

GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

1. General Description S701001

A: SPECIFICATIONS S701001E49

1. HVAC SYSTEM S701001E4901

| Item | | Specifications | Condition |
|---|---|---|--|
| Heating capacity | | 4.652 kW (4,000 kcal/h, 15,872 BTU/h) or more | <ul style="list-style-type: none"> ● Mode selector switch: HEAT ● Temperature control switch: FULL 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 | | 270 m ³ (9,534 cu ft)/h | Heat mode (FRESH), FULL HOT at 12.5 V |
| Max air flow rate | | 480 m ³ (16,949 cu ft)/h | <ul style="list-style-type: none"> ● Temperature control switch: FULL COLD ● Blower fan speed: 4th position ● Mode selector lever: RECIRC |
| Heater core size (height × length × width × thickness) | | 192.4 × 152.0 × 25.0 × 1.8 mm (7.57 × 5.98 × 0.984 × 0.071 in) | — |
| Blower motor | Type | Magnet motor 200 W or less | at 12 V |
| | Fan type and size (diameter × width) | Sirocco fan type 150 × 75 mm (5.91 × 2.95 in) | — |

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2. A/C SYSTEM S701001E4902

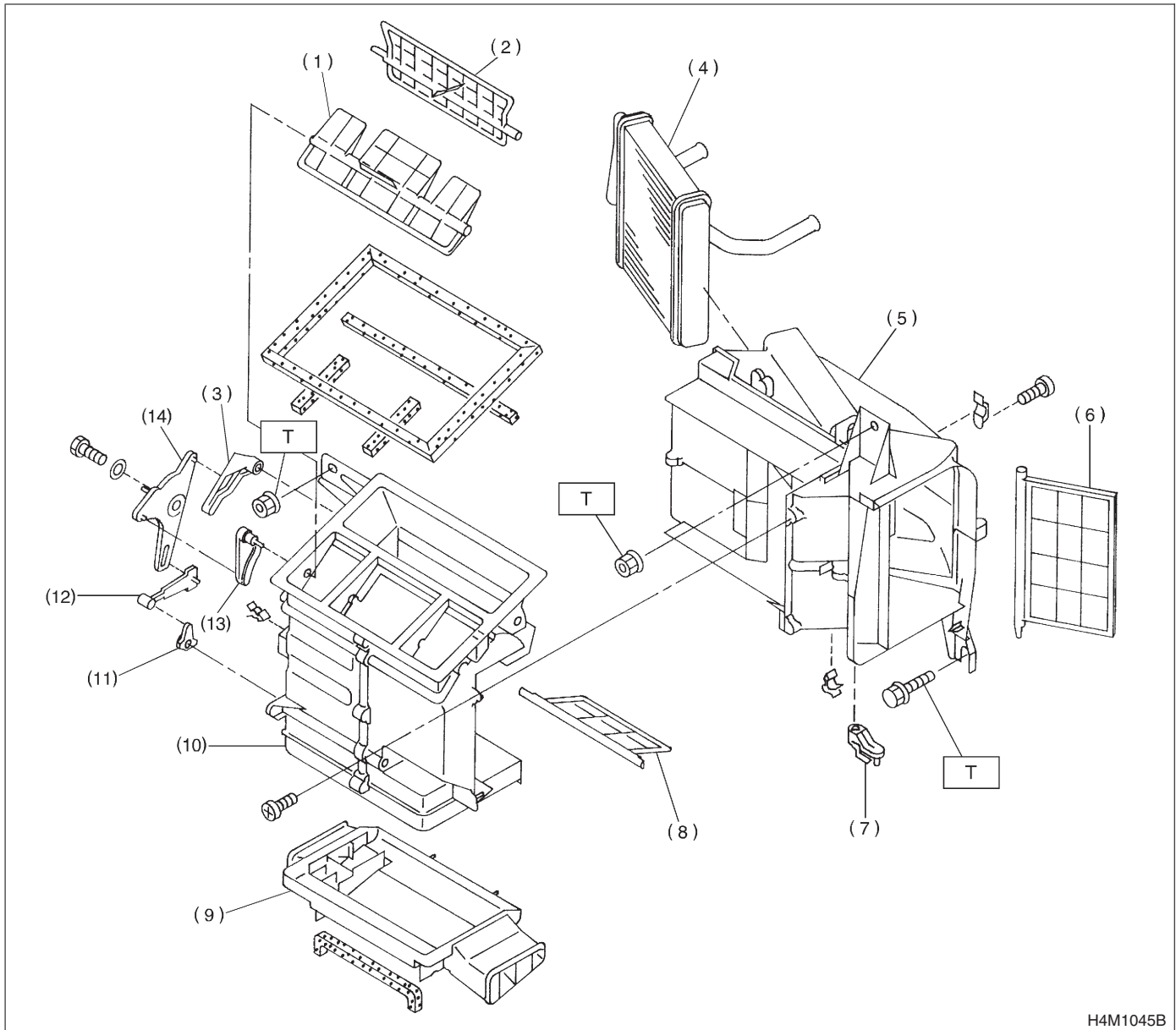
| Item | | Specifications | |
|---|--|--|--|
| Type of air conditioner | | Reheat air-mix type | |
| Cooling capacity | | 5.234 kW (4,500 kcal/h, 17,856 BTU/h) | |
| Refrigerant | | HFC-134a (CH ₂ FCF ₃) [0.6±0.05 kg (1.3±0.11 lb)] | |
| Compressor | Type | 5-vane rotary, fix volume (CR-14) | |
| | Discharge | 144 cm ³ (8.79 cu in)/rev | |
| | Max. permissible speed | 7,000 rpm | |
| Magnet clutch | Type | Dry, single-disc type | |
| | Power consumption | 47 W | |
| | Type of belt | V-Ribbed 4 PK | |
| | Pulley dia. (effective dia.) | 125 mm (4.92 in) | |
| | Pulley ratio | 1.064 | |
| Condenser | Type | Corrugated fin (Multi-flow) | |
| | Core face area | 0.211 m ² (2.27 sq ft) | |
| | Core thickness | 19 mm (0.75 in) | |
| | Radiation area | 5.76 m ² (62 sq ft) | |
| Receiver drier | Effective inner capacity | 250 cm ³ (15.26 cu in) | |
| Expansion valve | Type | Internal equalizing | |
| Evaporator | Type | Single tank | |
| | Dimensions (W × H × T) | 74 × 222 × 235 mm (2.91 × 8.74 × 9.25 in) | |
| Blower fan | Fan type | Sirocco fan | |
| | Outer diameter × width | 140 × 75 mm (5.51 × 2.95 in) | |
| | Power consumption | 200 W at 12 V | |
| Condenser fan (Sub fan) | Motor type | Magnet | |
| | Power consumption | 70 W at 12 V | |
| | Fan outer diameter | 320 mm (12.60 in) | |
| Radiator fan (Main fan) | Motor type | Magnet | |
| | Power consumption | 70 W at 12 V | |
| | Fan outer diameter | 320 mm (12.60 in) | |
| Idling speed (A/C ON) | MPFI model | 850±100 rpm (700±100 rpm "D" range in AT model) | |
| Dual switch (Pressure switch) | Low-pressure switch operating pressure | ON → OFF | 176±29 kPa (1.80±0.30 kg/cm ² , 25.5±4.3 psi) |
| | | OFF → ON | 186 ⁺³⁹ / ₋₂₅ kPa (1.90 ^{+0.4} / _{-0.25} kg/cm ² , 27.0 ^{+5.7} / _{-3.6} psi) |
| | High-pressure switch operating pressure | ON → OFF | 2,942±98 kPa (30±1 kg/cm ² , 427±14 psi) |
| | | DIFF | 588±196 kPa (6±2 kg/cm ² , 85±28 psi) |
| Compressor relief valve blow-out pressure | | 3,727±196 kPa (38±2.0 kg/cm ² , 540±28 psi) | |
| Thermo control amplifier working temperature (Evaporator outlet air) | | <p style="text-align: center;"> OFF ————— 3.0 ± 0.5°C (37 ± 0.9°F) ————— ON Diff. 1.5 ± 0.5°C (35 ± 0.9°F) </p> | |
| | | G4M0938 | |
| Compressor thermocut temperature | | 150±5°C (302±9°F) Diff. -3±5°C (27±9°F) | |

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B: COMPONENT S701001A05

1. HEATER UNIT S701001A0501



H4M1045B

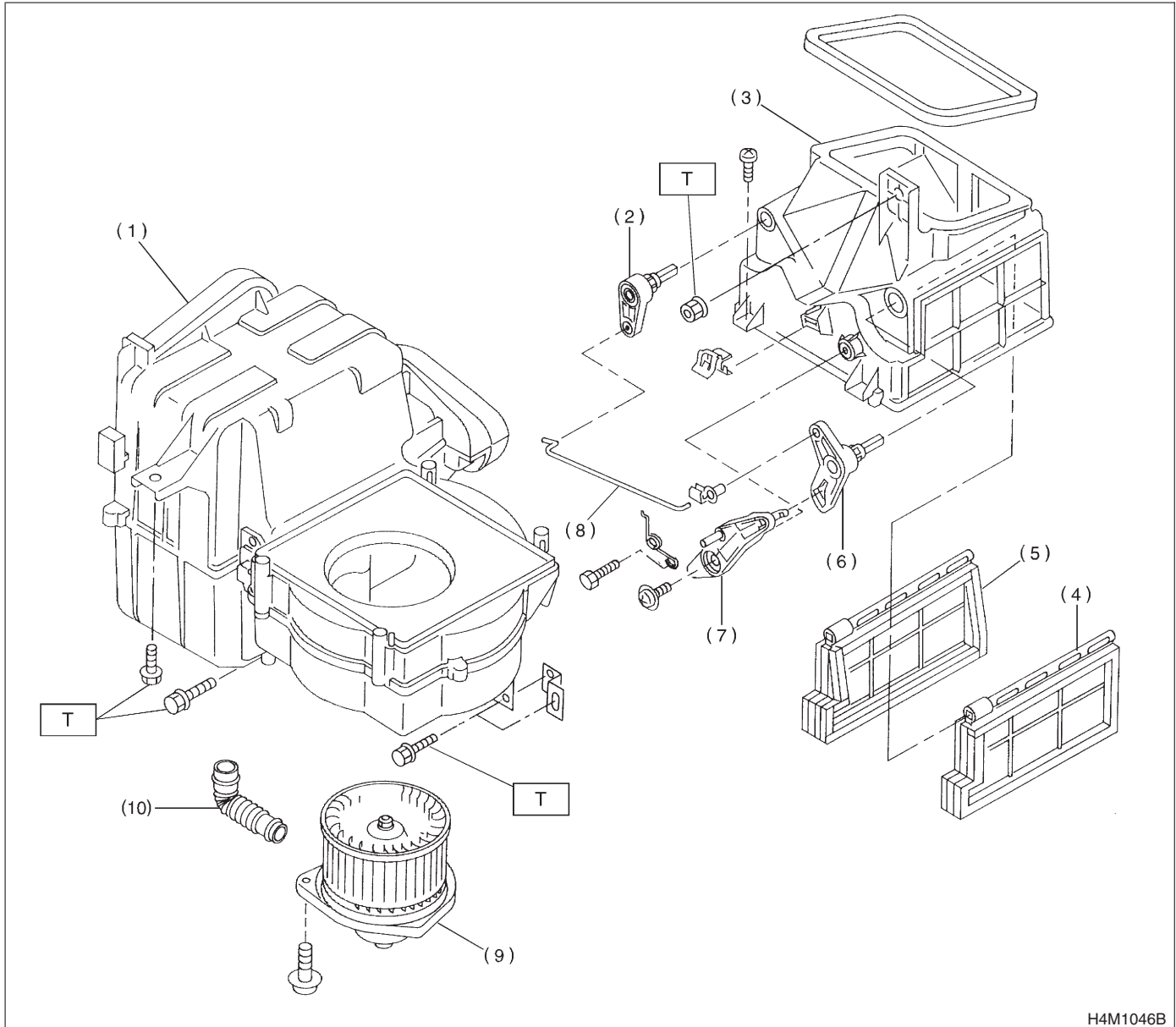
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|-----------------------|-----------------------|-----------------|
| (1) Vent door | (7) Mix lever | (13) Vent lever |
| (2) DEF door | (8) Foot door | (14) Side link |
| (3) DEF lever | (9) Foot duct | |
| (4) Heater core | (10) Heater case REAR | |
| (5) Heater case FRONT | (11) Foot lever lower | |
| (6) Mix door | (12) Foot lever upper | |

Tightening torque: N-m (kgf-m, ft-lb)
T: 7.35 (0.750, 5.421)

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2. INTAKE UNIT S701001A0502



H4M1046B

- | | |
|----------------------------|-----------------------|
| (1) Intake unit case lower | (6) Lever (A) |
| (2) Lever (B) | (7) Link |
| (3) Intake unit case upper | (8) Rod |
| (4) Door (A) | (9) Blower motor ASSY |
| (5) Door (B) | (10) Aspirator pipe |

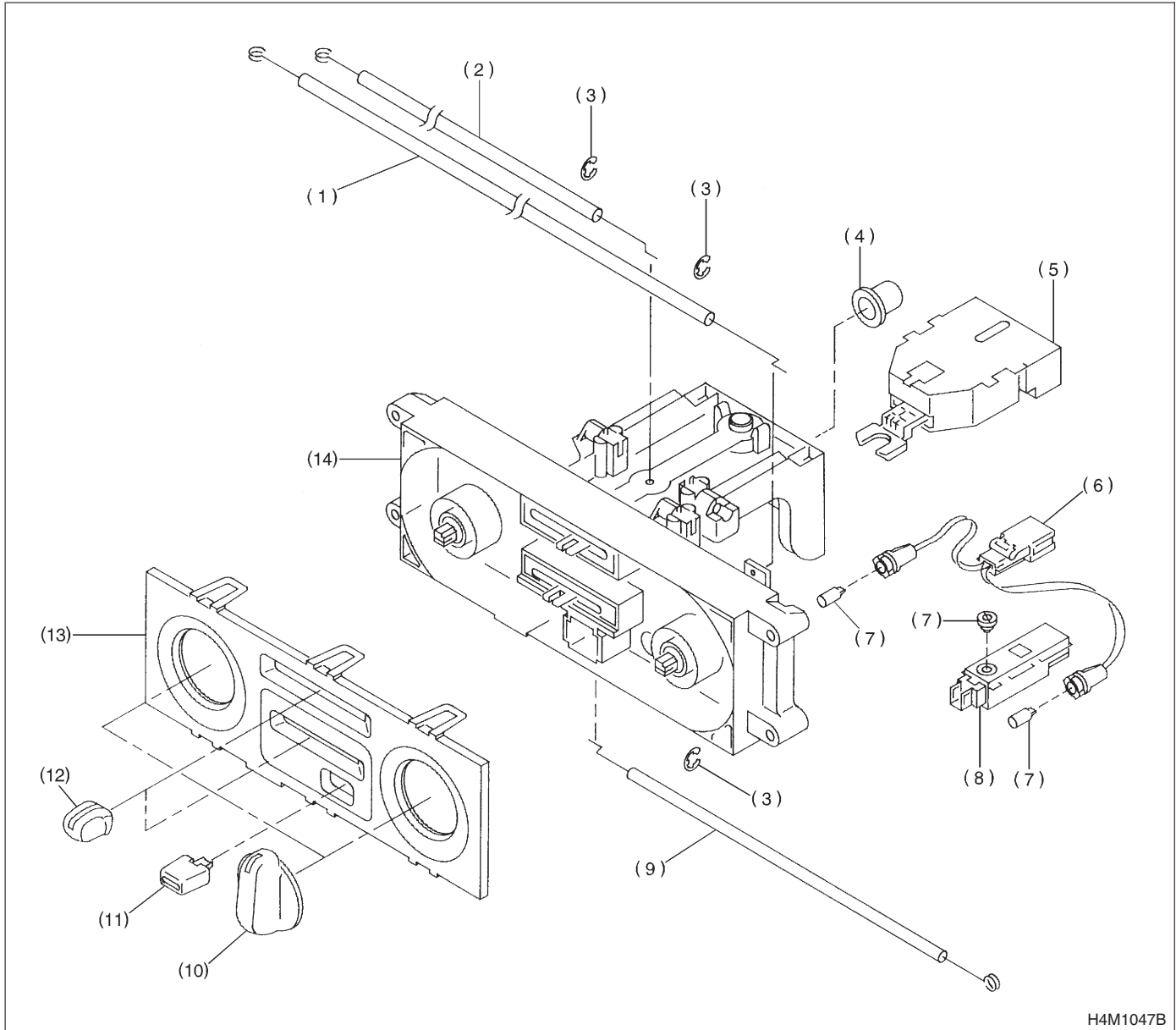
Tightening torque: N·m (kgf·m, ft·lb)

T: 7.35 (0.750, 5.421)

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3. CONTROL UNIT S701001A0503



- (1) Temperature control cable
- (2) Recirc control cable
- (3) Clip
- (4) Grommet
- (5) Blower switch ASSY

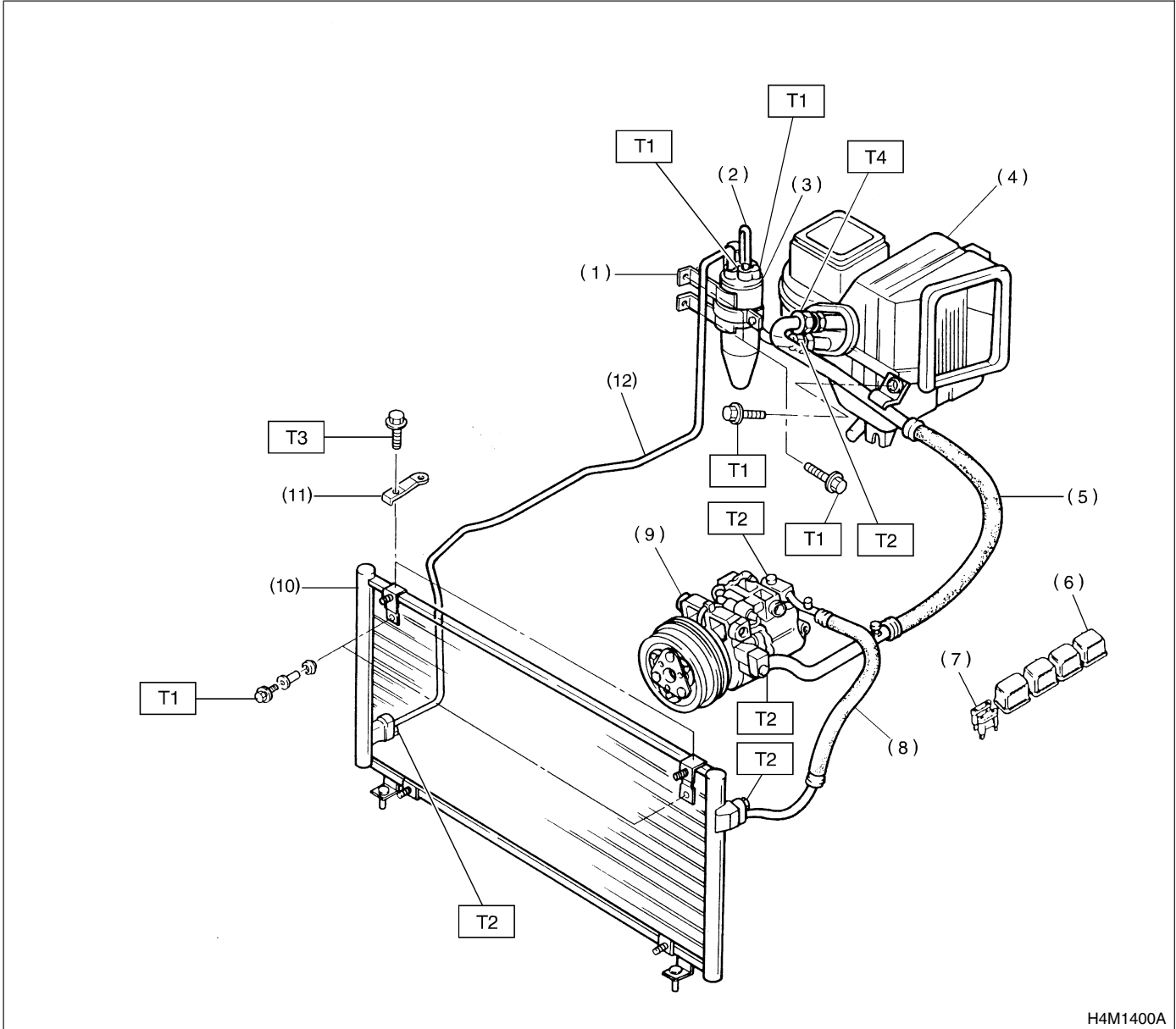
- (6) Harness ASSY
- (7) Bulb
- (8) A/C switch ASSY
- (9) Mode control cable
- (10) Control dial knob

- (11) A/C switch knob
- (12) Control lever knob
- (13) Plate
- (14) Base unit

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4. AIR CONDITIONING UNIT S701001A0504



H4M1400A

- | | |
|------------------------------------|--|
| (1) Receiver drier bracket | (8) Hose (High-pressure) |
| (2) Pipe (Receiver drier — C/unit) | (9) Compressor |
| (3) Receiver drier | (10) Condenser |
| (4) Cooling unit | (11) Radiator bracket |
| (5) Hose (Low-pressure) | (12) Pipe (Condenser — Receiver drier) |
| (6) A/C relay | |
| (7) Fuse | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 7.4 (0.75, 5.4)

T2: 18 (1.8, 13)

T3: 15 (1.5, 11)

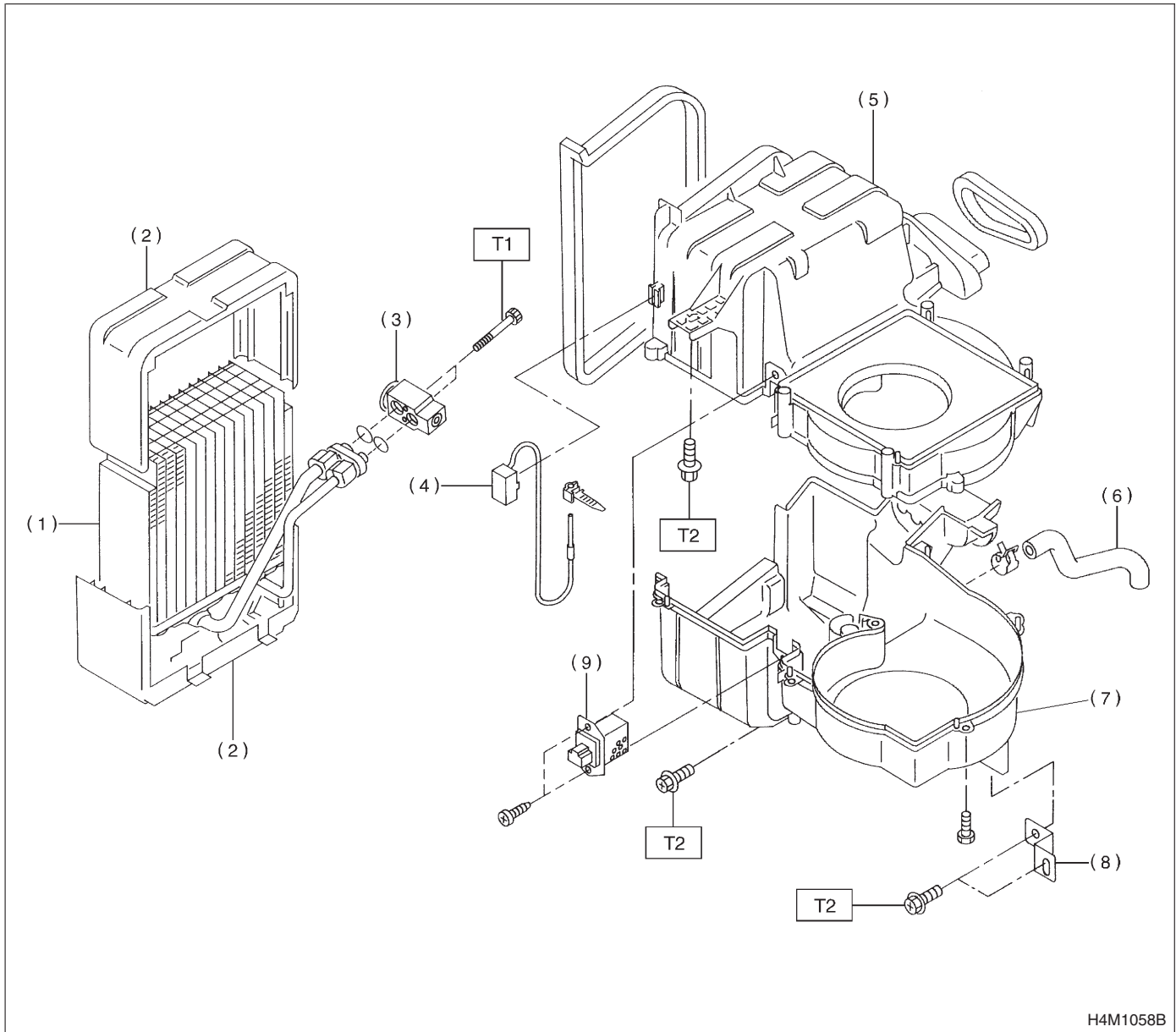
T4: 25 (2.5, 18)

GENERAL DESCRIPTION

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5. INTAKE UNIT WITH EVAPORATOR

S701001A0505



- | | |
|------------------------------|----------------------------|
| (1) Evaporator | (6) Drain hose |
| (2) Insulator | (7) Intake unit case lower |
| (3) Block expansion valve | (8) Mount bracket |
| (4) Thermo control amplifier | (9) Resistor |
| (5) Intake unit case upper | |

Tightening torque: N·m (kgf·m, ft·lb)

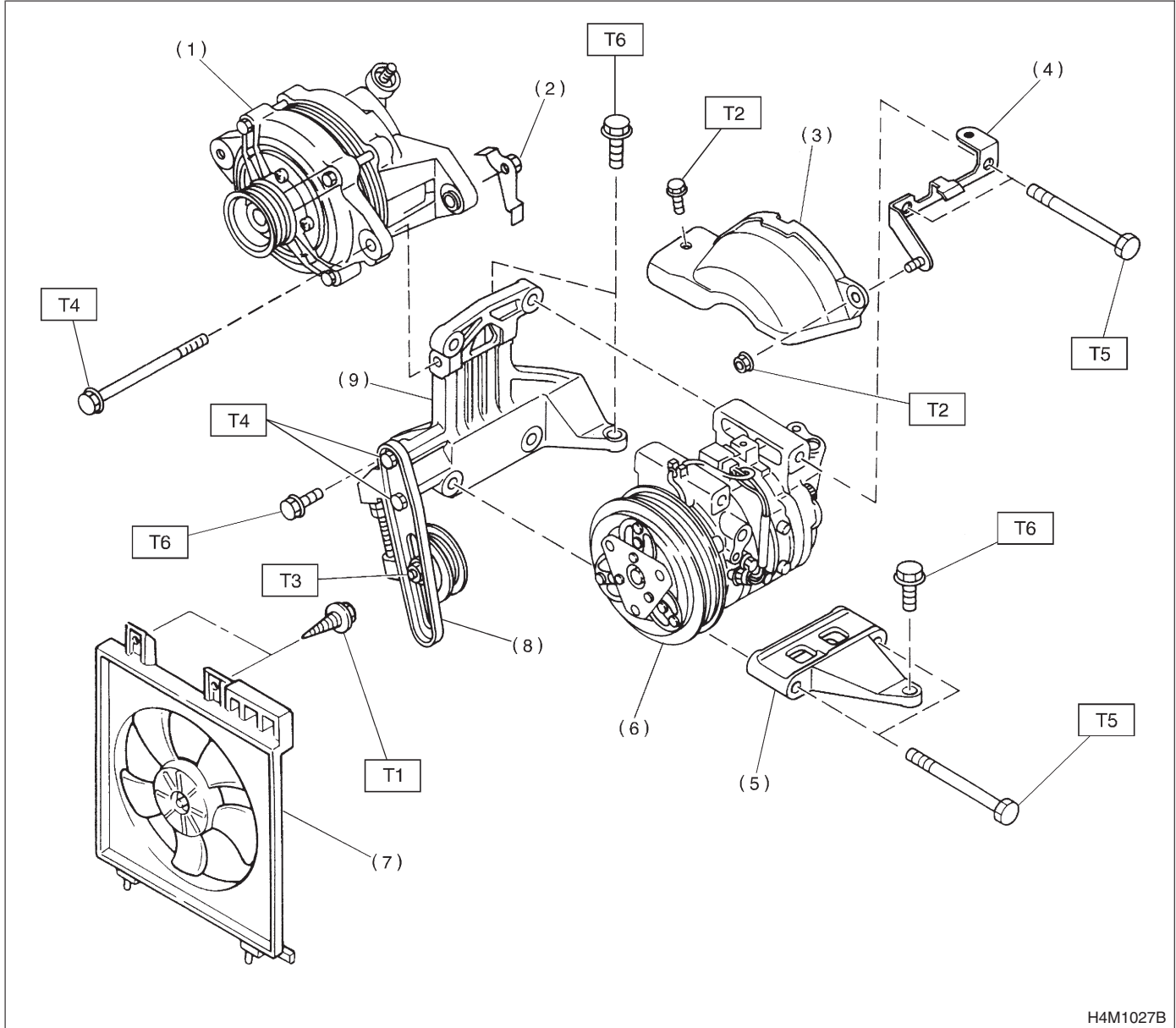
T1: 4 (0.4, 2.9)

T2: 7.4 (0.75, 5.4)

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6. COMPRESSOR S701001A0506



H4M1027B

- | | |
|------------------------------|------------------------------|
| (1) Alternator | (7) Condenser fan motor ASSY |
| (2) Alternator bracket nut | (8) Idler pulley ASSY |
| (3) Compressor belt cover | (9) Compressor bracket upper |
| (4) Bracket | |
| (5) Compressor bracket lower | |
| (6) Compressor | |

Tightening torque: N·m (kgf·m, ft·lb)

T1: 5 (0.5, 3.6)

T2: 7.4 (0.75, 5.4)

T3: 23 (2.3, 17)

T4: 23.0 (2.35, 17.0)

T5: 28.9 (2.95, 21.3)

T6: 35 (3.6, 26)

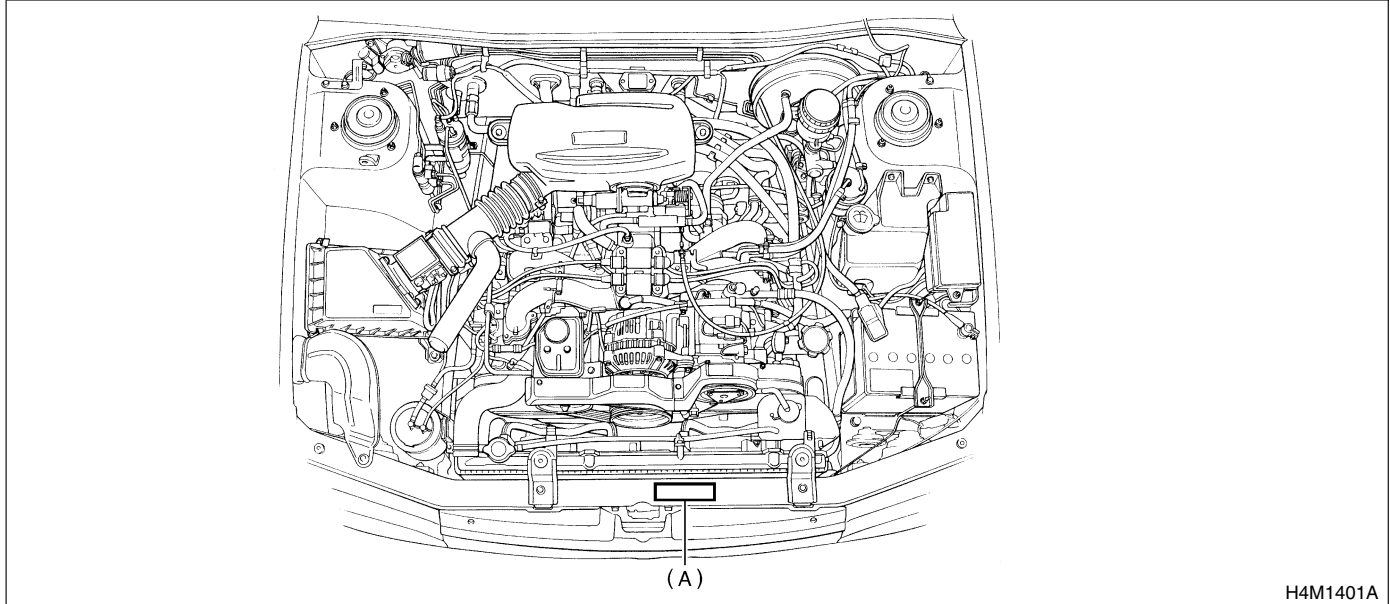
GENERAL DESCRIPTION

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C: CAUTION S701001A03

1. HFC-134a A/C SYSTEM S701001A0301

- Unlike the old conventional HFC-12 system components, the cooling system components for the HFC-134a system such as the refrigerant and compressor oil are incompatible.
- 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 in the vehicle.



H4M1401A

2. COMPRESSOR OIL S701001A0302

- HFC-134a compressor oil has no compatibility with that for R12 system.
- Use only the manufacturer-authorized compressor oil for the HFC-134a system.
- Do not mix multiple compressor oils.

If HFC-12 compressor oil is used in a 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 HFC-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 the atmosphere using a plug or tape. In order to avoid moisture, store the oil in a container with its cap tightly closed.

3. REFRIGERANT S701001A0303

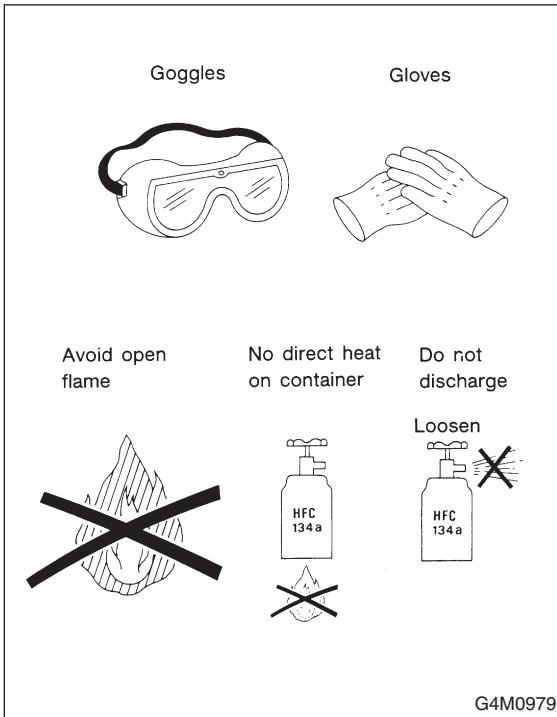
- The HFC-12 refrigerant cannot be used in the HFC-134a A/C system. The HFC-134a refrigerant, also, cannot be used in the HFC-12 A/C system.
- If an incorrect or no refrigerant is used, poor lubrication will result and the compressor itself may be damaged.

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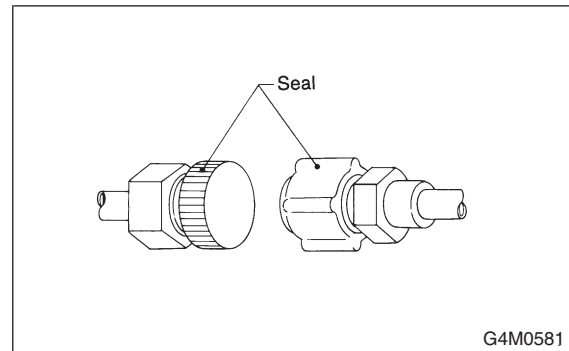
4. HANDLING OF REFRIGERANT S701001A0304

- The refrigerant boils at approx. -30°C (-22°F). When handling it, be sure to wear safety 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 hot water in 40°C (104°F) max.
- 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 the manifold gauge. The high-pressure gas will back-flow resulting in an explosion of the can.
- The refrigerant is non-toxic and harmless under normal operating circumstance, but it may change to phosgene (a noxious fume) under open flames or high temperatures (caused by a cigarette or heater).
- Provide good ventilation and do not work in a closed area.
- Never perform a gas leak test using a halide torch-type leak tester.
- In order to avoid destroying the ozone layer, prevent HFC-134a from being released into the atmosphere. Using a refrigerant recovery system, discharge and reuse it.

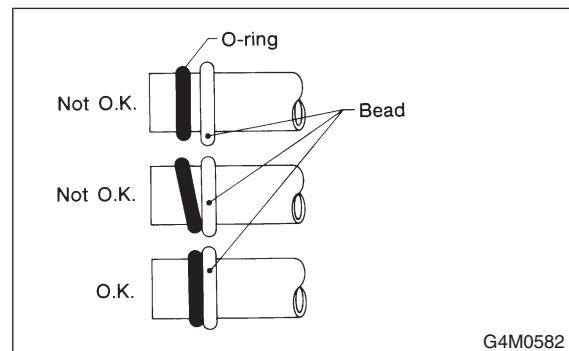


5. O-RING CONNECTIONS S701001A0305

- Use new O-rings.
- In order to keep the O-rings free of lint which will cause a refrigerant gas leak, perform operations without gloves and shop towels.
- Apply the compressor oil to the O-rings to avoid sticking, then install them.
- Use a torque wrench to tighten the O-ring fittings: Over-tightening will damage the O-ring and tube end distortion.
- If the operation is interrupted before completing a pipe connection, recap the tubes, components, and fittings with a plug or tape to prevent contamination from entering.



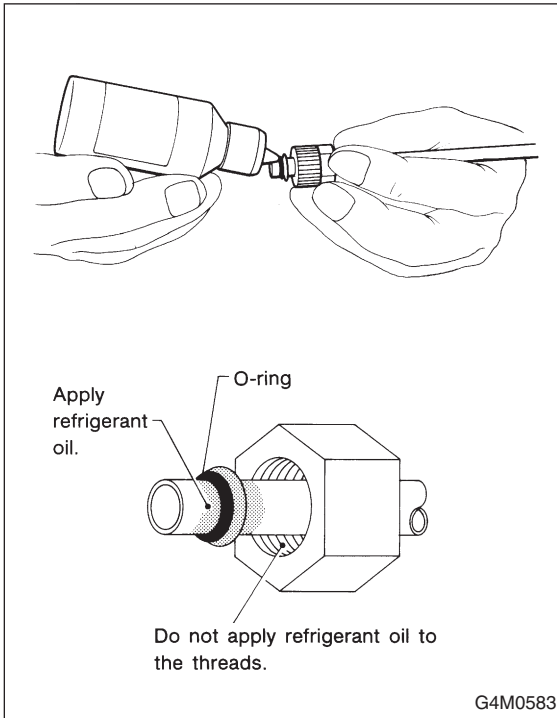
- Visually check the surfaces and mating surfaces of O-rings, threads, and connecting points. If a failure is found, replace the applicable parts.
- Install the O-rings at right angle to the tube beards.



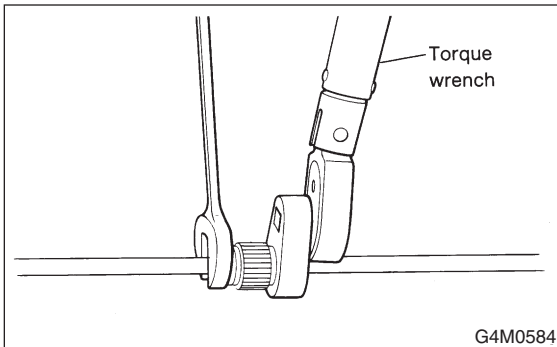
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- Use the oil specified in the service manual to lubricate the O-rings. Apply the oil to the top and sides of the O-rings before installation. Apply the oil to the area including the O-rings and tube beads.



- When connecting hoses or pipes, use 2 wrenches (a torque wrench for tightening). While securing one side with a wrench, tighten the other side to the specified torque with a torque wrench. If only one wrench is used to tighten, the tightening torque will be excessive or insufficient. This may cause a pipe distortion or gas leak, resulting in damage to hoses and pipes.
- After tightening, using a clean shop towel to remove excess 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 retighten the connections, Disconnect the connections, remove the O-rings, and check the O-rings, threads, and connections.



D: NOTE S701001A15

1. BASIC INFORMATION S701001A1501

- 1) The combination of moisture and refrigerant forms acid, therefore, moisture should not be allowed to enter the refrigerant.
- 2) Refrigerant oil readily absorbs moisture, therefore, keep refrigerant oil containers tightly capped.
- 3) The process of evacuating the system is performed to remove small amounts of moisture. This is accomplished by lowering the pressure inside the system, which allows the moisture to boil off, in much the same way that a pot of water will boil away to nothing given enough time. The evacuation process does not suck the moisture out of the system.
- 4) A minimum level of vacuum must be reached to satisfactorily evacuate the system. This minimum level of vacuum depends on the temperature inside the system. The chart below shows the level of vacuum required to boil water at various temperatures. Additionally, the vacuum level shown on a gauge will read approx. 3.3 kPa (25 mmHg, 1 inHg) less for each 304.8 m (1,000 ft) above sea level, due to the decrease in atmospheric pressure at altitude.

| Vacuum level required to boil water (at sea level) | |
|--|---------------------------------|
| Temperature | Vacuum |
| 1.7°C (35°F) | 100.9 kPa (757 mmHg, 29.8 inHg) |
| 7.2°C (45°F) | 100.5 kPa (754 mmHg, 29.7 inHg) |
| 12.8°C (55°F) | 99.8 kPa (749 mmHg, 29.5 inHg) |
| 18.3°C (65°F) | 99.2 kPa (744 mmHg, 29.3 inHg) |
| 23.9°C (75°F) | 98.5 kPa (739 mmHg, 29.1 inHg) |
| 29.4°C (85°F) | 97.2 kPa (729 mmHg, 28.7 inHg) |
| 35°C (95°F) | 95.8 kPa (719 mmHg, 28.3 inHg) |

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E: PREPARATION TOOL S701001A17

The following section provides information about the tools and equipment that will be necessary to properly service the A/C system.

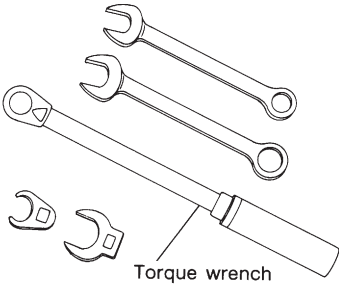
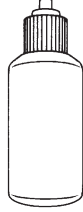
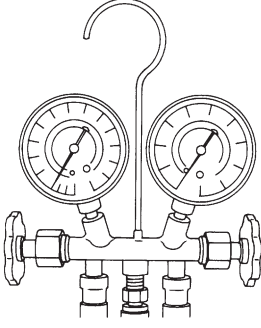
Since equipment may vary slightly depending on the manufacturer, it is important to always read and follow the manufacturer's instructions.

CAUTION:

When working on vehicles with the HFC-134a system, only use HFC-134a specified tools and parts. Do not mix with CFC-12 tools and parts. If HFC-134a and CFC-12 refrigerant or com-

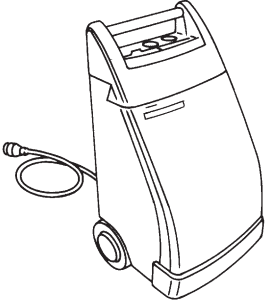
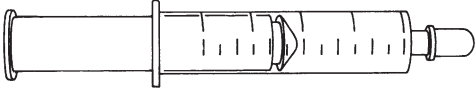
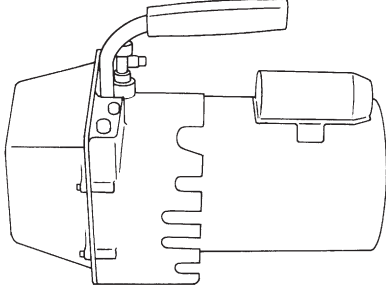
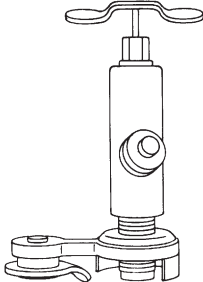
pressor oil is mixed, poor lubrication will result and the compressor itself may be destroyed. In order to help prevent mixing HFC-134a and CFC-12 parts and liquid, the tool and screw type and the type of service valves used are different. The gas leak detectors for the HFC-134a and CFC-12 systems must also not be interchanged.

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

| Tools and Equipment | Description |
|--|---|
| <ul style="list-style-type: none"> ● WRENCH <p>Various WRENCHES 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 with various crowfoot wrenches will be needed. Open end or flare nut wrenches will be needed for back-up on the tube and hose fittings.</p> |  <p style="text-align: center;">Torque wrench</p> <p style="text-align: right;">G4M0571</p> |
| <ul style="list-style-type: none"> ● APPLICATOR BOTTLE <p>A small APPLICATOR BOTTLE is recommended to apply refrigerant oil to the various parts. They can be obtained at a hardware or drug store.</p> |  <p style="text-align: right;">G4M0572</p> |
| <ul style="list-style-type: none"> ● MANIFOLD GAUGE SET <p>A MANIFOLD GAUGE SET (with hoses) can be obtained from either a commercial refrigeration supply house or from an auto shop equipment supplier.</p> |  <p style="text-align: right;">G4M0573</p> |

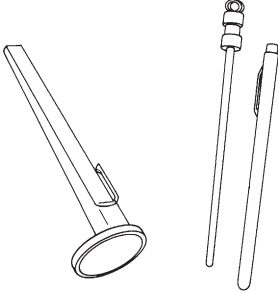
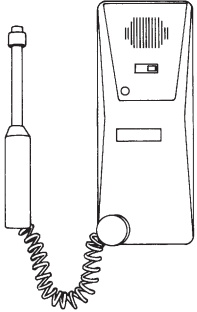
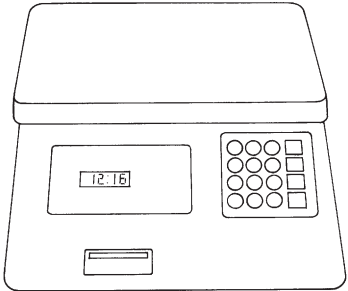
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| Tools and Equipment | Description |
|--|---|
| <p>● REFRIGERANT RECOVERY SYSTEM</p> <p>A REFRIGERANT RECOVERY SYSTEM is used for the recovery and reuse of A/C system refrigerant after contaminants and moisture have been removed from the refrigerant.</p> |  <p style="text-align: right;">G4M0574</p> |
| <p>● SYRINGE</p> <p>A graduated plastic SYRINGE will be needed to add oil back into the system. The syringe can be found at a pharmacy or drug store.</p> |  <p style="text-align: right;">G4M0575</p> |
| <p>● VACUUM PUMP</p> <p>A VACUUM PUMP (in good working condition) is necessary, and may be obtained from either a commercial refrigeration supply house or an automotive equipment supplier.</p> |  <p style="text-align: right;">G4M0576</p> |
| <p>● CAN TAP</p> <p>A CAN TAP for the 397 g (14 oz) can is available from an auto supply store.</p> |  <p style="text-align: right;">G4M0577</p> |

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|--|---|
| <ul style="list-style-type: none">● THERMOMETER <p>Pocket THERMOMETERS are available from either industrial hardware store or commercial refrigeration supply houses.</p> |  <p>G4M0578</p> |
| <ul style="list-style-type: none">● ELECTRONIC LEAK DETECTOR <p>An ELECTRONIC LEAK DETECTOR can be obtained from either a specialty tool supply or an A/C equipment supplier.</p> |  <p>G4M0579</p> |
| <ul style="list-style-type: none">● WEIGHT SCALE <p>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.</p> |  <p>G4M0580</p> |