

SERVICE MANUAL

SPLIT SYSTEM
HEAT PUMP

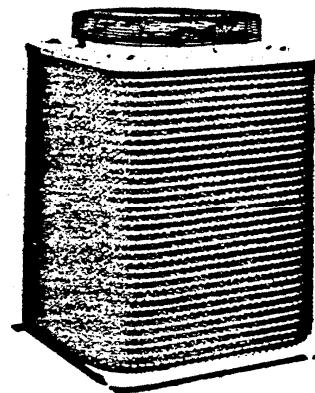


SAP362TCH
(U.S.A.)



Indoor Unit

SAP362TH



Outdoor Unit

SAP362CH

WM-17713

SANYO SPLIT SYSTEM HEAT PUMP SERVICE MANUAL

MODEL: SAP362TCH

Table of Contents

	Page
1. SPECIFICATIONS	1
1.1 Unit Specifications	1
1.2 Major Component Specifications	2
1.3 Compressor Identification	6
2. CONSTRUCTION OF THE UNIT	7
3. DIMENSIONAL DATA	8
4. PERFORMANCE CHARTS	10
5. OPERATING INSTRUCTIONS	14
6. INSTALLATION INSTRUCTIONS	16
7. TROUBLESHOOTING	29
8. CHECKING AND REPLACING ELECTRICAL COMPONENTS	46
9. DISASSMBLY AND SERVICE PROCEDURES	57
10. PARTS LIST	74
11. REFRIGERANT FLOW DIAGRM	80
12. ELECTRIC WIRING DIAGRAM	81

PRODUCTION CHANGE NOTICE

SANYO

Please add this notice to the literature listed below

- Parts List Service Manual Technical Data

Category: Air Conditioner Date: Feb. 1991
Model: SAP362TCH Changed date of production: September 1990
Reference No. WM-17713
Destination: U.S.A. Issue No.: 1

The following changes have been made in the products listed above model.

Page or Section		Key No.	Part No.	Description	Q'ty	Remarks
Page 22	Old	-	-	Wiring System Diagram	-	
	New	-	-	Wiring System Diagram	-	

New Wiring System Diagram

Addition of Disconnect Switch for Control line. (Field Supply)

INDOOR

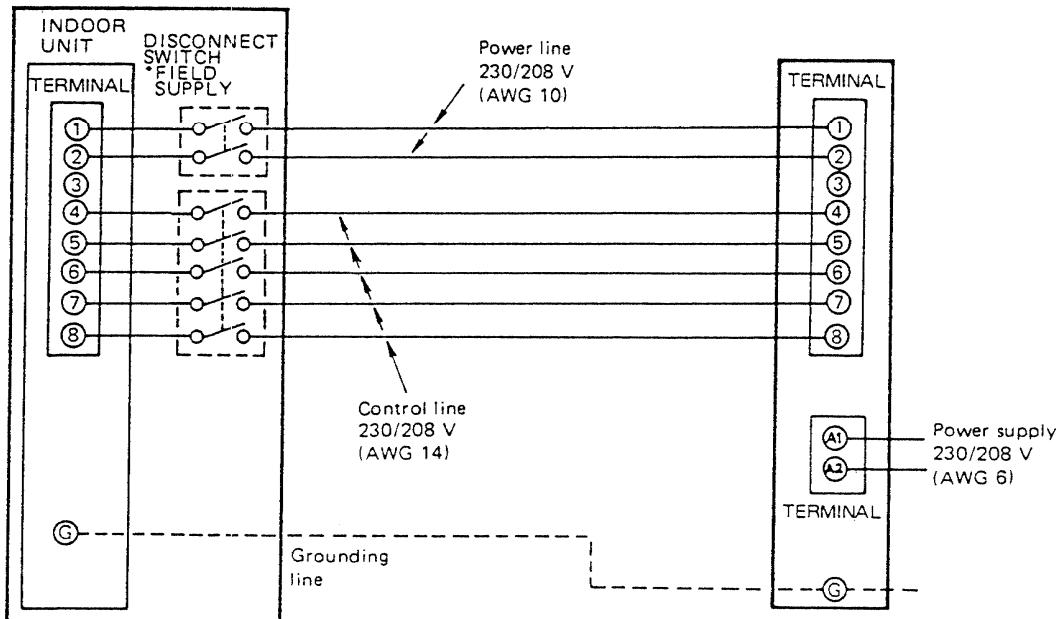


Fig. 21

- 22 -

Reason of change: Improvement of Performance.

S F S Corporation: 1200 West Artesia, Compton, California 90220

Printed in Japan

Reference No. WM-70151N

1. SPECIFICATIONS

1.1 Unit Specifications

Model No.		SAP362TCH	
Unit Model No.	Indoor Unit	32,400/31,400	
	Outdoor Unit	33,200/32,000	
PERFORMANCE & ELECTRICAL RATINGS		Cooling	Heating
Capacity – Cooling	BTU/hr.	32,400 (31,400)	
– Heating	BTU/hr.	33,200 (32,000)	
Moisture Removal (High)	Pints/hr.	9.2/8.5	–
Air Circulation (High)	Cu.ft./min.	820/770	
SEER (EER)	BTU/Whr.	9.10/9.10	–
COP		–	2.60/2.55
Frequency	Hz	60	
Rated Voltage	V	230/208	
*Running Amps	A	16.8/17.8	16.9/18.3
Power Input	W	3,575/3,470	3,740/3,675
Back-up Heater	kW	–	5.0/4.08
Fuse (or Circuit Breaker) Capacity	A		50
FEATURES			
Controls	Microcomputer	–	
	IC	Yes	
Fan Speeds		2	
Timer		–	
Ventilator		–	
Air Deflection	Horizontal	Automatic	
	Vertical	Manual	
Air Filter		Washable, easy access	
Temperature Control		IC Thermostat	
Compressor		Rotary	
Refrigerant (R22)	Ibs. (g)	11.04 (5,000)	
Refrigerant Tubing Connections		Flare type	
Refrigerant Line Length	Ft. (m)	100 (30)	
Max. Outdoor Unit Height	Ft. (m)	50 (15)	
Refrigerant Tube o.d.			
Narrow Tube	In. (mm)	3/8 (9.52)	
Wide Tube	In. (mm)	3/4 (19.05)	
Drain Tube o.d.	In. (mm)	3/4 (26.67)	
Refrigerant Tubing Kit		Optional	
DIMENSIONS & WEIGHT		Indoor Unit	Outdoor Unit
Dimensions	Height In. (mm)	11-1/32 (280)	38 (965)
	Width In. (mm)	61-13/32 (1,560)	26-3/8 (670)
	Depth In. (mm)	26-9/16 (675)	26-3/8 (670)
Net Weight	Ibs. (kg)	112 (51)	216 (98)
Shipping Size	Cu. ft. (cu.m)	17.3 (0.49)	25 (0.71)
Shipping Weight	Ibs. (kg)	134 (61)	235 (107)

*Without electric heater

DATA SUBJECT TO CHANGE WITHOUT NOTICE

1.2 Major Component Specifications

Unit Model No.		SAP362TCH	
COMPRESSOR		Hermetic Rotary Type	
Compressor Model No.		C-R220H6K	
Source		230/208V, 60 Hz, Single Phase	
Pole		2	
Nominal Output (W)		2,200	
Displacement (cc/rev.)		48.6	
Amps.-Full Load (A)		13.9/15.1	
Locked Rotor (A)		98 (240 V)	
Type of Oil		Special oil for Rotary Compressor	
Compressor Oil Amount (cc)		1,500	
Coil Resistance (Ω) (Ambient Temp. 77°F)		C-R: 0.549 C-S: 1.525	
Protective Device		Internal Protector (15HM2509)	
Run Capacitor	MFD	40	
	VAC	370 or 400	
Unit Model No.		SAP362TH	SAP362CH
FAN MOTOR		Capacitor Run Induction Motor	
Fan Motor Model No.		KFG4T-81A6P	KFC6S-161A6P
Source		230/208 V, 60 Hz, Single Phase	
Pole		4	6
Nominal Output (W)		80	160
Amps.-Full Load (A)		1.13/1.05	1.46/1.42
-Locked Rotor (A)		-	
Protective Device		Internal Protector (17AM031-A5-4)	Internal Protector (17AM031-A5-4)
Run Capacitor	MFD	4	4
	VAC	440	
Coil Resistance (Ω) (Ambient Temp. 68°F)		WHT-BRN 31.49 YEL-PNK 18.75 WHT-VLT 27.10 VLT-YEL 39.60	WHT-BRN 34.88 WHT-PNK 72.07 WHT-YEL 81.59
AUTO DEFLECTOR MOTOR		Synchronous Motor	
Motor Model No.		M12	
Source		230/208 V, 60 Hz, Single Phase	
Pole		-	
Nominal Output (W)		3	
Amps.-Full Load (A)		0.019/0.017	
-Locked Rotor (A)		0.020/0.018	
Protective Device		Impedance Protector	
Run Capacitor	MFD	-	
	VAC	-	
Coil Resistance (Ω) (Ambient Temp. 77°F)		11,150	

DATA SUBJECT TO CHANGE WITHOUT NOTICE.

Unit Model No.	SAP362TH
Room Temp. Sensor *1	OCS-5K-2
Resistance (kΩ)	65°F = 6.5–7 83°F = 4.2–4.5 73°F = 5.2–5.8

Figure

Incorporated in the
remote control unit.

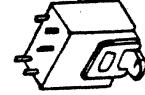
Note *1: Thermistor	
Unit Model No.	SAP362TH
Freeze Protection Thermostat	RTB-4U302
Operating Temperature	ON: 50°F OFF: 23°F



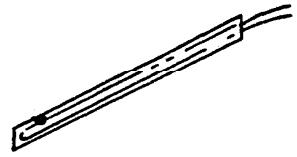
Unit Model No.	SAP362TH
Auto Deflector Motor	M12
Resistance (Ω)	11,150 (at 77°F)



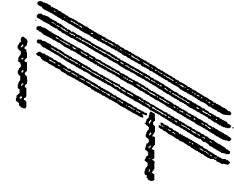
Unit Model No.	SAP362TH
Heater Relay	G5D-22423T-US-55
Rating	Contact: 230VAC, 20A Coil: 230/208VAC



Unit Model No.	SAP362TH
Dew Proof Warmer	
Rating	230V, 17W



Unit Model No.	SAP362TH
Heater	
Rating	1/0.82KW (230/208V)

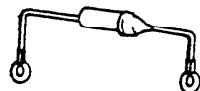


Unit Model No.	SAP362TH	
Heater Limit Control	S361	S362
Operating Temperature	ON: 104°F OFF: 140°F	ON: 113°F OFF: 149°F
Rating	240VAC, 0.1A	240VAC, 0.1A

Figure



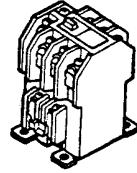
Unit Model No.	SAP362TH
Thermal Cut OFF	SF-169U
Operating Temperature	335°F



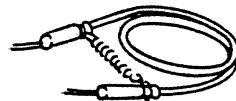
Unit Model No.	SAP362TH
Power Transformer (for controller PCB)	ATR-J122U
Resistance (Ω)	Primary: WHT-WHT 143.5 Secondary: BRN-BRN 1.2



Unit Model No.	SAP362CH
Magnet Relay	FMCA-1SUL



Unit Model no.	SAP362CH
Crankcase Heater	CH 5700
Rating	230 V, 30 W



Unit Model No.	SAP362CH
Defrost Timer	STMN-2-T0918
Rating	Contact: 250VAC, 1A Coil: 230/208VAC



Unit Model No.	SAP362CH
Outdoor Coil Thermostat	RTB-4U201F
Operating Temperature	ON: 23°F, OFF: 50°F

Figure



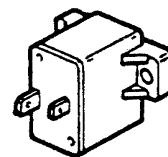
Unit Model No.	SAP362CH
High Pressure Switch	FTB-2UC01
Rating	OFF: 412.47 psig



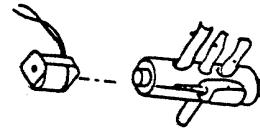
Unit Model No.	SAP362CH
Outdoor Pressure Switch	ACB-1UB04W
Operating Pressure	ON: 99.54 psig, OFF: 170.64 psig



Unit Model No.	SAP362CH
Thermistor	912 x 25E101YV20
Rating	100Ω (at 77°F)



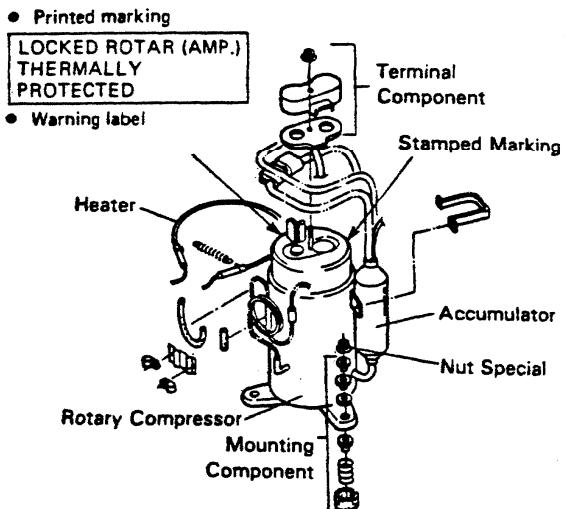
Unit Model No.	SAP362CH
4-way Reversing Valve	Coil: L27-9072 Valve Ass'y: V389000
Coil Voltage	230 V/208 V, 60 Hz



1.3. Compressor Identification

1. Marking (Stamped)

Compressor code No. → 806 589 46 Manufacturer:
 Model No. → C - R220H6K TSE T = Tokyo
 S = Sanyo
 E = Electric
 Production Date → 30 01 6 ← (= 30 Jan., 1986)
 Ratings (V) → V230/208
 Frequency (Hz) and Phase → HZ60 PH1



2. Compressor Code No.

806 589 46

Voltage Identification 2: 115V AC, 60 Hz 6: 208/230VAC, 60Hz
Phase & Application 4: 1-PH & High Back Pressure
Design Serial No. Figures to express Nominal Output (Approx. Watts)
Figures to express Compressor Type (806 means ROTARY)

WARNING-SERVICEMAN

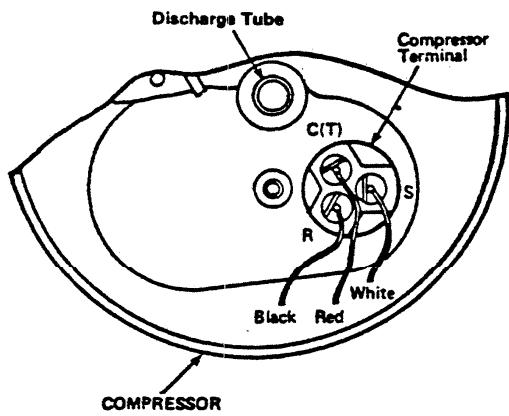
- FIELD SERVICE LEAK TEST PRESSURE MUST NOT EXCEED 150 P.S.I.G.
- THIS COMPRESSOR MUST BE GROUNDED.
- DO NOT OPERATE WITHOUT PROTECTIVE COVER OVER TERMINALS: DISCONNECT ALL POWER BEFORE REMOVING THE PROTECTIVE COVER.

CAUTION

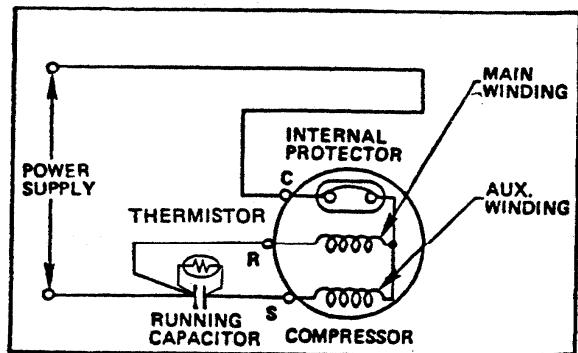
COMPRESSOR HOUSING MAY REACH 302°F (150°C) WITH TERMINAL PROTECTOR APPROVED BY TOKYO SANYO AND TESTED IN ACCORDANCE WITH UL984-1981.

TOKYO SANYO ELECTRIC CO.,LTD.

3. Compressor Wire Orientation

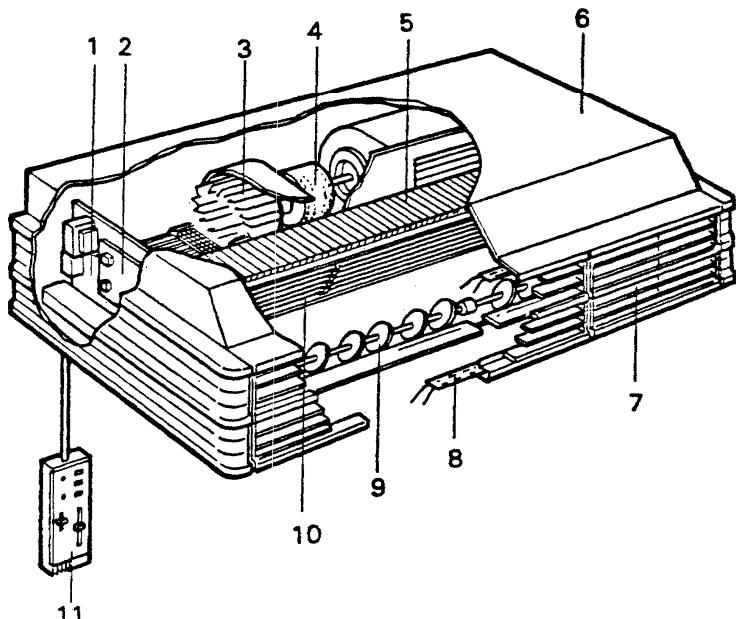


Wiring Diagram



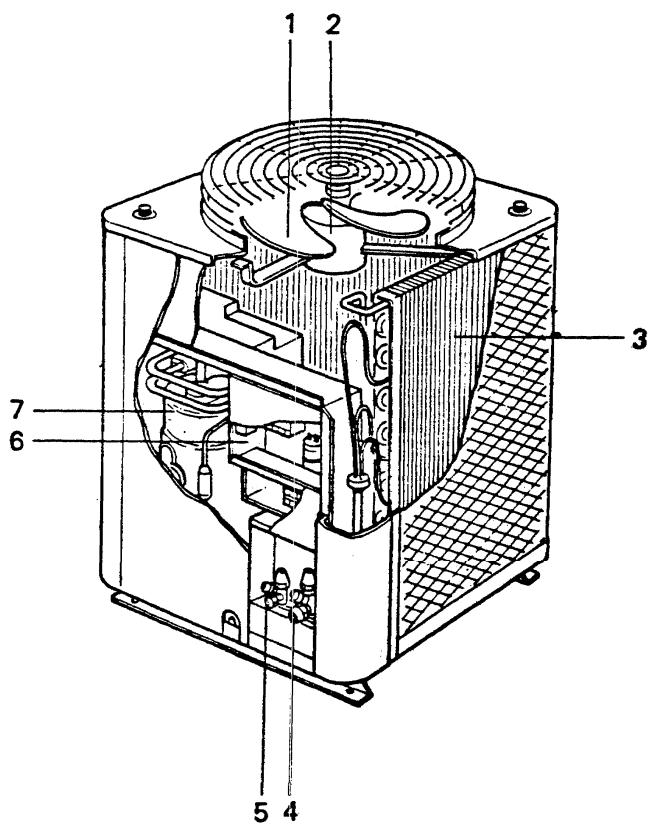
2. CONSTRUCTION OF THE UNIT

INDOOR UNIT SAP362TH



1. Electrical component box
2. Controller P.C.B.
3. Centrifugal fan
4. Fan motor
5. Evaporator (= Indoor heat exchanger)
6. Cabinet
7. Air discharge grille
8. Dew proof warmer
9. Auto deflector
10. Electric heater
11. Remote control unit

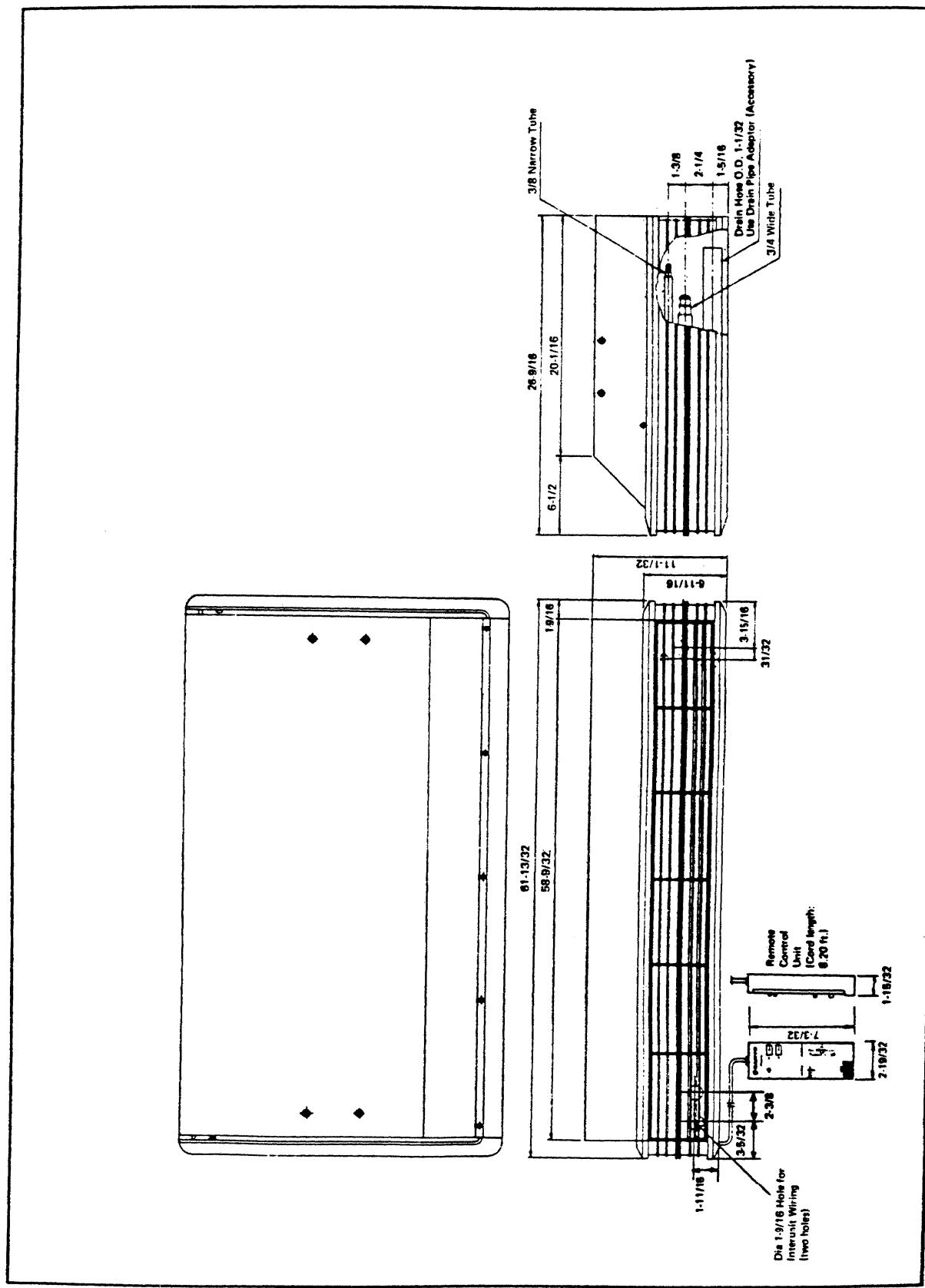
OUTDOOR UNIT SAP362CH



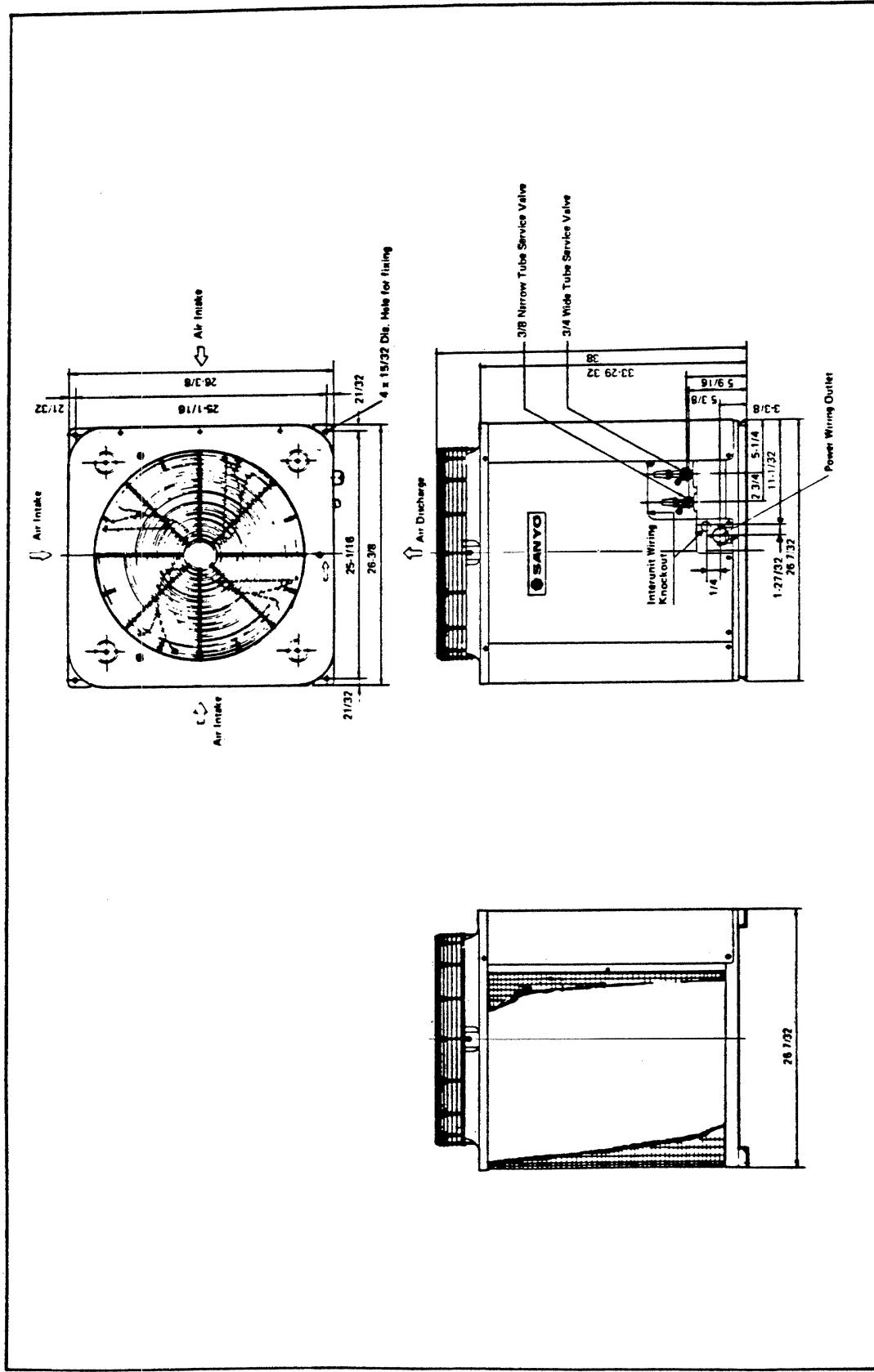
1. Propeller fan
2. Fan motor
3. Condenser (= Outdoor heat exchanger)
4. Service valve (Wide tube)
5. Service valve (Narrow tube)
6. Electrical component box
7. Compressor

3. DIMENSIONAL DATA

Indoor Unit SAP362TH



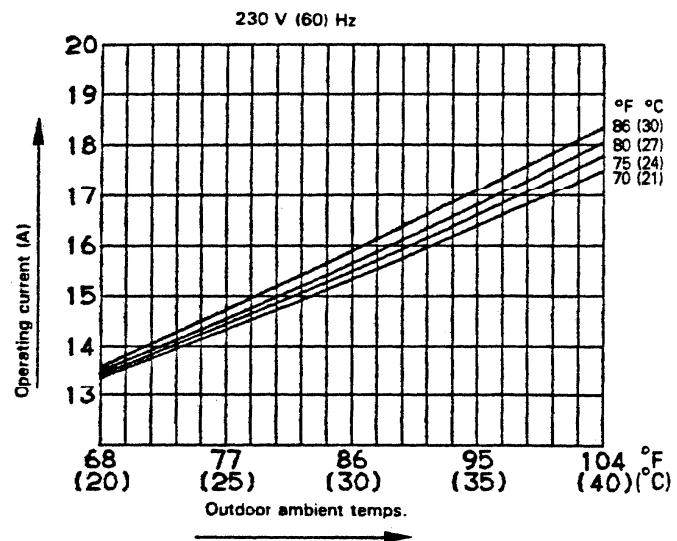
Outdoor Unit SAP362CH



4. PERFORMANCE CHARTS

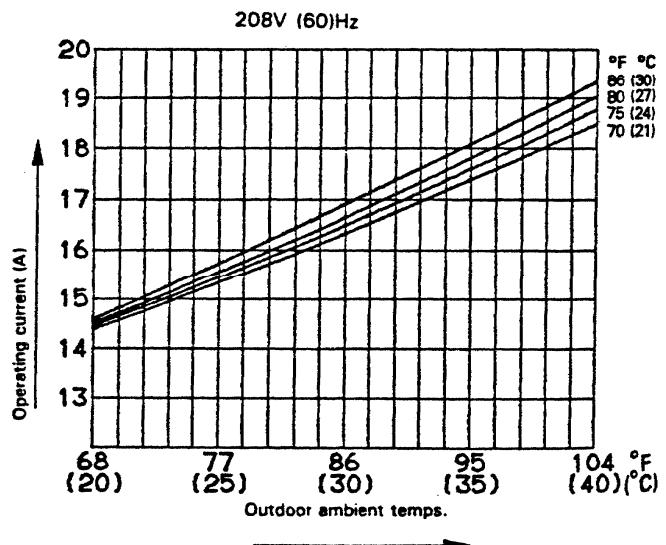
Cooling characteristics

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.)



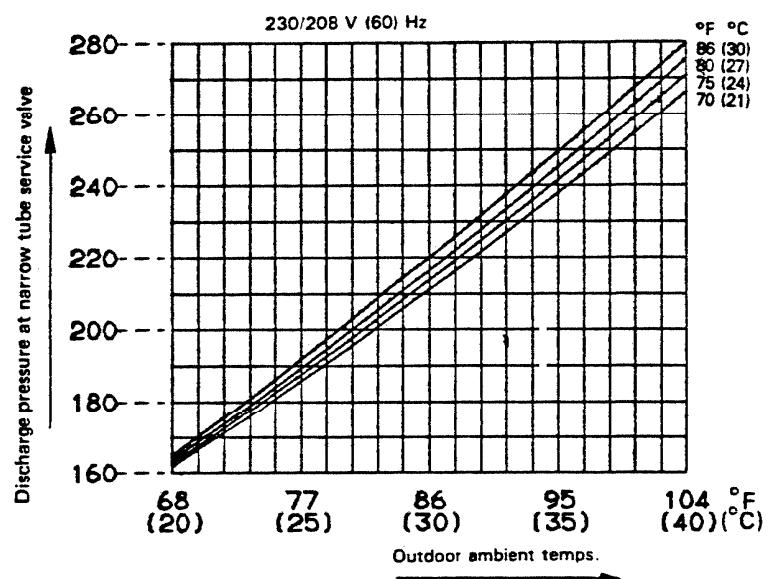
Cooling characteristics

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.)



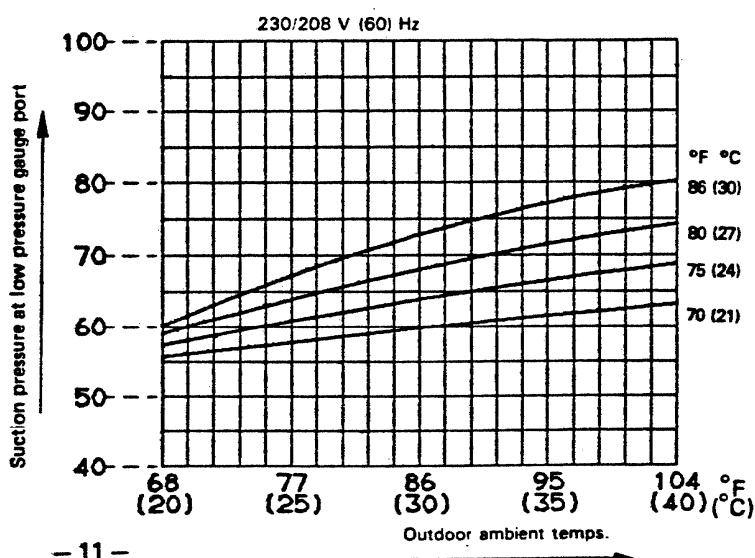
Cooling characteristics

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



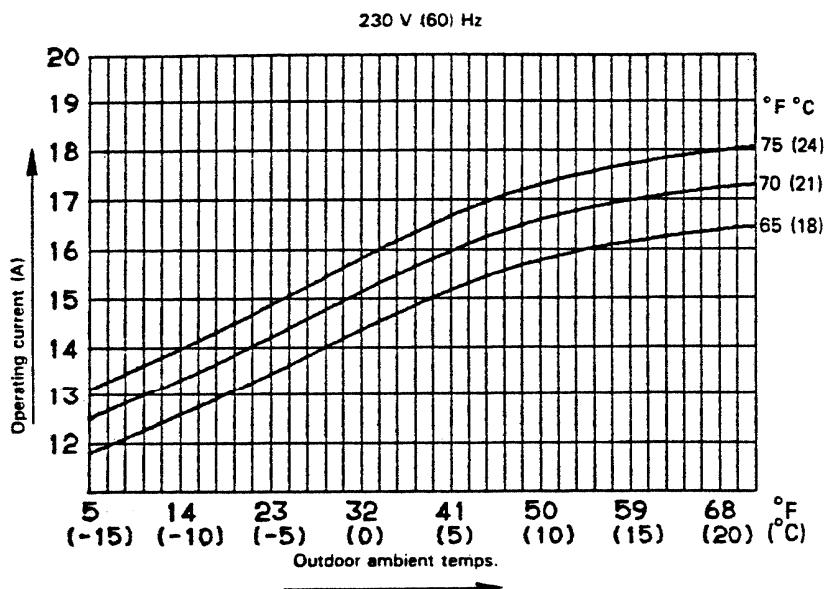
Cooling characteristics

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



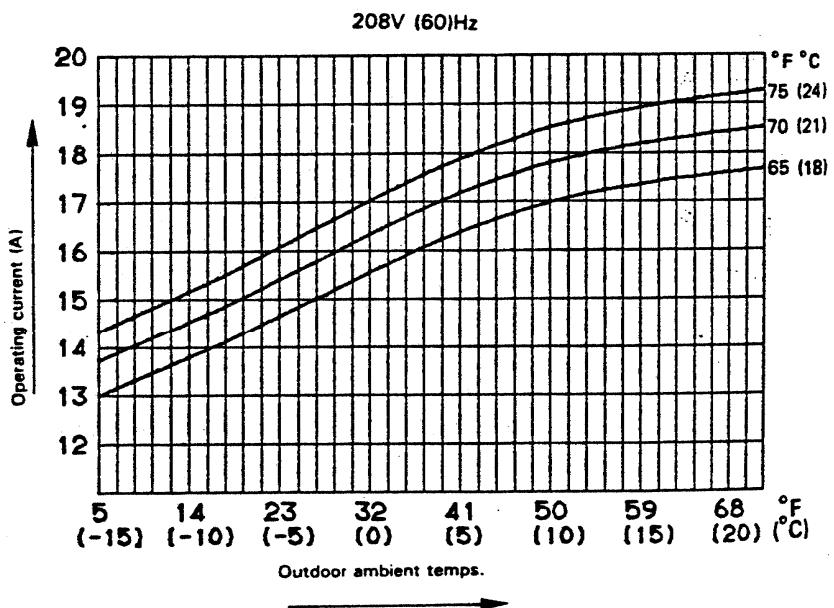
Heating characteristics

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



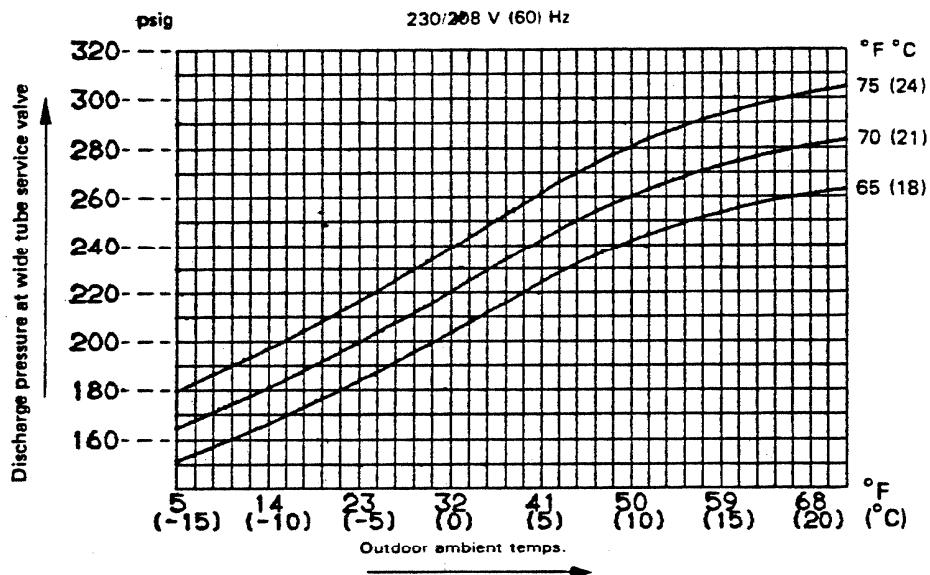
Heating characteristics

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



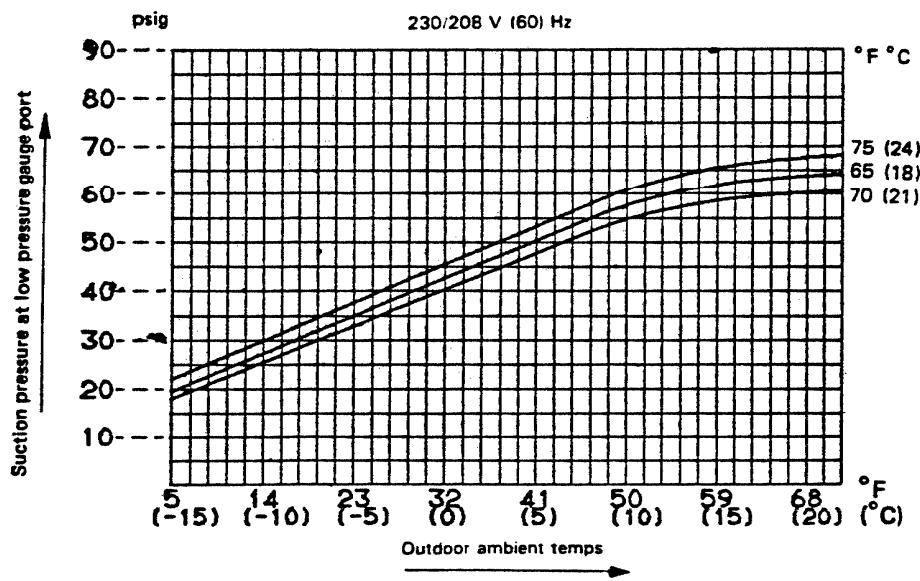
Heating characteristics

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



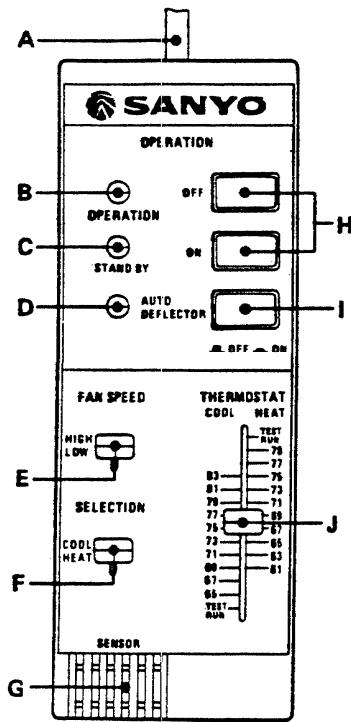
Heating characteristics

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



5. OPERATING INSTRUCTIONS

1. REMOTE CONTROL UNIT



A. REMOTE CONTROL WIRE

B. OPERATION INDICATOR LAMP

This lamp will light when the operation button is pushed.

C. STAND BY LAMP

This lights up under the following conditions:

- 1) At the start of heating (until heat exchanger coil becomes warm).
- 2) While the defrost system is working.

D. AUTO DEFLECTOR LAMP

E. FAN SPEED SELECTOR

F. COOL/HEAT SELECTOR

G. TEMPERATURE SENSOR

Electronically senses the room temperature.

H. OPERATION SWITCH

See page 15 for air conditioner operation procedures.

I. AUTO DEFLECTOR SWITCH

J. THERMOSTAT AND TEST RUN SLIDE SWITCH

● OPERATION SWITCH

SWITCH	KIND OF OPERATION	OPERATION INDICATOR LAMP
OFF	Stop operation.	Operation lamp goes out.
ON	Starts compressor for cooling or heating operation.	Operation lamp lights up.
AUTO DEFLECTOR	Starts auto deflector to deliver air to every corner of the room over 80 deg. arc.	Auto deflector lamp lights up.

● 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.

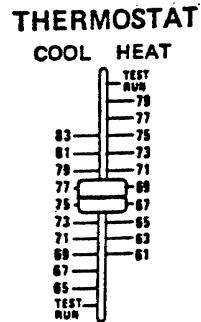
Note: TEST RUN

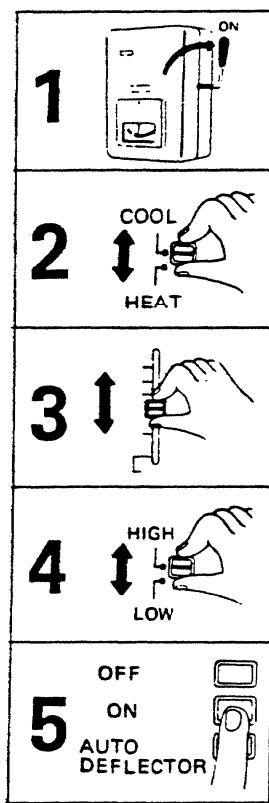
This position is to be used by the contractor only for the test operation upon installation of the air conditioner and during servicing. It is normally locked.

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

The position

- Left graduation: for cooling operation
- Right graduation: for heating operation





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 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, disconnect power supply.

3. AIR FLOW DIRECTION

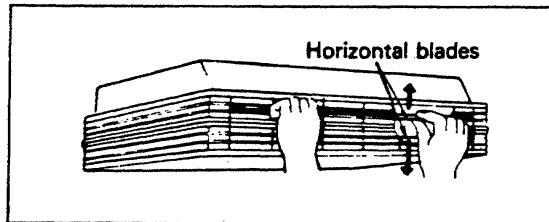
- Vertical adjustment (Manual). Move two horizontal blades of the air outlet by hand.
- Horizontal adjustment (Automatic)

Variable mode

Press the AUTO DEFLECTOR pushbutton to start automatic air sweep. AUTO DEFLECTOR lamp lights during operation.

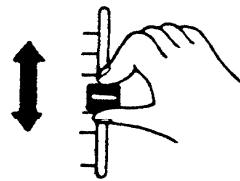
Fixed mode

To select a fixed air direction, press the pushbutton again when the air is flowing in the desired direction. The lamp will go out at this time.



● 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.

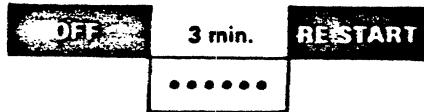


Do not move this lever too quickly.

4. CAUTION

● SAFETY INTERVAL RESTARTING

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



● 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

1. GENERAL

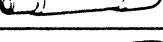
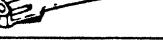
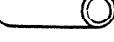
Here is a brief outline of where and how to install the unit. Please read over entire set of instructions for indoor and outdoor units and make sure all accessory parts listed are with the unit before beginning.

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

Drill, 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

Description	Shape	Q'ty	Remarks
Suspension fitting		4	Used to suspend indoor unit
Suspension bolt (M8x200)		4	
M8 hex. nut with flat washer		8	
M8 bolt		4	
M8 flat washer		4	
M8 spring washer		4	
Woodscrew (M3.1x13)		2	Used to mount remote control unit
Heat insulating material		1	Used for wide tube connection
		1	Used for narrow tube connection
Drain hose		1	Connect to drain outlet
Drain-hose clamp		1	
Drain hose adapter		1	

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 3/8" outside dia. with a 0.0314" wall thickness, and an equal length of 3/4" 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 3/4" 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 24.)
- Copper Wire
Inter Unit: Min. AWG 14 for Control Line
Min. AWG 10 for Power Line
Power Supply: Min. AWG 6

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 pt.)	

1-6. Tubing Length

- Refrigerant tubes between the indoor and the outdoor units shall be kept as short as possible.
- Standard length of tubing is designed as 50 ft. Refrigerant has factory charged in the outdoor unit at the time of shipment.
- If the tube length will exceed more than 50ft, additional refrigerant charge is necessary. (Refer to the below table and Fig. 1)

Max. allowable tubing length at shipment (ft)	Limit of tubing length (L) (ft)	Limit of elevation difference (H) (ft)	Required amount of additional refrigerant * (oz/ft)	Refrigerant amount charged at shipment (lb)
10 ~ 50	100	50	0.85	11.0

* No additional charge of compressor oil is required.

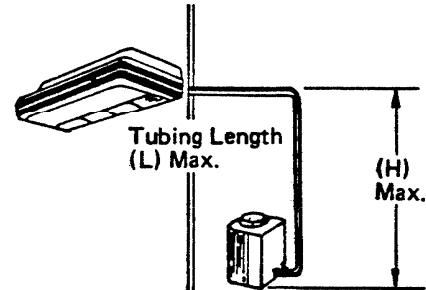


Fig. 1

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.
 - 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. Fig. 2
 - 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 cool (or hot) air from the unit.

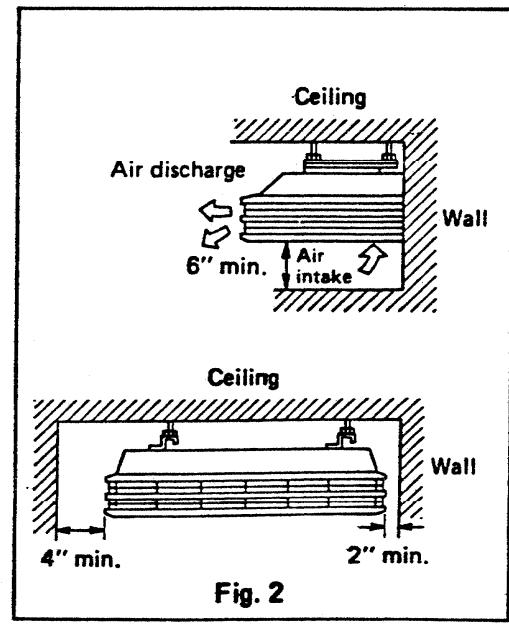


Fig. 2

Outdoor Unit :

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

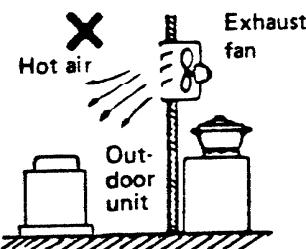


Fig. 3

- DO:**
- 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.
 - use lug bolts or equal to bolt down unit, reducing vibration and noise.

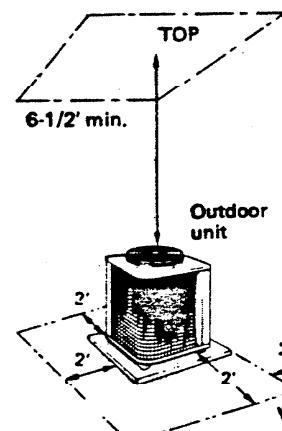


Fig. 4

Unit Installation in Areas of Heavy Snowfall or Extreme Cold

A. Countermeasure against snow and cold

- In areas where there is sleet, snowstorms or heavy snowfall, etc., install a platform for the outdoor unit and a snow-proof duct.
- Troubles such as the following may arise if there is no platform or snow-proof duct. Fig. 5-A
 - Draft flow stops and heat absorption is no longer possible.
 - Even if defrosting takes place, only the area near the fin melts and frost remains on the greater part of the unit.
 - Refrigerant tubing is deformed.

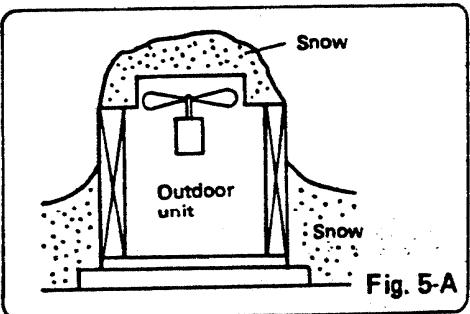


Fig. 5-A

B. Precautions for installing platform and snow-proof duct.

- Set the height of the platform so that it is higher than the highest level of snowfall. Fig. 5-B
- If the platform is larger than the bottom space of the unit, snow will gather on the platform and defrost water will freeze over again on it.

Make the platform smaller than the bottom space.

On the bottom plate of this model, drain holes have been opened so that defrost water can drain out easily. Construct the platform which does not block off these holes. Fig. 5-C

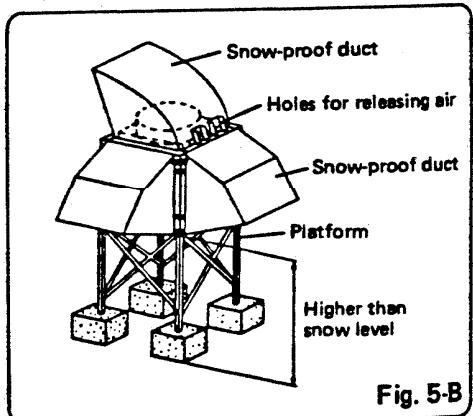


Fig. 5-B

- Set the intake opening of the snow-proof duct facing downwards, and make the opening area large. Fig. 5-B
- Since wind comes into the snow-proof duct through the exhaust part, be sure to provide a few holes for releasing air. Fig. 5-B
- Be sure to have a firm foundation because installation of the duct increases the wind pressure.

Paint the duct to prevent rusting.

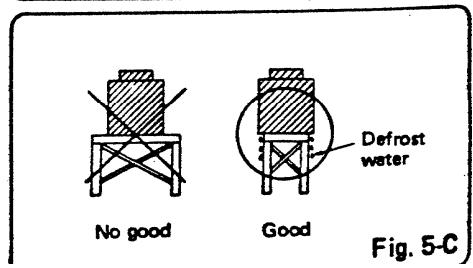


Fig. 5-C

3. HOW TO INSTALL INDOOR UNIT

3-1. Mount the Unit

- a) Place the Full-Scale Diagram (accessory) onto the ceiling, as shown in the illustration at right. Then mark the positions of the bolt anchors where the suspension bolts are to be mounted. Fig. 6A

NOTE : The diagram made of paper may shrink/stretch due to temperature or humidity, causing slight distortions in the dimensions. Therefore, before drill the hole, maintain the dimensions between the markings.

- b) In the holes for the bolts, insert securely bolt anchors (or bolt holding plugs). Then securely screw the bolts into the anchors, as shown in the illustration at right. Fig. 6B

- c) Install suspension pieces. Fig. 7A

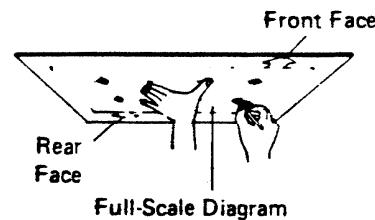


Fig. 6A

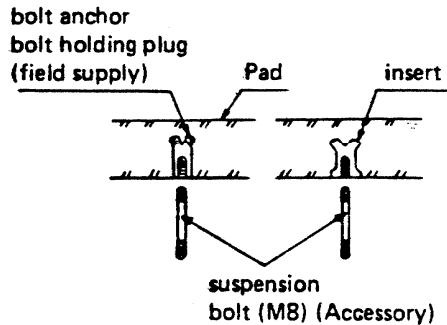
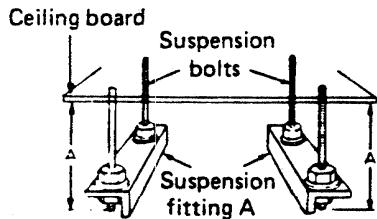


Fig. 6B

NOTE : If the ceiling pad is not strong enough to suspend the air conditioner or if it is difficult to use bolt anchors, secure the suspension bolts with the construction member. Refer to Fig. 7B



Four suspension bolts extruded from ceiling board shall be adjusted to equal in length (A) with one another.

Fig. 7A

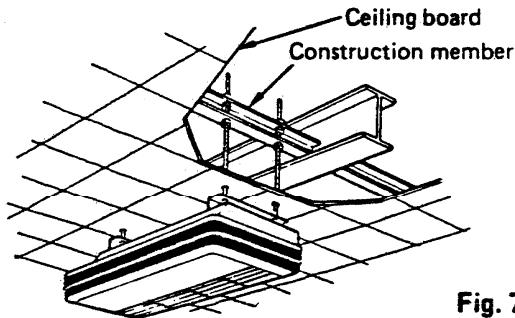
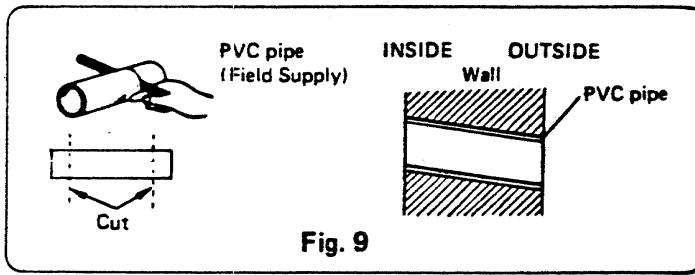


Fig. 7B

- d) If tubing and wire are to go directly out back of unit, make holes on the wall. Fig. 8

- e) Measure thickness of wall from inside edge to outside edge and cut PVC pipe at a slight angle. Insert PVC pipe in wall. Fig. 9



- f) Install suspension fitting (B) on the unit.

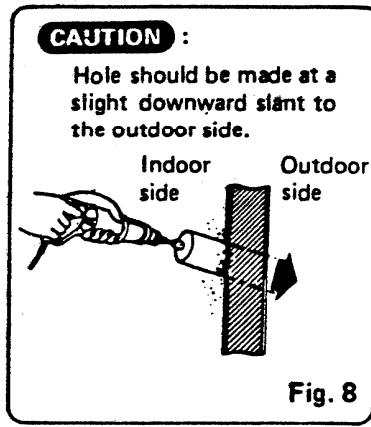
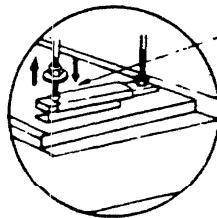


Fig. 8

g) Hang the unit on the suspension fitting A. Fig. 10



Lift up the hex nuts with flat washer, insert them in the holes in the fitting, and tighten them up.

Fig. 10

CAUTION : Avoid holding the plastic cover on both ends when lifting the unit. Fig. 11

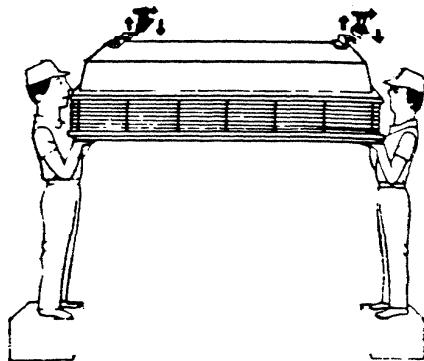
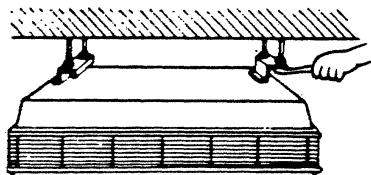


Fig. 11

h) Level the indoor unit by adjusting the M8 hex. nuts.

Fig. 12



Level

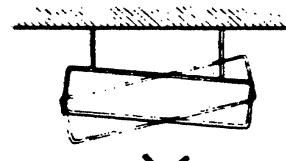


Fig. 12

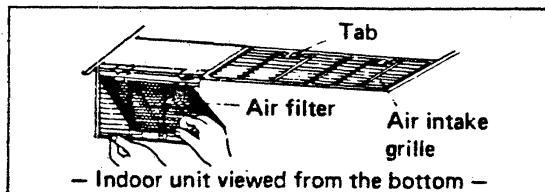
No good

3-2. Wiring Instruction 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. 7 in. from the wall face. Fig. 13

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

b) Remove the air intake grille and air filter. Fig. 14



— Indoor unit viewed from the bottom —

Fig. 14

c) Unscrew the cover plate of the electrical component box. Fig. 15

d) Temporarily set the wiring connector in the hole at the electrical component box.

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

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

CAUTION :

- Be sure to refer to the wiring system diagram label 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.

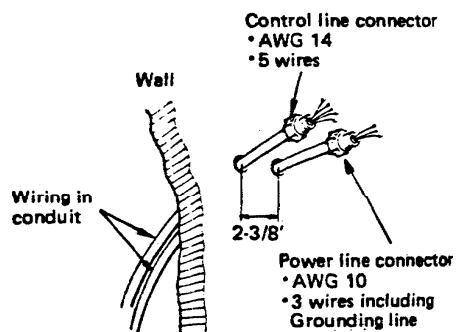


Fig. 13

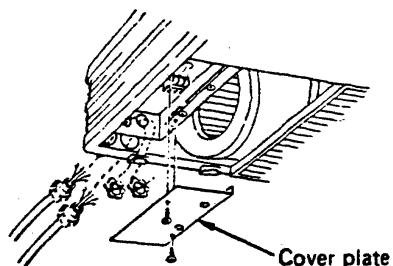


Fig. 15

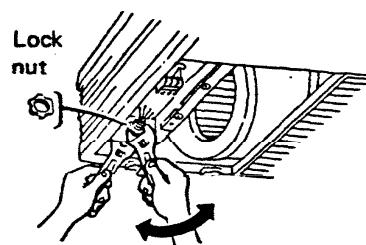


Fig. 16

3-3. 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 condensation should not damage furniture or floors. Fig. 18

* Formed polyurethane or polypropylene is recommended.

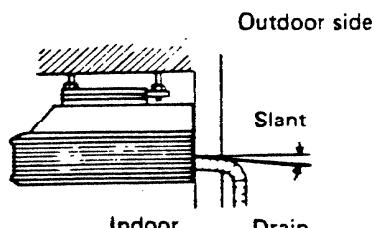


Fig. 17

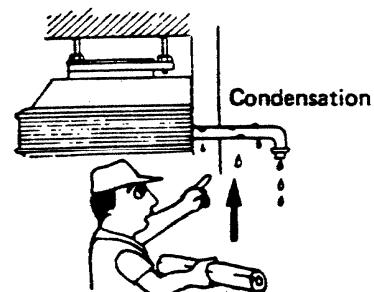


Fig. 18

3-4. 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 control cord to the wall.

CAUTION

- The remote control unit has a temperature sensing element. Do not install it where:
 - * Direct stream of cold air can reach it.
 - * Direct sunlight will fall on it.
 - * There are obstacles such as counters and tables.
 - * Water vapor or moisture 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.

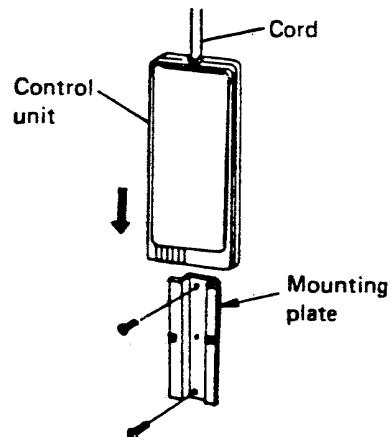


Fig. 19

WARNING

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

4. HOW TO INSTALL OUTDOOR UNIT

- Place unit on level pad, blocks or equal and anchor.
Refer to INSTALLATION SITE LOCATION given in page 18.

4-1. Wiring Instructions on Outdoor Unit

- Remove access panel "C" and 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
- 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		
POWER SUPPLY	INTERUNIT LINE	
	Power Line	Control line
1"	1/2"	1/2"

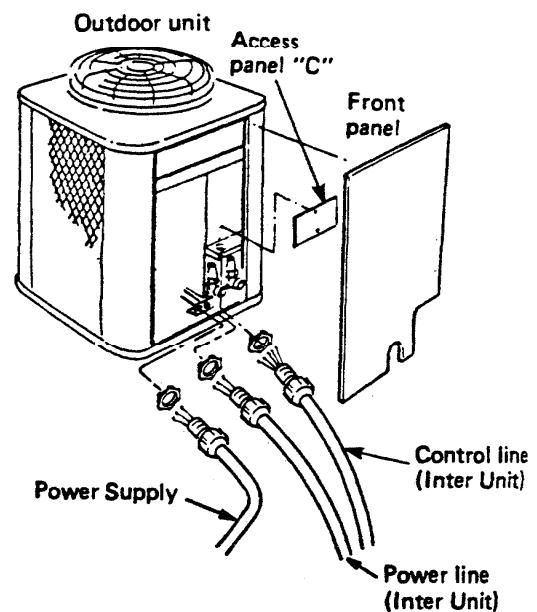


Fig. 20

WIRING SYSTEM DIAGRAM

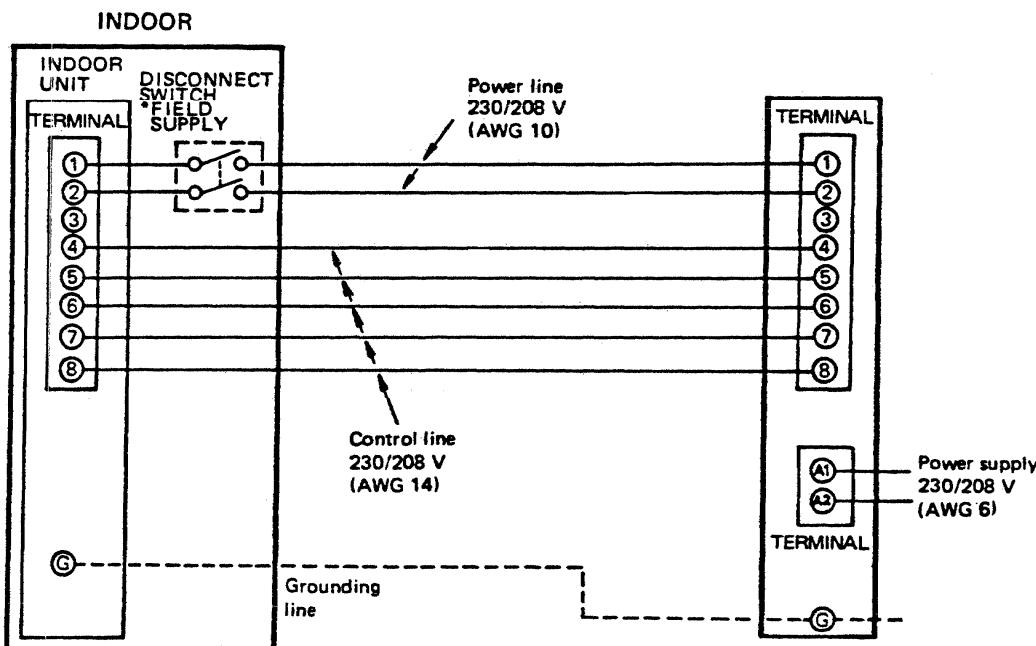


Fig. 21

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. 22

NOTE : When reaming, hold the copper tube end downward and be sure that no copper scraps fall into the tube. Fig. 23

- 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. 24 (*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.

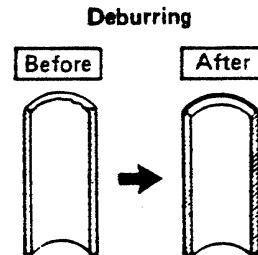


Fig. 22

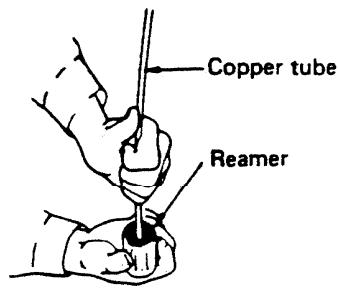


Fig. 23

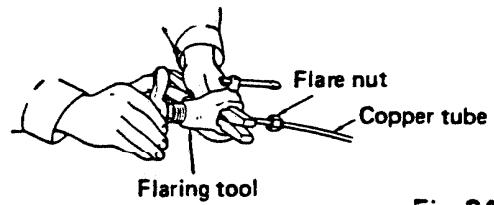


Fig. 24

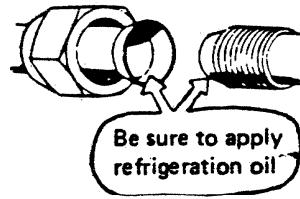


Fig. 25

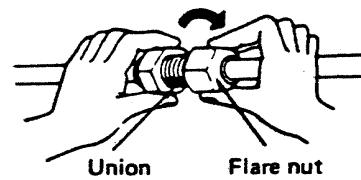


Fig. 26

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. 25
- 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. 26

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 600~680 lb. in. Flare nut small dia. tube should be torqued to 300~340 lb. in. Fig. 27
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. 28

NOTE : 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.

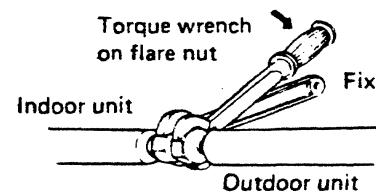


Fig. 27

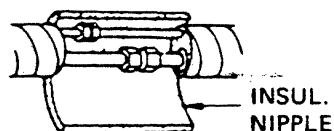


Fig. 28

5-5. Insulation of Refrigerant Tubing

To prevent heat loss and wet floors due to dripping of condensation, wide tube must be well insulated with proper insulation material. Thickness of insulation material should be min. 5/16". Fig. 29

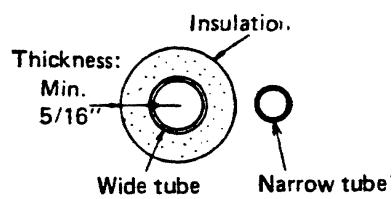


Fig. 29

- **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 Tubing

- 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. 30
- 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.

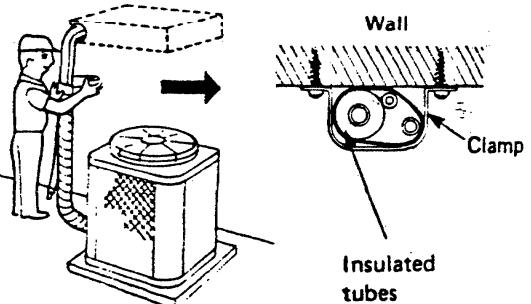


Fig. 30

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. 31

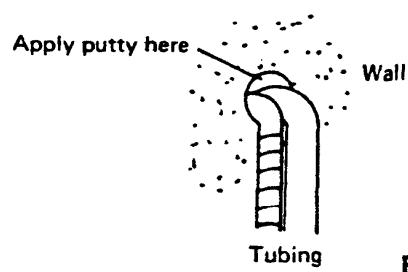


Fig. 31

6. AIR PURGING

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

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

CAUTION: Refrigerant has factory charged in the outdoor unit at the time of shipment.
Don't use this refrigerant gas for air purging.

■ TUBING DIAGRAM FOR AIR PURGING

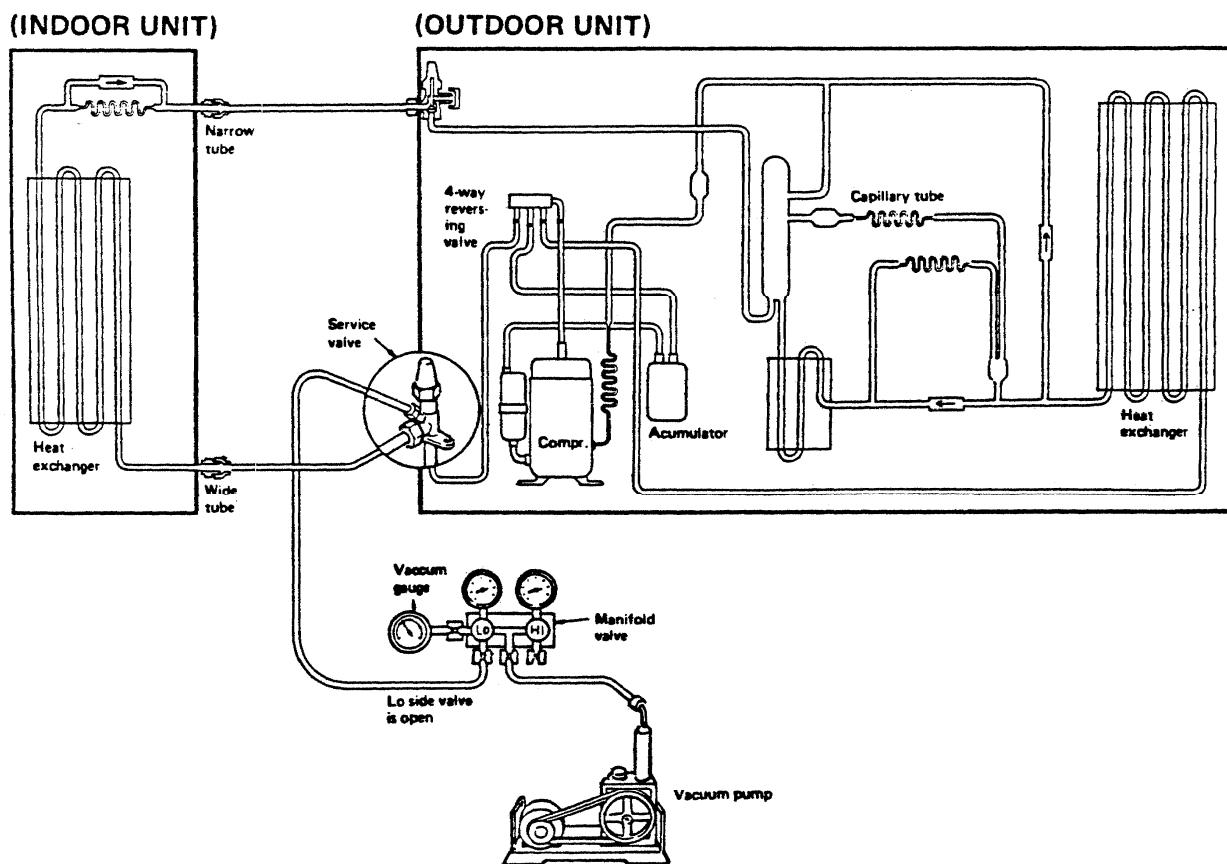


Fig. 32

6-1. Air Purging Procedure (Conventional evacuation system)

- a) Check gas leakage of all joints with liquid soap. Fig. 33
- b) If no gas leakage is confirmed, Connect both vacuum pump and vacuum gauge to service valve through 1/4" port with a flare nut. Fig. 32
- c) Next, run the vacuum pump until the pressure reaches to 1.5 mmHg abs. or less value than that.
- d) Close the low pressure side knob on the gauge manifold valve and stop evacuation.
- e) Remove the cap from the wide tube service valve and turn the spindle gradually until it is back seated. Fig. 34
- f) Disconnect vacuum pump and gauge manifold valve from the service valve. Then replace bonnet and flare nut to 1/4" port of service valve.
- g) The spindle of narrow tube service valve shall be fully back seated. Then tighten the valve seal cap with the copper gasket.
- h) The air purge procedure has been completed and the unit is ready for trial operation.

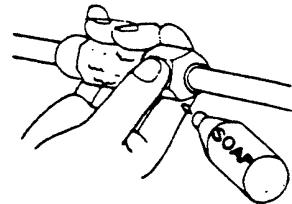


Fig. 33

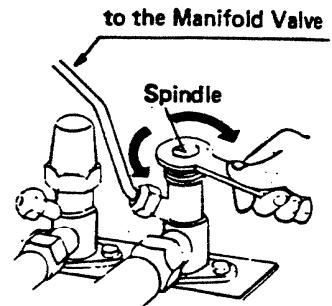


Fig. 34

6-2. Air Purging Procedure (If tubing length will not exceed more than 50 ft.)

- a) Connect refrigerant charging cylinder to narrow tube service valve, and open the valve of the charging cylinder. Fig. 35
- b) When gas begins to be expelled, stop the flow for about 5 seconds by holding your finger over the outlet, then remove it and allow gas to flow out freely for about 10 seconds.
Repeat this operation 6 or 7 times.
- c) Tighten the flare nuts quickly with bonnets on both charging ports right after hold no pressure before air comes in.
- d) The spindle of both service valves shall be fully back seated. Then, tighten the valve seal cap with the copper gasket.

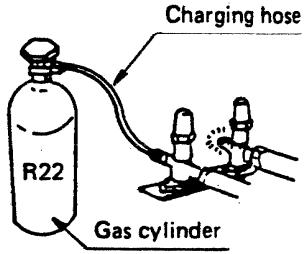


Fig. 35

■ SERVICE VALVE CONSTRUCTION

- **Valve Position -a-**

The valve spindles of both wide & narrow tubes are turned all the way in. The unit is shipped from the factory in this position. (Fig. 36-a)

- **Valve Position -b-**

The valve spindles 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-**

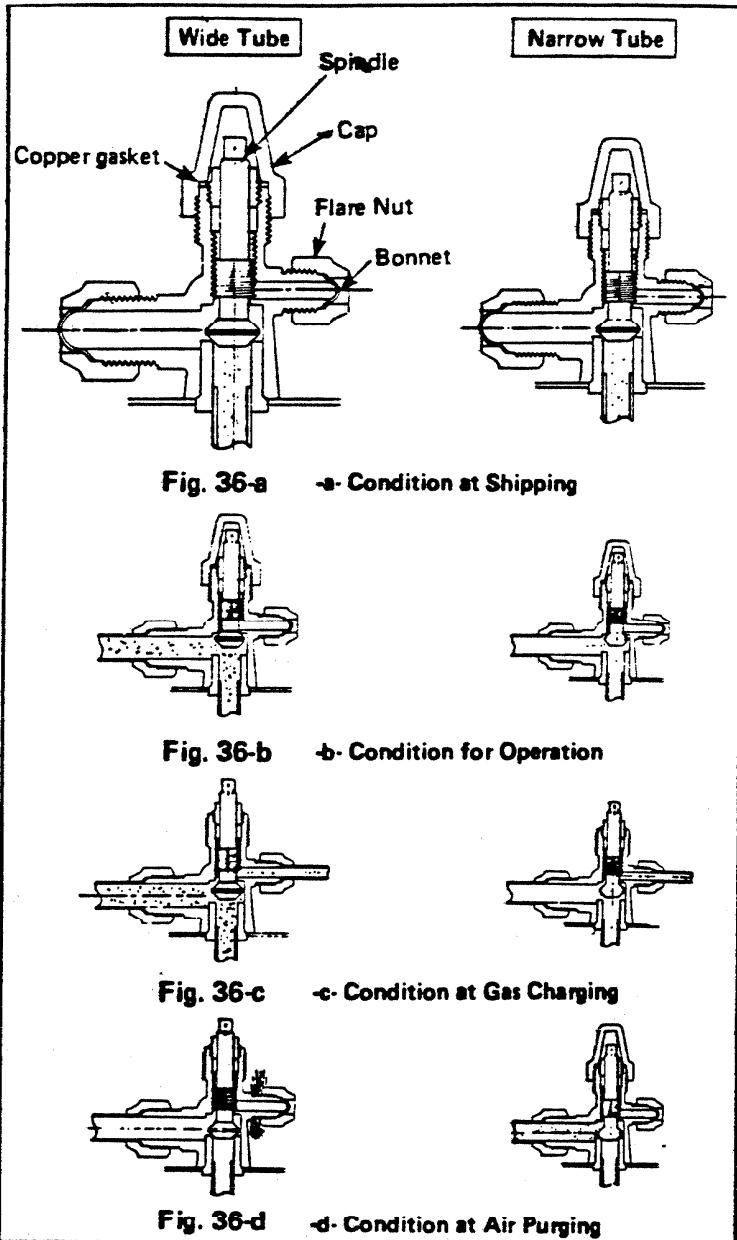
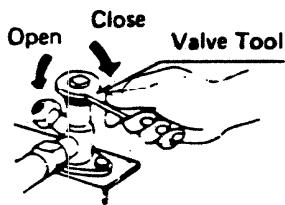
The valve spindles of both wide & narrow tubes are turned halfway-down position. This position is used for pressure measurement and gas charging. (Fig. 36-c)

- **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.

- 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.

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. Fig. 37

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. Fig. 38
- 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.

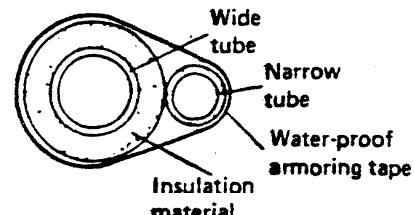


Fig. 37

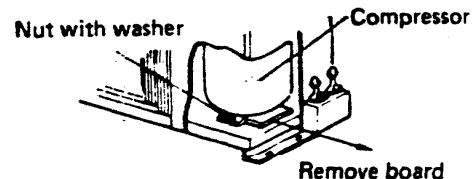


Fig. 38

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.)

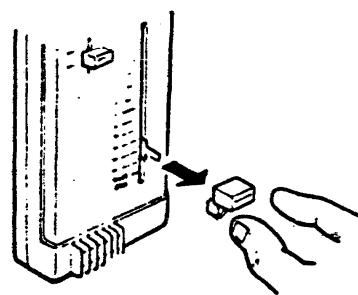


Fig. 39

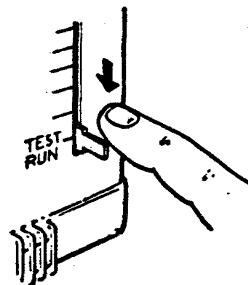


Fig. 40

7. TROUBLE SHOOTING

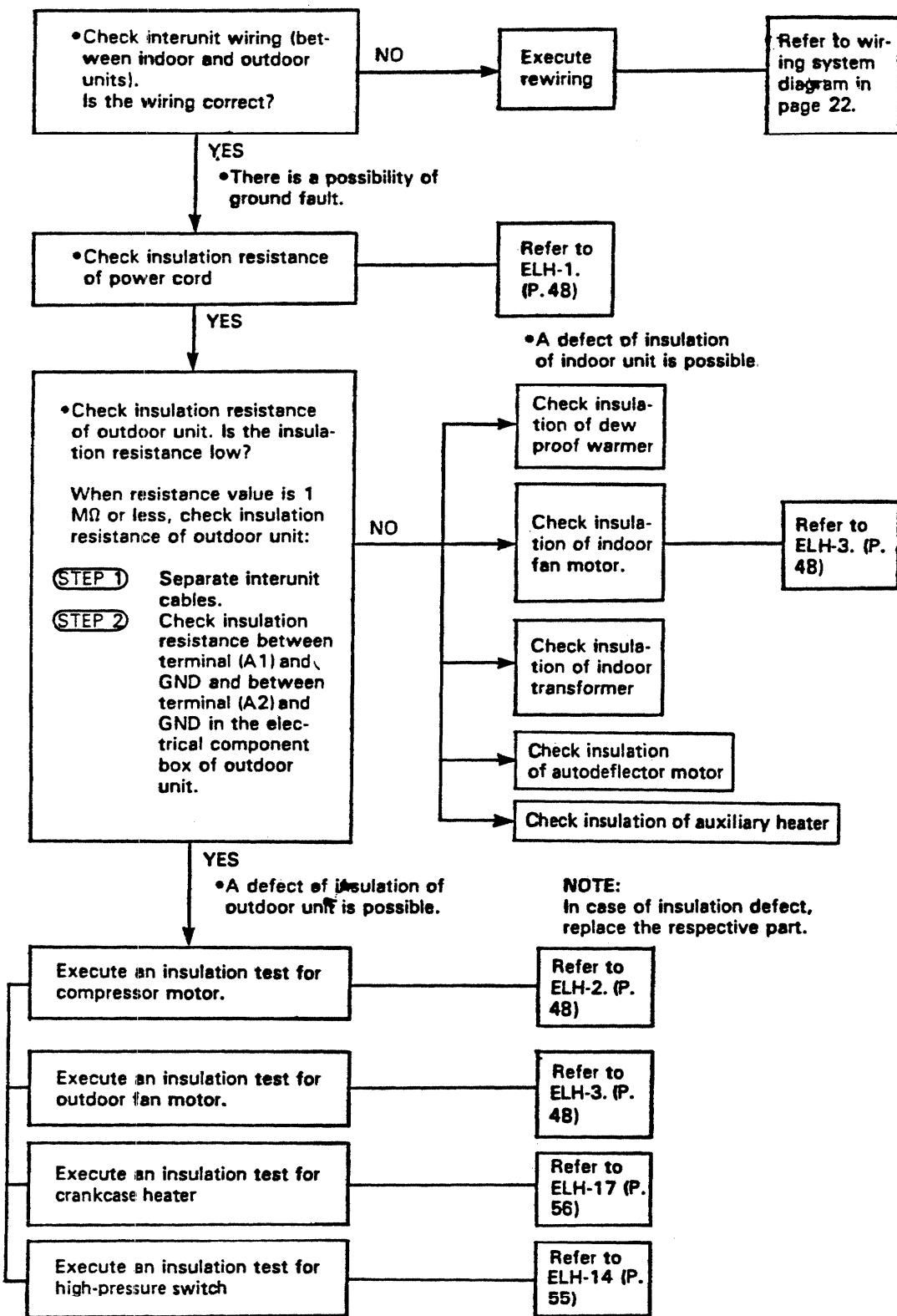
— Quick Access Index —

	Page
1. Air conditioner does not operate	30
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	33
2.1. Indoor fan does not run	
2.2. Neither outdoor fan nor compressor runs	
2.3. Only outdoor fan does not run	
2.4. Only compressor does not run	
2.5. Compressor frequently repeats ON and OFF	
2.6. Air conditioner will not enter into heating mode (Only cooling is possible)	
3. Air conditioner operates, but abnormalities are observed	39
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	43

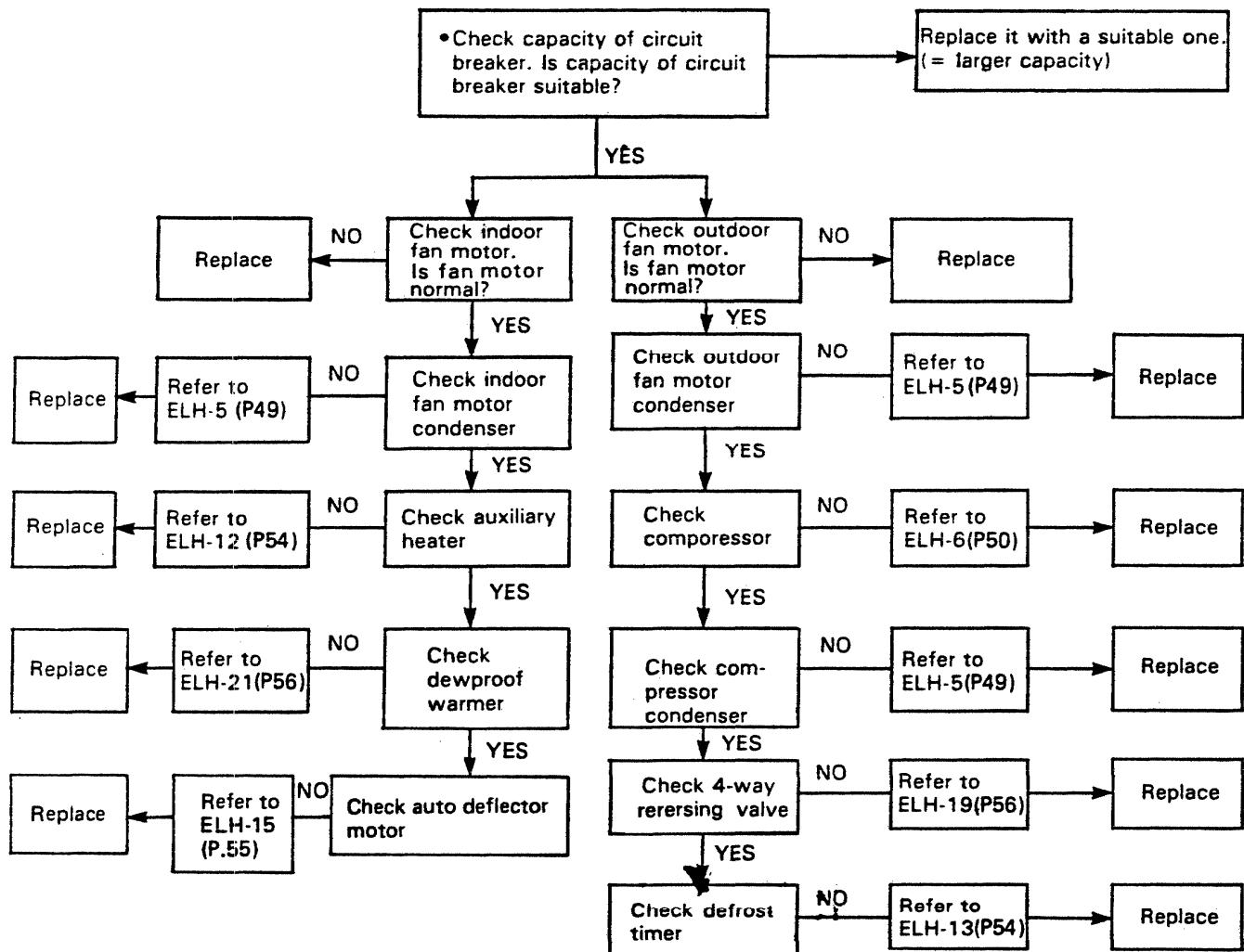
1. Air conditioner does not operate

1.1 Circuit breaker trips (or fuse blows)

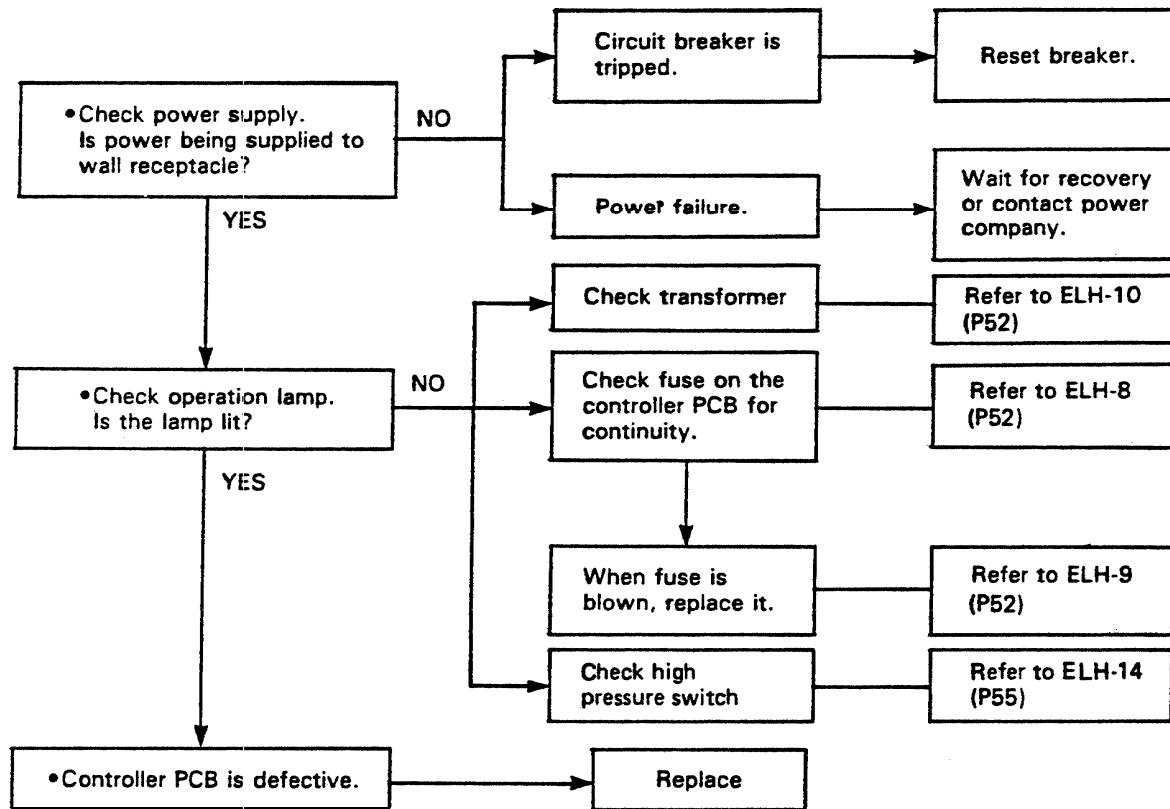
1.1.1 When circuit breaker is set to ON, it is tripped soon (Resetting is not possible)



1.1.2 Circuit breaker trips when the operation switch is depressed.

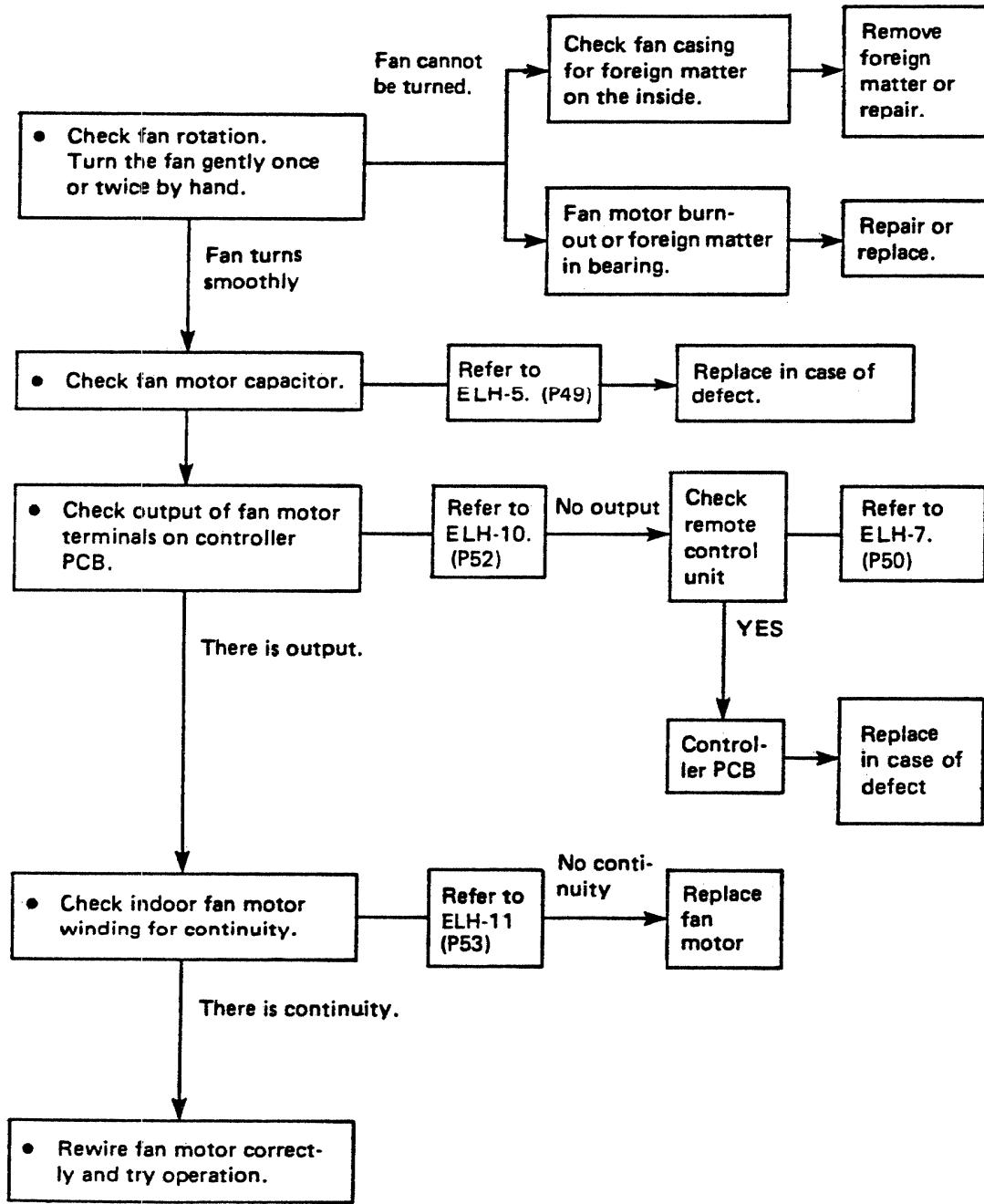


1.2 Neither indoor unit nor outdoor unit runs



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

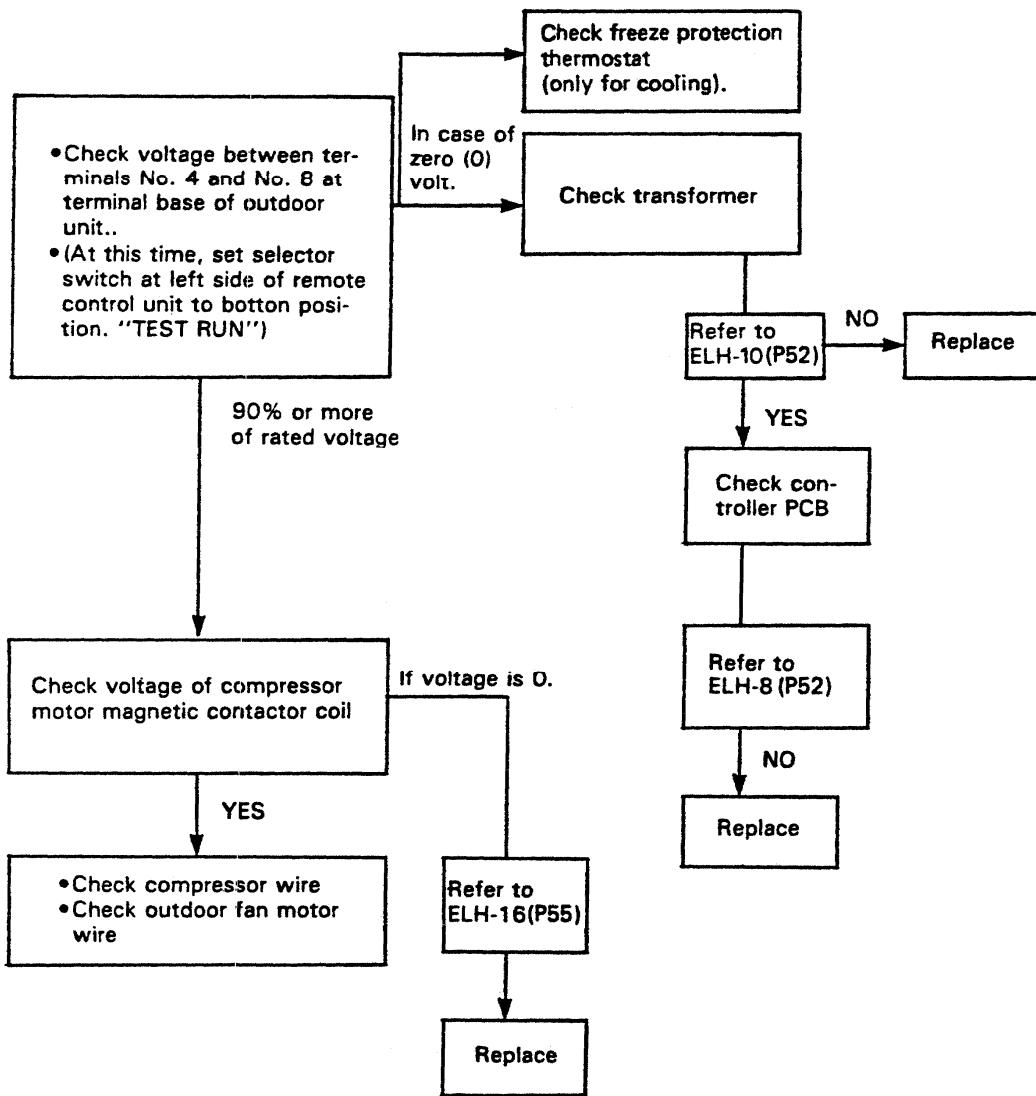
2.1 Indoor fan does not run



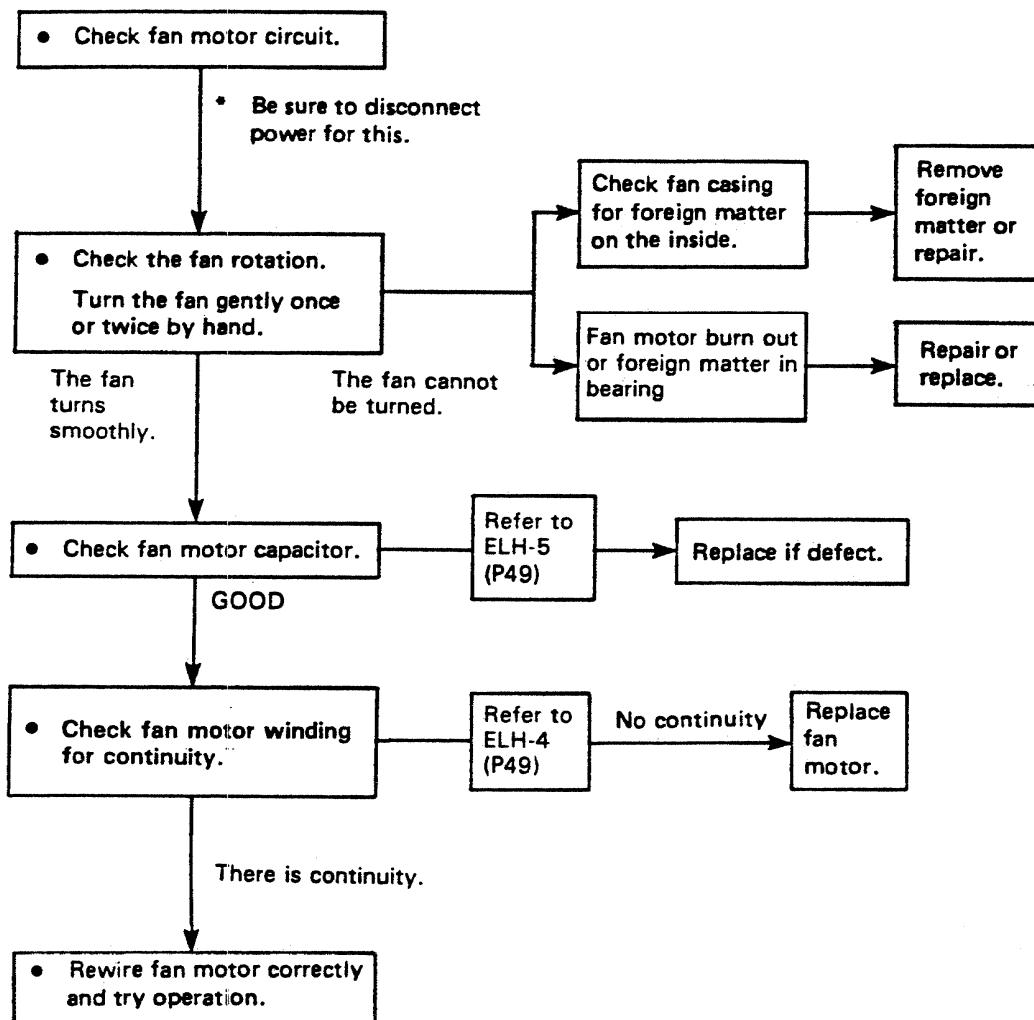
2.2 Neither outdoor fan nor compressor runs

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.)



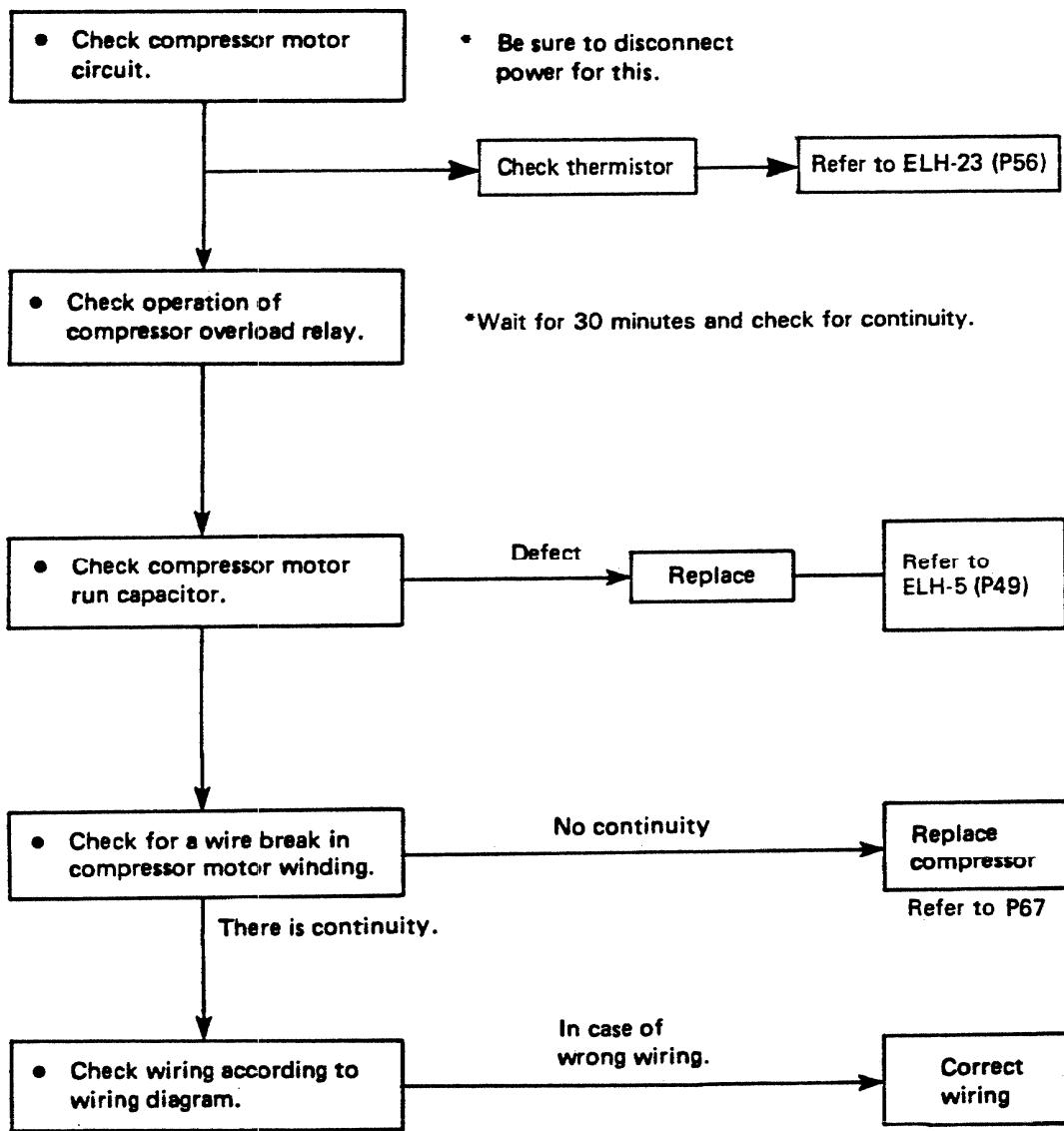
2.3 Only outdoor fan does not run



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

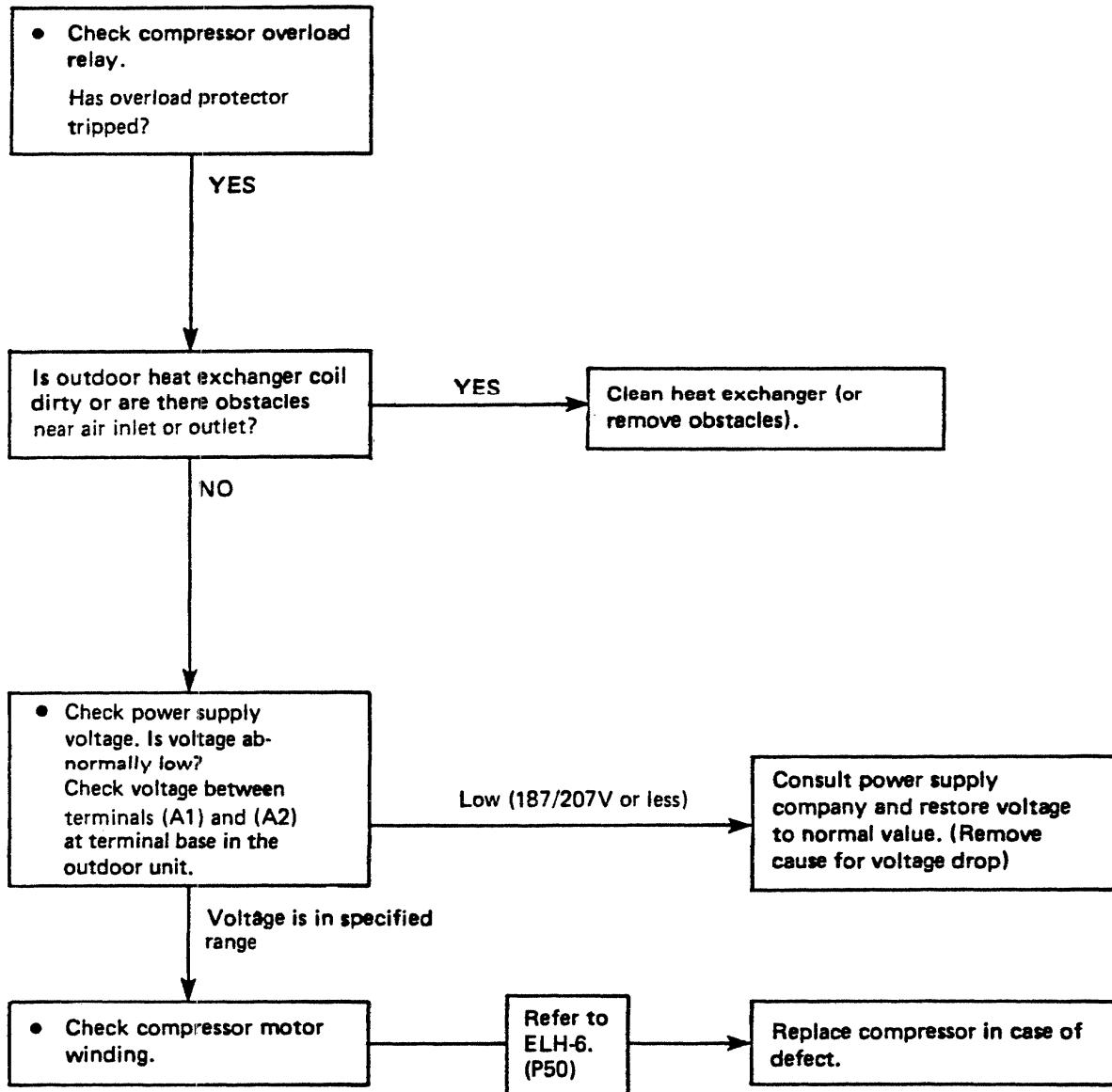
2: The indoor fan motor rotates at very low speed during defrosting.

2.4 Only compressor does not run

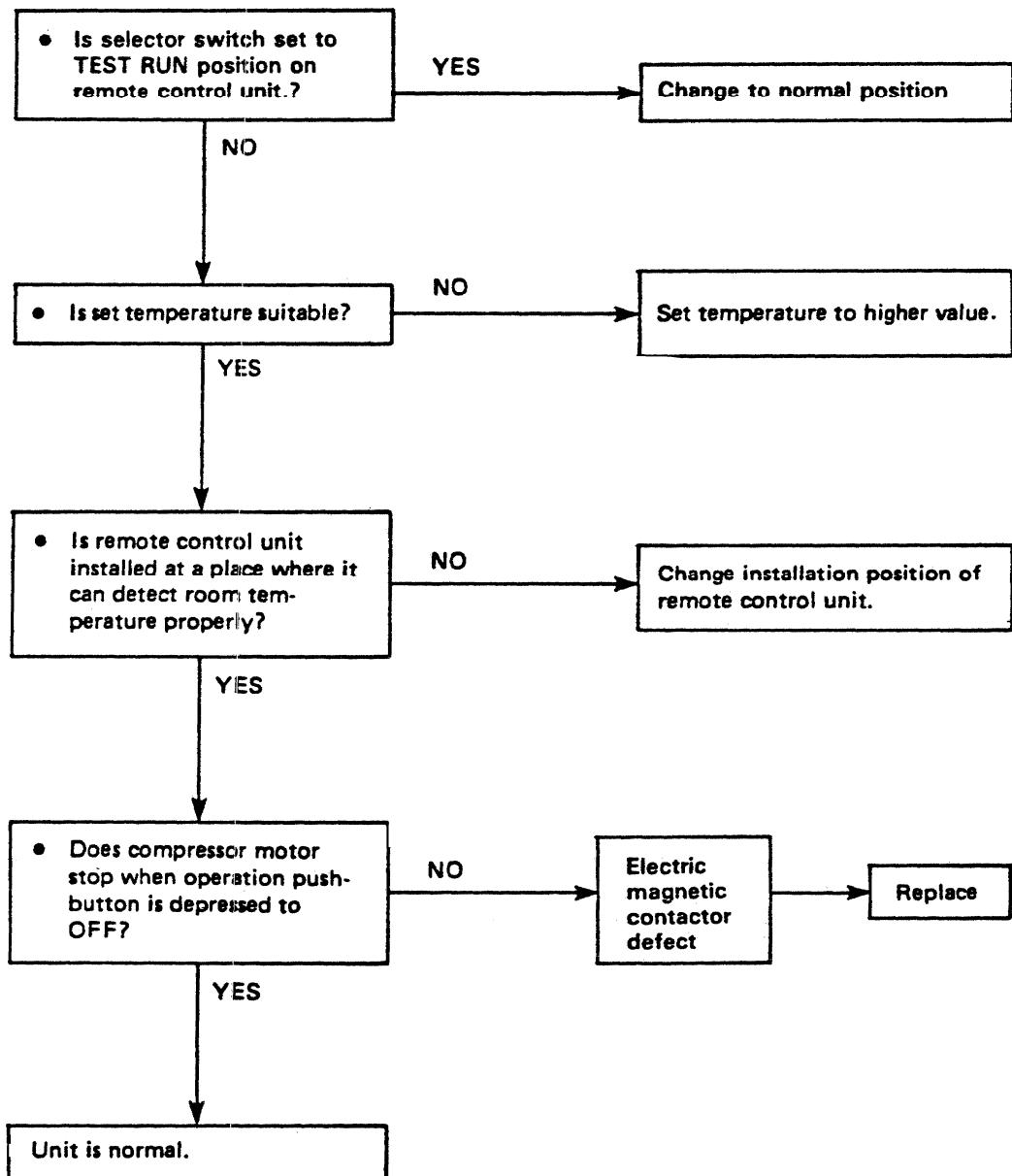


2.5 Compressor frequently repeats ON and OFF

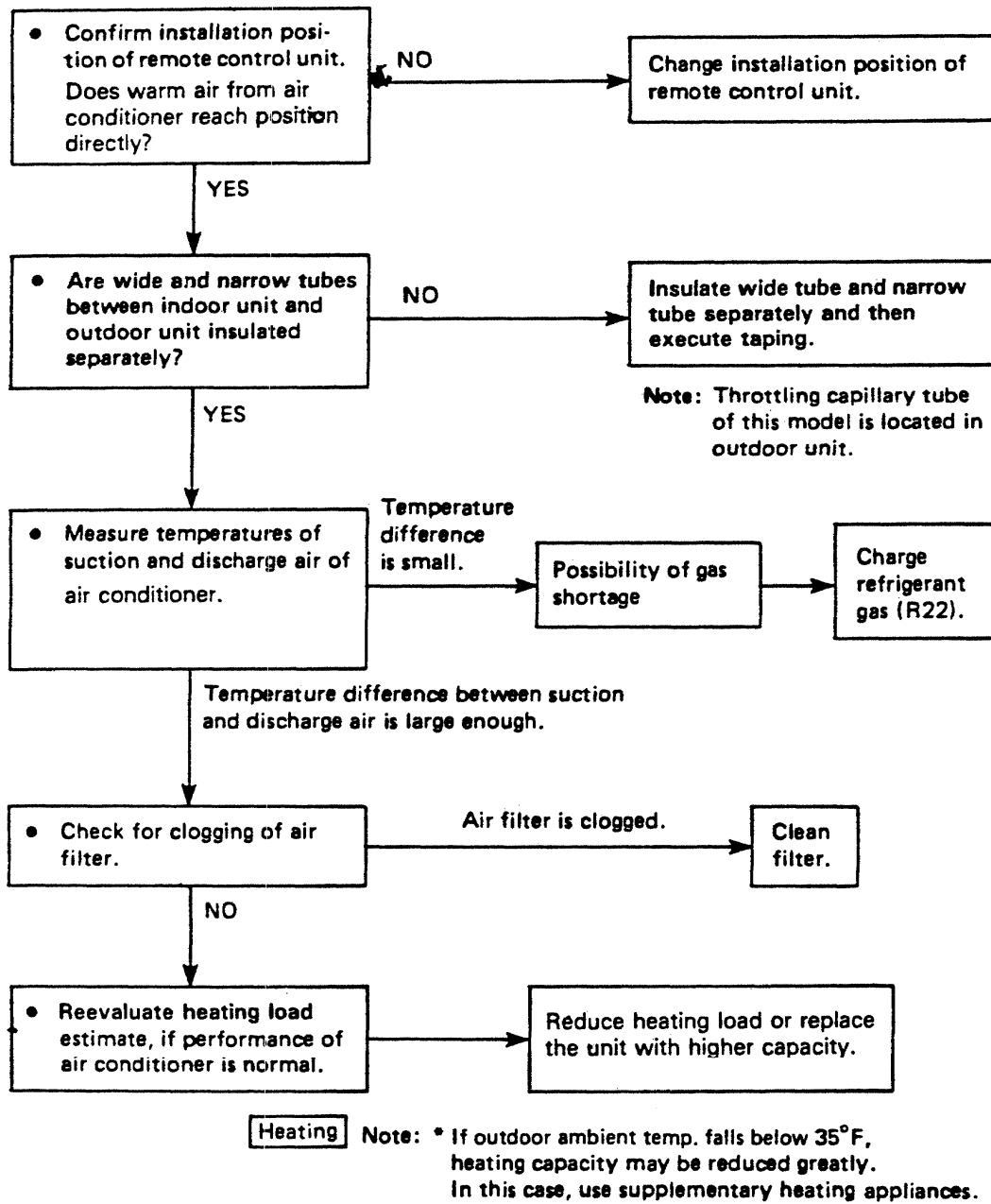
(Only compressor repeats ON and OFF, while indoor unit and outdoor fan run without fail.)



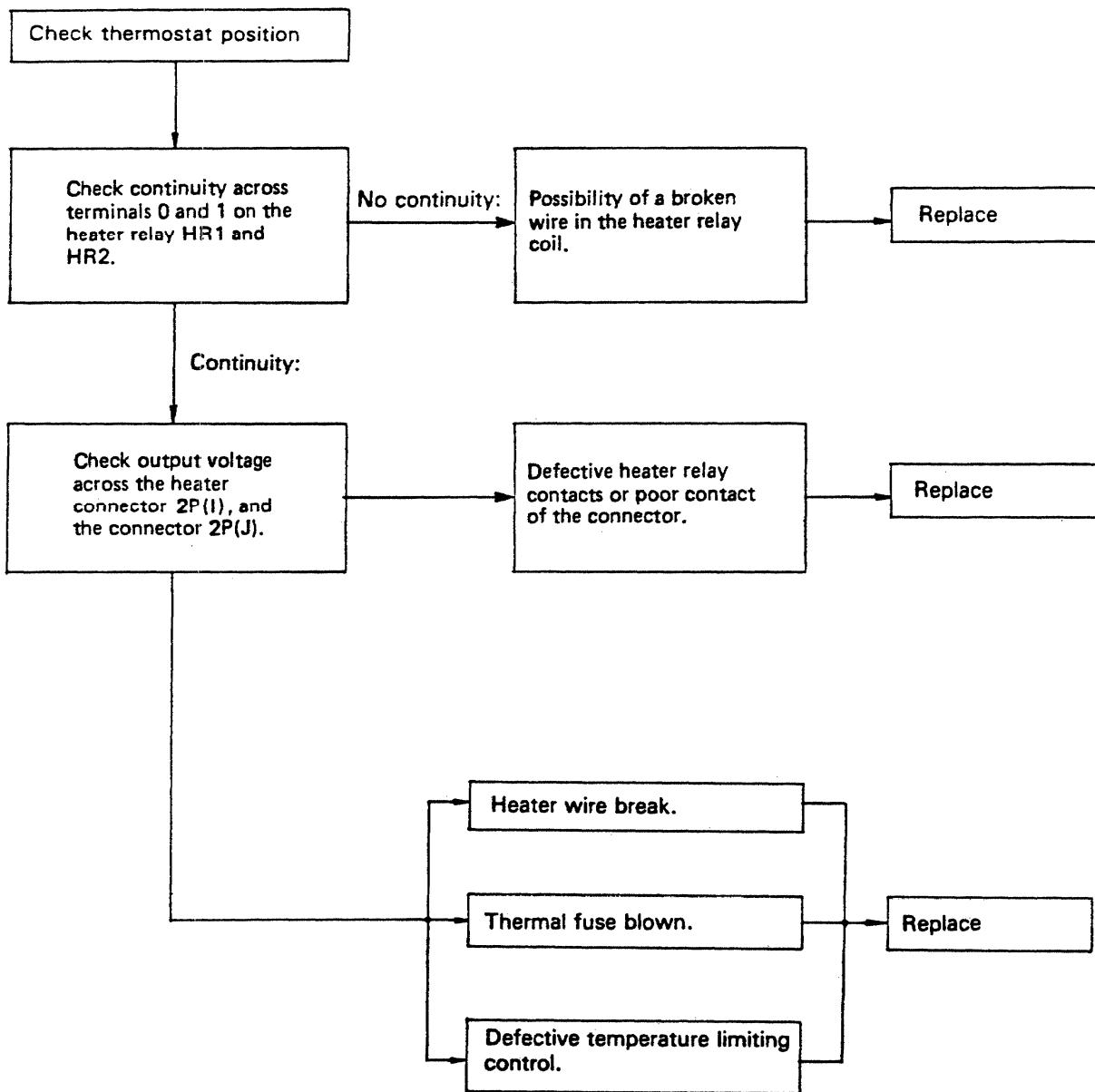
3.2 Excessive cooling



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 rotates at very low speed. Thus blowout of cold 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 system pressure is below 170.64 psig.
- b) During defrosting (normally, 7 – 8 min.) and right after changeover to heating from defrosting.

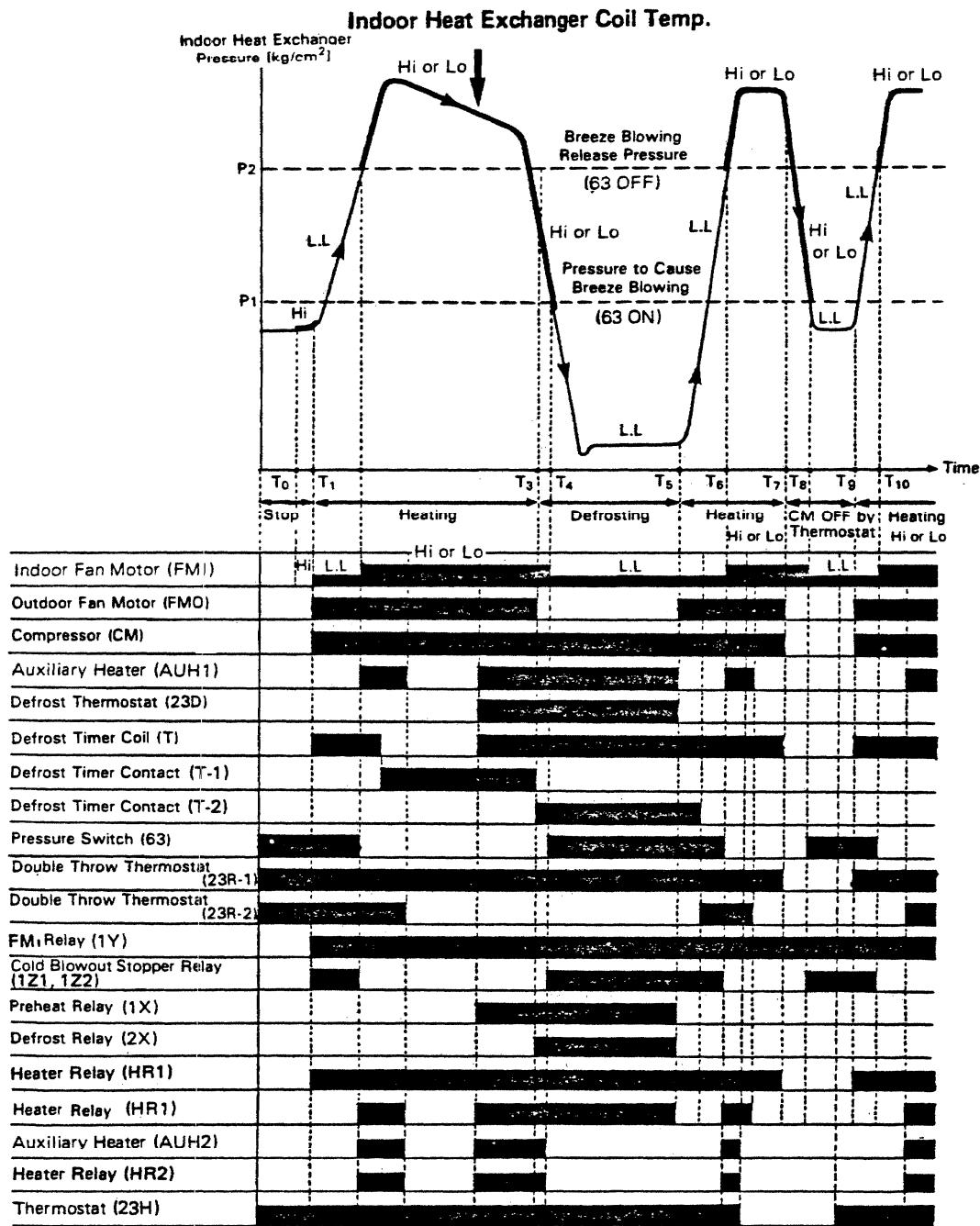
2) Defrosting Mode:

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 rotates at very low speed, and the system is automatically changed to cooling operation mode.

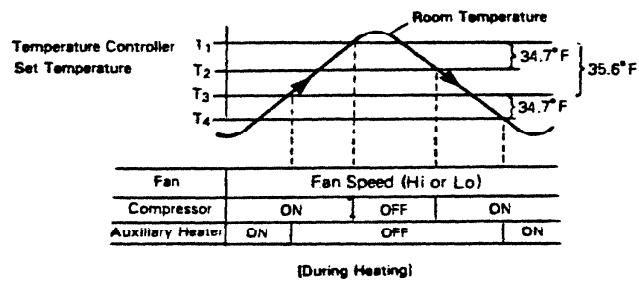
3) Thermo. Cycle Operation Mode:

The indoor fan motor rotates at very low speed to prevent cool air from being blown out when the pressure in the refrigerant system lowers below 99.54 psig after the compressor is stopped by thermostat operation.

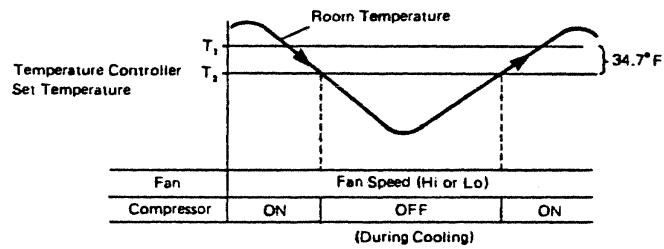
The sequence described in 1) — 3) are as illustrated in the following flow chart.



■ Heating Mode



■ Cooling Mode:



8. CHECKING AND REPLACING ELECTRICAL COMPONENTS

—Quick Access Index—

	Page
ELA. Connector Identification on Controller PCB	47
ELH-1. Measurement of Insulation Resistance of the Power Cord	48
ELH-2. Measurement of Insulation Resistance of the Compressor	48
ELH-3. Measurement of Insulation Resistance of the Fan Motor	48
ELH-4. Checking of the Outdoor Fan Motor	49
ELH-5. Checking of the Motor Capacitor	49
ELH-6. Checking of the Compressor Motor Winding	50
ELH-7. Checking of the Remote Control Unit Proper	50
ELH-8. Checking of the Continuity of Fuse on the Controller PCB	52
ELH-9. Method to Replace Fuse on the controller PCB.	52
ELH-10. Checking of the Power Transformer	52
ELH-11. Checking of the Indoor Fan Motor	53
ELH-12. Checking of the Heater Circuit	54
ELH-13. Checking of the Defrost Timer (T)	54
ELH-14. Checking of High Pressure Switch (63pH)	55
ELH-15. Checking of the Auto Deflector Motor (LC)	55
ELH-16. Checking of the Compressor Motor Magnetic Contactor (52C)	55
ELH-17. Checking of the Crankcase Heater (CH)	56
ELH-18. Checking of the Defrost Thermostat (23D)	56
ELH-19. Checking of the Four Way Reversing Valve (20S)	56
ELH-20. Checking of the Pressure Switch (63)	56
ELH-21. Checking of the Dewproof Warmer (DPH)	56
ELH-22. Checking of the Freeze Protection Thermostat (26C)	56
ELH-23. Checking of the Thermistor	56

ELA. Connector Identification on Controller PCB

POW-36TH (for SAP362TH)

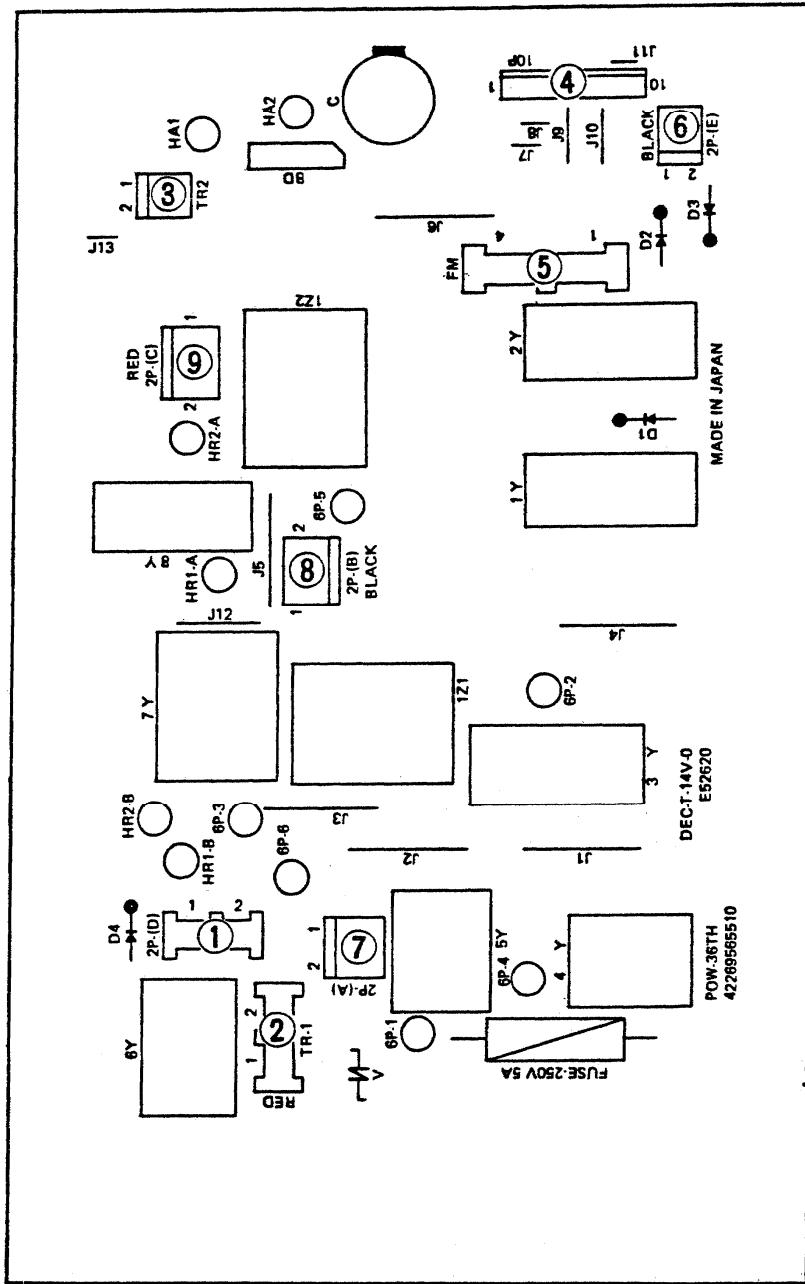


Fig. E-A

- Fig. E-A**

 1. Connector, Auto Deflector Motor*
 2. Connector, Transformer (Primary: *)
 3. Connector, Transformer (Secondary: 19V)
 4. Connector, Remote Control Unit 24VDC
 5. Connector, Fan Motor*
 6. Connector, Freeze Protection Thermostat 24VDC
 7. Connector, Dew Proof Warmer*
 8. Connector, Over Heat Protection Thermostat*
 9. Connector, Thermostat*

*Line voltage

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.

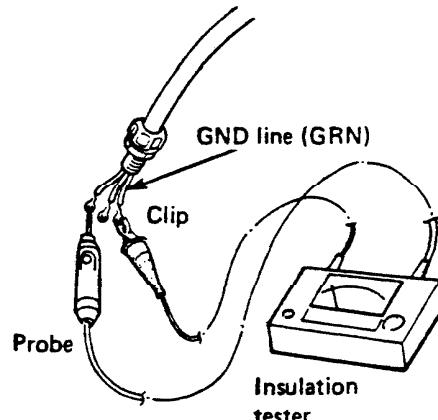


Fig. E-1H

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 Connector (FM)

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-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 auxiliary relay 2X-1 (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

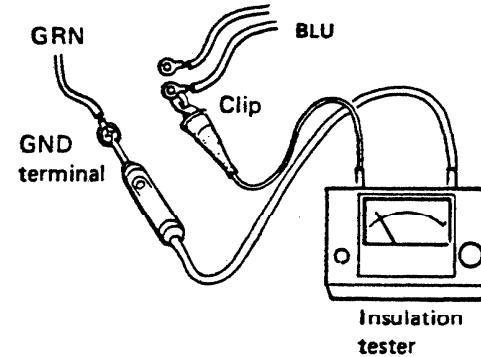


Fig. E-2H

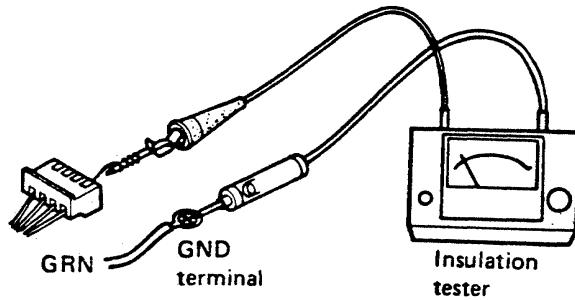


Fig. E-3H

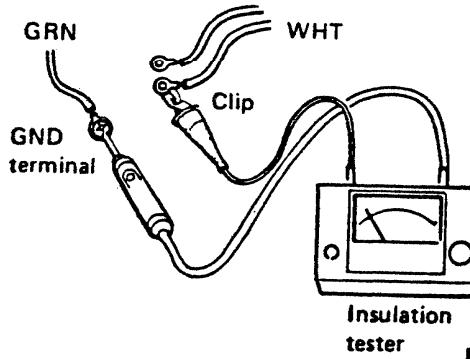


Fig. E-4H

3-3 In case of the crankcase heater.

Remove a white wire of the crankcase heater on the magnetic contactor (52C: terminal No. 32). Check continuity across the removed white wire and terminal No.2 at the 8P terminal plate.

3-4 In case of four way reversing valve.

1. Disconnect a black wire from terminal No.2 on the auxiliary relay 1X.
 2. Disconnect gray wires (2) from terminal No.A on the magnetic contactor 52C and twist them together.
 3. Disconnect gray wires (2) at terminal No. 2 at the 8P terminal plate.

Check between the twisted gray wires and the black wire for continuity. The solenoid coil is normal if there is a continuity.

ELH-4 Checking of the Outdoor Fan Motor.

Disconnect a white wire from the compressor motor magnetic contactor 52C (terminal No.32), a white wire from 8P terminal plate (terminal No.2) and a white wire from the high pressure switch 63PH (terminal No.C) respectively. Bundle these wires and clip these ends with an alligator clip. Measure the resistance between the clipped white wires and a brown wire, and a pink wire outstretched from the fan motor capacitor respectively. Fig. E-5H.

Set the resistance measuring range of the multimeter to "X1Ω" and measure the resistance between the fan motor lead wires. (Table 1-H).

Lead wire color	Coil resistance
WHT-BRN	$35\Omega \pm 10\%$
WHT-PNK	$72\Omega \pm 10\%$
WHT-YEL	$82\Omega \pm 10\%$

(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.

SAP362CH ELECTRIC WIRING DIAGRAM

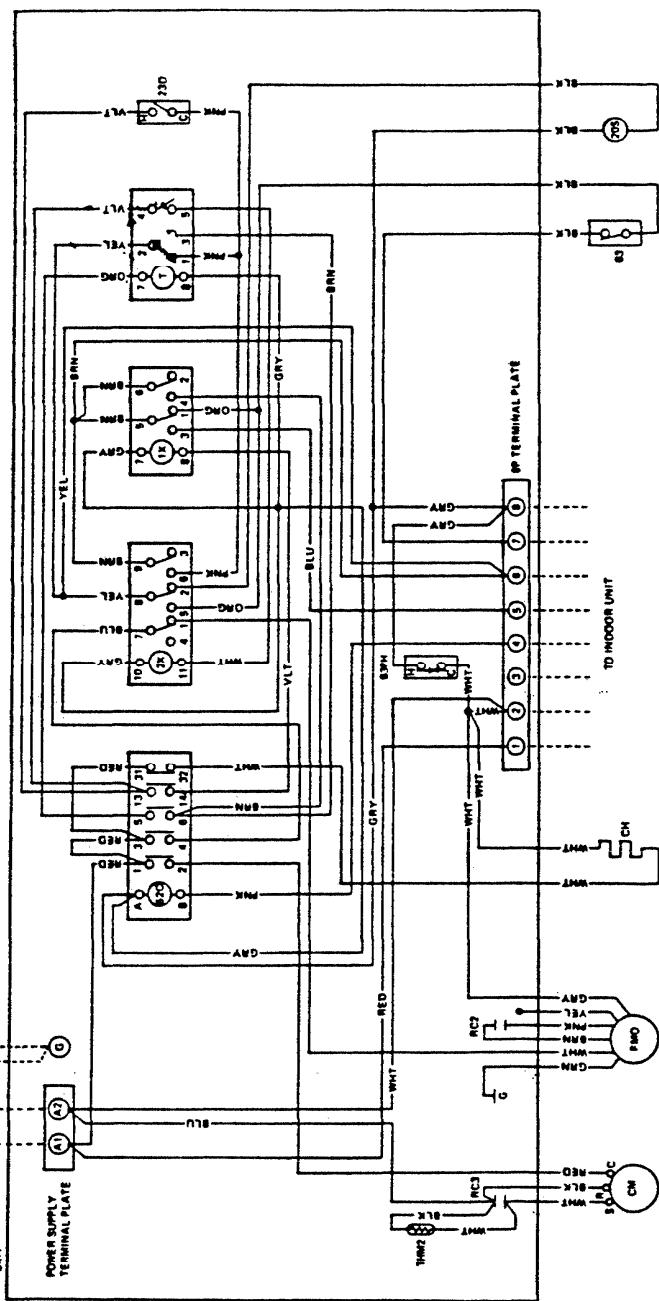


Fig. E-5H

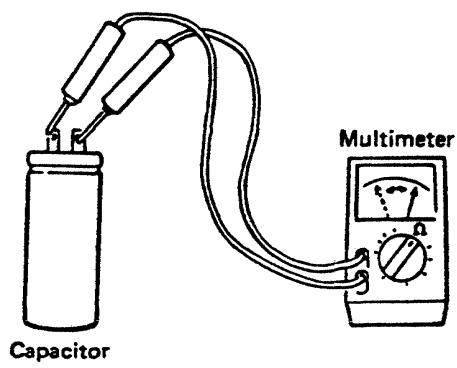


Fig. E-6H

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. (Table-2H)

SAP362 CH

Lead wire color	Coil resistance
C-R	$0.55\Omega \pm 10\%$
C-S	$1.53\Omega \pm 10\%$

(Table-2H)

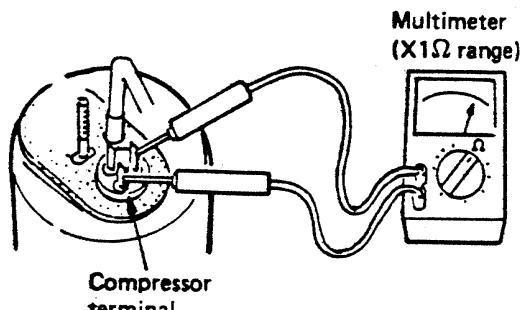


Fig. E-7H

REMOTE CONTROL UNIT

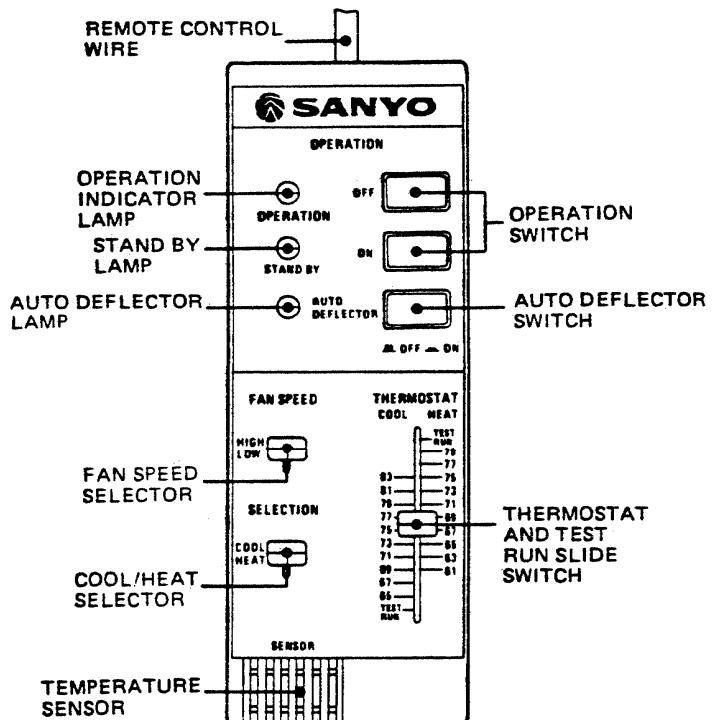


Fig. E-8H

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.)

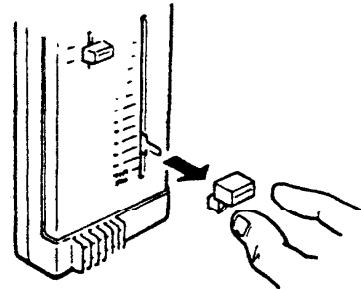


Fig. E-9H

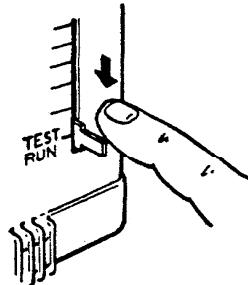


Fig. E-10H

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.) (Table-3H)

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

(Table-3H)

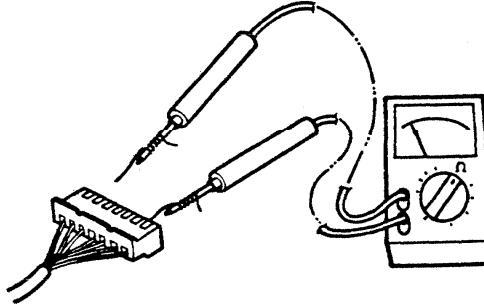


Fig. E-11H

(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.

NOTE: YES.....Continuity
NODiscontinuity

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.

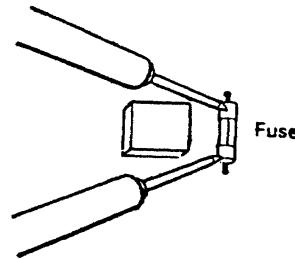


Fig. E-12H

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 when the fuse is blown.

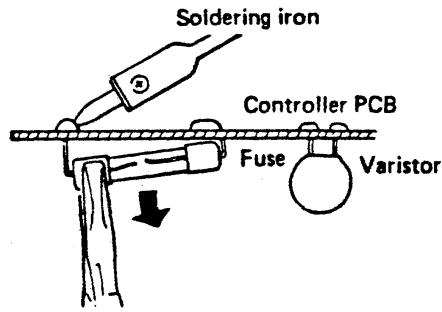


Fig. E-13H

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.

It will be completely satisfactory if all measured values agree with those indicated in Table-3-1H.

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

(Table-3-1H)

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 31Ω
WHT-VLT	27Ω
VLT-YEL	40Ω
YEL-PNK	19Ω

(Table-4H)

NOTE: Ambient temp 68°F

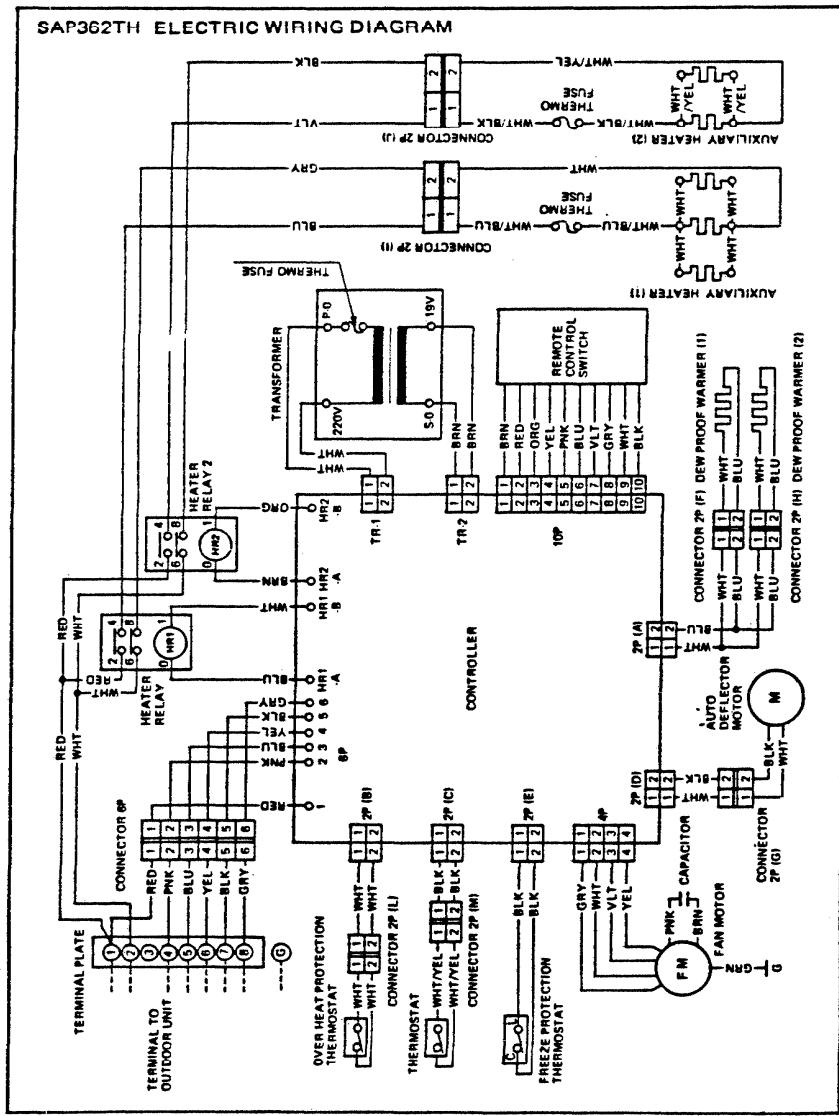


Fig. E-14H

ELH-12. Checking of the Heater Circuit

Disconnect power to the air conditioner before accessing the controller PCB.

1. Disconnect two 2P connectors; 2P(I) and 2P(J).
2. Set a multimeter to "x 10Ω" range and measure the resistance between connector pins No.1 and 2 for connector 2P(I), and between connector pins No.1 and 2 for connector 2P(J).

Any one of the following cases may be considered when there is no continuity.

1. Blown thermal cut-off (fuse)
2. Heater wire is broken. Replace the defective part after it has been identified.

Connector (I)		Connector (J)	
1 – 2	17.63Ω	1 – 2	26.45Ω

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 Ω 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 the High Pressure Switch

In the normal operating condition, there is continuity between contacts (C) and (H) of the High Pressure Switch. When the pressure in the refrigerant system exceeds the setting value (412.47 psig), the switch opens circuit and unit stops.

CAUTION

When the unit is shut down by the high pressure cut-out, turn off the power and locate the possible cause of trouble and remove it. Before resuming operation, press the RESET button on the high pressure switch and restore power. Fig. E4-15H

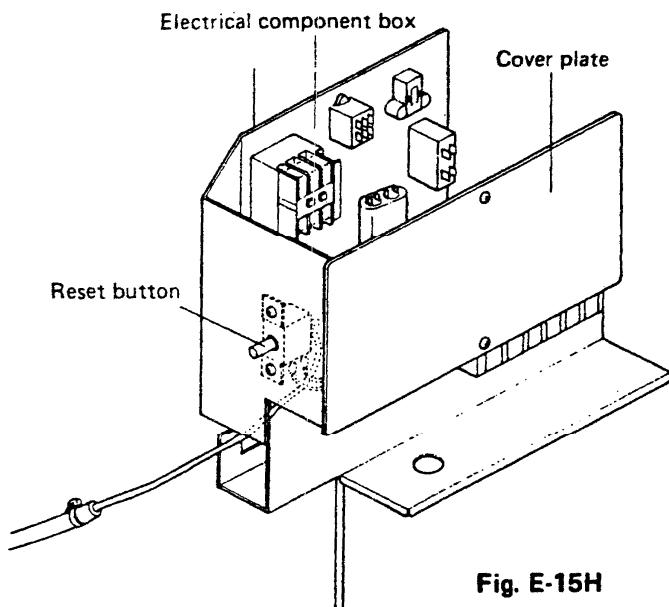


Fig. E-15H

ELH-15. Checking of the Auto Deflector Motor (LM)

Disconnect Connector 2P (G) on the auto deflector motor and measure the winding resistance value between Lead Wires (1) and (2) on both ends of the motor. Satisfactory if the resistance value is as shown below.

Coil Resistance (Ω) Ambient Temp. 77°F	About 11,150
--	--------------

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
----------	-----------

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: 99.54 psig	OFF: 170.64 psig
----------------	------------------

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

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

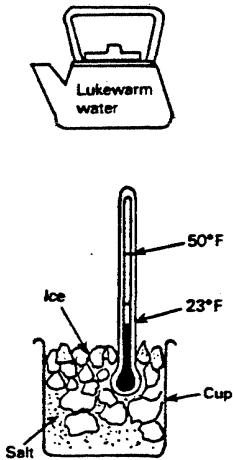
ELH-22. Checking the Freeze Protection Thermostat (26C)

Disconnect the connector 2P (E) with lead wires (BLK) from the controller PCB. Check continuity/discontinuity of the thermostat as follows:

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-23. Checking of the Thermistor

Disconnect lead wires (WHT and BLK) connected to the thermistor. Check the thermistor resistance with a multimeter ($\times 1\Omega$ range).

Desirable resistance at 77°F	Approx. 100Ω
------------------------------	--------------

9. DISASSEMBLY AND SERVICE PROCEDURES

— Quick Access Index —

	page	
INDOOR UNIT	SAP362TH	
9-1	Side Panel-Removal	58
9-2	Suction Grille-Removal	58
9-3	Electrical Component Box-Removal	58
9-4	Drain Pan-Removal	60
9-5	Fan and Fan Motor-Removal	61
9-6	Heater Thermal Protector-Replace	62
9-7	Electric Heater-Removal	63
OUTDOOR UNIT	SAP362CH	
9-8	Cabinet-Removal	64
9-9	Fan and Fan Motor-Removal	64
9-10	Electrical Component Box-Removal	65
9-11	Compressor Cover-Removal	65
9-12	Compressor-Removal	66
9-13	Compressor Replacement	67
9-13-1	Tool List for Compressor Replacement	
9-13-2	Safety Precautions	
9-13-3	Compressor Replacement Procedures	
A.	Separating the Outdoor Unit	
B.	Removing the Old Compressor	
C.	Installing a New Compressor	
9-14	Leak Testing, Evacuation and Charging	71
9-14-1	Required Tools and System Set Up	
9-14-2	Leak Testing the System	
9-14-3	Evacuation	
9-14-4	Charging Refrigerant (R22)	

INDOOR UNIT SAP362TH

9-1. Side Panel-Removal

- 1) Remove the four screws **(a)** of the cover plate on the under side.
- 2) Slide the side panels on both sides towards the front **(b)** of the unit in order to remove them. Fig. 1

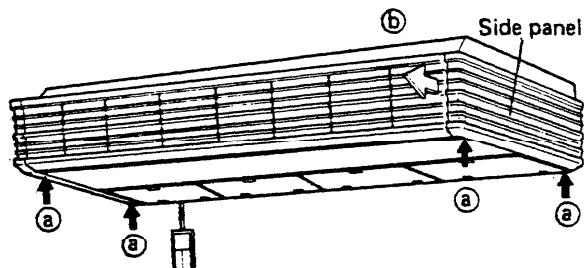


Fig. 1

9-2. Suction Grille-Removal

- 1) The suction grille opens when the tab of the suction grille is pulled.
- 2) Raise the suction grille lightly and shift it in the direction of the arrows **(a)** to remove it from the hooks. Fig. 2

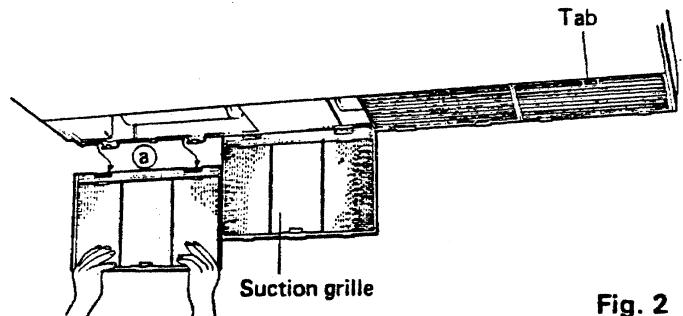


Fig. 2

9-3. Electrical Component Box-Removal

- 1) Remove the two screws **(a)** of the electrical component box, and remove the cover plate. Fig. 3

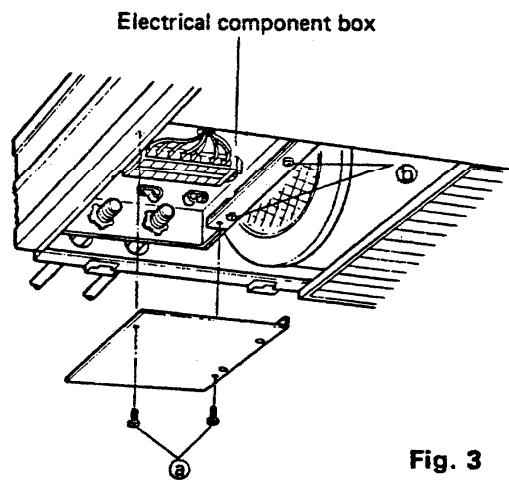


Fig. 3

- 2) Unclamp and stretch the temperature sensing capillary for the anti-freeze thermostat. Fig. 4

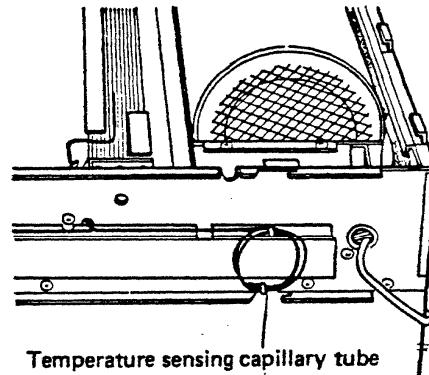


Fig. 4

- 3) When the three screws (b) are removed, the electrical component box can be pulled out to the lower side of the unit. (The one other screw (b) is at the rear between box and casting.) Fig. 3

- 4) Remove the screw (a) holding the wiring.
 5) Remove the wire bundling plastic tie (b) without damaging the wires.
 Note:
 After the disassembly, use vinyl tape instead of the plastic to bundle the wires at the same place.
 6) When the three fixing screws (c) are removed, the electric protection cover can be removed. Fig. 5

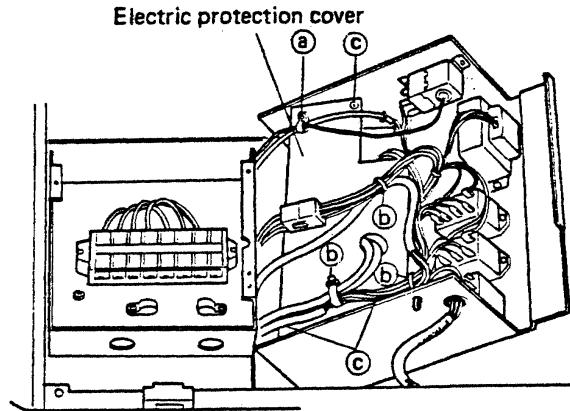


Fig. 5

- 7) The electrical components in the electrical component box all can be checked in this condition. Fig. 6

Note:
 For checking of the electrical components, refer to "CHECKING AND REPLACING ELECTRICAL COMPONENTS, page 46."

- (1) Terminal base
- (2) Fixed capacitor
- (3) Transformer
- (4) Controller

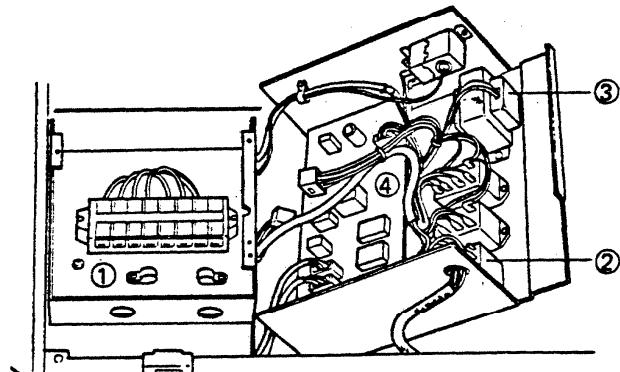


Fig. 6

9-4. Drain Pan-Removal

- 1) Remove the drain pipe.
- 2) Remove the suction grille from the unit body.
- 3) Remove the four screws (a) fixing the fan motor cover. Fig. 7

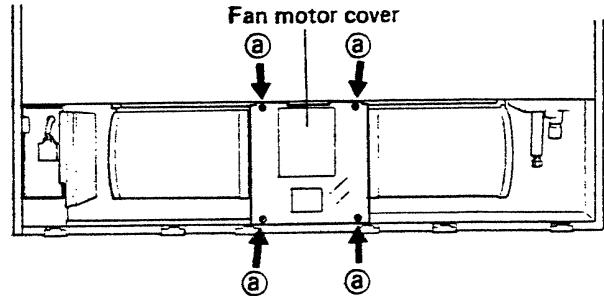


Fig. 7

- 4) Slide the discharge grille at the unit front about 0.38" to the side, remove it, and remove the screw (black color) at the center on the inside.

- 5) Remove the four screws (a) at the lower part on both sides. Fig. 8

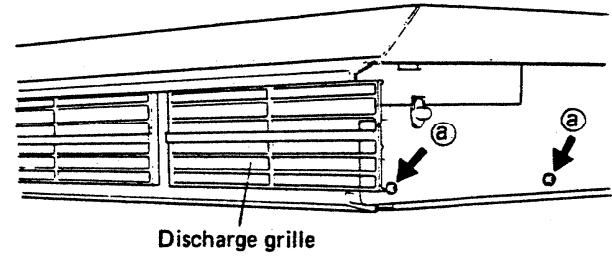


Fig. 8

- 6) Remove the seven screws (a) fixing the bottom plate and the partition plate.

- 7) Remove the drain pan in this condition.

- 8) Remove the two screws (b) to remove the rear panel. Fig. 9

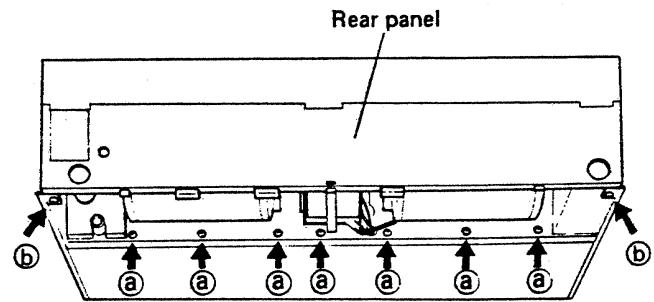


Fig. 9

9-5 Fan and Fan Motor-Removal

- 1) Remove the fan motor lead wires connector.
- 2) Remove the eight screws (a) fixing the casing.
- 3) Remove the four nuts (b) fixing the fan motor stand. Fig. 10

NOTE:

Take care not to drop the fan motor.

- 4) The fan motor stand is taken out with two fan casings.

NOTE:

Take care not to apply a strong force onto the fan motor wiring.

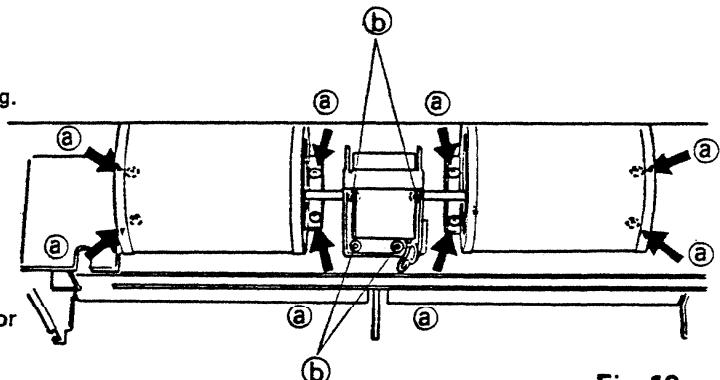


Fig. 10

- 5) Loosen the screw (a) fixing the fan boss on the motor shaft with a screwdriver.

- 6) In this condition, slide the fan and the fan casing together to the side for removal from the motor shaft.

Fig. 11

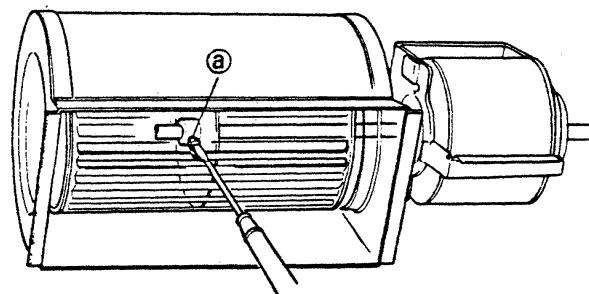


Fig. 11

- 7) The fan can be removed as shown in the figure when the four screws (a) fixing the back plate of the fan casing are removed. Fig. 12

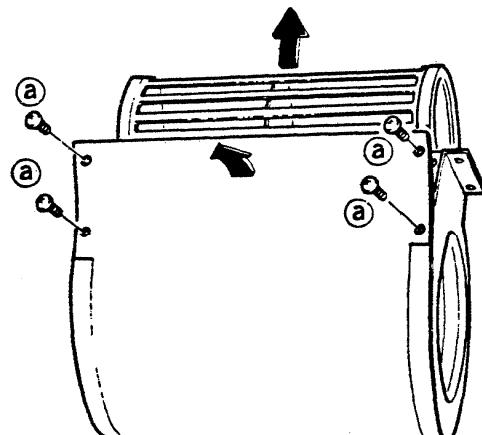


Fig. 12

8) Remove the four screws (a) fixing the motor. Fig. 13

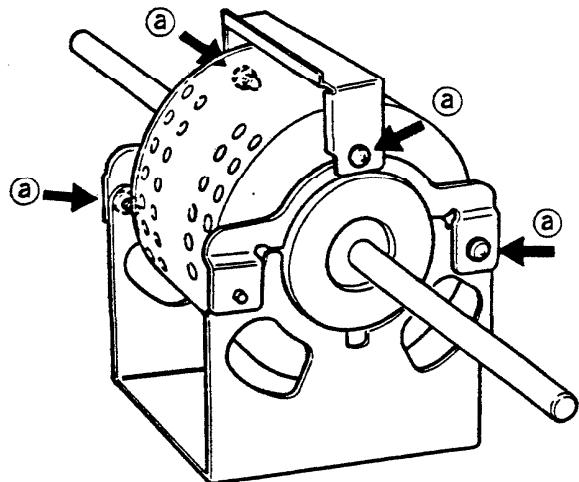


Fig. 13

9) Open the fixing arms as shown in the figure.
Then the fan motor can be removed from the fan motor stand.
Fig. 14

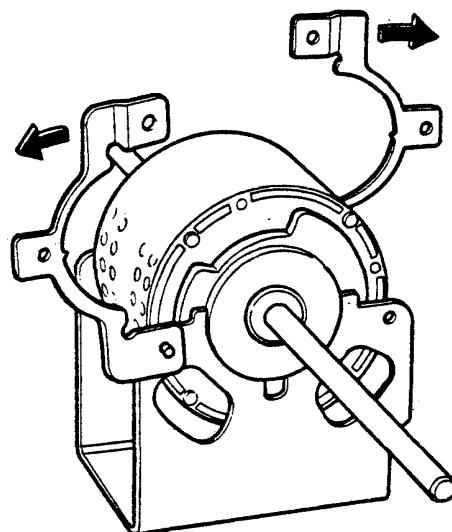


Fig. 14

9-6 Heater Thermal Protector-Replace

- 1) Remove the side panel. (Refer to 9-1, page 58).
- 2) Remove the discharge grille. (Refer to 9-4-4, page 60).
- 3) Remove the two screws (a) fixing the cap.
- 4) Remove the two black screws (b) fixing the support blade louver with three blade louvers. Fig. 15

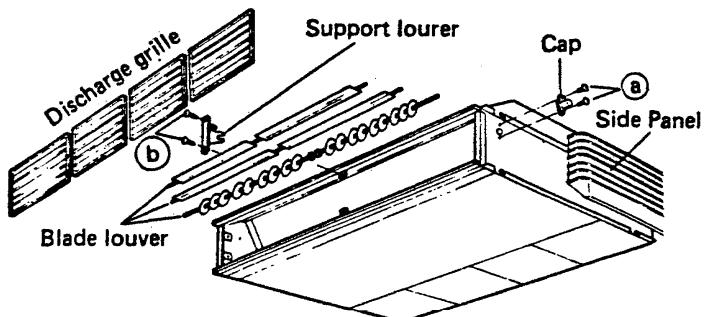


Fig. 15

- 5) The heater thermal protector and thermal cutoff can be checked and changed in this condition. Fig. 16
- 6) Because each thermal protector has its own settings, be sure to use one of the same rating in replacing.

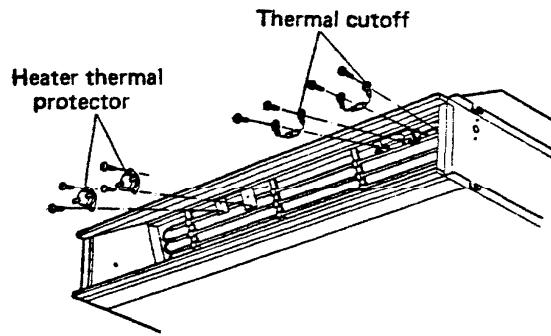


Fig. 16

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.

9-7 Electric Heater-Removal

- 1) Remove the drain pan (Refer to 9-4, page 60).
- 2) Remove the two screws fixing wire duct.
- 3) Pull out the connectors ② of the heater. Fig. 17
- 4) To remove the electric heater;
 1. Remove the fixing screws.
 2. Slide the heater upward once as the arrow ③ shows in Fig. 18.
 3. Slide out the heater toward you.

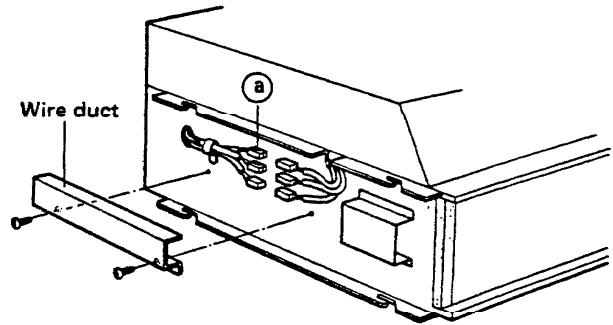


Fig. 17

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.
- 3) For the heater protection, an aluminium guard is provided; Never break the guard mesh in checking or replacing.

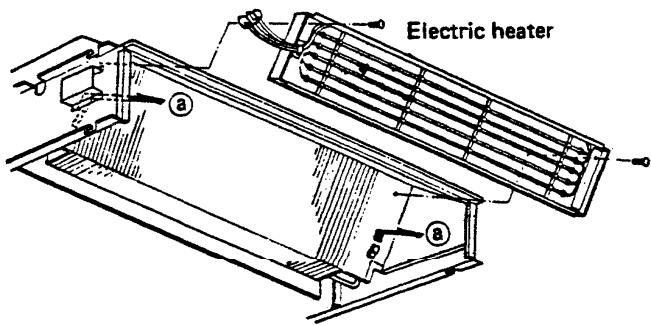


Fig. 18

9-8 Cabinet-Removal

- 1) Remove the exterior panels in the order of the front panel, side panels **(A)** and **(B)**.
- 2) Remove the cover plates **(C)** and **(D)**.
- 3) Remove the mounting plate. Fig. 19

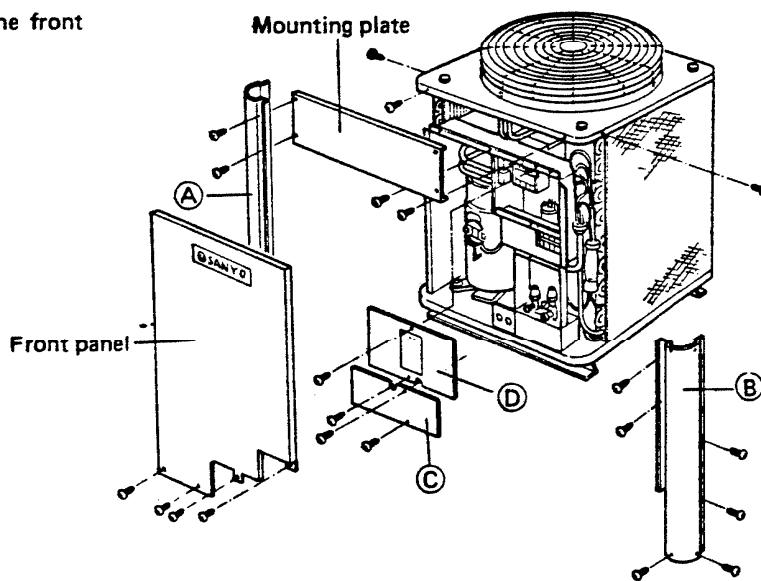


Fig. 19

9-9 Fan and Fan Motor-Removal

- 1) Remove the propeller fan and fan motor by lifting up after removing the guard and loosening two screws **(a)** of the propeller fan.
- 2) Disconnect the fan motor wires **(A)** from the electrical component box and then remove the top cover. Fig. 20

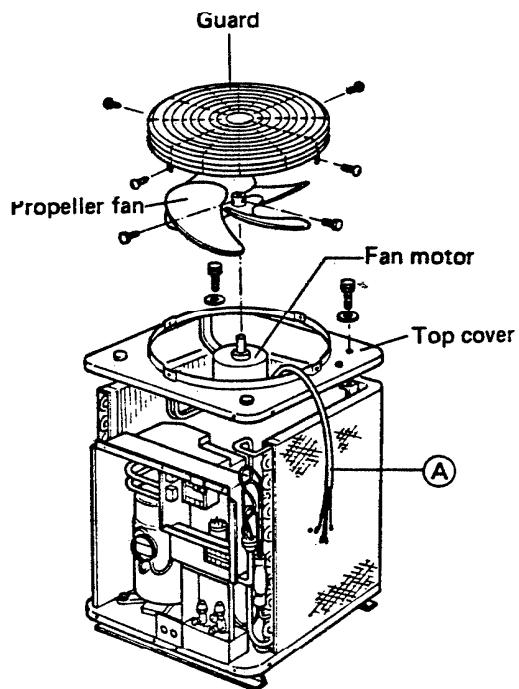


Fig. 20

9-10 Electrical Component Box-Removal

- 1) Disconnect the following wires from the electrical component box.
 - ① Compressor wire
 - ② Crankcase heater
 - ③ Four-way reversing valve wire
 - ④ Pressure switch wire Fig. 21
- 2) 1) Disconnect wires from the high pressure switch.
2) Loosen one screw **a** and remove the high pressure switch from the electrical component box carefully. Fig. 22
- 3) 1) Remove the cover plate **A**
2) Remove insulation. **B**
3) Loosen and remove the sensor. **C**
- 4) The electrical component box can now be removed by unscrewing one screw **b**. Fig. 21

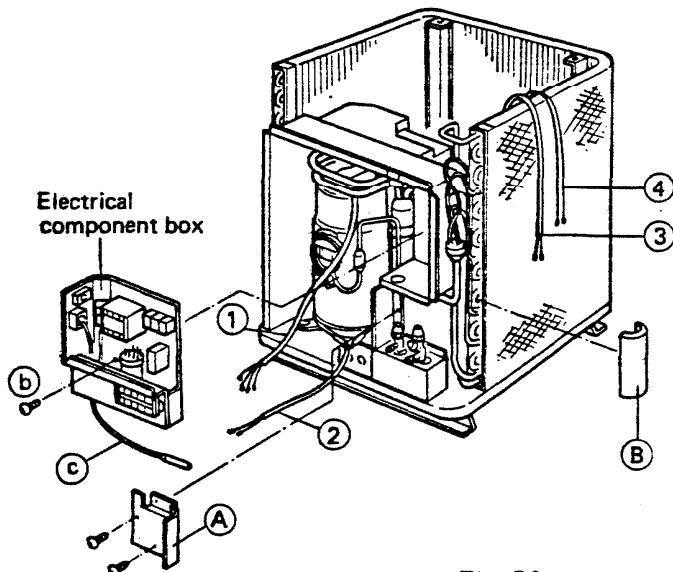


Fig. 21

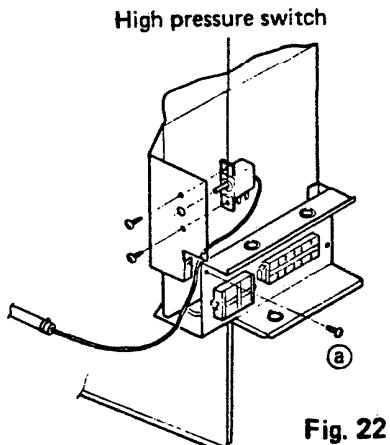


Fig. 22

9-11 Compressor Cover-Removal

Unfasten four screws fixing the cover. The cover can be removed by lifting it upward. Fig. 23

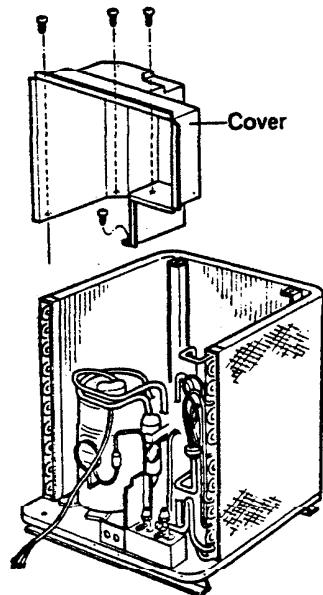


Fig. 23

9-12 Compressor-Removal

Take apart three joints (A), (B) and (C) brazed to the compressor by brazing torch. Fig. 24

CAUTION:

- 1) Many wires have to be removed. When removing wires, carefully check the electric diagram on the rear side of the cover plate (D). Fig. 19
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 tubing when replacing the compressor. Fig. 25

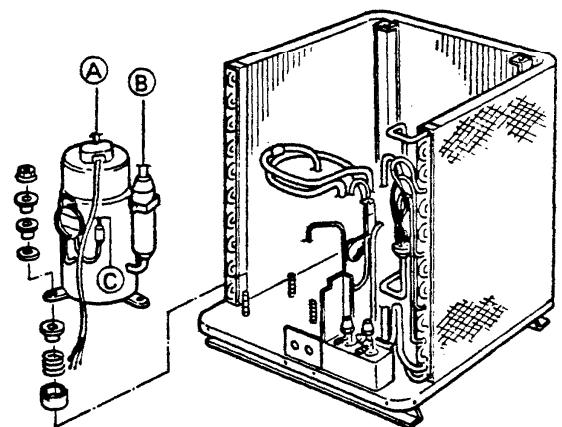


Fig. 24

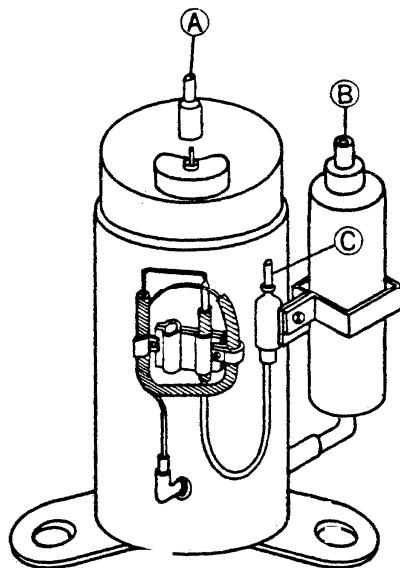


Fig. 25

CAUTION: Plastic material in a check valve or a 4-way reversing valve is weak against direct heat.

When brazing or unbrazing across such parts, be sure to provide damp cloth over them and special care should be taken so as not to burn internal components.

9-13. Compressor Replacement

9-13-1. 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 lbs. container)	1	
9	Refrigerant R22 (in 10 lbs. container)	1	
10	Refrigerant charging cylinder (5 lbs. 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 lbs.)	1	
21	Tub _____	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	

9-13-2. 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 tubing 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.

9-13-3 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.

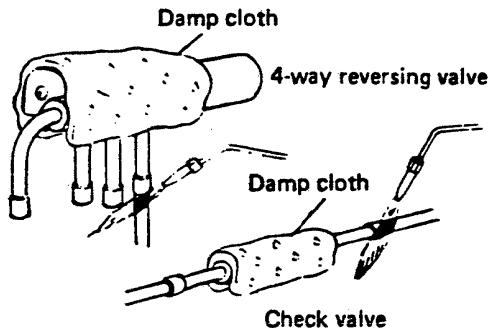
- 1) Make sure that the power is definitely turned OFF and remove the Access Panel "C" of the outdoor unit. Remove wires from terminals within the electrical component box and wrap the ends of the wires separately with the insulating tape.
- 2) Place an oil pan at the under side of the service valves. 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 adjustable wrenches to the union of the wide tube service valve, then disconnect tubing from the outdoor unit.
- 5) Use an adjustable wrench 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.

CAUTION: Plastic material in a check valve or a 4-way reversing valve is weak against direct heat.

When brazing or unbraze across such parts, be sure to provide damp cloth over them and special care should be taken so as not to burn internal components.



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 64. Furthermore remove the terminal cover at the top of the compressor and remove the wiring of the compressor terminal. Fig. 27.
- 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-Acetyline 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. 26 shows unbrazing points with arrows.

Be sure to save all mounting components with the replacement compressor for future use. Fig. 28.

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

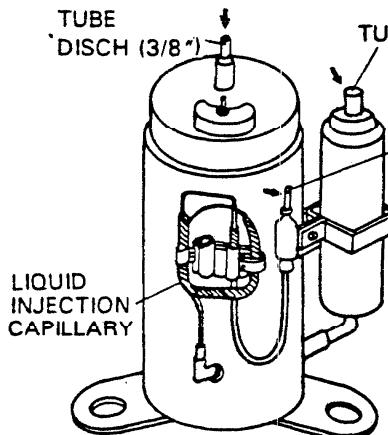


Fig. 26

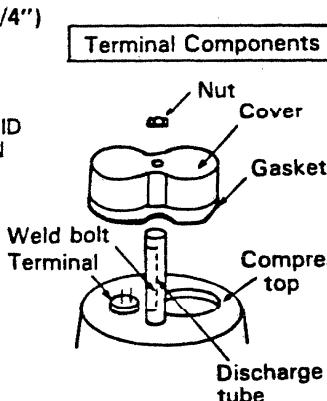


Fig. 27

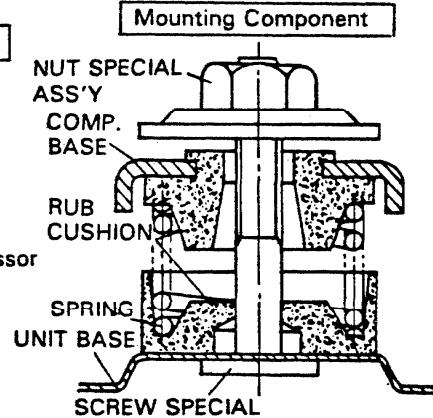


Fig. 28

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.: 80658946) 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, unbake 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 unbrazeing.

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 testing, evacuation, and charging refrigerant according to procedures described in section 9-14. page 71.

CAUTION :

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

9-14. Leak Testing, Evacuation and Charging

9-14.1 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 testing, evacuation and charging is described in section 9-14 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.

9-14-2. Leak Testing the system

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

- If cylinder has not yet been filled, move at least one pound of refrigerant (R22) to the charging cylinder. Fig. 29.
- 1) Prepare the system analyzer valve set and connect charging hoses as in Fig. 30. Be sure to close all valves before connection.
 - 2) Confirm that both Narrow Tube and Wide Tube service valves on the outdoor unit **V6** and **V7** are opened halfway, and other valves are still closed. Fig. 31.
 - 3) Open valves **V8**, **V4** and **V2** respectively to allow refrigerant gas entering into the system. Fill gas to the system and close **V2**, **V4** and **V8** in sequence.
 - 4) Apply liquid soap at:
 - Charge hose connectors,
 - Discharge and suction tubes,
 - Brazed liquid injection capillary section of the replaced compressor or other connection parts.
 Check to see change of bubbles.
 An electronic halogen gas leak detector, of course, may be used for this purpose.
 - 5) When leaks are located, depressurize system and repair leaks.
 - 6) If there are no leaks, open **V1** purge all gases of the system and proceed for evacuation in section 9-14-3. Refer to page 72.

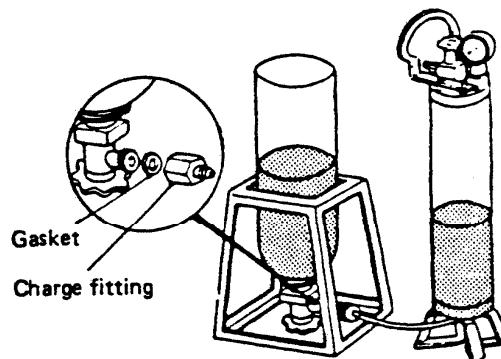


Fig. 29

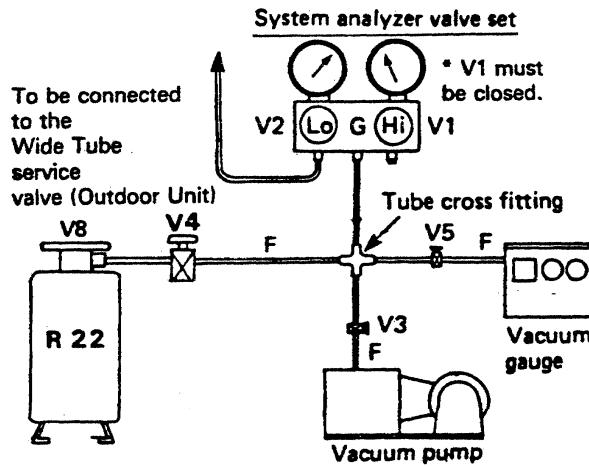
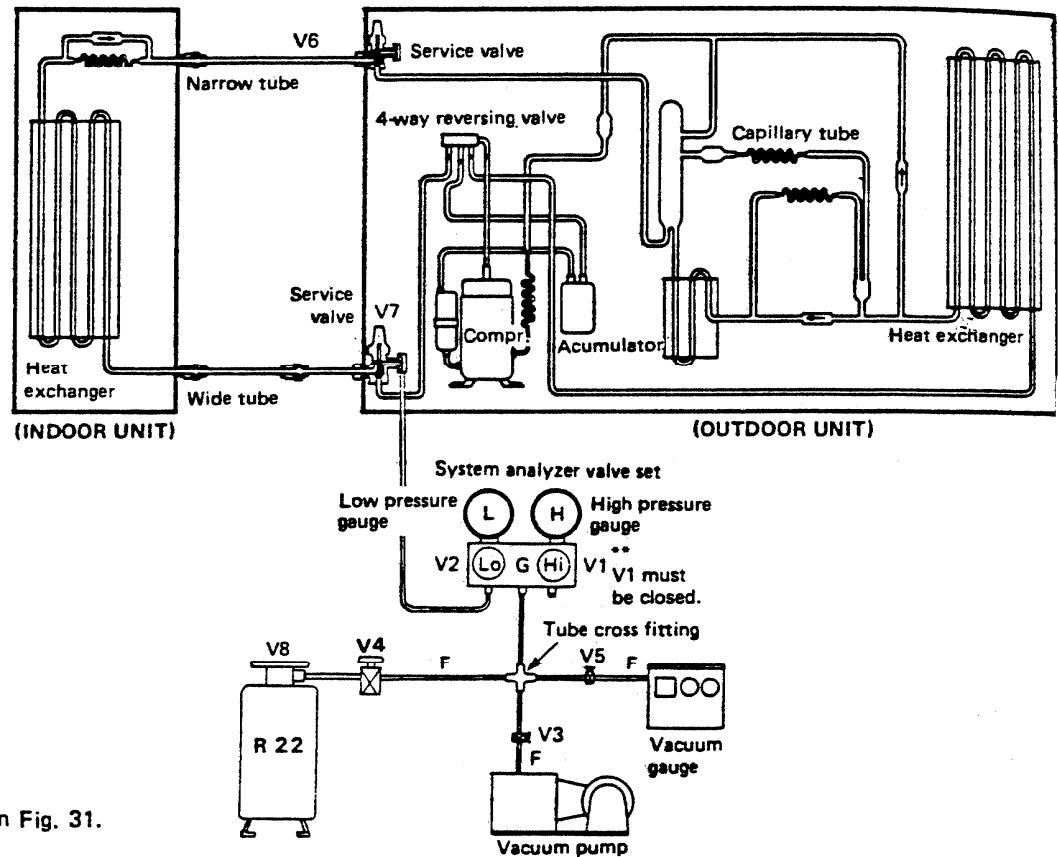


Fig. 30

9-14-3. Evacuation



- 1) Connect instrument as in Fig. 31.
 - 2) Confirm that all connections are made correctly and check all valves are closed. * **V6** and **V7** should be opened halfway.
 - 3) Open **V2** only.
 - 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.)
- * While system is evacuating, utilize this time to fill the charging cylinder, if it is not ready.
- 6) If vacuum gauge reading has reached 500 microns or less, stop the vacuum pump and close **V3**.
 - 7) Keep this condition at least 5 minutes and observe the vacuum gauge for change. Fig. 32.
If pointer on the gauge moves to larger numbers, check system for leaks again according to the procedure in section 9-14-2, Page 71.
 - 8) If the indication of the vacuum gauge will not change, system is now prepared for charging refrigerant. Close **V5**.
 - 9) Proceed to charging refrigerant in section 9-14-4, Page 73.

Fig. 31

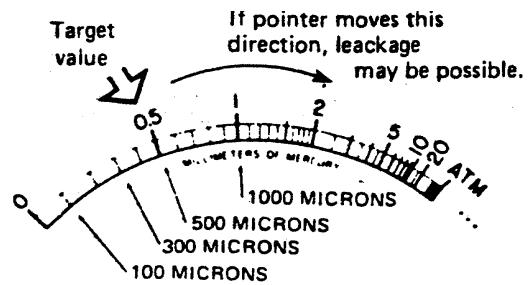


Fig. 32

9-14-4. 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 the charging cylinder. Be sure to measure the cylinder contents by weighing it. Fig. 33.

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 9-14-3.
- 2) Confirm that valves **V1**, **V2**, **V3**, **V4**, **V5**, and **V8** are closed when evacuation is completed. Fig. 31.
- 3) Open charging cylinder valve **V8** slightly.
- 4) Loosen hose connection at **V4** a little to let air escape from the hose. Then tighten connection again.
- 5) Measure and memorize charging cylinder weight to charge exact amount of refrigerant.
- 6) Open **V4** fully to supply refrigerant gas to **V2**.
- 7) For charging refrigerant, check that **V7** is set in a half-way position.
- 8) Open **V2** gradually and let refrigerant gas entering into the system.
- 9) When full charge has entered system, close **V2** tightly.

CAUTION : Do not permit liquid level to drop below "0" (zero) on the graduation of the charging cylinder.

- 10) Open **V7** fully, until they are turned all the way.
- 11) Close **V4** and **V8**.
- 12) Loosen hose connections and let refrigerant escape from hoses.
- 13) Remove hoses, charging cylinder and system analyzer valve set. Now, system charging has completed.

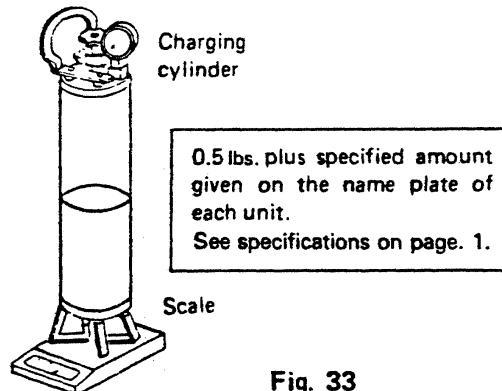
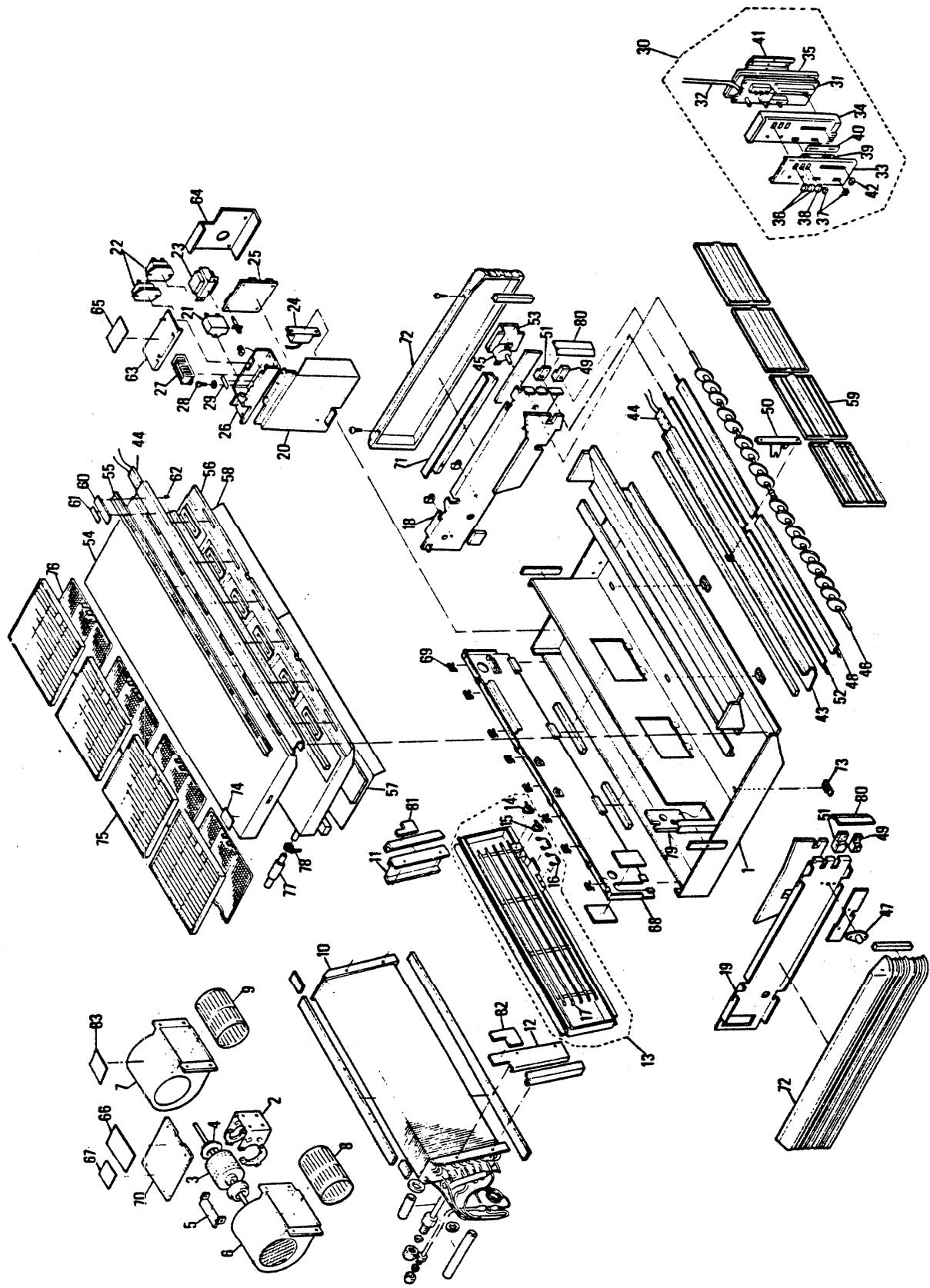


Fig. 33

10. PARTS LIST

SAP362TH
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
1	854-0-1105-252H1	Top Plate Ass'y	1
2	854-0-2511-14301	Support Motor Ass'y	1
3	851-0-5290-882M2	Fan Motor Ass'y KFG4T-81A6P	1
4	854-2-2534-13510	Cushion Rubber, Fan Motor	2
5	854-2-2518-28700	Mounting Plate, Fan Motor	1
6	854-0-2502-21001	Fan Casing Ass'y (Right)	1
7	854-0-2502-21101	Fan Casing Ass'y (Left)	1
8	854-0-2501-18700	Centrifugal Fan Ass'y (Right)	1
9	854-0-2501-18800	Centrifugal Fan Ass'y (Left)	1
10	854-0-4118-43601	Evaporator Ass'y	1
11	854-0-2317-156H0	Cover Ass'y, Evaporator	1
12	854-2-2303-205H0	Mounting Plate Ass'y, Evaporator	1
13	851-0-0052-02200	Heater Ass'y AH-5TH362	1
14	4-2339-56221	Thermostat 60C-40C	1
15	4-2339-56232	Thermostat 65C-45C	1
16	851-0-5261-00200	Fuse Ass'y SF169U	2
17	4-2459-56324	Heater 230V 1000W	5
18	854-0-1114-113H1	Side Cover Ass'y	1
19	854-0-1114-114H1	Side Cover Ass'y	1
20	854-0-5301-36601	Elec. Component Box Ass'y	1
21	4-2239-56222	Fixed Capacitor 440V 4MFD	1
22	4-2329-56313	Relay C5D-22423TUS	2
23	851-0-5290-882P1	Transformer Ass'y ATR-J122U	1
24	4-2339-56226	Thermostat RTB-4U302	1
25	851-0-5158-19300	Controller POW-36TH	1
26	854-0-5301-36501	Elec. Component Box Ass'y	1
27	4-2379-56176	Terminal Base JTU30-8	1
28	852-2-2396-10103	Screw Special M5X12	1
29	852-6-4729-17300	Label	1
30	851-0-0051-11500	Remote Control Switch Ass'y RCS-36TH	1
31	851-0-5158-19100	Control Switch PCB Ass'y	1
32	851-0-5292-19600	Remote Control Cable	1
33	851-2-5365-05101	Indicator Plate	1
34	800-2-5318-14921	Lid Plate	1
35	851-2-5358-02200	Bottom Plate	1
36	800-2-5328-12602	Switch Knob	2
37	854-2-1311-12002	Knob	2
38	851-2-5375-00601	Knob	1
39	800-2-5367-11300	Filter	1
40	851-2-5380-02300	Filter	1
41	800-2-5352-14801	Mounting Plate	1
42	854-2-1311-12401	Knob	1
43	854-0-1101-272H6	Front Panel Ass'y	1
44	851-0-5290-882H1	Heater Ass'y 230V 17W	2
45	851-0-5290-882M1	Synchro Motor Ass'y M12	1
46	854-0-1505-23100	Blade Louver Ass'y	1
47	854-2-1111-17810	Support Louver	1
48	854-0-1505-18401	Blade Louver Ass'y	1
49	854-2-1111-18000	Support Louver	2
50	854-2-1111-20301	Support Louver	1

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

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
51	854-2-1111-20400	Support Louver	2
52	854-0-1505-23801	Blade Louver Ass'y	1
53	854-2-2342-26701	Cover Plate, Synchro Motor	1
54	854-0-1101-273H6	Front Panel Ass'y	1
55	854-2-1330-16011	Ornamental Sash	1
56	854-0-2301-34801	Drain Pan Ass'y	1
57	854-2-2343-13000	Cover Plate, Drain Pan	1
58	854-2-2343-13100	Cover Plate, Drain Pan	1
59	854-2-1101-45115	Front Panel	4
60	852-2-1504-16414	Badge	1
61	854-2-1301-25101	Ornamental Sash	1
62	852-2-1314-11901	Stopper	2
63	854-2-5304-28601	Cover Plate	1
64	854-2-5304-29201	Cover Plate	1
65	854-2-1358-46800	Label	1
66	851-2-5251-02401	Elec. Wiring Diagram	1
67	854-6-4729-71600	Label	1
68	854-0-1109-203H0	Rear Panel Ass'y	1
69	854-2-1130-12513	Hook Plate	8
70	854-2-2307-11801	Cover Plate, Fan Motor	1
71	854-2-2342-30501	Cover Plate	1
72	854-2-1102-240H1	Side Panel Ass'y	2
73	854-2-1114-10810	Cap, Top Panel	3
74	854-2-1367-51900	Name Plate	1
75	854-2-1104-12613	Suction Grille	4
76	854-0-1302-13800	Air Filter Ass'y	4
77	854-0-4297-11900	Drain Pipe Ass'y	1
78	851-2-5354-00200	Clamper	1
79	854-2-2336-42210	Packing	1
80	854-2-2336-43310	Packing	2
81	854-2-2336-71400	Packing	1
82	854-2-2336-45710	Packing	1
83	851-2-5251-02001	Elec. Wiring Diagram	1
●	854-6-4139-42500	Installation Instructions	1
●	854-6-4119-42600	Operation Manual	1
●	854-6-4139-40400	Full-scale Installation Diagram	1

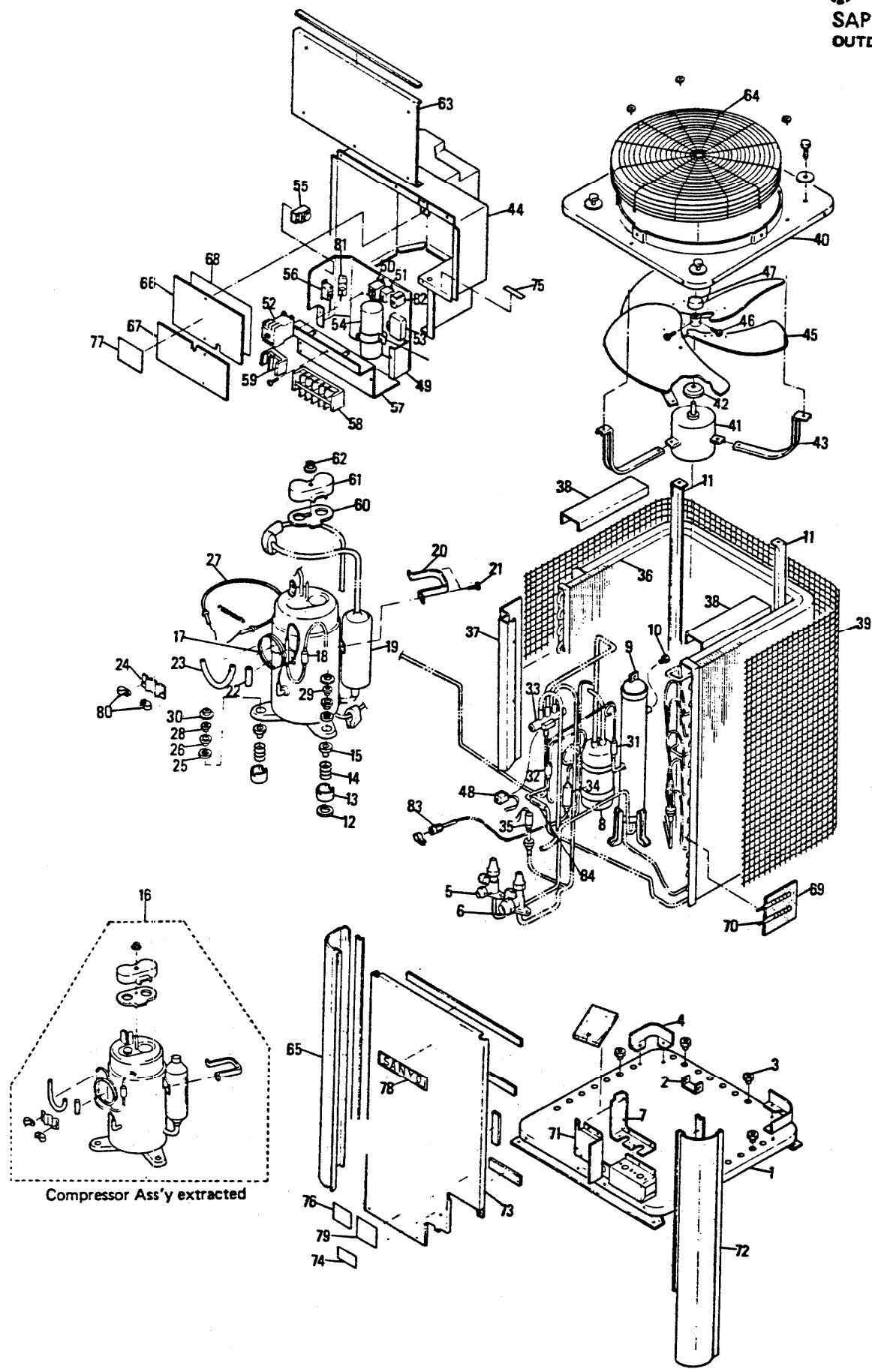
NOTE: Metal and plastic parts will be supplied basically with necessary heat insulation pads or packing.

Accessories

SAP362TH

Description	Shape	Q'ty	Parts No.
Suspension fitting		4	854 2 1127 13703
			854 2 1127 13903
Suspension bolt (M8 x 200)		4	854 2 1356 11901
M8 hex. nut with flat washer		8	851 0 2395 10201
M8 bolt		4	3 9240 81601
M8 flat washer		4	3 9280 08011

Description	Shape	Q'ty	Parts No.
M8 spring washer		4	3 9282 08001
Woodscrew (M3.1 x 13)		2	3 9261 21301
Heat insulating material		1	854 2 2410 45500
Drain hose		1	854 2 2334 13600
Drain-hose clamp		1	851 2 5354 00200
Drain hose		1	854 0 4297 11900



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
1	854-0-2204-37201	Bottom Plate Ass'y	1
2	854-2-4134-26600	Mounting Plate, Accumulator	1
3	854-2-1353-11000	Sheet Rubber, Condenser	4
4	854-2-2360-19100	Mounting Plate, Condenser	2
5	854-0-4504-13400	Valve Ass'y 3/8 in.	1
6	854-0-4507-16400	Valve Ass'y 3/4 in.	1
7	854-2-1133-17501	Cover Plate	1
8	854-0-4517-19301	Accumulator Ass'y	1
9	854-0-4110-19301	Receiver Tank Ass'y	1
10	3-9148-10200	Fusible Plug 1/4	1
11	854-0-2206-18200	Frame Ass'y	2
12	3-9022-01000	Washer	1
13	851-2-2390-14000	Cushion Rubber, Compressor	3
14	851-2-2330-13201	Spring	3
15	854-2-2356-10500	Protection Rubber, Compressor	3
16	852-0-4516-16300	Compressor Ass'y (80658946) C-R220H6K	1
17	854-2-4219-58100	Capillary Tube	1
18	852-0-4506-14000	Strainer Ass'y	1
19	854-0-4517-19100	Accumulator Ass'y	1
20	851-2-2356-16901	Band Mounting, Accumulator	1
21	852-2-2396-11001	Screw Special	1
22	852-2-2353-19500	Packing	1
23	853-2-4310-10300	Mounting Rubber, Capillary	1
24	852-2-2309-34101	Mounting Plate, Capillary	1
25	854-2-2356-10600	Protection Rubber, Compressor	3
26	854-2-2349-12201	Spacer	3
27	4-2459-56195	Heater CH5700 230V 30W	1
28	854-2-2356-10400	Protection Rubber, Compressor	3
29	854-2-2356-10700	Protection Rubber, Compressor	3
30	854-0-2321-10201	Nut Special Ass'y	3
31	852-0-4506-13300	Strainer Ass'y	1
32	852-0-4506-13700	Strainer Ass'y	1
33	854-2-4508-11000	Reversing Valve V38	1
34	852-0-4505-11100	Dehydrater Ass'y	1
35	851-0-5290-883S1	Pressure Switch Ass'y ACB-1UB04W	1
36	854-0-4118-42900	Condenser Ass'y	1
37	854-2-4134-34300	Mounting Plate, Condenser	1
38	854-2-2360-18900	Mounting Plate, Condenser	2
39	854-2-1113-11700	Guard, Condenser	1
40	854-0-1106-20201	Top Cover Ass'y	1
41	851-0-5290-883M1	Fan Motor Ass'y KFC6S-161A6P	1
42	852-2-2514-10700	Cover Rubber, Fan Motor	1
43	854-0-2511-14401	Support Motor Ass'y	3
44	854-0-2325-17500	Cover Ass'y	1
45	854-0-2501-18900	Propeller Fan Ass'y	1
46	854-2-2529-10101	Set Screw, blower M6	2
47	854-2-2346-11400	Cap, Fan	1
48	851-0-5290-883C1	Solenoid Ass'y L27-9072	1
49	854-0-5301-36901	Elec. Component Box Ass'y	1
50	4-2329-56289	Relay LY3F-US-TS COIL 208/230V	1

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

A T T E N T I O N !

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
1	854-0-2204-37201	Bottom Plate Ass'y	1
2	854-2-4134-26600	Mounting Plate, Accumulator	1
3	854-2-1353-11000	Sheet Rubber, Condenser	4
4	854-2-2360-19100	Mounting Plate, Condenser	2
5	854-0-4504-13400	Valve Ass'y 3/8 in.	1
6	854-0-4507-16400	Valve Ass'y 3/4 in.	1
7	854-2-1133-17501	Cover Plate	1
8	854-0-4517-19301	Accumulator Ass'y	1
9	854-0-4110-19301	Receiver Tank Ass'y	1
10	3-9148-10200	Fusible Plug 1/4	1
11	854-0-2206-18200	Frame Ass'y	2
12	3-9022-01000	Washer	1
13	851-2-2390-14000	Cushion Rubber, Compressor	3
14	851-2-2330-13201	Spring	3
15	854-2-2356-10500	Protection Rubber, Compressor	3
16	852-0-4516-16300	Compressor Ass'y (80658946) C-R220H6K	1
17	854-2-4219-58100	Capillary Tube	1
18	852-0-4506-14000	Strainer Ass'y	1
19	854-0-4517-19100	Accumulator Ass'y	1
20	851-2-2356-16901	Band Mounting, Accumulator	1
21	852-2-2396-11001	Screw Special	1
22	852-2-2353-19500	Packing	1
23	853-2-4310-10300	Mounting Rubber, Capillary	1
24	852-2-2309-34101	Mounting Plate, Capillary	1
25	854-2-2356-10600	Protection Rubber, Compressor	3
26	854-2-2349-12201	Spacer	3
27	4-2459-56195	Heater CH5700 230V 30W	1
28	854-2-2356-10400	Protection Rubber, Compressor	3
29	854-2-2356-10700	Protection Rubber, Compressor	3
30	854-0-2321-10201	Nut Special Ass'y	3
31	852-0-4506-13300	Strainer Ass'y	1
32	852-0-4506-13700	Strainer Ass'y	1
33	854-2-4508-11000	Reversing Valve V38	1
34	852-0-4505-11100	Dehydrater Ass'y	1
35	851-0-5290-883S1	Pressure Switch Ass'y ACB-1UB04W	1
36	854-0-4118-42900	Condenser Ass'y	1
37	854-2-4134-34300	Mounting Plate, Condenser	1
38	854-2-2360-18900	Mounting Plate, Condenser	2
39	854-2-1113-11700	Guard, Condenser	1

ATTENTION !

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

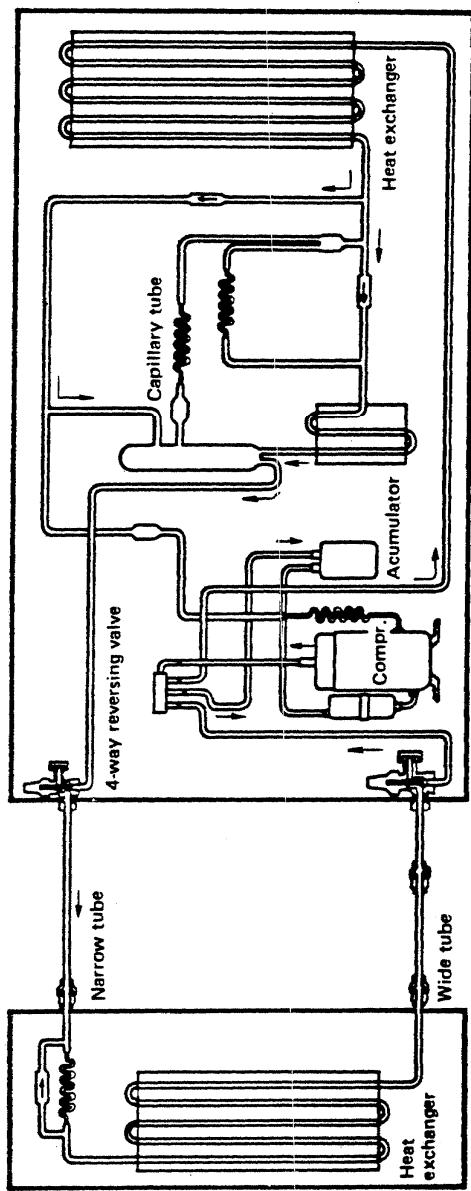
1. Part No. 2. Description 3. Q'ty 4. Volts-Hz-Ph 5. Product Model No.

Key	Part No.	Description	Q'ty
51	4-2329-56287	Relay MY2F-T1-USTS COIL 240V	1
52	4-2329-56320	Relay FMCA-1SUL 230V 26A	1
53	4-2239-56222	Fixed Capacitor 440V 4MFD	1
54	4-2239-56381	Fixed Capacitor 370V 40MFD	1
55	4-2489-56168	Time Switch STMN-2-T0918 COIL 230V AC	1
56	4-2319-56254	High Pressure Switch FTB-2UC01	1
57	854-0-5301-37001	Elec. Component Box Ass'y	1
58	4-2379-56176	Terminal Base JTU30-8	1
59	4-2379-56178	Terminal Base KTU60-2J	1
60	801-2-5303-13100	Gasket Terminal	1
61	801-2-6194-12100	Cover, Terminal	1
62	819-2-6919-10100	Nut Special (inch)	1
63	854-2-2208-226H1	Mounting Plate Ass'y	1
64	854-0-1113-13801	Guard Ass'y	1
65	854-0-1102-243H1	Side Panel Ass'y (Left)	1
66	854-2-5304-29400	Cover Plate, Elec. Box	1
67	854-2-5304-29500	Cover Plate, Elec. Box	1
68	851-2-5251-02601	Elec. Wiring Diagram	1
69	852-2-4380-10800	Insulation, Thermostat	1
70	854-2-5322-10100	Mounting, Thermostat	2
71	854-2-1133-20101	Cover Plate	1
72	854-0-1102-244H1	Side Panel Ass'y (Right)	1
73	854-0-1101-316H1	Front Panel Ass'y	1
74	854-6-4729-75900	Label	1
75	852-6-4729-17300	Label	1
76	854-6-4729-71600	Label	1
77	854-2-1358-46800	Label	1
78	854-2-1354-14301	Badge	1
79	854-2-1367-52000	Name Plate	1
80	3-9030-00508	Clamper F-6	2
81	4-2339-56196	Thermostat RTB-4U201F	1
82	4-2049-60102	Thermistor TDK 101YY	1
83	854-0-4514-10200	Charge Port Ass'y	1
84	854-0-4518-12700	Check Valve Ass'y TCV-2-S1	2

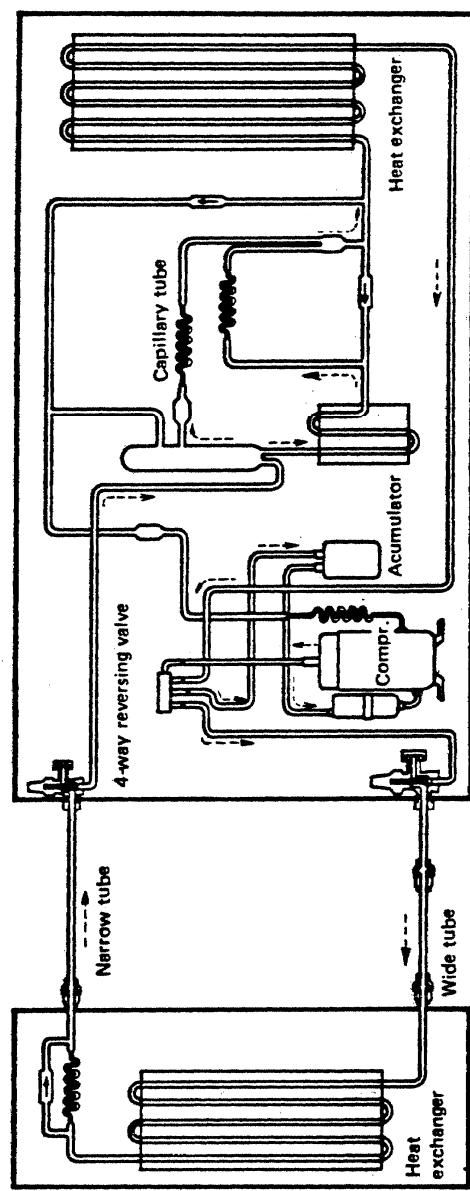
NOTE: Metal and plastic parts will be supplied basically with necessary heat insulation pads or packing.

11. REFRIGERANT FLOW DIAGRAM

COOLING CYCLE



HEATING CYCLE



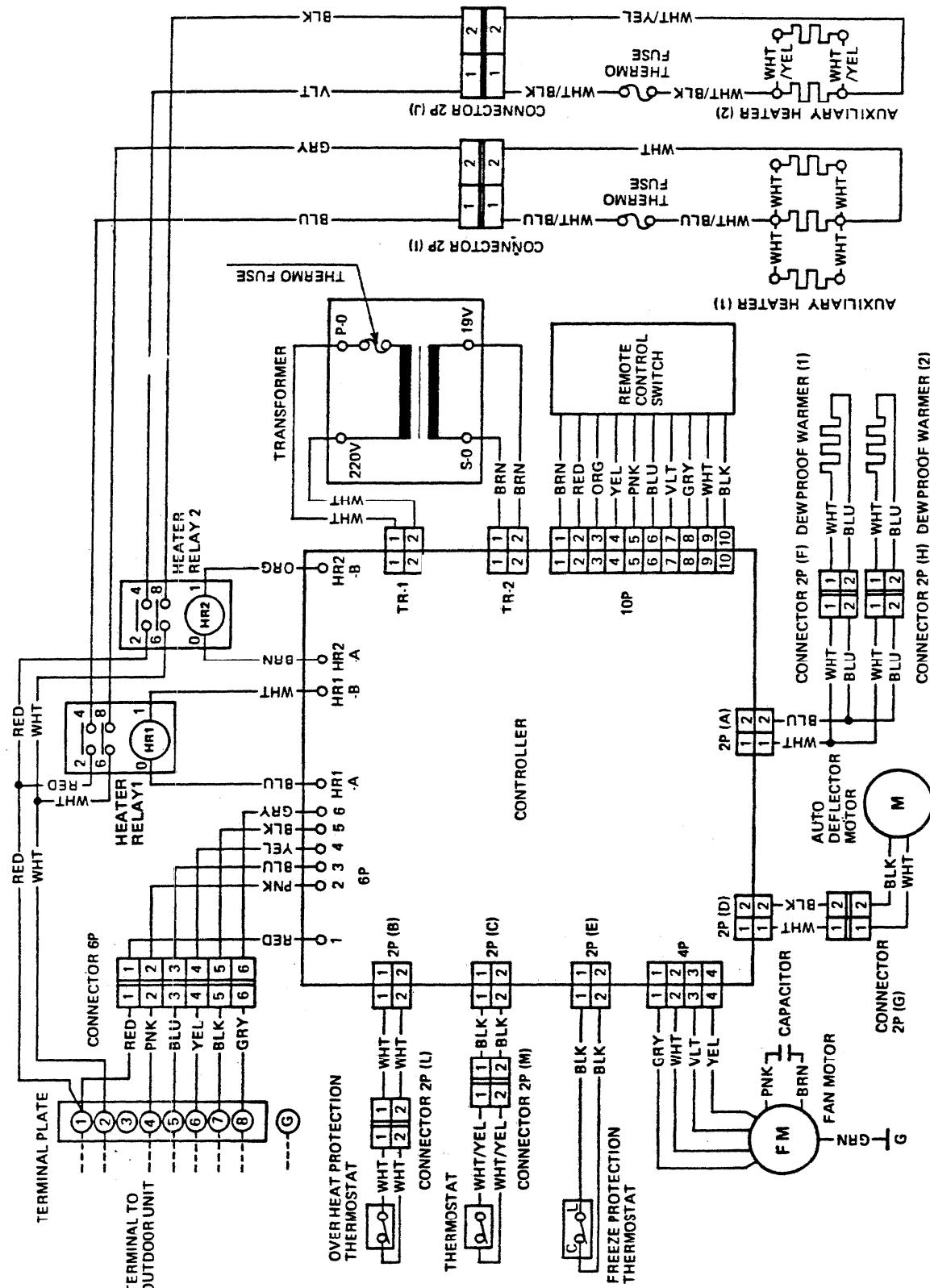
NOTE:

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

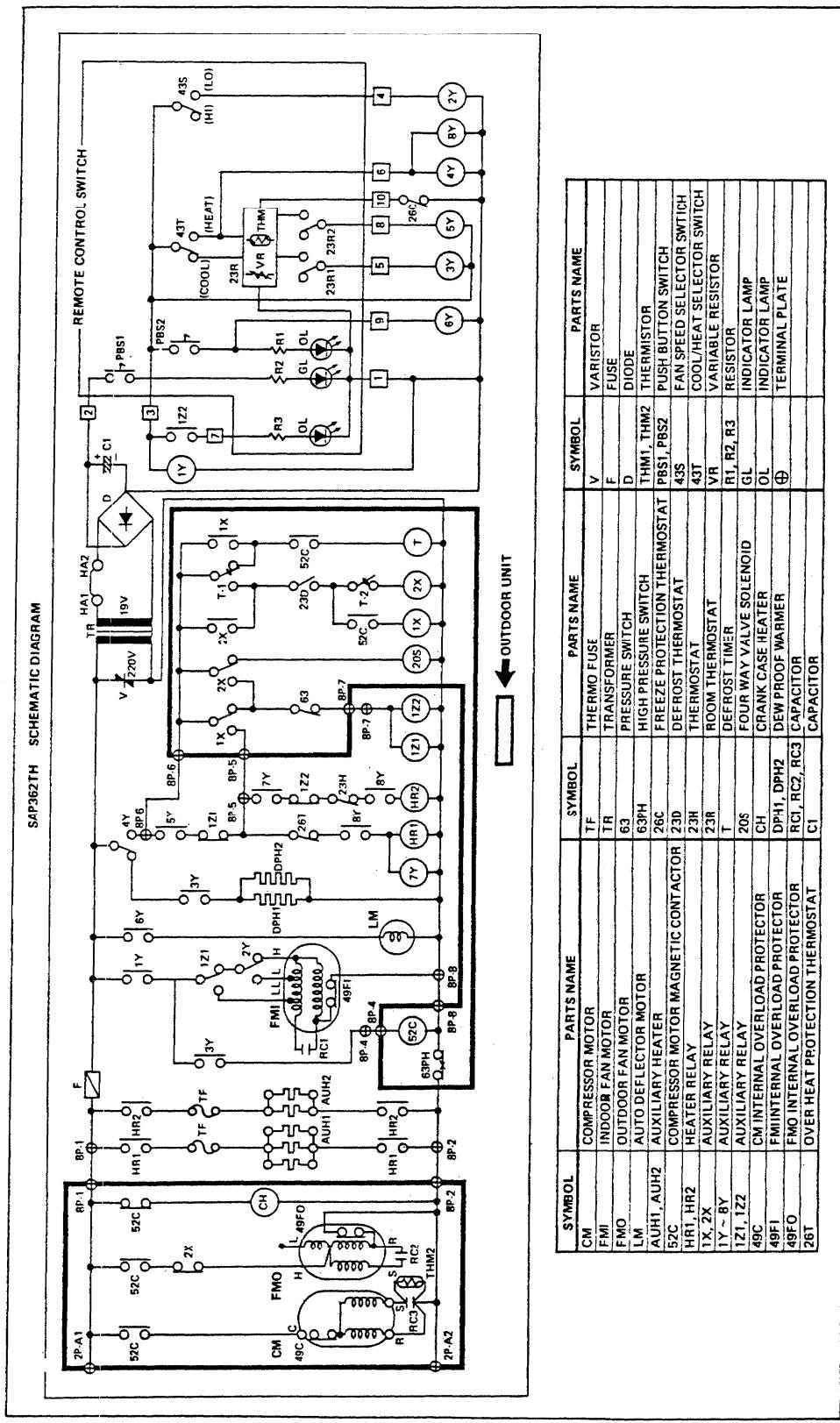
↔ with sequential number shows flow of refrigerant in **HEATING (= Reverse) CYCLE**.

12. ELECTRIC WIRING DIAGRAM Indoor Unit: SAP362TH 60Hz, 230/208V

SAP362TH

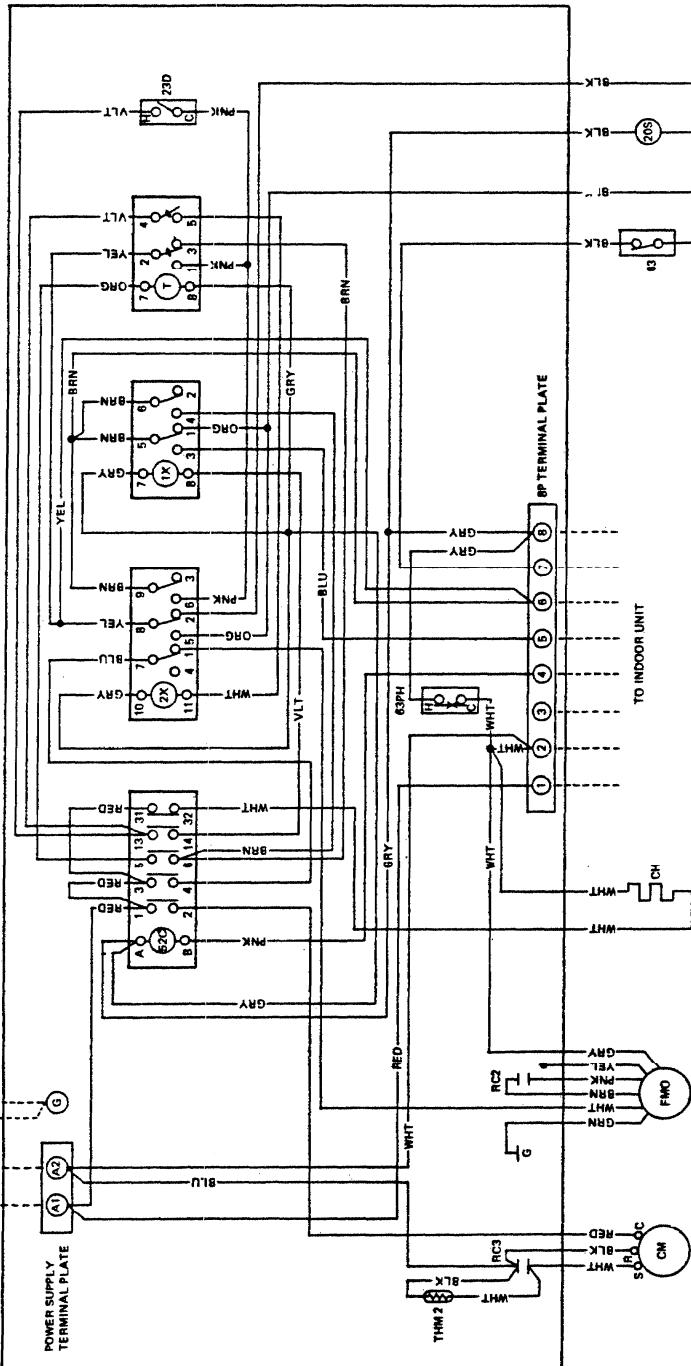


SCHEMATIC DIAGRAM

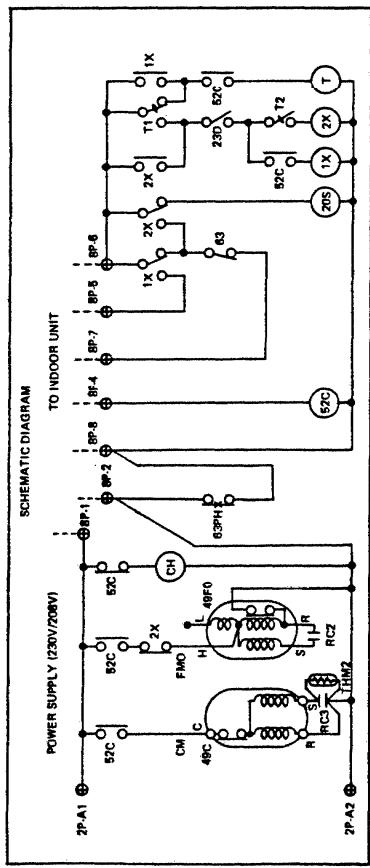


ELECTRIC WIRING DIAGRAM

SAP362CH

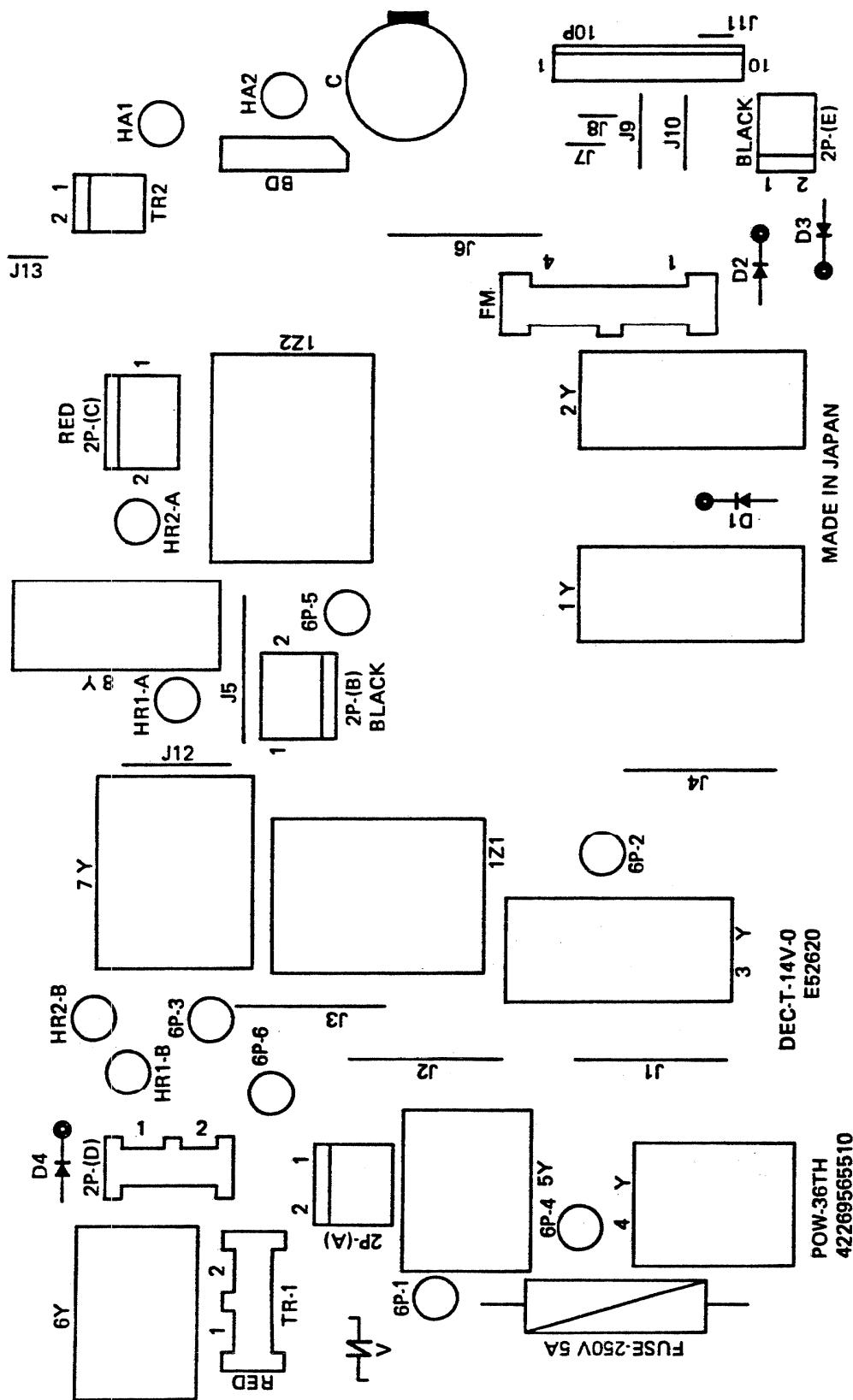


SYMBOL	PARTS NAME
CM	COMPRESSOR/MOTOR
FMO	COMPRESSOR/MOTOR MAGNETIC CONTACTOR
IX, 2X	AUXILIARY RELAY
49C	CM INTERNAL OVERLOAD PROTECTOR
49FO	FMO INTERNAL OVERLOAD PROTECTOR
63	PRESSURE SWITCH
CH	CRANK CASE HEATER
23D	DEFROST THERMOSTAT
T	DEFROST TIMER
20S	FOUR WAY VALVE
RC2, RC3	CAPACITOR
④	TERMINAL PLATE
63PH	HIGH PRESSURE SWITCH
THM2	TERMOSTOR



Sanyo Electric, Inc.
200 Riser Road
Little Ferry, New Jersey 07643
May, '86/TA 1200
Printed in Japan

**CONTROLLER P.C.B. (PRINTED PATTERN)
POW-36TH (for SAP362TH)**

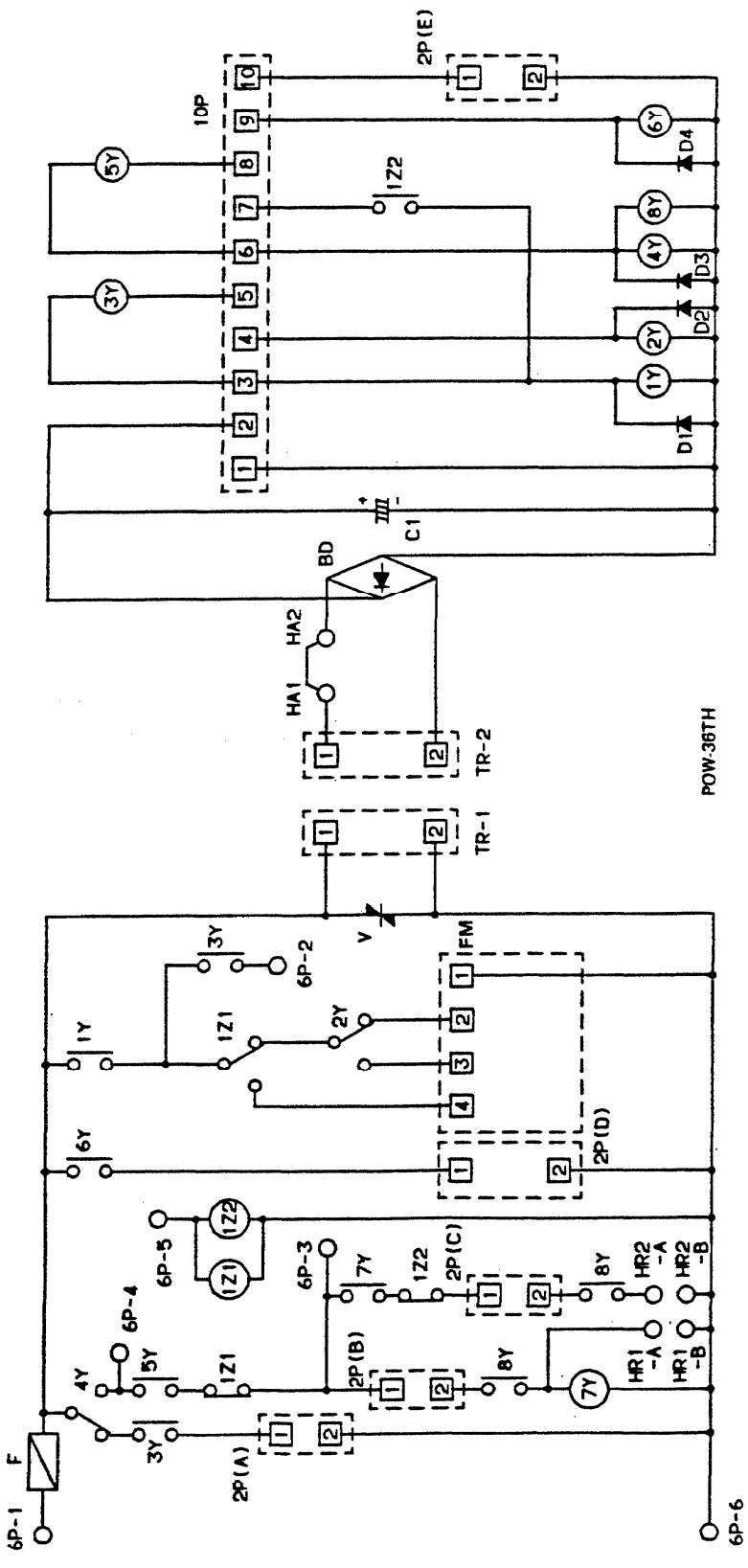


- 84 -

ELECTRIC WIRING DIAGRAM (CONTROLLER P.C.B.)
POW-36TH (for SAP362TH)

Mark	Material	Spec.	Mark	Material	Spec.
TP-1	Transistor	ULTILEX 2P (RED)	HR2-A, B	Connector	AMP 170338-1
TP-2	Transistor	SL-156	4P	Connector	ULTILEX 4P (BLK)
2P(A)	Connector	5289-02A (WHT)	10P	Connector	EI 10P
2P(B)	Connector	5289-02A-BL (BLK)	1Y	Relay	VB24TBU (DC24V)
2P(C)	Connector	5289-02A-RE (RED)	2Y	Relay	VB24TBU (DC24V)
2P(D)	Connector	ULTILEX 2P (BLK)	3Y	Relay	VB24TBU (DC24V)
2P(E)	Connector	5273-02A-BL (BLK)	4Y	Relay	LZG-24HE (DC24V)
3P-1 ~	Connector	AMP 170338-1	5Y	Relay	LZG-24HE (DC24V)
3P-6	Connector	AMP 170338-1	6Y	Relay	LZG-24HE (DC24V)
1A1, HA2	Connector	AMP 170338-1	1Z1	Relay	MY2-02-US-TS (AC230V)
1R1-A, B	Connector	AMP 170338-1	1Z2	Relay	MY2-02-US-TS (AC230V)

Mark	Material	Spec.
TP-1	Transistor	ULTILEX 2P (RED)
TP-2	Transistor	SL-156
2P(A)	Connector	5289-02A (WHT)
2P(B)	Connector	5289-02A-BL (BLK)
2P(C)	Connector	5289-02A-RE (RED)
2P(D)	Connector	ULTILEX 2P (BLK)
2P(E)	Connector	5273-02A-BL (BLK)
3P-1 ~	Connector	AMP 170338-1
3P-6	Connector	AMP 170338-1
1A1, HA2	Connector	AMP 170338-1
1R1-A, B	Connector	AMP 170338-1





Sanyo Electric Inc.
200 Riser Road, Little Ferry, New Jersey 07643
Jul. '86/TA 1500

Printed in Japan

PARTS LIST

Revision 1

Air Conditioner

Please dispose the previous parts list WM-17719

and replace with this list WM-18156

Reason: Arrangement in the Electric Wiring
Diagrams has changed.

230/208V 60Hz



SAP362TCH
(U.S.A.)

MODEL NO.	PRODUCT CODE NO.
SAP362TH	85264330
SAP362CH	85274167

May, 1986

SPECIFICATIONS

Model No.		SAP362TCH	
Unit Model No.	Indoor unit	SAP362TH	
	Outdoor unit	SAP362CH	
PERFORMANCE & ELECTRICAL RATINGS		Cooling	Heating
Capacity	Cooling	BTU/hr	32,400/31,400
	Heating	BTU/hr	33,200/32,000
Moisture removal (High)		Pints/hr	9.2/8.5
Air circulation (High)		Cu. ft./min	820/770
SEER (EER)			9.10/9.10
COP			2.60/2.55
Frequency	Hz		60
Rated voltage	V		230/208
Running amps	A	16.8/17.8	16.9/18.3
Power input	W	3,575/3,470	3,740/3,675
Buck-up heater	kW	—	5.0/4.08
Fuse (or circuit breaker) capacity	A		50
FEATURES			
Controls		IC	
Fan speeds	Indoor fan	2	
	Outdoor fan	1	
Timer		—	
Ventilator		—	
Air deflection	Horizontal	Automatic	
	Vertical	Manual	
Air filter		Washable, easy access	
Temperature control		IC Thermostat	
Compressor		Rotary	
Refrigerant (R22)	lbs. (g)	11.04 (5,000)	
Compressor oil	cc	1,500	
Refrigerant tubing connections		Flare type	
Refrigerant Control		Capillary tube	
Max. refrigerant line length	ft. (m)	100 (30)	
Max. outdoor unit height	ft. (m)	50 (15)	
Refrigerant tube o.d.	Narrow tube	In. (mm)	3/8 (9.52)
	Wide tube	In. (mm)	3/4 (19.05)
Drain pipe o.d.		In. (mm)	3/4 (26.67)
Refrigerant tube kit		Optional	
DEIMENSIONS & WEIGHT		Indoor unit	Outdoor unit
Height	In. (mm)	11-1/32 (280)	38 (965)
Width	In. (mm)	61-13/32 (1,560)	26-3/8 (670)
Depth	In. (mm)	26-9/16 (675)	26-3/8 (670)
Net weight	lbs. (kg)	112 (51)	216 (98)
Shipping size	Cu. ft. (Cu. m)	17.3 (0.49)	25 (0.71)
Shipping weight	lbs. (kg)	134 (61)	235 (107)

DATA SUBJECT TO CHANGE WITHOUT NOTICE

WM-18156