

# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

## 1. General Description

### A: SPECIFICATION

#### 1. HEATER SYSTEM

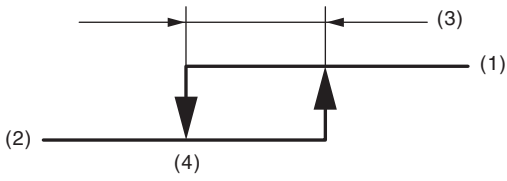
Item		Specifications	Condition
Heating capacity		5.0 kW (4,299 kcal/h, 17,059 BTU/h) or more	<ul style="list-style-type: none"> <li>Air flow control dial: FOOT</li> <li>Temperature adjustment dial: FULL HOT</li> <li>Temperature difference between hot water and inlet air: 65°C (149°F)</li> <li>Hot water flow rate: 360 ℓ (95.1 US gal, 79.2 Imp gal)/h</li> </ul>
Air flow rate		290 m <sup>3</sup> (10,243 cu ft)/h	FOOT mode (FRESH), FULL HOT at 12.5 V
Max air flow rate		480 m <sup>3</sup> (16,954 cu ft)/h	<ul style="list-style-type: none"> <li>Temperature adjustment dial: FULL COLD</li> <li>Fan speed control dial: Auto A/C: 7th position Manual A/C: 4th position</li> <li>FRESH/RECIRC switch: RECIRC</li> </ul>
Heater core size (height × length × width)		257.5 × 118.5 × 27 mm (10.1 × 4.67 × 1.06 in)	—
Blower motor	Type	Magnet motor 250 W or less	12 V
	Fan type and size (diameter × width)	Sirocco fan type 150 × 75 mm (5.91 × 2.95 in)	—

#### 2. A/C SYSTEM

Item		Specifications
Type of air conditioner		Reheat air-mix type
Cooling capacity		5.0 kW (4,299 kcal/h, 17,059 BTU/h)
Refrigerant		HFC-134a (CH <sub>2</sub> FCF <sub>3</sub> ) [0.5±0.03 kg (1.1±0.07 lb)]
Compressor	Type	Rotary, constant volume (DVK-10R)
	Discharge	105 cc (6.41 cu in)/rev
	Max. permissible speed	7,700 rpm
Magnet clutch	Type	Dry, single-disc type
	Power consumption	38.8 W
	Type of belt	V-belt 4 PK
	Pulley dia. (effective dia.)	100 mm (3.9 in)
	Pulley ratio	1.32
Condenser	Type	Sub cool type
	Core face area	0.188 m <sup>2</sup> (2.002 sq ft)
	Core thickness	16 mm (0.63 in)
	Radiation area	4.5 m <sup>2</sup> (48.44 sq ft)
Receiver drier	Effective inner capacity	177 cm <sup>3</sup> (10.8 cu in)
Expansion valve	Type	Block
Evaporator	Type	Dual-tank
	Dimensions (W × H × T)	290.1 × 172 × 39 mm (11.42 × 6.77 × 1.54 in)
Blower fan	Fan type	Sirocco fan
	Outer diameter × width	150 × 75 mm (5.91 × 2.95 in)
	Power consumption	250 W
Condenser fan (Sub fan)	Motor type	Magnet
	Power consumption	90 W
	Fan outer diameter	300 mm (11.8 in)

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Item		Specifications	
Radiator fan (Main fan)		Motor type	Magnet
		Power consumption	90 W
		Fan outer diameter	300 mm (11.8 in)
Idle speed		No load	AT model: 700±100 rpm MT model: 650±100 rpm
		A/C ON	850±100 rpm
Triple switch (Pressure switch)	Low-pressure switch operating pressure	ON → OFF	177±25 kPa (1.80±0.25 kgf/cm <sup>2</sup> , 25.7±3.6 psi)
		OFF → ON	206±30 kPa (2.10±0.31 kgf/cm <sup>2</sup> , 29.9±4.3 psi)
	High-pressure switch operating pressure	ON → OFF	2,940±200 kPa (29.98±2.04 kgf/cm <sup>2</sup> , 426.3±29 psi)
		OFF → ON	2,350±200 kPa (24.00±2.04 kgf/cm <sup>2</sup> , 340.7±29.0 psi)
	Middle-pressure switch operating pressure	ON → OFF	1,470±120 kPa (14.99±1.22 kgf/cm <sup>2</sup> , 213.15±17.4 psi)
		OFF → ON	1,770±100 kPa (18.05±1.02 kgf/cm <sup>2</sup> , 256.65±14.5 psi)
Thermo-control amplifier working temperature		<div></div> <div>AC-00601</div> <div>(1) ON (2) OFF (3) 1.5±0.3°C (34.7±0.5°F) (4) 1.0±0.5°C (33.8±0.9°F)</div>	

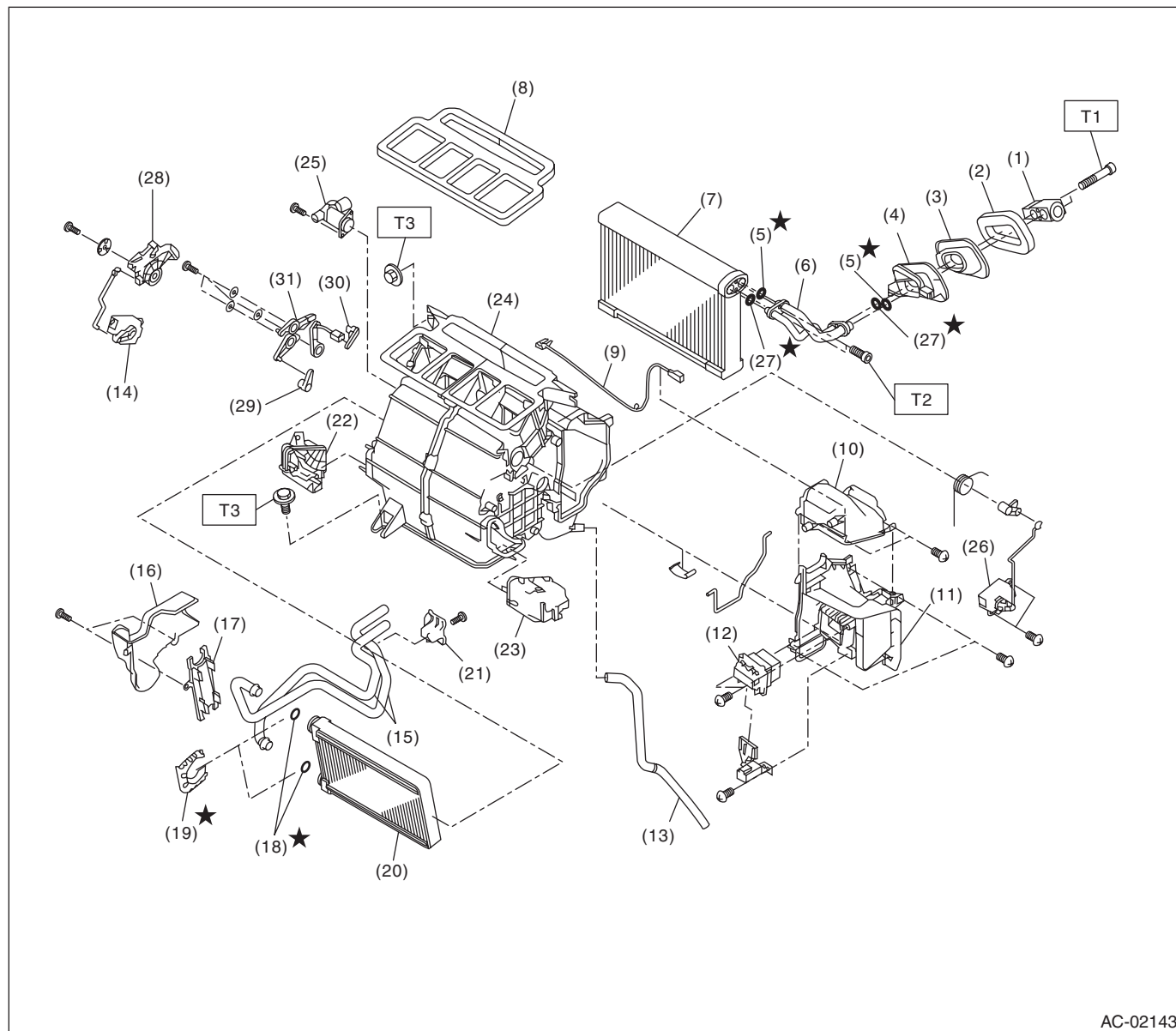
# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

## B: COMPONENT

### 1. HEATER COOLING UNIT

- Auto A/C model



AC-02143

(1) Expansion valve	(13) Drain hose	(25) Aspirator
(2) Gasket	(14) Mode actuator	(26) Air mix actuator
(3) Grommet	(15) Heater core pipe	(27) O-ring
(4) Case	(16) Heater pipe cover	(28) Mode main lever
(5) O-ring	(17) Heater core cover	(29) Vent door link
(6) Evaporator pipe	(18) O-ring	(30) Defroster door link
(7) Evaporator	(19) Clamp	(31) Mode link
(8) Lining	(20) Heater core	
(9) Evaporator sensor	(21) Pipe clamp	
(10) Evaporator pipe cover	(22) Foot duct (LH)	
(11) Evaporator cover	(23) Foot duct (RH)	
(12) Power transistor	(24) Heater case	

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

**T1: 5.0 (0.51, 3.7)**

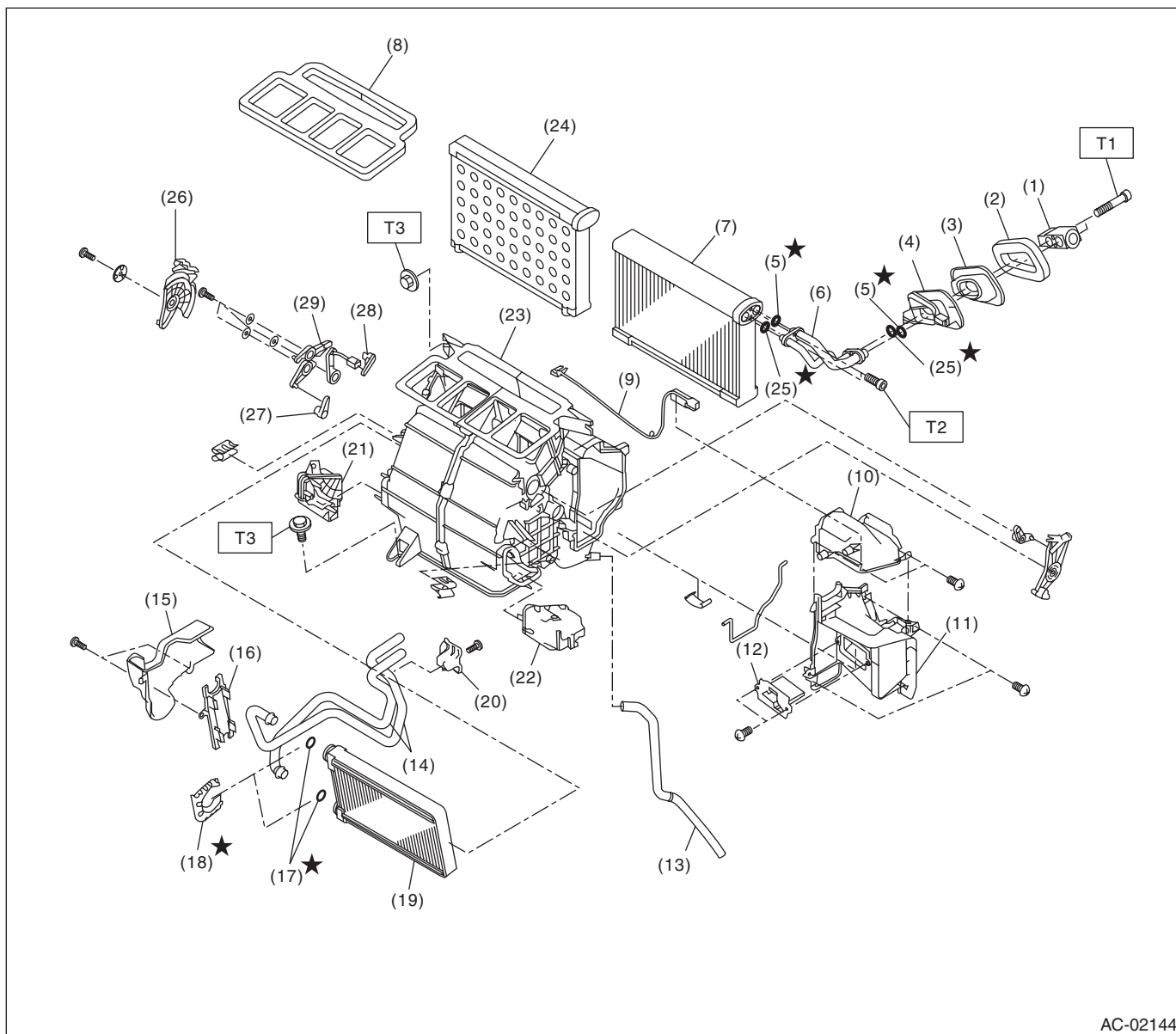
**T2: 6.7 (0.68, 4.9)**

**T3: 7.5 (0.76, 5.5)**

# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

## • Manual A/C model



AC-02144

- |                            |                                |                          |
|----------------------------|--------------------------------|--------------------------|
| (1) Expansion valve        | (13) Drain hose                | (25) O-ring              |
| (2) Gasket                 | (14) Heater core pipe          | (26) Mode main lever     |
| (3) Grommet                | (15) Heater pipe cover         | (27) Vent door link      |
| (4) Case                   | (16) Heater core cover         | (28) Defroster door link |
| (5) O-ring                 | (17) O-ring                    | (29) Mode link           |
| (6) Evaporator pipe        | (18) Clamp                     |                          |
| (7) Evaporator             | (19) Heater core               |                          |
| (8) Lining                 | (20) Pipe clamp                |                          |
| (9) Thermostat             | (21) Foot duct (LH)            |                          |
| (10) Evaporator pipe cover | (22) Foot duct (RH)            |                          |
| (11) Evaporator cover      | (23) Heater case               |                          |
| (12) Resistor              | (24) Plate (Model without A/C) |                          |

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

**T1: 5.0 (0.51, 3.7)**

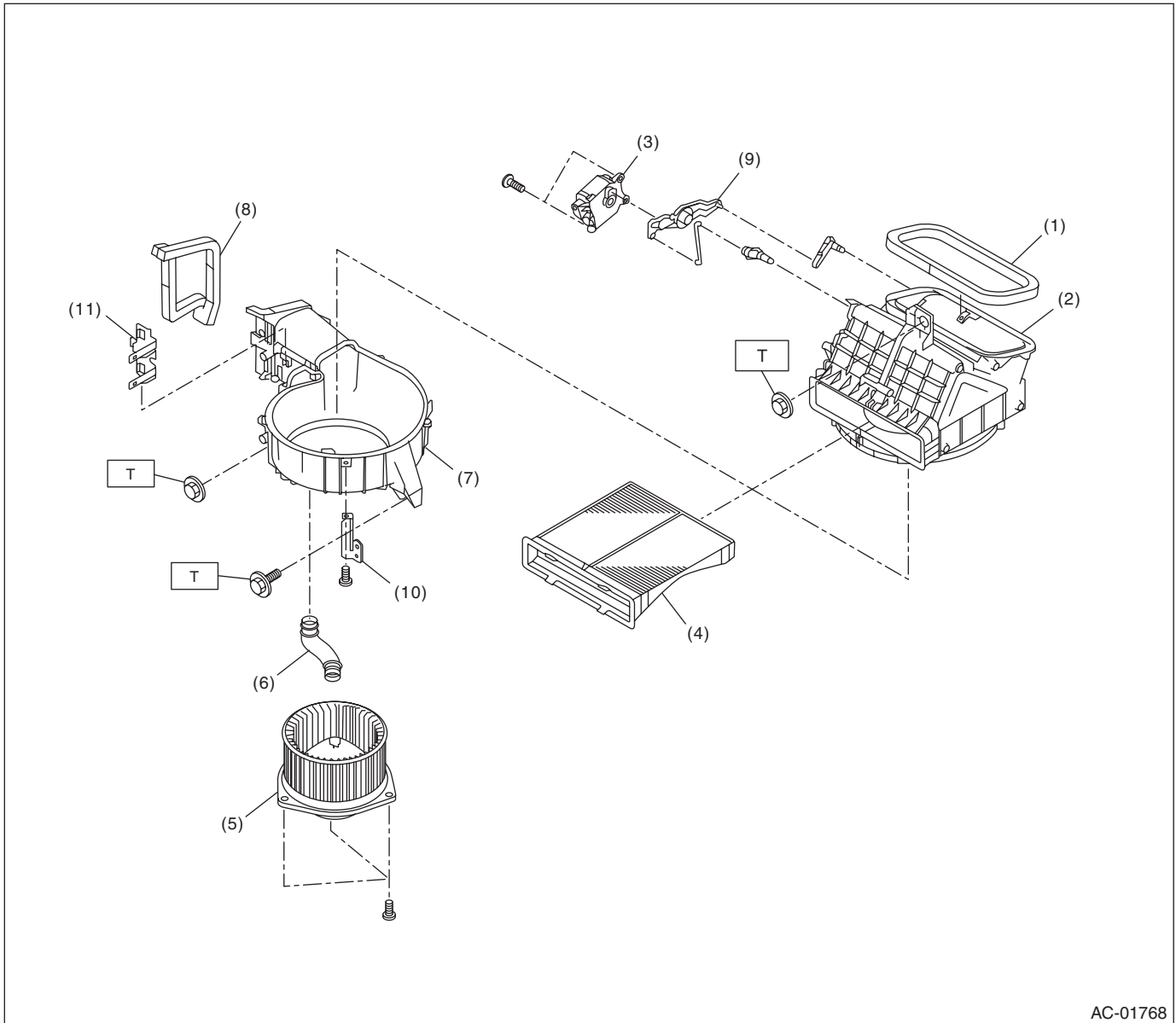
**T2: 6.7 (0.68, 4.9)**

**T3: 7.5 (0.76, 5.5)**

## General Description

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### 2. BLOWER MOTOR UNIT



AC-01768

- (1) Lining
- (2) Upper case
- (3) Intake door actuator
- (4) Filter
- (5) Blower motor ASSY

- (6) Hose
- (7) Lower case
- (8) Lining
- (9) Intake door link
- (10) Relay bracket

- (11) Relay holder bracket

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

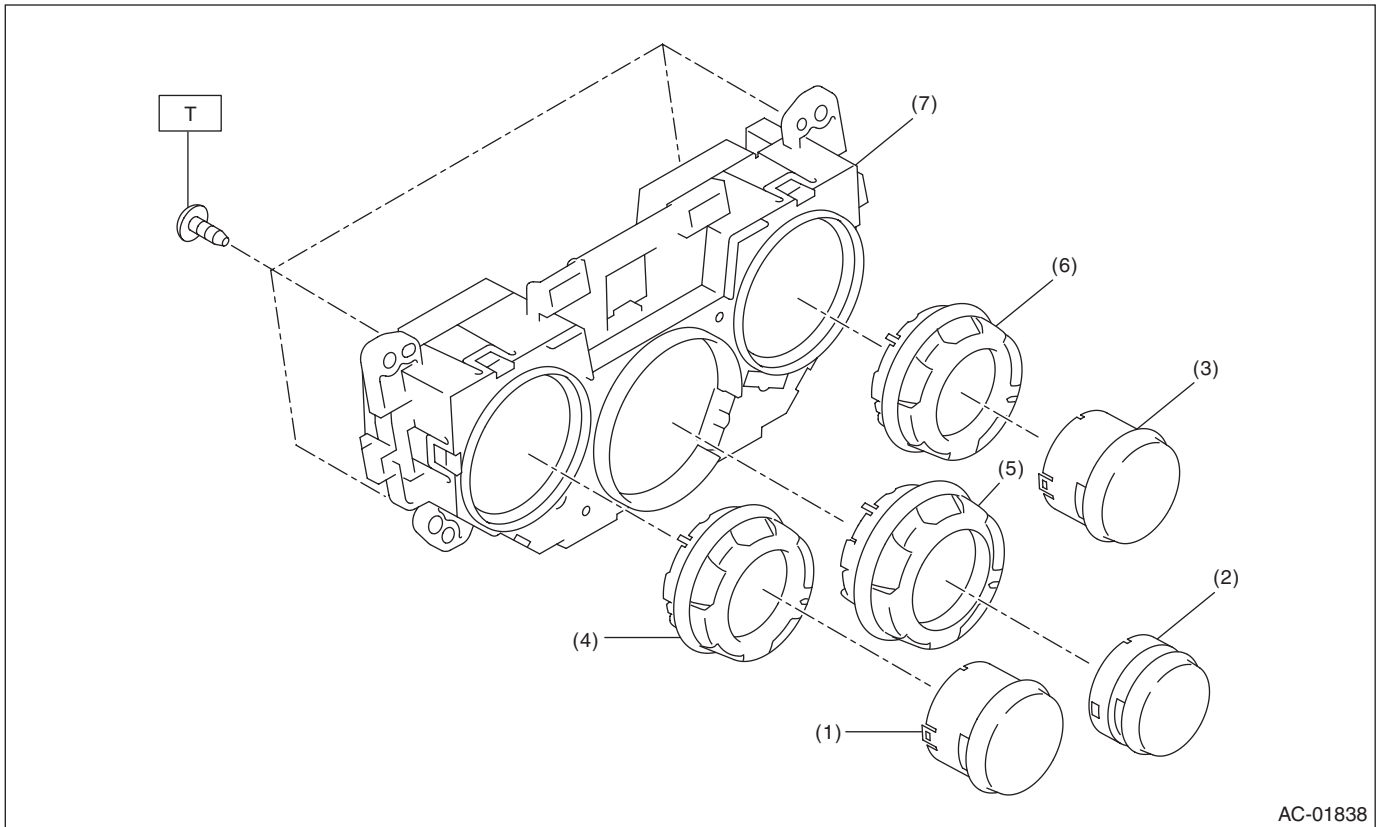
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## General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

### 3. CONTROL MODULE

Auto A/C model



- |                                 |                              |
|---------------------------------|------------------------------|
| (1) FRESH/RECIRC switch         | (5) Air flow control dial    |
| (2) Rear window defogger switch | (6) Temperature control dial |
| (3) A/C switch                  | (7) Control case             |
| (4) Fan speed control dial      |                              |

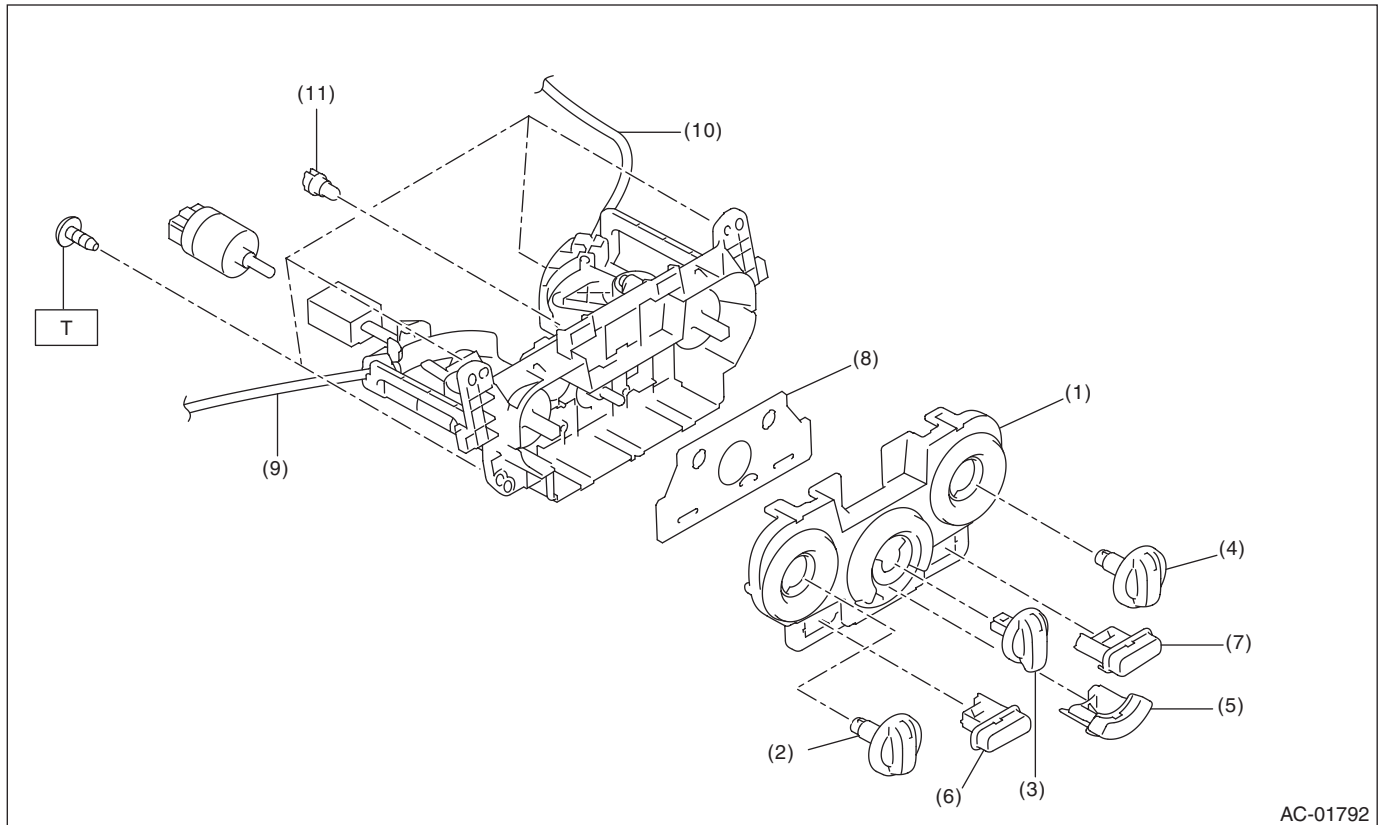
**Tightening torque: N·m (kgf-m, ft-lb)**

**T: 2 (0.2, 1.48)**

# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

## Manual A/C model



- |                              |                                 |            |
|------------------------------|---------------------------------|------------|
| (1) Panel                    | (6) Rear window defogger switch | (11) Valve |
| (2) Air flow control dial    | (7) FRESH/RECIRC switch         |            |
| (3) Fan speed control dial   | (8) Switch board                |            |
| (4) Temperature control dial | (9) Air flow control cable      |            |
| (5) A/C switch               | (10) Temperature control cable  |            |

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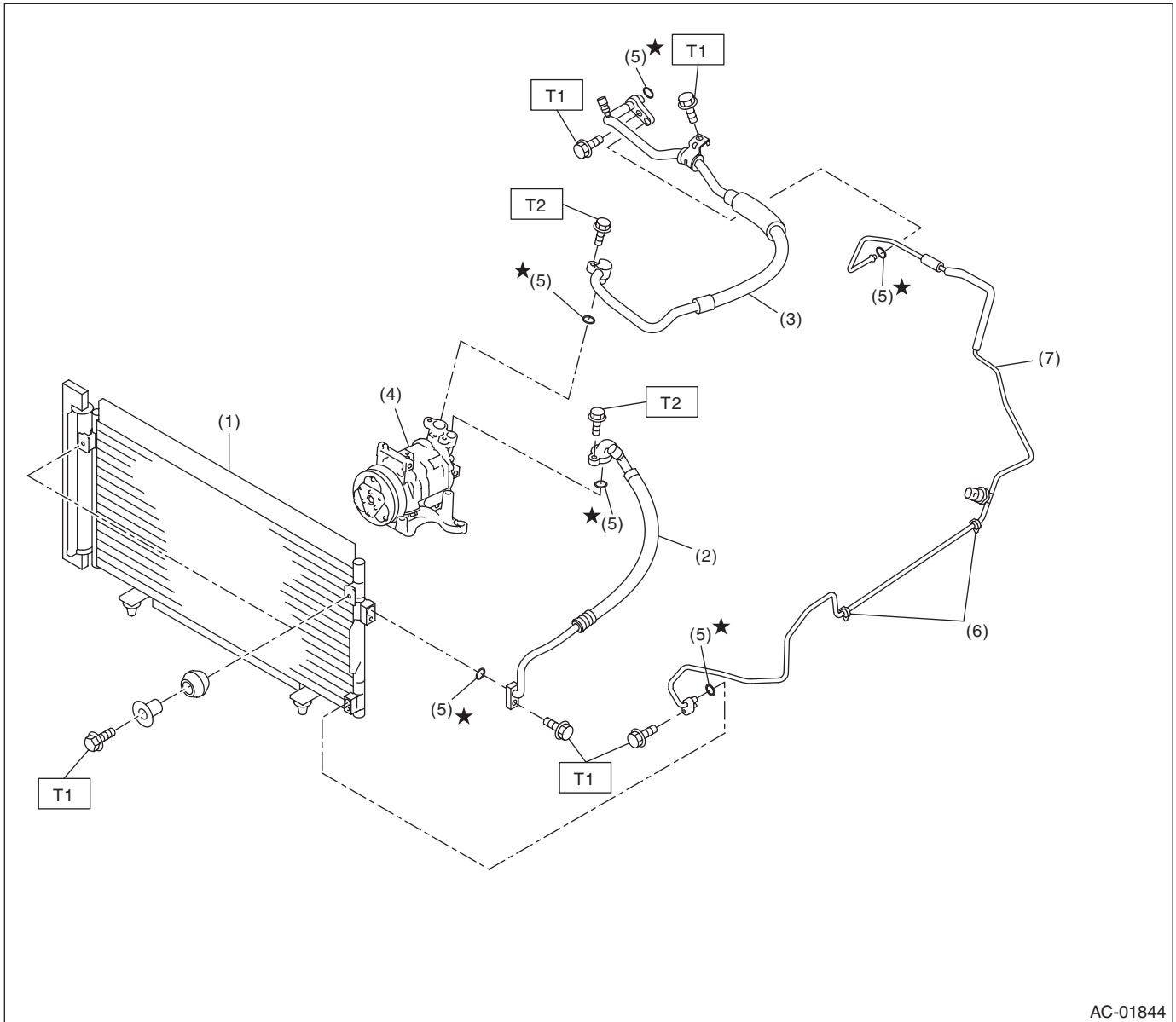
**Tightening torque: N·m (kgf-m, ft-lb)**  
**T: 2 (0.2, 1.48)**

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## 4. AIR CONDITIONING UNIT



- (1) Condenser
- (2) Hose (High-pressure)
- (3) Hose (Low-pressure)
- (4) Compressor

- (5) O-ring
- (6) Clamp
- (7) Pipe

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

**T1: 7.5 (0.76, 5.5)**

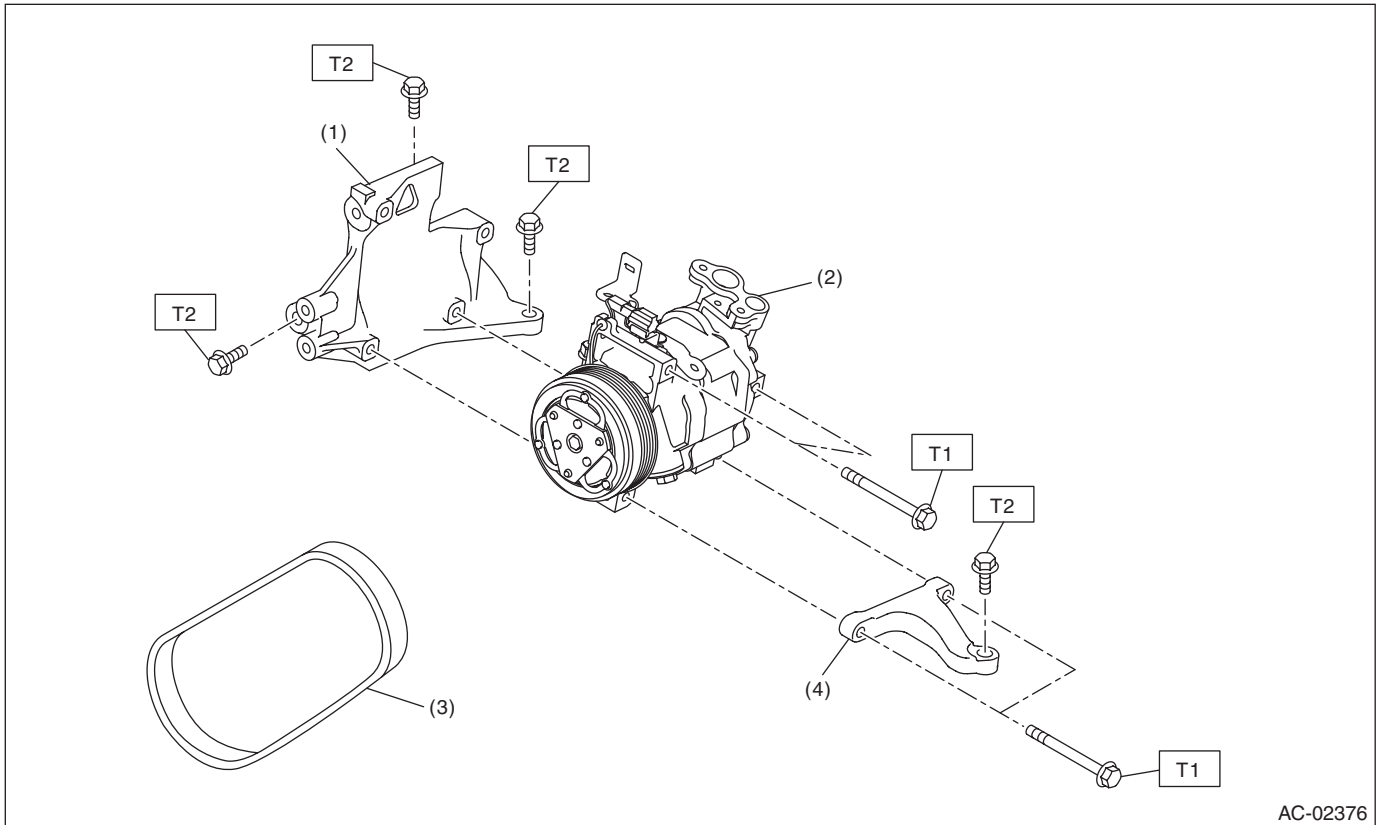
**T2: 10 (1.02, 7.4)**



## General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

### 5. COMPRESSOR



AC-02376

- |                        |                        |
|------------------------|------------------------|
| (1) Compressor bracket | (3) V-belt             |
| (2) Compressor         | (4) Compressor bracket |

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

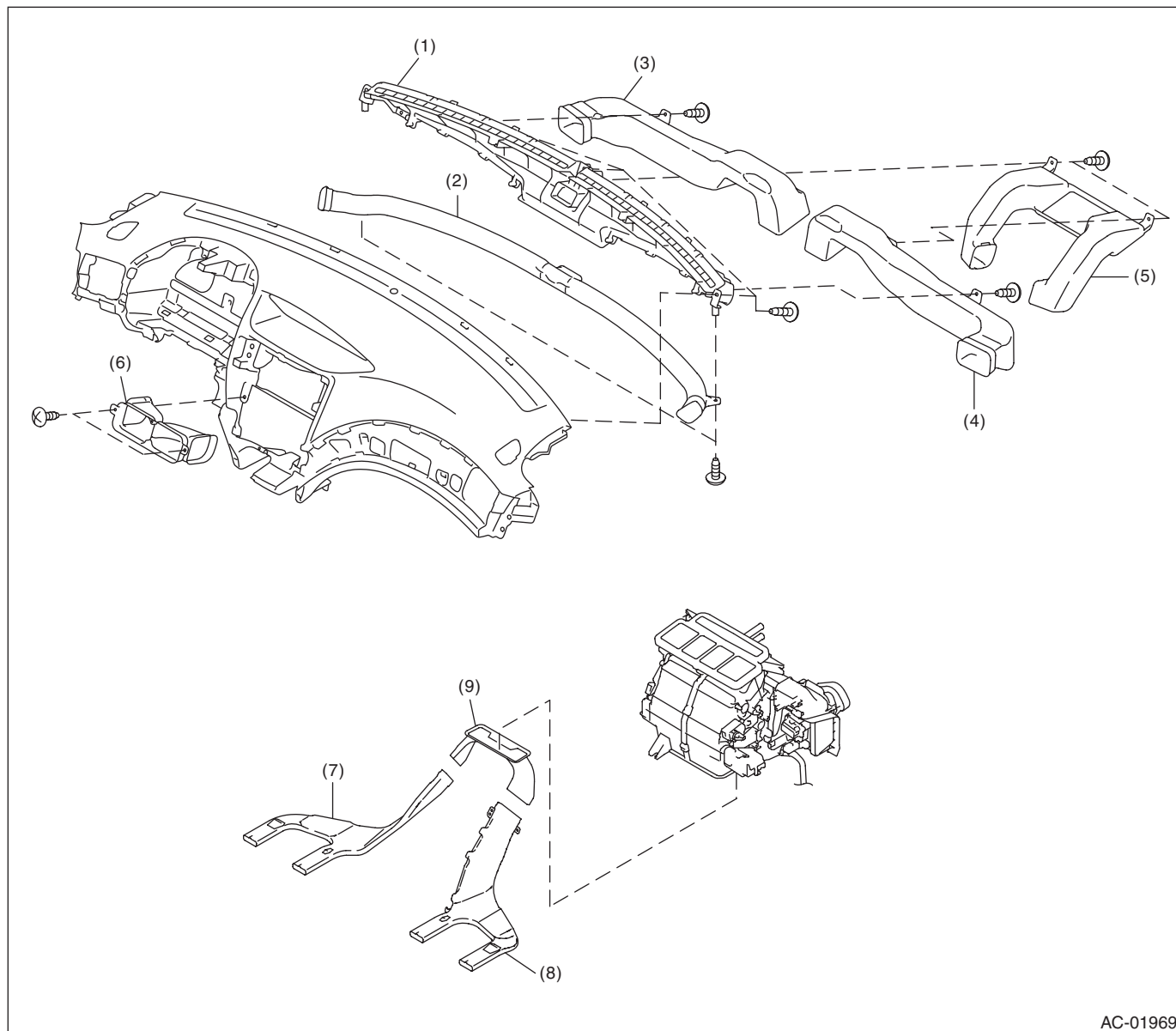
**T1: 26.5 (2.7, 19.5)**

**T2: 36 (3.67, 26.6)**

# General Description

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## 6. HEATER DUCT



AC-01969

- (1) Front defroster nozzle
- (2) Side defroster duct
- (3) Side vent duct (LH)

- (4) Side vent duct (RH)
- (5) Center vent duct
- (6) Center vent duct front

- (7) Rear heater duct (LH)
- (8) Rear heater duct (RH)
- (9) Rear heater duct center

# General Description

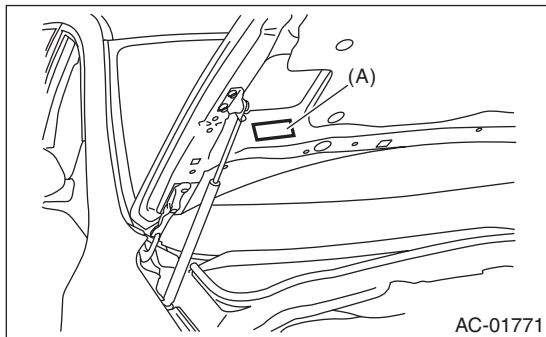
## HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

### C: CAUTION

- Before disassembling or reassembling parts, always disconnect the battery ground cable from battery. When replacing the audio, control module and other parts provided with memory functions, record the memory contents before disconnecting the battery ground cable. Otherwise, the memory is cleared.
- Reassemble the parts in the reverse order of disassembly procedure unless otherwise indicated.
- Adjust parts to the given specifications.
- Connect the connectors securely during reassembly.
- After reassembly, make sure that the functional parts operate normally.

### 1. HFC-134A A/C SYSTEM

- The cooling system components for the HFC-134a system such as the refrigerant and compressor oil are different from the conventional CFC-12 system components and they are incompatible with each other.
- Vehicles with the HFC-134a system can be identified by the label (A) attached to the vehicle. Before maintenance, check A/C system which is installed to the vehicle.



AC-01771

### 2. COMPRESSOR OIL

- HFC-134a compressor oil has no compatibility with that of CFC-12 system.
- Use only the manufacturer-authorized compressor oil for the HFC-134a system; only use DH-PR (ZXL200PG).
- Do not mix multiple compressor oils.

If CFC-12 compressor oil is used in the HFC-134a A/C system, the compressor may become stuck due to poor lubrication, or the refrigerant may leak due to swelling of rubber parts.

On the other hand, if HFC-134a compressor oil is used in a CFC-12 A/C system, the durability of the A/C system will be lowered.

- HFC-134a compressor oil is very hygroscopic. When replacing or installing/removing A/C parts, immediately isolate the oil from atmosphere using a plug or tape. In order to avoid moisture, store the oil in a container with its cap tightly closed.

### 3. REFRIGERANT

- CFC-12 refrigerant cannot be used in a HFC-134a A/C system. HFC-134a refrigerant, also cannot be used in a CFC-12 A/C system.
- If an incorrect or no refrigerant is used, it will result in poor lubrication and the compressor itself may be damaged.

### 4. HANDLING OF REFRIGERANT

- The refrigerant boils at approx.  $-30^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$ ). When handling it, be sure to wear protective goggles and protective gloves. Direct contact of the refrigerant with skin may cause frostbite.

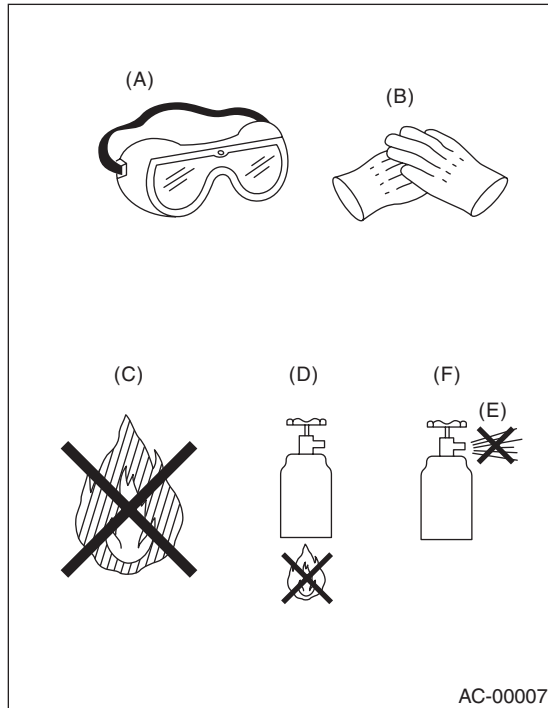
If the refrigerant gets into your eye, avoid rubbing your eyes with your hands. Wash your eye with plenty of water, and receive medical treatment from an eye doctor.

- Do not heat a service can. If a service can is directly heated, or put into boiling water, the inside pressure will become extremely high. This may cause the can to explode. If a service can must be warmed up, use warm water of  $40^{\circ}\text{C}$  ( $104^{\circ}\text{F}$ ) or less.
- Do not drop or impact a service can. (Observe the precautions and operation procedure described on the refrigerant can.)
- When the engine is running, do not open the high-pressure valve of manifold gauge. The high-pressure gas will back-flow resulting in an explosion of the can.
- Provide good ventilation and do not work in a closed area.

## General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

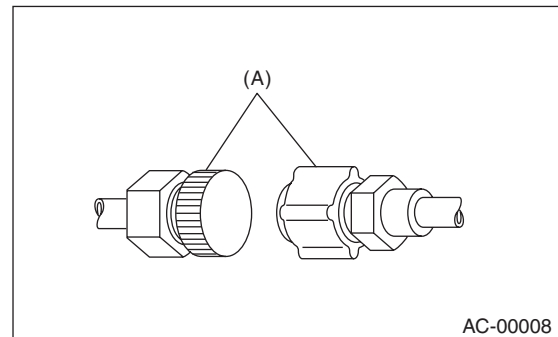
- In order to prevent global warming, avoid releasing HFC-134a into the atmosphere. Using a refrigerant recovery system, discharge and recycle the gas.



- (A) Goggles
- (B) Gloves
- (C) Avoid open flame
- (D) No direct heat on container
- (E) Do not discharge
- (F) Loosen

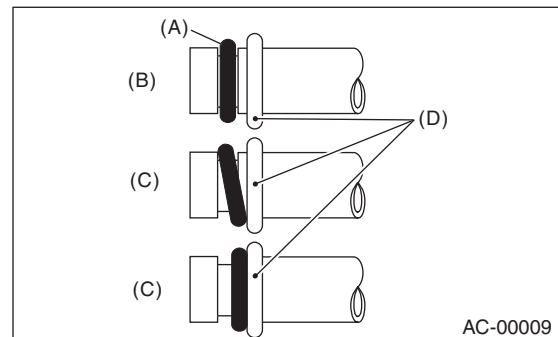
## 5. O-RING CONNECTIONS

- Always use a new O-ring.
- In order to keep the O-rings free of lint which will cause a refrigerant gas leak, perform work without using gloves or waste cloths.
- Apply compressor oil to O-rings to avoid sticking, before installation.
- Use a torque wrench to tighten the O-ring fittings. Over-tightening will result in damage of the O-ring and deformation of the pipe end.
- If the work is interrupted before completing pipe connections, recap the pipes, components and fittings with a plug or tape to prevent foreign matter from entering.



(A) Seal

- Visually check the surfaces and mating surfaces of O-rings, threads and connecting points. If a failure is found, replace the applicable parts.
- Install the O-rings straight against the pipe groove.



- (A) O-ring
- (B) OK
- (C) NG
- (D) Groove

## General Description

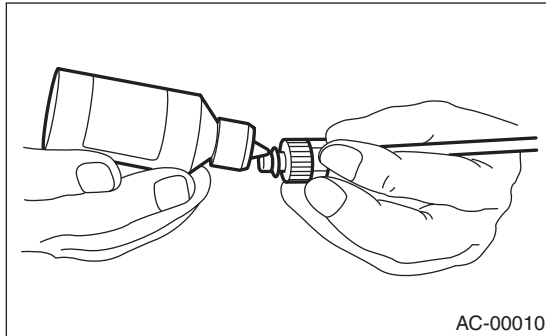
### HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

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- Use compressor oil specified in the service manual to lubricate the O-rings.

Apply oil to the top and sides of O-rings before installation.

Apply compressor oil to the pipe grooves.



- After tightening, use a clean cloth to remove excess compressor oil from the connections and any oil which may have run on the vehicle body or other parts.
- If any leakage is suspected after tightening, do not tighten the connections further, but disconnect the connections, remove the O-rings, and check the O-rings, threads, and connections.

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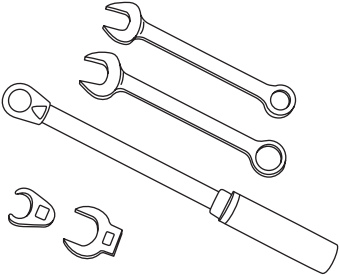
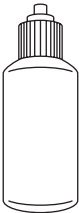
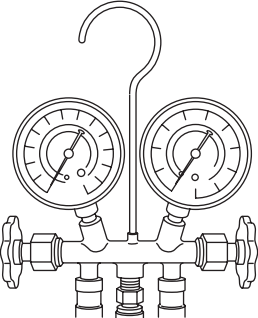
### D: PREPARATION TOOL

#### CAUTION:

When working on vehicles with a HFC-134a system, only use HFC-134a specified tools and parts. Do not mix CFC-12 tools and parts. If HFC-134a and CFC-12 refrigerant or compressor oil is mixed, it will result in poor lubrication and the compressor itself may be damaged.

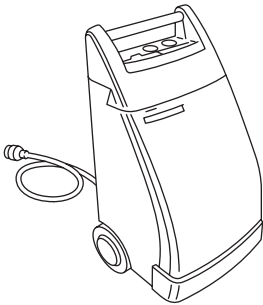
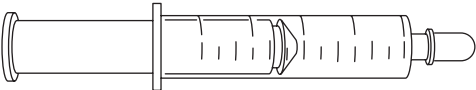
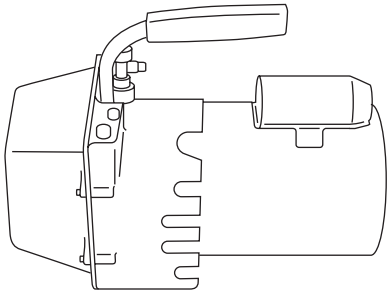
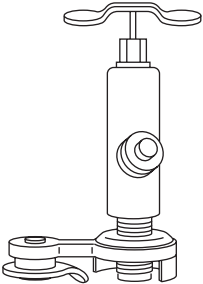
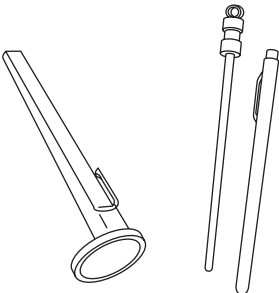
In order to prevent the mixture of HFC-134a and CFC-12 parts and liquid, the type of tool and screw, and the replacement valves used are different. The gas leak detectors for the HFC-134a and CFC-12 systems must also not be interchanged.

	HFC-134a	CFC-12
Tool & screw type	Millimeter size	Inch size
Valve type	Quick joint type	Screw-in type

ILLUSTRATION	Name and Function
 AC-00213	<b>Wrench</b> Various <b>WRENCHES</b> will be required to service any A/C system.7 — 40 N·m (0.7 to 4.1 kgf-m, 5 to 30 ft-lb) torque wrench and various crow-foot wrenches will be needed. Open end or flare nut wrenches will be needed to hold the tube and hose fittings.
 AC-00012	<b>Applicator bottle</b> A small <b>APPLICATOR BOTTLE</b> is recommended to apply compressor oil to the various parts. It can be available at a hardware store.
 AC-00013	<b>Manifold gauge set</b> A <b>MANIFOLD GAUGE SET</b> (with hoses) is available at either a refrigerant supplier or an automotive equipment supplier.

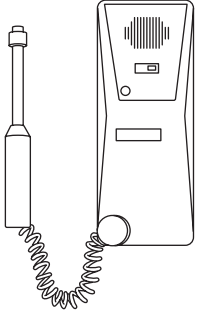
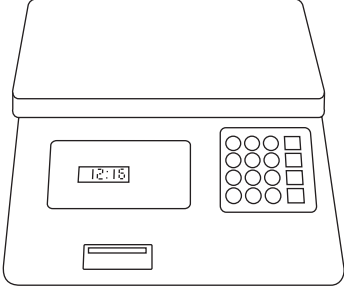
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ILLUSTRATION	Name and Function
 <p style="text-align: right;">AC-00014</p>	<p>Refrigerant recovery system</p> <p>A <b>REFRIGERANT RECOVERY SYSTEM</b> is used for the recovery and recycling of A/C system refrigerant after contaminants and moisture have been removed from the refrigerant.</p>
 <p style="text-align: right;">AC-00015</p>	<p>Syringe</p> <p>A graduated plastic <b>SYRINGE</b> will be needed to add oil into the system again. A syringe can be available at a pharmacy or drug store.</p>
 <p style="text-align: right;">AC-00016</p>	<p>Vacuum pump</p> <p>A <b>VACUUM PUMP</b> is necessary (for a good working condition), and may be available at either a refrigerant supplier or an automotive equipment supplier.</p>
 <p style="text-align: right;">AC-00017</p>	<p>Can tap</p> <p>A <b>CAN TAP</b> for the 397 g (14 oz.) can is available at an automotive equipment supplier.</p>
 <p style="text-align: right;">AC-00018</p>	<p>Thermometer</p> <p>A Pocket <b>THERMOMETER</b> is available at either a industrial hardware store or a refrigerant supplier.</p>

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ILLUSTRATION	Name and Function
 AC-00019	Electronic leak detector An <b>ELECTRONIC LEAK DETECTOR</b> can be available at either a specialty tool supplier or an A/C equipment supplier.
 AC-00020	Weight scale A <b>WEIGHT SCALE</b> such as an electronic charging scale or a bathroom scale with digital display will be needed, if a 13.6 kg (30 lb) refrigerant container is used.