

6. INSTALLATION INSTRUCTIONS

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1. GENERAL

Here is a brief outline of where and how to install the unit. Please read over entire set of instructions for indoor and outdoor units and make sure all accessory parts listed are with the unit before beginning.

1-1. Tools Required for Installation (not supplied)

Drill, 3-5/32" dia. hole saw or key hole saw for normal walls. However, chisels or core bits will be required for brick, concrete, or similar walls.

- Common Screwdriver
- Phillips Head Screwdriver
- Knife or Wire Stripper
- Level
- Tape Measure
- Tube Cutter
- Flaring Tool
- Torque Wrench
- Adjustable Wrench
- Reamer or Small File

1-2. Accessories Supplied with Unit for Installation

Parts	Figure	Q'ty	Parts	Figure	Q'ty
Wall fixture		1	Insul, Nipple		1
Tapping Screw	Truss HD Phillips 4 x 25 mm (1")	20	Drain Hose Adaptor		1
Mounting Bracket	For Remote Control Unit	1	Full Scale Installation Diagram		1
Tapping Screw	Truss HD Phillips 3.1 x 13 mm (1/2")	2			

1-3. Optional Copper Tubing Kit

Copper tubing for connecting outdoor unit to indoor unit is available in kits which contain the narrow and wide tubing, fittings and insulation.

1-4. Type of Copper Tubes and Insulation Material

If you wish to purchase these materials separately from a local source, you will need:

- Deoxidized annealed copper tube 1/4" outside dia. with a 0.0314" wall thickness, and an equal length of 5/8" outside dia. with a 0.0394" wall thickness.

Cut to the appropriate lengths + 12" to 20" on each to dampen vibration between units.

- Foamed insulation material 1/4" I.D., or 5/8" I.D. as required to precise length of copper tubing, wall thickness of insulation should be 5/16" to 1/2" thick. (Refer to page 31.)
- Copper Wire
Inter Unit: Min. AWG 14 in appropriate length.
Power Supply: Min. AWG 10 for model SAP 241KC or Min. AWG 8 for model SAP 242KCH in appropriate length.
- 3" O.D. (I.D. 2-13/16", wall thickness 3/16") PVC pipe length to match thickness of wall.

1-5. Additional Materials Required to Give Installation a Professional Appearance

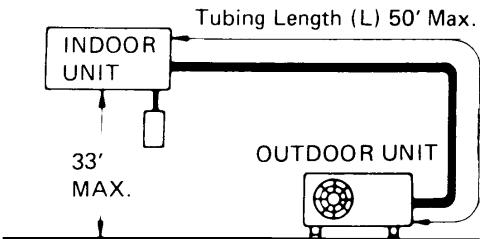
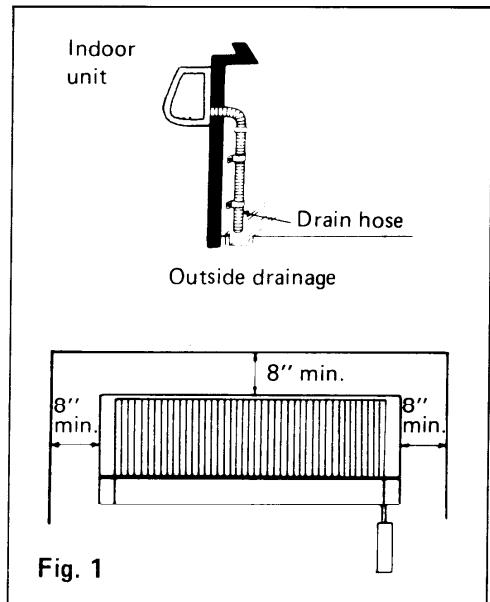
• Refrigeration (armored) tape	• Refrigeration Oil
• Insulated staples or clamps for connecting wire (Refer to local codes)	• 3-1/2" clamp – use 1 every 4 ft. (To secure copper tubing).
• Putty (1/2 lbs)	

2. INSTALLATION SITE SELECTION

Indoor Unit :

- AVOID:**
- areas where leakage of flammable gas may be expected.
 - places where large amounts of oil mist exist.
 - direct sunlight.
 - nearby heat sources that may affect performance of the unit.
 - locations where remote control will be splashed with water or affected by dampness or humidity.
 - installing remote control unit behind curtains or furniture that obstruct air circulation.

- DO:**
- select an appropriate position from which every corner of the room can be uniformly air-conditioned. (High on the wall is best.)
 - select a location that will hold the weight of the unit.
 - select a location where tubing and drain pipe have shortest run to the outside.
 - allow room for operation and maintenance as well as unrestricted air flow around the unit. See Fig. 1
 - allow room for mounting control unit about 4' off the floor, in an area that is not in direct sunlight or in the flow of cold (or hot) air from the unit.
 - install unit within 33' up or down of outdoor unit and within a total of 50' from outdoor unit. Fig. 2



Outdoor Unit :

AVOID:

- heat sources, exhaust fans, etc., Fig. 3
- damp, humid or uneven locations.

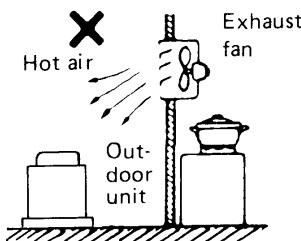


Fig. 3

DO:

- choose a place as cool as possible.
- choose a place that is well ventilated and outside air temperature does not exceed 115° F constantly.
- allow enough room around unit for air intake/exhaust and possible maintenance. Fig. 4
- provide a solid base; about 4" above ground level to reduce humidity and possible water damage in unit and decrease service life. Fig. 5
- use leg bolts or equal to bolt down unit, reducing vibration and noise.

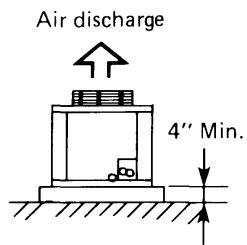


Fig. 5

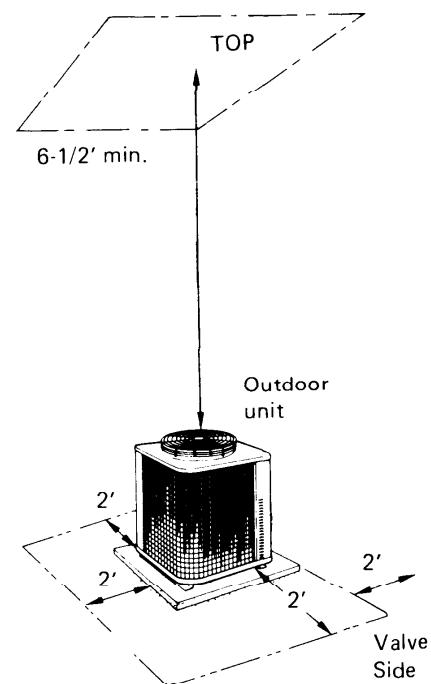


Fig. 4

3. HOW TO INSTALL INDOOR UNIT

3-1. Make a Hole

a) Tape full scale installation diagram on wall at location selected, make sure unit is horizontal, use a level or tape measure to measure down from ceiling. Fig. 6

b) Use a hammer and a finishing nail (gypsum or paneled wall) to tap tiny holes in the plan where pipe cut out is indicated to make sure wooden studs or pipes are not directly behind area to be cut out.

CAUTION: Avoid areas where wall outlets as wiring could be going to outlet through the wall from the ceiling.

Also avoid area where piping goes through wall in any other location.

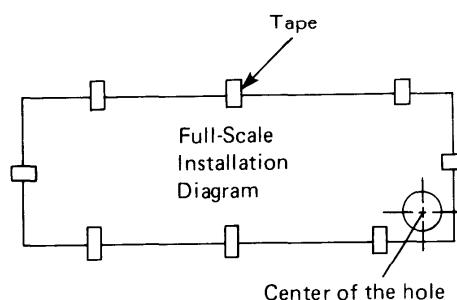


Fig. 6

- c) Using the hammer and nail method across the diagram, you can find the studs in the wall (usually 16" apart) to assure a strong base for hanging the unit, put a pencil mark over the diagram at each stud location.

- d) Using a hole saw 3-5/32" dia. or key hole saw, cut a hole in inside wall. Fig. 7

- e) Cut and move insulation in wall away from opening and drill a pilot hole 1/8" dia. at a slight downward angle through the outer wall, using the hole saw or key hole saw, cut a hole in the outer wall from the outside. (for concrete, brick plaster or similar type walls appropriate tools will have to be used.)

- f) Measure thickness of wall from inside edge to outside edge and cut PVC pipe at a slight angle. Fig. 8

- g) Insert PVC pipe in wall. Fig. 9

CAUTION :

Hole should be made at a slight downward slant to the outdoor side.

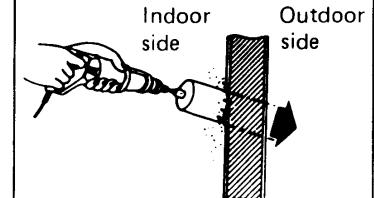


Fig. 7

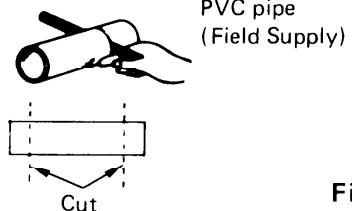


Fig. 8

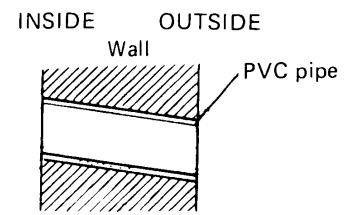
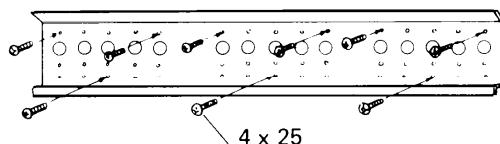


Fig. 9

3-2. Mount the wall fixture

- Mount the wall fixture to match the holes shown on the Full-Scale Diagram Panel. Fig. 10 and Fig. 11



For a wooden wall, mount the fixture using the furnished wood screws. (9 pls)

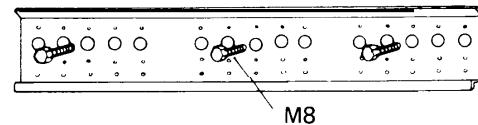


Fig. 10

For a concrete wall, mount the fixture using commercially available anchors (M8). (3 pls)

- 1) Drill a hole
- 2) Insert anchors
- 3) Hammer or screw anchors
- 4) Set the wall fixture and fix it with wood screws or bolts

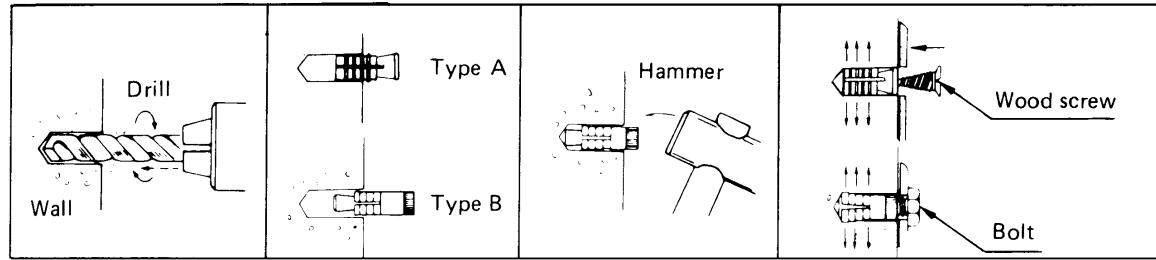


Fig. 11

* When using bolt anchors, the projection of the threaded section must not be more than 1/2 in. from the wall.

3-3. Wiring Instructions for Interunit Connections

- a) Insert the interunit wiring (according to local codes) into through-the-wall PVC pipe. Run the wiring toward indoor side allowing approx. 3 in. from the wall face. Fig. 12

CAUTION : Never fix the wiring by any means before the indoor unit is fully seated on the rear panel.

- b) Unscrew 6 screws and slide out the cabinet. Fig. 13
- c) Unscrew the cover plate of the electrical component box. Fig. 14
- d) Insert the wrapped tubing into the hole on the wall. Temporarily set the wiring connector in the hole at the electrical component box.
- e) Hang the unit on the wall fixture. Fig. 15

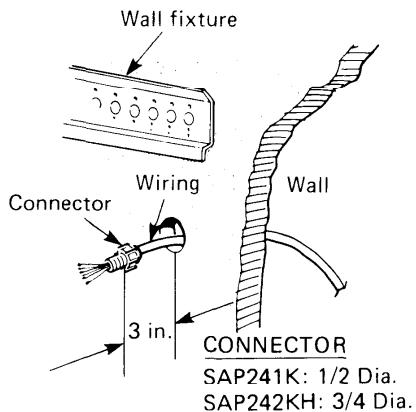


Fig. 12

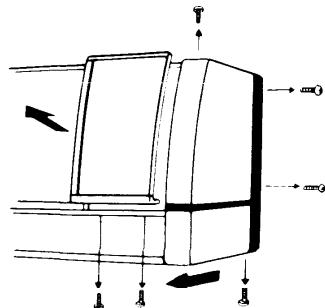


Fig. 13

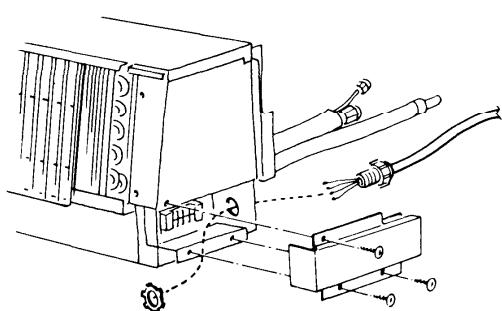


Fig. 14

- f) Secure the conduit connector to the electrical component box with a lock nut. Fig. 16

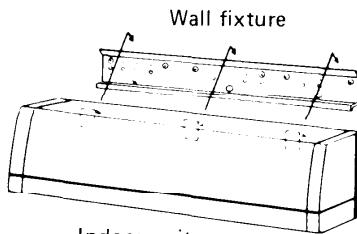


Fig. 15

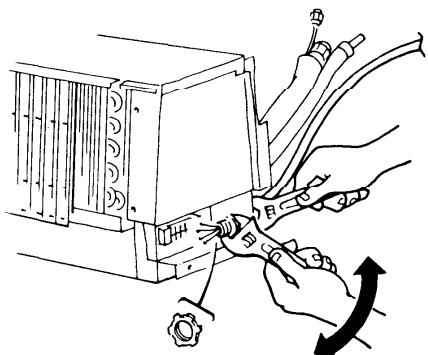


Fig. 16

g) Give some play to the interunit wiring from the outdoor unit to the corresponding terminals on the terminal base.

CAUTION :

- Be sure to refer the wiring system diagram labelled on the electrical component box and carry out correct field wiring. Wrong wiring causes malfunction of the unit.
- Check local electrical codes and also any specific wiring instructions or limitation.

3-4. Drain Piping

a) Drain piping should be slanted downward to outdoor.
Fig. 17

b) Never form a trap in the course of piping.

c) If the drain pipe will run in the room, insulate the pipe with an insulation material* so that chilled sweat should not damage furniture or floors. Fig. 18

* Foamed polyurethane or polypropylene is recommended.

3-5. Install the Control Unit

Mounting position of control unit should be located in an accessible place for control and enable the average room temperature to be detected. Never cover over the unit or recess it into the wall.

a) Fix the mounting plate on the wall with 2 screws, align the rail on the rear of the control unit and slide the unit down as far as it will go. Fig. 19

b) Fix the cord to the wall.

CAUTION

- The remote control unit has a temperature sensing element. Do not install it where:
 - * Direct stream of cold (or hot) air can reach it.
 - * Direct sunlight will fall on it.
 - * There are obstacles such as counters and tables.
 - * Water vapor or moisture (of restaurants, etc.) is always present.
 - * There is a door and outdoor air can reach it.
- Do not twist the cord of the remote control unit and other power cables together. Otherwise, the switch may malfunction.

WARNING

Do not supply power to the unit or operate until tubing and wiring to the outside unit is completed.

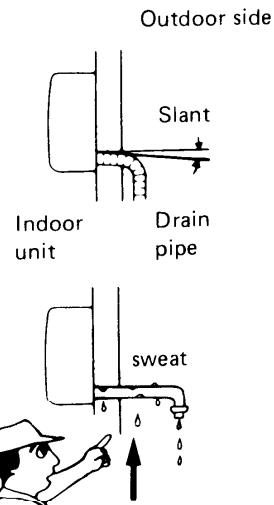


Fig. 17

Insulation material
(field supply) must
be applied.

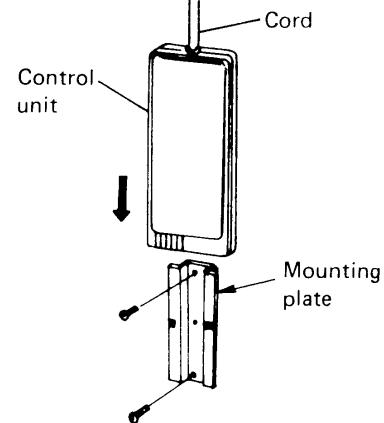


Fig. 19

4. HOW TO INSTALL OUTDOOR UNIT

- Place unit on level pad, blocks or equal and anchor.

Refer to INSTALLATION SITE LOCATION given in page 24.

4-1. Wiring Instructions on Outdoor Unit

- Remove front panel and access panel "C", then punch knockout holes on the panel. Fig. 20
- Connect interunit control line and power line per drawing on inside of the panel "C". Fig. 21, Fig. 22.
- Be sure to size each wire allowing several inches longer than the required length for wiring.
- When connections are completed secure both connectors on the panel with lock nuts and then close the panel.
- Ground unit in accordance with local codes.

CAUTION :

- Be sure to comply with local codes on running the wire from the indoor unit to outdoor unit. (size of wire and wiring method etc.)
- Every wire must be connected firmly.
- No wire should touch refrigerant tubing, compressor or any moving part.

CONNECTOR SIZE		
MODEL	POWER LINE CONNECTOR SIZE	INTERUNIT LINE CONNECTOR SIZE
SAP241C	1/2"	1/2"
SAP242CH	3/4"	3/4"

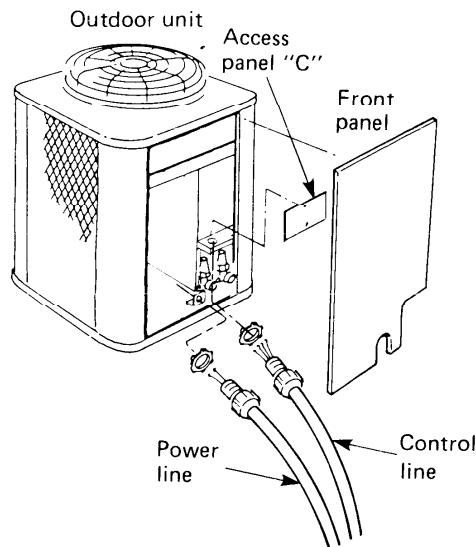


Fig. 20

WIRING SYSTEM DIAGRAM

SAP242KCH

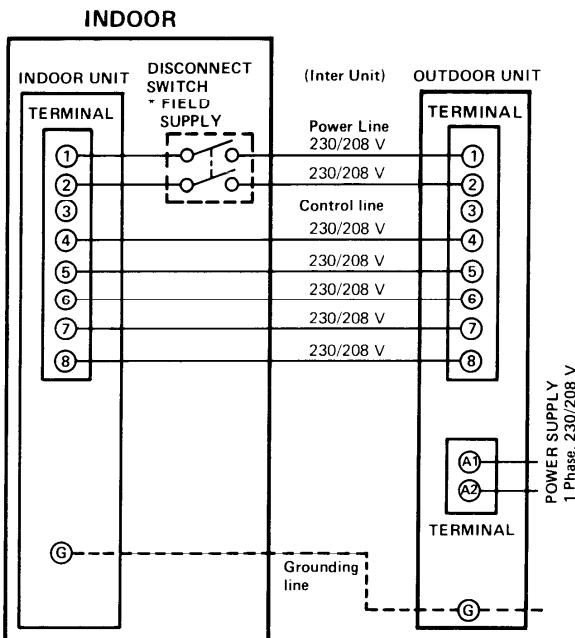


Fig. 21

SAP241KC

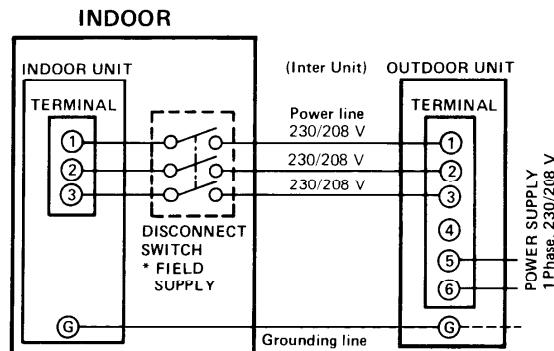


Fig. 22

5. REFRIGERANT TUBING

5-1. Use of the Flaring Method

The refrigerant tubing for every split type air conditioner must be connected by flaring. In this method, the copper tubes are flared at each end and connected with flare nuts.

5-2. Flaring Procedure with a Flaring Tool

- a) Cut the copper tube to proper length with a tube cutter. It is recommended to cut approx. 12 ~ 20 in. longer than the estimated tubing length.
- b) Remove burrs at the end of the copper tube with a reamer or a file. This process is important and should be done carefully to make a good flare. Fig. 23

NOTE : When reaming, hold the copper tube end downward and be sure that no copper scraps fall into the tube. Fig. 24

- c) Remove the flare nut from the unit and be sure to mount it on the copper tube.
- d) Make a flare at the end of copper tube with a flaring tool* Fig. 25 (*Use "RIGID" or equivalent.)

NOTE : Good flare should have following conditions:

- Inside surface is glossy and smooth.
- Edge is smooth.
- Tapered sides are in uniform length.

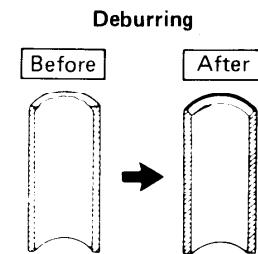


Fig. 23

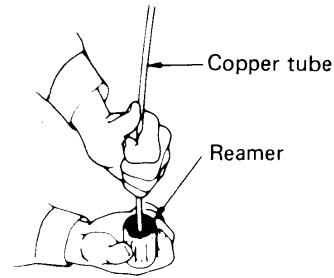


Fig. 24

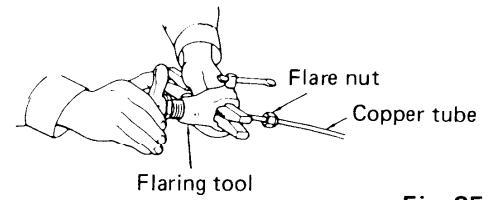


Fig. 25

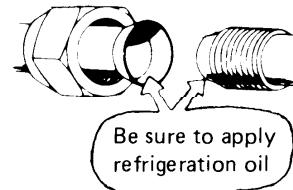


Fig. 26

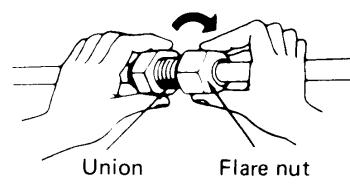


Fig. 27

5-4. Connecting Tubes between Indoor and Outdoor Units

1. Connect the indoor side refrigerant tubing extended from the wall with the outdoor side tubing tightly.
 2. Flare nut on large dia. tube should be torqued to 510 ~ 550 lbs. in. Flare nut small dia. tube should be torqued to 130 ~ 170 lbs. in. Fig. 28
 3. After performing a leak test on the connecting part, insulate it with INSUL. NIPPLE and finish with a vinyl masking tape over it. Fig. 29
- CAUTION :** Never connect up tubes by brazing them. If it is inevitable, be sure to blow nitrogen gas while brazing to avoid oxidation of inside copper tube.

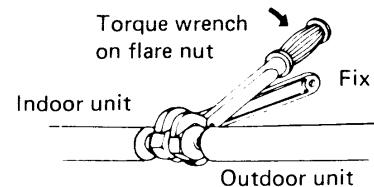


Fig. 28

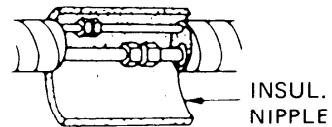


Fig. 29

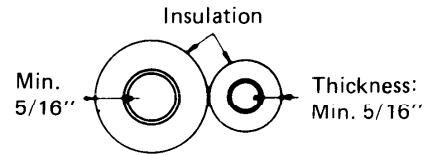


Fig. 30

5-5. Insulation of Refrigerant Tubing

Because the capillary tubing is installed in the outdoor unit, both wide and narrow tubes of this air conditioner become cold. Therefore, to prevent heat loss and wet floors due to dripping of chilled sweat, both tubes must be well insulated with proper insulation material. Thickness of insulation material should be min. 5/16". Fig. 30

- **Insulation material**

The material must of course have good insulation characteristics, be easy to use, age resistant, and must not easily absorb moisture. The following is recommended; foamed polyurethane or polypropylene.

5-6. Taping the Tubes

- a) At this time, the two refrigerant tubes (and electrical wire if code permits) should be taped together with armoring tape. The drain pipe may also be included and taped together as one bundle with the tubing.
- b) Wrap the armoring tape from the bottom of the outdoor unit to the top of the tubing, where it enters the wall. As you wrap the tubing cover half of each previous tape turn. Fig. 31
- c) Clamp tubing bundle to wall, one clamp every 4' approx.

NOTE : Do not wind the armoring tape around too tightly since this will impair the heat insulation effect. Also be sure condensation drain hose splits away from bundle and empties clear of unit and tubing.

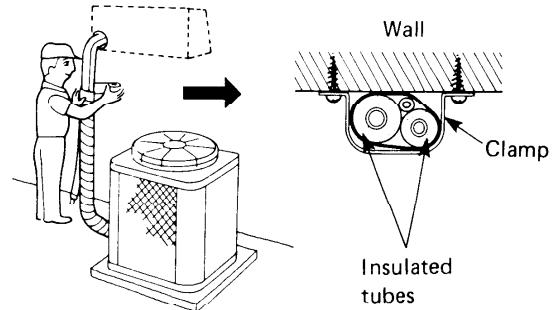
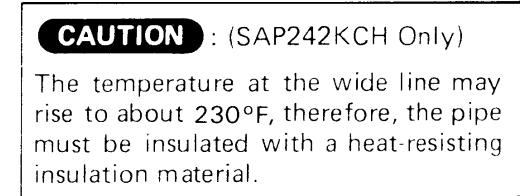


Fig. 31

5-7. Finishing the Installation

After finishing insulation and taping over tubing, fill the void space with putty to prevent rain and draft from entering. Fig. 32

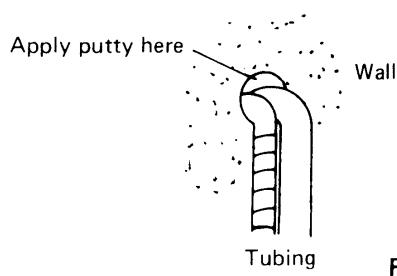


Fig. 32

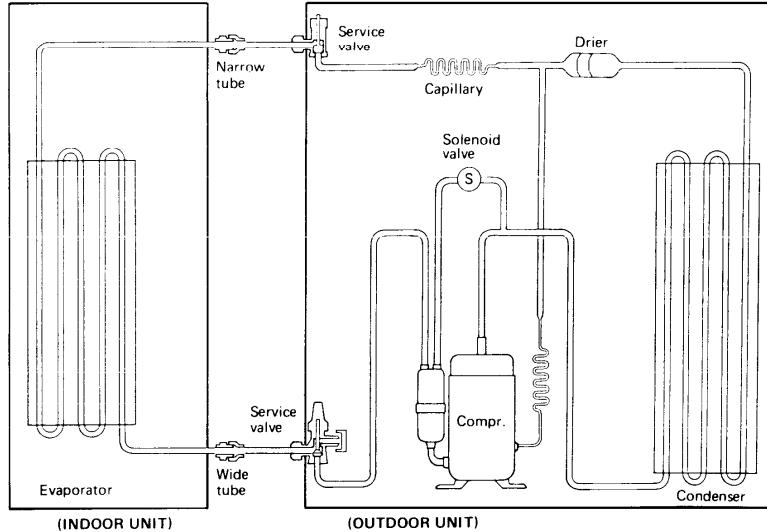
6. AIR PURGING

Air does not function as a refrigerant, because it cannot be liquefied in the condenser. Air and moisture remaining in the refrigerant system have undesirable effects as indicated at right. Therefore, they must be purged completely.

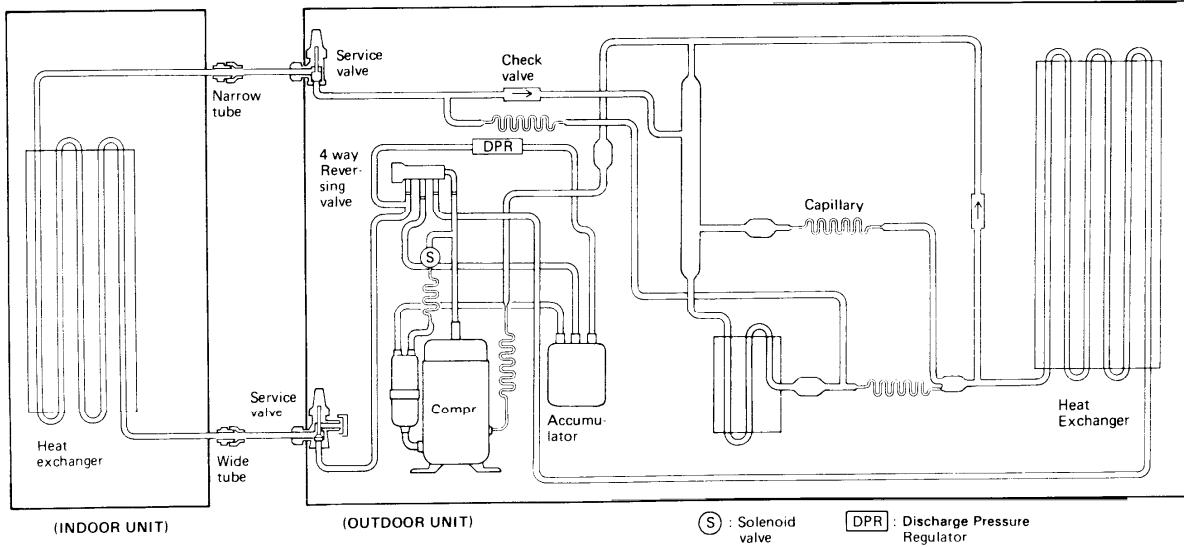
- The pressure in the narrow tube rises.
- The operating current rises.
- Cooling and heating efficiency drops.
- Water contained in the air may freeze and block the capillary tubing.
- Water may lead to corrosion of parts in the refrigerant circuit.

■ TUBING DIAGRAM FOR AIR PURGING

Model: SAP241KC



Model: SAP242KCH



(S) : Solenoid valve

DPR : Discharge Pressure Regulator

6-1. Quick Air Purge System

New quick air purge system represents purging the air in the indoor unit and connection tubes with the aid of refrigerant gas pre-charged in the outdoor unit.

By this system, air purging has become much simpler and installation time has become shorter than conventional methods.

NOTE : Outdoor unit is pre-charged at the factory. Don't open valves until tubing is hooked up and you are ready to proceed with purging procedure.

I. Air Purging Procedure

- a) Remove the valve caps from the service valves on the narrow tubes.
- b) Loosen the flare nut (A) of wide tube by 180 degrees (1/2 turn). Fig. 33
- c) Open the spindle of the narrow tube by 90 degrees (1/4 turn) for 15 seconds and close it to the original position.
- d) After 45 seconds, fasten the flare nut (A) of wide tube tightly as it was. Fig. 34

CAUTION : Basically, unit should be evacuated. Air purge system such like above be taken only when normal evacuation cannot be employed in some reasons.

- e) Open the wide tube service valve by a quarter turn and close it as soon as hissing stops. This indicates that tubings are filled with the refrigerant gas of the outdoor unit.
- f) Leak test the joints with liquid soap. If no leakage, wipe off the soap. Fig. 35
- g) Turn the valve stems all the way out to Back Seat on both service valves, then, tighten the valve seal caps with the copper gaskets.
- h) The all air purge procedure has been completed and the unit is ready for trial operation.

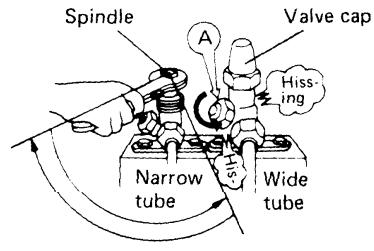


Fig. 33

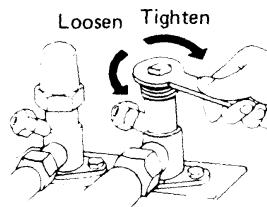


Fig. 34

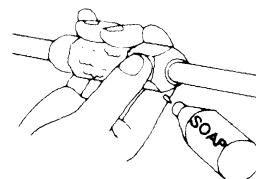


Fig. 35

■ SERVICE VALVE CONSTRUCTION

• Valve Position -a-

The valve stems of both wide & narrow tubes are turned all the way in. The unit is shipped from the factory in this position and it is also used for PUMP DOWN. (Fig. 36-a)

• Valve Position -b-

The valve stems of both wide & narrow tubes are turned all the way out ("BACK SEAT" position). This is the normal operating position. (Fig. 36-b)

• Valve Position -c-

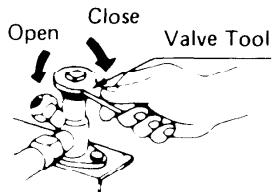
With the narrow tube valve kept at BACK SEAT, only the wide tube valve stem is turned halfway-down position. This position is used for pressure measurement and gas charging. (Fig. 36-c)

• Valve Position -d-

Like position -a-, but with the flare nut of wide tube open. This position is used for air purging. (Fig. 36-d)

CAUTION :

Be sure to use the valve tool or ratchet wrench when opening or closing the shut-off valve spindle.



■ PUMP DOWN

Pump down means collecting all refrigerant in the system back into the outdoor unit without losing refrigerant gas. Pump down is used when unit is moved or for servicing the refrigerant circuit.

CAUTION :

Set the COOLING/HEATING selector lever to the 'COOL' side and operate in cooling mode.

- 1) Close valve on wide tube halfway (2 turns).
- 2) Close valve on narrow tube all the way (4 turns).
- 3) Turn unit on (cooling) for approximately 3 minutes then shut off.
- 4) Close valve on wide tube all the way (2 additional turns).
- 5) Disconnect tubes slowly allowing pressure to equalize inside and out.
- 6) When tubing is disconnected provide dust covers for both valves and tubes until unit is reconnected.

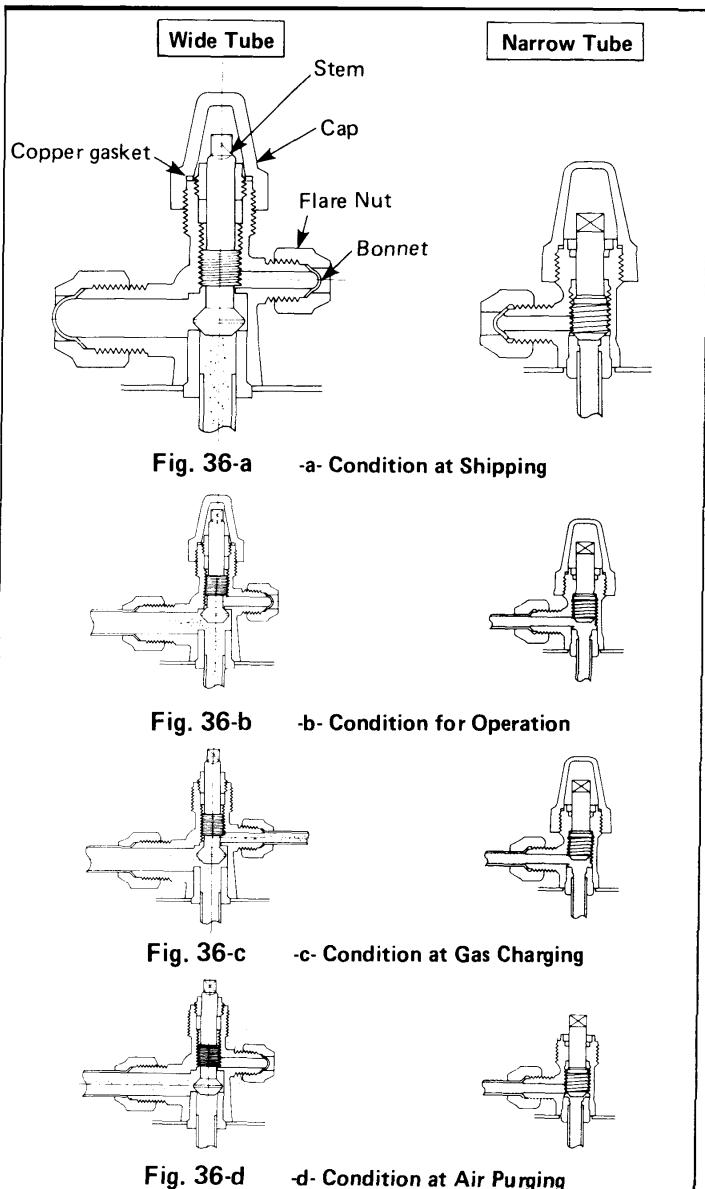


Fig. 36-d -d- Condition at Air Purging

7. PRECAUTIONS BEFORE STARTING

After insulation, be sure to bind up insulation material and refrigerant tubings with a water-proof tape so as rain should not creep into the insulation material and wiring.

Before attempting to start the air conditioner, check the following:

- a) All loose matter is removed from the cabinet especially steel fillings and chips.
- b) Control wirings are correctly connected and all electrical connections tight.
- c) All temporary jumper wires removed. (Refer to unit wiring diagram.)
- d) Check to see if compressor mounting bracket or board, which secures compressor during transportation, is removed. If not, remove them.
- e) Be sure to confirm that all shut-off valves are open.
- f) Power connected to unit for at least five hours before starting the compressor. The bottom of compressor should be warm to the touch and crankcase heater around the feet of the compressor should be hot to the touch.

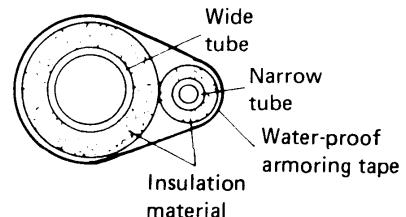


Fig. 37

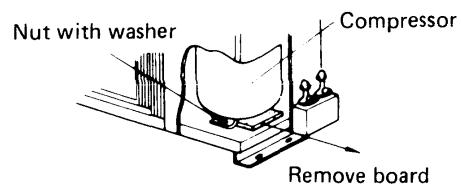


Fig. 38

8. TRIAL RUN

Check that all tubing and wiring have been completed correctly. Check again that wide and narrow tube service valves are fully opened. Turn on power and run the unit.

NOTE :

If the room temperature is too low, cooling operation may not be possible even if the thermostat knob is set at the lowest position.

In this event, perform test run as follows:

- a) Pull off the thermostat knob. Fig. 39.
- b) Set the thermostat lever to the lowest position. (The central position of the lever becomes the TEST RUN position.) Fig. 40
- c) Press OPERATION "ON" button to start the air conditioner.
- d) After completion of test run, press "OFF" button to stop the unit.
- e) Reinstall the thermostat knob. (The stopper position facing down.)

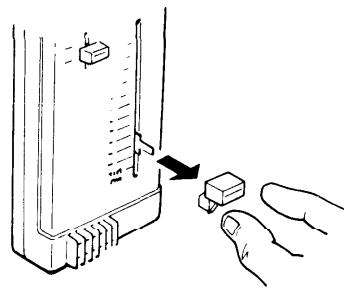


Fig. 39

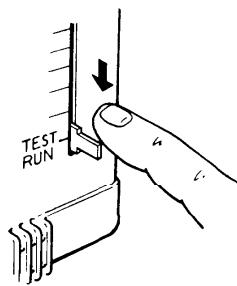


Fig. 40