

## General Description

### FUEL INJECTION (FUEL SYSTEMS)

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## 1. General Description

### A: SPECIFICATION

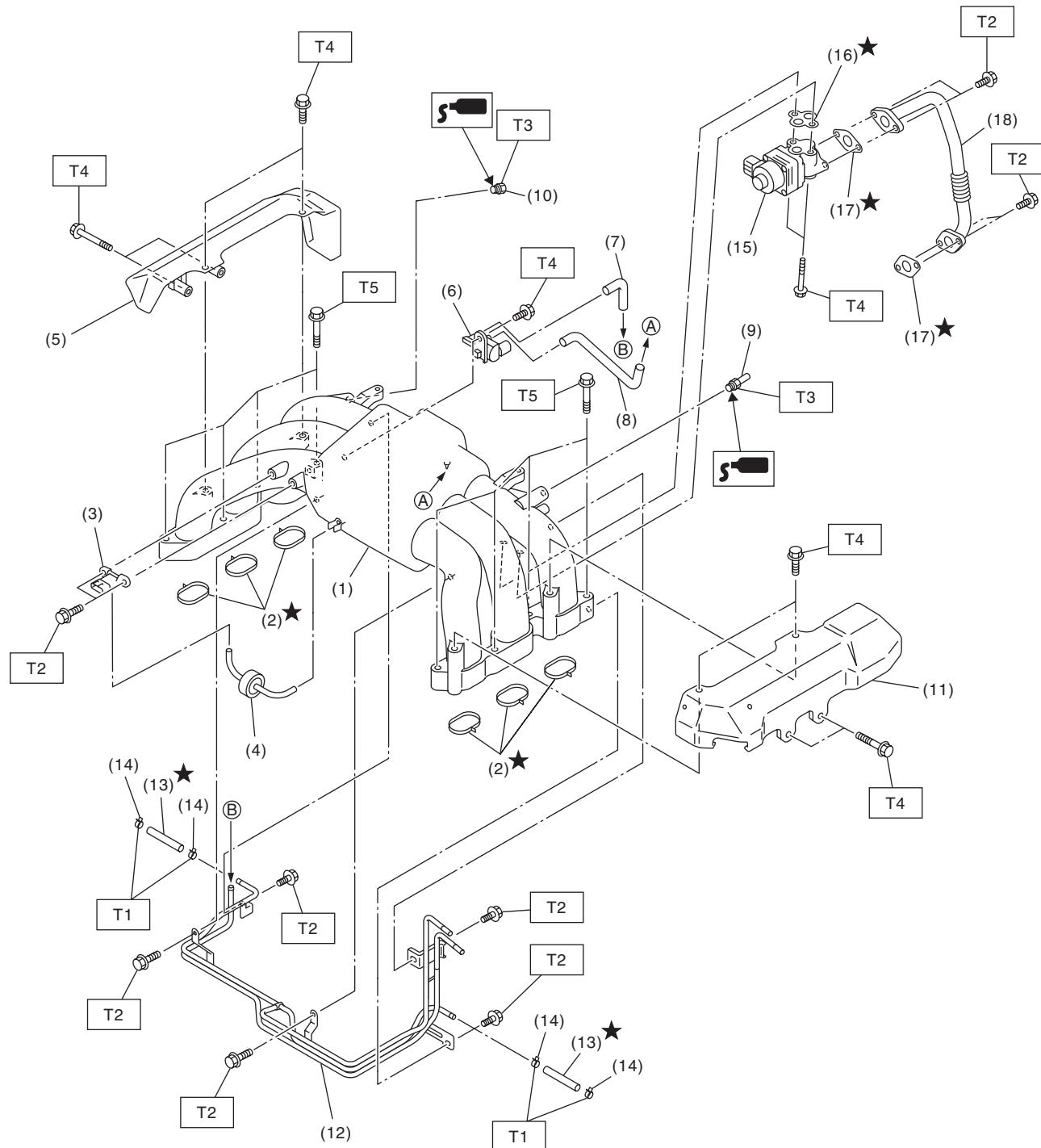
|             |                            |   |
|-------------|----------------------------|---|
| Fuel tank   | Capacity                   | 70 L (18.5 US gal, 15.4 Imp gal)  |
|             | Location                   | Rear floor under  |
| Fuel pump   | Type                       | Impeller  |
|             | Shutoff discharge pressure | 850 kPa (8.67 kg/cm <sup>2</sup> , 123.3 psi), or less  |
|             | Discharge rate             | 155 L (41 US gal, 34.1 Imp gal)/h or more<br>[12 V at 300 kPa (3.06 kg/cm <sup>2</sup> , 43.5 psi)] |
| Fuel filter |                            | In-tank type  |

# General Description

## FUEL INJECTION (FUEL SYSTEMS)

### B: COMPONENT

#### 1. INTAKE MANIFOLD



FU-06469

## General Description

### FUEL INJECTION (FUEL SYSTEMS)

|                                       |                             |
|---------------------------------------|-----------------------------|
| (1) Intake manifold                   | (10) Plug                   |
| (2) O-ring                            | (11) Fuel pipe protector LH |
| (3) Manifold absolute pressure sensor | (12) Fuel pipe ASSY         |
| (4) Filter                            | (13) Fuel hose              |
| (5) Fuel pipe protector RH            | (14) Clamp                  |
| (6) Purge control solenoid valve      | (15) EGR valve              |
| (7) Hose                              | (16) Gasket                 |
| (8) Hose                              | (17) Gasket                 |
| (9) Nipple                            | (18) EGR pipe               |

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

***T1: 1.25 (0.1, 0.9)***

***T2: 6.4 (0.7, 4.7)***

***T3: 17 (1.7, 12.5)***

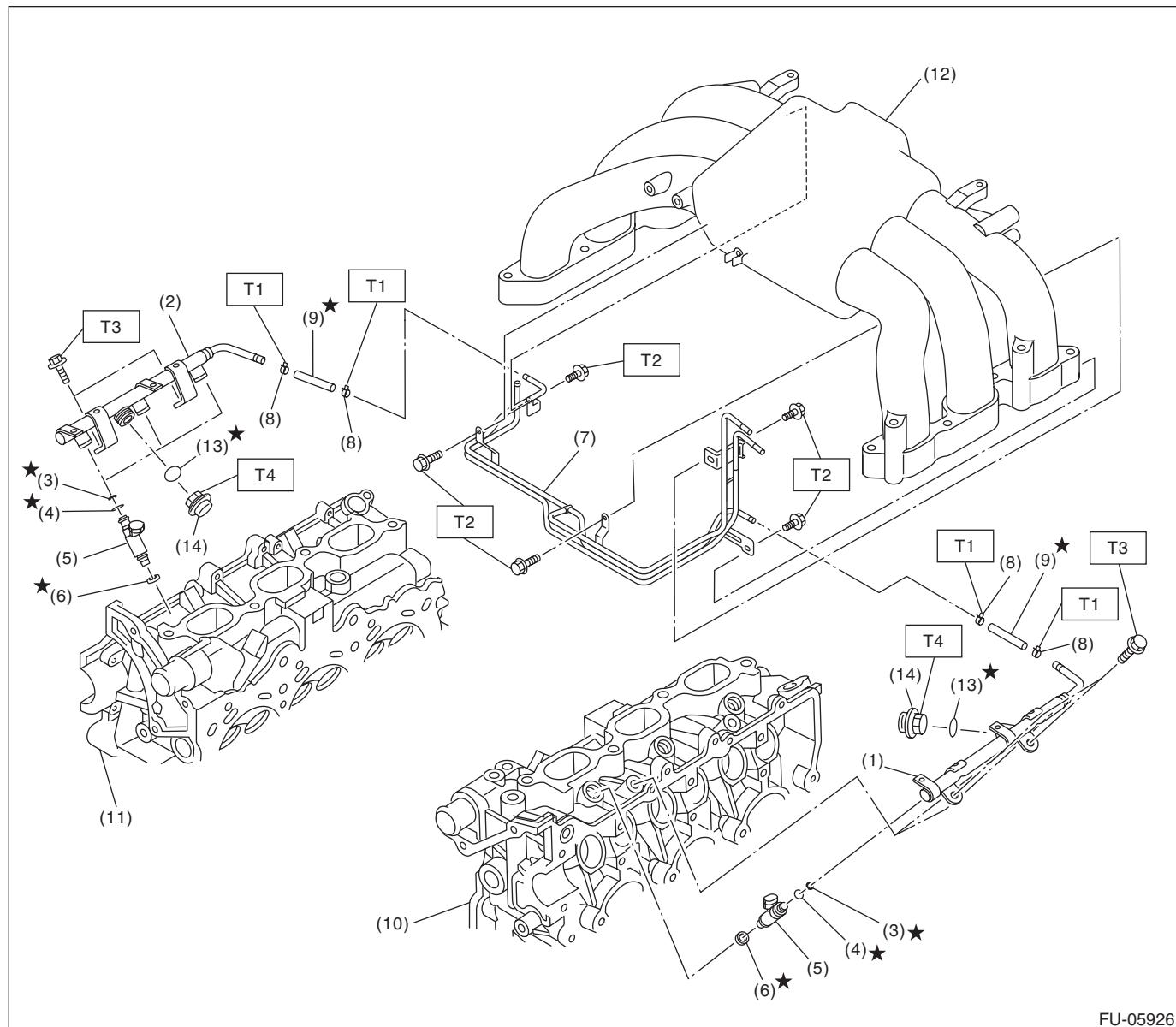
***T4: 19 (1.9, 14.0)***

***T5: 25 (2.5, 18.4)***

# General Description

## FUEL INJECTION (FUEL SYSTEMS)

### 2. FUEL INJECTOR



|                           |                       |
|---------------------------|-----------------------|
| (1) Fuel injector pipe LH | (8) Clamp             |
| (2) Fuel injector pipe RH | (9) Fuel hose         |
| (3) O-ring                | (10) Cylinder head LH |
| (4) Injection rubber      | (11) Cylinder head RH |
| (5) Fuel injector         | (12) Intake manifold  |
| (6) Seal ring             | (13) Gasket           |
| (7) Fuel pipe ASSY        | (14) Pulsation damper |

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

**T1: 1.25 (0.1, 0.9)**

**T2: 6.4 (0.7, 4.7)**

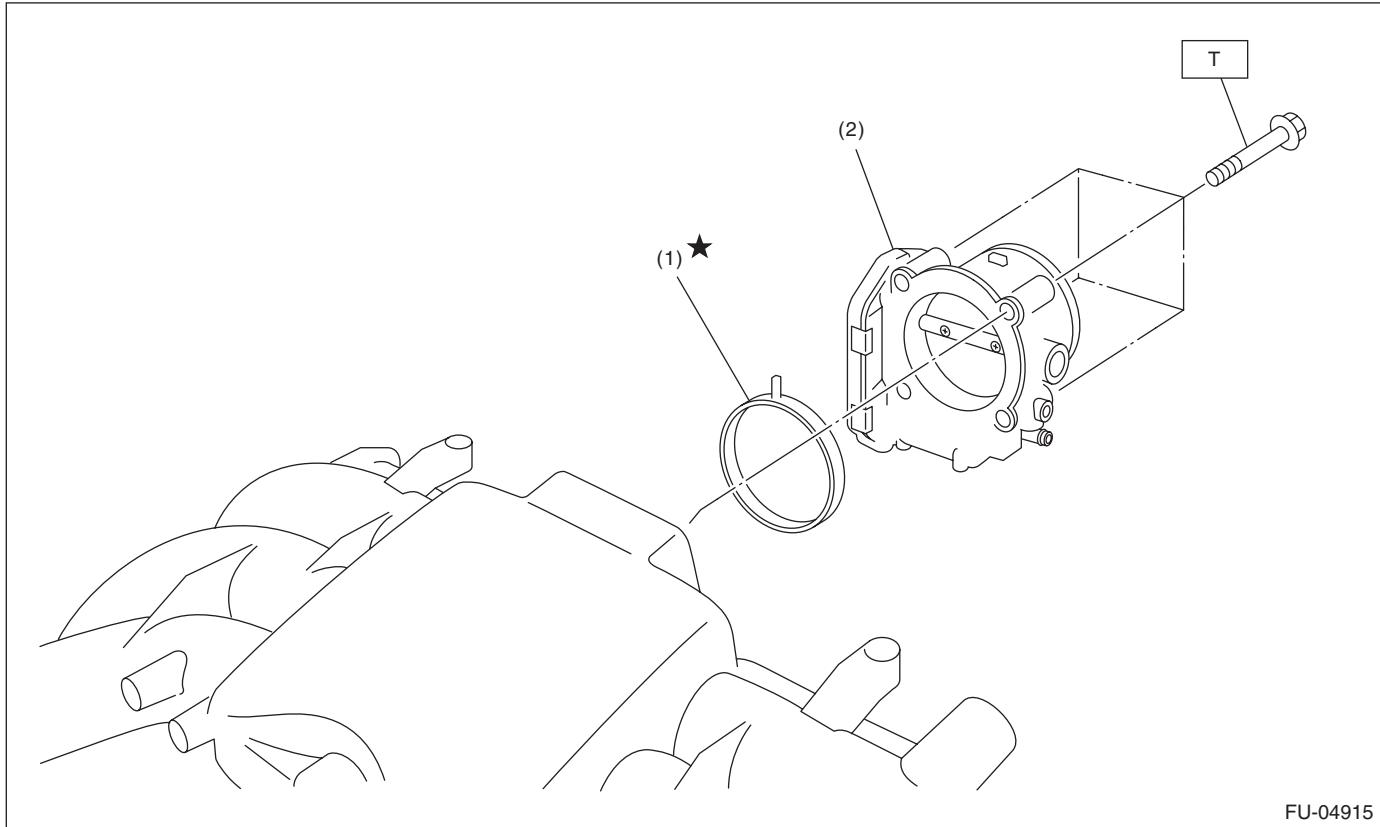
**T3: 19 (1.9, 14.0)**

**T4: 21.6 (2.2, 15.9)**

# General Description

## FUEL INJECTION (FUEL SYSTEMS)

### 3. AIR INTAKE SYSTEM



FU-04915

(1) O-ring

(2) Throttle body

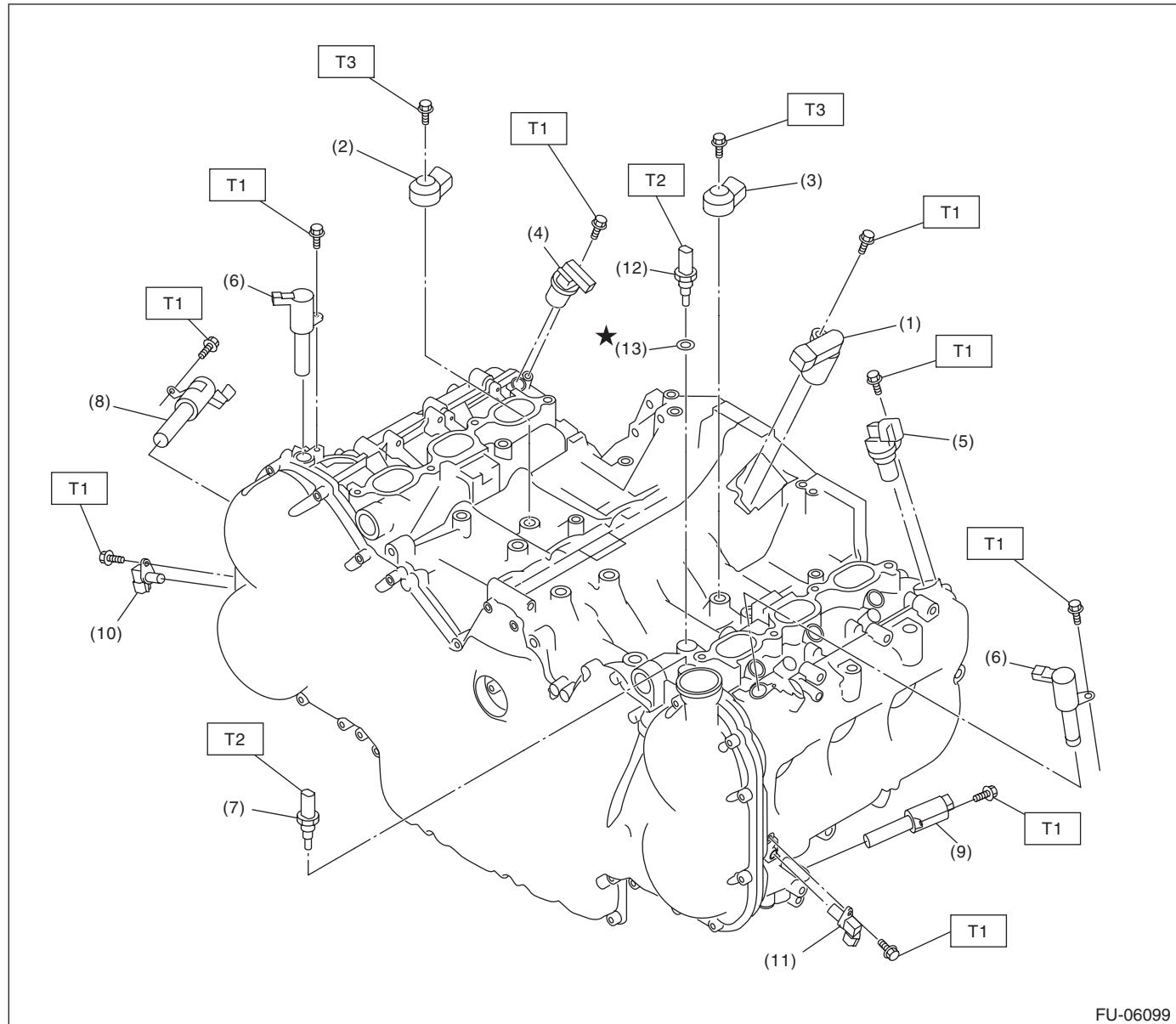
***Tightening torque: N·m (kgf·m, ft-lb)***

***T: 8 (0.8, 5.9)***

# General Description

## FUEL INJECTION (FUEL SYSTEMS)

### 4. SENSOR



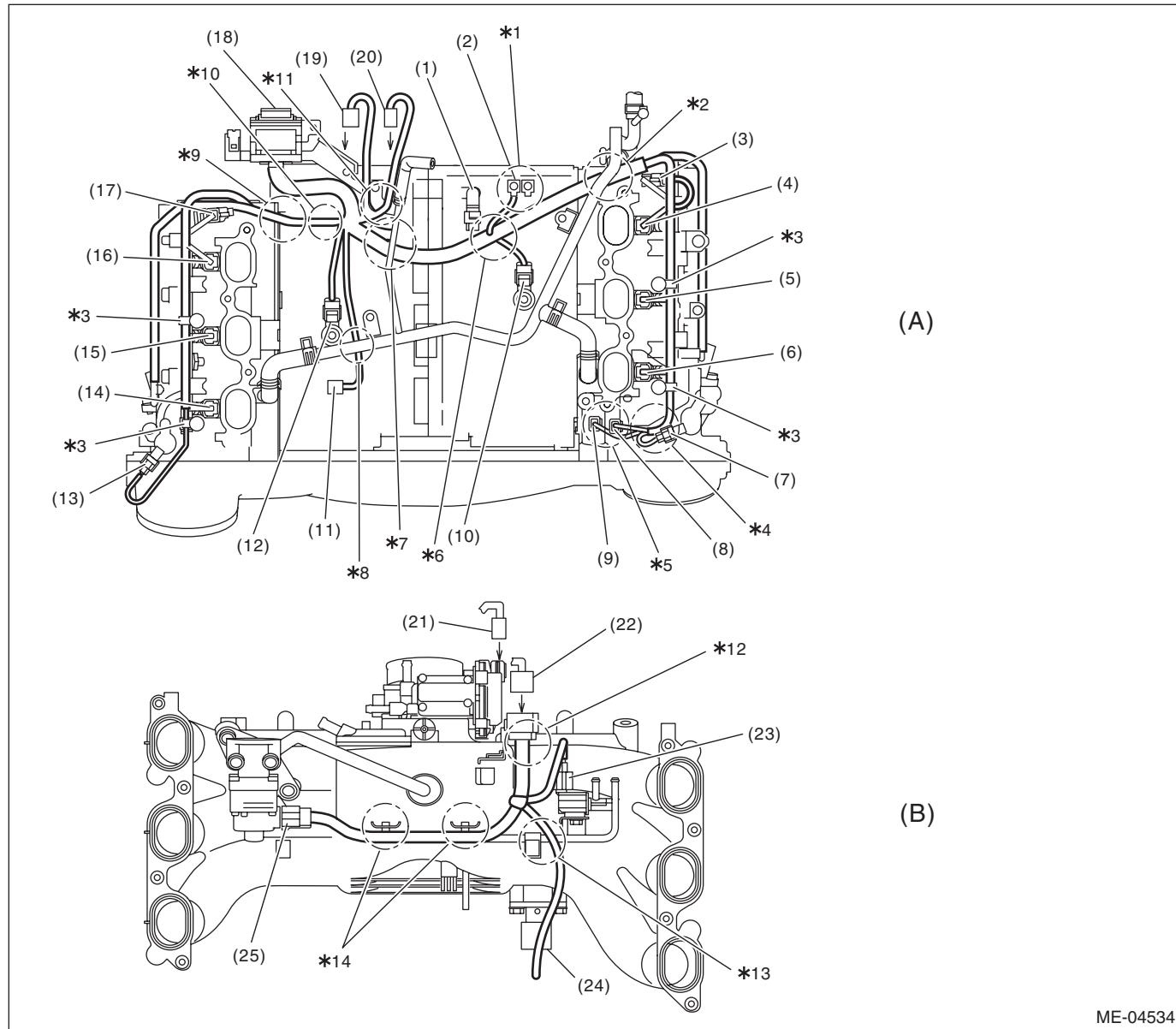
|  |  |  |
|--|--|--|
| (1) Crankshaft position sensor             | (7) Oil temperature sensor                     | (13) Gasket                                  |
| (2) Knock sensor RH                        | (8) Exhaust oil flow control solenoid valve RH |  |
| (3) Knock sensor LH                        | (9) Exhaust oil flow control solenoid valve LH | <b>Tightening torque: N·m (kgf·m, ft-lb)</b> |
| (4) Intake camshaft position sensor RH     | (10) Exhaust camshaft position sensor RH       | <b>T1: 6.4 (0.7, 4.7)</b>                    |
| (5) Intake camshaft position sensor LH     | (11) Exhaust camshaft position sensor LH       | <b>T2: 22 (2.2, 16.2)</b>                    |
| (6) Intake oil flow control solenoid valve | (12) Engine coolant temperature sensor         | <b>T3: 25 (2.5, 18.4)</b>                    |

# General Description

## FUEL INJECTION (FUEL SYSTEMS)

### 5. ENGINE HARNESS

#### Engine harness assembly diagram 1



ME-04534

# General Description

## FUEL INJECTION (FUEL SYSTEMS)

|   |  |  |
|---|--|--|
| (A) Cylinder block upper face                           | (B) Intake manifold back surface                         |  |
| (1) Crankshaft position sensor connector                | (10) Knock sensor LH connector                           | (19) Upper/lower connection connector (to intake manifold)                         |
| (2) Engine ground                                       | (11) Power steering switch connector                     | (20) Electronic throttle control connector (to intake manifold)                    |
| (3) Intake camshaft position sensor LH connector        | (12) Knock sensor RH connector                           | (21) Electronic throttle control connector (from upper part of the cylinder block) |
| (4) #6 injector connector                               | (13) Intake oil flow control solenoid valve RH connector | (22) Upper/lower connection connector (from upper part of the cylinder block)      |
| (5) #4 injector connector                               | (14) #1 injector connector                               | (23) Purge control solenoid valve connector  |
| (6) #2 injector connector                               | (15) #3 injector connector                               | (24) Manifold absolute pressure sensor connector                                   |
| (7) Intake oil flow control solenoid valve LH connector | (16) #5 injector connector                               | (25) EGR valve connector   |
| (8) Oil temperature sensor connector                    | (17) Intake camshaft position sensor RH connector        |  |
| (9) Engine coolant temperature sensor connector         | (18) Engine harness docking connector                    |  |

\*1: Install so that engine ground terminals face the rear side of vehicle.

\*2: Route under the heater pipe.

\*3: Attach the engine harness fixing clip to the fuel pipe stay.

\*4: Route from the cutout portion on the fuel pipe protector LH.

\*5: Be careful not to mix up the connectors of oil temperature sensor and engine coolant temperature sensor.

\*6: Route between crankshaft position sensor and knock sensor LH.

\*7: Route under the heater pipe.

\*8: Route under the heater pipe.

\*9: Route under the fuel pipe.

\*10: Attach the engine harness fixing clip to the fixing boss on the cylinder block.

\*11: Route over the heater pipe stay.

\*12: Securely install the engine harness fixing stay.

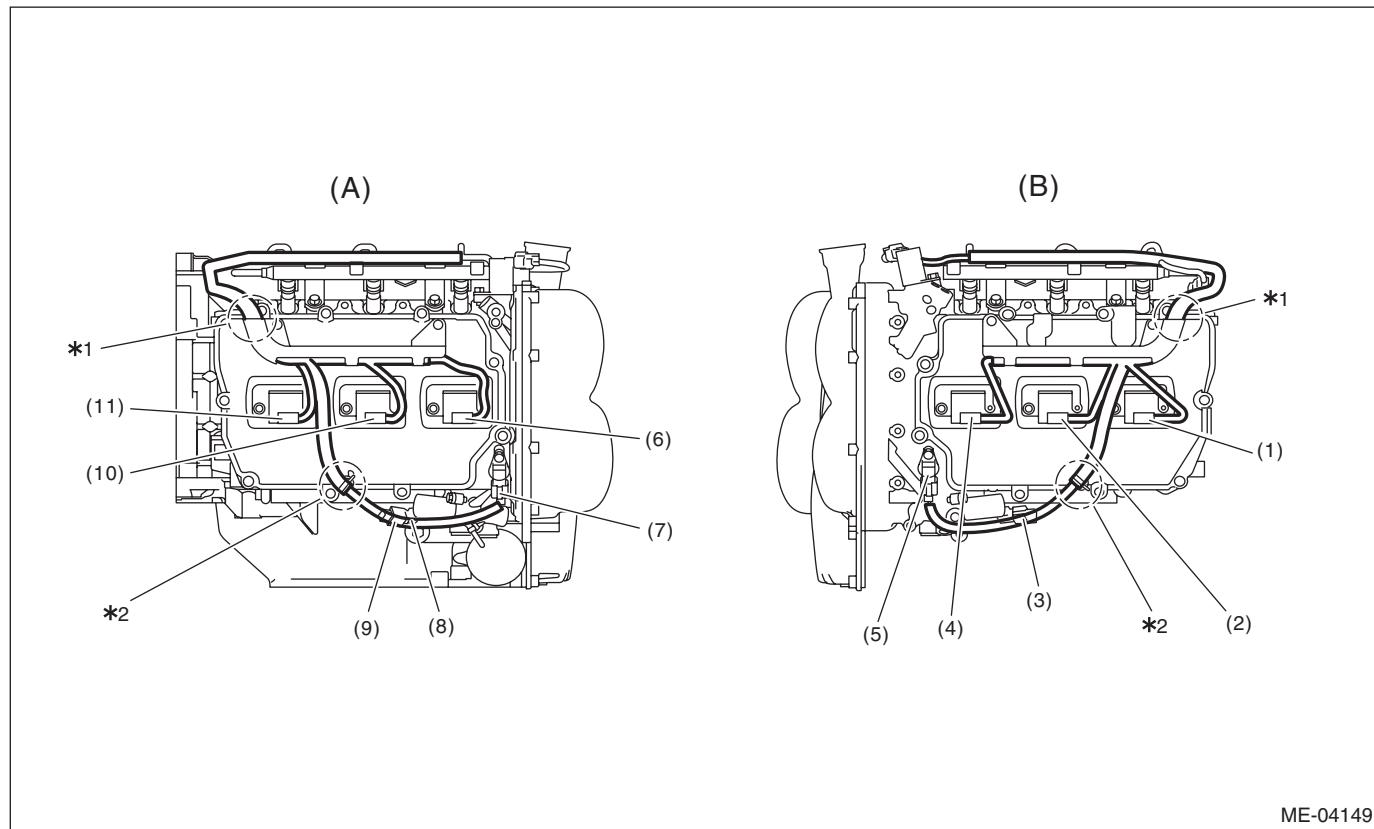
\*13: Route outside the fuel pipe.

\*14: Attach the engine harness fixing clip to the fixing stay on the intake manifold.

# General Description

## FUEL INJECTION (FUEL SYSTEMS)

### Engine harness assembly diagram 2



(A) Right side of the engine

(B) Left side of the engine

|  |   |  |
|--|---|--|
| (1) #6 ignition coil connector                           | (5) Exhaust camshaft position sensor LH connector | (9) Exhaust oil flow control valve solenoid RH connector |
| (2) #4 ignition coil connector                           | (6) #1 injector connector                         | (10) #3 ignition coil connector                          |
| (3) Exhaust oil flow control valve solenoid LH connector | (7) Exhaust camshaft position sensor RH connector | (11) #5 ignition coil connector                          |
| (4) #2 ignition coil connector                           | (8) Oil pressure switch connector                 |  |

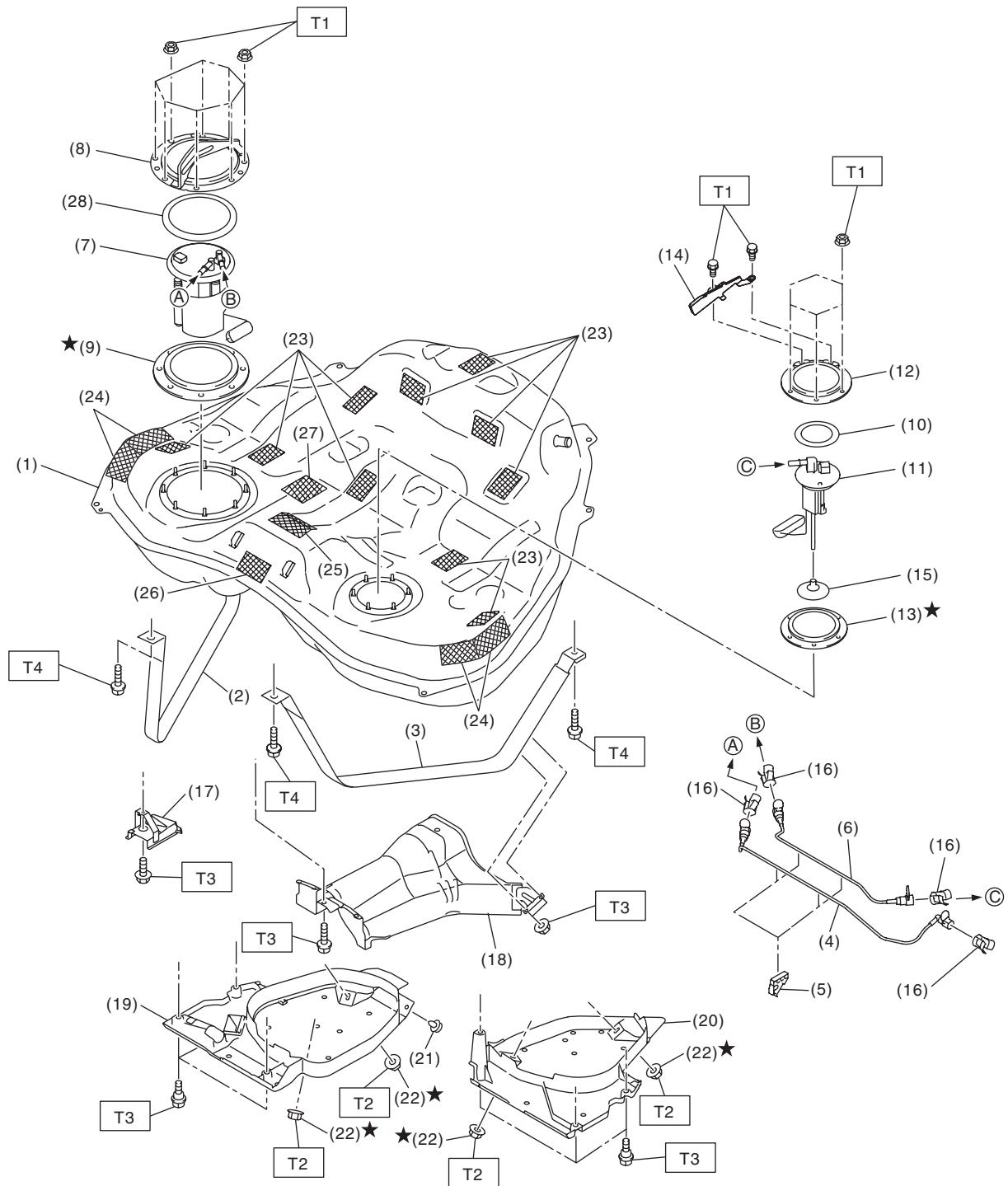
\*1: Align the engine harness stay end with the end of engine harness identification tape.

\*2: Attach the engine harness fixing clip to the fixing boss on the rocker cover.

## General Description

## FUEL INJECTION (FUEL SYSTEMS)

## 6. FUEL TANK



FU-07567

## General Description

### FUEL INJECTION (FUEL SYSTEMS)

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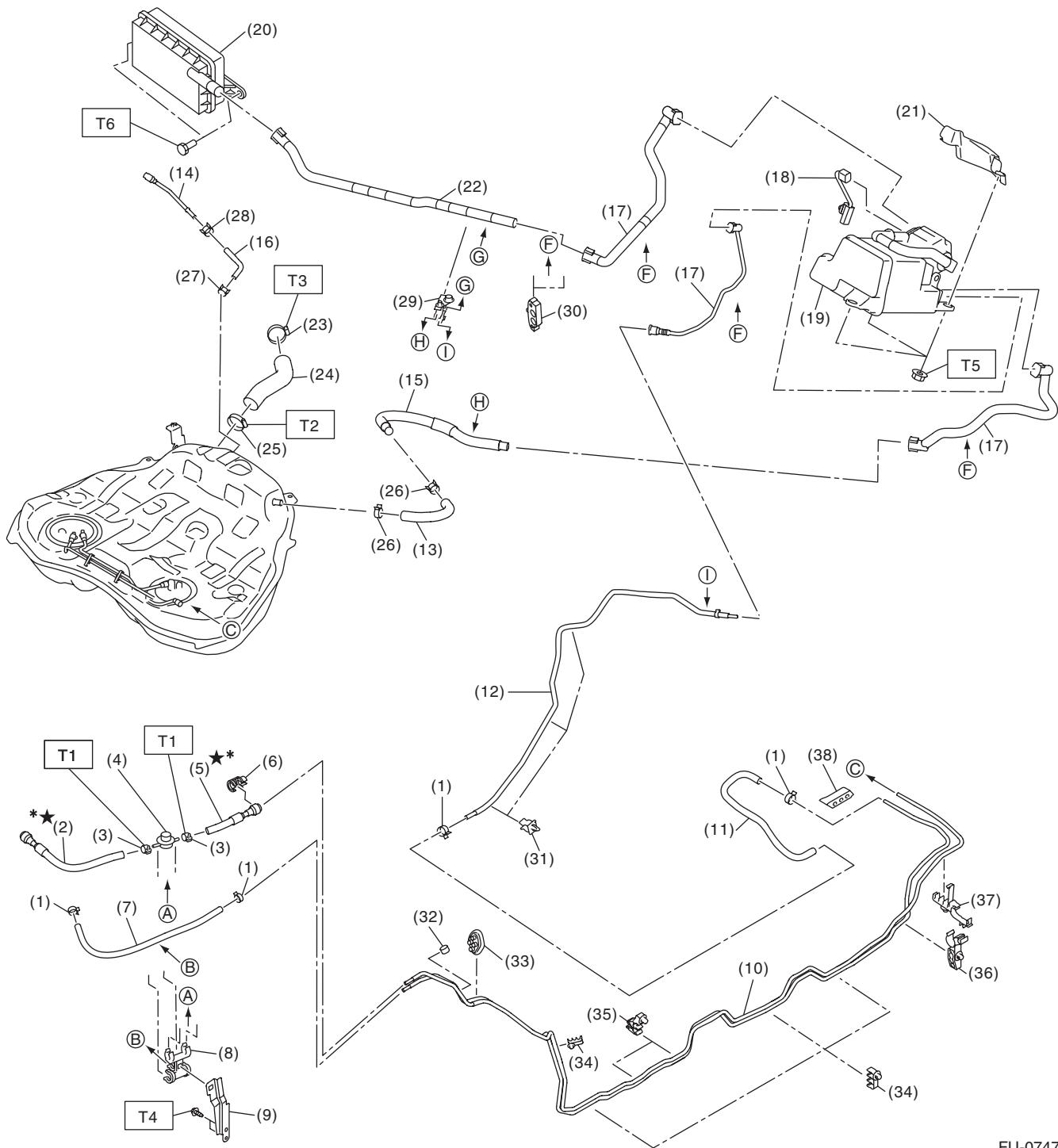
|  |  |  |
|--|--|--|
| (1) Fuel tank                                  | (12) Fuel sub level sensor upper plate | (23) Cushion                                 |
| (2) Fuel tank band RH                          | (13) Fuel sub level sensor gasket      | (24) Cushion                                 |
| (3) Fuel tank band LH                          | (14) Fuel sub level sensor protector   | (25) Cushion                                 |
| (4) Fuel delivery tube                         | (15) Fuel sub level sensor filter      | (26) Cushion                                 |
| (5) Tube clamp                                 | (16) Retainer                          | (27) Cushion                                 |
| (6) Fuel sub delivery tube                     | (17) Stopper                           | (28) Fuel upper plate cushion                |
| (7) Fuel pump ASSY                             | (18) Heat shield cover                 | <b>Tightening torque: N·m (kgf-m, ft-lb)</b> |
| (8) Fuel pump upper plate                      | (19) Fuel tank protector RH            | <b>T1: 4.4 (0.4, 3.2)</b>                    |
| (9) Fuel pump gasket                           | (20) Fuel tank protector LH            | <b>T2: 9 (0.9, 6.6)</b>                      |
| (10) Fuel sub level sensor upper plate cushion | (21) Clip                              | <b>T3: 18 (1.8, 13.3)</b>                    |
| (11) Fuel sub level sensor                     | (22) Self-locking nut                  | <b>T4: 33 (3.4, 24.3)</b>                    |

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## General Description

## FUEL INJECTION (FUEL SYSTEMS)

## 7. FUEL LINE



FU-07477

## General Description

### FUEL INJECTION (FUEL SYSTEMS)

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|                          |                         |                              |
|--------------------------|-------------------------|------------------------------|
| (1) Clip                 | (17) Canister tube ASSY | (32) Bushing                 |
| (2) Fuel delivery hose A | (18) Connector ASSY     | (33) Fuel pipe front grommet |
| (3) Clamp                | (19) Canister           | (34) Pipe clamp              |
| (4) Fuel damper          | (20) Drain filter       | (35) Pipe clamp              |
| (5) Fuel delivery hose B | (21) Canister protector | (36) Pipe clamp              |
| (6) Connect check cover  | (22) Drain tube ASSY    | (37) Pipe clamp              |
| (7) Evaporation hose     | (23) Clamp              | (38) Fuel pipe rear grommet  |
| (8) Fuel damper holder   | (24) Fuel filler hose   |                              |
| (9) Damper bracket       | (25) Clamp              |                              |
| (10) Fuel pipe ASSY      | (26) Clip               |                              |
| (11) Purge hose          | (27) Clip               |                              |
| (12) Purge pipe          | (28) Clip               |                              |
| (13) Air vent hose A     | (29) Tube clamp         |                              |
| (14) Circulate tube      | (30) Tube clamp         |                              |
| (15) Air vent tube       | (31) Pipe clamp         |                              |
| (16) Circulate hose      |                         |                              |

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

***T1: 1.25 (0.1, 2.9)***

***T2: 2 (0.2, 1.5)***

***T3: 2.5 (0.3, 1.8)***

***T4: 7.5 (0.8, 5.5)***

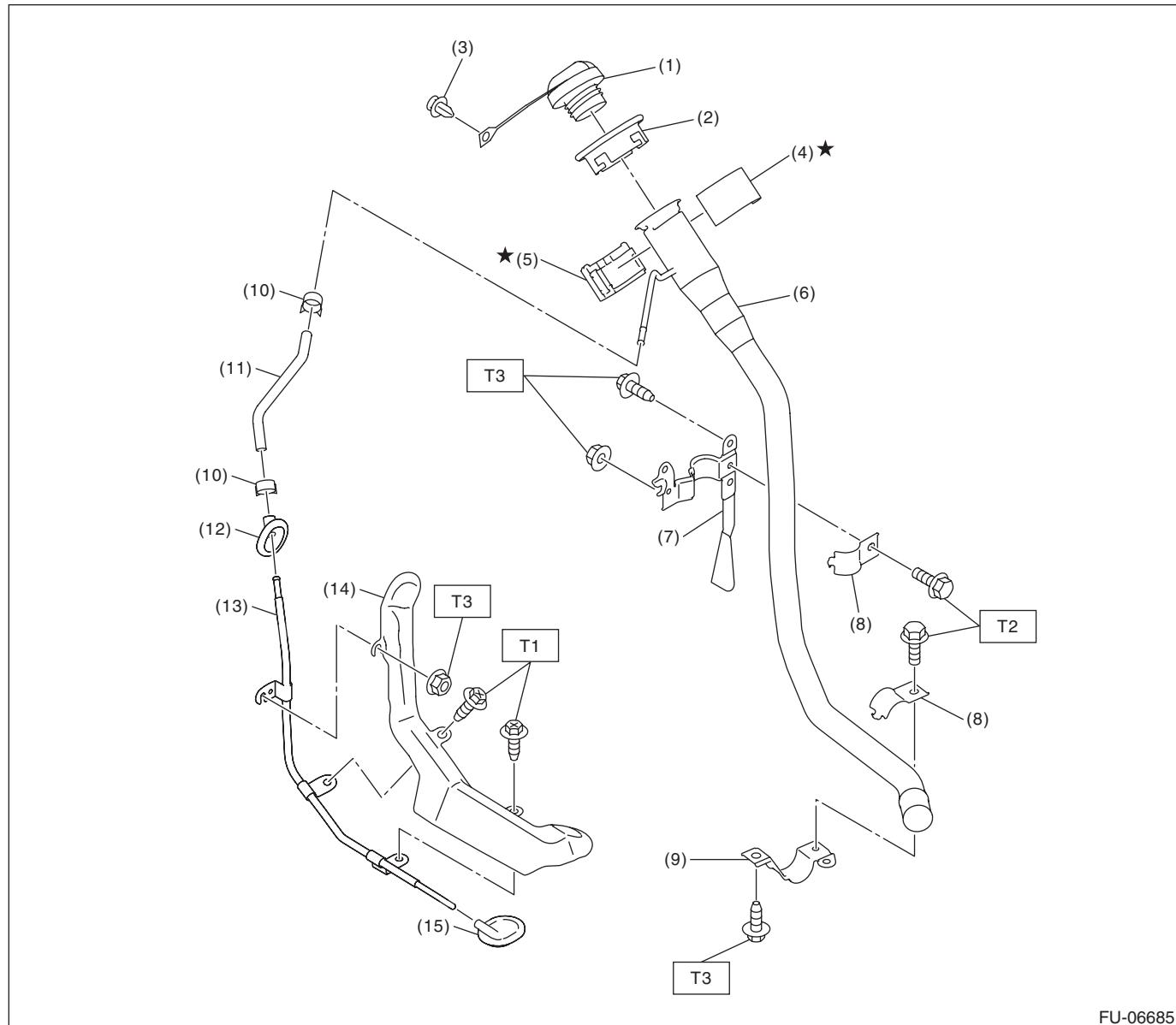
***T5: 8 (0.8, 5.9)***

***T6: 7.5 (0.8, 5.5)***

# General Description

## FUEL INJECTION (FUEL SYSTEMS)

### 8. FUEL FILLER PIPE



FU-06685

- (1) Fuel filler cap
- (2) Fuel filler pipe protector
- (3) Clip
- (4) Neck holder A
- (5) Neck holder B
- (6) Fuel filler pipe
- (7) Fuel filler pipe bracket A

- (8) Fuel filler pipe bracket B
- (9) Fuel filler pipe bracket C
- (10) Clip
- (11) Evaporation hose
- (12) Grommet
- (13) Evaporation pipe

- (14) Evaporation pipe protector
- (15) Grommet

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

**T1: 1 (0.1, 0.7)**

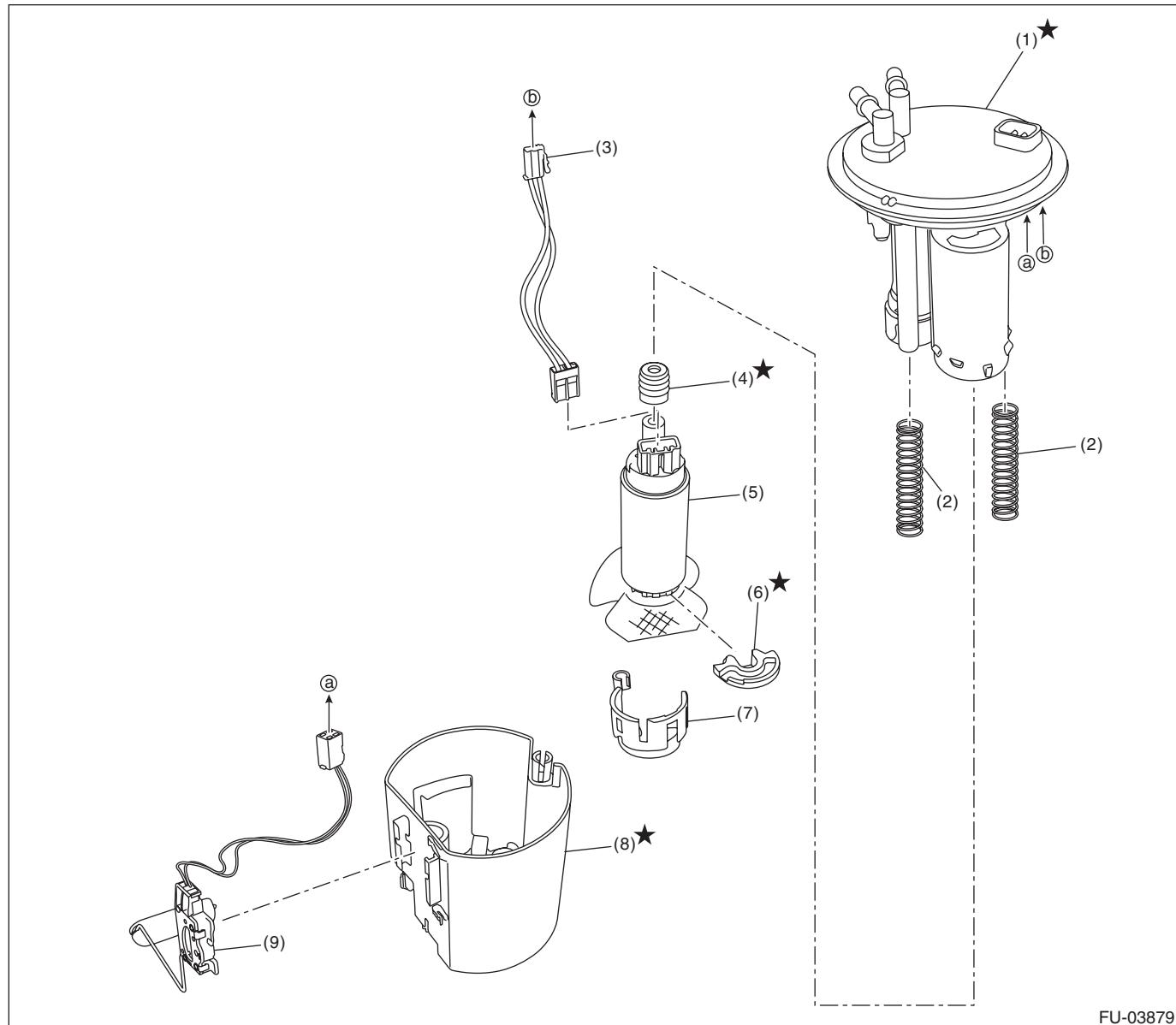
**T2: 7.35 (0.7, 5.4)**

**T3: 7.5 (0.8, 5.5)**

# General Description

## FUEL INJECTION (FUEL SYSTEMS)

### 9. FUEL PUMP



FU-03879

|                        |                            |                       |
|------------------------|----------------------------|-----------------------|
| (1) Fuel filter ASSY   | (4) Packing spacer         | (7) Fuel pump holder  |
| (2) Pump module spring | (5) Fuel pump              | (8) Fuel chamber ASSY |
| (3) Fuel pump harness  | (6) Support rubber cushion | (9) Fuel level sensor |

### C: CAUTION

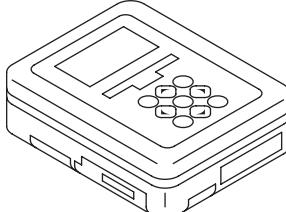
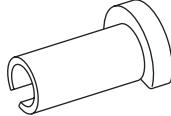
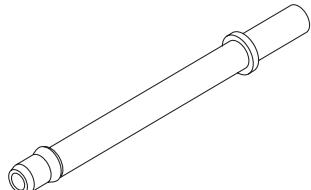
- Prior to starting work, pay special attention to the following:
  1. Always wear work clothes, a safety cap, protective shoes. Additionally, wear a helmet, protective goggles, etc. if necessary.
  2. Protect the vehicle using a seat cover, fender cover, etc.
  3. Prepare the service tools, clean cloth, containers to catch grease and oil, etc.
- 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 oil spills, wipe it off immediately to prevent from penetrating into floor or flowing out for environmental protection.
- Vehicle components are extremely hot immediately after driving. Be wary of receiving burns from heated parts.
- When performing a repair, identify the cause of trouble and avoid unnecessary removal, disassembly and replacement.
- Before disconnecting connectors of sensors or units, be sure to disconnect the ground cable from battery.
- Always use the jack-up point when the shop jacks or rigid racks are used to support the vehicle.
- Remove contamination including dirt and corrosion before removal, installation, disassembly or assembly.
- Keep the removed parts in order and protect them from dust and dirt.
- All removed parts, if to be reused, should be reinstalled in the original positions with attention to the correct directions, etc.
- Bolts, nuts and washers should be replaced with new parts as required.
- Follow all government and local regulations concerning disposal of refuse when disposing fuel.

## General Description

FUEL INJECTION (FUEL SYSTEMS)

### D: PREPARATION TOOL

#### 1. SPECIAL TOOL

| ILLUSTRATION  | TOOL NUMBER | DESCRIPTION                   | REMARKS                                     |
|---|-------------|-------------------------------|---|
| <br>ST1B022XU0     | 1B022XU0    | SUBARU SELECT MONITOR III KIT | Used for draining fuel and each inspection. |
| <br>ST42099AE000   | 42099AE000  | QUICK CONNECTOR RELEASE       | Used for removing the quick connector.      |
| <br>ST18471AA000 | 18471AA000  | FUEL PIPE ADAPTER             | Used for draining fuel.                     |

#### 2. GENERAL TOOL

| TOOL NAME      | REMARKS  |
|----------------|--|
| Circuit tester | Used for measuring resistance and voltage.       |
| Oscilloscope   | Used for inspecting the waveform of each sensor. |