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FUEL INJECTION (FUEL SYTEMS)

General Description

FUEL INJECTION (FUEL SYSTEMS)

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1. General Description

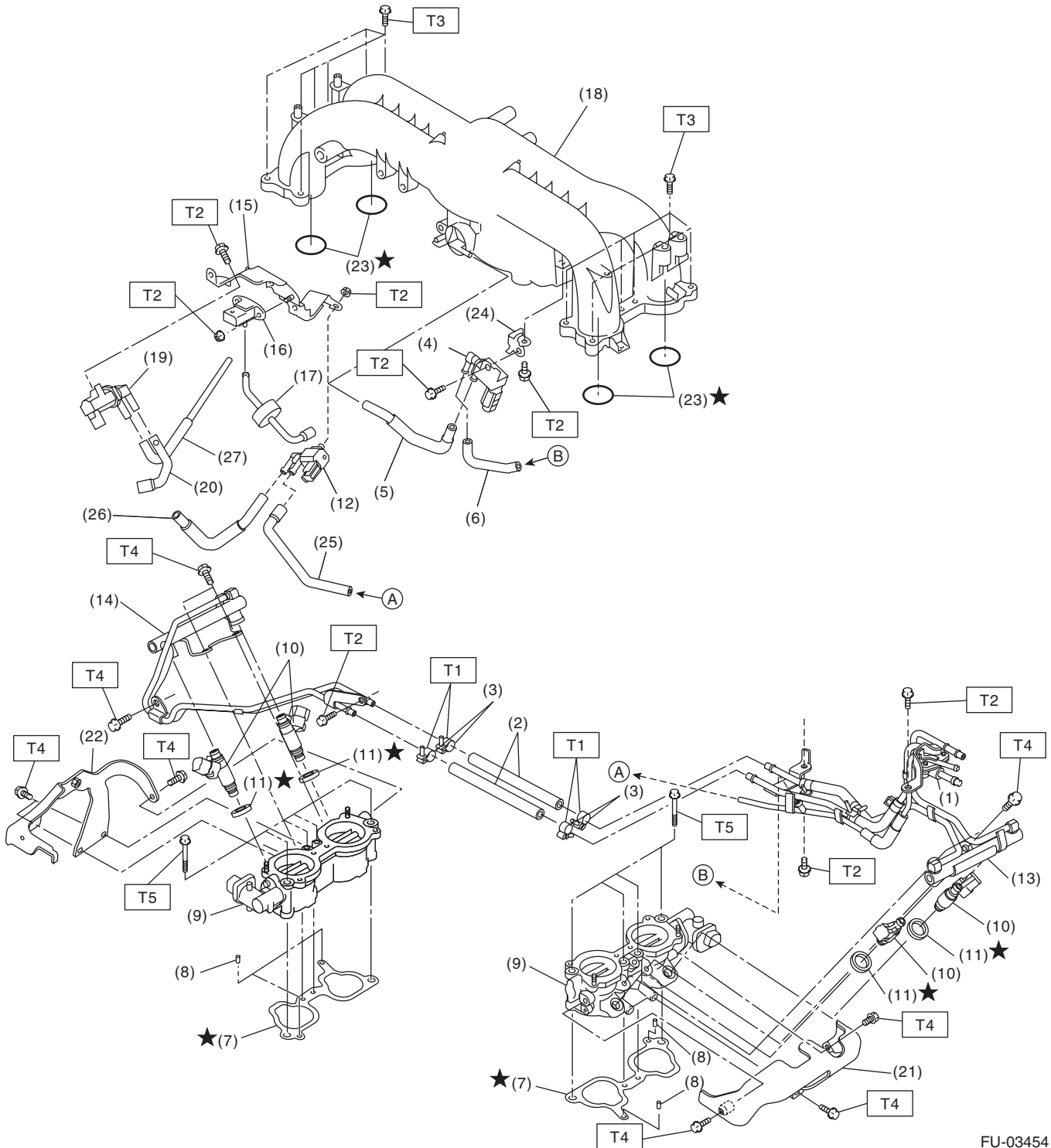
A: SPECIFICATION

Fuel tank	Capacity	64 ℓ (16.9 US gal, 14.1 Imp gal)
	Location	Under rear seat
Fuel pump	Type	Impeller
	Shutoff discharge pressure	550 — 850 kPa (5.61 — 8.67 kg/cm ² , 79.8 — 123.3 psi)
	Discharge rate	155 ℓ (40.9 US gal, 34.1 Imp gal)/h or more [12 V at 300 kPa (3.06 kg/cm ² , 43.5 psi)]
Fuel filter		In-tank type

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B: COMPONENT

1. INTAKE MANIFOLD



FU-03454

General Description

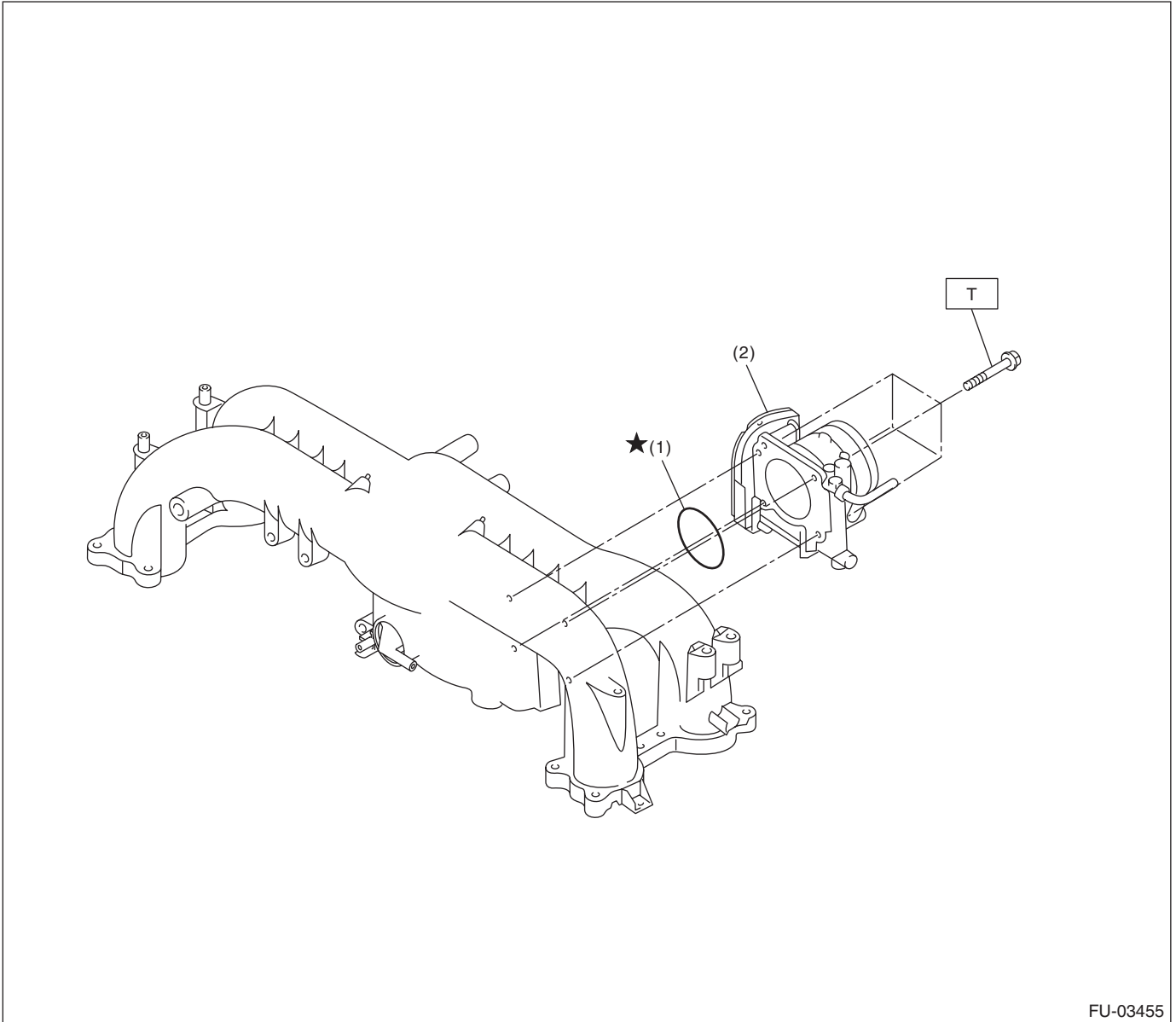
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- | | | |
|-------------------------------------|--|-----------------------------|
| (1) Pressure regulator | (13) Fuel injector pipe LH | (24) Solenoid valve bracket |
| (2) Fuel hose | (14) Fuel injector pipe RH | (25) Vacuum hose B |
| (3) Clamp | (15) Solenoid valve bracket | (26) Vacuum hose A |
| (4) Purge control solenoid valve 1 | (16) Manifold absolute pressure sensor | (27) Air control hose |
| (5) Vacuum hose D | (17) Filter | |
| (6) Vacuum hose C | (18) Intake manifold | |
| (7) Intake manifold gasket | (19) Wastegate control solenoid valve ASSY | |
| (8) Guide pin | (20) Vacuum hose | |
| (9) Tumble generator valve ASSY | (21) Fuel pipe protector LH | |
| (10) Fuel injector | (22) Fuel pipe protector RH | |
| (11) Seal ring | (23) O-ring | |
| (12) Purge control solenoid valve 2 | | |

Tightening torque:N-m (kgf-m, ft-lb)**T1: 1.25 (0.13, 0.94)****T2: 6.4 (0.65, 4.7)****T3: 8.3 (0.85, 6.1)****T4: 19 (1.9, 14.0)****T5: 25 (2.5, 18.4)**

2. AIR INTAKE SYSTEM



FU-03455

(1) O-ring

(2) Throttle body

Tightening torque: N·m (kgf·m, ft·lb)

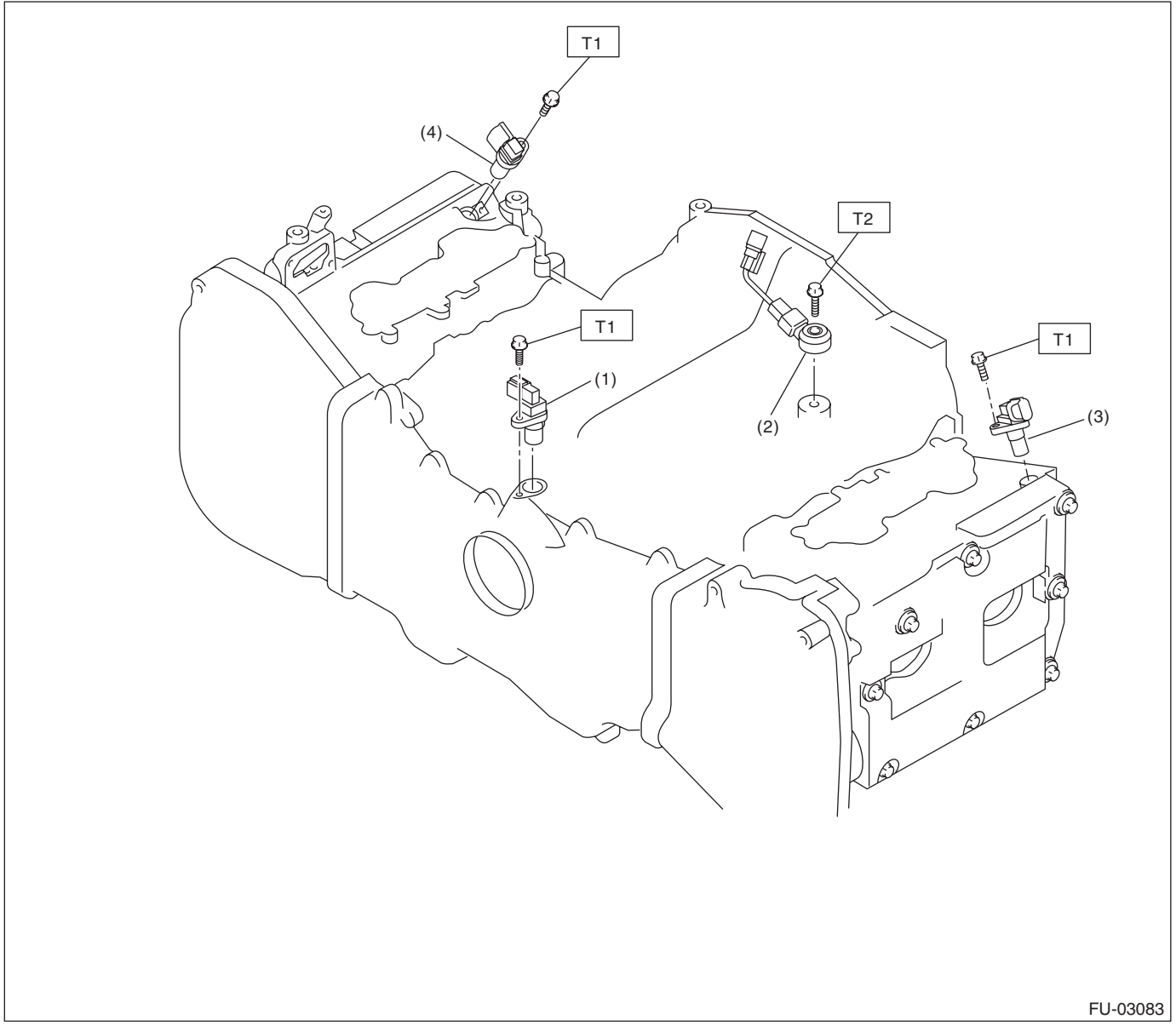
T: 8 (0.8, 5.9)

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3. CRANKSHAFT POSITION, CAMSHAFT POSITION AND KNOCK SENSORS



FU-03083

- (1) Crankshaft position sensor
- (2) Knock sensor
- (3) Camshaft position sensor LH
- (4) Camshaft position sensor RH

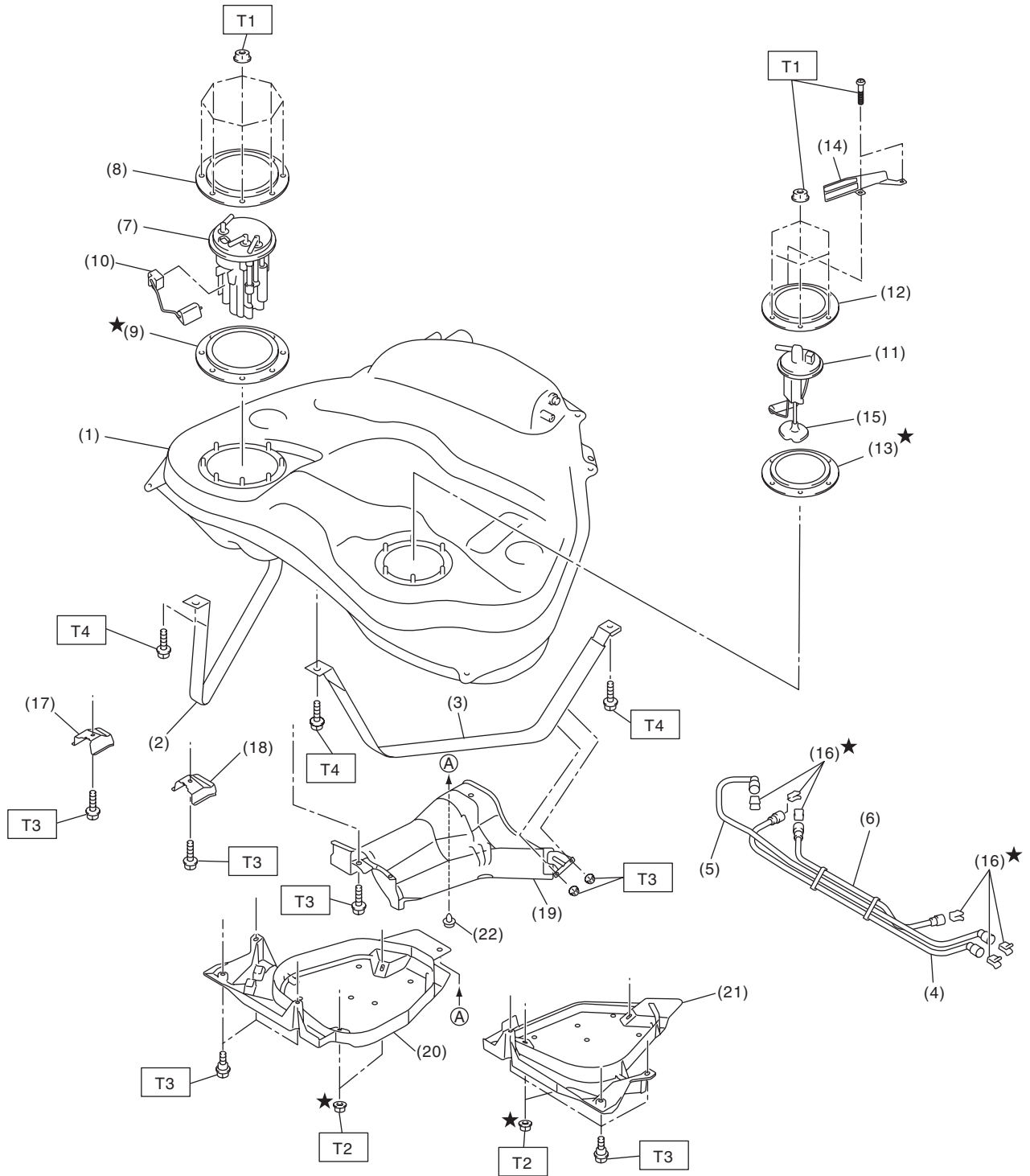
Tightening torque: N·m (kgf·m, ft·lb)
T1: 6.4 (0.65, 4.7)
T2: 24 (2.4, 17.7)

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4. FUEL TANK



FU-03441

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- | | | |
|---------------------------|--|-----------------------------|
| (1) Fuel tank | (11) Fuel sub level sensor | (21) Fuel tank protector LH |
| (2) Fuel tank band RH | (12) Fuel sub level sensor upper plate | (22) Clip |
| (3) Fuel tank band LH | (13) Fuel sub level sensor gasket | |
| (4) Delivery tube | (14) Fuel sub level sensor protector | |
| (5) Return tube | (15) Fuel sub level sensor filter | |
| (6) Jet pump tube | (16) Retainer | |
| (7) Fuel pump ASSY | (17) Stopper RH | |
| (8) Fuel pump upper plate | (18) Stopper LH | |
| (9) Fuel pump gasket | (19) Heat shield cover | |
| (10) Fuel level sensor | (20) Fuel tank protector RH | |

Tightening torque:N·m (kgf-m, ft-lb)**T1: 4.4 (0.45, 3.2)****T2: 9 (0.9, 6.6)****T3: 18 (1.8, 13.3)****T4: 33 (3.4, 24.3)**

General Description

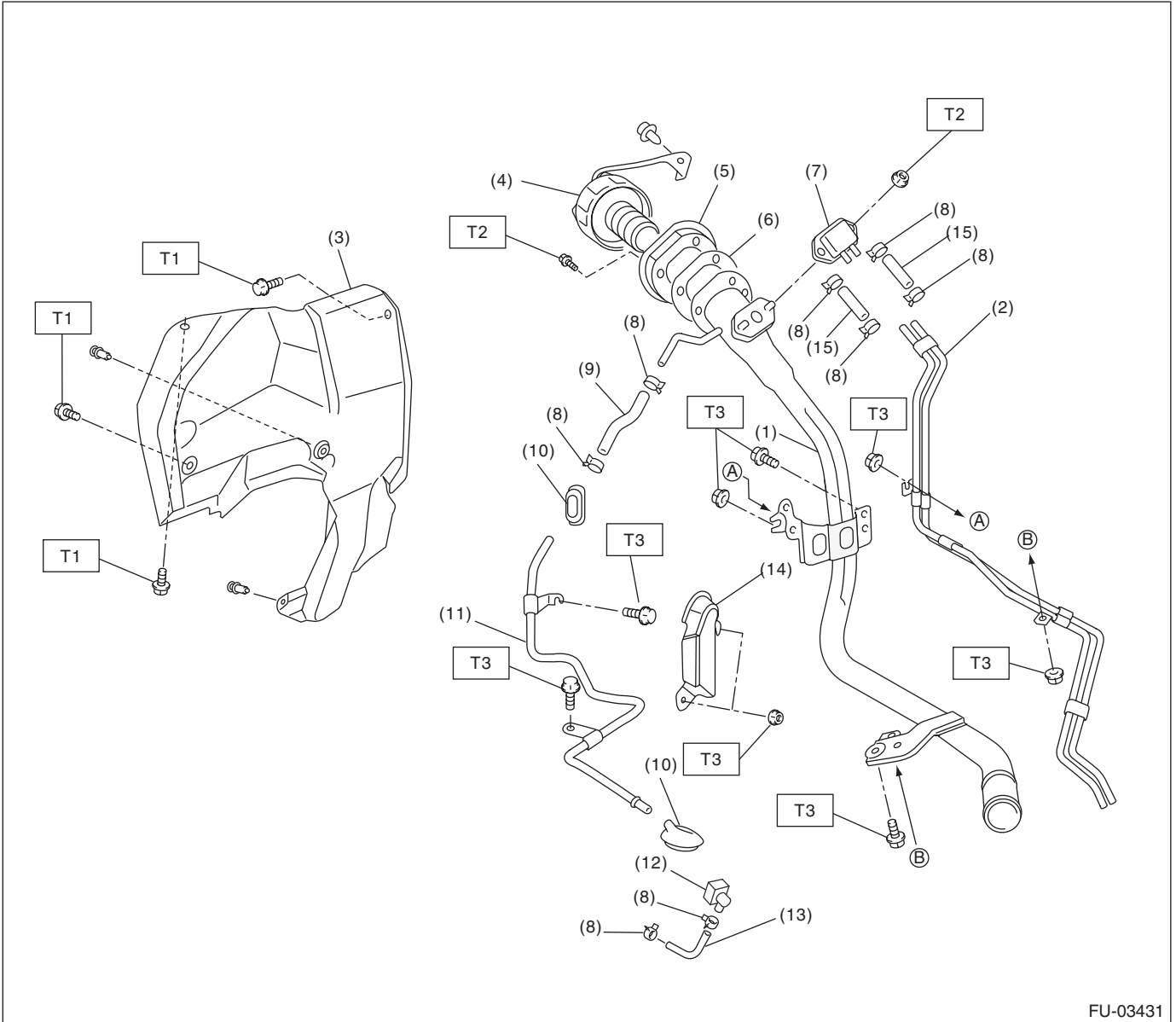
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(1) Clip	(18) Fuel tank pressure sensor bracket B	(33) Drain tube A
(2) Fuel return hose A	(19) Fuel tank pressure sensor	(34) Drain valve bracket
(3) Fuel return hose B	(20) Vacuum hose	(35) Drain valve
(4) Evaporation hose A	(21) Evaporation hose C	(36) Purge tube
(5) Evaporation hose B	(22) Clamp	(37) Vent tube
(6) Fuel delivery hose A	(23) Fuel filler hose	(38) Drain tube B
(7) Fuel delivery hose B	(24) PCV drain tube	(39) Canister
(8) Fuel damper valve holder	(25) Evaporation hose D	(40) Canister cover LH
(9) Clamp	(26) Evaporation hose E	(41) Center canister cover
(10) Purge damper valve	(27) Pressure control solenoid valve	(42) Canister cover RH
(11) Purge damper valve bracket	(28) Pressure control solenoid valve bracket A	
(12) Damper valve bracket	(29) Pressure control solenoid valve bracket B	
(13) Fuel damper valve	(30) Evaporation hose F	
(14) Clamp	(31) Evaporation hose G	
(15) Fuel pipe ASSY	(32) Canister drain hose	
(16) Pressure hose		
(17) Fuel tank pressure sensor bracket A		

Tightening torque:N·m (kgf-m, ft-lb)**T1: 1.25 (0.13, 0.94)****T2: 7.5 (0.76, 5.5)****T3: 8 (0.8, 5.9)****T4: 18 (1.8, 13.3)**

6. FUEL PIPE



FU-03431

- (1) Fuel filler pipe ASSY
- (2) Evaporation pipe A
- (3) Filler pipe protector
- (4) Fuel filler cap
- (5) Filler ring
- (6) Filler pipe gasket
- (7) Shut valve

- (8) Clip
- (9) Evaporation hose A
- (10) Grommet
- (11) Evaporation pipe B
- (12) Quick connector
- (13) Evaporation hose B
- (14) Evaporation pipe protector

- (15) Evaporation hose C

Tightening torque: N·m (kgf-m, ft-lb)

T1: 1 (0.1, 0.7)

T2: 4.4 (0.45, 3.2)

T3: 7.5 (0.76, 5.53)

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FUEL INJECTION (FUEL SYSTEMS)

C: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- 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 connectors of sensors or units, be sure to disconnect the ground cable from the battery.
- Place “NO OPEN FLAMES” signs near the working area.
- Prepare a container and cloth to prevent scattering of fuels when performing work where fuels can be spilled. If the fuel spills, wipe it off immediately to prevent from penetrating into floor or flowing out for environmental protection.
- Follow all government and local regulations concerning disposal of refuse when disposing fuel.

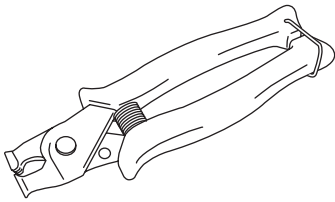
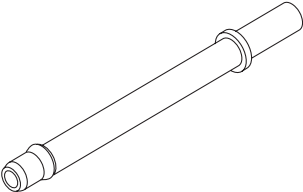
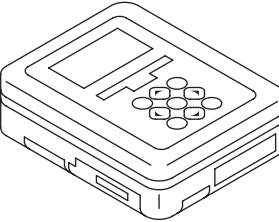
D: PREPARATION TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
A line drawing of a tool with a long handle and a curved, hook-like end designed to grip and pull a connector. ST18371AA000	18371AA000	CONNECTOR REMOVER	Used for disconnecting the quick connector on the fuel return hose of the engine compartment.
A line drawing of a cylindrical tool with a flange on one end and a curved, hook-like end on the other, designed to release a quick connector. ST42099AE000	42099AE000	QUICK CONNECTOR RELEASE	Used for disconnecting quick connector on the fuel delivery hose side of the engine compartment.

General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p>ST18353AA000</p>	18353AA000	CLAMP PLIERS	<ul style="list-style-type: none"> Used for removing and installing the PCV hose. This is a general tool made by the French company CAILLAU. (code) 54.0.000.205 To make this easier to obtain in the same way as genuine Subaru parts, it has been provided with a tool number as an ST.
 <p>ST18471AA000</p>	18471AA000 (Newly adopted tool)	FUEL PIPE ADAPTER	Used for draining fuel.
 <p>ST1B021XU0</p>	1B021XU0	SUBARU SELECT MONITOR III KIT	Used for draining fuel.

Throttle Body

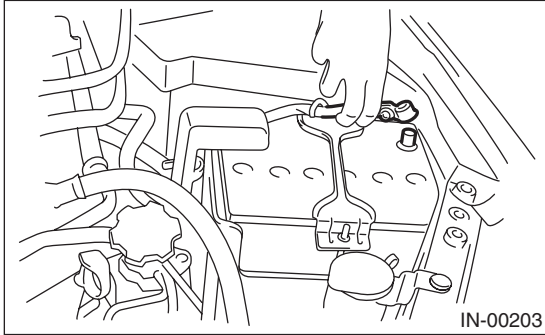
FUEL INJECTION (FUEL SYSTEMS)

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2. Throttle Body

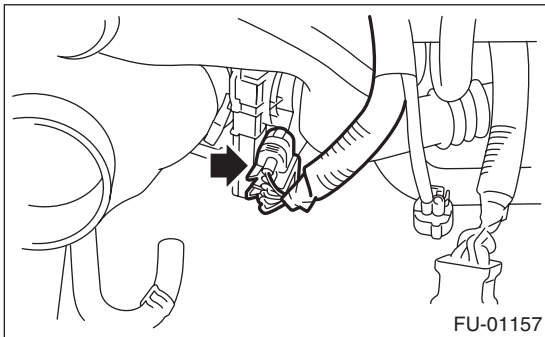
A: REMOVAL

1) Disconnect the ground cable from the battery.

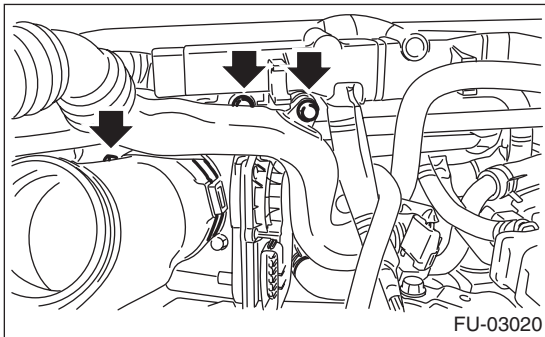


2) Remove the intercooler. <Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>

3) Disconnect the connectors from the throttle position sensor.

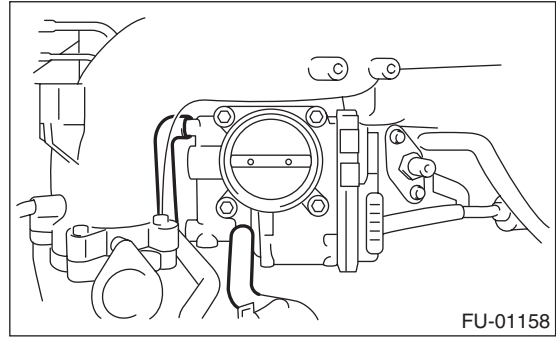


4) Remove the bolts which secure the air by-pass pipe and PCV pipe to the intake manifold, and loosen the clamp which connects the throttle body and duct.



5) Remove the duct from the throttle body.

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



7) Remove the bolts which secure the throttle body to the intake manifold, and remove the throttle body.

B: INSTALLATION

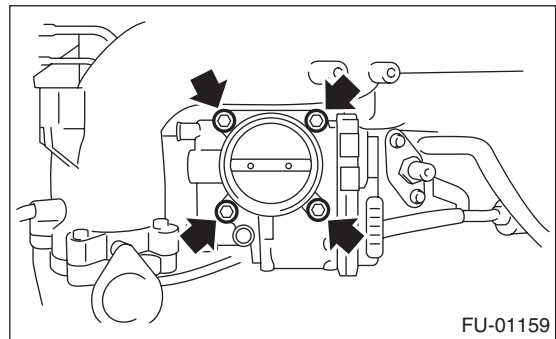
Install in the reverse order of removal.

NOTE:

Use new O-rings.

Tightening torque:

8 N·m (0.8 kgf·m, 5.9 ft·lb)

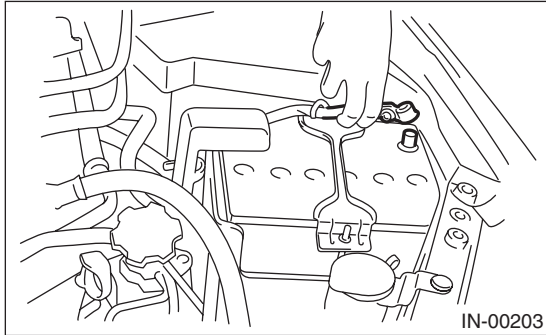


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3. Intake Manifold

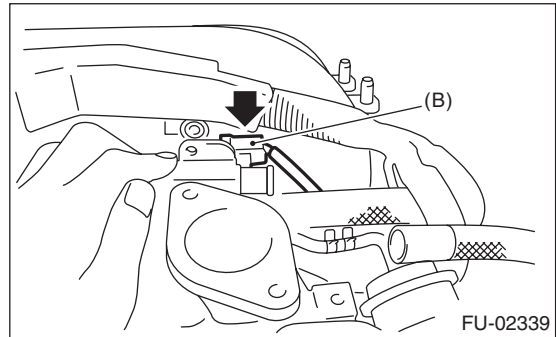
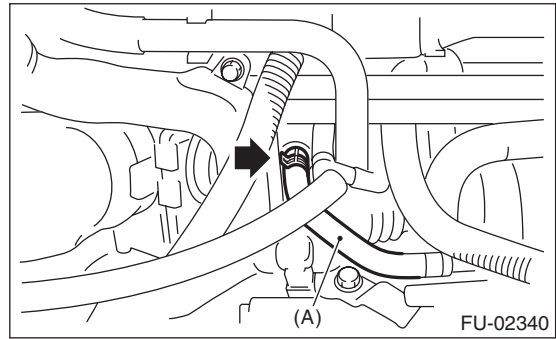
A: REMOVAL

- 1) Set the vehicle on a lift.
- 2) Release the fuel pressure.
 <Ref. to FU(H4DOTC)-50, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
- 3) Disconnect the ground cable from battery.

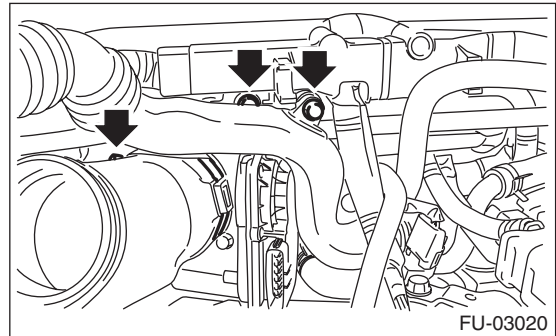


- 4) Open the fuel filler flap lid, and remove the fuel filler cap.
- 5) Lift up the vehicle.
- 6) Remove the under cover.
- 7) Drain approximately 3.0 ℓ (3.2 US qt, 2.6 Imp qt) of coolant.
- 8) Remove the intake duct from the air cleaner case.
- 9) Remove the intercooler. <Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
- 10) Remove the generator. <Ref. to SC(H4SO)-12, REMOVAL, Generator.>
- 11) Remove the coolant filler tank. <Ref. to CO(H4DOTC)-29, REMOVAL, Coolant Filler Tank.>

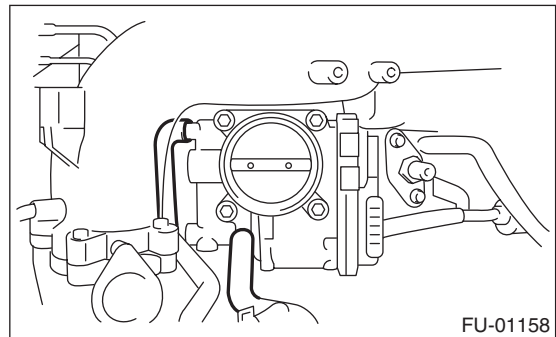
- 12) Disconnect the emission hose (A) and the connector (B) from the PCV hose assembly.



- 13) Remove the bolts which secure the air by-pass pipe and PCV pipe to the intake manifold, and loosen the clamp which connects the throttle body and duct.



- 14) Remove the duct from the throttle body.
- 15) Disconnect the engine coolant hoses from the throttle body.

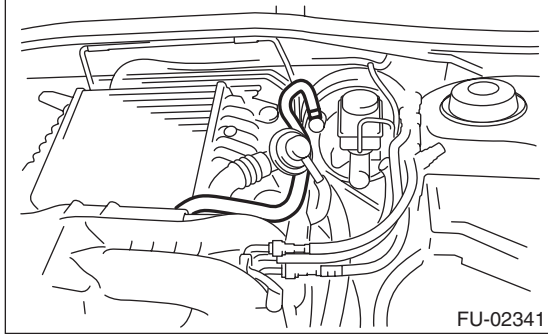


Intake Manifold

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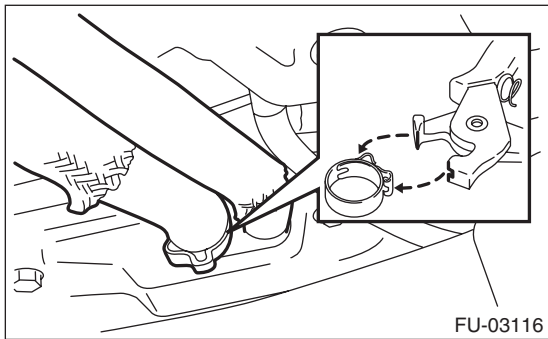
FUEL INJECTION (FUEL SYSTEMS)

16) Disconnect the brake booster vacuum hose.

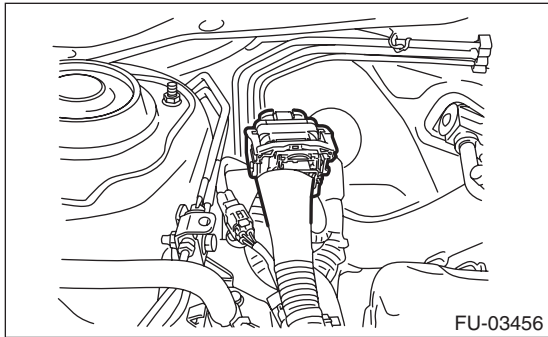


17) Fit the cut out in the ST with the protrusion on the clamp to unlock, and disconnect the PCV hose from the rocker cover.

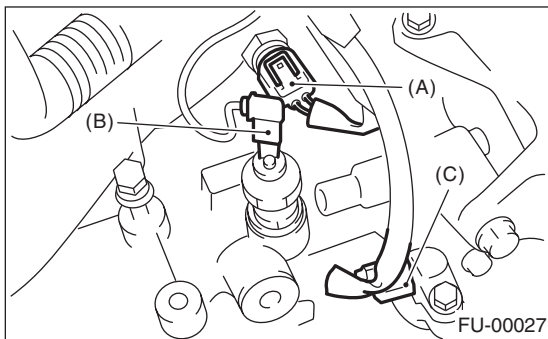
ST 18353AA000 CLAMP PLIERS



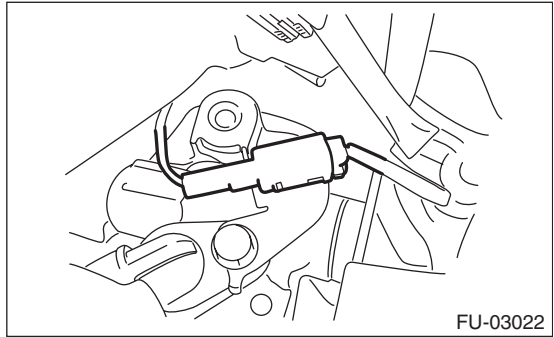
18) Disconnect the engine harness connectors from the bulk head harness connector.



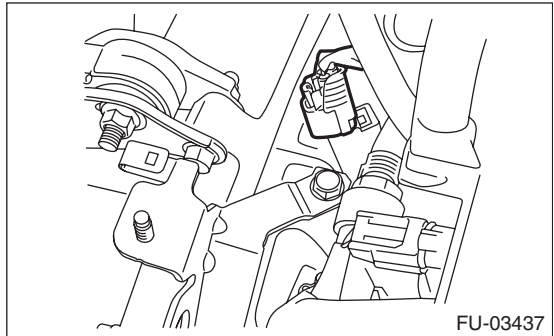
19) Disconnect the connectors from the engine coolant temperature sensor (A), oil pressure switch (B) and crankshaft position sensor (C).



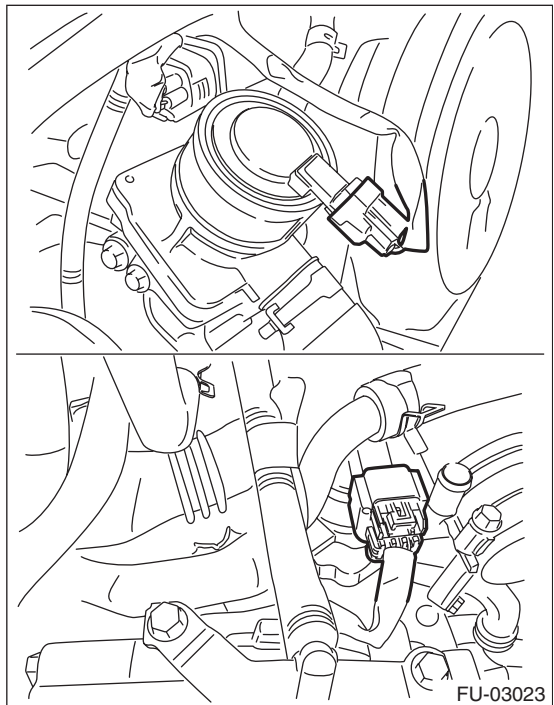
20) Disconnect the connector from power steering pump switch.



21) Disconnect the knock sensor connector.



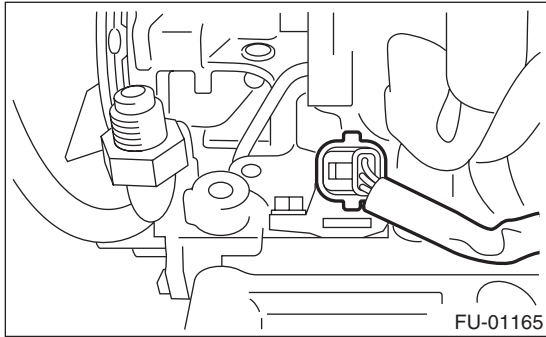
22) Disconnect the connector from the secondary air combination valve.



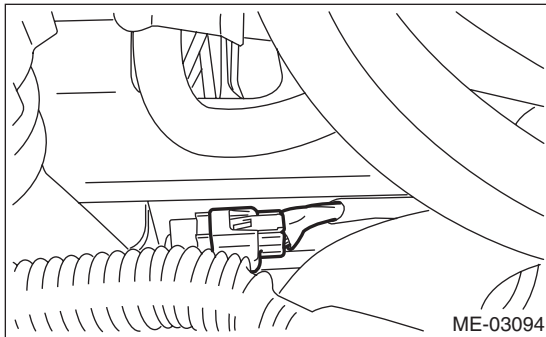
Intake Manifold

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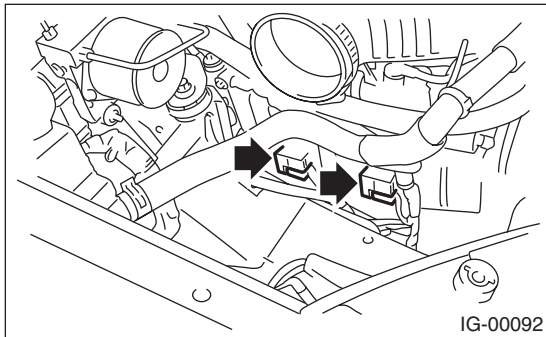
23) Disconnect the connector from the camshaft position sensor.



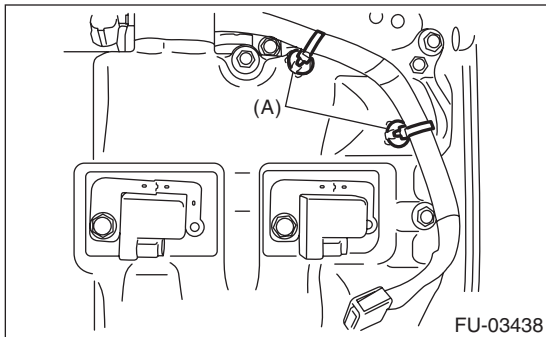
24) Disconnect the connector from the oil flow control solenoid valve.



25) Disconnect the connector from ignition coil.



26) Remove the engine harness fixed by clip (A) from the rocker cover.

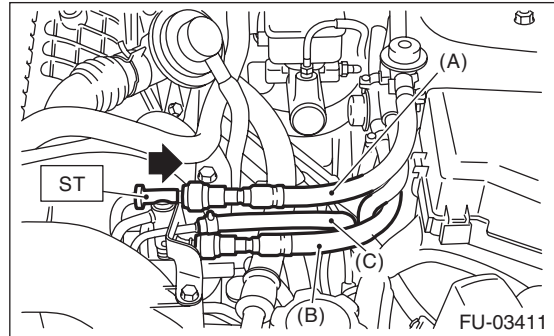


27) Attach ST to the fuel delivery pipe and push ST in the direction of arrow mark to disconnect the fuel delivery hose.

ST 42099AE000 QUICK CONNECTOR RELEASE

CAUTION:

- Be careful not to spill fuel.
- Catch the fuel from hoses using a container or cloth.



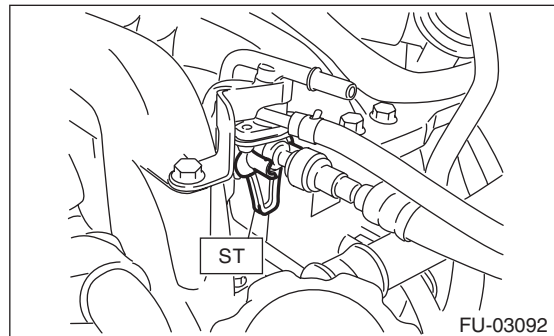
- (A) Fuel delivery hose
- (B) Fuel return hose
- (C) Evaporation hose

28) Disconnect the fuel return hose using the ST. ST 18371AA000 CONNECTOR REMOVER

CAUTION:

- Be careful not to spill fuel.
- Catch the fuel from hoses using a container or cloth.

(1) Attach ST to the fuel return pipe as shown in the figure.

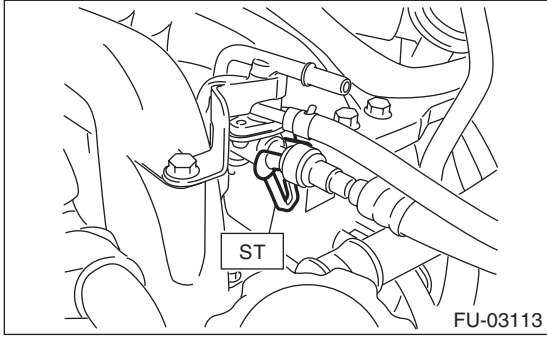


Intake Manifold

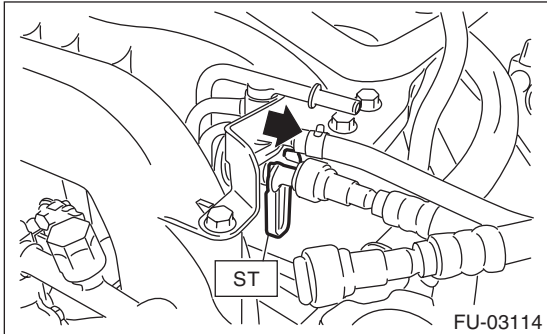
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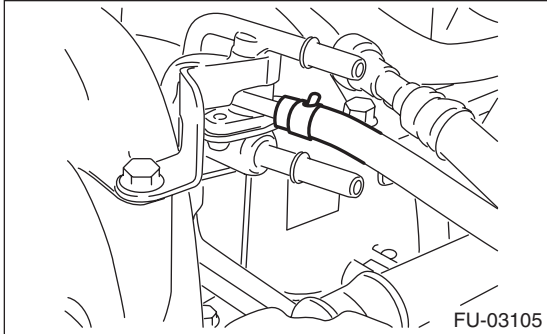
(2) Insert the front side of ST into the quick connector.



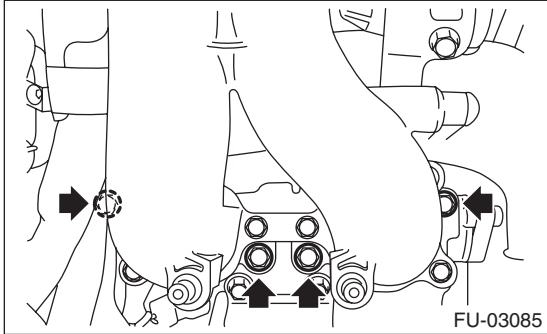
(3) Insert the back side of ST into the quick connector and push ST in the direction of arrow mark to disconnect the fuel return hose.



29) Remove the clip and disconnect the evaporation hose from the fuel pipe.



30) Remove the bolts which hold the tumble generator valve assembly onto the cylinder head.



31) Remove the intake manifold.

B: INSTALLATION

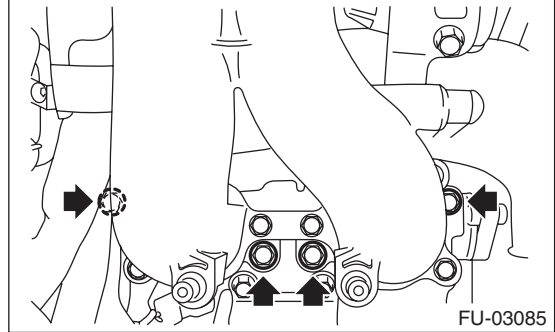
1) Install the intake manifold onto cylinder heads.

NOTE:

Use a new gasket.

Tightening torque:

25 N·m (2.5 kgf-m, 18.4 ft-lb)

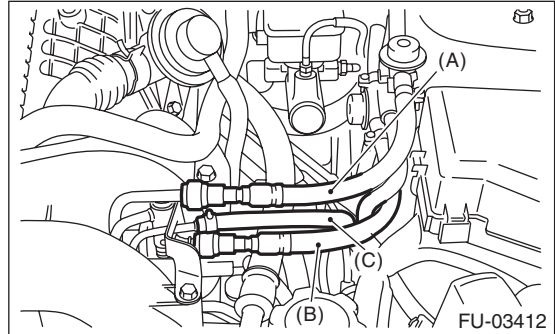


2) Connect the fuel delivery hose, fuel return hose, and evaporation hose.

<Ref. to FU(H4DOTC)-73, INSTALLATION, Fuel Delivery, Return and Evaporation Lines.>

NOTE:

If fuel hoses or clamps are damaged, replace them with new parts.

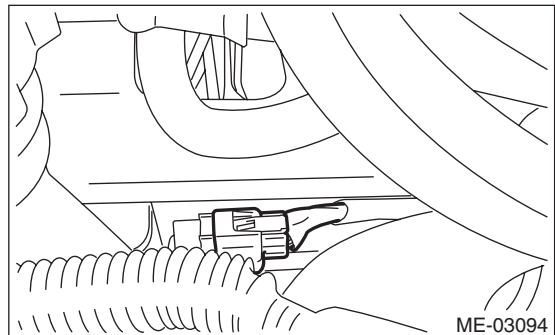


(A) Fuel delivery hose

(B) Fuel return hose

(C) Evaporation hose

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

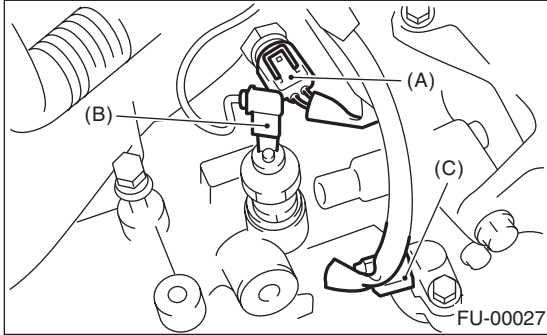


Intake Manifold

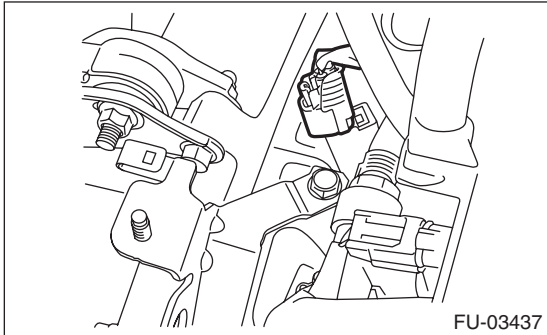
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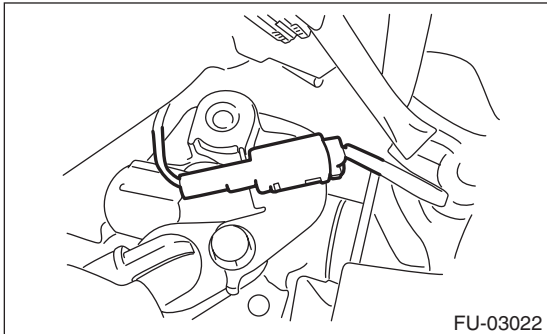
4) Connect the connector to the engine coolant temperature sensor (A), oil pressure switch (B) and crankshaft position sensor (C).



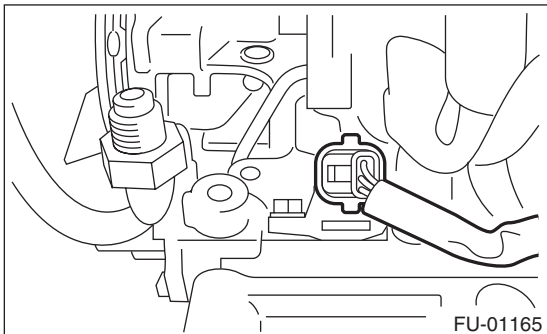
5) Connect the connector to the knock sensor.



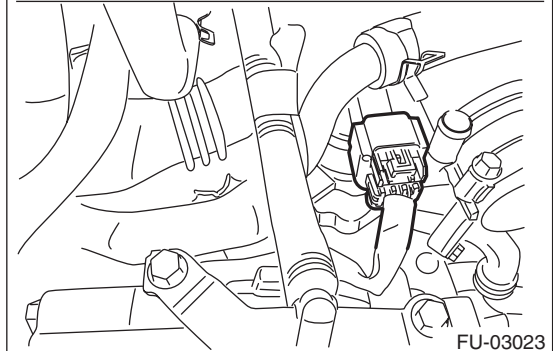
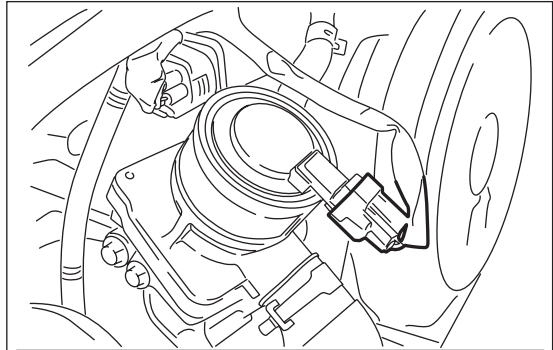
6) Connect the connector to the power steering pump switch.



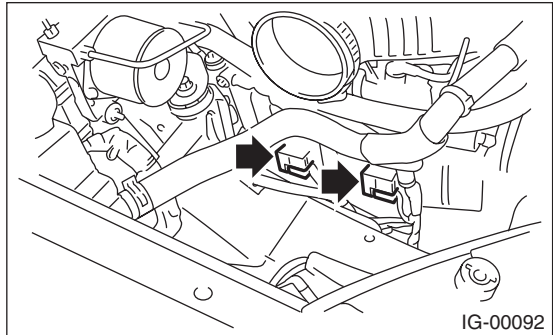
7) Connect the connectors to camshaft position sensor.



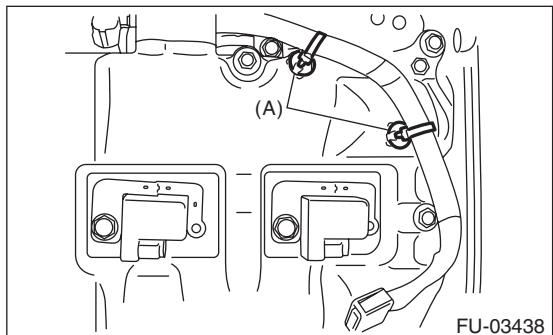
8) Connect the connector to the secondary air combination valve.



9) Connect the connector to the ignition coil.



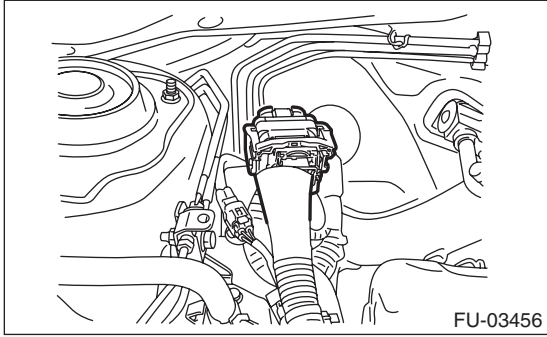
10) Install the engine harness with clip (A) to the rocker cover.



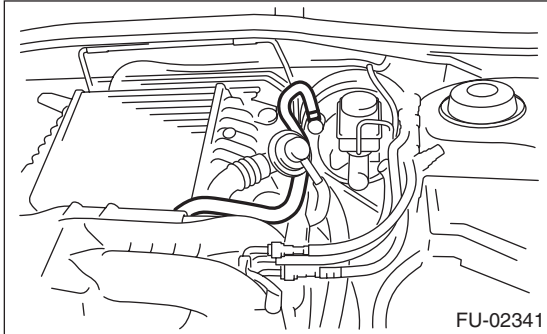
Intake Manifold

FUEL INJECTION (FUEL SYSTEMS)

11) Connect the engine harness connectors to the bulkhead harness connectors.



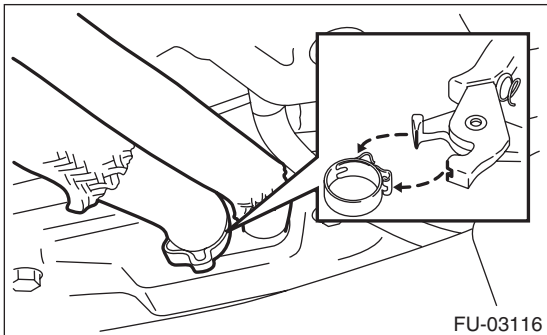
12) Connect the brake booster vacuum hose.



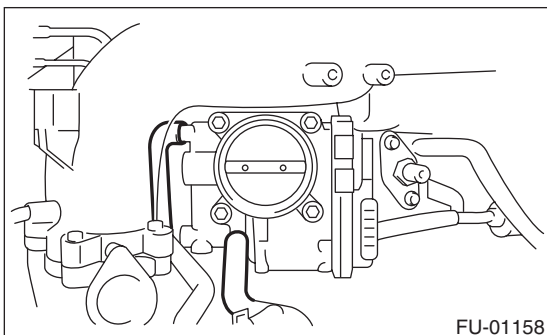
13) Connect the PCV hose to the rocker cover and lock it by fitting the clamp protrusion using ST. ST 18353AA000 CLAMP PLIERS

NOTE:

Use a new clamp.



14) Connect the engine coolant hoses to throttle body.

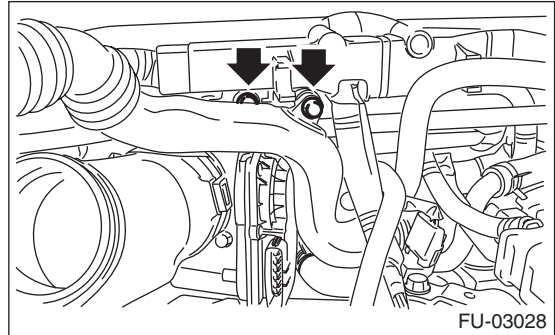


15) Install the duct to the throttle body.

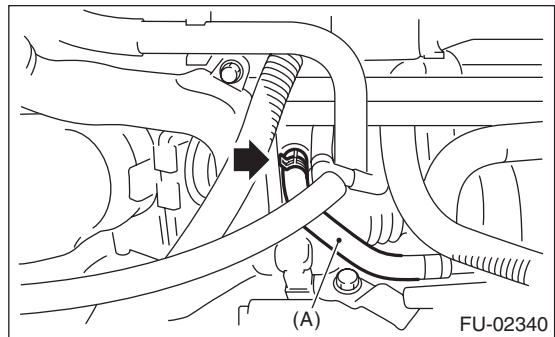
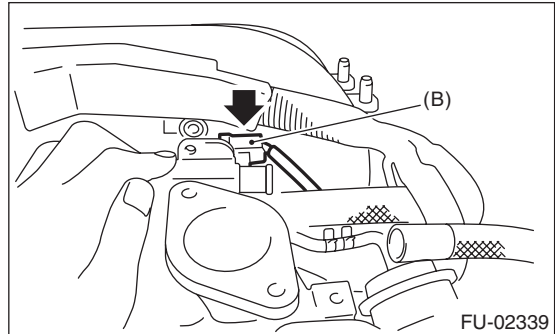
16) Attach the bolts which secure the air by-pass pipe and PCV pipe to the intake manifold.

Tightening torque:

6.4 N·m (0.65 kgf·m, 4.7 ft·lb)



17) Connect the emission hose (A) and the connector (B) to the PCV hose assembly.



18) Install the coolant filler tank.

<Ref. to CO(H4DOTC)-29, INSTALLATION, Coolant Filler Tank.>

19) Install the intercooler. <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>

20) Install the intake duct to the air cleaner case.

21) Install the fuse of fuel pump to the main fuse box.

22) Connect the battery ground cable to the battery.

23) Lift up the vehicle.

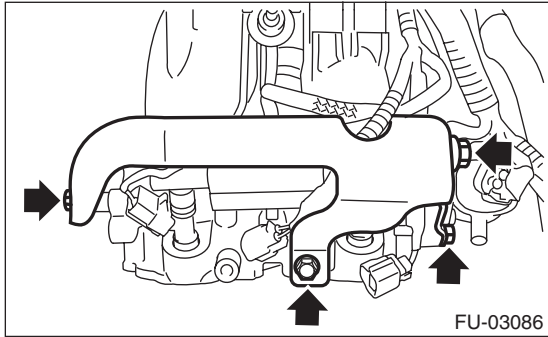
24) Install the under cover.

25) Fill engine coolant. <Ref. to CO(H4DOTC)-13, FILLING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>

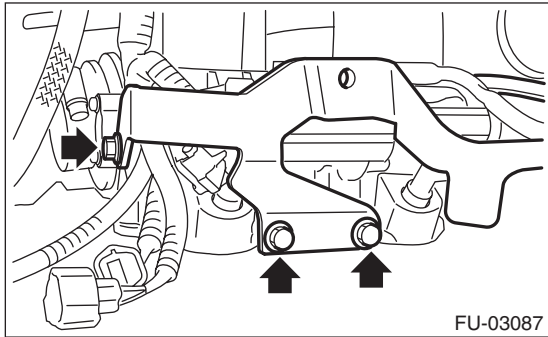
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C: DISASSEMBLY

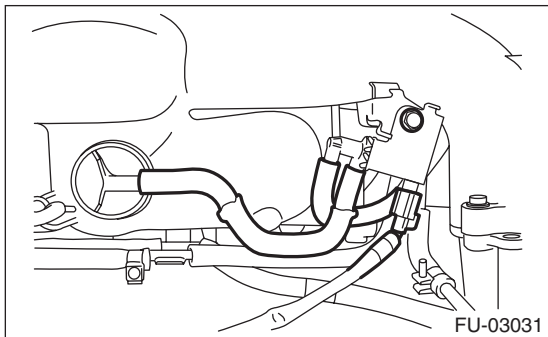
1) Remove the engine ground terminal from the fuel pipe protector LH and remove the fuel pipe protector LH from the intake manifold.



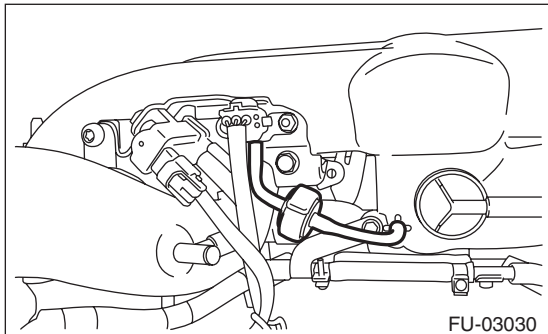
2) Remove the fuel pipe protector RH from the intake manifold.



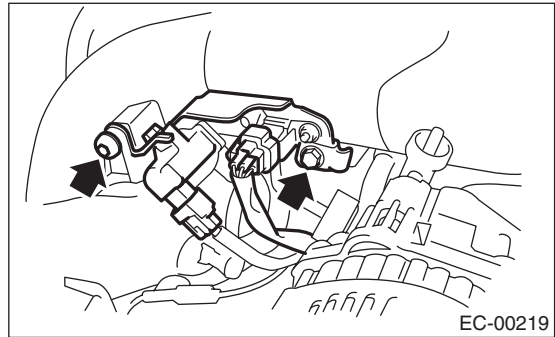
3) Disconnect the evaporation hose and the connector from the purge control solenoid valve 1, and remove the purge control solenoid valve 1 from the intake manifold.



4) Disconnect the filter assembly.

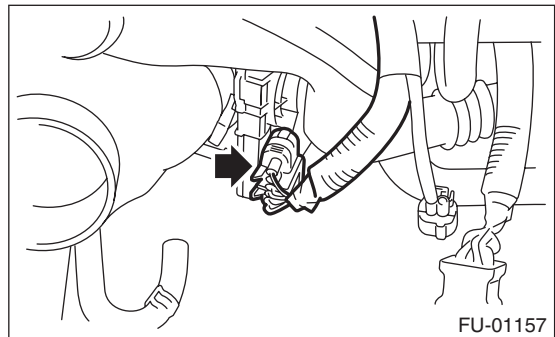


5) Remove the solenoid valve bracket assembly from the intake manifold, and disconnect the connector from the wastegate control solenoid valve, manifold absolute pressure sensor and purge control solenoid valve 2.

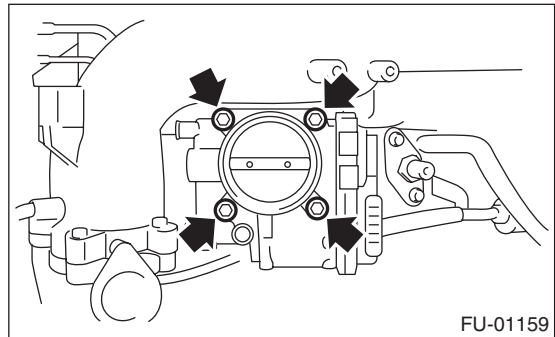


6) Disconnect the evaporation hose of the purge control solenoid valve 2 from the intake duct and fuel pipe assembly.

7) Disconnect the connectors from the throttle position sensor.



8) Remove the throttle body from the intake manifold.

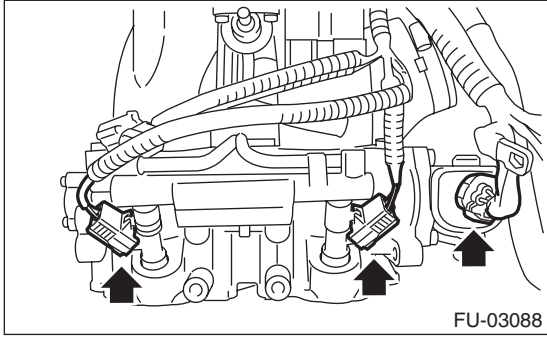


Intake Manifold

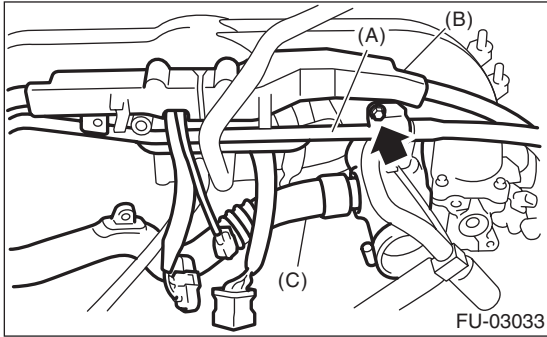
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FUEL INJECTION (FUEL SYSTEMS)

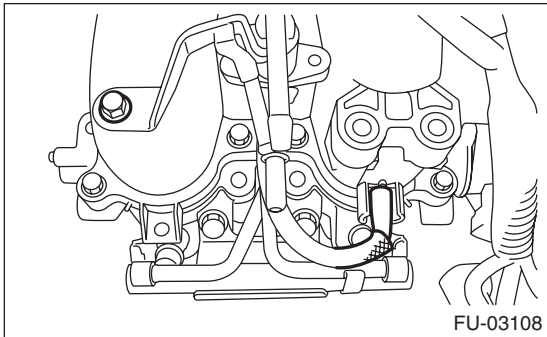
9) Disconnect the connector from the fuel injector and the tumble generator valve assembly.



10) Remove the PCV pipe (A), harness assembly (B) and intake duct (C) from the intake manifold.

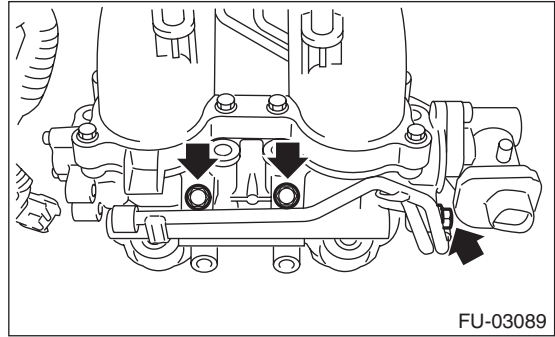


11) Remove the bolt which secures the fuel injector pipe LH onto the front side of intake manifold, and disconnect the pressure regulator vacuum hose from the intake manifold.

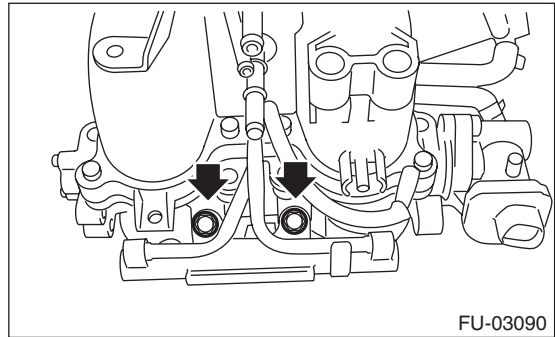


12) Remove the bolt which holds fuel injector pipe onto intake manifold.

- RH side

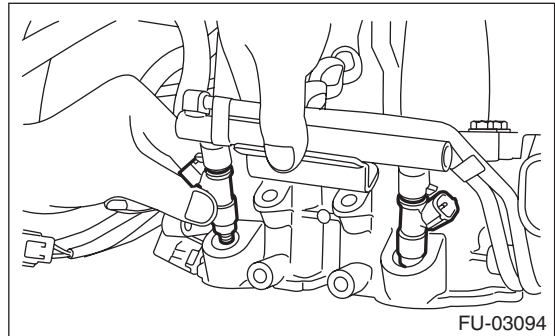


- LH side

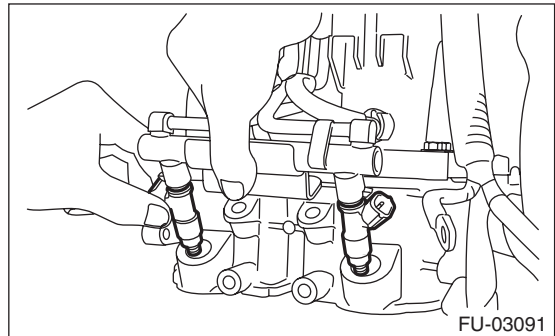


13) Remove the fuel injector.

- RH side



- LH side

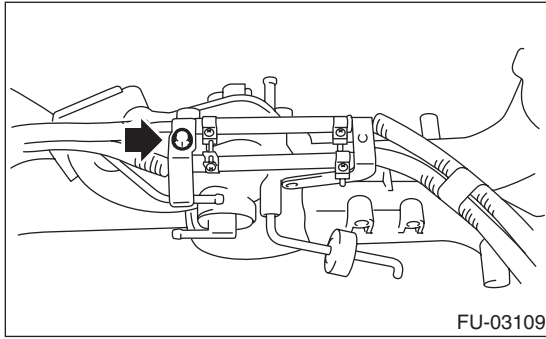


Intake Manifold

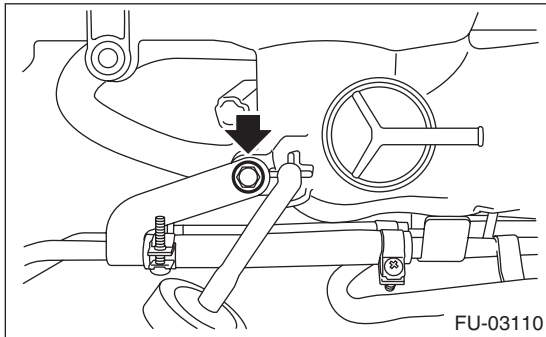
FUEL INJECTION (FUEL SYSTEMS)

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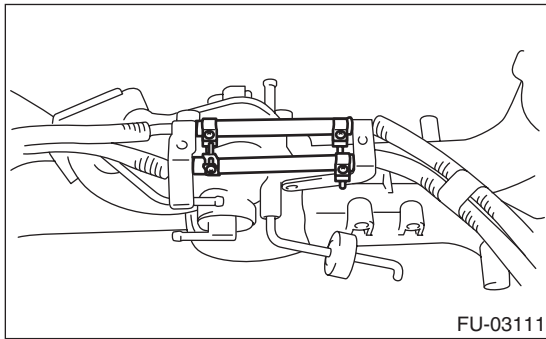
- 14) Remove the bolt which holds fuel injector pipe onto intake manifold.



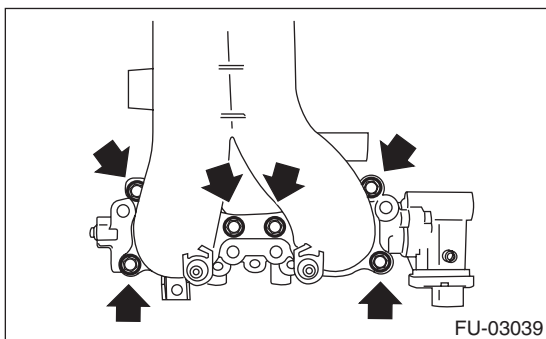
- 15) Remove the bolt which secures fuel injector pipe RH onto the lower side of the intake manifold.



- 16) Loosen the clamp which holds the fuel hose to the fuel injector pipe, and then disconnect the fuel hose from pipe.



- 17) Remove the fuel injector pipe.
18) Remove the tumble generator valve assembly from the intake manifold.

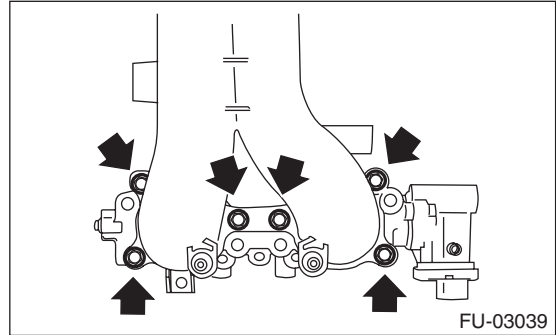


D: ASSEMBLY

- 1) Install the tumble generator valve assembly onto intake manifold.

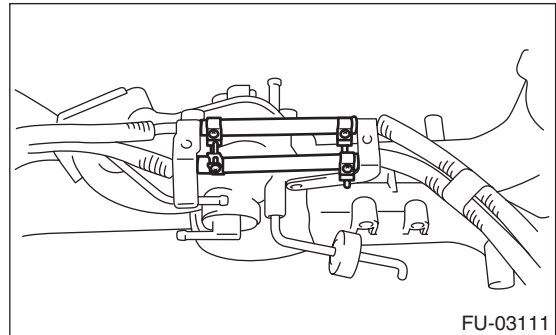
NOTE:
Use new O-rings.

Tightening torque:
8.3 N·m (0.85 kgf-m, 6.1 ft-lb)



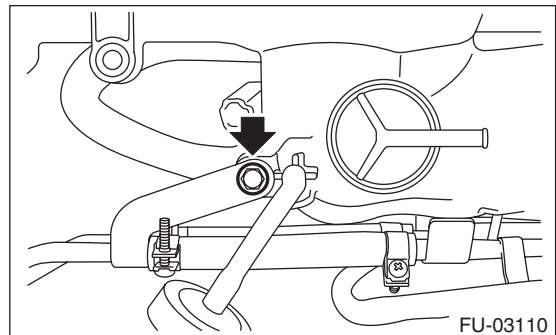
- 2) Install the fuel injector pipe.
3) Connect fuel hoses to fuel injector pipes on both sides, and secure them with the clamps.

Tightening torque:
1.25 N·m (0.13 kgf-m, 0.94 ft-lb)



- 4) Tighten the bolts which secure the fuel injector pipe RH to the lower side of the intake manifold.

Tightening torque:
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



Intake Manifold

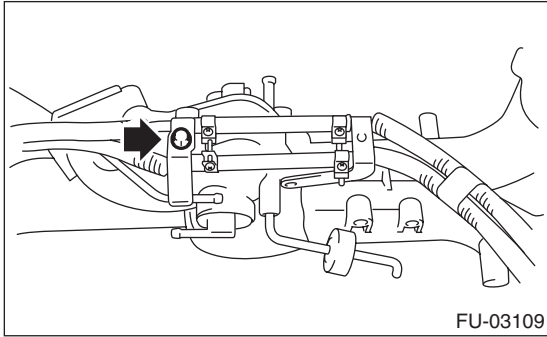
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FUEL INJECTION (FUEL SYSTEMS)

5) Tighten the bolts which secure fuel injector pipe onto intake manifold.

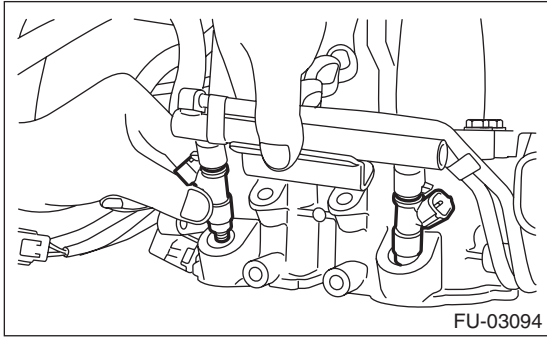
Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

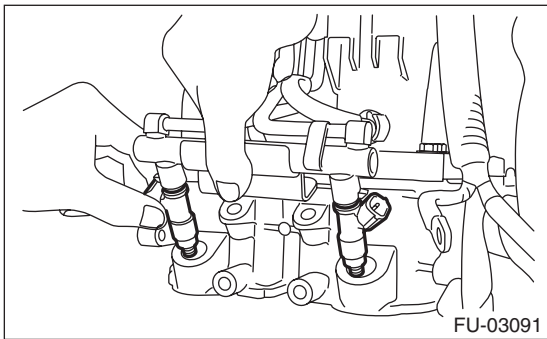


6) Install the fuel injector.

- RH side



- LH side

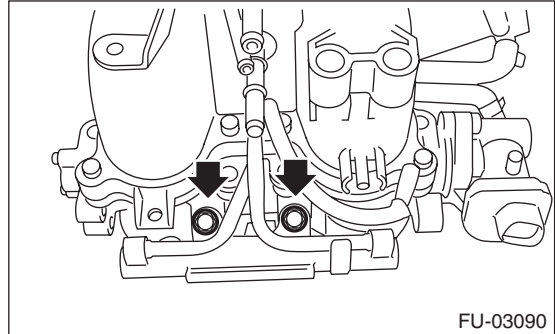


7) Tighten the bolts which secure fuel injector pipe onto intake manifold.

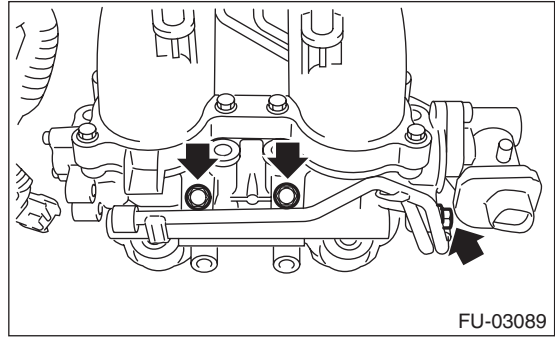
Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)

- LH side



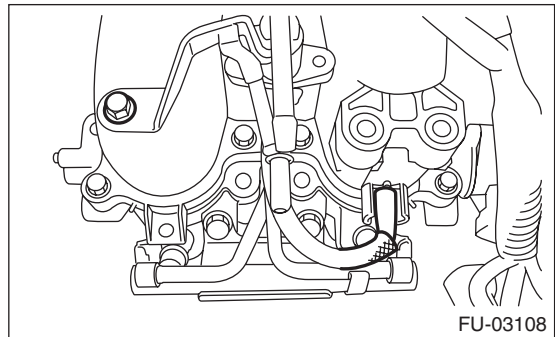
- RH side



8) Tighten the bolt which holds the fuel injector pipe LH to the front side of the intake manifold, and connect the pressure regulator vacuum hose to the intake manifold.

Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



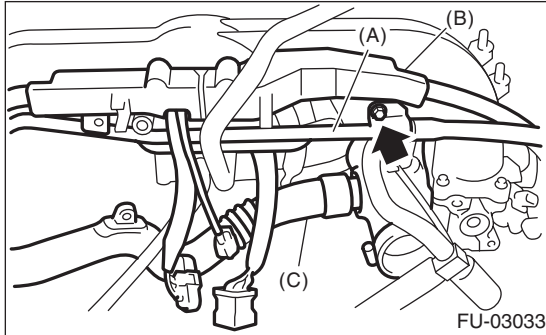
Intake Manifold

FUEL INJECTION (FUEL SYSTEMS)

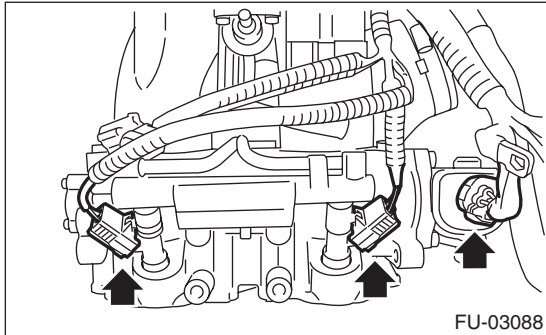
9) Install PCV pipe (A), harness assembly (B) and intake duct (C) to the intake manifold.

Tightening torque:

6.5 N·m (0.66 kgf·m, 4.8 ft·lb)



10) Connect the connector to the fuel injector and the tumble generator valve assembly.



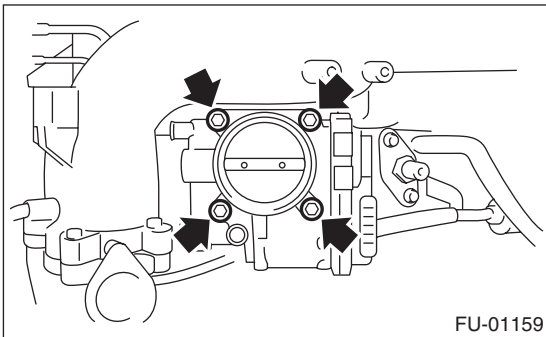
11) Install the throttle body to the intake manifold.

NOTE:

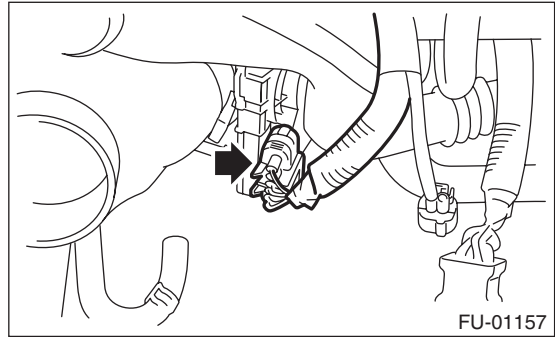
Use new O-rings.

Tightening torque:

8 N·m (0.8 kgf·m, 5.9 ft·lb)



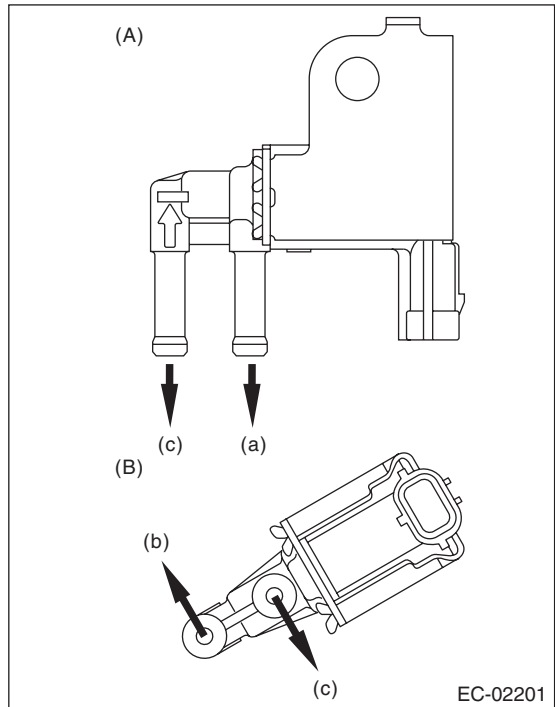
12) Connect the connector to the throttle position sensor.



13) Connect the evaporation hose to the purge control solenoid valve 2.

NOTE:

Connect the evaporation hose as shown in the figure.



- (A) Purge control solenoid valve 1
- (B) Purge control solenoid valve 2
- (a) To intake manifold
- (b) To intake duct
- (c) To fuel pipe

Intake Manifold

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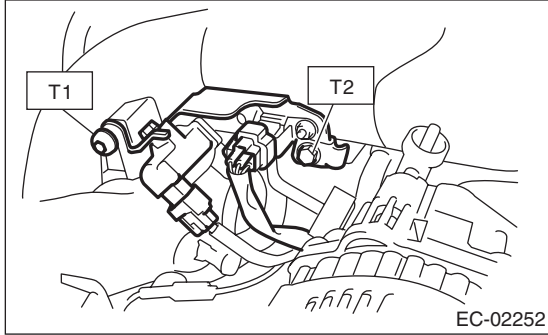
FUEL INJECTION (FUEL SYSTEMS)

14) Connect the connectors to the wastegate control solenoid valve, manifold absolute pressure sensor and purge control solenoid valve 2, and install the solenoid valve bracket assembly to the intake manifold.

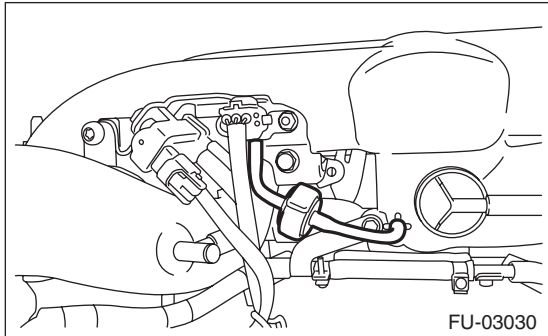
Tightening torque:

T1: 17 N·m (1.7 kgf-m, 12.5 ft-lb)

T2: 19 N·m (1.9 kgf-m, 14.0 ft-lb)



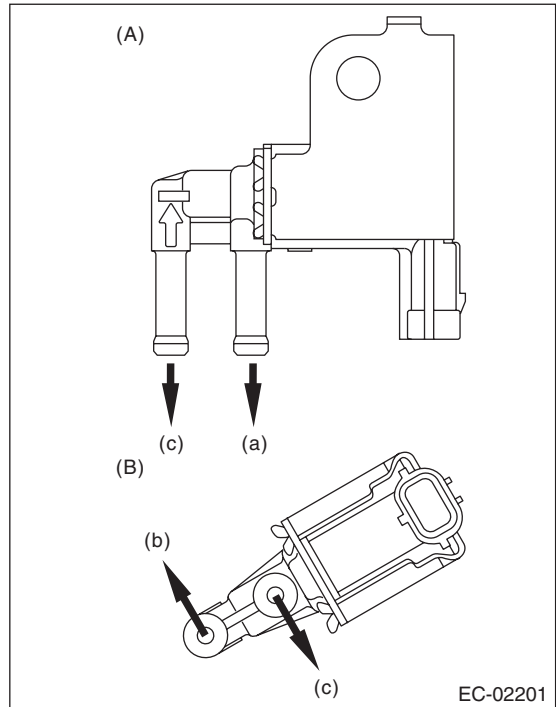
15) Connect the filter assembly.



16) Connect the evaporation hose and the connector to the purge control solenoid valve 1, and install the purge control solenoid valve 1 to the intake manifold.

NOTE:

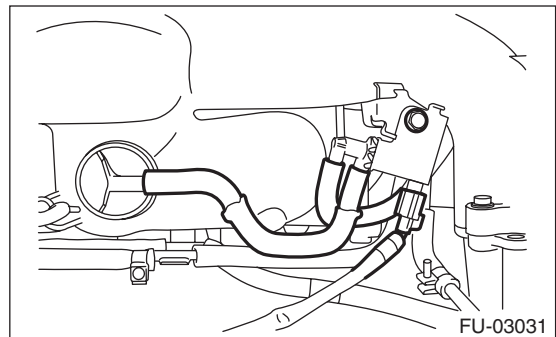
Connect the evaporation hose as shown in the figure.



- (A) Purge control solenoid valve 1
- (B) Purge control solenoid valve 2
- (a) To intake manifold
- (b) To intake duct
- (c) To fuel pipe

Tightening torque:

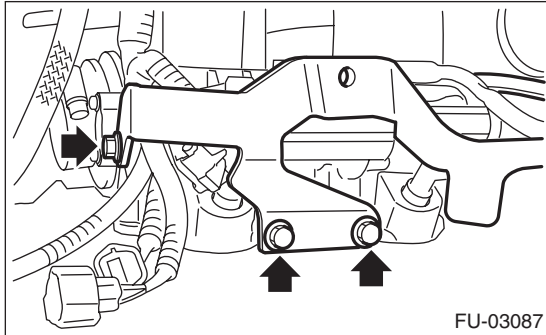
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



17) Install the fuel pipe protector RH to the intake manifold.

Tightening torque:

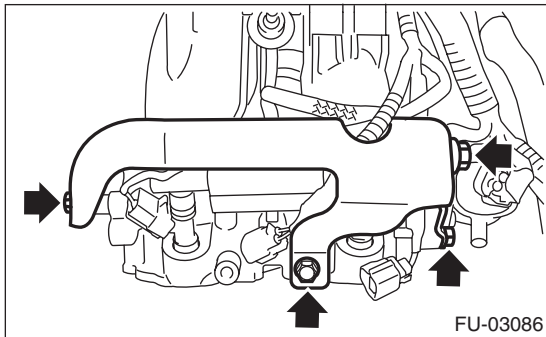
19 N·m (1.9 kgf-m, 14.0 ft-lb)



18) Install the fuel pipe protector LH to the intake manifold, and install the engine ground terminal to the fuel pipe protector LH.

Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



E: INSPECTION

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

Engine Coolant Temperature Sensor

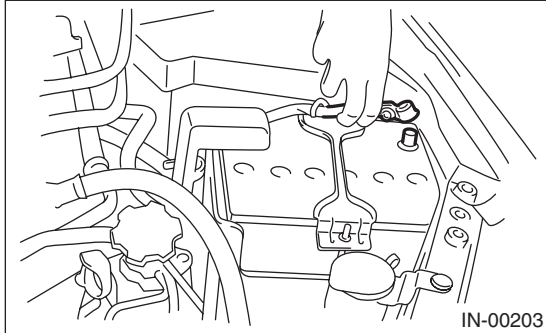
FUEL INJECTION (FUEL SYSTEMS)

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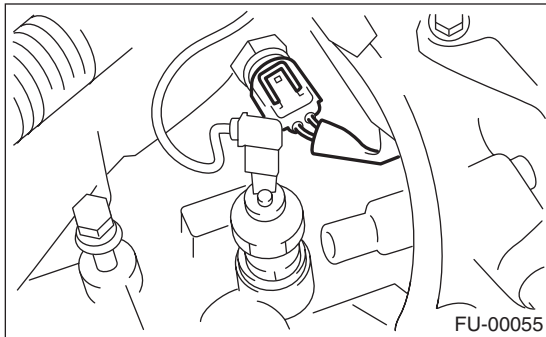
4. Engine Coolant Temperature Sensor

A: REMOVAL

- 1) Disconnect the ground cable from the battery.



- 2) Remove the generator. <Ref. to SC(H4SO)-12, REMOVAL, Generator.>
- 3) Drain engine coolant. <Ref. to CO(H4DOTC)-13, DRAINING OF ENGINE COOLANT, REPLACEMENT, Engine Coolant.>
- 4) Disconnect the connectors from the engine coolant temperature sensor.



- 5) Remove the engine coolant temperature sensor.

B: INSTALLATION

Install in the reverse order of removal.

NOTE:

Use a new gasket.

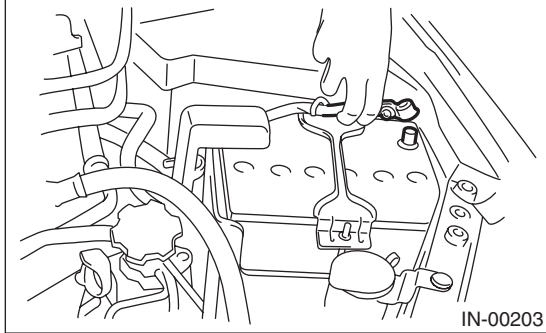
Tightening torque:

18 N·m (1.8 kgf·m, 13.3 ft·lb)

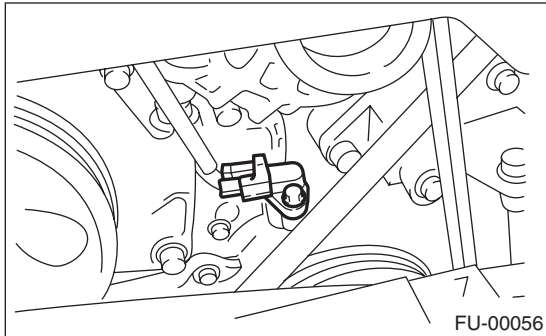
5. Crankshaft Position Sensor

A: REMOVAL

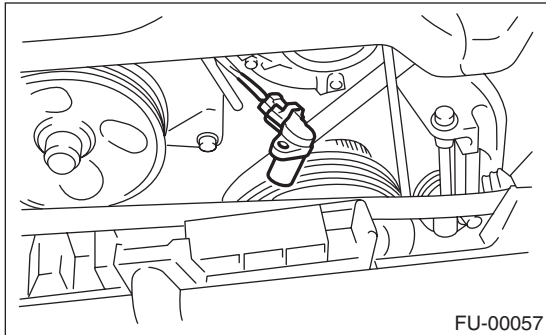
1) Disconnect the ground cable from the battery.



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



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

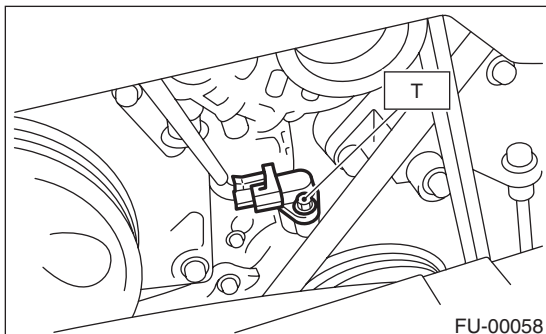


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

T: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



Camshaft Position Sensor

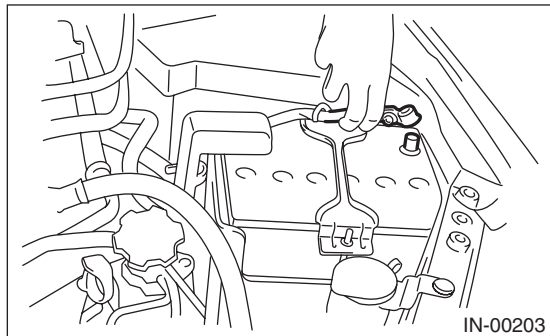
FUEL INJECTION (FUEL SYSTEMS)

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6. Camshaft Position Sensor

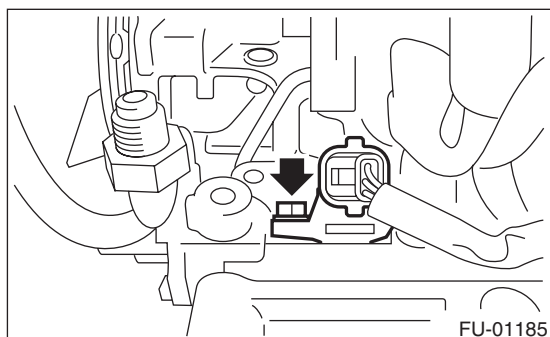
A: REMOVAL

1) Disconnect the ground cable from battery.



2) Disconnect the connector from camshaft position sensor RH.

3) Remove the camshaft position sensor RH from the rear side of the cylinder head.



4) Remove the cam shaft position sensor LH in the same way as RH.

B: INSTALLATION

Install in the reverse order of removal.

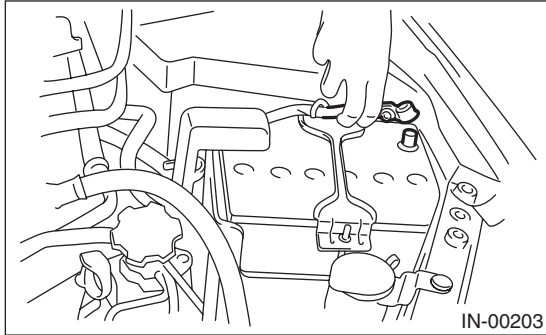
Tightening torque:

6.4 N·m (0.65 kgf·m, 4.7 ft·lb)

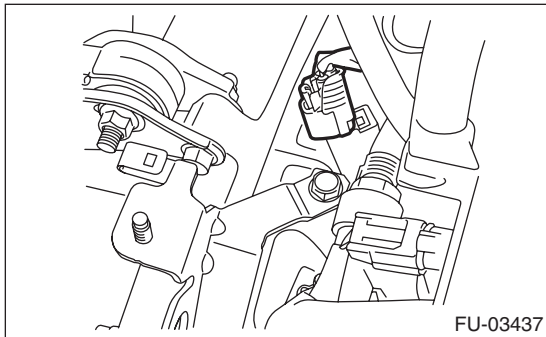
7. Knock Sensor

A: REMOVAL

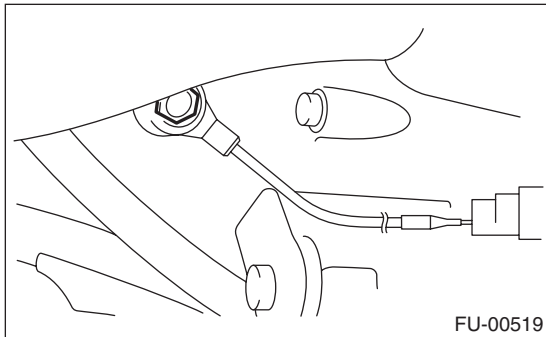
- 1) Disconnect the ground cable from the battery.



- 2) Remove the intercooler. <Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
- 3) Disconnect the knock sensor connector.



- 4) Remove the knock sensor from the cylinder block.



B: INSTALLATION

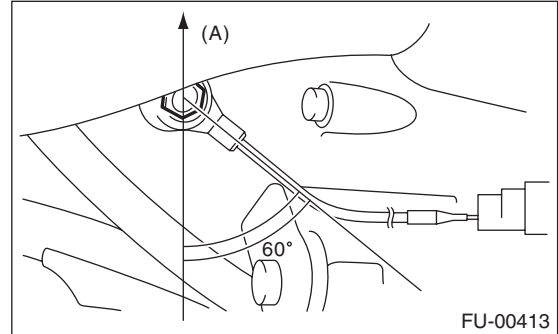
- 1) Install the knock sensor to the cylinder block.

NOTE:

The portion of the knock sensor cord that is pulled out must be positioned at a 60° angle relative to the engine rear.

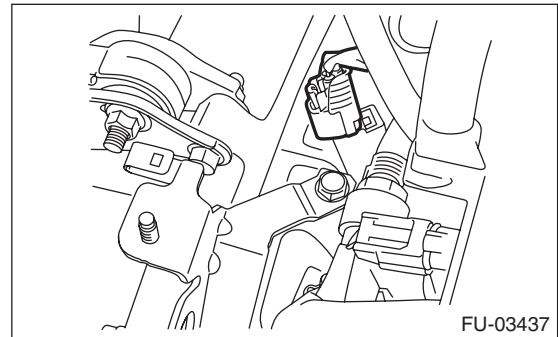
Tightening torque:

24 N·m (2.4 kgf·m, 17.7 ft·lb)

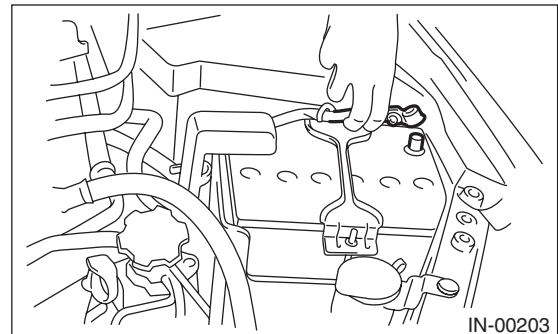


(A) Front side

- 2) Connect the knock sensor connector.



- 3) Install the intercooler.
<Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
- 4) Connect the ground cable to the battery.



Throttle Position Sensor

FUEL INJECTION (FUEL SYSTEMS)

8. Throttle Position Sensor

A: SPECIFICATION

Throttle body is a non-disassembled part, so do not remove the throttle position sensor from throttle body.

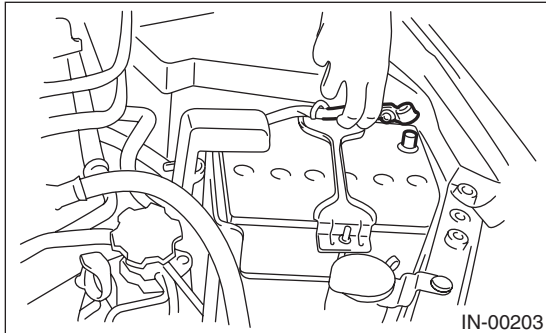
Refer to “Throttle Body” for removal and installation procedure. <Ref. to FU(H4DOTC)-14, REMOVAL, Throttle Body.> <Ref. to FU(H4DOTC)-14, INSTALLATION, Throttle Body.>

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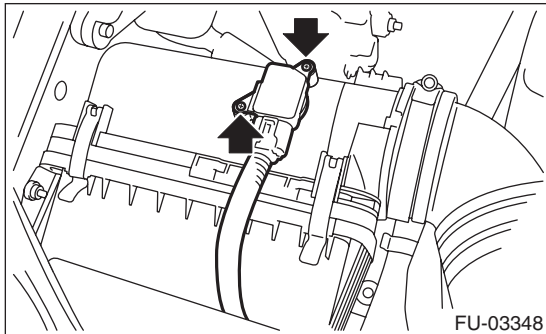
9. Mass Air Flow and Intake Air Temperature Sensor

A: REMOVAL

- 1) Disconnect the ground cable from battery.



- 2) Disconnect the connector from the 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 N·m (0.1 kgf·m, 0.7 ft·lb)

Manifold Absolute Pressure Sensor

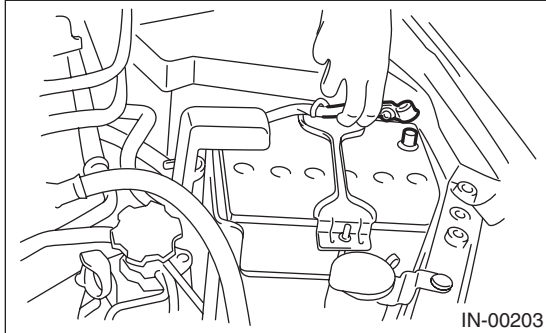
FUEL INJECTION (FUEL SYSTEMS)

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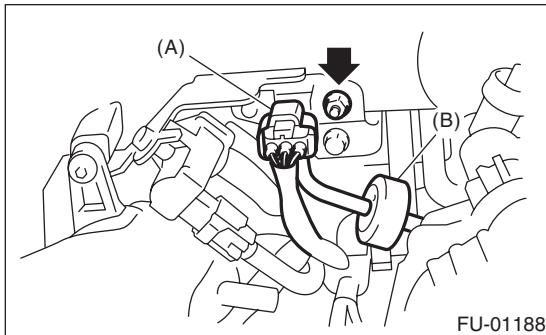
10. Manifold Absolute Pressure Sensor

A: REMOVAL

- 1) Disconnect the ground cable from battery.



- 2) Disconnect the connector from manifold absolute pressure sensor (A), and remove the filter assembly (B) from intake manifold.
- 3) Remove the manifold absolute pressure sensor from the solenoid valve bracket.



B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

6.4 N·m (0.65 kgf·m, 4.7 ft·lb)

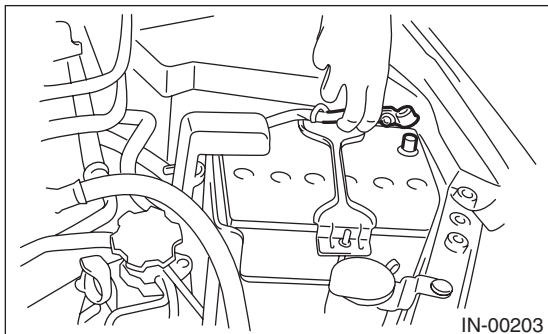
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11. Fuel Injector

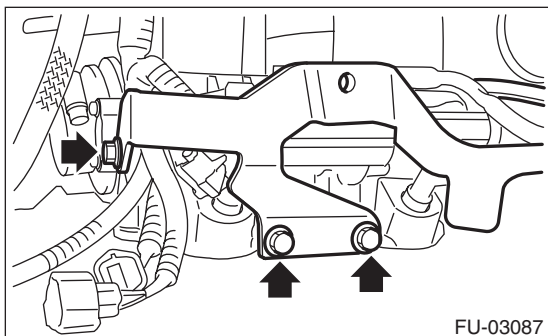
A: REMOVAL

1. RH SIDE

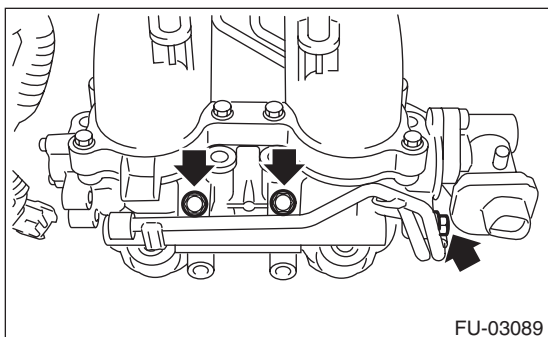
- 1) Release the fuel pressure.
 <Ref. to FU(H4DOTC)-50, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
- 2) Disconnect the ground cable from battery.



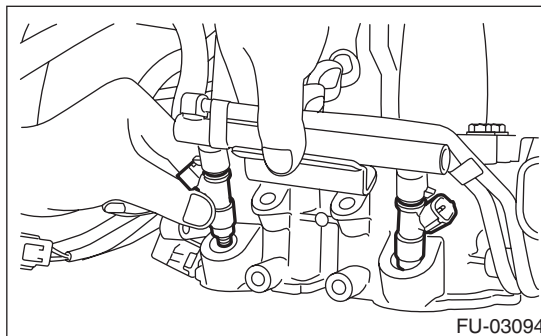
- 3) Open the fuel filler flap lid, and remove the fuel filler cap.
- 4) Remove the intake manifold. <Ref. to FU(H4DOTC)-15, REMOVAL, Intake Manifold.>
- 5) Remove the fuel pipe protector RH from the intake manifold.



- 6) Disconnect the connector from fuel injector.
- 7) Remove the bolt which holds fuel injector pipe onto intake manifold.

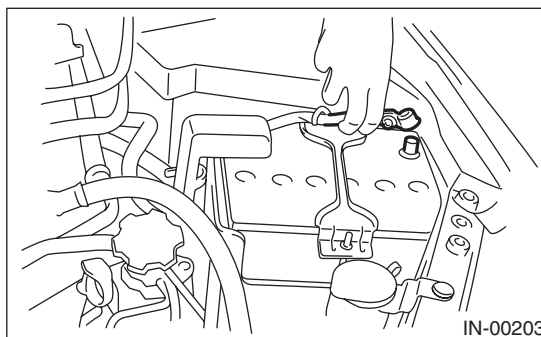


- 8) Remove the fuel injector.

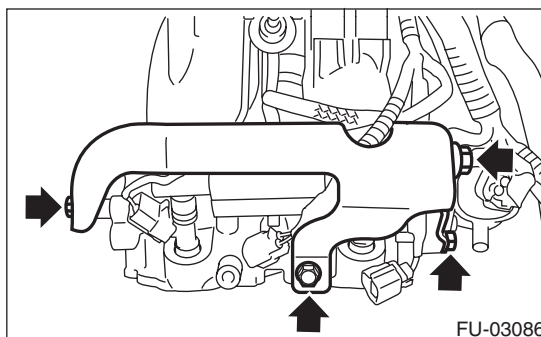


2. LH SIDE

- 1) Release the fuel pressure.
 <Ref. to FU(H4DOTC)-50, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
- 2) Disconnect the ground cable from battery.



- 3) Open the fuel filler flap lid, and remove the fuel filler cap.
- 4) Remove the intake manifold. <Ref. to FU(H4DOTC)-15, REMOVAL, Intake Manifold.>
- 5) Remove the engine ground terminal from the fuel pipe protector LH and remove the fuel pipe protector LH from the intake manifold.



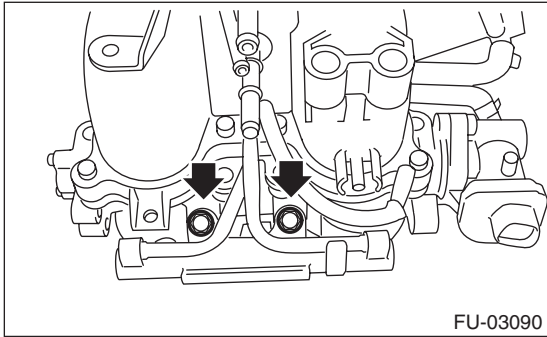
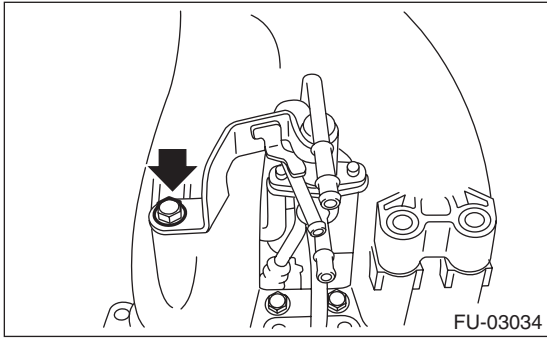
- 6) Disconnect the connector from fuel injector.

Fuel Injector

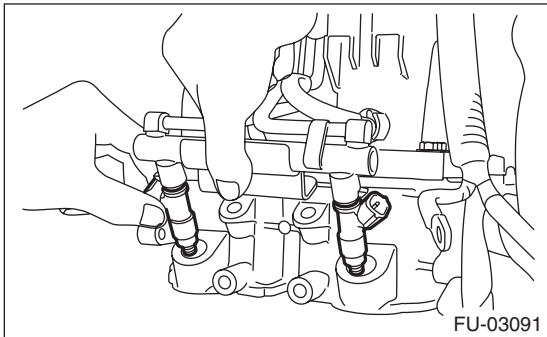
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FUEL INJECTION (FUEL SYSTEMS)

7) Remove the bolt which holds fuel injector pipe onto intake manifold.



8) Remove the fuel injector.



B: INSTALLATION

1. RH SIDE

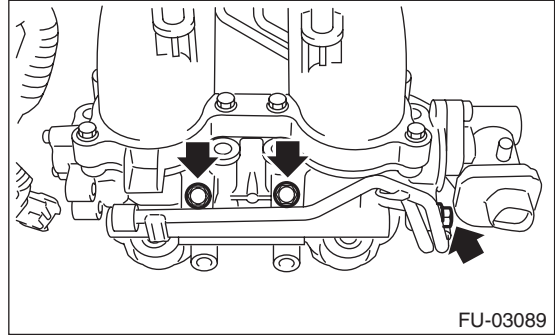
Install in the reverse order of removal.

NOTE:

Use new O-rings.

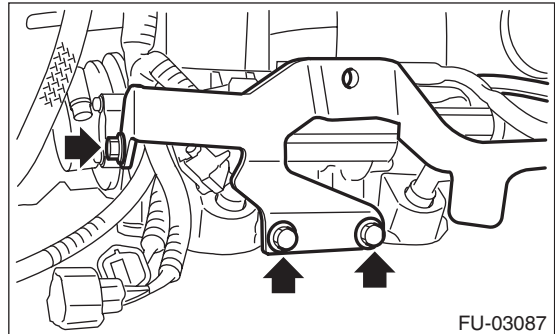
Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



2. LH SIDE

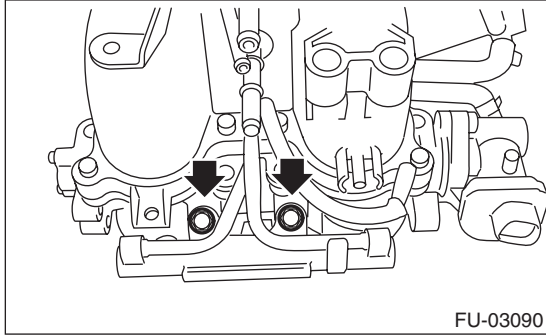
Install in the reverse order of removal.

NOTE:

Use new O-rings.

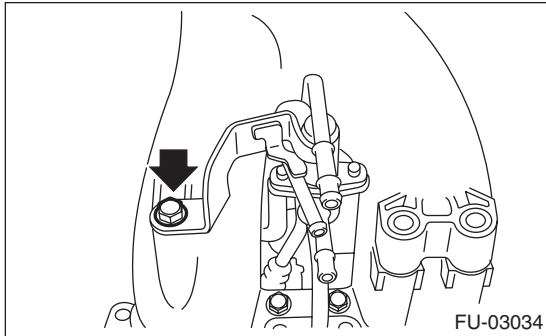
Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



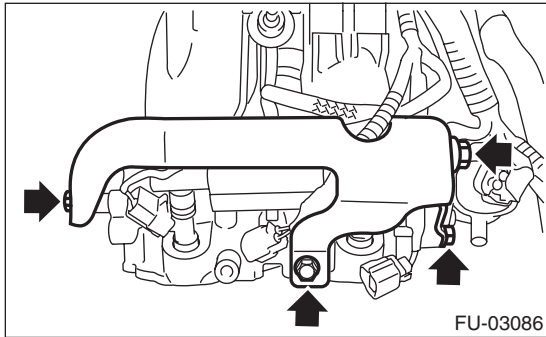
Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



Tightening torque:

19 N·m (1.9 kgf-m, 14.0 ft-lb)



Tumble Generator Valve Assembly

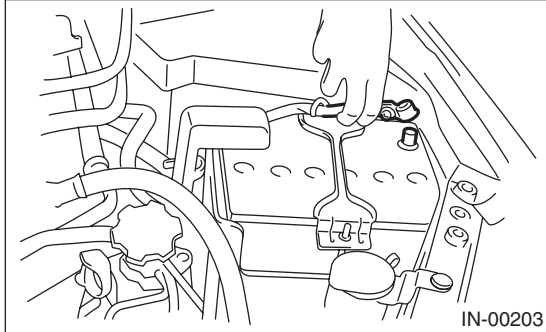
FUEL INJECTION (FUEL SYSTEMS)

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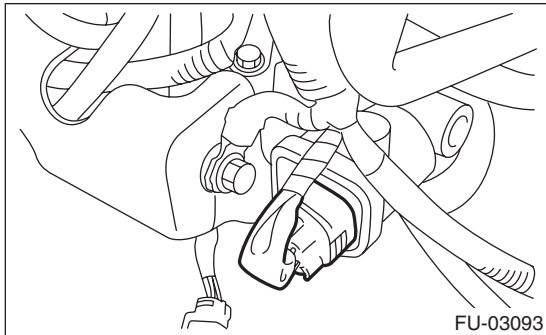
12. Tumble Generator Valve Assembly

A: REMOVAL

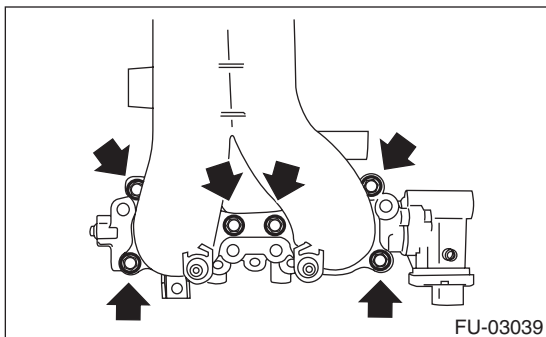
- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-50, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
- 2) Disconnect the ground cable from battery.



- 3) Open the fuel filler flap lid, and remove the fuel filler cap.
- 4) Remove the intake manifold. <Ref. to FU(H4DOTC)-15, REMOVAL, Intake Manifold.>
- 5) Disconnect the connector from the tumble generator valve assembly.



- 6) Remove the fuel injector. <Ref. to FU(H4DOTC)-35, REMOVAL, Fuel Injector.>
- 7) Remove the tumble generator valve body from intake manifold.



B: INSTALLATION

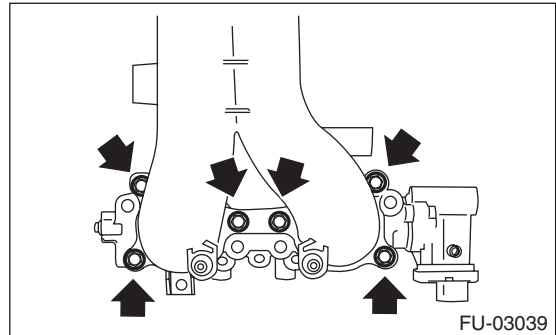
Install in the reverse order of removal.

NOTE:

Use a new gasket.

Tightening torque:

8.3 N·m (0.85 kgf·m, 6.1 ft·lb)



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13. Tumble Generator Valve Actuator

A: SPECIFICATION

The tumble generator valve assembly cannot be disassembled.

Refer to "Tumble Generator Valve Assembly" for removal and installation procedures. <Ref. to FU(H4DOTC)-38, REMOVAL, Tumble Generator Valve Assembly.> <Ref. to FU(H4DOTC)-38, INSTALLATION, Tumble Generator Valve Assembly.>

Oil Flow Control Solenoid Valve

FUEL INJECTION (FUEL SYSTEMS)

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14. Oil Flow Control Solenoid Valve

A: REMOVAL

Oil flow control solenoid valve is a unit with camshaft cap.

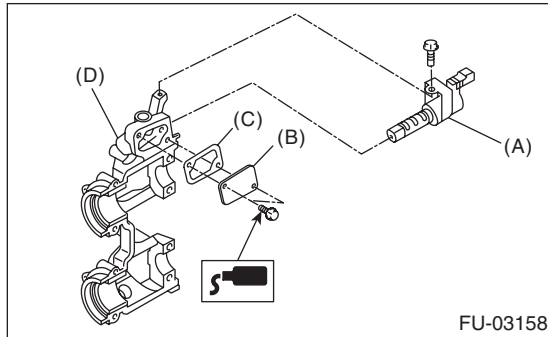
Refer to "Camshaft" for removal procedures. <Ref. to ME(H4DOTC)-63, REMOVAL, Camshaft.>

B: INSTALLATION

Refer to "Camshaft" for installation procedure. <Ref. to ME(H4DOTC)-64, INSTALLATION, Camshaft.>

C: DISASSEMBLY

- 1) Remove the 2 mounting bolts and remove the oil return cover and gasket.
- 2) Remove the mounting bolt and remove the oil flow control solenoid valve.



- (A) Oil flow control solenoid valve
- (B) Oil return cover
- (C) Gasket
- (D) Camshaft cap

D: ASSEMBLY

- 1) Install the oil flow control solenoid valve.

Tightening torque:

8 N·m (0.8 kgf-m, 5.9 ft-lb)

- 2) Apply liquid gasket to the two bolts which secure the oil return cover.

Liquid gasket:

THREE BOND 1324 (Part No. 004403042) or equivalent

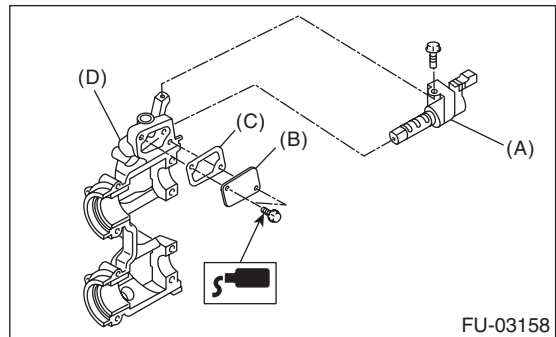
- 3) Attach the oil return cover and gasket.

Tightening torque:

8 N·m (0.8 kgf-m, 5.9 ft-lb)

NOTE:

Use a new gasket.

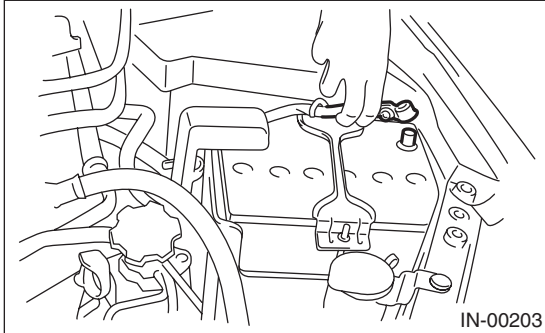


- (A) Oil flow control solenoid valve
- (B) Oil return cover
- (C) Gasket
- (D) Camshaft cap

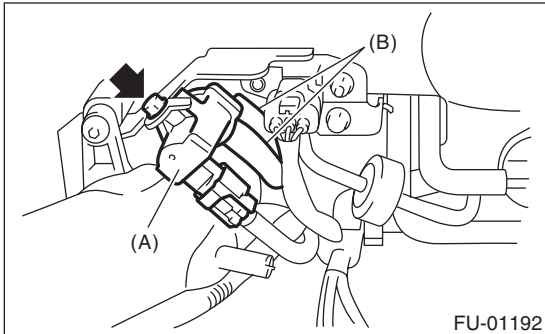
15. Wastegate Control Solenoid Valve

A: REMOVAL

- 1) Disconnect the ground cable from battery.



- 2) Disconnect the connector from the wastegate control solenoid valve (A).
- 3) Disconnect pressure hose (B) from the wastegate control solenoid valve.
- 4) Remove the wastegate control solenoid valve from the bracket.



B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

Front Oxygen (A/F) Sensor

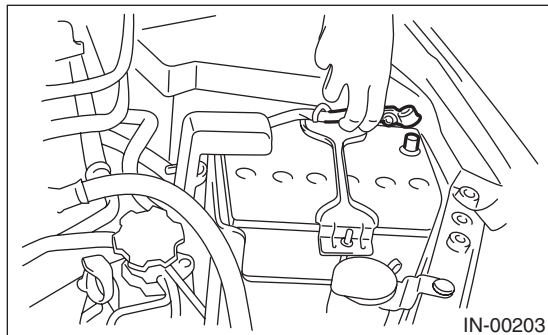
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16. Front Oxygen (A/F) Sensor

A: REMOVAL

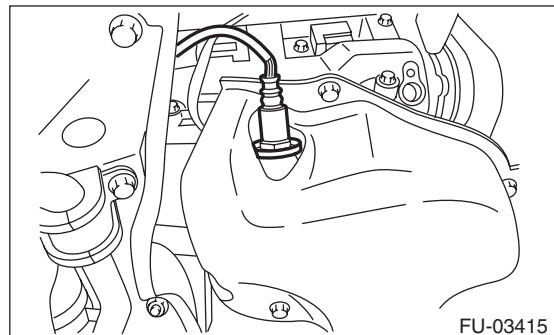
- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.



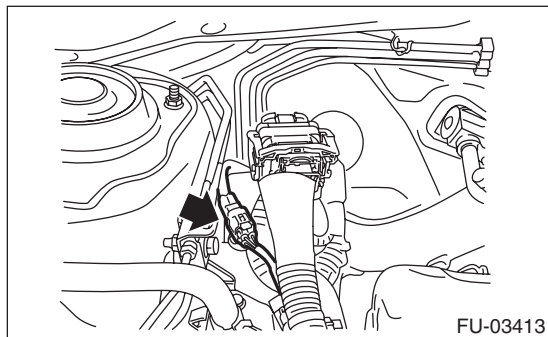
- 8) Remove the front oxygen (A/F) sensor.

CAUTION:

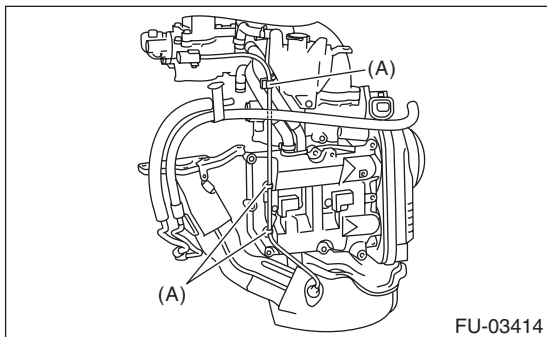
When removing the oxygen (A/F) sensor, wait until exhaust pipe cools, otherwise it will damage the exhaust pipe.



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



- 4) Remove the front oxygen (A/F) sensor harness that is held by a clip.



- 5) Lift up the vehicle.
- 6) Remove the under cover.
- 7) Apply spray-type lubricant or equivalent to the threaded portion of front oxygen (A/F) sensor, and leave it for one minute or more.

Front Oxygen (A/F) Sensor

FUEL INJECTION (FUEL SYSTEMS)

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B: INSTALLATION

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

CAUTION:

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

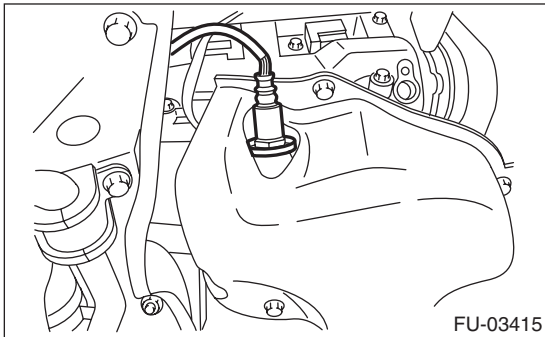
Anti-seize compound:

NEVER-SEEZ NSN, JET LUBE SS-30 or equivalent

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

Tightening torque:

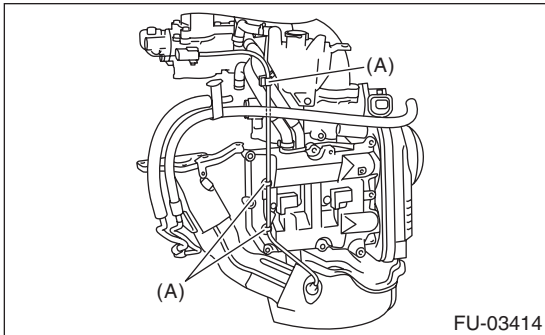
30 N·m (3.1 kgf·m, 22.1 ft·lb)



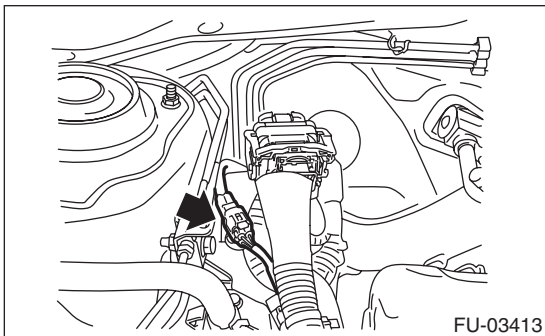
3) Install the under cover.

4) Lower the vehicle.

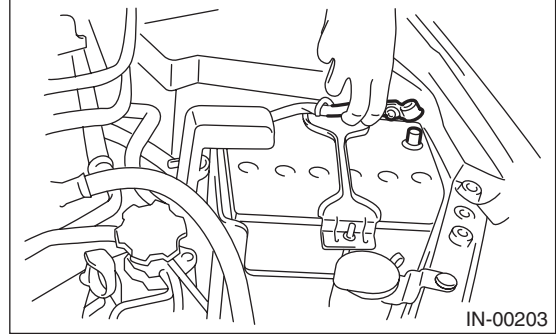
5) Affix the front oxygen (A/F) sensor with the clip.



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



7) Connect the battery ground cable to the battery.



Rear Oxygen Sensor

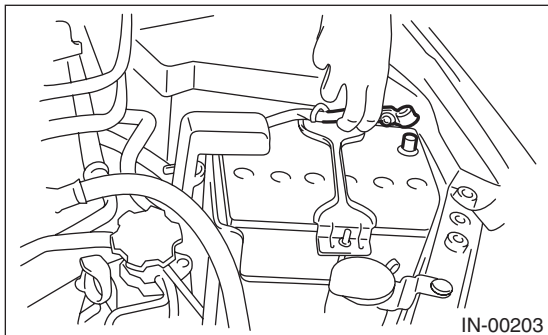
FUEL INJECTION (FUEL SYSTEMS)

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17. Rear Oxygen Sensor

A: REMOVAL

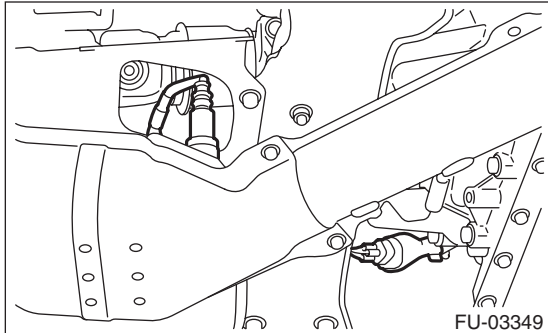
- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.



- 3) Lift up the vehicle.
- 4) Disconnect the connector from the rear oxygen sensor.
- 5) Apply spray-type lubricant or equivalent to the threaded portion of rear oxygen sensor, and leave it for one minute or more.
- 6) Remove the rear oxygen sensor.

CAUTION:

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



B: INSTALLATION

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

CAUTION:

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

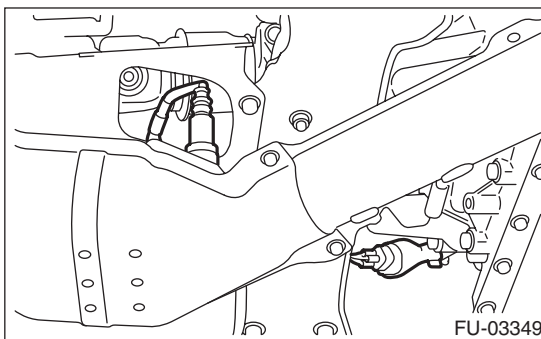
Anti-seize compound:

NEVER-SEEZ NSN, JET LUBE SS-30 or equivalent

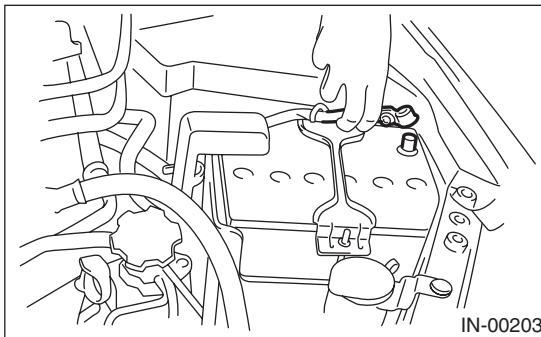
- 2) Install the rear oxygen sensor.

Tightening torque:

21 N·m (2.1 kgf·m, 15.5 ft·lb)



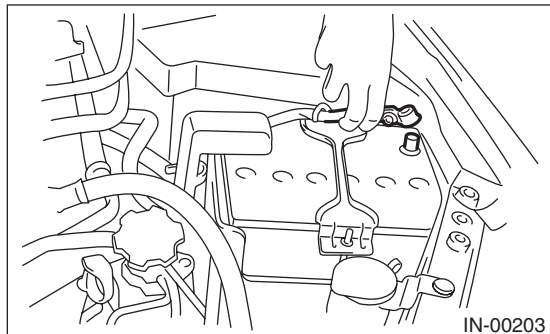
- 3) Connect the connector to rear oxygen sensor.
- 4) Lower the vehicle.
- 5) Connect the battery ground cable to the battery.



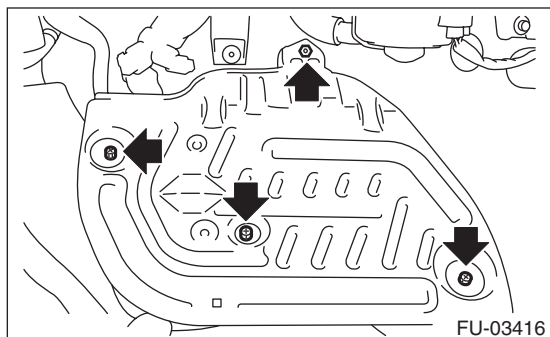
18.Engine Control Module (ECM)

A: REMOVAL

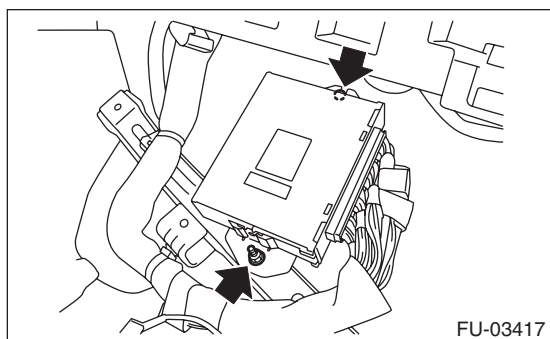
- 1) Disconnect the ground cable from battery.



- 2) Remove the lower inner trim of passenger's side.
<Ref. to EI-53, REMOVAL, Lower Inner Trim.>
- 3) Detach the floor mat of passenger's seat.
- 4) Remove the protect cover.



- 5) Remove the bolts and nuts which hold the ECM to the bracket.



- 6) Disconnect the ECM connectors, and take out the ECM.

B: INSTALLATION

Install in the reverse order of removal.

CAUTION:

When the ECM on a model with immobilizer has been replaced, be sure to perform registration of the immobilizer. (Refer to the "IMMOBILIZER TEACHING OPERATION MANUAL".)

NOTE:

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

Tightening torque:

7.5 N·m (0.8 kgf·m, 5.5 ft·lb)

Main Relay

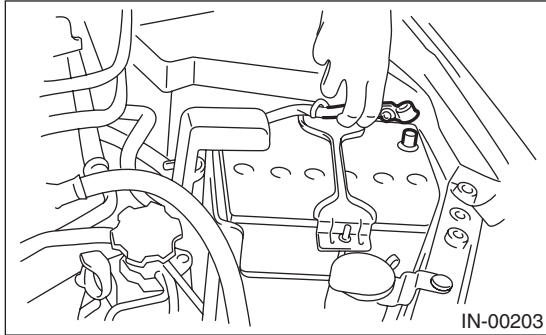
FUEL INJECTION (FUEL SYSTEMS)

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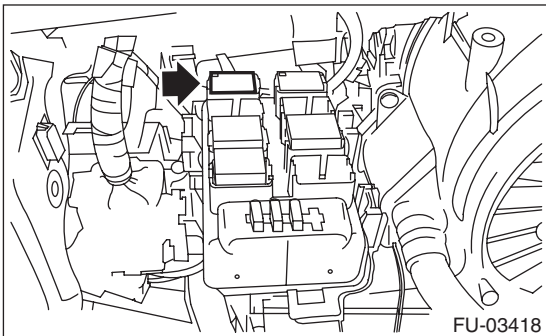
19.Main Relay

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Remove the main relay from the relay block on the back side of the glove box.



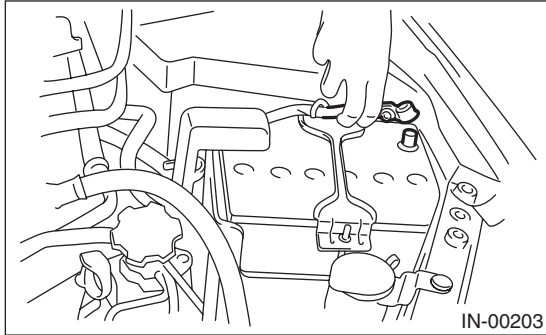
B: INSTALLATION

Install in the reverse order of removal.

20. Fuel Pump Relay

A: REMOVAL

1) Disconnect the ground cable from battery.



2) Remove the fuel pump relay from the relay block on the back side of the glove box.



B: INSTALLATION

Install in the reverse order of removal.

Electronic Throttle Control Relay

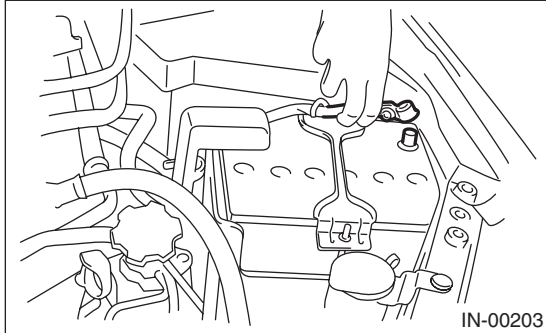
FUEL INJECTION (FUEL SYSTEMS)

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21. Electronic Throttle Control Relay

A: REMOVAL

- 1) Disconnect the ground cable from battery.



- 2) Remove the electronic throttle control relay from the relay block on the back side of the glove box.



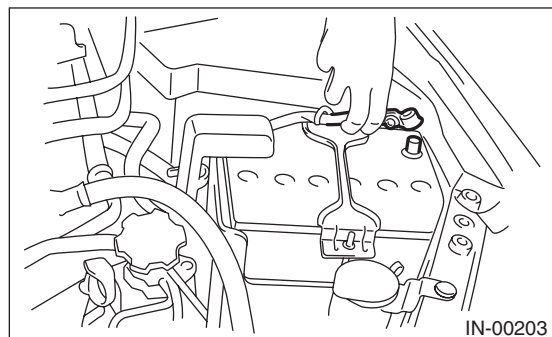
B: INSTALLATION

Install in the reverse order of removal.

22. Fuel Pump Control Unit

A: REMOVAL

1) Disconnect the ground cable from battery.

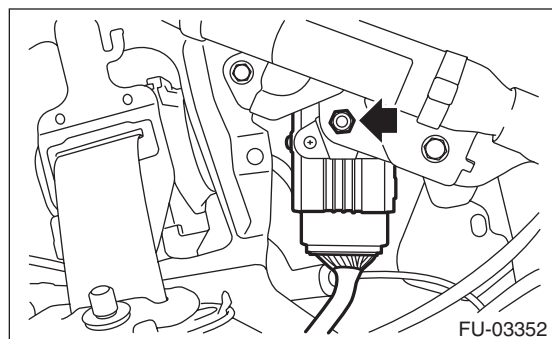


2) Remove the rear quarter trim of the left side. (Wagon model) <Ref. to EI-55, REMOVAL, Rear Quarter Trim.>

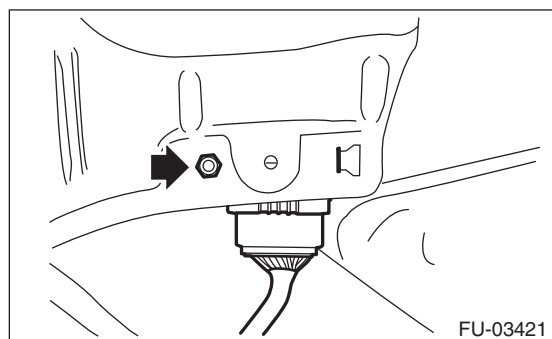
3) Remove the left side trunk side trim. (Sedan model) <Ref. to EI-58, REMOVAL, Trunk Room Trim.>

4) Remove the fuel pump control unit.

- Wagon model



- Sedan model



5) Disconnect the connector from fuel pump control unit.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

5 N·m (0.5 kgf-m, 3.7 ft-lb)

23. Fuel

A: PROCEDURE

1. RELEASING OF FUEL PRESSURE

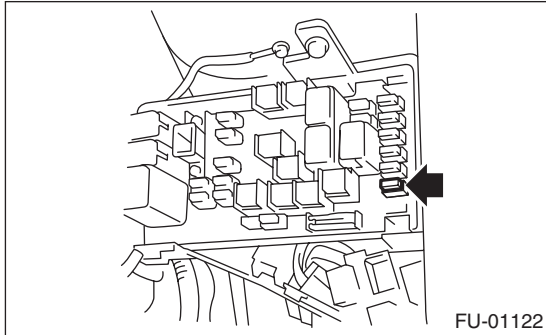
WARNING:

Place “NO OPEN FLAMES” signs near the working area.

CAUTION:

Be careful not to spill fuel.

1) Remove the fuse of fuel pump from main fuse box.



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

2. DRAINING FUEL (WITH SUBARU SELECT MONITOR)

WARNING:

Place “NO OPEN FLAMES” signs near the working area.

CAUTION:

Be careful not to spill fuel.

NOTE:

- If the fuel pump cannot be actuated, refer to DRAINING FUEL (THROUGH THE FUEL FILLER HOSE). <Ref. to FU(H4DOTC)-51, DRAINING FUEL (THROUGH THE FUEL FILLER HOSE), PROCEDURE, Fuel.>

- Be careful not to allow the battery to go flat.

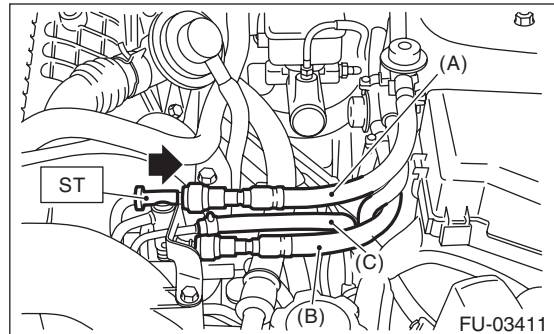
- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-50, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>

- 2) Attach ST to the fuel delivery pipe and push ST in the direction of arrow mark to disconnect the fuel delivery hose.

ST 42099AE000 QUICK CONNECTOR RELEASE

CAUTION:

- **Be careful not to spill fuel.**
- **Catch the fuel from hoses using a container or cloth.**



- 3) Connect ST to the fuel delivery hose.
ST 18471AA000 FUEL PIPE ADAPTER
- 4) Connect the gasoline proof hose to ST, and put the hose end into the container.
- 5) Drive the fuel pump and drain the fuel using Subaru Select Monitor. <Ref. to EN(H4DOTC)(diag)-58, FUEL PUMP CONTROL (ON/OFF DRIVE), OPERATION, System Operation Check Mode.>

CAUTION:

Be careful not to spill fuel.

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3. DRAINING FUEL (THROUGH THE FUEL FILLER HOSE)

• SEDAN MODEL

WARNING:

Place "NO OPEN FLAMES" signs near the working area.

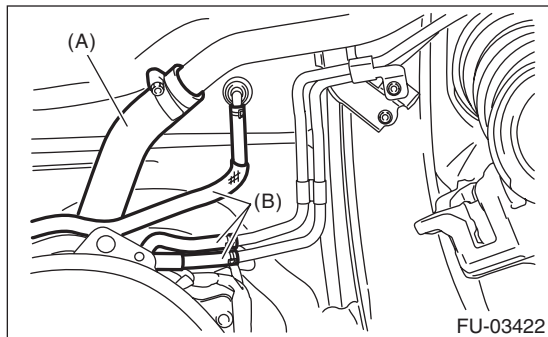
CAUTION:

- Be careful not to spill fuel.
- Fuel may be remaining in the fuel filler pipe. Using a gasoline proof pump and a gasoline proof hose of 10 mm dia. or less, drain the fuel from the fuel filler pipe through the filler opening before performing any work.

- 1) Set the vehicle on a lift.
- 2) Lift up the vehicle.
- 3) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
- 4) Remove the rear sub frame. <Ref. to RS-15, REMOVAL, Rear Sub Frame.>
- 5) Open the fuel filler flap lid, and remove the fuel filler cap.
- 6) Drain the fuel from the fuel filler pipe through the fill opening using the gasoline proof pump and the gasoline proof hose (10 mm dia. or less).
- 7) Disconnect the fuel filler hose (A) from the fuel filler pipe assembly.

CAUTION:

- Be careful not to spill fuel.
- Catch the fuel from hoses using a container or cloth.



(A) Fuel filler hose
(B) Evaporation hose

- 8) Set a container under the vehicle and insert a gasoline proof hose of 10 mm dia. or less into the fuel filler hose to drain the fuel.

CAUTION:

Be careful not to spill fuel.

• WAGON MODEL

WARNING:

Place "NO OPEN FLAMES" signs near the working area.

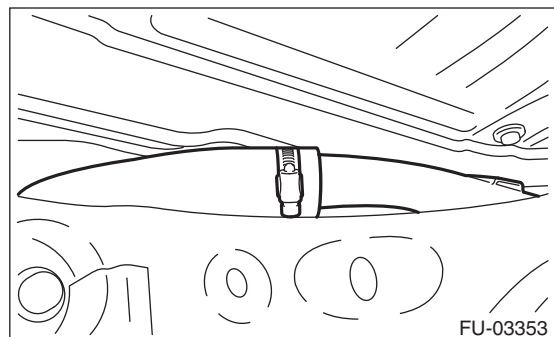
CAUTION:

- Be careful not to spill fuel.
- Fuel may remain in the fuel filler pipe. Perform the work after draining the fuel from the fuel filler pipe through the fill opening using the gasoline proof pump and the gasoline proof hose (ø10 or less).

- 1) Set the vehicle on a lift.
- 2) Lift up the vehicle.
- 3) Remove the rear exhaust pipe and muffler. <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
- 4) Open the fuel filler flap lid, and remove the fuel filler cap.
- 5) Drain the fuel from the fuel filler pipe through the fill opening using the gasoline proof pump and the gasoline proof hose (ø10 or less).
- 6) Disconnect the fuel filler hose from the fuel filler pipe assembly.

CAUTION:

- Be careful not to spill fuel.
- Catch the fuel from hoses using a container or cloth.



(A) Fuel filler hose
(B) Evaporation hose

- 7) Set a container under the vehicle and insert a gasoline proof hose of 10 mm dia. or less into the fuel filler hose to drain the fuel.

CAUTION:

Be careful not to spill fuel.

24. Fuel Tank

A: REMOVAL

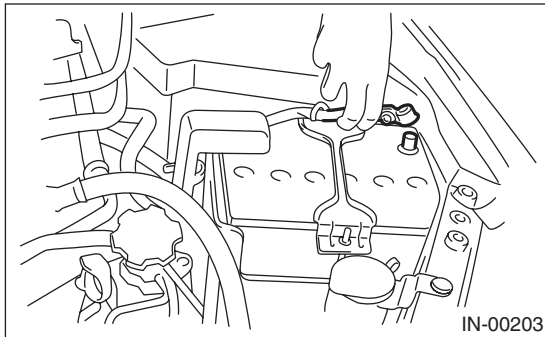
WARNING:

Place "NO OPEN FLAMES" signs near the working area.

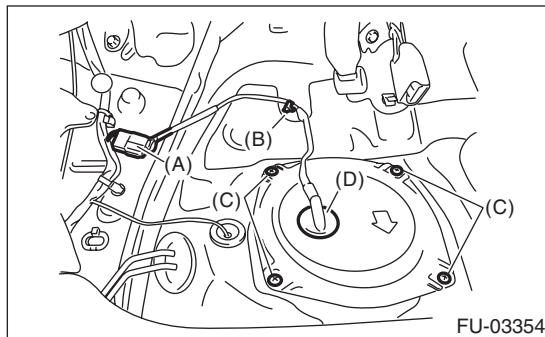
CAUTION:

Be careful not to spill fuel.

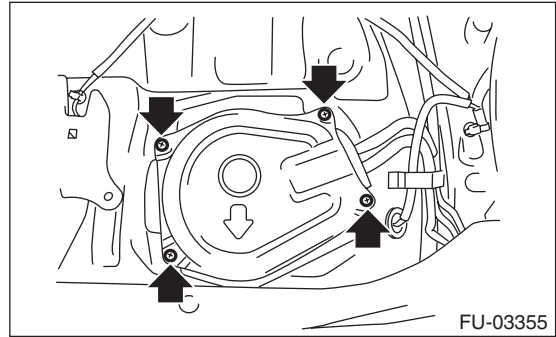
- 1) Set the vehicle on a lift.
- 2) Release the fuel pressure. <Ref. to FU(H4DOTC)-50, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
- 3) Drain fuel from fuel tank. <Ref. to FU(H4DOTC)-50, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
- 4) Disconnect the battery ground cable from the battery.



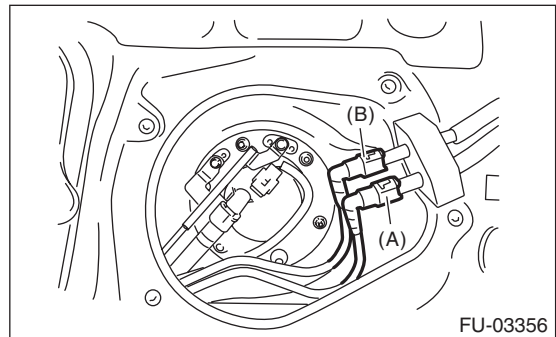
- 5) Remove the rear seat.
- 6) Remove the service hole cover of fuel pump.
 - (1) Separate fuel pump connector (A), and remove clip (B).
 - (2) Remove bolt (C).
 - (3) Push the grommet (D) down and remove the service hole cover.



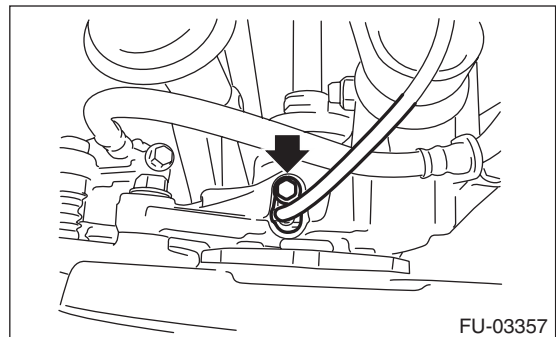
- 7) Remove the service hole cover of fuel sub level sensor.



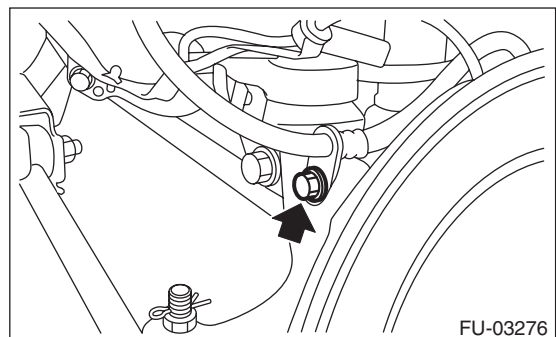
- 8) Disconnect the quick connector of fuel delivery tube (A) and fuel return tube (B). <Ref. to FU(H4DOTC)-71, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>



- 9) Remove the rear wheels.
- 10) Lift up the vehicle.
- 11) Remove the rear ABS wheel speed sensor from the rear housing.

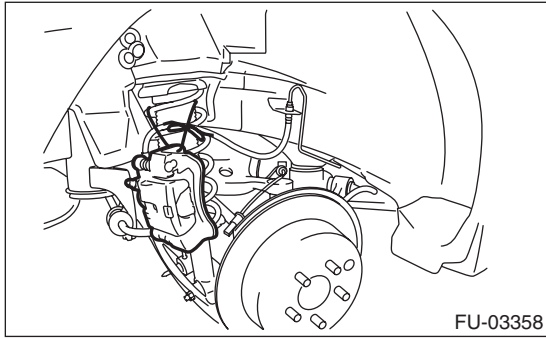


- 12) Remove the bolt holding the rear brake hose bracket.



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13) Remove the rear brake caliper and tie it to the body side of the vehicle.



14) Remove the parking brake cable from the parking brake assembly. <Ref. to PB-6, REMOVAL, Parking Brake Assembly (Rear Disc Brake).>

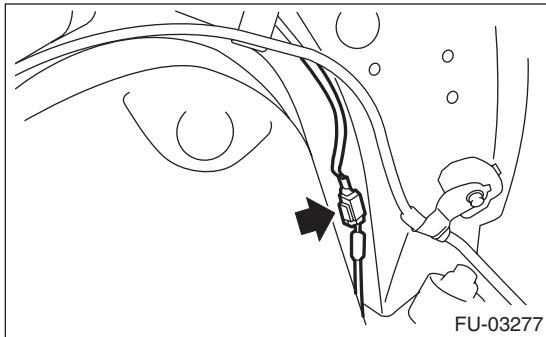
15) Remove the rear exhaust pipe.

<Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.>

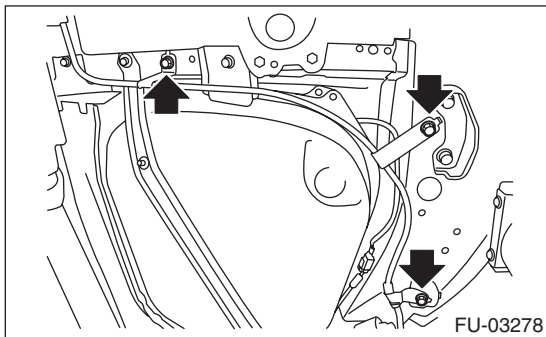
16) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>

17) Remove the heat shield cover and fuel tank protector.

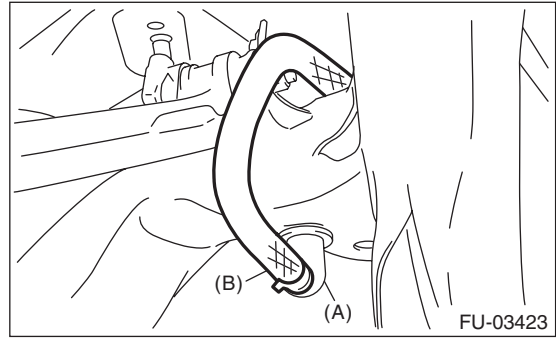
18) Disconnect the connector from the rear ABS wheel speed sensor.



19) Remove the bolts securing the parking brake cable clamp.



20) Disconnect drain hose (B) from the canister drain connector (A).



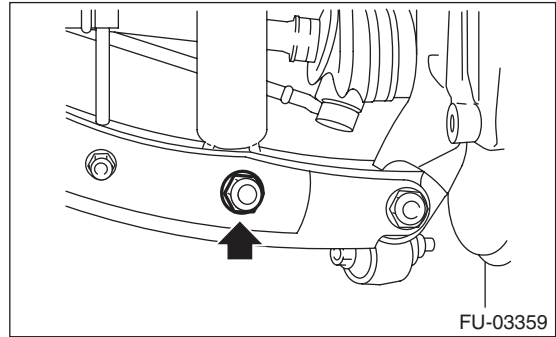
21) Remove the rear suspension assembly.

WARNING:

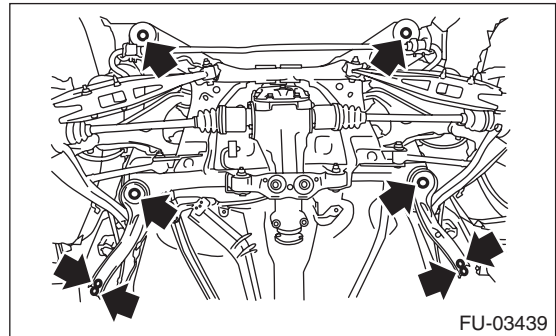
A helper is required to perform this work.

(1) Support the rear differential with the transmission jack.

(2) Remove the bolts which hold the rear shock absorber to the rear suspension arm.



(3) Remove the bolts which secure the rear suspension assembly to the body.



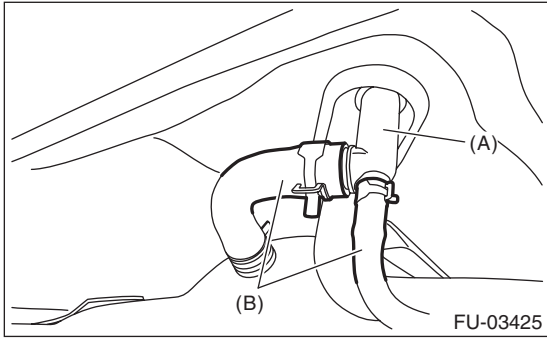
(4) Remove the rear suspension assembly.

Fuel Tank

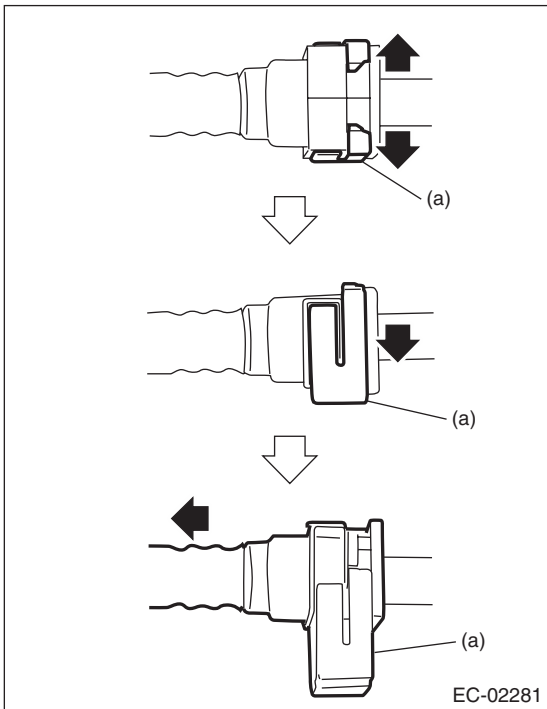
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FUEL INJECTION (FUEL SYSTEMS)

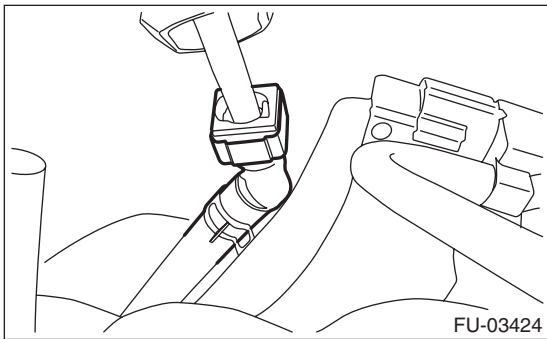
22) Disconnect evaporation hose (B) from connector (A).



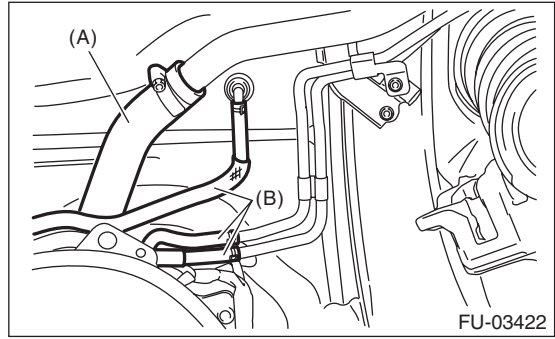
23) Disconnect the quick connector of the evaporation hose from the evaporation pipe as shown in the figure.



(a) Retainer



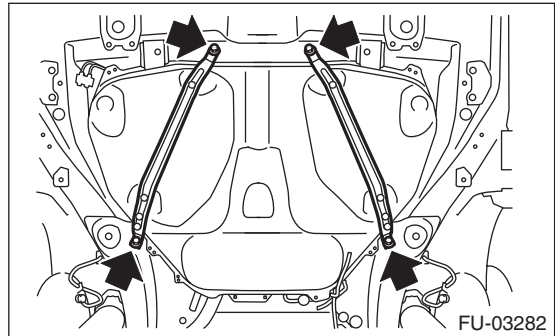
24) Disconnect the fuel filler hose (A) and evaporation hose (B).



25) Support the fuel tank with a transmission jack, remove the bolts from the fuel tank band, and remove the fuel tank from the vehicle.

WARNING:

- A helper is required to perform this work.
- Fuel may remain in the fuel tank. This will cause the left and right sides to be unbalanced. Be careful not to drop the fuel tank when removing.



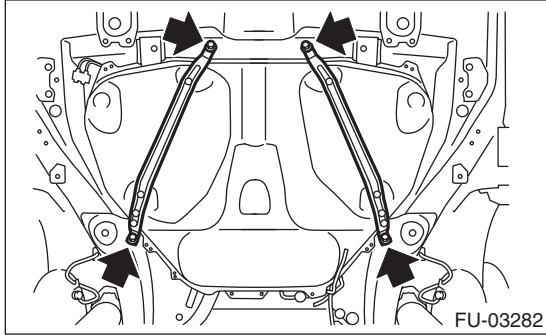
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B: INSTALLATION

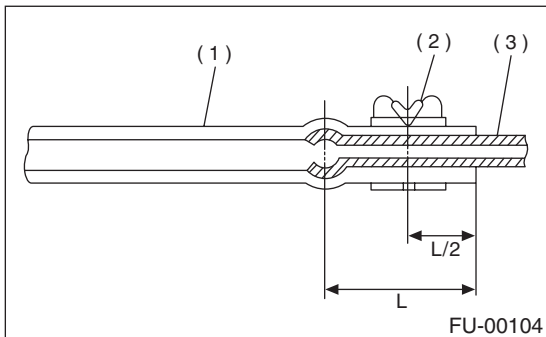
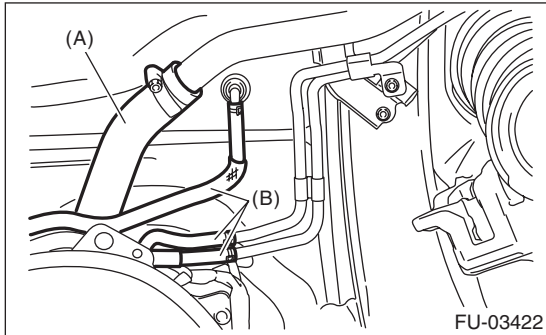
1) Support the fuel tank with a transmission jack, set the fuel tank in place, and temporarily tighten the bolts of the fuel tank band.

WARNING:

A helper is required to perform this work.



2) Securely insert the fuel filler hose (A) and evaporation hose (B) into the specified position, then attach the clamp or clip as shown in the figure.

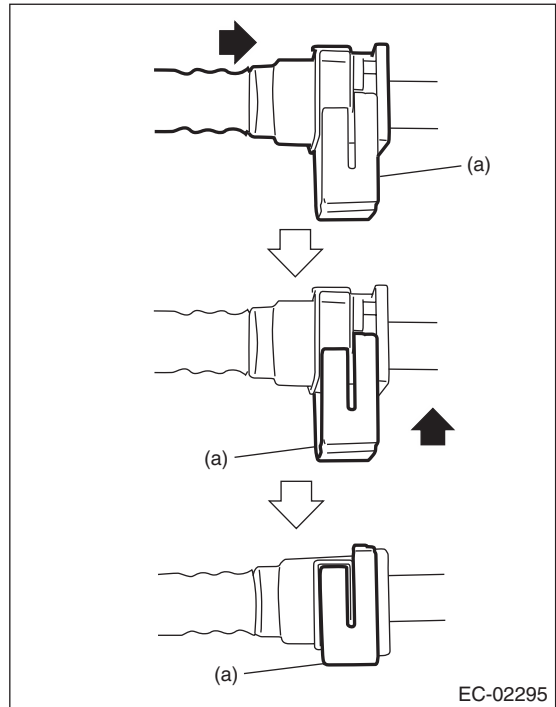


- (1) Hose
- (2) Clip or clamp
- (3) Pipe

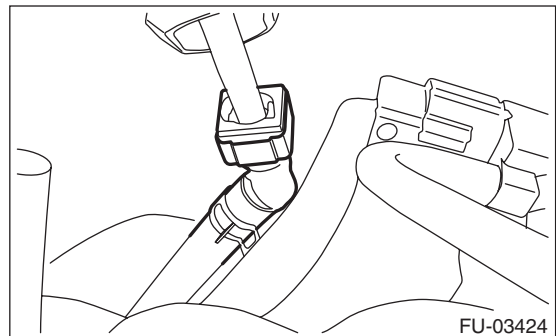
3) Connect the quick connector of the evaporation hose to the evaporation pipe.

CAUTION:

- Check that there is no damage or dust on the quick connector. If necessary, clean seal surface of pipe.
- When connecting the quick connector, insert the pipe all the way in securely, then operate the push lock.
- If it is not possible to perform the push lock operation of the retainer, recheck whether the pipe is securely inserted.
- Confirm that the quick connector is securely connected.



(a) Retainer

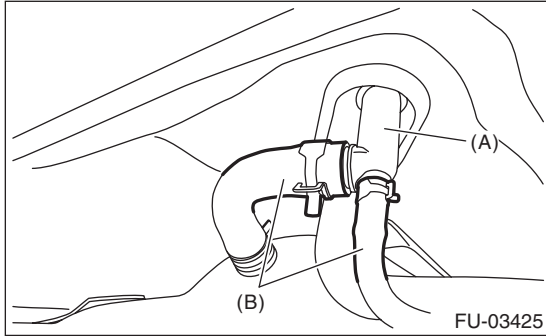


Fuel Tank

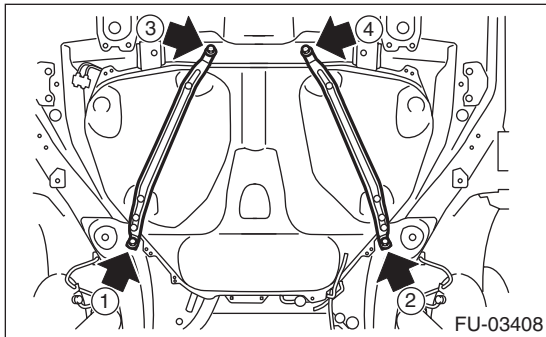
FUEL INJECTION (FUEL SYSTEMS)

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4) Connect evaporation hose (B) to connector (A).



5) Tighten the fuel tank band bolts in the order shown in the figure.



Tightening torque:

33 N·m (3.4 kgf·m, 24.3 ft·lb)

6) Install the rear suspension assembly.

WARNING:

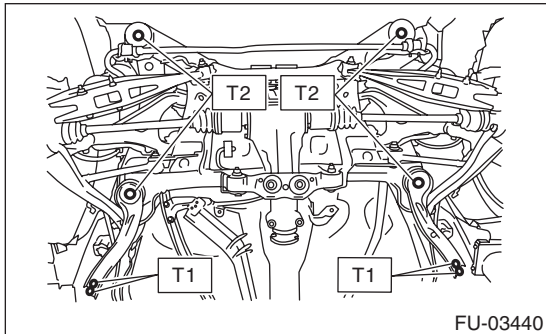
A helper is required to perform this work.

- (1) Support the rear differential with the transmission jack.
- (2) Support the rear suspension assembly, and tighten the bolts which secure the rear suspension assembly to the body.

Tightening torque:

T1: 70 N·m (7.1 kgf·m, 51.6 ft·lb)

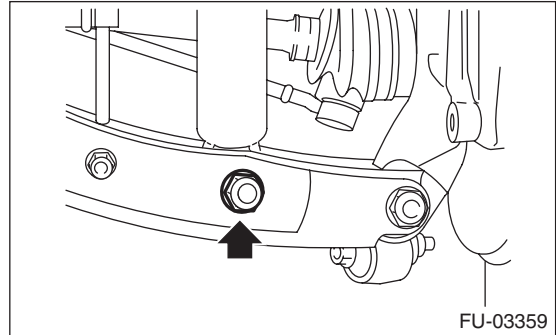
T2: 200 N·m (20.4 kgf·m, 147.5 ft·lb)



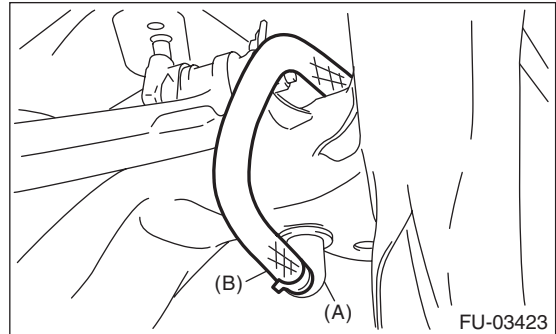
(3) Tighten the bolts which hold the rear shock absorber to the rear suspension arm.

Tightening torque:

120 N·m (12.2 kgf·m, 88.5 ft·lb)



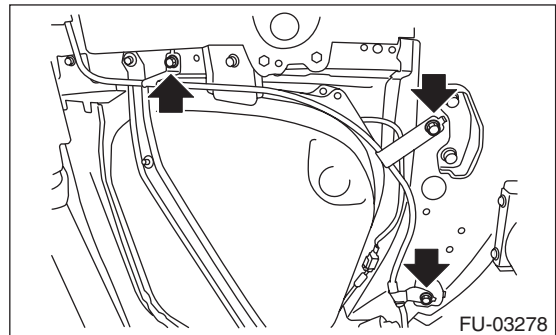
7) Connect drain hose (B) to canister drain connector (A).



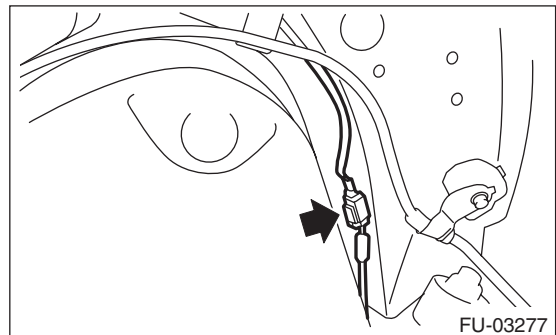
8) Tighten the bolts holding the parking brake cable clamp.

Tightening torque:

18 N·m (1.8 kgf·m, 13.3 ft·lb)



9) Connect the connector to the rear ABS wheel speed sensor.



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10) Install the heat shield cover.

Tightening torque:

18 N·m (1.8 kgf-m, 13.3 ft-lb)

11) Install the fuel tank protector.

Tightening torque:

Nut: 9 N·m (0.9 kgf-m, 6.6 ft-lb)

Bolt: 18 N·m (1.8 kgf-m, 13.3 ft-lb)

12) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>

13) Install the rear exhaust pipe. <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.>

14) Lower the vehicle.

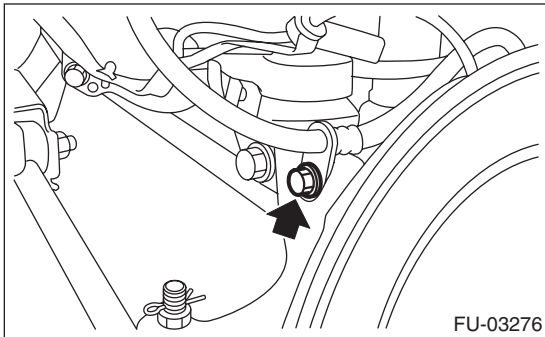
15) Connect the parking brake cable to the parking brake assembly. <Ref. to PB-7, INSTALLATION, Parking Brake Assembly (Rear Disc Brake).>

16) Install the rear brake caliper. <Ref. to BR-23, INSTALLATION, Rear Disc Brake Assembly.>

17) Tighten the bolts which hold the rear brake hose bracket.

Tightening torque:

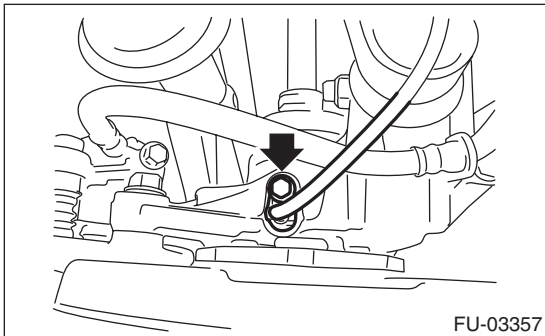
33 N·m (3.4 kgf-m, 24.3 ft-lb)



18) Attach the rear ABS wheel speed sensor to the rear housing.

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



19) Install the rear wheels.

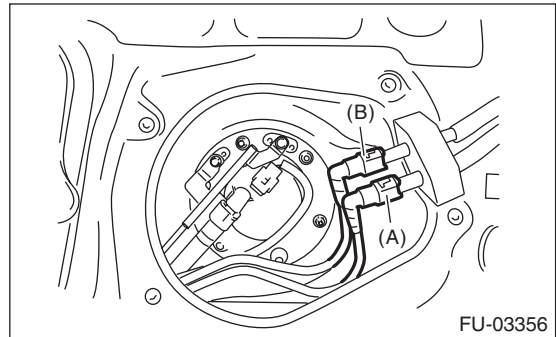
Tightening torque:

100 N·m (10.2 kgf-m, 73.8 ft-lb)

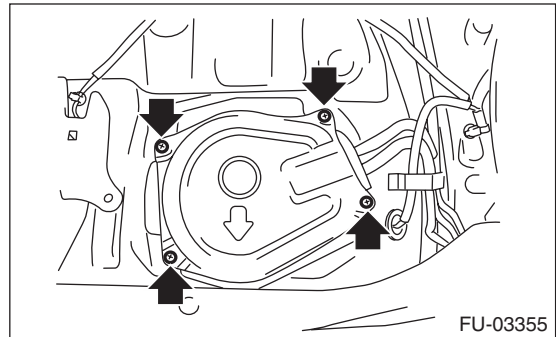
20) Connect the quick connector of fuel delivery tube (A) and fuel return tube (B). <Ref. to FU(H4DOTC)-73, INSTALLATION, Fuel Delivery, Return and Evaporation Lines.>

NOTE:

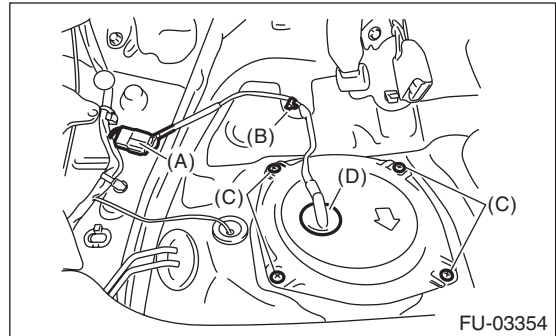
When connecting, be careful not to reverse the delivery side and return side.



21) Install the service hole cover of fuel sub level sensor.



22) Attach the service hole cover of the fuel pump, and secure the connector and clip.



- (A) Connector
- (B) Clip
- (C) Bolt
- (D) Grommet

23) Install the rear seat.

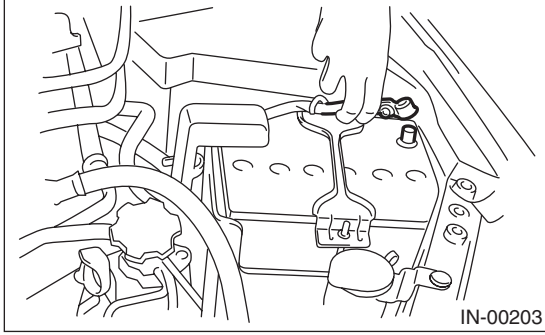
24) Install the fuse of fuel pump to main fuse box.

Fuel Tank

FUEL INJECTION (FUEL SYSTEMS)

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25) Connect the ground cable to the battery.



26) Inspect the wheel alignment and adjust if necessary.

C: INSPECTION

- 1) Check that the fuel tank does not have holes, cracks or is damaged in any other way.
- 2) Make sure that the fuel pipe and fuel hose are not cracked and that the connections are tight.

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25. Fuel Filler Pipe

A: REMOVAL

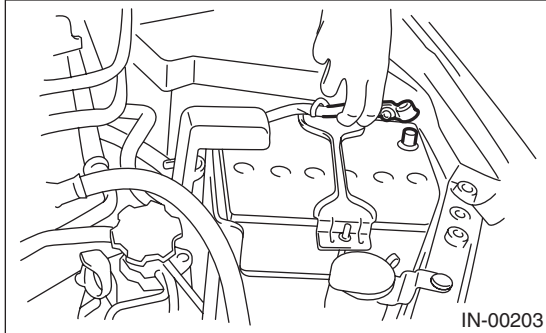
WARNING:

Place "NO OPEN FLAMES" signs near the working area.

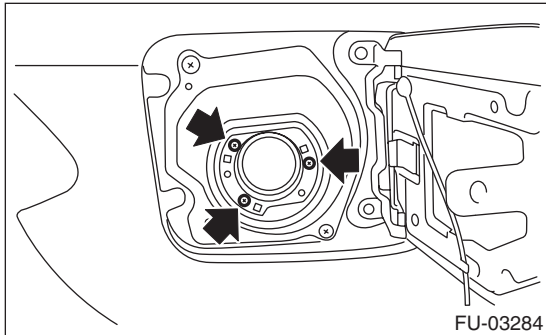
CAUTION:

Be careful not to spill fuel.

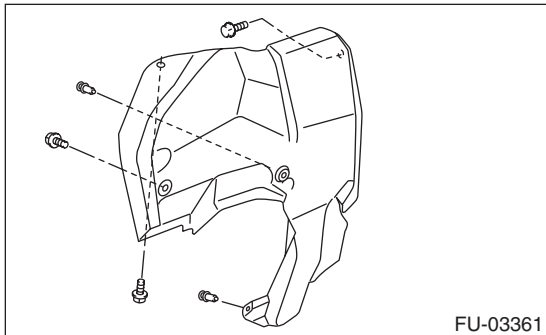
- 1) Set the vehicle on a lift.
- 2) Disconnect the ground cable from battery.



- 3) Open the fuel filler flap lid, and remove the fuel filler cap.
- 4) Remove the screws which secure gasket.

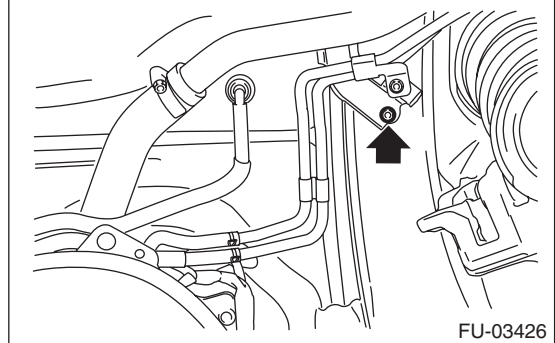
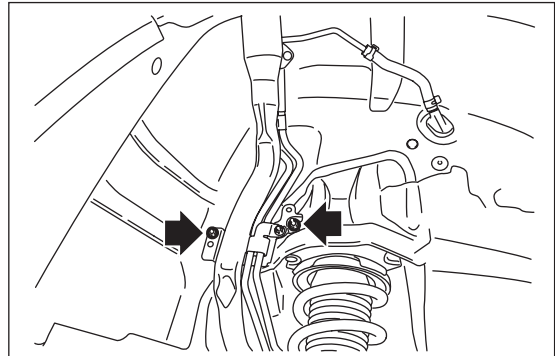


- 5) Remove the rear wheel RH.
- 6) Lift up the vehicle.
- 7) Drain fuel from fuel tank. <Ref. to FU(H4DOTC)-50, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
- 8) Remove the fuel filler pipe protector.

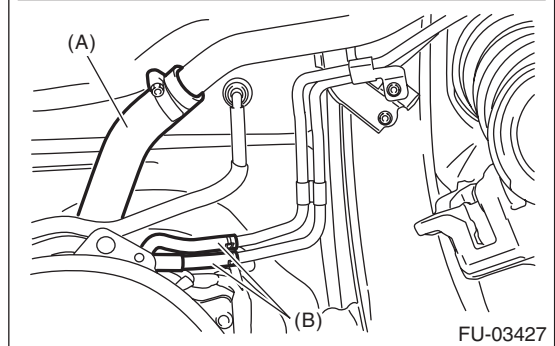
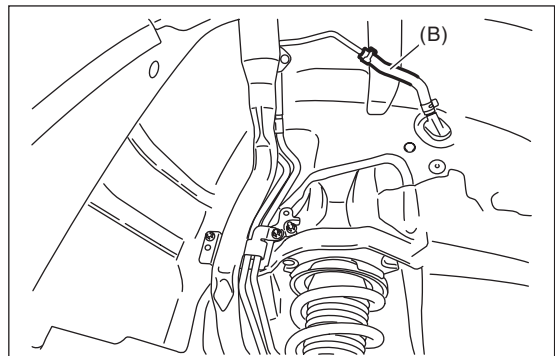


- 9) Remove the rear sub frame. <Ref. to RS-15, REMOVAL, Rear Sub Frame.>

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



- 11) Loosen the clamp, and disconnect the fuel filler hose (A) and evaporation hose (B).



- 12) Remove the fuel filler pipe to the underside of the vehicle.

Fuel Filler Pipe

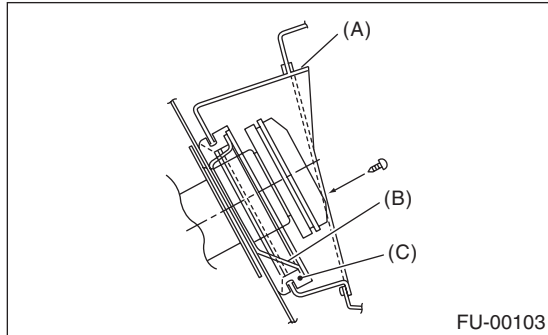
FUEL INJECTION (FUEL SYSTEMS)

B: INSTALLATION

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

NOTE:

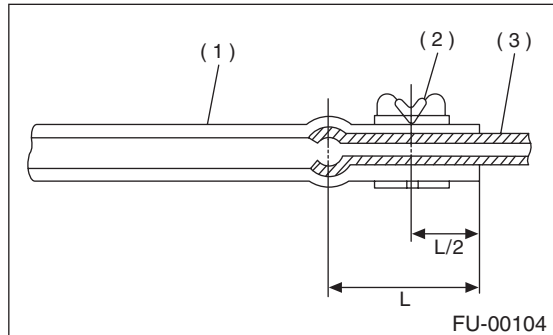
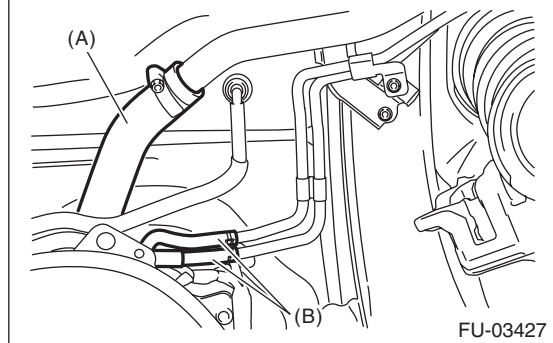
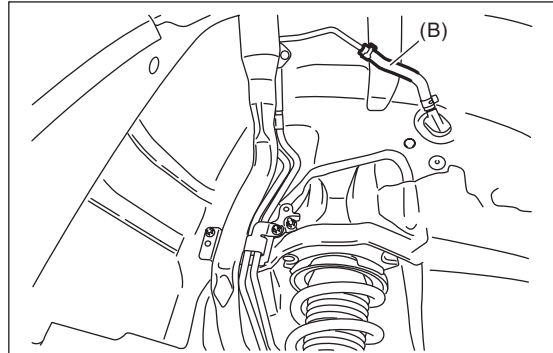
If the edges of rubber seal are folded toward inside, straighten it with a flat tip screwdriver.



- 4) Securely insert the fuel filler hose (A) and evaporation hose (B) to the specified position, then tighten the clamp.

Tightening torque:

2.5 N·m (0.3 kgf-m, 1.8 ft-lb)



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

Fuel Filler Pipe

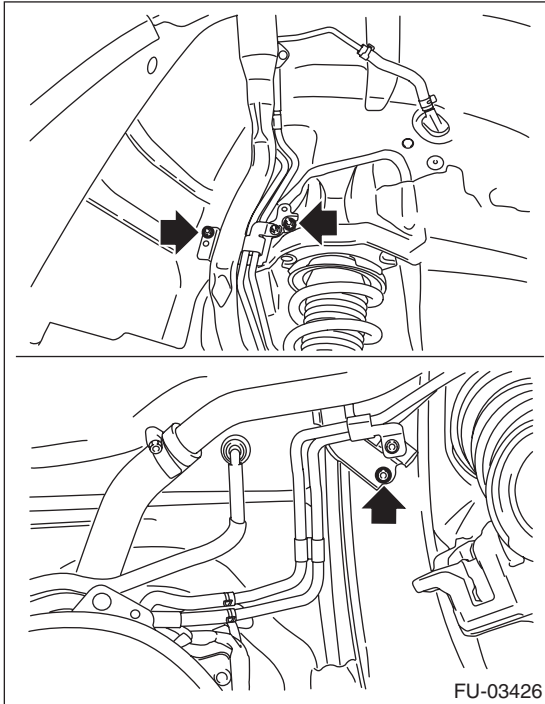
FUEL INJECTION (FUEL SYSTEMS)

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5) Tighten the bolts which hold fuel filler pipe bracket on the body.

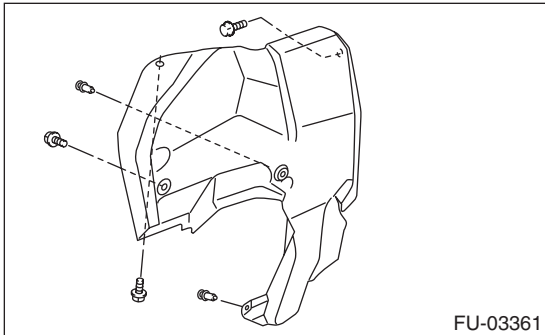
Tightening torque:

7.5 N·m (0.76 kgf-m, 5.5 ft-lb)



6) Install the rear sub frame. <Ref. to RS-16, INSTALLATION, Rear Sub Frame.>

7) Install the fuel filler pipe protector.



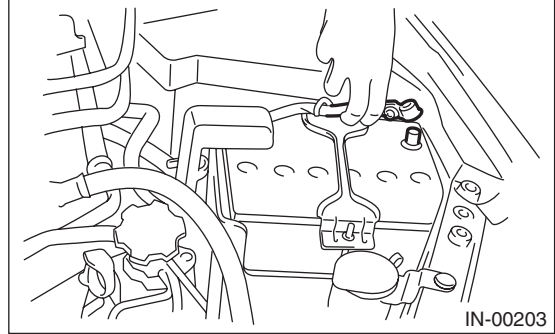
8) Lower the vehicle.

9) Install the rear wheel RH.

Tightening torque:

100 N·m (10.2 kgf-m, 73.8 ft-lb)

10) Connect the ground cable to the battery.



11) Inspect the wheel alignment and adjust if necessary.

C: INSPECTION

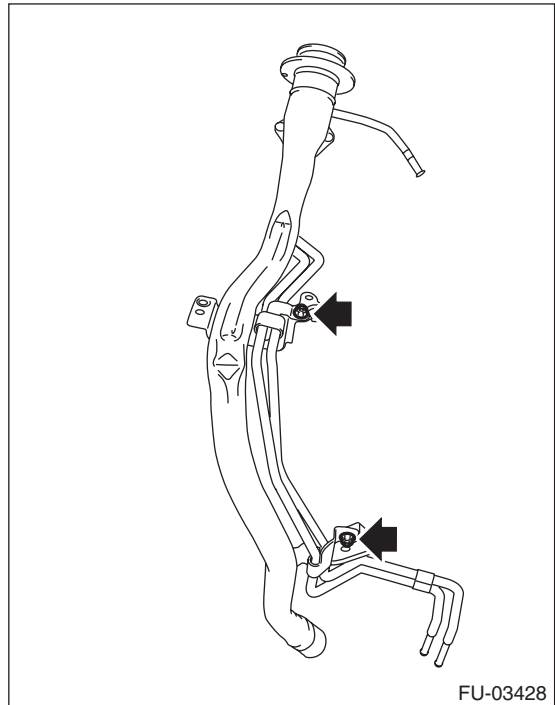
1) Check that the fuel filler pipe does not have holes, cracks or is damaged in any other way.

2) Make sure that the fuel hose is not cracked and that the connections are tight.

D: DISASSEMBLY

1) Remove the shut valve from the fuel filler pipe. <Ref. to EC(H4DOTC)-20, REMOVAL, Shut Valve.>

2) Remove the nut which holds the evaporation pipe assembly to the fuel filler pipe.

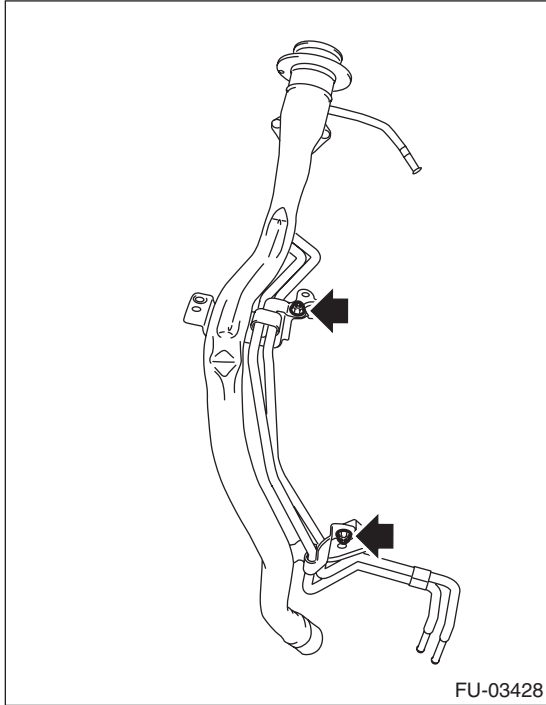


E: ASSEMBLY

1) Tighten the nuts which secure the evaporation pipe assembly to the fuel filler pipe.

Tightening torque:

7.5 N·m (0.8 kgf·m, 5.5 ft·lb)



FU-03428

2) Install the shut valve to the fuel filler pipe. <Ref. to EC(H4DOTC)-20, INSTALLATION, Shut Valve.>

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26. Fuel Pump

A: REMOVAL

WARNING:

Place "NO OPEN FLAMES" signs near the working area.

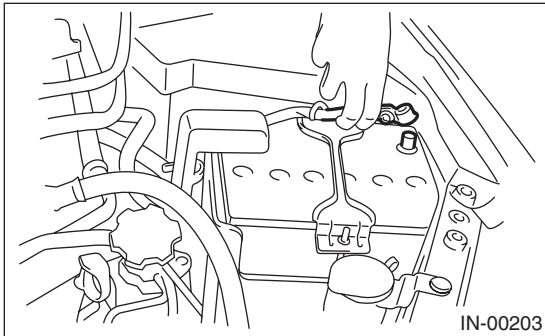
CAUTION:

- Be careful not to spill fuel.
- When the fuel meter indication is higher than two third of the total, perform the work after draining the fuel not to spill the fuel.

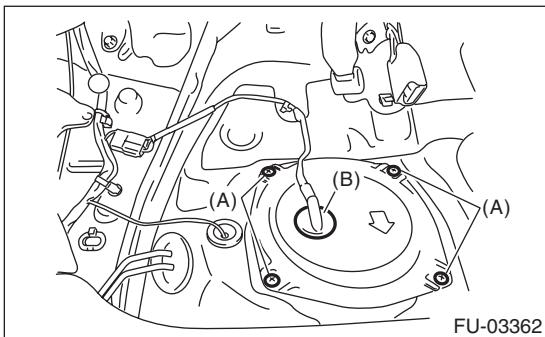
NOTE:

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

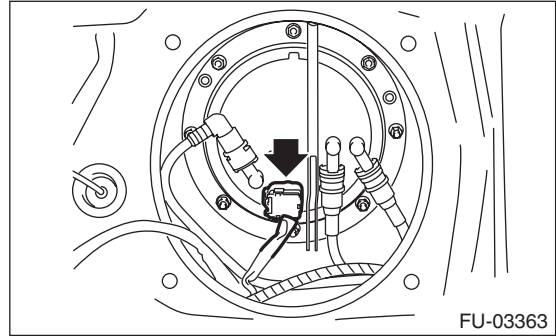
- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-50, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
- 2) Drain fuel. <Ref. to FU(H4DOTC)-50, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
- 3) Disconnect the ground cable from the battery.



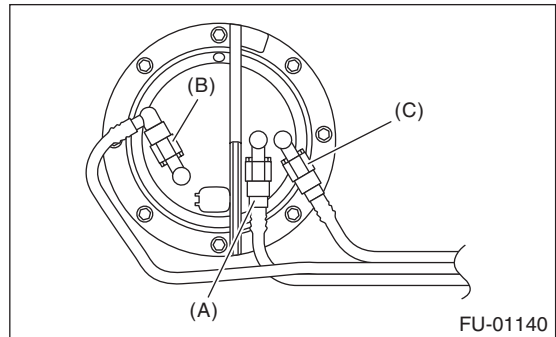
- 4) Remove the rear seat.
- 5) Remove the service hole cover.
 - (1) Remove the bolt (A).
 - (2) Push the grommet (B) down and remove the service hole cover.



- 6) Disconnect the connector from fuel pump.



- 7) Disconnect the quick connector, then disconnect the fuel delivery tube, fuel return tube, and jet pump tube. <Ref. to FU(H4DOTC)-71, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>
- 8) Remove the nuts which install fuel pump assembly onto fuel tank.



- (A) Fuel delivery tube
- (B) Fuel return tube
- (C) Fuel jet pump tube

- 9) Remove the fuel pump assembly from the fuel tank.

FUEL INJECTION (FUEL SYSTEMS)

B: INSTALLATION

Install in the reverse order of removal while being careful of the following.

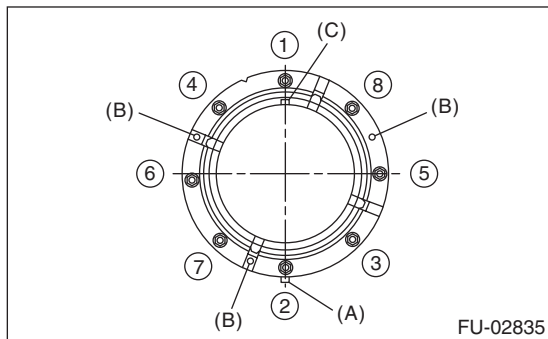
- Make sure the sealing portion is free from fuel or foreign matter before installation.
- Install with the protrusion (A) of gasket aimed at the front side of the vehicle.
- Insert the protrusion (B) of gasket to the upper plate. (3 places)
- Align the protrusion (C) of fuel pump assembly with the cutout on the upper plate.
- Tighten the nuts to the specified torque in the order as shown in the figure.

NOTE:

Use a new gasket and retainer.

Tightening torque:

4.4 N·m (0.45 kgf-m, 3.2 ft-lb)

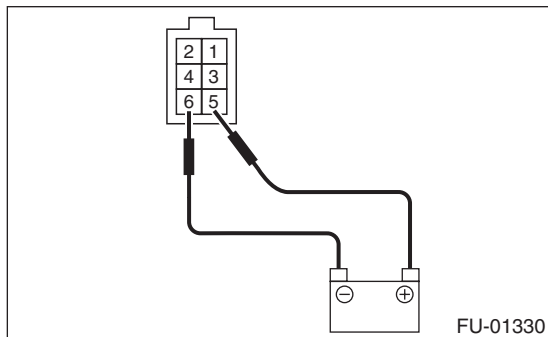


C: INSPECTION

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

WARNING:

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



27. Fuel Level Sensor

A: REMOVAL

WARNING:

Place “NO OPEN FLAMES” signs near the working area.

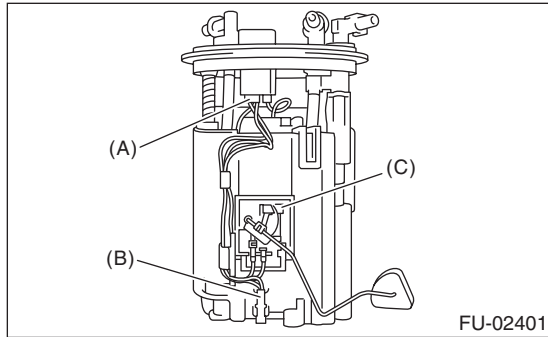
CAUTION:

Be careful not to spill fuel.

NOTE:

The fuel level sensor is built in fuel pump assembly.

- 1) Remove the fuel pump assembly. <Ref. to FU(H4DOTC)-63, REMOVAL, Fuel Pump.>
- 2) Disconnect the connector from fuel pump bracket.
- 3) Remove the fuel temperature sensor.
- 4) Remove the fuel level sensor.



- (A) Connector
- (B) Fuel temperature sensor
- (C) Fuel level sensor

B: INSTALLATION

Install in the reverse order of removal.

NOTE:

Use a new gasket.

Tightening torque:

4.4 N·m (0.45 kgf·m, 3.2 ft·lb)

Fuel Sub Level Sensor

FUEL INJECTION (FUEL SYSTEMS)

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28. Fuel Sub Level Sensor

A: REMOVAL

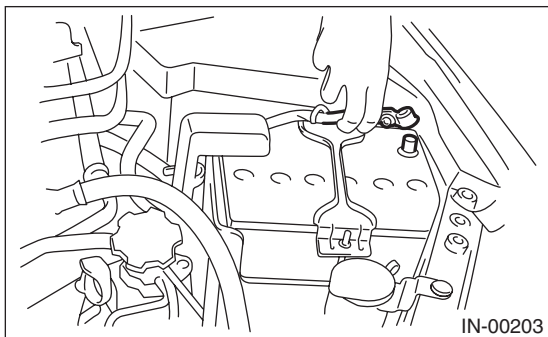
WARNING:

Place "NO OPEN FLAMES" signs near the working area.

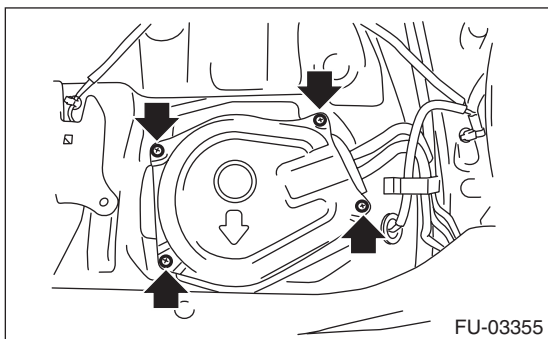
CAUTION:

- Be careful not to spill fuel.
- When the fuel meter indication is higher than two third of the total, perform the work after draining the fuel not to spill the fuel.

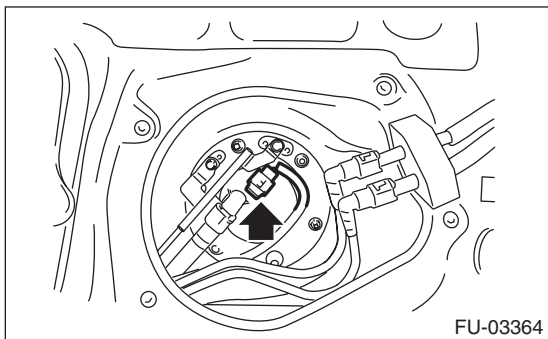
- 1) Release the fuel pressure. <Ref. to FU(H4DOTC)-50, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
- 2) Drain fuel. <Ref. to FU(H4DOTC)-50, DRAINING FUEL (WITH SUBARU SELECT MONITOR), PROCEDURE, Fuel.>
- 3) Disconnect the ground cable from the battery.



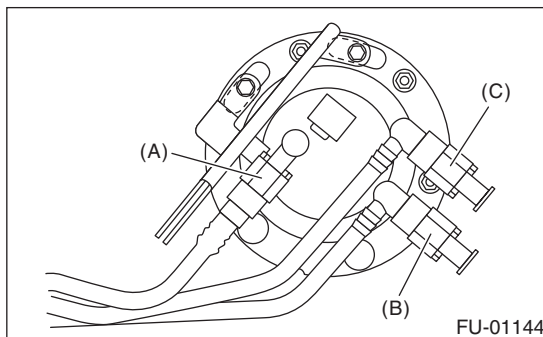
- 4) Remove the rear seat.
- 5) Remove the service hole cover.



- 6) Disconnect the connector from the fuel sub level sensor.



- 7) Disconnect the quick connector, then disconnect the fuel delivery tube, fuel return tube, and jet pump tube. <Ref. to FU(H4DOTC)-71, REMOVAL, Fuel Delivery, Return and Evaporation Lines.>
- 8) Remove the nuts and bolts which install fuel sub level sensor on fuel tank.



- (A) Jet pump tube
- (B) Fuel delivery tube
- (C) Fuel return tube

- 9) Remove the fuel sub level sensor.

B: INSTALLATION

Install in the reverse order of removal while being careful of the following.

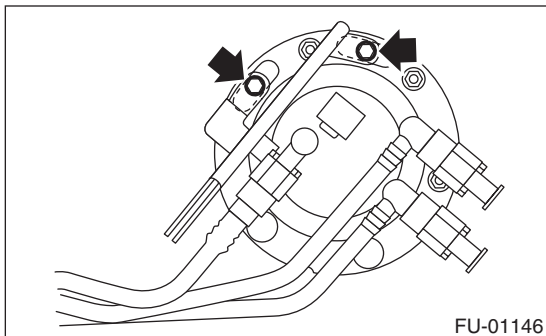
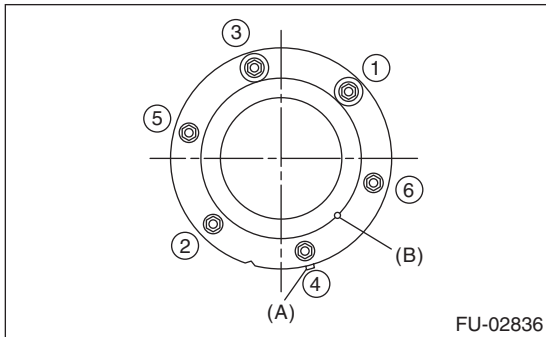
- Make sure the sealing portion is free from fuel or foreign matter before installation.
- Align the protrusion (A) of gasket to the position shown in the following figure.
- Align the protrusion (B) of fuel sub level sensor with the cutout portion of fuel sub level sensor upper plate.
- Tighten the nuts and bolts to the specified torque in the order as shown in the figure.

NOTE:

Use a new gasket and retainer.

Tightening torque:

4.4 N·m (0.45 kgf·m, 3.2 ft·lb)



29. Fuel Filter

A: SPECIFICATION

Fuel filter forms a single unit with fuel pump.
Refer to "Fuel Pump" for removal and installation.
<Ref. to FU(H4DOTC)-63, REMOVAL, Fuel Pump.>
<Ref. to FU(H4DOTC)-64, INSTALLATION, Fuel Pump.>

30. Fuel Damper Valve

A: REMOVAL

WARNING:

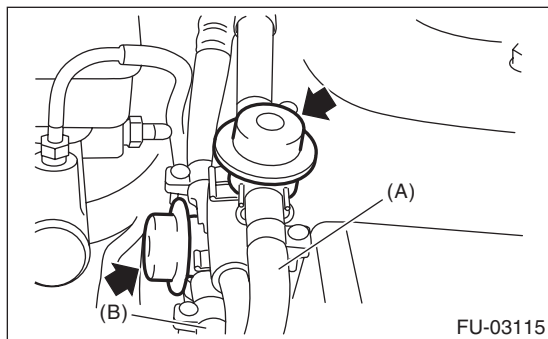
Place “NO OPEN FLAMES” signs near the working area.

CAUTION:

- Be careful not to spill fuel.
- Catch the fuel from hoses using a container or cloth.

1) Release the fuel pressure. <Ref. to FU(H4DOTC)-50, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>

2) Remove the fuel damper valve from fuel delivery hose (A) and fuel return hose (B).



B: INSTALLATION

CAUTION:

If fuel hoses or clamps are damaged, replace them with new parts.

Install in the reverse order of removal.

Tightening torque:

1.25 N·m (0.13 kgf·m, 0.94 ft·lb)

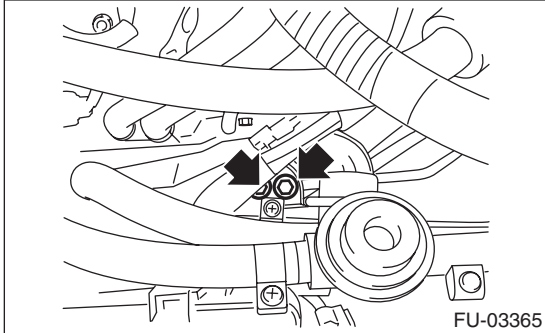
31.Purge Damper Valve

A: REMOVAL

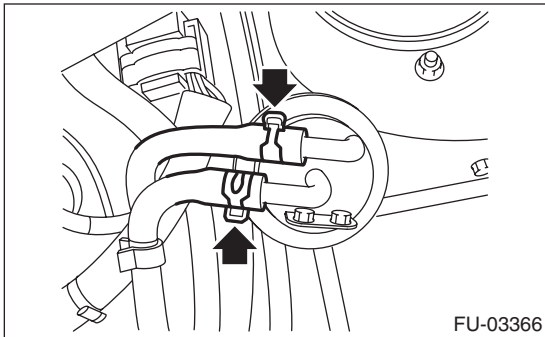
WARNING:

Place “NO OPEN FLAMES” signs near the working area.

1) Remove the purge damper valve from the purge damper valve stay.



2) Disconnect the evaporation hose from the purge damper valve.



B: INSTALLATION

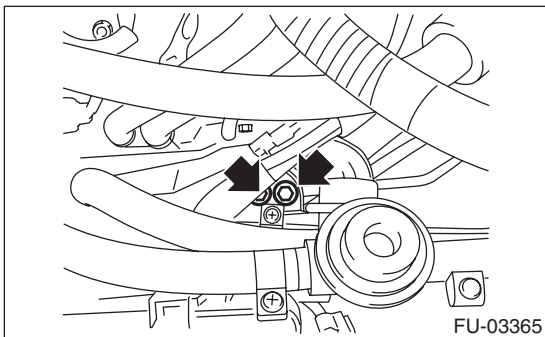
CAUTION:

If there is damage on the evaporation hose, replace with a new hose.

Install in the reverse order of removal.

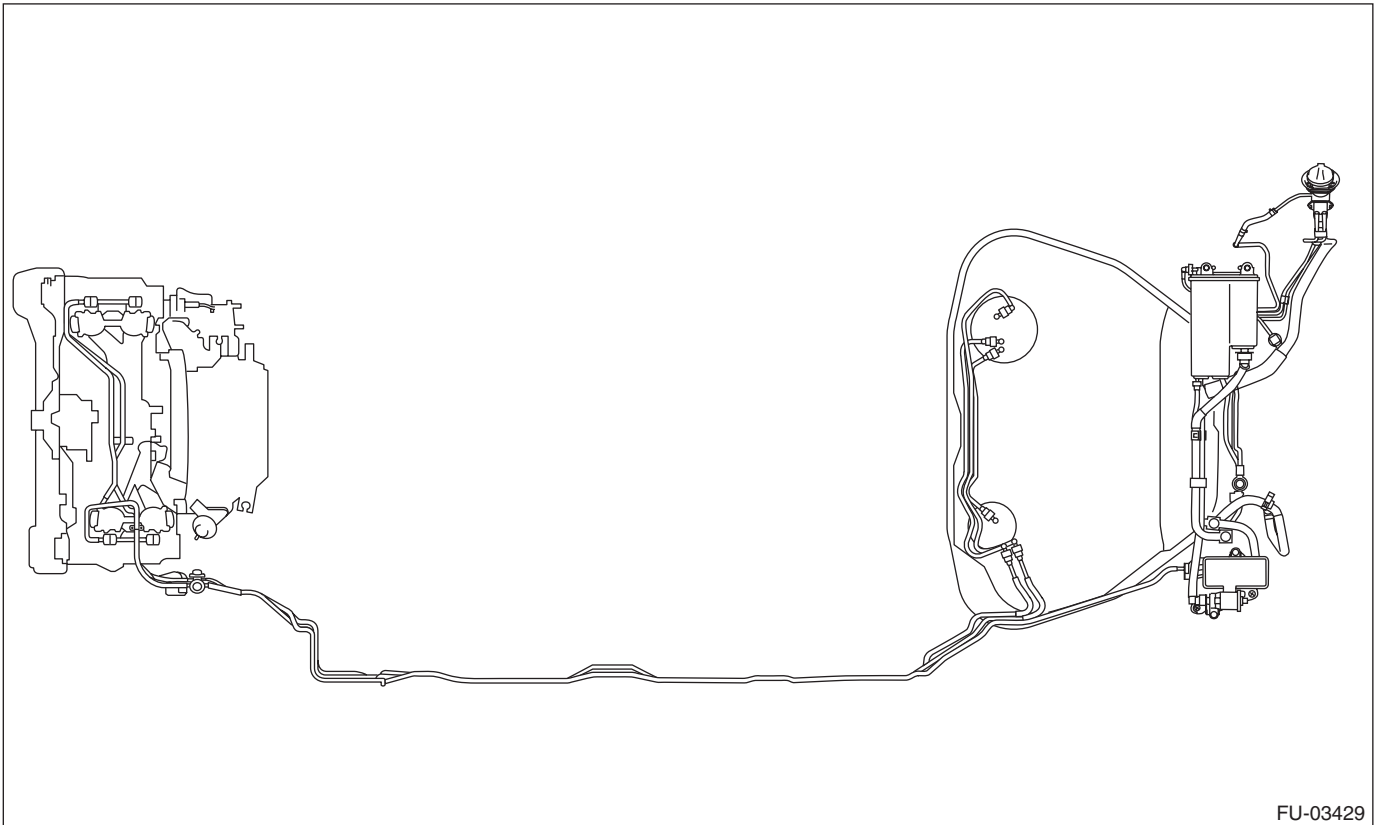
Tightening torque:

8 N·m (0.8 kgf·m, 5.9 ft·lb)



32. Fuel Delivery, Return and Evaporation Lines

A: REMOVAL



WARNING:
Place "NO OPEN FLAMES" signs near the working area.

CAUTION:
Be careful not to spill fuel.

Fuel Delivery, Return and Evaporation Lines

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FUEL INJECTION (FUEL SYSTEMS)

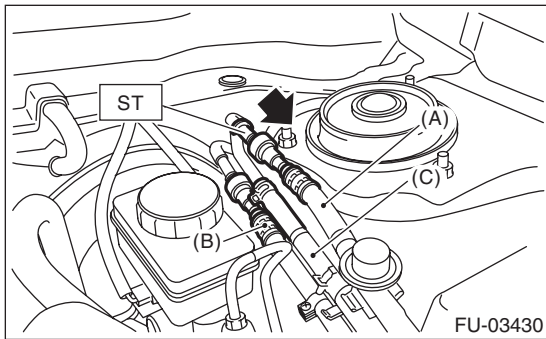
- 1) Set the vehicle on a lift.
- 2) Release the fuel pressure. <Ref. to FU(H4DOTC)-50, RELEASING OF FUEL PRESSURE, PROCEDURE, Fuel.>
- 3) Open the fuel filler flap lid, and remove the fuel filler cap.
- 4) Remove the floor mat. <Ref. to EI-64, REMOVAL, Floor Mat.>
- 5) In the engine compartment, disconnect the fuel delivery hose, fuel return hose and evaporation hose.

(1) Disconnect the quick connector on the fuel delivery line and return line by pushing the ST in the direction of the arrow.

ST 42099AE000 QUICK CONNECTOR RELEASE

CAUTION:

- Be careful not to spill fuel.
- Catch the fuel from hoses using a container or cloth.

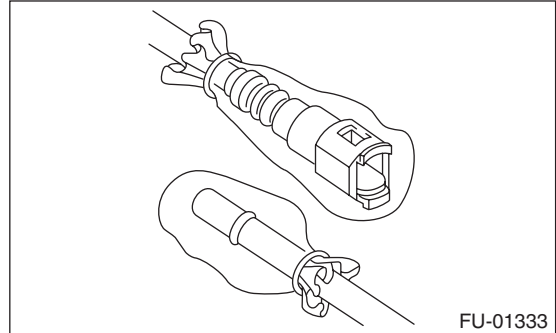


- (A) Fuel delivery hose
- (B) Fuel return hose
- (C) Evaporation hose

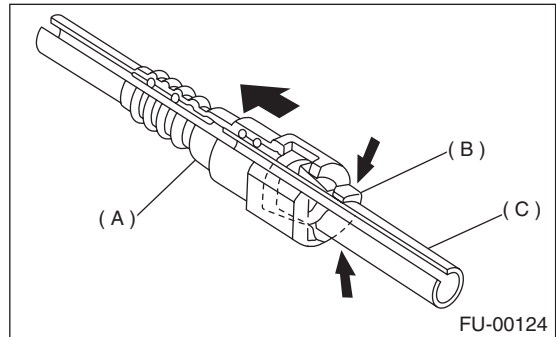
- 6) Remove the canister. <Ref. to EC(H4DOTC)-7, REMOVAL, Canister.>
- 7) Remove the fuel tank. <Ref. to FU(H4DOTC)-52, REMOVAL, Fuel Tank.>
- 8) Remove the fuel pipe assembly.

- 9) Disconnect the quick connector, then disconnect the fuel delivery tube, fuel return tube, and jet pump tube.

- (1) Clean the pipe and connector, if they are covered with dust.
- (2) To prevent from damaging or entering foreign matter, wrap the pipes and connectors with plastic bag etc.



- (3) Hold the connector (A) and push the retainer (B) down.
- (4) Pull out the connector (A) from the retainer (B).



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

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B: INSTALLATION

Install in the reverse order of removal while being careful of the following.

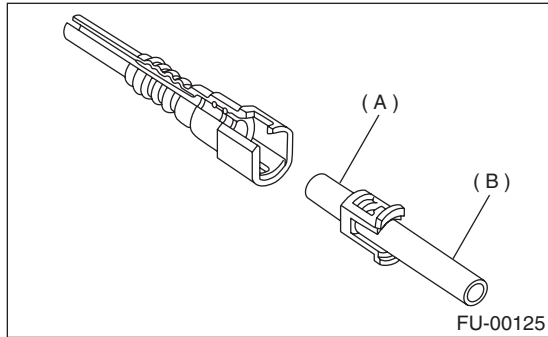
1. CONNECTING THE FUEL LINE QUICK CONNECTOR

CAUTION:

Make sure there are no damage or dust on connections. If necessary, clean seal surface of pipe.

NOTE:

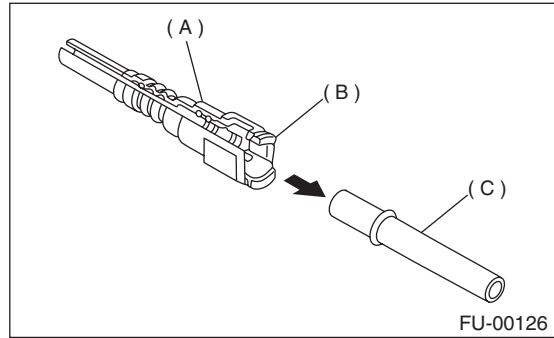
Use a new retainer.



- (A) Seal surface
- (B) Pipe

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

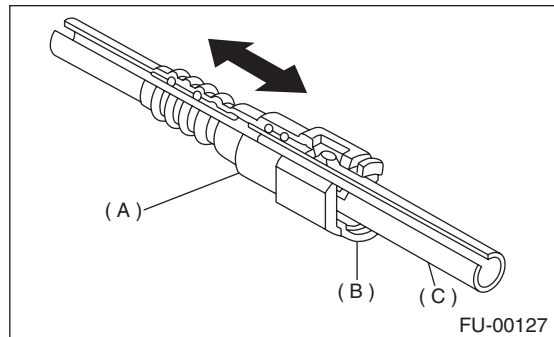
2) Push the pipe into the connector completely.



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

CAUTION:

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



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

Fuel Delivery, Return and Evaporation Lines

FUEL INJECTION (FUEL SYSTEMS)

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2. CONNECT FUEL DELIVERY HOSE AND FUEL RETURN HOSE

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

Type A: When the amount to be inserted is specified.

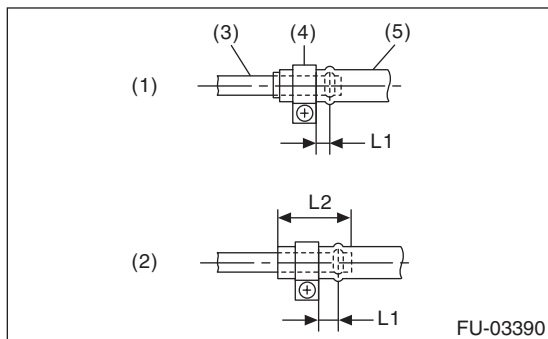
Type B: When the amount to be inserted is not specified.

L1: 2.5 ± 1.5 mm (0.098 ± 0.059 in)

L2: 22.5 ± 2.5 mm (0.886 ± 0.098 in)

CAUTION:

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

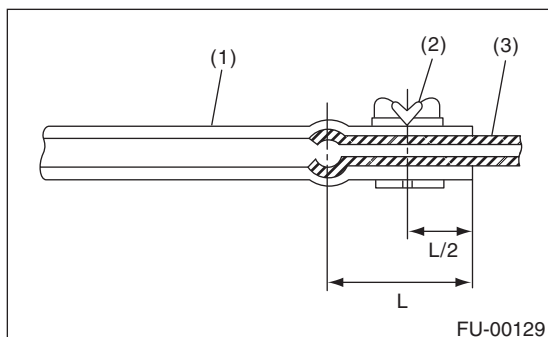


- (1) Type A
- (2) Type B
- (3) Pipe
- (4) Clamp
- (5) Hose

3. EVAPORATION HOSE CONNECTION

Connect the evaporation hose to the pipe with an overlap of 15 to 20 mm (0.59 to 0.79 in).

L = 17.5 ± 2.5 mm (0.689 ± 0.098 in)



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

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33. Fuel System Trouble in General

A: INSPECTION

Trouble and possible cause		Corrective action
1. Insufficient fuel supply to injector		
1)	Fuel pump does not operate.	
	○ Defective terminal contact	Inspect contact, especially ground, and tighten it securely.
	○ Trouble in electromagnetic or electronic circuit parts	Replace the faulty parts.
2)	Decline of fuel pump function	Replace the fuel pump.
3)	Clogged fuel filter	Replace the fuel pump.
4)	Clogged or bent fuel pipe or hose	Clean, correct or replace the fuel pipe or hose.
5)	Air is mixed in the fuel system.	Inspect or retighten each connection part.
6)	Clogged or bent air breather tube or pipe.	Clean, correct or replace the air breather tube or pipe.
7)	Damaged diaphragm of pressure regulator	Replace.
2. Leakage or blow out of fuel		
1)	Loose joints of the fuel pipe	Retighten.
2)	Cracked fuel pipe, hose and fuel tank	Replace.
3)	Defective welding part on the fuel tank	Replace.
4)	Clogged or bent air breather tube or air vent tube	Clean, correct or replace the 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	Retighten.
2)	Problem in tightness of the fuel saucer gasket air	Correct or replace the gasket.
3)	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. Fill fuel fully to prevent the problem.
- In snow-covered areas, mountainous areas, skiing areas, etc. where ambient temperatures drop below 0°C (32°F) throughout the winter season, use a water removing agent in the fuel system to prevent freezing fuel system and accumulating water.
- When water is accumulated in fuel filter, fill the water removing agent in the fuel tank.
- Before using water removing agent, follow the cautions noted on the bottle.

Fuel System Trouble in General

FUEL INJECTION (FUEL SYSTEMS)

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