

# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

## 1. General Description

### A: SPECIFICATION

#### 1. HEATER SYSTEM

Item		Specification	Condition
Heating capacity		5.2 kW (4,471 kcal/h, 17,743 BTU/h) or more	<ul style="list-style-type: none"> <li>• Mode selector switch: HEAT</li> <li>• Temperature control switch: 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		340 m <sup>3</sup> (11,301 cu ft)/h	Heat mode (FRESH), FULL HOT at 12.5 V
Max air flow rate		550 m <sup>3</sup> (16,245 cu ft)/h	<ul style="list-style-type: none"> <li>• Temperature control switch: FULL COLD</li> <li>• Blower fan speed: 6th position</li> <li>• Mode selector lever: RECIRC</li> </ul>
Heater core size (height × length × width)		264 × 110 × 27 mm (10.4 × 4.33 × 1.06 in)	—
Blower Motor	Type	Brush motor 220W or less	12 V
	Fan type and size (diameter × width)	Sirocco fan type 165 × 75 mm (6.51 × 2.95 in)	—

#### 2. A/C SYSTEM

- Single A/C model (front only)

Item		Specification
Type of air conditioner		Reheat air-mix type
Cooling capacity		6.2 kW (5,331 kcal/h, 21,154 BTU/h)
Refrigerant		HFC-134a (CH <sub>2</sub> FCF <sub>3</sub> ) [0.87±0.03 kg (1.92±0.07 lb)]
Compressor	Type	Inclined plate (SWASH PLATE), fixed capacity (10SR17), Temperature fuse
	Exhaust	177 cc (10.80 cu in)/rev
	Max. permissible speed	6,000 rpm
Magnet clutch	Type	Dry, single-disc type
	Power consumption	35 W
	Type of belt	V-belt 6 PK
	Pulley dia. (effective dia.)	115 mm (4.53 in)
	Pulley ratio	1.16
Condenser	Type	Corrugated fin (Sub cool type)
	Core face area	0.29 m <sup>2</sup> (3.122 sq ft)
	Core thickness	16 mm (0.63 in)
	Radiation area	7.65 m <sup>2</sup> (82.35 sq ft)
Receiver drier	Effective inner capacity	190 cm <sup>3</sup> (11.6 cu in)
Expansion valve	Type	Box time (external pressure equalizing type)
Evaporator	Type	Single tank
	Dimensions (W × H × T)	293.1 × 211 × 38 mm (11.54 × 8.31 × 1.50 in)
Blower fan	Fan type	Sirocco fan
	Outer diameter × width	165 × 75 mm (6.50 × 2.95 in)
	Power consumption	260 W

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Item		Specification	
Condenser fan (Sub fan)	Motor type	Magnet	
	Power consumption	160 W	
	Fan outer diameter	320 mm (12.6 in)	
Radiator fan (Main fan)	Motor type	Magnet	
	Power consumption	160 W	
	Fan outer diameter	320 mm (12.6 in)	
Idling speed (A/C ON)		MPFI model	800±100 rpm
Triple switch (Pressure switch)	Low-pressure switch working pressure	ON → OFF	196±20 kPa (2.00±0.20 kg/cm <sup>2</sup> , 28.4±2.9 psi)
		OFF → ON	225 <sup>+25</sup> <sub>-29</sub> kPa (2.29 <sup>+0.25</sup> <sub>-0.30</sub> kg/cm <sup>2</sup> , 32.6 <sup>+3.6</sup> <sub>-4.2</sub> psi)
	High-pressure switch working pressure	ON → OFF	3,140 <sup>+50</sup> <sub>-200</sub> kPa (32.02 <sup>+0.51</sup> <sub>-2.04</sub> kg/cm <sup>2</sup> , 455.4 <sup>+7.25</sup> <sub>-29.0</sub> psi)
		OFF → ON	2,550±200 kPa (26.00±2.04 kg/cm <sup>2</sup> , 369.8±29.0 psi)
	Middle-pressure switch operating pressure	ON → OFF	1,370±120 kPa (13.97±1.22 kg/cm <sup>2</sup> , 198.65±17.35 psi)
		OFF → ON	1,770±100 kPa (18.05±1.02 kg/cm <sup>2</sup> , 256.81±14.50 psi)
Thermo-control amplifier working temperature (Evaporator outlet air)		<p style="text-align: right;">AC-00601</p> <p>(1) ON  (2) OFF  (3) 1±0.5°C (33.8±0.9°F)  (4) 4<sup>+1.5</sup><sub>0</sub>°C (39.2<sup>+2.7</sup><sub>0</sub>°F)</p>	

## General Description

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

- Dual A/C model (Front A/C and Rear cooler)

Item		Specification	
Type of air conditioner	Front	Reheat air-mix type	
	Rear	Cooler	
Cooling capacity		7.2 kW (5,331 kcal/h, 21,154 BTU/h)	
Refrigerant		HFC-134a (CH <sub>2</sub> FCF <sub>3</sub> ) [0.87±0.03 kg (1.92±0.07 lb)]	
Compressor	Type	Inclined plate (SWASH PLATE), fixed capacity (10SR17), Temperature fuse	
	Exhaust	177 cc (10.80 cu in)/rev	
	Max. permissible speed	6,000 rpm	
Magnet clutch	Type	Dry, single-disc type	
	Power consumption	35 W	
	Type of belt	V-belt 6 PK	
	Pulley dia. (effective dia.)	115 mm (3.7 in)	
	Pulley ratio	1.16	
Condenser	Type	Corrugated fin (Sub cool type)	
	Core face area	0.29 m <sup>2</sup> (2.077 sq ft)	
	Core thickness	16 mm (0.63 in)	
	Radiation area	7.65 m <sup>2</sup> (61.57 sq ft)	
Receiver drier		Effective inner capacity 280 cc (17.1 cu in)	
Expansion valve	Front	Type	
	Rear	Type	
		Box time (external pressure equalizing type)	
Evaporator	Front	Type	Single tank
		Dimensions (W × H × T)	293.1 × 211 × 38 mm (11.54 × 8.31 × 1.50 in)
	Rear	Type	Single tank
		Dimensions (W × H × T)	132.1 × 181 × 38 mm (5.2 × 7.13 × 1.50 in)
Blower fan	Front	Fan type	Sirocco fan
		Outer diameter × width	165 × 75 mm (6.49 × 2.95 in)
		Power consumption	260 W
	Rear	Fan type	Sirocco fan
		Outer diameter × width	150 × 70 mm (5.91 × 2.95 in)
		Power consumption	150 W or less
Condenser fan (Sub fan)	Motor type	Magnet	
	Power consumption	160 W	
	Fan outer diameter	320 mm (12.6 in)	
Radiator fan (Main fan)	Motor type	Magnet	
	Power consumption	160 W	
	Fan outer diameter	320 mm (12.6 in)	
Idling speed (A/C ON)		MPFI model 800±100 rpm	

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HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

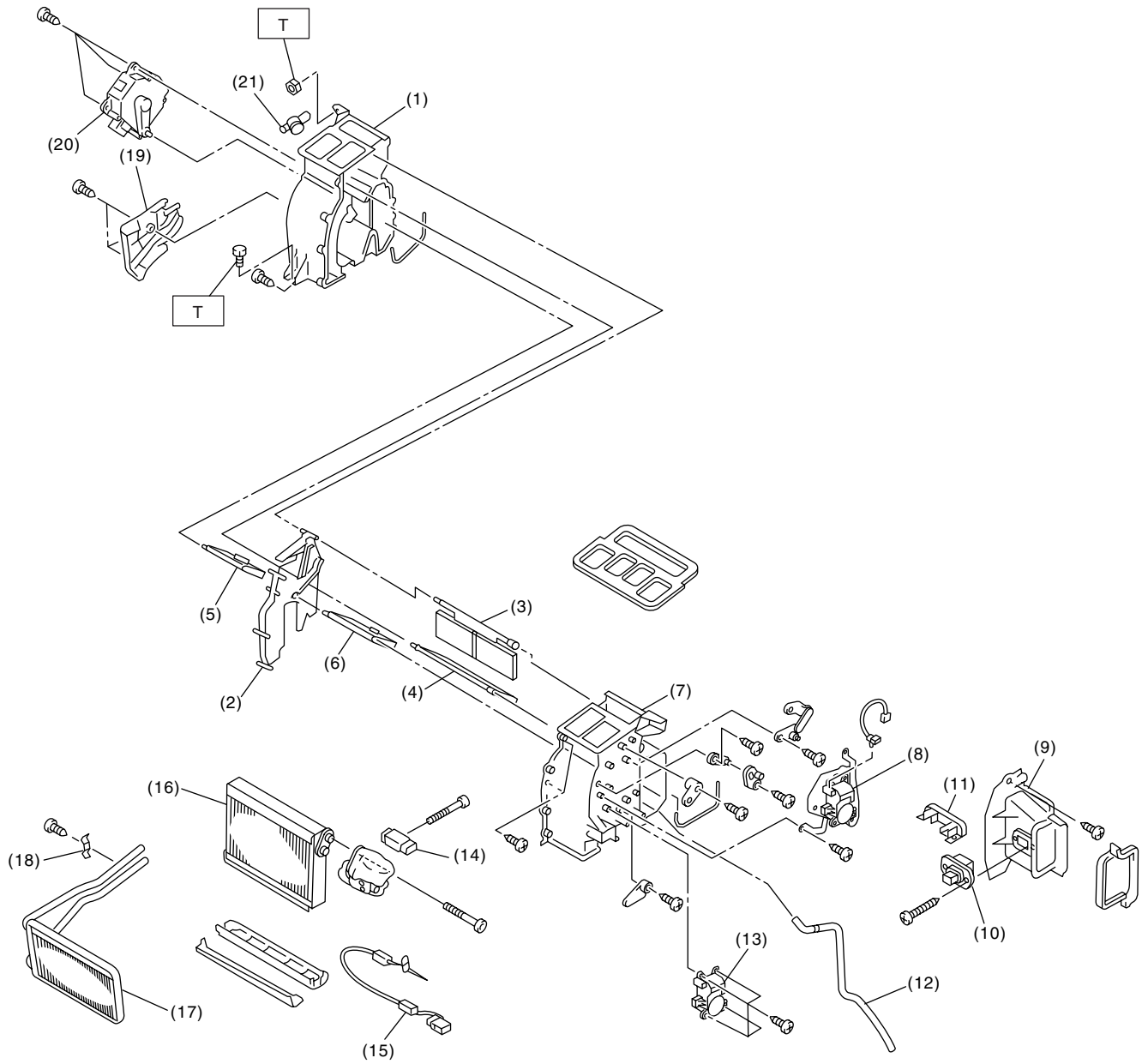
Item			Specification
Triple switch (Pressure switch)	Low-pressure switch working pressure	ON → OFF	196±20 kPa (2.00±0.20 kg/cm <sup>2</sup> , 28.4±2.9 psi)
		OFF → ON	225 <sup>+25</sup> <sub>-29</sub> kPa (2.29 <sup>+0.25</sup> <sub>-0.30</sub> kg/cm <sup>2</sup> , 32.6 <sup>+3.6</sup> <sub>-4.2</sub> psi)
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		OFF → ON	2,550±200 kPa (26.00±2.04 kg/cm <sup>2</sup> , 369.8±29.0 psi)
	Middle-pressure switch operating pressure	ON → OFF	1,370±120 kPa (13.97±1.22 kg/cm <sup>2</sup> , 198.65±17.35 psi)
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Thermo-control amplifier working temperature (Evaporator outlet air)			<p style="text-align: right;">AC-00601</p> <p>(1) ON (2) OFF (3) 1±0.5°C (33.8±0.9°F) (4) 4 <sup>+1.5</sup> <sub>0</sub> °C (39.2 <sup>+2.7</sup> <sub>0</sub> °F)</p>

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HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

## B: COMPONENT

### 1. HEATER COOLING UNIT



AC-01268

AC-6

# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

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(1) Heater unit case LH	(9) Evaporator cover	(17) Heater Core
(2) Separator	(10) Power transistor	(18) Heater pipe clamp
(3) Mode door RR	(11) Pipe cover	(19) Heater core cover
(4) Mode door FR	(12) Drain hose	(20) Air mix door actuator LH
(5) Air mix door LH	(13) Air mix door actuator RH	(21) Aspirator
(6) Air mix door RH	(14) Expansion valve	
(7) Heater unit case RH	(15) Evaporator sensor	
(8) Mode door actuator	(16) Evaporator	

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

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

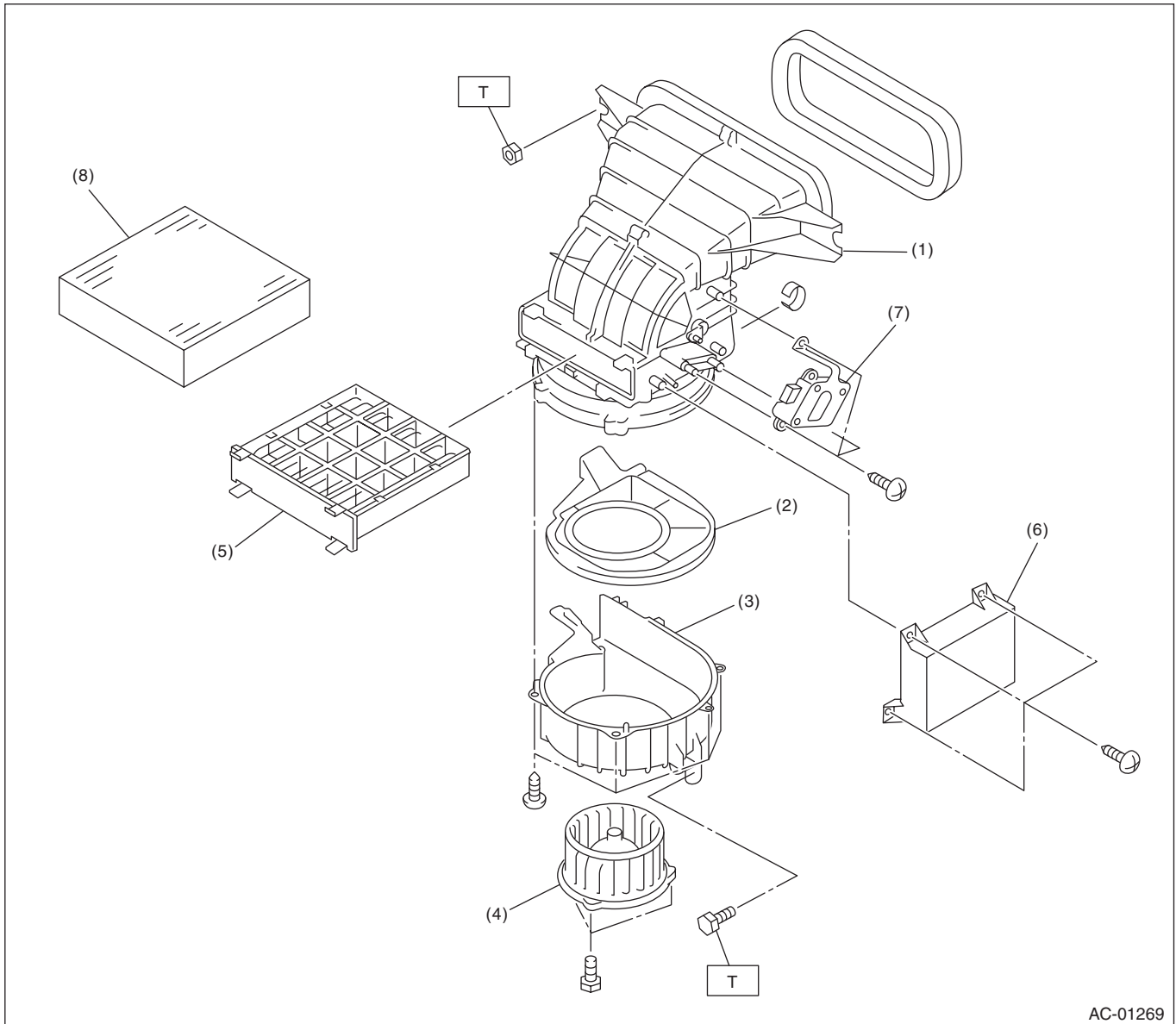
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# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

## 2. BLOWER MOTOR UNIT

Front



- (1) Upper case
- (2) Blower plate
- (3) Lower case
- (4) Blower motor

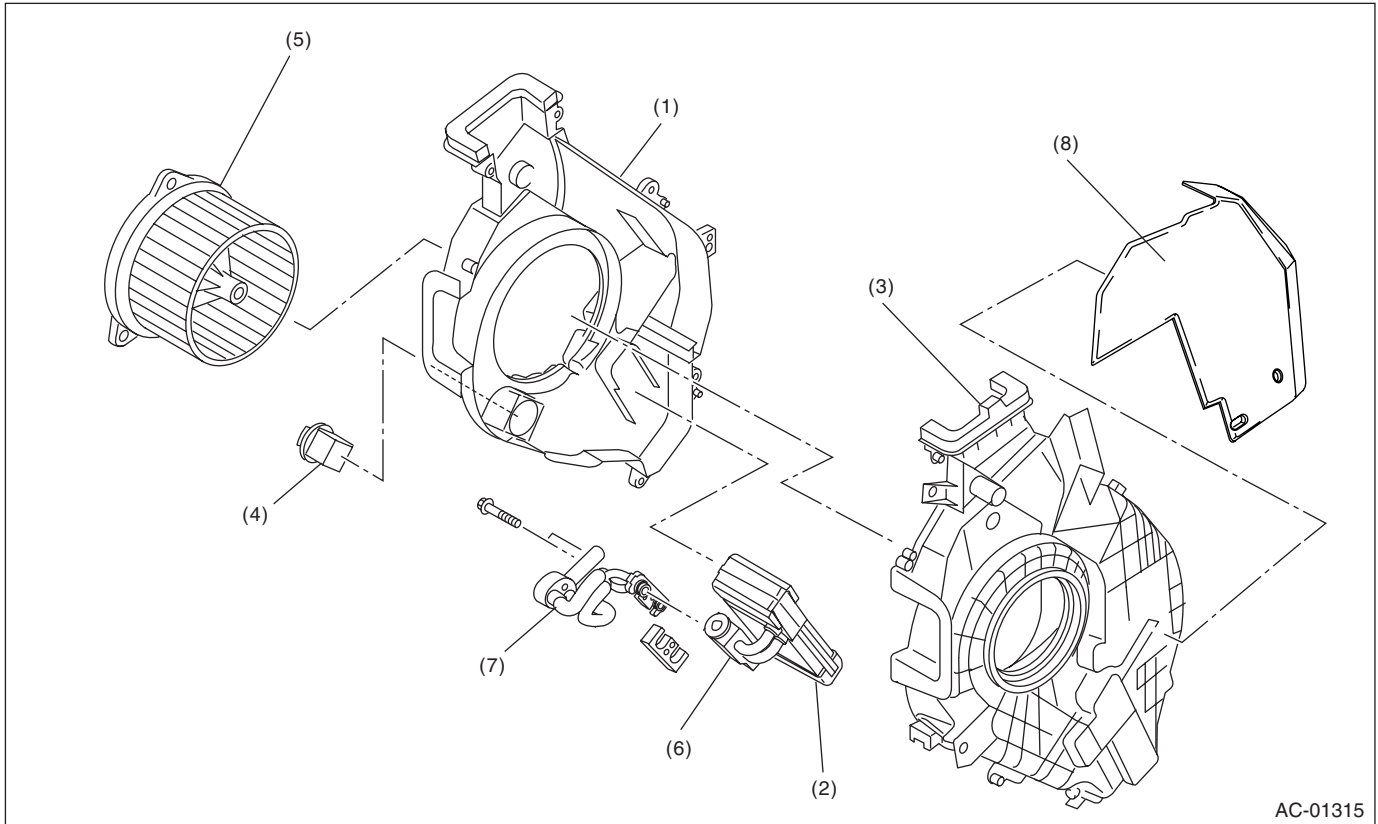
- (5) Filter cover
- (6) Control unit (Auto A/C model)
- (7) FRESH/RECIRC door actuator
- (8) Filter

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

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## Rear

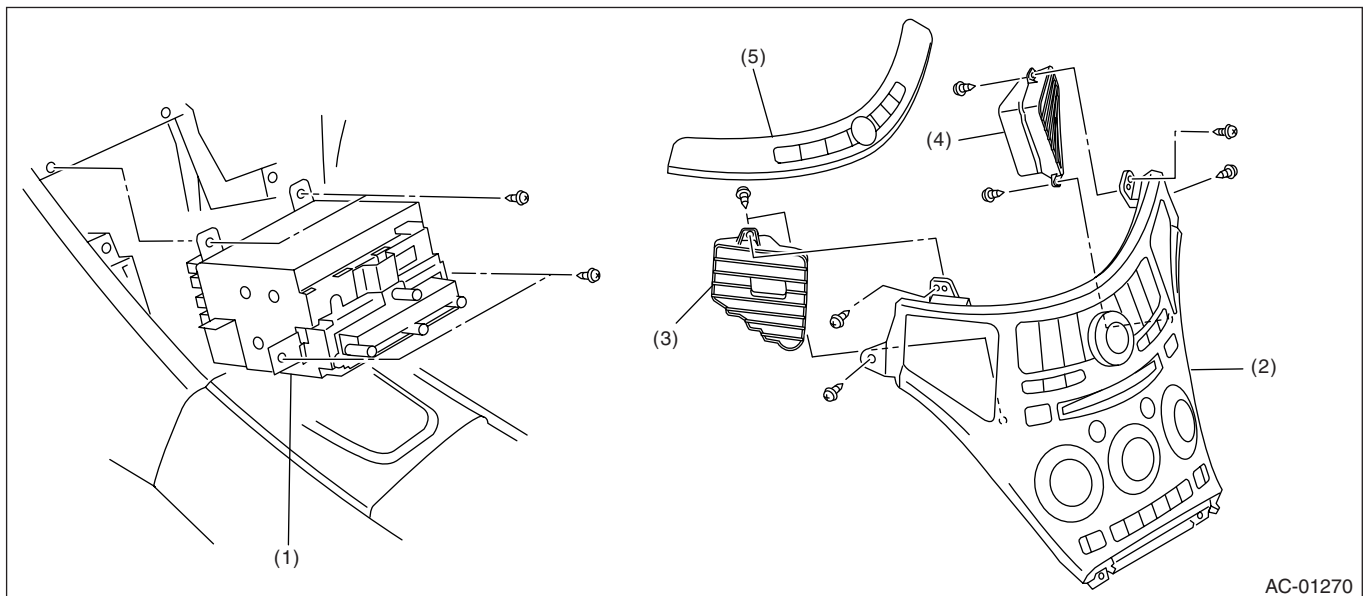


AC-01315

- |                     |                     |
|---------------------|---------------------|
| (1) Inner case      | (5) Blower motor    |
| (2) Evaporator      | (6) Expansion valve |
| (3) Outer case      | (7) Expansion tube  |
| (4) Blower resistor | (8) Cover           |

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

## 3. CONTROL PANEL



AC-01270

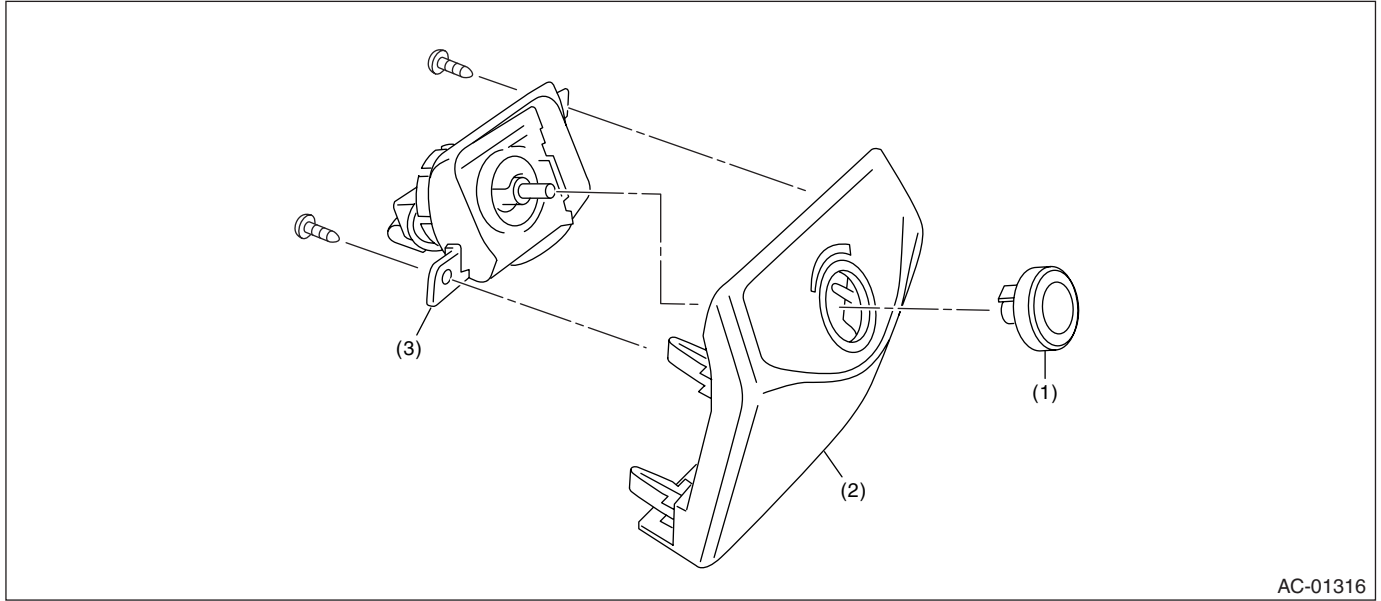
- |                   |                      |                                    |
|-------------------|----------------------|------------------------------------|
| (1) Audio ASSY    | (3) Center duct (RH) | (5) Navigation, MFD control switch |
| (2) Control panel | (4) Center duct (LH) |                                    |



# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

## Rear cooler model



(1) Dial

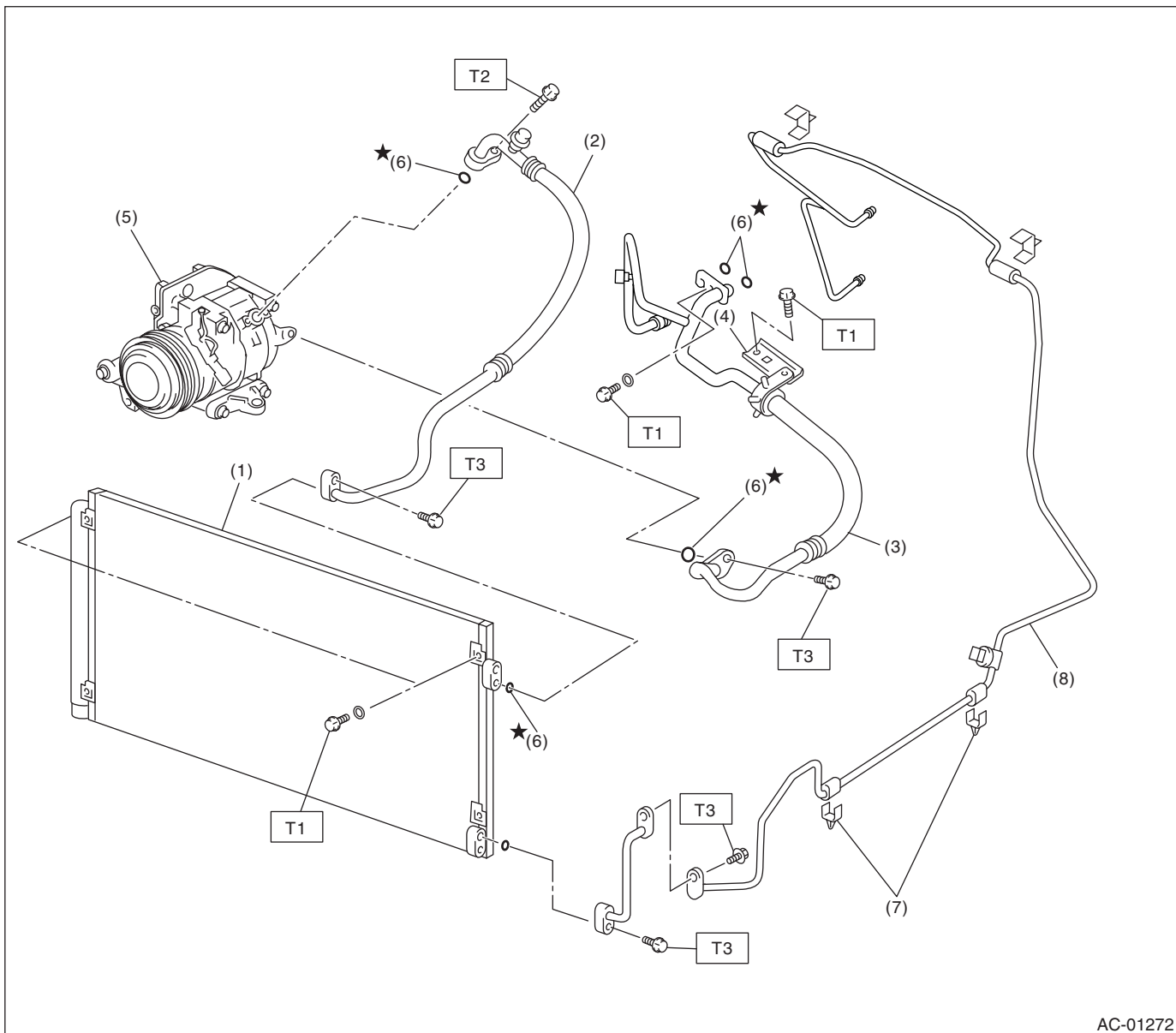
(2) Control panel

(3) Blower switch

# General Description

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## 4. AIR CONDITIONING UNIT



AC-01272

- |                          |                |
|--------------------------|----------------|
| (1) Condenser            | (5) Compressor |
| (2) Hose (High-pressure) | (6) O-ring     |
| (3) Hose (Low-pressure)  | (7) Clamp      |
| (4) Bracket              | (8) Tube       |

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

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

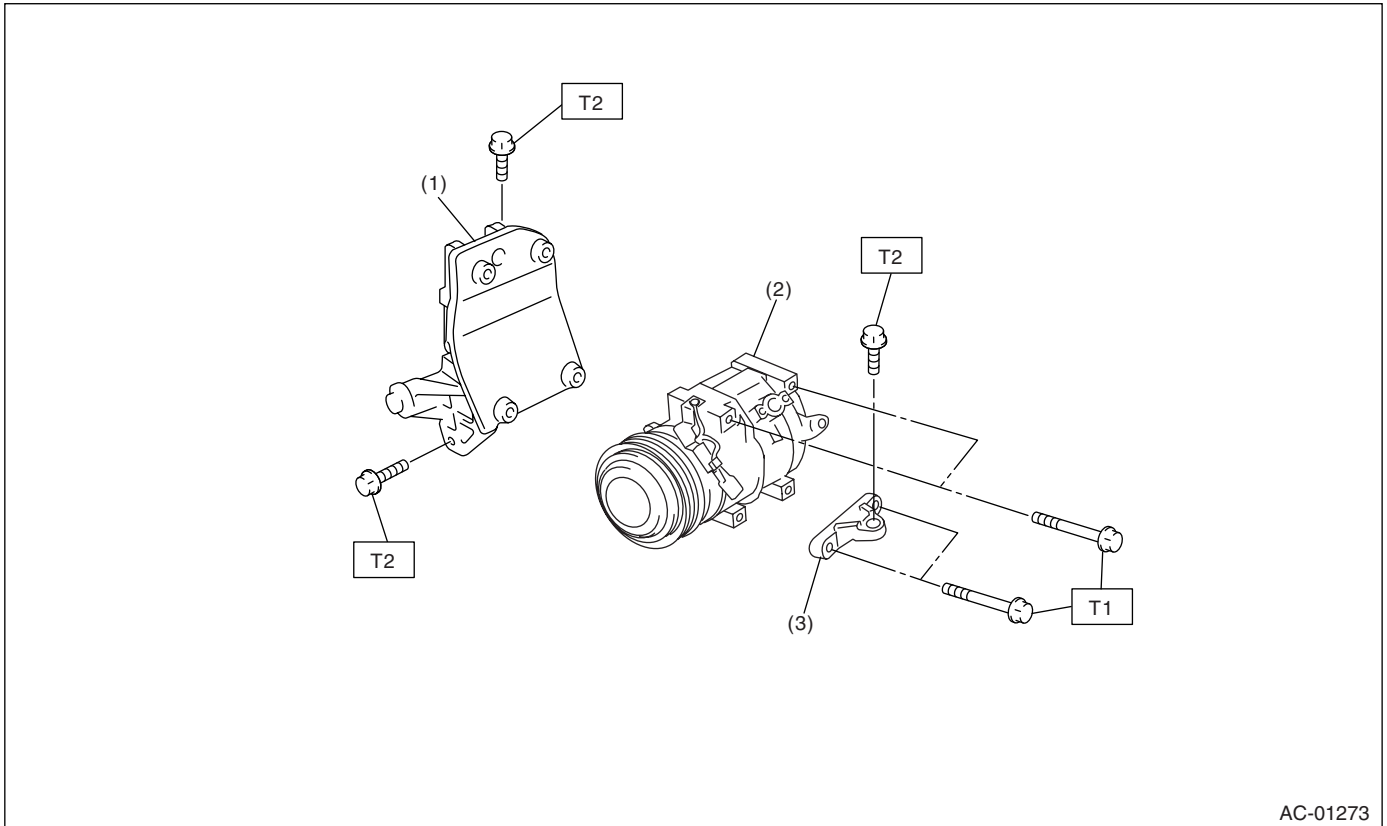
**T2: 10 (1.0, 7.4)**

**T3: 5 (0.5, 3.7)**

# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

## 5. COMPRESSOR



- (1) Compressor upper bracket
- (2) Compressor
- (3) Compressor lower bracket

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

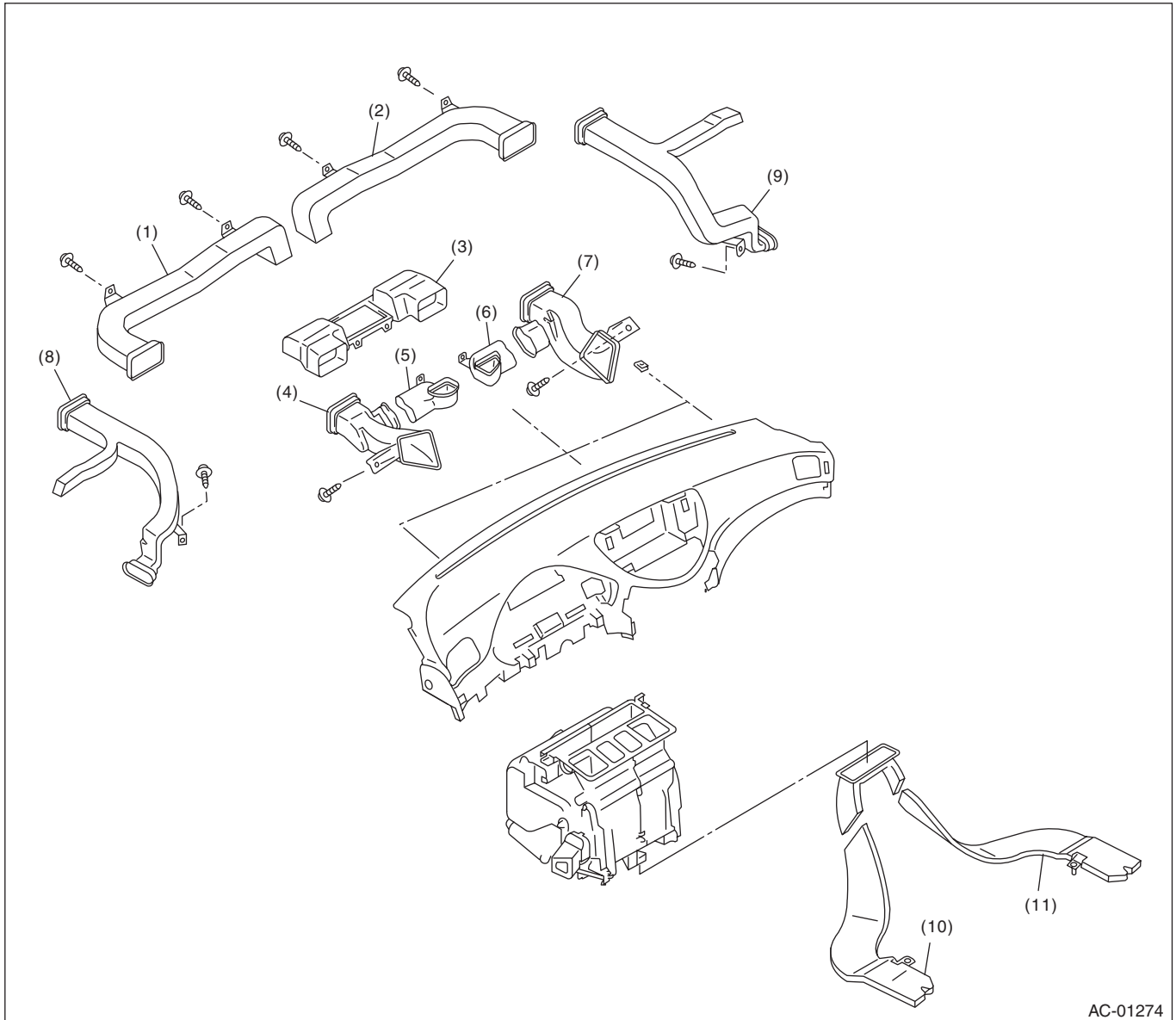
**T1: 26.5 (2.95, 21.3)**

**T2: 36 (3.7, 26.6)**

# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

## 6. HEATER DUCT



- |                                |                              |                              |
|--------------------------------|------------------------------|------------------------------|
| (1) Side ventilation duct (LH) | (5) Upper duct (LH)          | (9) Side defroster duct (RH) |
| (2) Side ventilation duct (RH) | (6) Upper duct (RH)          | (10) Rear heater duct (LH)   |
| (3) Center ventilation duct    | (7) Center duct (RH)         | (11) Rear heater duct (RH)   |
| (4) Center duct (LH)           | (8) Side defroster duct (LH) |                              |

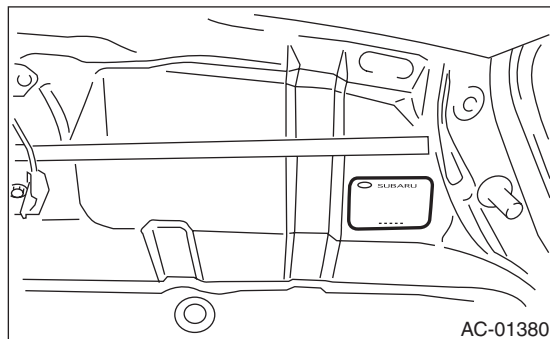
# General Description

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

### C: CAUTION

#### 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 which A/C system is installed to the vehicle.



#### 2. COMPRESSOR OIL

- HFC-134a compressor oil has no compatibility with that of CFC-12 system.
- Use only Denso Oil 8, the manufacturer-authorized compressor oil for the HFC-134a system.
- 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.

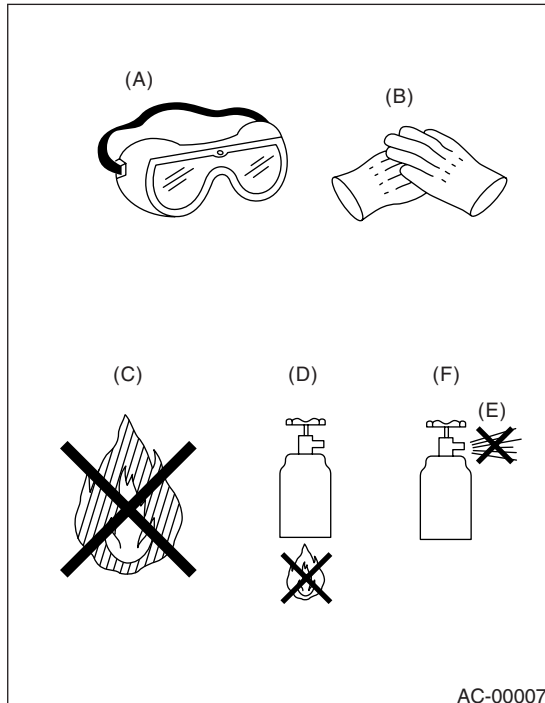
- HFC-134a compressor oil is very hygroscopic. When replacing or installing/removing A/C parts, immediately isolate the oil from atmosphere using a plug or tape. In order to avoid moisture, store the oil in a container with its cap tightly closed.

#### 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 subject a service can to impacts. (Observe the precautions and operation procedure described on the refrigerant can.)
- When the engine is running, do not open the high-pressure valve of the manifold gauge. High-pressure gas can back-flow resulting in an explosion of the can.
- Provide good ventilation and do not work in a closed area.
- In order to prevent global warming, avoid releasing HFC-134a into the atmosphere. Using a refrigerant recovery system, discharge and recycle the gas.



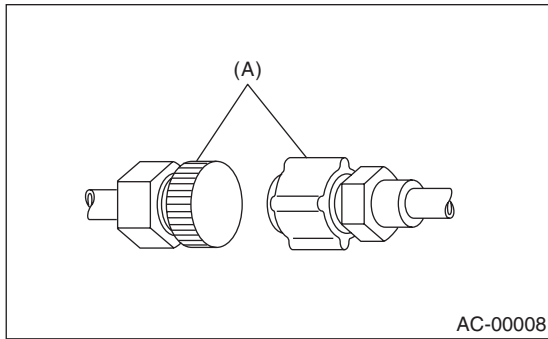
- (A) Goggles
- (B) Gloves
- (C) Avoid open flame
- (D) No direct heat on container
- (E) Do not discharge
- (F) Loosen

# General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

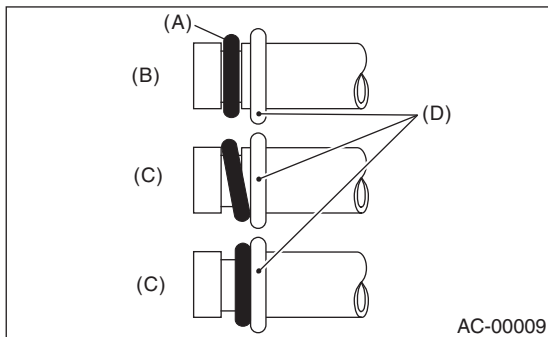
## 5. O-RING CONNECTIONS

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



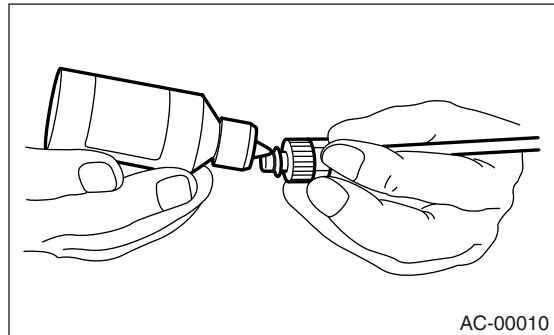
(A) Seal

- 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 at a right angle to tube beads.



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

- 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 grooves of the tube.



- 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.

## D: PREPARATION TOOL

### CAUTION:

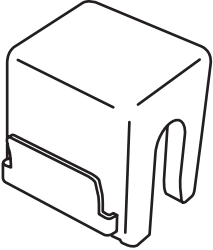
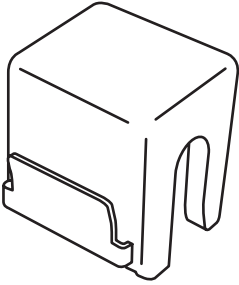
When working on vehicles with a HFC-134a system, only use HFC-134a specified tools and parts. Do not mix CFC-12 tools and parts. If HFC-134a and CFC-12 refrigerant or compressor oil is mixed, it will result in poor lubrication and the compressor itself may be damaged. In order to prevent the mixture of HFC-134a and CFC-12 parts and liquid, the tool and screw type and the type of service 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

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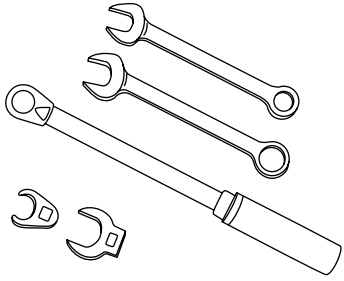
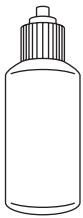
## 1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST73499XA00A	73499XA00A	S/T REMOVER PD	Used to disconnect the connector for a quick joint type air conditioner piping (high pressure side).
 ST73499XA01A	73499XA01A	S/T REMOVER PS	Used to disconnect the connector for a quick joint type air conditioner piping (high pressure side).

**NOTE:**

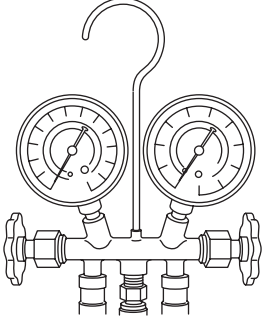
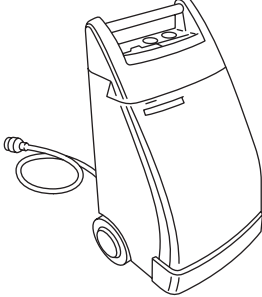
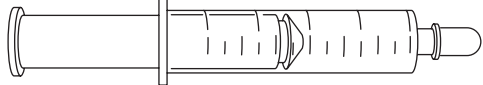
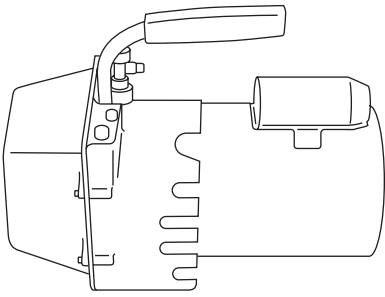
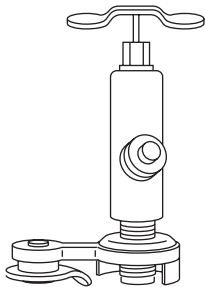
Read the instruction manual for the connector remover before using.

## 2. GENERAL TOOL

ILLUSTRATION	Name and Function
 AC-00213	<p><b>WRENCH</b></p> <p>Various <b>WRENCHES</b> will be required to service any A/C system. A 7 to 40 N·m (0.7 to 4.1 kg-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.</p>
 AC-00012	<p>Applicator bottle</p> <p>A small <b>APPLICATOR BOTTLE</b> is recommended to apply compressor oil to the various parts. It can be available at a hardware or drug store.</p>

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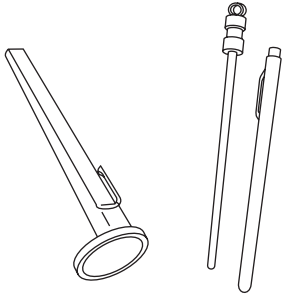
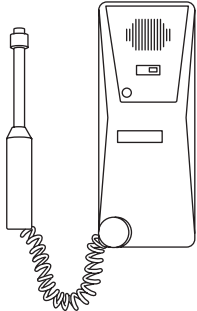
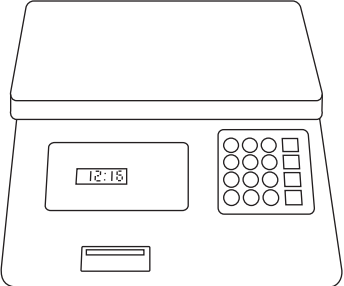
## HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

ILLUSTRATION	Name and Function
 <p>AC-00013</p>	<p>Manifold gauge set A <b>MANIFOLD GAUGE SET</b> (with hoses) is be available at either a refrigerant supplier or an automotive equipment supplier.</p>
 <p>AC-00014</p>	<p>Refrigerant recovery system 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>AC-00015</p>	<p>Syringe 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>AC-00016</p>	<p>Vacuum pump 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>AC-00017</p>	<p>Can tap A <b>CAN TAP</b> for the 397 g (14 oz.) can is available at an automotive equipment supplier.</p>



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

ILLUSTRATION	Name and Function
 <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>
 <p style="text-align: right;">AC-00019</p>	<p>Electronic leak detector</p> <p>An <b>ELECTRONIC LEAK DETECTOR</b> can be available at either a specialty tool supplier or an A/C equipment supplier.</p>
 <p style="text-align: right;">AC-00020</p>	<p>Scale</p> <p>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.</p>