TO INDEX

K1 HEATER & AIR CONDITIONER

1 HEATER AND AIR CONDITIONER

1-1 INSTRUCTIONS FOR SERVICE OPERATION

1-1-1 REFRIGERANT AND COMPRESSOR OIL SPECIFICATIONS

Refrigerant	HFC－134a
Refrigerant replenishing amount (g)	300±30
Compressor oil	ND－OIL8

CAUTION

- When adjusting the amount of refrigerant, remove all the refrigerant in the cycle, and then refill the amount provided above [additional refill is not allowed].

NOTE

- Refrigerant service can (300 g):999-01090-C9-006

1-1-2 INSTRUCTIONS FOR REFRIGERANT AND SERVIS CAN

WARNING

- Any wrong handling may cause toxic substances to generate or the service can to explode, thus leading to serious injuries. Or, the liquid may splash, resulting in blindness, frostbite, etc.

1. Be sure to use the refrigerant HFC－134a.
2. When taking out the refrigerant during the repair, etc. of the air conditioner, be sure to use a refrigerant recovery machine. Never allow the refrigerant to be discharged to the atmosphere.
3. Be sure to recover the refrigerant when the vehicle is scrapped or the car air conditioner is disposed of.
4. When the refrigerant gas is exposed to open flame or very high temperature, it will be dissolved, thus generating toxic substances. Therefore, utmost care must be exercised so that the refrigerant gas may not leak at such a place.
5. Do not perform operations at a place with poor ventilation.
6. Never use a halide torch-type leak detector. This type of detector does not detect HFC－134a gas leak. Also, it decomposes the HFC－134a, thus generating a toxic substance.
7. Do not heat up the service can. When heating of the service can is absolutely necessary, use hot water at a temperature below 40˚C.
8. Do not recycle the can by returning the refrigerant into the service can.
9. Be very careful not to shake the service can strongly. There is a danger that the can valve may be detached if it has been installed improperly.
10. Do not handle the can near your face in preparation for the explosion of the can. Also, be certain to wear protective goggles.
11. Do not open the valve of the manifold gauge at the high-pressure side while the engine is running. There is a danger that the high-pressure gas flows backward, thus leading to the explosion of the can.
12. In cases where the refrigerant should enter your eyes, do not rub your eyes with your hands or handkerchief, but immediately wash your eyes with clean water for more than 15 minutes. Then, immediately receive medical treatment at an eye doctor.

1-1-3 INSTRUCTIONS FOR COMPRESSOR OIL

1. Be sure to use the designated compressor oil.
2. The compressor oil has high moisture-absorption characteristics. Hence, when an air conditioner part is removed, be sure to immediately shut off the exposure to the atmosphere, using plugs, vinyl tape, etc.
3. The compressor oil has an adverse influence on the paint surface and resin. Therefore, utmost care must be exercised so that the compressor oil may not adhere to such places. If the compressor oil should be adhered to such places, immediately wipe off the oil, using cloth.

1-1-4 INSTRUCTIONS FOR INSTALLATION OF O-RINGS AND PIPES

1.Be certain to use O-rings for HFC—134a.
2.Be sure to use new O-rings when the pipes are connected.
3.When the O-rings are detached, use a soft object, such as a toothpick, being very careful not to damage the pipes.
4.Liberally apply compressor oil to the O-ring.
5.Route the hose pipes naturally. Be very careful not to twist them or bend them forcibly.
6.If a foreign substance, such as a lint, is adhered to the joint section of the pipes and O-rings, it will cause the refrigerant gas to leak. Therefore, make sure that no foreign substance is present before connecting the pipes. Also, do not touch the joint section of the pipes and O-rings with cotton work gloves.
7.When the pipes are replaced with new ones, replenish the following amount of compressor oil.

REPLACEMENT PARTS	Pipes and hoses
Replenishing amount of compressor oil	5 cc (per 1 piece)

1-2 ARTICLES TO BE PREPARED

Instrument

Dial gauge,Torque wrench,Tachometer,Dry and wet bulb hygrometer,Temperature gauge

Tool

Manifold gauge

1-3 BASIC CHECK AND ADJUSTMENT

1-3-1 CHECK OF COOLING PERFORMANCE

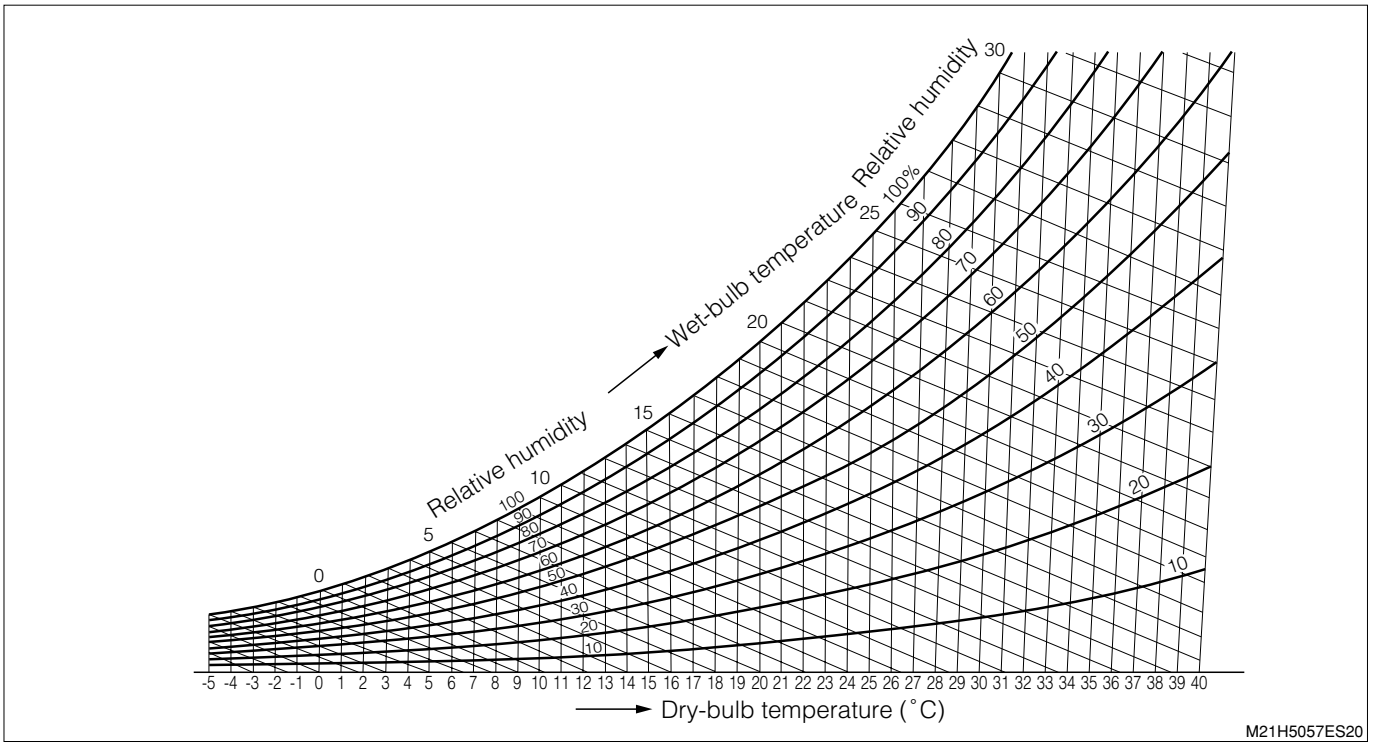
1.Install a manifold gauge.
2.Set the vehicle to the following conditions.

Detected item	Condition
Vehicle body	Parked state in a shaded area
Hood door	Fully opened
A/C switch (magnet clutch)	ON
Engine revolution speed	2000rpm
Switching of inside and outside air	Inside air
Register	VENT
Set temperature	MAX COOL
Blower speed	HI
Temperature at cooling unit intake port *1	25 - 35˚C
Gauge high-pressure side pressure *2	1.5MPa {15.5kgf/cm^2}

CAUTION

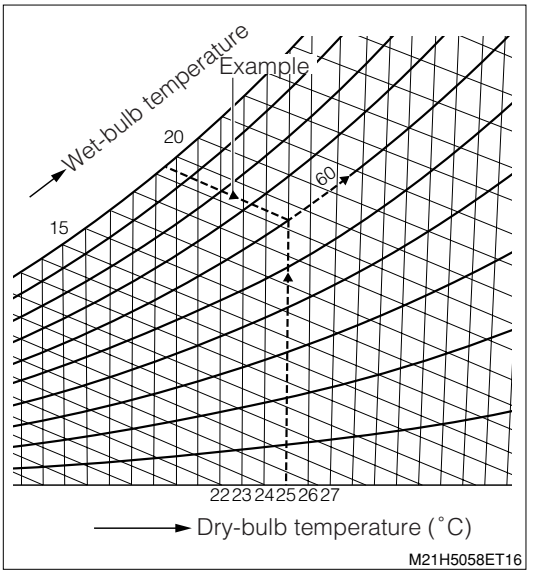
- *1 To ensure accurate measurements, the temperatures at the air intake port of the cooling unit must be somewhere between 25 - 35˚C. If the temperature is too low, postpone the testing.
  *2 When the pressure is too high, pour water on the condenser to reduce the pressure. Conversely, if the pressure is too low, cover the front part of the condenser to raise the pressure.

3.Remove the glove box. Place a wet and dry bulb thermometer (necessary for measuring humidity) at the air intake port of the cooling unit.
4.Insert the bulb section of the wet and dry bulb thermometer into the center of the register.
5.Start the operation under the condition of Item 2, thus stabilizing the temperature at the register. (Approx. 5 to 6 minutes)
6.Measure dry-bulb and wet-bulb temperatures of the air intake port and the register temperature.
7.Determine the relative humidity using the air diagram from the measured temperatures of the wet and dry bulb of the air intake port.

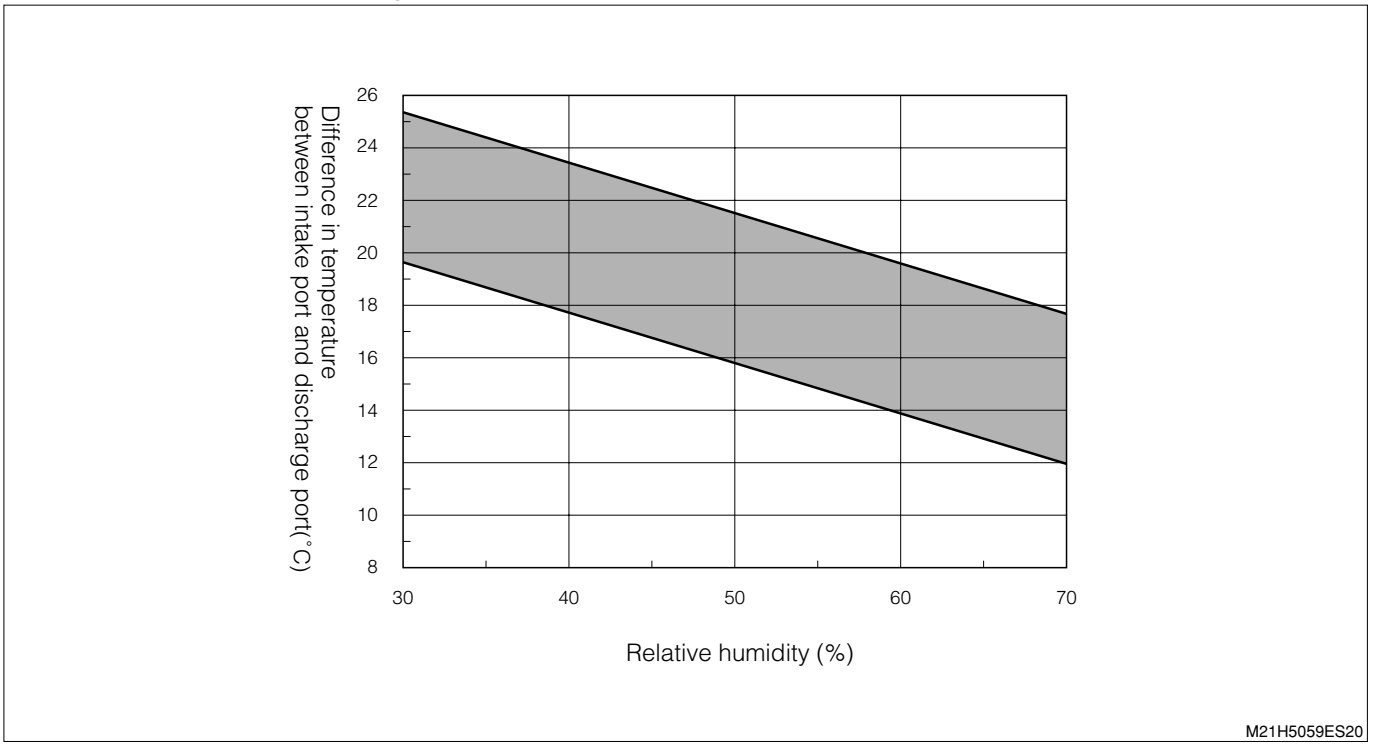


NOTE

- When the dry-bulb temperature of the wet and dry bulb thermometer that has been set to the air intake port is 25˚C and the wet-bulb temperature is 19.5˚C, the intersection of the dotted lines in the diagram indicates the relative humidity. In this case, the relative humidity is 60%.



8.Check the difference between measured temperatures of the air intake port and the register as well as their relative humidity using the standard performance table.

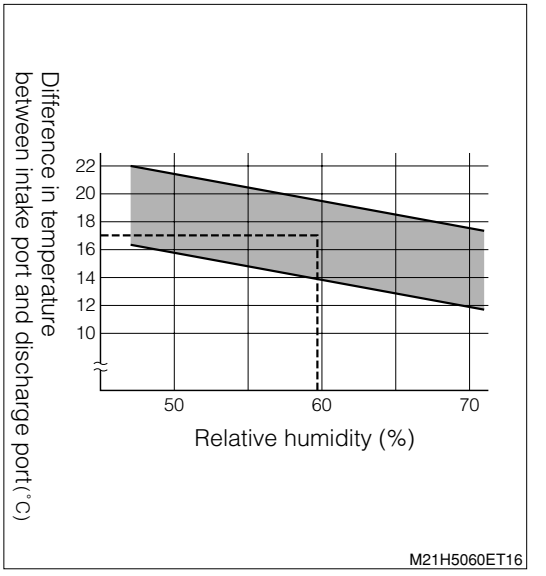


SPECIFIED VALUE: Ensure that the check results are within the range of the slant line section in the figure.

NOTE

- The example shows how to evaluate performance using the standard performance table, where the difference between the dry-bulb temperatures of the air intake port and the register is 17˚C and the relative humidity is 60%.

9.In cases where an abnormality is confirmed, check and repair the air conditioner system according to the trouble-shooting.



1-3-2 CHECK AND ADJUSTMENT OF AIR CONDITIONER COMPRESSOR BELT TENSION (DEFLECTION AMOUNT)

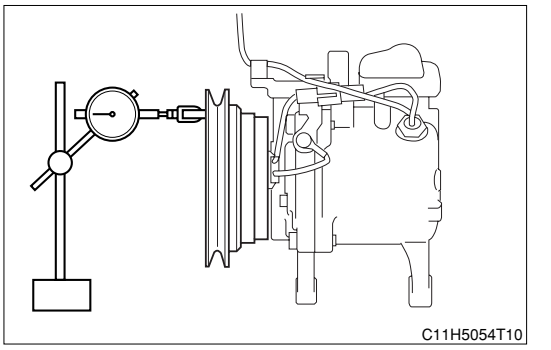
(1) Type 1KR-FE engine

Refer to Page B1-5.

(2) Type K3-VE engine

Refer to Page B1-21.

1-3-3 CHECK AND ADJUSTMENT OF MAGNET CLUTCH AIR GAP



1.Remove the compressor.
Refer to Page K1-22.

2.Install the dial gauge to the magnet clutch hub vertically.
3.Connect the connector terminal of the magnet clutch to the positive (+) terminal of the battery, and the body earth of the compressor to the negative (-) terminal of the battery. Then, start the operation of the magnet clutch. At this time, check the air gap.
SPECIFIED VALUE: $0.5^{+0.15}_{-0.20}$ mm
4.If the check results fail to conform to the specified value, remove the magnet clutch hub and perform the adjustment by means of the plate washer.

CAUTION
- The number of plate washers to be used should be 3 pcs. or less.

Refer to Page K1-24.

1-3-4 CHECK OF DEFROSTER OPERATION

1.Check that air blows out the defroster vent, when the IG switch is turned "ON".
2.Checks that air volume changes according to the blower switch operation.

2 REFRIGERANT

2-1 REPLACEMENT

CAUTION

- When adjusting the amount of refrigerant, remove all the refrigerant in the cycle, and then refill the amount below [additional refill is not allowed].

2-1-1 ARTICLES TO BE PREPARED

Tool

Vacuum pump,Manifold gauge,Halogen leak detector

Lubricant,adhesive,others

Chlorofluorocarbon recovery and regenerating machine,Refrigerant gus HFC－134a(R134a)

2-1-2 REPLACING PROCEDURE

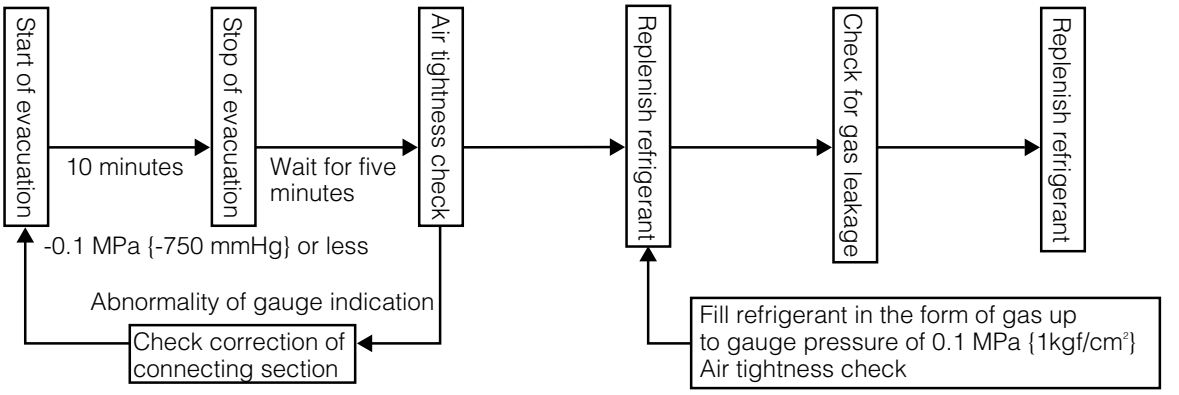
(1) Recovery procedure

1.Turn ON the A/C switch.

2.Start the engine and operate the compressor for about 5 to 6 minutes so that the residual compressor oil in each function part may circulate with the refrigerant and be recovered to the compressor.

3.Recover the refrigerant, following the instruction manual of the refrigerant recovery and recycling machine to be used.

(2) Replenishing procedure



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SPECIFIED VALUE: Replenishing amount of refrigerant: 300±30g

NOTE

- Refrigerant service can (300 g):999-01090-C9-006

3 HEATER CONTROL PANEL

3-1 REMOVAL AND INSTALLATION

3-1-1 ARTICLES TO BE PREPARED

Tool

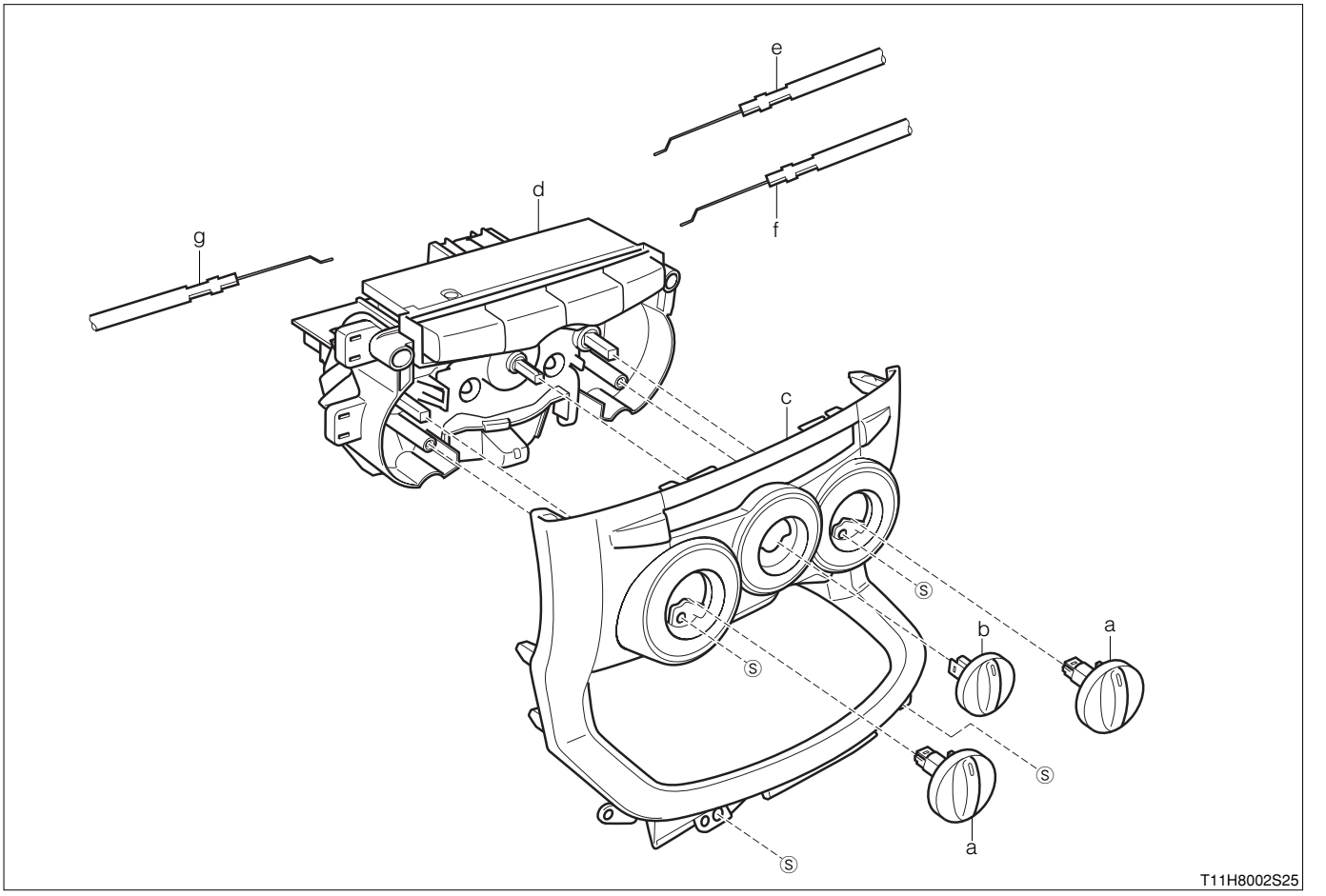
Snap ring pliers

3-1-2 OPERATION BEFORE REMOVAL

1.Remove the panel S/A, instrument panel finish lower.
Refer to Page I2-23.

3-1-3 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



(2) Removal and installation procedures

	1	a	Knob S/A, control (temperature control mode)
	2	b	Knob S/A, control (blower)
	3	c	Panel S/A, instrument cluster finish, lower center
▼	4	d	Control S/A, heater
▼ ▲	5	e	Cable S/A, defroster damper control
▼ ▲	6	f	Cable S/A, temp damper control
▼ ▲	7	g	Cable S/A, air inlet damper control

3-1-4 POINTS OF REMOVAL

(1) Control S/A, heater

1.Disconnect the cooling unit side cable S/A to remove the control Ay together with the cable S/A.

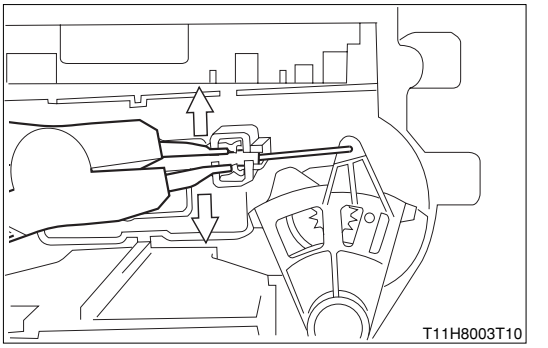
(2) Cable S/A, defroster damper control, Cable S/A, temp damper control, Cable S/A, air inlet damper control

1.Disconnect the cable S/A from the heater blower switch, while widening the cable clip pawl with snap ring pliers.

CAUTION

- The cable at the switch, heater blower side is of a pawl securing type. Therefore, there is the possibility that, if the pawl is opened forcibly, the securing force becomes weak, thus becoming unable to secure the cable again. Hence, be sure to use snap ring pliers.

TOOL: Snap ring pliers

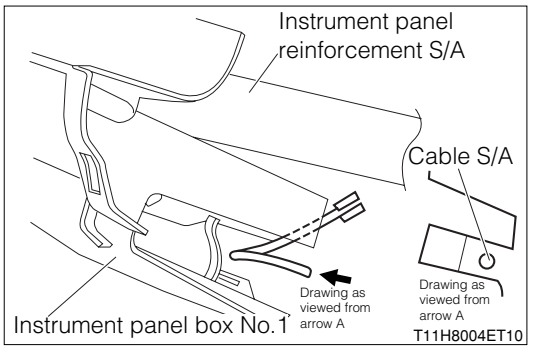


3-1-5 POINTS OF INSTALLATION

(1) Cable S/A, air inlet damper control

① RHD vehicles

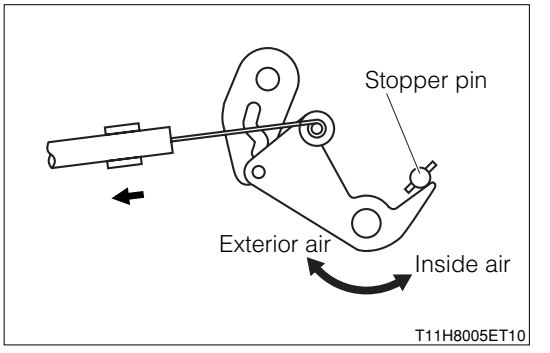
1.Route the cable S/A on the vehicle front side of the No.1 instrument panel box.



2.Set the inside/outside air selection lever to the inside air.

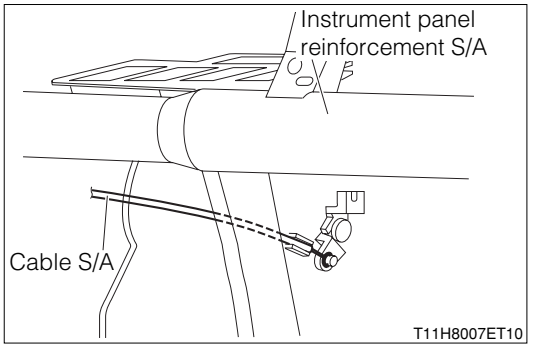
3.Push the inside/outside air selection link of the unit assembly, air conditioner against the stopper pin at the inside air side.

4.While pulling the cable outer in the arrowheaded direction, clamp the cable.



② LHD vehicles

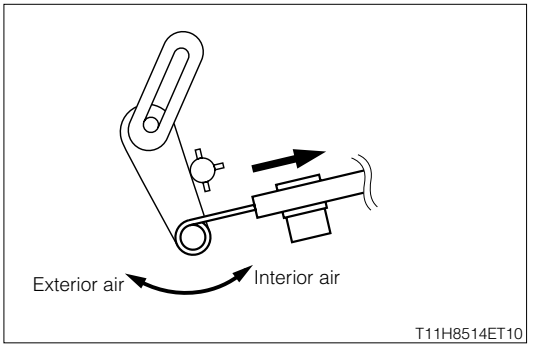
1.Route the cable S/A between the brace and the vehicle harness.



2.Set the inside/outside air selection lever to the inside air.

3.Push the inside/outside air selection link of the unit assembly, air conditioner against the stopper pin at the inside air side.

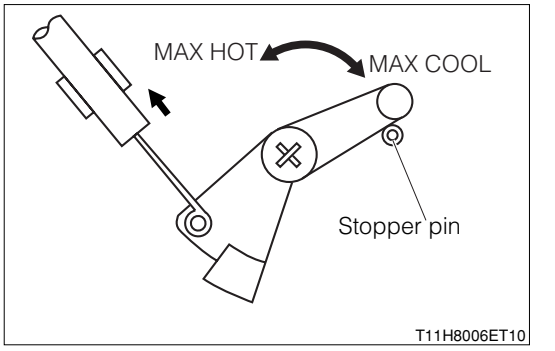
4.While pulling the cable outer in the arrowheaded direction, clamp the cable.



(2) Cable S/A, temp damper control

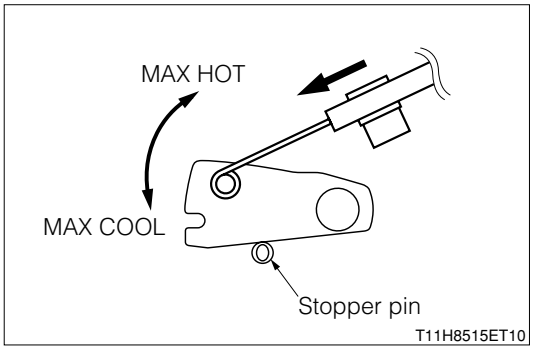
① RHD vehicles

1.Set the temperature adjusting dial to the MAX COOL.
2.Push the control link of the heater radiator Ay against the MAX COOL side stopper pin.
3.While pushing the cable outer in the arrowheaded direction, clamp the cable.



② LHD vehicles

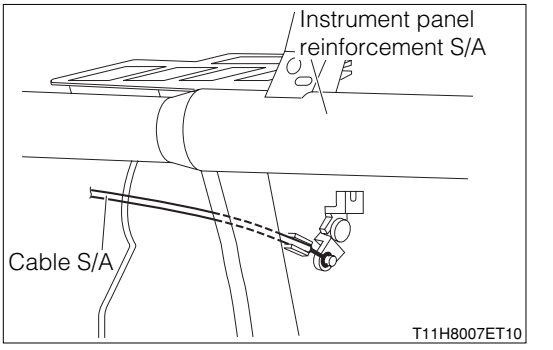
1.Set the temperature adjusting dial to the MAX COOL.
2.Push the control link of the heater radiator Ay against the MAX COOL side stopper pin.
3.While pushing the cable outer in the arrowheaded direction, clamp the cable.



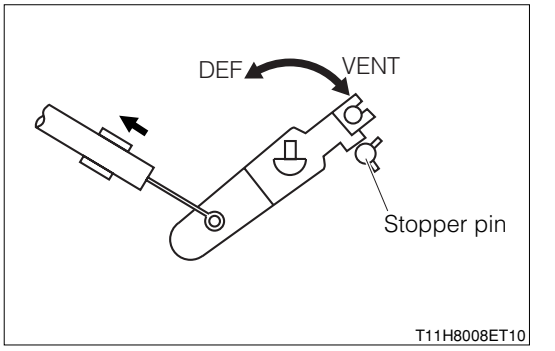
(3) Cable S/A, defroster damper control

① RHD vehicles

1.Route the cable S/A between the brace and the vehicle harness.

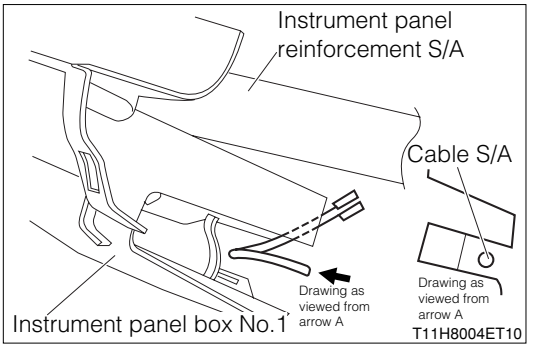


2.Set the register selection dial to the VENT position.
3.Push the mode link of the heater radiator Ay against the VENT side stopper pin.
4.While pulling the cable outer in the arrowheaded direction, clamp the cable.

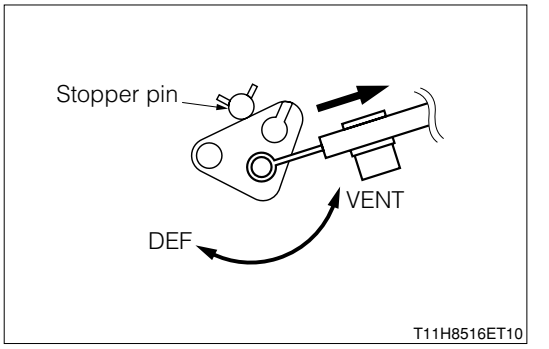


② LHD vehicles

1.Route the cable S/A on the vehicle front side of the No.1 instrument panel box.



2.Set the register selection dial to the VENT position.
3.Push the mode link of the heater radiator Ay against the VENT side stopper pin.
4.While pulling the cable outer in the arrowheaded direction, clamp the cable.



3-1-6 OPERATION AFTER INSTALLATION

1.Install the panel S/A, instrument panel finish lower.
Refer to Page I2-23.

4 COOLING UNIT

4-1 REMOVAL AND INSTALLATION

4-1-1 ARTICLES TO BE PREPARED

Instrument

Torque wrench

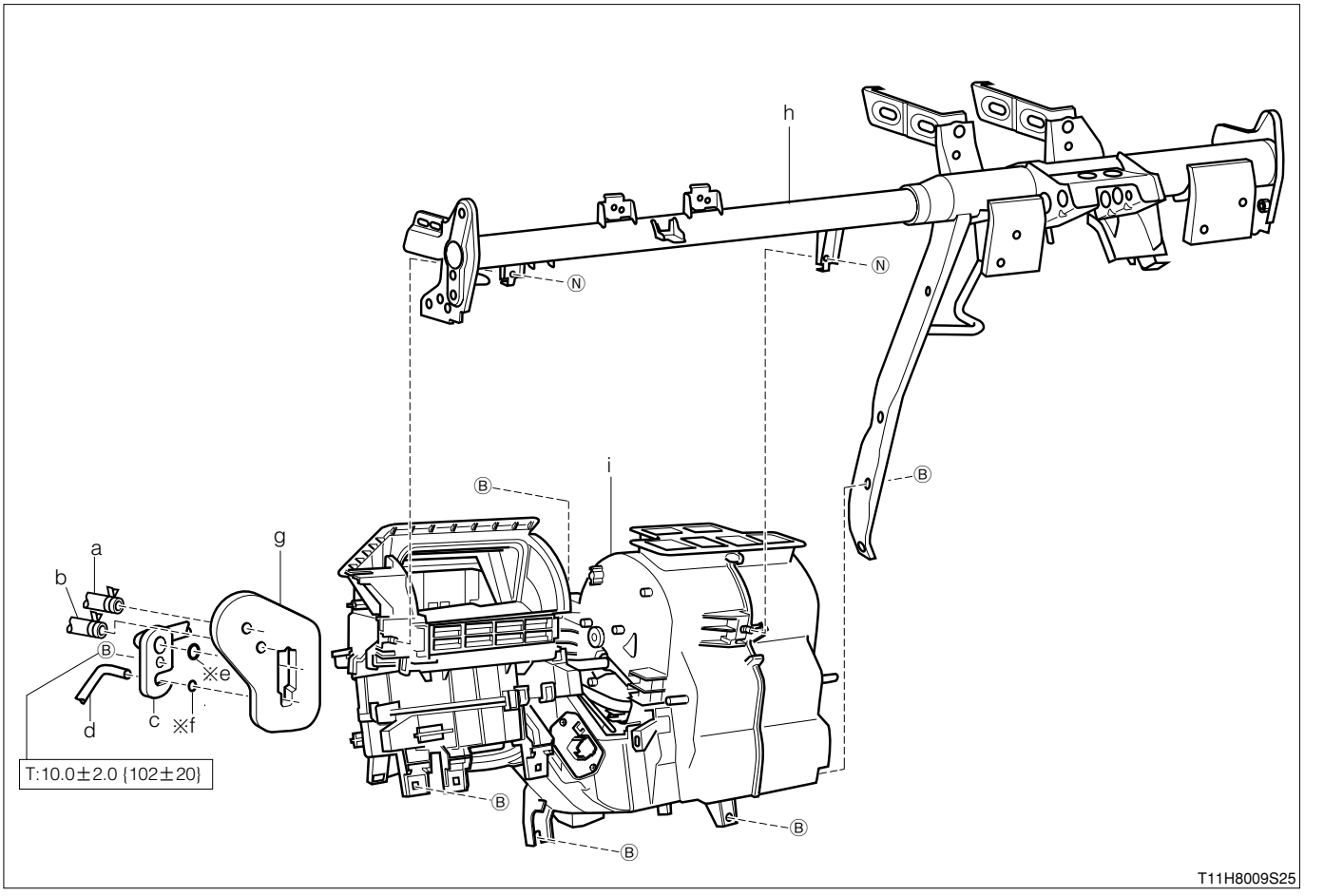
4-1-2 OPERATION BEFORE REMOVAL

1.Drain refrigerant.
Refer to Page K1-6.

2.Drain the cooling water.
3.Remove the panel, instrument.
Refer to Page I2-23.

4-1-3 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



Unit: N·m{kgf·cm}
※: Non-reusable parts

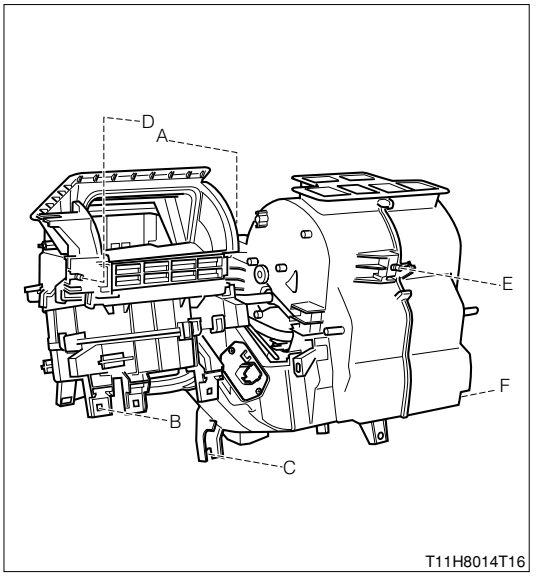
(2) Removal and installation procedures

1 a Hose, water
2 b Hose, water, No.2
3 c Hose, suction
4 d Tube, liquid, No.1
5 e Ring, O
6 f Ring, O
7 g Packing
8 h Reinforcement S/A, instrument panel
▼ ▲ 9 i Unit Ay, air conditioner

4-1-4 POINTS OF REMOVAL

(1) Unit Ay, air conditioner

1.Remove "A" from the engine compartment side.
2.Remove the bolts in the sequence of "B" and "C".
3.Remove the bolts from the instrument panel reinforcement S/A in the sequence of "D".
4.Move the instrument panel reinforcement S/A toward the back of the vehicle and remove the unit Ay.



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4-1-5 POINTS OF INSTALLATION

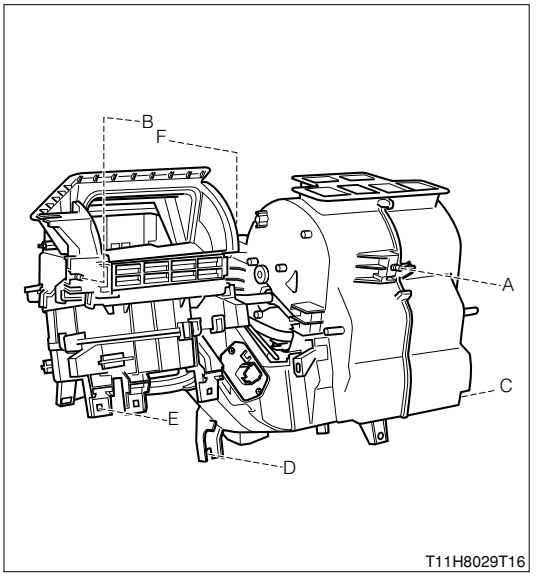
(1) Unit Ay, air conditioner

1.When the unit assembly is replaced with a new one, replenish the following amount of compressor oil.

REPLACEMENT PARTS	Unit Ay
Replenishing amount of compressor oil	25

LUBRICANT: Compressor oil (ND—OIL8)

2.Reinstall the unit Ay to the instrument panel reinforcement S/A in the sequence of "A".
3.Move the instrument panel reinforcement S/A toward the front of the vehicle and tighten the bolts in the sequence of "D" and "E".
4.Install "F" from the engine compartment side.



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4-1-6 OPERATION AFTER INSTALLATION

1.Install the panel instrument.
Refer to Page I2-23.

2.Fill cooling water.
3.Replenish refrigerant.
Refer to Page K1-6.

4-2 DISASSEMBLING AND ASSEMBLING

4-2-1 ARTICLES TO BE PREPARED

Lubricant,adhesive,others

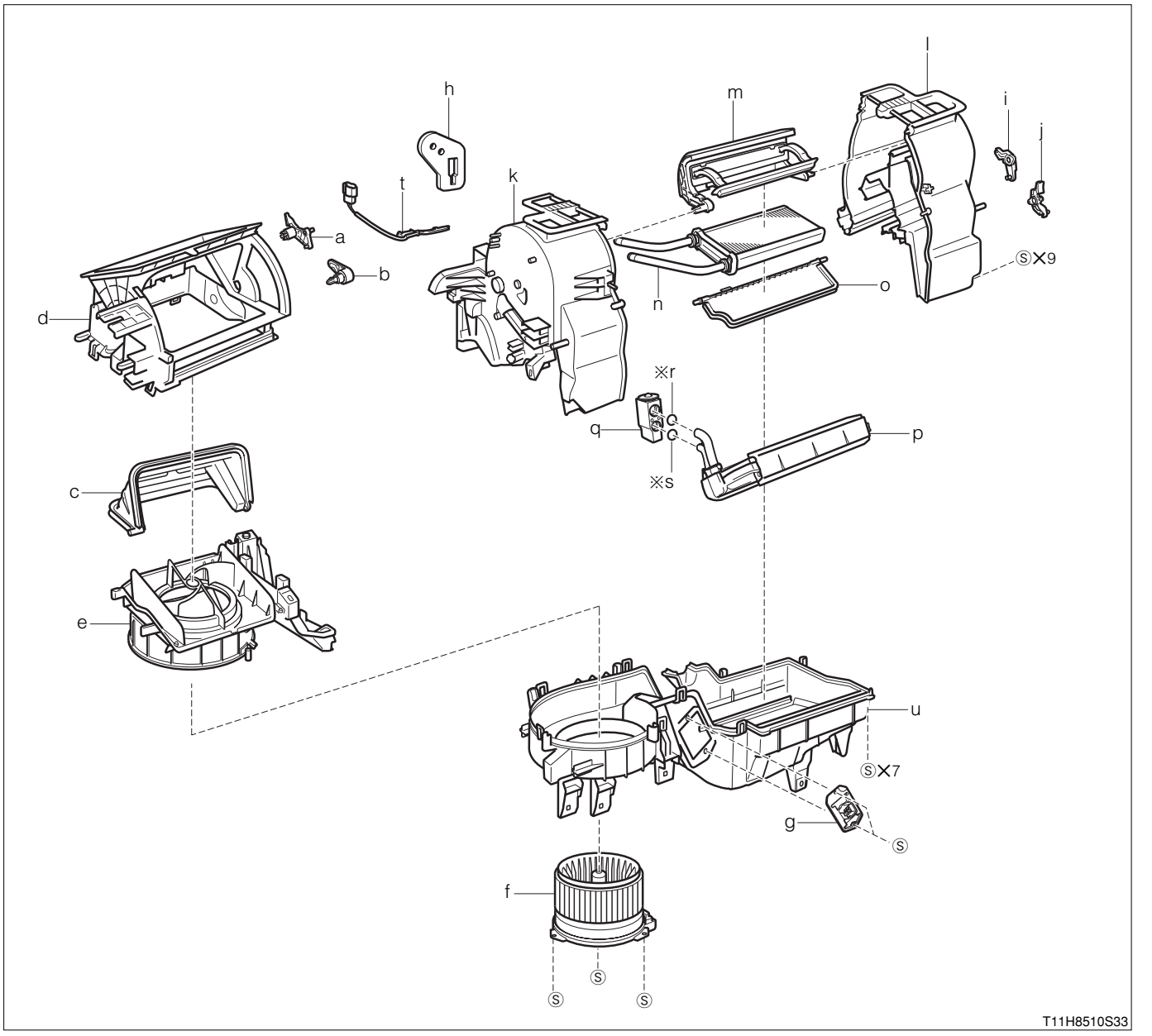
Compressor oil (ND—OIL8)

4-2-2 OPERATION BEFORE DISASSEMBLY

1.Remove the unit assembly, air conditioner.
Refer to Page K1-11.

4-2-3 DISASSEMBLY AND ASSEMBLY PROCEDURES

(1) Components



※: Non-reusable parts

(2) Disassembling and assembling procedure

1 a Lever (for inside-and-outside mind doors)
2 b Lever (for inside-and-outside air cable)
3 c Door S/A (for inside-and-outside air)
▲ 4 d Case S/A, blower (for inside-and-outside air)
5 e Case S/A, blower (blower upper)
6 f Motor Ay, w/fan
7 g Resistor, blower
8 h Packing
9 i Lever (for mode selection)
10 j Lever (for air mixture)
11 k Case, heater, LH
12 l Case, heater, RH
13 m Door S/A (for mode selection)
14 n Core S/A, heater
15 o Door S/A (for air mixture)
16 p Evaporator S/A
17 q Valve, expansion
18 r Ring, O
19 s Ring, O
20 t Thermistor, cooler
▲ 21 u Case S/A, blower (blower lower)

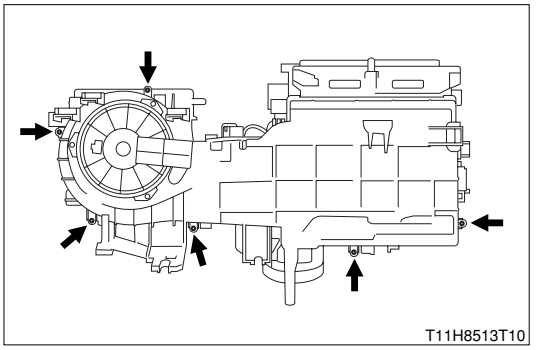
4-2-4 POINTS OF ASSEMBLY

(1) Case S/A, blower (Blower lower)

1.When the case is used again, attach and tighten the screws supplied as replacement parts at the (six) positions shown in the right figure.

NOTE

- Screw part number:88466-87202-000

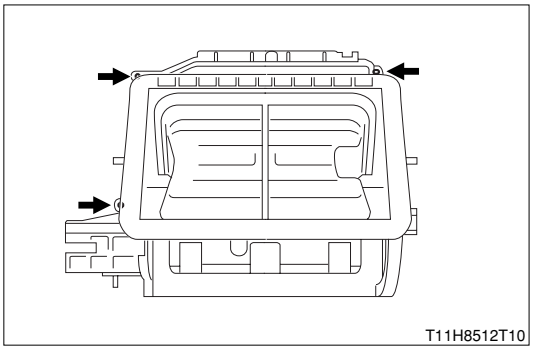


(2) Case S/A, blower (For inside-and-outside air)

1.When the case is used again, attach and tighten the screws supplied as replacement parts at the (three) positions shown in the right figure.

NOTE

- Screw part number:88466-87202-000



4-2-5 OPERATION AFTER ASSEMBLY

1.Install the unit assembly, air conditioner.
Refer to Page K1-11.

4-3 REMOVAL AND INSTALLATION (LHD VEHICLES)

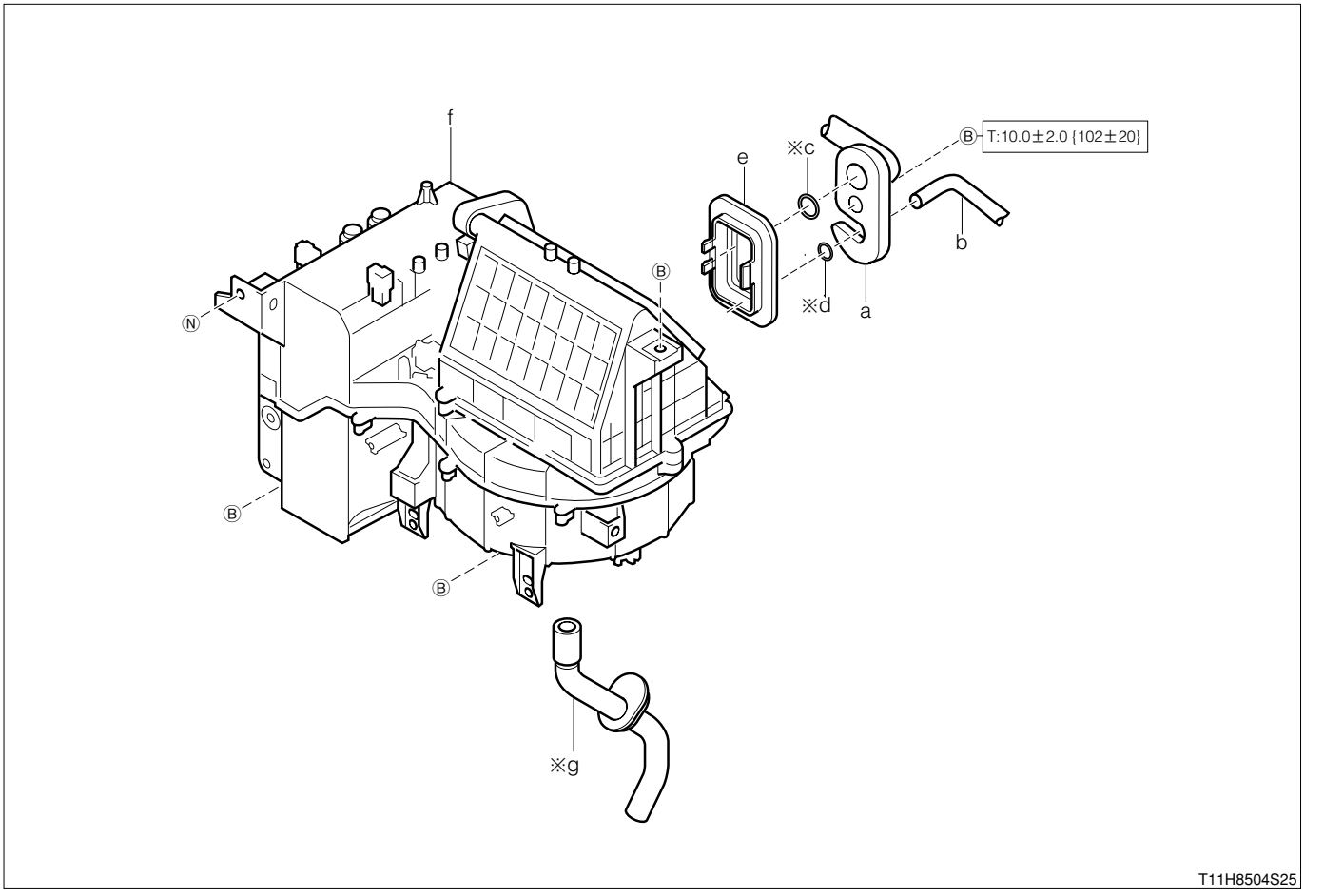
4-3-1 OPERATION BEFORE REMOVAL

1.Drain refrigerant.
Refer to Page K1-6.

2.Drain the cooling water.
3.Remove the panel, instrument.
Refer to Page I2-23.

4-3-2 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



Unit: N·m{kgf·cm}
※: Non-reusable parts

(2) Removal and installation procedures

1 a Tube, suction, No.1
2 b Tube, liquid, No.1
3 c Ring, O
4 d Ring, O
5 e Cover, cooler, No.1
6 f Unit Ay, air conditioner
7 g Hose, drain cooler

4-3-3 OPERATION AFTER INSTALLATION

1.Install the panel instrument.
Refer to Page I2-23.

2.Fill cooling water.
3.Replenish refrigerant.
Refer to Page K1-6.

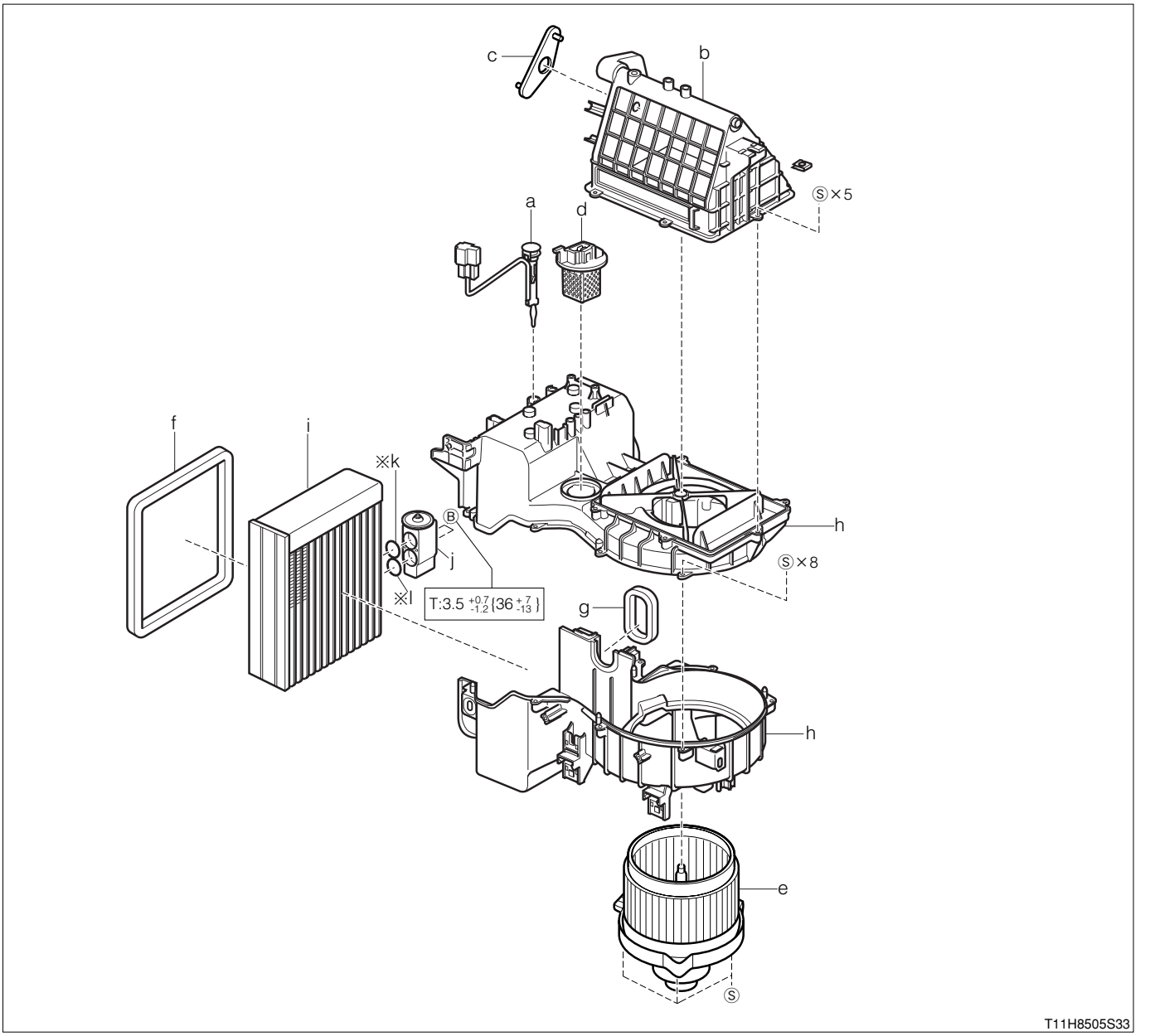
4-4 DISASSEMBLING AND ASSEMBLING

4-4-1 OPERATION BEFORE DISASSEMBLY

1.Remove the unit assembly, air conditioner.
Refer to Page K1-15.

4-4-2 DISASSEMBLY AND ASSEMBLY PROCEDURES

(1) Components



Unit: N·m{kgf·cm}
※: Non-reusable parts

(2) Disassembling and assembling procedure

1	a	Thermistor, cooler	7	g	Packing, cooler
2	b	Case, air damper	8	h	Case S/A, cooling unit
3	c	Element, air refiner	9	i	Evaporator S/A
4	d	Resistor, blower	10	j	Valve, expansion
5	e	Motor S/A, blower w/fan	11	k	Ring, O
6	f	Packing, cooler	12	l	Ring, O

4-4-3 OPERATION AFTER ASSEMBLY

1.Install the unit assembly, air conditioner.

Refer to Page K1-15.

5 HEATER UNIT

5-1 REMOVAL AND INSTALLATION (LHD VEHICLES)

5-1-1 OPERATION BEFORE REMOVAL

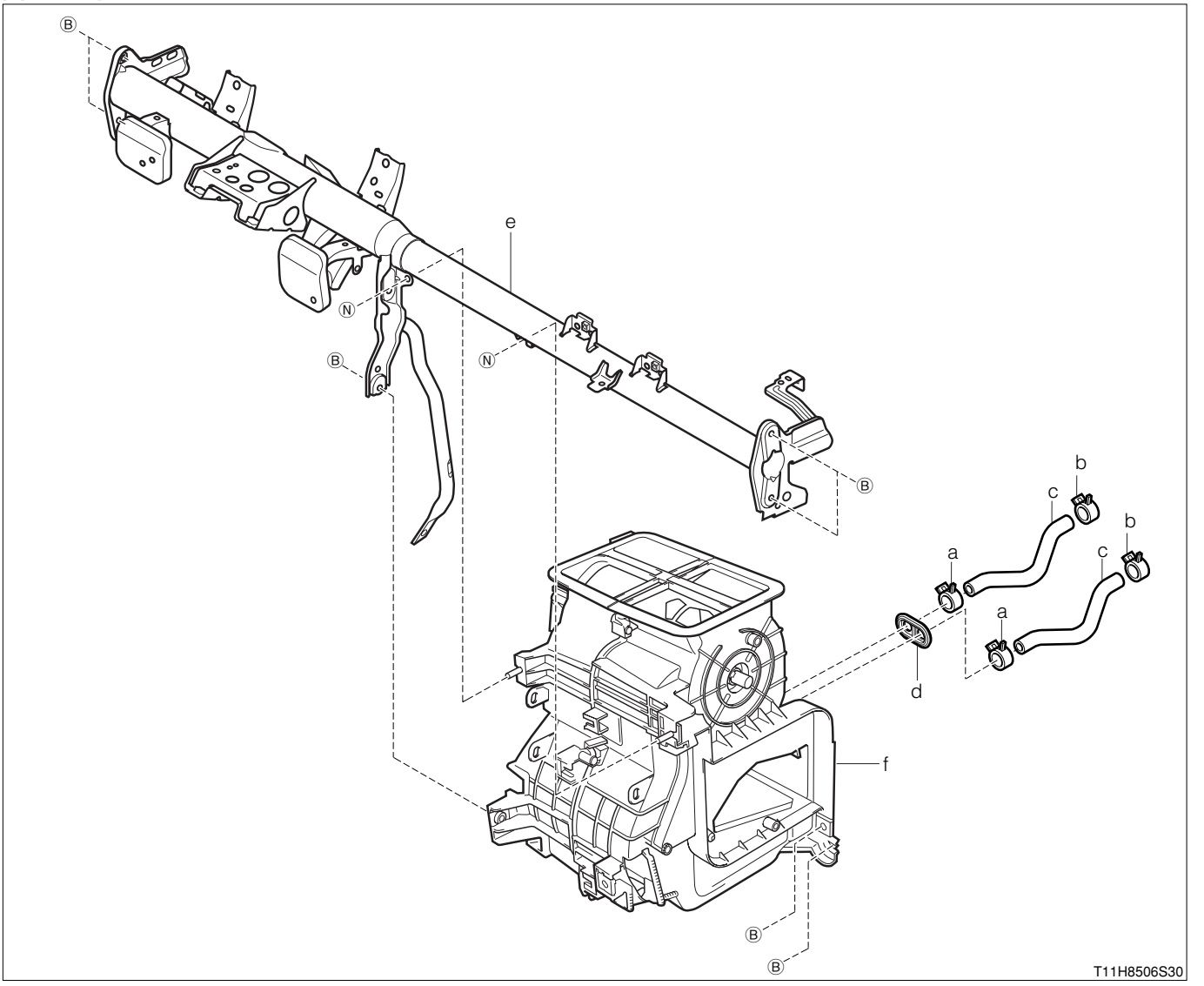
1.Drain refrigerant.
Refer to Page K1-6.

2.Drain the cooling water.
3.Remove the panel, instrument.
Refer to Page I2-23.

4.Remove the unit assembly, air conditioner.
Refer to Page K1-15.

5-1-2 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



(2) Removal and installation procedures

1 a Clip
2 b Clip
3 c Hose, water, No.1
4 d Grommet
5 e Reinforcement S/A, instrument panel
6 f Radiator Ay, heater

5-1-3 OPERATION AFTER INSTALLATION

1.Install the unit assembly, air conditioner.
Refer to Page K1-15.

2.Install the panel instrument.
Refer to Page I2-23.

3.Fill cooling water.
4.Replenish refrigerant.
Refer to Page K1-6.

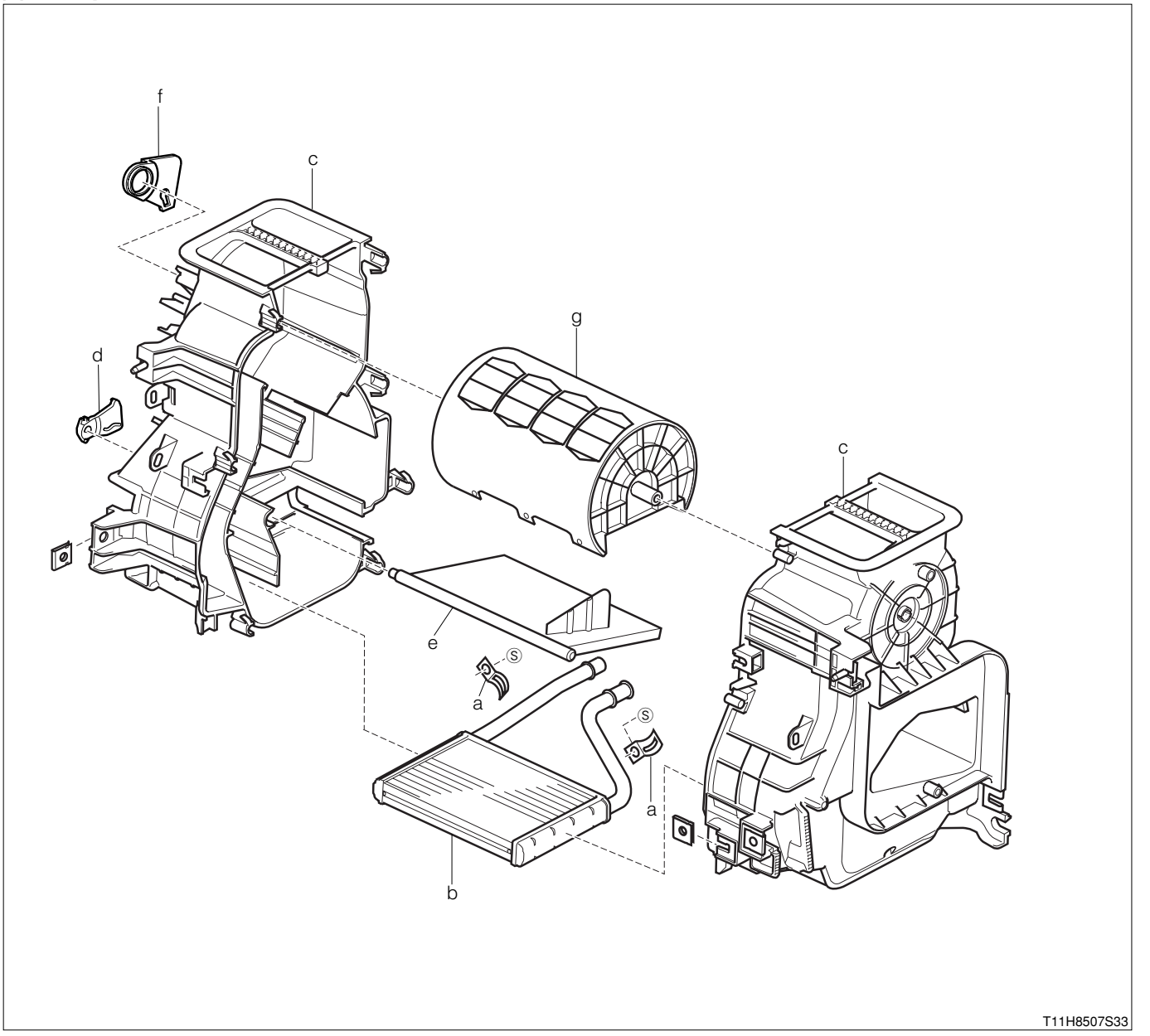
5-2 DISASSEMBLING AND ASSEMBLING (LHD VEHICLES)

5-2-1 OPERATION BEFORE DISASSEMBLY

1.Remove the radiator assembly, heater.
Refer to Page K1-18.

5-2-2 DISASSEMBLY AND ASSEMBLY PROCEDURES

(1) Components



(2) Disassembling and assembling procedure

1 a Clamp, cooler, No.1
2 b Unit S/A, radiator heater
▲ 3 c Case, heater, RH/LH
4 d Element, air refiner (for air mixture)
5 e Damper, heater duct (for air mixture)
6 f Element, air refiner (for mode selection)
7 g Damper, heater duct (for mode selection)

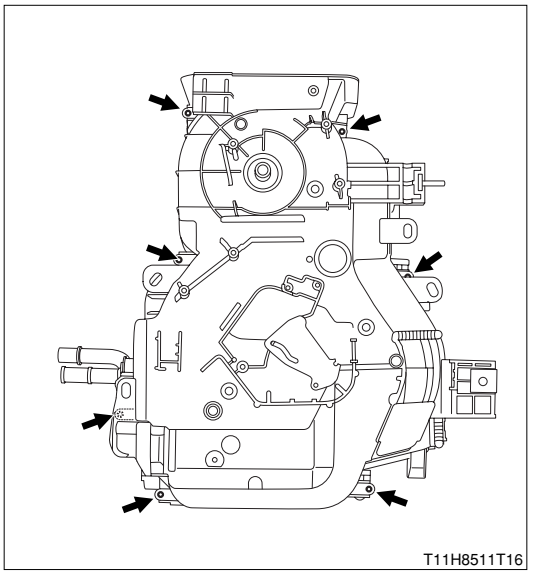
5-2-3 POINTS OF ASSEMBLY

(1) Case, heater, RH/LH

1.When the case is used again, attach and tighten the screws supplied as replacement parts at the (seven) positions shown in the right figure.

NOTE

- Screw part number:88466-87202-000



5-2-4 OPERATION AFTER ASSEMBLY

1.Install the radiator assembly, heater.
Refer to Page K1-18.

6 COMPRESSOR

6-1 REMOVAL AND INSTALLATION

6-1-1 ARTICLES TO BE PREPARED

Instrument

Torque wrench

6-1-2 OPERATION BEFORE REMOVAL

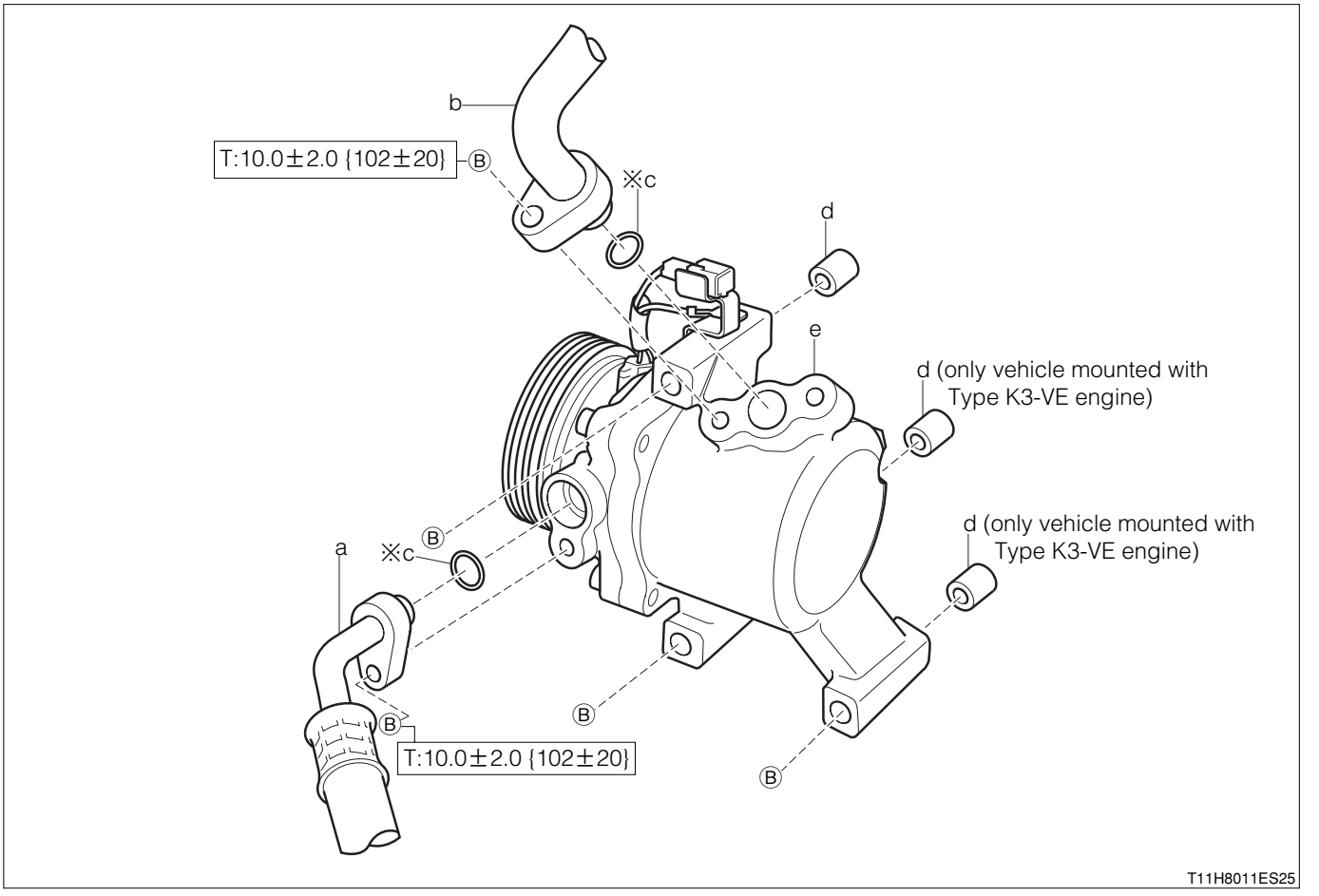
1.Drain refrigerant.
Refer to Page K1-6.

2.Remove the cover, front bumper.
Refer to Page I2-2.

3.Remove the V-ribbed belt.

6-1-3 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



Unit: N·m{kgf·cm}
※: Non-reusable parts

(2) Removal and installation procedures

1 a Hose, suction
2 b Hose, discharge
3 c Ring, O
4 d Stay, compressor
▲ 5 e Compressor Ay, W/magnet clutch

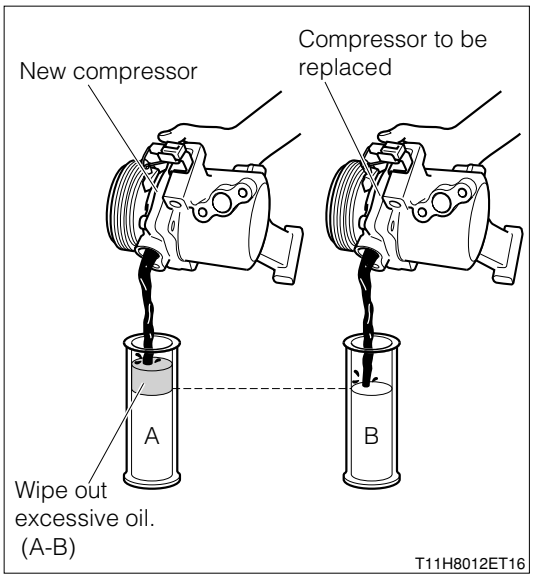
6-1-4 POINTS OF INSTALLATION

(1) Compressor Ay, W/magnet clutch

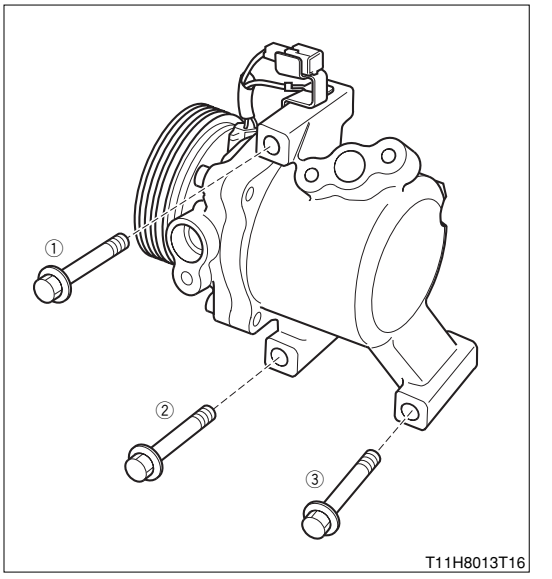
1.When a new compressor assembly is installed, drain the excessive oil of the new compressor so that the amount of the oil may become the same as that of the oil inside the compressor to be replaced.

NOTE

- The new compressor Ay contains the amount of oil required for the full air-conditioning cycle. Therefore, if only the compressor Ay is to be replaced, it is necessary to drain the excess oil which remains in the condenser and the cooling unit.



2.Make sure to tighten the mounting bolts for mounting the compressor Ay in the sequence of ①→②→③ in order to prevent abnormal sound and/or loosing of a belt.



6-1-5 OPERATION AFTER INSTALLATION

1.Replenish refrigerant.
Refer to Page K1-6.

2.Reinstall the V-ribbed belt.

3.When a new belt has been assembled, operate the compressor for five minutes or more. Then, adjust the belt tension (deflection amount) again.
Refer to Page K1-4.

4.Install the front bumper cover.
Refer to Page I2-2.

6-2 DISASSEMBLING AND ASSEMBLING

6-2-1 ARTICLES TO BE PREPARED

Tool

Snap ring pliers

Instrument

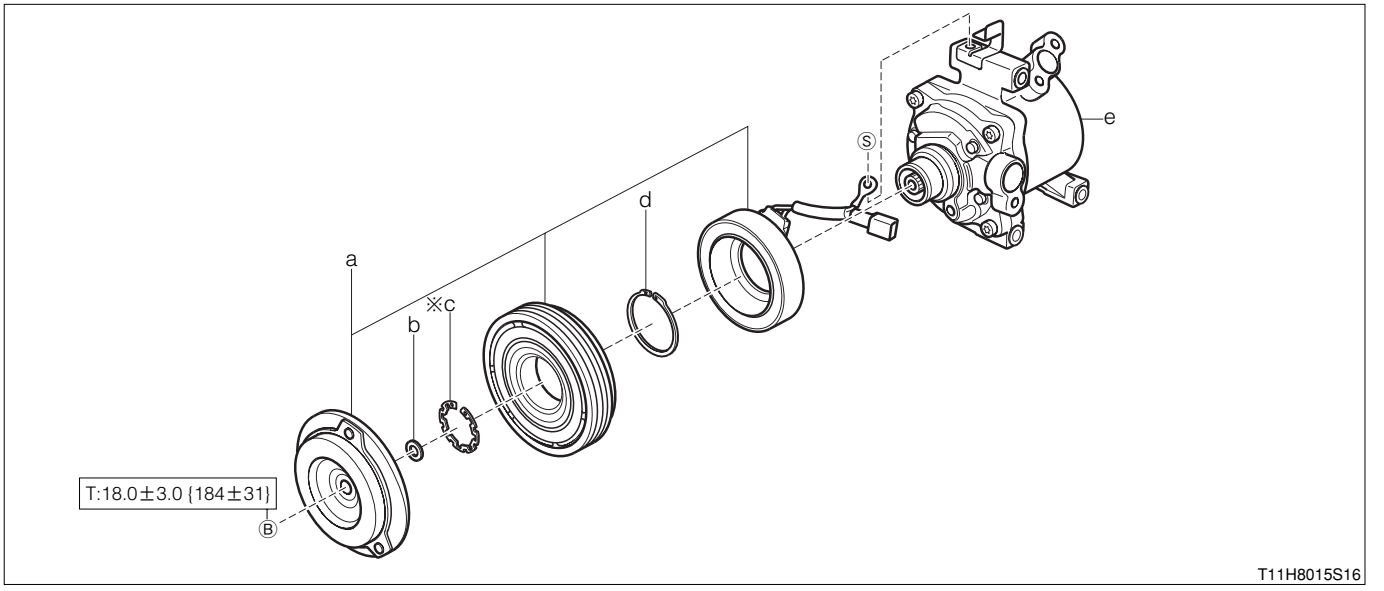
Torque wrench

6-2-2 OPERATION BEFORE DISASSEMBLY

1.Remove the compressor Ay, w/magnet clutch.
Refer to Page K1-22.

6-2-3 DISASSEMBLY AND ASSEMBLY PROCEDURES

(1) Components



Unit: N·m{kgf·cm}
※: Non-reusable parts

(2) Disassembling and assembling procedure

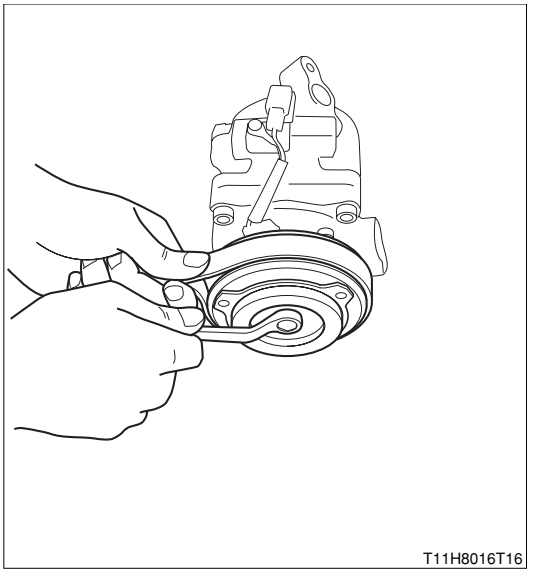
▼ ▲ 1 a Clutch Ay, magnet
2 b Washer, plate
3 c Ring, snap
▲ 4 d Ring, snap
▲ 5 e Compressor Ay

6-2-4 POINTS OF DISASSEMBLY

(1) Clutch Ay, magnet

1.Energize the clutch assembly, thus securing the hub and rotor.

2.Wind the V-belt around the pulley section and secure it by your hand.
3.Remove the bolt.



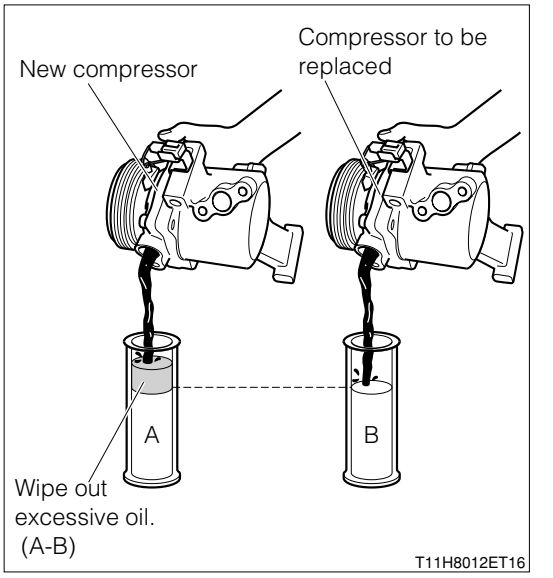
6-2-5 POINTS OF ASSEMBLY

(1) Compressor Ay

1.When a new compressor assembly is installed, drain the excessive oil of the new compressor so that the amount of the oil may become the same as that of the oil inside the compressor to be replaced.

NOTE

- The new compressor Ay contains the amount of oil required for the full air-conditioning cycle. Therefore, if only the compressor Ay is to be replaced, it is necessary to drain the excess oil which remains in the condenser and the cooling unit.



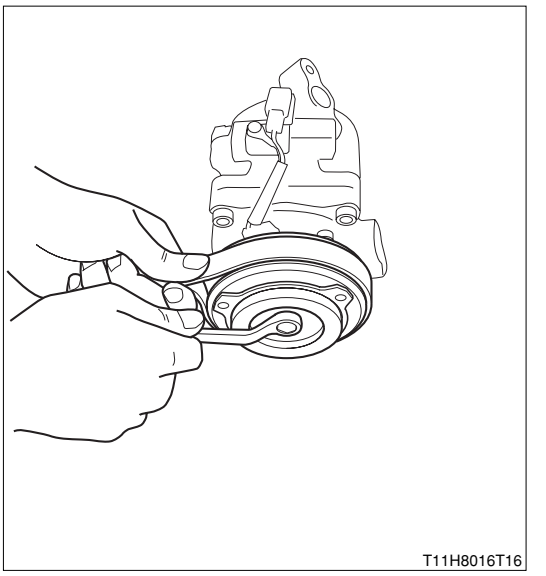
(2) Snap ring

1.Assemble the ring with a chamfered surface on the pulley side.
TOOL: Snap ring pliers

(3) Magnet clutch Ay

1.Tighten the clutch assembly attaching bolt as far as it can be tightened.
2.Energize the clutch assembly, thus securing the hub and rotor.

3.Wind the V-belt around the pulley section and secure it by your hand.
4.Securely tighten the bolt.
5.Check the air gap of the clutch assembly. If the check results fail to conform to the specified value, remove the magnet clutch hub and perform the adjustment by means of the washer.
Refer to Page K1-5.


T11H8016T16

6-2-6 OPERATION AFTER ASSEMBLY

1.Install the compressor Ay W/magnet clutch .
Refer to Page K1-22.

7 CONDENSER

7-1 REMOVAL AND INSTALLATION

7-1-1 ARTICLES TO BE PREPARED

Instrument

Torque wrench

Lubricant,adhesive,others

Compressor oil (ND—OIL8)

7-1-2 OPERATION BEFORE REMOVAL

1.Drain refrigerant.
Refer to Page K1-6.

2.Remove the front bumper cover.
Refer to Page I2-2.

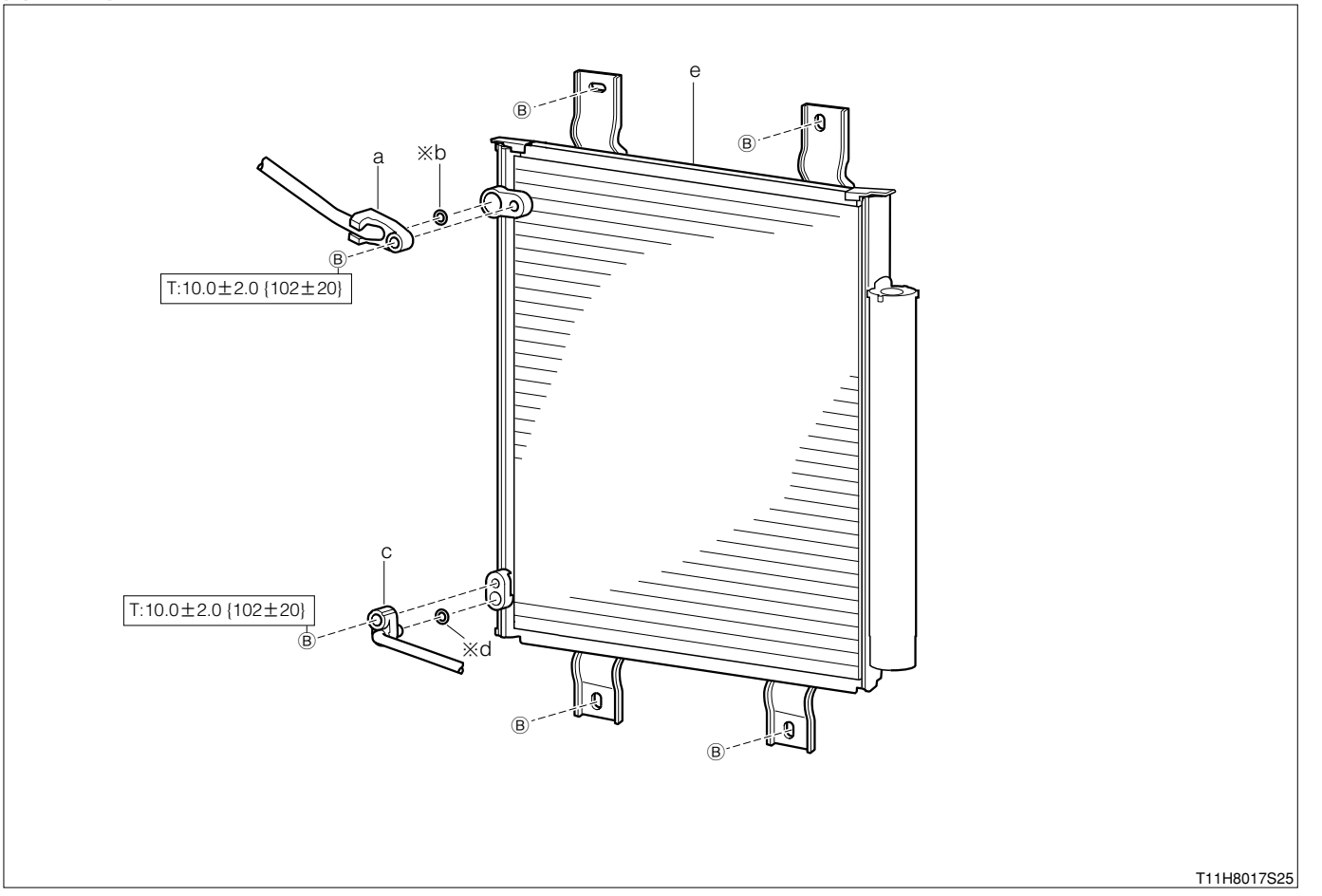
3.Remove the upper radiator support.

Vehicle with Type 1KR-FE engine
Refer to Page B6-5.

Vehicle with Type K3-VE engine
Refer to Page B6-13.

7-1-3 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



Unit: N·m{kgf·cm}
※: Non-reusable parts

(2) Removal and installation procedures

1 a Hose, suction
2 b Ring, O
3 c Hose, discharge
4 d Ring, O
▲ 5 e Condenser Ay

7-1-4 POINTS OF INSTALLATION

(1) Condenser Ay

1.When the condenser is replaced with a new one, replenish the following amount of compressor oil.

REPLACEMENT PARTS	Condenser
Replenishing amount of compressor oil	20

LUBRICANT: Compressor oil (ND—OIL8)

7-1-5 OPERATION AFTER INSTALLATION

1.Install the upper radiator support.

Vehicle with Type 1KR-FE engine

Refer to Page B6-5.

Vehicle with Type K3-VE engine

Refer to Page B6-13.

2.Install the front bumper cover.

Refer to Page I2-2.

3.Replenish refrigerant.

Refer to Page K1-6.

8 BLOWER MOTOR

8-1 REMOVAL AND INSTALLATION (RHD VEHICLES)

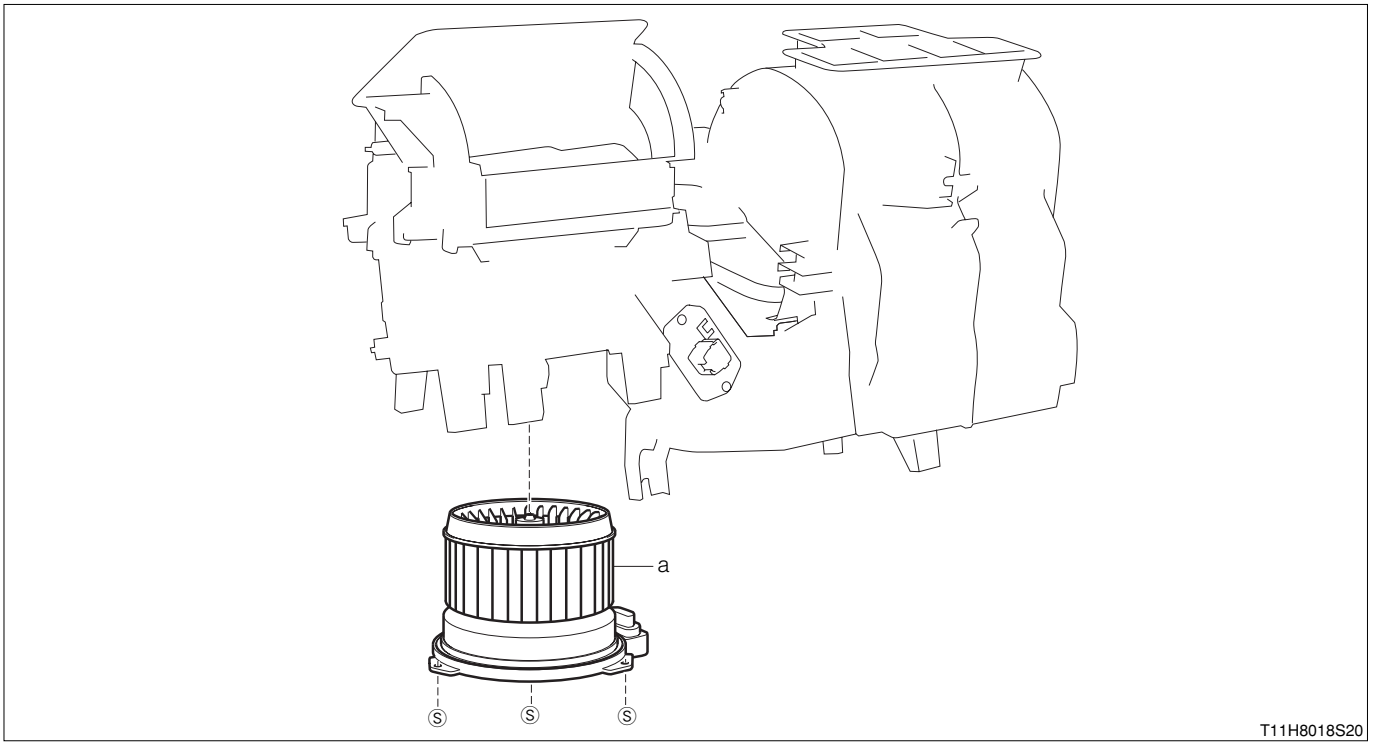
8-1-1 OPERATION BEFORE REMOVAL

1.Remove the No.1instrument panel under cover.
Refer to Page I2-23.

2.Remove the fuel injection computer Ay.
Refer to Page B8-1.

8-1-2 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



(2) Removal and installation procedures

1 a Motor Ay, W/fan

8-1-3 OPERATION AFTER INSTALLATION

1.Install the fuel injection computer Ay.
Refer to Page B8-1.

2.Install the No.1 instrument panel under cover.
Refer to Page I2-23.

8-2 REMOVAL AND INSTALLATION

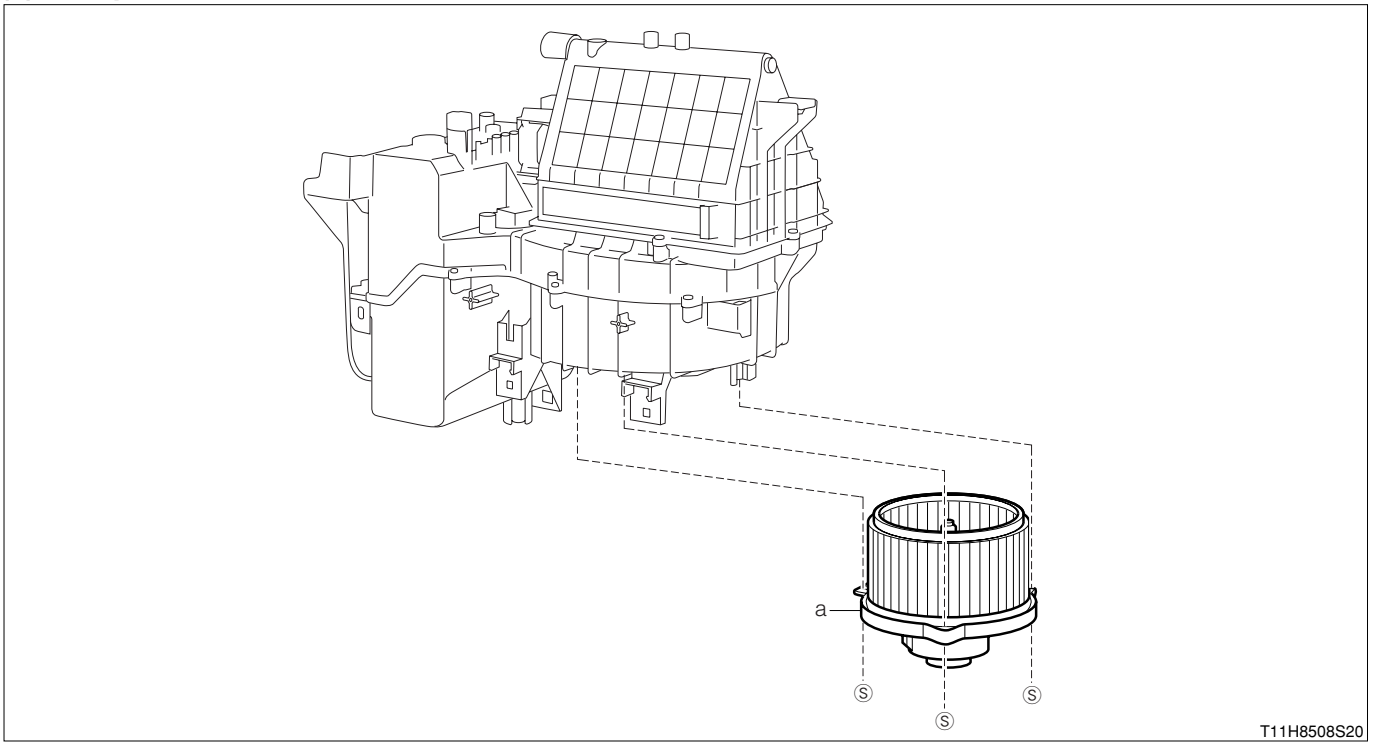
8-2-1 OPERATION BEFORE REMOVAL

1.Remove the No.1instrument panel under cover.
Refer to Page I2-23.

2.Remove the fuel injection computer Ay.
Refer to Page B8-1.

8-2-2 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



(2) Removal and installation procedures

1 a Motor S/A, blower W/fan

8-2-3 OPERATION AFTER INSTALLATION

1.Install the fuel injection computer Ay.
Refer to Page B8-1.

2.Install the No.1 instrument panel under cover.
Refer to Page I2-23.

9 BLOWER RESISTOR

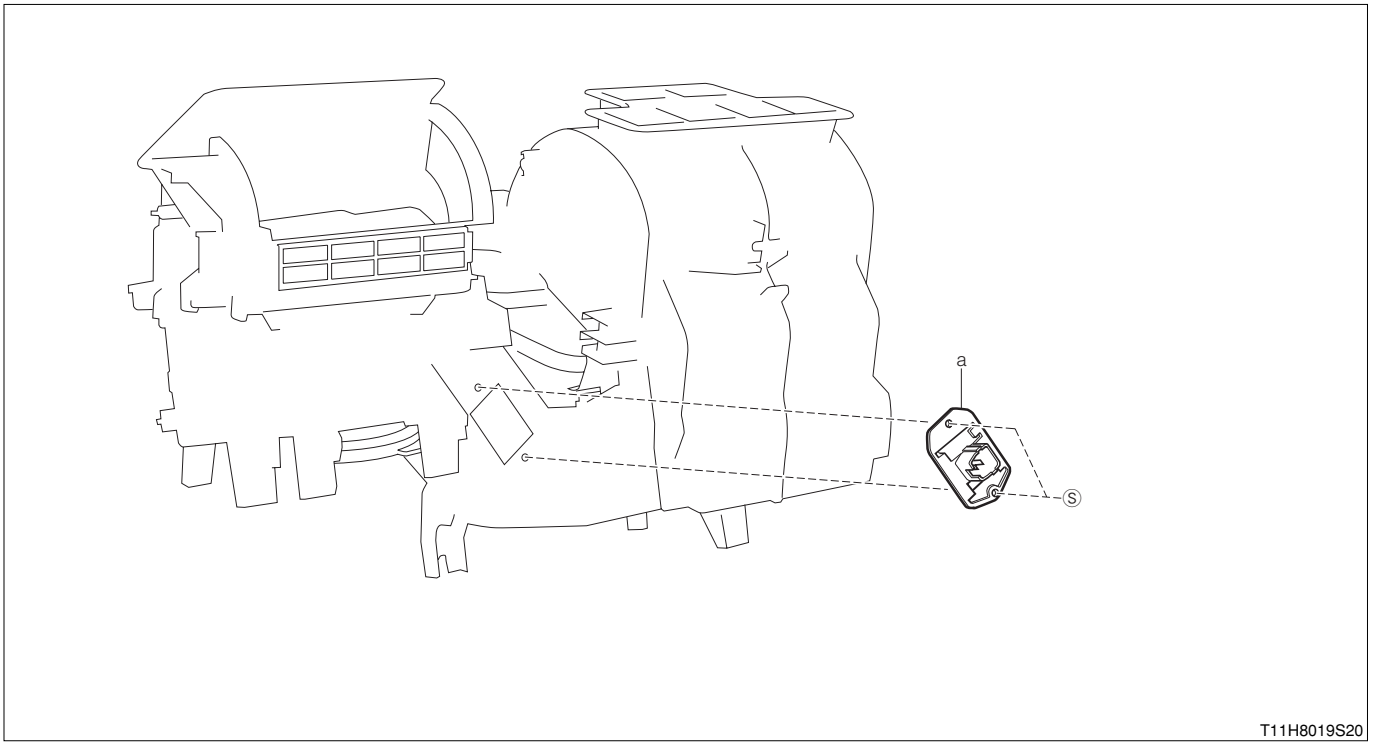
9-1 REMOVAL AND INSTALLATION

9-1-1 OPERATION BEFORE REMOVAL

1.Remove the No.1 instrument panel under cover.
Refer to Page I2-23.

9-1-2 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



(2) Removal and installation procedures

1 a Resistor, blower

9-1-3 OPERATION AFTER INSTALLATION

1.Install the No.1 instrument panel under cover.
Refer to Page I2-23.

9-2 REMOVAL AND INSTALLATION

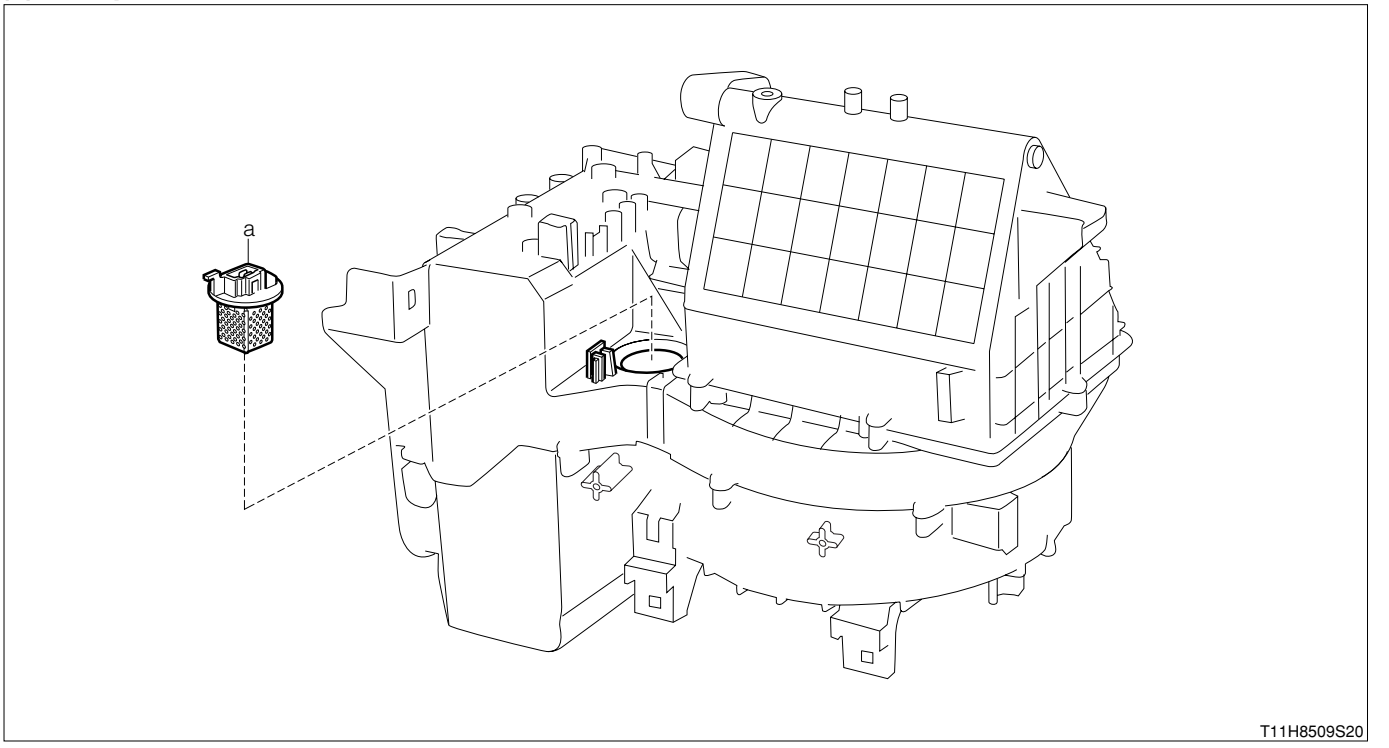
9-2-1 OPERATION BEFORE REMOVAL

1.Remove the instrument panel door.
Refer to Page I2-23.

2.Remove the No.1 instrument panel box.
Refer to Page I2-23.

9-2-2 REMOVAL AND INSTALLATION PROCEDURES

(1) Components



(2) Removal and installation procedures

1 a Resistor, blower

9-2-3 OPERATION AFTER INSTALLATION

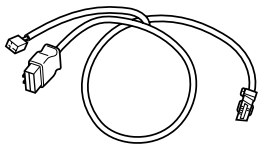
1.Install the No.1 instrument panel box.
Refer to Page I2-23.

2.Install the instrument panel door.
Refer to Page I2-23.

10 MANUAL AIR CONDITIONER SYSTEM

10-1 ARTICLES TO BE PREPARED

SST

Shape	Part No.	Part name
	09991-87404-000 (09991-87401-000)	Wire,engine control system inspection
	09991-87403-000	Wire,diagnosis check

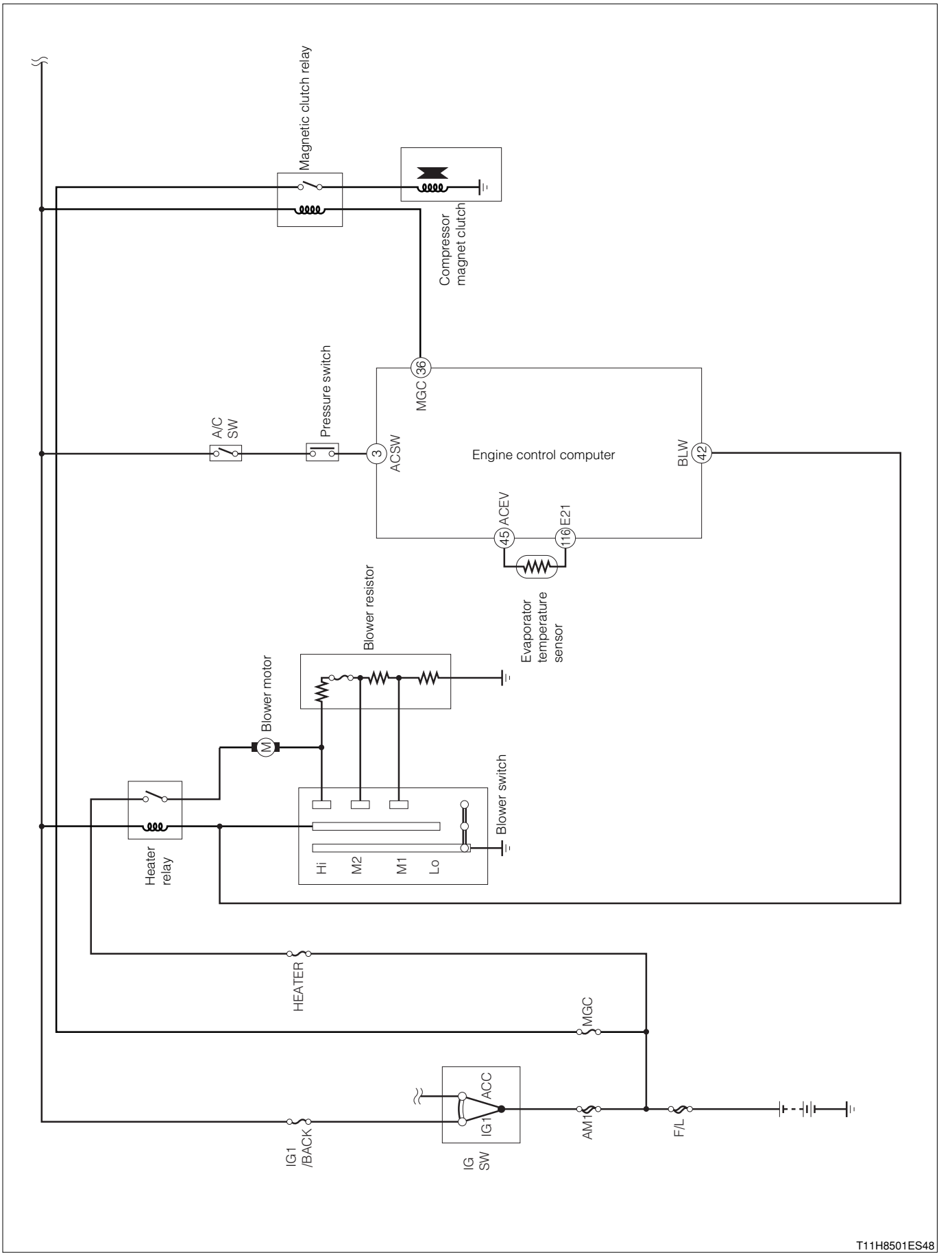
Instrument

Electrical Tester

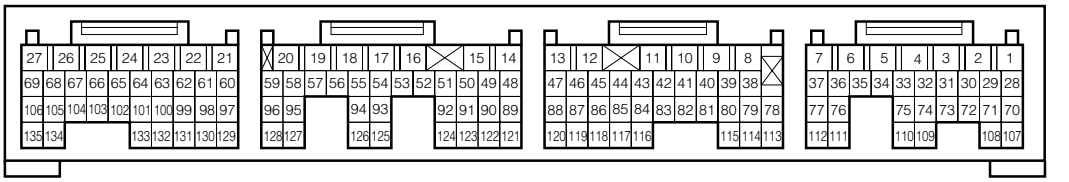
Tool

Manifold gauge

10-2 SYSTEM WIRING DIAGRAM



10-3 ARRANGEMENT OF ECU TERMINAL

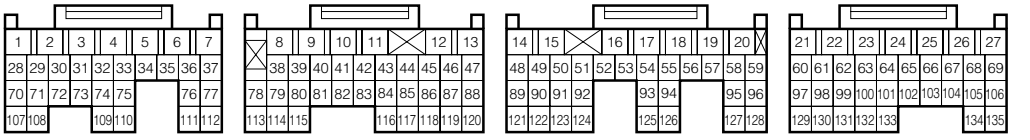


H11E6091S10

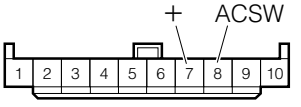
Engine Control Computer terminal name

Terminal No.	Terminal code	Terminal name
3	ACSW	A/C switch input
36	MGC	Magnet clutch drive output
42	BLW	Heater blower operation input
45	ACEV	Evaporator temperature sensor input
116	E21	Sensor earth

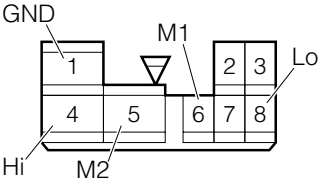
10-4 ARRANGEMENT OF VEHICLE HARNESS SIDE CONNECTOR TERMINALS



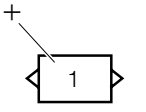
Engine control computer



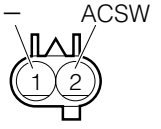
A/C switch



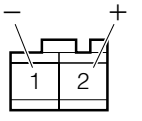
Blower switch



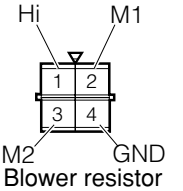
Compressor magnet clutch



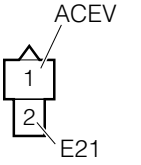
Pressure switch



Blower motor



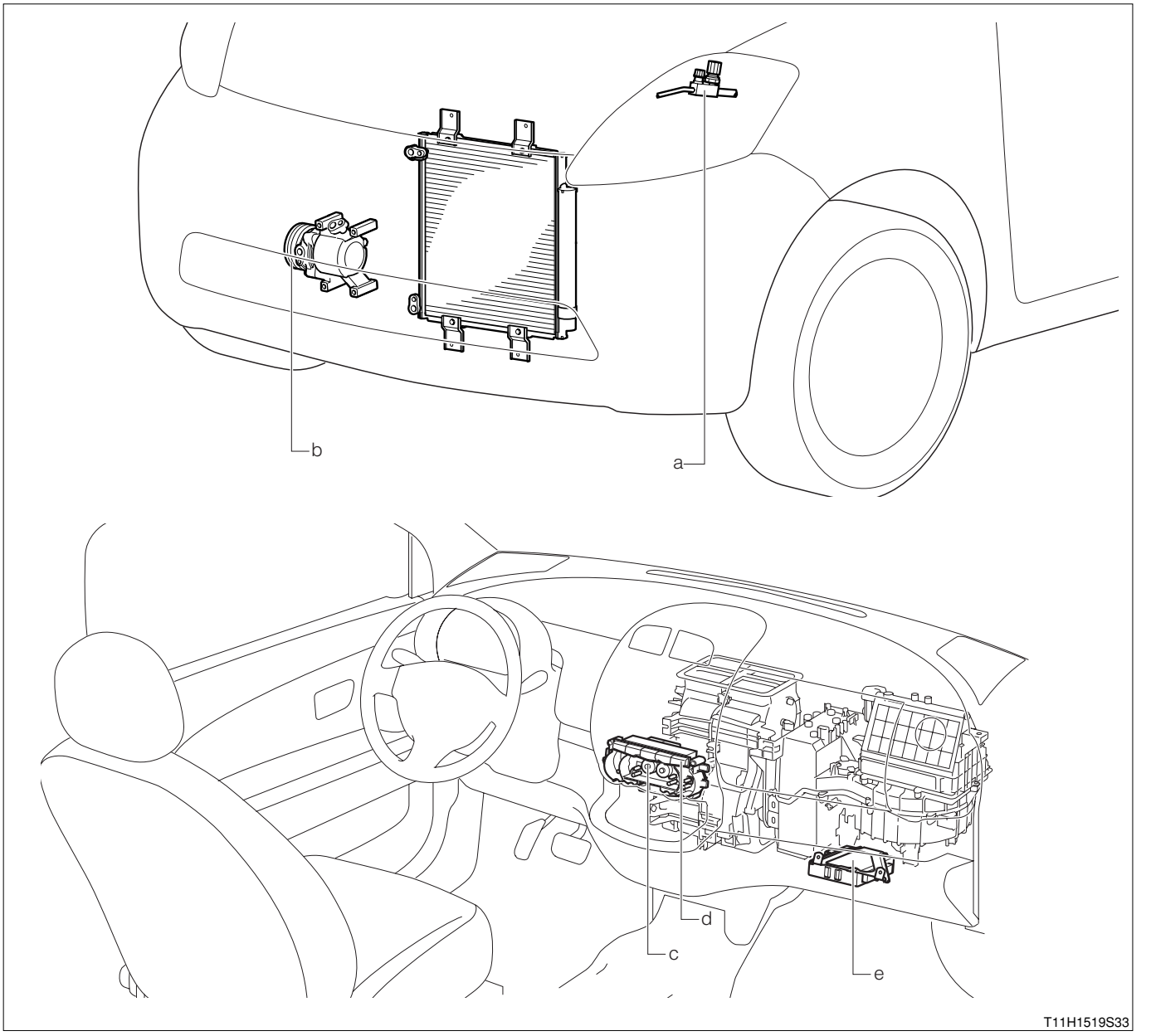
Blower resistor



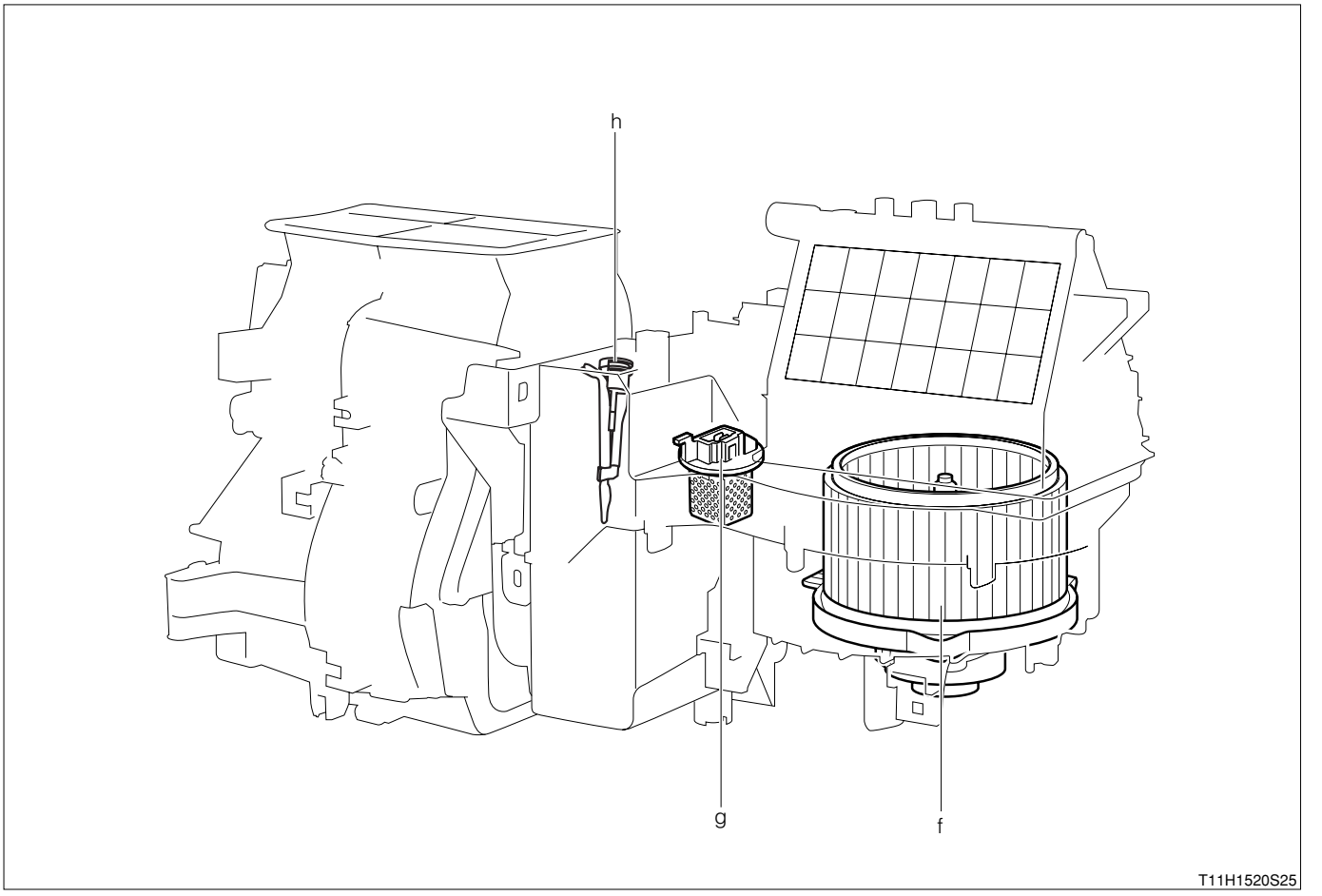
Evaporator temperature sensor

T11H8502ES25

10-5 LOCATION OF COMPONENTS (LHD)

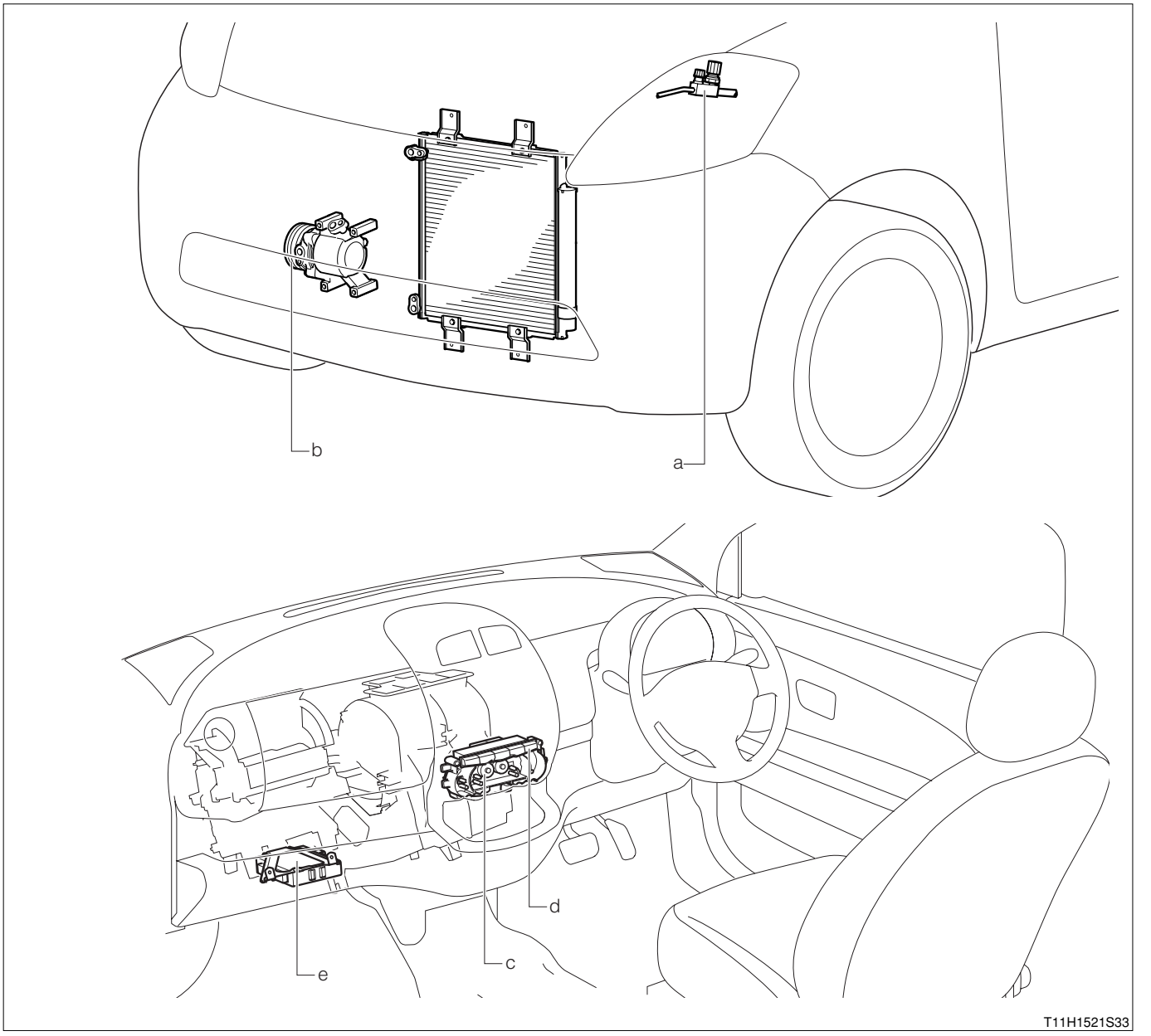


a	Pressure switch
b	Compressor magnet clutch
c	Blower switch
d	A/C switch
e	Engine control computer

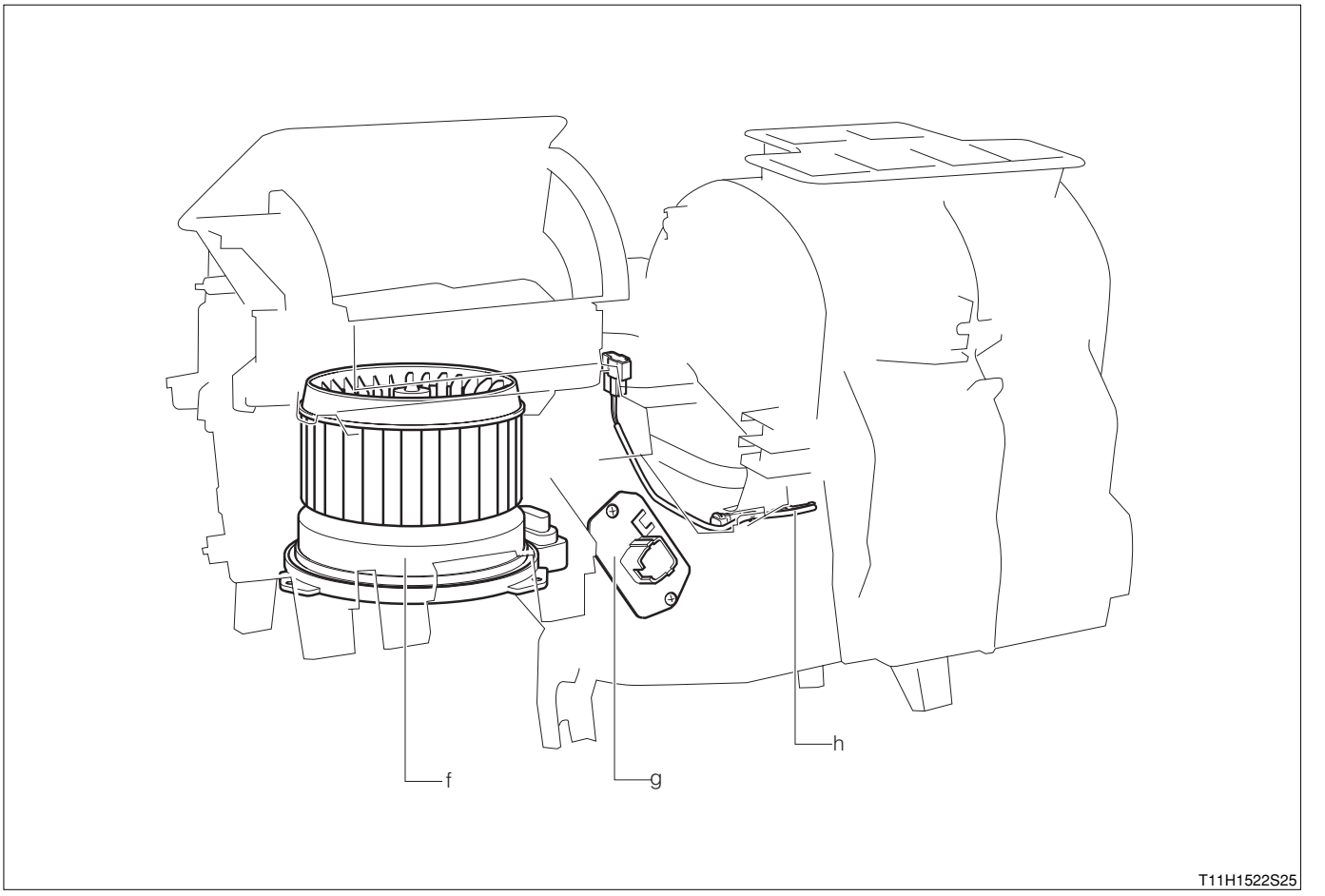


f	Blower motor
g	Blower resistor
h	Evaporator temperature sensor

10-6 LOCATION OF COMPONENTS (RHD)



a	Pressure switch
b	Compressor magnet clutch
c	Blower switch
d	A/C switch
e	Engine control computer



f	Blower motor
g	Blower resistor
h	Evaporator temperature sensor

10-7 HOW TO PROCEED WITH TROUBLE SHOOTING

10-7-1 INQUIRY

1. In your attempt to remove the causes for a malfunction of the vehicle, you will not able to remove the causes unless you actually confirm the malfunctioning phenomenon. No matter how long you continue operations, the vehicle may not resume the normal state unless you confirm the malfunctioning phenomenon. The inquiry with the customer is a vital information collecting activity which is to be conducted previous to the confirmation of malfunctioning phenomenon.
2. This inquiry will provide you with an important clue in an effort to reproduce the malfunctioning phenomenon. Furthermore, the information obtained by the inquiry can be referred to during the troubleshooting. Hence, instead of making general questions, it is necessary to focus your questions on the items related to the malfunction.

(1) DIAGNOSIS BY INTERVIEW SHEET FOR HEATER AND AIR CONDITIONER SYSTEM

Checked by		Check date	Day Month (day of week)

Customer information

Name of customer	Mr./Ms.	Gender of customer (Male, female)	Age [approx.]	Occupation [ ]	
		Area where vehicle is mainly used	Urban, suburb, seashore, mountain, others	Parking place	Outdoor, indoor

Details of vehicle

Date when vehicle was brought to workshop	Day Month (day of week)	Date when malfunction took place	Day Month (day of week)	Repair history	No,Yes (How many times?)
Frame No.		Registration date	Day Month Year	Vehicle model	
Engine type		Transmission	5M/T·3A/T·4A/T·CVT electronically-controlled 4A/T	Driving	2WD·4WD
Running distance	km	Equipment	Tire [ ]· Wheel [Steel · Aluminum]		

Weather

☐ Fine	☐ Cloudy	☐ Rainy	☐ Snow	☐ Other( )
Temperature(Approx. °C)				

Frequency of malfunction

☐ Always ☐ Under certain condition( ) ☐ Sometimes( )

Phenomenon

☐ Poor cooling performance.
☐ The blower motor will not rotate.
☐ The blower motor will not change its speed.
☐ The temperature of the air outlet does not change.
☐ The air outlet can not be switched.
☐ No switching can be made between the indoor air and outdoor air.
☐ The compressor magnet clutch will not be turned ON.
☐
☐ Other

10-8 TROUBLE SHOOTING ACCORDING TO MALFUNCTION PHENOMENA

10-8-1 LIST OF POINTS TO BE CHECKED ACCORDING TO MALFUNCTION PHENOMENA

Malfunction phenomena	Check points	Reference page
Poor cooling performance.	1. Check of cooling performance. 2. Confirmation of normal operation of compressor 3. Confirmation of normal operation of radiator fan 4. Confirmation of normal operation of blower motor 5. Measurement of refrigerant pressure	※1
The blower motor will not rotate.	1. Check of fuse 2. Check of heater relay system 3. Check of blower motor system 4. Check of blower switch system 5. Check of blower register system 6. Check of wire harness and connector	1. — 2. ※2 3. ※2 4. ※2 5. ※2 6. —
The blower motor will not change its speed.	1. Check of blower switch system 2. Check of blower register system 3. Check of wire harness and connector	1. ※2 2. ※2 3. —
The compressor magnet clutch will not be turned ON.	1. Check of fuse 2. Check of magnet clutch relay system 3. Check of compressor magnet clutch system 4. Check of engine control computer switch signal system (Air conditioner switch system) 5. Check of pressure switch system 6. Check of air conditioner switch system 7. Check of evaporator temperature sensor 8. Check of engine control computer 9. Check of wire harness and connector	1. — 2. ※2 3. ※2 4. ※4 5. ※2 6. ※2 7. ※5 8. ※3 9. —

※1

Refer to Page K1-42.

※2

Refer to Page K1-45.

※3

Refer to Page K1-47.

※4

Vehicle with Type 1KR-FE engine

Refer to Page B8-150.

Vehicle with Type K3-VE engine

Refer to Page B8-375.

※5

Vehicle with Type 1KR-FE engine

Refer to Page B8-156.

Vehicle with Type K3-VE engine

Refer to Page B8-382.

10-8-2 TROUBLE-SHOOTING ACCORDING TO MALFUNCTION PHENOMENON ITEMS

(1) Poor cooling performance

∑>1.Check of cooling performance

1.Check cooling performance.

Refer to Page K1-2.

▼If it is OK, the cooling performance is satisfactory.

▼If it is NG, go to step ∑>2.

∑>2. Compressor operation check

1.Check the operation of the compressor when the A/C switch is turned "ON".

SPECIFIED VALUE: The magnet clutch is turned "ON" and the compressor is activated.

▼If it is OK, go to step ∑>3.

▼In the case of NG, perform the troubleshooting for the problem "Compressor magnet clutch is not turned ON."

Refer to Page K1-41.

∑>3. Radiator fan operation check

1.Check the operation of the radiator fan when the compressor is turned "ON".

SPECIFIED VALUE: The fan shall rotate.

▼If it is OK, go to step ∑>4.

▼In the case of NG, check the radiator fan circuit.

Vehicle with Type 1KR-FE engine

Refer to Page B8-211.

Vehicle with Type K3-VE engine

Refer to Page B8-457.

∑>4. Blower motor operation check

1.Check the operation of the blower motor.

SPECIFIED VALUE: Air volume shall change according to the blower switch operation.

▼If it is OK, go to step ∑>5.

▼In the case of NG, perform the troubleshooting for the problem "Blower motor does not change speed".

Refer to Page K1-41.

⊳5. Measurement of refrigerant pressure

1.Install a manifold gauge.

2.After warming up the engine, set the vehicle to the following conditions.

Detected item	Condition
Vehicle body	Vehicle stopped in a shaded place with no wind
Hood door	Fully opened
A/C switch (magnet clutch)	ON
Engine revolution speed	1500rpm
Switching of inside and outside air	Inside air
Set temperature	MAX COOL
Blower speed	HI
Outside air temperature	30°C
Humidity	0.5

3.Measure the pressure of refrigerant.

Normal pressure (reference value)

Gauge	Pressure value
High-pressure side	1.4 - 1.8MPa
Low-pressure side	0.21 - 0.28MPa

NOTE

- The values given above are provided just for reference only, since the pressures change according to environmental conditions (outside temperature, solar radiation, ground heat, wind), vehicle conditions (engine heat, vehicle heat load), etc.

(1) Based on the measurement results, determine the action by referring to the following table.

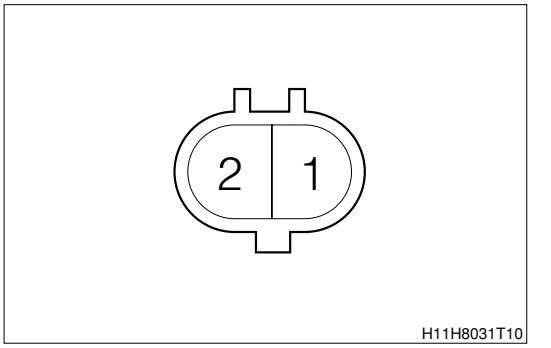
Phenomena	Causes	Diagnosis	Remedies
∗ During the operation, the pressure at the low-pressure side becomes vacuum at one time and normal at another time.	∗ The moisture admitted into the cooler system is frozen at the expansion valve port. As a result, the refrigerant will not circulate temporarily. However, the normal condition is restored.	∗The drier is supersaturated. ∗The moisture of the cooler system is frozen at the expansion valve port, thus shutting the circulation of the refrigerant gas.	1 Remove the moisture from the cycle by performing the vacuum evacuation repeatedly. 2 If the problem persists, replace the condenser.
∗ The pressure at both high-pressure side and low-pressure side is low. ∗ The cooling performance is not enough.	∗ The gas is leaking from somewhere in the cooler system.	∗The refrigerant gas is not enough. ∗Leakage of refrigerant gas	1 Check that the refrigerant gas is not leaking. Repair, as required. 2 If the repair has been carried out, perform the vacuum evacuation and check the air tightness positively. 3 After all refrigerant has been recovered, replenish an optimum amount of refrigerant again.
∗ The low-pressure side becomes negative pressure.	∗ Dust, etc. admitted into the expansion valve and condenser is blocking the flow of refrigerant.	∗The expansion valve is clogged. ∗The condenser is clogged.	1 Check the expansion valve. 2 Check the condenser.
∗ The pressures at both high-pressure side and low-pressure side are too high.	∗ Excessive refrigerant ∗ The condenser is not cooled adequately. ∗ Air has been admitted into the cooler system.	∗Excessive refrigerant ∗The condenser is not cooled adequately. ∗Air has been admitted into the cooler system. ∗The vacuum evacuation is not enough.	1 Clean the condenser fin. 2 If Item 1 is normal, recover all refrigerant and check that the compressor oil is not smeared or insufficient. Then, replenish an optimum amount of refrigerant.
∗ There is almost no difference between the pressure at the low-pressure side and that at the high-pressure side.	∗ Leakage inside compressor	∗Poor compression ∗Leakage at valve or breakage of sliding parts	1 Repair or replace the compressor.
∗ The pressure exhibits no abnormality.	∗ There is the possibility that the pressure value has fluctuated because of the slight difference between the normal condition and the measurement environment, changes in the vehicle due to passage of time, etc.	∗There is the possibility that the pressure value has fluctuated because of the slight difference between the normal condition and the measurement environment, changes in the vehicle due to passage of time, etc.	1 Observe for a while. If the condition will not improve, recover all refrigerant. Then, replenish an optimum amount of refrigerant.

10-9 UNIT CHECK

10-9-1 PRESSURE SWITCH

1.Check continuity between the respective terminals of the connector of the pressure switch (on the liquid tube).

SPECIFIED VALUE: The condition becomes as indicated in the figure, depending on the refrigerant pressure.



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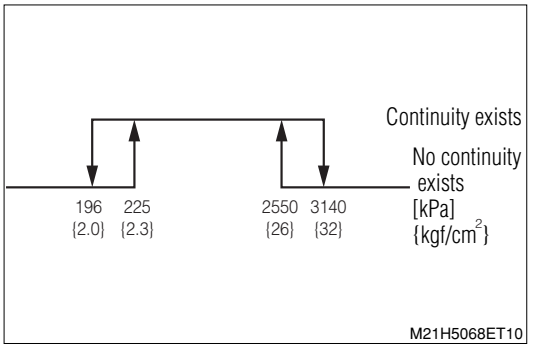

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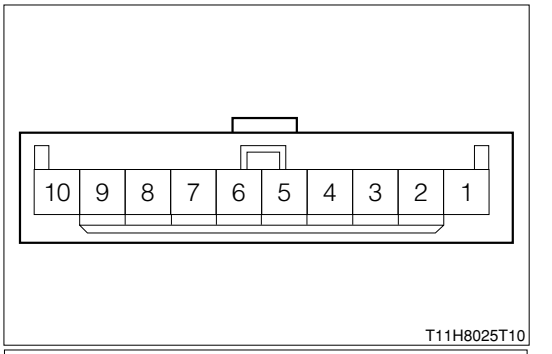
10-9-2 HIATER CONTROL

(1) Air conditioner switch

1.Operate the air conditioner switch. At this time, check continuity between the terminals 8 and 9.

2.With the switch turned "ON".

SPECIFIED VALUE: Illuminates.



T11H8025T10

(2) Blower switch

1.Check that continuity exists between the blower switch connector terminals as per the continuity table.

○—○:Continuity exists

Terminal / Position	GND	Lo	M1	M2	Hi
OFF	○				
1	○	○			
2	○	○	○		
3	○	○		○	
4	○	○			○

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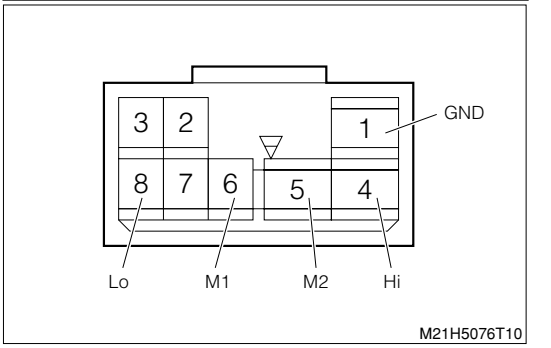
2.Check the illumination status when the battery positive (+) terminal is connected to the terminal 2 and the battery negative (-) terminal to the terminal 3.

SPECIFIED VALUE: Illuminates.



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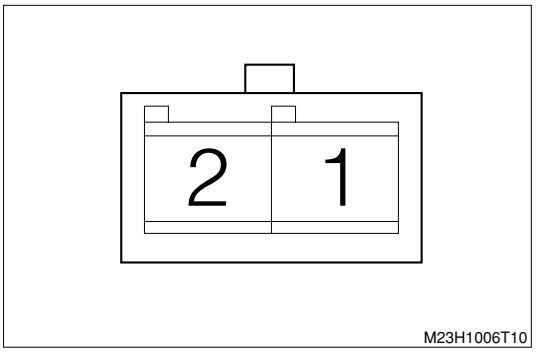
10-9-3 BLOWER MOTOR

1.Check operation of the motor when the battery positive (+) terminal is connected to the blower motor connector terminal 2 and the battery negative (-) terminal to the terminal 1.

SPECIFIED VALUE: Shall rotates normally without an abnormal noise.



10-9-4 BLOWER RESISTOR

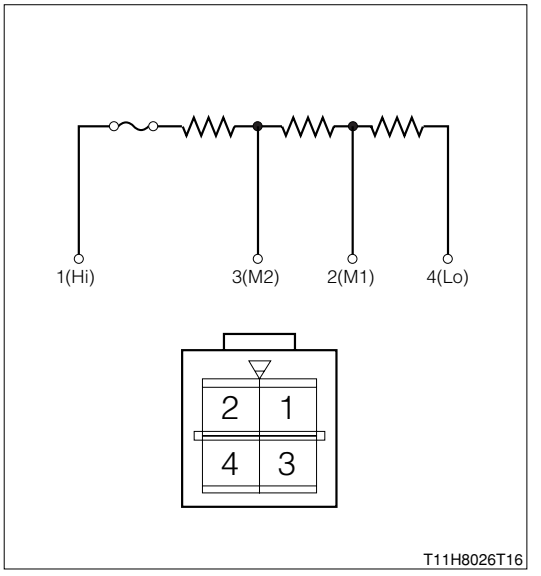
1.Check resistance between the connector terminals of the resister.

RHD vehicles

SPECIFIED VALUE: HI－M2 : 0.44 - 0.50(Ω)
HI－M1 : 0.96 - 1.10(Ω)
HI－LO : 3.19 - 3.67(Ω)

LHD vehicles

SPECIFIED VALUE: HI－M2 : 0.50(Ω)
M1－M2 : 0.82(Ω)
M1－LO : 1.8(Ω)



10-9-5 MAGNET CLUTCH

1.Check operation of the magnet clutch when the battery positive (+) terminal is connected to the magnet clutch connector terminal and the battery negative (-) terminal to the compressor unit.

SPECIFIED VALUE: The magnet clutch hub is locked with the rotor, emitting operating sound.

10-9-6 EVAPORATOR TEMPEREATURE SENSOR

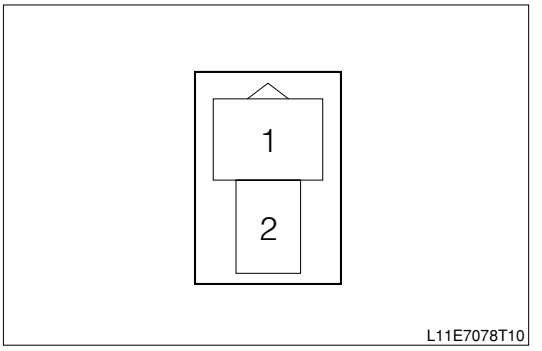
1.Check resistance between the connector terminals of the thermistor.

RHD vehicles

Temperature (°C)	Resistance (kΩ)
0	4.6 - 5.1
15	2.1 - 2.6

LHD vehicles

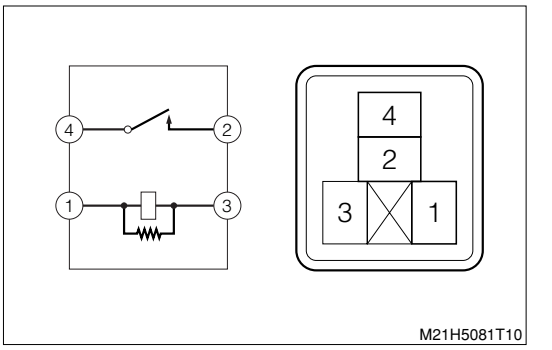
Temperature (°C)	Resistance (kΩ)
0	4.6 - 5.1
15	2.1 - 2.6



10-9-7 MAGNET CLUTCH RELAY AND HEATER RELAY

1.Check continuity between each connector terminal.

Terminal No.	Standard
2 - 4	No continuity exists
1 - 3	Continuity exists.



2.Apply the battery voltage between the terminals 1 and 3. At this time, check continuity between the terminals 2 and 4.

SPECIFIED VALUE: Continuity exists.

10-10 ECU INPUT/OUTPUT SIGNAL CHECK

10-10-1 CHECKING METHOD

1.Check voltage and continuity between each connector terminal.

CAUTION

- With the connector connected, perform the check from behind the connector at the vehicle harness side.

10-10-2 SPECIFIED VALUE FOR INPUT/ OUTPUT SIGNAL

(1) Engine control computer

Check system	Terminal No. (Nomenclature of terminal)	Input and output	Detected item	Measurement condition	Specified value
AIR CONDITIONER RELAY	36(MGC) - 125(E1)	Output	Voltage	When the air-conditioner relay is "ON".	Approx. 0V
				When the air-conditioner relay is "OFF".	Battery voltage
Air conditioner switch	3(ACSW) - 125(E1)	Input	Voltage	When the air-conditioner is in operation.	Battery voltage
				When the air-conditioner is not in operation.	0 - 0.5V
Blower	42(BLW) - 125(E1)	Input	Voltage	When the heater blower switch is "ON".	0 - 0.5V
				When the heater blower switch is "OFF".	Battery voltage
Evaporator temperature sensor	45(ACEV) - 116(E21)	Input	Voltage	When the air-conditioner is "ON".	0.15 - 4.8V