

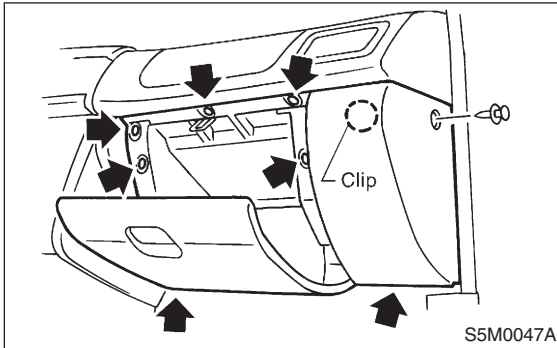
BLOWER MOTOR ASSEMBLY

HVAC System (Heater, Ventilator and A/C)

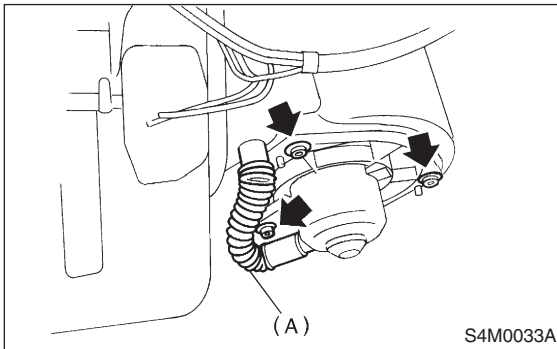
7. Blower Motor Assembly S701295

A: REMOVAL S701295A18

- 1) Disconnect GND cable from battery.
- 2) Remove glove box.



- 3) Disconnect blower motor harness connector.
- 4) Disconnect aspirator pipe (A).
- 5) Remove blower motor mounting screw.



- 6) Remove blower motor assembly.

B: INSTALLATION S701295A11

Install in the reverse order of removal.

COMPRESSOR OIL

HVAC System (Heater, Ventilator and A/C)

5. Compressor Oil S701294

A: OPERATION S701294A16

- 1) Prior to opening the refrigerant system for repairs (except compressor seizure) the system must be stabilized for correct oil replenishment.
- 2) Follow these procedures:
 - (1) Engine speed set to 1,500 rpm.
 - (2) A/C "ON".
 - (3) Air source to recirculate
 - (4) Blower 4th or high speed position
- Make sure the air entering the evaporator is above 26.7°C (80°F).
- The discharge (high) side pressure must be above 588 kPa (6 kg/cm², 85 psi).
- (5) Operate the A/C for 10 minutes.
- 3) Slowly, discharge the system starting with the high-pressure side until the pressure drops below 345 kPa (3.52 kg/cm², 50 psi), then open the low-pressure side.

B: REPLACEMENT S701294A20

- 1) After stabilization and discharge, replace the component, adding the appropriate amount of oil (DH-PR) to the new component before installation.

Evaporator	114 mℓ (3.9 US fl oz, 4.0 Imp fl oz)
Receiver drier	5 mℓ (0.2 fl oz, 0.2 fl oz)
Condenser	2 mℓ (0.07 fl oz, 0.07 fl oz)
Hose	1 mℓ (0.03 fl oz, 0.04 fl oz)

- 2) If the compressor is replaced (after stabilization):
 - (1) Drain and measure the oil from the original compressor.
 - (2) Drain the oil from the replacement compressor and refill with the same amount that was drained from the original [20 mℓ (0.7 US fl oz, 0.7 Imp fl oz) minimum]. Always use DH-PR for the replacement oil.

9. Compressor

S701281

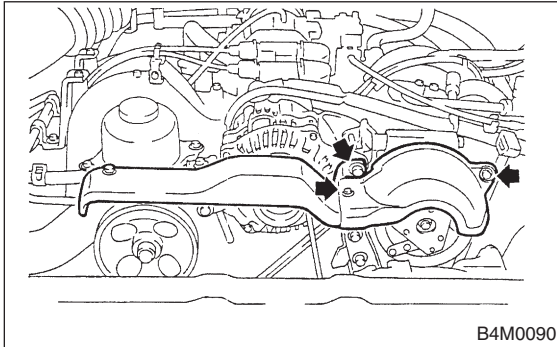
A: INSPECTION

S701281A10

NOTE:

- Compressor is a 5-vane rotary type. When trouble occurs, replace compressor as a single unit.
- Compressor clutch trouble is often caused by clutch slippage and noise. Check and take corrective measures, as required.

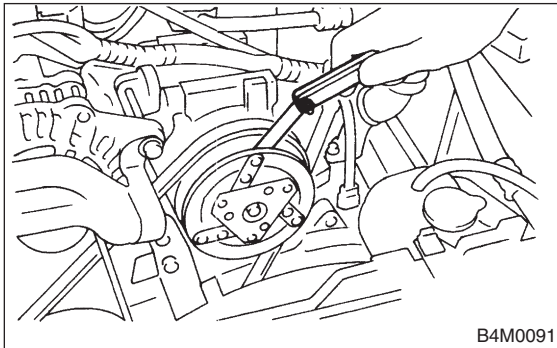
- 1) Remove belt cover.



- 2) Check that clearance between drive plate and pulley over the entire perimeter is within specifications.

Clearance:

$0.45 \pm 0.15 \text{ mm } (0.0177 \pm 0.0059 \text{ in})$



- 3) Check that voltage applied to magnetic coil is at least 10.5 volts.
- 4) When noise is noted, check that it originates in either compressor or pulley bearing.

B: REMOVAL

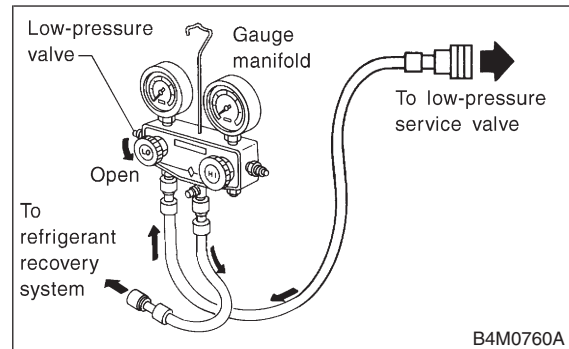
S701281A18

- 1) Disconnect ground cable from battery.
- 2) Discharge refrigerant using refrigerant recovery system. <Ref. to AC-16 OPERATION, Refrigerant Recovery Procedure.>

- (1) Fully close low-pressure valve of manifold gauge.
- (2) Connect low-pressure charging hose of manifold gauge to low-pressure service valve.
- (3) Open low-pressure manifold gauge valve slightly, and slowly discharge refrigerant from system.

CAUTION:

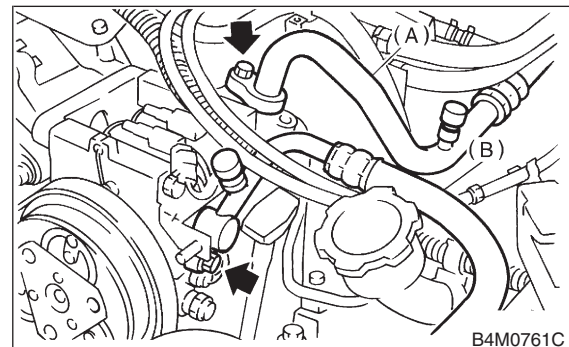
Do not allow refrigerant to rush out. Otherwise, compressor oil will be discharged along with refrigerant.



- 3) Remove low-pressure hose (A) (Flexible hose Ps) and high-pressure hose (B) (Flexible hose Pd).

CAUTION:

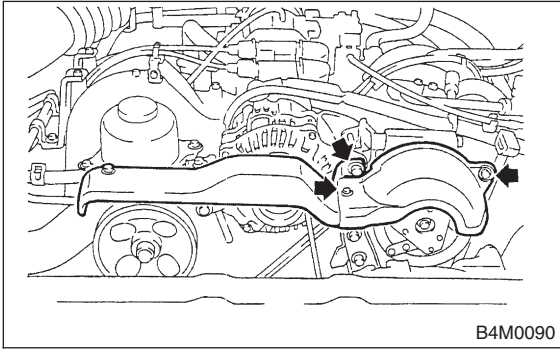
- Be careful not to lose O-ring of low-pressure hose.
- Plug the opening to prevent foreign matter from entering.



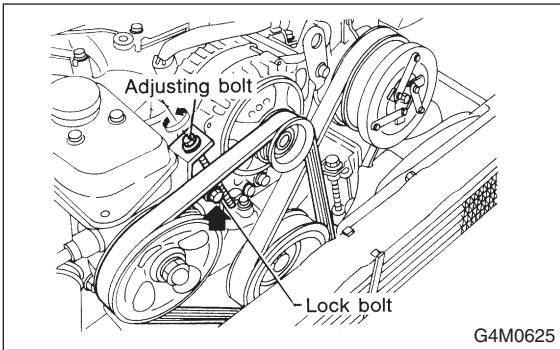
COMPRESSOR

HVAC System (Heater, Ventilator and A/C)

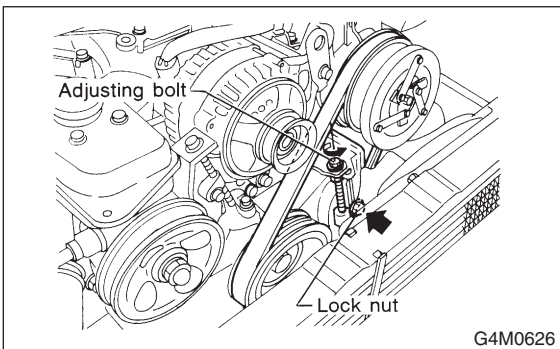
- 4) Compressor belt cover and generator belt cover:
Remove bolts which secure belt covers.



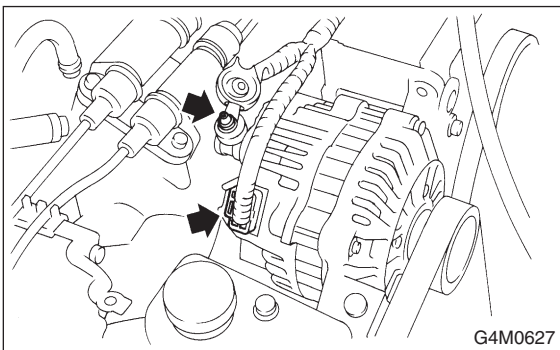
- 5) Remove alternator V-belt:
(1) Loosen lock bolt on generator bracket.
(2) Turn adjusting bolt and remove V-belt.



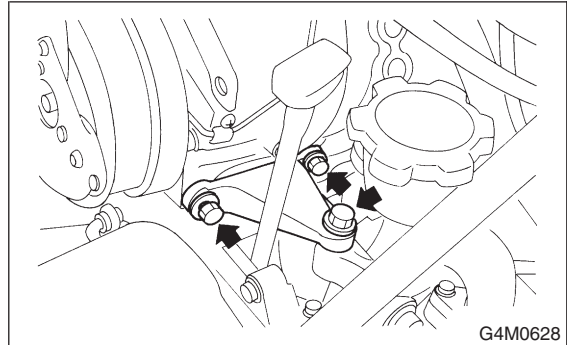
- 6) Remove compressor V-belt:
(1) Loosen lock bolt on idler pulley.
(2) Turn adjusting bolt and remove V-belt.



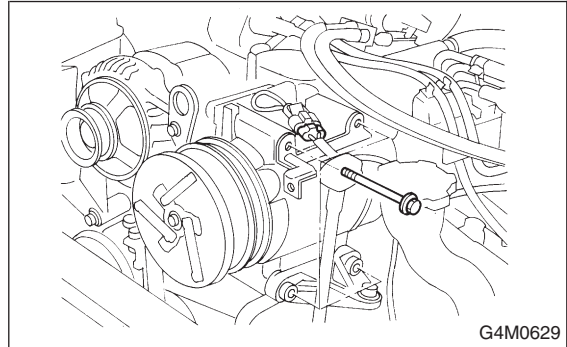
- 7) Disconnect alternator harness.



- 8) Disconnect compressor harness:
Disconnect compressor harness from body harness.
9) Remove lower bracket:
Remove bolts which secure lower compressor bracket.



- 10) Remove compressor:
(1) Remove bolts which secure compressor.
(2) Remove compressor from bracket.

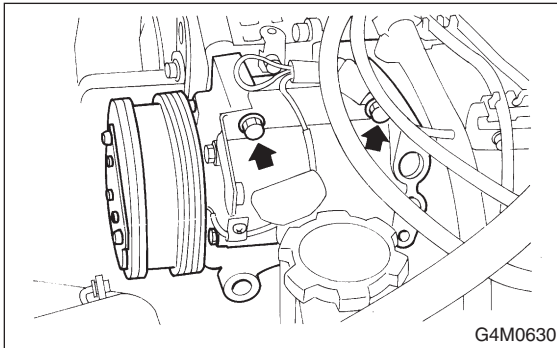


COMPRESSOR

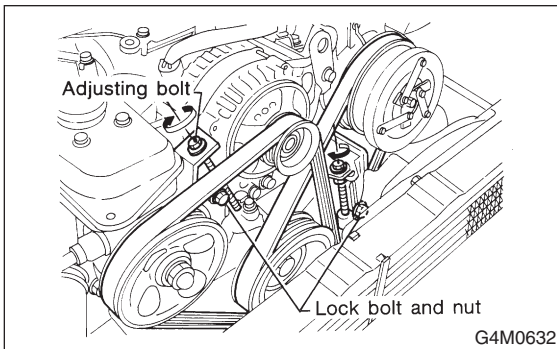
HVAC System (Heater, Ventilator and A/C)

C: INSTALLATION S701281A11

- 1) Install compressor:
Install compressor on bracket.



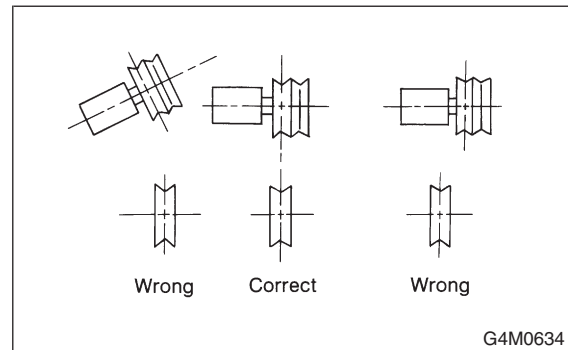
- 2) Connect compressor harness.
- 3) Connect alternator harness.
- 4) Install compressor V-belt (Rear):
After adjusting belt tension, tighten tension pulley lock bolt securely.
- 5) Install alternator V-belt:
After adjusting V-belt tension, tighten generator bracket lock bolt securely.



- 6) Check drive belt tension and adjust it if necessary by changing alternator position and/or idler pulley position.

CAUTION:

- Ensure that the V-belt is aligned correctly. If it is not, check for loose bolts.
- The V-belt should not be too tight or too loose. A belt which is too tight may break bearing or cause gas to leak from the shaft seal. A belt which is too loose slips, thereby causing the belt cut.
- After completing the compressor installation and testing the system operation, check and adjust the tension of both V-belts again.



Pulley arrangement	Tension mm (in)/98N (10 kg, 22 lb)	
	(A)	(B)
	*New belt: 7.0 – 9.0 (0.276 – 0.354) Existing belt: 9.0 – 11.0 (0.354 – 0.433)	*New belt: 7.5 – 8.5 (0.295 – 0.335) Existing belt: 9.0 – 10.0 (0.354 – 0.394)
Figures in table refer to the number of grooves in pulleys. C/P: Crankshaft pulley ALT: Alternator pulley P/S: Power steering oil pump pulley A/C: Air conditioner compressor pulley I/P: Idler pulley		
*When replacing belts with new ones, adjust tensions to specification and then readjust to the same specification after running engine for 5 minutes.		

B4M1098A

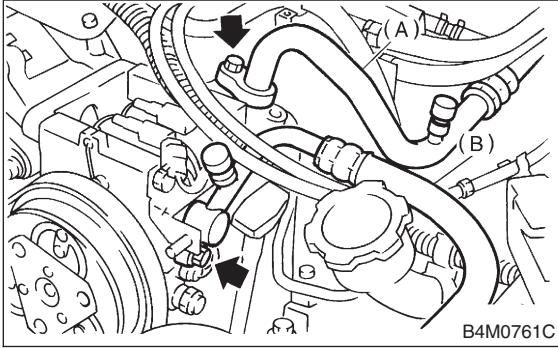
COMPRESSOR

HVAC System (Heater, Ventilator and A/C)

7) Install high-pressure hose (B) (Flexible hose Pd) and low-pressure hose (A) (Flexible hose Ps): Connect high-pressure hose (B) and low-pressure hose (A) with compressor.

CAUTION:

Be sure to apply compressor oil to the periphery of O-ring.



8) Install belt cover.

CAUTION:

- After installing belt cover, make sure it is not misaligned or twisted.
- After installing belt cover, check the clearance between pulley and belt cover.

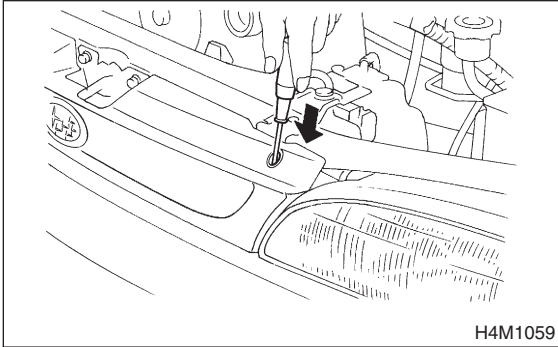
9) Connect ground cable to negative terminal of battery.

10) Charging refrigerant. <Ref. to AC-17 OPERATION, Refrigerant Charging Procedure.>

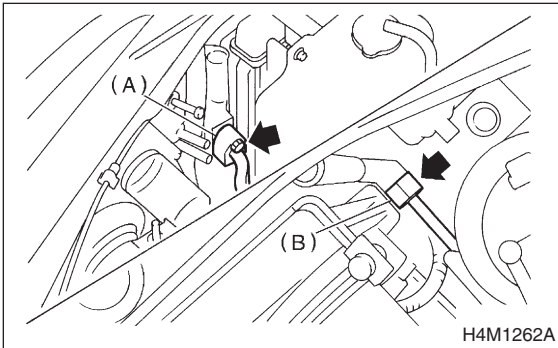
10. Condenser S701282

A: REMOVAL S701282A18

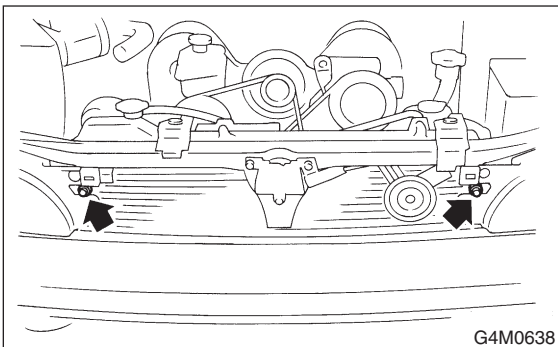
- 1) Disconnect battery negative terminal.
- 2) Discharge refrigerant using refrigerant recovery system. <Ref. to AC-16 OPERATION, Refrigerant Recovery Procedure.>
- 3) Remove front grille.



- 4) Remove the radiator bracket.
- 5) Disconnect high-pressure hose (A) and high-pressure pipe (B) from condenser.



- 6) Remove the two bolts which secure condenser. While lifting condenser, remove it through space between radiator and radiator panel.



B: INSTALLATION S701282A11

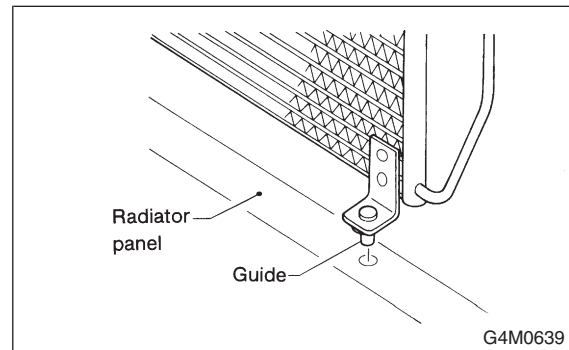
- 1) The condenser should be installed in the reverse order in which it was removed. When installing the condenser, pay attention to the following:

CAUTION:

Before connecting the pipe, be sure to apply oil to the periphery of O-ring.

NOTE:

After installing condenser, ensure that guide on lower side of condenser is inserted into hole in radiator panel. Tighten attaching bolts.



- 2) Charge refrigerant. <Ref. to AC-17 OPERATION, Refrigerant Charging Procedure.>

C: INSPECTION S701282A10

- 1) Make sure the condenser fins are free from dust and insects. If the fins are clogged, clean by blowing air or water through them.

NOTE:

To prevent dust and water from getting into the condenser, this work must be done when the condenser is installed in an actual vehicle.

- 2) Check the condenser to see if it shows any sign of oil. If oil ooze or gas leak occur from the condenser, replace it with a new one.

8. Control Unit

S701285

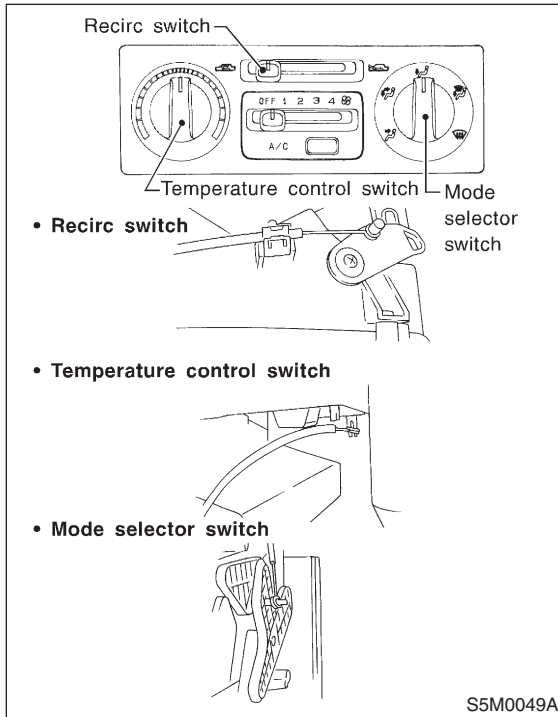
A: REMOVAL

S701285A18

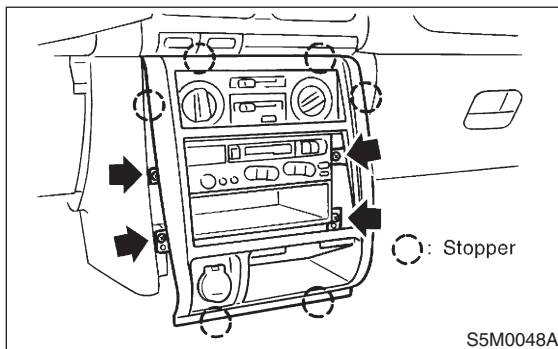
- 1) Disconnect GND cable from battery.
- 2) Set temperature control switch to "FULL HOT" and mode selector switch to "DEF" position and recirc switch to "FRESH" position.
- 3) Disconnect temperature control cable and mode door control cable from heater unit then disconnect recirc control cable from intake unit.

NOTE:

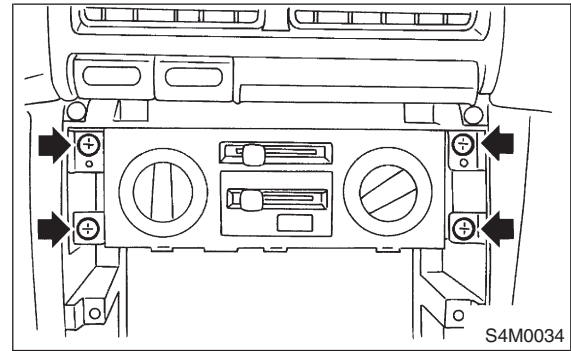
Do not attempt to move links during installation.



- 4) Remove console box. <Ref. to EI-24 REMOVAL, Console Box.>
- 5) Remove center panel and then disconnect connector.
- 6) Remove audio.



- 7) Remove control unit assembly from center console.



B: INSTALLATION

S701285A11

Install in the reverse order of removal.

NOTE:

Before installing control unit, set temperature control switch to "FULL HOT" and mode selector switch to "DEF" position and recirc switch to "FRESH" position.

CONTROL UNIT

HVAC System (Heater, Ventilator and A/C)

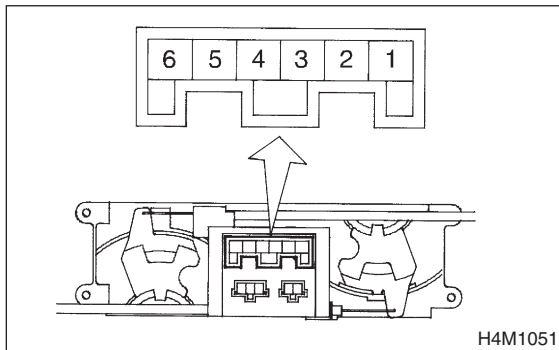
C: INSPECTION S701285A10

1. FAN SWITCH S701285A1003

Check continuity between terminals at each switch position.

Switch position	Terminals					
	1	2	3	4	5	6
1	○				○	○
2	○			○		○
3	○		○			○
4	○	○				○
	IGN					GND

H5M1280A



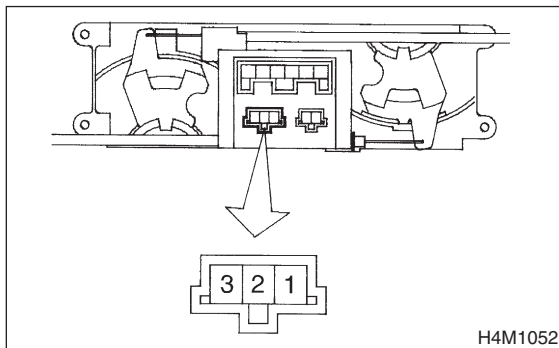
H4M1051

2. A/C SWITCH S701285A1004

Check A/C switch continuity between each terminal.

Terminal	Switch ON	Illumi.
1		○
2	○	○
3	○	○

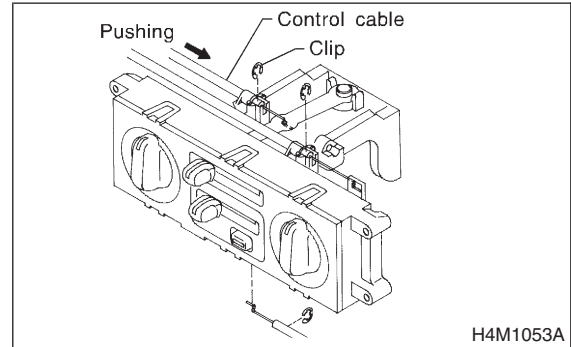
H5M1281A



H4M1052

D: ADJUSTMENT S701285A01

- 1) Operate temperature control switch to "FULL COLD" and mode selector switch to "VENT" position and recirc switch to "RECIRC" position.
- 2) Install control cable to lever. While pushing outer cable, secure control cable with clip.



H4M1053A

13. Flexible Hose S701286

A: REMOVAL S701286A18

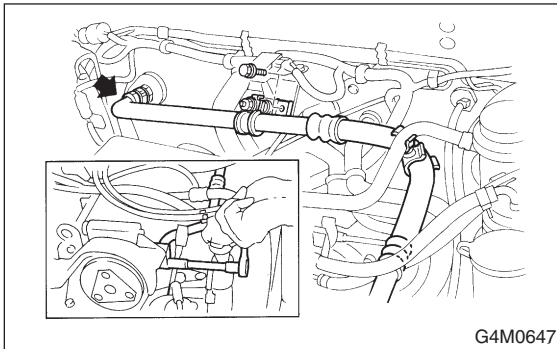
- 1) Disconnect battery negative terminal.
- 2) Discharge refrigerant using refrigerant recovery system. <Ref. to AC-16 OPERATION, Refrigerant Recovery Procedure.>
- 3) Remove low-pressure hose:

CAUTION:

With the following cautions, replace flexible hoses with new ones if they are damaged or swollen.

- The flexible hoses should be free from twists and tension after they have been connected.
- The flexible hoses must not be bent or twisted forcibly.

- (1) Remove hose attaching bolts.



- (2) Remove hose clip.

CAUTION:

Plug the opening to prevent foreign matter from getting in.

- (3) Disconnect the connector at evaporator unit.

- 4) Remove high-pressure hose:

CAUTION:

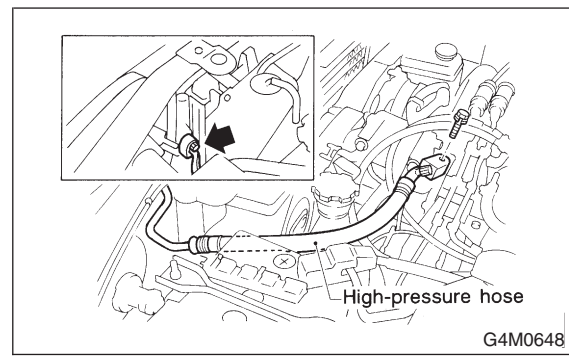
With the following cautions, replace flexible hoses with new ones if they are damaged or swollen.

- The flexible hoses should be free from twists and tension after they have been connected.
- The flexible hoses must not be bent or twisted forcibly.

- (1) Disconnect hose attaching bolt (compressor side).
- (2) Disconnect hose attaching bolt (condenser side).

CAUTION:

Plug the opening to prevent foreign matter from getting in.



B: INSTALLATION S701286A11

- 1) Install in the reverse order of removal.
- 2) Charge refrigerant. <Ref. to AC-17 OPERATION, Refrigerant Charging Procedure.>

C: INSPECTION S701286A10

NOTE:

If cracking, damage, or swelling is found on a hose, replace it with a new one.

GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

1. General Description S701001

A: SPECIFICATIONS S701001E49

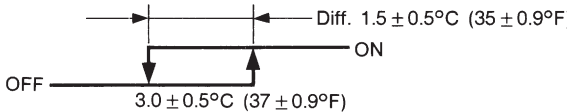
1. HVAC SYSTEM S701001E4901

Item		Specifications	Condition
Heating capacity		4.652 kW (4,000 kcal/h, 15,872 BTU/h) or more	● 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	● 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)	—

GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

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)			
Compressor thermocut temperature			150±5°C (302±9°F) Diff. -3±5°C (27±9°F)

GENERAL DESCRIPTION

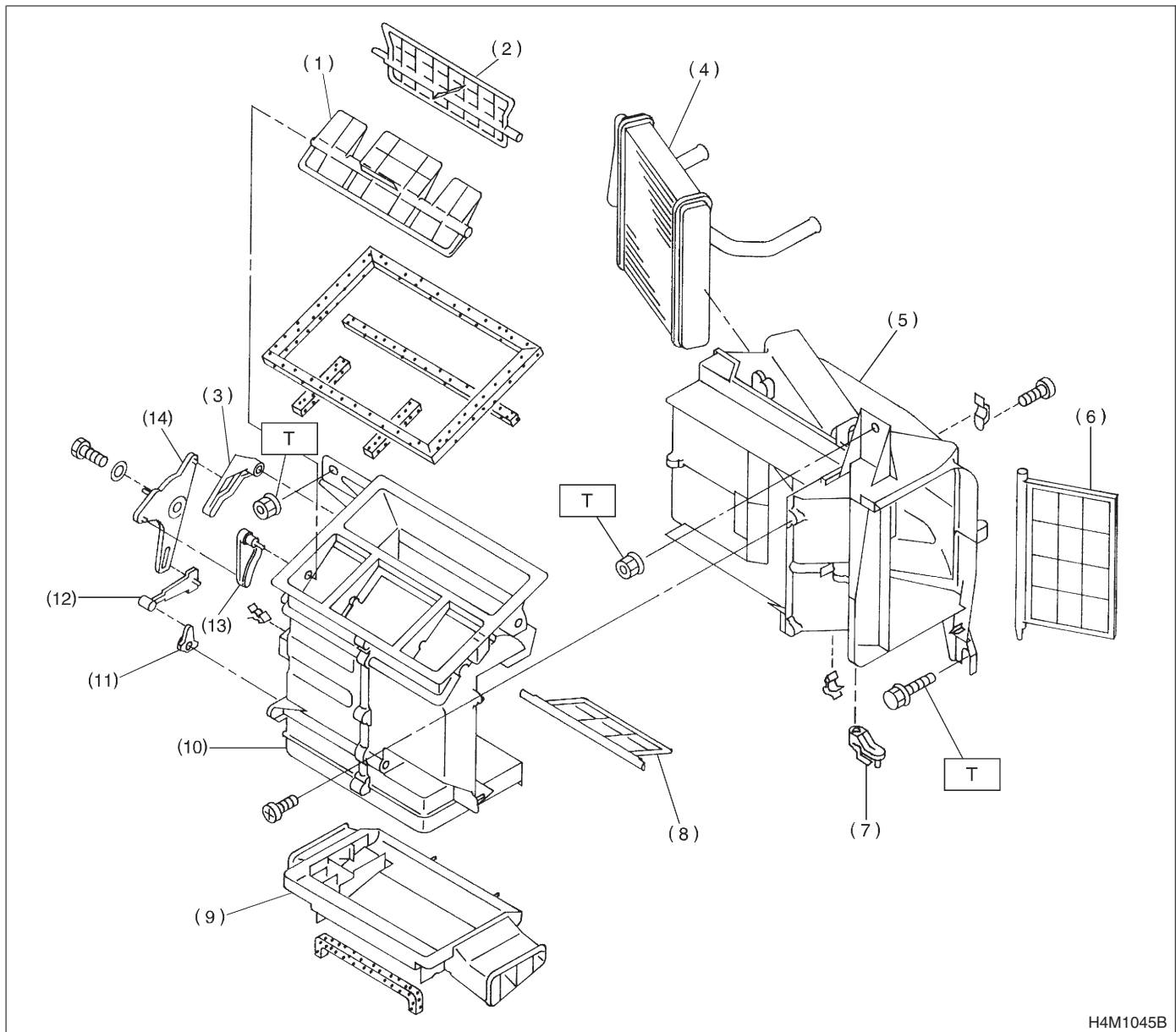
HVAC System (Heater, Ventilator and A/C)

B: COMPONENT

S701001A05

1. HEATER UNIT

S701001A0501



- (1) Vent door
- (2) DEF door
- (3) DEF lever
- (4) Heater core
- (5) Heater case FRONT
- (6) Mix door

- (7) Mix lever
- (8) Foot door
- (9) Foot duct
- (10) Heater case REAR
- (11) Foot lever lower
- (12) Foot lever upper

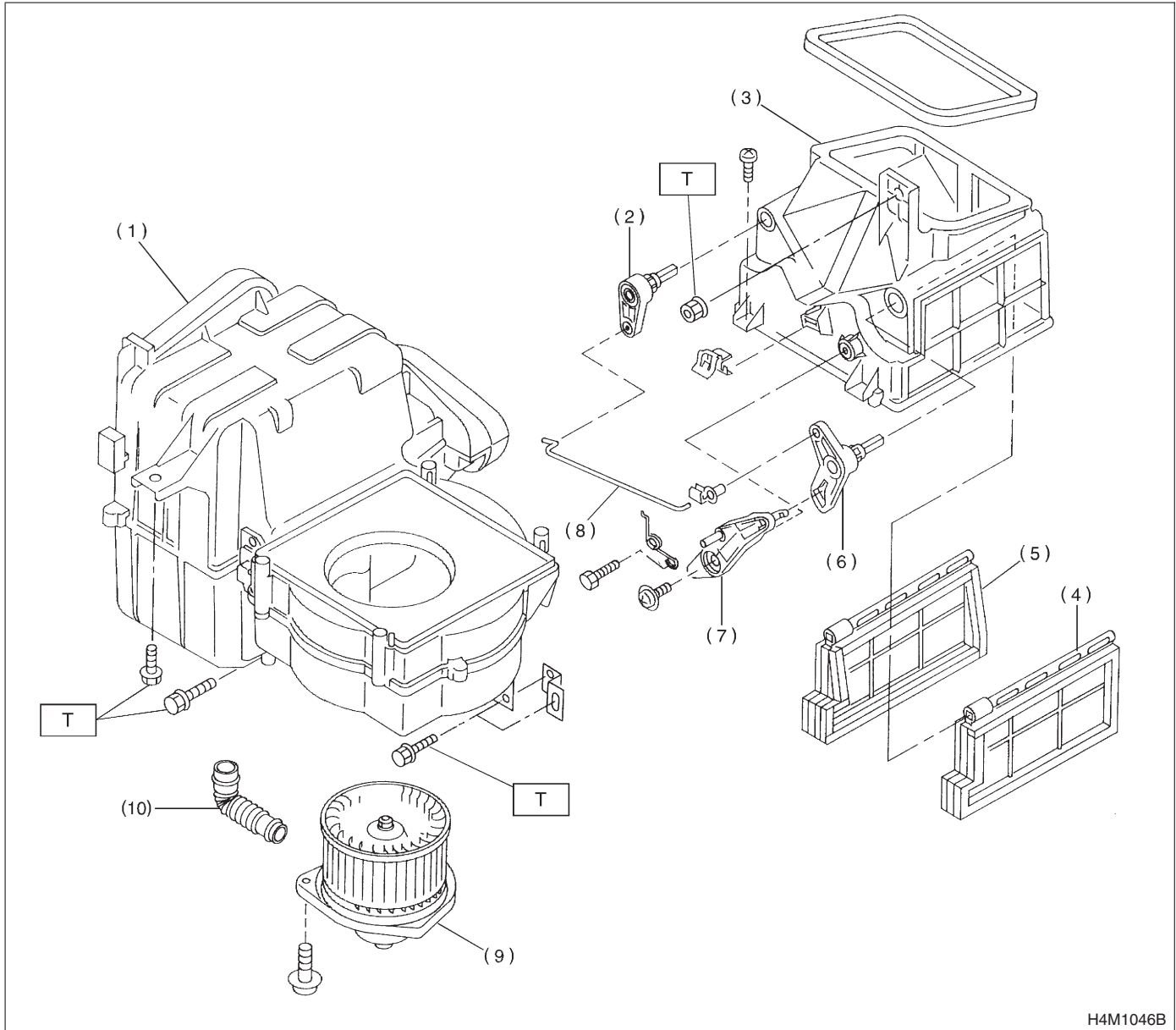
- (13) Vent lever
- (14) Side link

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

GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

2. INTAKE UNIT S701001A0502



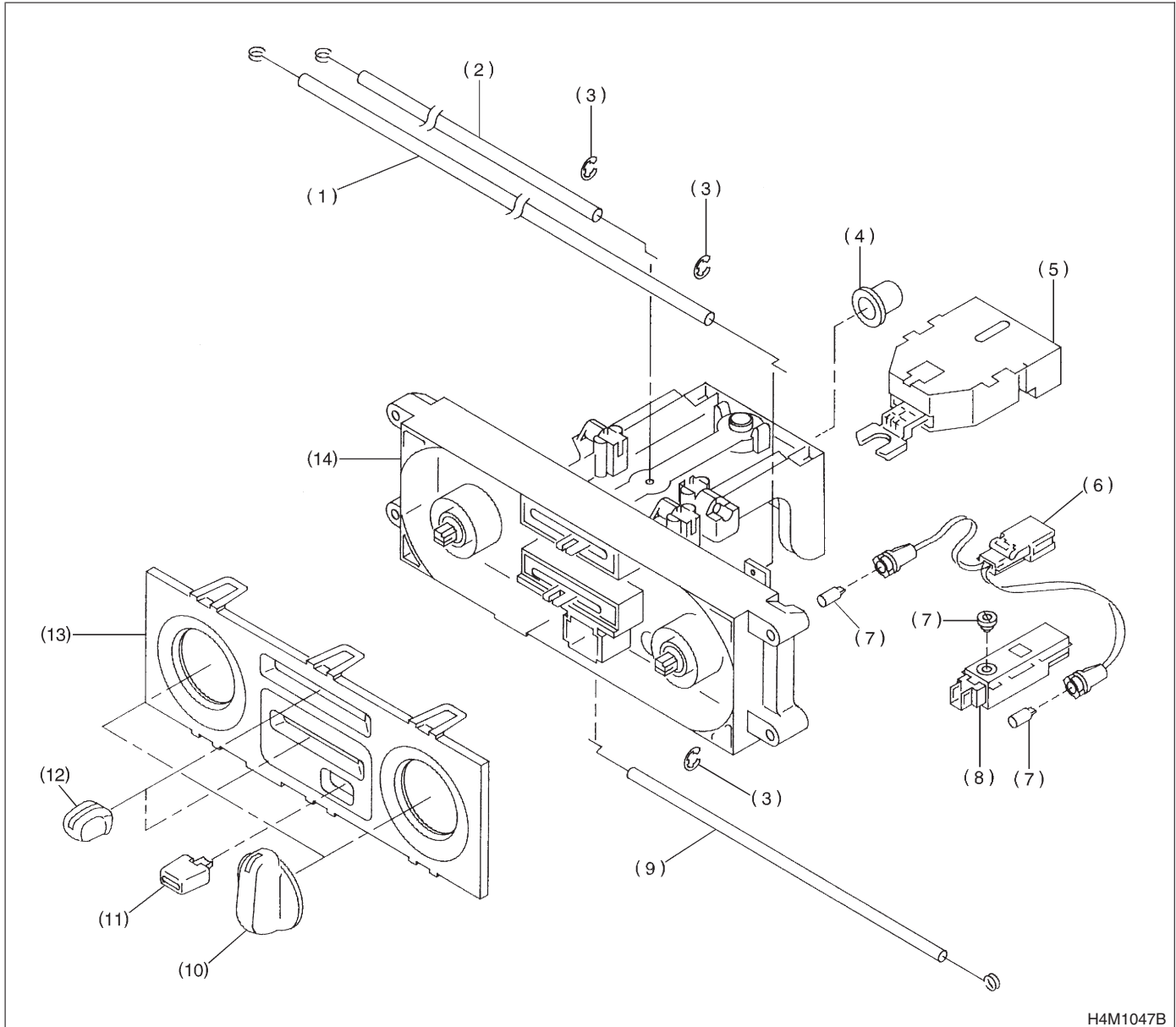
- | | |
|----------------------------|-----------------------|
| (1) Intake unit case lower | (6) Lever (A) |
| (2) Lever (B) | (7) Link |
| (3) Intake unit case upper | (8) Rod |
| (4) Door (A) | (9) Blower motor ASSY |
| (5) Door (B) | (10) Aspirator pipe |

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

GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

3. CONTROL UNIT S701001A0503



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

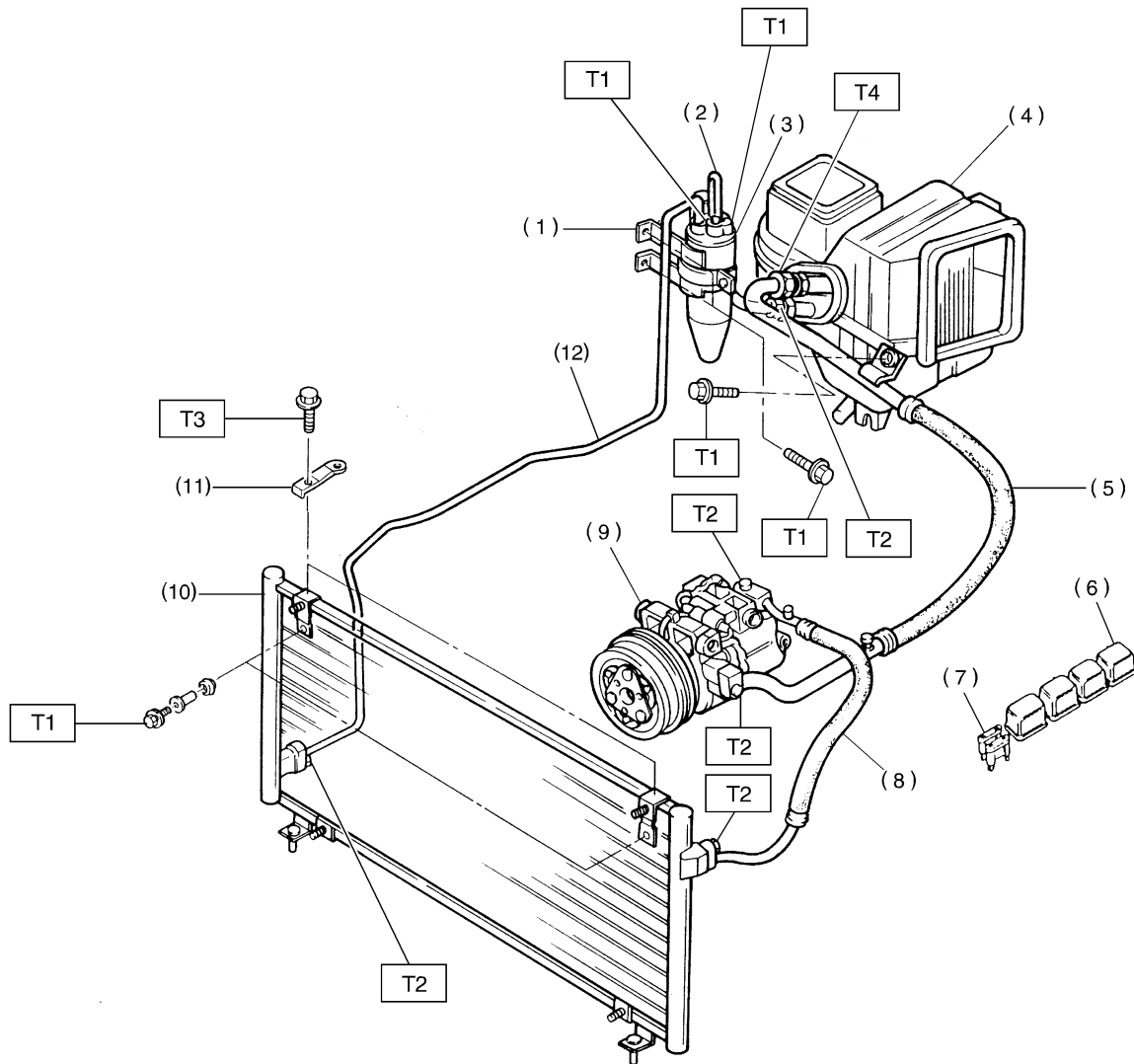
- (6) Harness ASSY
- (7) Bulb
- (8) A/C switch ASSY
- (9) Mode control cable
- (10) Control dial knob

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

GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

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)

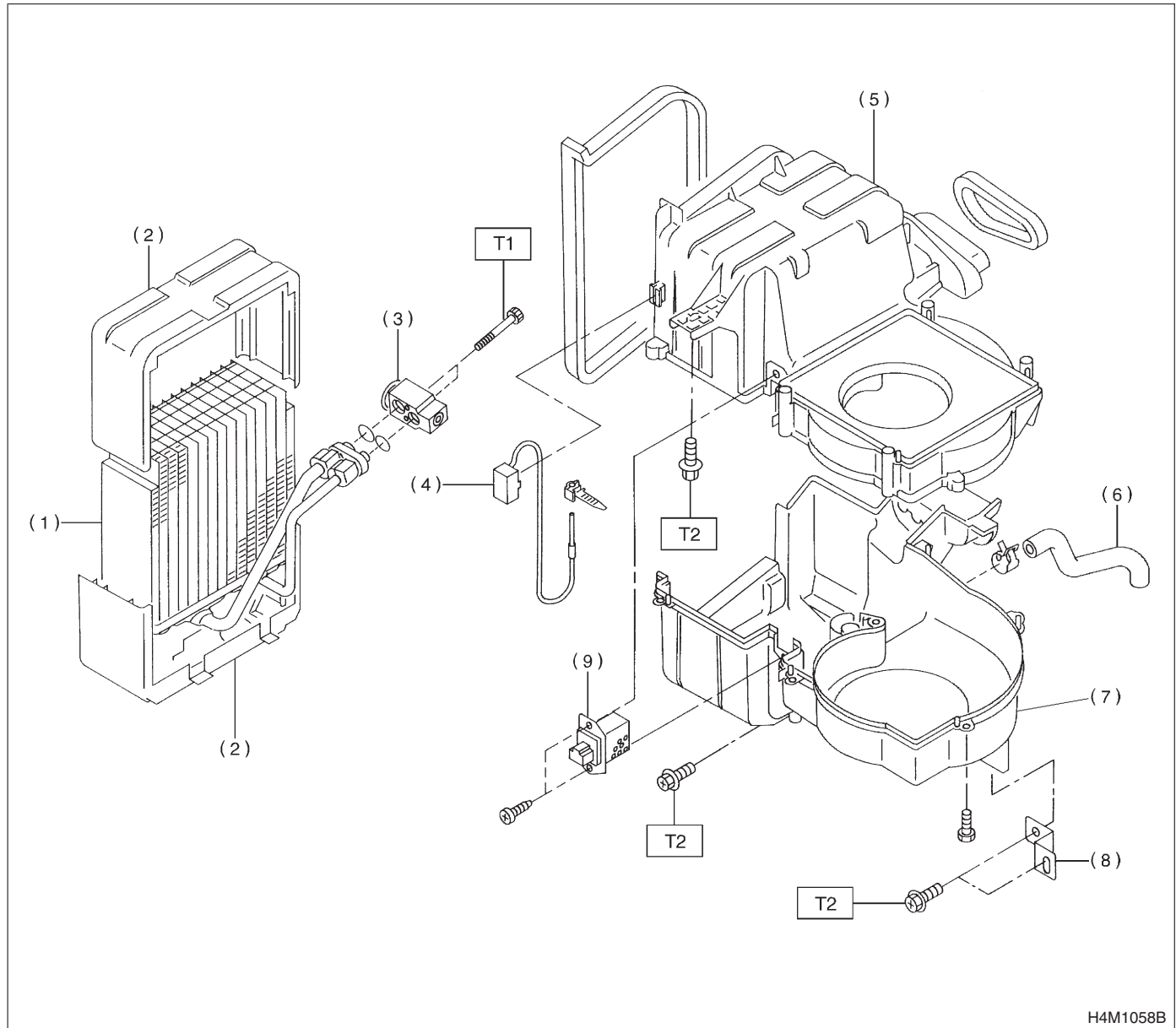
T4: 25 (2.5, 18)

GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

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)

HVAC System (Heater, Ventilator and A/C)

[illegible]

- T6: 35 (3.6, 26)***

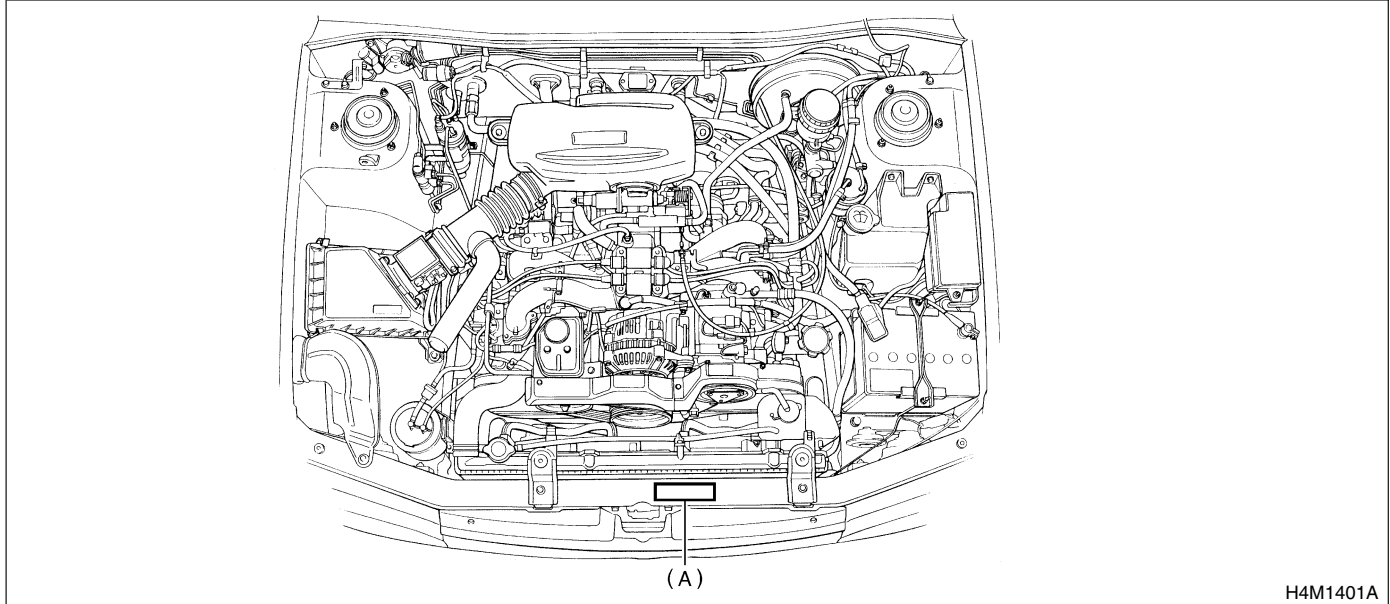
GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

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

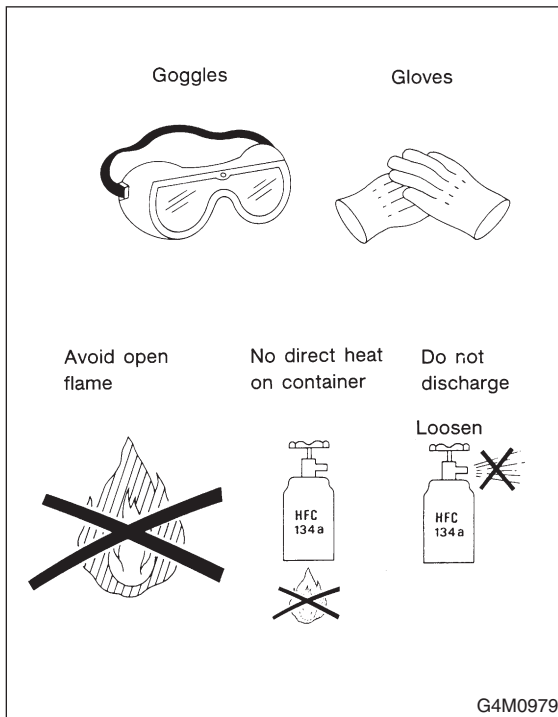
- The HFC-12 refrigerant cannot be used in the HFC-134a A/C system. The HFC-134a refrigerant, also, cannot be used in the HFC-12 A/C system.
- If an incorrect or no refrigerant is used, poor lubrication will result and the compressor itself may be damaged.

GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

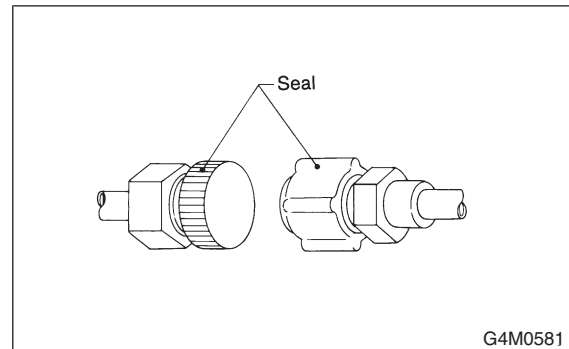
4. HANDLING OF REFRIGERANT S701001A0304

- 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.

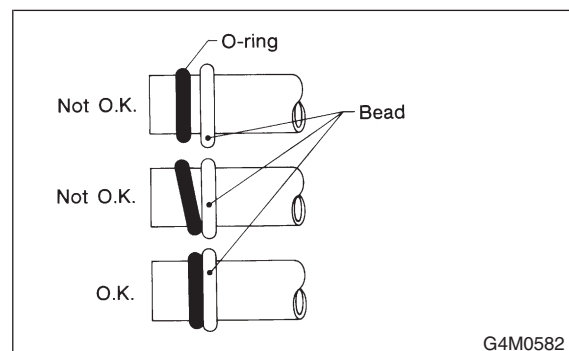


5. O-RING CONNECTIONS S701001A0305

- 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.



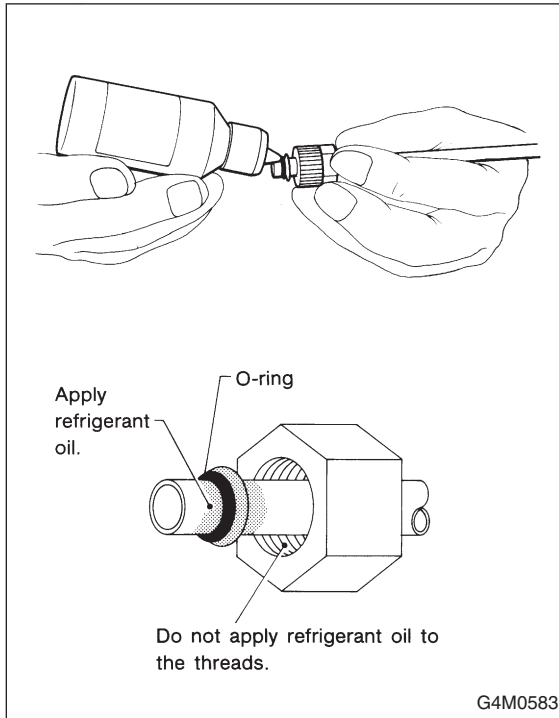
- Visually check the surfaces and mating surfaces of O-rings, threads, and connecting points. If a failure is found, replace the applicable parts.
- Install the O-rings at right angle to the tube beards.



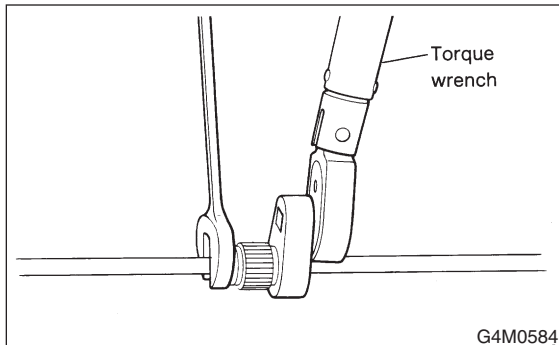
GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

- 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)

GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

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.

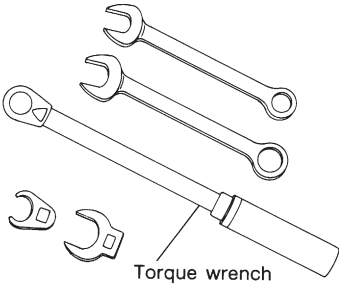
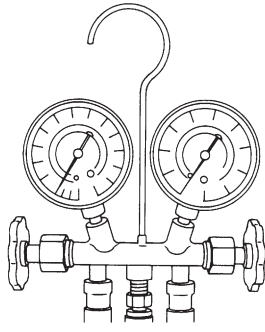
Since equipment may vary slightly depending on the manufacturer, it is important to always read and follow the manufacturer's instructions.

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-

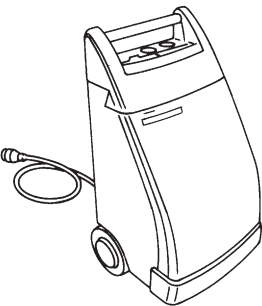
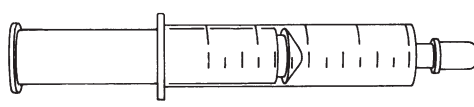
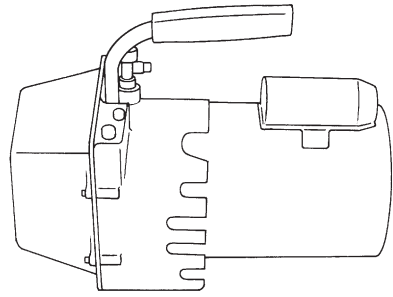
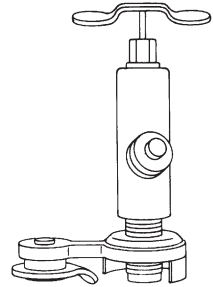
pressor oil is mixed, poor lubrication will result and the compressor itself may be destroyed. In order to help prevent mixing HFC-134a and CFC-12 parts and liquid, the tool and screw type and the type of service valves used are different. The gas leak detectors for the HFC-134a and CFC-12 systems must 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
● WRENCH 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.	 G4M0571
● APPLICATOR BOTTLE A small APPLICATOR BOTTLE is recommended to apply refrigerant oil to the various parts. They can be obtained at a hardware or drug store.	 G4M0572
● MANIFOLD GAUGE SET A MANIFOLD GAUGE SET (with hoses) can be obtained from either a commercial refrigeration supply house or from an auto shop equipment supplier.	 G4M0573

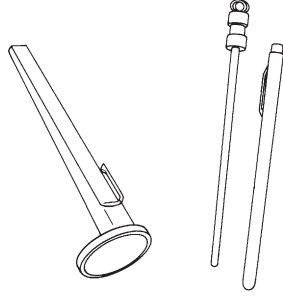
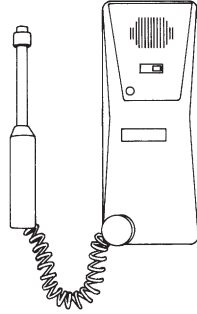
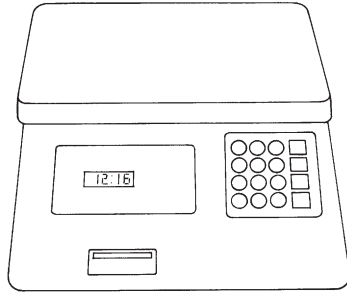
GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

Tools and Equipment	Description
● REFRIGERANT RECOVERY SYSTEM 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.	 G4M0574
● SYRINGE 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.	 G4M0575
● VACUUM PUMP 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.	 G4M0576
● CAN TAP A CAN TAP for the 397 g (14 oz) can is available from an auto supply store.	 G4M0577

GENERAL DESCRIPTION

HVAC System (Heater, Ventilator and A/C)

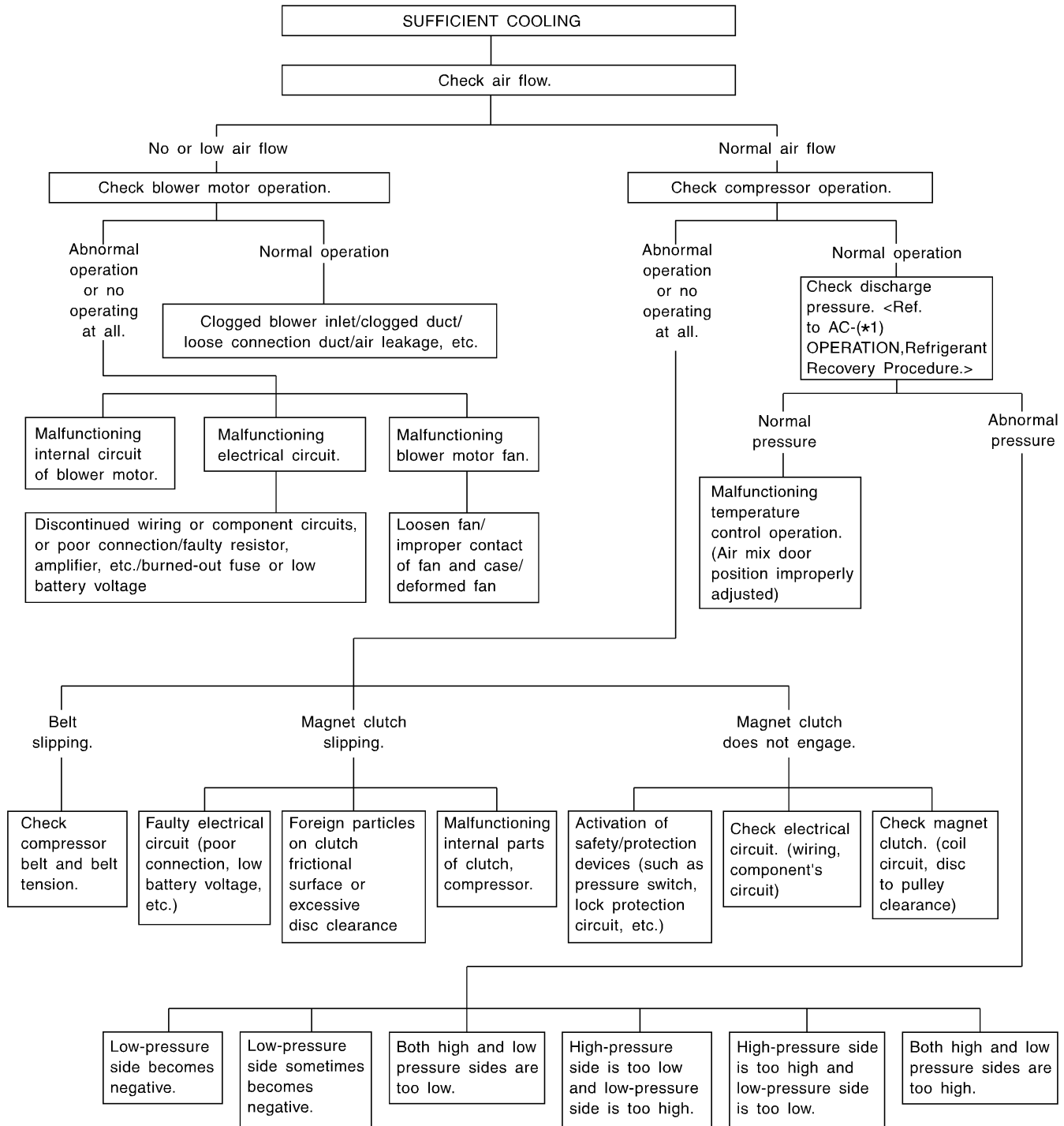
Tools and Equipment	Description
● THERMOMETER Pocket THERMOMETERS are available from either industrial hardware store or commercial refrigeration supply houses.	 G4M0578
● ELECTRONIC LEAK DETECTOR An ELECTRONIC LEAK DETECTOR can be obtained from either a specialty tool supply or an A/C equipment supplier.	 G4M0579
● 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.	 G4M0580

GENERAL DIAGNOSTICS

HVAC System (Heater, Ventilator and A/C)

16. General Diagnostics S701278

A: GENERAL DIAGNOSTIC PROCEDURE S701278A09



H4M1265B

*1: AC-16

GENERAL DIAGNOSTICS

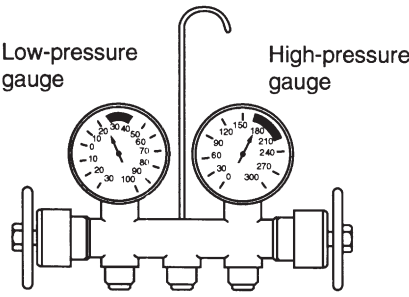
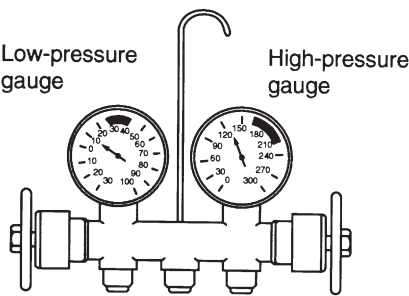
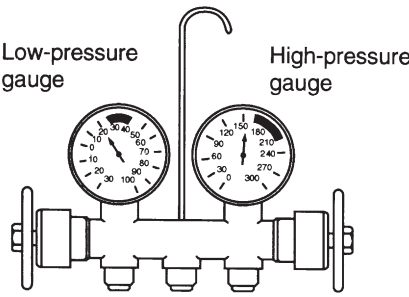
HVAC System (Heater, Ventilator and A/C)

B: PERFORMANCE CHECK S701278E44

If various conditions caused to other air conditioning system, the characteristics revealed on manifold gauge reading are shown in the following.

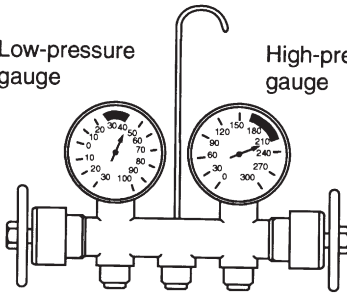
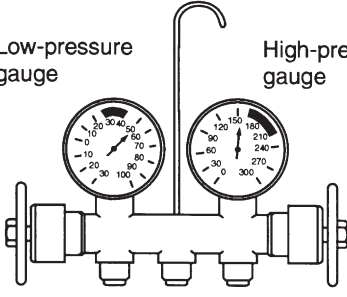
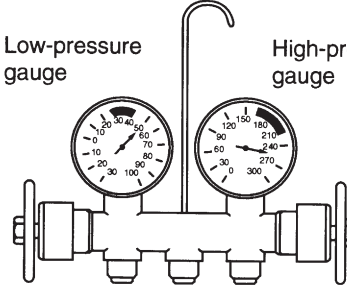
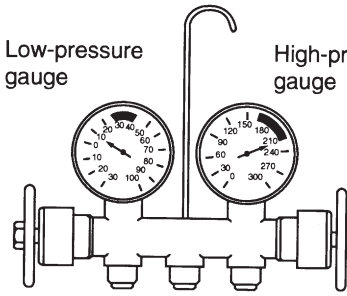
As to the method of a performance test, refer to the item of "Performance Test".

Each shaded area on the following tables indicates a reading of the normal system when the temperature of outside air is 32.5°C (91°F).

Condition		Probable cause	Corrective action
INSUFFICIENT REFRIGERANT CHARGE  G4M0673	Insufficient cooling.	Refrigerant is small, or leaking a little.	1. Leak test. 2. Repair leak. 3. Charge system. Evacuate, as necessary, and recharge system.
ALMOST NO REFRIGERANT  G4M0674	No cooling action.	Serious refrigerant leak.	Stop compressor immediately. 1. Leak test. 2. Discharge system. 3. Repair leak(s). 4. Replace receiver drier if necessary. 5. Check oil level. 6. Evacuate and recharge system.
FAULTY EXPANSION VALVE  G4M0675	Slight cooling. Sweating or frosted expansion valve inlet.	Expansion valve restricts refrigerant flow. • Expansion valve is clogged. • Expansion valve is inoperative. • Valve stuck closed. Thermal bulb has lost charge.	If valve inlet reveals sweat or frost: 1. Discharge system. 2. Remove valve and clean it. Replace it if necessary. 3. Evacuate system. 4. Charge system. If valve does not operate: 1. Discharge system. 2. Replace valve. 3. Evacuate and charge system.

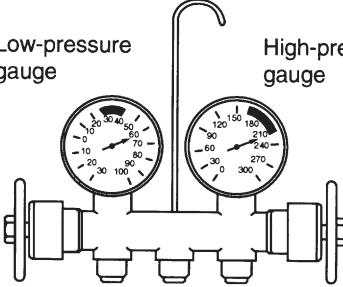
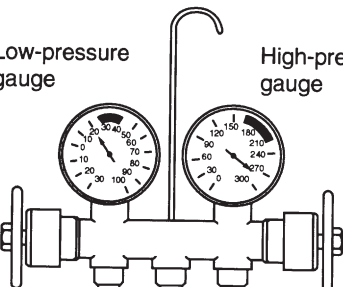
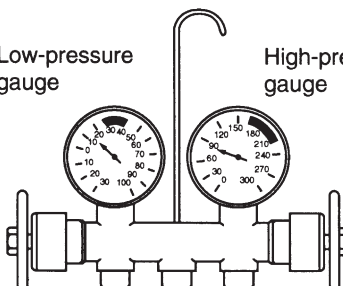
GENERAL DIAGNOSTICS

HVAC System (Heater, Ventilator and A/C)

Condition	Probable cause	Corrective action
Low-pressure gauge High-pressure gauge  G4M0676 Low-pressure gauge High-pressure gauge  G4M0677	Insufficient cooling. Sweated suction line. No cooling. Sweating or frosted suction line.	Expansion valve allows too much refrigerant through evaporator. Faulty seal of O-ring in expansion valve. Check valve for operation. If suction side does not show a pressure decrease, replace valve. 1. Discharge system. 2. Remove expansion valve and replace O-ring. 3. Evacuate and replace system.
AIR IN SYSTEM	Insufficient cooling.	Air mixed with refrigerant in system.
Low-pressure gauge High-pressure gauge  G4M0678		1. Discharge system. 2. Replace receiver drier. 3. Evacuate and charge system.
MOISTURE IN SYSTEM	After operation for a while, pressure on suction side may show vacuum pressure reading. During this condition, discharge air will be warm. As warning of this, reading shows 39 kPa (0.4 kg/cm ² , 6 psi) vibration.	Drier is saturated with moisture. Moisture has frozen at expansion valve. Refrigerant flow is restricted.
Low-pressure gauge High-pressure gauge  G4M0679		1. Discharge system. 2. Replace receiver drier (twice if necessary). 3. Evacuate system completely (Repeat 30 minute evacuating three times.). 4. Recharge system.

GENERAL DIAGNOSTICS

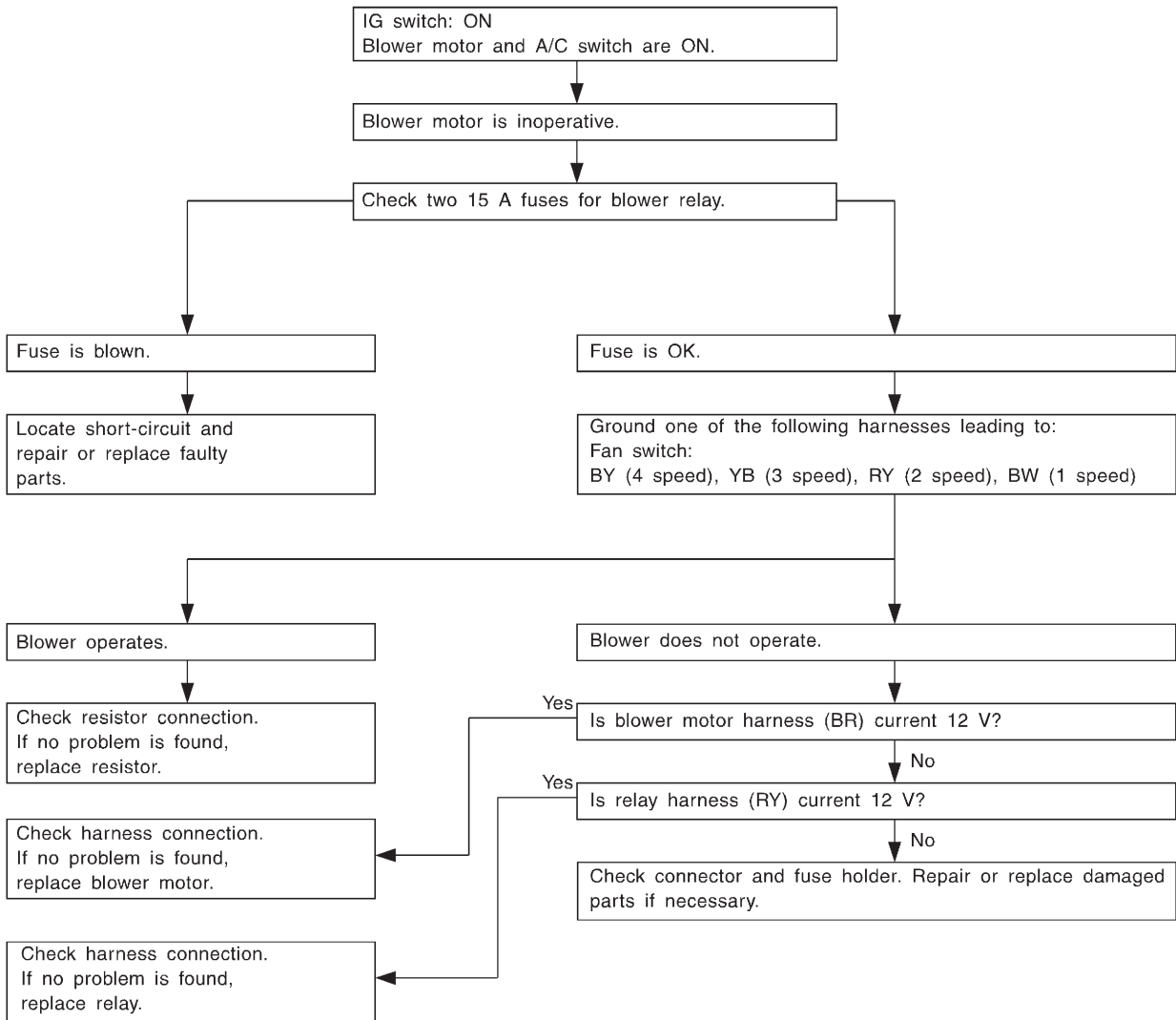
HVAC System (Heater, Ventilator and A/C)

Condition		Probable cause	Corrective action
FAULTY CONDENSER Low-pressure gauge  High-pressure gauge G4M0680		No cooling action. Engine may overheat. Suction line is very hot.	Condenser is often found not functioning well. ● Check condenser cooling fan. ● Check condenser for dirt accumulation. ● Check engine cooling system for over-heat. ● Check for refrigerant overcharge. If pressure remains high in spite of all above actions taken, remove and inspect the condenser for possible oil clogging.
HIGH-PRESSURE LINE BLOCKED Low-pressure gauge  High-pressure gauge G4M0681		Insufficient cooling. Frosted high-pressure liquid line.	Drier clogged, or restriction in high-pressure line. 1. Discharge system. 2. Remove receiver drier or strainer and replace it. 3. Evacuate and charge system.
FAULTY COMPRESSOR Low-pressure gauge  High-pressure gauge G4M0682		Insufficient cooling.	Internal problem in compressor, or damaged gasket and valve. 1. Discharge system. 2. Remove and check compressor. 3. Repair or replace compressor. 4. Check oil level. 5. Replace receiver drier. 6. Evacuate and charge system.

GENERAL DIAGNOSTICS

HVAC System (Heater, Ventilator and A/C)

C: BLOWER MOTOR CHECK S701278E32



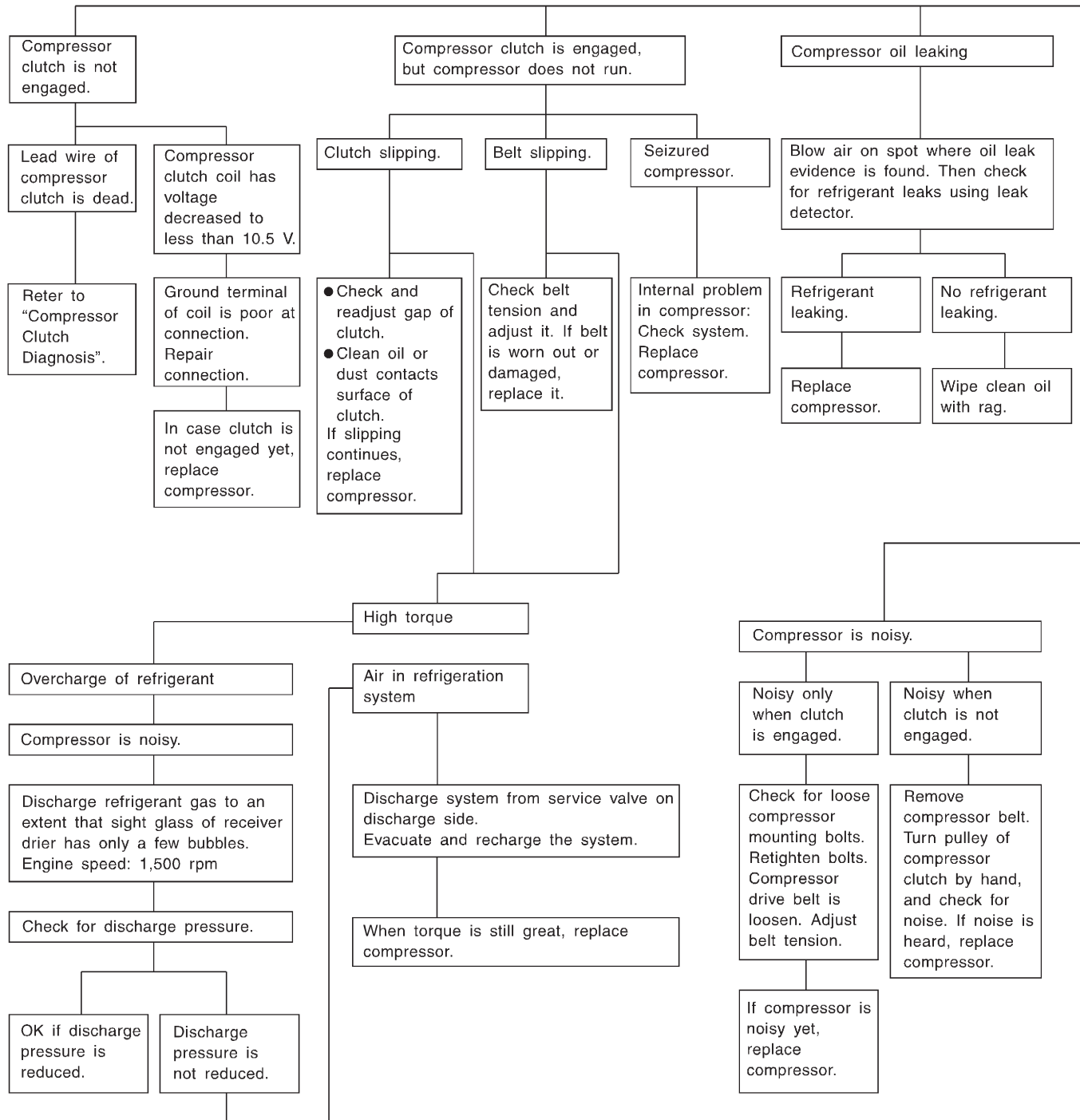
H4M1266A

D: COMPRESSOR CHECK

S701278E36

1. COMPRESSOR

S701278E3601

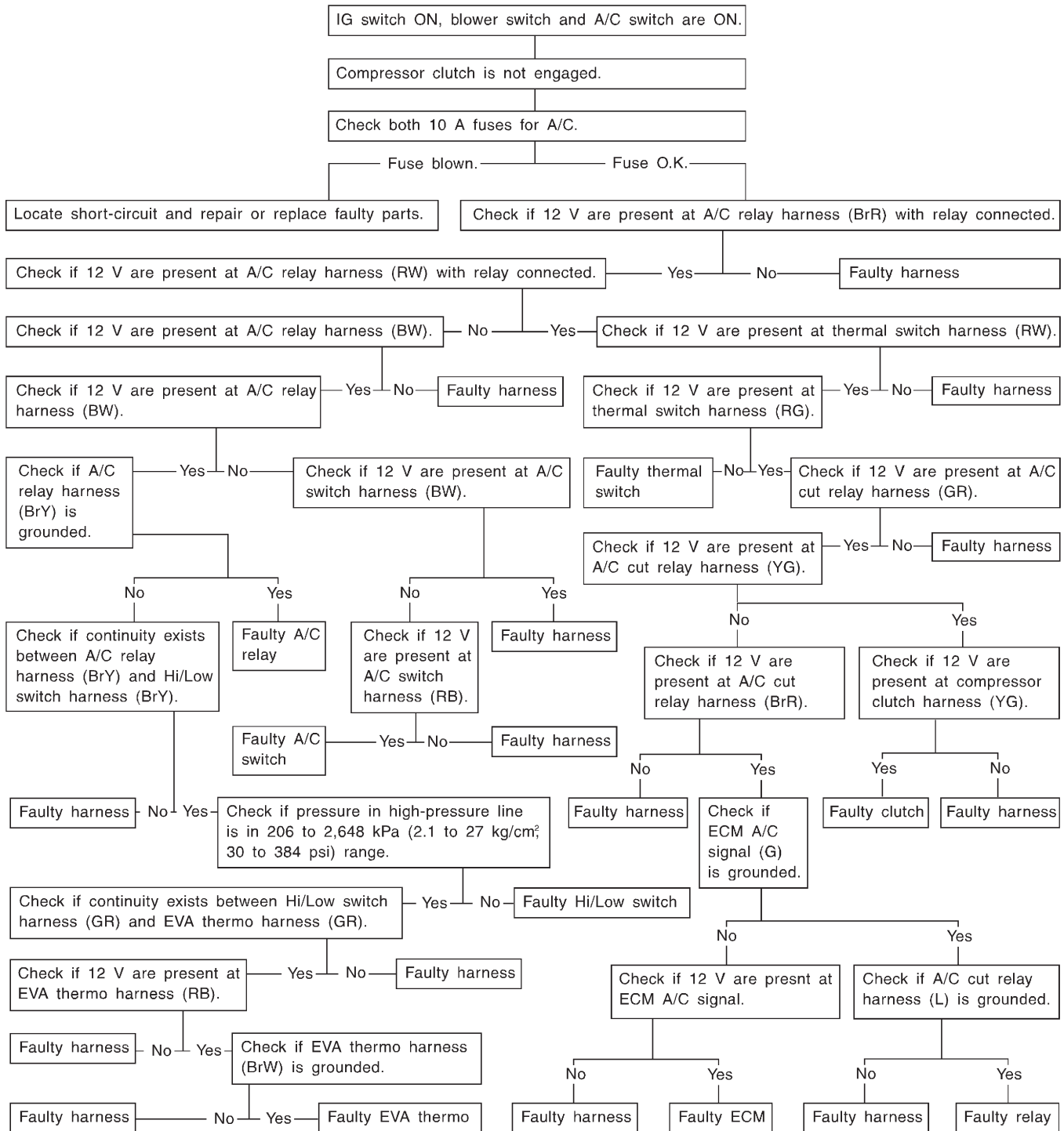


H4M1267A

GENERAL DIAGNOSTICS

HVAC System (Heater, Ventilator and A/C)

2. COMPRESSOR CLUTCH S701278E3602



H4M1268A

6. Heater Unit S701290

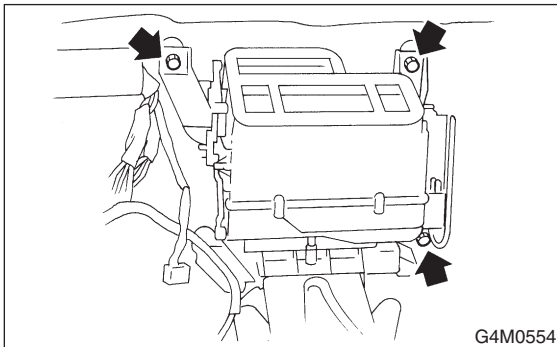
A: REMOVAL S701290A18

- 1) Disconnect GND cable from battery.
- 2) Remove heater hoses (inlet, outlet) in engine compartment.

NOTE:

Drain as much coolant from heater unit as possible, and plug disconnected hose with cloth.
<Ref. to CO-6 REPLACEMENT, Engine Coolant.>

- 3) Remove instrument panel.
<Ref. to EI-25 REMOVAL, Instrument Panel Assembly.>
- 4) Remove steering support beam.
- 5) Remove cooling unit.
<Ref. to AC-33 REMOVAL, Intake Unit with Evaporator.>
- 6) Remove heater unit.



B: INSTALLATION S701290A11

- 1) Install in the reverse order of removal.

Fitted length of heater hose over pipe:
27.5±2.5 mm (1.083±0.098 in)

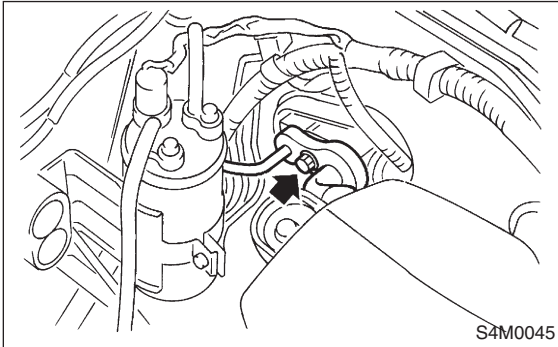
- 2) Pour coolant.
<Ref. to CO-6 REPLACEMENT, Engine Coolant.>

12. Intake Unit with Evaporator

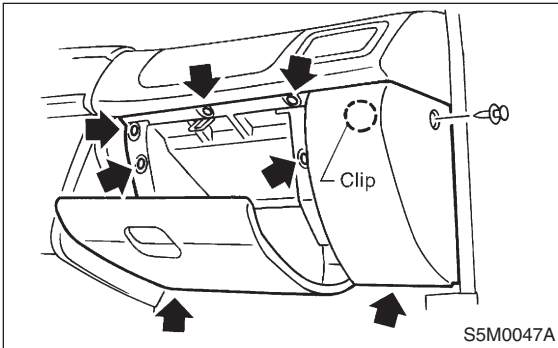
S701280

A: REMOVAL S701280A18

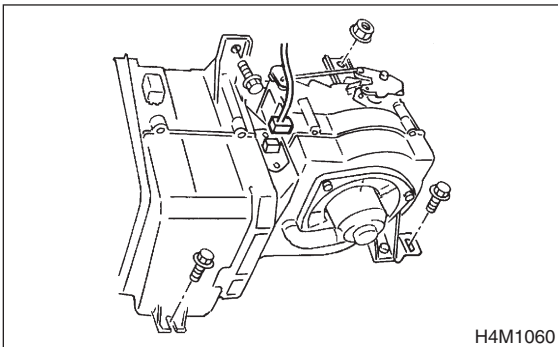
- 1) Disconnect battery negative terminal.
- 2) Discharge refrigerant using refrigerant recovery system. <Ref. to AC-16 OPERATION, Refrigerant Recovery Procedure .>
- 3) Remove bolt, then disconnect discharge pipe and suction pipe.



- 4) Remove glove box.



- 5) Disconnect the harness connector from evaporator.
- 6) Disconnect drain hose.
- 7) Remove intake unit mounting bolt and nut.



B: INSTALLATION S701280A11

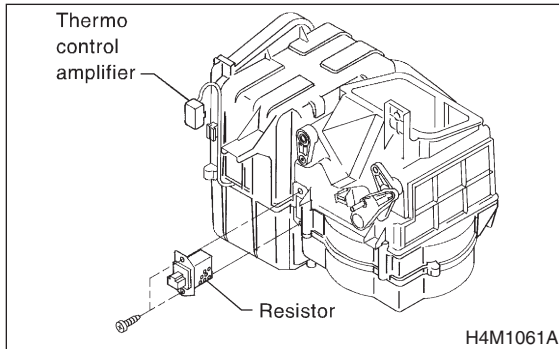
- 1) Install in the reverse order of removal.
- 2) Charge refrigerant. <Ref. to AC-17 OPERATION, Refrigerant Charging Procedure.>

INTAKE UNIT WITH EVAPORATOR

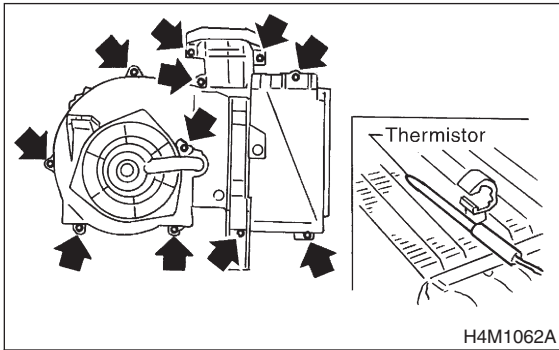
HVAC System (Heater, Ventilator and A/C)

C: DISASSEMBLY S701280A06

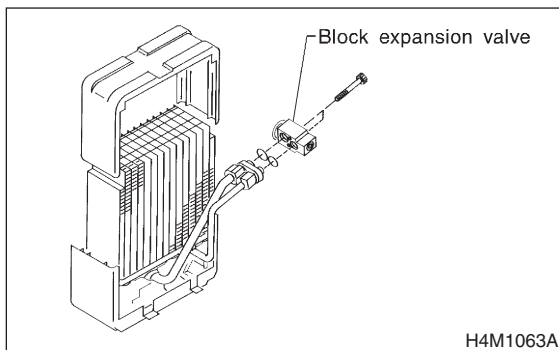
- 1) Remove resistor assembly and remove thermo control amplifier from intake unit case.



- 2) Remove some screws then separate intake unit case.
- 3) Remove thermistor from clip with the evaporator.



- 4) Remove the block expansion valve from pipes.



- 5) Check to see if the evaporator fins are clogged. If they are, clean them with compressed air.

CAUTION:

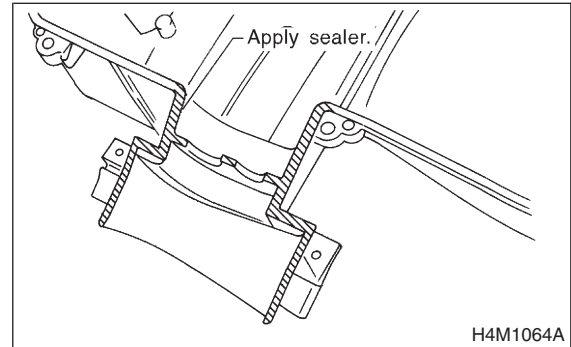
Water must never be used to clean the evaporator.

- 6) Check parts that have been removed for cracks or scratches, and repair or replace them with new ones, if necessary.

- 7) Before assembling intake unit, apply sealer to flange of intake unit case.

Sealer:

THREE BOND 1215 or equivalent



D: ASSEMBLY S701280A02

Assemble in the reverse order of disassembly.

NOTE:

Confirm that the O-ring is inserted in the specified position.

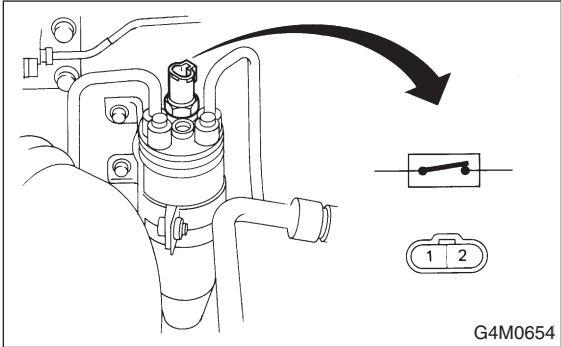
15. Pressure Switch (Dual Switch)

S701555

A: INSPECTION

S701555A10

NOTE:
Pressure switch is attached to receiver dryer. It has two built-in switches.



- 1) Remove cap from high-pressure line service valve, and connect gauge manifold to service valve.
- 2) Disconnect pressure switch harness connector, and check pressure switch for proper ON-OFF operation. Use a circuit tester.

	Terminal	Operation	High-pressure side line pressure
High and low pressure switch	1 — 2	Turns OFF.	Increasing to 2,942±98 kPa (30±1 kg/cm ² , 427±14 psi)
			Decreasing to 177±29 kPa (1.8±0.3 kg/cm ² , 26±4 psi)
		Turns ON.	Increasing to 186 ⁺³⁹ / ₋₂₅ kPa (1.9 ^{+0.4} / _{-0.25} kg/cm ² , 27 ^{+5.7} / _{-3.6} psi)
			Decreasing to 2,059±196 kPa (21±2 kg/cm ² , 299±28 psi)

RECEIVER DRIER

HVAC System (Heater, Ventilator and A/C)

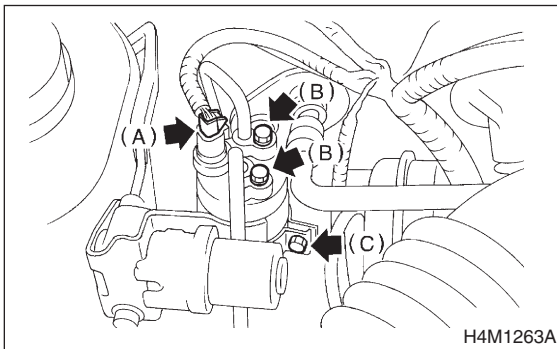
11. Receiver Drier S701283

A: REMOVAL S701283A18

- 1) Disconnect battery negative terminal.
- 2) Discharge refrigerant using refrigerant recovery system. <Ref. to AC-16 OPERATION, Refrigerant Recovery Procedure.>
- 3) Disconnect pressure switch connector (A).
- 4) Disconnect pipes (B).
- 5) Remove mounting bolt (C) and remove receiver drier.

CAUTION:

The receiver drier contains a desiccant. Be sure to put a blind plug in the detached receiver drier to protect it from moisture.



B: INSTALLATION S701283A11

- 1) Install in the reverse order of removal.
- 2) Charge refrigerant. <Ref. to AC-17 OPERATION, Refrigerant Charging Procedure.>

REFRIGERANT CHARGING PROCEDURE

HVAC System (Heater, Ventilator and A/C)

3. Refrigerant Charging Procedure

S701292

A: OPERATION

S701292A16

CAUTION:

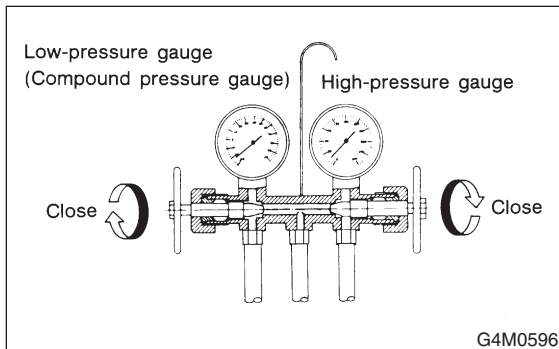
- During operation, be sure to wear safety goggles and protective gloves.
- Before charging the refrigerant, evacuate the system to remove small amounts of moisture remaining in the system.

The moisture in the system can be completely evacuated only under the minimum vacuum level. The minimum vacuum level affects the temperature in the system.

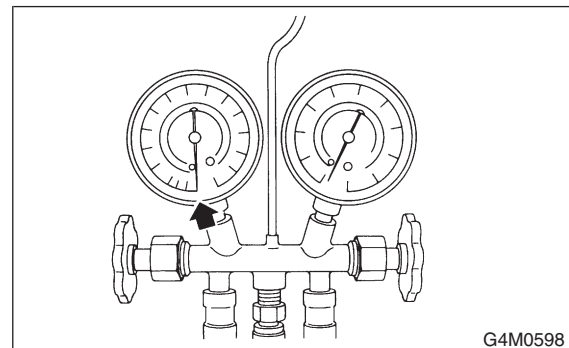
- The list below shows the vacuum values necessary to boil water in various temperature. In addition, the vacuum levels indicated on the gauge are approx. 3.3 kPa (25 mmHg, 0.98 inHg) lower than those measured at 304.8 m (1,000 ft) above sea level.

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)

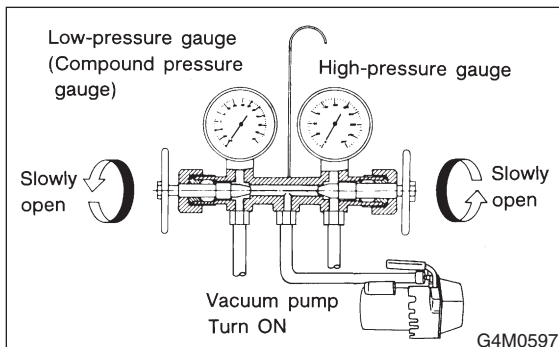
- 1) Close the valves on low-/high-pressure sides of the manifold gauge.



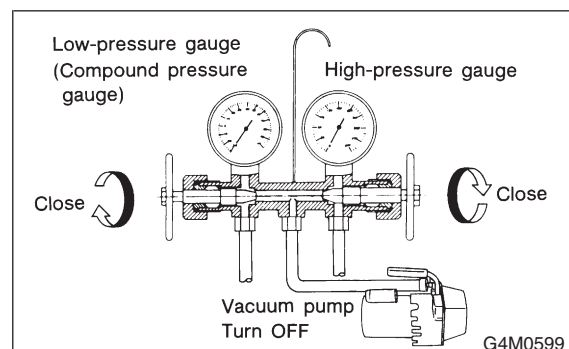
- 5) After the low-pressure gauge reaches 100.0 kPa (750 mmHg, 29.5 inHg) or higher, evacuate the system for approx. 15 minutes.



- 2) Install the low-/high-pressure hoses to the corresponding service ports on the vehicle respectively.
- 3) Connect the center hose of the manifold gauge set with the vacuum pump.
- 4) Carefully open the valves on the low-/high-pressure sides to activate the vacuum pump.



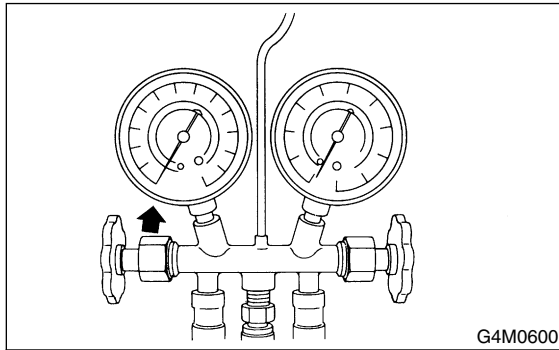
- 6) After 15 minutes of evacuation, if the reading shows 100.0 kPa (750 mmHg, 29.5 inHg) or higher, close the valves on the both sides to stop the vacuum pump.



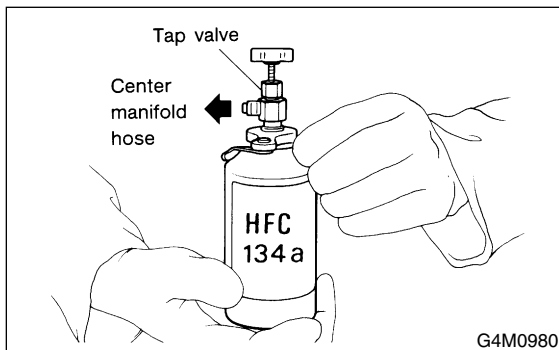
REFRIGERANT CHARGING PROCEDURE

HVAC System (Heater, Ventilator and A/C)

7) Note the low-pressure gauge reading.

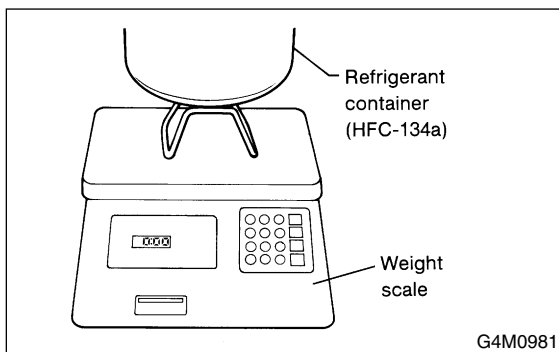


8) Leave it at least 5 minutes, and then check the low-pressure gauge reading for any changes. If the vacuum level has changed by at least 3.3 kPa (25 mmHg, 0.98 inHg), perform the leak test.
9) Following the can tap operation manual instructions, install it to the refrigerant can.

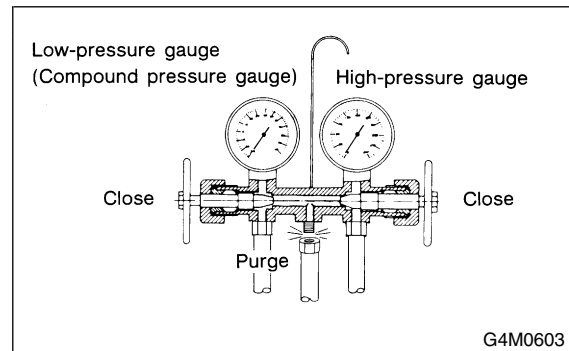


10) Disconnect the center manifold hose from the vacuum pump, and connect the hose to the tap valve.

11) When a 13.6 kg (30 lb) refrigerant container is used, measure the refrigerant amount in use using a weighting scale.



12) Confirm that all the 3 hoses are tightly connected to the manifold gauge set.



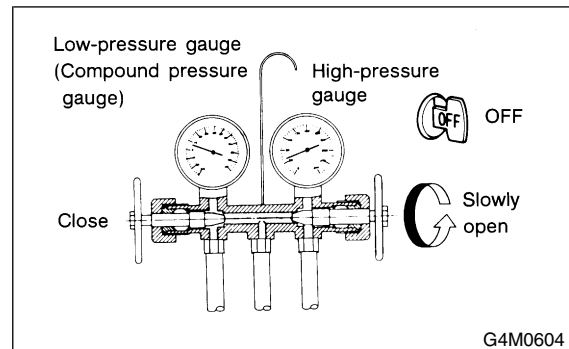
13) Open the valve on the HFC-134a source.

14) Loosen the center hose connection on the manifold gauge set (if applicable, press a purge valve on the manifold gauge set) only for a couple of seconds to allow the air in the center hose to escape by the refrigerant.

15) Carefully open the high-pressure valve with the engine running.

CAUTION:

Do not open the low-pressure valve.



CAUTION:

Never run the engine during charging from the high-pressure side.

16) Close the high-pressure valve when the low-pressure gauge reaches 98 kPa (1 kg/cm², 14 psi). Using a leak tester, check the system for leaks.

If any leakage is found after the refrigerant recovery is completed, repair the applicable area.

17) After confirming that there are no leaks with the leak test, charge the required amount of refrigerant.

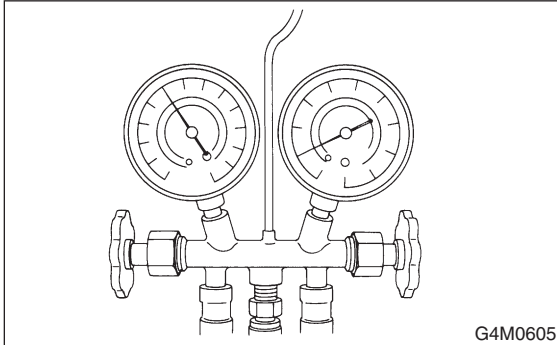
CAUTION:

Never run the engine during charging from the high-pressure side.

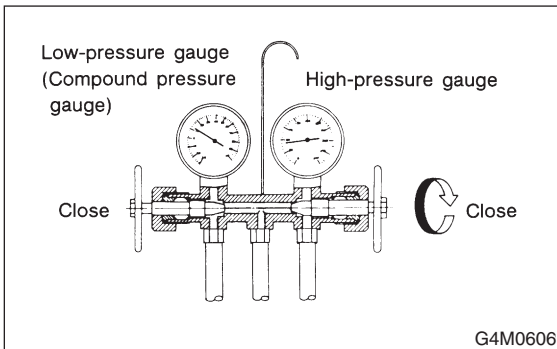
REFRIGERANT CHARGING PROCEDURE

HVAC System (Heater, Ventilator and A/C)

- 18) Close the high-pressure valve when;
- the readings of low- and high-pressure gauges become almost equal, after the charging speed is reduced,
 - the HFC-134a source becomes empty, or
 - the system is filled with the gas.



- 19) If the HFC-134a source is empty, close the high-pressure valve, close the valve on the can tap, and replace the HFC-134a source with a new one to restart the operation.



- 20) Confirm that both the low- and high-pressure valves can be closed. Start the engine with the A/C switch OFF.

- 21) Quickly repeat ON-OFF cycles a few times to prevent initial compressor damage.

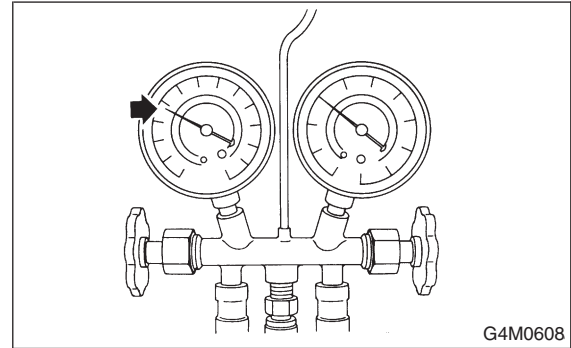
- 22) Set up the vehicle to the following status:

- A/C switch ON
- Engine running at 1,500 rpm
- Blower speed setting to "HI"
- Temperature setting to "MAX COOL"
- Air inlet setting to "RECIRC"
- Windows open

- 23) While reading the low-pressure gauge, carefully open the low-pressure valve with the refrigerant source connected and the service hose purged.

CAUTION:

Never open the high-pressure valve with the engine running.



- 24) Adjust the refrigerant flow to maintain the pressure on the low-pressure side at 276 kPa (2.81 kg/cm², 40 psi) max.

- 25) After the system is fully charged, close the low-pressure valve.

- 26) Close the valve on the refrigerant source.

Refrigerant amount		
Refrigerant	Minimum	Maximum
HFC-134a	0.55 kg (1.21 lb)	0.65 kg (1.43 lb)

- 27) Disconnect the hose from the service port, and install the service port cap.

REFRIGERANT LEAK CHECK

HVAC System (Heater, Ventilator and A/C)

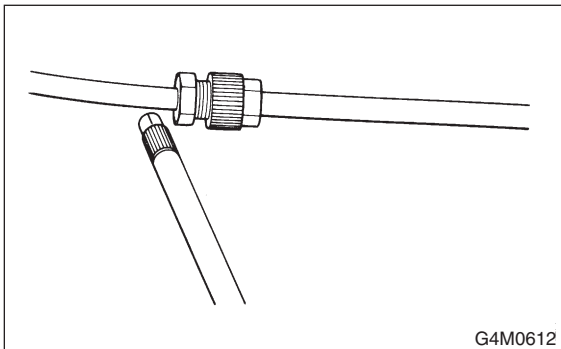
4. Refrigerant Leak Check S701293

A: INSPECTION S701293A10

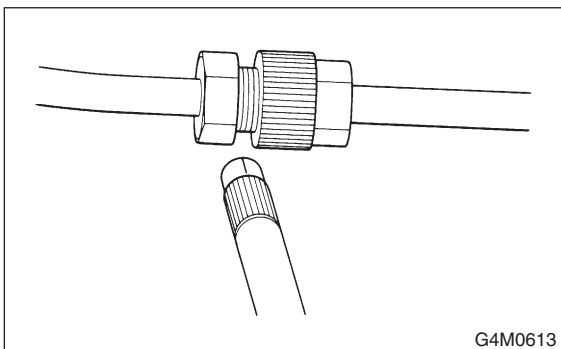
1) Operate the A/C system for approx. 10 minutes, and confirm that the high-side pressure shows at least 690 kPa (7.03 kg/cm², 100 psi). Then stop the engine to start the leak test.

2) Starting from the connection between the high-pressure tube and evaporator, check the system for leaks along the high-pressure side through the compressor. The following items must be checked thoroughly.

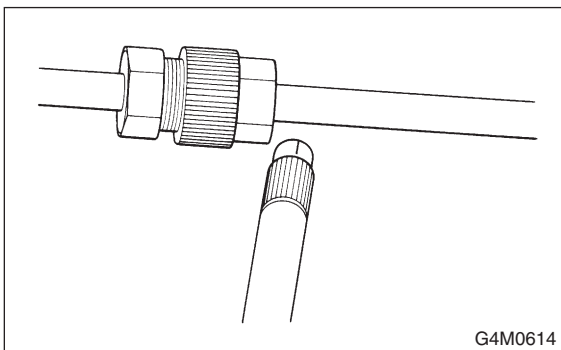
- Connection between the tube and tube fitting



- Connection between 2 parts



- Connection between the tube and nut



3) Check the joint and seam between the pressure switch (dual switch) and receiver dryer.

4) Check the connections between the condenser and tubes, and welded joints on the condenser. The leak tester may detect the oil on the condenser fins as a leak.

5) Check the joint between the compressor and hoses.

6) Check the machined area of compressor and other joints on the compressor.

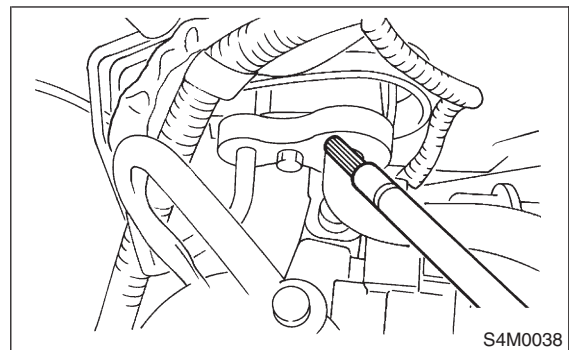
7) Check the thermal limiter (if equipped) on the compressor housing.

8) Check the compressor shaft seal at the area near the center of compressor clutch pulley.

Some shaft seals show a slight amount of leakage about 28 g (1.0 oz) per year. This is not a problem.

9) Starting from the connection between the low-pressure tube and evaporator, check the system for leakage along the high-pressure side through the compressor. The following items must be checked thoroughly.

- Connection between the tube and tube fitting
- Connection between 2 parts
- Connection between the tube and nut

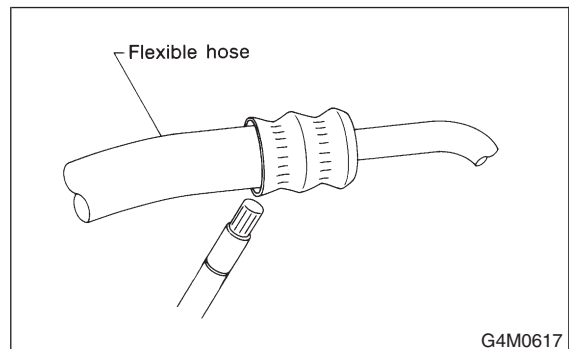


10) Visually check the rubber area of the flexible hose for cracks.

Check the entire length of the flexible hose, especially the connection with the metal hose end.

CAUTION:

Carefully check the external surface of hoses and tubes at approx. 25 mm (0.98 in.) per second.



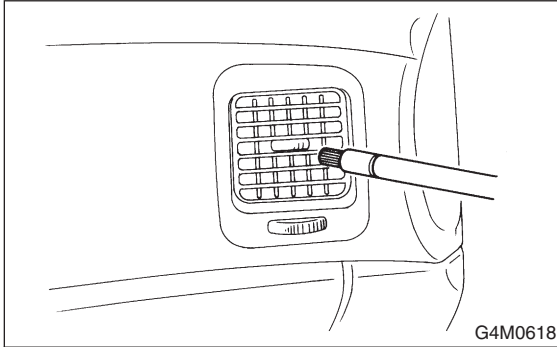
11) Disconnect the drain hose from the evaporator case, and check the hose end for at least 10 seconds.

After the test is finished, reconnect the drain hose.

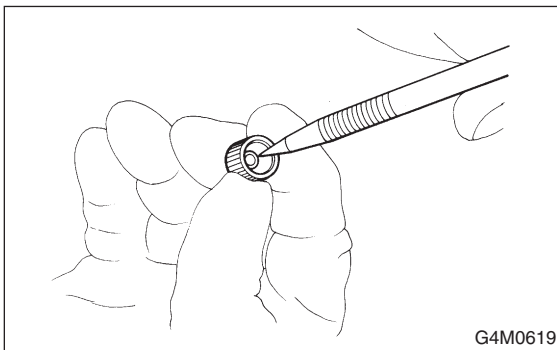
REFRIGERANT LEAK CHECK

HVAC System (Heater, Ventilator and A/C)

12) Turn the ignition key to ON position, and run the blower at high speed for 1 minute. Stop the blower to check the ventilation grill on the instrument panel. While moving the tester closer to the grill, run the blower for 1 or 2 seconds, then stop it. Check the grill at that point for at least 10 seconds.



- 13) Check the valve in the service port.
14) Visually check the rubber seal in the service port cap.



REFRIGERANT RECOVERY PROCEDURE

HVAC System (Heater, Ventilator and A/C)

2. Refrigerant Recovery Procedure S701291

6) Follow the operation manual to activate the refrigerant recovery system.

A: OPERATION S701291A16

CAUTION:

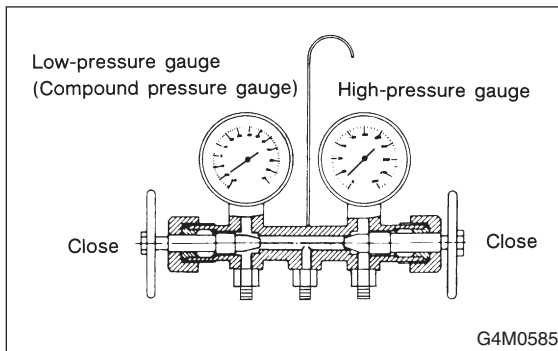
- During operation, be sure to wear safety goggles and protective gloves.
- Connect the refrigerant recovery system with the manifold gauge set to discharge the refrigerant from the A/C system and reuse it.
- When reusing the discharged refrigerant, keep service cans on hand. Because the discharge rate with the recovery system is approx. 90%, service cans are necessary to charge the refrigerant.
- Follow the detailed operation procedure described in the operation manual attached to the refrigerant recovery system.

1) Turn the A/C switch ON.

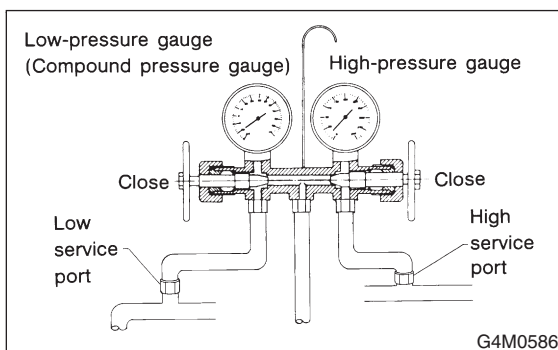
Leave the engine running for approx. 5 minutes to activate the compressor. Perform the refrigerating cycle with the refrigerant to discharge the compressor oil remaining on the functional parts into the compressor as much as possible.

2) Stop the engine.

3) Close the valves on the low-/high-pressure sides of the manifold gauge set.



4) Install the low-/high-pressure hoses to the service ports on the low-/high-pressure sides of the vehicle respectively.



5) Connect the center hose to the refrigerant recovery system.

RELAY AND FUSE

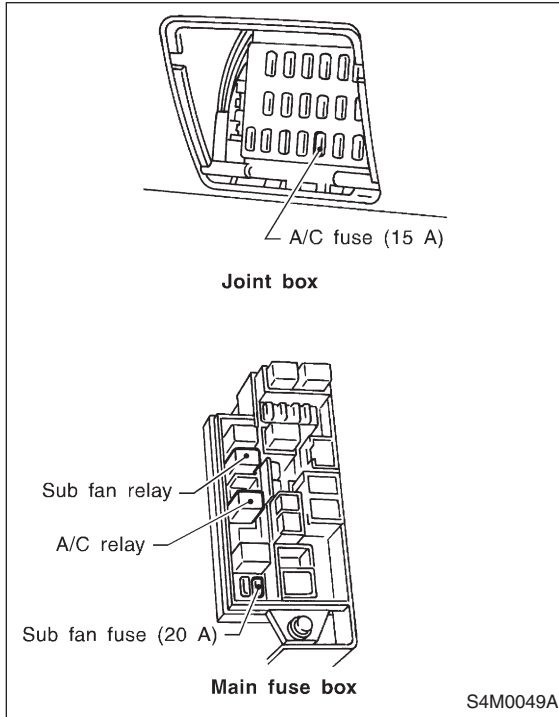
HVAC System (Heater, Ventilator and A/C)

14. Relay and Fuse S701287

A: LOCATION S701287A13

Relays used with A/C system are located as shown in figure.

- A/C relay
- Sub fan (condenser fan) relay
- Fuses (15 A and 20 A)



B: INSPECTION S701287A10

Check conduction with a circuit tester (ohm range) according to the following table in figure.

