



# SAP241KC

# SAP242KCH (USA)

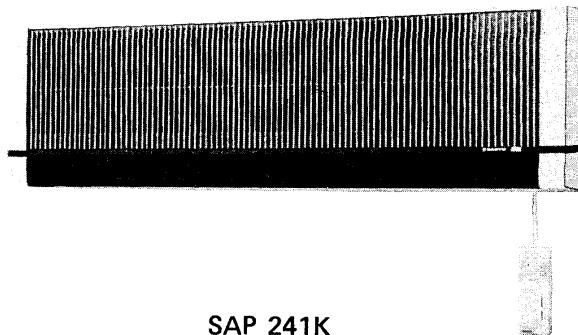
## SPLIT SYSTEM AIR CONDITIONER & HEAT PUMP

Revised Edition  
Dispose WM-14965 and use this WM-20689

June 1987

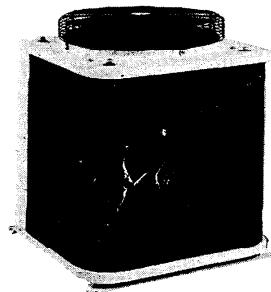
MODEL NO.	PRODUCT CODE NO.	VOLT-PHASE-HERTZ
SAP241K	852 6 4247	230/208- 1 - 60
SAP241C	852 7 4135	230/208- 1 - 60

MODEL NO.	PRODUCT CODE NO.	VOLT-PHASE-HERTZ
SAP242KH	852 6 4250	230/208-1-60
SAP242CH	852 7 4140	230/208-1-60



SAP 241K  
242KH

Indoor Unit



SAP 241C  
242CH

Outdoor Unit

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SANYO ELECTRIC INC. Home Appliance Division :

200 Riser Road Little Ferry, New Jersey 07643

# 1. SPECIFICATIONS

## 1.1 Unit Specifications

Model No.	SAP241KC		SAP242KCH			
Unit Model No.	Indoor Unit Outdoor Unit		SAP242KH SAP242CH			
<b>PERFORMANCE &amp; ELECTRICAL RATINGS</b>			Cooling	Heating		
Capacity—Cooling —Heating	BTU/hr BTU/hr	23,800/23,400 —	23,200/22,800 26,000/26,000			
Moisture Removal (High)	Pints/hr	8.4	8.4	—		
Air-Circulation (High)	Cu.ft /min.	565/530				
SEER (FFR)	BTU/Whr	8.1/8.3 (7.85/7.90)	7.6/7.75 (7.5/7.55)	—		
COP		—	—	2.5/2.5		
Frequency	Hz	60	60			
Rated Voltage	V	230/208				
*Running Amps	A	13.6/14.4	13.9/14.8	14.3/15.6		
Power Input	W	3,030/2,960	3090/3020	3,040/3,040		
Back-up Heater	kW	—	—	1.8/1.47		
Fuse (or Circuit Breaker) Capacity A		30	40			
<b>FEATURES</b>						
Controls	Microcomputer IC	— Yes				
Fan Speeds		2				
Timer		—				
Ventilator		—				
Air Deflection	Horizontal Vertical	Manual Manual				
Air Filter		Washable, Easy Access				
Temperature Control		1C thermostat				
Compressor		Rotary				
Refrigerant (R22)	lbs (g)	5.74 (2,600)	5.08 (2,300)			
Refrigerant Tubing Connections		Flare Type				
Refrigerant Line Length	Ft. (m)	50 (15)				
Max. outdoor Unit Height	Ft. (m)	33 (10)				
Refrigerant Tube o.d.	Narrow Tube In. (mm) Wide Tube In. (mm)	1/4 ( 6.35) 5/8 (15.88)				
Drain Pipe o.d.	In. (mm)	3/4 (26.67)				
Refrigerant Tubing Kit		Optional				
<b>DIMENSIONS &amp; WEIGHT</b>		Indoor Unit	Outdoor Unit	Indoor Unit		
Dimensions	Height In. (mm) Width In. (mm) Depth In. (mm)	14-3/4 (370) 49-7/32 (1250) 7-13/32 (188)	30-1/8 (765) 26-6/16 (670) 26-6/16 (670)	14-3/4 (375) 49-7/32 (1250) 7-13/32 (188)		
Net Weight	Ibs. (kg)	50.7 (23)	176.4 (80)	52.9 (24)		
Shipping Size	Cu.ft (Cu. m)	6.7 (0.19)	18.0 (0.51)	6.7 (0.19)		
Shipping Weight	Ibs. (kg)	57.2 (26)	193.6 (88)	59.4 (27)		
Outdoor Unit						

\*Without electric heater

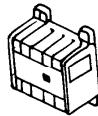
DATA SUBJECT TO CHANGE WITHOUT NOTICE

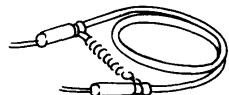
## 1.2 Major Component Specifications

Unit Model No.	SAP241C	SAP242CH		
Compressor	Hermetic Rotary Type			
Compressor Model No.	C-R190 H6N			
Source	230 V/208 V, 60 Hz, Single Phase			
Pole	2			
Nominal Output (W)	1900			
Displacement (cc/rev.)	41.6			
Amps.-Full Load (A)	12.7/14.0			
-Locked Rotor (A)	84 (240V)			
Type of Oil	Special Oil for Rotary Compressor			
Compressor Oil Amount (cc)	1350			
Coil Resistance ( $\Omega$ ) (Ambient Temp. 77°F)	C-R: 0.66 C-S: 1.968			
Protective Device	Internal Protector (15 HM 2505)			
Run Capacitor,	MFD	35		
	VAC	370 or 400		
Unit Model No.	SAP241K/SAP242KH	SAP241C/SAP242CH		
FAN MOTOR	Capacitor-Run Induction Motor			
Fan Motor Model No.	KFH4T-21B6SP	KFC8-101A6P		
Source	230 V/208 V, 60 Hz, Single Phase			
Pole	4	8		
Nominal Output (W)	20	100		
Amps-Full Load (A)	0.41/0.39	1.16/1.13		
-Locked Rotor (A)	—			
Protective Device	Internal Protector (17AM035A5-4)			
Run Capacitor,	MFD	2		
	VAC	440		
Coil Resistance ( $\Omega$ ) (Ambient Temp 68°F)	WHT-BRN WHT-VLT VLT-YEL YEL-PNK	140.7 82.6 72.5 21.2	WHT-BRN WHT-PNK	24.1 53.8

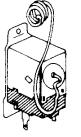
Unit Model No.	SAP241K/SAP242KH	Figure
Room Temp. Sensor *1	OCS5K-UL	Incorporated in the remote control unit.
Resistance (kΩ)	69°F: 6-6.5    86°F: 3.9-4.2 77°F: 4.9-5.2	

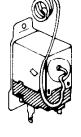
Note \*1: Thermistor

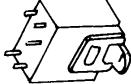
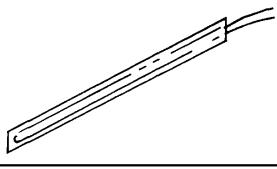
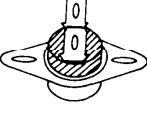
Unit Model No.	SAP241C/SAP242CH	Figure
Magnet Relay	SAP241C: CLK-16E3-21 SAP242CH: SHC3631-51UL	

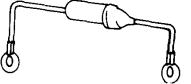
Unit Model no.	SAP241C/SAP242CH	Figure
Crankcase Heater	CH 5700	
Rating	230 V, 30 W	

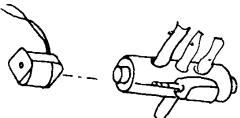
Unit Model No.	SAP242CH	Figure
Defrost Timer	STMN-2-T0918	
Rating	Contact: 250 V, 5A Coil: 230 V/208 V	

Unit Model No.	SAP241C/SAP242CH	Figure
Outdoor Coil Thermostat	YTB-4U201F	
Operating Temperature	75°F ON, 78°F OFF	

Unit Model No.	SAP242CH	Figure
Outdoor Defrost Thermostat	RTB-4U201F	
Operating Temperature	23 °F ON, 50 °F OFF	

Unit Model No.	SAP242CH	Figure
Outdoor Pressure Switch	ACB-2UB01W	
Operating Pressure	13 kg/cm <sup>2</sup> G OFF, 8 kg/cm <sup>2</sup> G ON	
Unit Model No.	SAP241C/SAP242CH	Figure
Solenoid Valve	NEV-603DXFU (Valve) NEVAC208 (Coil)	
Rating	230 V/208 V, 5.5 W/5 W	
Unit Model No.	SAP242KH	Figure
Heater Relay	G2J-2212T-US	
Rating	Contact 240 VAC 20 A, Coil 220 VAC	
Unit Model No.	SAP241K/SAP242KH	Figure
Dew Proof Warmer		
Rating	230 V, 13 W	
Unit Model No.	SAP242KH	Figure
Heater		
Kw Rating	0.6/0.491 (230 V/208 V)	
Unit Model No.	SAP242KH	Figure
Heater Limit Control	INTOIL-0544L55-11	
Operating Temp	131°F ON, 111°F OFF	
Rating	250 V, 10 A	

Unit Model No.	SAP242KH	Figure
Thermal Cut OFF	SF-169U	
Operating Temperature	335°F	

Unit Model No.	SAP242CH	Figure
4-way Reversing Valve	L27-9072 (Coil) V26-9000 (Valve Assy)	
Coil Voltage	230 V/208 V, 60 Hz	

Unit Model No.	SAP241K/SAP242KH	Figure
Power Transformer (for controller PCB)	ATR-J122U	
Resistance ( $\Omega$ )	Primary: WHT-WHT 143.5 Secondary: BRN-BRN 1.2	

Unit Model No.	SAP241K/SAP242KH	Figure
Freeze Protection Thermostat	RTB-4U302	
Operating Temperature	ON: 50°F OFF: 23°F	

### 1.3. Compressor Identification

#### 1. Marking (Stamped)

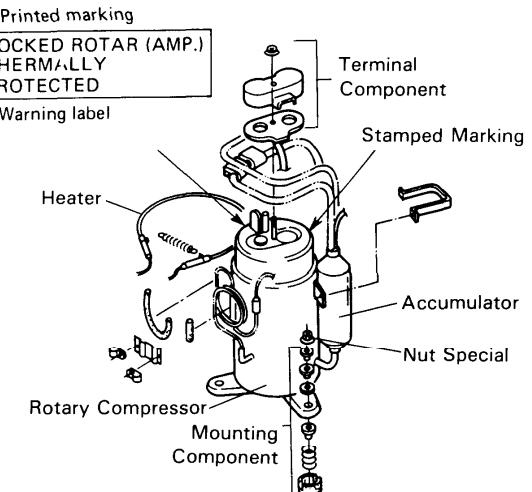
Compressor code No. → 806 486 46  
 Manufacturer:  
 T = Tokyo  
 S = Sanyo  
 E = Electric.

Model No. → C - R190H6N **TSE**

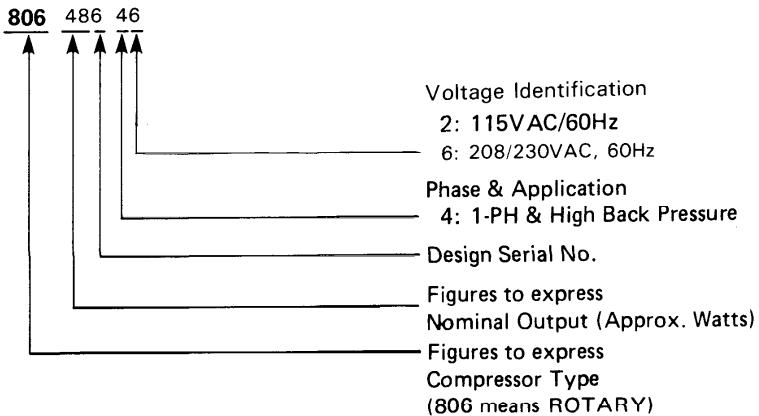
Production Date → 30 01 7 ← (= 30 Jan., 1987)

Ratings (V) → 230/208

Frequency (Hz) and Phase → HZ60 PH1



#### 2. Compressor Code No.



#### WARNING-SERVICEMAN

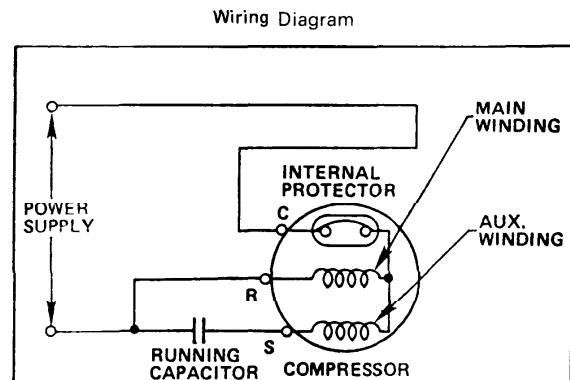
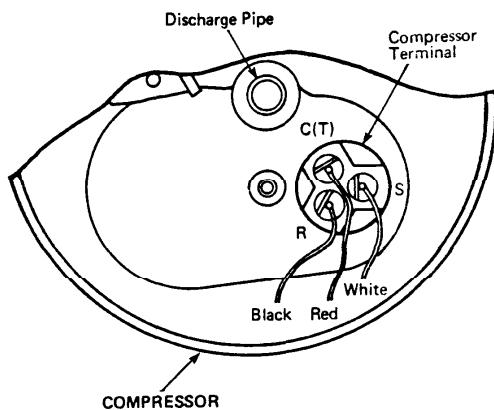
1. FIELD SERVICE LEAK TEST PRESSURE MUST NOT EXCEED 150 P.S.I.G.
2. THIS COMPRESSOR MUST BE GROUNDED.
3. DO NOT OPERATE WITHOUT PROTECTIVE COVER OVER TERMINALS: DISCONNECT ALL POWER BEFORE REMOVING THE PROTECTIVE COVER.

#### CAUTION

COMPRESSOR HOUSING MAY REACH 302°F (150°C)  
 WITH TERMINAL PROTECTOR APPROVED BY  
 TOKYO SANYO AND TESTED IN ACCORDANCE  
 WITH UL984-1981.

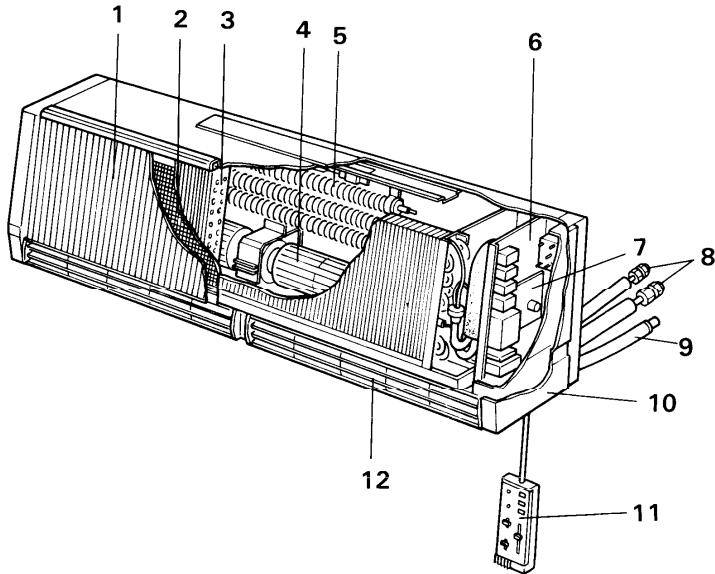
TOKYO SANYO ELECTRIC CO., LTD.

### 3. Compressor Wire Orientation



## 2. CONSTRUCTION OF THE UNIT

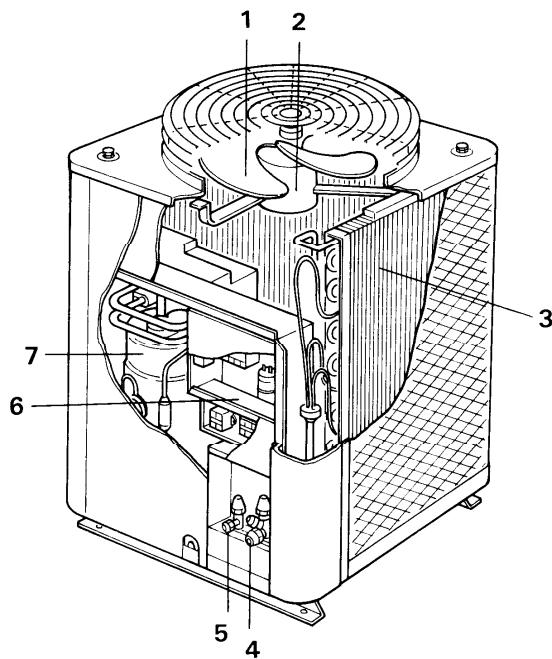
INDOOR UNIT SAP241K/SAP242KH



Model: SAP242KH

1. Air intake grille
2. Air filter (slide-out)
3. Evaporator (= Indoor heat exchanger.)
4. Indoor fan
5. Heater assy \*(SAP242KH only)
6. Electrical component box
7. Controller
8. Refrigerant tubing
9. Drain hose
10. Cabinet
11. Remote control unit
12. Air outlet grille

OUTDOOR UNIT SAP241C/SAP242CH



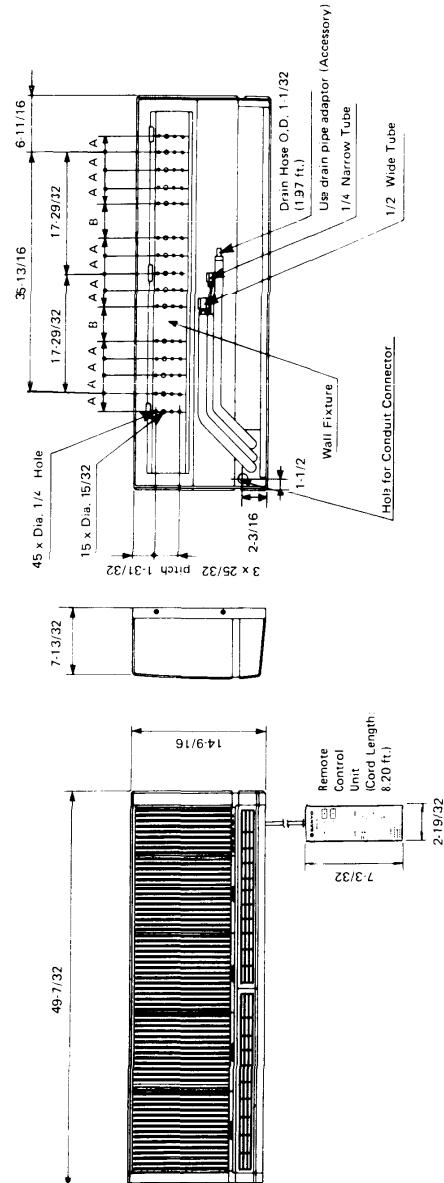
1. Propeller fan
2. Fan motor
3. Condenser (= Outdoor heat exchanger)
4. Service valve (Wide tube)
5. Service valve (Narrow tube)
6. Electrical component box
7. Compressor

Model: SAP242CH

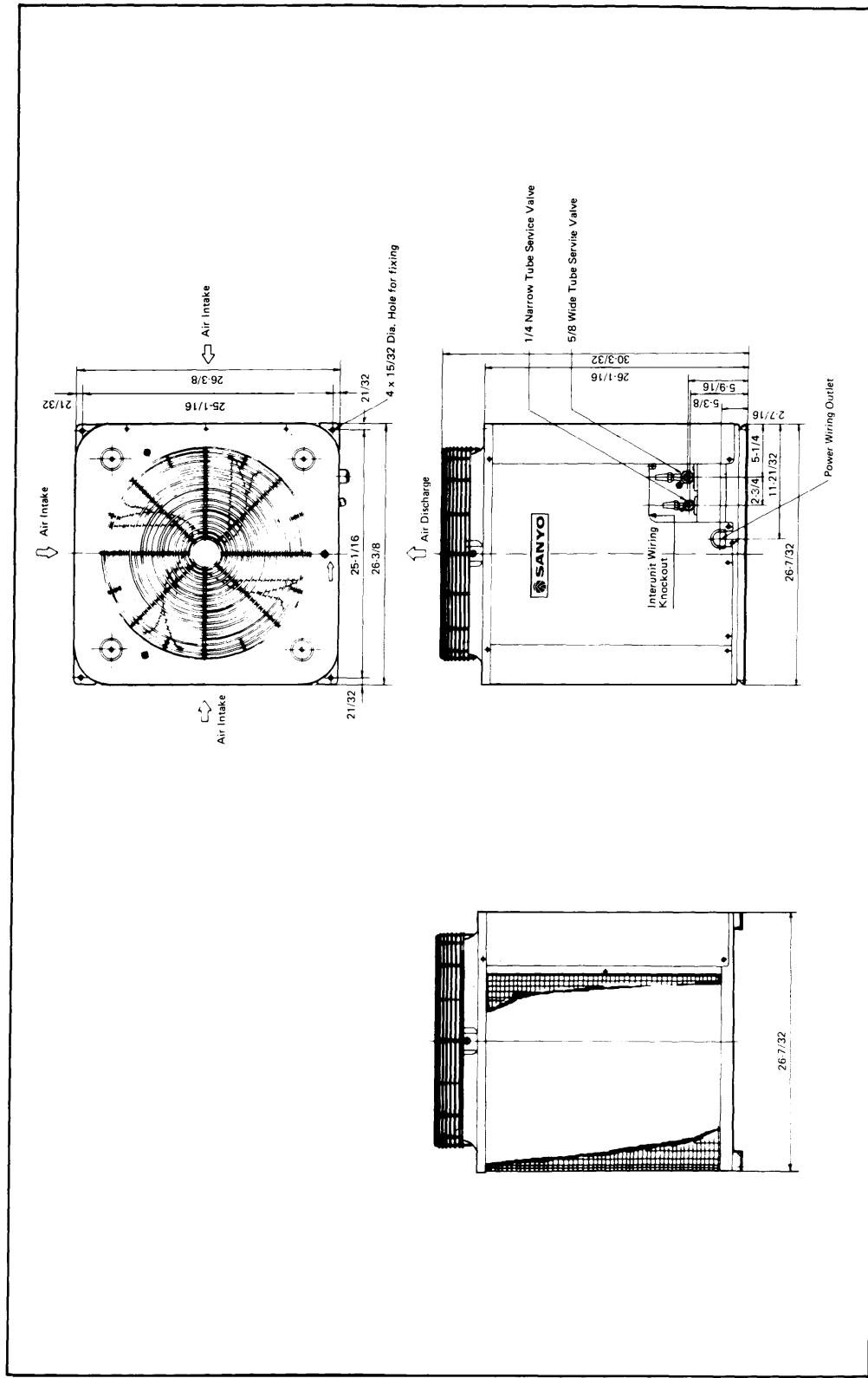
### 3. DIMENSIONAL DATA

Indoor Unit SAP241K

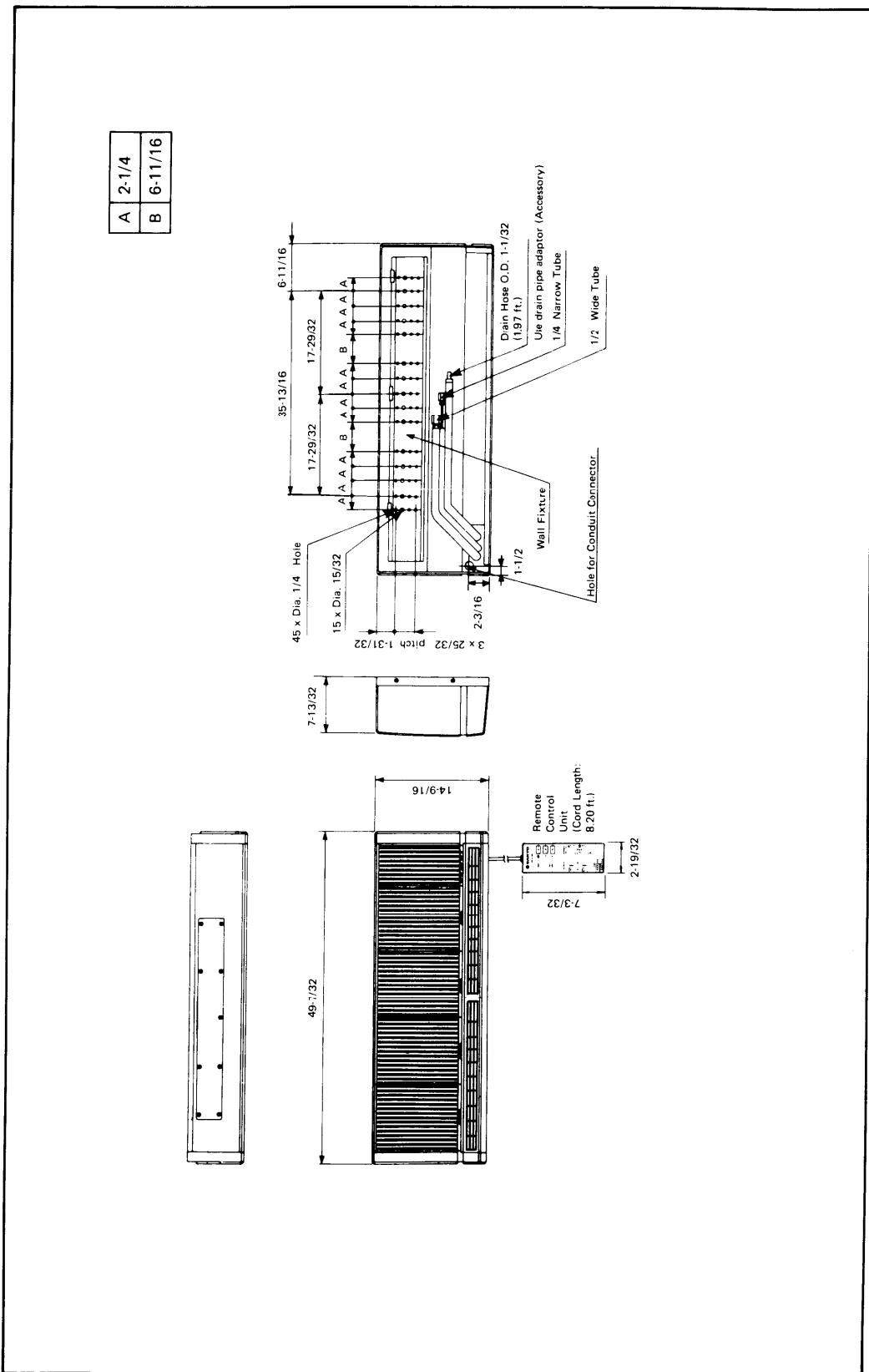
A	2-1/4
B	6-11/16



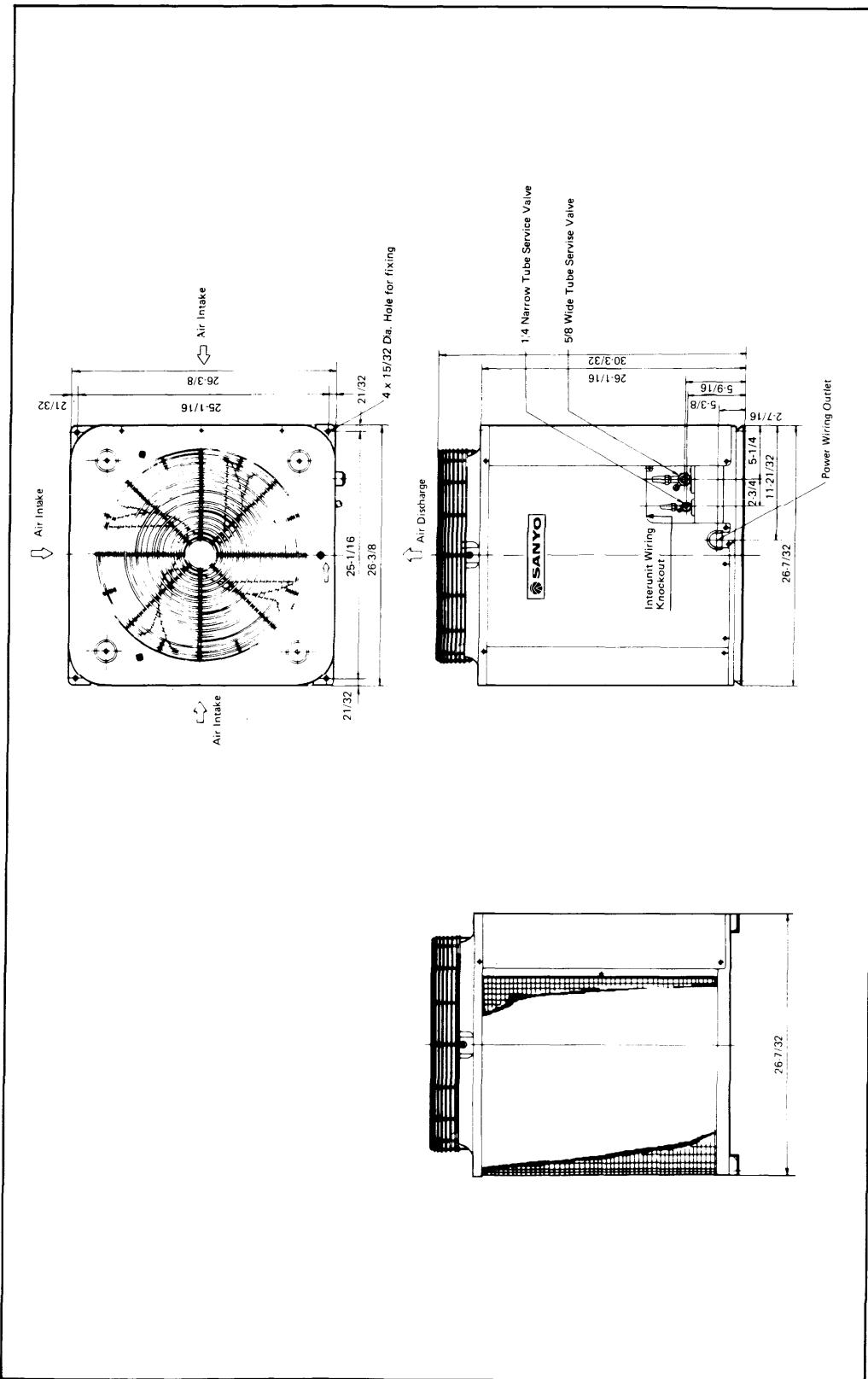
**Outdoor Unit SAP 241C**



**Indoor Unit SAP242KH**



**Outdoor Unit SAP242CH**

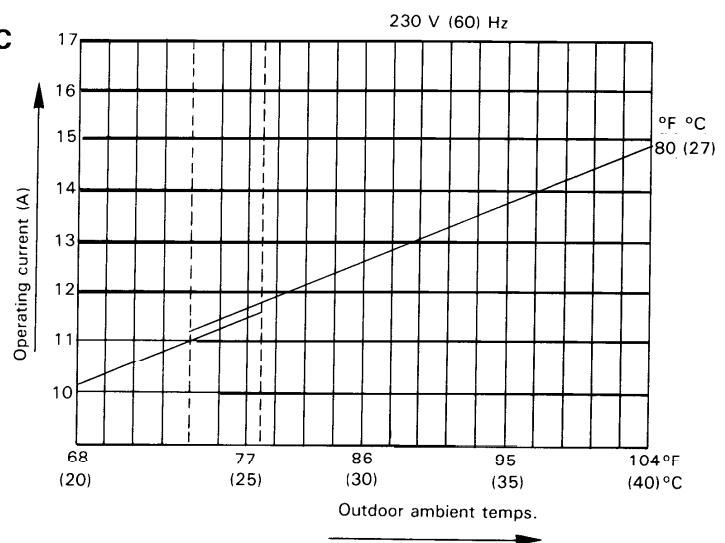


## 4. PERFORMANCE CHARTS

### Cooling characteristics Model: SAP241KC

Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High, overall value for indoor and outdoor shown.)

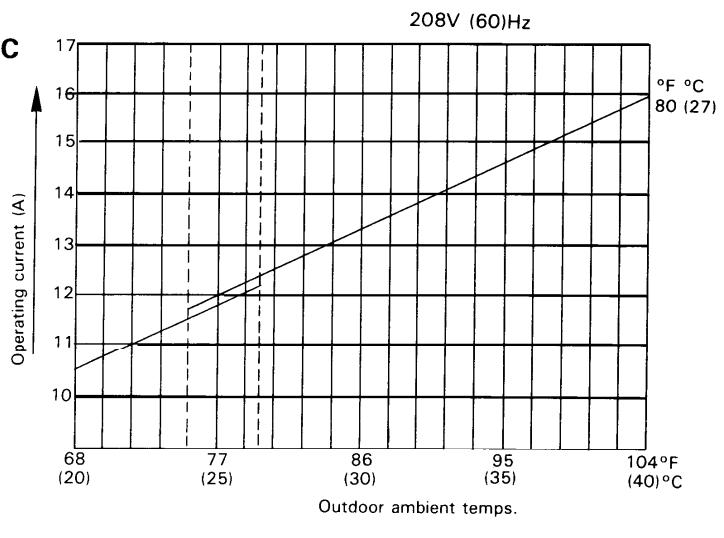
**NOTE:** The valve opens to the by-pass when the level lowers below the dotted-line range.



### Cooling characteristics Model: SAP241KC

Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High, overall value for indoor and outdoor shown.)

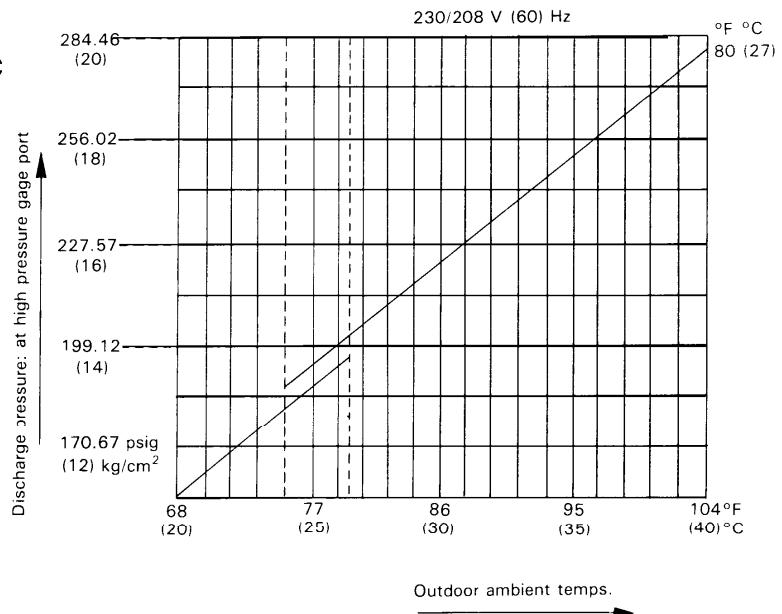
**NOTE:** The valve opens to the by-pass when the level lowers below the dotted-line range.



### Cooling characteristics Model: SAP241KC

High pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High.)

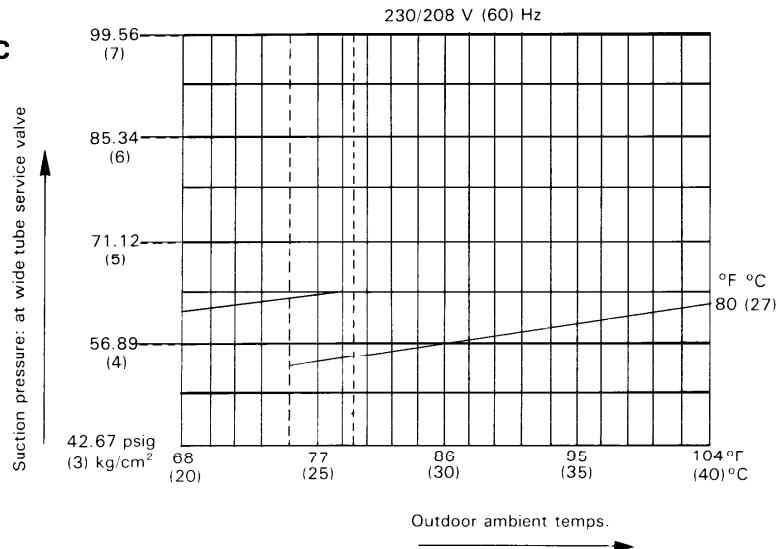
**NOTE:** The valve opens to the by-pass when the level lowers below the dotted-line range.



### Cooling characteristics Model: SAP241KC

Low pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High.)

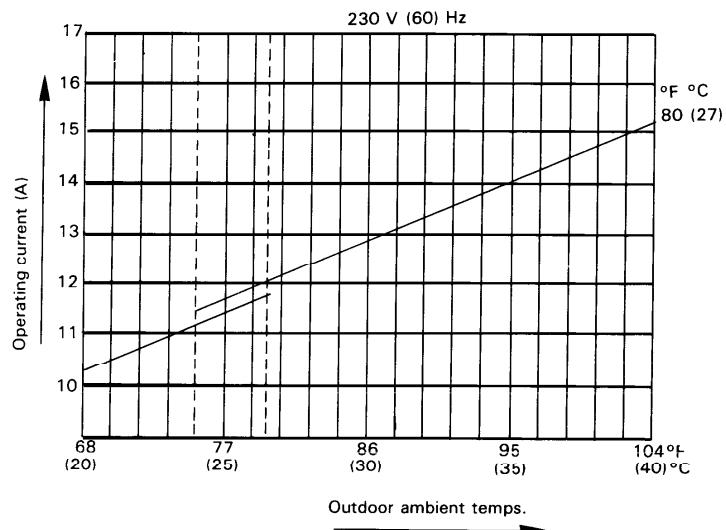
**NOTE:** The valve opens to the by-pass when the level lowers below the dotted-line range.



**Cooling characteristics Model: SAP242KCH**

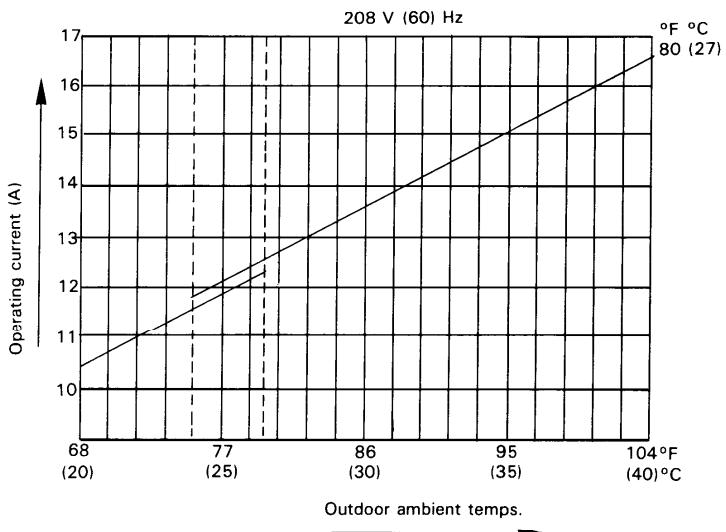
Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High, overall value for indoor and outdoor shown.)

**NOTE:** The valve opens to the by-pass when the level lowers below the dotted-line range.

**Cooling characteristics Model: SAP242KCH**

Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High, overall value for indoor and outdoor shown.)

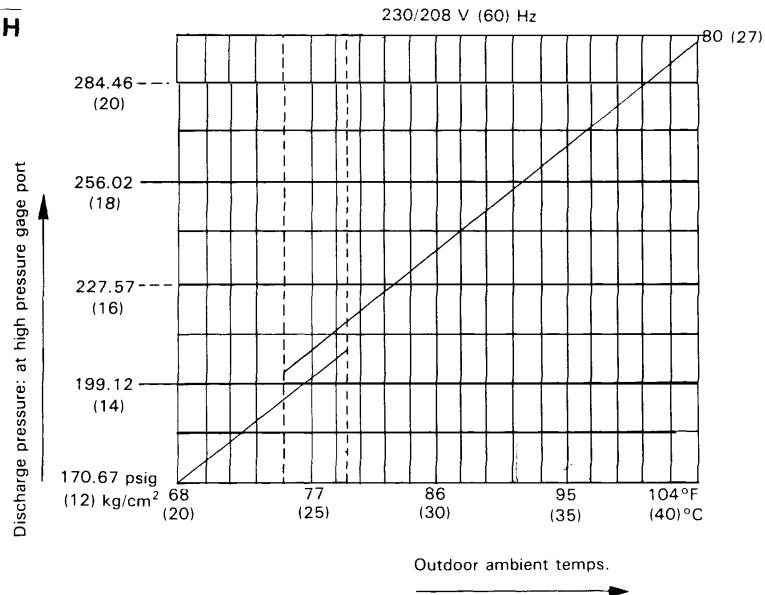
**NOTE:** The valve opens to the by-pass when the level lowers below the dotted-line range.



### Cooling characteristics Model: SAP242KCH

High pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High.)

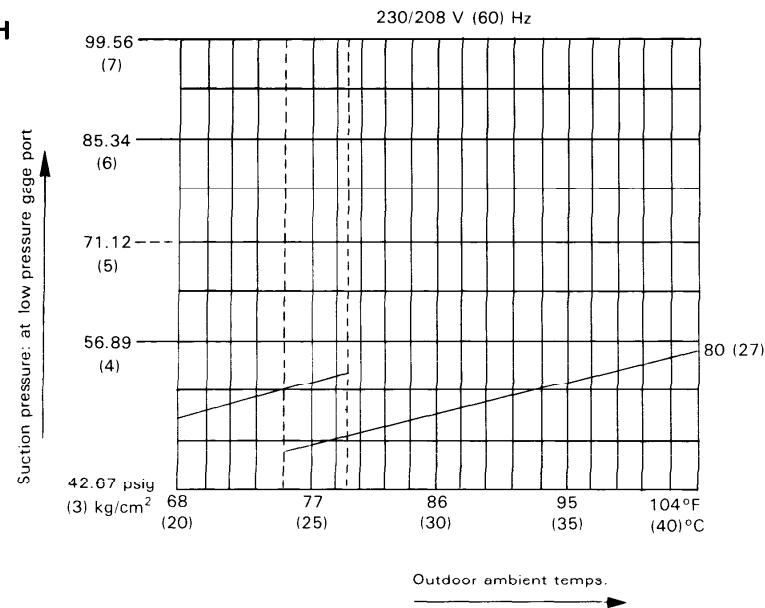
**NOTE:** The valve opens to the by-pass when the level lowers below the dotted-line range.



### Cooling characteristics Model: SAP242KCH

Low pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity High.)

**NOTE:** The valve opens to the by-pass when the level lowers below the dotted-line range.

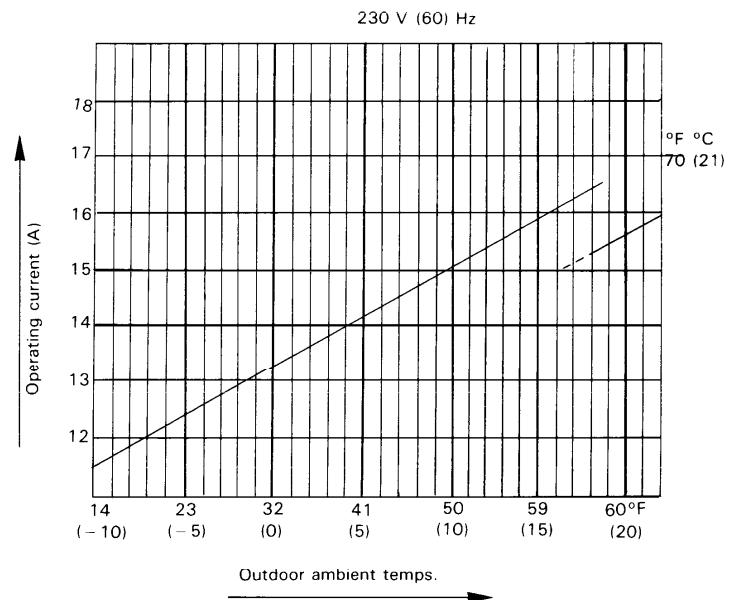


**Heating characteristics Model: SAP242KCH**

Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 75%, indoor air velocity: High, overall value for indoor and outdoor shown.)

(However, the heater shall be excluded.)

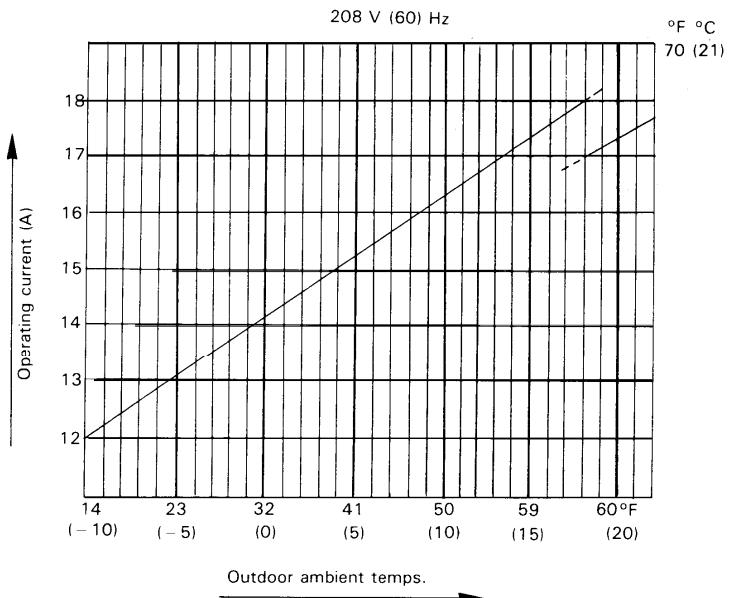
**NOTE:** The by-pass opens when the high pressure level surpasses 327.12 psig (23 kg/cm<sup>2</sup>).

**Heating characteristics Model: SAP242KCH**

Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 75%, indoor air velocity: High, overall value for indoor and outdoor shown.)

(However, the heater shall be excluded.)

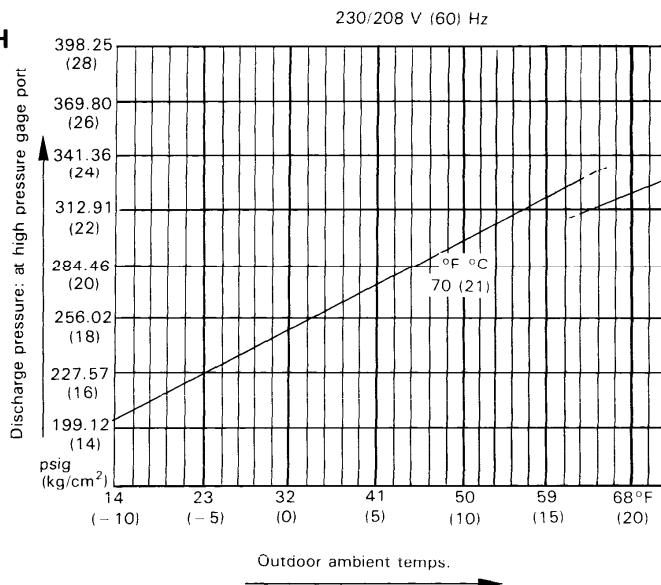
**NOTE:** The by-pass opens when the high pressure level surpasses 327.12 psig (23 kg/cm<sup>2</sup>).



### Heating characteristics Model: SAP242KCH

High pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 75%, indoor air velocity: High )

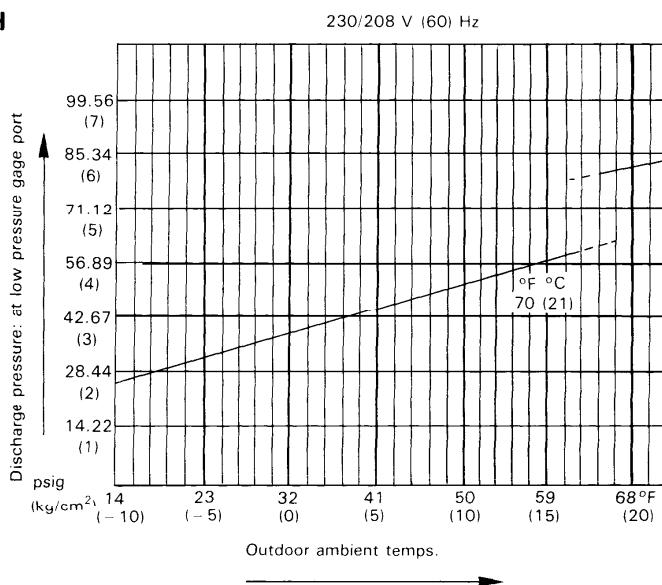
**NOTE:** The by-pass opens when the high pressure level surpasses 327.12 psig (23 kg/cm<sup>2</sup>).



### Heating characteristics Model: SAP242KCH

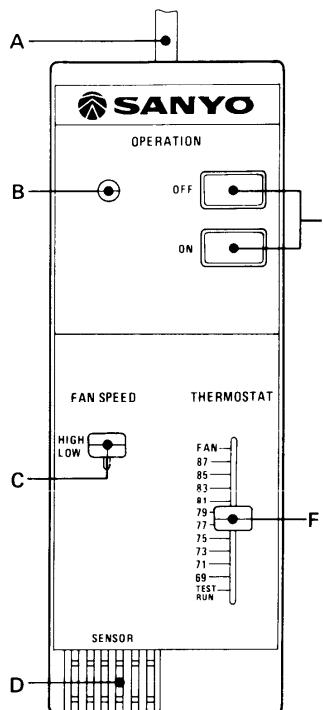
Low pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 75%, indoor air velocity: High )

**NOTE:** The by-pass opens when the high pressure level surpasses 327.12 psig (23 kg/cm<sup>2</sup>).



## 5. OPERATING INSTRUCTIONS

### 1. REMOTE CONTROL UNIT



### A. REMOTE CONTROL WIRE

### B. OPERATION INDICATOR LAMP

This lamp will light when the operation button (ON) is pushed.

### C. FAN SPEED SELECTOR

### D. TEMPERATURE SENSOR

Electronically senses the room temperature and feeds data to the IC.

### E. OPERATION SWITCH

See page 19 for how to operate.

### F. THERMOSTAT, FAN AND TEST RUN SLIDE SWITCH

#### ● OPERATION SWITCH

SWITCH	KIND OF OPERATION	OPERATION INDICATOR LAMP
OFF	Stop of operation.	Operation lamp goes out.
ON	Cooling operation takes place.	Operation lamp lights up.

Note: If the lamp goes out and the air conditioner stops operating, refer to the section entitled "REMEDIES" of operation manual

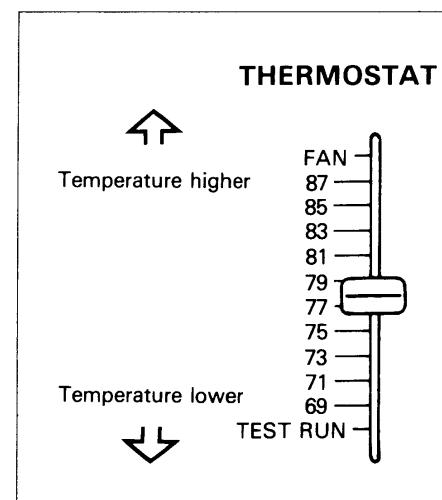
#### ● THERMOSTAT

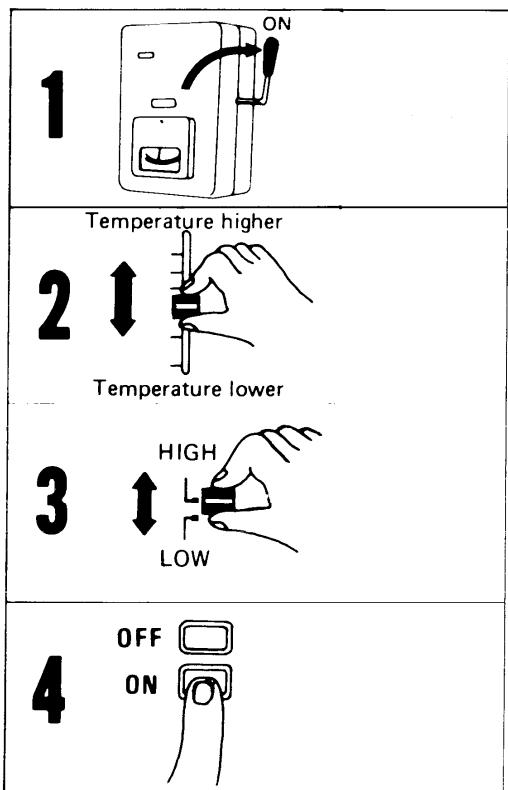
The thermostat maintains the room temperature automatically at the desired level and ensures economical operation of the air conditioner. Just set the thermostat lever for the temperature level you want.

**NOTE:** The numbers on the graduated scale are meant to serve as a guideline only. The actual room temperature may differ from the thermostat setting depending on room size and heating or cooling load.

**FAN:** Set thermostat lever to this position when FAN operation only is needed.

**CAUTION: TEST RUN;** This position is to be used only for test operation after completion of installation or during service operations. Normally it is locked.





## 2. HOW TO OPERATE

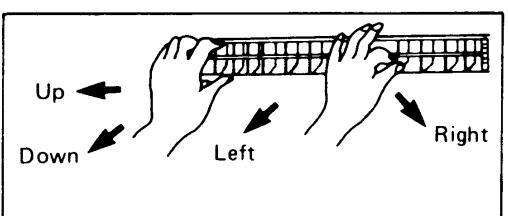
- 1) Turn on the power supply at least five hours before starting up the air conditioner.
- 2) Adjust the position of the thermostat lever.
- 3) Set the FAN SPEED selector to the desired speed
- 4) Press the ON pushbutton.

- HOW TO STOP

Press the OFF pushbutton to stop the air conditioner.

- EMERGENCY SHUTDOWN

If the air conditioner does not stop even when the OFF pushbutton is pressed, turn off disconnect the power supply.



## 3. AIR FLOW DIRECTION

You can direct the air flow to the desired angle by moving the flap and vertical blades.

## 4. CAUTION

- SAFETY INTERVAL RESTARTING

After pressing the OFF button, the air conditioner stops and it will not start for three minutes. To start the air conditioner again after three minutes, press the ON button.

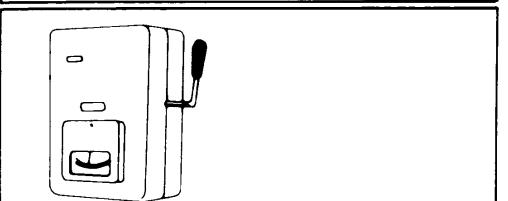
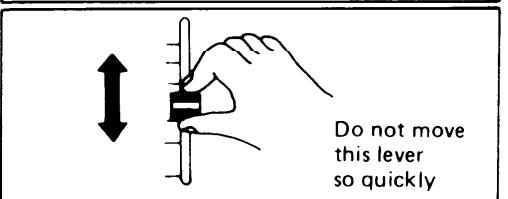
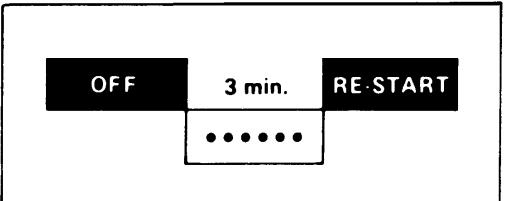
- THERMOSTAT SETTING

Inadvertently moving the thermostat lever quickly up and down will cause the compressor to stop for three minutes.

Set the lever to the desired temperature and the unit will operate normally after three minutes.

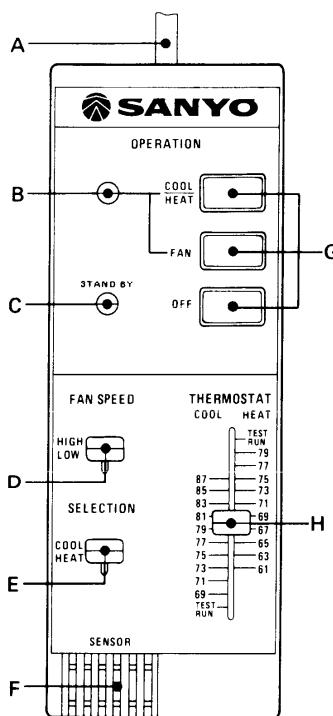
- POWER SUPPLY

Be sure to supply power at least five (5) hours before operating the air conditioner at the beginning of the season. During the period of service, leave the power supply ON and let the current flow in the crankcase heater to warm up the compressor.



# OPERATING INSTRUCTIONS

## 1. REMOTE CONTROL UNIT



### ● OPERATION SWITCH

SWITCH	KIND OF OPERATION	OPERATION INDICATOR LAMP
OFF	Stops operation	Operation lamp goes out.
FAN	Starts fan for room air circulation and filtering of dust.	Operation lamp lights up.
COOL HEAT	Starts compressor for cooling or heating operation.	Operation lamp lights up.

**Note:** If the lamp goes out and the air conditioner stops operating, refer to the section entitled "REMEDIES" of operation manual

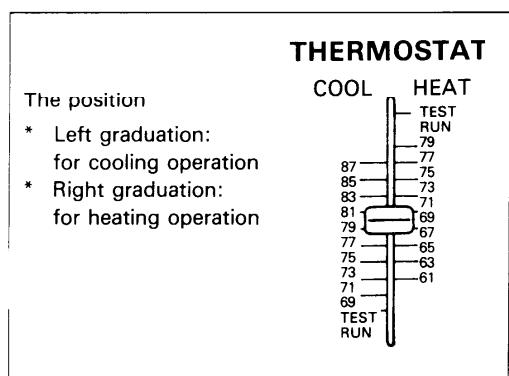
### ● THERMOSTAT

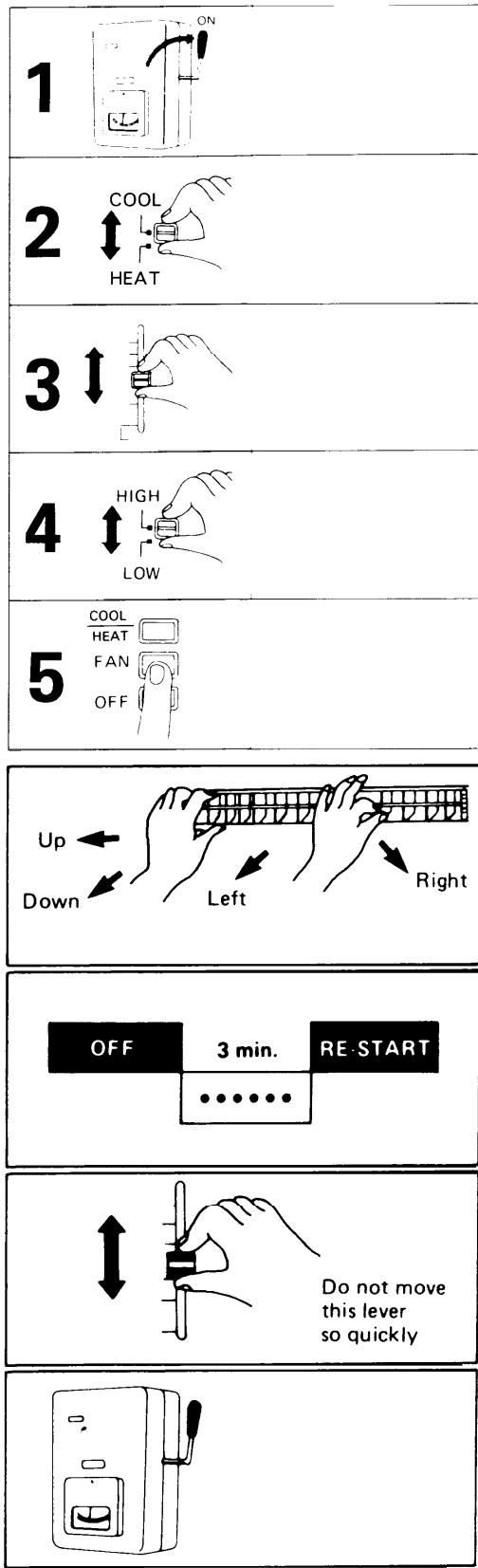
The thermostat maintains the room temperature automatically at the desired level and ensures economical operation of the air conditioner. Just set the thermostat lever for the temperature level you want.

#### Note: TEST RUN

This position is used only for the test run after installation of the air conditioner and during servicing. It is normally locked.

If the air conditioner does not stop even when the OFF button is pushed, turn off the power supply disconnect.





## 2. HOW TO OPERATE

- 1) Turn on the power supply at least five hours before starting up the air conditioner.
- 2) Set the COOL/HEAT selector switch to either COOL or HEAT position.
- 3) Adjust the position of the thermostat lever.
- 4) Set the FAN SPEED selector to the desired operating condition.
- 5) Press "FAN" button first, then press "COOL/HEAT".
  - The FAN button will immediately spring back after being depressed.
  - The COOL/HEAT button will remain depressed.

Note: The air conditioner will not operate if only the COOL/HEAT button is pressed.

### ● HOW TO STOP

Press the OFF button to stop the air conditioner.

### ● EMERGENCY SHUTDOWN

If the air conditioner does not stop even when the OFF push button is pressed, disconnect power supply.

## 3. AIR FLOW DIRECTION

You can direct the air flow to the desired angle by moving the flap and vertical blades.

## 4. CAUTION

### ● SAFETY INTERVAL RESTARTING

After pressing the OFF button, the air conditioner stops and it will not start again for three minutes. To start the unit again after three minutes, press the FAN and COOL/HEAT buttons.

### ● THERMOSTAT SETTING

Inadvertently moving the thermostat lever quickly up and down will cause the compressor to stop for three minutes. Set the lever to the desired temperature and the unit will operate normally after three minutes.

### ● POWER SUPPLY

Be sure to supply power at least five (5) hours before operating the air conditioner at the beginning of the season. During the period of service, leave the power supply ON and let the current flow in the crankcase heater to warm up the compressor.

## 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

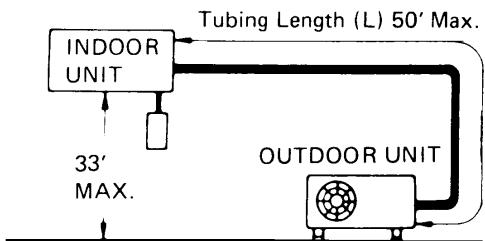
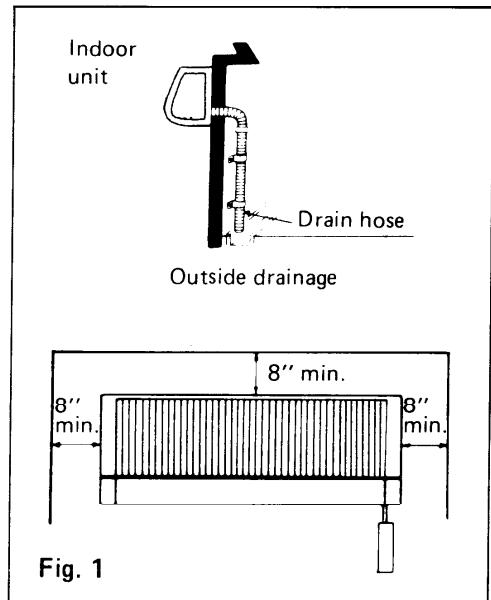


Fig. 2

### Outdoor Unit :

**AVOID:**

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

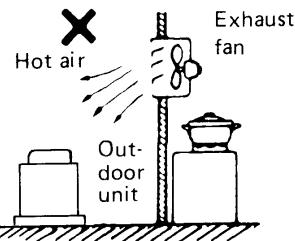


Fig. 3

**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.

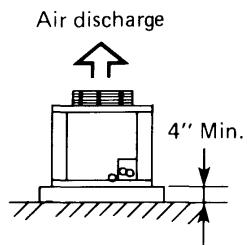


Fig. 5

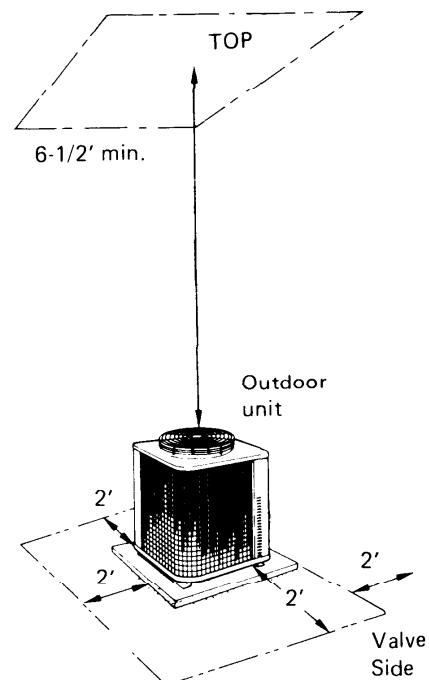


Fig. 4

## 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.

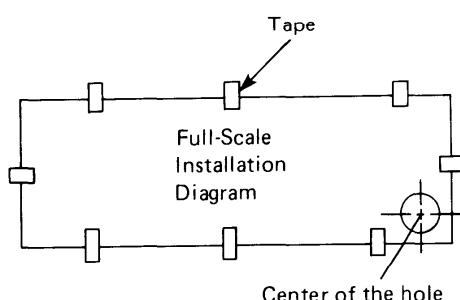


Fig. 6

- 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.

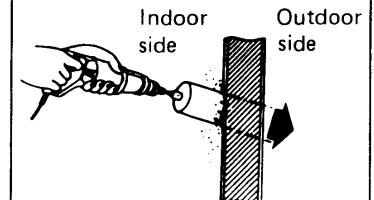


Fig. 7

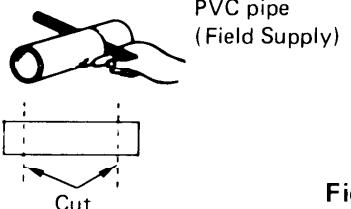


Fig. 8

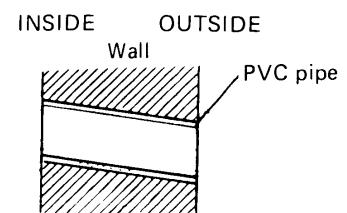
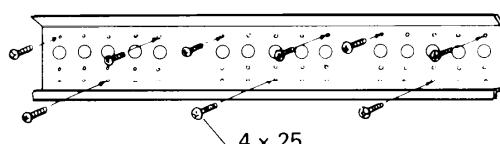


Fig. 9

### 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)

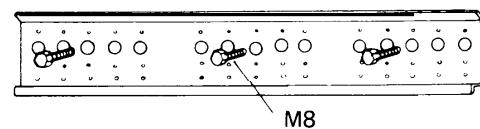


Fig. 10

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

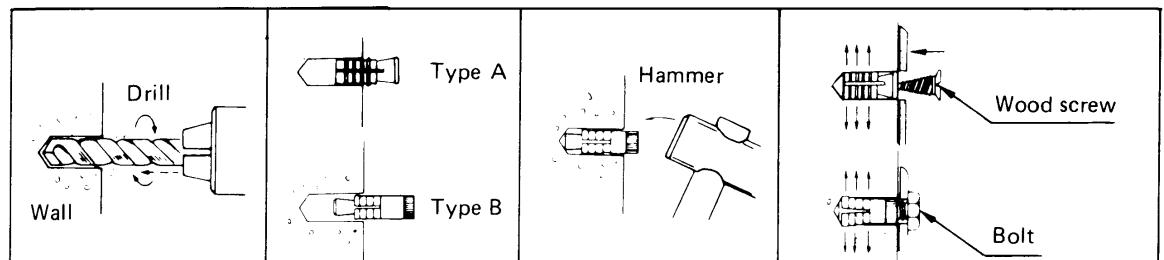


Fig. 11

\* 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

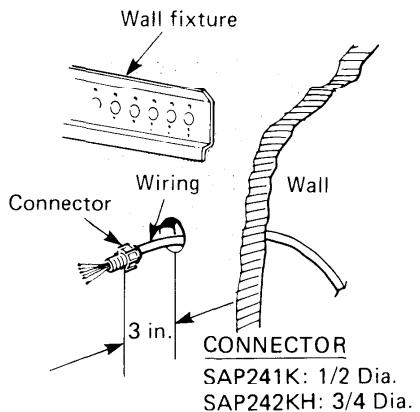


Fig. 12

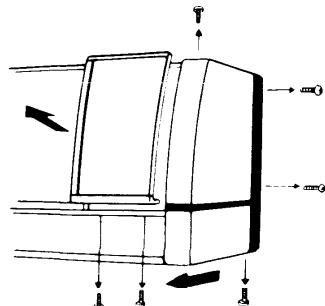


Fig. 13

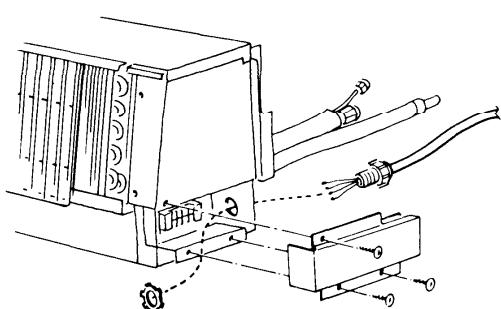


Fig. 14

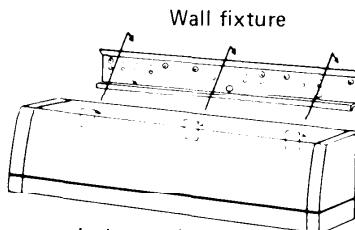


Fig. 15

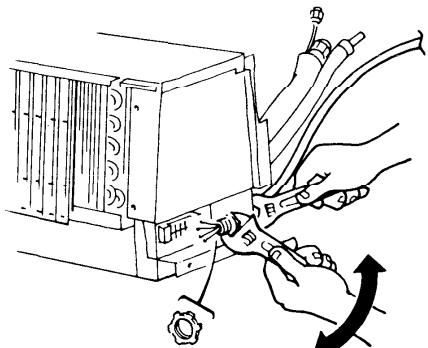


Fig. 16

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.

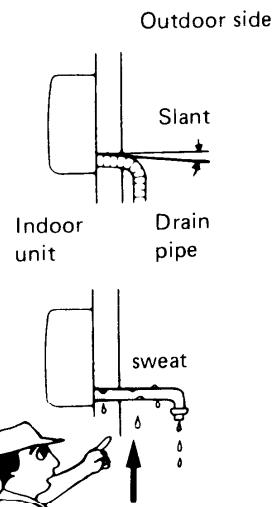


Fig. 17

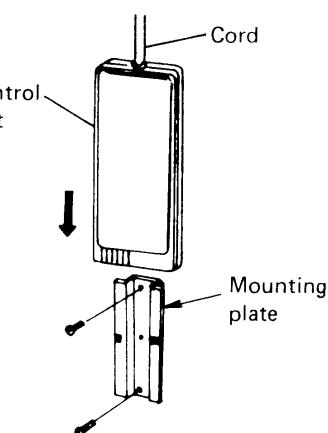


Fig. 19

## 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"

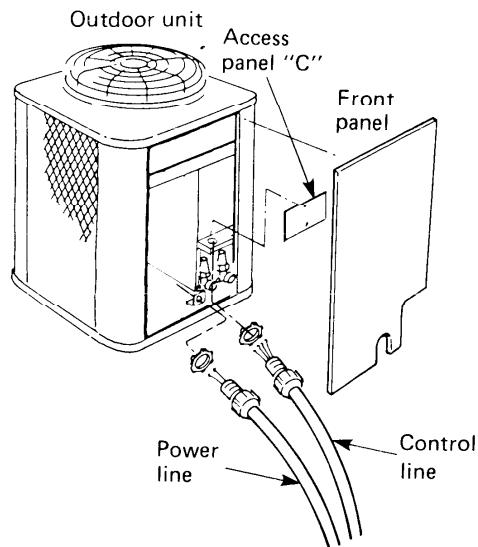


Fig. 20

### WIRING SYSTEM DIAGRAM

SAP242KCH

SAP241KC

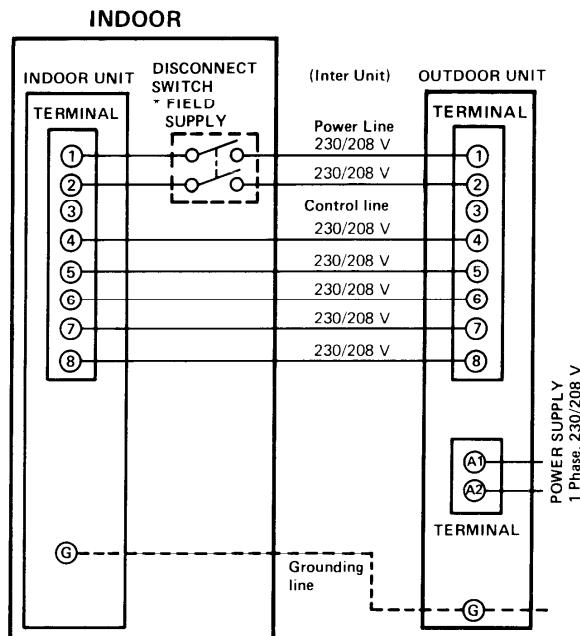


Fig. 21

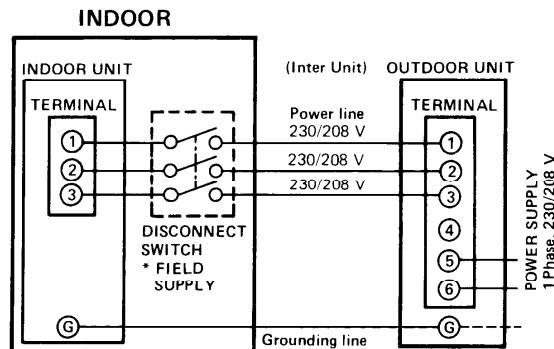


Fig. 22

## 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.

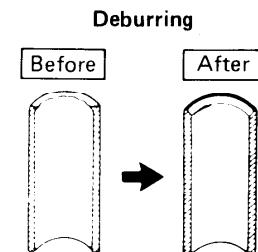


Fig. 23

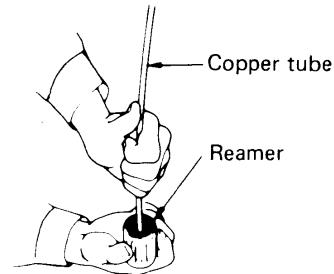


Fig. 24

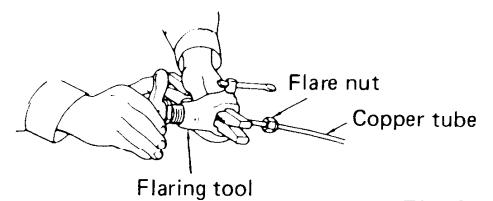


Fig. 25

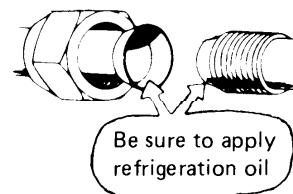


Fig. 26

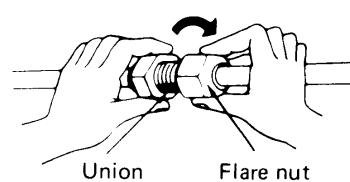


Fig. 27

### 5-3. Caution before Connecting Tubes Tightly

- a) Be sure to apply blind cap or water proof tape to prevent dust or water from getting into the copper tube , until it is used.
- b) Be sure to apply refrigeration oil to the matching surfaces of flare and union before connecting them together. This is effective for reducing gas leaks. Fig. 26
- c) For proper connection, hold the tube with union and the flared tube straight with each other, screw in the flare nut lightly at first to obtain smooth match. 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.

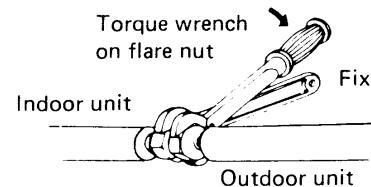


Fig. 28

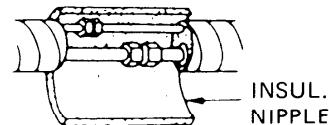


Fig. 29

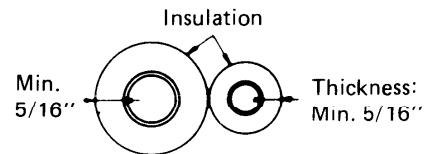


Fig. 30

#### 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.

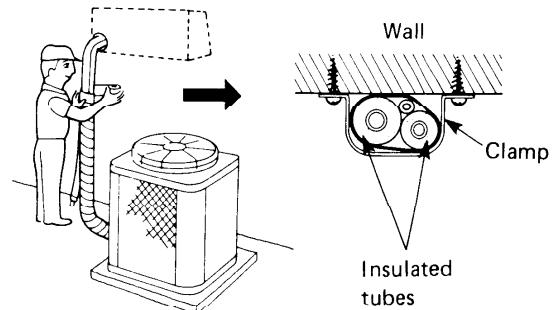
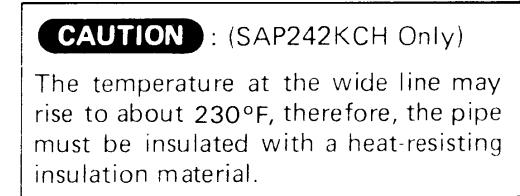


Fig. 31

#### 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

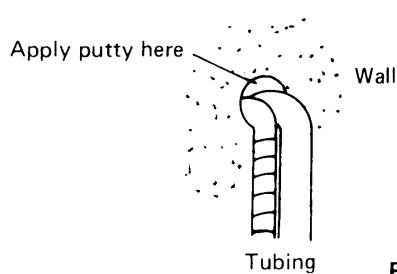


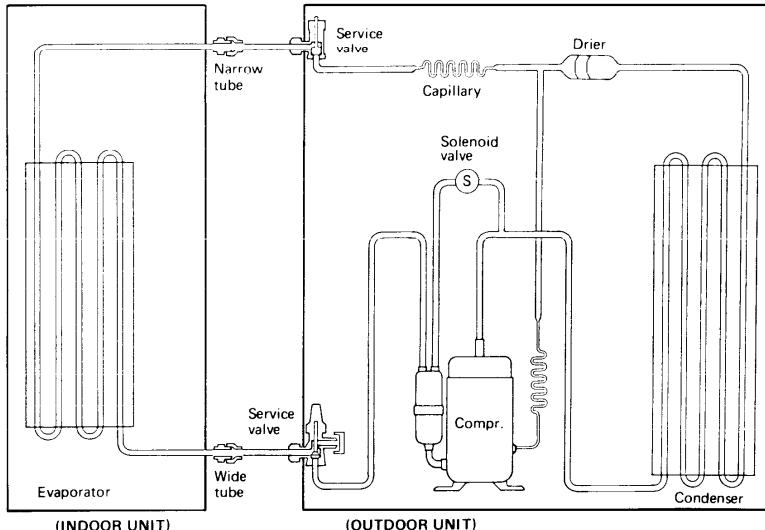
Fig. 32

## 6. AIR PURGING

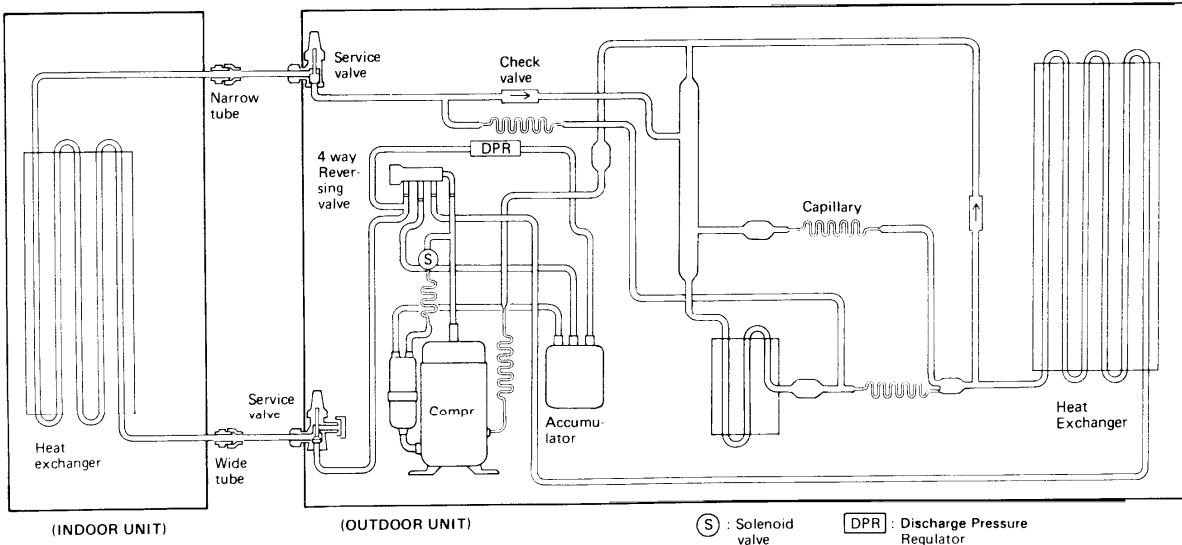
Air does not function as a refrigerant, because it cannot be liquefied in the condenser. Air and moisture remaining in the refrigerant system have undesirable effects as indicated at right. Therefore, they must be purged completely.

### ■ 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.

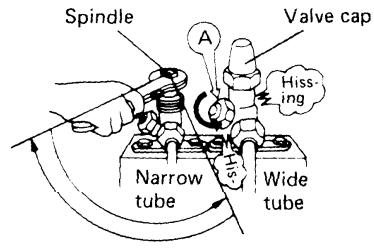


Fig. 33

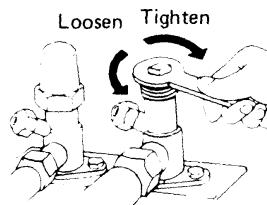


Fig. 34

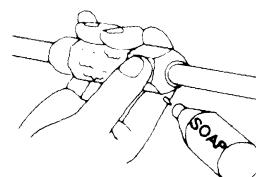


Fig. 35

## ■ 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-

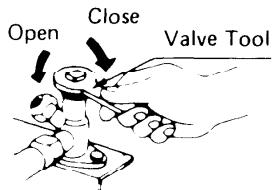
With the narrow tube valve kept at BACK SEAT, only the wide tube valve stem is turned halfway-down position. This position is used for pressure measurement and gas charging. (Fig. 36-c)

### • 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.

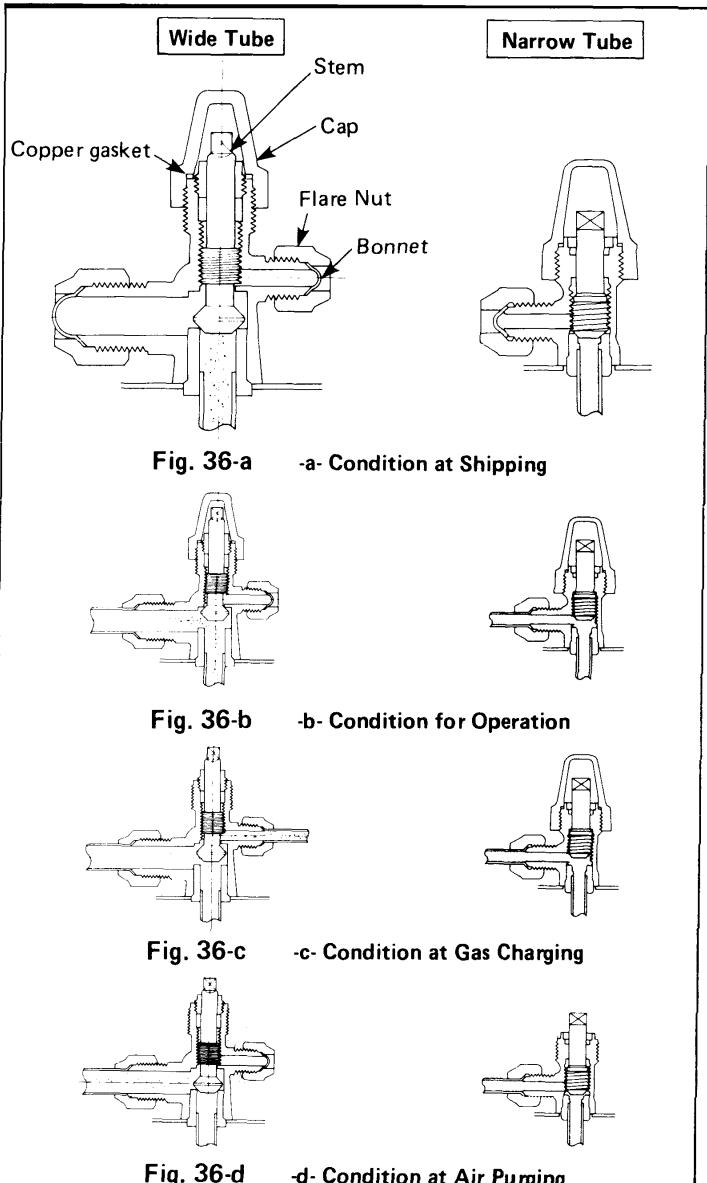


Fig. 36-a -a- Condition at Shipping

Fig. 36-b -b- Condition for Operation

Fig. 36-c -c- Condition at Gas Charging

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.

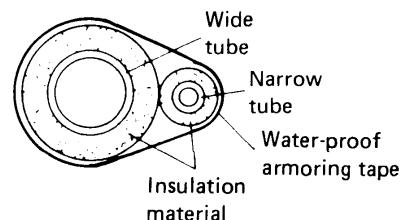


Fig. 37

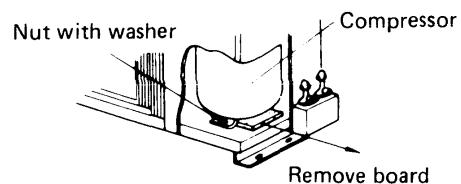


Fig. 38

## 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.)

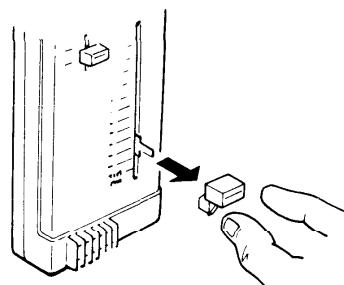


Fig. 39

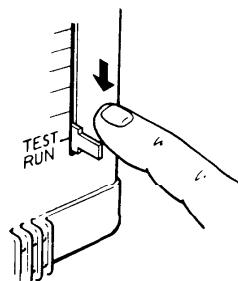


Fig. 40

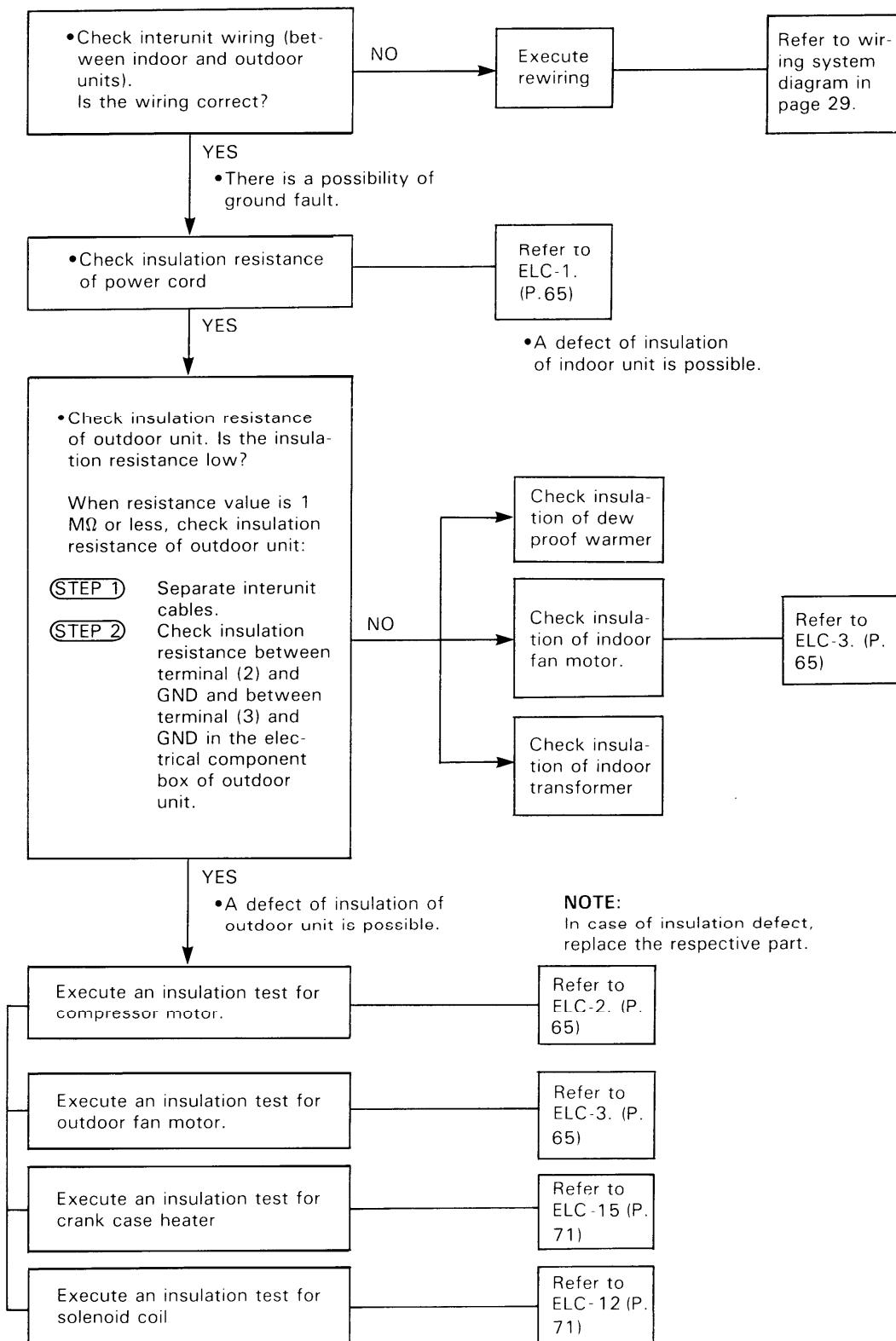
## 7. TROUBLESHOOTING

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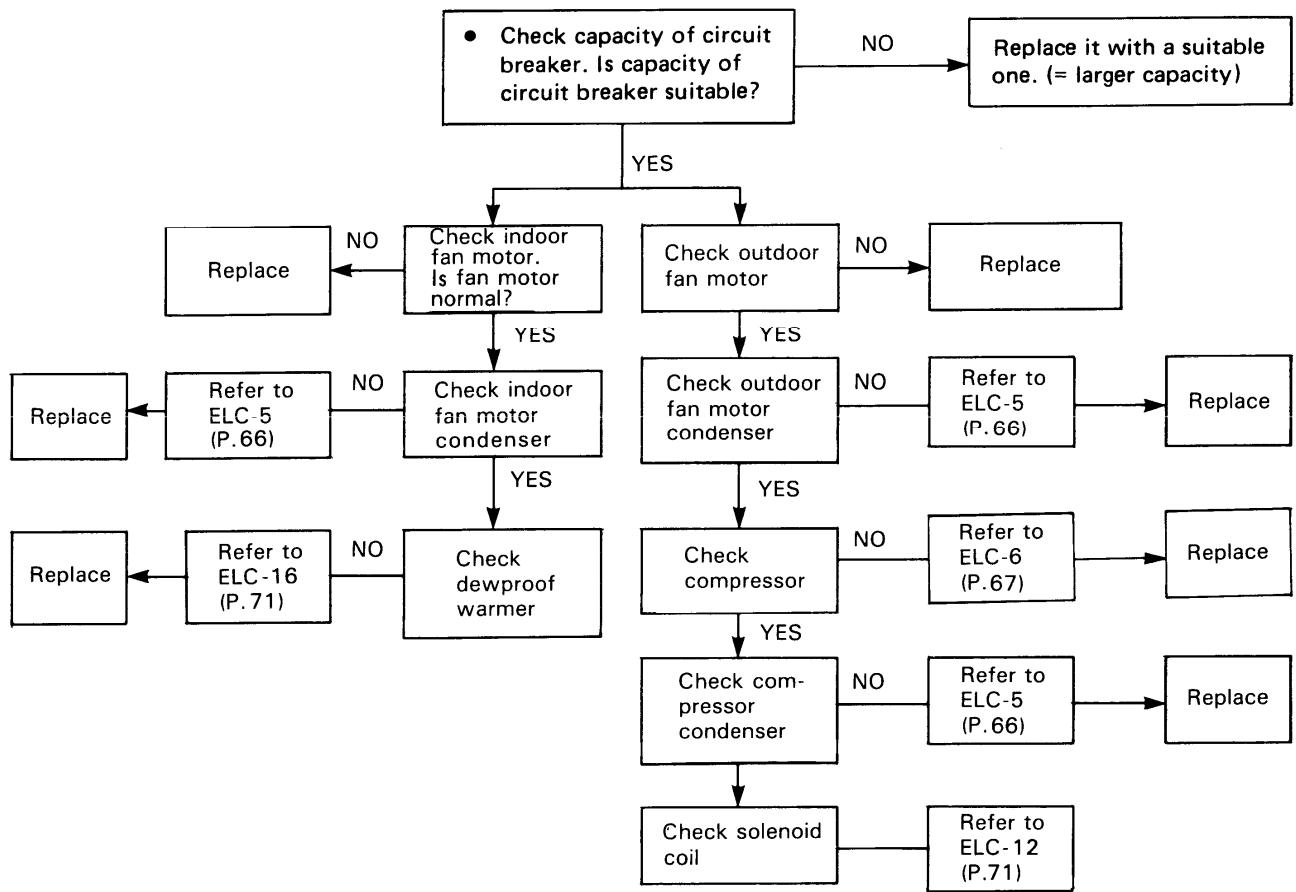
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1.1.1. When circuit breaker is set to ON, it is tripped soon (resetting is not possible)	
1.1.2. Circuit breaker trips when the operation switch is depressed	
1.2. Neither indoor unit nor outdoor unit runs	
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**1.1 Circuit breaker trips (or fuse blows)**

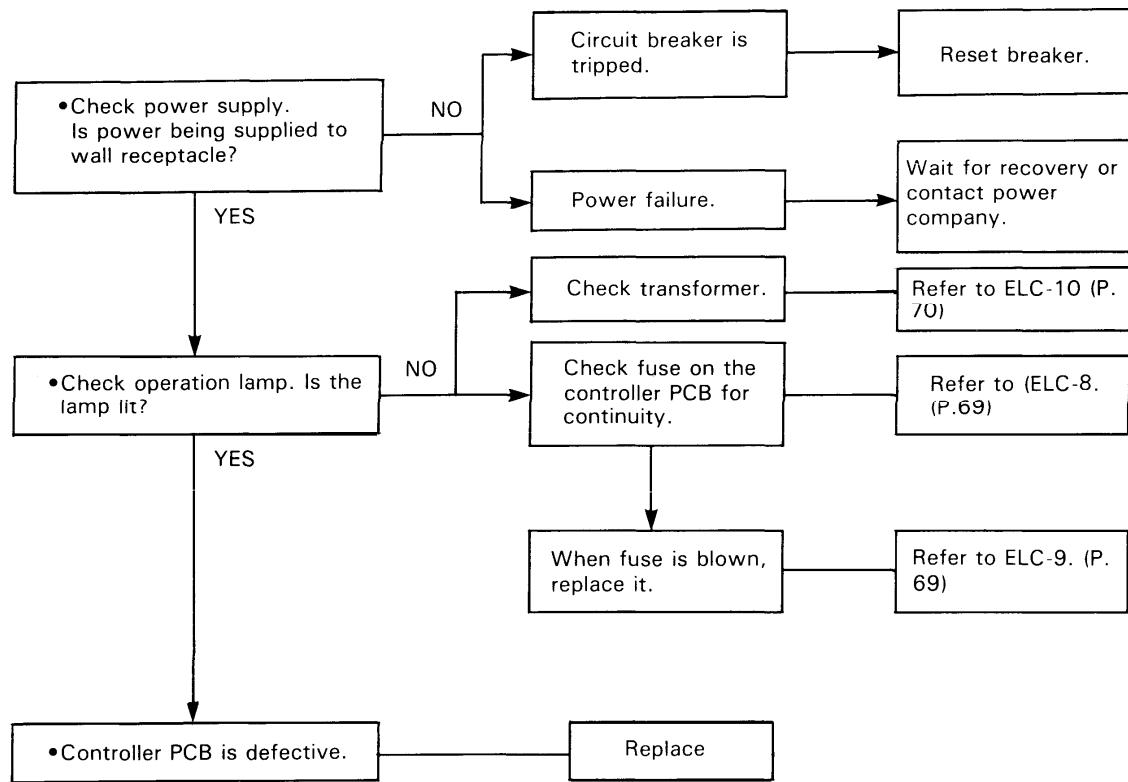
1.1.1 When circuit breaker is set to ON, it trips soon  
(resetting is not possible)



**1.1.2 Circuit breaker trips when the operation switch is depressed.**

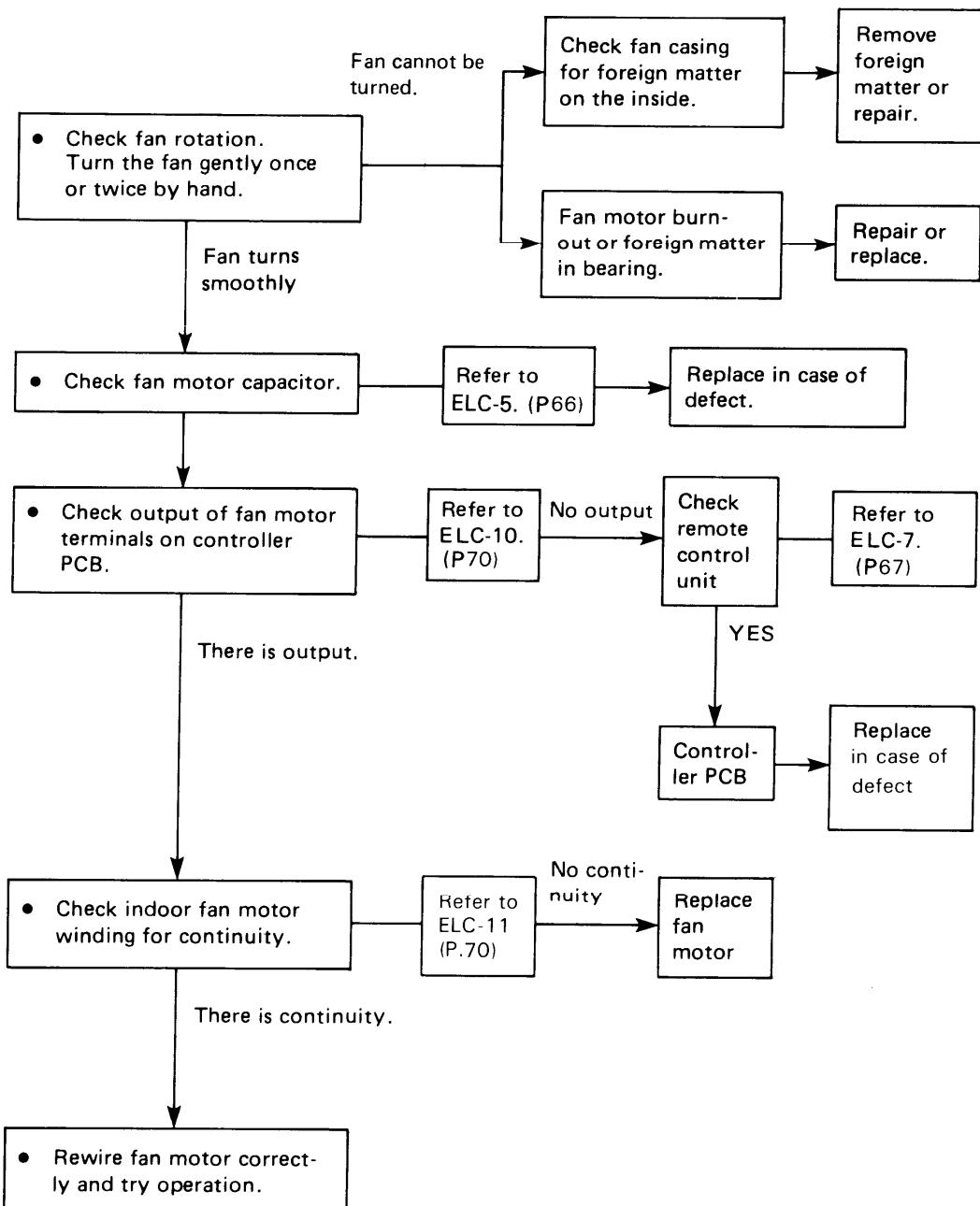


## 1.2 Neither indoor unit nor outdoor unit runs



**2. Some part of air conditioner does not operate**

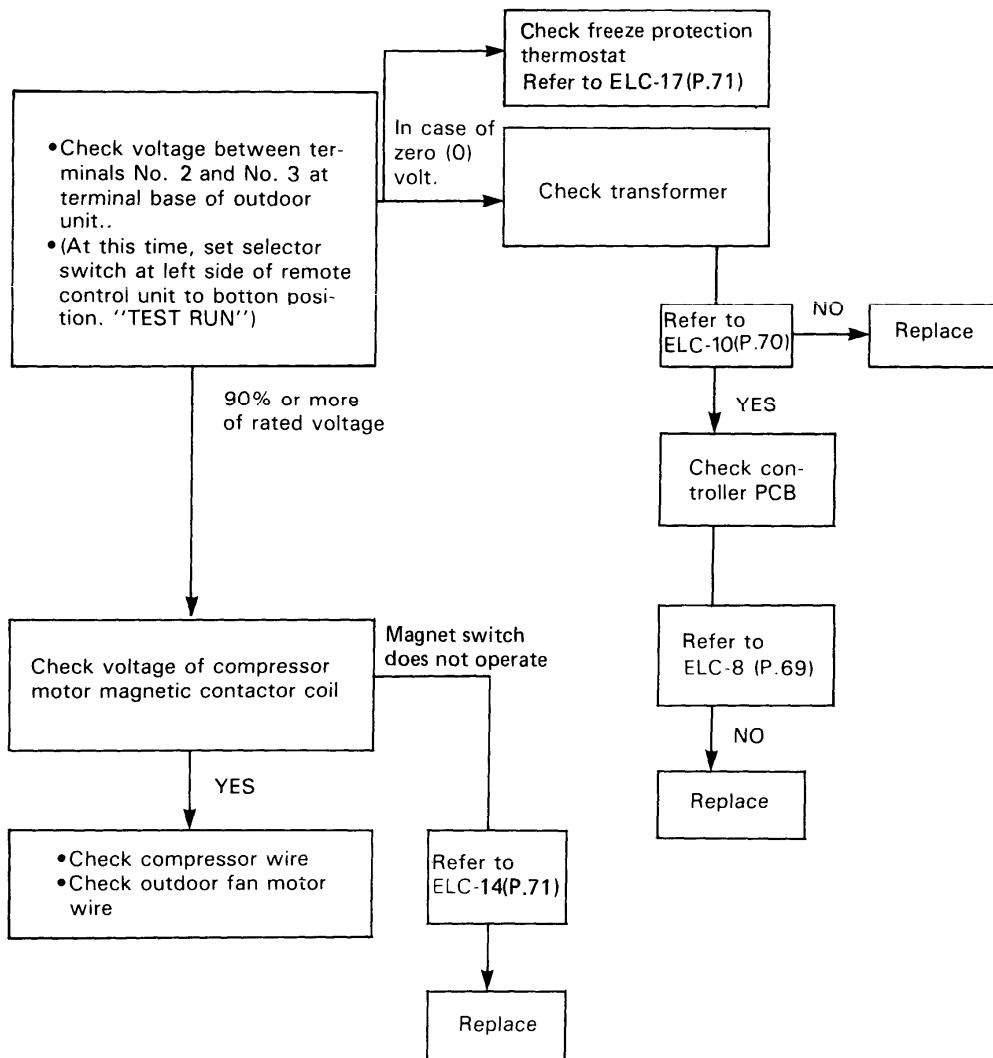
**2.1 Indoor fan does not run**



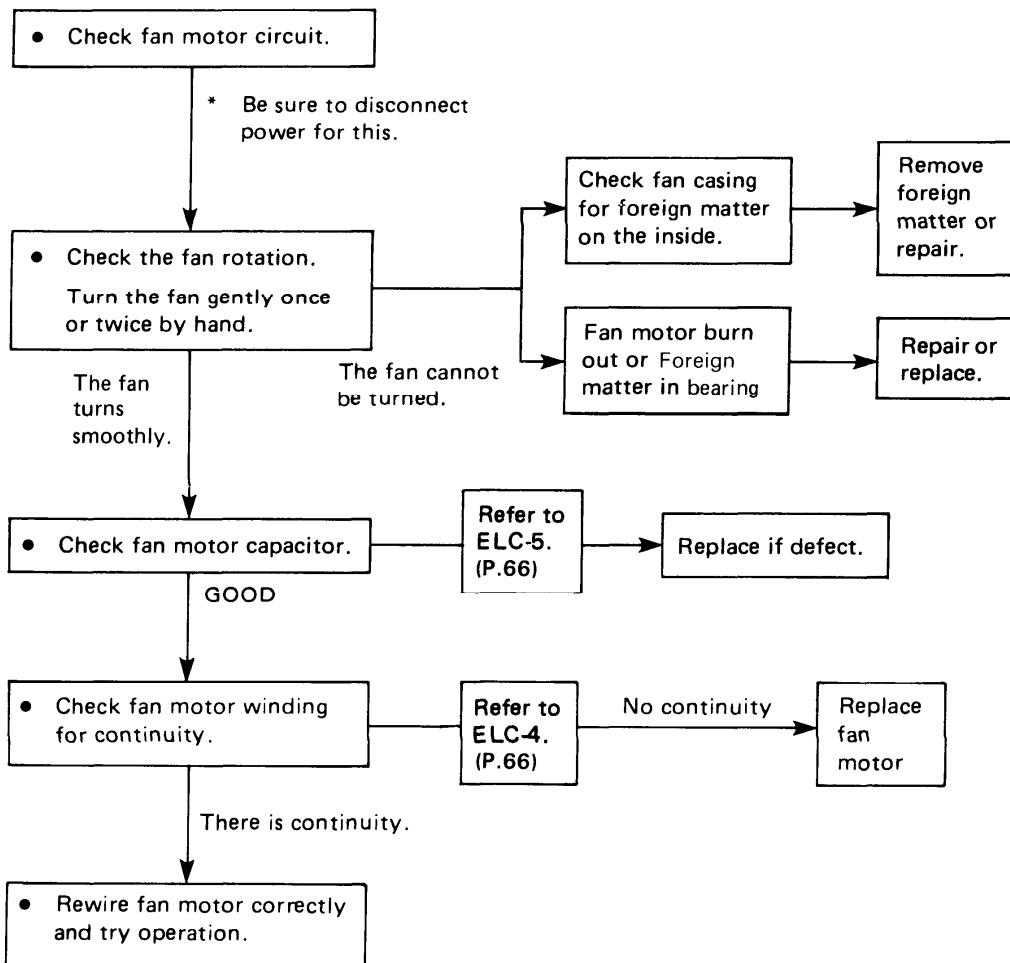
## 2.2 Neither outdoor fan nor compressor runs

**Note:** Check following points at first;

1. Is thermostat setting suitable?
2. Has 3 minute timer operated?  
(No operation for 3 minutes after power ON.)

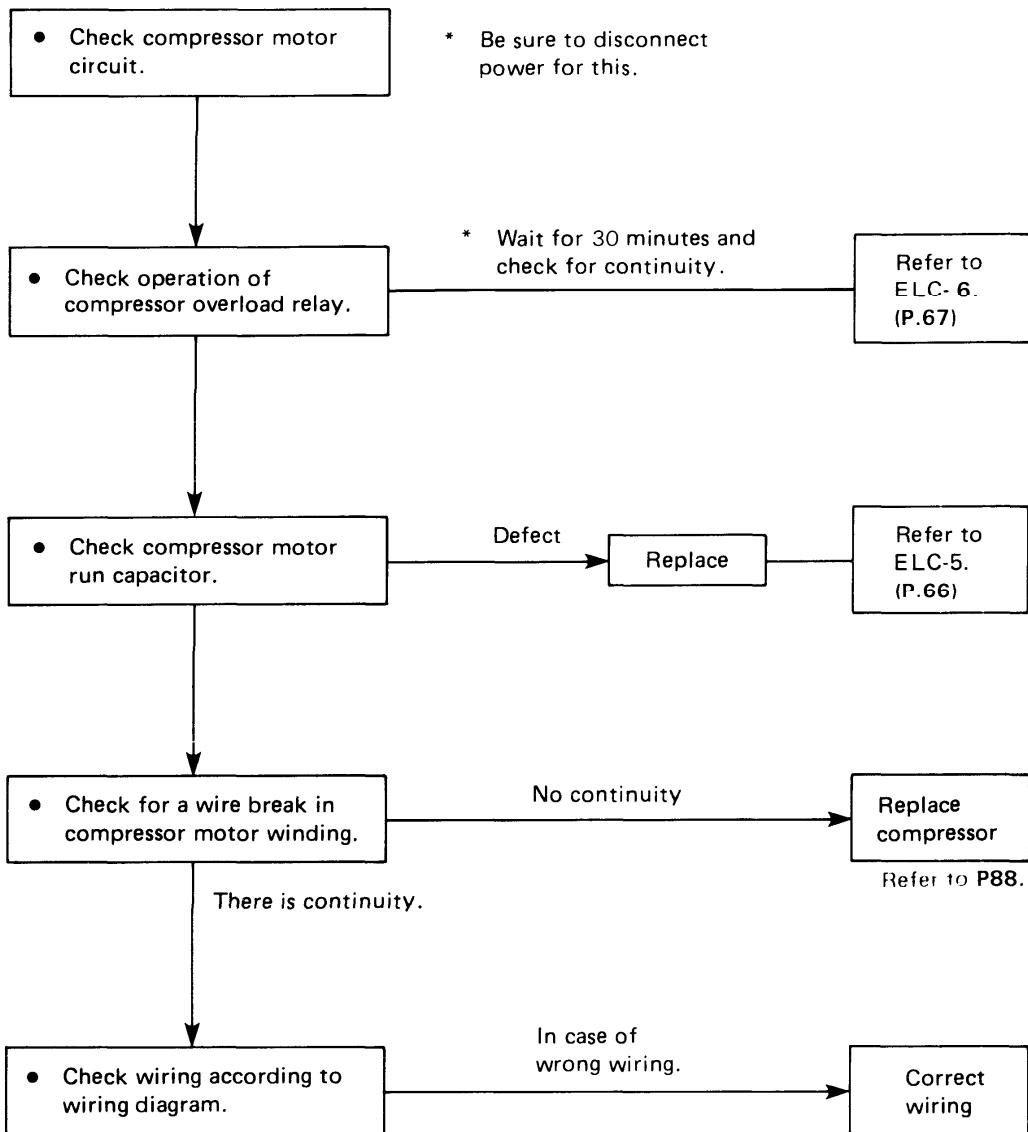


### 2.3 Only outdoor fan does not run



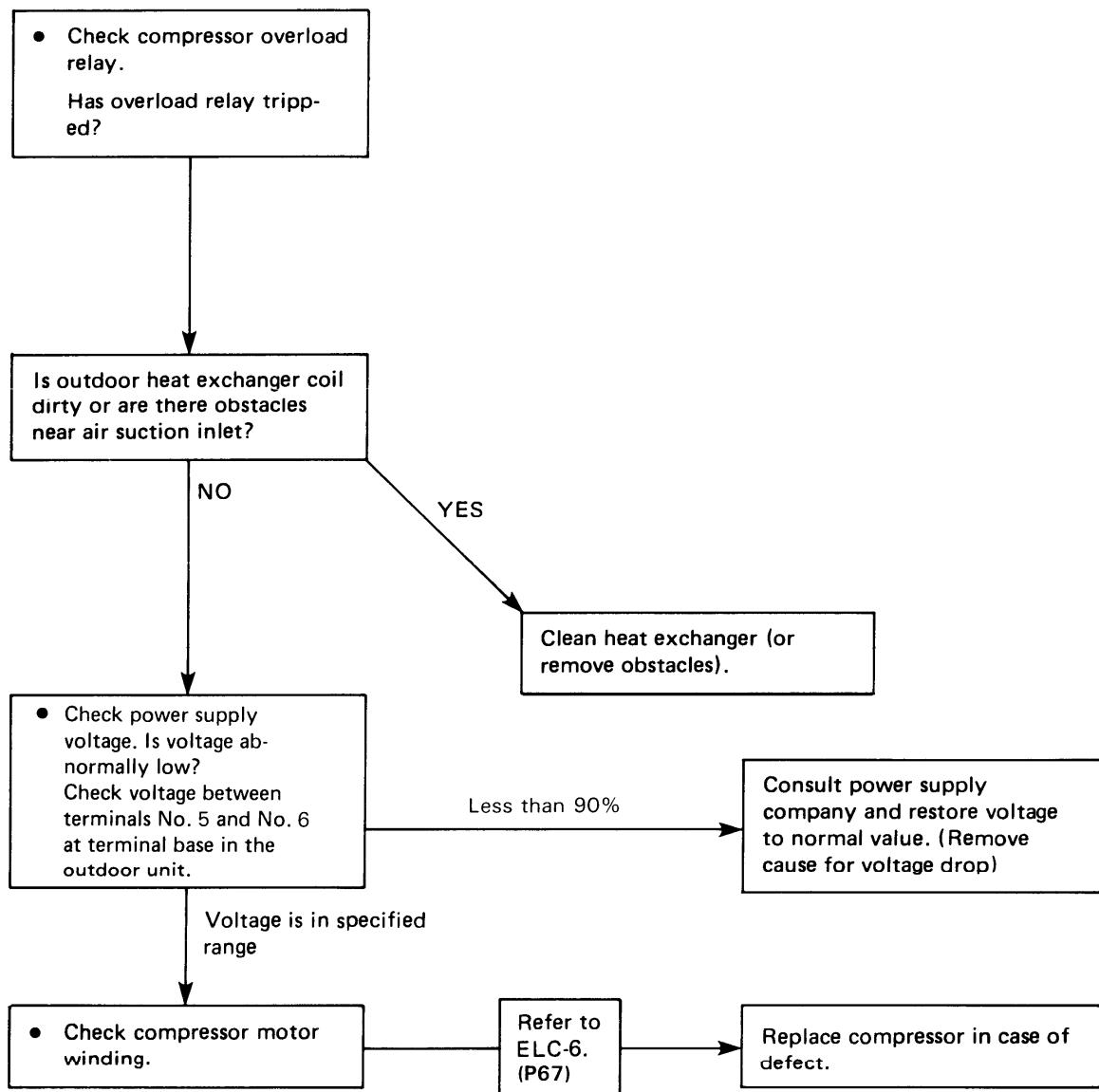
**NOTE:** The fan motor does not run until the winding temperature lowers and automatic resetting works if the internal thermostat operates.

## 2.4 Only compressor does not run



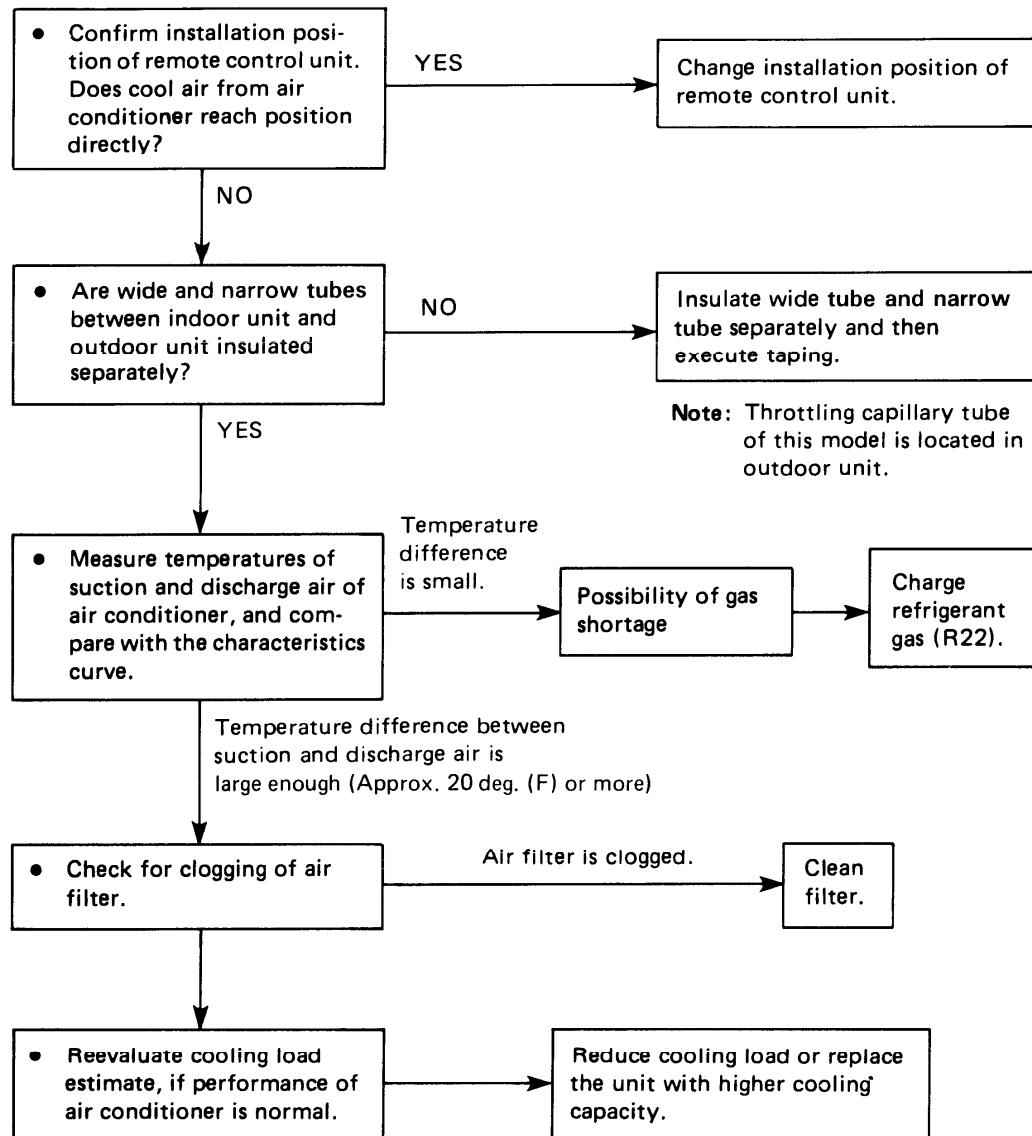
## 2.5 Compressor frequently repeats ON and OFF

(Only compressor repeats ON and OFF, while indoor unit and outdoor fan run without fail.)

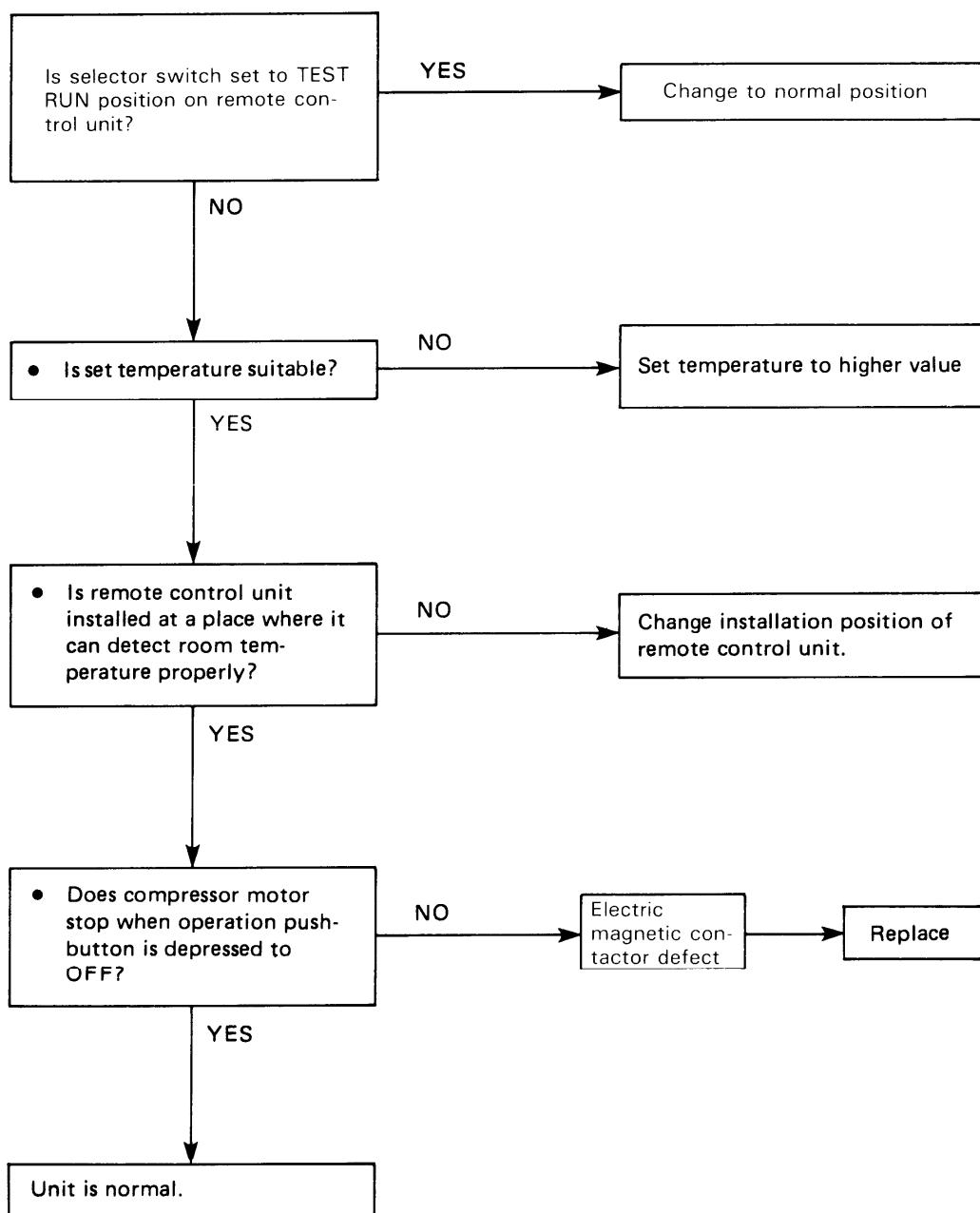


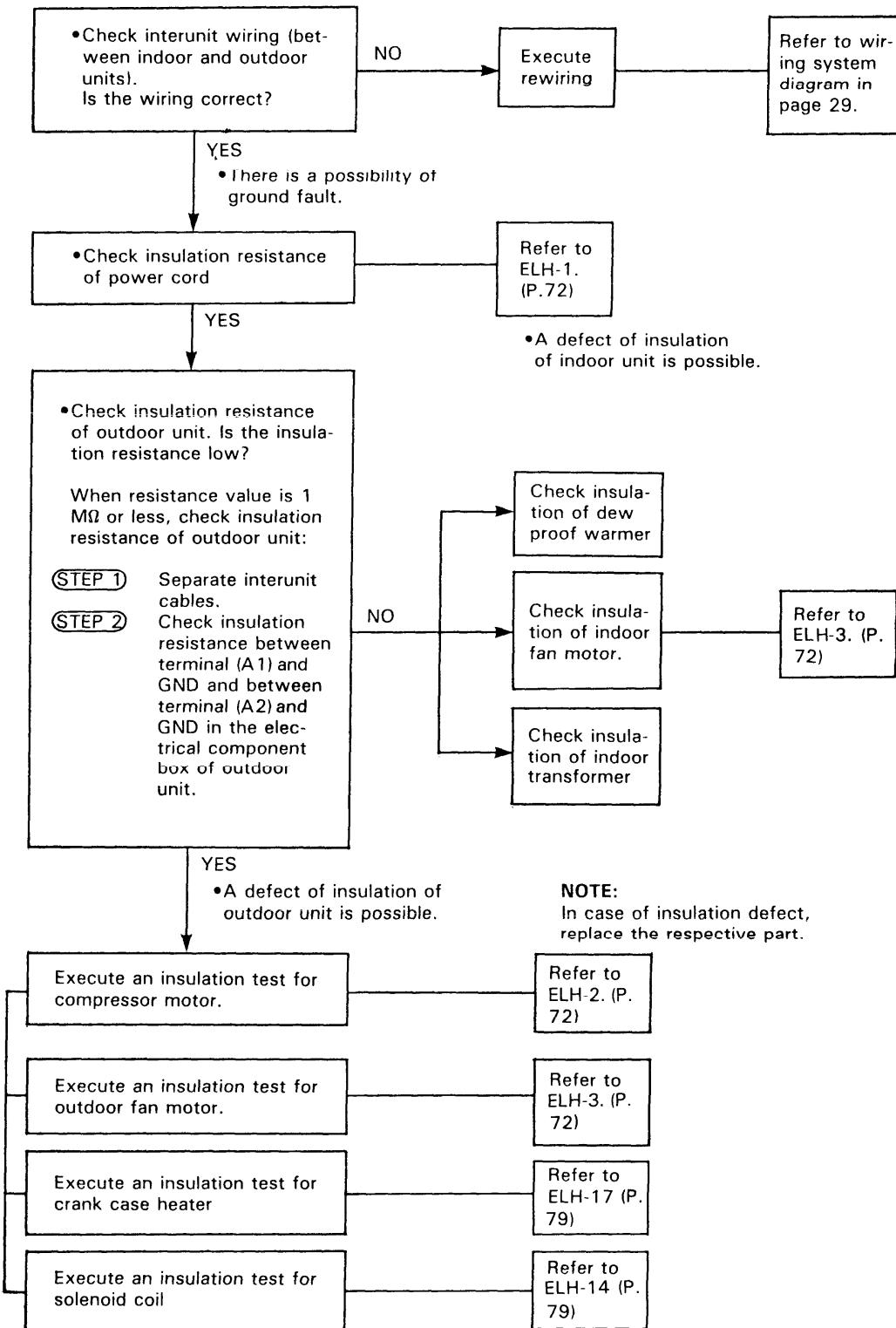
**3. Air conditioner operates, but abnormalities are observed**

**3.1 Poor cooling**

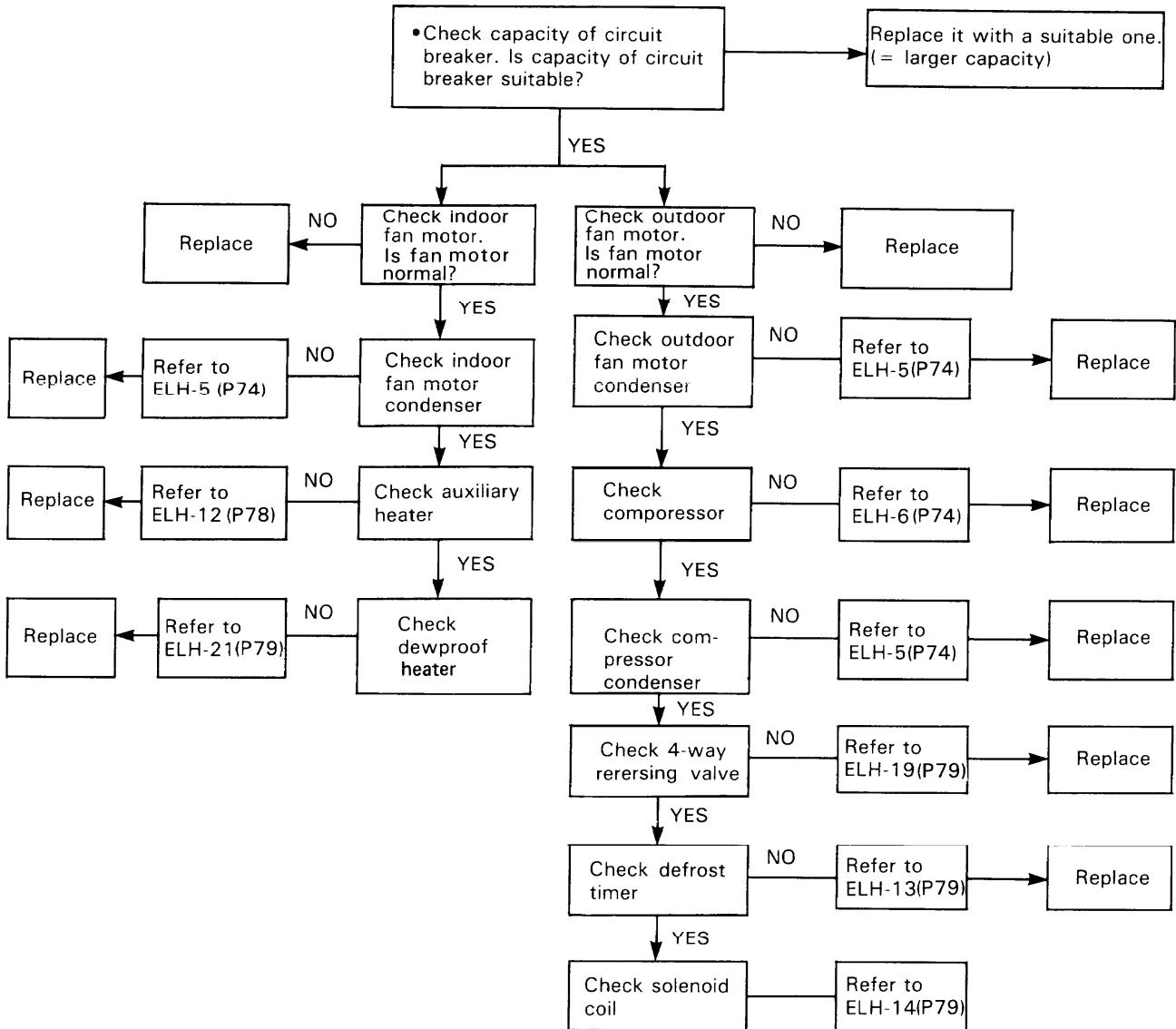


### 3.2 Excessive cooling

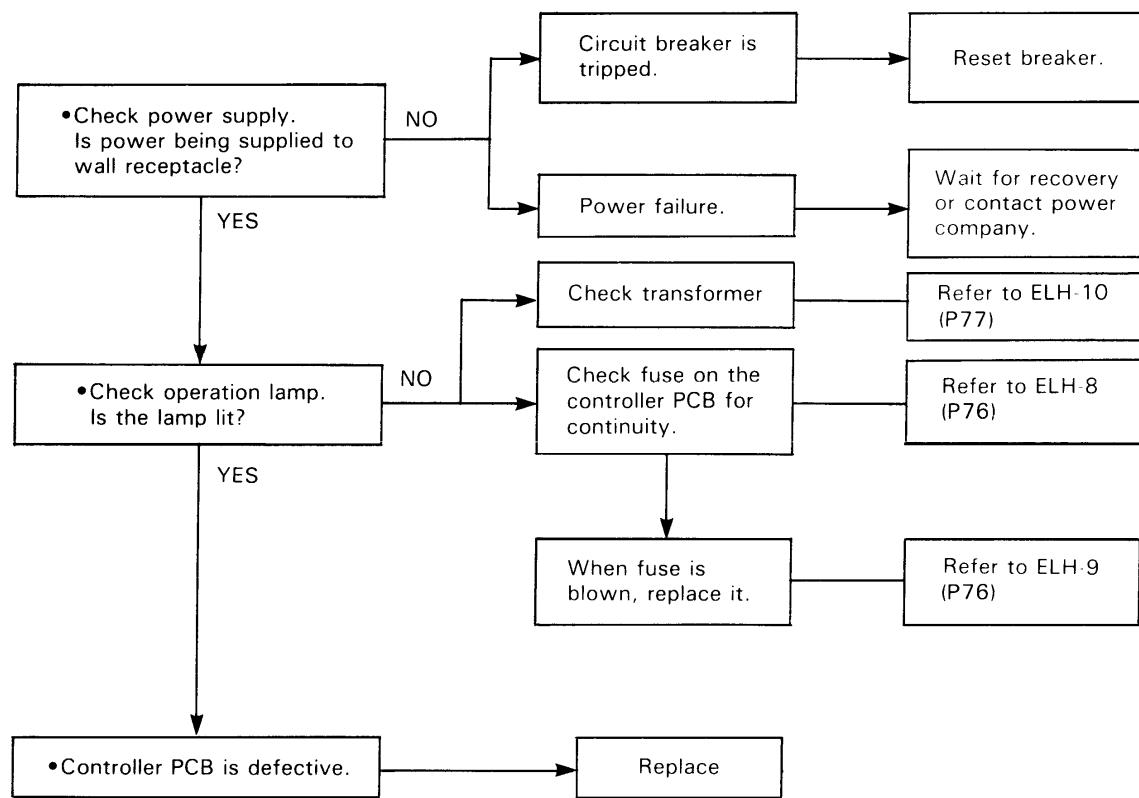


**1.1 Circuit breaker trips (or fuse blows)****1.1.1 When circuit breaker is set to ON, it is tripped soon  
(resetting is not possible)**

**1.1.2 Circuit breaker trips when the operation switch is depressed.**

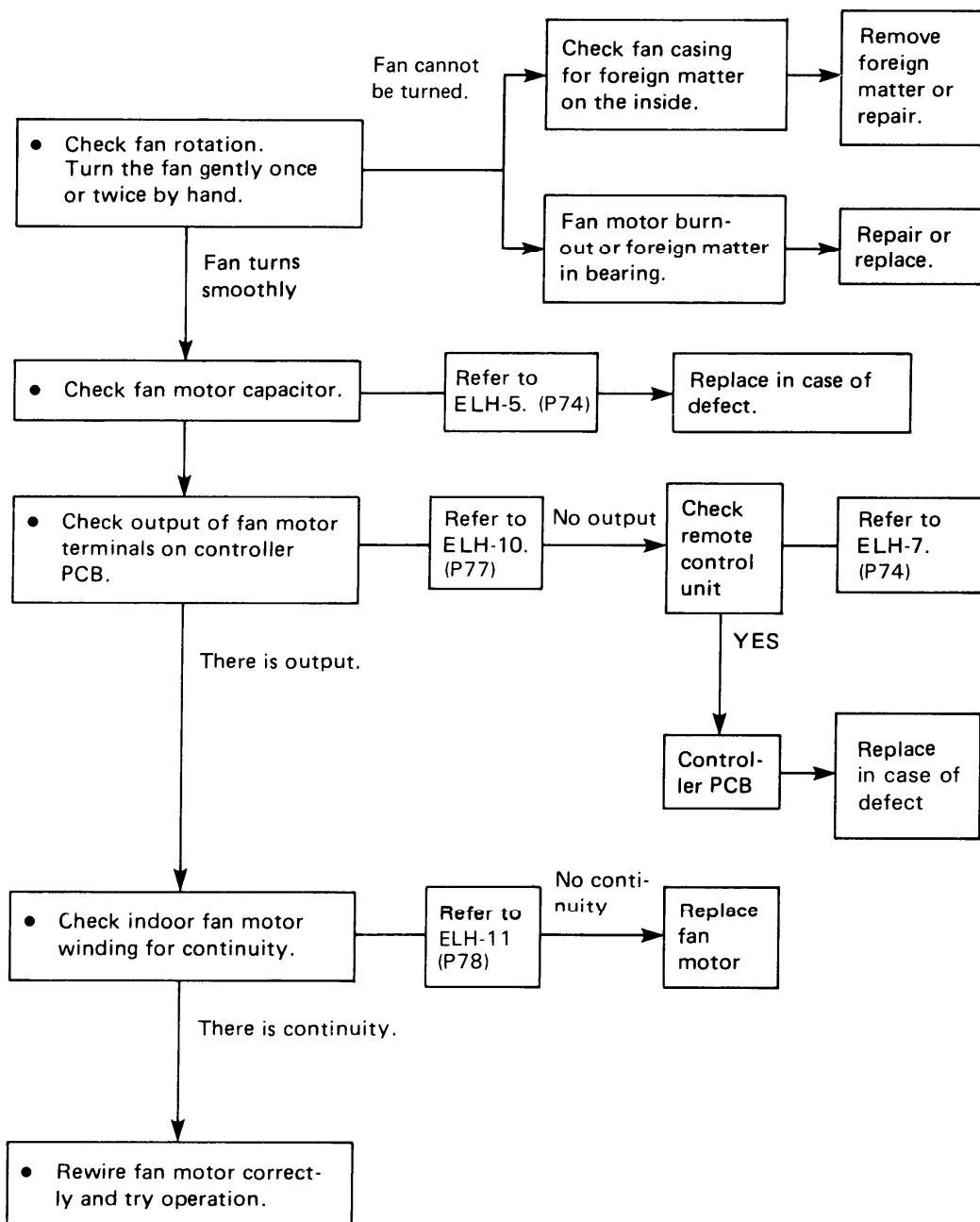


## 1.2 Neither indoor unit nor outdoor unit runs



**2. Some part of air conditioner  
does not operate**

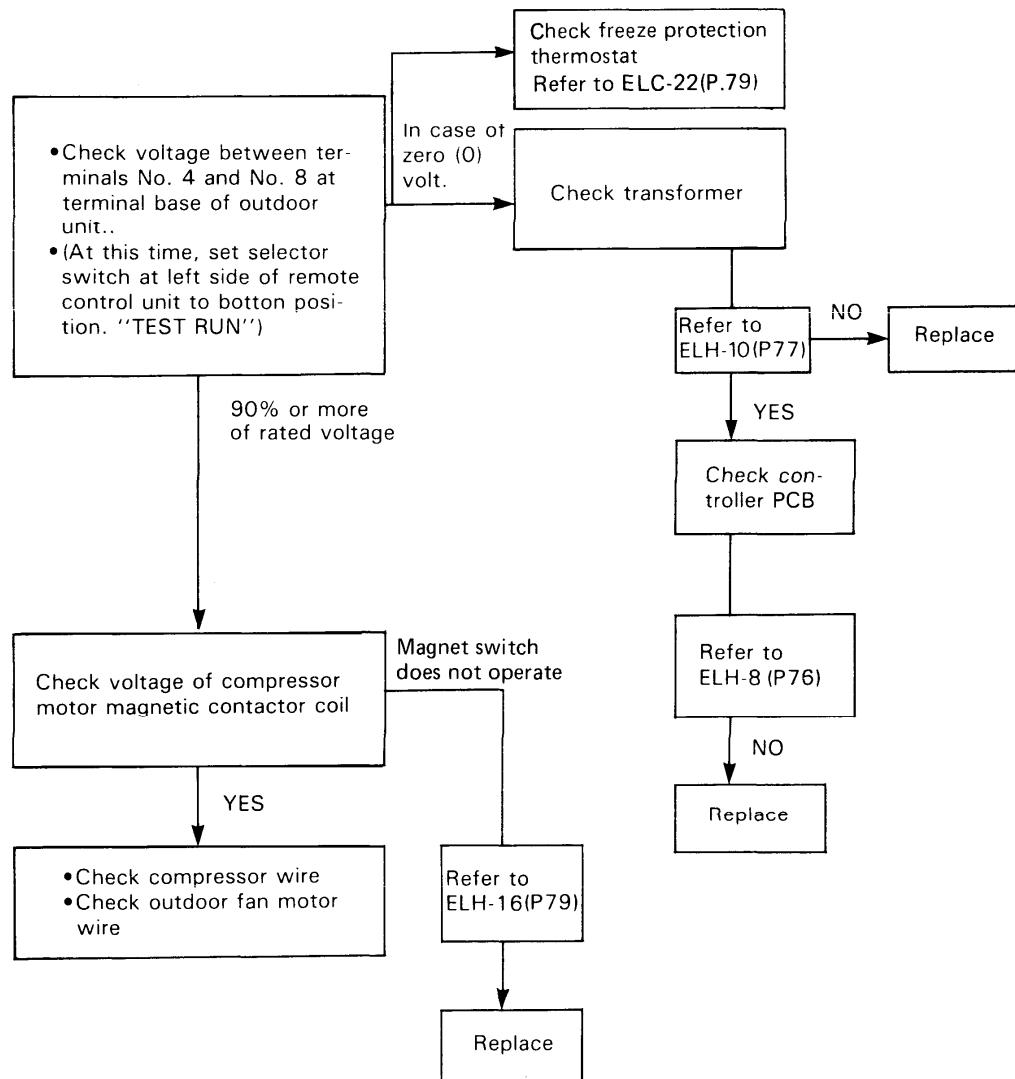
**2.1 Indoor fan does not run**



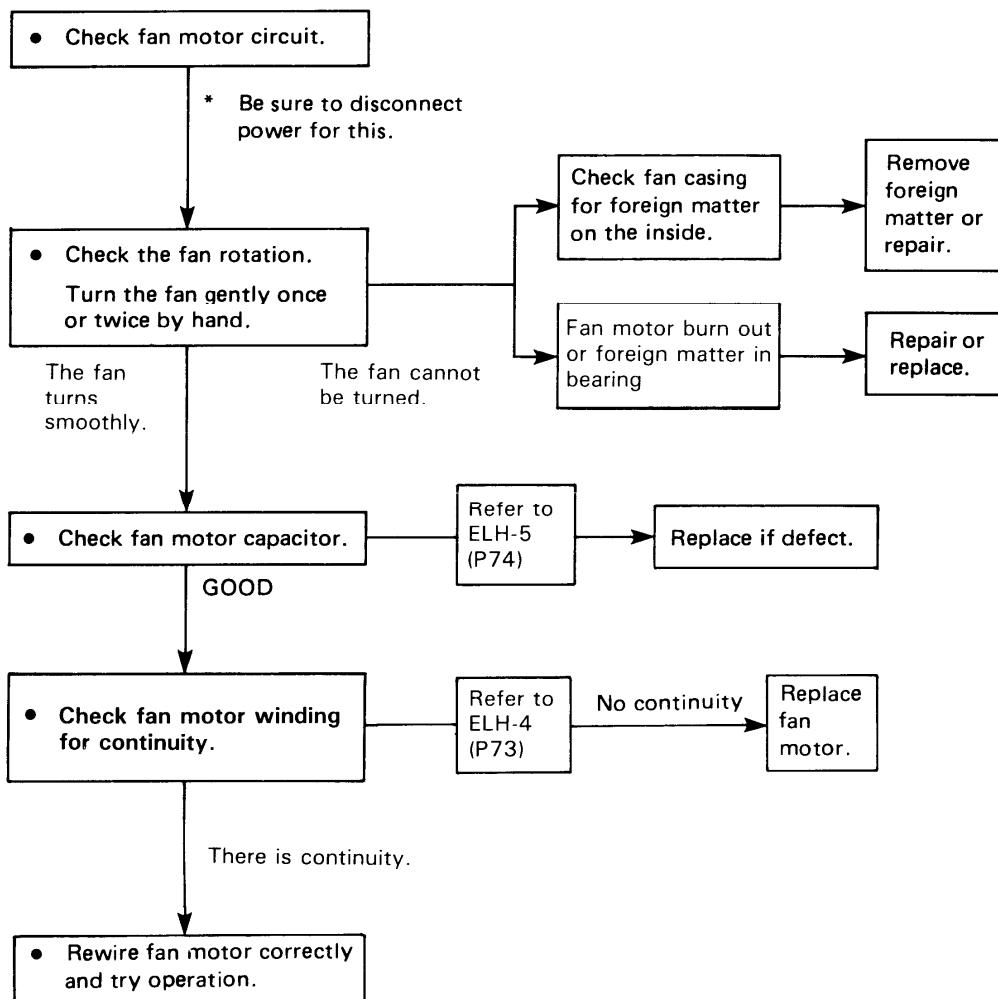
## 2.2 Neither outdoor fan nor compressor runs

**Note:** Check following points at first;

1. Is thermostat setting suitable?
2. Has 3 minute timer operated?  
(No operation for 3 minutes after power ON.)



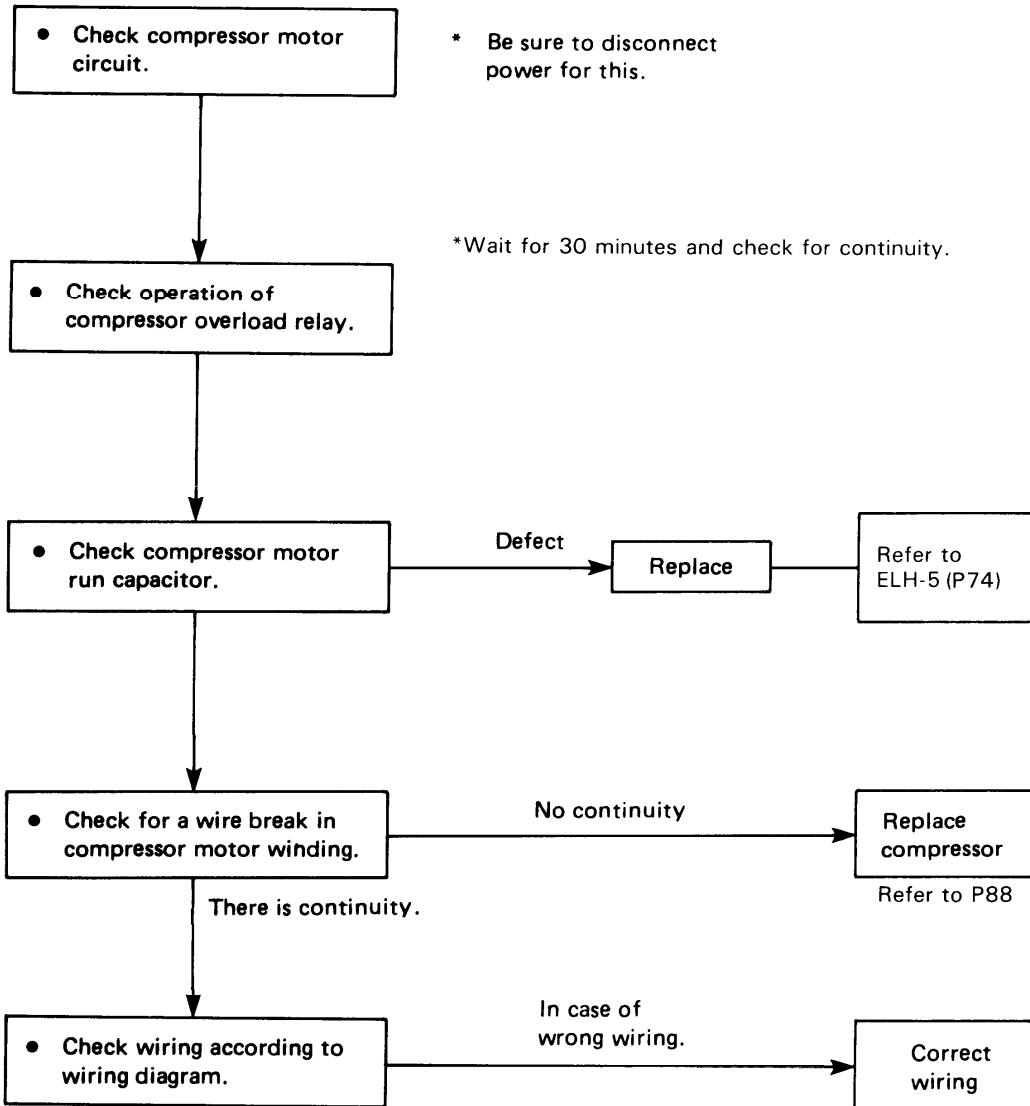
### 2.3 Only outdoor fan does not run



**NOTE 1:** The fan motor does not run until the winding temperature lowers and automatic resetting works if the internal thermostat operates.

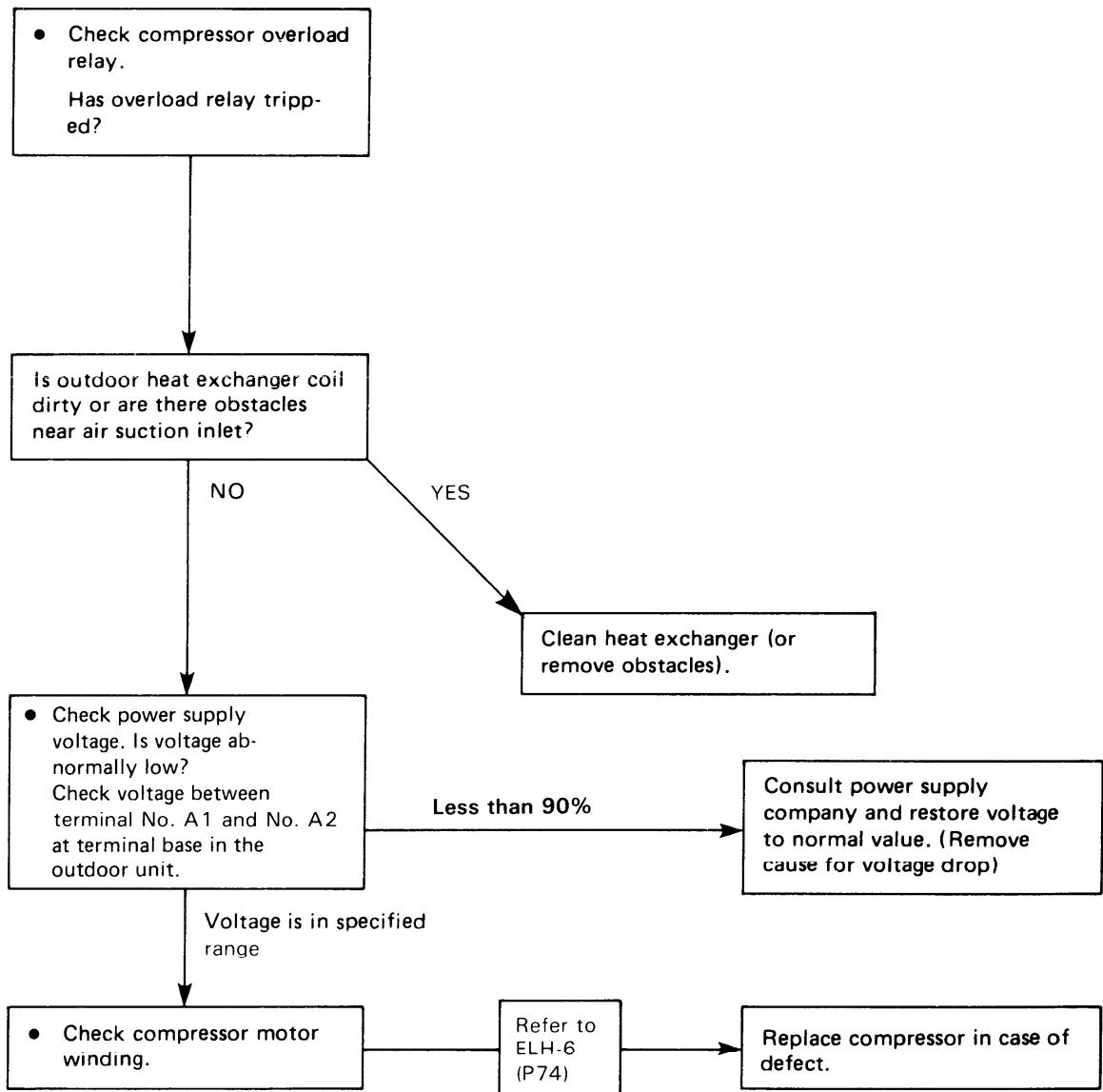
**2:** The fan motor stops during defrosting.

## 2.4 Only compressor does not run



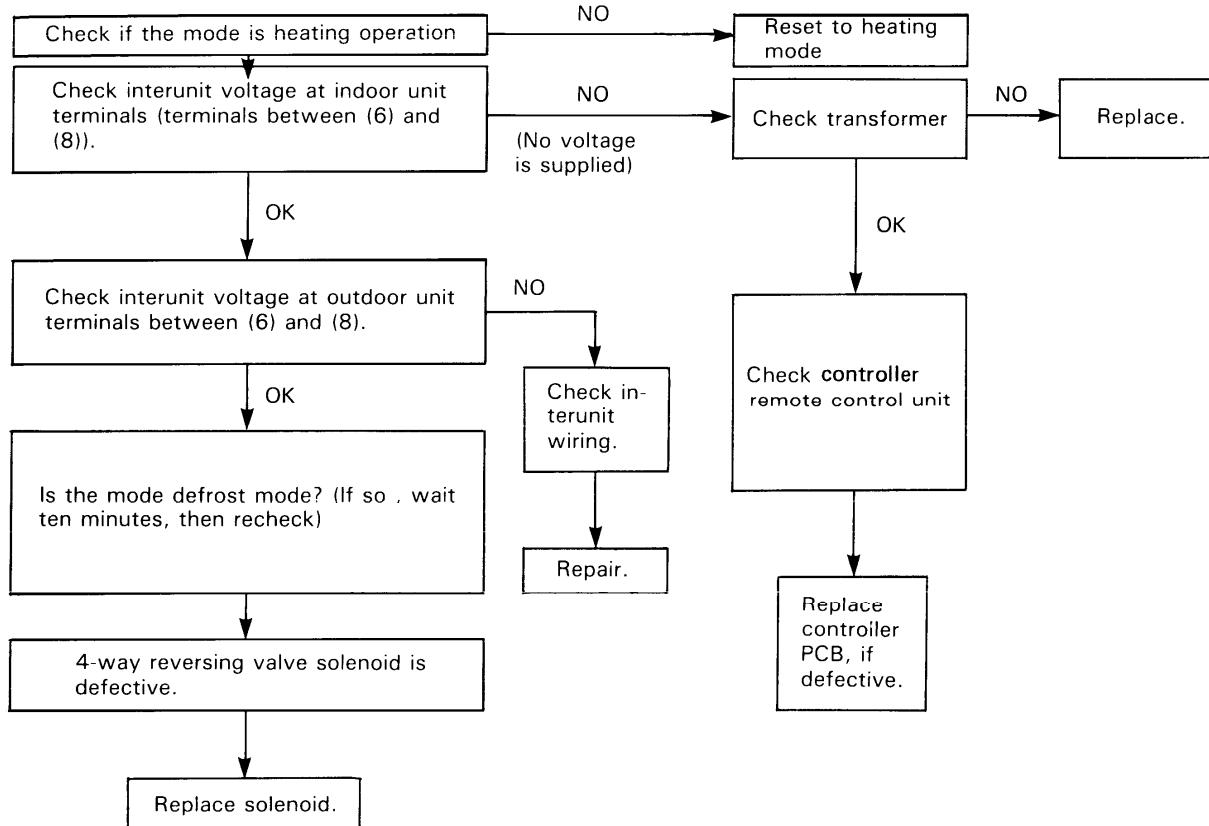
## 2.5 Compressor frequently repeats ON and OFF

(Only compressor repeats ON and OFF, while indoor unit and outdoor fan runs without fail.)



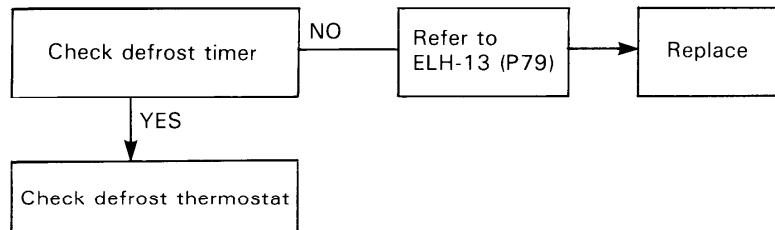
**2.6. Air conditioner will not enter into heating mode  
(only cooling is possible).**

**1) Heating operation cannot be done (4-way reversing valve malfunction).**



**2) Defrosting system malfunction**

**2-1. Defrosting can be achieved after continuous operation of the unit for a long time.**

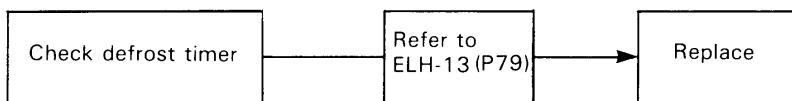


Defrost thermostat is normal if following conditions will be satisfied:

OFF	Maximum 50°F	ON	Minimum 23°F
-----	--------------	----	--------------

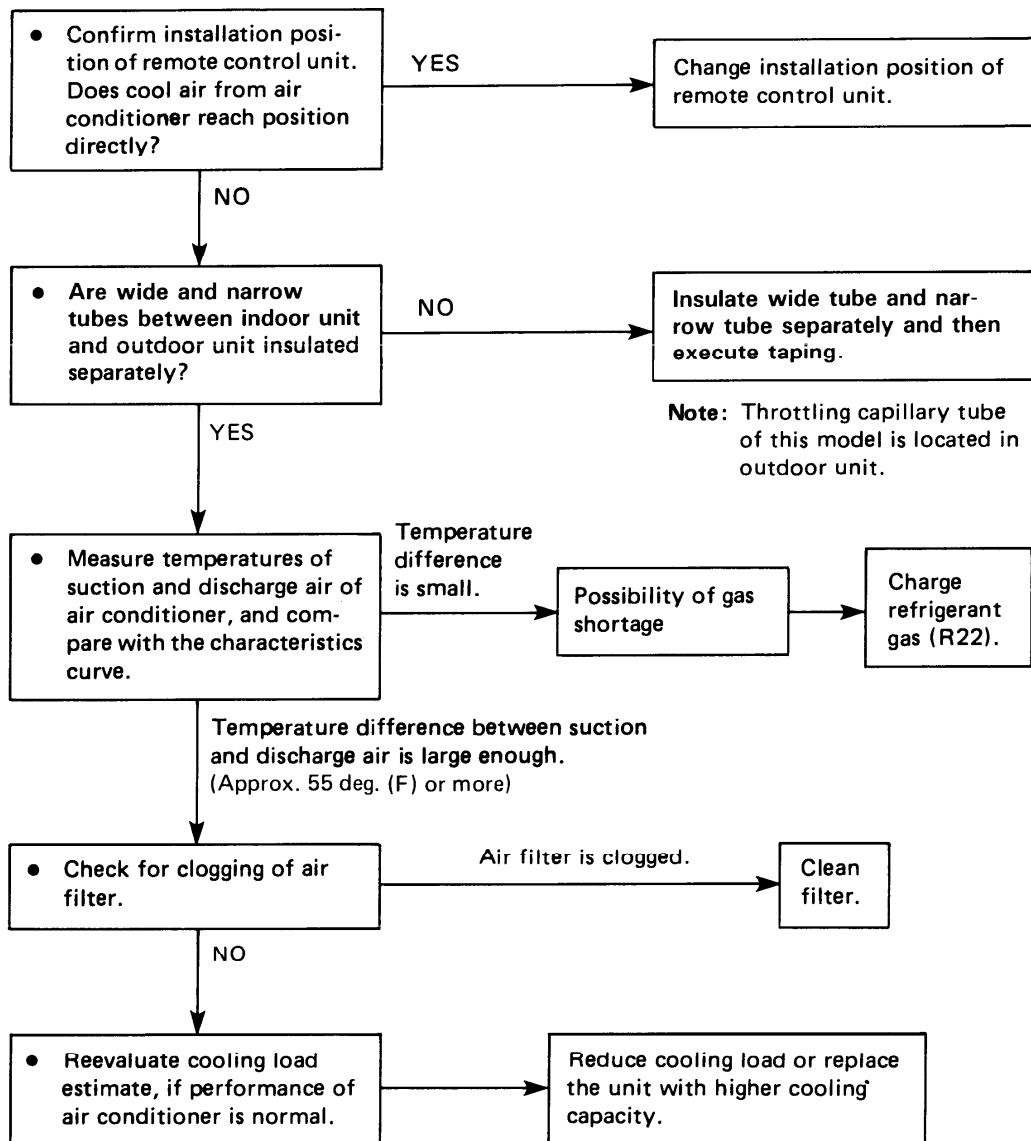
If the thermostat stays ON below 50°F, it is defective. → Replace the thermostat.

**2-2. No defrosting will be taken place at all.**

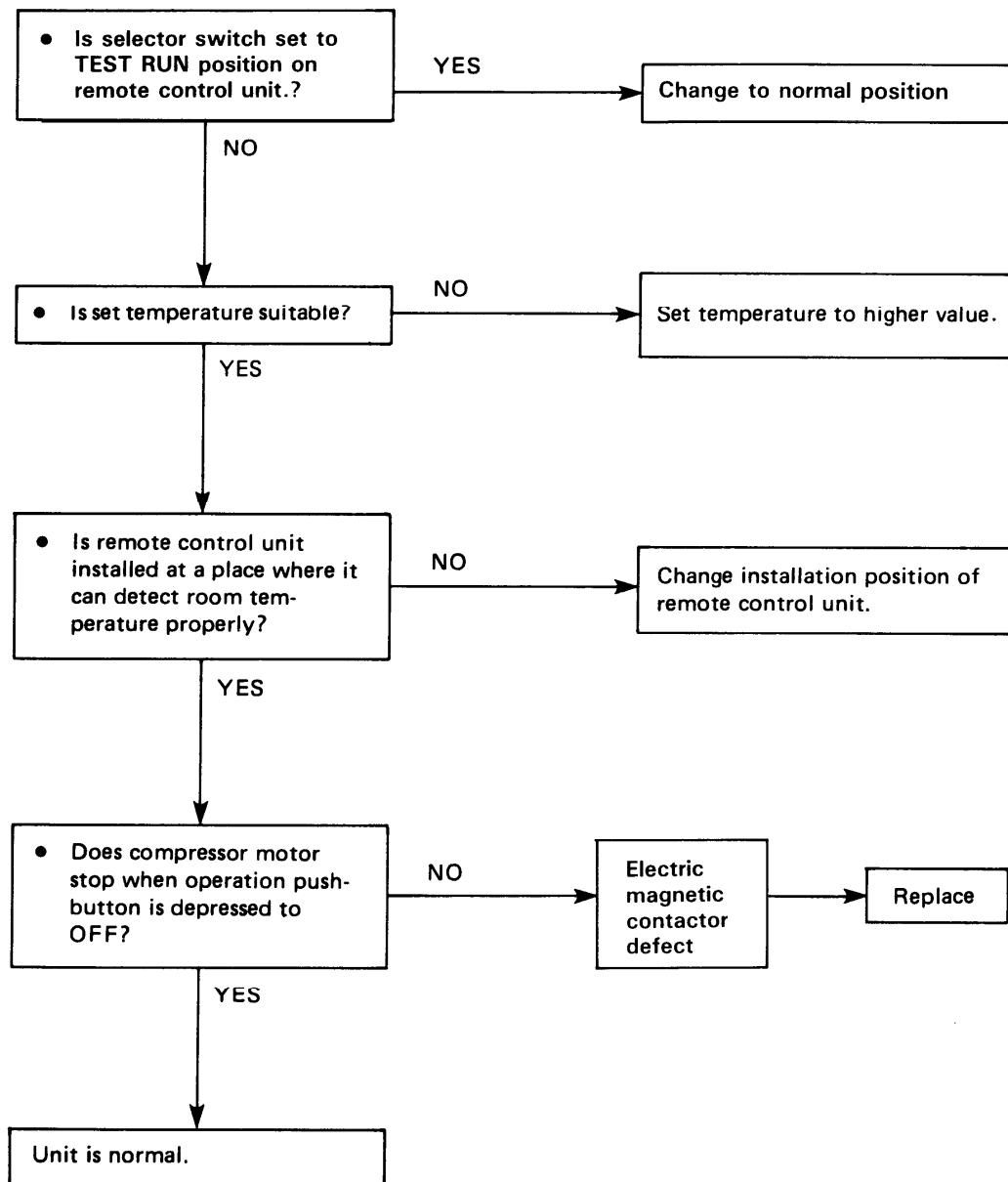


**3. Air conditioner operates, but abnormalities are observed**

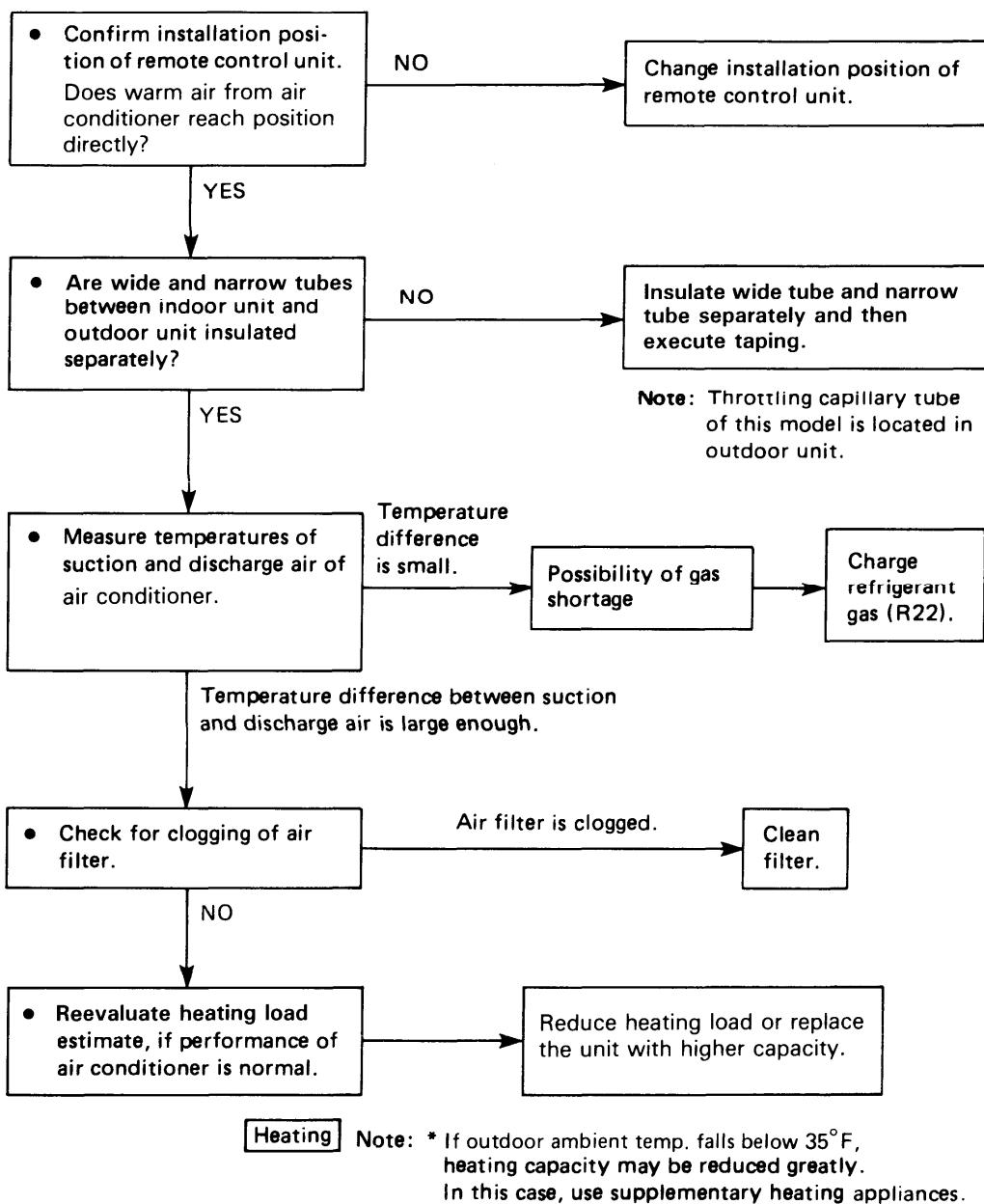
**3.1 Poor cooling**



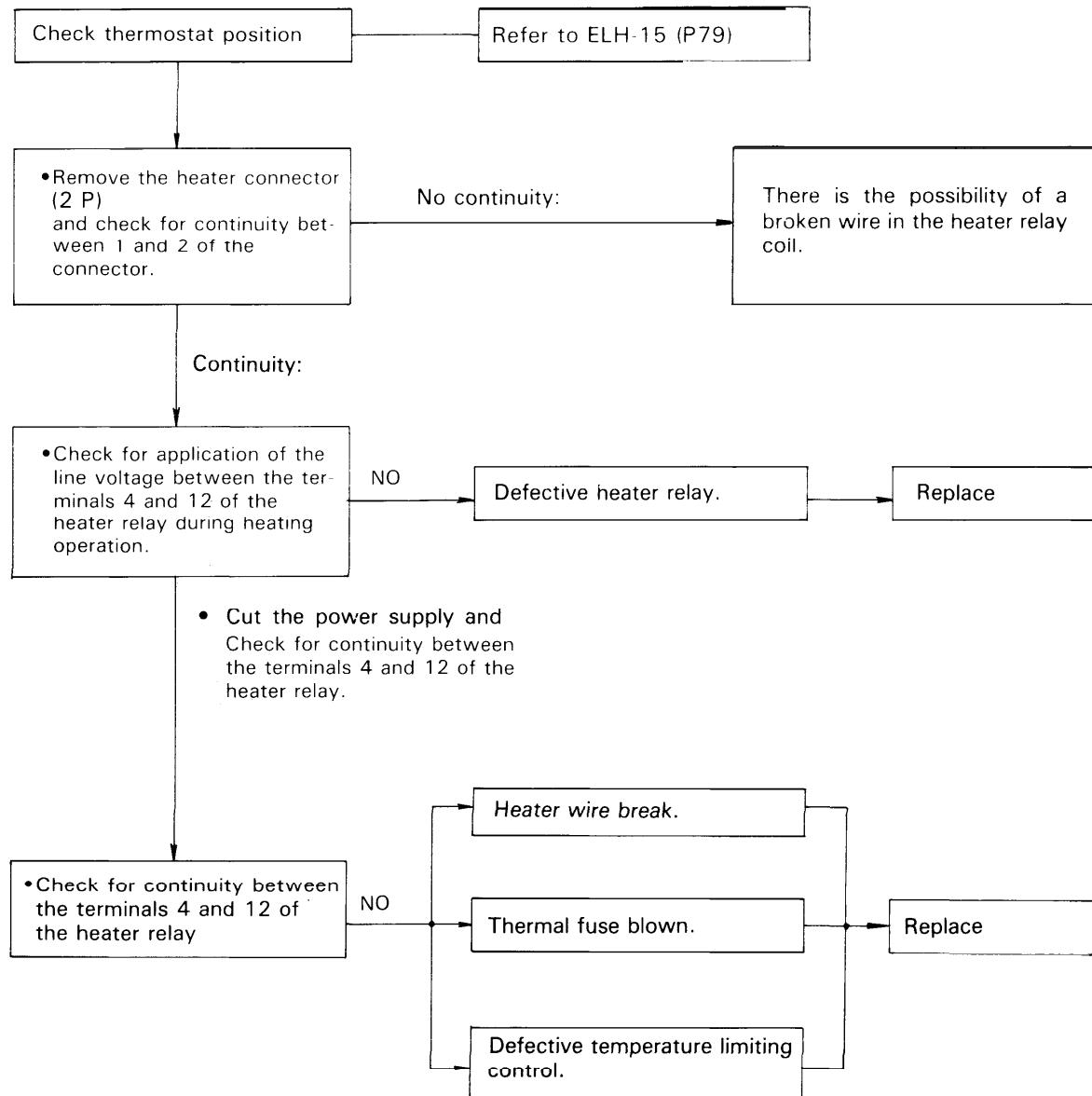
### 3.2 Excessive cooling



### 3.3 Poor heating



### 3.4. The electric heater does not work



#### 4. Respective Operation Modes at the Time of Heating

This system is so designed as to maintain a comfortable room temperature during heating operation according to the sequences described below.

##### 1) Cold Draft Prevention (=Standby) Mode:

When the standby lamp lights on, the indoor fan motor feeds a breeze and blowout of cool air is prevented. This takes place in the following cases.

- a) When compressor is turned off by the thermostat at the beginning of heating operation, and when the high pressure level is below 3 kg/cm<sup>2</sup>.
- b) During defrosting (normally, 7 – 8 min.) and right after changeover to heating from defrosting.

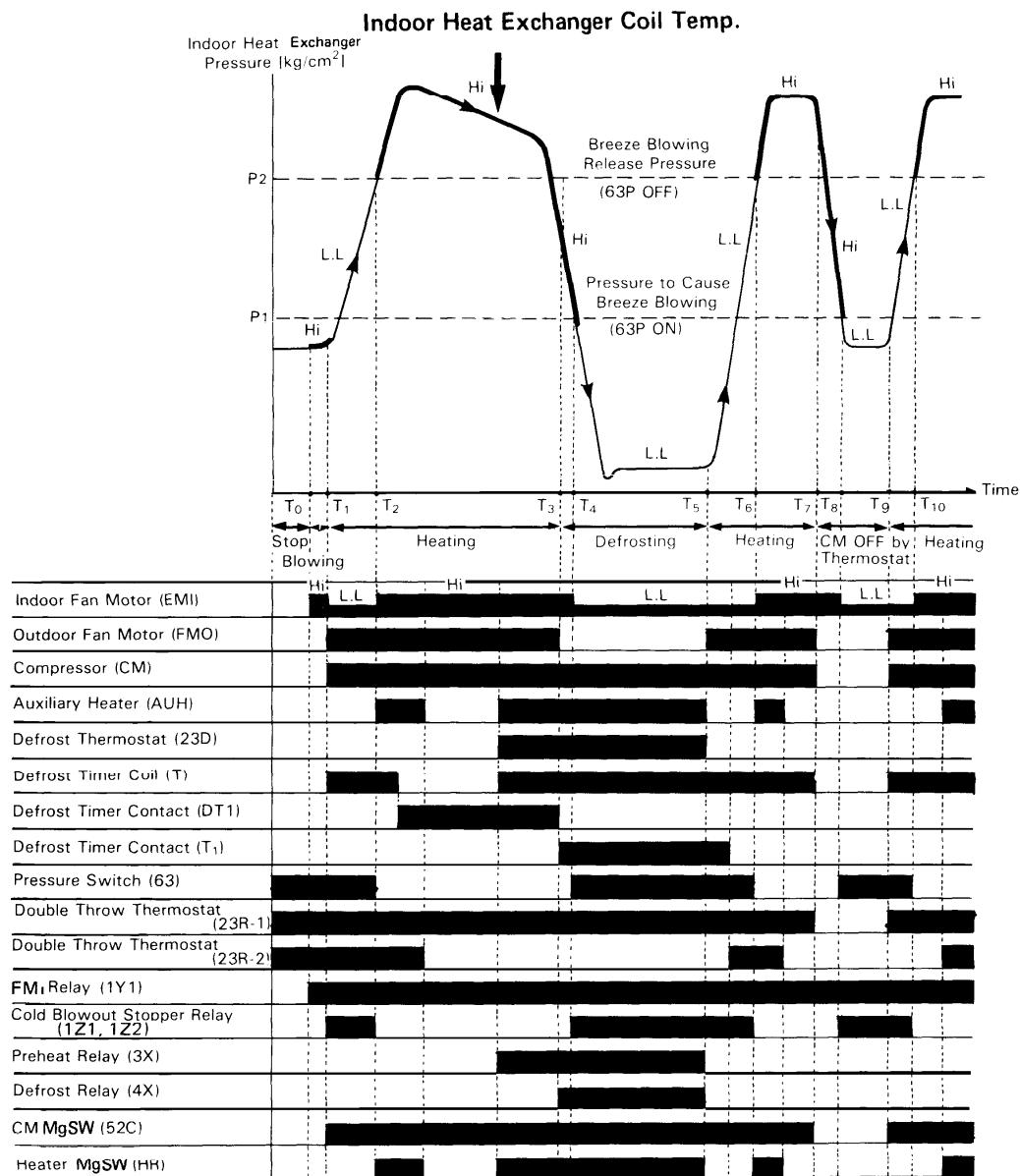
##### 2) Defrosting Mode:

When the capacity of unit has been decreased due to frost sticking to the outdoor heat exchanger during heating, the temperature drop gradient is detected by the defrost thermostat mounted at the inlet to the outdoor heat exchanger, and defrosting operation is started. At this time, the indoor fan motor feeds a breeze, and the system is automatically changed to cooling operation mode.

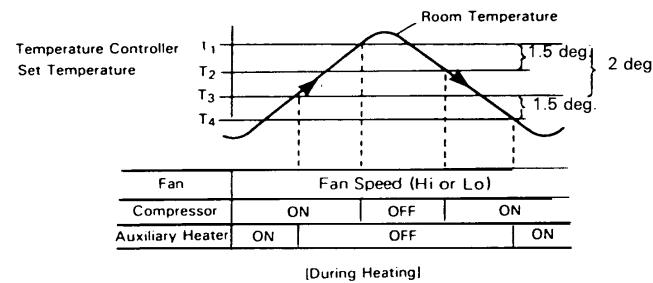
##### 3) Thermo. Cycle Operation Mode:

The indoor fan motor feeds a breeze to prevent cool air from being blown out when the high pressure level lowers below 8 kg/cm<sup>2</sup> after the compressor is stopped by thermostat operation.

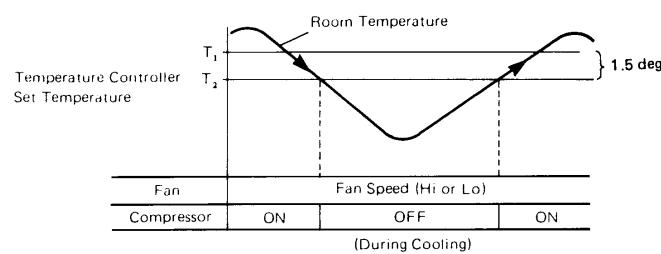
The sequence described in 1) – 5) are as illustrated in the following flow chart.



■ Automatic Fan Speed Control in Heating Mode



■ Automatic Fan Speed Control in Cooling Mode:



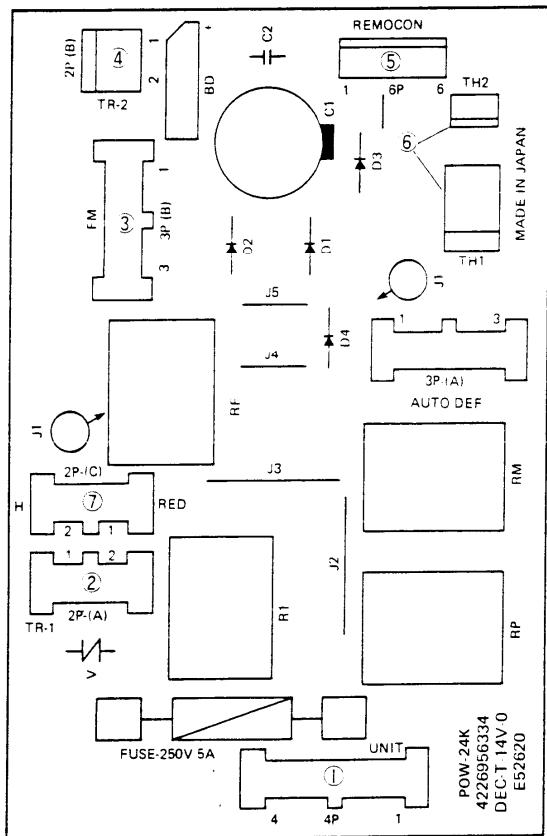
## **8. CHECKING AND REPLACING ELECTRICAL COMPONENTS**

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## ELA, Connector Identification on Controller PCB

POW-24K (For SAP241KC)

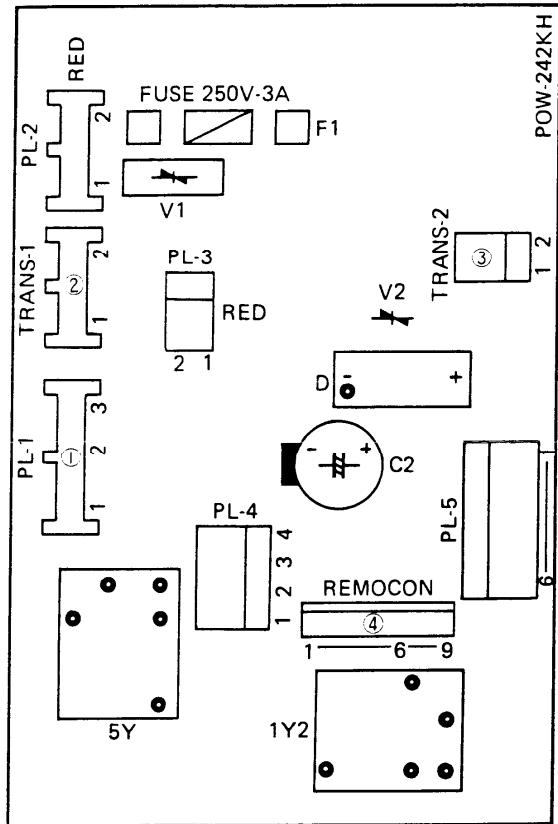


**Fig. E-A**

1. Connector, Power Supply to PCB \*
  2. Connector, Transformer (Primary: \* )
  3. Connector, Fan Motor \*
  4. Connector, Transformer (Secondary: 19 V)
  5. Connector, Remote Control Unit 24 V
  6. Connector, Thermistor Sensor 24 V
  7. Connector, Dew Proof Warmer \*

\*Line voltage

POW-242KH (For SAP242KCH)



**Fig. E-B**

1. Connector, Power Supply to PCB \*
  2. Connector, Transformer (Primary: \* )
  3. Connector, Transformer (Secondary: 19 V)
  4. Connector, **Remote** Control Unit 24 V

\* Line voltage

### ELC-1. Measurement of Insulation Resistance of the Power Cord

Clamp the ground (GND) line of the Power Cord with a lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the two power lines.

Then also measure the resistance between the GND line and the other power line. The insulation is in good condition if the resistance exceeds  $1\text{ M}\Omega$ . (Fig. E-1)

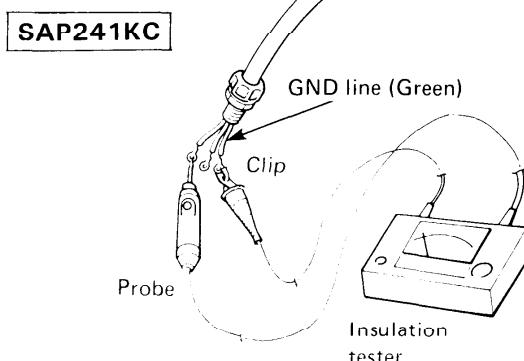


Fig. E-1

### ELC-2. Measurement of Insulation Resistance of the Compressor

Remove the red lead wire connected to the compressor motor from (4) on the terminal base. Clamp the removed black lead wire with a lead clip of the insulation resistance tester and measure the resistance by placing a probe of the tester to the terminal GND, to which green lead wire is connected.

The insulation is in good condition if the resistance exceeds  $1\text{ M}\Omega$ . (Fig. E-2).

### ELC-3. Measurement of Insulation Resistance of the Fan Motor

#### 3.1. In case of indoor fan motor

Remove the fan motor connector from controller PCB (P64, Fig. E-A). Clamp the green lead wire (at the bear section) extended from the terminal GND in the electrical component box and measure insulation resistance by placing a probe of the insulation tester to either pole of this connector.

The insulation is in good condition if the resistance exceeds  $1\text{ M}\Omega$ . Fig. E-3.

#### Note:

If the probe does not enter the pole because the hole is too narrow then use a probe with a thinner pin.

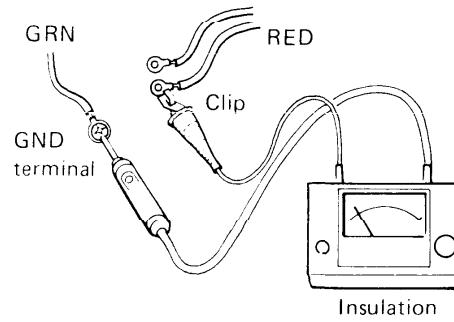


Fig. E-2

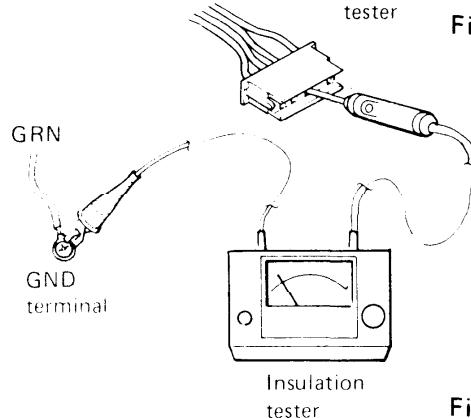


Fig. E-3

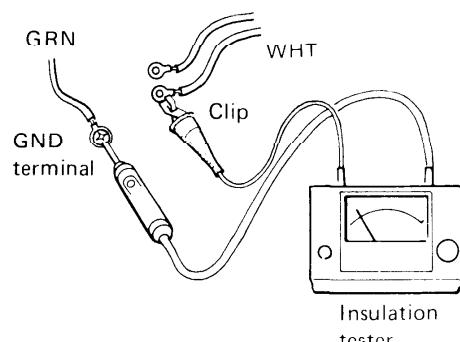


Fig. E-4

#### 3.2. In case of outdoor fan motor

Disconnect the white lead wire connected to Terminal (6) of the electric magnetic contactor. Clamp this lead wire with a lead clip of the insulation resistance tester and measure the resistance by placing a probe of the tester to the terminal GND.

The insulation is in good condition if the resistance exceeds  $1\text{ M}\Omega$ . Fig. E-4.

#### 3.3. Crankcase heater

Disjoin and check both ends of the crank case heater.

**ELC-4. Checking of the Outdoor Fan Motor**

Disconnect and check the fan motor lead wires (WHT, BRN, and PNK) as shown in the wiring diagram (Fig. E-5).

Set the resistance measuring range of the multimeter to "X1Ω" and measure the resistance between the fan motor lead wires.

SAP241C

Lead wire color	Coil resistance
WHT-BRN	$24\Omega \pm 10\%$
WHT-PNK	$54\Omega \pm 10\%$

(Table-1)

Note: When ambient temp is 70°F

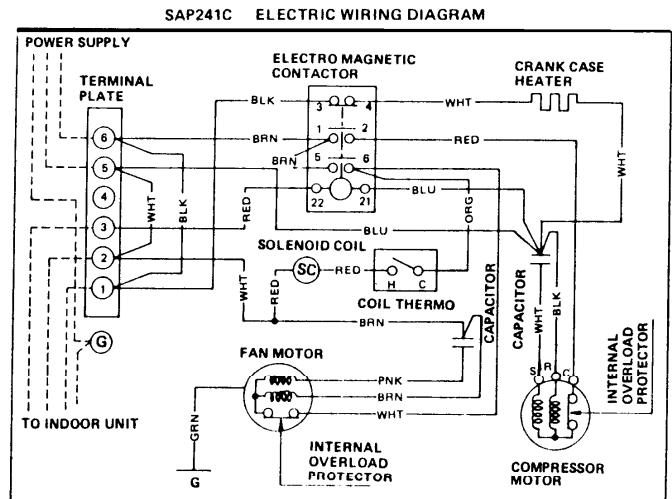


Fig. E-5

**ELC-5. Checking of the Motor Capacitor**

Checking of any of the indoor fan motor capacitor, outdoor fan motor capacitor and compressor motor capacitor can be done by the same method.

Remove both the lead wire terminals connected to the capacitor, place the probe on the capacitor terminals as shown in the Fig. E-6 and observe the deflection of the pointer, setting the resistance measuring range of the multimeter to the maximum value.

For good condition of the capacitor, the pointer bounces to a great extent and then gradually returns to its original position.

The range of deflection and deflection time differ according to the capacity of the capacitor.

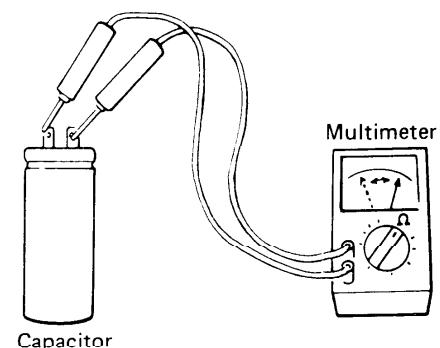


Fig. E-6

### ELC-6. Checking of the Compressor Motor Winding

Remove the terminal cover of the compressor motor, set the resistance measuring range of the multimeter to "X1Ω" and check the continuity between each pair out of the 3 terminals as indicated in Fig. E-7.

It is in good working condition if there is continuity among each pair of terminals.

SAP241C

Lead wire color	Coil resistance
C-R	0.66Ω ± 10%
C-S	1.97Ω ± 10%

(Table-2)

Note: When ambient temp is 77°F.

### ELC-7. Checking of the Remote Control Unit Proper

#### A. Caution: Use of the Test Switch (TEST RUN)

The position of the switch which is used to operate the air conditioner for a room temperature below 69°F(21°C) is the position of the switch for this TEST RUN.

If this operation is continued for a long time, there would be a bad effect on the air conditioner because of over-cooling. Therefore, use this switch only for checking, and in any case, DO NOT KEEP ON COOLING FOR MORE THAN 15 MIN. UNDER TEST RUN MODE.

When the checking is over, TURN THE SWITCH BACK TO ITS ORIGINAL POSITION (= RUN) WITHOUT FAIL.

#### REFERENCE TEST 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:

- Pull off the thermostat knob. Fig. E-8.
- Set the thermostat lever to the lowest position. (The central position of the lever becomes the TEST RUN position.) Fig. E-9.
- Press OPERATION "ON" button to start the air conditioner.
- After completion of test run, press "OFF" button to stop the unit.
- Reinstall the thermostat knob. (The stopper position facing down.)

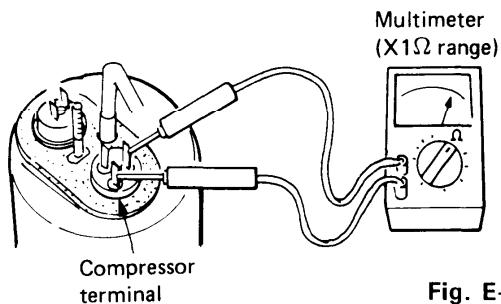


Fig. E-7

### 1. REMOTE CONTROL UNIT

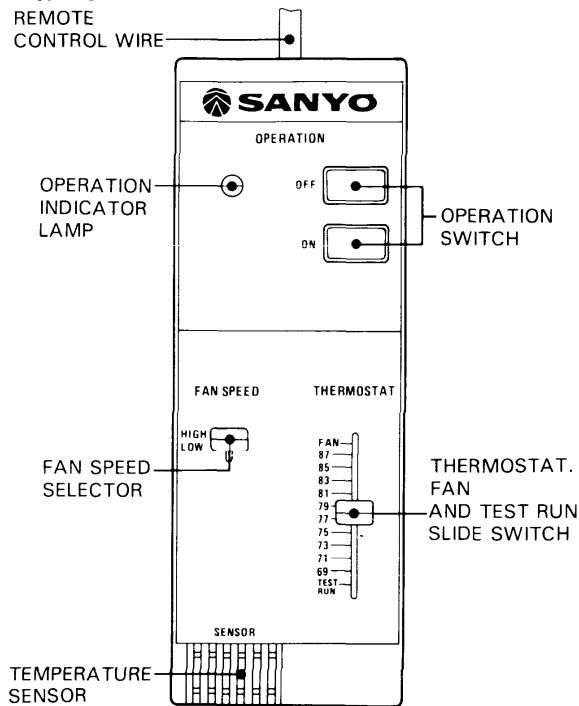


Fig. E-7A

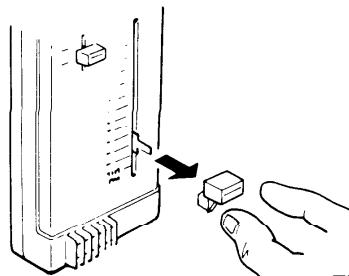


Fig. E-8

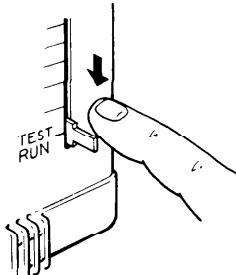
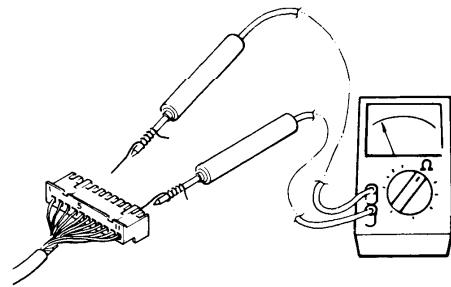


Fig. E-9

### B. Checking of the Items of the Remote Control Unit

At first, pull out the connector (7P) of the remote control unit from the controller PCB of the unit (refer to Fig. E-10).



#### (1) Fan Speed Selector

Check the continuity of the connector No. 3 against No. 4 (place the negative (-) probe on No. 4 and positive (+) probe on No. 3.)

**Fig. E-10**

Checking points	Position of the selector	
	High	Low
3-4	NO	NES

(Table-3)

**NOTE:** YES ..... Continuity  
NO ..... Discontinuity .....

#### (2) Checking of the Operation Pushbutton

The operating switch is in good working condition if there is continuity between No. 2 (placing the negative (-) probe) and No. 3 (placing positive (+) probe) while the pushbutton is pressed.

#### **CAUTION:**

Do not disassemble the Remote Control Unit.

It is supplied as a complete assembly and is carefully adjusted in the factory by skillful workmanship. Inexperienced disassembly will cause trouble and malfunction in the unit.

### **ELC-8. Checking of the Continuity of Fuse on the Controller PCB**

Check the continuity by the multimeter as shown in Fig. E-11.

If it is difficult to check in this way, remove the lamp board ass'y connector and then check it.

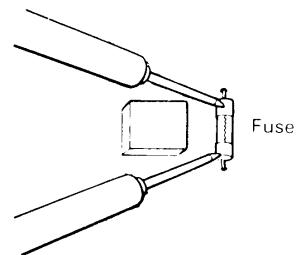


Fig. E-11

### **ELC-9. Method to Replace Fuse on the Controller PCB**

1. Remove the controller PCB
2. Pull out the fuse at the metal clasp by a pair of pliers while heating the soldered leads on the back side of the controller PCB with a soldering iron (30W or 60W). Fig. E-12.
3. Remove the fuse ends one by one. For replacement, insert a fuse of the same rating and solder it.  
(Allow time to radiate heat during soldering so that the fuse does not melt).

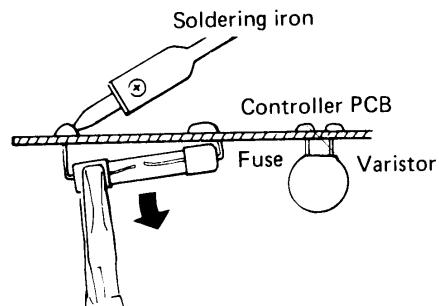


Fig. E-12

**CAUTION** : Be sure to replace the varistor adjacent to the fuse either when the fuse is blown.

**ELC-10. Checking of the Power Transformer**

1. Remove connectors TRANS-1 and TRANS-2 from the controller PCB.
2. Set the resistance measuring range of multimeter to "X1Ω" and measure the resistance of the lead wires between WHT - WHT and BRN - BRN as shown in Fig. E-13.

It will be completely satisfactory if all measured values agree with those indicated in Table-5.

Lead wires	Value of resistance
WHT - WHT	About 143.5Ω
BRN - BRN	About 1.2Ω

(Table-5)

NOTE: Ambient room temp . . . . . 70°F

**ELC-11. Checking of the Indoor Fan Motor**

Remove the fan motor connector FM from controller PCB and measure the resistance between each lead wires of the fan motor connector setting the resistance measuring range to "X1Ω".

The motor is in very good working condition if all the values agree with those indicated in Table-6.

Lead wires	Value of resistance
WHT-BRN	about 141 Ω
WHT-VLT	83 Ω
VLT-YEL	73 Ω
YEL-PNK	21 Ω

(Table-6)

NOTE: Ambient room temp . . . . . 68°F

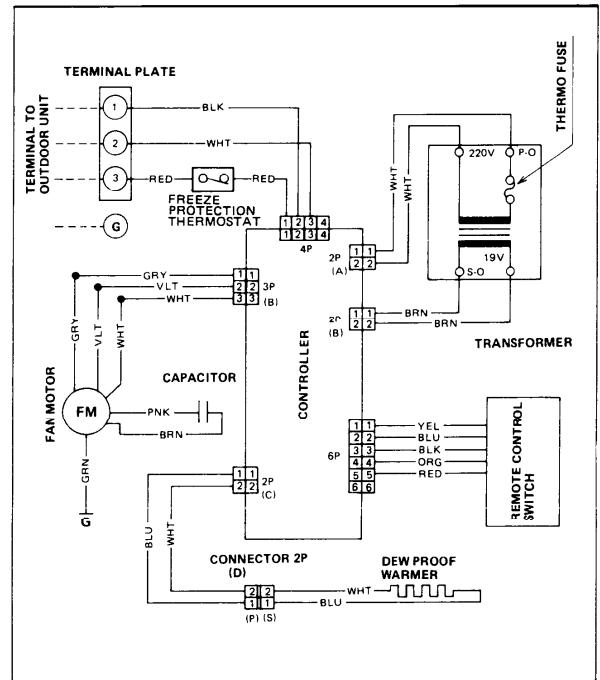
**SAP241K ELECTRIC WIRING DIAGRAM**

Fig. E-13

### **ELC-12. Checking of the Solenoid Coil**

Disconnect Terminals (2) from the terminal and check the continuity between RED and RED disjoining Coil Thermostat "H." Satisfactory if continuity is assured. If continuity cannot be verified, the wire must be broken. Check and replace the wire.

### **ELC-13. Checking of the Coil Thermostat**

Disconnect the lead wire connected to the coil thermostat. Check the coil thermostat itself. Satisfactory if the value is as follows. (Table 8)

ON	75°F	OFF	79°
----	------	-----	-----

(Table-8)

### **ELC-14. Checking of the Electric Magnetic Contactor**

Disconnect (21) and (22) and check continuity using a multimeter. Satisfactory if continuity is assured. If continuity cannot be verified, the coil must be broken. Check and replace the coil.

### **ELC-15. Checking of the Crankcase Heater**

Disjoin both ends and check continuity. Satisfactory if continuity is assured. If continuity cannot be verified, the heater must have broken wire. Check and replace broken wire.

### **ELC-16. Checking of the Dewproof Warmer**

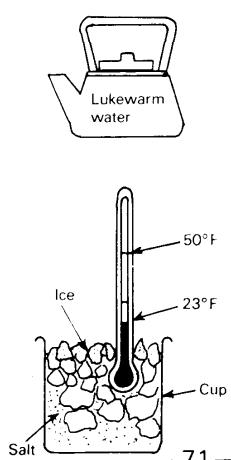
Disconnect Connector 2P for the dewproof warmer located by the power transformer and check continuity. Satisfactory if continuity is assured. If continuity cannot be verified, replace the connector.

### **ELC-17. Checking of the Freeze Protection Thermostat**

Remove the red lead wires (RED) connected to the freeze protection thermostat.

Temperature	Normal Condition
23°F or below	Discontinuous
50°F and above	Continuous

1. Prepare a cup of water with ice.
2. Add several spoonful of salt in it and stir well.
3. Measure the water temperature with a thermometer.
4. Dip the end of thermostat sensor in the cup and check continuity while measuring change in water temperature.
5. If discontinuity around 23°F is confirmed, pour lukewarm water (not boiling hot) and observe continuity around 50°F.



Above conditions are confirmed, functions of the thermostat is normal.

### ELH-1. Measurement of Insulation Resistance of the Power Cord

Clamp the ground (GND) line of the Power Cord with a lead clip of the insulation resistance tester and measure the resistance by placing a probe on either of the two power lines.

Then also measure the resistance between the GND line and the other power line. The insulation is in good condition if the resistance exceeds  $1 \text{ M}\Omega$ . (Fig. E-1H)

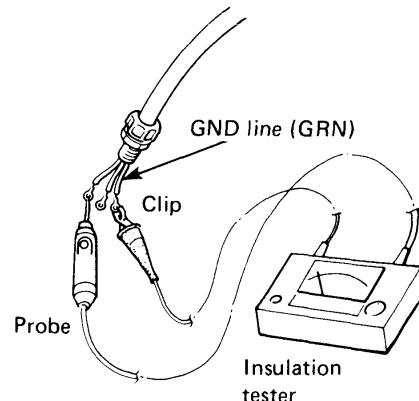


Fig. E-1H

### ELH-2. Measurement of Insulation Resistance of the Compressor

Remove the blue lead wire connected to the compressor motor from A2 on the terminal base. Clamp the removed blue lead wire with a lead clip of the insulation resistance tester and measure the resistance by placing a probe of the tester to the terminal GND to which green lead wire is connected.

The insulation is in good condition if the resistance exceeds  $1 \text{ M}\Omega$  (Fig. E-2H).

### ELH-3. Measurement of Insulation Resistance of the Fan Motor

#### 3.1. In case of indoor fan motor

Disconnect and check Terminal 8P-2 (GRY).

Clamp the green lead wire (at the bear section) exended from the terminal GND in the electrical component box and measure insulation resistance by placing a probe of the insulation tester to either pole of this connector.

The insulation is in good condition if the resistance exceeds  $1 \text{ M}\Omega$ . Fig. E-3H.

**Note:**

If the probe does not enter the pole because the hole is too narrow then use a probe with a thinner pin.

#### 3.2. In case of outdoor fan motor

Disjoin and check A2 (WHT) and 8P-2 (WHT).

Clamp this lead wire with a lead clip of the insulation resistance tester and measure the resistance by placing a probe of the tester to the terminal GND.

The insulation is in good condition if the resistance exceeds  $1 \text{ M}\Omega$ . Fig. E-4H

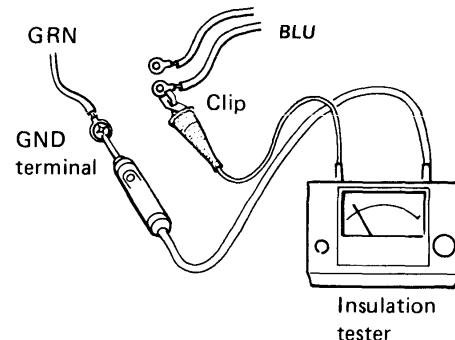


Fig. E-2H

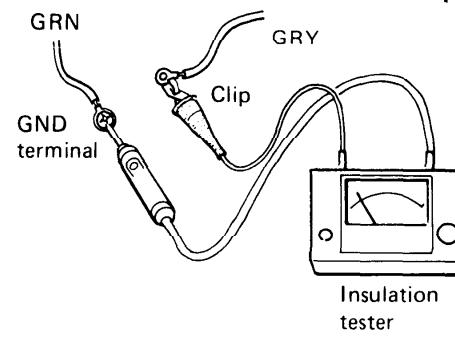


Fig. E-3H

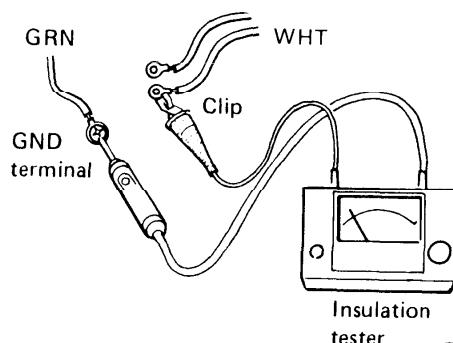


Fig. E-4H

### **3.3 In case of the crankcase heater**

Disjoin and check 8P-2 (WHT) and 8P-1 (RED).

### **3.4 In case of the solenoid coil**

Disjoin and check (H) of Thermostat 23A and 8P-8.

### **3.5 In case of the four way reversing valve**

Disjoin and check 8P-8 and Auxiliary Relay 4X-2.

#### **ELH-4. Checking of the Outdoor Fan Motor**

Remove the white (WHT) lead wire from the terminal ③, then brown (BRN) and pink (PNK) lead wires from the fan motor capacitor respectively as shown in page 109.

Set the resistance measuring range of the multimeter to "X1Ω" and measure the resistance between the fan motor lead wires.

Lead wire color	Coil resistance
WHT-BRN	$24\Omega \pm 10\%$
WHT-PNK	$54\Omega \pm 10\%$

(Table 1H)

**NOTE:** When ambient temp. is 70°F.

### ELH-5. Checking of the Motor Capacitor

Checking of any of the indoor fan motor capacitor, outdoor fan motor capacitor and compressor motor capacitor can be done by the same method.

Remove both the lead wire terminals connected to the capacitor, place the probe on the capacitor terminals as shown in the Fig. E-6H and observe the deflection of the pointer, setting the resistance measuring range of the multimeter to the maximum value.

For good condition of the capacitor, the pointer bounces to a great extent and then gradually returns to its original position.

The range of deflection and deflection time differ according to the capacity of the capacitor.

### ELH-6. Checking of the Compressor Motor Winding

Remove the terminal cover of the compressor motor, set the resistance measuring range of the multimeter to "X1Ω" and check the continuity between each pair out of the 3 terminals as indicated in Fig. E-7.

It is in good working condition if there is continuity among each pair of terminals.

SAP242 CH

Lead wire color	Coil resistance
C-R	$0.66\Omega \pm 10\%$
C-R	$1.97\Omega \pm 10\%$

### ELH-7. Checking of the Remote Control Unit Proper

#### A. Caution: Use of the Test Switch (TEST RUN)

The position of the switch which is used to operate the air conditioner for a room temperature below 69°F(21°C) is the position of the switch for this TEST RUN.

If this operation is continued for a long time, there would be a bad effect on the air conditioner because of over-cooling. Therefore, use this switch only for checking, and in any case, DO NOT KEEP ON COOLING FOR MORE THAN 15 MIN. UNDER TEST RUN MODE.

When the checking is over, TURN THE SWITCH BACK TO ITS ORIGINAL POSITION (= RUN) WITHOUT FAIL.

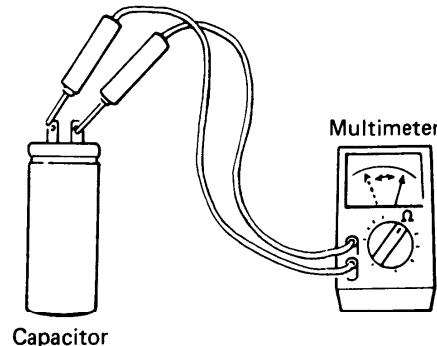


Fig. E-6H

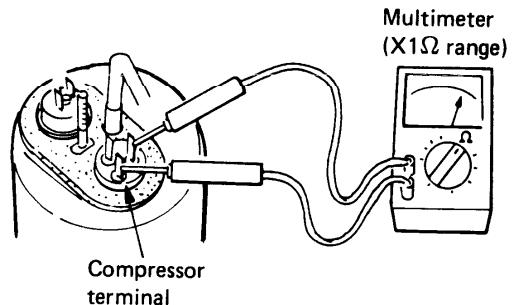


Fig. E-7H

### 1. REMOTE CONTROL UNIT

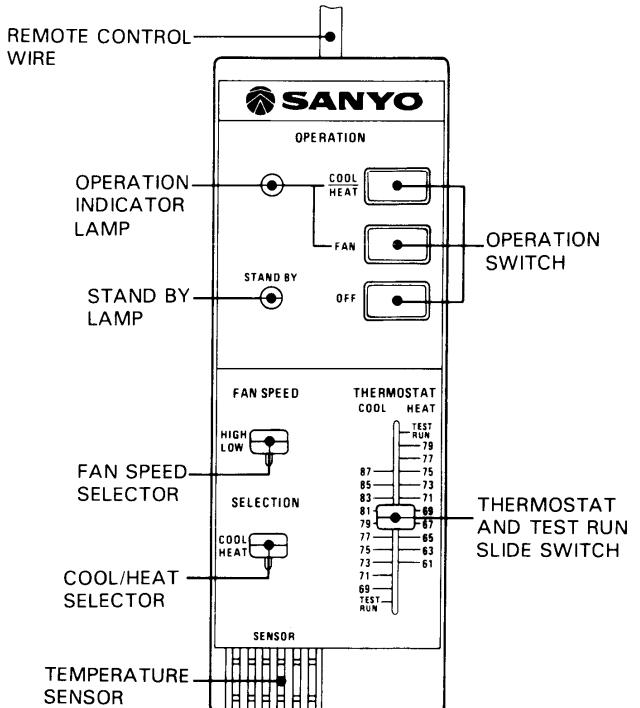


Fig. E-8H

**REFERENCE****TEST 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:

- Pull off the thermostat knob. Fig. E-9H.
- Set the thermostat lever to the lowest position. (The central position of the lever becomes the TEST RUN position.)Fig. E-10H.
- Press OPERATION "ON" button to start the air conditioner.
- After completion of test run, press "OFF" button to stop the unit.
- Reinstall the thermostat knob. (The stopper position facing down.)

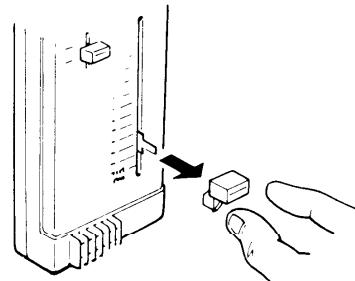


Fig. E-9H

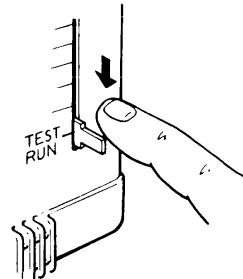


Fig. E-10H

**B. Checking of the Items of the Remote Control Unit**

At first, pull out the connector (9P) of the remote control unit from the controller PCB of the unit (refer to Fig. E-11H).

## (1) Fan Speed Selector

Check the continuity of the connector No. 3 and No. 4 (place the negative (-) probe on No. 4 and positive (+) probe on No. 3.)

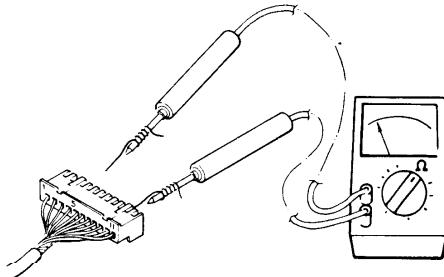


Fig. E-11H

Checking points	Position of the selector	
	High	Low
3-4	NO	YES

NOTE: YES .....Continuity  
NO .....Discontinuity

## (2) Checking of the Operation Pushbutton

The operating switch is in good working condition if there is continuity between No. 2 (placing the negative (-) probe) and No. 3 (placing positive (+) probe) while the pushbutton is pressed.

**CAUTION:**

Do not disassemble the Remote Control Unit.

It is supplied as a complete assembly and is carefully adjusted in the factory by skillful workmanship. Inexperienced disassembly will cause trouble and malfunction in the unit.

### ELH-8. Checking of the Continuity of Fuse on the Controller PCB

Check the continuity by the multimeter as shown in Fig. E-12H.

If it is difficult to check in this way, remove the lamp board ass'y connector and then check it.

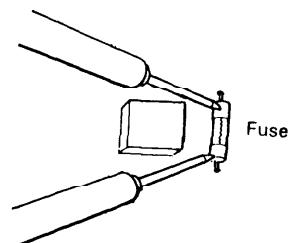


Fig. E-12H

### ELH-9. Method to Replace Fuse on the Controller PCB

1. Remove the controller PCB
2. Pull out the fuse at the metal clasp by a pair of pliers while heating the soldered leads on the back side of the controller PCB with a soldering iron (30W or 60W). Fig. E-13H.
3. Remove the fuse ends one by one. For replacement, insert a fuse of the same rating and solder it.  
(Allow time to radiate heat during soldering so that the fuse does not melt).

**CAUTION** : Be sure to replace the varistor adjacent to the fuse either when the fuse is blown.

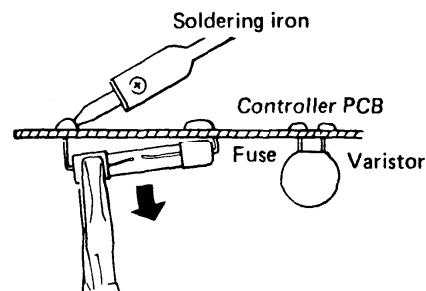


Fig. E-13H

#### **ELH-10. Checking of the Power Transformer**

1. Remove connectors TRANS-1 and TRANS-2 from the controller PCB.
2. Set the resistance measuring range of multimeter to "X1Ω" and measure the resistance of the lead wires between WHT - WHT and BRN - BRN as shown in page 108.

It will be completely satisfactory if all measured values agree with those indicated in Table -3H

<b>Lead wires</b>	<b>Value of resistance</b>
WHT-WHT	About 143.5 Ω
BRN-BRN	About 1.2 Ω

(Table-3H)

Note: Ambient room temp ..... 70°F

**ELH-11. Checking of the Indoor Fan Motor**

Remove the fan motor connector FM from controller PCB and measure the resistance between each lead wires of the fan motor connector setting the resistance measuring range to "X1Ω".

The motor is in very good working condition if all the values agree with those indicated in Table 4H.

Lead wires	Value of resistance
WHT—BRN	About 141Ω
WHT—VLT	83 Ω
VLT—YEL	73 Ω
YEL—PNK	21 Ω

(Table-4H)

NOTE: Ambient temp 68°F

**ELH-12. Checking of the Heater Circuit**

Switch off air conditioner power and remove Heater Terminals (4) and (12). Next, set the multimeter to the "Ω" range and check for continuity between WHT and WHT/BLK. There should be continuity, and any one of the following cases can be considered when there is no continuity.

1. Blown thermal cut-off (fuse)
2. Defective temperature limiting control (T.L.C.)
3. Heater wire break.

Exchange the defective part after it has been identified.

### **ELH-13. Checking of the Defrost Timer (T)**

Remove Lead Wires ORG and GRY from Terminals (7) and (8) of the defrost timer motor. Set the multimeter to the  $\Omega$  range and check continuity of Terminals (7) and (8) of the defrost timer motor. Satisfactory if continuity is assured. If continuity cannot be verified, the coil wire of the defrost timer motor must be broken. Check and replace the wire.

### **ELH-14. Checking of the Solenoid Coil (SV)**

Disconnect Terminals (2) from the terminal and check the continuity between RED and RED disjoining coil Thermostat "H." Satisfactory if continuity is assured. If continuity cannot be verified, the wire must be broken. Check and replace the wire.

### **ELH-15. Checking of the Thermostat (23A)**

Satisfactory if the value is as follows.

ON 75°F	OFF 79°F
---------	----------

(Table-5H)

### **ELH-16. Checking of the Compressor Motor Magnetic Contactor (52C)**

Disconnect the connected terminals and check the contactor itself. Satisfactory if continuity is assured. Replace if continuity cannot be verified.

### **ELH-17 Checking of the Crankcase Heater (CH)**

Disjoin both ends and check continuity. Satisfactory if continuity is assured. If continuity cannot be verified, the heater must have broken wire. Check and replace broken wire.

### **ELH-18. Checking of the Defrost Thermostat (23D)**

Satisfactory if the value is as follows.

ON 23°F	OFF 50°F
---------	----------

(Table-6H)

NOTE: Ambient temp 32°F

### **ELH-19. Checking of the Four-Way Reversing Valve (20S)**

Check coil continuity. Satisfactory if continuity is assured. If continuity cannot be verified, replace the coil.

### **ELH-20. Checking of the Pressure Switch (63)**

Satisfactory if the value is as shown below.

ON 8kg/cm <sup>2</sup>	OFF 13kg/cm <sup>2</sup>
------------------------	--------------------------

(Table-7H)

### **ELH-21. Checking of the Dewproof Warmer (DPH)**

Disconnect the dewproof heater connector (2P) mounted by the power transformer and check continuity. Satisfactory if continuity is assured. If continuity cannot be verified, replace the connector.

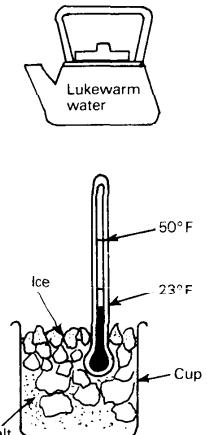
### **ELE-22 Checking of the Freeze Protection thermostat**

Remove the violet and pink lead wires (VLT, PNK) connected to the freeze protection thermostat.

Temperature	Normal Condition
23°F or below	Discontinuous
50°F and above	Continuous

1. Prepare a cup of water with ice.
2. Add several spoonful of salt in it and stir well.
3. Measure the water temperature with a thermometer.
4. Dip the end of thermostat sensor in the cup and check continuity while measuring change in water temperature.
5. If discontinuity around 23°F is confirmed, pour lukewarm water (not boiling hot) and observe continuity around 50°F.

Above conditions are confirmed, functions of the thermostat is normal.



## 9. DISASSEMBLY AND SERVICE PROCEDURES

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## Indoor Unit

### 9-1 Electrical Component Box-Removal

- 1) Remove the side cover (A) by unfastening four black color screws.
- 2) Remove the front panel (B) by unfastening two black color screws.
- 3) Remove the cover plates (C) and (D) of the electrical component box in accordance with Figure D-1.

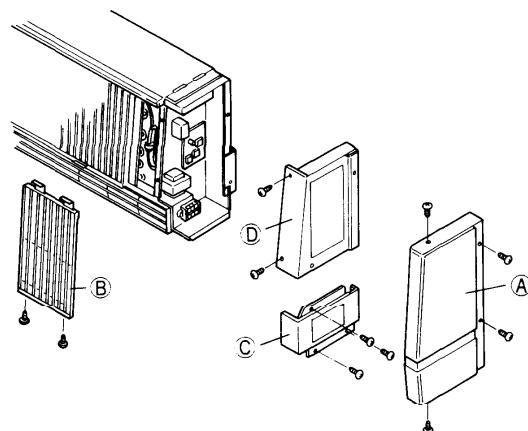


Fig. D-1

- 4) Disconnect the interunit wires from the terminal block.

- 5) Remove or loosen the connector socket and lead wires in accordance with Figure D-2.

#### CAUTION :

Do not apply an excessive force when removing the connector socket or lead wires.

- 6) Unfasten the screws in accordance with Figure D-2. The electrical component box can be pulled out.

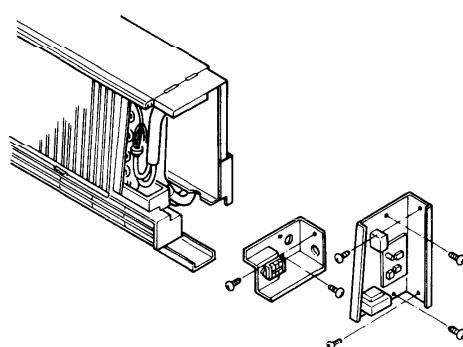


Fig. D-2

### 9-2 Evaporator (Indoor Heat Exchanger) and Drain Pan Removal

- 1) Remove the electrical component box.
- 2) Remove the side cover (A).
- 3) Slide the sash (B) sideways to remove, then remove the air intake grille (with a filter) as shown in Figure D-3.

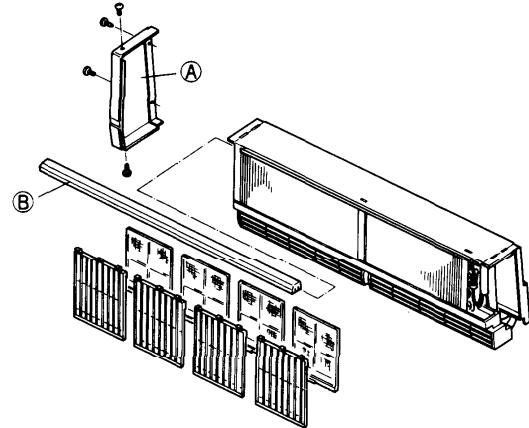


Fig. D-3

- 4) Remove the four mounting metals (A).
- 5) Remove the refrigerant tubing holder (B).
- 6) The evaporator and drain pan can be pulled out after removing the screws shown in Figure D-4.

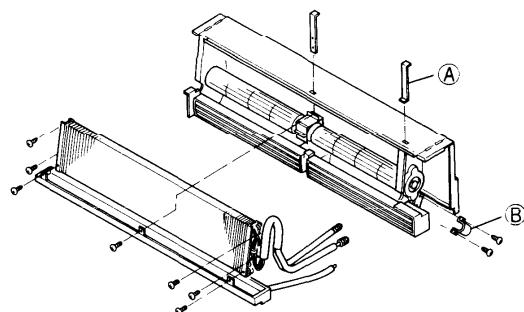


Fig. D-4

### 9-3 Fan and Fan Motor - Removal

- 1) Remove the blade mounting parts (A), (B) and (C) and pull the blade (D) out.
- 2) Remove the bottom plate. (See Figure D-5.)

**NOTE :**

Slide and pull out the mounting metal (G) from the bottom plate (E) to remove the dewproof warmer (F).

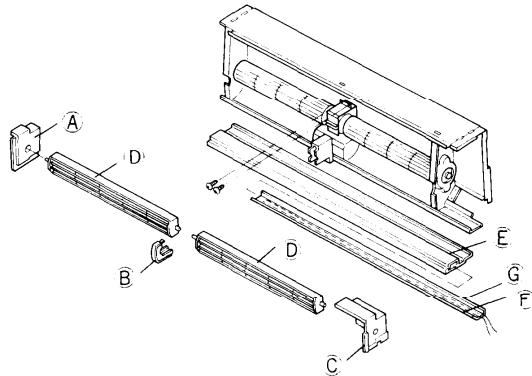


Fig. D-5

- 3) Remove the bearing case (A) and bearing assembly (B).
- 4) Loosen the fan fixing bolts (C) using a hexagonal key.
- 5) Slide the fans left and right to remove them.
- 6) Remove the motor cover (D) and unscrew the screws (E) fixing the motor to open the motor fixing arm (F) as shown in Fig. D-6.
- 7) The fan motor can be removed in front as shown in Figure D-6.

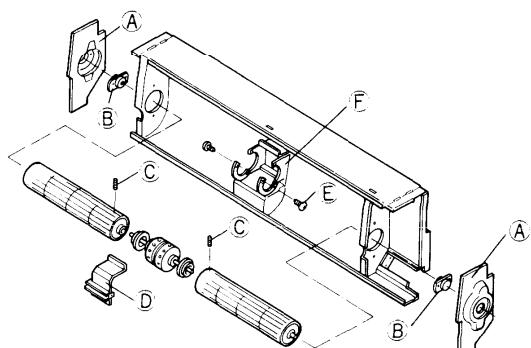


Fig. D-6

**9-4 Electric Heater-Removal (SAP242KH Only)**

- 1) Remove the heat exchanger.
- 2) Unscrew the two screws (A) fixing the heater.
- 3) Remove the cover top plate (B) in the upper part of the unit by unscrewing ten screws to detach the electric heater assembly from the upper part of the unit. See Figure D-7.

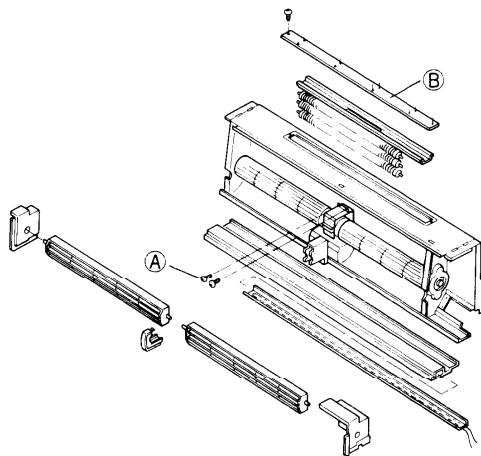


Fig. D-7

**9-5 Heater Thermal Protector-Removal (SAP242KH Only)**

- 1) Remove the cover top plate (A) on the unit by unscrewing ten screws.
- 2) Remove the lead wire and four screws as shown in Fig. D-8 to pull up the mounting plate for the heater thermal protector (B) from the unit.
- 3) The heater thermal protector can be checked and changed in this condition. (See Figure D-8.)

**CAUTION :**

- 1) When reassembling, securely fasten the screws to the same condition as that when the unit was shipped by the factory.
- 2) Check that the distance between the electric live sections and non-live sections particularly is sufficient.

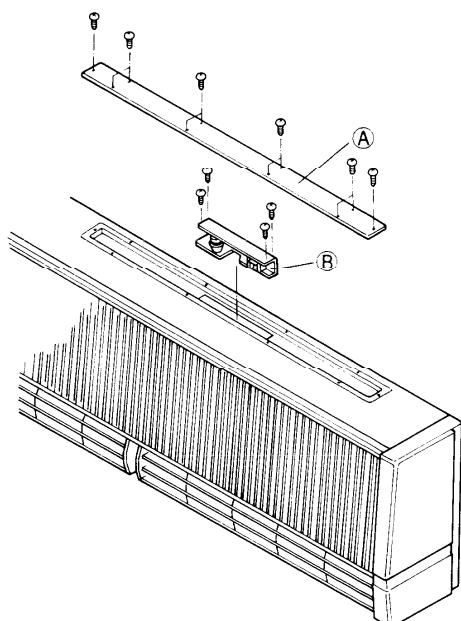


Fig. D-8

## Outdoor Unit

### 9-6 Cabinet-Removal

- 1) Remove the exterior panels in the order of the front panel (A), side panel (B) and side panel (C).
- 2) Remove the cover plates (D) and (E).
- 3) Remove the mounting plate (F). (See Figure D-9.)

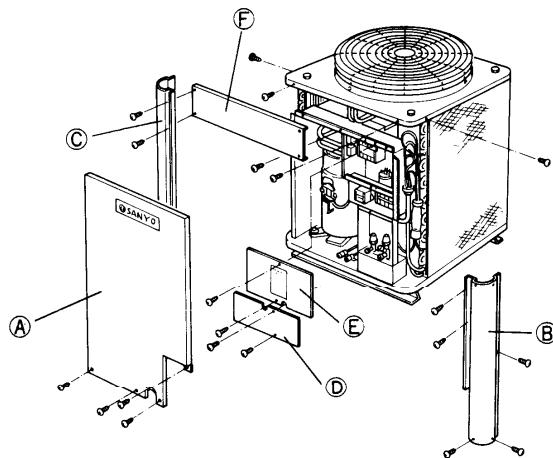


Fig. D-9

### 9-7 Fan and Fan Motor-Removal

- 1) Remove the fan and fan motor by lifting up after removing the guard (A) and loosening one screw of the propeller fan (B).
- 2) Disconnect the fan motor wires from the electrical component box and, then remove the top cover (C) with fan motor. (See Figure D-10.)

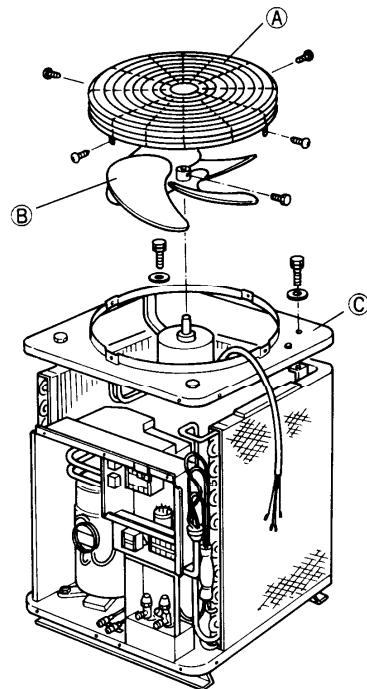


Fig. D-10

**9-8 Electrical Component Box-Removal**

- 1) Disconnect the following wires from the electrical component box.
  - ① Compressor wire
  - ② Crankcase heater wire
  - ③ Four-way reversing valve wire (SAP242CH only)
  - ④ Pressure switch wire (SAP242CH only)
  - ⑤ Solenoid valve wire
- 2) ① Remove the cover plate (A) and the sensor (B).  
 ② Remove insulation (C). Loosen and remove the sensor (D) holder.
- 3) The electrical component box can now be removed by unscrewing one screw (E).
- 4) Loosen one screw of the mounting plate (F) fixing the solenoid valve to remove the cover (G). (See Figure D-11.)

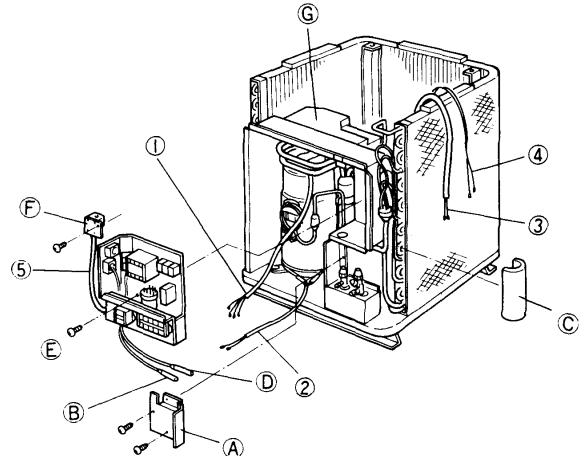


Fig. D-11

**9-9 Compressor Cover-Removal**

- 1) Unfasten one screw (A) and remove the mounting plate (C) from the cover (B). (SAP242CH only)
- 2) Unfasten four screws fixing the cover (B). The cover (B) can be removed by lifting it upward. (See Figure D-12.)

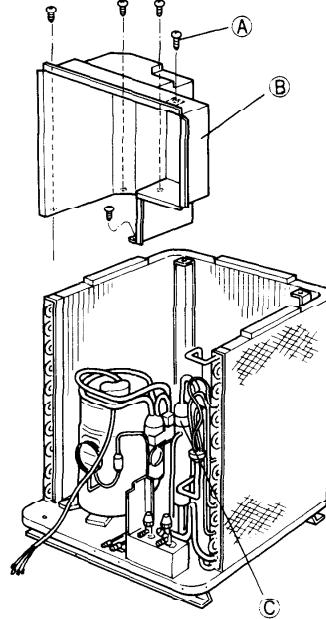


Fig. D-12

## 9-10 Compressor-Removal

Take apart four joints (A) (B) (C) and (D) brazed to the compressor by brazing torch (See Figure D-13)

### CAUTION :

- 1) Many wires have to be removed. When removing wires, carefully check the electric diagram on the rear side of the cover plate (E). (See Figure D-9.) Reconnect the wires correctly after replacing the compressor.
- 2) Three sections of the replacement compressor (A) (B) and (C) are sealed to avoid entry of dust and water. Remove this seals, then connect to the unit piping when replacing the compressor (See Figure D-14)

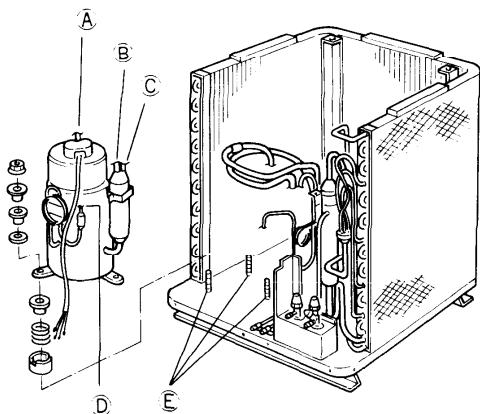


Fig. D-13

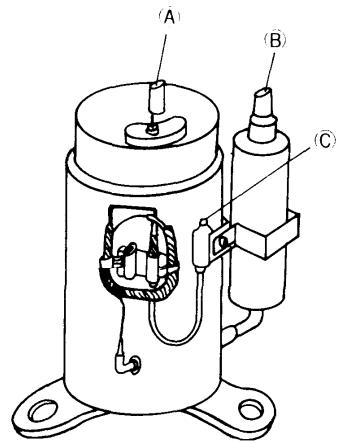


Fig. D-14

## 9-11. Compressor Replacement

### 9-11-1. Tool List for Compressor Replacement

No.	Item	Q'ty	Remarks
1	Portable fire extinguisher	1	
2	Oxy-acetylene torch set	1	Prest-O-Lite Portable Outfit or equivalent
3	Torch lighter	1	
4	Oxweld goggles	1	
5	Brazing flux	1	
6	Soldering rod	1	
7	Vacuum pump (Capacity: 2 ~ 3 Cu-ft./min.)	1	Robinair or equivalent
8	Nitrogen gas (in 10 lb. container)	1	
9	Refrigerant R22 (in 10 lb. container)	1	
10	Refrigerant charging cylinder (5 lb. or more)	1	
11	System analyzer valve set	1	Robinair, Imperial or equivalent "Robbi" thermistor vacuum gauge or equivalent
12	Vacuum gauge (Range 0 – 1000 microns)	1	
13	Charging hose W/ 1/4" fittings	5	
14	Charge fitting 1/4"	1	
15	Tube adapter 1/4"	1	
16	Pinch-off tool	1	
17	Diagonal cutting pliers	1	
18	Long-nose side cutting pliers	1	
19	Slip-joint pliers	1	
20	Torque wrench (340 lb.)	1	
21	Tube cutter	1	Imperial or Rigid
22	Flaring tool	1	Rigid or equivalent
23	Swaging tool	1	
24	Combination file set	1	
25	Regular screwdriver 8"	1	
26	Phillips screwdriver 6"	1	
27	Adjustable wrench 10"	1	
28	Adjustable wrench 12 "	1	
29	Hex. nut driver (6mm)	1	(For compressor bolt)
30	Oil pan	1	
31	Liquid soap with a brush	1	
32	Clean moist cloth	1	

### 9-11-2. Safety Precautions

1. Make sure unit is disconnected from the power source while it is being assembled or disassembled for servicing.
2. Wear protective goggles at any time when brazing or unbrazing.
3. Be sure to confirm system is at atmospheric pressure before using torch.
4. When brazing or unbrazing tubes, never locate face or any other parts of the human body in direct line with the tube opening.
5. Before commencing the trial run, be sure the unit is correctly wired and is grounded adequately when it is connected to the power.

### **9-11-3. Compressor Replacement Procedures**

#### **A. Separating the Outdoor Unit**

In case the compressor malfunctions with a split type air conditioner under normal conditions, release the refrigerant gas at the location first and remove the tubing, then separate the outdoor unit. Pay special attention to ventilation if the place of installation is small.

- 1) Make sure that the power is definitely turned OFF and remove the Access Panel "C" of the outdoor unit with power line and inter-unit line connectors. Remove wires from terminals within the electrical component box and wrap the ends of the wires separately with the insulating tape.
- 2) Place an oil pan at the under side of the service valves. Then remove the caps of the wide tube service valve and narrow tube service valve with an adjustable wrench.
- 3) Leave the wide tube service valve fully close by turning the spindle of the valve clockwise with a valve key or ratchet wrench. Close the narrow tube service valve in the same manner.
- 4) Apply two pairs of adjustable wrenches to the union of the wide tube service valve, then disconnect tubing from the outdoor unit.
- 5) Use an adjustable wrench and a torque wrench (130 ~ 170 lbs. in.), and disconnect narrow tube from the outdoor unit.

The refrigerant gas will seep out from the indoor unit as well as the tubing.

- 6) Seal the ends of the tubing so that no moisture or dust to enter.
- 7) Gradually open the narrow tube service valve and release the remaining refrigerant.
- 8) Open the wide tube service valve and release the remaining refrigerant.
- 9) Finally leave the wide tube service valve and narrow tube service valve fully open.
- 10) Clean the oil that has spread around the periphery.
- 11) Keep the separated outdoor unit in an upright position and carry it to the service station.

## B. Removing the Old Compressor

### CAUTION :

Always wear welder's goggles when heating the tubing with a torch and make sure not to get too close to the opening of the tubing. Furthermore, pay special attention to the position of the torch flame so as not to burn the compressor terminals.

- 1) The outdoor unit carried into the service shop may have some refrigerant gas remaining within it. Therefore, make sure that both wide tube service valve and narrow tube service valve are fully open.
- 2) Remove the cabinet according to the disassembly procedure of the outdoor unit. Refer to Page 85  
Furthermore remove the terminal cover at the top of the compressor and remove the wiring of the compressor terminal. Fig. D-16.
- 3) Set aside an Oxy-Acetylene torch which is needed for removing the tubing of the compressor.
- 4) Confirm that system has reached atmospheric pressure.
- 5) With an Oxy-Acetylene torch apply heat uniformly and unbraze the joints of upper section of the Liquid Injection Capillary tube to the compressor, the upper section of the accumulator and the upper section of the compressor discharge tube respectively, and pull them free with pliers. Fig. D-15 shows unbrazing points with arrows.

\* Be sure to save all mounting components with the replacement compressor for future use. Fig. D-17

- 6) To remove the compressor, raise it straight and disengage from the base unit.

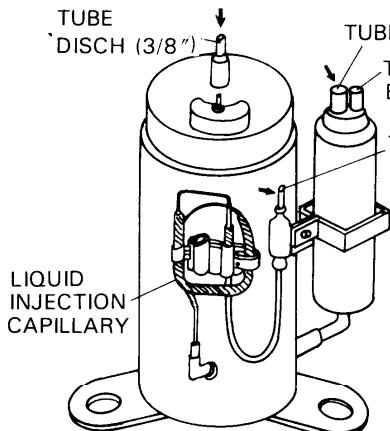


Fig. D-15

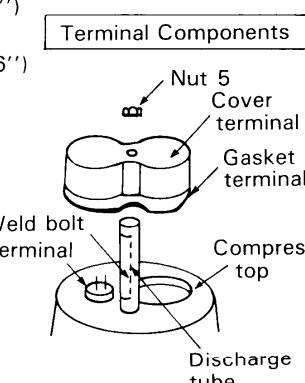


Fig. D-16

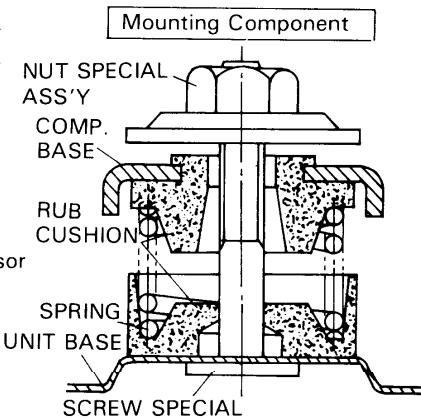


Fig. D-17

### IMPORTANT NOTICE

Before installing the new compressor, check for possible system contamination by the following procedure:

- Place about 10 cc of the oil from the old compressor into a transparent container and visually check the degree of oil contamination. If the oil has a slight burnt odor but no color change or residue, and ordinary compressor replacement according to the instructions below may be carried out.
- If the oil has a burnt pungent odor and shows contamination (dark color with tiny particles of metal) the system must be cleaned sufficiently with a suction filter or a drier-strainer and then replace the oil drier with a new one.
- However, if just the compressor is replaced without sufficient system cleaning, contaminated oil may cause the burning of the compressor again.
- If the oil compressor is to be scrapped, by pinching the terminal section with a pair of pliers, there should not be any chance of it being mistakenly used.

### C. Installing a New Compressor

1. Make sure that the defective old compressor has been removed and the new compressor to be installed is of the same specification by checking the 8 digit code number on stamped marking on the upper section of the compressor helmet case. (e.g.:80648646) For the detail of the compressor identification refer to page. 6.
2. Transfer the mounting parts to the new compressor.
3. Nick the end of the pinched suction tube of the new compressor with a pincher and release the holding charge (Nitrogen: 29 psig).
4. With an Oxy-acetylene torch and pliers, unbend compressor seals at both discharge port and suction port (upper part of the accumulator).

**CAUTION :**

Be careful of the position of the torch so as not to burn the terminals of the compressor when brazing or unbrazing.

5. Install the new compressor in exactly the same manner as the original compressor.  
(\* See CAUTION bottom of this page.)
6. Shape both the suction and discharge lines to the approx. area of the compressor fittings and engage each tube end to the mating compressor fitting.
7. Hold tubing securely with pliers and braze all connections carefully with the torch.
8. Perform leak test, evacuation, and charging refrigerant according to procedures described in section 9-12. Page 92.

**CAUTION**

\* If the old compressor was heavily contaminated, be sure to replace strainer (or drier) when replacing the new compressor.

## 9-12. Leak Test, Evacuation and Charging

### 9-12-1. Required Tools and System Set Up

No.	Item	Q'ty
1)	Vacuum pump	1
2)	Vacuum gauge	1
3)	System analyzer valve set	1
4)	Charging hose (With 1/4" connector)	6
5)	1/4" Flared tube cross fitting	1
6)	Charging Cylinder	1
7)	1/4" Flared Packless valve (To be used for V3, V4 and V5)	3

\* One of conventional system set up and procedure for leak test, evacuation and charging is described in section 9-12 for the reference.

\*\* Robinair or Imperial Portable Charging Station may be used as a convenient packaged tool for the purpose of servicing the refrigerant system.

### 9-12-2. Leak Test in the System

After replacement of the new compressor, the system must be checked for leaks according to the below mentioned procedure:

- 1) If cylinder has not yet been filled, move at least one pound of refrigerant (R22) to the charging cylinder. Fig. D-18.
- 2) Prepare the system analyzer valve set and connect charging hoses as in Fig. D-19. Be sure to close all valves before connection.
- 3) Open fully both Narrow Tube and Wide Tube service valves on the outdoor unit.
- 4) Open valves **V1** and **V2** on the system analyzer valve set and allow vapor refrigerant entering into the system. Charge about 1/2 pound gas to the system and close **V1** and **V2**, and then close the valve on the charging cylinder.
- 5) Apply liquid soap at charge hose connectors, discharge and suction tubes, and brazed liquid injection capillary section of the replaced compressor or other connection parts, and check to see change of bubbles. An electronic halogen gas leak detector, of course, may be used for this purpose.
- 6) When leaks are located, depressurize system and repair leaks.
- 7) If no leaks, purge the 1/2 pound refrigerant from the system and proceed the system set up for evacuation in section 9-12-3. Refer to page 93.

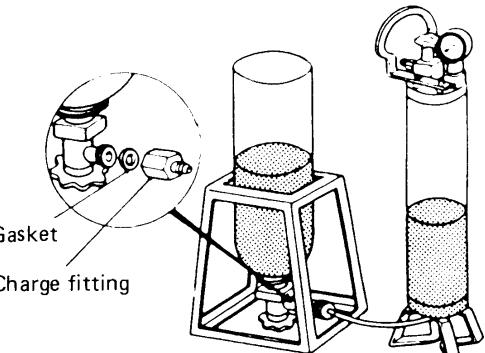


Fig. D-18

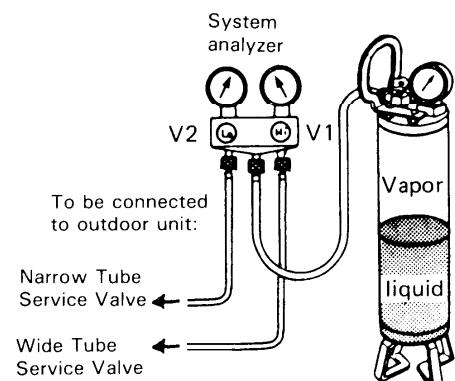


Fig. D-19

### 9-12-3. Evacuation

- 1) Connect instrument as in Fig. D-20.
- 2) Confirm that all connections are made correctly and check all valves are closed.
- 3) Open **V6**, **V7**, **V1** and **V2** respectively.
- 4) Open **V3** and **V5**. Never fail to open the shut off valve on the vacuum pump if there is.
- 5) Run the vacuum pump for evacuation. Required time for complete evacuation differs with capacity of the pump. (Consult shop manual for specifications.)
- 6) While system is evacuating, utilize this time to fill the charging cylinder, if it is not ready.
- 7) If vacuum gauge reading has reached 500 microns or less, stop the vacuum pump and close **V3**.
- 8) Keep this condition at least 5 minutes and observe the vacuum gauge for change. Fig. D-21.  
If pointer on the gauge moves to larger numbers, check system for leaks again according to the procedure in section 9-12-2. Page 92.
- 9) If the indication of the vacuum gauge will not change, system is now prepared for charging refrigerant.
- 10) Proceed to charging refrigerant in section 9-12-4. Page 94.

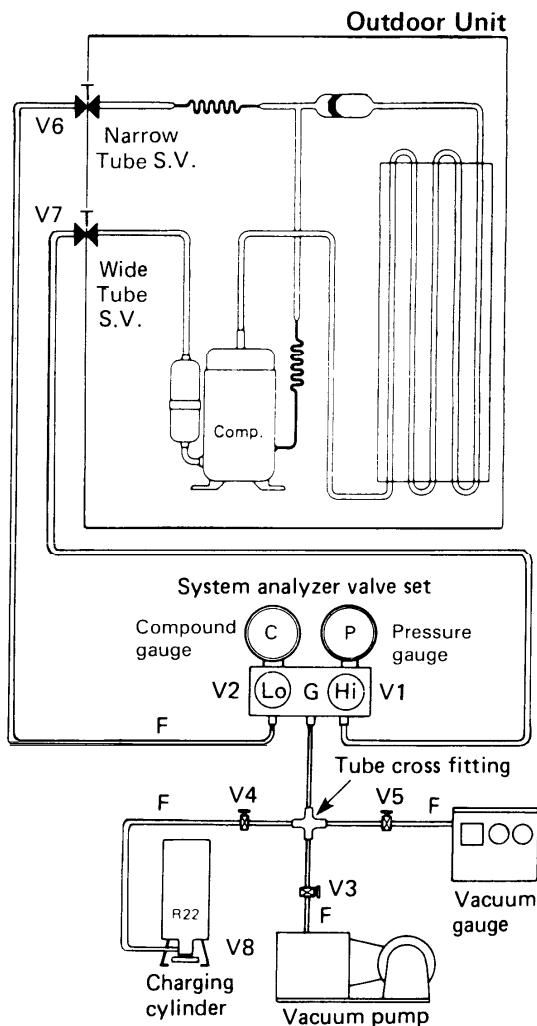


Fig. D-20

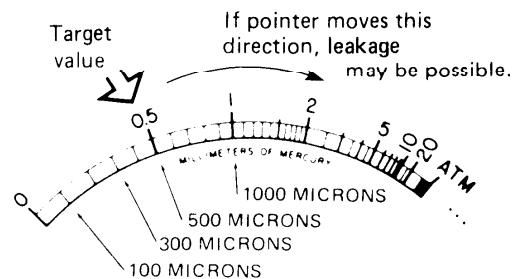


Fig. D-21

#### 9-12-4. Charging Refrigerant (R22)

- Preparation of Refrigerant

- a) Measure the net weight of the charging cylinder before charging refrigerant and memorize it.
- b) Refill required amount of refrigerant from the container to the charging cylinder. Be sure to measure the cylinder contents by weighing it. Fig. D-22.

**NOTE :** Do not confuse the refrigerant gas level graduations on the charging cylinder with the weight. Vapor refrigerant on the upper cylinder part must be taken into consideration.

- Charging Procedure

- 1) Evacuate system according to the procedure in section 9-12-3.
- 2) Close valves **V3**, **V5**, **V1**, **V6** and **V7** when evacuation is completed.
- 3) Open charging cylinder valve at bottom **V8** slightly.
- 4) Loosen hose connection at **V4** a little to let air escape from the hose. Then tighten connection again.
- 5) Open **V4** fully to let liquid refrigerant flow in the charging hose through **V2**.
- 6) Measure charging cylinder weight to charge exact amount of refrigerant just before opening **V6**.
- 7) Open **V6** and let liquid refrigerant entering into the system.
- 8) When full charge has entered system (do not permit liquid level to drop below "0" (zero) on the graduation of the charging cylinder), close **V6** tightly.
- 9) Close **V8** at the bottom of the charging cylinder.
- 10) Loosen hose connections and let refrigerant escape from hoses.
- 11) Remove hoses, charging cylinder and system analyzer valve set. Now, system charging has completed.
- 12) Carry out tubing between indoor unit and outdoor unit and also do necessary wiring according to the procedure given in the installation instructions in section, and perform trial operation.

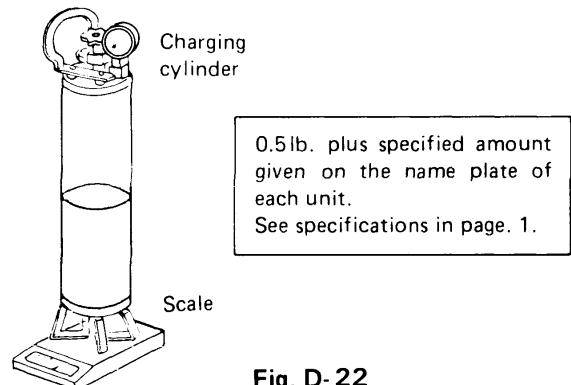
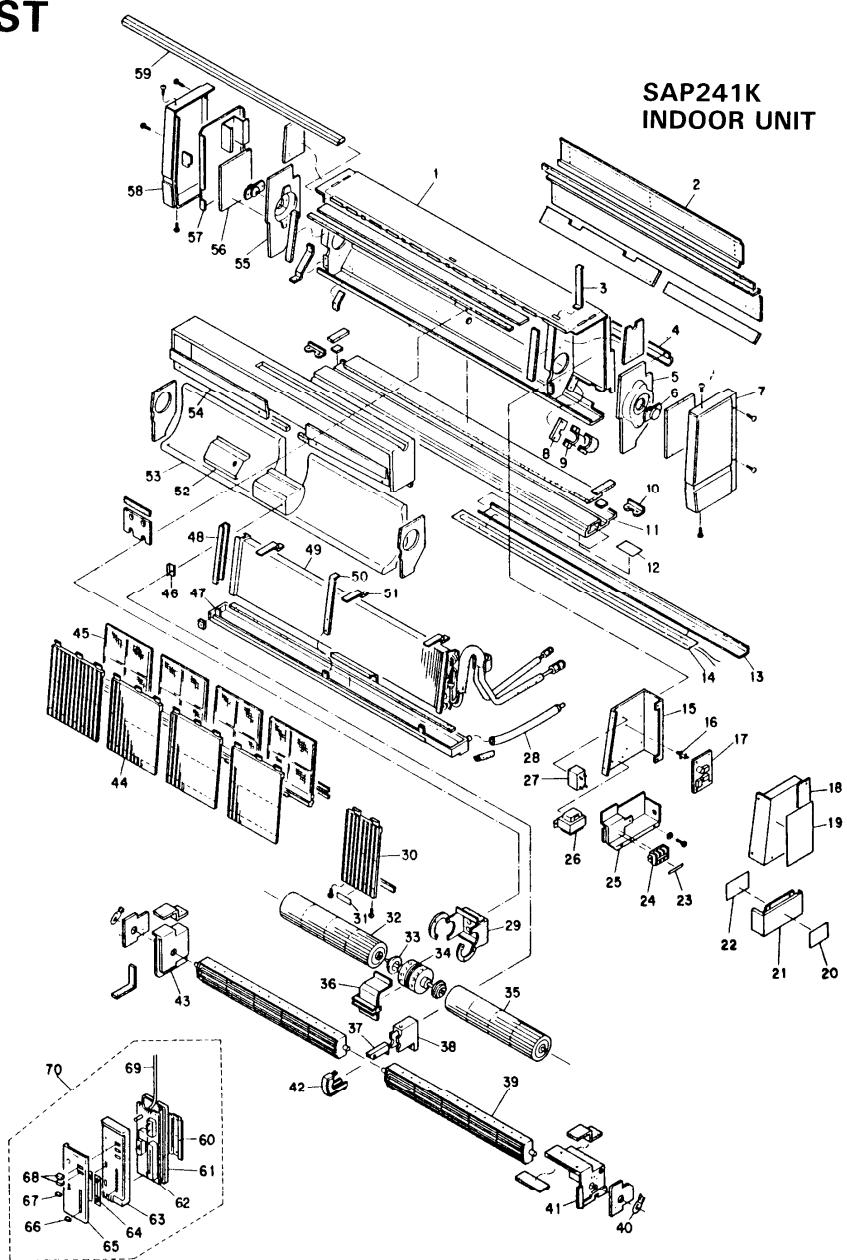


Fig. D-22

## 10. PARTS LIST

SAP241KC

SAP241K  
INDOOR UNIT



**■ Accessory Parts List**  
**LIST OF PACKAGED PARTS**

Parts Name	Figure	Q'ty	Code	Parts Name	Figure	Q'ty	Code	
Wall fixture		1	854-2-1130-12901	Insul, Nipple		1	854-2-2410-37610	
Tapping Screw	Truss HD Phillips 4x25mm (1")	20	3-9219-42501	Drain Hose Adaptor		1	854-2-2334-13600	
Mounting Bracket	For Remote Control Unit		1	800-2-5352-14801	Full Scale Installation Diagram		1	852-6-4139-51400
Tapping Screw	Truss HD Phillips 3.1x13mm (1/2")	2	3-9261-21301					

SAP241K  
INDOOR UNIT

**ATTENTION !**

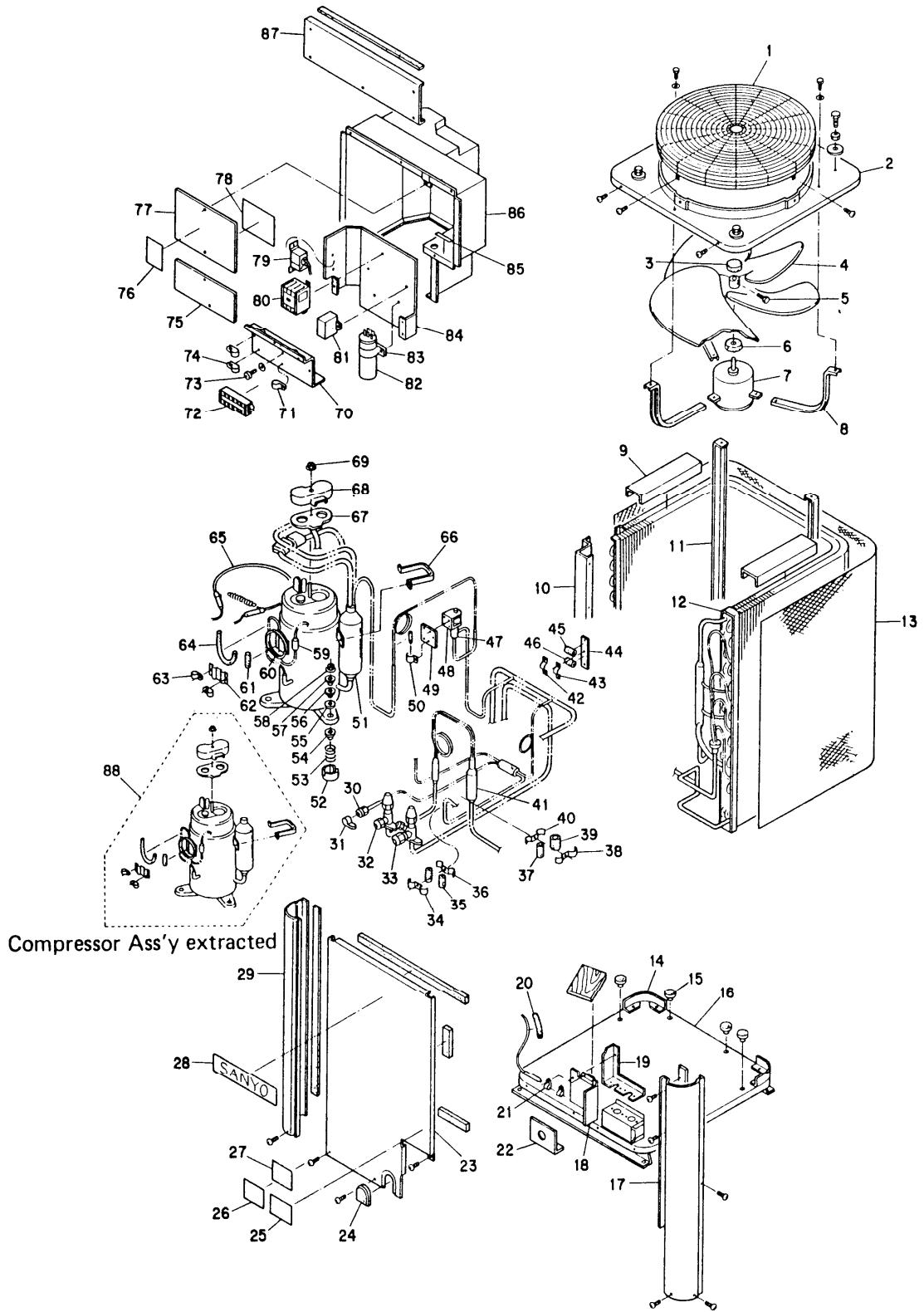
To ensure correct parts supply, please let us know followings, when you make service parts order:

1. Part No.    2. Description    3. Q'ty    4. Volts - Hz - Ph    5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	854-0-1109-197H1	Rear Cover Ass'y	1	61	851-2-5358-00620	Bottom Plate	1
2	854-2-1130-12901	Mounting Plate	1	62	851-0-5158-07000	Control Switch PCB Ass'y	1
3	854-2-1129-41200	Mounting Plate	1	63	851-2-5359-00520	Lid, Remote Control Switch	1
4	854-2-1129-44501	Mounting Plate	1	64	800-2-5367-11300	Filter	2
5	854-0-2512-12301	Mounting Plate Ass'y, Bearing	1	65	851-2-5365-03301	Indicator Plate	1
6	852-0-2510-12200	Bearing Housing Ass'y	2	66	854-2-1311-12401	Knob	1
7	854-2-1102-25511	Side Panel, Right	1	67	854-2-1311-12002	Knob	1
8	854-2-1129-39301	Mounting Plate	1	68	800-2-5328-12602	Knob	2
9	854-2-2313-162H1	Band Ass'y	1	69	851-0-5292-13300	Remote Control Cable	1
10	854-2-1129-41501	Mounting Plate	1	70	859-2-1434	Remote Control Switch Ass'y RCS-24K	1
11	854-0-1301-118H1	Ornamental Plate Ass'y	1	■	854-6-4119-36700	Operation Manual	1
12	854-2-1367-31400	Name Plate	1	■	854-6-4139-30100	Installation Instructions	1
13	854-2-5312-46801	Mounting Plate, Heater	1	■	852-6-1139-51400	Full-scale Installation Diagram	1
14	851-0-5290-637H1	Heater Ass'y 230V 13W	1				
15	854-0-5301-34701	Electrical Component Box Ass'y	1				
16	851-2-5366-01400	Spacer	4				
17	859-4-7291	Controller POW-24K	1				
18	854-2-5304-262H2	Cover Ass'y	1				
19	851-2-5250-76900	Wiring Diagram	1				
20	851-6-4729-14600	Label	1				
21	854-2-5304-263H2	Cover Ass'y	1				
22	854-2-1358-46700	Label	1				
23	852-6-4729-17300	Label	1				
24	4-2379-56168	Terminal Base JTU20-3	1				
25	854-0-5301-33101	Electrical Component Box Ass'y	1				
26	851-0-5290-637P1	Transformer Ass'y ATR-J122U	1				
27	4-2239-56218	Fixed Capacitor 440V 2MFD	1				
28	854-0-4297-11400	Drain Hose Ass'y	1				
29	854-0-2511-17101	Support Motor Ass'y	1				
30	854-2-1101-473H0	Front Panel Ass'y	1				
31	854-2-1358-45700	Label	1				
32	854-0-2501-16300	Blower Ass'y	1				
33	852-2-2511-12110	Cushion Rubber	2				
34	851-0-5290-637M1	Fan Motor Ass'y KFH4T-21B6SP	1				
35	854-0-2501-16200	Blower Ass'y	1				
36	854-0-2323-27901	Mounting Plate Ass'y	1				
37	854-2-2360-41201	Mounting Plate	1				
38	854-2-1111-18812	Support Louver	1				
39	854-2-1110-138H3	Blade Louver Ass'y	2				
40	854-2-1342-10901	Spring	2				
41	854-2-1111-186H1	Support Louver Ass'y	1				
42	854-2-1111-18912	Support Louver	1				
43	854-2-1111-187H2	Support Louver Ass'y	1				
44	854-2-1104-12711	Suction Grille	4				
45	854-0-1302-139H1	Air Filter Ass'y	4				
46	854-2-2352-12801	Guide	1				
47	854-0-2301-340H1	Drain Pan Ass'y	1				
48	854-2-4134-31301	Mounting Plate	1				
49	854-0-4118-34601	Evaporator Ass'y	1				
50	854-2-2345-58201	Mounting Plate	2				
51	854-2-1129-41400	Mounting Plate	3				
52	854-2-2360-37801	Mounting Plate	1				
53	854-0-2502-19200	Blower Casing Ass'y	1				
54	854-2-2316-10201	Mounting Plate	2				
55	854-0-2512-12400	Mounting Plate Ass'y, Bearing	1				
56	854-2-2336-52110	Packing	2				
57	854-0-2322-14201	Mounting Plate Ass'y	1				
58	854-2-1102-256H2	Side Panel Ass'y, Left	1				
59	854-2-1301-19910	Ornamental Sash	1				
60	800-2-5352-14801	Mounting Plate	1				

**NOTE:** Metal and plastic parts will be supplied basically with necessary heat insulating pads or packing.  
Some key numbers are intentionally omitted or left blank for the editor's convenience.

SAP241C  
OUTDOOR UNIT



**SAP241C  
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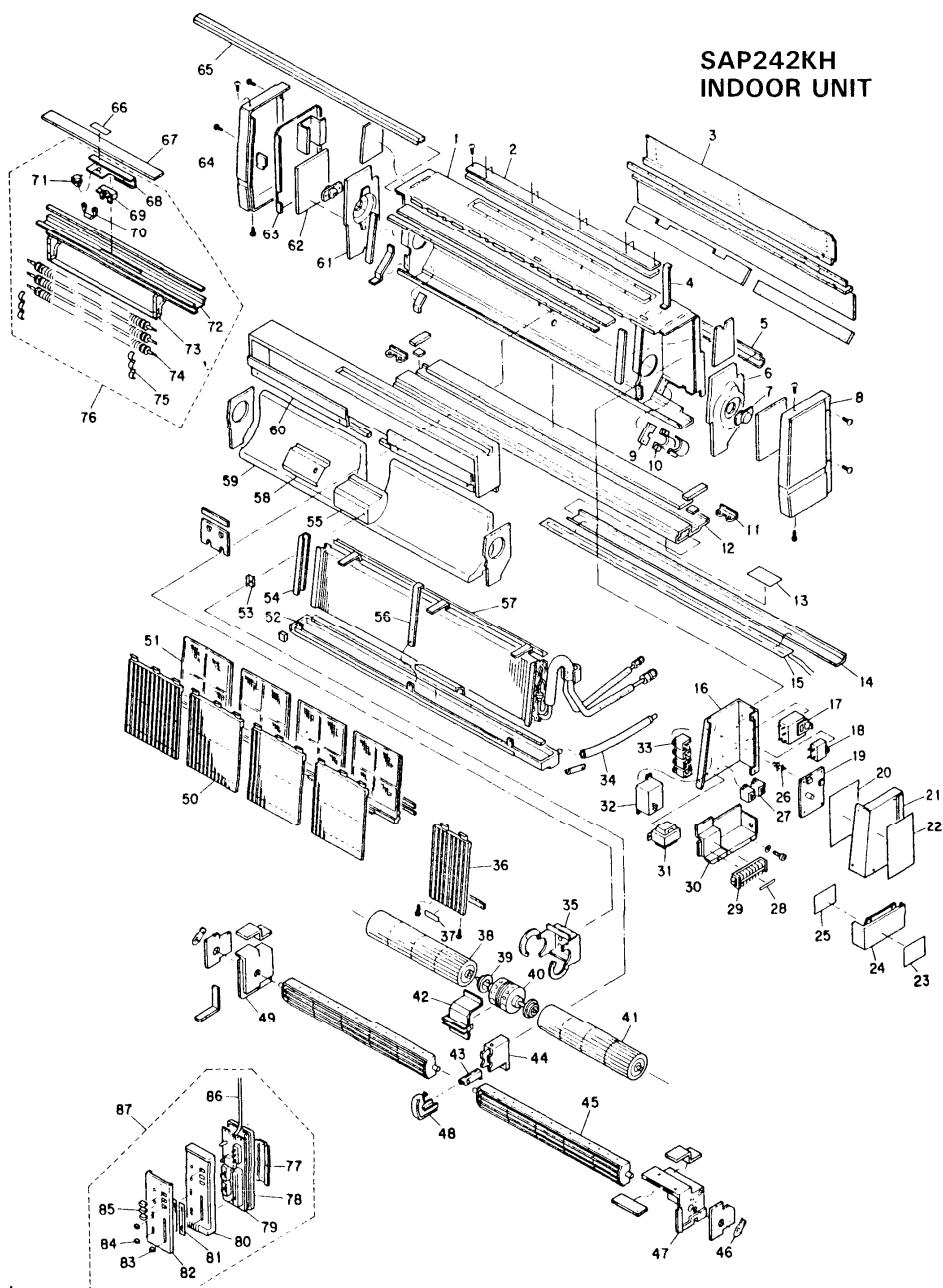
**ATTENTION !**

To ensure correct parts supply, please let us know followings, when you make service parts order:

1. Part No.    2. Description    3. Q'ty    4. Volts - Hz - Ph    5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	854-0-1113-13801	Guard Ass'y	1	59	852-0-4506-14000	Strainer Ass'y	1
2	854-0-1106-20201	Top Cover Ass'y	1	60	854-2-4219-58100	Capillary Tube	1
3	854-2-2346-11400	Cap	1	61	852-2-2353-19500	Packing	1
4	854-0-2501-18100	Propeller Fan Ass'y	1	62	852-2-2309-34101	Mounting Plate	1
5	854-2-2529-10101	Bolt Special, Propeller Fan	1	63	3-9030-00508	Clamper F-6	2
6	852-2-2514-10700	Cap Rubber	1	64	853-2-4310-10300	Packing	1
7	851-0-5290-636M1	Fan Motor Ass'y KFC8-101A6P	1	65	851-0-5290-636H1	Heater Ass'y CH5700 230V30W	1
8	854-0-2511-14400	Support Motor Ass'y	3	66	851-2-2356-16901	Mounting Plate, Accumulator	1
9	854-2-2360-18900	Mounting Plate	2	67	801-2-5303-13100	Gasket Terminal	1
10	854-2-4134-32100	Mounting Plate	1	68	801-2-6194-12100	Cover Terminal	1
11	854-0-2206-18100	Frame Ass'y	2	69	801-2-8305-10100	Nut 5mm	1
12	854-0-4106-18500	Condenser Ass'y	1	70	854-2-5301-48401	Electrical Component Box	1
13	854-2-1113-12400	Guard	1	71	3-9030-00508	Clamper F-6	1
14	854-2-2360-19100	Mounting Plate	2	72	4-2379-56175	Terminal Base 6P 30A	1
15	854-2-1353-11000	Cushion Rubber	4	73	852-2-2396-10103	Screw Special	1
16	854-0-2204-35801	Bottom Plate Ass'y	1	74	3-9030-00512	Clamper F-10	1
17	854-0-1102-234H0	Side Panel Ass'y, Right	1	75	854-2-5304-26100	Cover Plate	1
18	854-2-1133-20101	Cover Plate	1	76	854-2-1358-46700	Label	1
19	854-2-1133-17501	Cover Plate	1	77	854-2-5304-26000	Cover Plate	1
20	854-2-4310-10100	Mounting Rubber, Capillary	1	78	851-2-5250-76800	Wiring Diagram	1
21	3-9030-00506	Clamper F-4	2	79	4-2339-56195	Thermostat YTB-4U201F	1
22	854-2-2360-26801	Mounting Plate	1	80	4-2329-56284	Relay CLK-16E3-21	1
23	854-0-1101-301H0	Front Panel Ass'y	1	81	4-2239-56224	Fixed Capacitor 440VAC 5MF	1
24	852-2-1320-10500	Eyelet Rubber	1	82	4-2239-56339	Fixed Capacitor 400VAC 35MF	1
25	854-2-1367-31500	Name Plate	1	83	852-2-5301-20600	Clip, Capacitor	1
26	854-6-4729-68600	Label	1	84	854-0-5301-33001	Electrical Component Box Ass'y	1
27	854-6-4729-71600	Label	1	85	852-6-4729-17300	Label	1
28	854-2-1354-14300	Badge	1	86	854-0-2325-16900	Cover Ass'y	1
29	854-0-1102-233H0	Side Panel Ass'y, Left	1	87	854-2-2208-195H0	Mounting Plate Ass'y	1
30	854-0-4514-10200	Charge Port Ass'y	1	88	852-0-4516-15700	Compressor Ass'y C-R190H6N (806-4-8646)	1
31	3-9030-00512	Clamper F-10	1				
32	854-0-4521-11100	Vaive Ass'y 1/4"	1				
33	854-0-4506-16200	Vaive Ass'y 5/8"	1				
34	852-2-2356-13301	Mounting Plate, Tube	1				
35	854-2-2336-48200	Packing	2				
36	852-2-2356-13201	Mounting Plate, Tube	1				
37	854-2-4315-13900	Packing	1				
38	854-2-4316-12100	Mounting Plate, Tube	1				
39	854-2-2336-49200	Packing	1				
40	854-2-4316-12200	Mounting Plate, Tube	1				
41	852-0-4505-13600	Dehydrater Ass'y	1				
42	853-2-2340-21901	Mounting Plate, Tube	1				
43	854-2-4134-16501	Mounting Plate, Tube	1				
44	854-2-2360-28700	Mounting Plate	1				
45	854-2-4315-13500	Packing	1				
46	853-2-4319-11200	Packing	1				
47	854-2-4549-10100	Solenoid Valve NEV603DXFU	1				
48	851-0-5290-636C1	Solenoid Ass'y NEVAC208V	1				
49	854-2-2360-38000	Mounting Plate	1				
50	854-2-4316-13101	Mounting Plate, Tube	1				
51	854-0-4517-17800	Accumulator Ass'y	1				
52	851-2-2390-14000	Cushion Rubber	3				
53	851-2-2330-13201	Spring	3				
54	854-2-2356-10500	Rubber Protection	3				
55	854-2-2356-10600	Rubber Protection	3				
56	854-2-2349-12201	Spacer	3				
57	854-2-2356-10400	Rubber Protection	2				
57	854-2-2356-10700	Rubber Protection	1				
58	854-0-2321-10201	Nut Special Ass'y	2				
58	851-0-2395-10702	Nut Special Ass'y	1				

NOTE: Metal and plastic parts will be supplied basically with necessary heat insulating pads or packing.  
Some key numbers are intentionally omitted or left blank for the editor's convenience.

**SAP242KCH****SAP242KH  
INDOOR UNIT**

**■ Accessory Parts List  
LIST OF PACKAGED PARTS**

Parts Name	Figure	Q'ty	Code	Parts Name	Figure	Q'ty	Code
Wall fixture		1	854-2-1130-12901	Insul, Nipple		1	854-2-2410-37610
Tapping Screw	Truss HD Phillips 4x25mm (1")	20	3-9219-42501	Drain Hose Adaptor		1	854-2-2334-13600
Mounting Bracket		1	800-2-5352-14801	Full Scale Installation Diagram		1	852-6-4139-51400
Tapping Screw	Truss HD Phillips 3.1x13mm (1/2")	2	3-9261-21301				

SAP242KH  
INDOOR UNIT

**ATTENTION !**

To ensure correct parts supply, please let us know followings, when you make service parts order:

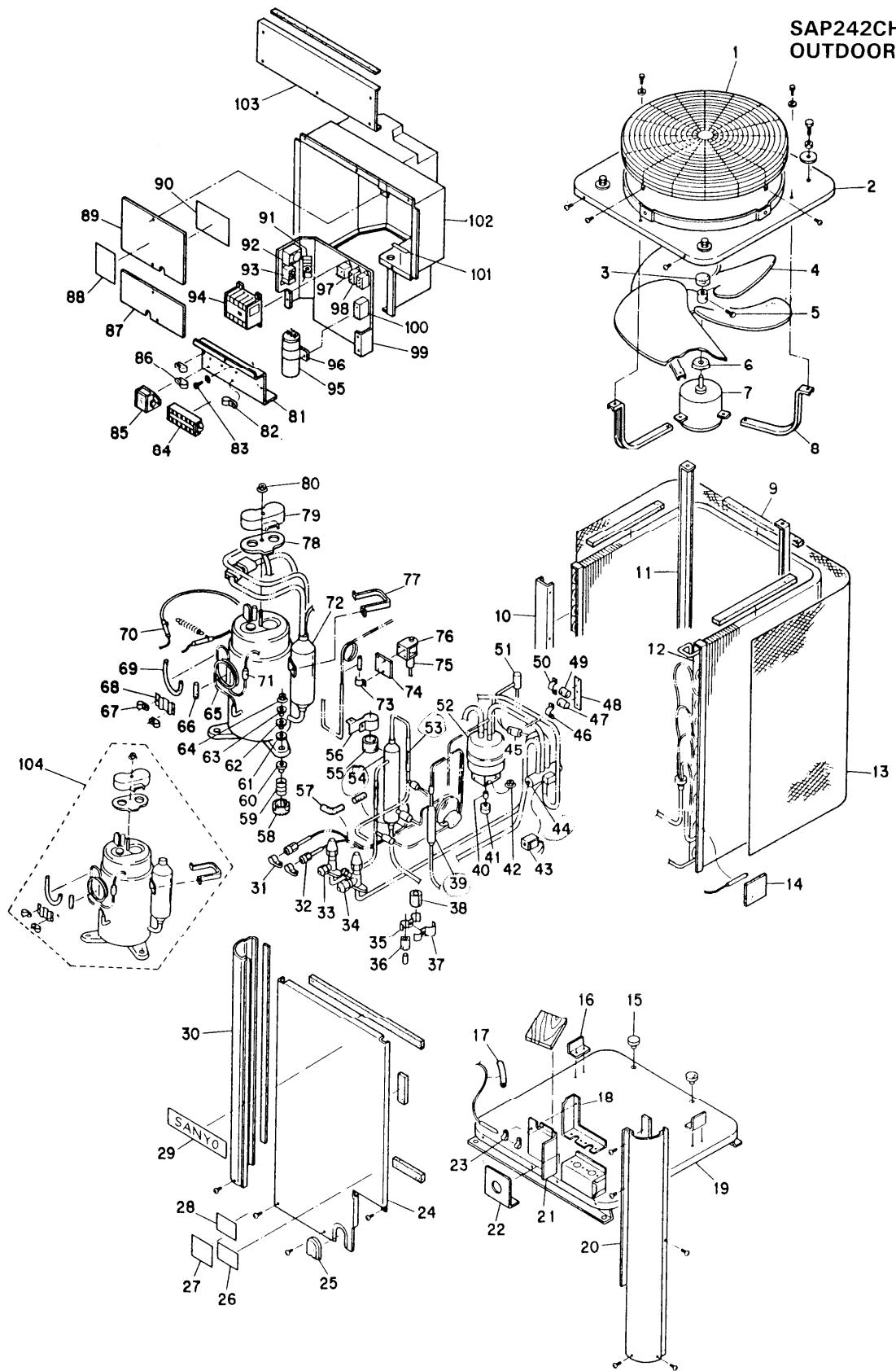
1. Part No.    2. Description    3. Q'ty    4. Volts - Hz - Ph    5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	854-0-1109-199H1	Rear Cover Ass'y	1	61	854-0-2512-12400	Mounting Plate Ass'y, Bearing	1
2	852-2-1115-146H1	Top Panel Ass'y	1	62	854-2-2336-52110	Packing	2
3	854-2-1130-12901	Mounting Plate	1	63	854-0-2322-14201	Mounting Plate Ass'y	1
4	854-2-1129-41200	Mounting Plate	1	64	854-2-1102-256H2	Side Panel	1
5	854-2-1129-44501	Mounting Plate	1	65	854-2-1301-19910	Ornamental Sash	1
6	854-0-2512-12301	Mounting Plate Ass'y, Bearing	1	66	854-6-4729-70900	Label	1
7	852-0-2510-12200	Bearing Housing Ass'y	2	67	854-2-2336-63400	Packing	1
8	854-2-1102-25511	Side Panel	1	68	345-0-5003-19000	Protector Ass'y	1
9	854-2-1129-39301	Mounting Plate	1	69	345-2-5317-11800	Porcelain	1
10	854-2-2313-162H1	Band Ass'y	1	70	851-0-526-100200	Fuse Ass'y 10A 169°C	1
11	854-2-1129-41501	Mounting Plate	2	71	4-2339-56198	Thermostat 1NTO1L-	1
12	854-0-1301-118H1	Ornamental Plate Ass'y	1	72	854-2-5312-49801	Mounting Plate	1
13	854-2-1367-34900	Name Plate	1	73	854-0-2323-28901	Mounting Plate Ass'y	1
14	854-2-5312-46801	Mounting Plate	1	74	4-2459-56300	Heater 230V 600W	3
15	851-0-5290-648H1	Heater Ass'y 230V 13W	1	75	852-2-2309-34401	Mounting Plate	2
16	854-0-5301-348H1	Electrical Component Box Ass'y	1	76	345-0-0001-258H1	Panel Heater Ass'y	1
17	4-2329-56290	Relay G2J-2212T-US	1	77	800-2-5352-14801	Mounting Plate	1
18	4-2239-56218	Fixed Capacitor 440VAC 2.0MFD	1	78	851-2-5358-00620	Bottom Plate	1
19	859-4-7302	Controller POW-24KH	1	79	851-0-5158-07300	Control Switch PCB Ass'y	1
20	851-2-5250-81600	Wiring Diagram	1	80	851-2-5359-00520	Lid, Remote Control Switch	1
21	854-2-5304-262H1	Cover Ass'y	1	81	800-2-5367-11300	Filter	1
22	851-2-5250-78100	Wiring Diagram	1	82	851-2-5365-03501	Indicator Plate	1
23	851-6-4729-14600	Label	1	83	854-2-1311-12401	Knob	1
24	854-2-5304-263H1	Cover Ass'y	1	84	854-2-1311-12002	Knob	2
25	854-2-1358-46800	Label	1	85	800-2-5328-12602	Knob	3
26	851-2-5366-01400	Spacer	4	86	851-0-5292-13800	Remote Control Cable ..	1
27	4-2329-56287	Relay MY2F-T1-USTS 208/230V	2	87	859-2-1447	Remote Control Switch Ass'y RCS-24KH	1
28	852-6-4729-17300	Label	1	■	854-6-4119-38000	Operation Manual	1
29	4-2379-56171	Terminal Base JTU20-8	1	■	854-6-4139-30100	Installation Instructions	1
30	854-0-5301-33401	Electrical Component Box Ass'y	1	■	852-6-4139-51400	Full-Scale Installation Diagram	1
31	851-0-5290-648P1	Transformer Ass'y ATR-J122U	1				
32	859-2-4128	Time Switch TRY-KC (UL)	1				
33	4-2329-56288	Relay MY2F-T1-USTS 24VDC	4				
34	854-0-4297-11400	Drain Hose Ass'y	1				
35	854-0-2511-17101	Support Motor Ass'y	1				
36	854-2-1104-473H0	Front Panel Ass'y	1				
37	854-2-1358-46400	Label	1				
38	854-0-2501-16300	Blower Ass'y	1				
39	852-2-2511-12110	Cushion Rubber	2				
40	851-0-5290-648M1	Fan Motor Ass'y KFH4T-21B6SP	1				
41	854-0-2501-16200	Blower Ass'y	1				
42	854-0-2323-28601	Mounting Plate Ass'y	1				
43	854-2-2360-41201	Mounting Plate	1				
44	854-2-1111-18812	Support Louver	1				
45	854-2-1110-138H3	Blade Louver Ass'y	2				
46	854-2-1342-10901	Spring	2				
47	854-2-1111-186H1	Support Louver Ass'y	1				
48	854-2-1111-18912	Support Louver	1				
49	854-2-1111-187H2	Support Louver Ass'y	1				
50	854-2-1104-12711	Suction Grille	4				
51	854-0-1302-139H1	Air Filter Ass'y -	4				
52	854-0-2301-340H1	Drain Pan Ass'y	1				
53	854-2-2352-12801	Guide	1				
54	854-2-4134-31301	Mounting Plate	1				
55	854-0-4118-34901	Evaporator Ass'y	1				
56	854-2-2345-58201	Mounting Plate	2				
57	854-0-2322-14901	Mounting Plate Ass'y	1				
58	854-2-2360-37801	Mounting Plate	1				
59	854-0-2502-19200	Blower Casing Ass'y	1				
60	854-2-2316-10201	Mounting Plate	2				

**NOTE: Metal and plastic parts will be supplied basically with necessary heat insulating pads or packing.**

**Some key numbers are intentionally omitted or left blank for the editor's convenience.**

SAP242CH  
OUTDOOR UNIT



**SAP242CH  
OUTDOOR UNIT**

**ATTENTION !**

To ensure correct parts supply, please let us know followings, when you make service parts order:

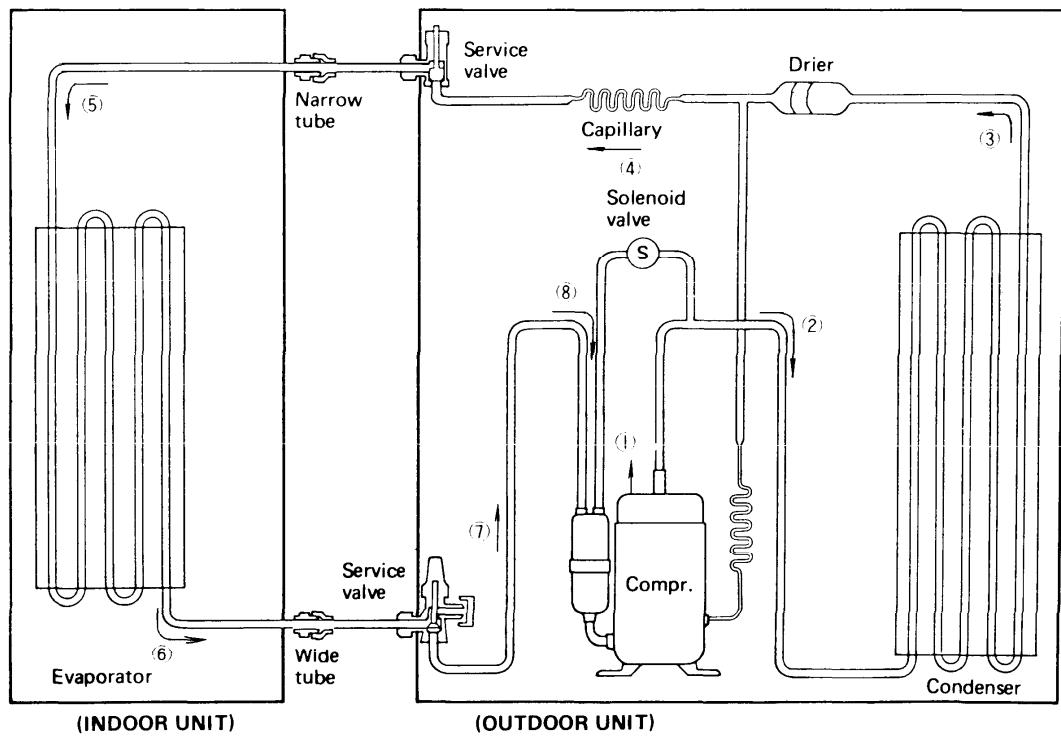
**1. Part No.      2. Description      3. Q'ty      4. Volts - Hz - Ph      5. PRODUCT MODEL NO.**

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	854-0-1113-13801	Guard Ass'y	1	61	854-2-2356-10600	Protection Rubber	3
2	854-0-1106-20201	Top Cover Ass'y	1	62	854-2-2349-12201	Spacer	3
3	854-2-2346-11400	Cap	1	63	854-2-2356-10400	Protection Rubber	2
4	854-0-2501-18100	Propeller Fan Ass'y	1	63	854-2-2356-10700	Protection Rubber	1
5	854-2-2529-10101	Bolt Special, Propeller Fan	1	64	854-0-2321-10201	Nut Special Ass'y	3
6	852-2-2514-10700	Cap Rubber	1	64	851-0-2395-10702	Nut Special Ass'y	1
7	851-0-5290-649M1	Fan Motor Ass'y KFC8-101A6P	1	65	854-2-4219-58100	Capillary Tube	1
8	854-0-2511-14401	Support Motor Ass'y	3	66	852-2-2353-19500	Packing	1
9	854-2-1351-50810	Packing	3	67	3-9030-00508	Clamper F-6	2
10	854-2-4134-31400	Mounting Plate	1	68	852-2-2309-34101	Mounting Plate	1
11	854-0-2206-18100	Frame Ass'y	2	69	853-2-4310-10300	Packing	1
12	854-0-4118-34801	Condenser Ass'y	1	70	4-2459-56195	Heater CH5700 230V 30W	1
13	854-2-1113-12400	Guard	1	71	852-0-4506-14000	Strainer Ass'y	1
14	852-2-4380-10800	Insulation, Thermostat	1	72	854-0-4517-17800	Accumulator Ass'y	1
15	854-2-1353-11000	Cushion Rubber	2	73	854-2-4316-13101	Mounting Plate	1
16	854-2-2360-28100	Mounting Plate	2	74	854-2-2360-38000	Mounting Plate	1
17	854-2-4310-10100	Packing, Capillary	2	75	854-2-4549-10100	Solenoid Valve NEV603DXFU	1
18	854-2-1133-17501	Cover Plate	1	76	851-0-5290-649C2	Solenoid Ass'y NEV AC208	1
19	854-0-2204-36101	Bottom Plate Ass'y	1	77	851-2-2356-16901	Mounting Plate, Accumulator	1
20	854-0-1102-234H0	Side Panel Ass'y, Right	1	78	801-2-5303-13100	Gasket Terminal	1
21	854-2-1133-20101	Cover Plate	1	79	801-2-6194-12100	Cover Terminal	1
22	854-2-2360-41101	Mounting Plate	1	80	801-2-8305-10100	Nut 5mm	1
23	3-9030-00506	Clamper F-4	2	81	854-2-5301-48401	Electrical Component Box	1
24	854-0-1101-301H0	Front Panel Ass'y	1	82	3-9030-00509	Clamper F-7	1
25	852-2-1320-10500	Eyelet Rubber	1	83	852-2-2396-10103	Screw Special	1
26	854-2-1367-34600	Name Plate	1	84	4-2379-56171	Terminal Base JTU20-8	1
27	854-6-4729-68500	Label	1	85	4-2379-56178	Terminal Base KTU60-2J	1
28	854-6-4729-71600	Label	1	86	3-9030-00514	Clamper F-12	1
29	854-6-1354-14300	Badge	1	87	854-2-5304-26100	Cover Plate	1
30	854-0-1102-233H0	Side Panel Ass'y - <del>L</del> ft	1	88	854-2-1358-46800	Label	1
31	3-9030-00512	Clamper F-10	2	89	854-2-5304-26000	Cover Plate	1
32	854-0-4514-10200	Charge Port Ass'y	2	90	851-2-5250-78200	Wiring Diagram	1
33	854-0-4521-11100	Valve Ass'y 1/4"	1	91	4-2339-56196	Thermostat RTB-4U201F	1
34	854-0-4506-16200	Valve Ass'y 5/8"	1	92	4-2489-56168	Time Switch STMN-2 TO918	1
35	854-2-4316-12200	Mounting Plate, Tube	1	93	4-2339-56195	Thermostat YTB-4U201	1
36	854-2-4315-13900	Packing, Tube	1	94	4-2329-56292	Relay SRC3631-51UL	1
37	854-2-4316-12100	Mounting Plate, Tube	1	95	4-2239-56339	Fixed Capacitor 400VAC 35MFD	1
38	854-2-2336-49200	Packing, Tube	1	96	852-2-5301-20600	Clip, Capacitor	1
39	852-0-4505-13600	Dehydrater Ass'y	1	97	4-2329-56289	Relay LY3F-USTS	1
40	831-2-4307-10100	Sleeve	1	98	4-2329-56287	Relay MY2F-T1-USTS	2
41	854-2-2318-10600	Cushion Rubber	1	99	854-0-5301-33001	Electrical Component Box Ass'y	1
42	851-0-2395-10501	Nut Special Ass'y	1	100	4-2239-56224	Fixed Capacitor 440VAC 5MFD	1
43	851-0-5290-649C1	Solenoid Ass'y L27-9072	1	101	852-6-4729-17300	Label	1
44	4-2649-56162	Reversing Valve V26-9000	1	102	854-0-2325-17000	Cover Ass'y	1
45	851-0-5290-649S1	Switch Ass'y ACB-1UBO2W	1	103	854-2-2208-195H0	Mounting Plate Ass'y	1
46	853-2-2340-21901	Mounting Plate, Tube	1	104	852-0-4516-15700	Compressor Ass'y C-R190IIGN (806-4-8646)	1
47	853-2-4319-11200	Packing, Tube	1				
48	854-2-2360-28700	Mounting Plate	1				
49	854-2-4315-13500	Packing, Tube	1				
50	854-2-4134-16500	Mounting Plate	1				
51	852-0-4205-10300	Discharge Pressure Regulator Ass'y	1				
52	854-0-4517-18101	Accumulator Ass'y	1				
53	854-0-4518-13800	Check Valve Ass'y	2				
54	854-0-4110-16900	Receiver Tank Ass'y	1				
55	854-2-2336-47000	Packing, Receiver Tank	1				
56	854-2-2360-28800	Mounting Plate, Receiver Tank	1				
57	854-2-4310-10100	Packing, Capillary	2				
58	851-2-2390-14000	Cushion Rubber	3				
59	851-2-2330-13201	Spring	3				
60	854-2-2356-10500	Protection Rubber	3				

**NOTE:** Metal and plastic parts will be supplied basically with necessary heat insulating pads or packing.  
Some key numbers are intentionally omitted or left blank for the editor's convenience.

## **11. REFRIGERANT FLOW DIAGRAM**

SAP241KC

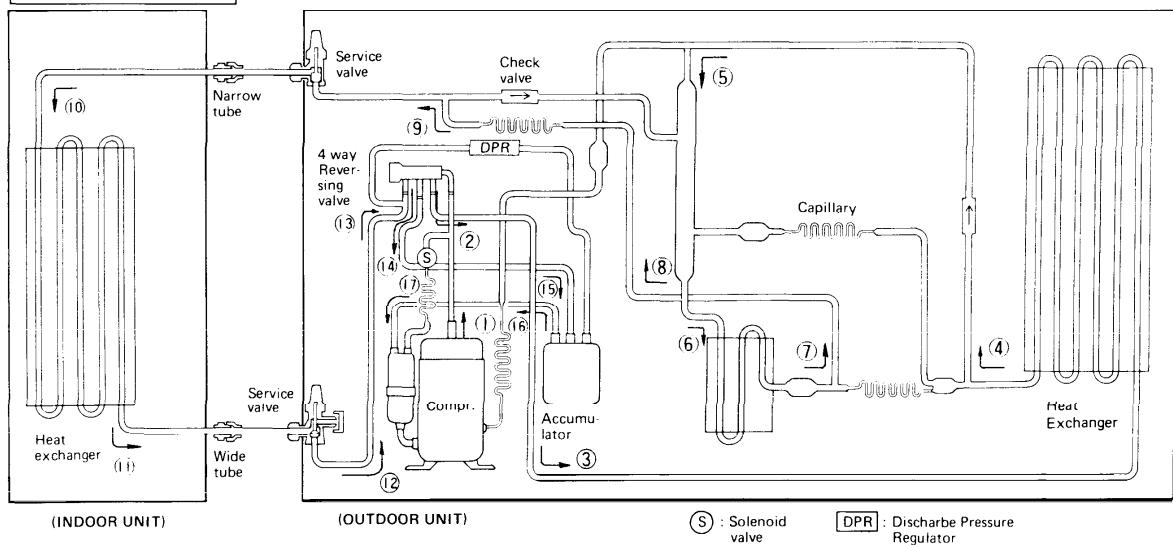


**NOTE:**

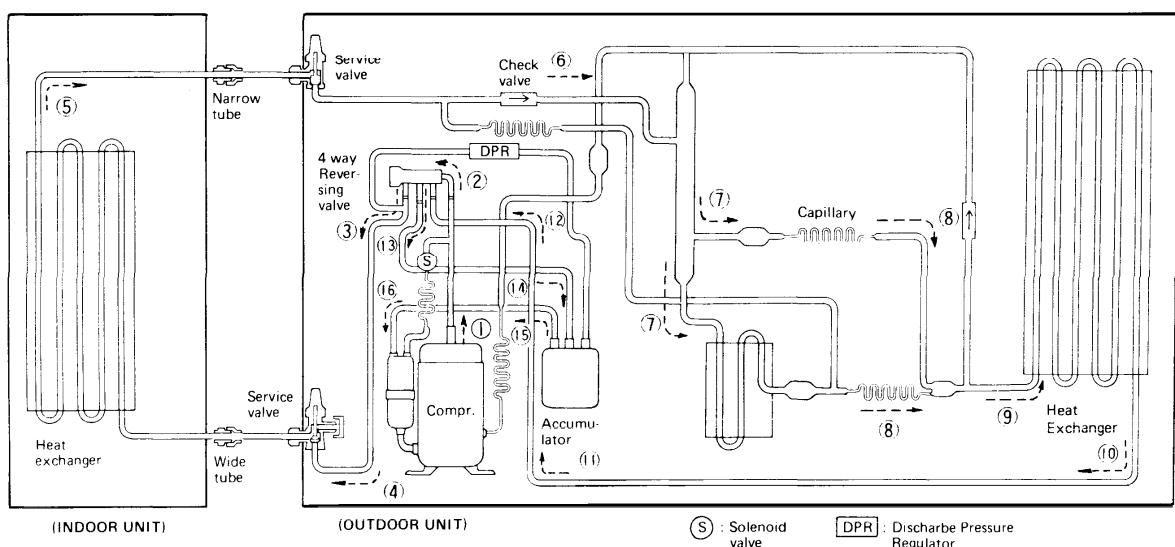
→ with sequential number shows flow of refrigerant in COOLING CYCLE.

## SAP242KCH

### COOLING CYCLE



### HEATING CYCLE



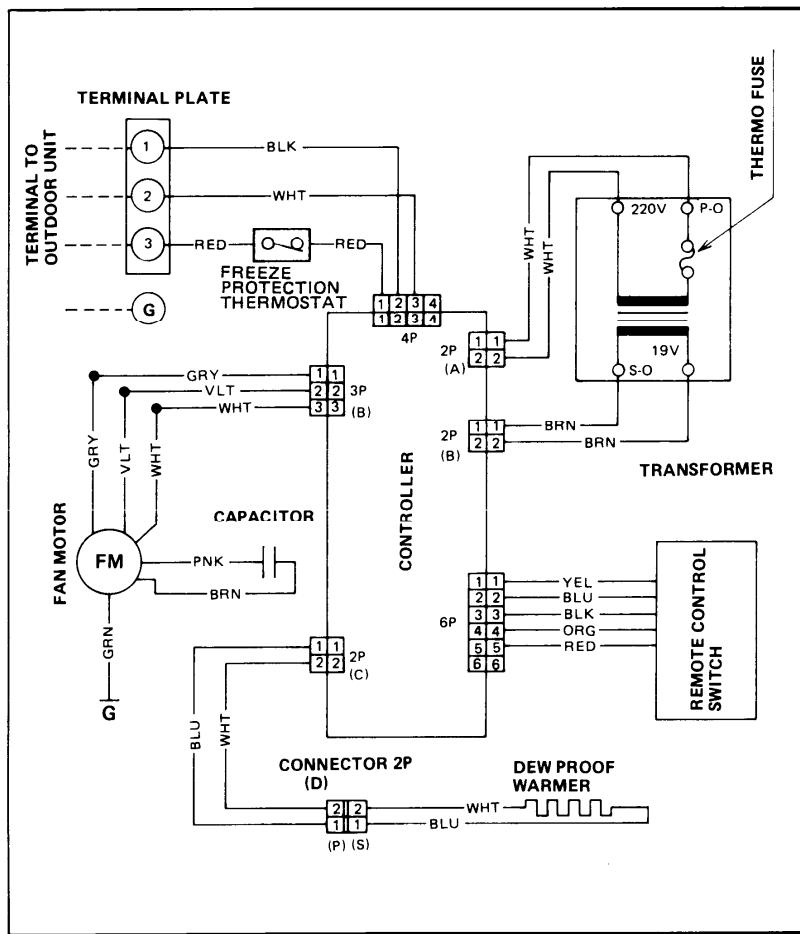
#### NOTE:

→ with sequential number shows flow of refrigerant in COOLING CYCLE.

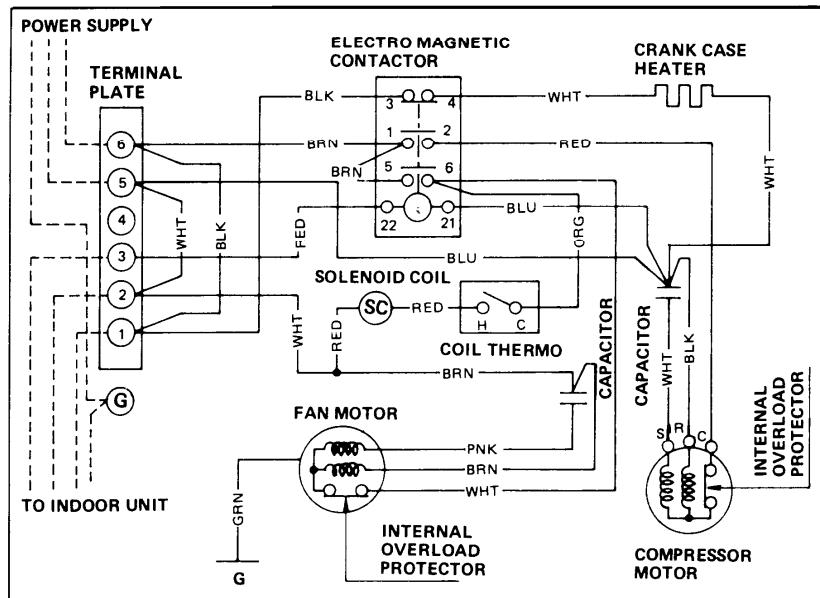
→ with sequential number shows flow of refrigerant in HEATING (=Reverse) CYCLE.

## 12. ELECTRIC WIRING DIAGRAM

SAP241K ELECTRIC WIRING DIAGRAM

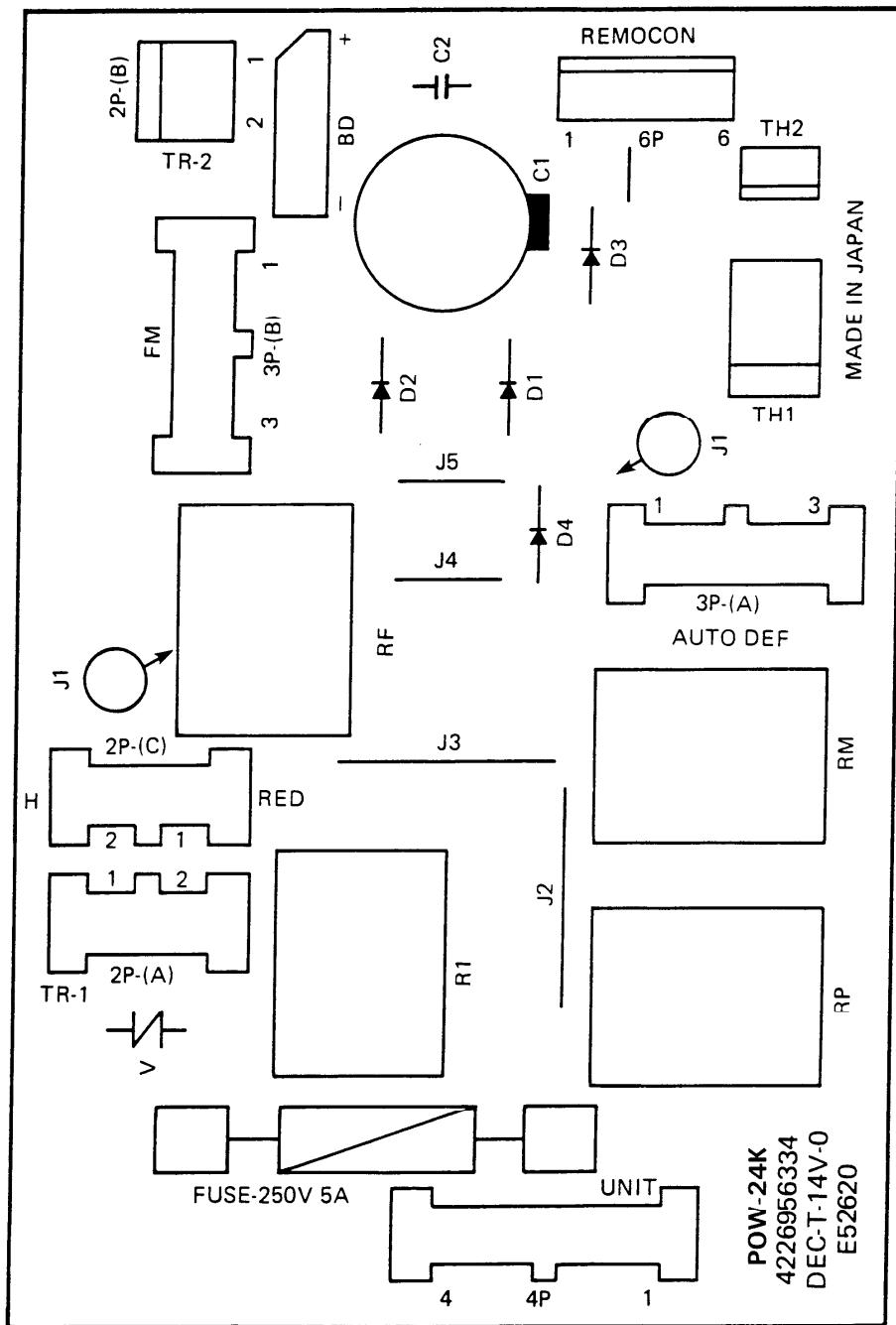


SAP241C ELECTRIC WIRING DIAGRAM



CONTROLLER P.C.B. POW-24K (PRINTED PATTERN)

SAP241K

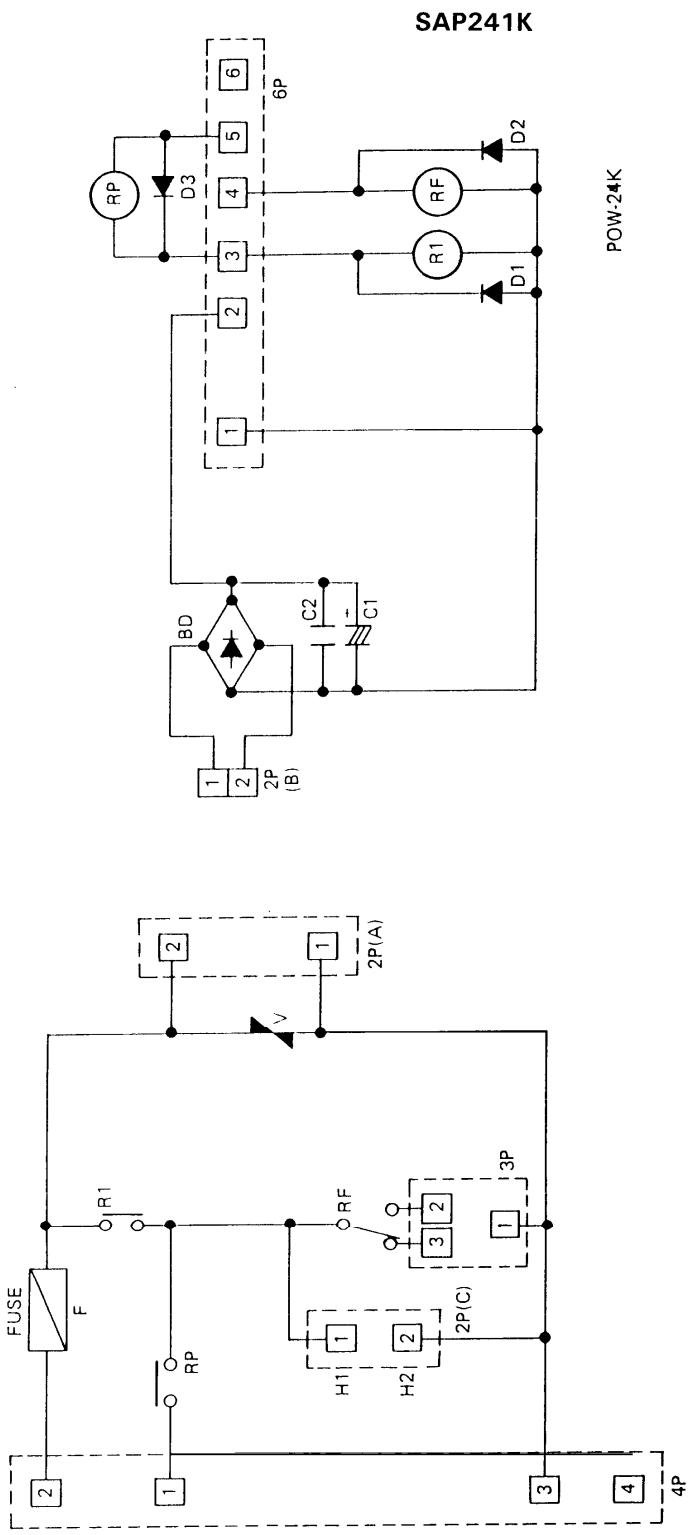


**ELECTRIC WIRING DIAGRAM (CONTROLLER P.C.B.)**  
**POW-24K**

Key No.	Description	Key No.	Description
BD	Bridge Diode	R1	Relay
D1	Diode	RF	Relay
D2	Diode	RP	Relay
D3	Diode	V	Varistor
C1	Capacitor	6P	Connector 6P
C2	Capacitor	4P	Connector 4P

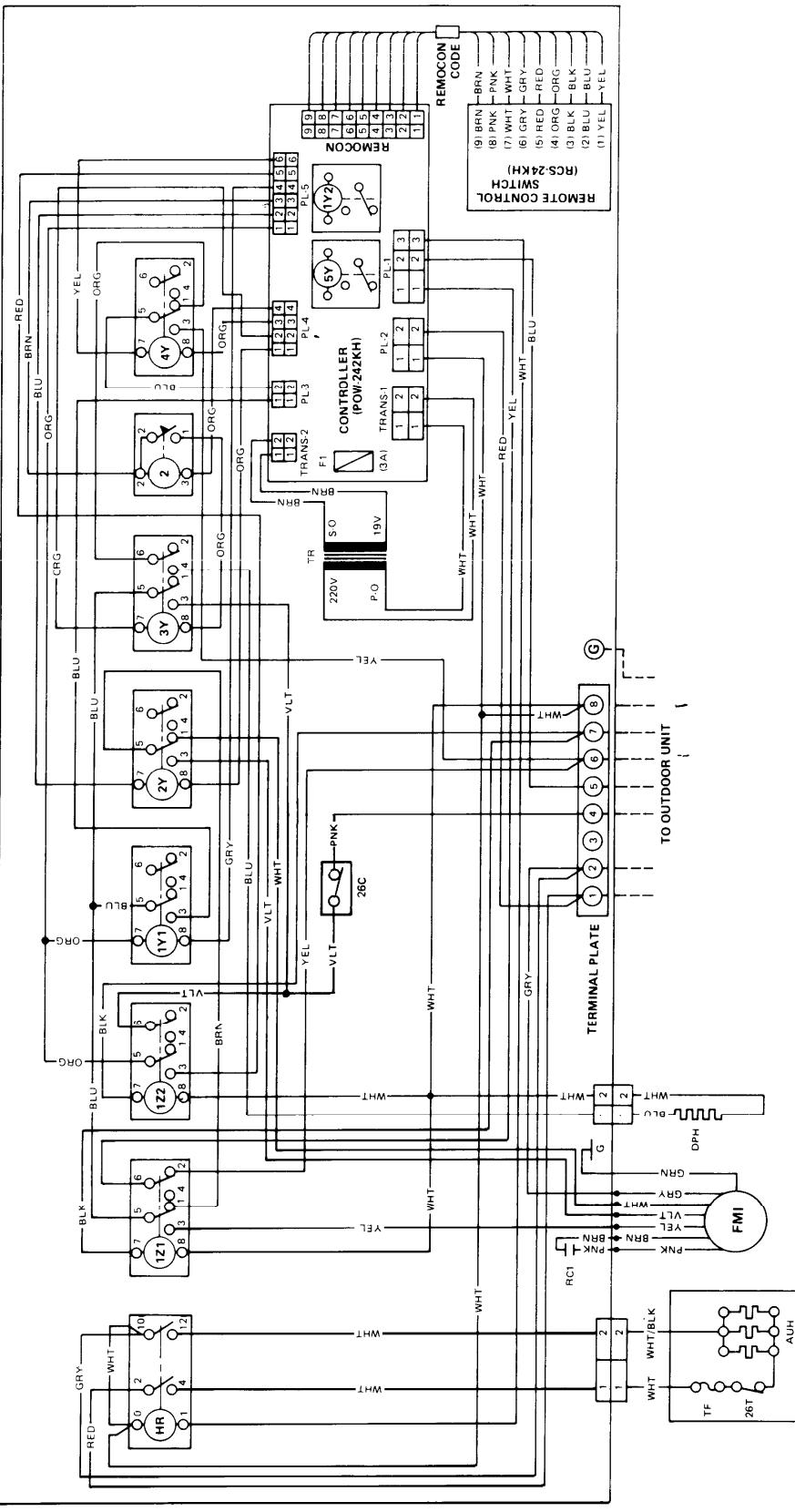
  

Key No.	Description
DBA-10C	DS-442X
DS-442X	DS-442X
DS-442X	470 $\mu$ F/50V TW
0.047 $\mu$ F/50V	



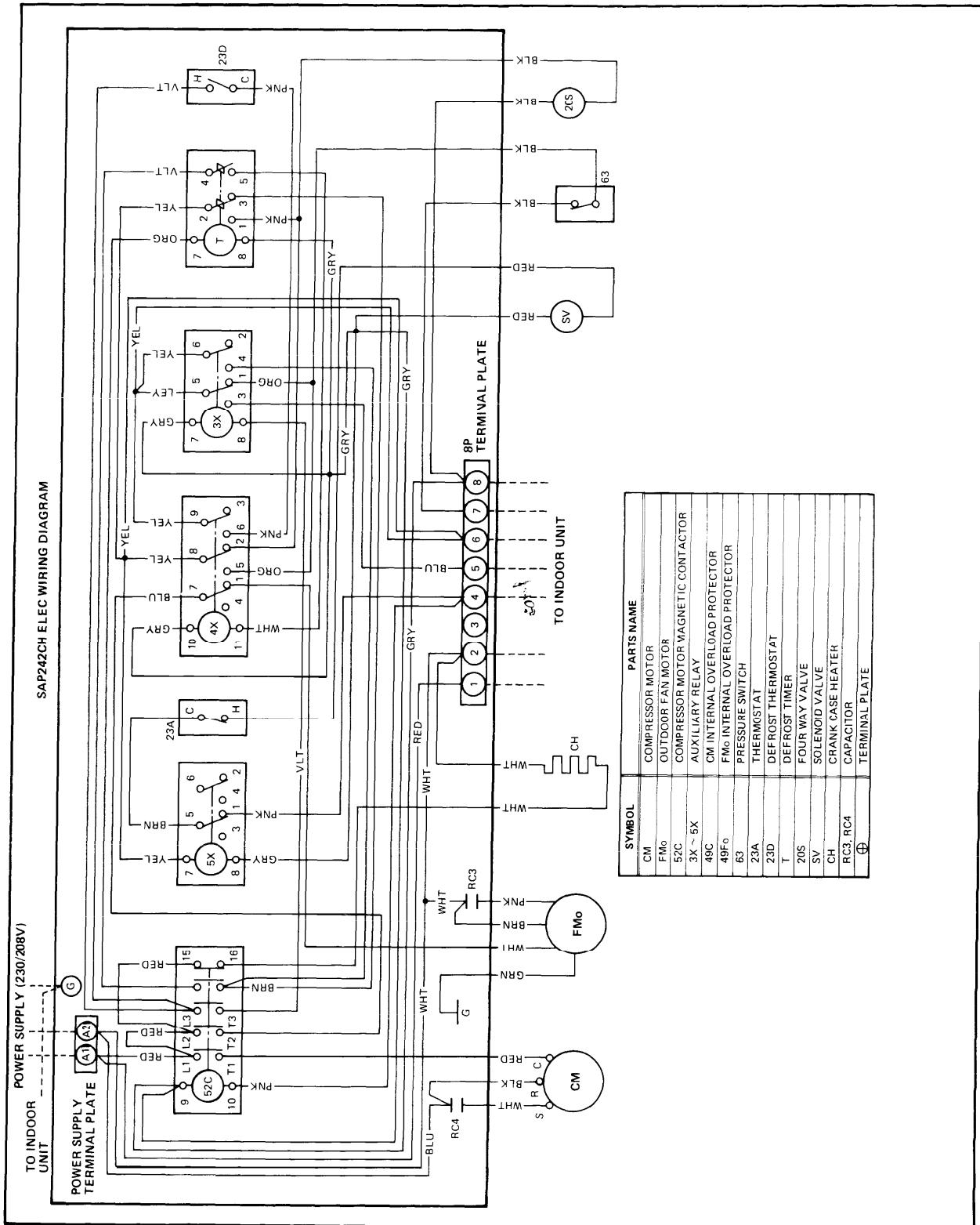
## **ELECTRIC WIRING DIAGRAM**

SAP242KH ELECTRIC WIRING DIAGRAM

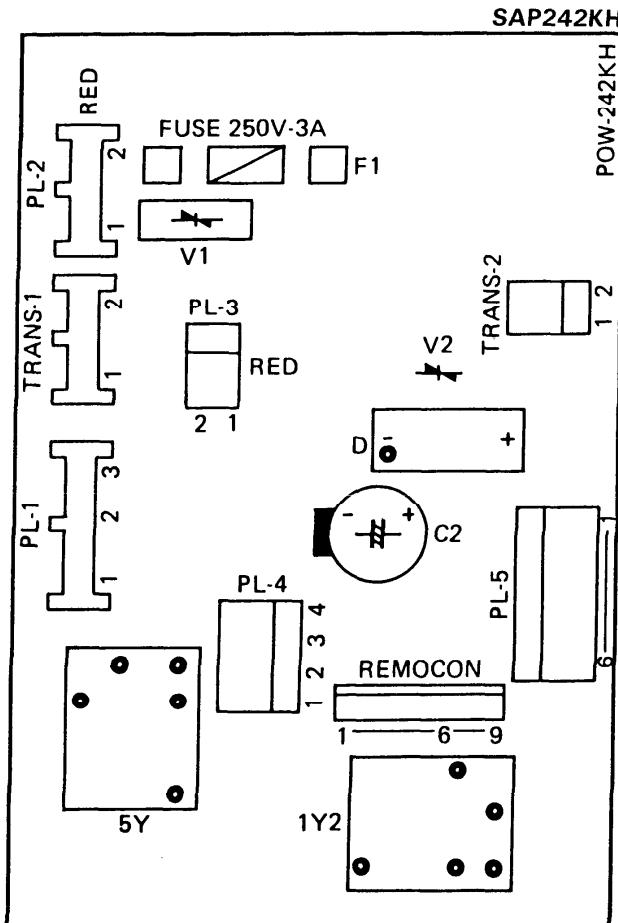


SYMBOL	PARTS NAME	SYMBOL	PARTS NAME
FMI	INDOOR FAN MOTOR	26T	OVER HEAT PROTECTION THERMOSTAT
AUH	AUXILIARY HEATER	TF	THERMO FUSE
HR	HEATER RELAY	TR	TRANSFORMER
1Y1, 1Y2	AUXILIARY RELAY	2	TIMER
2Y ~ 5Y	AUXILIARY RELAY	DPH	DEW PROOF WARMER
1Z1, 1Z2	AUXILIARY RELAY	RC1	CAPACITOR
49FI	FMI INTERNAL OVERLOAD PROTECTOR	F1	FUSE
26C	FREEZE PROTECTION THERMOSTAT		

## ELECTRIC WIRING DIAGRAM



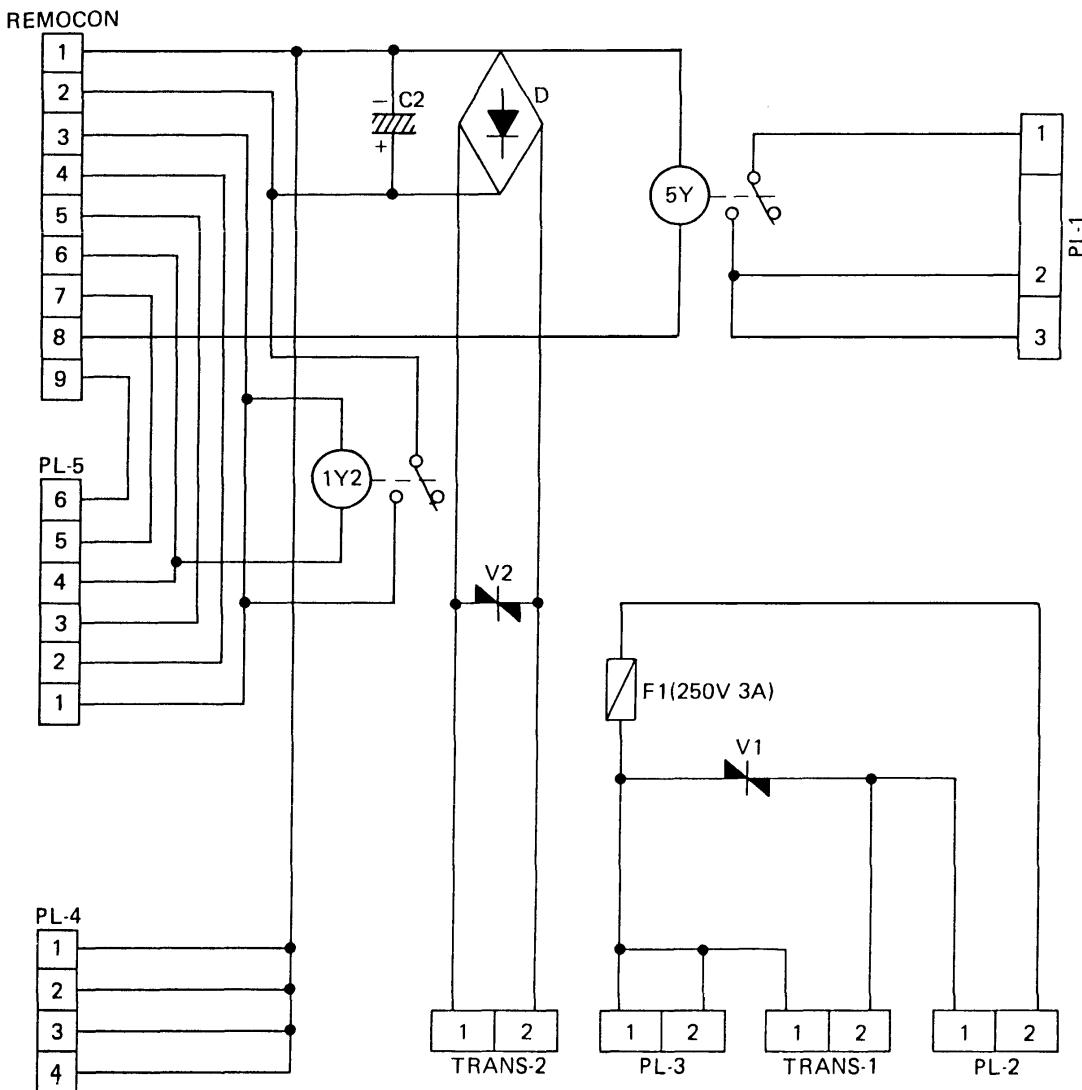
CONTROLLER P.C.B. POW-242KH (PRINTED PATTERN)



## CONTROLLER P.C.B. (POW-242KH)

### SAP242KH

Key No.	Description	Key No.	Description	Key No.	Description
D	Diode	5Y	Relay LZG-24HE	PL-4	Connector Plug
C2	Capacitor 470MF/50V	F1	Connector Fuse 250V 3A	PL-5	Connector Plug
V1	Varistor MNR-68NA	PL-1	Connector Plug ULTLEX	TRANS-1	Connector Plug ULTLEX
V2	Varistor MNR-68NA	PL-2	Connector Plug ULTLEX (RED)	TRANS-2	Connector Plug
1Y2	Relay LZG-24HE	PL-3	Connector Plug	REMOCON	Connector Plug EI 9P



POW-242KH

For parts or service contact



**SFS CORPORATION**: 210 RISER ROAD LITTLE FERRY, NEW JERSEY 07643

1987/ June/1000/TA Printed in Japan