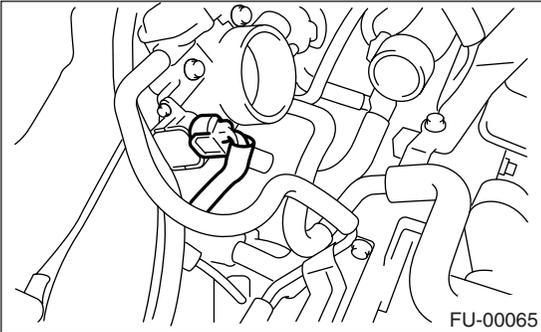
A: REMOVAL

1) Disconnect the ground cable from battery.

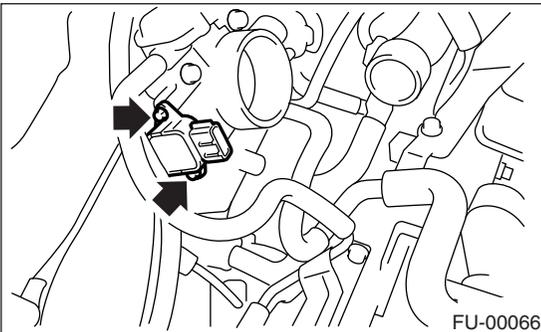


2) Remove the intercooler. <Ref. to IN(H4DOTC)-10, REMOVAL, Intercooler.>

3) Disconnect the connector from throttle position sensor.



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

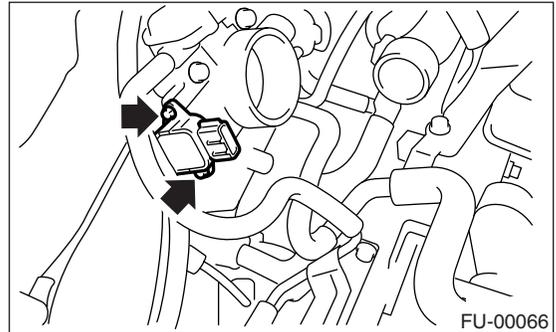


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

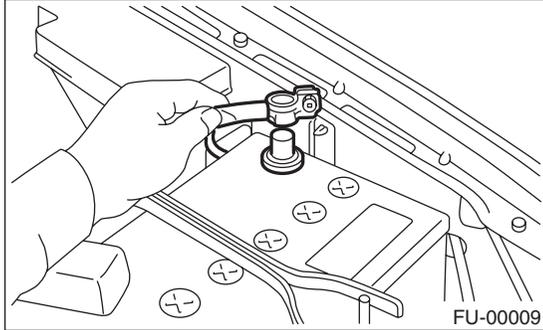
1.6 N·m (0.16 kgf-m, 1.2 ft-lb)



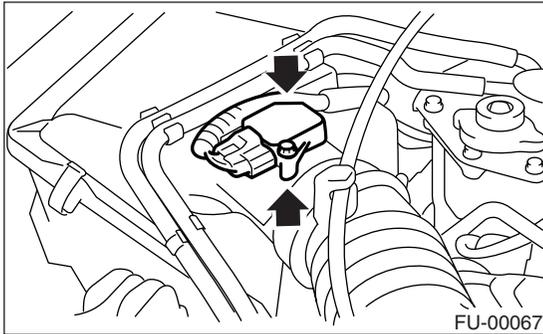
10. Mass Air Flow and Intake Air Temperature Sensor

A: REMOVAL

- 1) Disconnect the ground cable from battery.



- 2) Disconnect the connector from mass air flow and intake air temperature sensor.
- 3) Remove the mass air flow and intake air temperature sensor.



B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

1.7 N·m (0.17 kgf-m, 1.3 ft-lb)

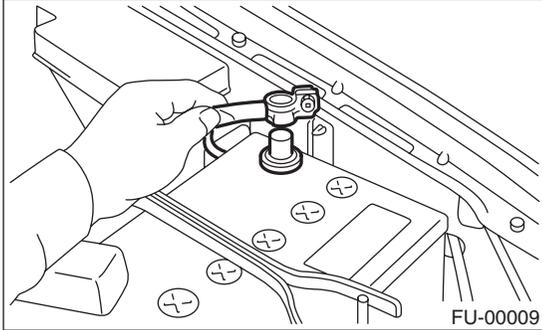
Manifold Absolute Pressure Sensor

FUEL INJECTION (FUEL SYSTEM)

11. Manifold Absolute Pressure Sensor

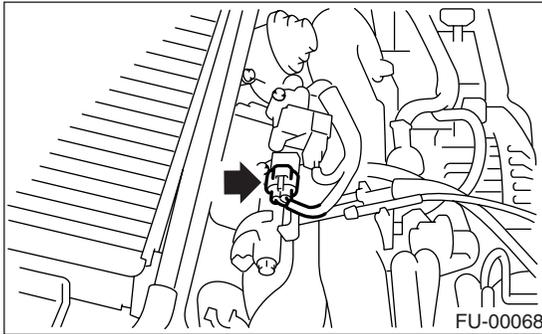
A: REMOVAL

1) Disconnect the ground cable from battery.



2) Remove the idle air control solenoid valve. <Ref. to FU(H4DOTC)-37, REMOVAL, Idle Air Control Solenoid Valve.>

3) Disconnect the connectors from manifold absolute pressure sensor.



4) Remove the manifold absolute pressure sensor from throttle body.

B: INSTALLATION

Install in the reverse order of removal.

NOTE:

Replace the O-rings for manifold absolute pressure sensor with new ones.

Tightening torque:

1.6 N·m (0.16 kgf-m, 1.2 ft-lb)

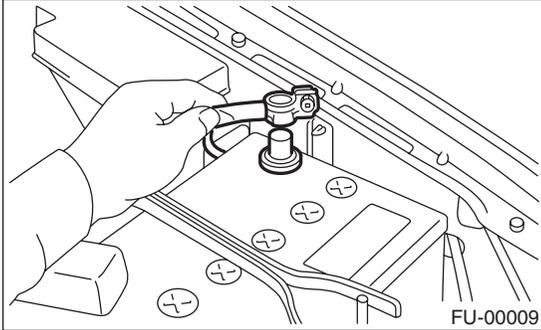
Idle Air Control Solenoid Valve

FUEL INJECTION (FUEL SYSTEM)

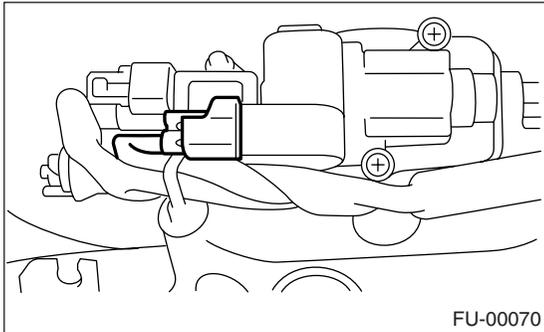
12. Idle Air Control Solenoid Valve

A: REMOVAL

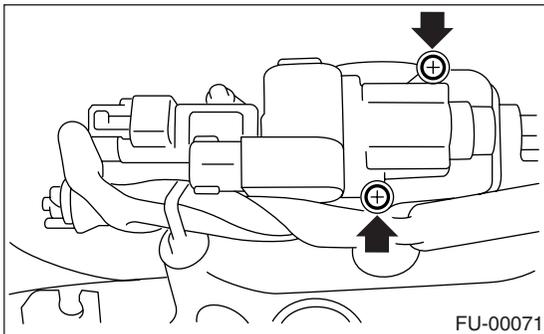
1) Disconnect the ground cable from battery.



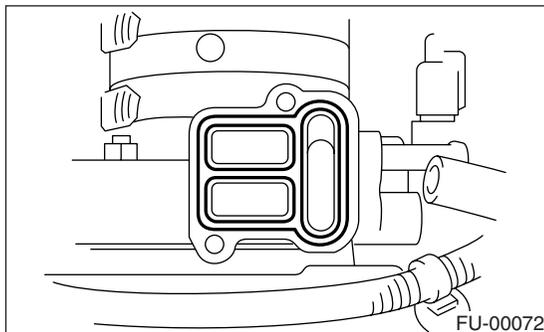
2) Disconnect the connector from idle air control solenoid valve.



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



4) Remove the gasket from throttle body.



B: INSTALLATION

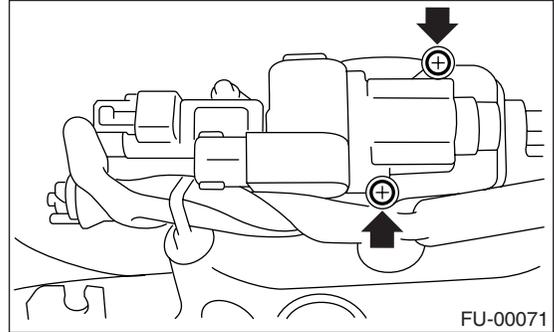
Install in the reverse order of removal.

NOTE:

Replace the gasket with a new one.

Tightening torque:

2.8 N·m (0.29 kgf-m, 2.1 ft-lb)



Fuel Injector

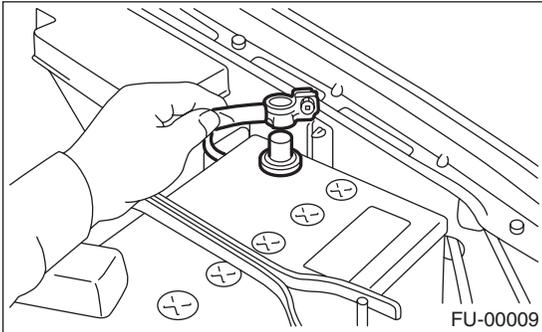
FUEL INJECTION (FUEL SYSTEM)

13. Fuel Injector

A: REMOVAL

1. RH SIDE

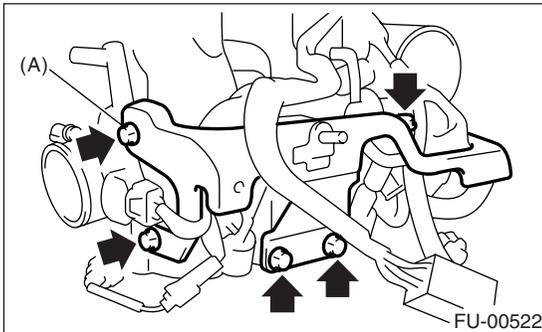
- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel filler flap lid and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.



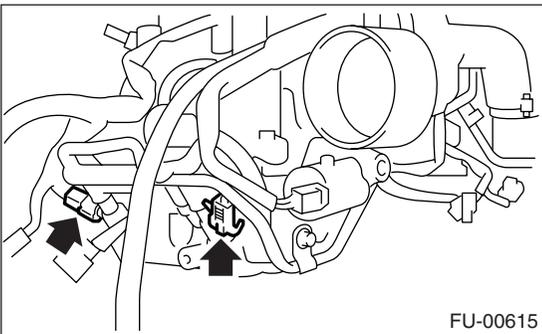
- 4) Remove the intake manifold. <Ref. to FU(H4DOTC)-14, REMOVAL, Intake Manifold.>
- 5) Remove the fuel pipe protector RH.

NOTE:

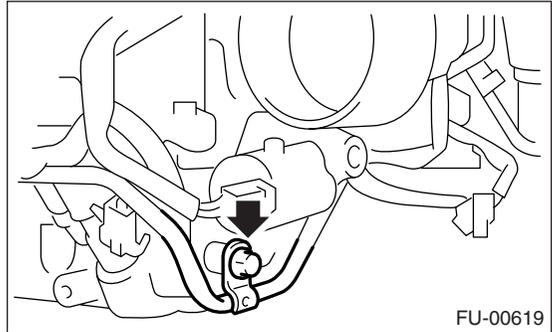
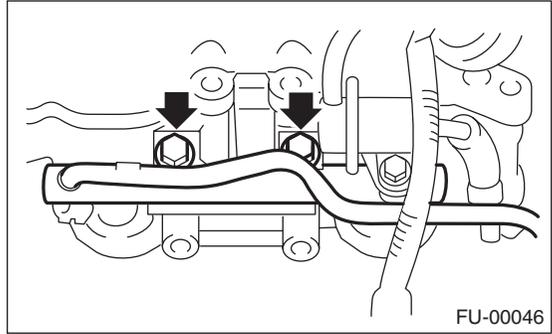
Bolt (A) is tightened together with ground cable.



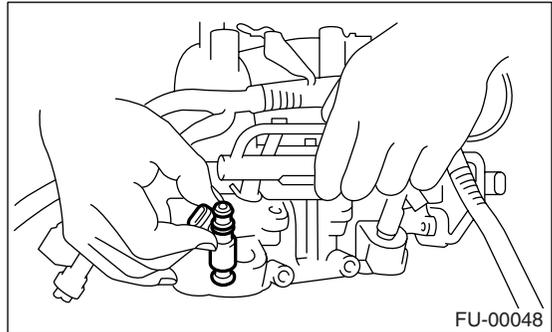
- 6) Disconnect the connector from fuel injector.



- 7) Remove the bolts which hold the injector pipe to intake manifold.

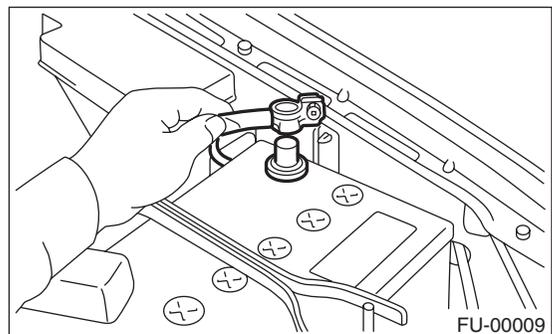


- 8) Remove the fuel injector while lifting up the fuel injector pipe.



2. LH SIDE

- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel filler flap lid and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.



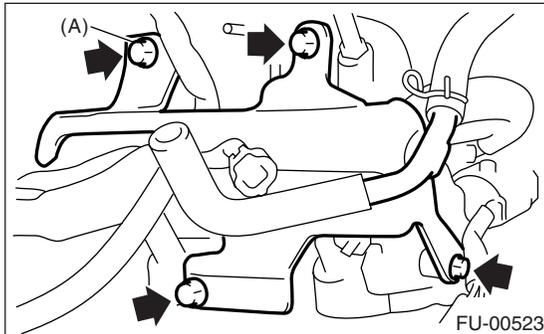
Fuel Injector

4) Remove the intake manifold. <Ref. to FU(H4DOTC)-14, REMOVAL, Intake Manifold.>

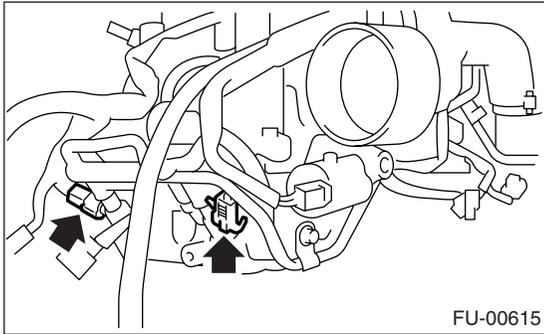
5) Remove the fuel pipe protector LH.

NOTE:

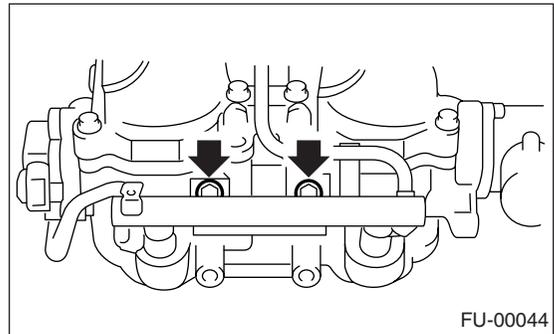
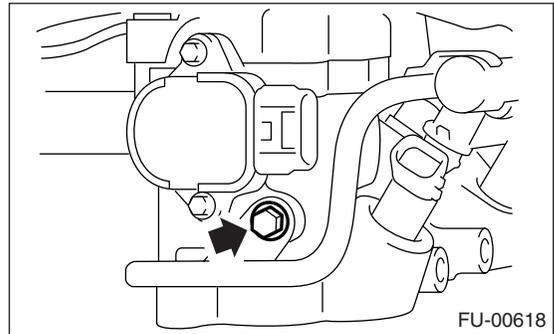
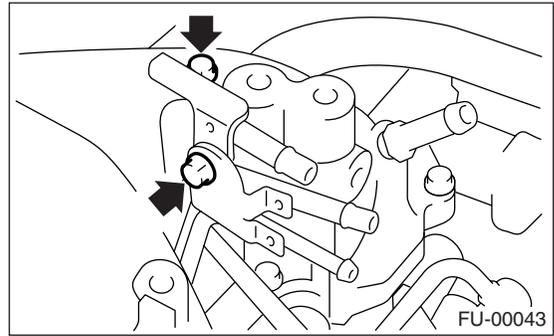
Bolt (A) is tightened together with ground cable.



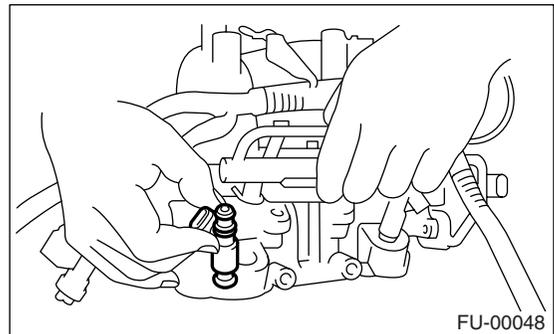
6) Disconnect the connector from fuel injector.



7) Remove the bolts which hold the fuel injector pipe to intake manifold.



8) Remove the fuel injector while lifting up the fuel injector pipe.



Fuel Injector

FUEL INJECTION (FUEL SYSTEM)

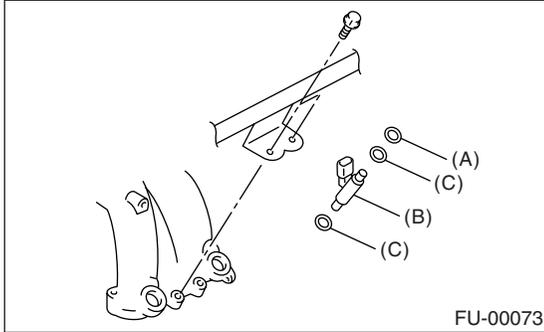
B: INSTALLATION

1. RH SIDE

Install in the reverse order of removal.

NOTE:

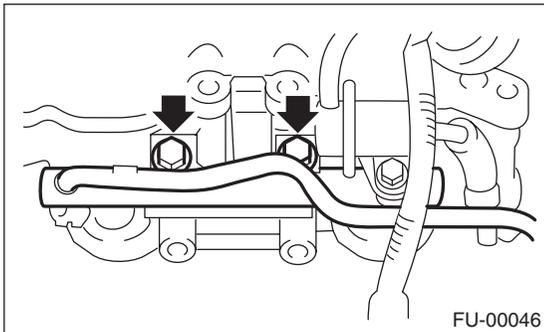
Replace the O-ring and insulators with new ones.



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

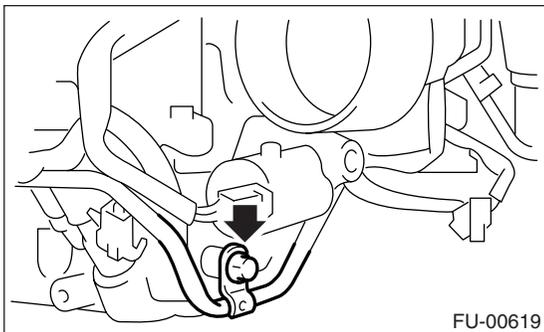
Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

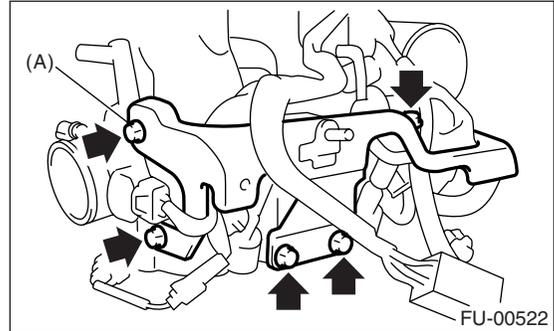


NOTE:

Bolt (A) is tightened together with ground cable. Tighten it securely.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

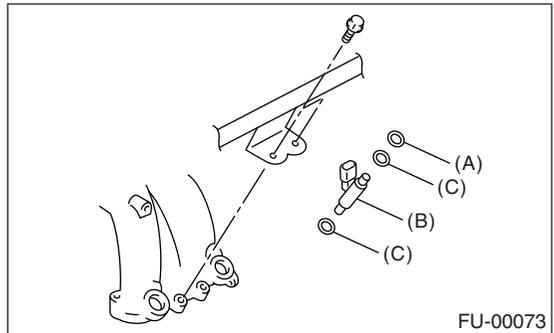


2. LH SIDE

Install in the reverse order of removal.

NOTE:

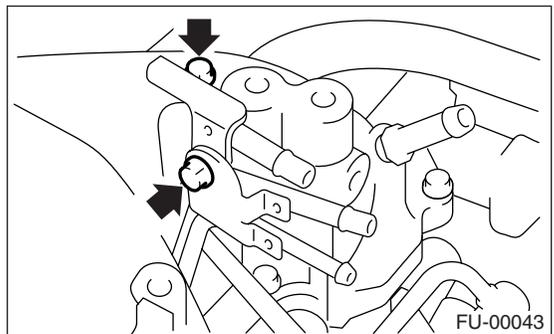
Replace the O-ring and insulators with new ones.



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

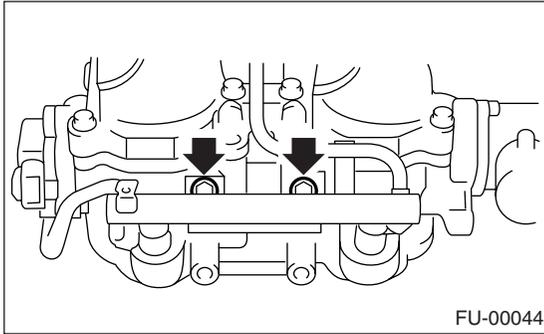
Tightening torque:

5 N·m (0.5 kgf-m, 3.7 ft-lb)



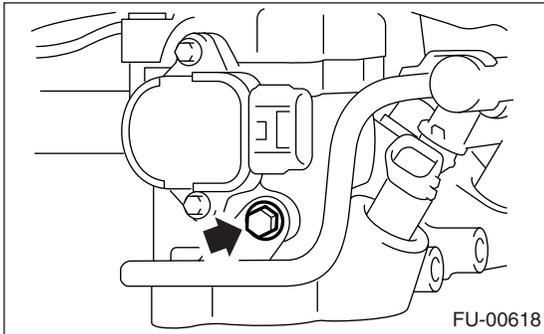
Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

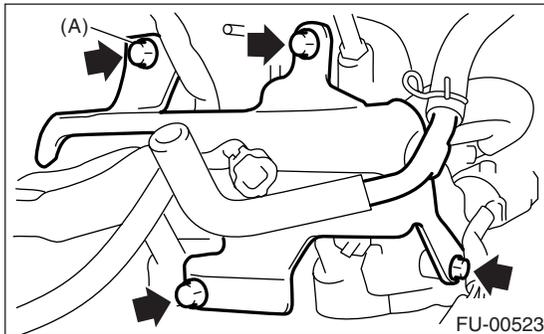


NOTE:

Bolt (A) is tightened together with ground cable.
Tighten it securely.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



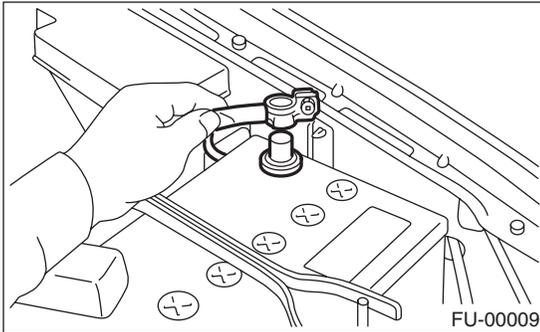
Tumble Generator Valve Assembly

FUEL INJECTION (FUEL SYSTEM)

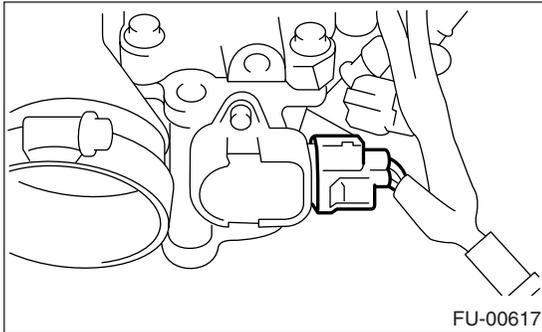
14. Tumble Generator Valve Assembly

A: REMOVAL

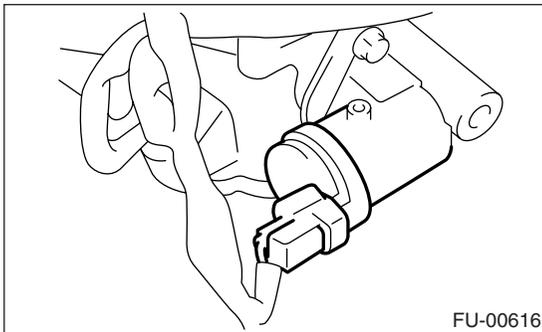
- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel filler flap lid, and then remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.



- 4) Remove the intake manifold. <Ref. to FU(H4DOTC)-14, REMOVAL, Intake Manifold.>
- 5) Disconnect the connector from tumble generator valve sensor.

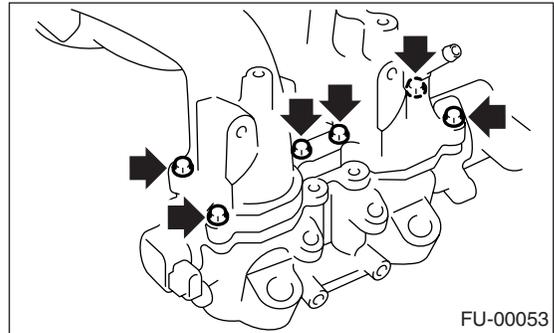


- 6) Disconnect the connector from tumble generator valve actuator.



- 7) Remove the fuel injector. <Ref. to FU(H4DOTC)-38, REMOVAL, Fuel Injector.>

- 8) Remove the tumble generator valve body from intake manifold.



B: INSTALLATION

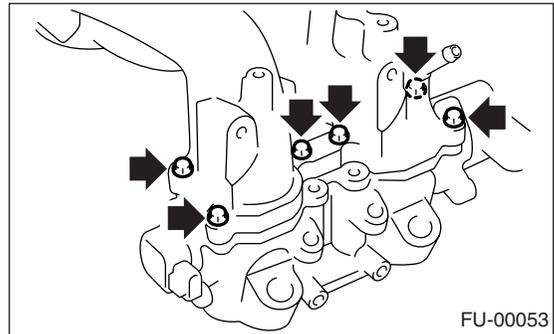
Install in the reverse order of removal.

NOTE:

Always use new gaskets.

Tightening torque:

8.25 N·m (0.84 kgf-m, 6.1 ft-lb)



Tumble Generator Valve Actuator

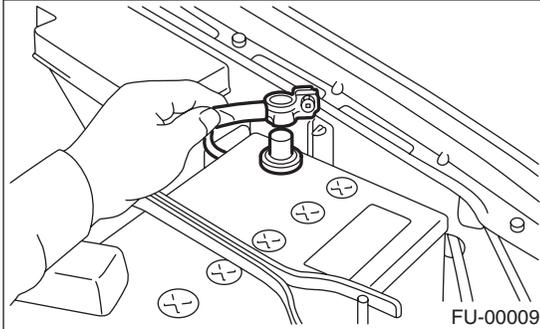
FUEL INJECTION (FUEL SYSTEM)

15. Tumble Generator Valve Actuator

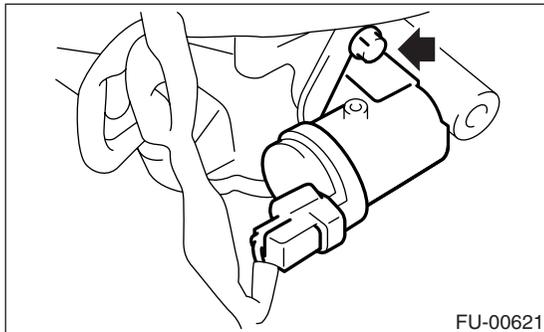
A: REMOVAL

1. RH SIDE

- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel filler flap lid and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.

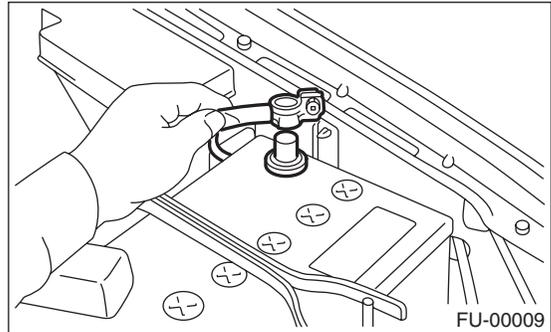


- 4) Remove the intake manifold. <Ref. to FU(H4DOTC)-14, REMOVAL, Intake Manifold.>
- 5) Disconnect the connector from tumble generator valve actuator RH.
- 6) Remove the tumble generator valve RH.

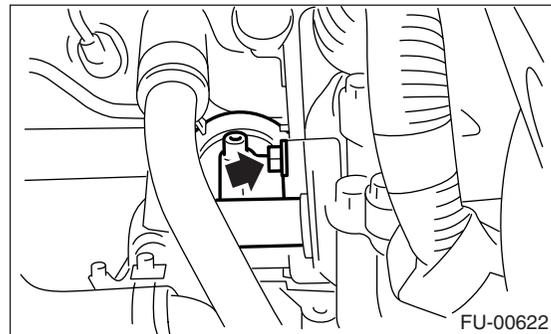


2. LH SIDE

- 1) Disconnect the ground cable from battery.



- 2) Disconnect the connector from tumble generator valve LH.
- 3) Remove the tumble generator valve actuator LH.



B: INSTALLATION

1. RH SIDE

Install in the reverse order of removal.

2. LH SIDE

Install in the reverse order of removal.

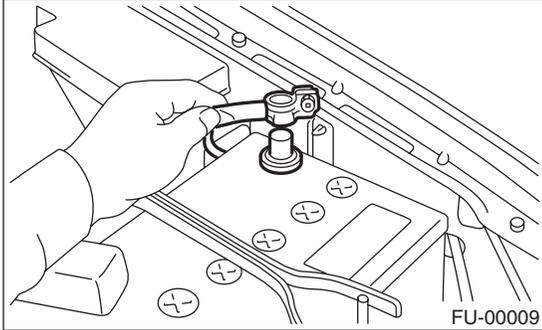
Wastegate Control Solenoid Valve Assembly

FUEL INJECTION (FUEL SYSTEM)

16. Wastegate Control Solenoid Valve Assembly

A: REMOVAL

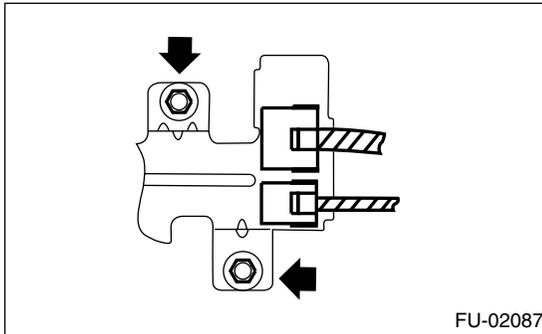
1) Disconnect the ground cable from battery.



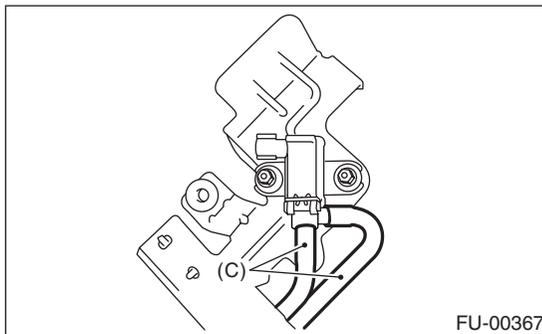
2) Disconnect the connector from wastegate control solenoid valve assembly.

3) Disconnect the engine harness connector from bracket.

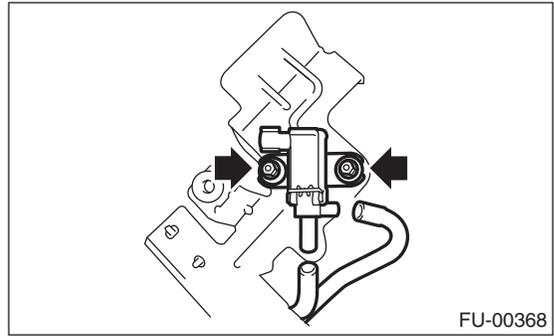
4) Remove the bracket from body.



5) Disconnect the pressure hoses (C) from wastegate control solenoid valve assembly.



6) Remove the wastegate control solenoid valve assembly from bracket.

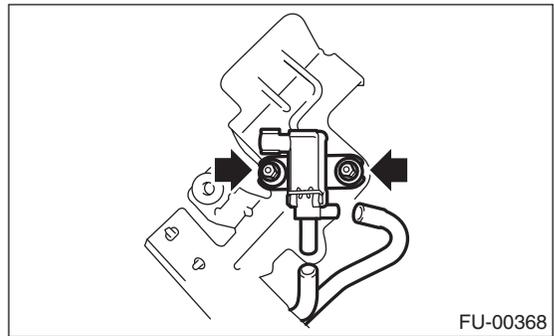


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

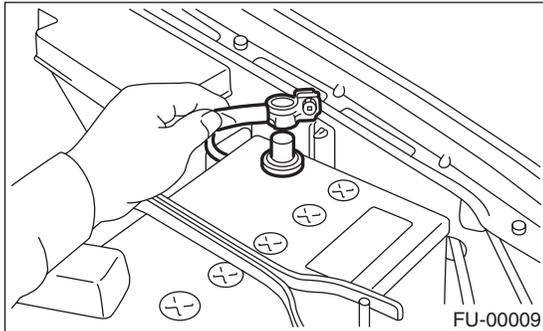
6.5 N·m (0.66 kgf·m, 4.8 ft·lb)



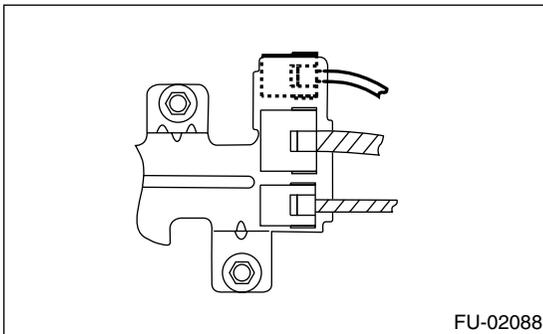
17. Front Oxygen (A/F) Sensor

A: REMOVAL

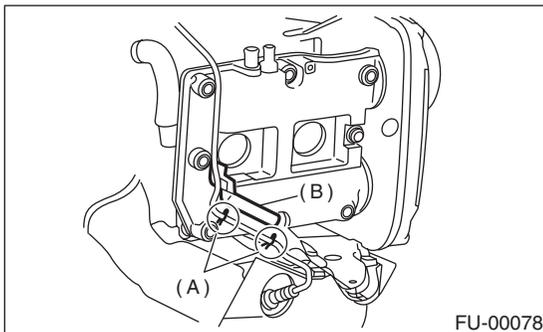
- 1) Disconnect the ground cable from battery.



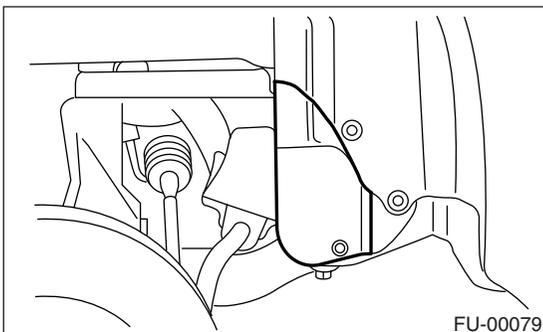
- 2) Disconnect the connector from front oxygen (A/F) sensor.



- 3) Disconnect the engine harness fixed by clip (A) from bracket (B).



- 4) Remove the front right side wheel.
- 5) Lift-up the vehicle.
- 6) Remove the service hole cover.



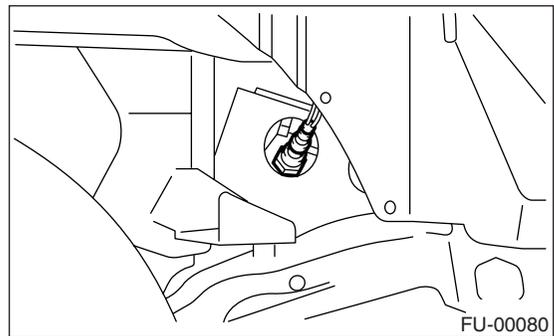
- 7) Apply SUBARU CRC or its equivalent to the threaded portion of front oxygen (A/F) sensor, and leave it for 1 minute or more.

SUBARU CRC (Part No. 004301003)

- 8) Remove the front oxygen (A/F) sensor.

CAUTION:

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



B: INSTALLATION

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

Anti-seize compound:

SS-30 JET LUBE

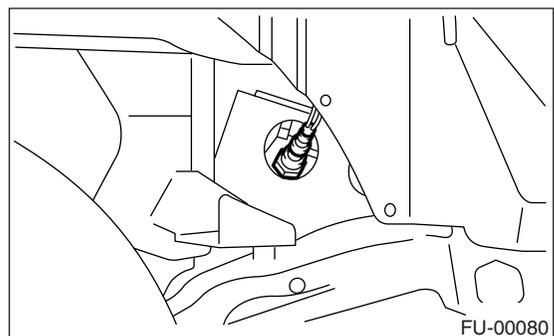
CAUTION:

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

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

Tightening torque:

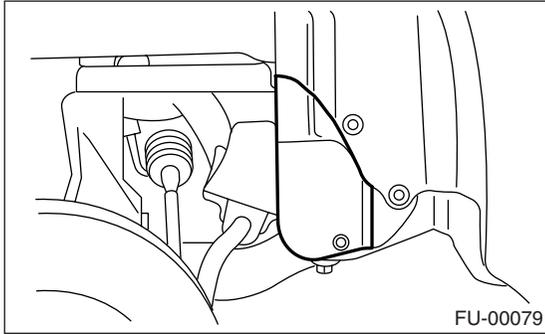
30 N·m (3.1 kgf-m, 22.1 ft-lb)



Front Oxygen (A/F) Sensor

FUEL INJECTION (FUEL SYSTEM)

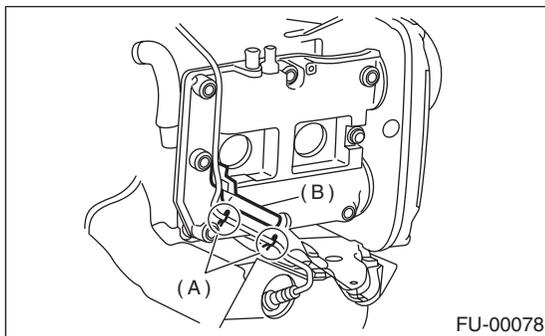
3) Install the service hole cover.



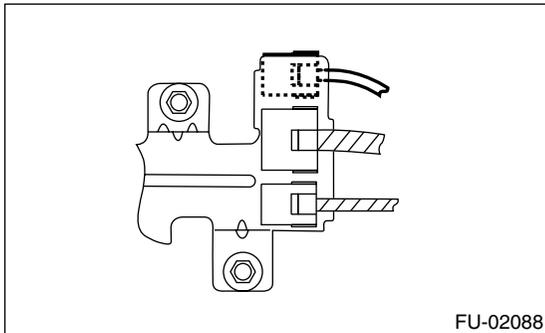
4) Lower the vehicle.

5) Install the front right side wheel.

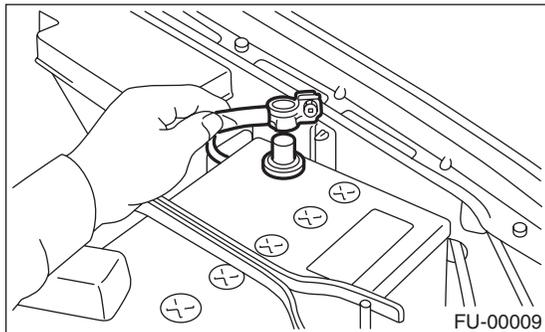
6) Connect the engine harness with clip (A) to bracket (B).



7) Connect the connector of front oxygen (A/F) sensor.



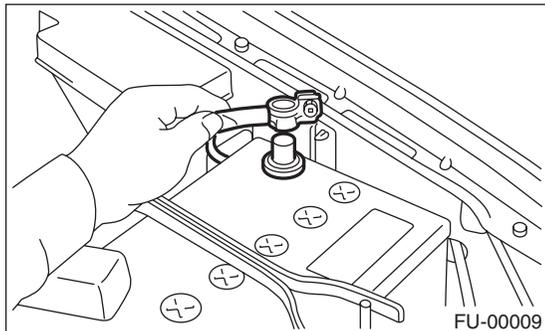
8) Connect the battery ground cable to battery.



18.Rear Oxygen Sensor

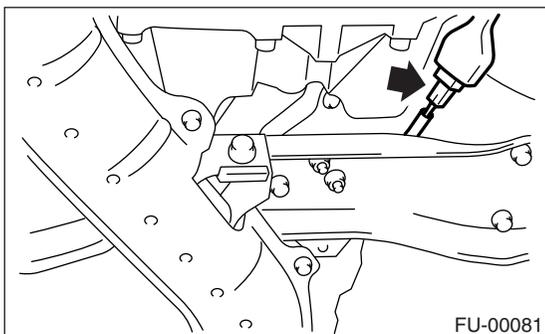
A: REMOVAL

1) Disconnect the ground cable from battery.



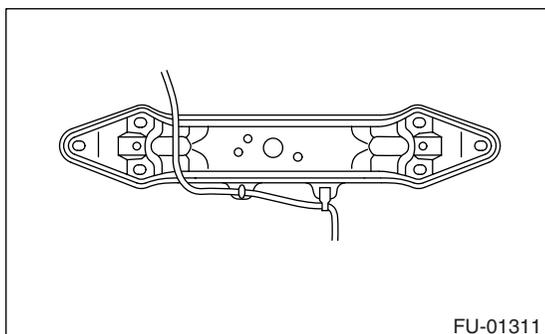
2) Lift-up the vehicle.

3) Disconnect the connector from rear oxygen sensor.

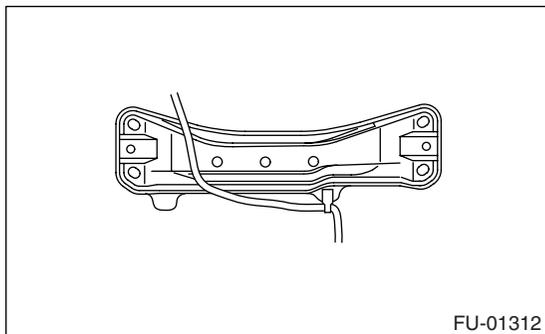


4) Remove the clip by pulling it out from the upper side of crossmember.

- AT model



- MT model



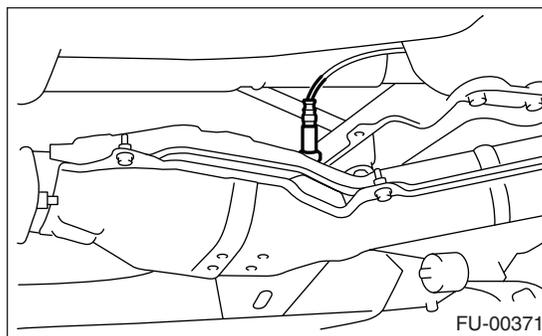
5) Apply SUBARU CRC or its equivalent to the threaded portion of rear oxygen sensor, and leave it for 1 minute or more.

SUBARU CRC (Part No. 004301003)

6) Remove the rear oxygen sensor.

CAUTION:

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



B: INSTALLATION

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

CAUTION:

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

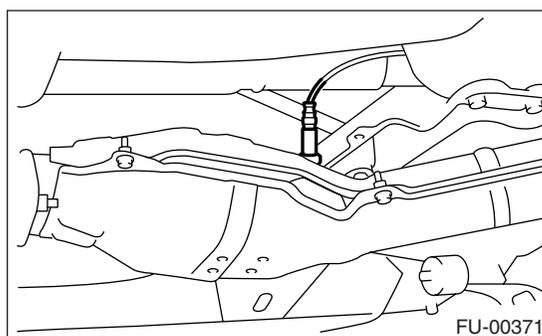
Anti-seize compound:

SS-30 JET LUBE

2) Install the rear oxygen sensor.

Tightening torque:

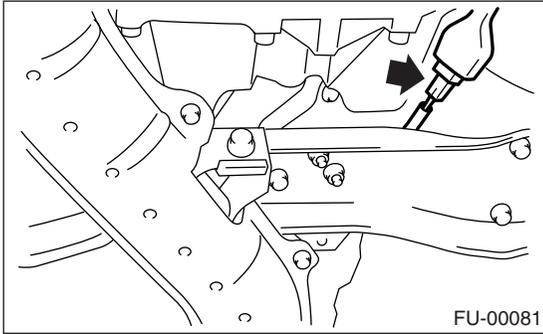
21 N·m (2.1 kgf-m, 15.2 ft-lb)



Rear Oxygen Sensor

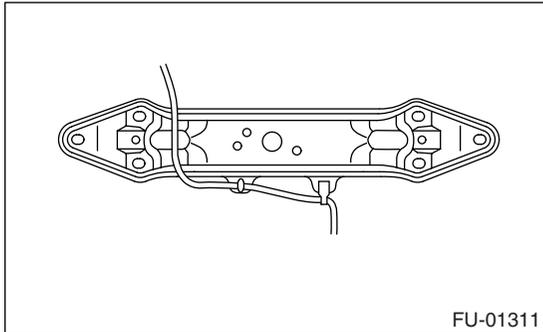
FUEL INJECTION (FUEL SYSTEM)

3) Connect the connector to rear oxygen sensor.

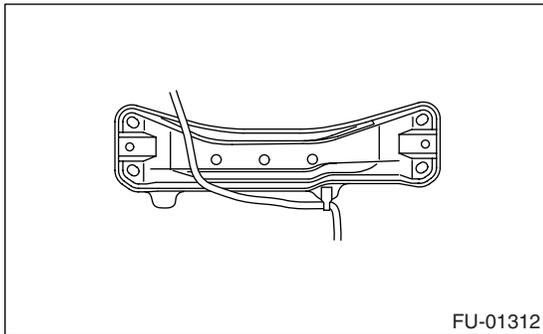


4) Connect the clip to crossmember.

- AT model

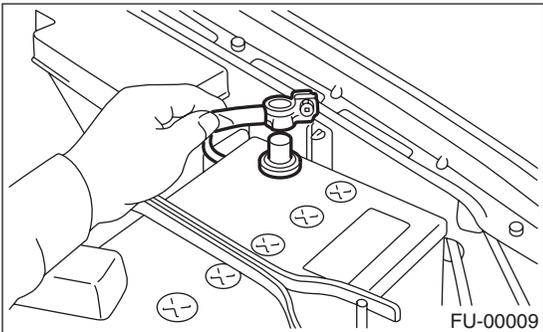


- MT model



5) Lower the vehicle.

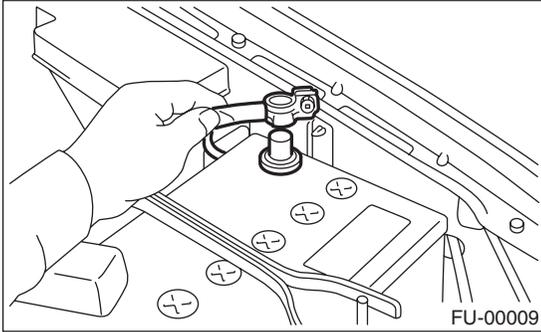
6) Connect the battery ground cable to battery.



19. Exhaust Temperature Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Remove the joint pipe. <Ref. to EX(H4DOTC)-13, REMOVAL, Joint Pipe.>

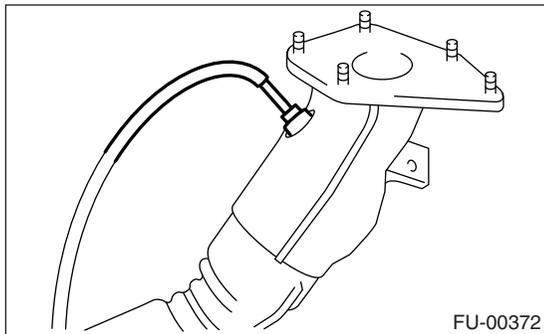
3) Apply SUBARU CRC or its equivalent to the threaded portion of exhaust temperature sensor, and leave it for 1 minute or more.

SUBARU CRC (Part No. 004301003)

4) Remove the exhaust temperature sensor.

CAUTION:

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



B: INSTALLATION

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

CAUTION:

Never apply anti-seize compound to the protector of exhaust temperature sensor.

Anti-seize compound:

SS-30 JET LUBE

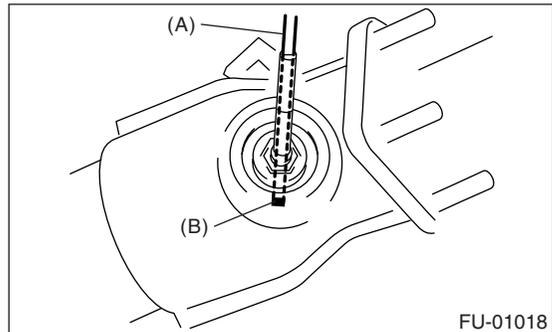
2) Install the exhaust temperature sensor.

NOTE:

Align the harness (A) direction of exhaust temperature sensor to the marking (B) of joint pipe, and tighten the screws.

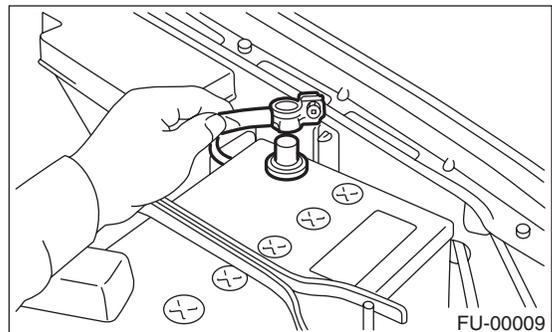
Tightening torque:

21 N·m (2.1 kgf-m, 15.2 ft-lb)



3) Install the joint pipe. <Ref. to EX(H4DOTC)-13, INSTALLATION, Joint Pipe.>

4) Connect the battery ground cable to battery.



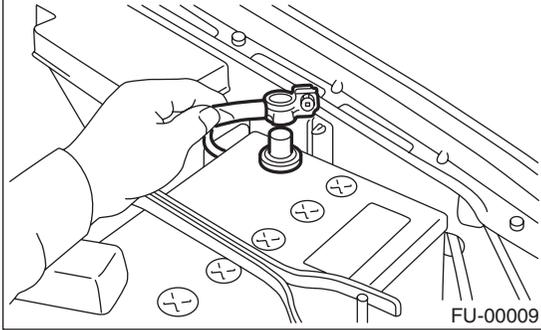
Engine Control Module (ECM)

FUEL INJECTION (FUEL SYSTEM)

20.Engine Control Module (ECM)

A: REMOVAL

1) Disconnect the ground cable from battery.

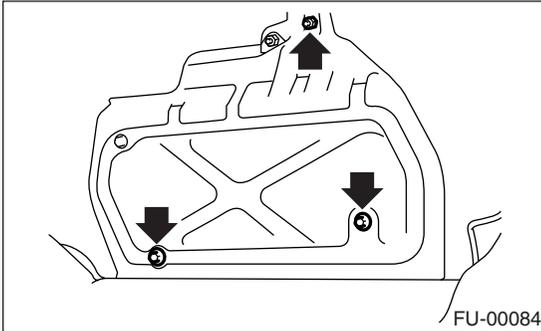


2) Remove the lower inner trim of passenger side.

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

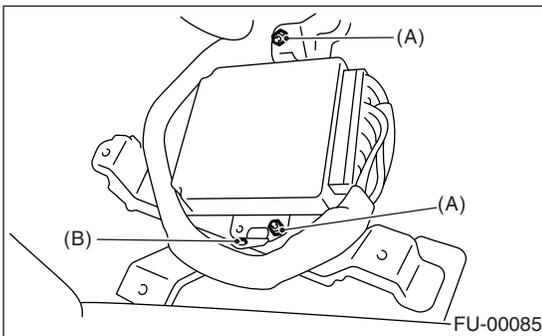
3) Detach the floor mat of front passenger seat side.

4) Remove the protect cover.



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

6) Remove the clip (B) from bracket.



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

B: INSTALLATION

Install in the reverse order of removal.

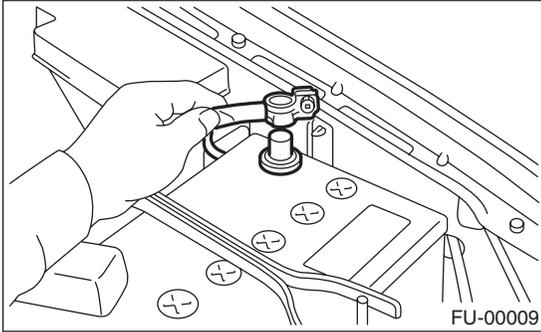
NOTE:

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

21.Main Relay

A: REMOVAL

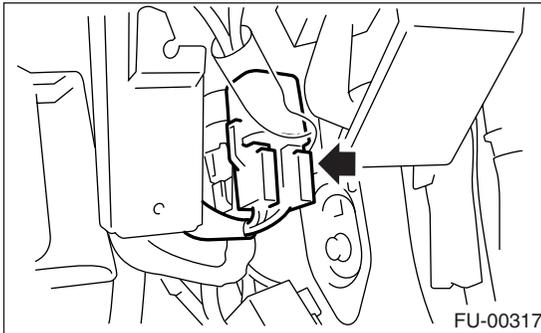
1) Disconnect the ground cable from battery.



2) Remove the glove box. <Ref. to EI-37, REMOVAL, Glove Box.>

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

4) Disconnect the connectors from main relay.



B: INSTALLATION

Install in the reverse order of removal.

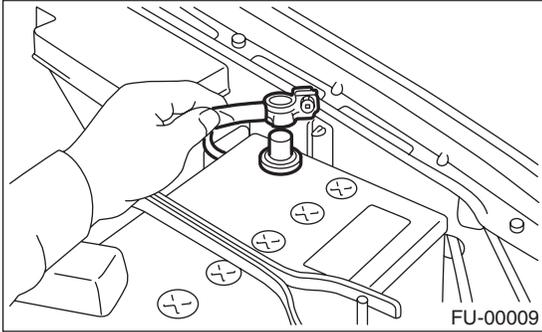
Fuel Pump Relay

FUEL INJECTION (FUEL SYSTEM)

22. Fuel Pump Relay

A: REMOVAL

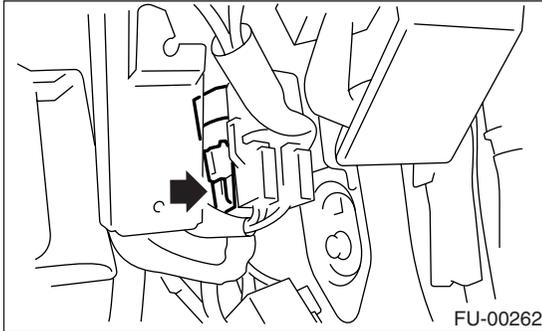
1) Disconnect the ground cable from battery.



2) Remove the glove box. <Ref. to EI-37, REMOVAL, Glove Box.>

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

4) Disconnect the connector from fuel pump relay.



5) Remove the fuel pump relay from mounting bracket.

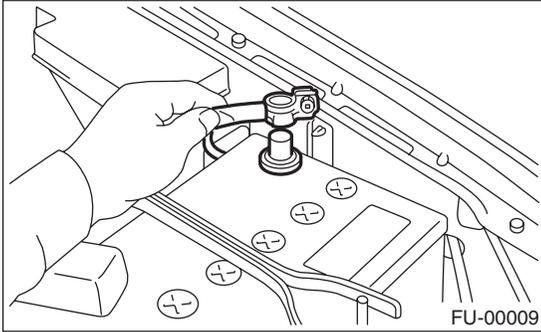
B: INSTALLATION

Install in the reverse order of removal.

23. Fuel Pump Control Unit

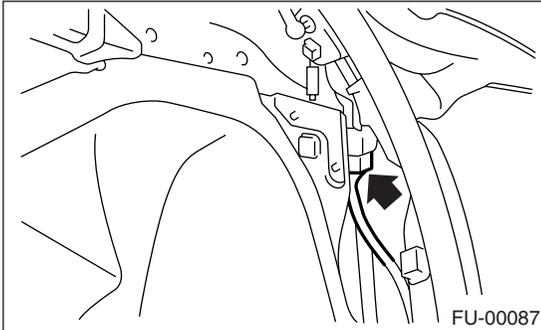
A: REMOVAL

1) Disconnect the ground cable from battery.

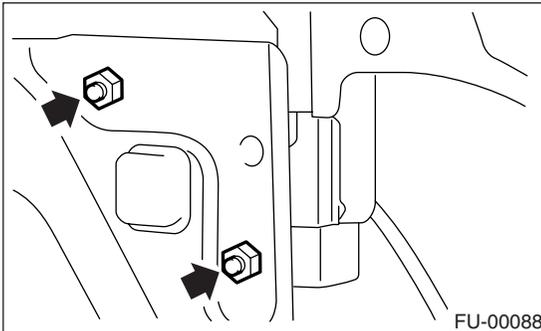


2) Remove the rear quarter trim. <Ref. to EI-45, REMOVAL, Rear Quarter Trim.>

3) Disconnect the connector from fuel pump control unit.



4) Remove the fuel pump control unit.



B: INSTALLATION

Install in the reverse order of removal.

24. Fuel

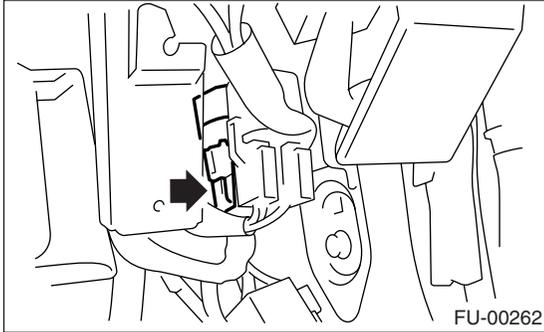
A: OPERATION

1. RELEASING OF FUEL PRESSURE

WARNING:

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

1) Disconnect the connector from fuel pump relay.



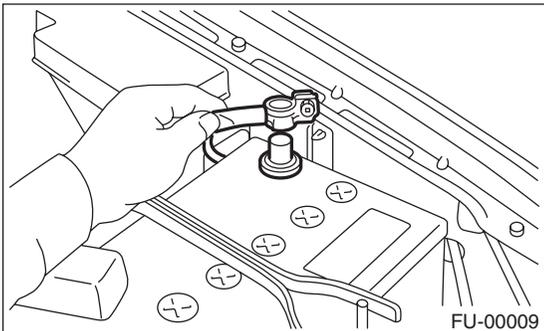
- 2) Start and run the engine until it stalls.
- 3) After the engine stalls, crank it for 5 more seconds.
- 4) Turn the ignition switch to OFF.

2. DRAINING FUEL

WARNING:

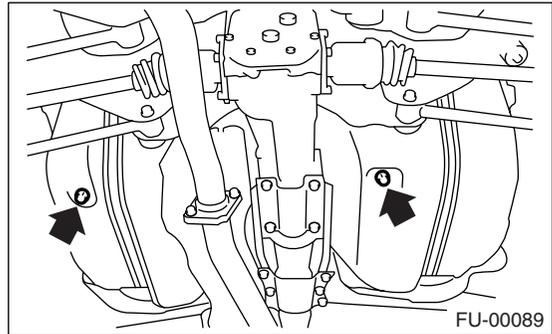
- Place “NO FIRE” signs near working area.
- Be careful not to spill fuel on floor.

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



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

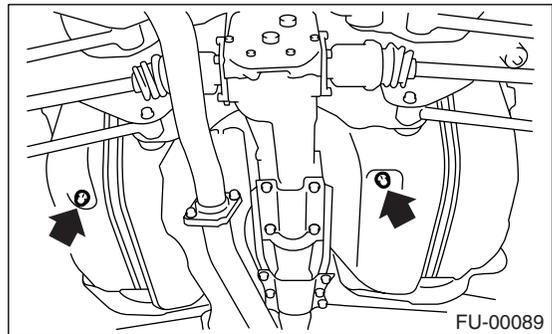
- 5) Drain fuel from the fuel tank.
Set a container under vehicle and remove the drain plug from fuel tank.



- 6) Tighten the fuel drain plug.

Tightening torque:

26 N·m (2.7 kgf-m, 19.2 ft-lb)



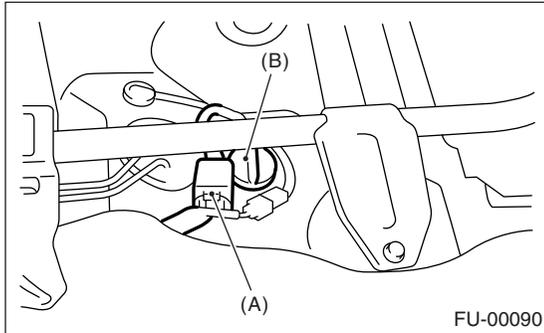
25. Fuel Tank

A: REMOVAL

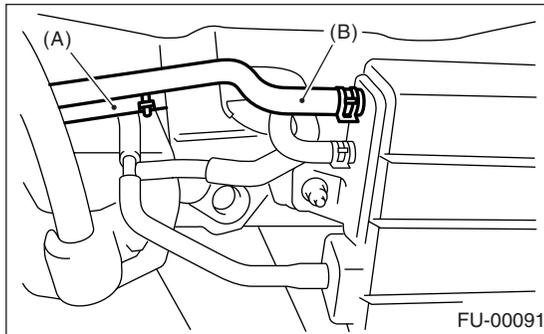
WARNING:

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

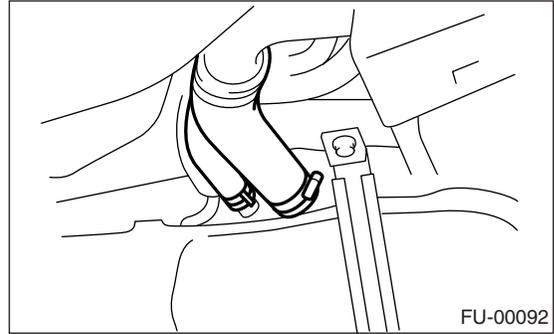
- 1) Set the vehicle on a lift.
- 2) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 3) Drain fuel from fuel tank. <Ref. to FU(H4DOTC)-54, DRAINING FUEL, OPERATION, Fuel.>
- 4) Remove the rear seat.
- 5) Disconnect the connector (A) of fuel tank cord to rear harness.
- 6) Push the grommet (B) which holds the fuel tank cord on floor panel down under body.



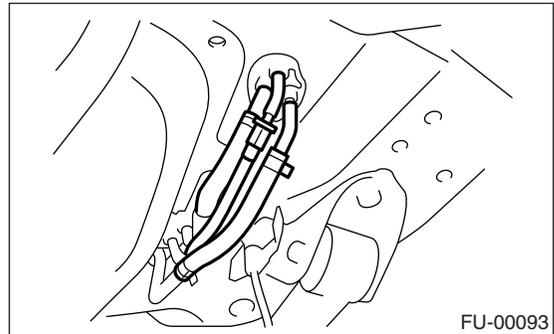
- 7) Remove the rear crossmember. <Ref. to RS-18, REMOVAL, Rear Crossmember.>
- 8) Disconnect the two-way valve hose (A) from two-way valve, and disconnect the canister hose (B) from canister.



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



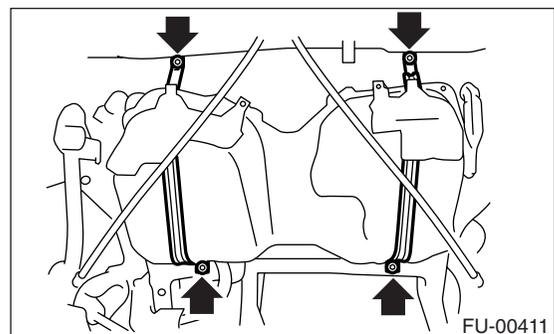
- 10) Move the clips and disconnect the quick connector. <Ref. to FU(H4DOTC)-70, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>
- 11) Disconnect the fuel hoses.



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

WARNING:

A helper is required to perform this work.



Fuel Tank

FUEL INJECTION (FUEL SYSTEM)

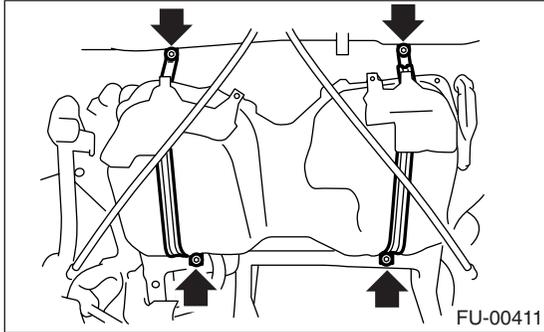
B: INSTALLATION

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

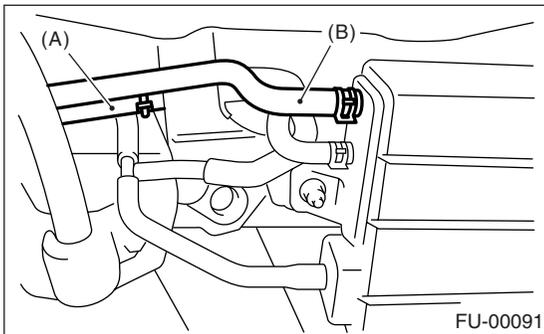
2) Set the fuel tank and temporarily tighten the bolts of fuel tank bands.

WARNING:

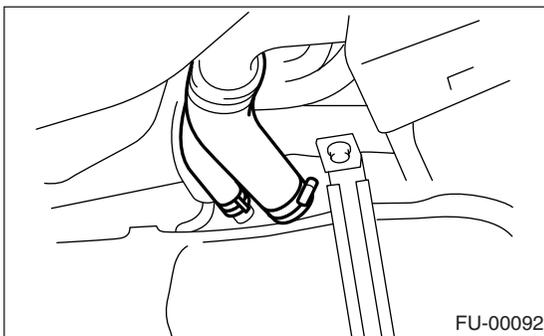
A helper is required to perform this work.



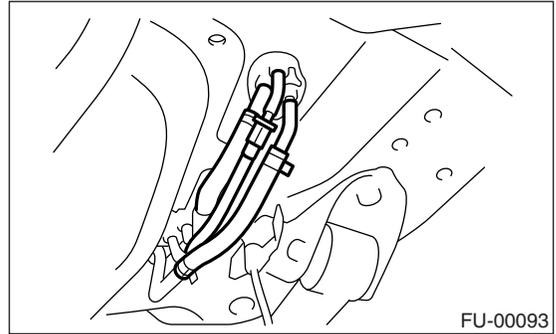
3) Connect the two-way valve hose (A) to two-way valve and connect the canister hose (B) to canister.



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



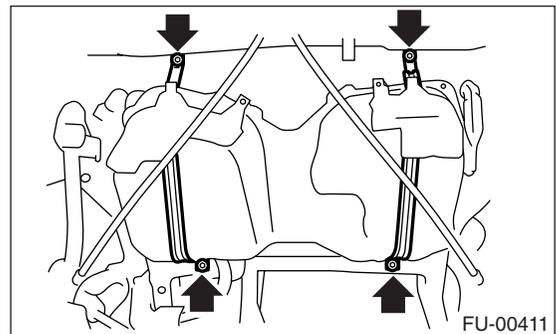
5) Connect the fuel hoses, and secure them with clips and quick connector. <Ref. to FU(H4DOTC)-71, INSTALLATION, Fuel Delivery, Return and Evaporation Lines.>



6) Tighten the band mounting bolts.

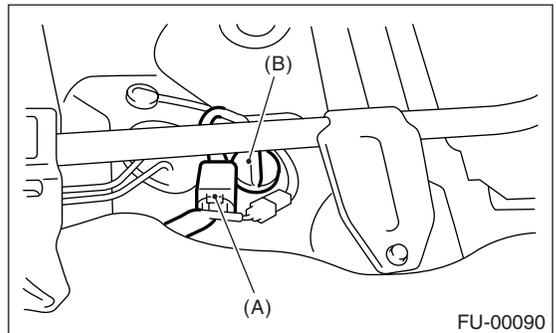
Tightening torque:

33 N·m (3.4 kgf-m, 24.3 ft-lb)



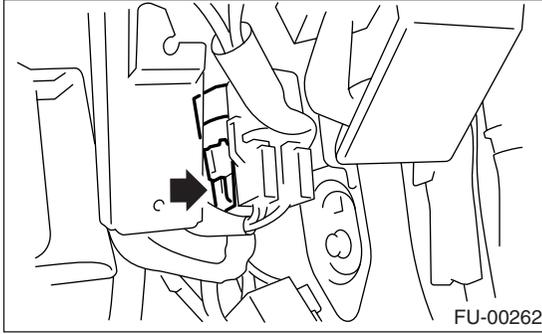
7) Install the rear crossmember. <Ref. to RS-18, INSTALLATION, Rear Crossmember.>

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



9) Set the rear seat and floor mat.

10) Connect the connector to the fuel pump relay.



C: INSPECTION

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

Fuel Filler Pipe

FUEL INJECTION (FUEL SYSTEM)

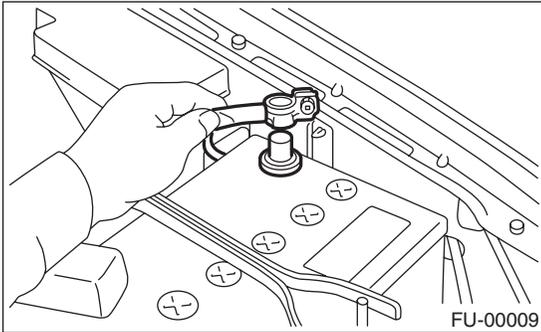
26. Fuel Filler Pipe

A: REMOVAL

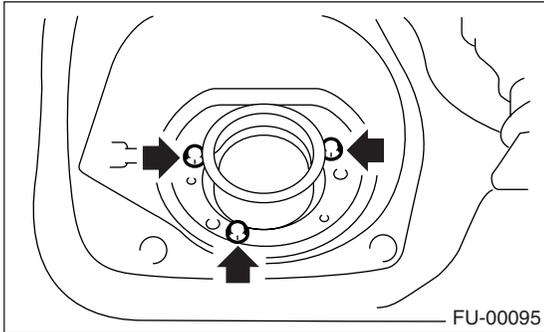
WARNING:

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

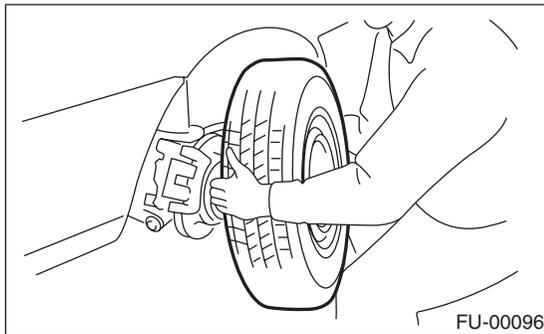
- 1) Set the vehicle on a lift.
- 2) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 3) Open the fuel filler flap lid and remove the fuel filler cap.
- 4) Disconnect the ground cable from battery.



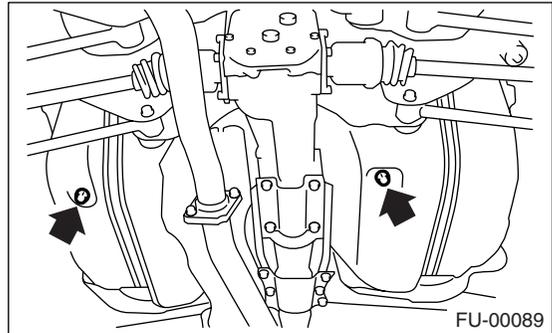
- 5) Remove the screws holding the packing in place.



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



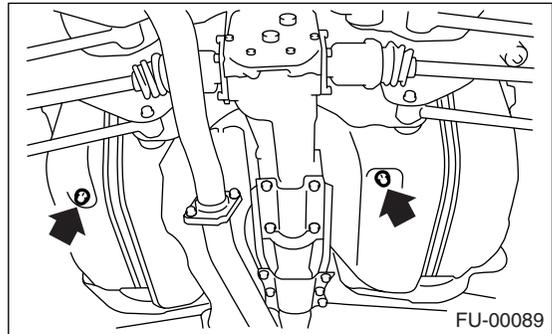
- 9) Drain fuel from fuel tank. Set a container under vehicle and remove the drain plug from fuel tank.



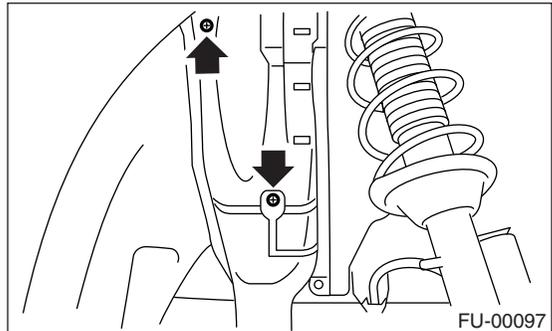
- 10) Tighten the fuel drain plug, and install the front right side tank cover.

Tightening torque:

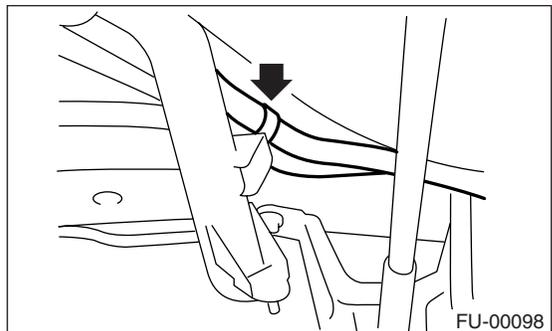
26 N·m (2.7 kgf-m, 19.2 ft-lb)



- 11) Remove the fuel filler pipe protector.



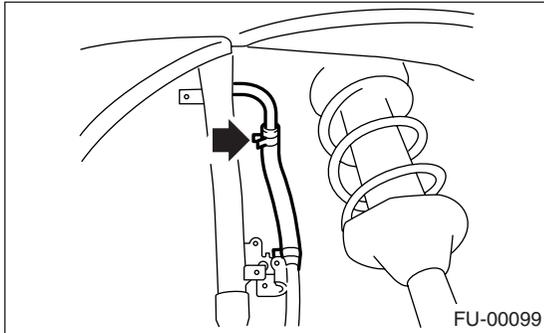
- 12) Separate the evaporation hoses from clip of fuel filler pipe.



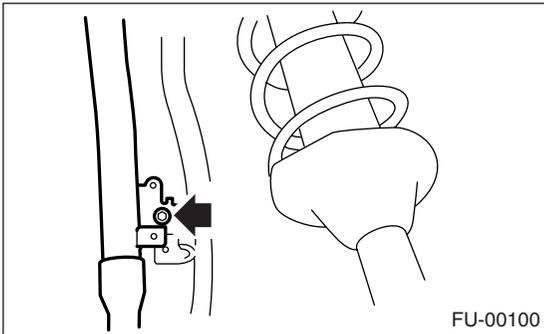
Fuel Filler Pipe

FUEL INJECTION (FUEL SYSTEM)

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

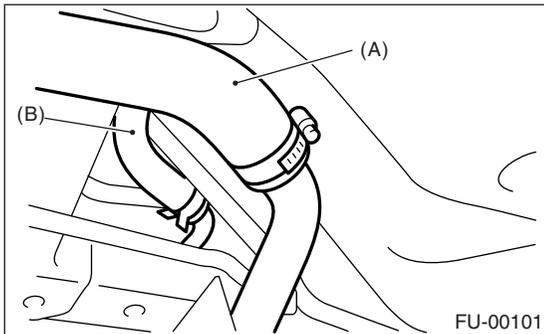


- 14) Remove the bolts which hold the fuel filler pipe bracket on body.



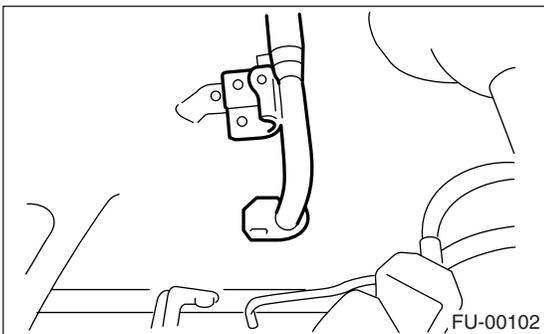
- 15) Loosen the clamp and separate the fuel filler hose (A) from fuel filler pipe.

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



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

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

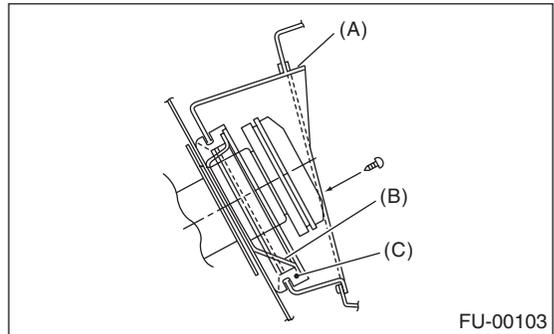


B: INSTALLATION

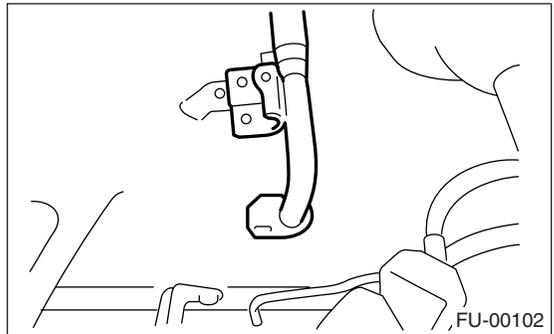
- 1) Hold the fuel filler flap open.
- 2) Set the fuel saucer (A) with rubber packing (C) and insert the fuel filler pipe into hole from the inner side of apron.
- 3) Align the holes in fuel filler pipe neck, set the cup (B), and then tighten the screws.

NOTE:

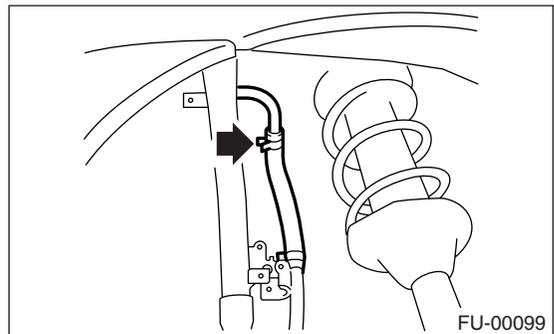
If the edges of rubber packing are folded toward inside, straighten it with a screwdriver.



- 4) Install the air vent pipe.



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



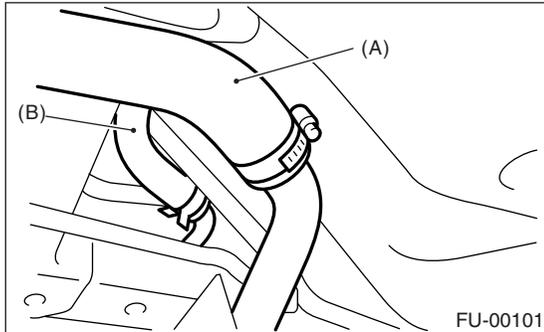
Fuel Filler Pipe

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.

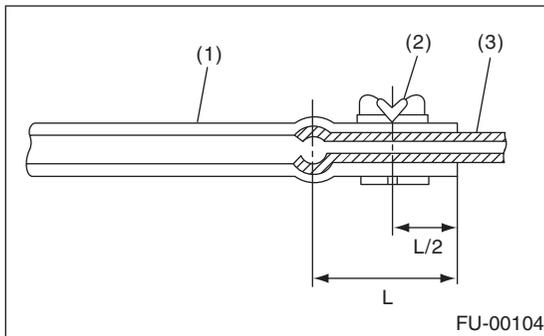
CAUTION:

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 air vent pipe and hold clip.

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

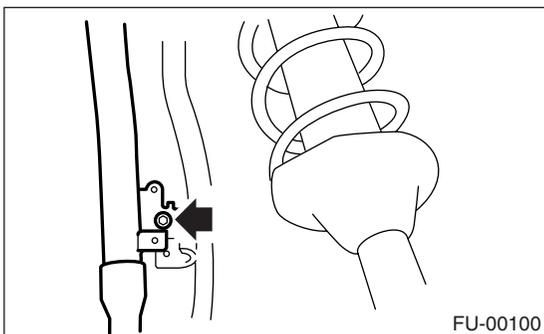


- (1) Hose
- (2) Clip
- (3) Pipe

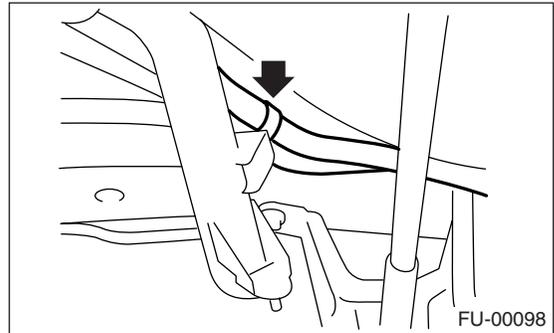
8) Tighten the bolt which holds the fuel filler pipe bracket on body.

Tightening torque:

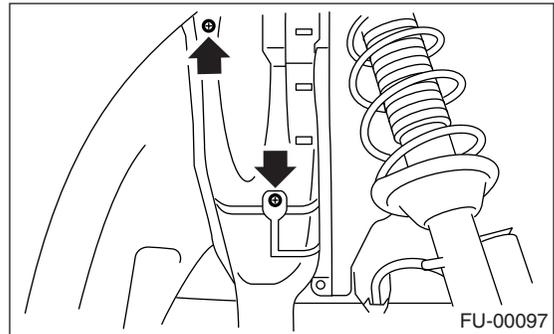
$7.4 \text{ N} \cdot \text{m (0.75 kgf} \cdot \text{m, 5.4 ft} \cdot \text{lb)}$



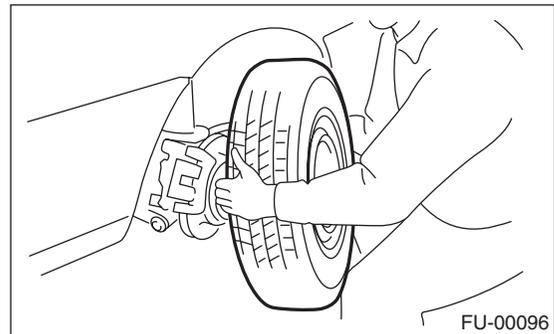
9) Hold the evaporation hoses onto clip of fuel filler pipe.



10) Install the fuel filler pipe protector.



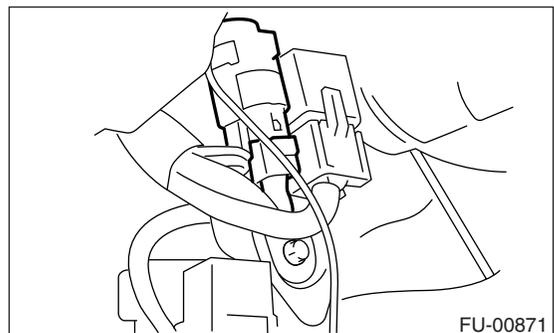
11) Install the rear right wheel.



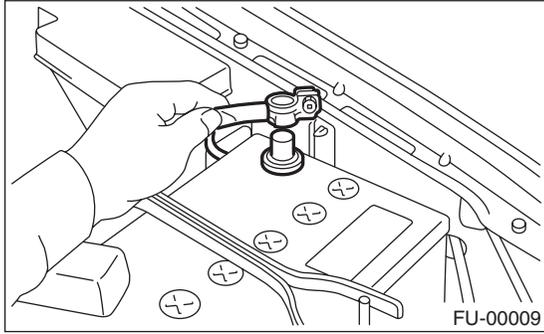
12) Lower the vehicle.

13) Tighten the wheel nuts.

14) Connect the connector to the fuel pump relay.



15) Connect the battery ground cable to battery.



Fuel Pump

FUEL INJECTION (FUEL SYSTEM)

27. Fuel Pump

A: REMOVAL

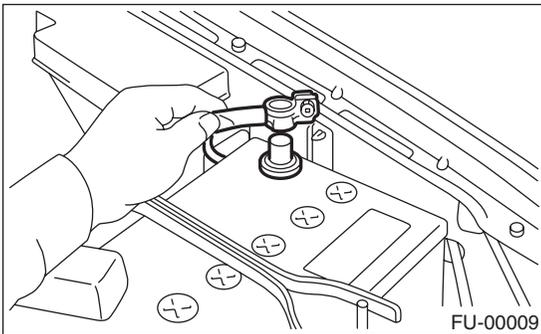
WARNING:

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

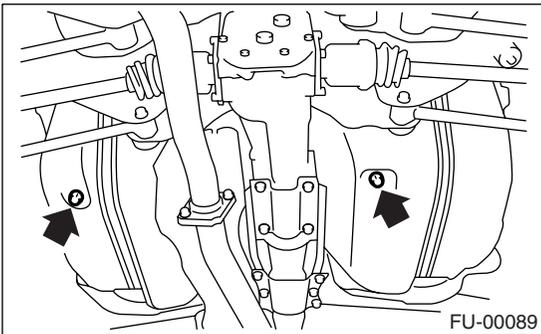
NOTE:

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

- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel filler flap lid and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.



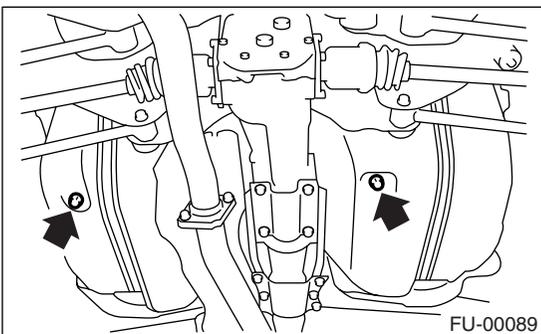
- 4) Lift-up the vehicle.
- 5) Drain fuel from fuel tank. Set a container under vehicle and remove the drain plug from fuel tank.



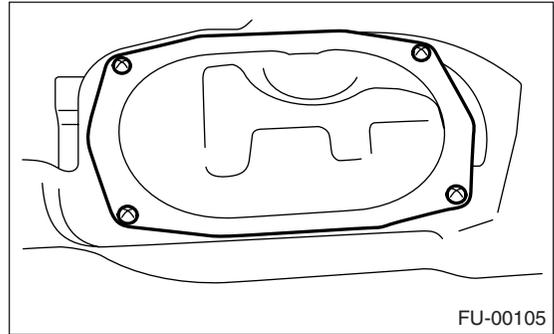
- 6) Tighten the fuel drain plug.

Tightening torque:

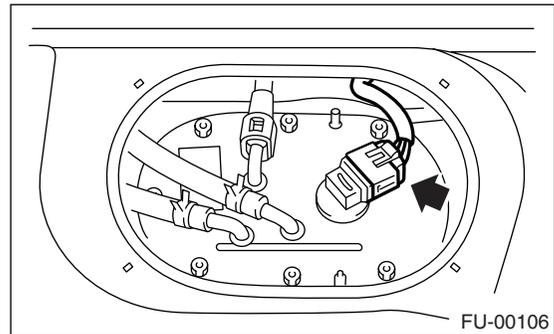
26 N·m (2.7 kgf·m, 19.2 ft·lb)



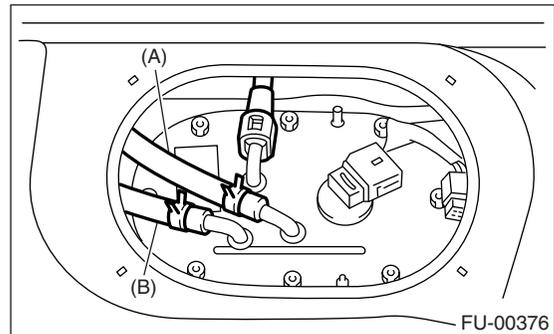
- 7) Raise the rear seat and turn the floor mat up.
- 8) Remove the access hole lid.



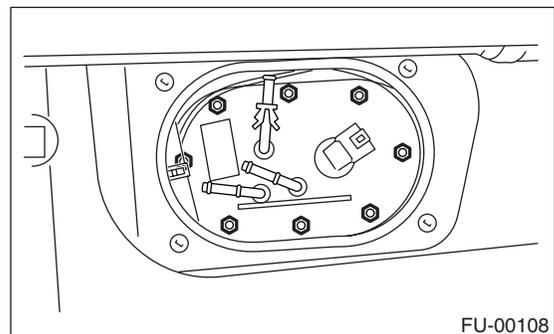
- 9) Disconnect the connector from fuel pump.



- 10) Disconnect the quick connector, and disconnect the fuel delivery hose. <Ref. to FU(H4DOTC)-70, Fuel Delivery, Return and Evaporation Lines.>
- 11) Move the clips, and then disconnect the fuel return hose (A) and jet pump hose (B).



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



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

B: INSTALLATION

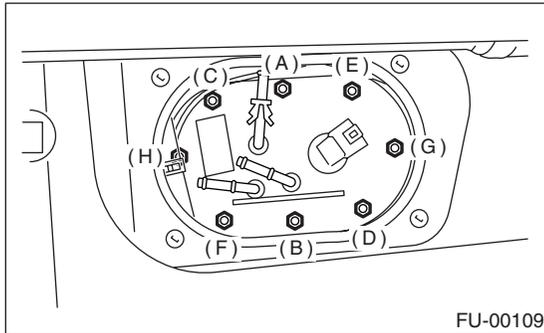
NOTE:

Replace the gaskets with new ones.

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

Tightening torque:

4.4 N·m (0.45 kgf-m, 3.3 ft-lb)

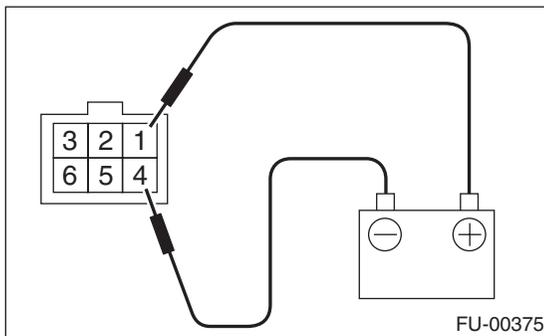


C: INSPECTION

Connect the lead harness to connector terminal of fuel pump, and then 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.



28. Fuel Level Sensor

A: REMOVAL

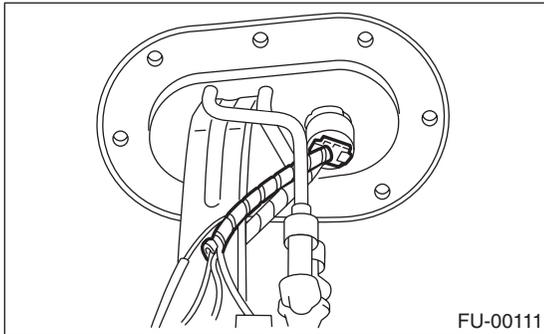
WARNING:

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

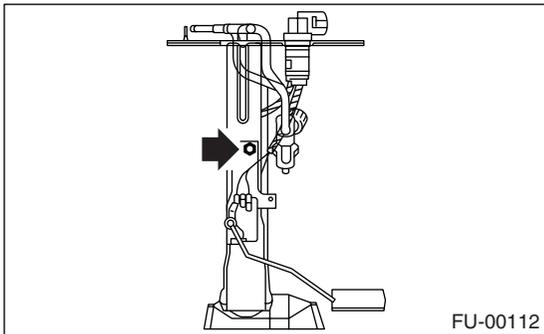
NOTE:

Fuel level sensor is built in fuel pump assembly.

- 1) Remove the fuel pump assembly. <Ref. to FU(H4DOTC)-62, REMOVAL, Fuel Pump.>
- 2) Disconnect the connector from fuel pump bracket.



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



B: INSTALLATION

Install in the reverse order of removal.

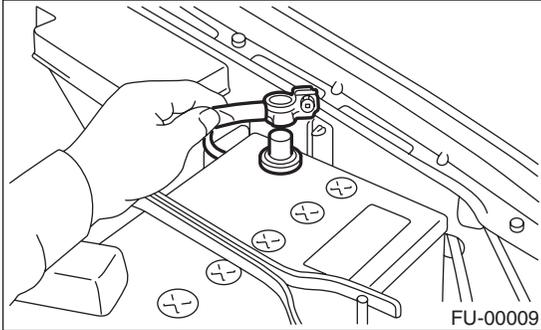
29. Fuel Sub Level Sensor

A: REMOVAL

WARNING:

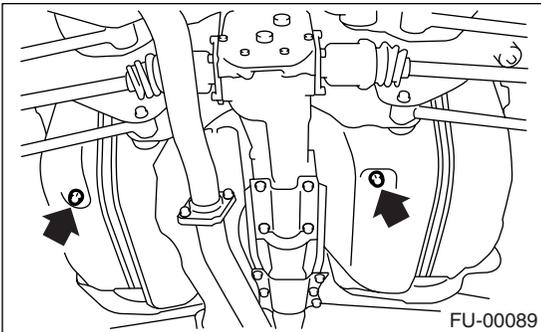
- Place “NO FIRE” signs near working area.
- Be careful not to spill fuel on floor.

1) Disconnect the ground cable from battery.



2) Lift-up the vehicle.

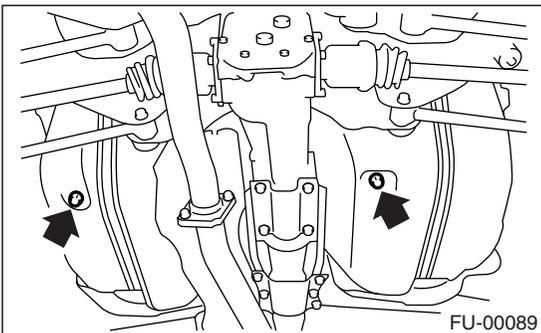
3) Drain fuel from fuel tank. Set a container under vehicle and remove the drain plug from fuel tank.



4) Tighten the fuel drain plug.

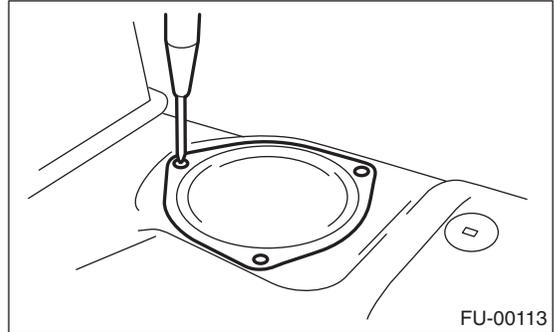
Tightening torque:

26 N·m (2.7 kgf·m, 19.2 ft·lb)



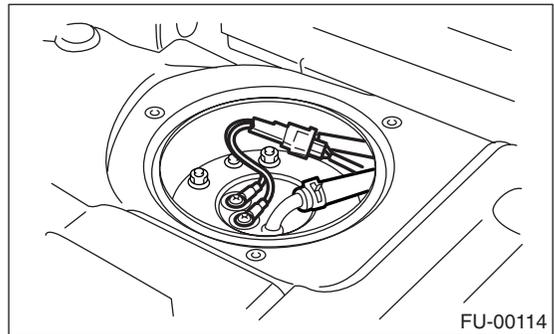
5) Remove the rear seat.

6) Remove the service hole cover.

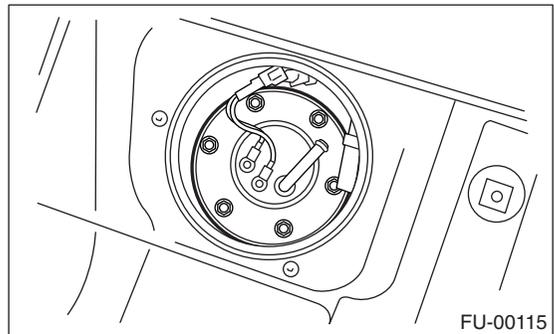


7) Disconnect the connector from fuel sub level sensor.

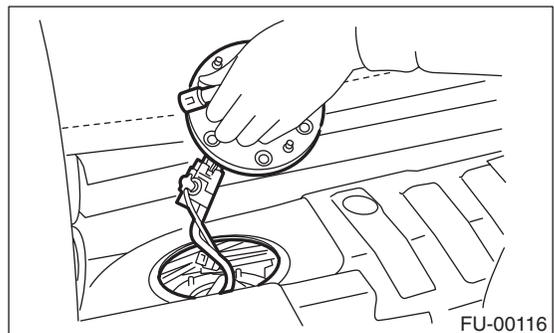
8) Disconnect the fuel jet pump hose.



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



10) Remove the fuel sub level sensor.



Fuel Sub Level Sensor

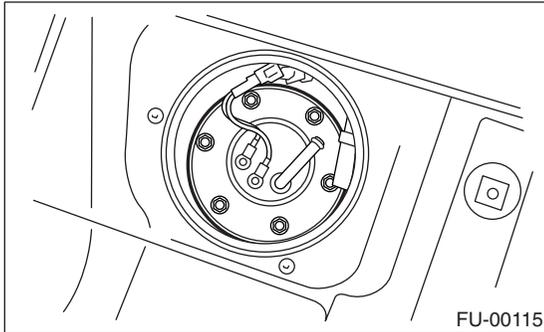
FUEL INJECTION (FUEL SYSTEM)

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

4.4 N·m (0.45 kgf-m, 3.3 ft-lb)



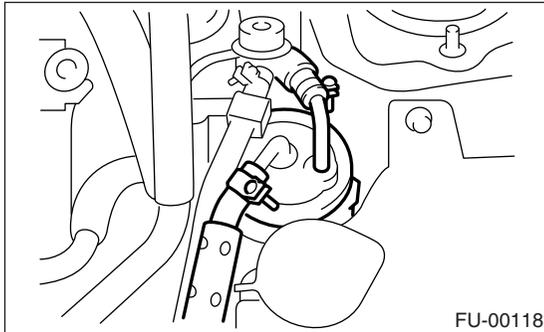
30. Fuel Filter

A: REMOVAL

WARNING:

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

- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Disconnect the fuel delivery hoses from fuel filter.



- 3) Remove the filter from holder.

B: INSTALLATION

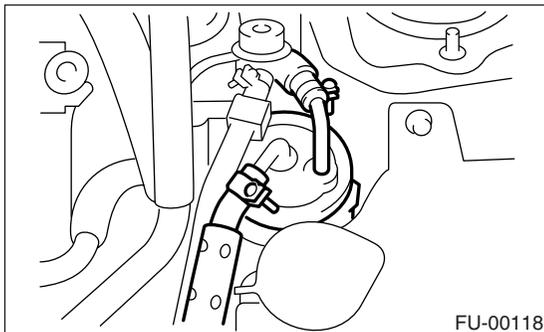
CAUTION:

- If fuel hoses are damaged at connecting portions, replace them with new ones.
- If clamps are badly damaged, replace them 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.

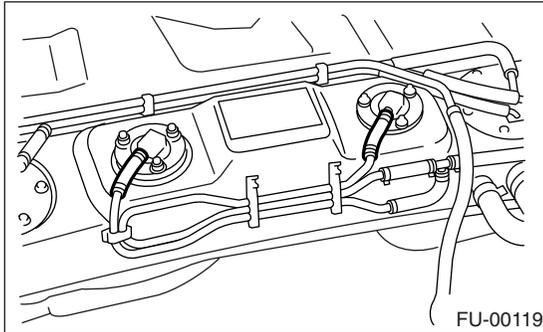
31. Fuel Cut Valve

A: REMOVAL

WARNING:

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

- 1) Remove the fuel tank. <Ref. to FU(H4DOTC)-55, REMOVAL, Fuel Tank.>
- 2) Move the clip and disconnect the evaporation hose from fuel cut valve.



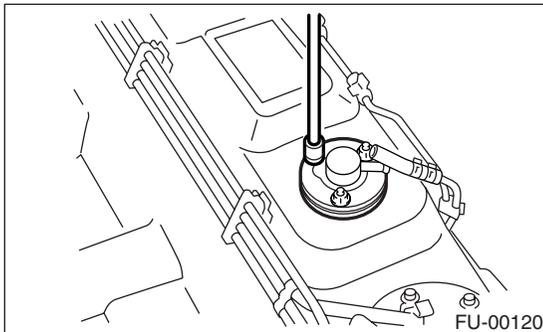
- 3) Remove the bolts which install the fuel cut valve.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

4.4 N·m (0.45 kgf-m, 3.3 ft-lb)

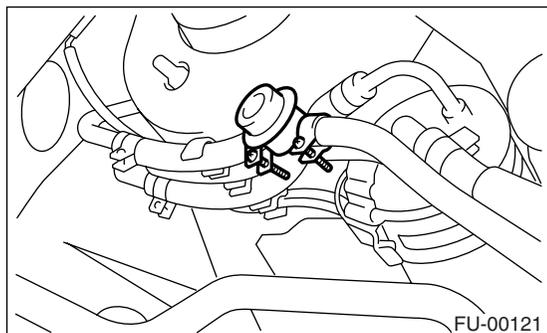


32. Fuel Damper Valve

A: REMOVAL

1) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, 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.

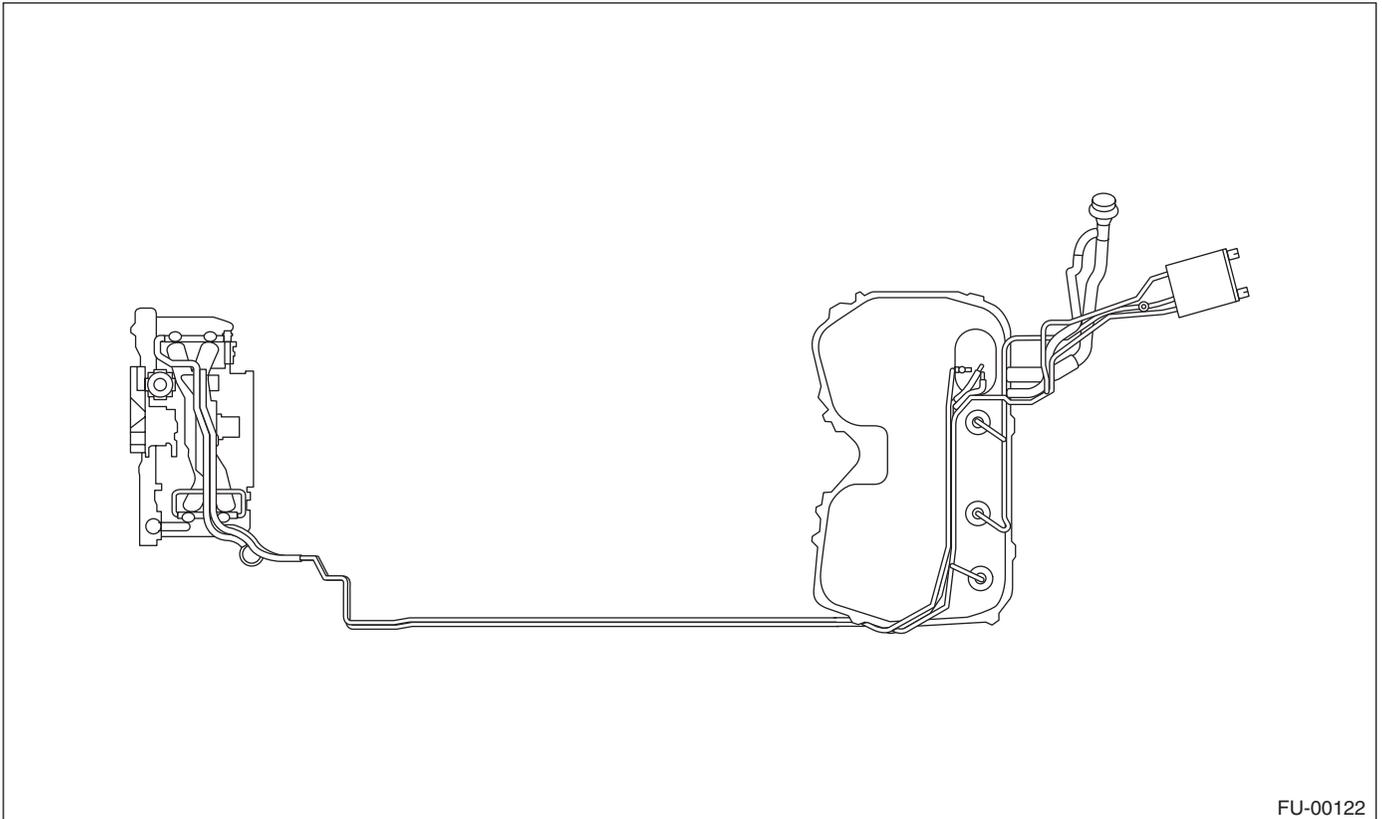
Fuel Delivery, Return and Evaporation Lines

FUEL INJECTION (FUEL SYSTEM)

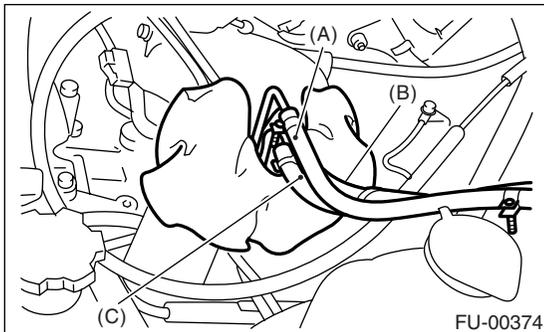
33. Fuel Delivery, Return and Evaporation Lines

A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Release the fuel pressure. <Ref. to FU(H4DOTC)-54, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 3) Open the fuel filler flap lid and remove the 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.

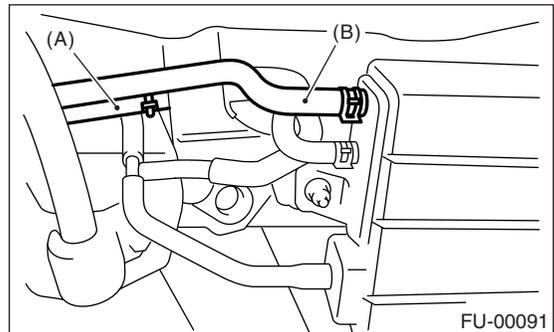


6) In the engine compartment, detach the fuel delivery hoses (A), return hoses (B) and evaporation hoses (C).



7) Lift-up the vehicle.

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

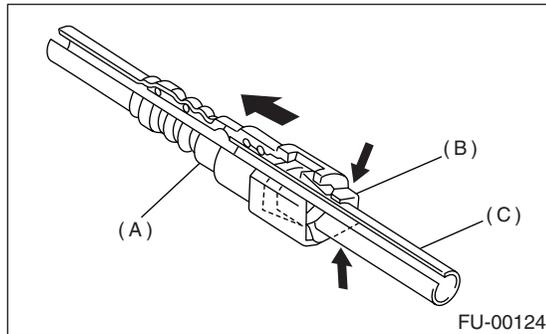


Fuel Delivery, Return and Evaporation Lines

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).



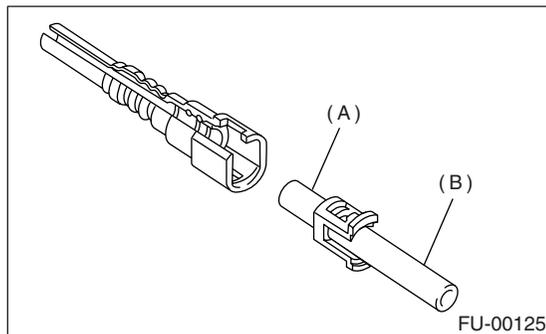
- (A) Connector
- (B) Retainer
- (C) Pipe

B: INSTALLATION

1) Connect the quick connector on fuel delivery line.

NOTE:

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

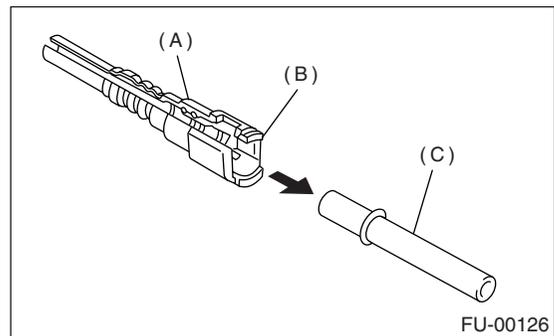


- (A) Seal surface
- (B) Pipe

- (1) Set the new retainer (B) to connector (A).
- (2) Push the pipe into connector completely.

NOTE:

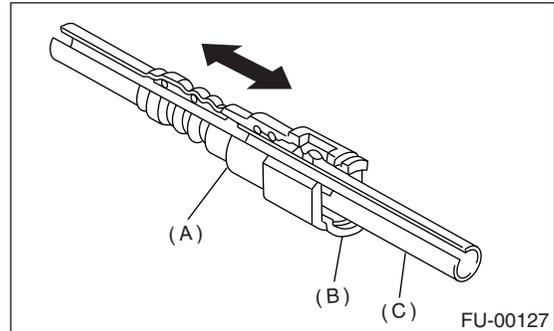
At this time, two clicking sounds are heard.



- (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 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)

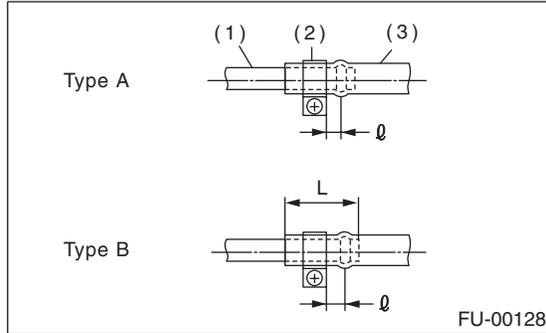
2) Connect the fuel delivery hose to pipe with an overlap of 20 to 25 mm (0.79 to 0.98 in).

Type A: When the fitting length is specified.

Type B: When the fitting length is not specified.

\varnothing : 2.5 ± 1.5 mm (0.098 ± 0.059 in)

L : 22.5 ± 2.5 mm (0.886 ± 0.098 in)



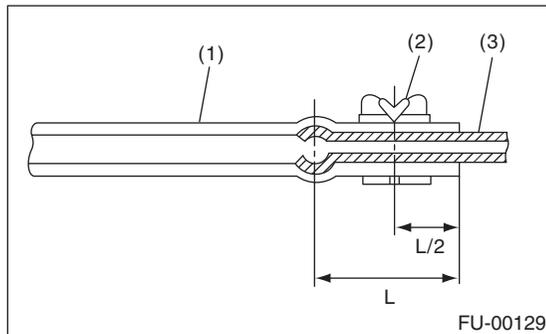
- (1) Fitting
- (2) Clamp
- (3) Hose

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

$L = 17.5 \pm 2.5$ mm (0.689 ± 0.098 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 there are no cracks on fuel pipes and fuel hoses.

2) Make sure the fuel pipe and fuel hose connections are tightened firmly.

Fuel System Trouble in General

FUEL INJECTION (FUEL SYSTEM)

34. 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.

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.

- 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.

Fuel System Trouble in General

FUEL INJECTION (FUEL SYSTEM)
