4.2 REMOVAL AND INSTALLATION OF THE UNIT

(1) Removing the blower unit

1) Remove the connectors connected to the inner/outer air select motor actuator, the blower motor and the blower controller. Also remove the harness from the blower casing.

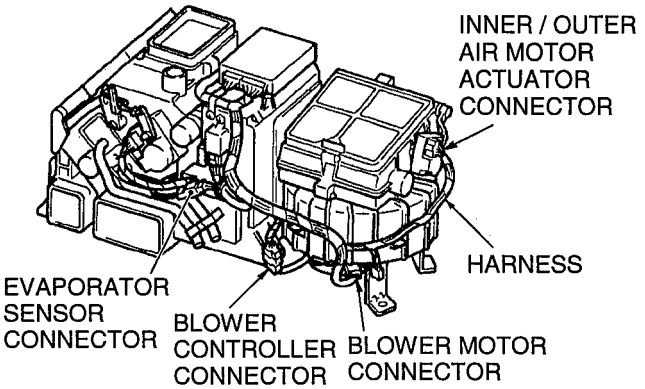


Fig. 14

2) Draw out the inner air filter from the intake casing. Remove four cross-recessed screws T5 ×14 (T1) from the top of the intake casing, using a screwdriver. Then remove the intake casing.

3) Remove three cross-recessed screws T5×14 (T1) fastening the blower casing with the unit casing. Then separate the blower unit from the air-conditioner unit.

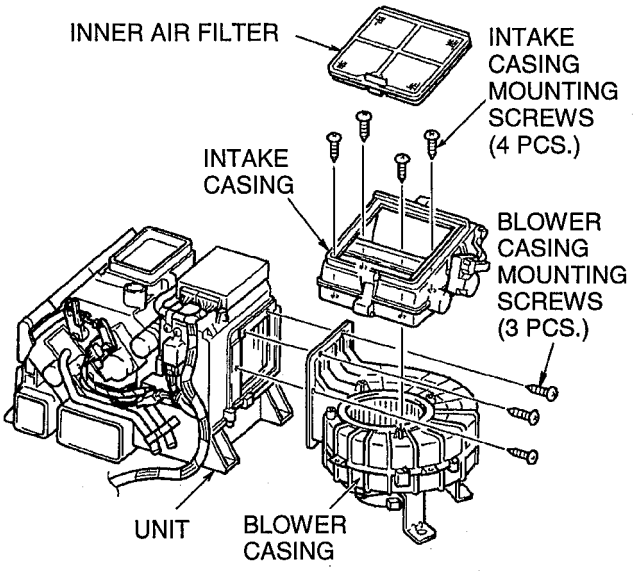


Fig. 15

(2) Replacing the blower motor

1) Disconnect the cooling hose that is connected between the blower motor and the blower casing.

2) Remove three cross-recessed screws N5×16 (W) fixed from the bottom of the blower unit casing. Then draw out the blower motor.

- Do not separate the fan from the blower motor.

3) Assembly is the reverse order of disassembly.

(3) Replacing the blower controller

1) Remove two cross-recessed screws T4 × 14 (T1) fixed from the bottom of the blower unit casing and draw out the blower controller.

2) Install a new blower controller in the reverse order of removal.

- Do not disassemble the blower controller in any circumstances.

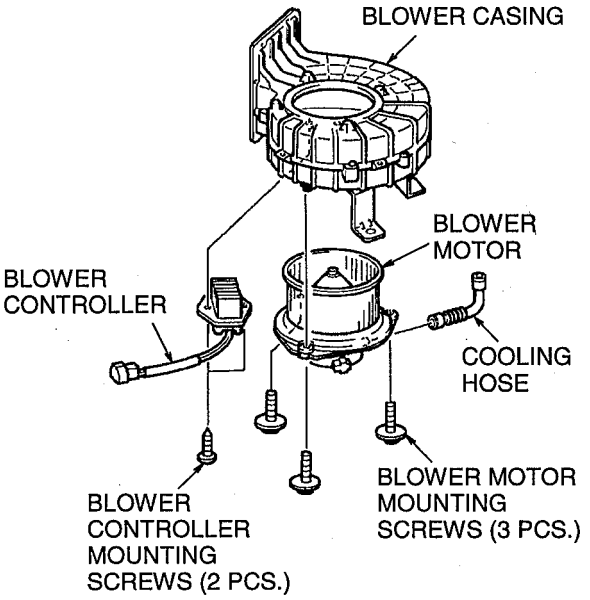


Fig. 16

(4) Removing the heater core

1) After discharging the cooling water, disconnect the heater hose from heater core.

2) Remove one cross-recessed screw N5×16 (T2) each for the AHC bracket fixing the heater core to the unit and for the pipe clamp. Then remove the AHC bracket and the pipe clamp and draw out the heater core from the unit casing.

3) Assembly is the reverse order of disassembly.

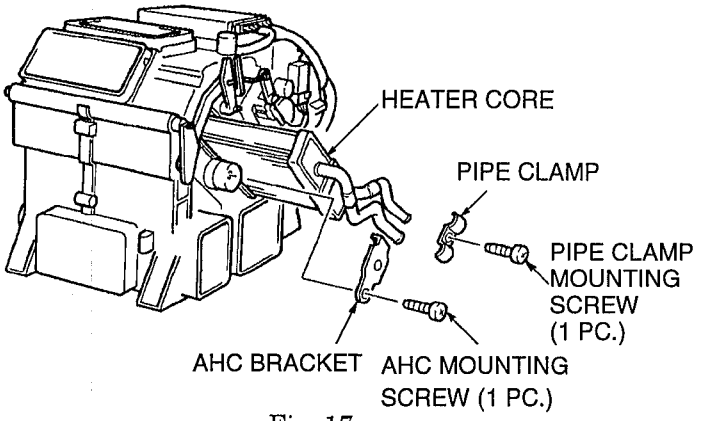


Fig. 17

(5) Removing the upper and lower parts of the air-conditioner unit casing

1) Draw out the connectors for the mode motor actuator and the evaporation sensor.

2) Separate the rod 120 from the rod holder that is fixed to the lever MAL1 on the mode motor actuator.

3) Remove three cross-recessed screws N4×22 (T2) fastening the mode motor actuator that install the bottom of the unit casing to the back of the unit casing. Then separate the mode motor actuator.

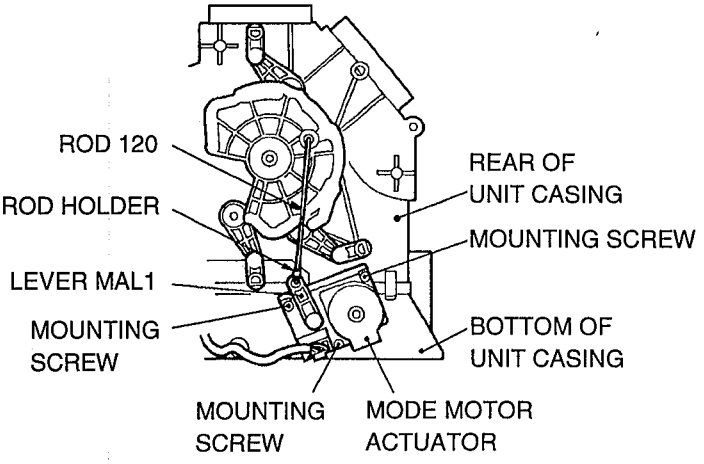


Fig. 18

4) Remove eleven cross-recessed screws N5×16 (T2) that install the bottom of the unit casing to the top of the unit casing.
Draw out the top of the unit casing upwards, using care so the evaporator sensor cord is not arrested by the casing.

- On that occasion, do the work with the heater core off the unit casing.

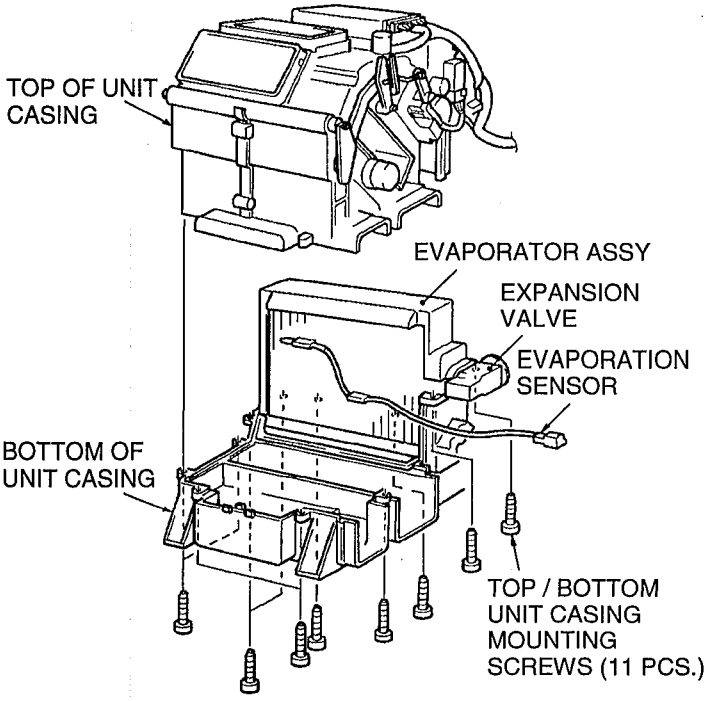


Fig. 19

(6) Replacing the evaporator and the expansion valve

1) Remove the evaporator assy from the bottom of the casing, together with the casing insulator and the expansion valve.

2) Remove the upper and lower casing insulators from the evaporator assy and draw out the evaporator sensor with the sensor holder.

3) Remove the socket head cap screws M5×40 (2 pcs.) from the evaporator. Then separate the expansion valve from the evaporator.
: 4mm

4) Attach O rings (NFO ring 5/8 and 1/2, one piece each) to a new evaporator. Then install the expansion valve to it.
: 4mm,
Tightening torque 0.7kgf·m (5.1ft·lbs)

- When attaching O rings, use care so the O rings are not caught.

(7) Installing the evaporator sensor
Install the evaporation sensor as shown in Fig.21.

- When installing the casing, exercise care so the sensor cord is not caught by the casing.

(8) Replacing the motor actuator

1) Replacing the mode motor actuator
Remove the connector fixed to the motor actuator.
Remove the rod 120 linking the motor actuator with the mode cam, from the rod holder.
Remove three cross-recessed screws T4×14 (T1) fixing the motor actuator. Separate the motor actuator from the unit, together with the rod holder and the lever MAL1. Remove the rod holder and the lever MAL1 from the motor actuator and install them to a new motor actuator. Assembly is the reverse order of disassembly.

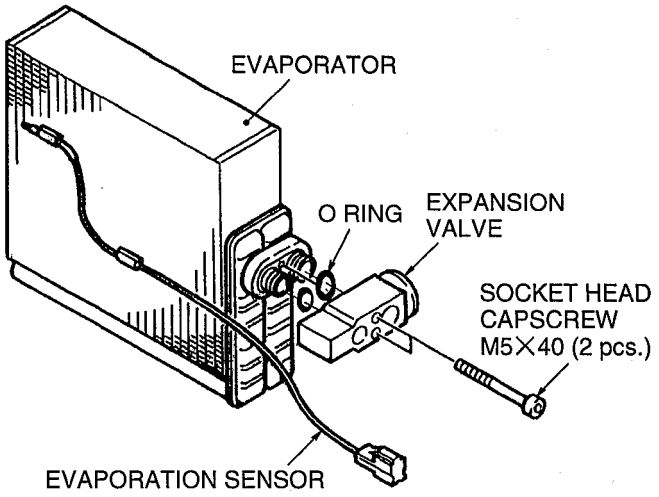


Fig. 20

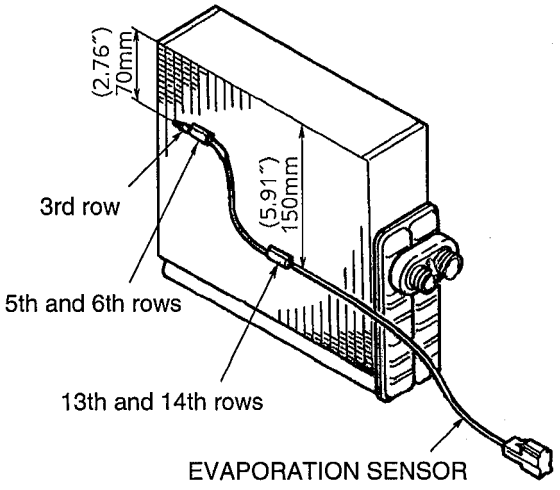


Fig. 21 Installing the evaporator sensor

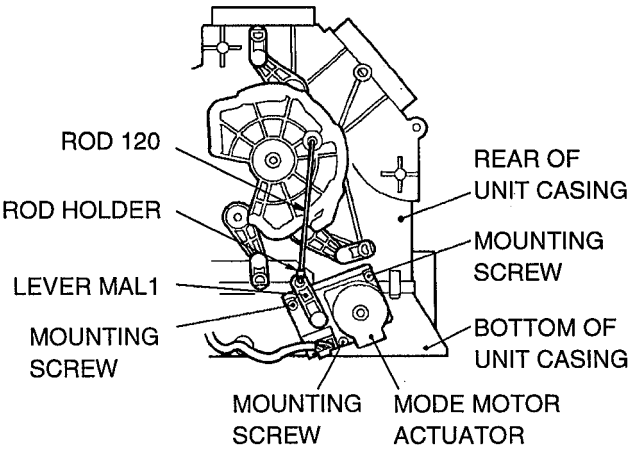


Fig. 22

2) Replacing the air mix motor actuator
Disconnect the connector connected with the motor actuator.
Separate the rod 67 linking the motor actuator with the lever AM, from the rod holder.
Remove three cross-recessed screws T4×14 (T1) fastening the motor actuator. Then remove the motor actuator with the rod holder and the lever MAL1, from the unit. Remove the rod holder and the lever MAL1 from the motor actuator and install them to a new motor actuator. Assembly is the reverse order of disassembly.

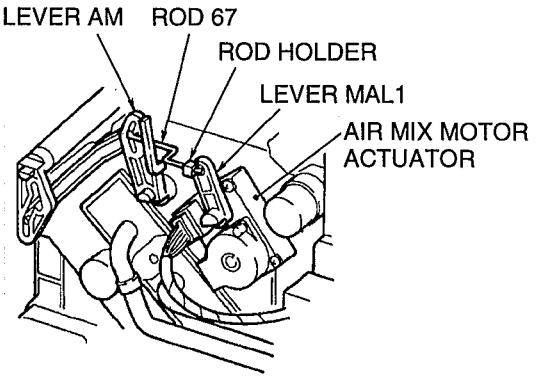


Fig. 23

3) Replacing the inner/outer air select motor actuator
Disconnect the connector connected with the motor actuator.
Separate the motor actuator with lever MAL2 from the unit.
Remove the lever MAL2 from the motor actuator and install it to a new motor actuator, in the reverse order of disassembly.

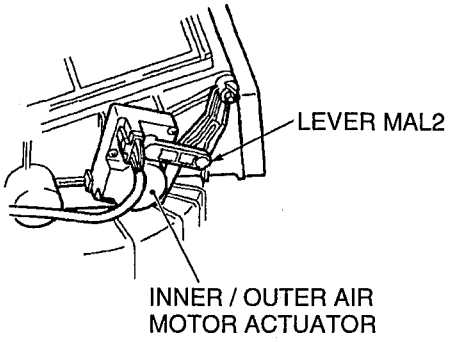


Fig. 24

5. CHARGING REFRIGERANT

5.1 PRECAUTIONS TO BE EXERCISED IN OPERATION

(1) Always assign a person in charge of handling refrigerant.
Refrigerant charge operation involves dangers as it handles high pressure gas. Always assign a person familiar with how work is done for handling refrigerant.

⚠
- Always wear protective goggles. (You may lose your sight if the refrigerant gets in your eyes.)
- The refrigerant in liquid state is at very low temperature [approx. -26℃ (-15°F)]. Therefore, handle it with care. (You may get a frostbite if the refrigerant is sprayed over your skin.)

(2) Storage and Transportation

1) Hold the service can (hereinafter called can) less than 40℃ (104°F). Since high pressure gas of R134a is filled in the can in a saturated liguefied state, the pressure in the can increases sharply as temperature rises. The can may blast as the result.
It is for this reason why the can temperature must be kept below 40℃ (104°F).
2) For storage, choose a cold bark place not exposed to direct sunlight.
3) If the can is placed near a fire source, it is subject to radiation heat and gets hot. This causes the inside pressure to rise and may cause the can to blow out. Therefore, never bring the can close to a fire.
4) The inside of the closed compartment gets very hot as the radiation heat of the sunlight enters the compartment. The areas of the compartment which are exposed to direct sunlight may rise to a dangerous temperature level. Therefore, do not bring the can into the compartment. Also, the inside of the trunk room may rise to a dangerous temperature level even in the summer time. Use sufficient care, therefore, taking the above into account.
5) Note that if the can has scratches, marks and distortion, the strength of the can will deteriorate.
    1. Do not drop or knock on the can.
    2. When transporting, loading or unloading cans and packages containing cans, do not throw or drod them.
6) Store cans beyond the reach of children.

(3) Charging

1) When warming the can in which refrigerant is charged, do not fail to open the service can valve and the low pressure valve of the gauge manifold and warm the can in warm water of 40℃ (104°F) or below (to an extent that you do not feel hot when you put your hand in the water.) If the can is put in hot water or heated by a direct fire, the pressure of the can may rise sharply, thereby blowing off the can.
2) When charging refrigerant while running the engine, do not open the high pressure valve (HI) of the gauge manifold in any case.

(4) Others
Re-use of service cans is prohibited by law; never use them again. Do not allow foreign matter to enter the air-conditioner circuit. Air, water and dust are detrimental to the refrigeration cycle. Install the components of the air-conditioner correctly and speedily. Pay full attention to the entry of water and dust.

⚠
- Be careful about overcharge of gas.
- Fasten pipes to a specified torque.

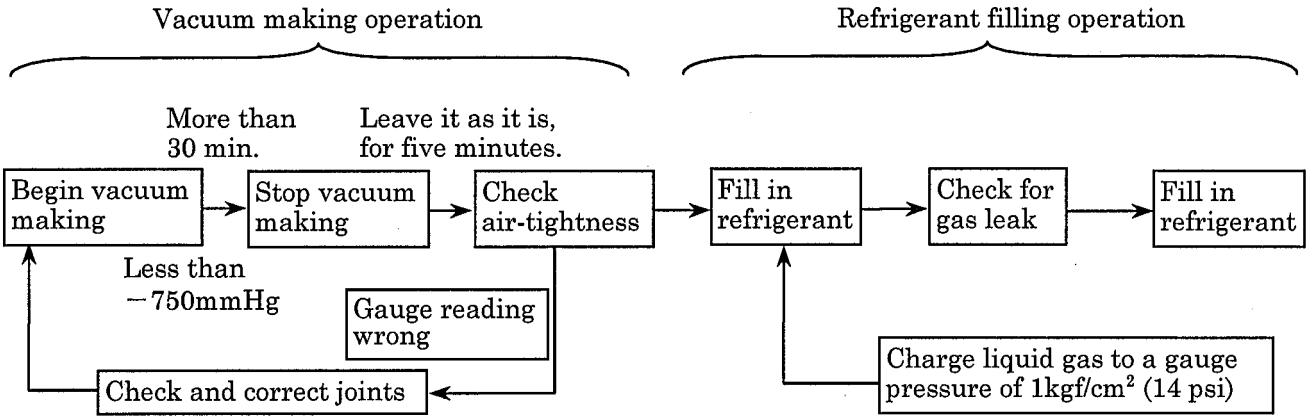
5.2 OPERATING PROCEDURE

(1) Refrigerant charge into the air-conditioner consists mainly of "vacuum making operation", and "gas charge operation".

1) The "vacuum making operation" consists of removing water in the air-conditioner circuit. If only a little water remains in the circuit, the small holes of the expansion valve are frozen during operation. This causes the circuit to clog up or rust, resulting in a variety of malfunctions. Therefore, before filling refrigerant in the circuit, make vacuum and allow the water in the circuit to boil and vaporize. Water in the circuit is thus eliminated.

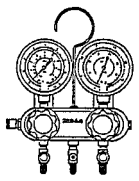
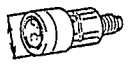
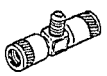
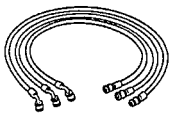
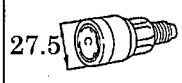
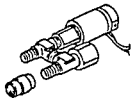
2) The "gas charging operation" consists of filling refrigerant in the circuit after forming vacuum. Filling gas not only depends upon the cooling performances of the air-conditioner, but also affects the service life of the component parts of the circuit. Extreme overcharge will make the circuit pressure extremely high and causes the cooling performance to deteriorate. On the contrary, undercharge causes poor circulation of the lubricating oil of the compressor and causes seizure of the moving parts of the compressor. The gas filling operation involves handling of high pressure gas; filling gas according to incorrect operation procedure is dangerous. Fill refrigerant correctly following the operation procedures and cautions stated in this manual.

(2) Operation Chart



(3) Tools

Table 5 unit : mm

No.	Name of Part	Q'TY	Sketch	Service	No.	Name of Part	Q'TY	Sketch	Service
1	Gauge manifold	1			4	Quick joint	1	 23.5	Low pressure side
					5	T joint	1		For service can valve
2	Charging hose	3		Red : high pressure side Blue : low pressure side Yellow : vacuum pump side	6	Service can valve	2		For service can
3	Quick joint	1	 27.5	High pressure side	7	Vacuum pump adapter	1		For vacuum pump

5.3 CHARGING PROCEDURE

5.3.1 VACUUM MAKING OPERATION

(1) Connecting Gauge Manifold (See Fig.25.)

1) Close the high pressure valve (HI) and the low pressure valve (LO) of the gauge manifold.
2) Connect the charging hoses (red and blue) with the service valves of the compressor.
   Red hose : High pressure side (HI) of the gauge manifold → high pressure side (DIS) of compressor
   Blue hose : Low pressure side (LO) of gauge manifold → low pressure side (SUC) of compressor

⚠
- Take care so as not to mistake the high pressure side for low pressure side and push it in till a click is heard.
- Connect the end bent like "L" of the charging hose with the service valve of the compressor. If the charging hose is connected the opposite way, the mini core valve of the compressor does not open. (See Fig.26.)

3) Connect the middle valve of the gauge manifold with the charging hose of the vacuum pump.

⚠ Some kinds of gauge manifolds are not equipped with an open/close valve in the center.

(2) Vacuum Making (See Fig.27.)

1) Open the high pressure valve (HI) and the low pressure valve (LO) of the gauge manifold.
2) Turn on the switch of the vacuum pump and make vacuum for more than 30 minutes.
3) When vacuum making for a specified duration is over (degree of vacuum : less than − 750mmHg), close the high pressure valve and the low pressure valve of the gauge manifold.
4) Then turn off the vacuum pump.

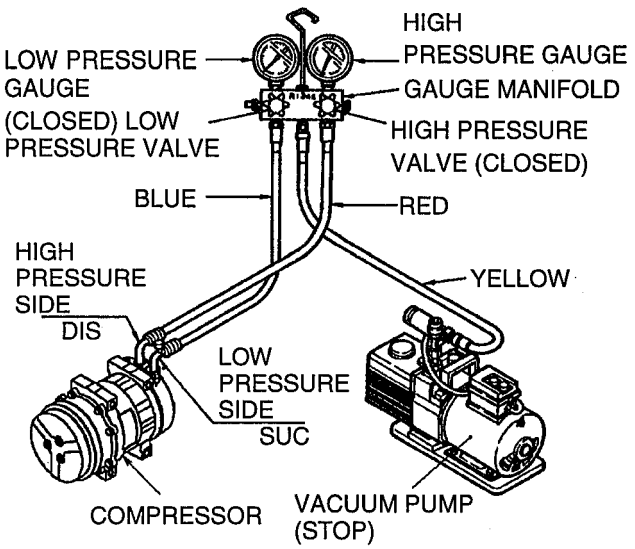


Fig. 25 Connecting gauge manifold

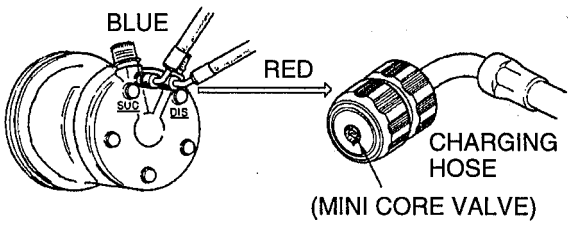


Fig. 26 Connecting piping with compressor

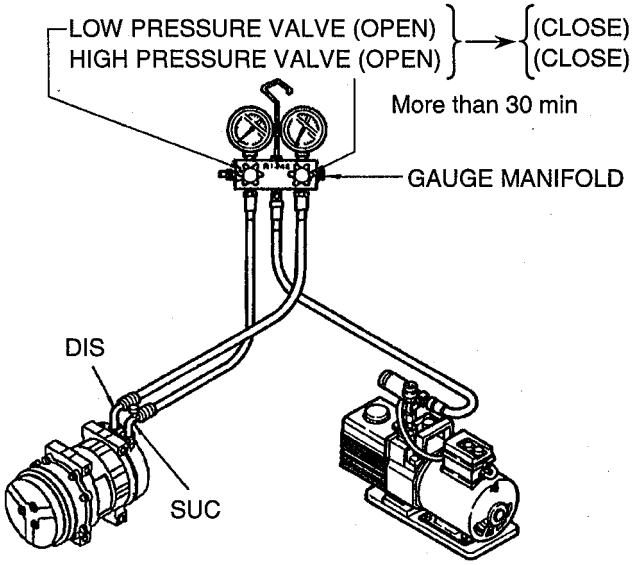


Fig. 27 Vacuum making operation

(3) Air-tightness Check
Close the high pressure valve and the low pressure valve of the gauge manifold, leave it as it is for more than five minutes and make sure that the gauge indication does not return toward O.

⚠ If the gauge indication swings toward O, there is somewhere that is leaking. Retighten pipe joints, make vacuum again and make sure of no leakage.

5.3.2 GAS CHARGING OPERATION

(1) Charging from High Pressure Side
(See Fig.28.)

1) After making vacuum repeatedly, change the charging hose (yellow) of the gauge manifold from the vacuum pump to the service can.
2) Air purge
Open the service can valve. (However, close the high and low pressure valves of the gauge manifold.) Then push the mini core valve of the side service port on the low pressure side of the gauge manifold, using a screwdriver or something, in order to let out the air in the charging hose by the pressure of the refrigerant. (See Fig.28.) (The operation ends when a hissing sound is heard.)
3) Open the high pressure valve of the gauge manifold and charge in refrigerant. [Charge in gaseous refrigerant to a gauge pressure of 1kgf/cm^2 (14psi).]
After charging, close the high pressure valve of the gauge manifold and the service and valve. (See Fig.29.)

⚠ Do not run the compressor in any case, (Otherwise the refrigerant flow in reverse direction which causes the service can and the hoses to rupture. This is very dangerous.)

(2) Checking for Gas Leakage
Check for gas leakage in the cycle, using a gas leak detector (electric type). Retighten and correct leaking points.

⚠ Always use R134a for the leak tester. (The presently used fron gas affects the sensitivity adversely.)

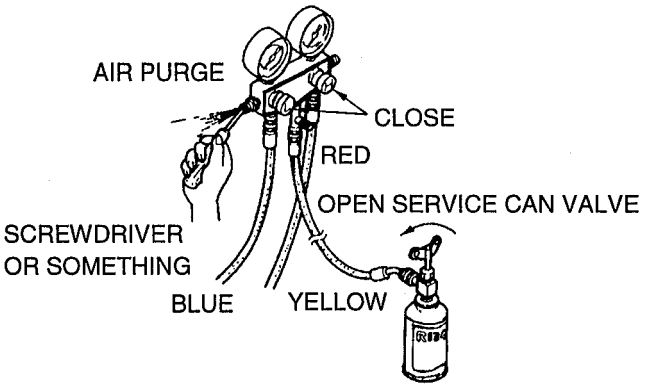


Fig. 28 Gas charging operation

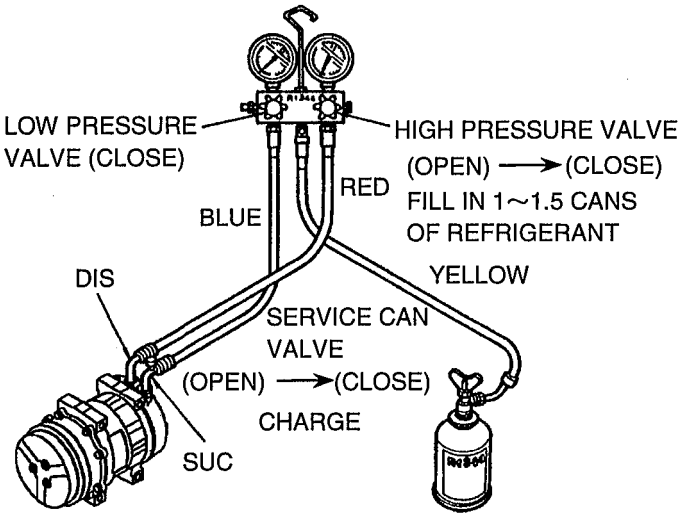


Fig. 29 Gas charging operation
(High pressure side)

(3) Charging from Low Pressure Side
(See Fig.30.)

1) Make sure that the high-pressure and low-pressure valves of the gauge manifold and the service can valve are closed.
2) Start the engine and run the revolution to 1500±100rpm and fully open the cab door and the windows.
3) Turn on the air-conditioner switch, set the fan switch to Max and the temperature control switch to cool Max.
4) When charging gas, set the discharge pressure of the compressor to 14~16kgf/cm^2 (200~230psi).
5) Open the low pressure valve of the gauge manifold and the service can valve and fill in refrigerant till air bubbles of the sight glass of the receiver go away. (See Fig.31.)
[Total amount of gas to be charged : 800 $^{+50}_{0}$ g (1.8 $^{+0.1}_{0}$ lbs)]
6) When refrigerant charge is over, close the low pressure valve of the gauge manifold and the service can valve.

⚠
- Do not open the high pressure valve of the gauge manifold in any circumstances.
- Never place the service can upside down. (The compressor valve may be scored because the refrigerant is sucked in a liquid state.)

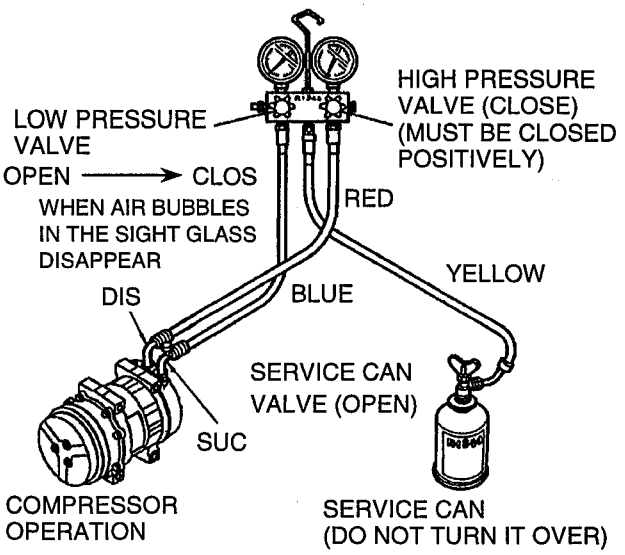


Fig. 30 Gas charging operation
(Low pressure side)

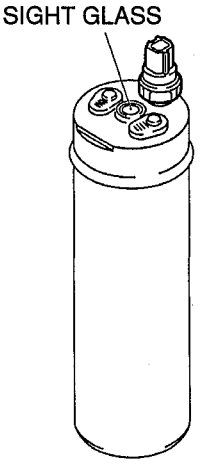
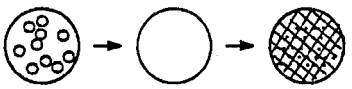
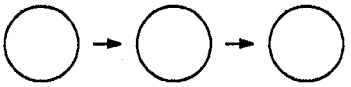
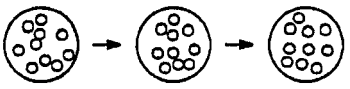


Fig. 31 Receiver dryer

(4) Criterion for Checking the Amount of Refrigerant Filled in

Judgment of refrigerant level through the sight glass of receiver dryer

Proper level	After A/C is turned on, only a little bubbles are seen and thereafter light milky white is seen.	
Overcharge	After A/C is turned on, no air bubbles are seen.	
Undercharge	After A/C is turned on, continuous air bubbles are seen.	

⚠
- If the air-conditioner is run with scant refrigerant R134a, it has adverse effect on the compressor.
- If the refrigerant is charged too much (overcharged), the cooling performance is deteriorated. Moreover, the circuit pressure gets abnormally high : Always keep a proper level.

(5) Detaching Gauge Manifold

When the refrigerant level has been checked, disconnect the charging hoses from the compressor in the following manner :

1) Press the "L" shape metal fitting of the charging hose (blue) on the low pressure side against the service valve of the compressor so the refrigerant does not leak out and loosen the nut. As soon as the nut has been removed, disconnect the charging hose from the service valve.
2) Leave the high pressure side as it is till the high pressure gauge reading falls. [below 10kg/cm^2 (140psi)].
3) Disconnect the charge hose (red) on the high pressure side the same way as on the low pressure side.

6. ELECTRIC CIRCUIT

6.1 WIRING DIAGRAM AND CONNECTORS

P	W	B	R	Y	G	L	Br	Lg	O
pink	white	black	red	yellow	green	blue	brown	light green	orange

Note) 1. The double chain lines indicate the wiring on the excavator side.
2. The connector colors indicate the cord colors seen from the connecting part.

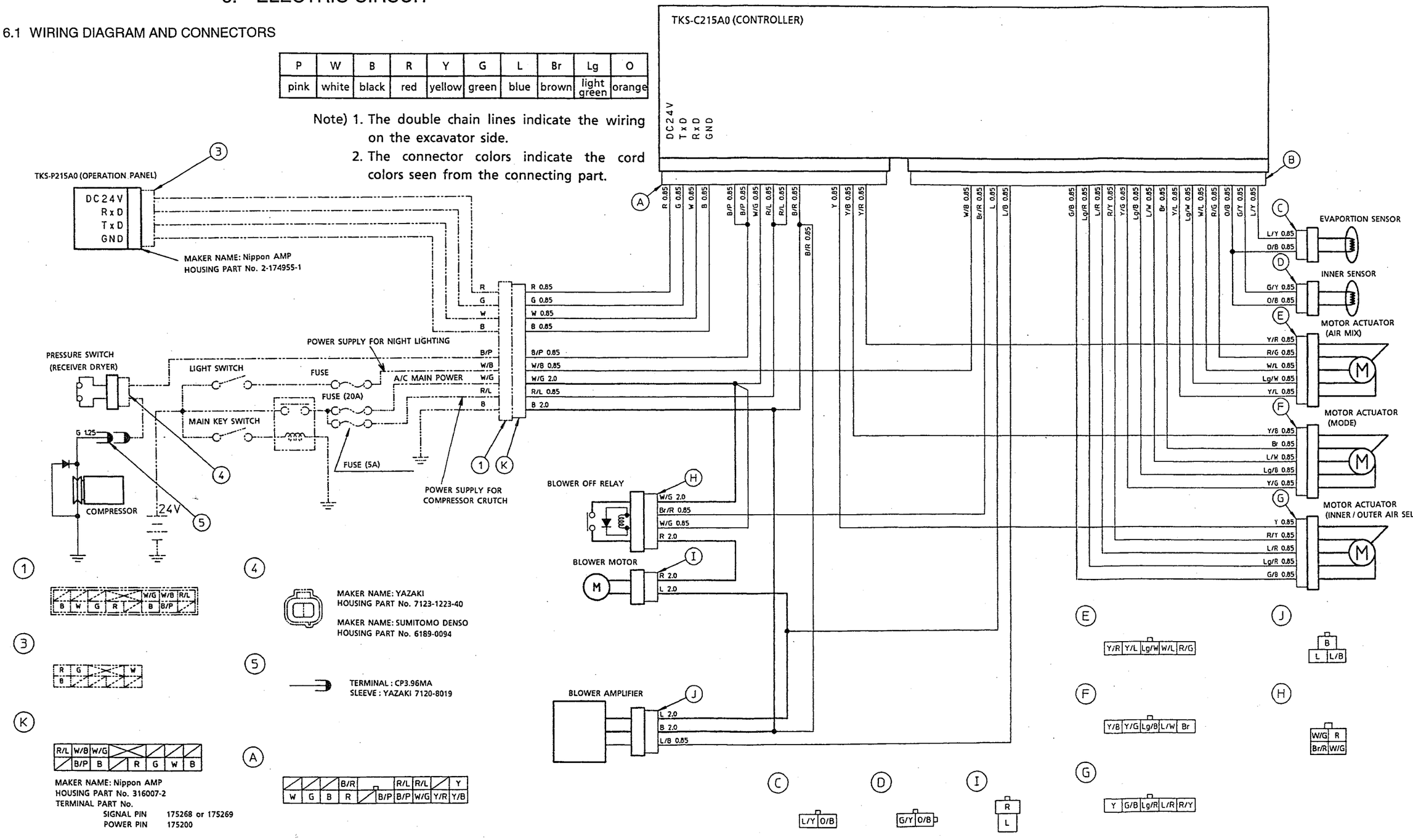


Fig. 32 Electric diagram