

General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

1. General Description

A: SPECIFICATION

1. HEATER SYSTEM

Item		Specifications	Condition
Heating capacity		5.2 kW (4,471 kcal/h, 17,743 BTU/h) or more	- Mode selector switch: HEAT - Temperature control switch: MAX HOT - Temperature difference between hot water and inlet air: 65°C (149°F) - Hot water flow rate: 360 L (95.1 US gal, 79.2 Imp gal)/h
Air flow rate		340 m ³ (11,301 cu ft)/h	Heat mode (FRESH), MAX HOT at 12.5 V
Max air flow rate		550 m ³ (16,245 cu ft)/h	- Temperature control switch: MAX COOL - Blower fan speed: 6th position - Mode selector lever: RECIRC
Heater core size (height × length × width)		264 × 110 × 27 mm (10.4 × 4.33 × 1.06 in)	—
Blower motor	Type	Brush motor 260 W or less	12 V
	Fan type and size (diameter × width)	Sirocco fan type 165 × 70 mm (6.50 × 2.76 in)	—

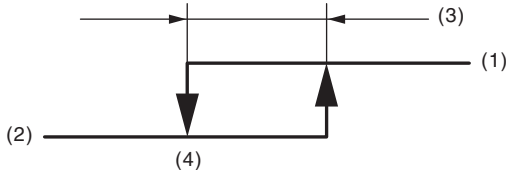
2. A/C SYSTEM

- Single A/C model (front only)

Item		Specifications
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 ₂ FCF ₃) 20 — 22 oz (0.57 — 0.63 kg, 1.26 — 1.39 lb)
Compressor	Type	Inclined plate (SWASH PLATE), fixed capacity (10SR17), Temperature fuse
	Discharge	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	1.24
Condenser	Type	Corrugated fin (Sub cool type)
	Core face area	0.29 m ² (3.122 sq ft)
	Core thickness	16 mm (0.63 in)
	Radiation area	7.65 m ² (82.35 sq ft)
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 × 70 mm (6.50 × 2.76 in)
	Power consumption	260 W
Condenser fan (Sub fan)	Motor type	Magnet
	Power consumption	200 W
	Fan outer diameter	320 mm (12.6 in)

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Item		Specifications	
Radiator fan (Main fan)		Motor type	Magnet
		Power consumption	200 W
		Fan outer diameter	320 mm (12.6 in)
Idle speed		MPFI model	No load: 700±100 rpm A/C ON: 805±100 rpm
Triple switch (Pressure switch)	Low-pressure switch operating pressure	ON → OFF	196±20 kPa (2.00±0.20 kg/cm ² , 28.4±2.9 psi)
		OFF → ON	225 ⁺²⁵ ₋₂₉ kPa (2.29 ^{+0.25} _{-0.30} kg/cm ² , 32.6 ^{+3.6} _{-4.2} psi)
	High-pressure switch operating pressure	ON → OFF	3,140 ⁺⁵⁰ ₋₂₀₀ kPa (32.02 ^{+0.51} _{-2.04} kg/cm ² , 455.4 ^{+7.25} _{-29.0} psi)
		OFF → ON	2,550±200 kPa (26.00±2.04 kg/cm ² , 369.8±29.0 psi)
	Middle-pressure switch operating pressure	ON → OFF	1,370±120 kPa (13.97±1.22 kg/cm ² , 198.65±17.35 psi)
		OFF → ON	1,770±80 kPa (18.05±0.82 kg/cm ² , 256.81±11.60 psi)
Thermo-control amplifier working temperature (Evaporator outlet air)			
		AC-00601	
		(1) ON (2) OFF (3) 1°C (33.8°F) (4) 1.5 ^{+8.0} ₋₀ °C (34.7 ^{+46.4} ₋₀ °F)	

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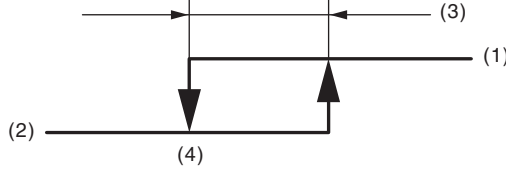
HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

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

Item		Specifications	
Type of air conditioner	Front	Reheat air-mix type	
	Rear	Cooler	
Cooling capacity		7.2 kW (6,191 kcal/h, 24.56 BTU/h)	
Refrigerant		HFC-134a (CH ₂ FCF ₃) 30 — 32 oz (0.84 — 0.90 kg, 1.85 — 1.98 lb)	
Compressor	Type	Inclined plate (SWASH PLATE), fixed capacity (10SR17), Temperature fuse	
	Discharge	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)	
Condenser	Pulley ratio	1.24	
	Type	Corrugated fin (Sub cool type)	
	Core face area	0.29 m ² (3.122 sq ft)	
	Core thickness	16 mm (0.63 in)	
Expansion valve	Front	Type	Box time (external pressure equalizing type)
	Rear	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 × 70 mm (6.49 × 2.76 in)
		Power consumption	260 W
	Rear	Fan type	Sirocco fan
		Outer diameter × width	150 × 70 mm (5.91 × 2.76 in)
		Power consumption	150 W or less
Condenser fan (Sub fan)	Motor type		Magnet
	Power consumption		200 W
	Fan outer diameter		320 mm (12.6 in)
Radiator fan (Main fan)	Motor type		Magnet
	Power consumption		200 W
	Fan outer diameter		320 mm (12.6 in)
Idle speed	MPFI model		No load: 700±100 rpm A/C ON: 805±100 rpm

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HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

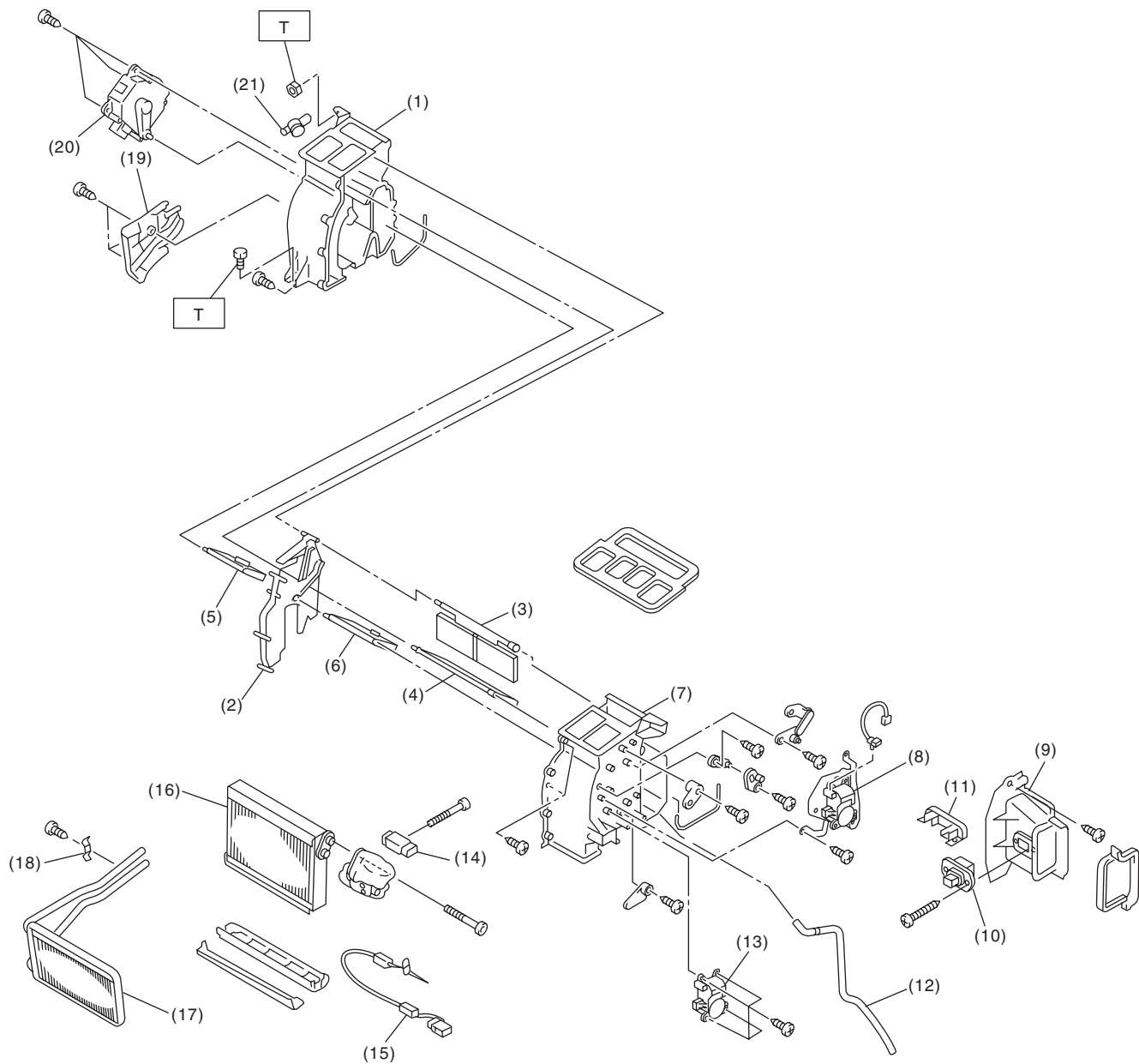
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		OFF → ON	1,770±80 kPa (18.05±0.82 kg/cm ² , 256.81±11.60 psi)
Thermo-control amplifier working temperature (Evaporator outlet air)			 AC-00601 (1) ON (2) OFF (3) 1°C (33.8°F) (4) 1.5^{+0.8}°C (34.7^{+46.4}°F)

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HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

B: COMPONENT

1. HEATER COOLING UNIT



AC-01268

General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

(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	

Tightening torque: N·m (kgf-m, ft-lb)

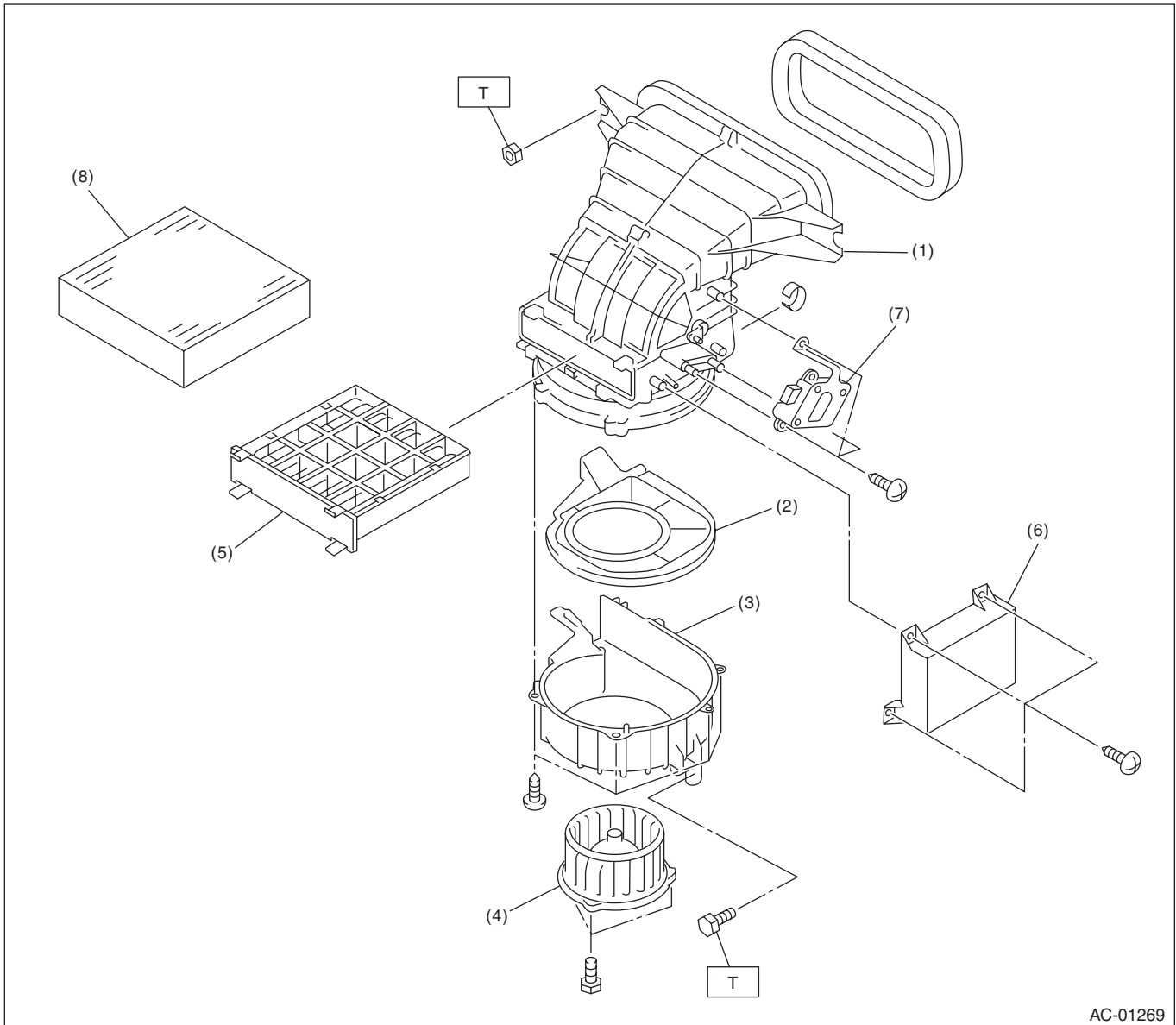
T: 7.5 (0.76, 5.5)

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HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

2. BLOWER MOTOR UNIT

Front



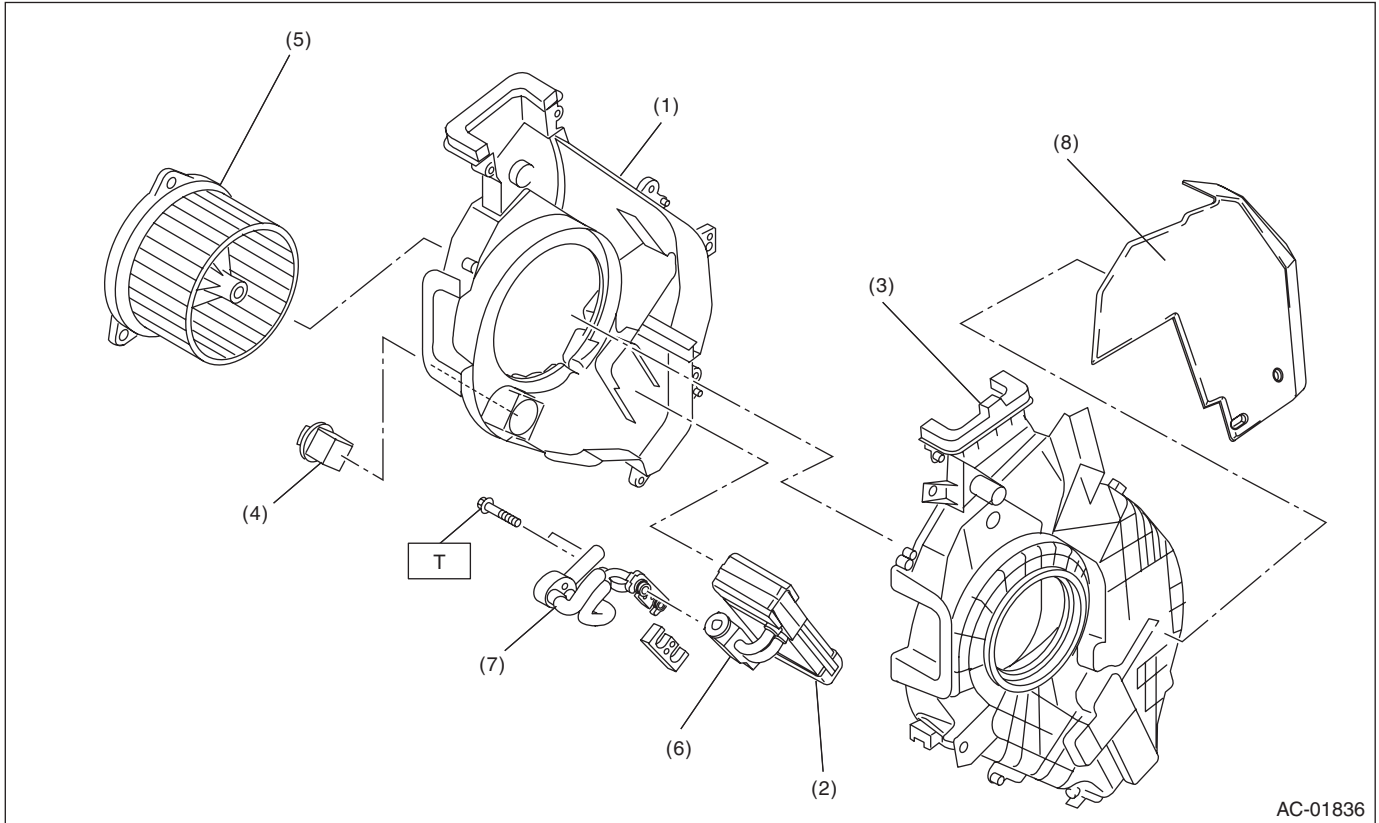
- | | |
|------------------|-----------------------------------|
| (1) Upper case | (5) Filter cover |
| (2) Blower plate | (6) Control unit (auto A/C model) |
| (3) Lower case | (7) Intake door actuator |
| (4) Blower motor | (8) Filter |

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

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HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

Rear



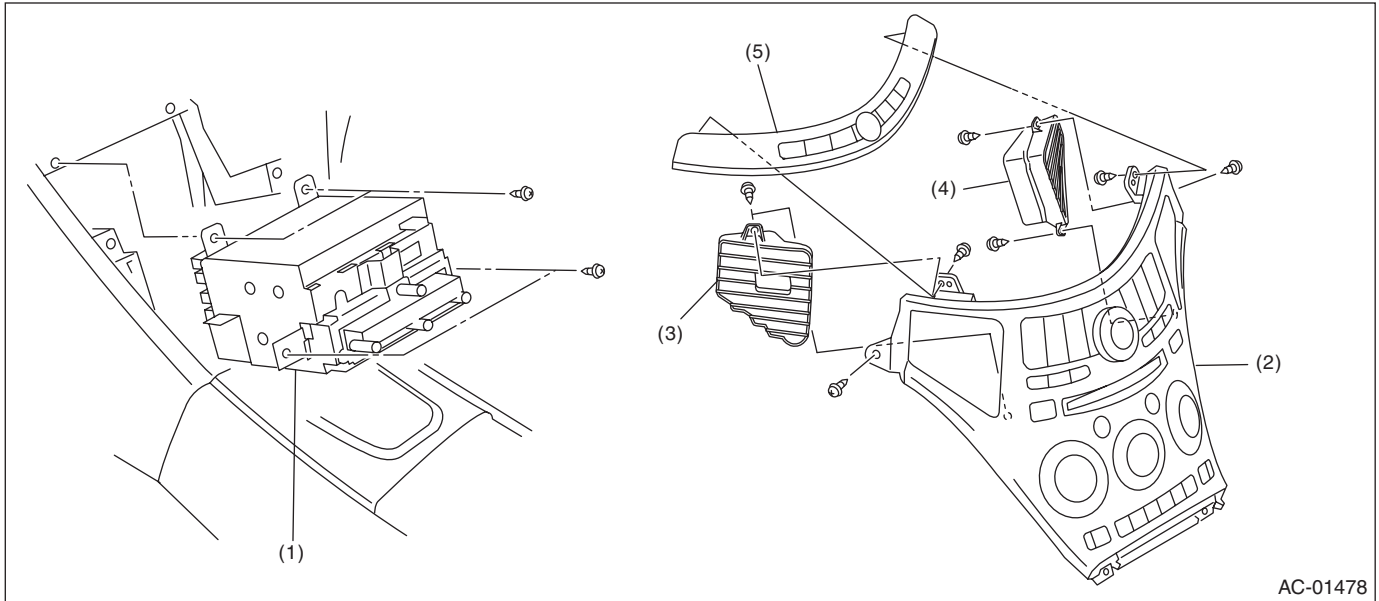
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|---------------------|---------------------|
| (1) Inner case | (5) Blower motor |
| (2) Evaporator | (6) Expansion valve |
| (3) Outer case | (7) Expansion tube |
| (4) Blower resistor | (8) Cover |

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

General Description

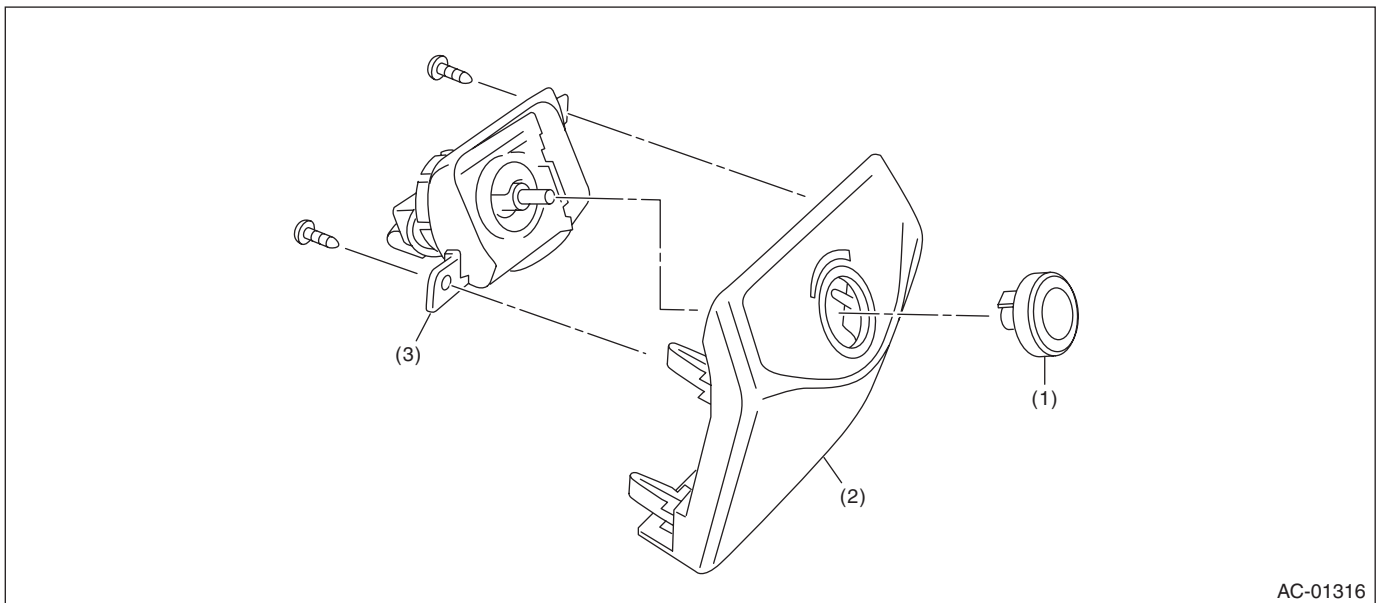
HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

3. CONTROL PANEL



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

Rear cooler model



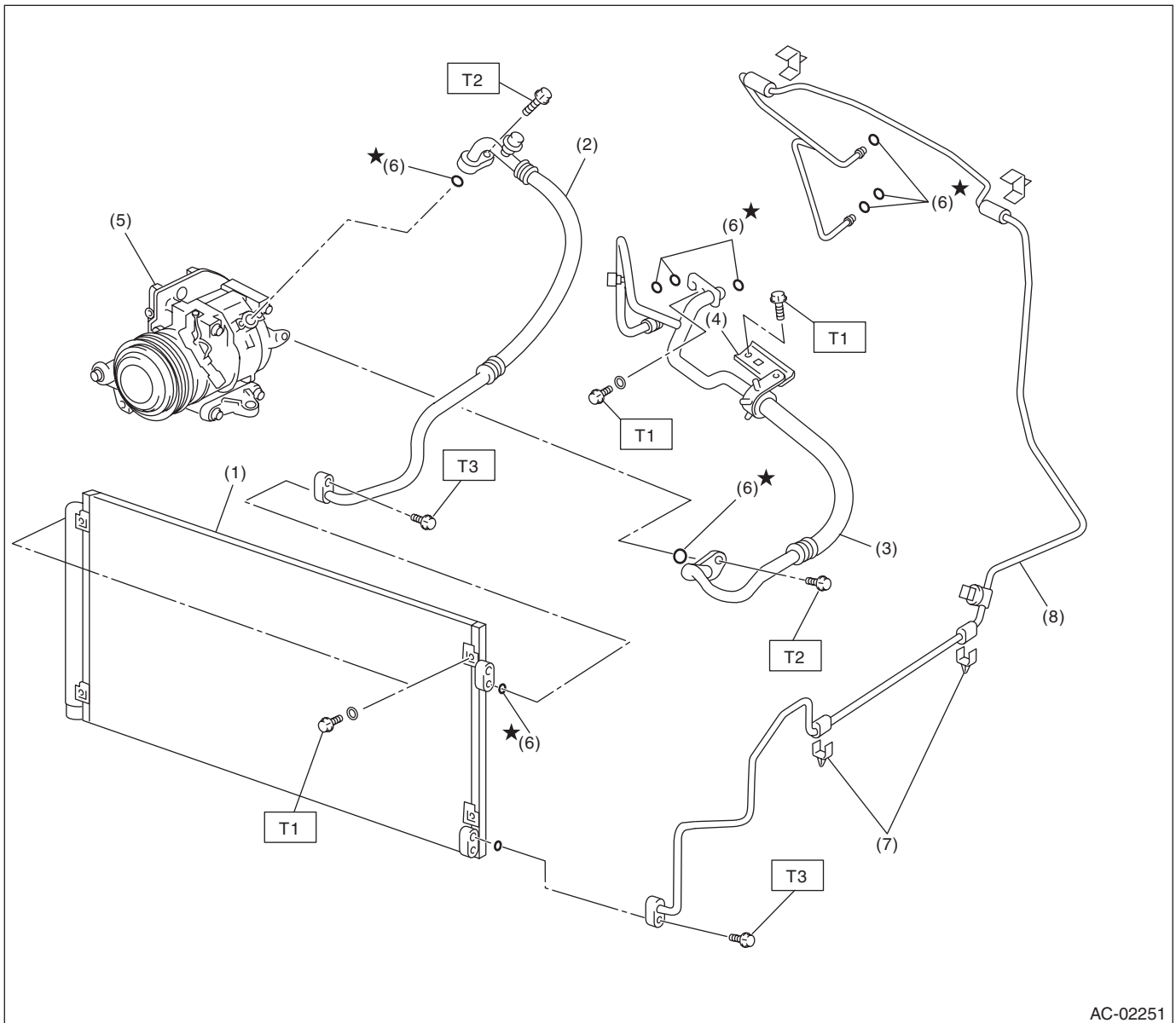
- | | | |
|----------|-------------------|-------------------|
| (1) Dial | (2) Control panel | (3) Blower switch |
|----------|-------------------|-------------------|

General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

4. AIR CONDITIONING UNIT

Front



- | | |
|--------------------------|----------------|
| (1) Condenser | (5) Compressor |
| (2) Hose (high-pressure) | (6) O-ring |
| (3) Hose (low-pressure) | (7) Clamp |
| (4) Bracket | (8) Pipe |

Tightening torque: N·m (kgf-m, ft-lb)

T1: 7.5 (0.76, 5.5)

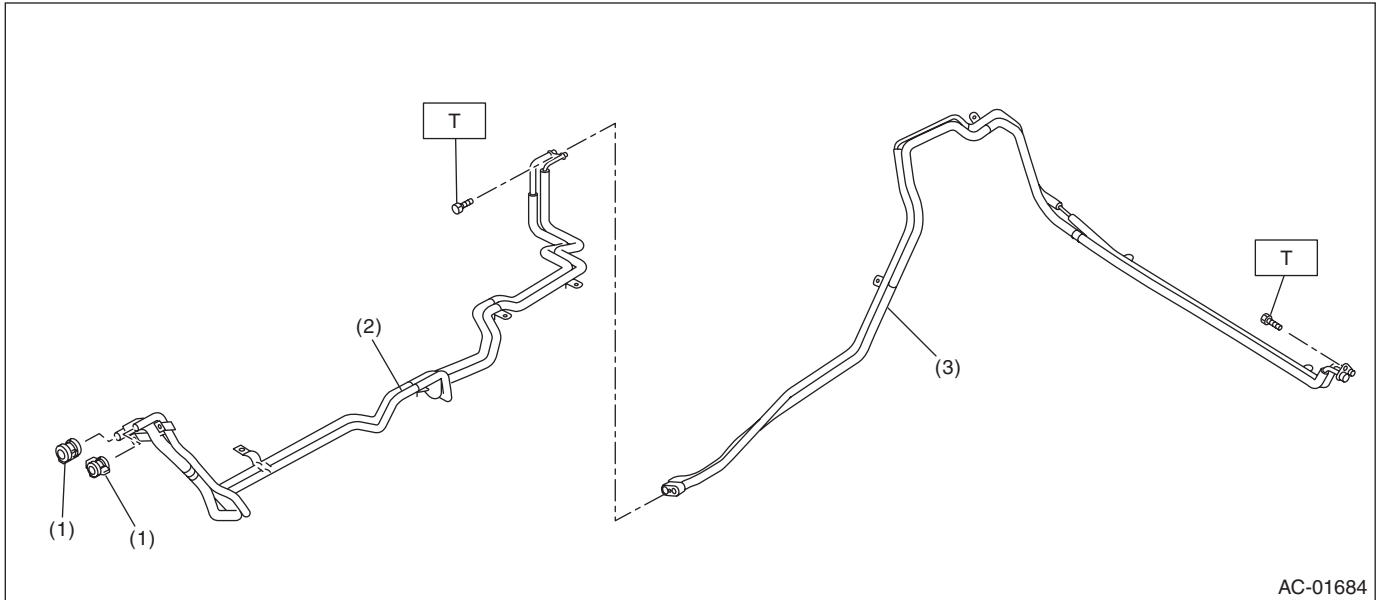
T2: 10 (1.0, 7.4)

T3: 5 (0.5, 3.7)

General Description

HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

Rear

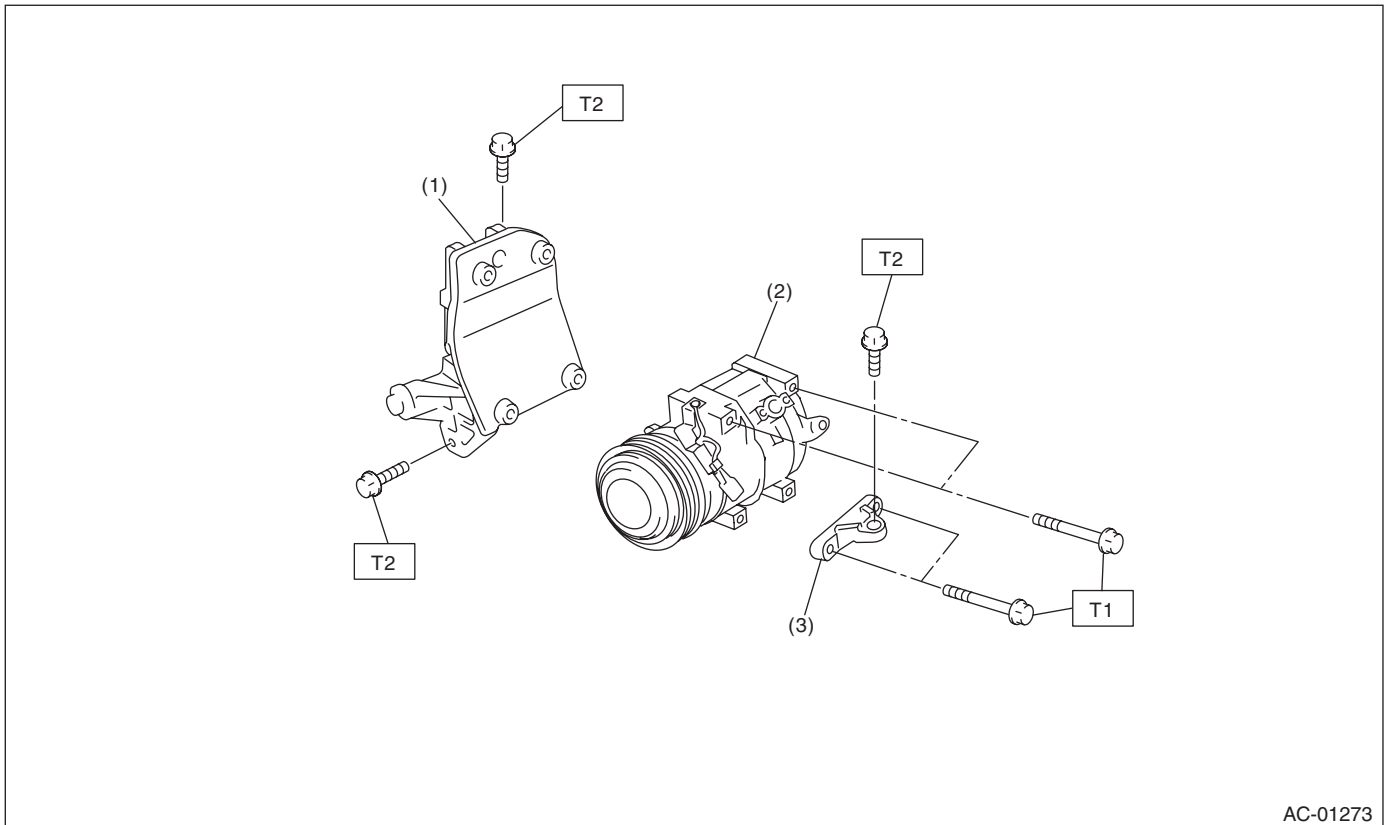


- (1) Quick connector
- (2) Front pipe
- (3) Rear pipe

Tightening torque: N·m (kgf·m, ft·lb)

T: 7.5 (0.76, 5.5)

5. COMPRESSOR



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

Tightening torque: N·m (kgf·m, ft·lb)

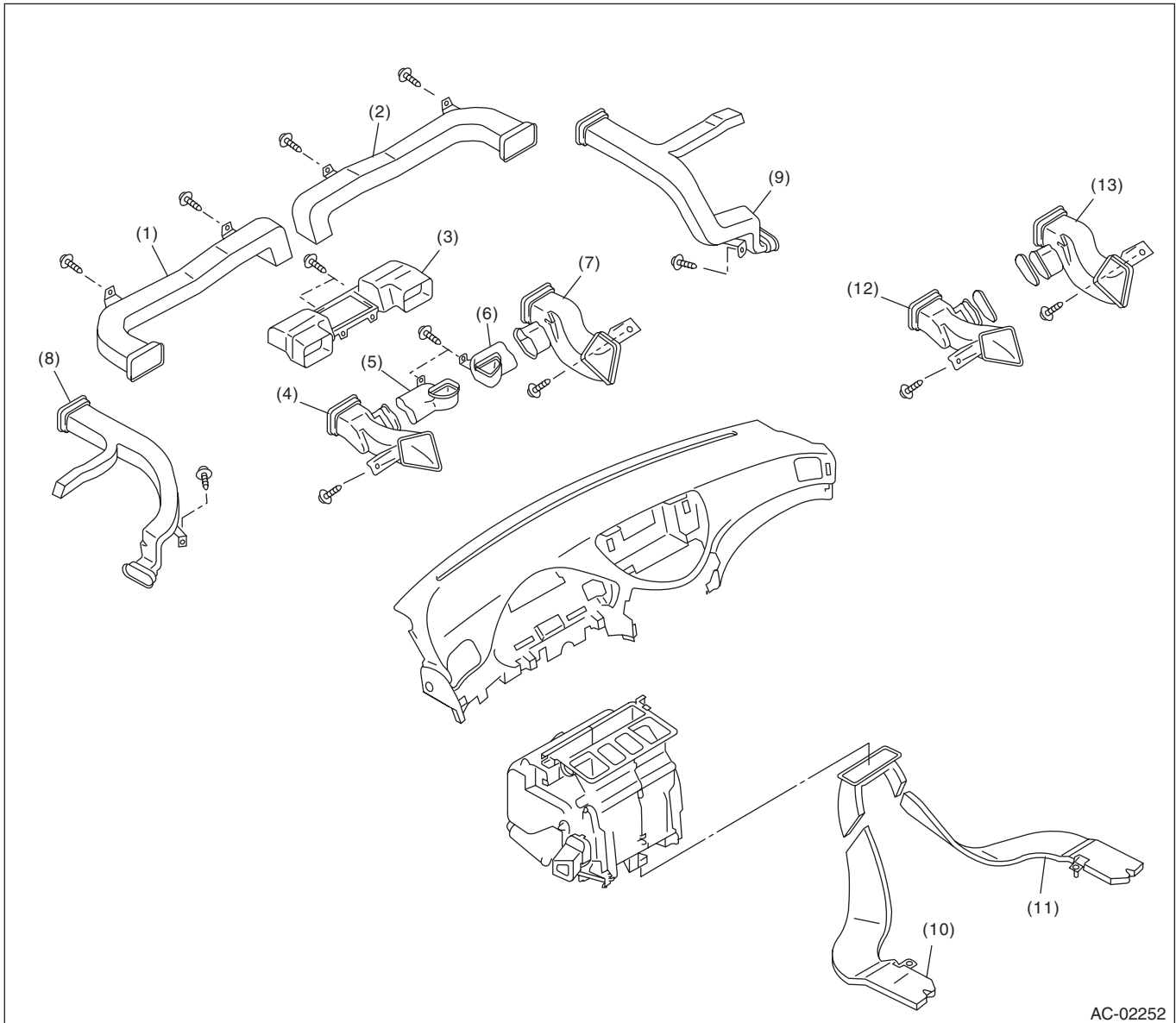
T1: 26.5 (2.95, 21.3)

T2: 36 (3.7, 26.6)

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6. HEATER DUCT



AC-02252

- | | | |
|------------------------------|----------------------------|---|
| (1) Side ventilation duct LH | (6) Upper duct RH | (10) Rear heater duct LH |
| (2) Side ventilation duct RH | (7) Center duct RH | (11) Rear heater duct RH |
| (3) Center ventilation duct | (8) Side defroster duct LH | (12) Center duct LH (for harman/
kardon audio) |
| (4) Center duct LH | (9) Side defroster duct RH | (13) Center duct RH (for harman/
kardon audio) |
| (5) Upper duct LH | | |

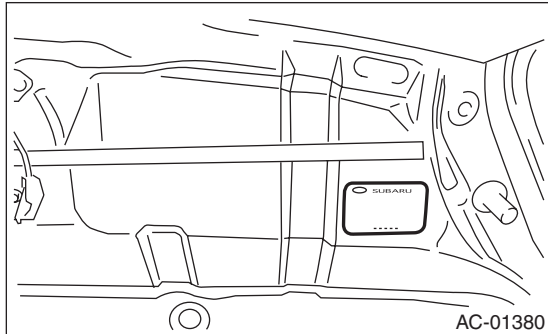
General Description

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 attached to the vehicle. Before maintenance, check which A/C system is installed to the vehicle.



2. COMPRESSOR OIL

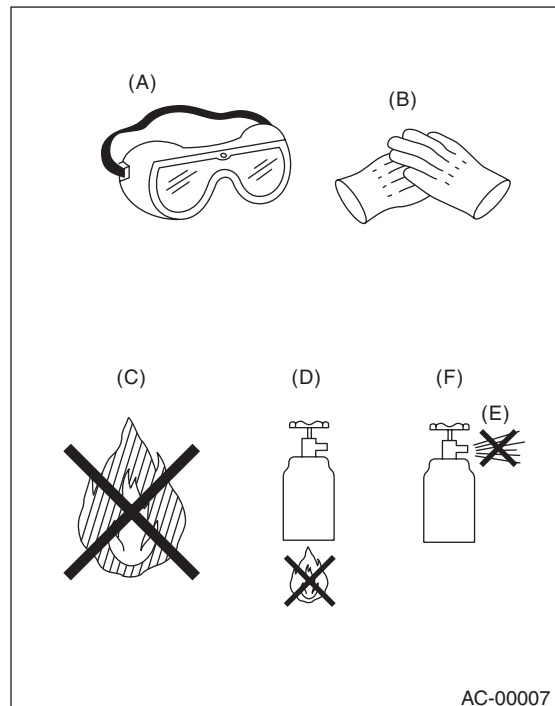
- HFC-134a compressor oil has no compatibility with that of CFC-12 system.
 - Use only DENSO OIL 8, the manufacturer-authorized compressor oil for the HFC-134a system.
 - Do not mix multiple compressor oils.
- If CFC-12 compressor oil is used in the HFC-134a A/C system, the compressor may become stuck 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°C (-22°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°C (104°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.



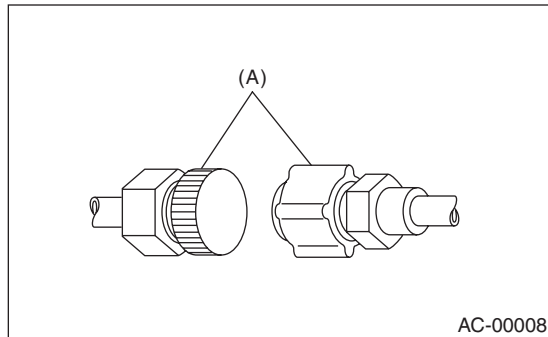
- (A) Goggles
- (B) Gloves
- (C) Avoid open flame
- (D) No direct heat on container
- (E) Do not discharge
- (F) Loosen

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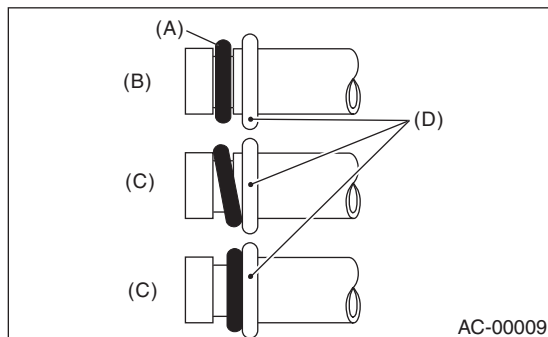
5. O-RING CONNECTIONS

- 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 groove of the pipe.

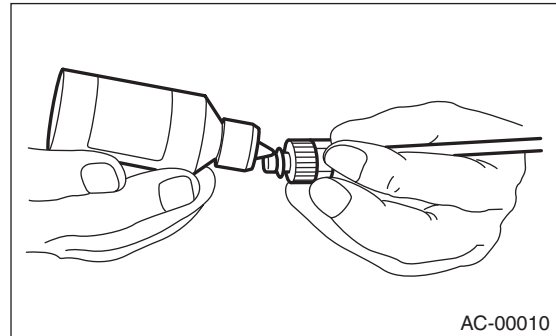


- (A) O-ring
- (B) OK
- (C) NG
- (D) Groove

- 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 pipe.



- 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:

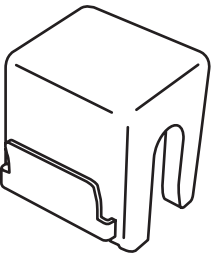
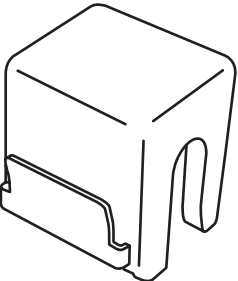
If HFC-134a and CFC-12 refrigerant or compressor oil is mixed, it will result in poor lubrication and the compressor itself may be damaged, be careful of the following:

- 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.
- The gas leak detectors for the HFC-134a and CFC-12 systems must also not be interchanged.

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.

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

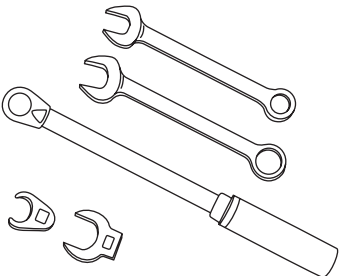
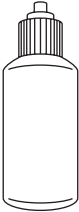
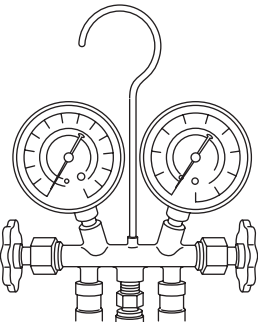
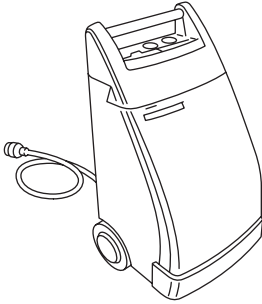
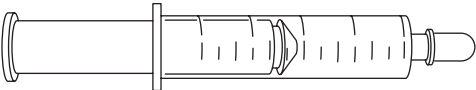
1. SPECIAL TOOL

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).

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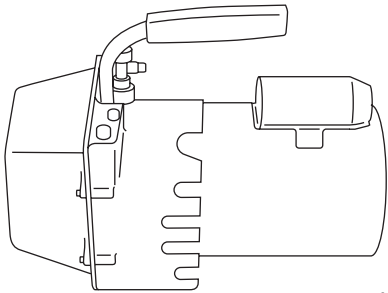
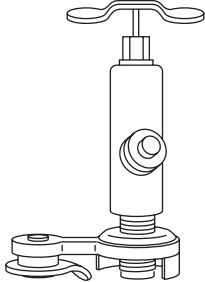
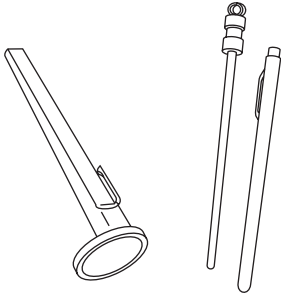
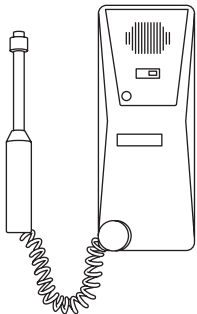
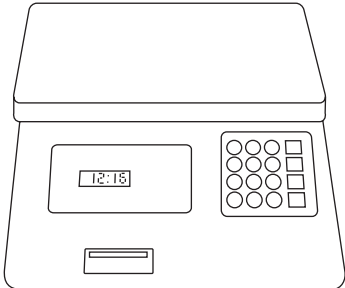
HVAC SYSTEM (HEATER, VENTILATOR AND A/C)

2. GENERAL TOOL

Illustration	Name and Function
 AC-00213	Wrench Various WRENCHES will be required to service any A/C system. 7 — 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 affix the pipe and hose fittings.
 AC-00012	Applicator bottle A small APPLICATOR BOTTLE is recommended to apply compressor oil to the various parts. It can be available at a hardware or drug store.
 AC-00013	Manifold gauge set A MANIFOLD GAUGE SET (with hoses) is available at either a refrigerant supplier or an automotive equipment supplier.
 AC-00014	Refrigerant recovery system A REFRIGERANT RECOVERY SYSTEM is used for the recovery and recycling of A/C system refrigerant after contaminants and moisture have been removed from the refrigerant.
 AC-00015	Syringe A graduated plastic SYRINGE will be needed to add oil into the system again. A syringe can be available at a pharmacy or drug store.

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Illustration	Name and Function
 AC-00016	Vacuum pump A VACUUM PUMP is necessary (for a good working condition), and may be available at either a refrigerant supplier or an automotive equipment supplier.
 AC-00017	Can tap A CAN TAP for the 397 g (14 oz.) can is available at an automotive equipment supplier.
 AC-00018	Thermometer A pocket THERMOMETER is available either at a industrial hardware store or a refrigerant supplier.
 AC-00019	Electronic leak detector An ELECTRONIC LEAK DETECTOR can be available at either a specialty tool supplier or an A/C equipment supplier.
 AC-00020	Weight scale A WEIGHT SCALE 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.