

ENGINE 1 SECTION

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles. This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics. Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

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

FUEL INJECTION (FUEL SYSTEMS)	FU(SOHC)
EMISSION CONTROL (AUX. EMISSION CONTROL DEVICES)	EC(SOHC)
INTAKE (INDUCTION)	IN(SOHC)
MECHANICAL	ME(SOHC)
EXHAUST	EX(SOHC)
COOLING	CO(SOHC)
LUBRICATION	LU(SOHC)
SPEED CONTROL SYSTEMS	SP(SOHC)
IGNITION	IG(SOHC)
STARTING/CHARGING SYSTEMS	SC(SOHC)
ENGINE (DIAGNOSTICS)	EN(SOHC)

FUEL INJECTION (FUEL SYSTEMS)

FU(SOHC)

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GENERAL DESCRIPTION

FUEL INJECTION (FUEL SYSTEMS)

1. General Description

A: SPECIFICATIONS

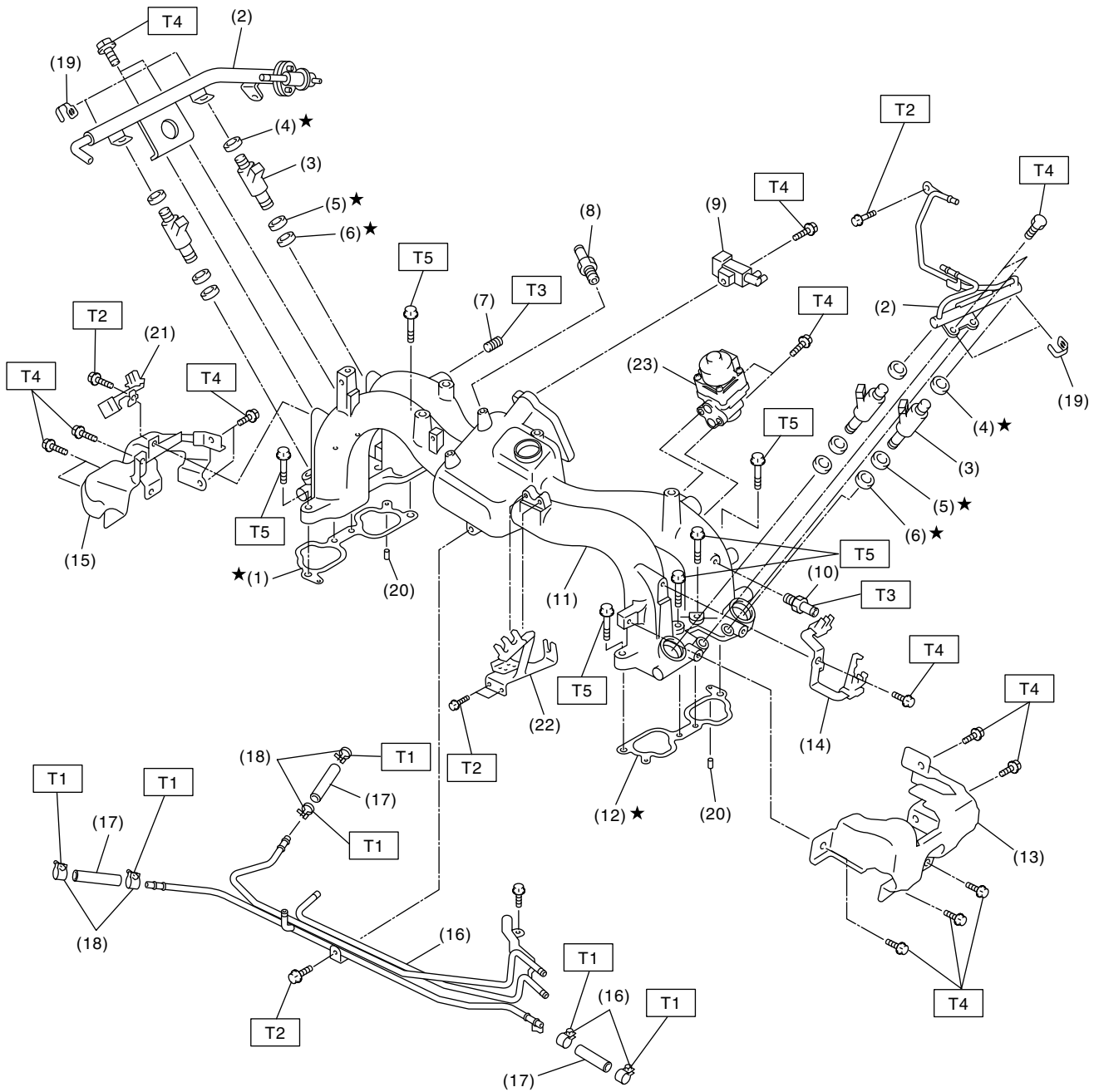
Model		Specification
Fuel tank	Capacity	60 ℓ (15.9 US gal, 13.2 Imp gal)
	Location	Under rear seat
Fuel pump	Type	Impeller
	Shutoff discharge pressure	370 — 677 kPa (3.77 — 6.9 kg/cm ² , 53.6 — 98 psi)
	Discharge flow	More than 65 ℓ (17.2 US gal, 14.3 Imp gal)/h [12 V at 300 kPa (3.06 kg/cm ² , 43.5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

GENERAL DESCRIPTION

FUEL INJECTION (FUEL SYSTEMS)

B: COMPONENT

1. INTAKE MANIFOLD



FU-00377

GENERAL DESCRIPTION

FUEL INJECTION (FUEL SYSTEMS)

- (1) Intake manifold gasket RH
- (2) Fuel injector pipe
- (3) Fuel injector
- (4) O-ring
- (5) O-ring
- (6) O-ring
- (7) Plug
- (8) PCV valve
- (9) Purge control solenoid valve
- (10) Nipple

- (11) Intake manifold
- (12) Intake manifold gasket LH
- (13) Fuel pipe protector LH
- (14) Plug cord holder LH
- (15) Fuel pipe protector RH
- (16) Fuel pipe ASSY
- (17) Fuel hose
- (18) Clip
- (19) Clip
- (20) Guide pin

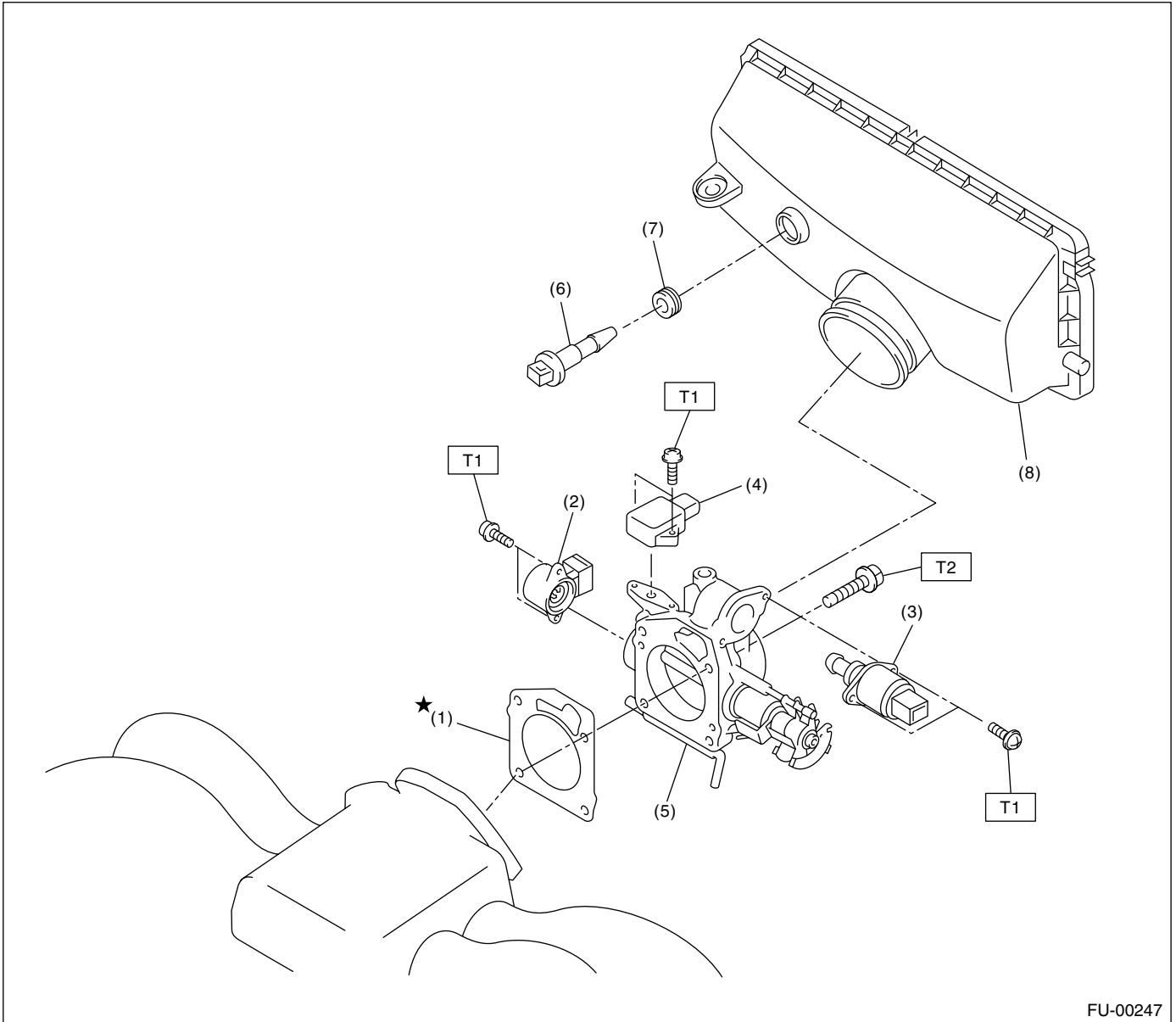
- (21) Plug cord holder RH
- (22) Accelerator cable bracket
- (23) EGR valve

Tightening torque: N·m (kgf·m, ft·lb)***T1: 1.5 (0.15, 1.1)******T2: 5.0 (0.51, 3.7)******T3: 17 (1.7, 12.5)******T4: 19 (1.9, 13.7)******T5: 25 (2.5, 18.1)***

GENERAL DESCRIPTION

FUEL INJECTION (FUEL SYSTEMS)

2. AIR INTAKE SYSTEM



FU-00247

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

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

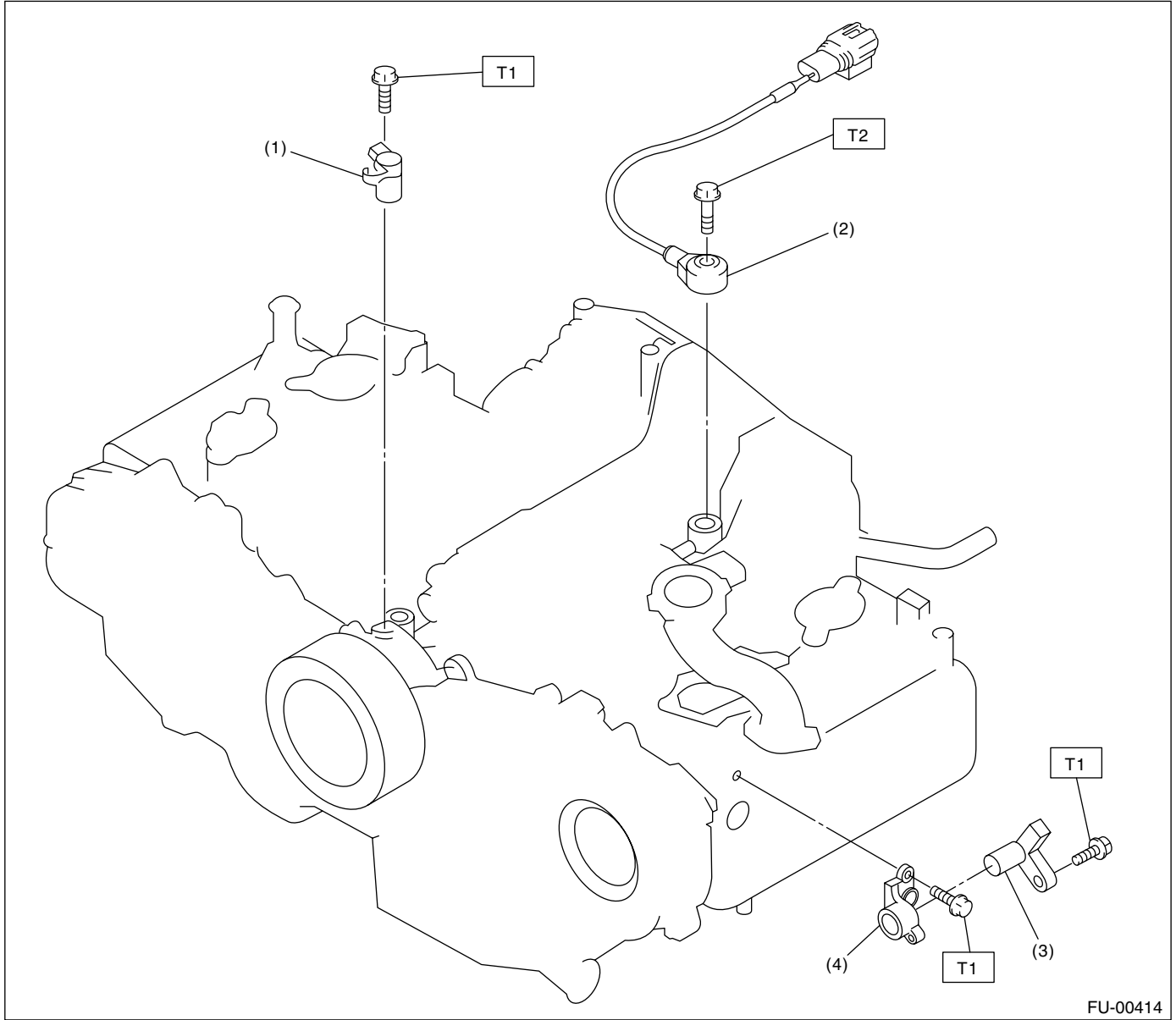
T1: 1.6 (0.16, 1.2)

T2: 22 (2.2, 15.9)

GENERAL DESCRIPTION

FUEL INJECTION (FUEL SYSTEMS)

3. CRANKSHAFT POSITION, CAMSHAFT POSITION AND KNOCK SENSORS



FU-00414

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

- (4) Camshaft position sensor support

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

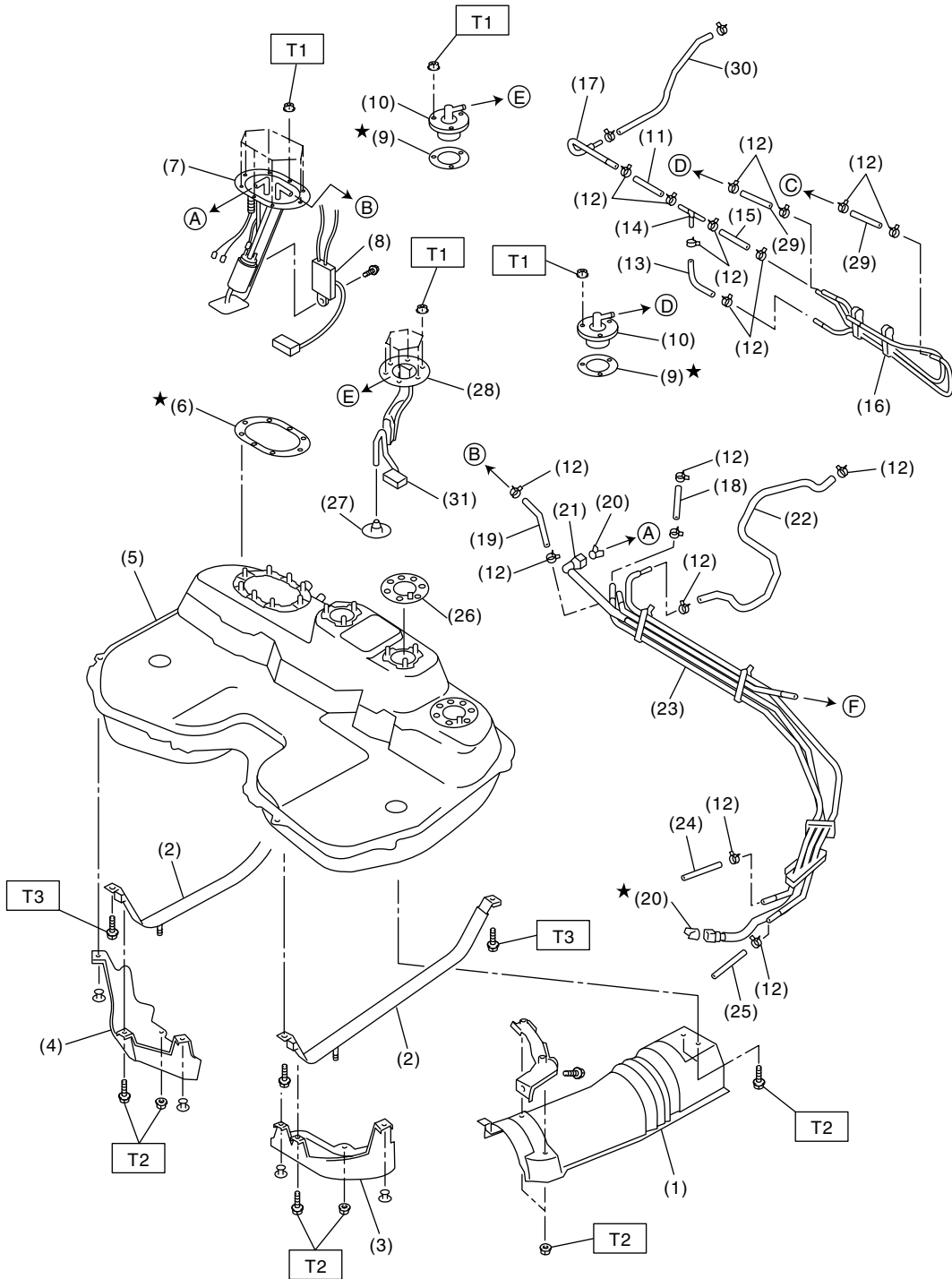
T1: 6.4 (0.65, 4.7)

T2: 24 (2.4, 17.4)

GENERAL DESCRIPTION

FUEL INJECTION (FUEL SYSTEMS)

4. FUEL TANK



FU-00004

GENERAL DESCRIPTION

FUEL INJECTION (FUEL SYSTEMS)

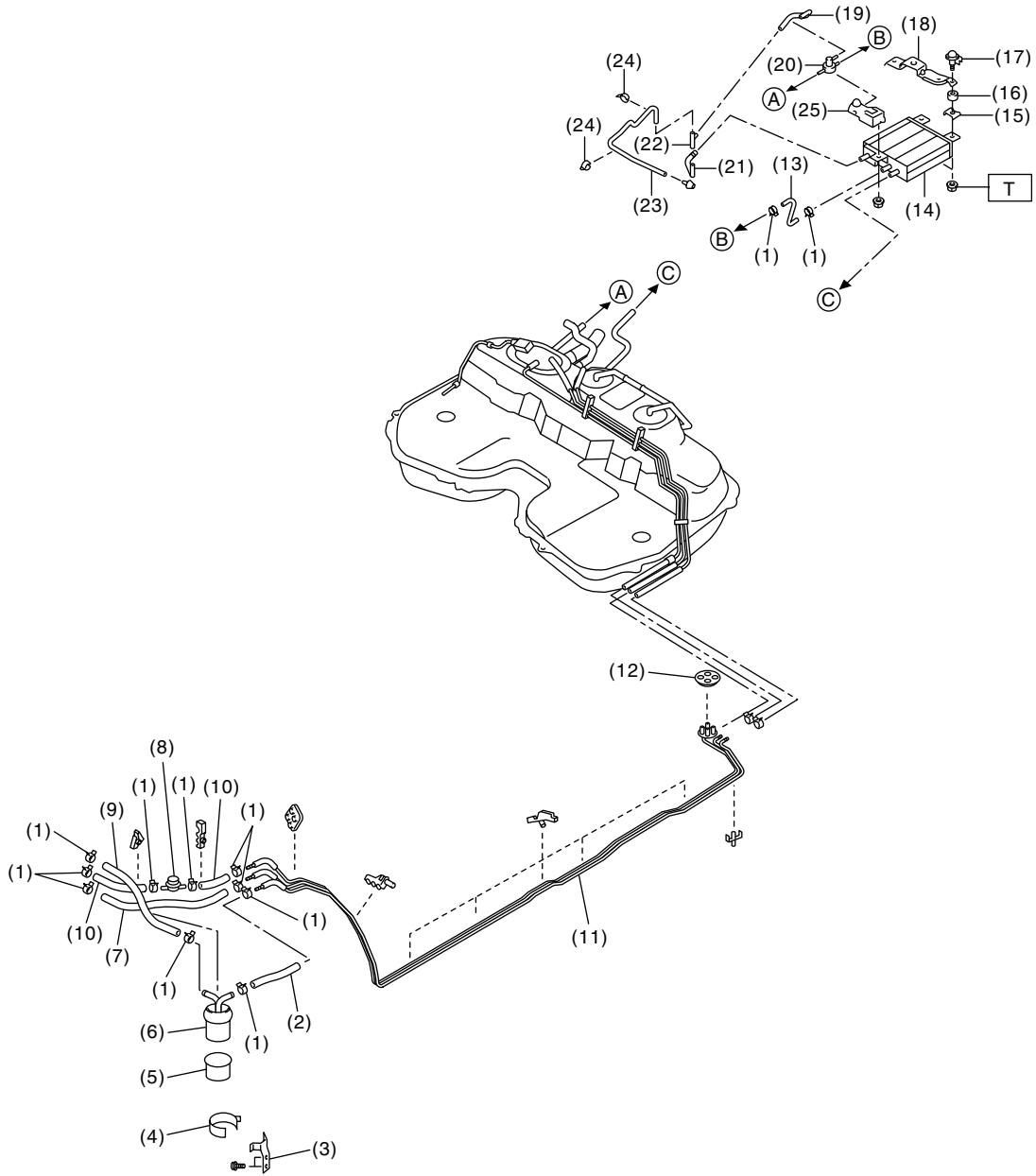
- | | | |
|---------------------------|----------------------------|----------------------------|
| (1) Heat shield cover | (13) Evaporation hose B | (25) Fuel return hose B |
| (2) Fuel tank band | (14) Joint pipe | (26) Fuel sub meter gasket |
| (3) Protector LH | (15) Evaporation hose C | (27) Jet pump filter |
| (4) Protector RH | (16) Evaporation pipe ASSY | (28) Fuel sub meter unit |
| (5) Fuel tank | (17) Evaporation pipe | (29) Evaporation hose G |
| (6) Fuel pump gasket | (18) Evaporation hose D | (30) Evaporation hose H |
| (7) Fuel pump ASSY | (19) Fuel return hose A | |
| (8) Fuel meter unit | (20) Retainer | |
| (9) Fuel cut valve gasket | (21) Quick connector | |
| (10) Fuel cut valve | (22) Evaporation hose E | |
| (11) Evaporation hose A | (23) Fuel pipe ASSY | |
| (12) Clip | (24) Evaporation hose F | |

Tightening torque: N·m (kgf·m, ft·lb)**T1: 4.4 (0.45, 3.3)****T2: 7.4 (0.75, 5.4)****T3: 33 (3.4, 24.3)**

GENERAL DESCRIPTION

FUEL INJECTION (FUEL SYSTEMS)

5. FUEL LINE



FU-00516

GENERAL DESCRIPTION

FUEL INJECTION (FUEL SYSTEMS)

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

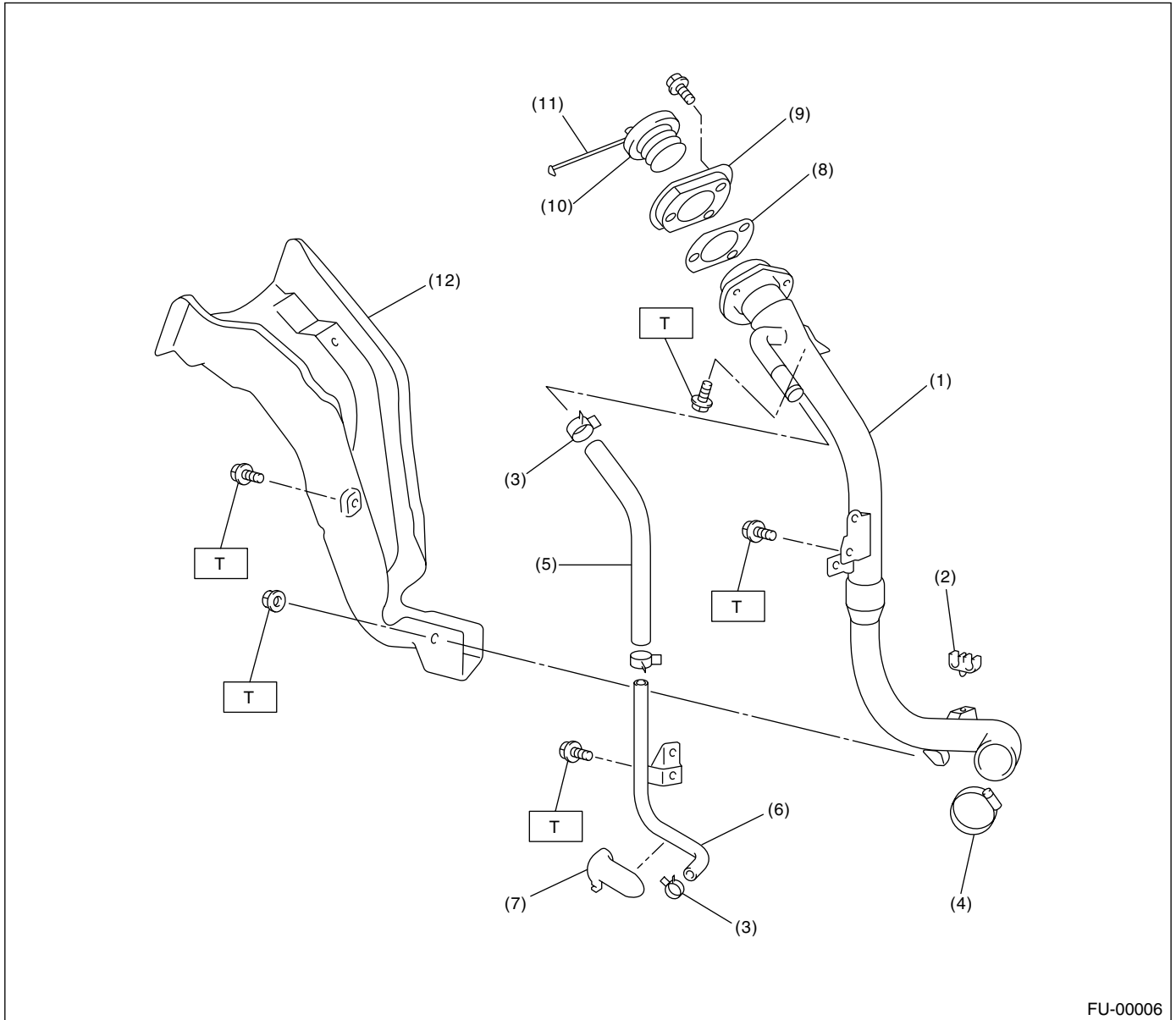
Tightening torque: N·m (kgf-m, ft-lb)

T: 23 (2.3, 17.0)

GENERAL DESCRIPTION

FUEL INJECTION (FUEL SYSTEMS)

6. FUEL FILLER PIPE



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

Tightening torque: N·m (kgf·m, ft·lb)
T: 7.5 (0.76, 5.5)

GENERAL DESCRIPTION

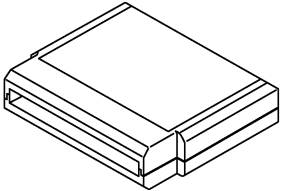

FUEL INJECTION (FUEL SYSTEMS)

C: CAUTION

- Wear working clothing, including a cap, protective goggles, and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust or dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly, and replacement.

- Be careful not to burn your hands, because each part on the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or safety stands at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect negative terminal from battery.
- Place "NO FIRE" signs near the working area.
- Be careful not to spill fuel on the floor.

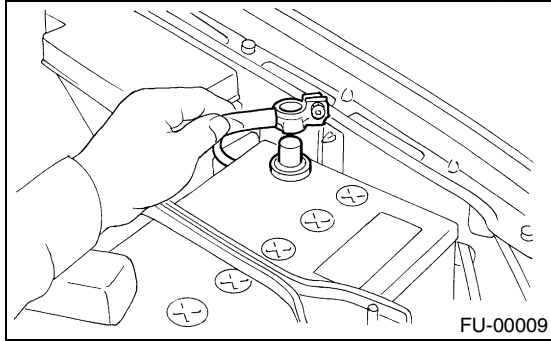
D: PREPARATION TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 <p style="text-align: center;">ST24082AA210</p>	<p style="text-align: center;">24082AA210 (Newly adopted tool)</p>	<p style="text-align: center;">CARTRIDGE</p>	<p>Troubleshooting for electrical system.</p>
 <p style="text-align: center;">ST22771AA030</p>	<p style="text-align: center;">22771AA030</p>	<p style="text-align: center;">SUBARU SELECT MONITOR KIT</p>	<p>Troubleshooting for electrical systems.</p> <ul style="list-style-type: none"> • English: 22771AA030 (Without printer) • German: 22771AA070 (Without printer) • French: 22771AA080 (Without printer) • Spanish: 22771AA090 (Without printer)

2. Throttle Body

A: REMOVAL

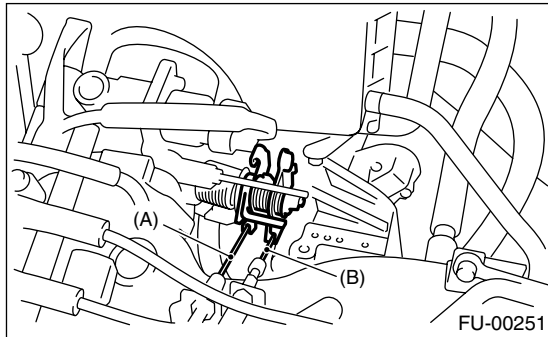
1) Disconnect the ground cable from battery.



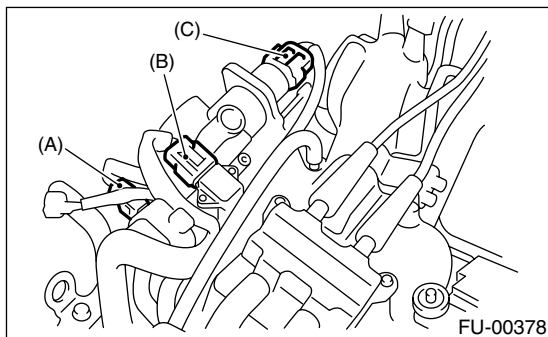
2) Remove the air cleaner case. <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.>

3) Disconnect the accelerator cable (A).

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



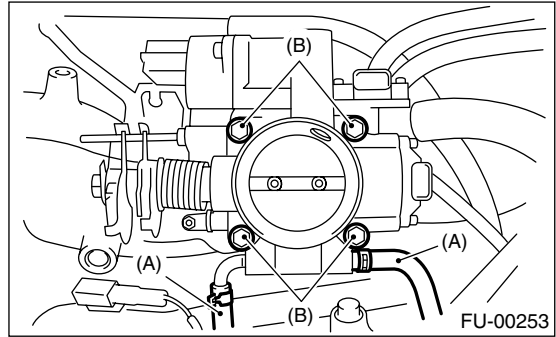
5) Disconnect the connectors from idle air control solenoid valve, throttle position sensor and pressure sensor.



- (A) Throttle position sensor
- (B) Pressure sensor
- (C) Idle air control solenoid valve

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

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



B: INSTALLATION

1) Install in the reverse order of removal.

NOTE:

Replace the gasket with a new one.

Tightening torque:

Throttle body;

22 N·m (2.2 kgf-m, 15.9 ft-lb)

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

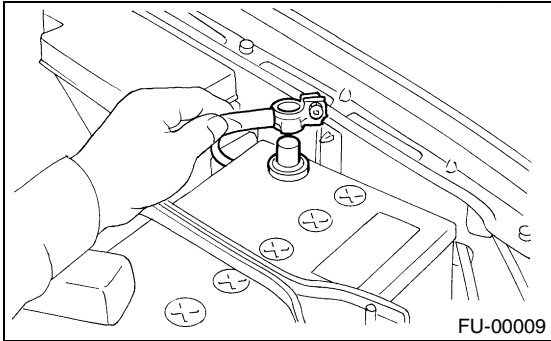
INTAKE MANIFOLD

FUEL INJECTION (FUEL SYSTEMS)

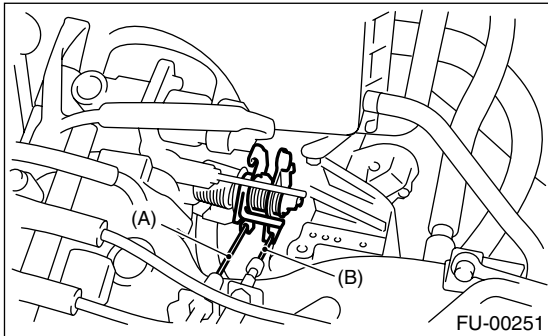
3. Intake Manifold

A: REMOVAL

- 1) Release the fuel pressure. <Ref. to FU(SOHC)-49, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel flap lid, and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.



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

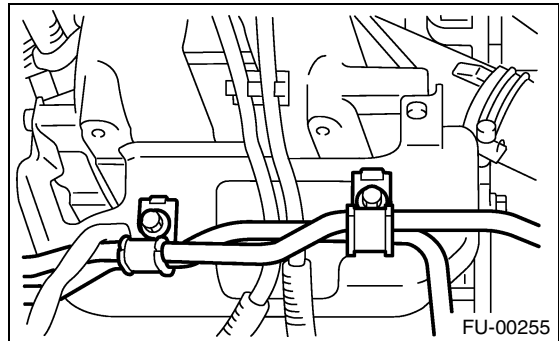


- 7) Remove the power steering pump and reservoir tank from bracket.
 - (1) Remove the resonator chamber. <Ref. to IN(SOHC)-8, REMOVAL, Resonator Chamber.>
 - (2) Remove the front side V-belt. <Ref. to ME(SOHC)-41, REMOVAL, V-belt.>

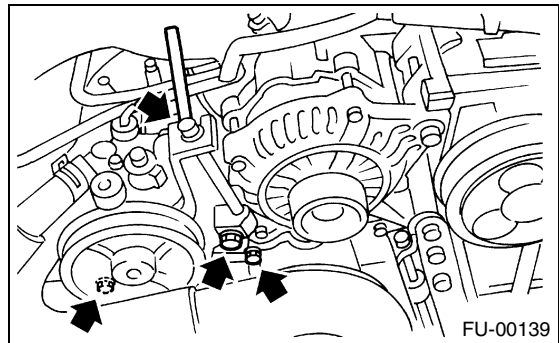
- (3) Remove the bolts which hold power steering pipes onto the intake manifold protector.

NOTE:

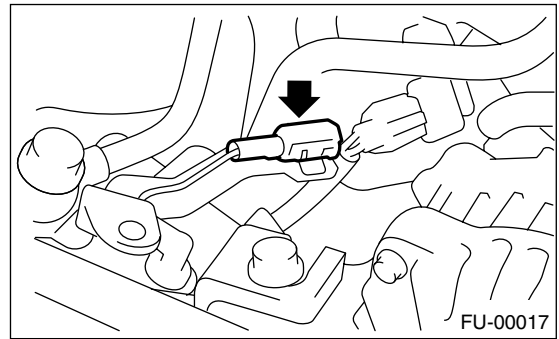
Do not disconnect the power steering hose.



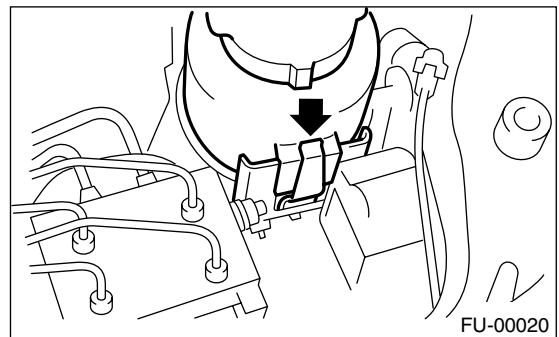
- (4) Remove the bolts which install power steering pump bracket.



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



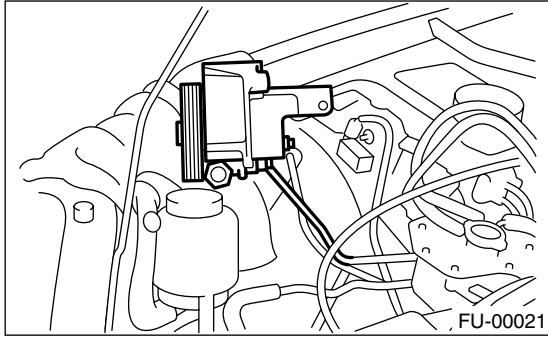
- (6) Remove the power steering tank from the bracket by pulling it upwards.



INTAKE MANIFOLD

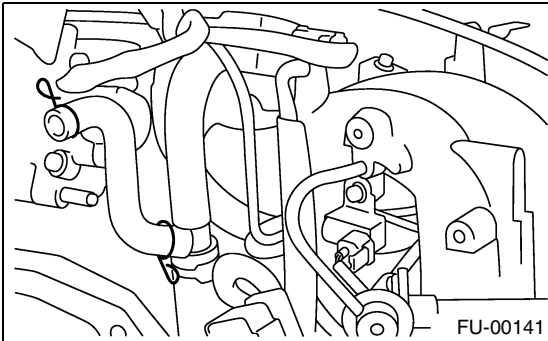
FUEL INJECTION (FUEL SYSTEMS)

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

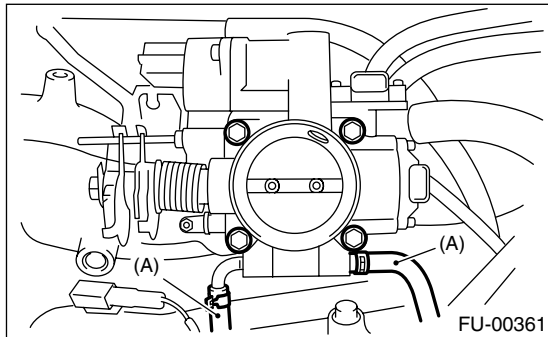


8) Disconnect the spark plug cords from the spark plugs.

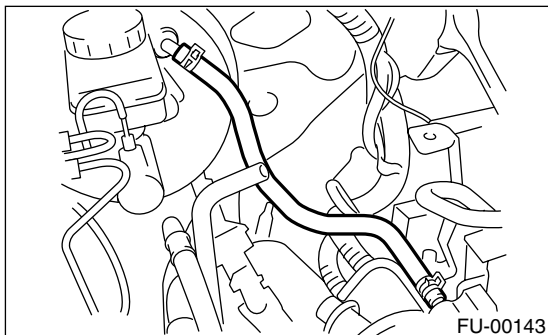
9) Disconnect the PCV hose from the intake manifold.



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



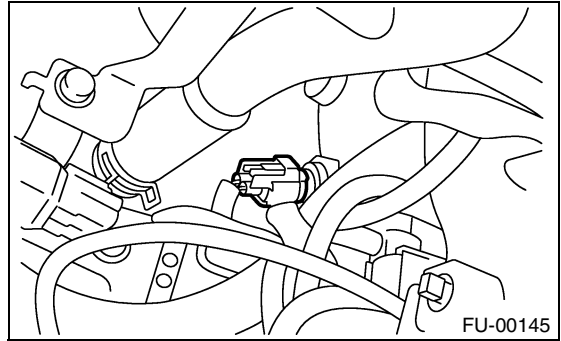
11) Disconnect the brake booster hose.



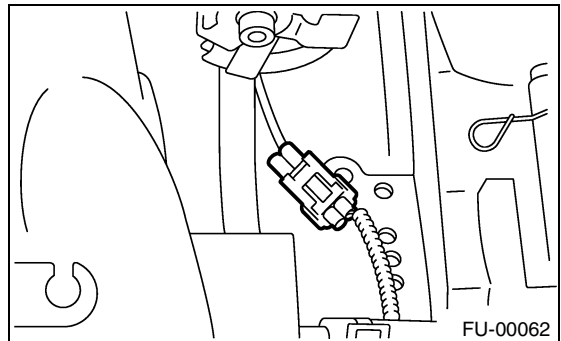
12) Remove the air cleaner case stay RH and engine harness bracket, and disconnect the engine harness connectors from the bulkhead harness connectors.



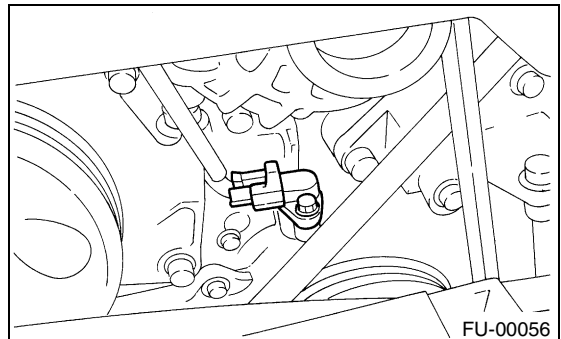
13) Disconnect the connectors from the engine coolant temperature sensor.



14) Disconnect the knock sensor connector.



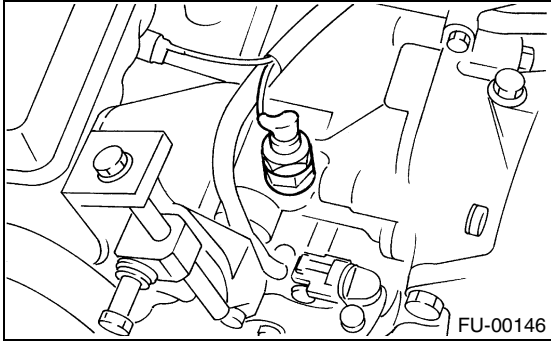
15) Disconnect the connector from the crankshaft position sensor.



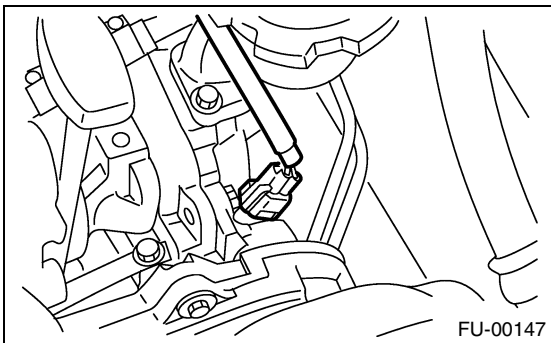
INTAKE MANIFOLD

FUEL INJECTION (FUEL SYSTEMS)

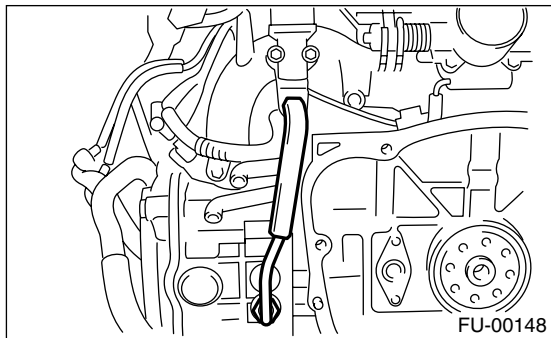
16) Disconnect the connector from the oil pressure switch.



17) Disconnect the connector from the camshaft position sensor.



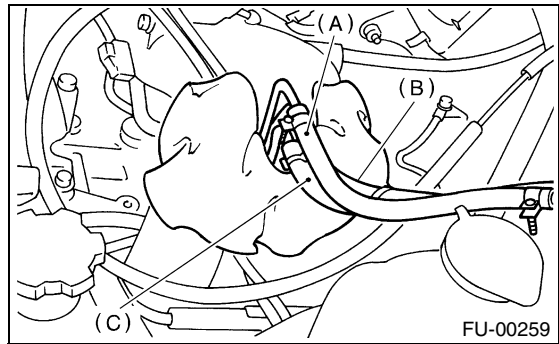
18) Remove the EGR pipe from intake manifold.



19) Disconnect the fuel hoses from the fuel pipes.

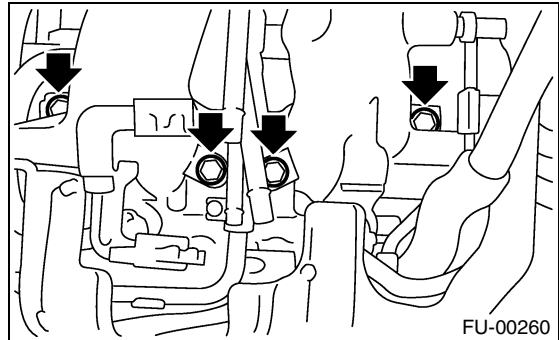
WARNING:

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



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

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



21) Remove the intake manifold.

B: INSTALLATION

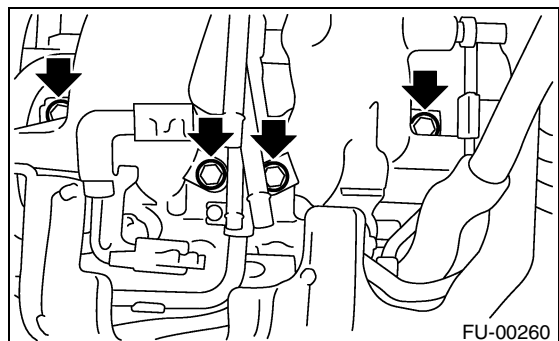
1) Install the intake manifold onto the cylinder heads.

NOTE:

Replace the gaskets with new ones.

Tightening torque:

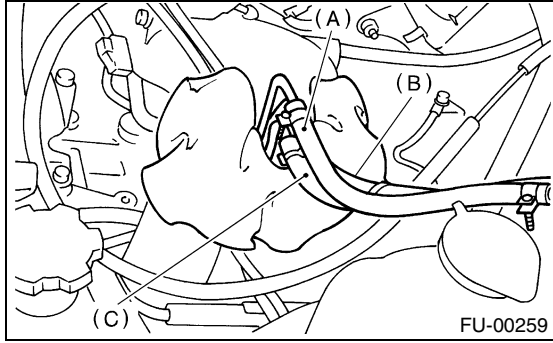
25 N·m (2.5 kgf-m, 18.1 ft-lb)



INTAKE MANIFOLD

FUEL INJECTION (FUEL SYSTEMS)

2) Connect the fuel hoses.

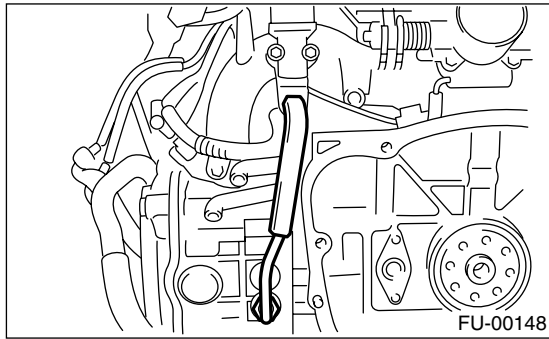


- (A) Fuel delivery hose
- (B) Return hose
- (C) Evaporation hose

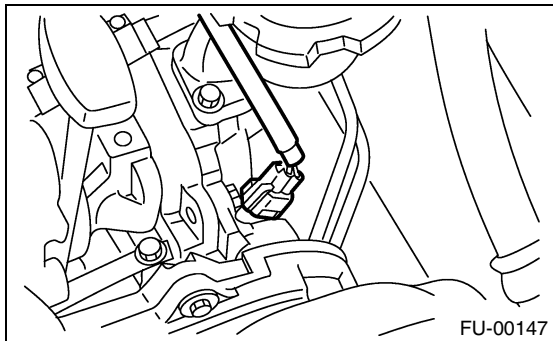
3) Connect the EGR pipe to intake manifold.

Tightening torque:

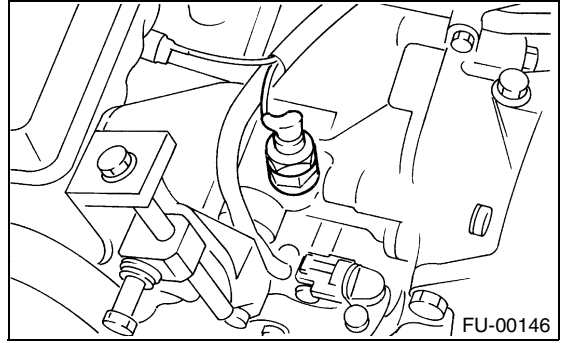
34 N·m (3.4 kgf·m, 24.6 ft·lb)



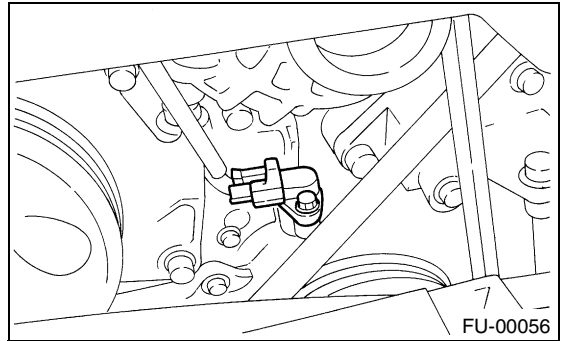
4) Connect the connector to the camshaft position sensor.



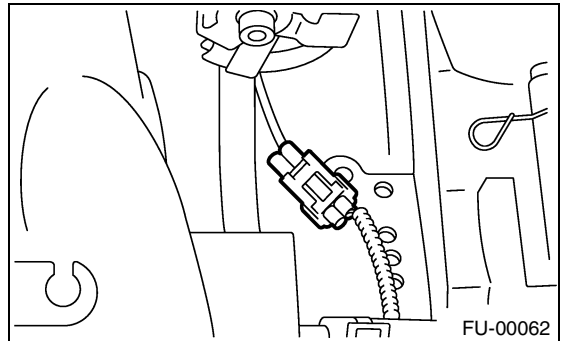
5) Connect the connector to the oil pressure switch.



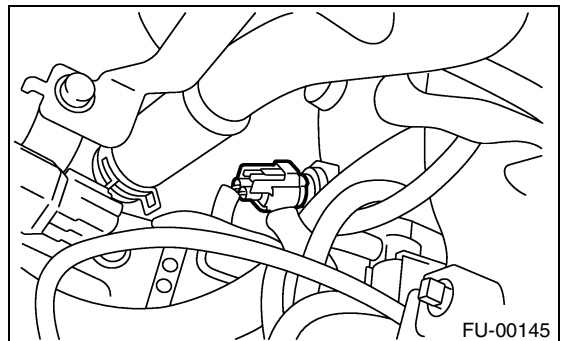
6) Connect the connector to the crankshaft position sensor.



7) Connect the knock sensor connector.



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



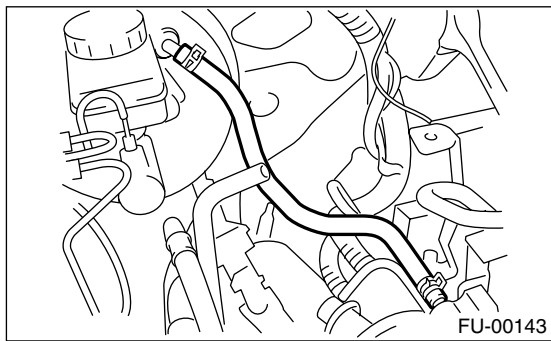
INTAKE MANIFOLD

FUEL INJECTION (FUEL SYSTEMS)

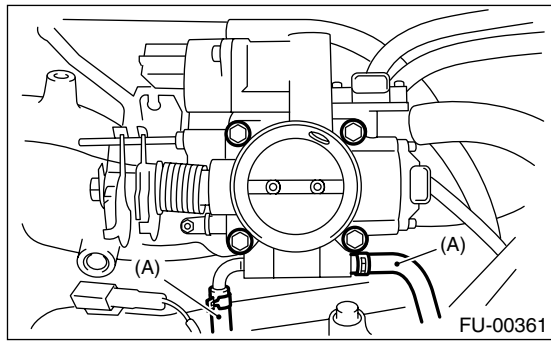
9) Install the air cleaner case stay RH and engine harness bracket, and connect the engine harness connectors to the bulkhead connectors.



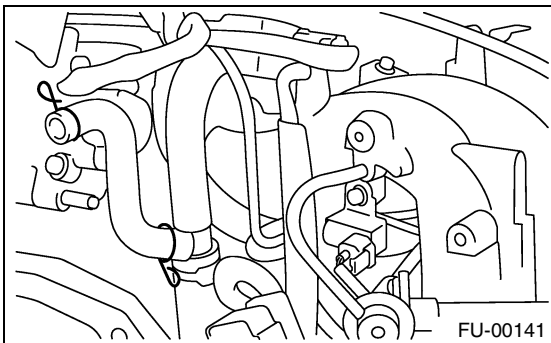
10) Connect the brake booster hose.



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



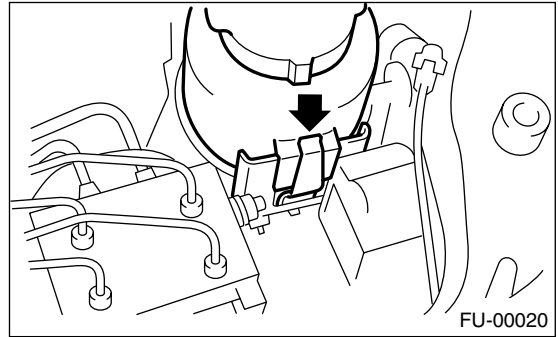
12) Connect the PCV hose to the intake manifold.



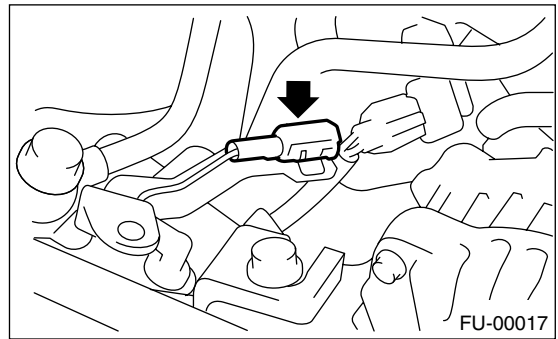
13) Connect the spark plug cords to the spark plugs.

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

(1) Install the reservoir tank to bracket.



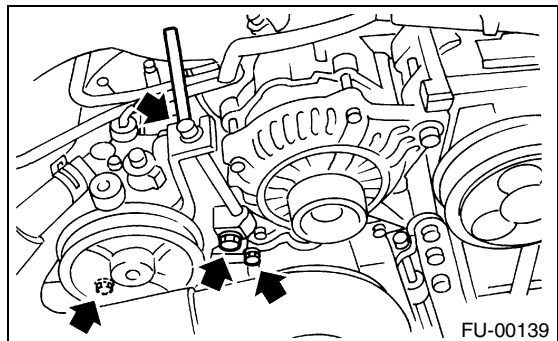
(2) Connect the connector to the power steering pump switch.



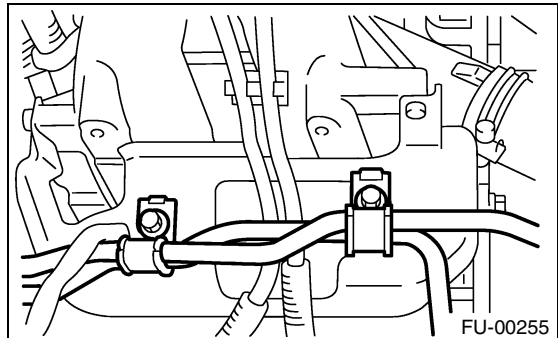
(3) Tighten the bolts which install power steering pump bracket.

Tightening torque:

22 N·m (2.2 kgf-m, 15.9 ft-lb)



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



INTAKE MANIFOLD

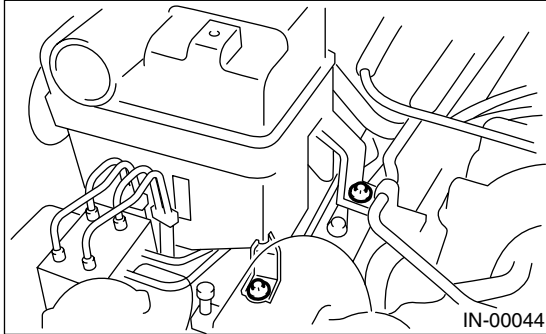
FUEL INJECTION (FUEL SYSTEMS)

(5) Install the front side V-belt. <Ref. to ME(SOHC)-41, INSTALLATION, V-belt.>

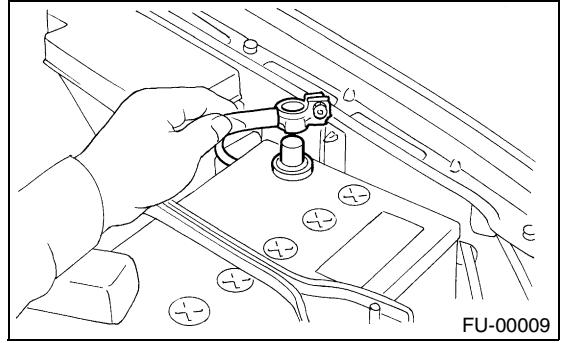
(6) Install the resonator chamber.

Tightening torque:

33 N·m (3.4 kgf·m, 24.6 ft·lb)

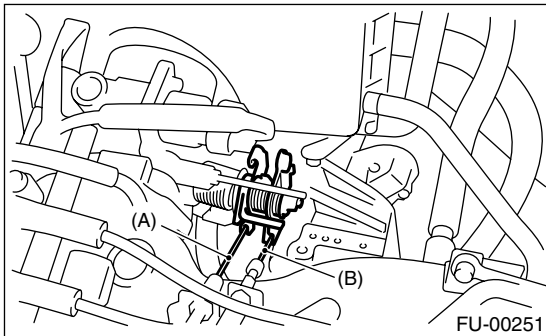


19) Connect the battery ground cable to battery.



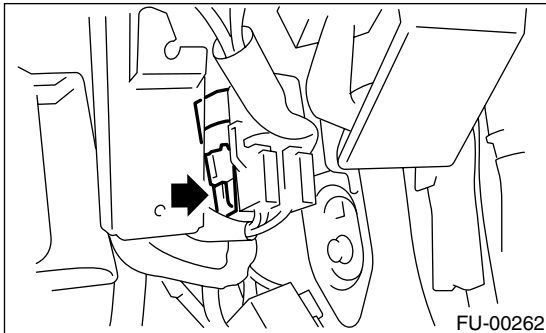
15) Connect the accelerator cable (A). <Ref. to SP(SOHC)-9, INSTALLATION, Accelerator Control Cable.>

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



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

18) Connect the connector to the fuel pump relay.

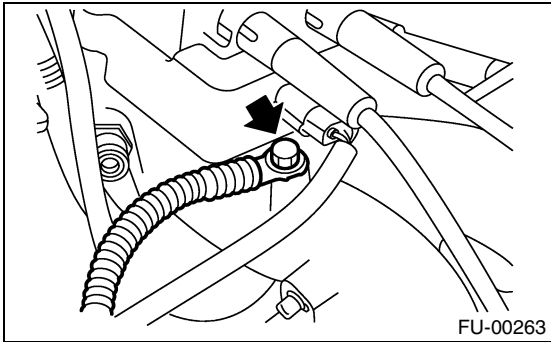


INTAKE MANIFOLD

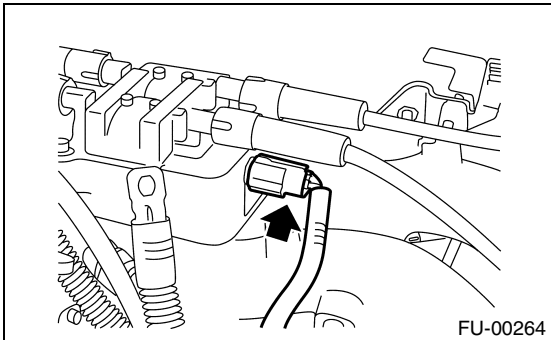
FUEL INJECTION (FUEL SYSTEMS)

C: DISASSEMBLY

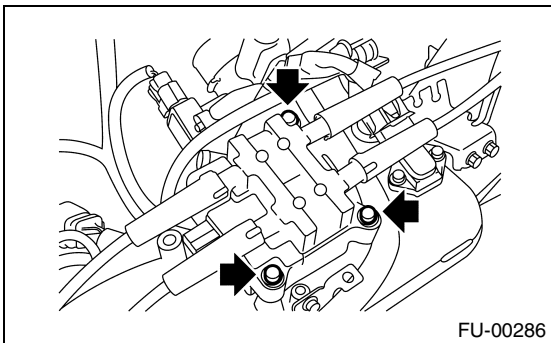
1) Disconnect the engine ground terminal from the intake manifold.



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



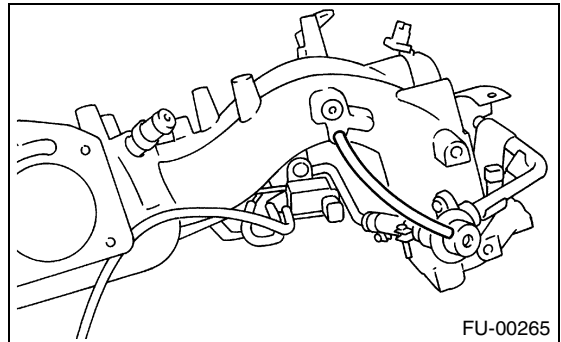
3) Remove the ignition coil and ignitor assembly.



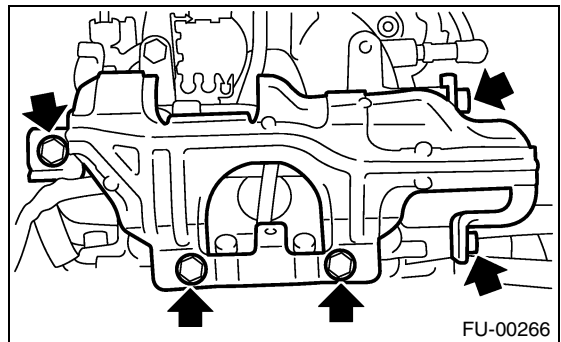
4) Remove the throttle body.<Ref. to FU(SOHC)-13, REMOVAL, Throttle Body.>

5) Remove the EGR valve.<Ref. to FU(SOHC)-36, REMOVAL, EGR Valve.>

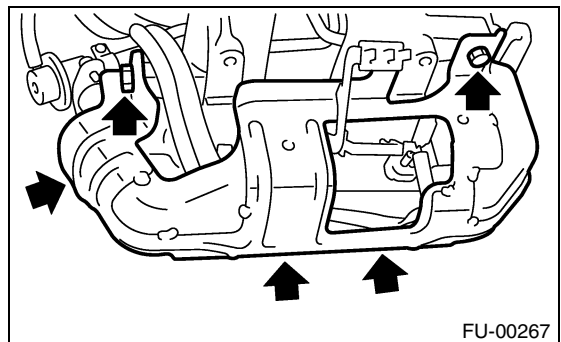
6) Disconnect the pressure regulator vacuum hose from the intake manifold.



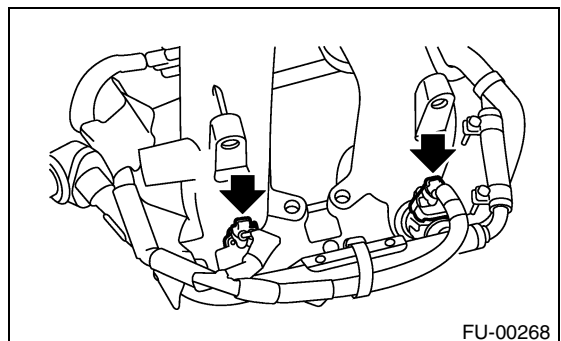
7) Remove the fuel pipe protector LH.



8) Remove the fuel pipe protector RH.



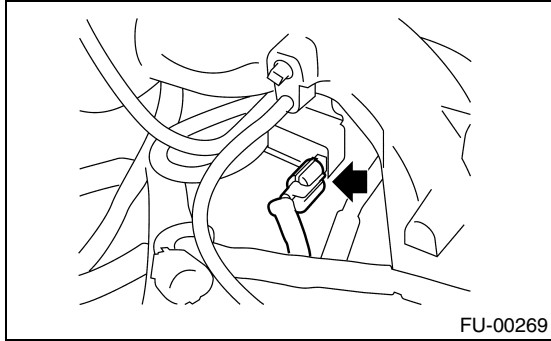
9) Disconnect the connectors from the fuel injectors.



INTAKE MANIFOLD

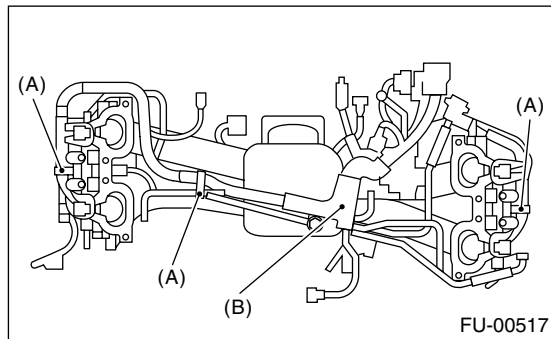
FUEL INJECTION (FUEL SYSTEMS)

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



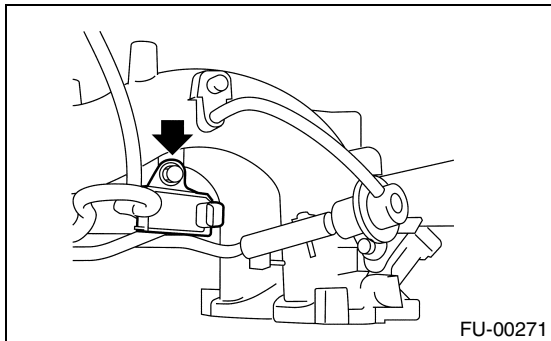
11) Disconnect the air by-pass hose from the purge control solenoid valve.

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

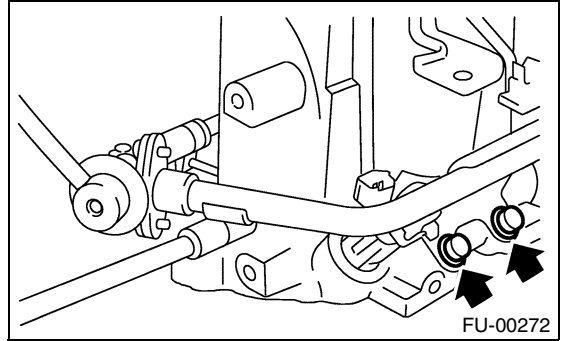


13) Remove the engine harness from the intake manifold.

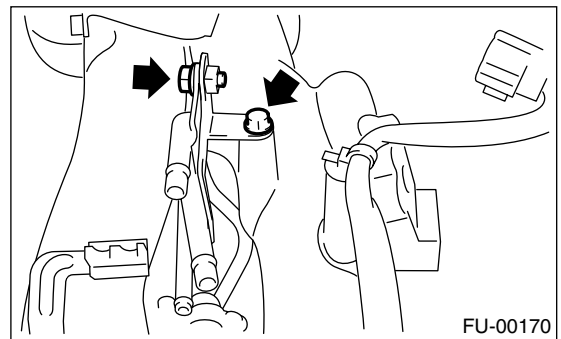
14) Remove the purge control solenoid valve.



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

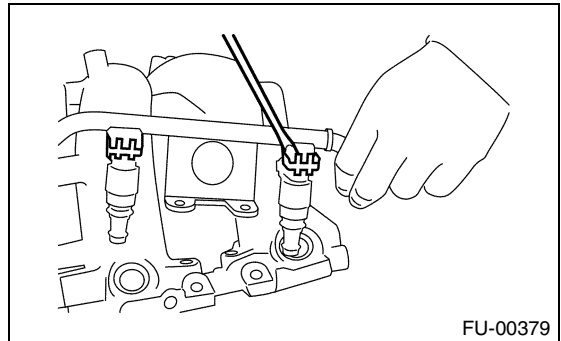


16) Remove the two bolts which hold fuel pipes on the left side of intake manifold.

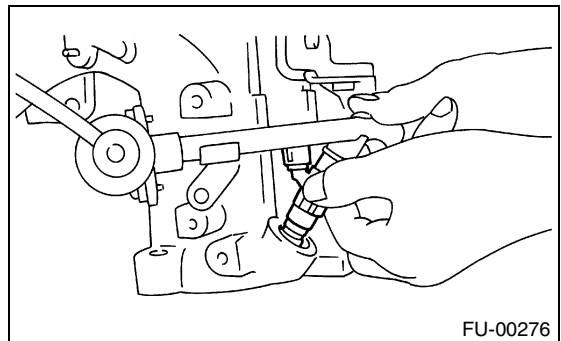


17) Remove the fuel injectors.

(1) Remove the fuel injector securing clip.



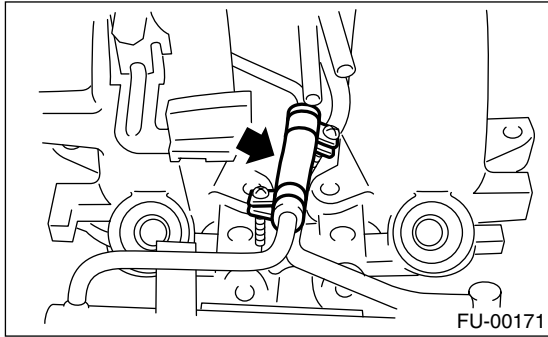
(2) Remove the fuel injector while lifting up the fuel injector pipe.



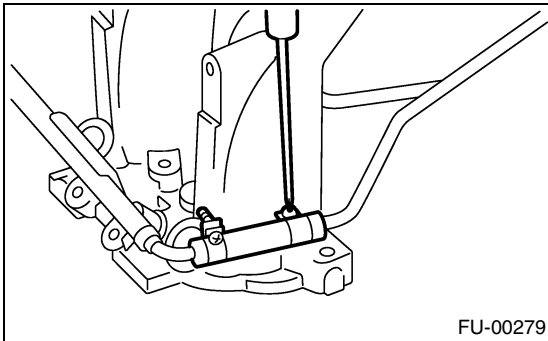
INTAKE MANIFOLD

FUEL INJECTION (FUEL SYSTEMS)

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

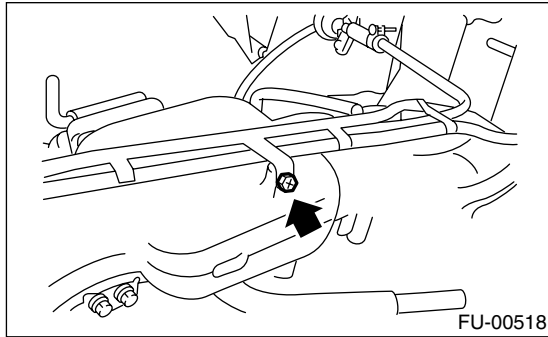


19) Loosen the clamp which holds the front right side fuel hose to the injector pipe and remove the pipe.



20) Remove the fuel injector pipe.

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



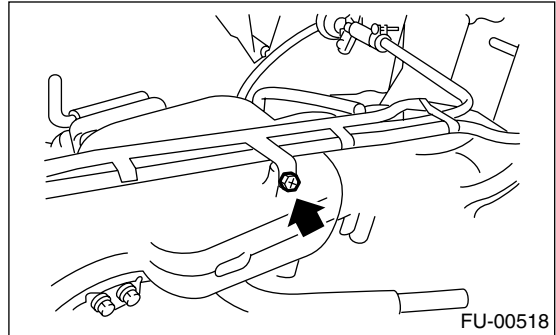
22) Remove the fuel pipe assembly and pressure regulator, from the intake manifold.

D: ASSEMBLY

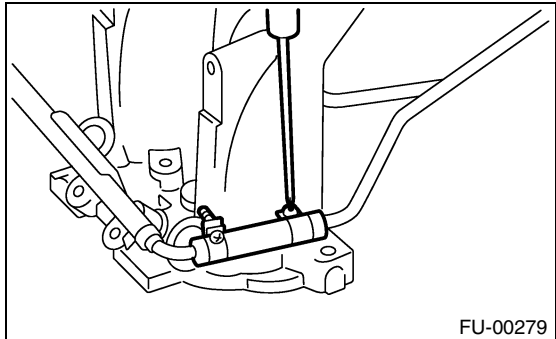
- 1) Install the fuel pipe assembly and pressure regulator, etc. to the intake manifold.
- 2) Tighten the bolt which installs the fuel pipes on the intake manifold.

Tightening torque:

5.0 N·m (0.51 kgf·m, 3.7 ft·lb)

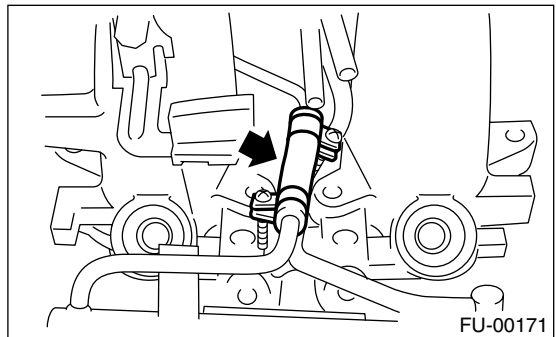


- 3) Connect the right side fuel hose to the injector pipe, and tighten the clamp screw.



- 4) Install the fuel injector pipe.

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



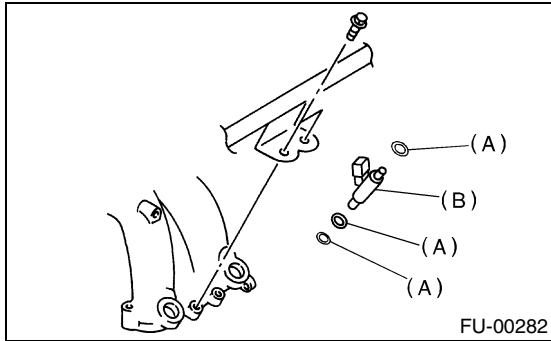
INTAKE MANIFOLD

FUEL INJECTION (FUEL SYSTEMS)

6) Install the fuel injectors.

NOTE:

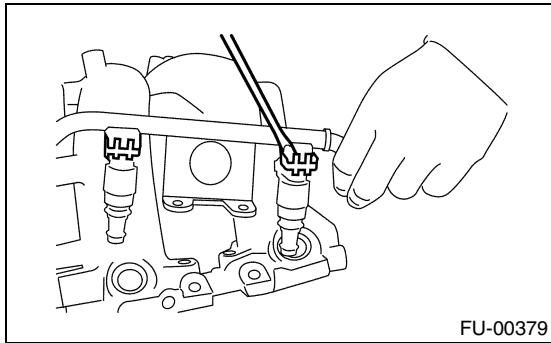
Replace the O-rings with new ones.



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

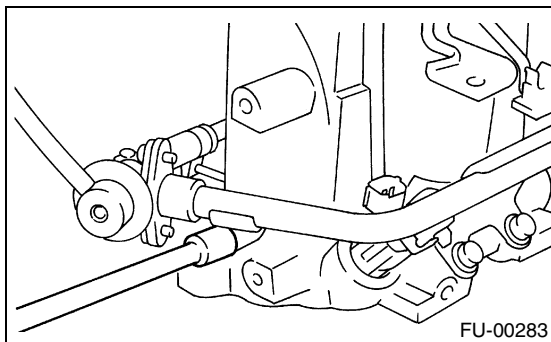
NOTE:

Do not forget to install the fuel injector securing clip.



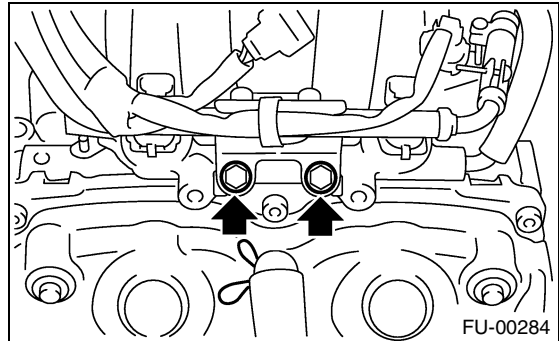
7) Tighten the bolt which installs the injector pipe on the intake manifold.

Tightening torque:
5.0 N·m (0.51 kgf-m, 3.7 ft-lb)



Tightening torque:

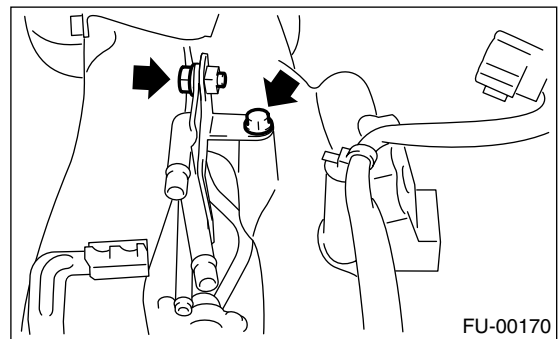
19 N·m (1.9 kgf-m, 13.7 ft-lb)



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

Tightening torque:

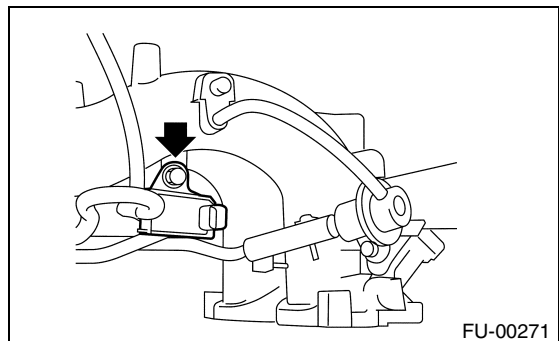
5.0 N·m (0.51 kgf-m, 3.7 ft-lb)



9) Install the purge control solenoid valve.

Tightening torque:

19 N·m (1.9 kgf-m, 13.7 ft-lb)



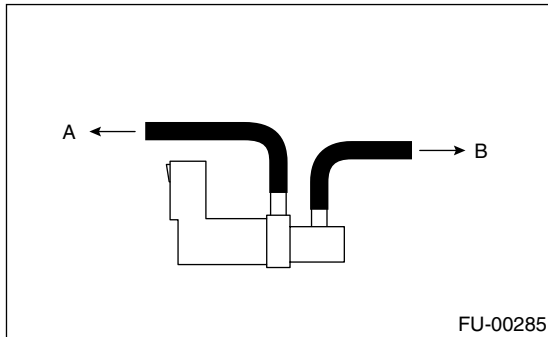
INTAKE MANIFOLD

FUEL INJECTION (FUEL SYSTEMS)

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

NOTE:

Connect the evaporation hose as shown in the figure.



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

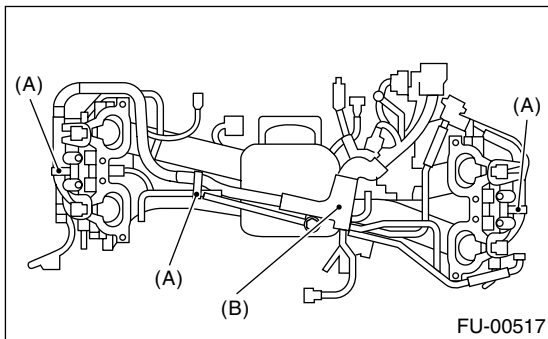
11) Install the engine harness onto the intake manifold.

Tightening torque:

16 N·m (1.6 kgf·m, 11.8 ft·lb)

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

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



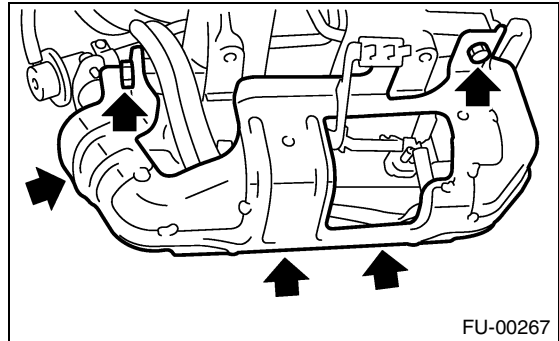
NOTE:

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

14) Install the fuel pipe protector RH.

Tightening torque:

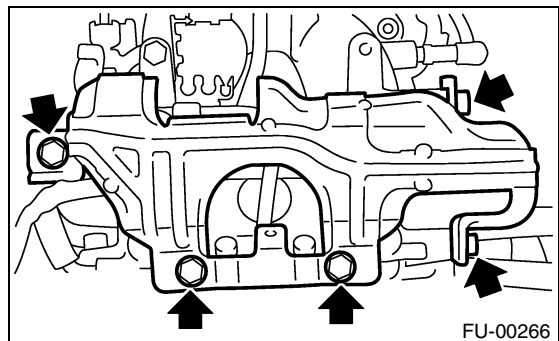
19 N·m (1.9 kgf·m, 13.7 ft·lb)



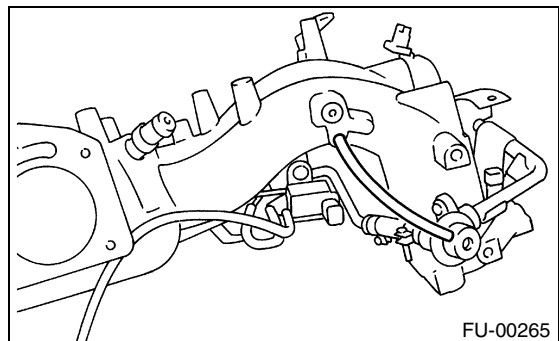
15) Install the fuel pipe protector LH.

Tightening torque:

19 N·m (1.9 kgf·m, 13.7 ft·lb)



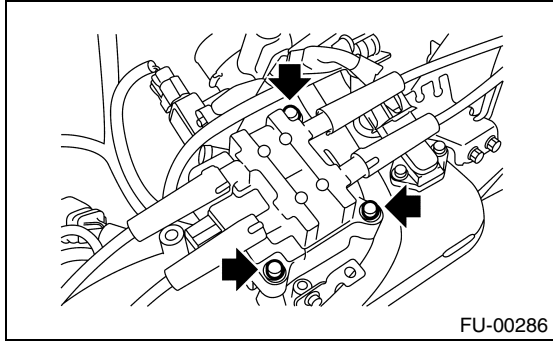
16) Connect the pressure regulator vacuum hose to the intake manifold.



17) Install the EGR valve.<Ref. to FU(SOHC)-36, INSTALLATION, EGR Valve.>

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

19) Install the ignition coil and ignitor assembly.

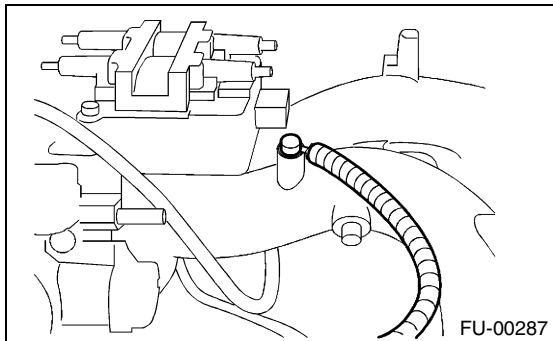


20) Connect the connector to the ignition coil and ignitor assembly.

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

Tightening torque:

19 N·m (1.9 kgf·m, 13.7 ft·lb)



E: INSPECTION

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

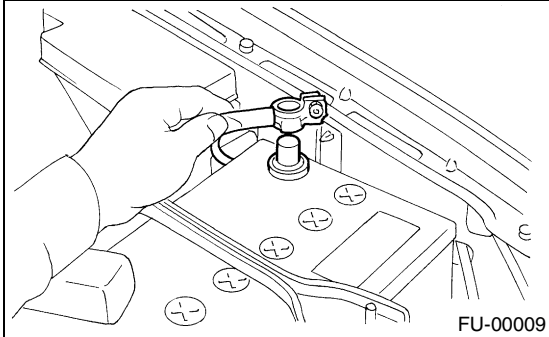
ENGINE COOLANT TEMPERATURE SENSOR

FUEL INJECTION (FUEL SYSTEMS)

4. Engine Coolant Temperature Sensor

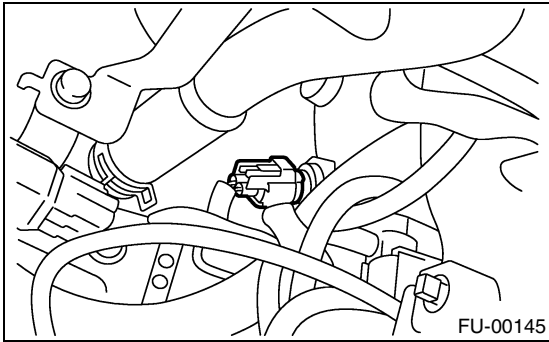
A: REMOVAL

1) Disconnect the ground cable from battery.



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

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



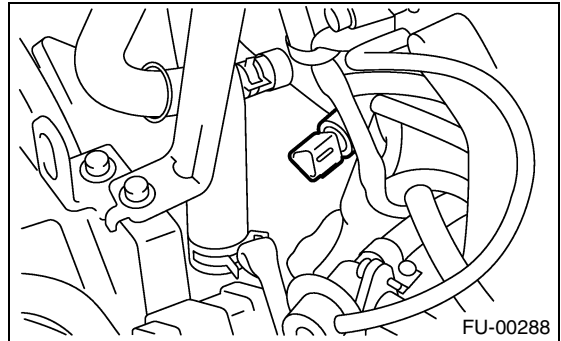
4) Remove the engine coolant temperature sensor.

B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

18 N·m (1.8 kgf-m, 13.0 ft-lb)



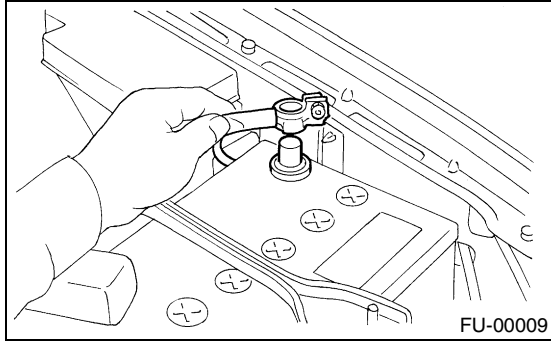
CRANKSHAFT POSITION SENSOR

FUEL INJECTION (FUEL SYSTEMS)

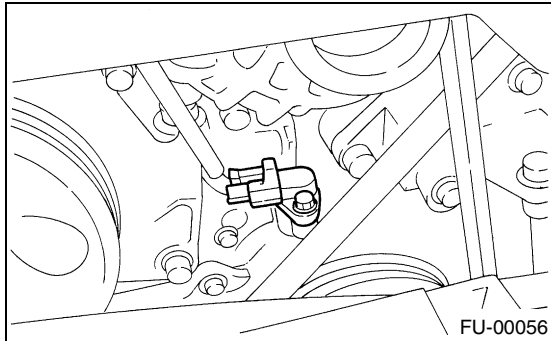
5. Crankshaft Position Sensor

A: REMOVAL

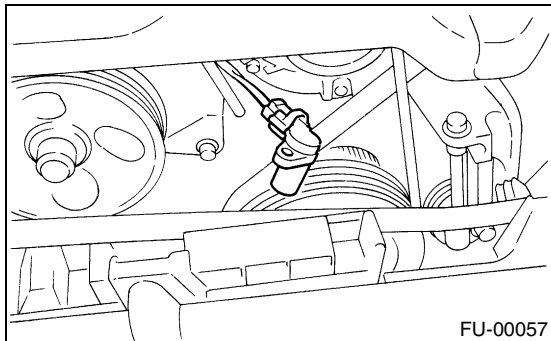
1) Disconnect the ground cable from battery.



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



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

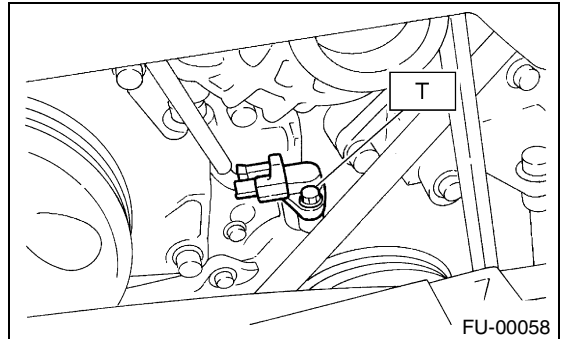


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

T: 6.4 N·m (0.65 kgf-m, 4.7 ft-lb)



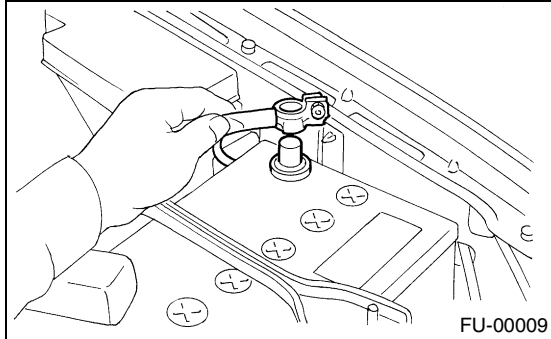
CAMSHAFT POSITION SENSOR

FUEL INJECTION (FUEL SYSTEMS)

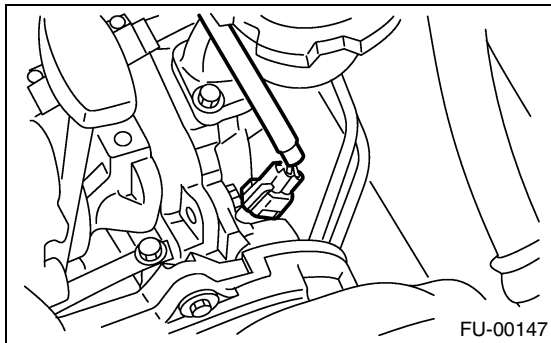
6. Camshaft Position Sensor

A: REMOVAL

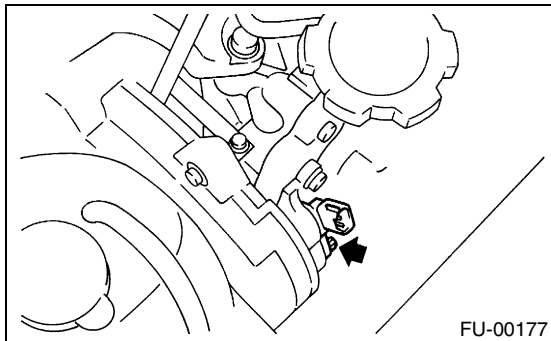
1) Disconnect the ground cable from battery.



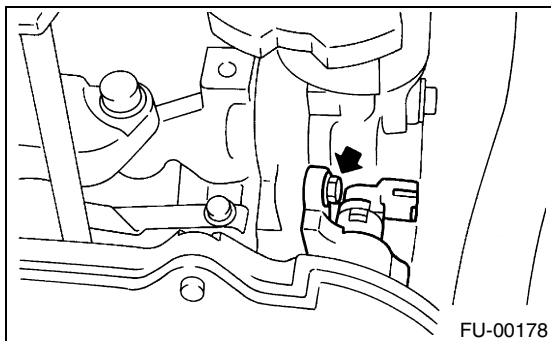
2) Disconnect the connector from the camshaft position sensor.



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

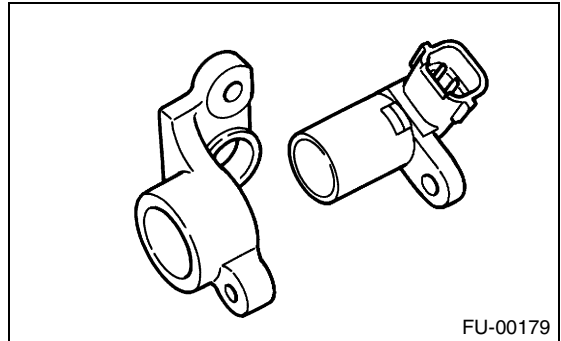


4) Remove the bolt which installs camshaft position sensor support to the camshaft cap LH.



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

6) Remove the camshaft position sensor itself.



B: INSTALLATION

Install in the reverse order of removal.

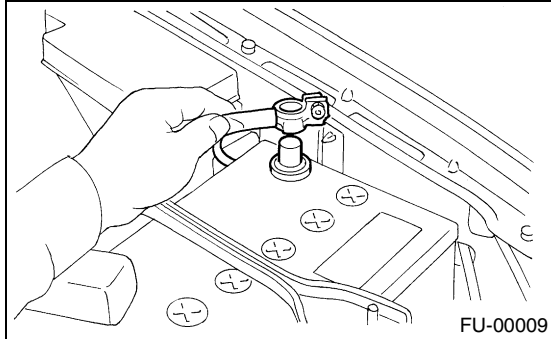
Tightening torque:

- **Camshaft position sensor support;**
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)
- **Camshaft position sensor;**
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

7. Knock Sensor

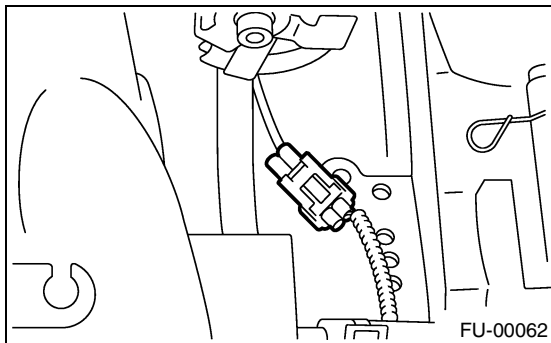
A: REMOVAL

1) Disconnect the ground cable from battery.

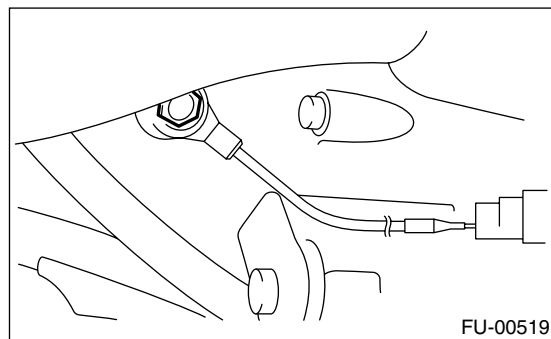


2) Remove the air cleaner case. <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.>

3) Disconnect the knock sensor connector.



4) Remove the knock sensor from the cylinder block.



B: INSTALLATION

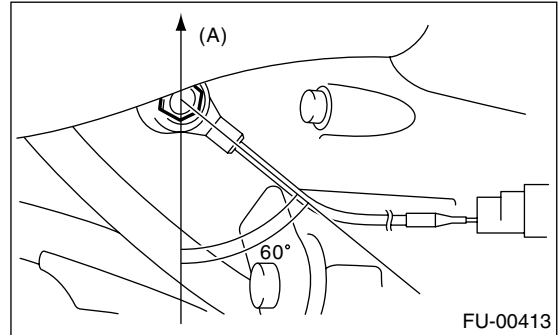
1) Install the knock sensor to the cylinder block.

Tightening torque:

24 N·m (2.4 kgf-m, 17.4 ft-lb)

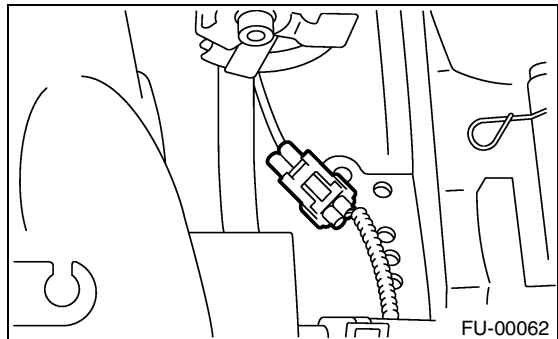
NOTE:

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



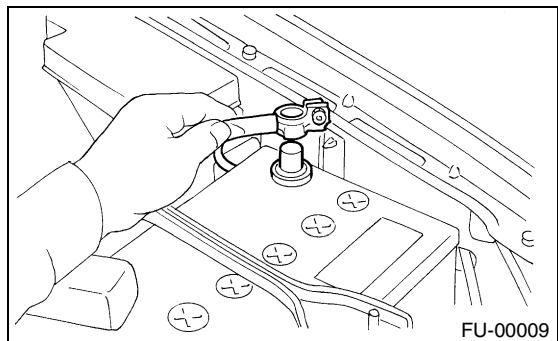
(A) Front side

2) Connect the knock sensor connector.



3) Install the air cleaner case. <Ref. to IN(SOHC)-6, REMOVAL, Air Cleaner Case.>

4) Connect the battery ground cable to battery.



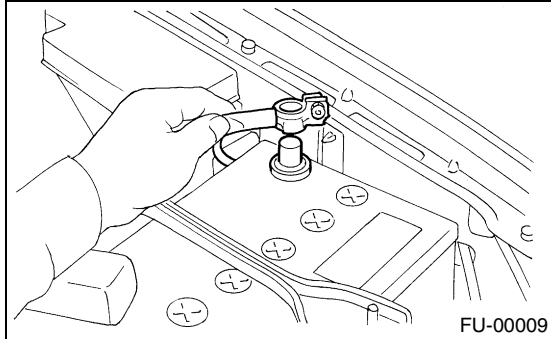
THROTTLE POSITION SENSOR

FUEL INJECTION (FUEL SYSTEMS)

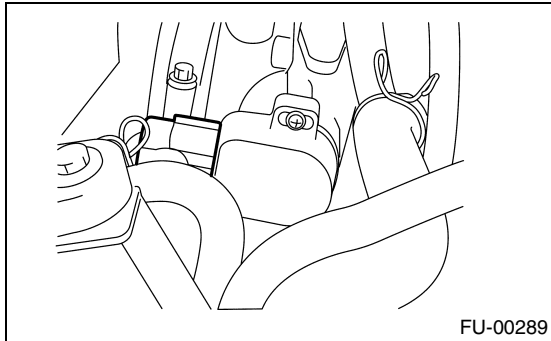
8. Throttle Position Sensor

A: REMOVAL

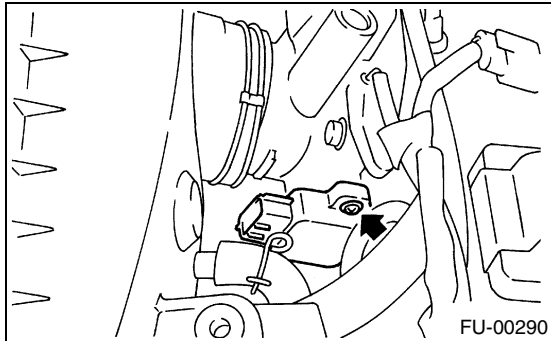
- 1) Disconnect the ground cable from battery.



- 2) Disconnect the connector from the throttle position sensor.



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



B: INSTALLATION

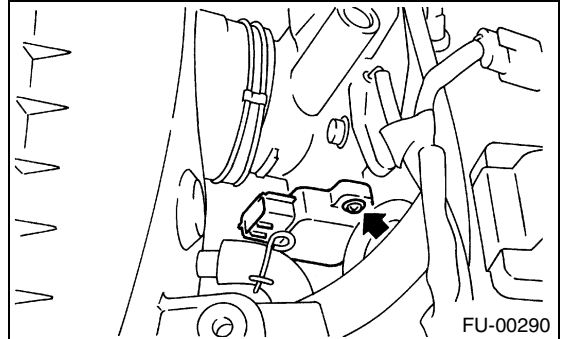
Install in the reverse order of removal.

Tightening torque:

1.6 N·m (0.16 kgf·m, 1.2 ft·lb)

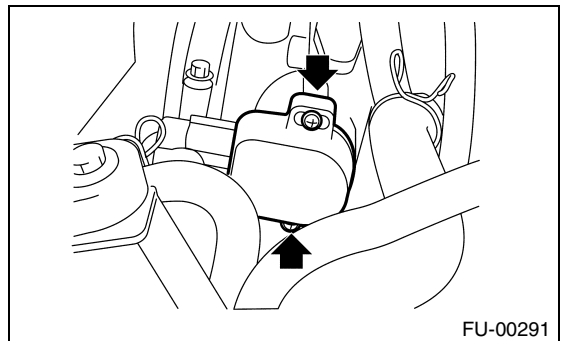
CAUTION:

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



C: ADJUSTMENT

- 1) Turn the ignition switch to OFF.
- 2) Loosen the throttle position sensor holding screws.



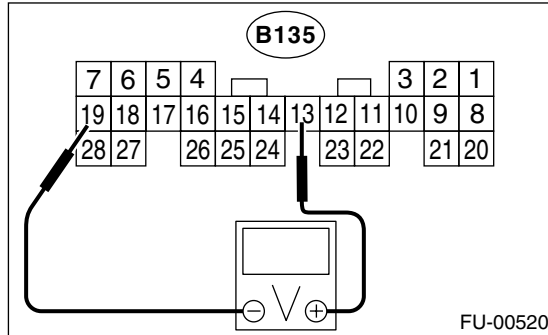
- 3) When using voltage meter;
 - (1) Take out the ECM.
 - (2) Turn the ignition switch to ON.

THROTTLE POSITION SENSOR

FUEL INJECTION (FUEL SYSTEMS)

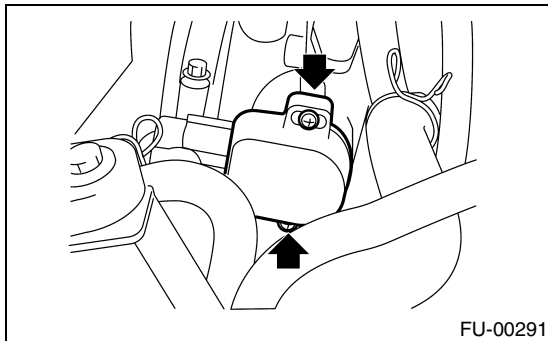
(3) Adjust the throttle position sensor to the proper position to allow the voltage signal to the ECM to be in specification.

Connector & terminal / Specified voltage
(B134) No. 13 (+) — (B134) No. 19 (–) / 0.45 — 0.55 V
[Fully closed.]

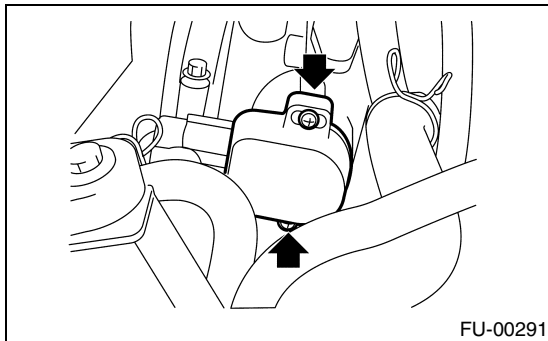


(4) Tighten the throttle position sensor holding screws.

Tightening torque:
1.6 N·m (0.16 kgf-m, 1.2 ft-lb)

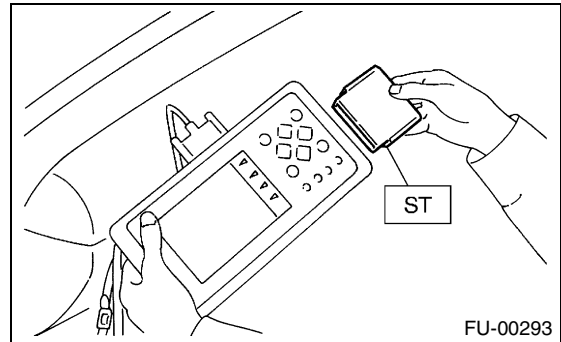


4) When using Subaru Select Monitor;
 (1) Turn the ignition switch to OFF.
 (2) Loosen the throttle position sensor holding screws.

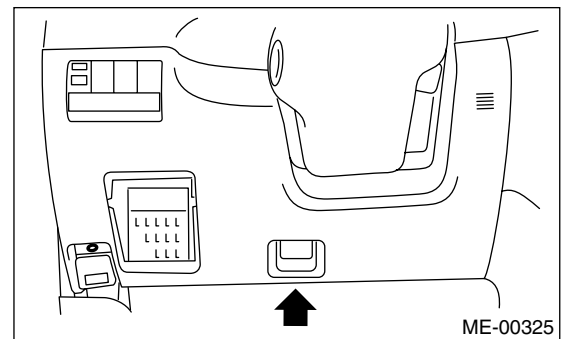


NOTE:
 For detailed operation procedures, refer to the Subaru Select Monitor Operation Manual.

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



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



- 5) Turn the ignition switch to ON, and the Subaru Select Monitor switch to ON.
- 6) Select the {2. Each System Check} in Main Menu.
- 7) Select the {Engine Control System} in Selection Menu.
- 8) Select the {1. Current Data Display & Save} in Engine Control System Diagnosis.
- 9) Select the {1.12 Data Display} in Data Display Menu.
- 10) Adjust the throttle position sensor to the proper position to match with the following specifications.

Condition: Throttle fully closed
Throttle opening angle 0.00%
Throttle sensor voltage 0.50 V

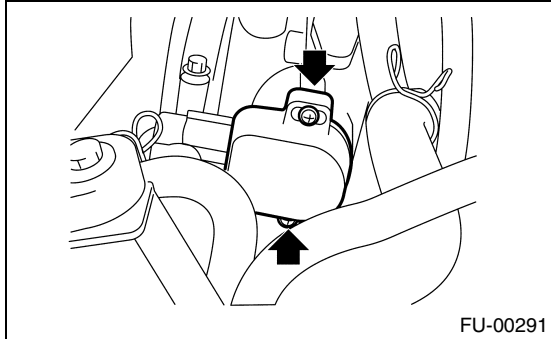
THROTTLE POSITION SENSOR

FUEL INJECTION (FUEL SYSTEMS)

11) Tighten the throttle position sensor holding screws.

Tightening torque:

1.6 N·m (0.16 kgf·m, 1.2 ft·lb)



FU-00291

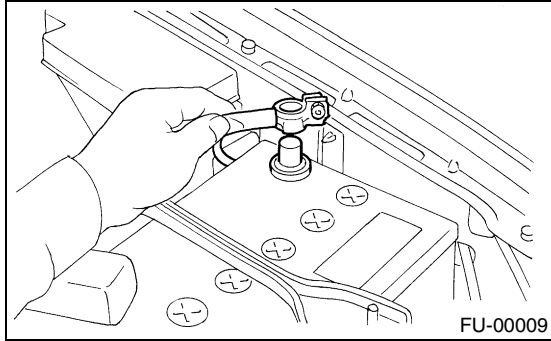
PRESSURE SENSOR

FUEL INJECTION (FUEL SYSTEMS)

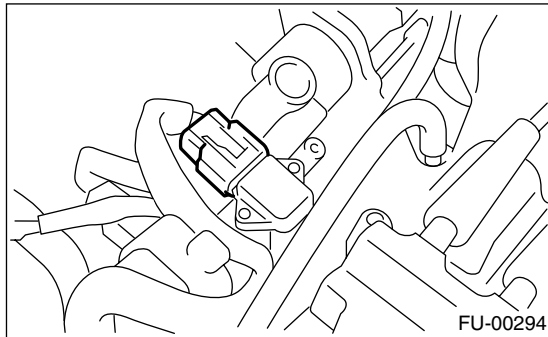
9. Pressure Sensor

A: REMOVAL

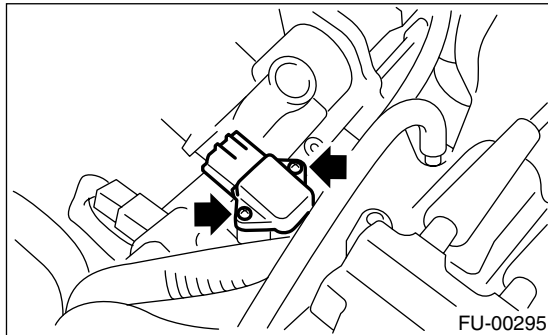
1) Disconnect the ground cable from battery.



2) Disconnect the connector from the pressure sensor.



3) Remove the pressure sensor.

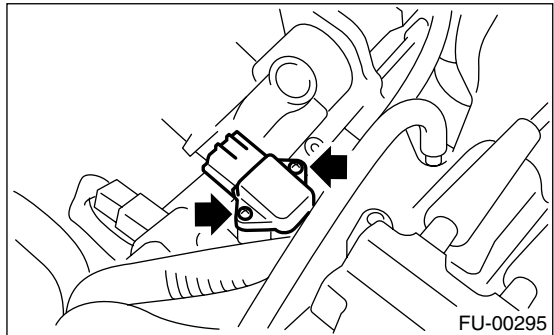


B: INSTALLATION

Install in the reverse order of removal.

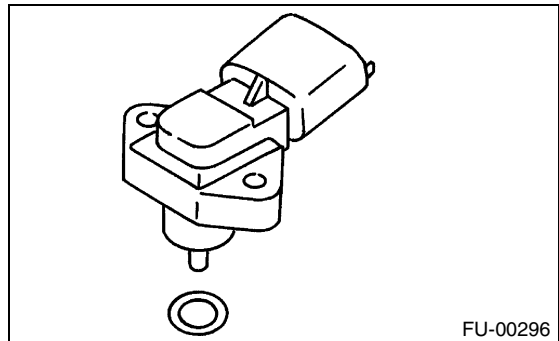
Tightening torque:

1.6 N·m (0.16 kgf-m, 1.2 ft-lb)



NOTE:

Replace the O-ring with a new one.



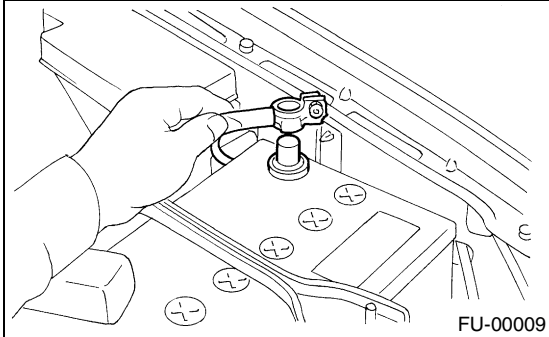
INTAKE AIR TEMPERATURE SENSOR

FUEL INJECTION (FUEL SYSTEMS)

10. Intake Air Temperature Sensor

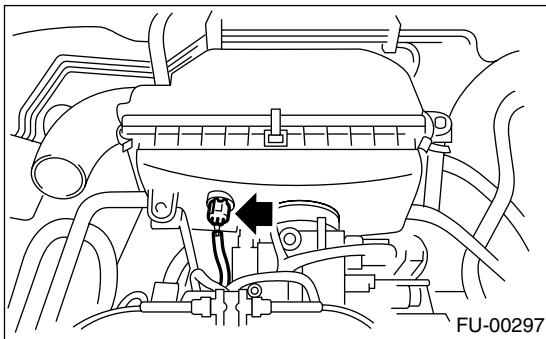
A: REMOVAL

1) Disconnect the ground cable from battery.



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

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



B: INSTALLATION

Install in the reverse order of removal.

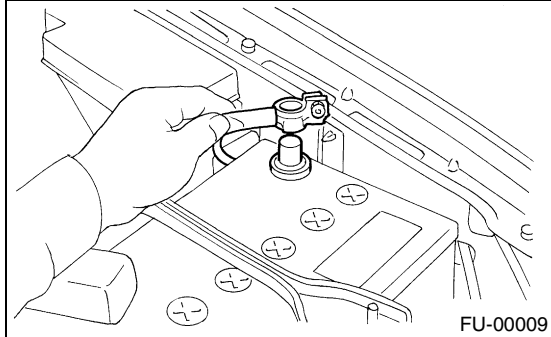
IDLE AIR CONTROL SOLENOID VALVE

FUEL INJECTION (FUEL SYSTEMS)

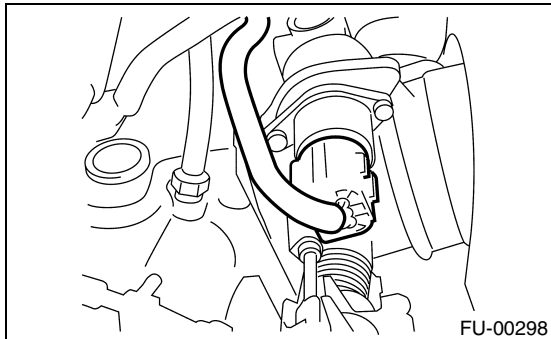
11. Idle Air Control Solenoid Valve

A: REMOVAL

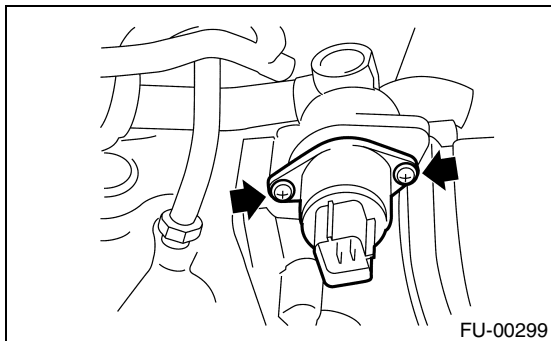
- 1) Disconnect the ground cable from battery.



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



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



B: INSTALLATION

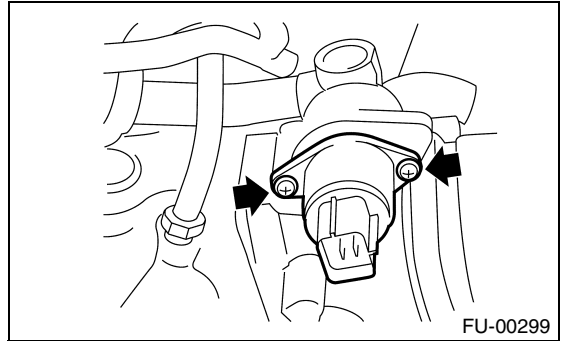
Install in the reverse order of removal.

NOTE:

Always use new gasket.

Tightening torque:

1.6 N·m (0.16 kgf-m, 1.2 ft-lb)



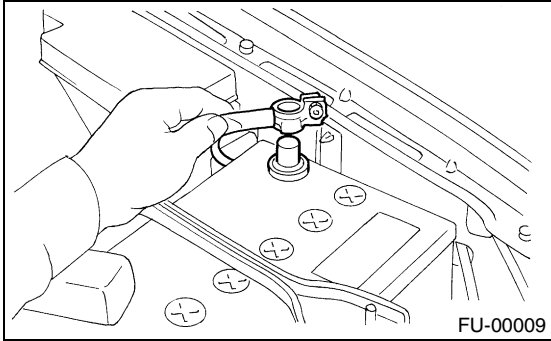
EGR VALVE

FUEL INJECTION (FUEL SYSTEMS)

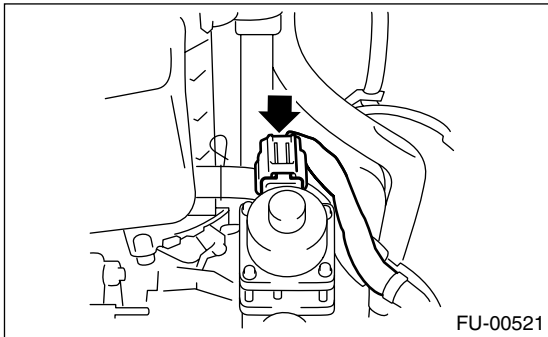
12.EGR Valve

A: REMOVAL

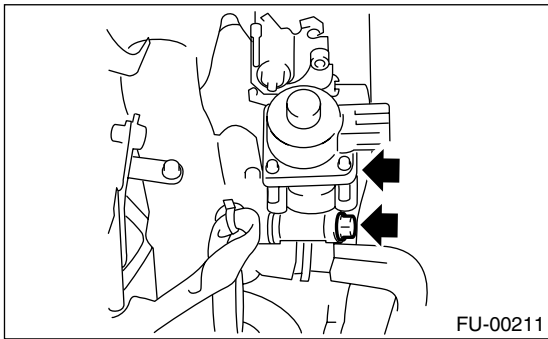
1) Disconnect the ground cable from battery.



2) Disconnect the connector from EGR valve.



3) Remove the EGR valve from intake manifold.

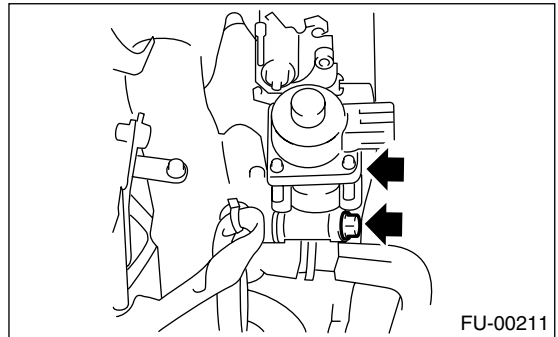


B: INSTALLATION

Install in the reverse order of removal.

Tightening torque:

19 N·m (1.9 kgf-m, 13.7 ft-lb)

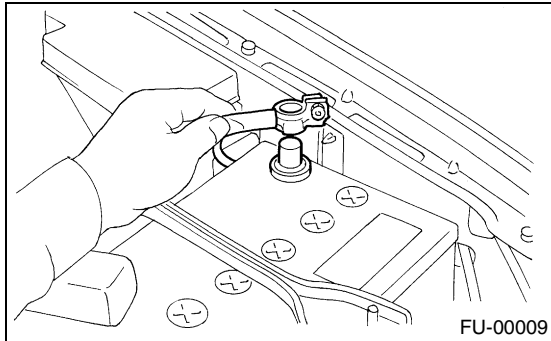


13. Fuel Injector

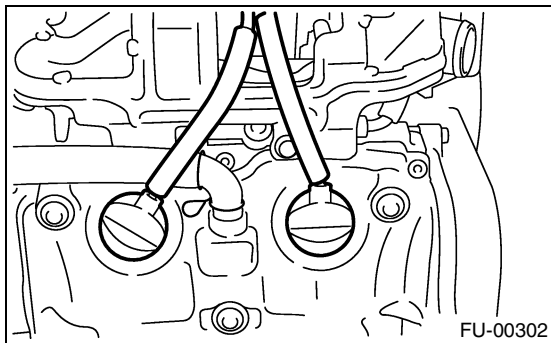
A: REMOVAL

1. RH SIDE

- 1) Release the fuel pressure. <Ref. to FU(SOHC)-49, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel flap lid, and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.

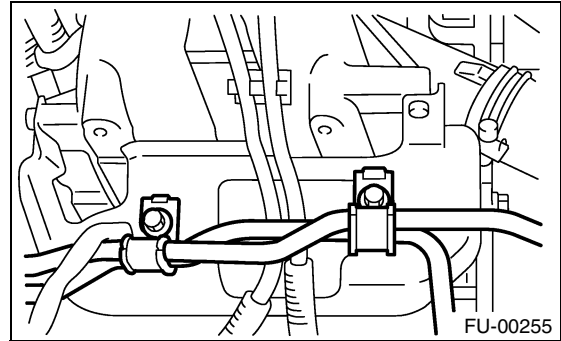


- 4) Remove the resonator chamber. <Ref. to IN(SOHC)-8, REMOVAL, Resonator Chamber.>
- 5) Remove the spark plug cords from the spark plugs (#1 and #3 cylinders).

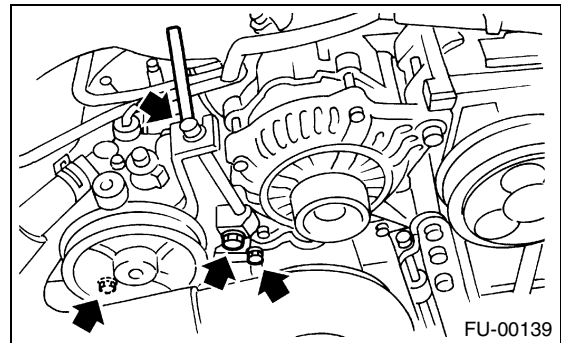


- 6) Remove the power steering pump and tank from the brackets.

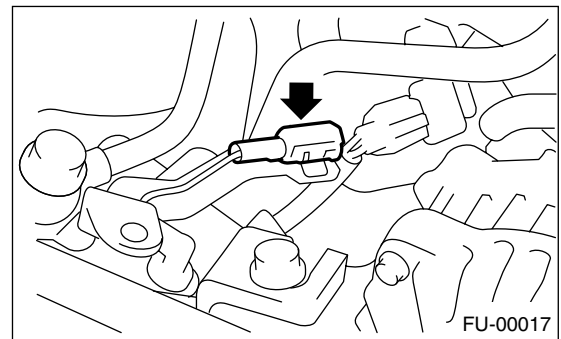
- (1) Remove the front side V-belt. <Ref. to ME(SOHC)-41, REMOVAL, V-belt.>
- (2) Remove the bolts which hold the power steering pipes onto the intake manifold protector.



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



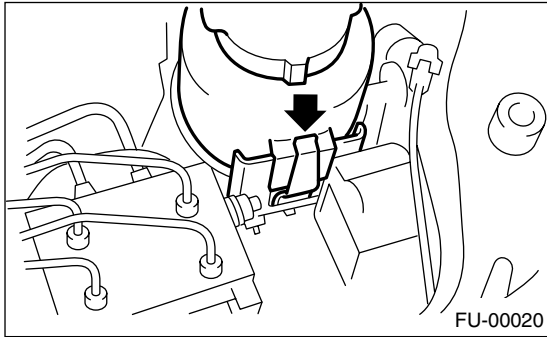
- (4) Disconnect the connector from the power steering pump switch.



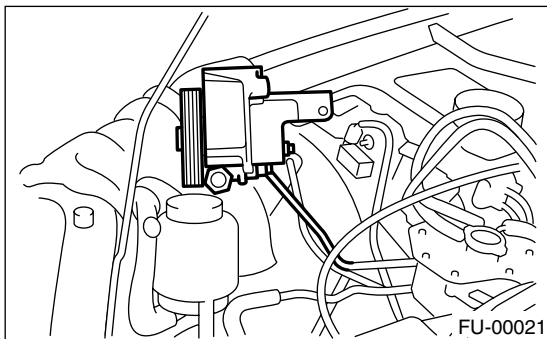
FUEL INJECTOR

FUEL INJECTION (FUEL SYSTEMS)

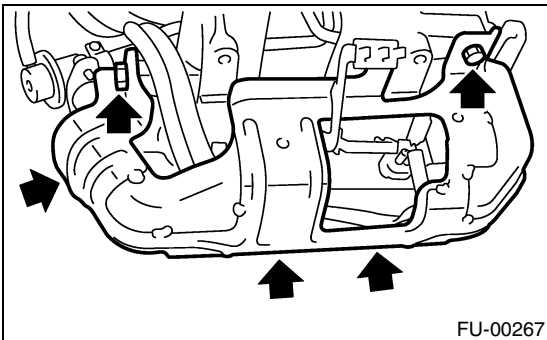
(5) Remove the power steering tank from the bracket by pulling it upwards.



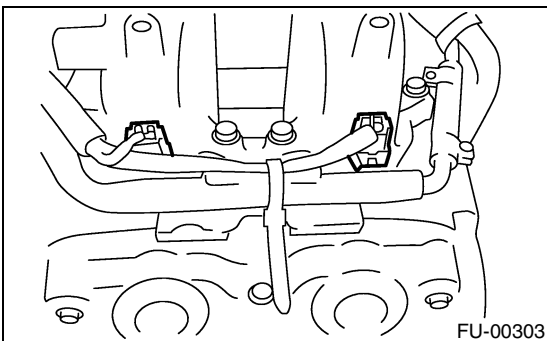
(6) Place the power steering pump and tank on the right side wheel apron.



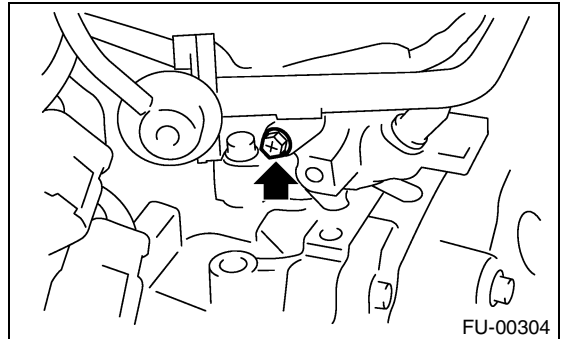
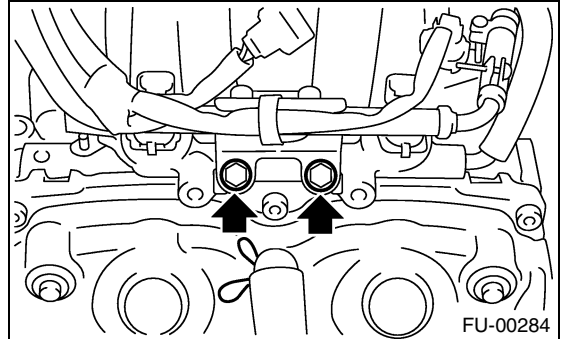
7) Remove the fuel pipe protector RH.



8) Disconnect the connector from fuel injector.

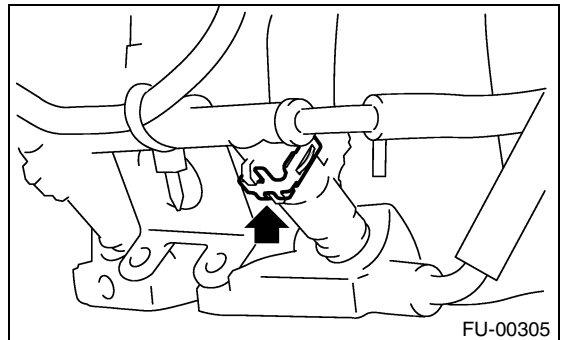


9) Remove the bolt which holds the injector pipe to the intake manifold.

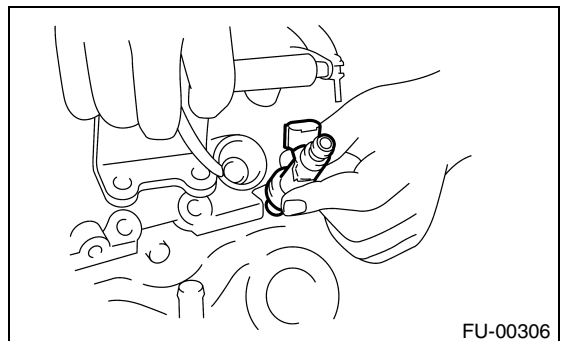


10) Remove the fuel injector from the intake manifold.

(1) Remove the fuel injector securing clip.



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

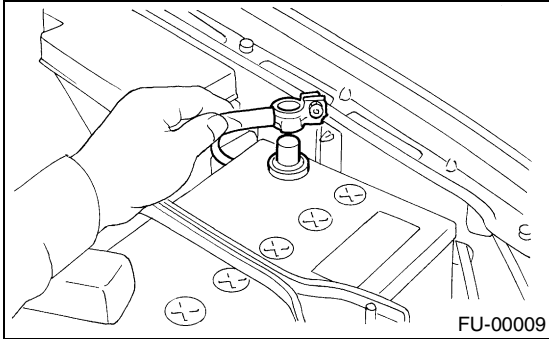


FUEL INJECTOR

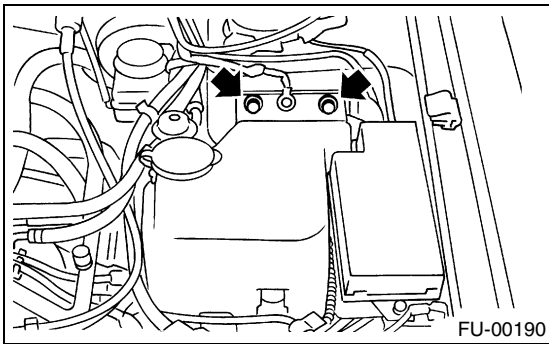
FUEL INJECTION (FUEL SYSTEMS)

2. LH SIDE

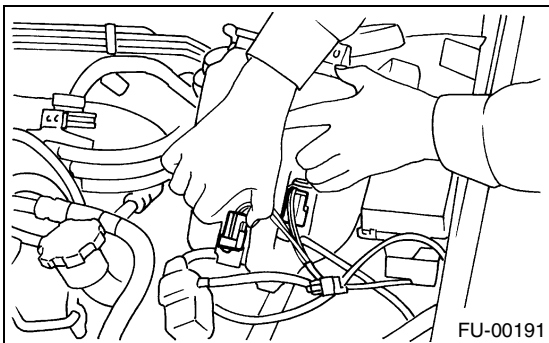
- 1) Release the fuel pressure. <Ref. to FU(SOHC)-49, RELEASING OF FUEL PRESSURE, OPERATION, Fuel.>
- 2) Open the fuel flap lid, and remove the fuel filler cap.
- 3) Disconnect the ground cable from battery.



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

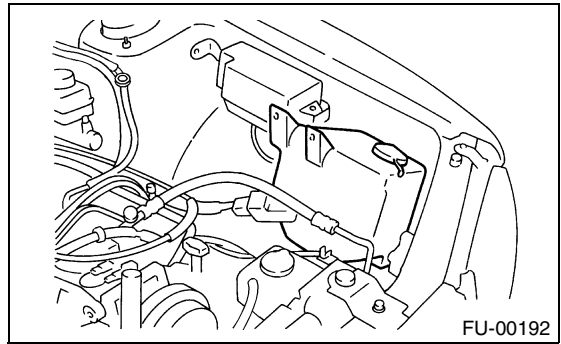


- 5) Disconnect the connector from the front window washer motor.
- 6) Disconnect the connector from the rear gate glass washer motor.

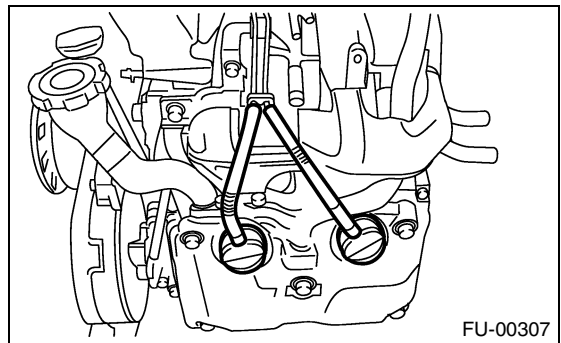


- 7) Disconnect the rear window glass washer hose from the washer motor, then plug the connection with a suitable cap.

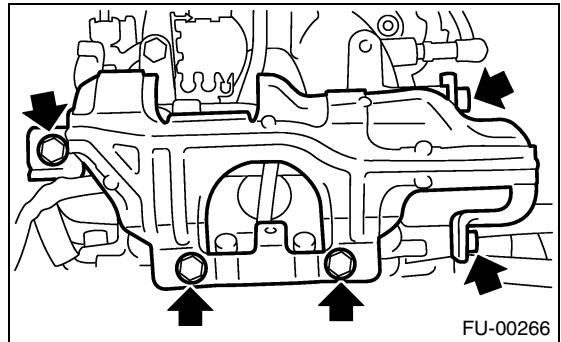
- 8) Move the washer tank, and secure it away from the working area.



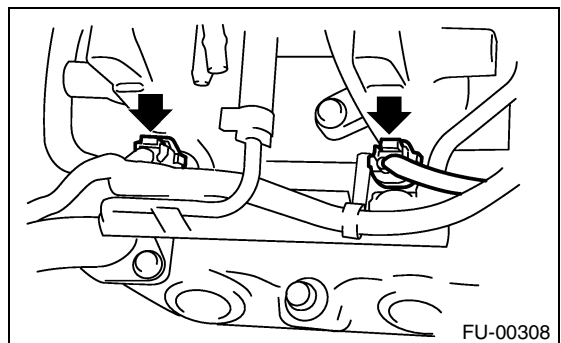
- 9) Remove the spark plug cords from the spark plugs (#2 and #4 cylinders).



- 10) Remove the fuel pipe protector LH.



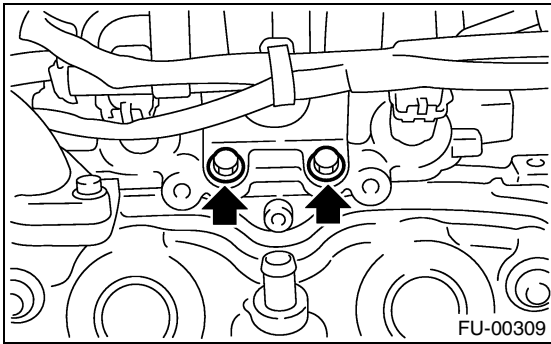
- 11) Disconnect the connector from the fuel injector.



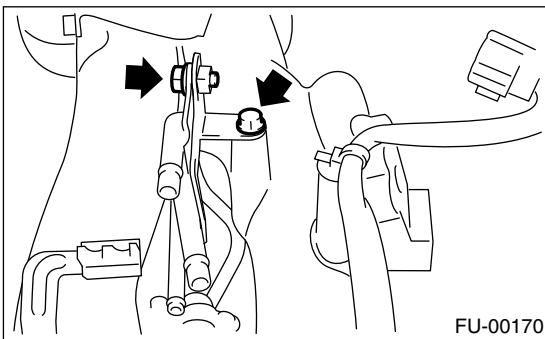
FUEL INJECTOR

FUEL INJECTION (FUEL SYSTEMS)

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

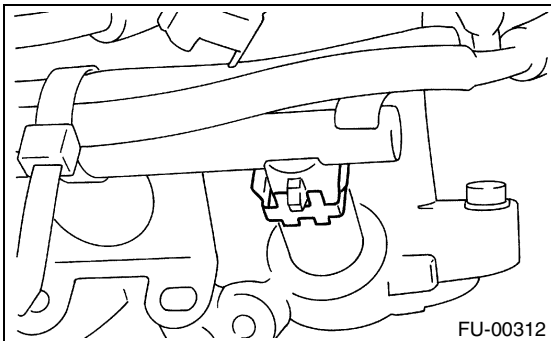


13) Remove the bolt which holds the fuel pipe on the left side intake manifold.

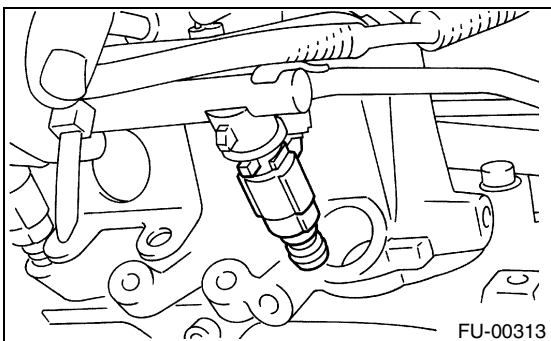


14) Remove the fuel injector from the intake manifold.

(1) Remove the fuel injector securing clip.



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



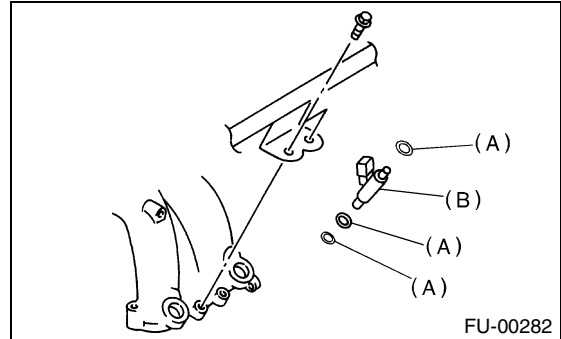
B: INSTALLATION

1. RH SIDE

Install in the reverse order of removal.

NOTE:

Replace O-rings with new ones.

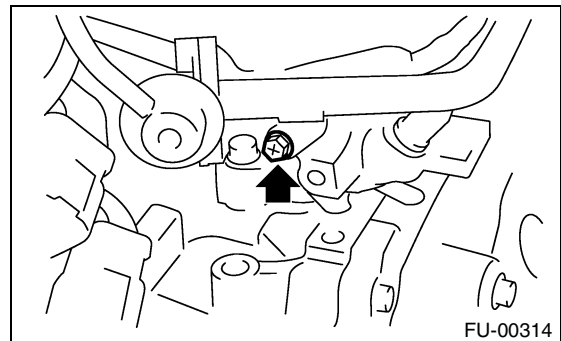


(A) O-ring

(B) Fuel injector

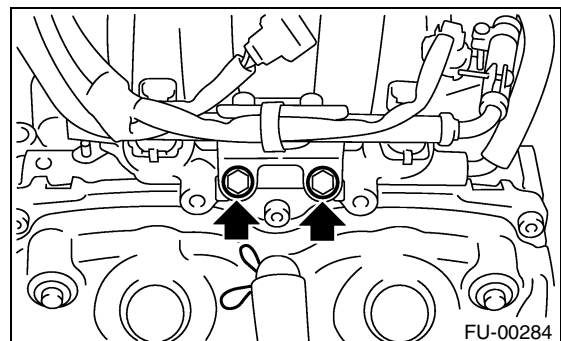
Tightening torque:

5.0 N-m (0.51 kgf-m, 3.7 ft-lb)



Tightening torque:

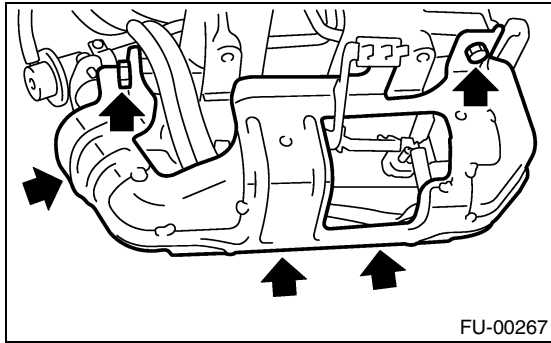
19 N-m (1.9 kgf-m, 13.7 ft-lb)



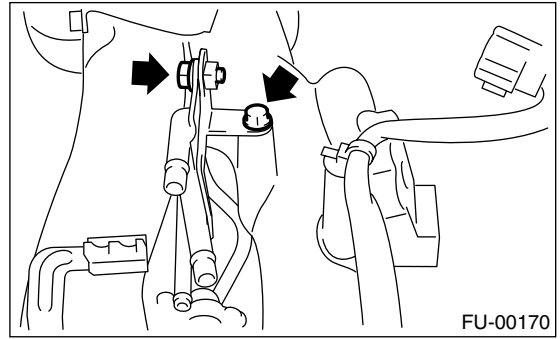
FUEL INJECTOR

FUEL INJECTION (FUEL SYSTEMS)

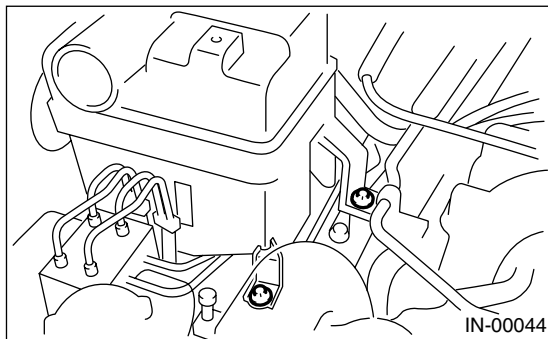
Tightening torque:
19 N·m (1.9 kgf-m, 13.7 ft-lb)



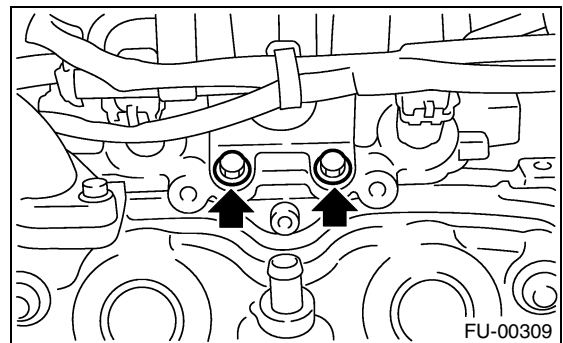
Tightening torque:
5.0 N·m (0.51 kgf-m, 3.7 ft-lb)



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



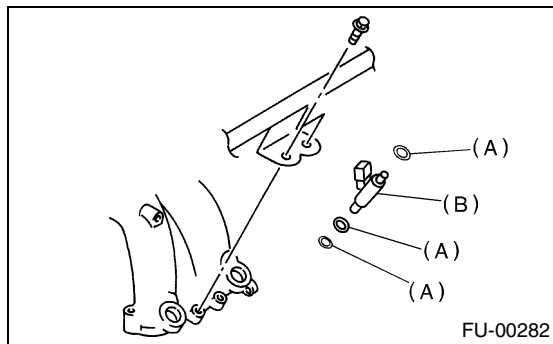
Tightening torque:
19 N·m (1.9 kgf-m, 13.7 ft-lb)



2. LH SIDE

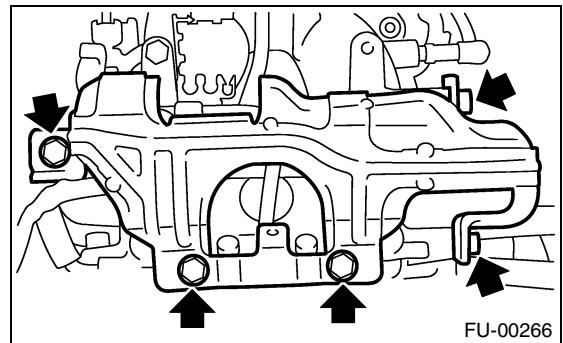
Install in the reverse order of removal.

CAUTION:
Replace O-rings with new ones.



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

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



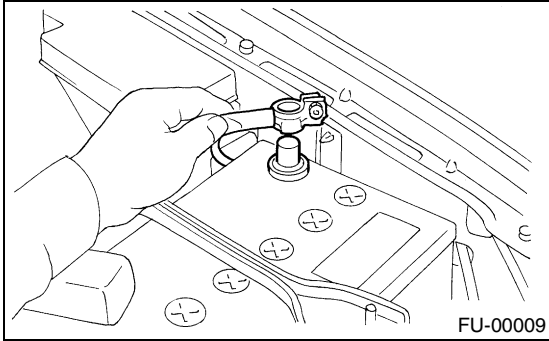
FRONT OXYGEN (A/F) SENSOR

FUEL INJECTION (FUEL SYSTEMS)

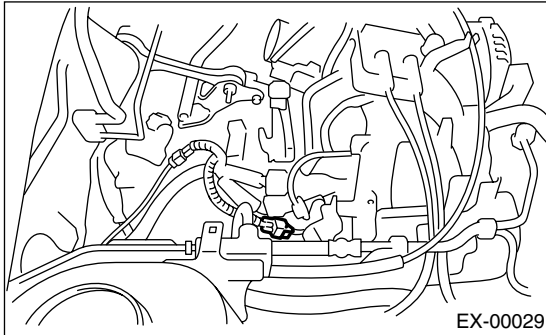
14. Front Oxygen (A/F) Sensor

A: REMOVAL

1) Disconnect the ground cable from battery.



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



3) Lift-up the vehicle.

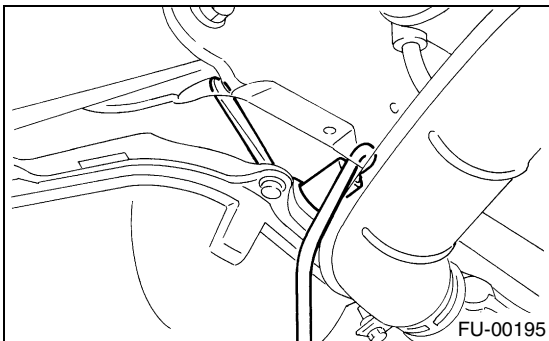
4) Apply SUBARU CRC or its equivalent to the threaded portion of front oxygen (A/F) sensor, and leave it for one minute or more.

SUBARU CRC (Part No. 004301003)

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

CAUTION:

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



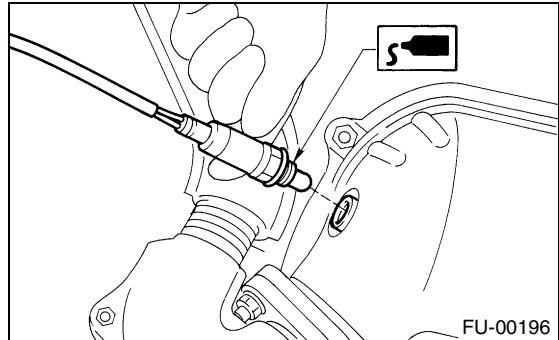
B: INSTALLATION

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

Anti-seize compound:
SS-30 by JET LUBE

CAUTION:

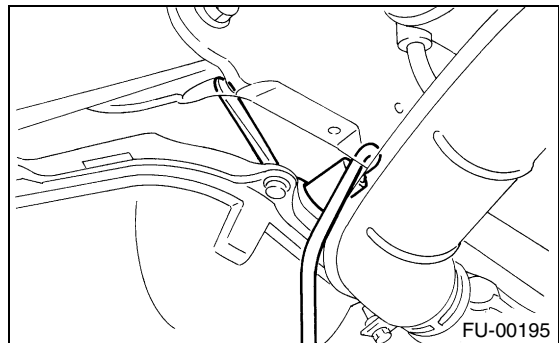
Never apply anti-seize compound to protector of front oxygen (A/F) sensor.



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

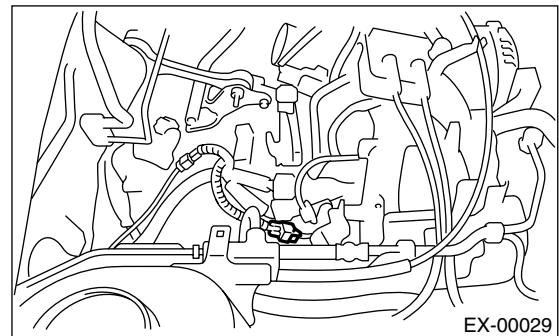
Tightening torque:

21 N·m (2.1 kgf·m, 15.2 ft·lb)



3) Lower the vehicle.

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



FRONT OXYGEN (A/F) SENSOR

FUEL INJECTION (FUEL SYSTEMS)

5) Connect the battery ground cable to battery.

