

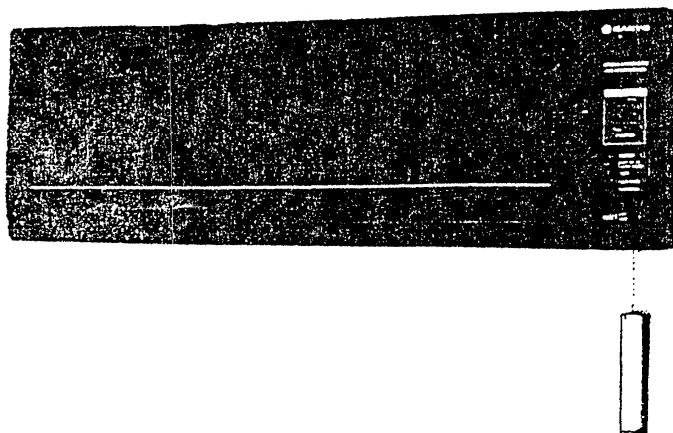
SERVICE MANUAL

(Cooling Only)	(Heat Pump)
SAP91KC	SAP92KCH
SAP121KC	SAP122KCH
SAP181KC	SAP182KCH (USA)

SANYO

Nov. 1987 Reprint

SPLIT SYSTEM AIR CONDITIONER & HEAT PUMP



SAP91K SAP92KH
SAP121K SAP122KH
SAP181K SAP182KH

Indoor Unit



SAP91C SAP92CH
SAP121C SAP122CH
SAP181C SAP182CH

Outdoor Unit

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SANYO

Home Appliance Division:

200 Riser Road Little Ferry, New Jersey 07643

REFERENCE NO. WM-20692

Model No.		SAP121KC	SAP122KCH	
Unit Model No.	Indoor unit Outdoor unit	SAP121K SAP121C	SAP122KH SAP122CH	
PERFORMANCE & ELECTRICAL RATINGS		COOLING	COOLING	HEATING
Capacity — Cooling	BTU/hr.	12,000	11,400/11,200	
— Heating	BTU/hr.	—	13,300/13,000	
Moisture removal (High)	Pints/hr.	3.5	3.3/3.2	—
Air circulation (High)	Cu.ft./min.	330	310/300	
SEER (EER)		10.1 (10.0)	9.5/9.5 (9.2/9.2)	—/
COP		—	3.45/3.45	
Frequency	Hz	60	60	
Rated Voltage	V	115	230/208	
* Running amps	A	10.6	5.6/6.1	5.1/5.4
Power Input	W	1,200	1,240/1,220	1,130/1,100
Back-up heater	kW	—	—	1.5/1.23
Fuse (or circuit breaker) Capacity		15 Amps., 125 V	20 Amps., 250 V	
FEATURES				
Controls	Microcomputer IC		Yes	—
Fan speeds			3 and automatic control	
Timer			ON/OFF 12-hours	
Ventilator			—	
Air deflection	Horizontal Vertical		Manual Manual	
Air filter			Washable, easy access	
Temperature control			IC thermostat (Microcomputer)	
Other special features			Energy Saver Filter Check	
Compressor			Rotary	
Refrigerant (R22) at shipping	lbs. (g)	2.51 (1,140) + 0.088 (40)...for quick air purge	2.95 (1,340) + 0.088 (40)...for quick air purge	
Refrigerant piping connections			Flare type	
Refrigerant line length	ft. (m)		33 (10)	
Max. outdoor unit height	ft. (m)		23 (7)	
Refrigerant pipe o.d.				
Narrow pipe	In. (mm)		1/4 (6.35)	
Wide pipe	In. (mm)		1/2 (12.7)	
Drain pipe o.d.	In. (mm)		23/32 (18.26)	
Refrigerant piping kit			Optional	
DIMENSIONS & WEIGHT		Indoor unit	Outdoor unit	Indoor unit
Dimensions	Height-In. (mm)	13-9/16 (345)	20-7/8 (530)	13-9/16 (345)
	Width In. (mm)	38-31/32 (990)	29-17/32 (750)	38-31/32 (990)
	Depth In. (mm)	6-7/8 (175)	11-1/32 (280)	6-7/8 (175)
Net weight	lbs. (kg)	28.6 (13)	90.4 (41)	28.6 (13)
Shipping size	Cuft (cu.m)	3.88 (0.11)	6.71 (0.19)	3.88 (0.11)
Shipping weight	lbs. (kg)	35.3 (16)	88 (40)	41.8 (19)
				94.6 (43)

* Without electric heater

DATA SUBJECT TO CHANGE WITHOUT NOTICE

Model No.		SAP181KC	
Unit Model No.	Indoor unit Outdoor unit	SAP181K SAP181C	
PERFORMANCE & ELECTRICAL RATINGS		COOLING	
Capacity — Cooling	BTU/hr.	18,000/17,600	
— Heating	BTU/hr.	—	
Moisture removal (High)	Pints/hr.	5.3/5.2	
Air circulation (High)	Cu.ft./min.	330/320	
SEER (EER)		8.5/8.5 (8.2/8.2)	
COP		—	
Frequency	Hz	60	
Rated Voltage		230/208	
* Running amps	A	9.8/10.7	
Power Input	W	2,190/2,140	
Back-up heater	kW	—	
Fuse (or circuit breaker) Capacity		15 Amps., 250 V	
FEATURES			
Controls	Microcomputer IC	Yes —	
Fan speeds		3 and automatic control	
Timer		ON/OFF 12-hours	
Ventilator		—	
Air deflection	Horizontal Vertical	Manual Manual	
Air filter		Washable, easy access	
Temperature control		IC thermostat (Microcomputer)	
Other special features		Energy Saver Filter Check	
Compressor		Rotary	
Refrigerant (R22) at shipping	lbs. (g)	3.57 (1,620) + 0.176 (80)...for quick air purge	
Refrigerant piping connections		Flare type	
Refrigerant line length	ft. (m)	50 (15)	
Max. outdoor unit height	ft. (m)	23 (7)	
Refrigerant pipe o.d.	Narrow pipe In. (mm) Wide pipe In. (mm)	1/4 (6.35) 5/8 (15.88)	
Drain pipe o.d.	In. (mm)	23/32 (18.26)	
Refrigerant piping kit		Optional	
DIMENSIONS & WEIGHT		Indoor unit Outdoor unit	
Dimensions	Height In. (mm) Width In. (mm) Depth In. (mm)	13-9/16 (345) 38-31/32 (990) 6-7/8 (175)	24-13/16 (630) 32-11/16 (830) 12-13/32 (315)
Net weight	lbs. (kg)	28.6 (13)	127.9 (58)
Shipping size	Cuft (cu.m)	3.88 (0.11)	10.59 (0.3)
Shipping weight	lbs. (kg)	35.2 (16)	134.2 (61)

* Without electric heater

DATA SUBJECT TO CHANGE WITHOUT NOTICE

Model No.		SAP182KCH	
Unit Model No.	Indoor unit Outdoor unit	SAP182KH SAP182CH	
PERFORMANCE & ELECTRICAL RATINGS		COOLING	HEATING
Capacity — Cooling	BTU/hr.	17,200/16,800	
— Heating	BTU/hr.	19,200/18,900	
Moisture removal (High)	Pints/hr.	5.1/5.0	—
Air circulation (High)	Cu.ft./min.	330/320	
SEER (EER)		8.5/8.5 (8.2/8.2)	—
COP		2.50/2.50	
Frequency	Hz	60	
Rated Voltage	V	230/208	
* Running amps	A	9.5/10.2	10.6/11.6
Power Input	W	2,100/2,050	2,240/2,210
Back-up heater	kW	—	1.8/1.47
Fuse (or circuit breaker) Capacity		30 Amps., 250 V	
FEATURES			
Controls	Microcomputer	Yes	
	IC	—	
Fan speeds		3 and automatic control	
Timer		ON/OFF 12-hours	
Ventilator		—	
Air deflection	Horizontal	Manual	
	Vertical	Manual	
Air filter		Washable, easy access	
Temperature control		IC thermostat (Microcomputer)	
Other special features		Energy Saver Filter Check	
Compressor		Rotary	
Refrigerant (R22) at shipping	lbs. (g)	4.63 (2,100) + 0.176 (80)...for quick air purge	
Refrigerant piping connections		Flare type	
Refrigerant line length	ft. (m)	33 (10)	
Max. outdoor unit height	ft. (m)	23 (7)	
Refrigerant pipe o.d.			
	Narrow pipe In. (mm)	1/4 (6.35)	
	Wide pipe In. (mm)	5/8 (15.88)	
Drain pipe o.d.	In. (mm)	23/32 (18.26)	
Refrigerant piping kit		Optional	
DIMENSIONS & WEIGHT		Indoor unit	Outdoor unit
Dimensions	Height-In. (mm)	13-9/16 (345)	24-13/16 (630)
	Width In. (mm)	38-31/32 (990)	32-11/16 (830)
	Depth In. (mm)	6-7/8 (175)	12-13/32 (315)
Net weight	lbs. (kg)	28.6 (13)	134.5 (61)
Shipping size	Cuft (cu.m)	3.88 (0.11)	10.59 (0.3)
Shipping weight	lbs. (kg)	41.8 (19)	143 (65)

* Without electric heater

DATA SUBJECT TO CHANGE WITHOUT NOTICE

1.2 Major Component Specifications

Unit Model No.	SAP91C		SAP92CH	
COMPRESSOR	Hermetic Rotary Type			
Compressor Model No.	C-R70H2V			C-R70H6V
Source	115 V, 60 Hz, Single phase			230/208 V, 60 Hz, Single Phase
Pole	2			2
Nominal output W(H.P.)	700 (15/16)			700 (15/16)
Displacement (cc/rev.)	13.3			13.3
Amps.-Full Load (A)	8.5			4.6/4.4
-Locked Rotor (A)	49			27/24
Type of oil	Special oil for Rotary Compressor			
Compressor oil amount (cc)	500			500
Coil resistance (Ω) (Ambient temp. 77°)	C-R: 1.43 C-S: 5.24			C-R: 2.510 C-S: 5.58
Protective Device	External Line Break Overload Relay			
Run Capacitor,	MFD	30	17.5	
	VAC	330	370	
Unit Model No.	SAP91K	SAP91C	SAP92KH	SAP92CH/122CH
FAN MOTOR				
Fan Motor Model No.	SV4T-11C1P		FT6-21A1P	SV4T-11D6P
Source	115 V, 60 Hz, Single Phase		230/208 V, 60 Hz, Single Phase	
Pole	4		6	4
Nominal output W(H.P.)	10 (1/32)		20 (1/32)	10 (1/32)
Amps.-Full Load (A)	0.26		0.64	0.14/0.15
-Locked Rotor (A)	0.33		0.69	0.18/0.22
Protective Device	Internal Protector (9700K 211-215)			
Run Capacitor,	MFD	2	6	0.6
	VAC	220	220	440
Coil Resistance (Ω) at 68°F	BLU-GRY: 137.2 BLU-VLT: 63.0 VLT-YEL: 28.3 YEL-PNK: 159.8		BLU-BRN: 68.9 BLU-PNK: 103.9	WHT-BRN: 464.8 WHT-VLT: 209.8 VLT-YEL: 93.4 YEL-PNK: 539.6
			WHT-BRN: 184.2 WHT-PNK: 156.1	

Unit Model No.	SAP121C	SAP122CH	
COMPRESSOR	Hermetic Rotary Type		
Compressor Model No.	C-R90H2S	C-R90H6S	
Source	115 V, 60 Hz, Single phase	230/208 V, 60 Hz, Single Phase	
Pole	2	2	
Nominal output W(H.P.)	900 (1-6/32)	900 (1-6/32)	
Displacement (cc/rev.)	17.5	17.5	
Amps.-Full Load (A)	11.2	6.1/5.6	
-Locked Rotor (A)	60	32/29	
Type of oil	Special oil for Rotary Compressor		
Compressor oil amount (cc)	650	650	
Coil resistance (Ω) (Ambient temp. 77°)	C-R: 0.581 C-S: 2.796	C-R: 2.183 C-S: 6.39	
Protective Device	External Line Break Overload Relay		
Run Capacitor,	MFD VAC	35 330	20 370
Unit Model No.	SAP121K	SAP121C	SAP122KH
FAN MOTOR			
Fan Motor Model No.	FV4T-11F1PE	FT6-21C1PE	FV4T-11F6P
Source	115 V, 60 Hz, Single Phase	230/208 V, 60 Hz, Single Phase	
Pole	4	6	4
Nominal output W(H.P.)	20 (1/32)	20 (1/32)	10 (1/32)
Amps.-Full Load (A)	0.34	0.69	0.17/0.18
-Locked Rotor (A)	0.44	0.79	0.28/0.23
Protective Device	Internal Protector (9700K 211-215)		
Run Capacitor,	MFD VAC	3.5 220	8 220
Coil Resistance (Ω) at 68°F	BLU-BRN: 99.6 BLU-VLT: 29.7 VLT-YEL: 16.2 YEL-PNK: 91.9	BLU-BRN: 62.5 BLU-PNK: 59.1	WHT-BRN: 321.2 WHT-VLT: 113.4 VLT-YEL: 53.8 YEL-PNK: 252.0

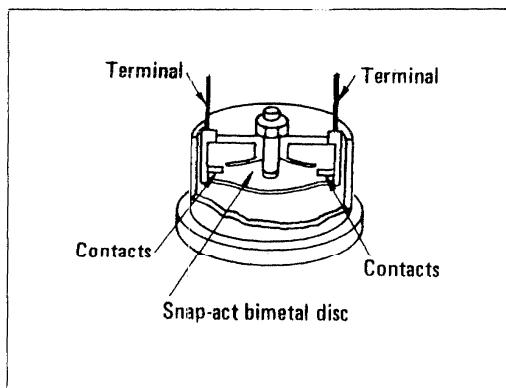
Unit Model No.	SAP181C/SAP182CH	
COMPRESSOR	Hermetic Rotary Type	
Compressor Model No.	C-R150H6M	
Source	230/208 V, 60 Hz, Single Phase	
Pole	2	
Nominal output W(H.P.)	1,500 (2-1/32)	
Displacement (cc/rev.)	30.85	
Amps.-Full Load (A)	11/10	
-Locked Rotor (A)	65/59	
Type of oil	Special oil for Rotary Compressor	
Compressor oil amount (cc)	1,200	
Coil resistance (Ω) (Ambient temp. 77°)	C-R: 0.872 C-S: 2.275	
Protective Device	Internal Line Break Overload Relay	
Run Capacitor,	MFD	30
	VAC	370/400
Unit Model No.	SAP181K/182KH	SAP181C/182CH
FAN MOTOR		
Fan Motor Model No.	FV4T-11L6P	SG6S-51C6P
Source	230/208 V, 60 Hz, Single Phase	
Pole	4	6
Nominal output W(H.P.)	10 (1/32)	50 (1/16)
Amps.-Full Load (A)	0.18/0.19	0.49/0.48
-Locked Rotor (A)	0.32/0.27	0.80/0.67
Protective Device	Internal Protector (9700K 211-215)	
Run Capacitor,	MFD	1
	VAC	440
Coil Resistance (Ω) at 68°F	WHT-BRN: 312.1 WHT-VLT: 68.7 VLT-YEL: 48.7 YEL-PNK: 259.7	WHT-BRN: 85.9 YEL-PNK: 59.6

Unit Model No.	SAP91C	SAP92CH	SAP121C	SAP122CH	SAP181C/182CH
OVERLOAD RELAY, COMPRESSOR					
OLR Model No.	MRA98675	MRA98735	MRA98693	MSTOOAKU	Internal Type
Temps. — Operating — Reset	293±9°F 156±20°F	311±9°F 156±20°F	329±9°F 156±20°F	275±9°F 156±20°F	302±9°F 189±20°F
Amps. at 77°F (Cold Start)	Operates within 6—16 sec. at 39.5 A	Operates within 6—16 sec. at 24 A	Operates within 6—16 sec. at 43 A	Operates within 6—16 sec. at 21 A	Operates within 6—16 sec. at 55 A
Amps. (Cold Start)	* ¹ Not operate for 30 min. at 15.8 A	* ¹ Not operate for 30 min. at 7.9 A	* ¹ Not operate for 30 min. at 29.8 A	* ¹ Not operate for 30 min. at 9.5 A	* ² Not operate for 30 min. at 18.5 A
Reset	Automatic	Automatic	Automatic	Automatic	Automatic

*¹ Reference value: measure at 176°F

*² Reference value: measure at 280°F

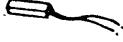
External Line Break Overload Relay

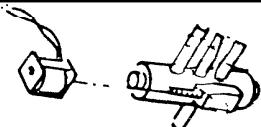


Unit Model No.	SAP91C/SAP121C	Figure
PTC Thermistor (for compressor starting)	PTH491A04AR470N500	
Resistance at 60°F (Ω)	47	

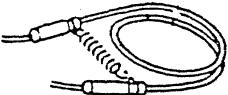
Unit Model No.	SAP91K/SAP121K/SAP92KH/ SAP122KH/SAP181K/SAP182KH	Figure
Room Temp. Sensor *1	OCS-5K	
Resistance (kΩ)	69°F: 6—6.5 77°F: 4.9—5.2 86°F: 3.9—4.2	Incorporated in the remote control unit.

Unit Model No.	SAP92KH/SAP122KH/SAP182KH	Figure
Indoor Coil Temp. Sensor *1	NTC-51H-S2	
Resistance (kΩ)	32°F: 186 ~ 177 50°F: 112 ~ 107 68°F: 70 ~ 67	86°F: 45 ~ 43 122°F: 20 ~ 19 140°F: 13.8 ~ 13.5

Unit Model No.	SAP92CH/SAP122CH/SAP182CH	Figure
Outdoor Coil Temp. Sensor *2	TRS02-12MSR	
Characteristics	OFF: 39°F ON: 54°F±4°F Diff: less than 14.4°F	

Unit Model No.	SAP92CH/SAP122CH/SAP182CH	Figure
4 Way Reversing Valve	L279072 (Coil) V269000 (Valve Ass'y)	
Coil voltage	230/208 V, 60 Hz	

Unit Model No.	SAP91K/SAP121K	SAP92KH/SAP122KH/ SAP181K/SAP182KH	Figure
Power Transformer (for controller PCB)	ATR-J121U1	ATR-J122U	
Resistance (Ω)	Primary: WHT—WHT 36.5 Secondary: BRN—BRN 1.2	Primary: WHT—WHT 143.5 Secondary: BRN—BRN 1.2	

Unit Model No.	SAP181C/SAP182CH	
Crankcase Heater	CH5700	
Rating	230 V, 30 W	

Unit Model No.	SAP182CH	
Starting Relay	V1 — 235172A	

Unit Model No.	SAP182CH	
Fixed Capacitor	160 V — 100 MFD	

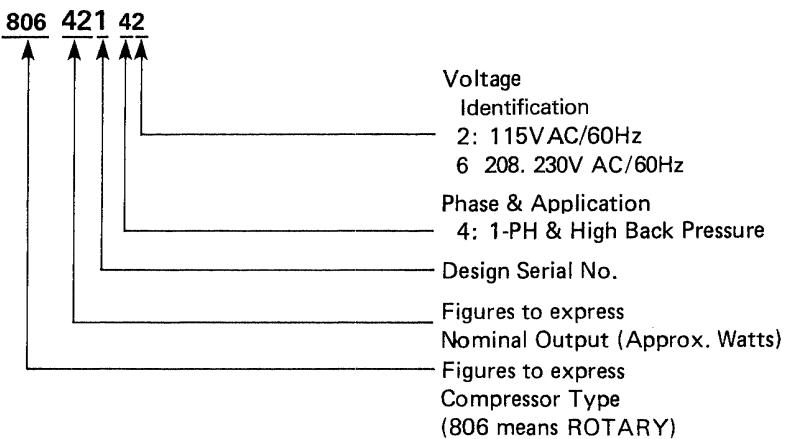
NOTES: *1 = Thermistor *2 = Lead Switch

1.3. Compressor Identification

1. Marking (Stamped)

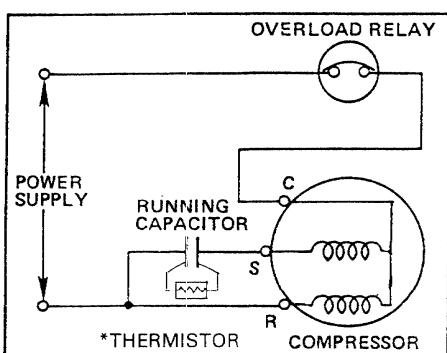
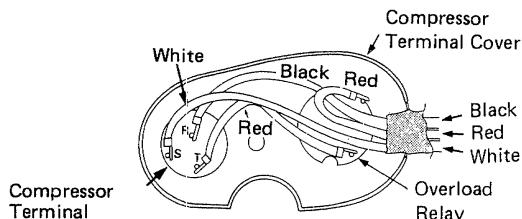
Compressor code No. → 806 421 42 Manufacturer: T = Tokyo
 Model No. → C -- R70H2V S = Sanyo
 E = Electric.
 Production Date → 30 01 7 ← (= 30 Jan., 1987)
 Ratings (V) → V115
 Frequency (Hz) and Phase → HZ60 PH1

2. Compressor Code No.

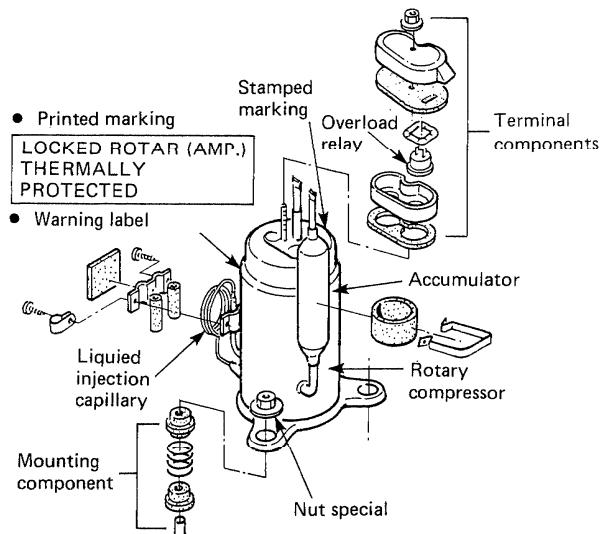


3. Compressor Wire Orientation

SAP91C/SAP92CH/SAP121C/SAP122CH



*THERMISTOR: SAP91C and SAP121C only



WARNING-SERVICEMAN

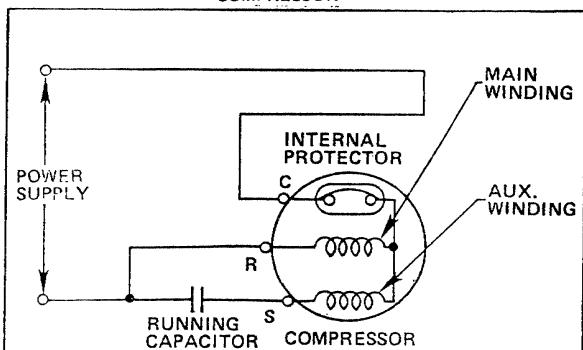
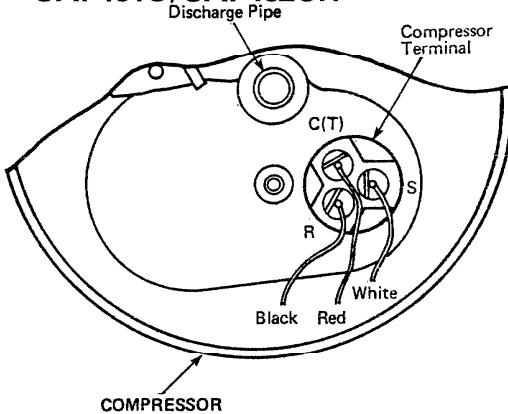
- FIELD SERVICE LEAK TEST PRESSURE MUST NOT EXCEED 150 P.S.I.G.
- THIS COMPRESSOR MUST BE GROUNDED.
- DO NOT OPERATE WITHOUT PROTECTIVE COVER OVER TERMINALS: DISCONNECT ALL POWER BEFORE REMOVING THE PROTECTIVE COVER

CAUTION

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

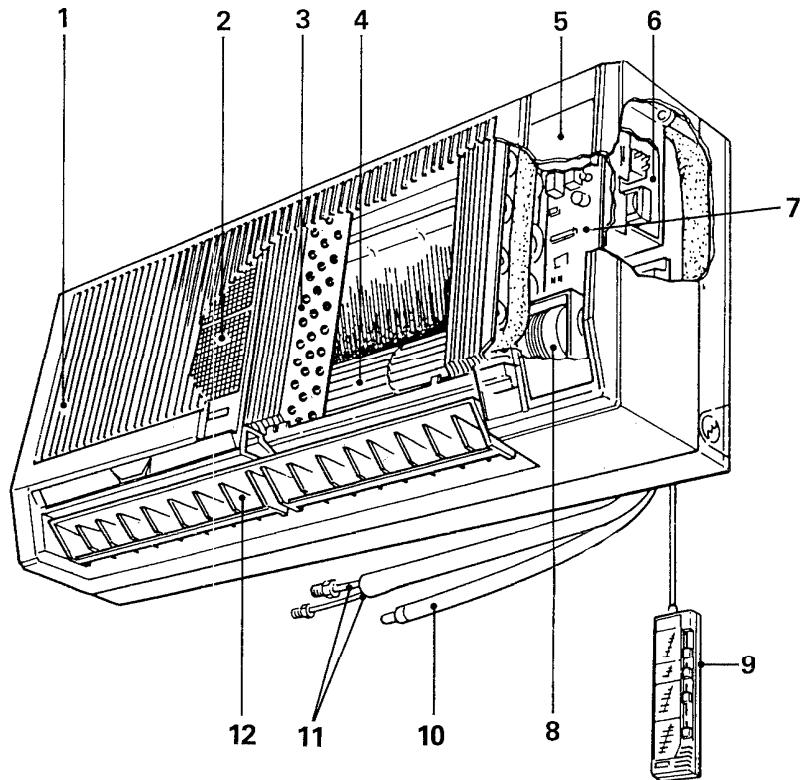
TOKYO SANYO ELECTRIC CO.,LTD.

SAP181C/SAP182CH



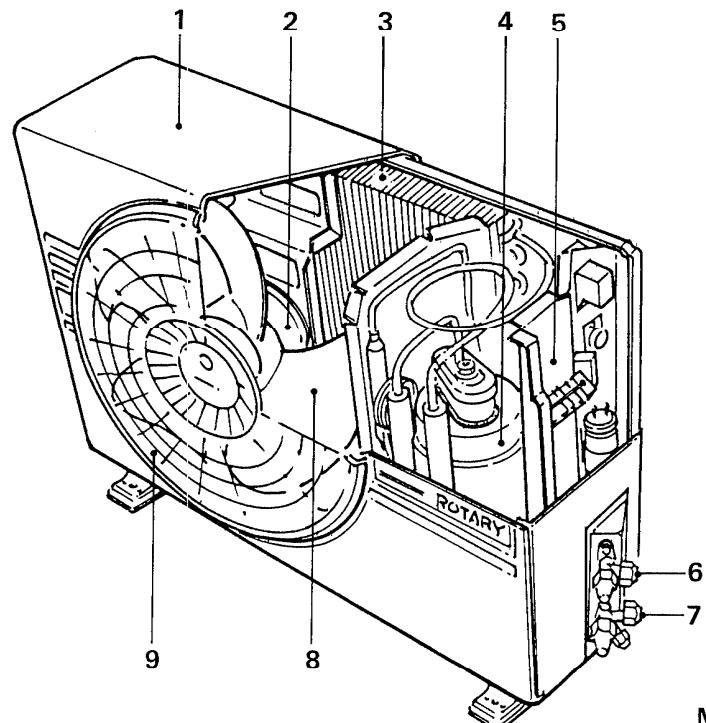
2. CONSTRUCTION OF THE UNIT

INDOOR UNIT SAP91K/SAP121K



1. Air intake
2. Air filter (slide-out)
3. Evaporator (=Indoor heat exchanger)
4. Indoor Fan
5. Casing
6. Electrical component box
7. Controller PCB
8. Fan motor
9. Remote control unit
10. Drain hose
11. Refrigerant piping
12. Air outlet

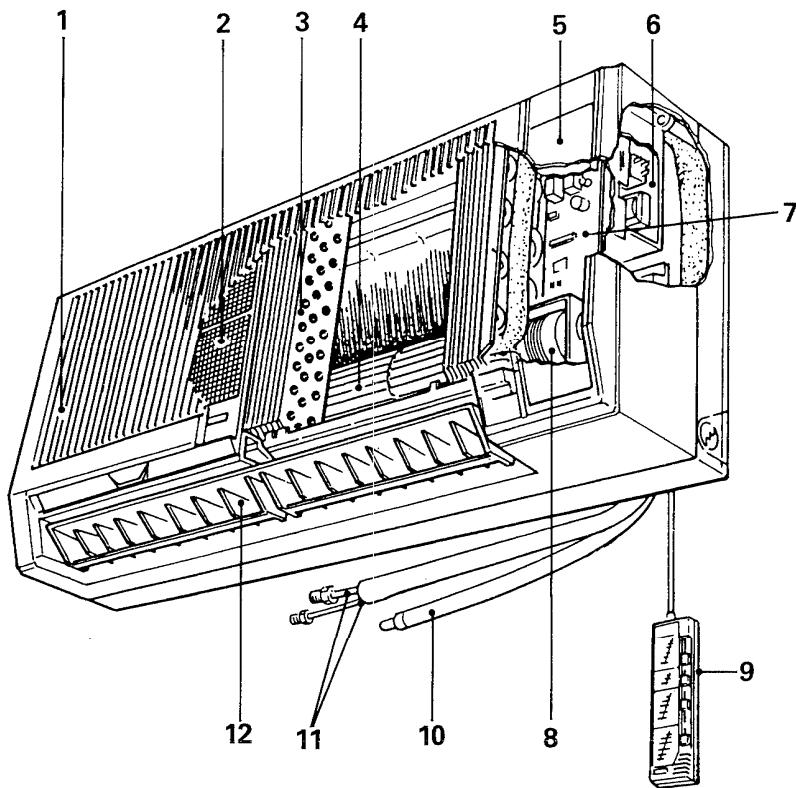
OUTDOOR UNIT SAP91C/SAP121C/SAP92CH/SAP122CH



1. Cabinet
2. Fan motor
3. Condenser(= Outdoor heat exchanger)
4. Compressor
5. Electrical component box
6. Service valve (Narrow pipe)
7. Service valve (Wide pipe)
8. Outdoor fan
9. Fan guard

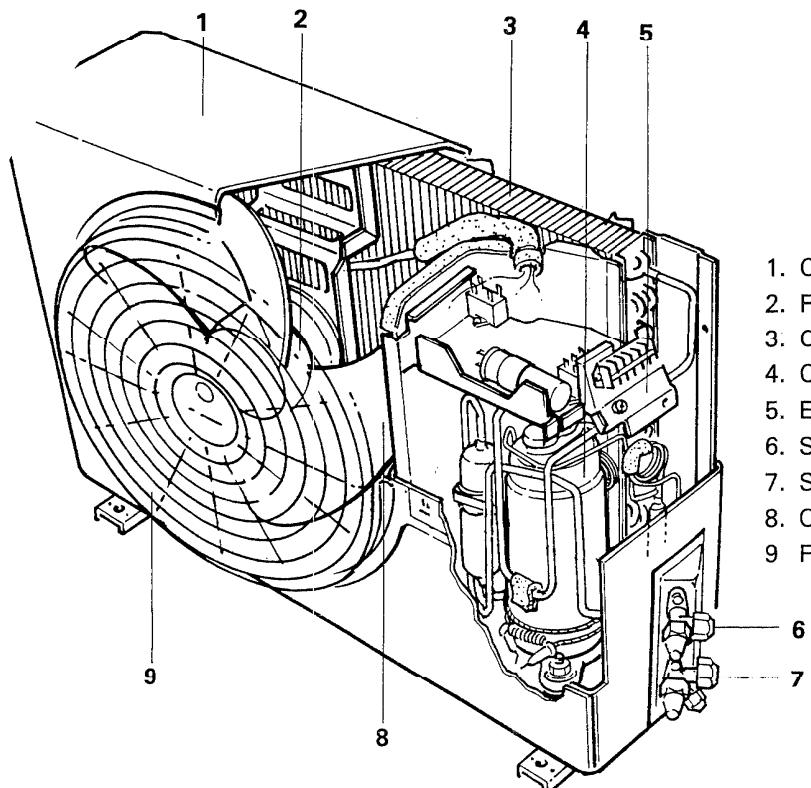
Model: SAP91C/SAP121C

INDOOR UNIT SAP181K



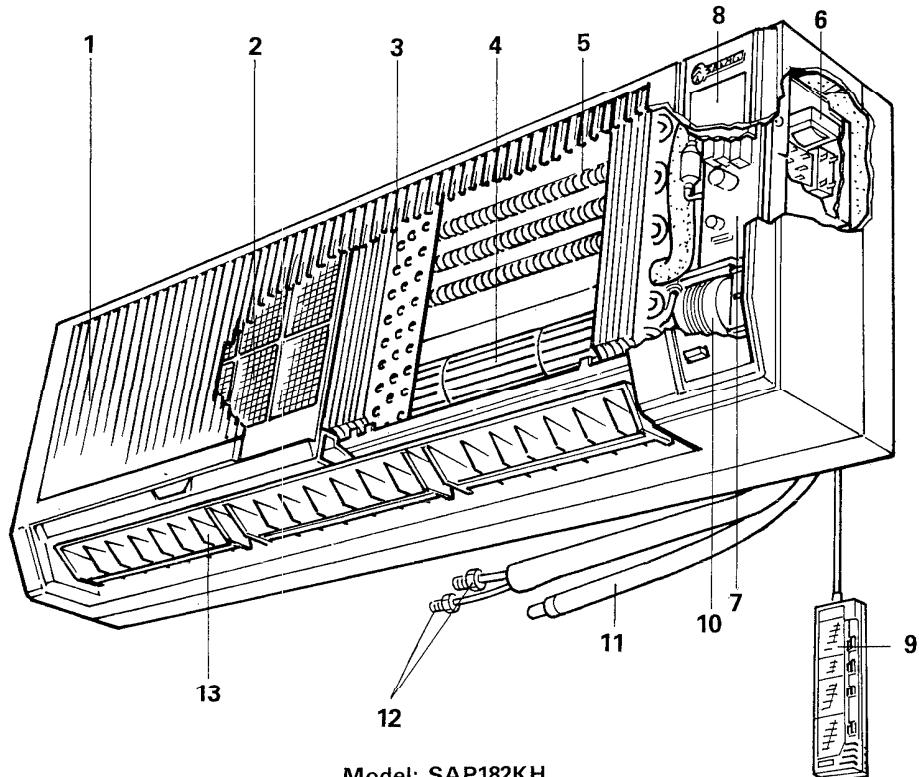
1. Air intake
2. Air filter (slide-out)
3. Evaporator (= Indoor heat exchanger)
4. Indoor Fan
5. Casing
6. Electrical component box
7. Controller PCB
8. Fan motor
9. Remote control unit
10. Drain hose
11. Refrigerant piping
12. Air outlet

OUTDOOR UNIT SAP181C



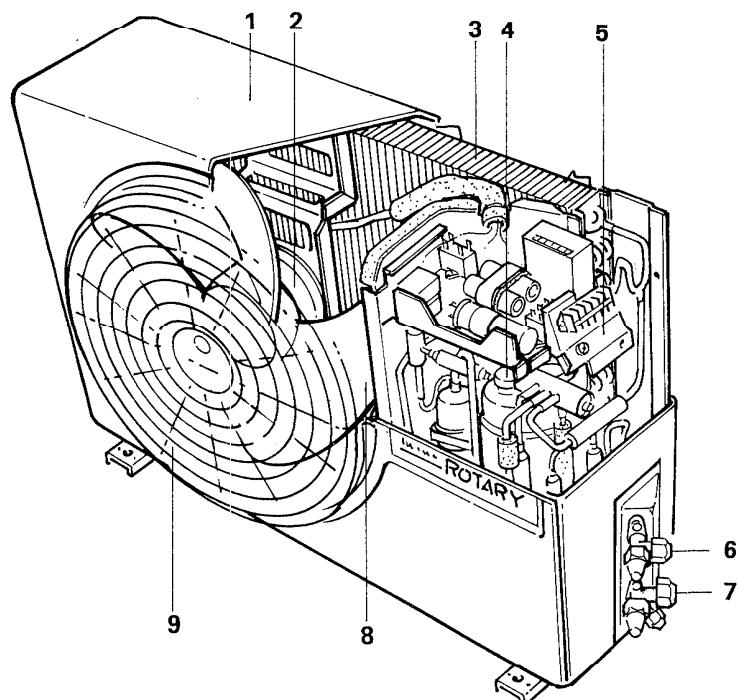
1. Cabinet
2. Fan motor
3. Condenser (= Outdoor heat exchanger)
4. Compressor
5. Electrical component box
6. Service valve (Narrow pipe)
7. Service valve (Wide pipe)
8. Outdoor fan
9. Fan guard

INDOOR UNIT SAP92KH/SAP122KH/SAP182KH



Model: SAP182KH

OUTDOOR UNIT SAP182CH

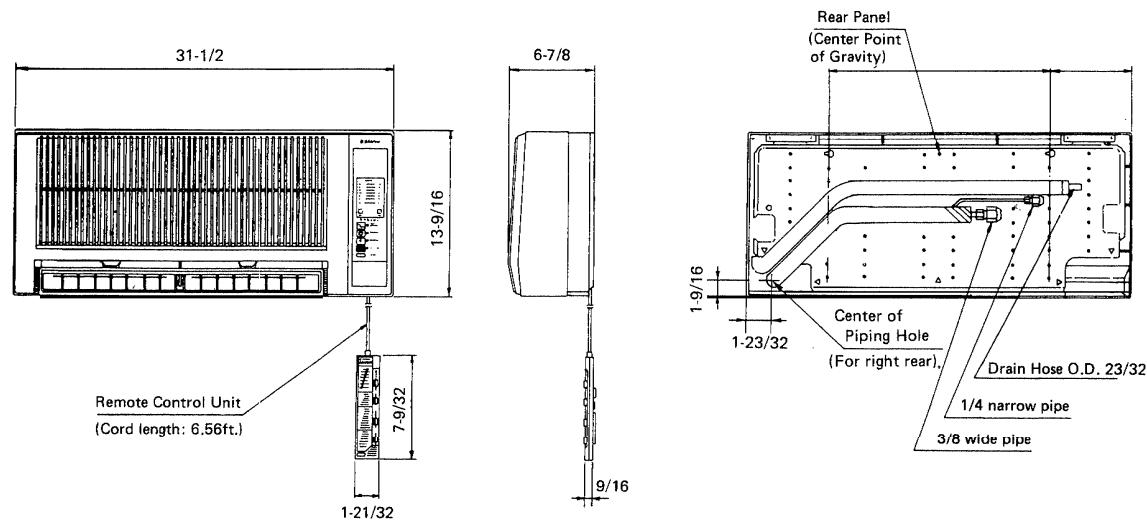


1. Casing
2. Fan motor
3. Condenser (= Outdoor heat exchanger)
4. Compressor
5. Electrical component box
6. Service valve (Narrow pipe)
7. Service valve (Wide pipe)
8. Outdoor fan
9. Fan guard

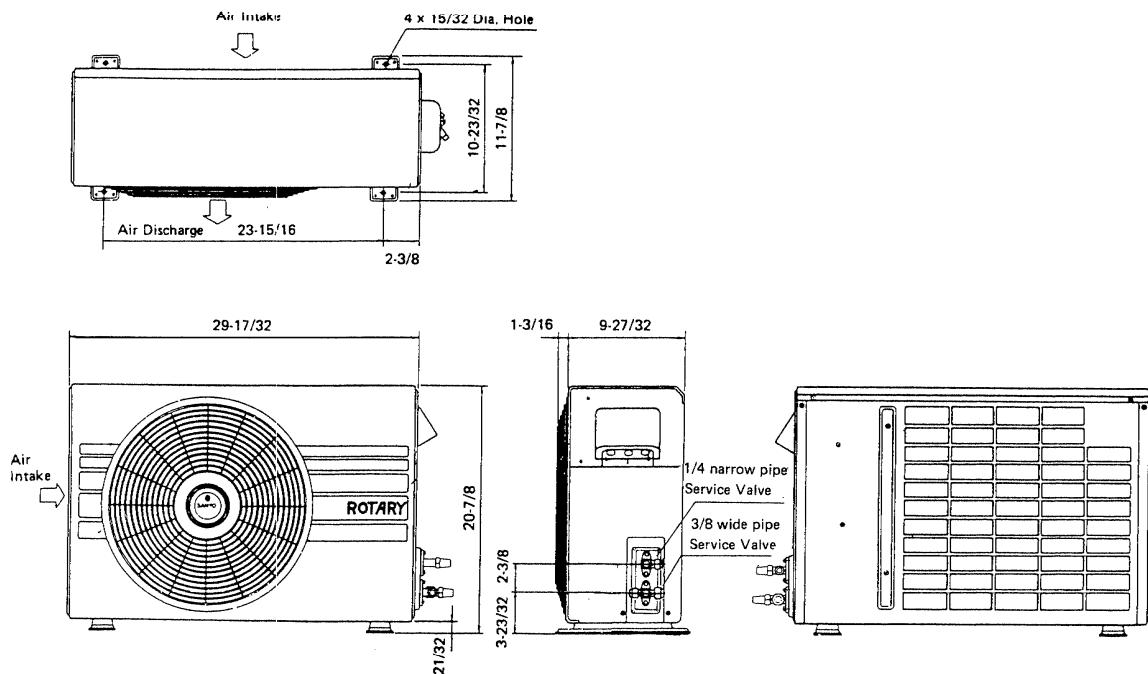
3. DIMENSIONAL DATA

Dimensions

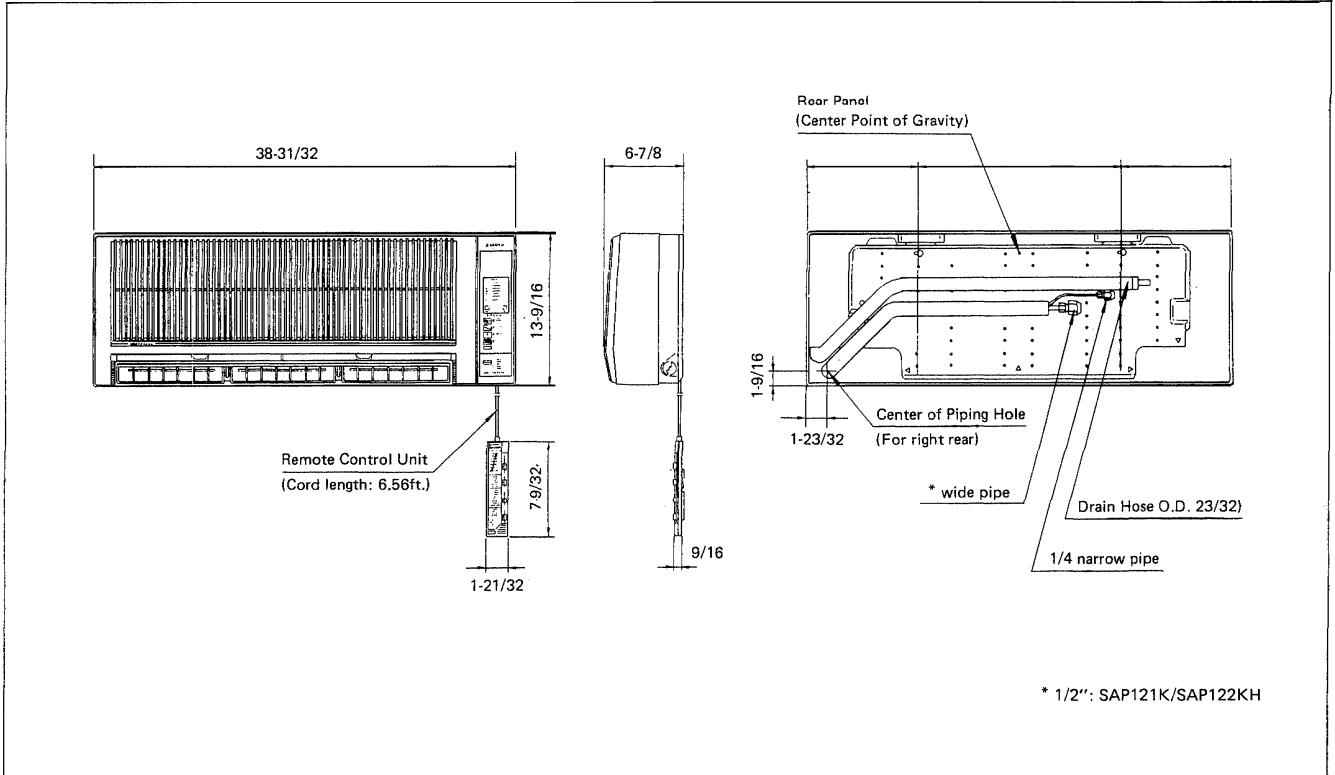
Indoor Unit SAP91K/SAP92KH



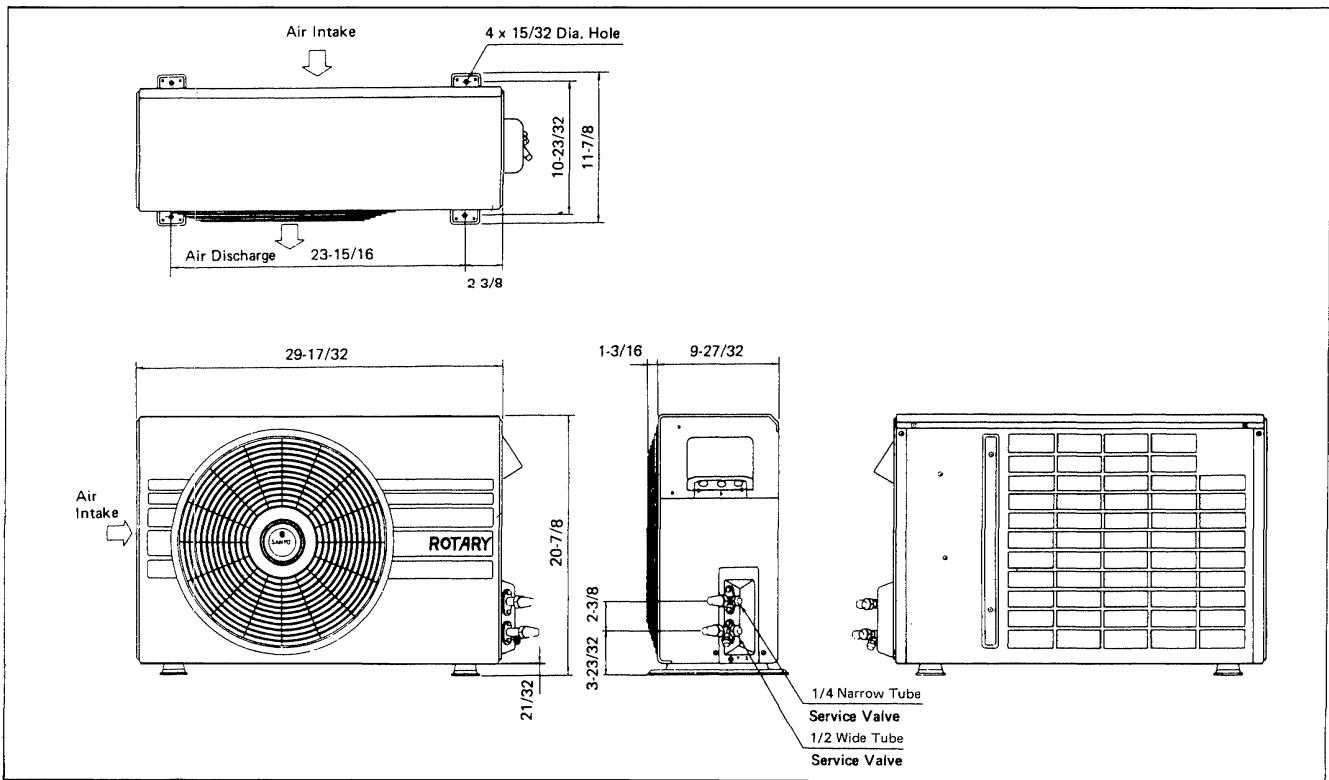
Outdoor Unit SAP91C/SAP92CH



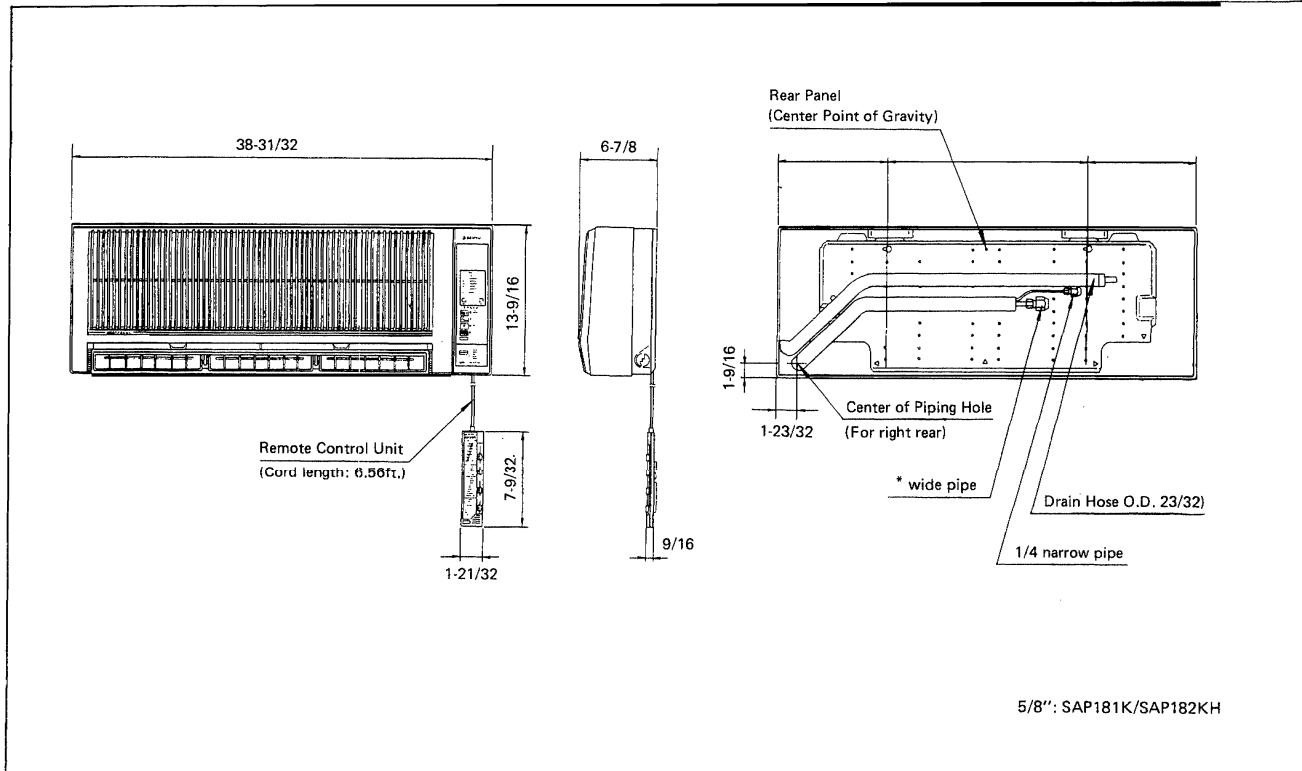
Indoor Unit SAP121K/SAP122KH



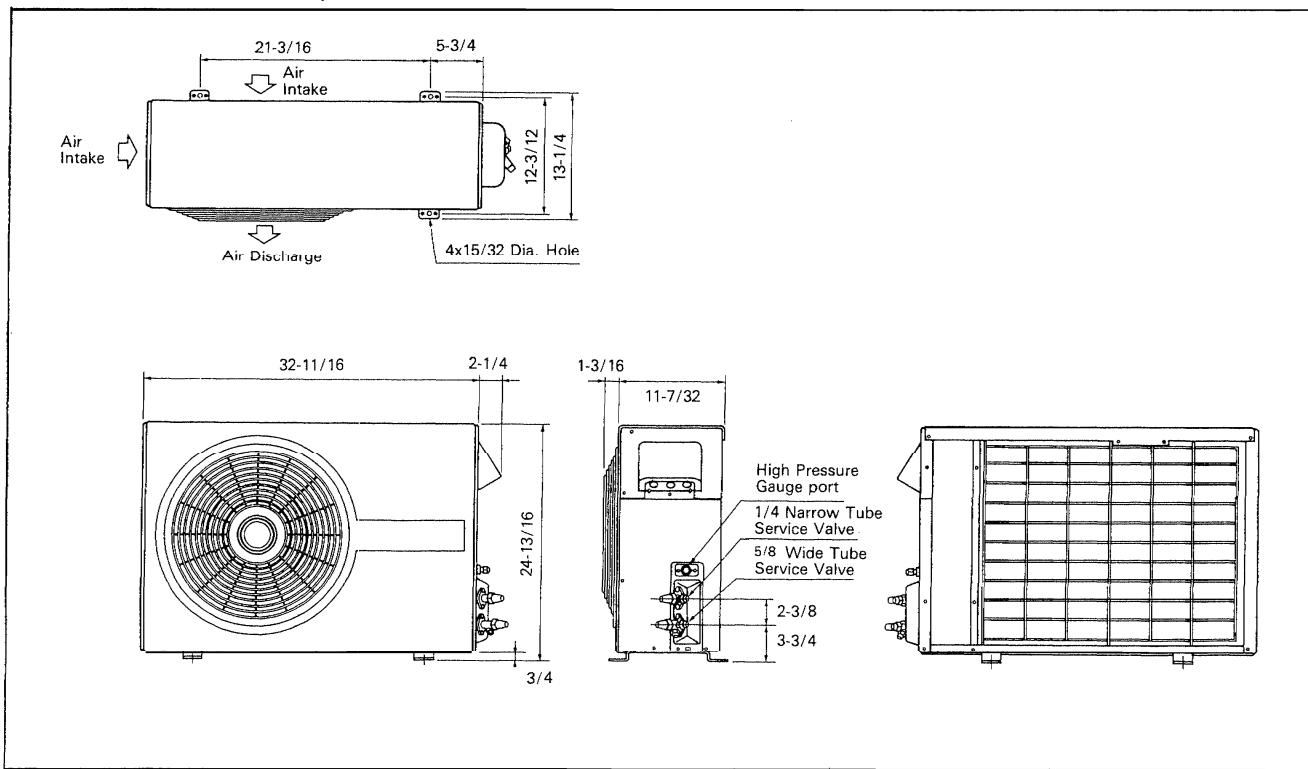
Outdoor Unit SAP121C/SAP122CH



Indoor Unit SAP181K/SAP182KH



Outdoor Unit SAP181C/182CH



4. PERFORMANCE CHARTS

NOTES:

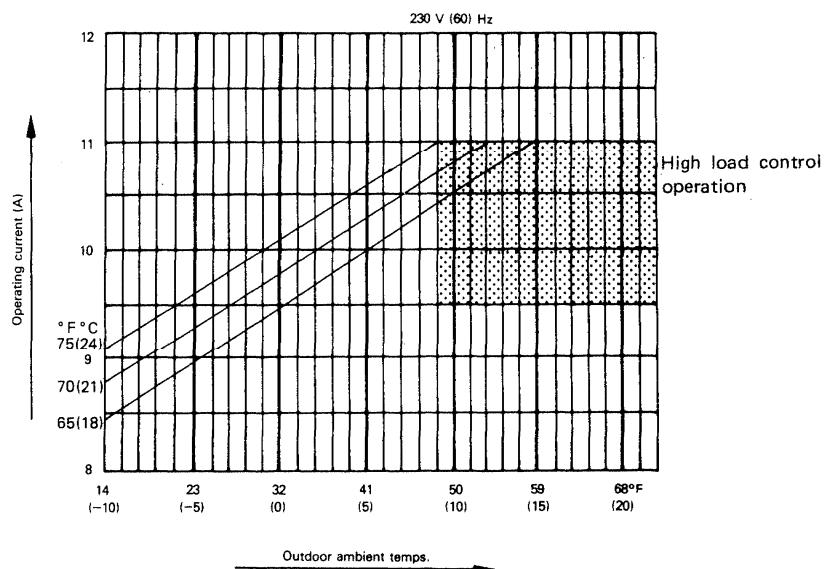
1. Heater

Current required for the heater is given in the table below.

Model	230 V	208 V
SAP92KCH	4.35 A	3.93 A
SAP122KCH	6.52	5.90
SAP182KCH	7.83	7.08

2. High load prevention mechanism

* Applicable for SAP92KCH/SAP122KCH/SAP182KCH.
Below chart shows an example of SAP182KCH.



- 1) The shaded part indicates ON/OFF operation status for the outdoor fan by operation of the high load prevention function, and current and pressure vary over this width.
- 2) Please note that the characteristics of the shaded part may vary somewhat.

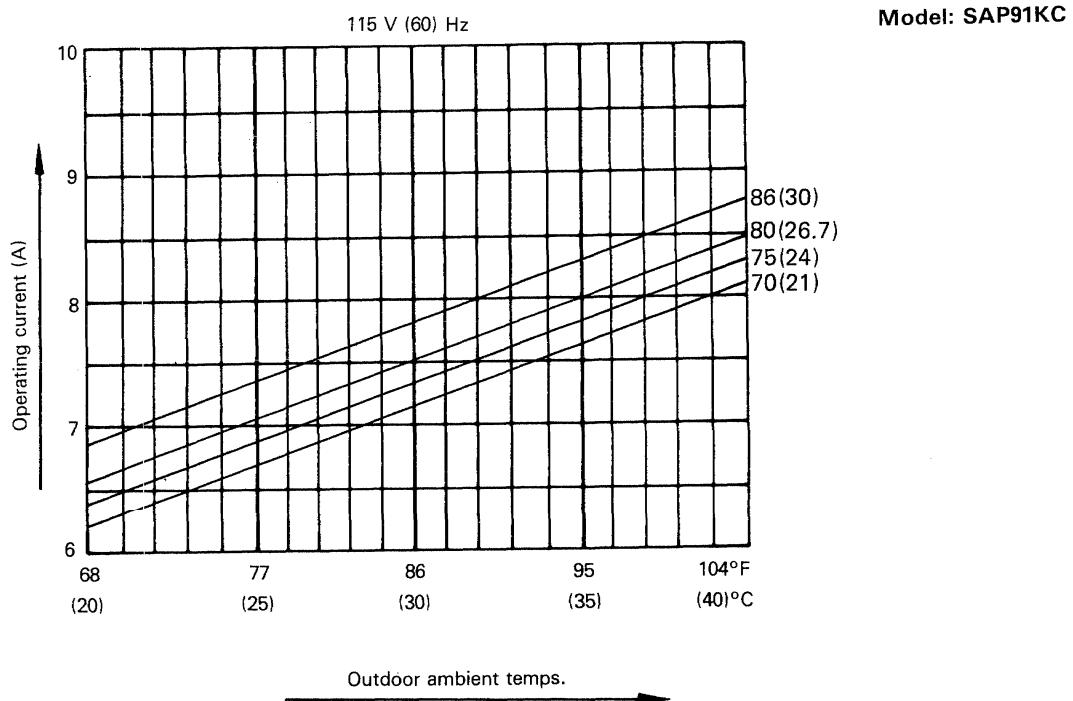
3. Outdoor fan speed

* Applicable for SAP181C/SAP182CH

In low temperature area, the outdoor fan speed is automatically adjusted to LOW in order to prevent freezing of the outdoor coil.

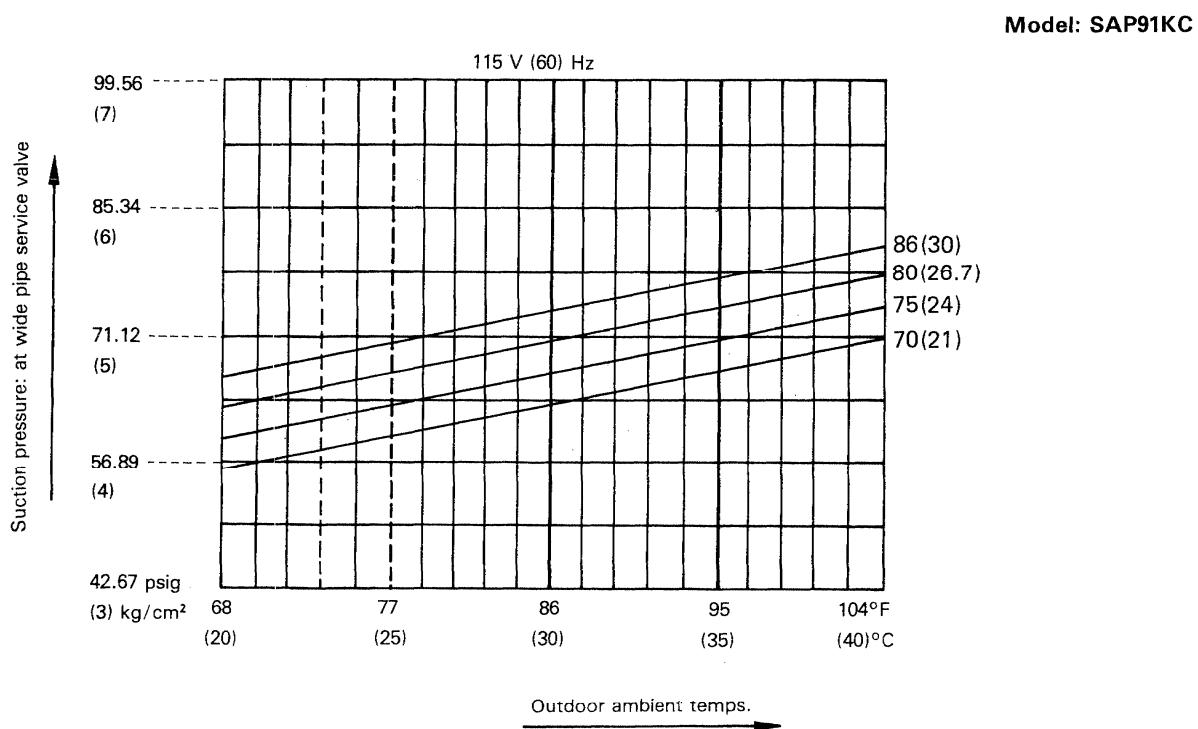
Cooling characteristics

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

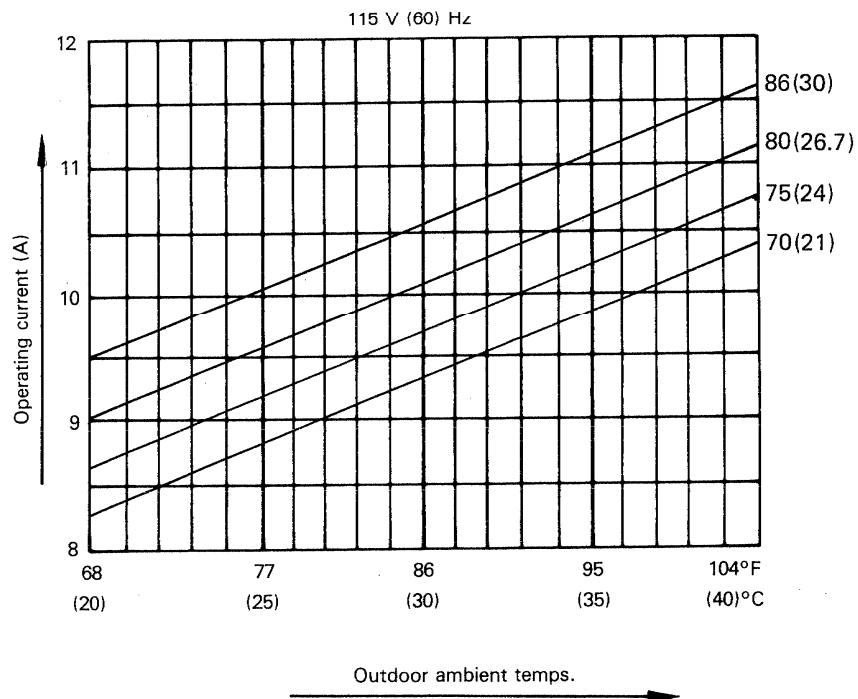
Low pressure characteristics versus outdoor ambient temperature and indoor temperature
(Indoor relative humidity: 50%, indoor air velocity: High.)



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.)

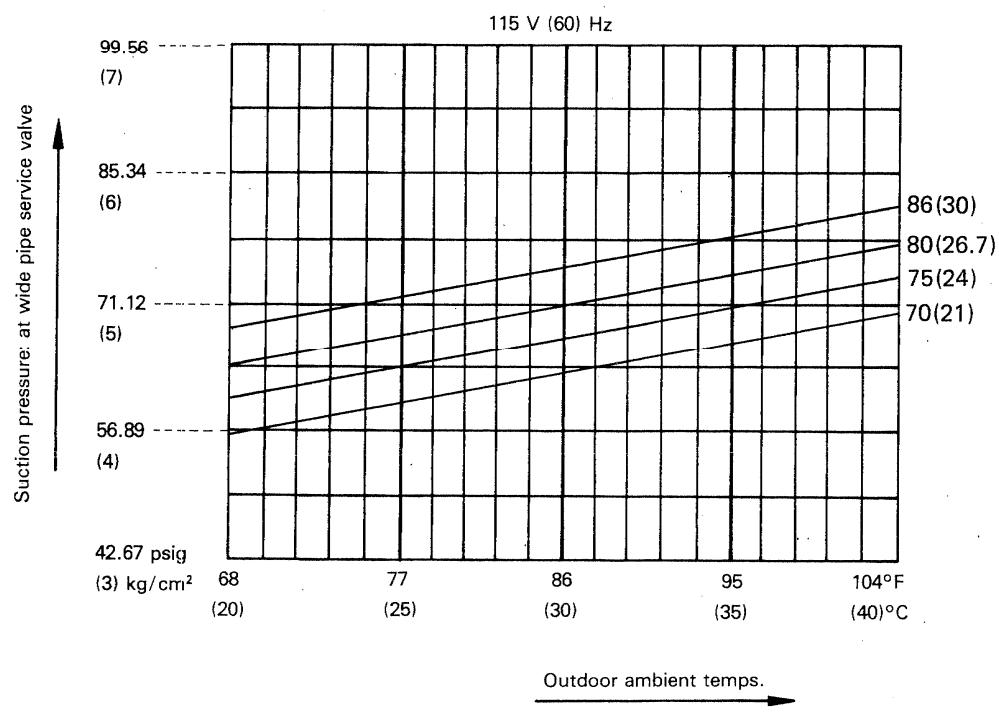
Model: SAP121KC



Cooling characteristics

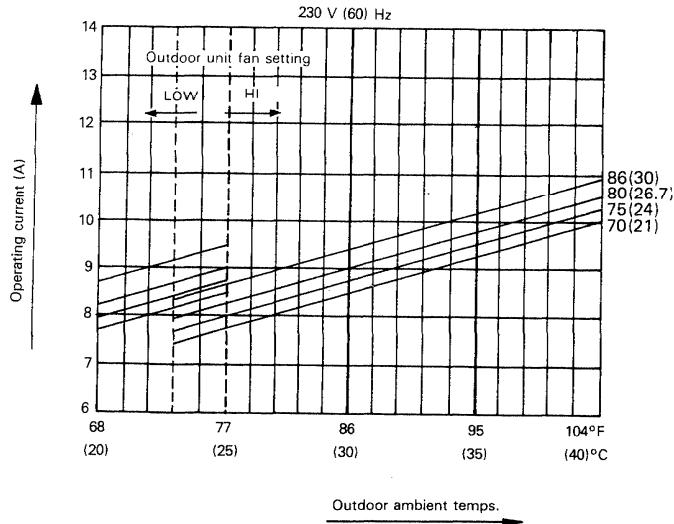
Low pressure characteristics versus outdoor ambient temperature and indoor temperature
(Indoor relative humidity: 50%, indoor air velocity: High.)

Model: SAP121KC



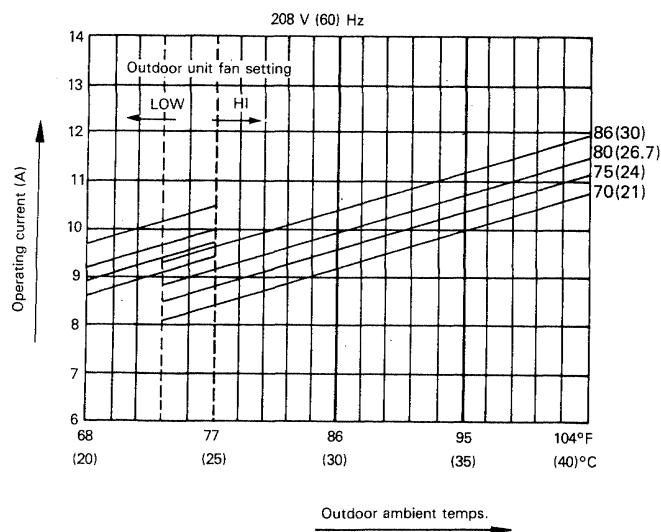
Cooling characteristics Model: SAP181KC

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.)



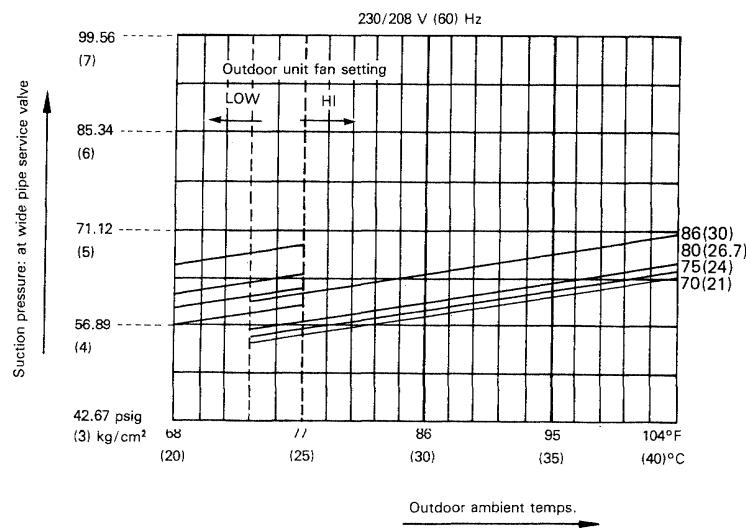
Cooling characteristics Model: SAP181KC

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.)



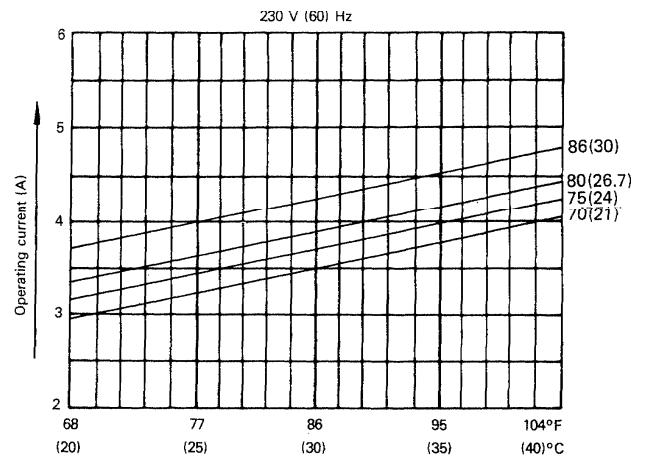
Cooling characteristics Model: SAP181KC

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



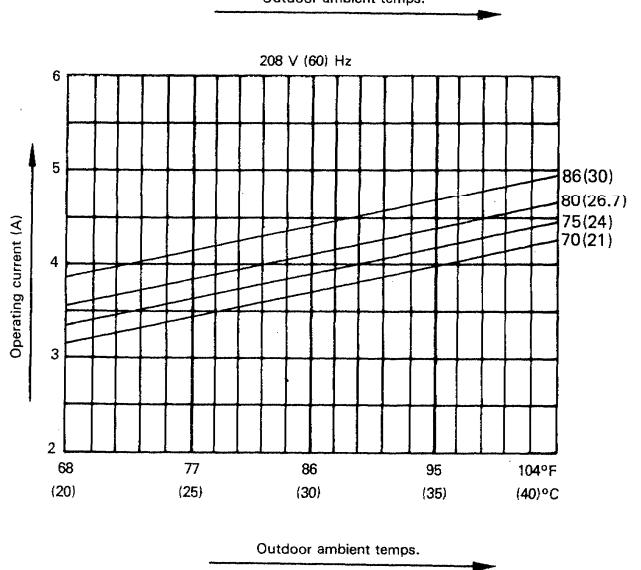
Cooling characteristics Model: SAP92KCH

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.)



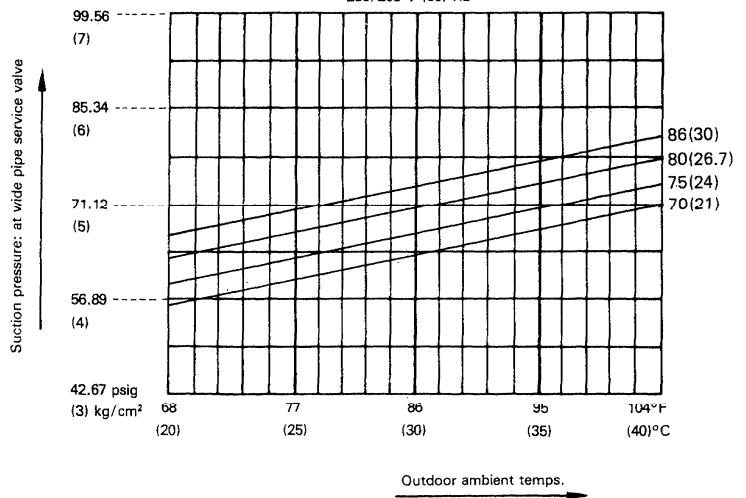
Cooling characteristics Model: SAP92KCH

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 Model: SAP92KCH

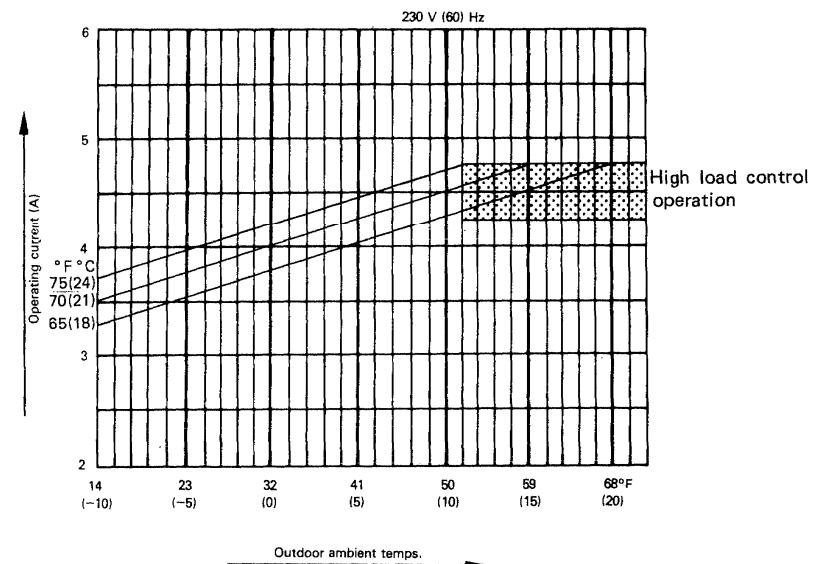
Low pressure characteristics versus outdoor ambient temperature and indoor temperature
(Indoor relative humidity: 50%, indoor air velocity: High.)



Heating characteristics Model: SAP92KCH

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

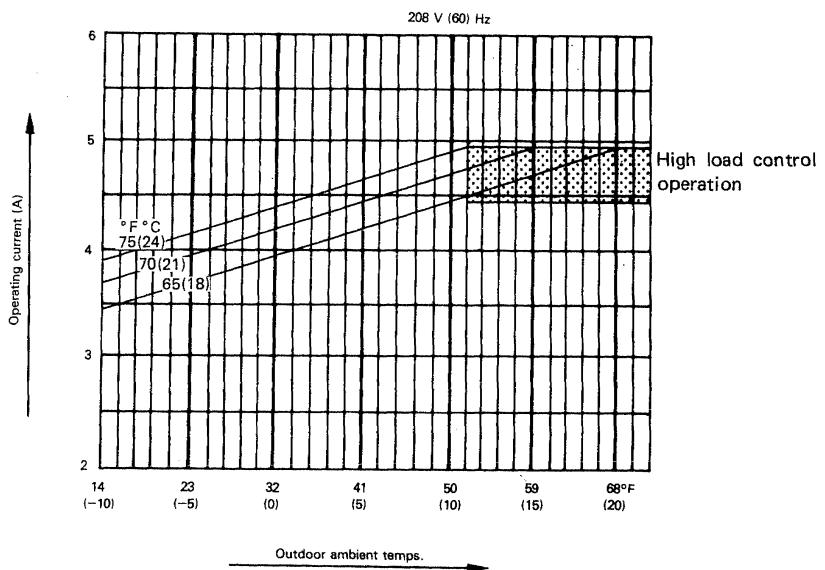
(However, the heater shall be excluded.)



Heating characteristics Model: SAP92KCH

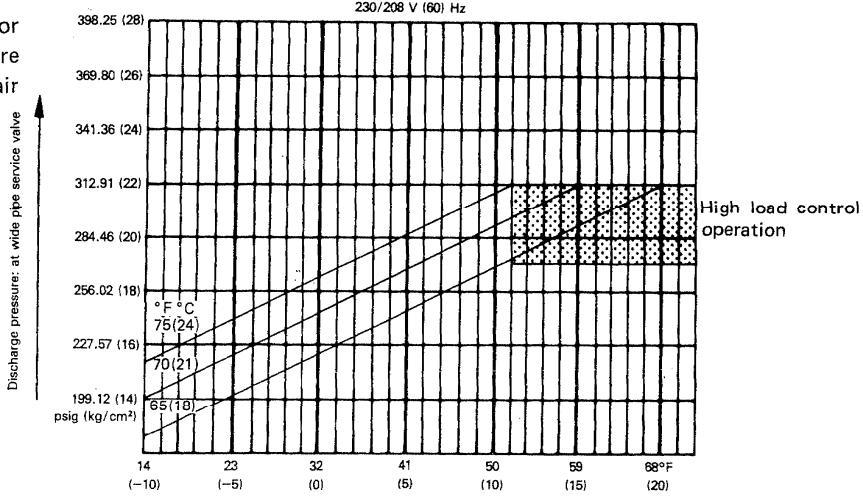
Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 75%, indoor air velocity: High, overall value for indoor and outdoor shown.)

(However, the heater shall be excluded.)



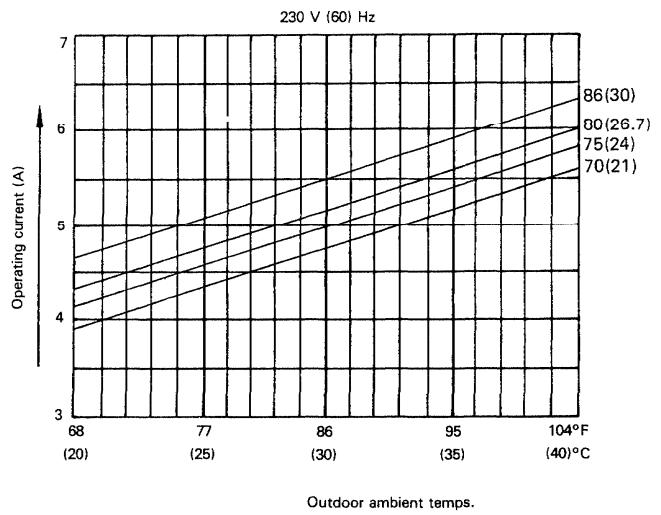
Heating characteristics Model: SAP92KCH

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



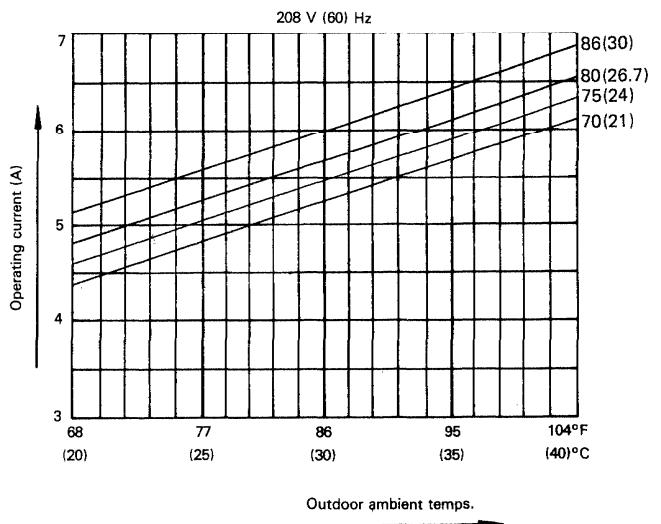
Cooling characteristics Model: SAP122KCH

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.)



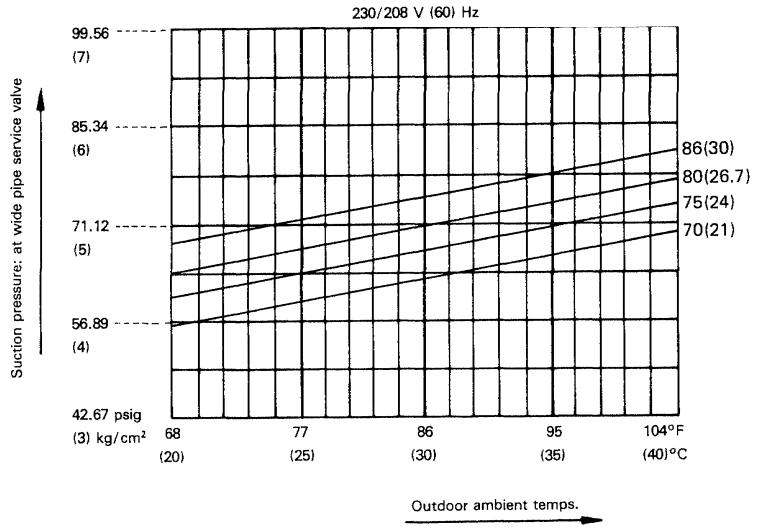
Cooling characteristics Model: SAP122KCH

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 Model: SAP122KCH

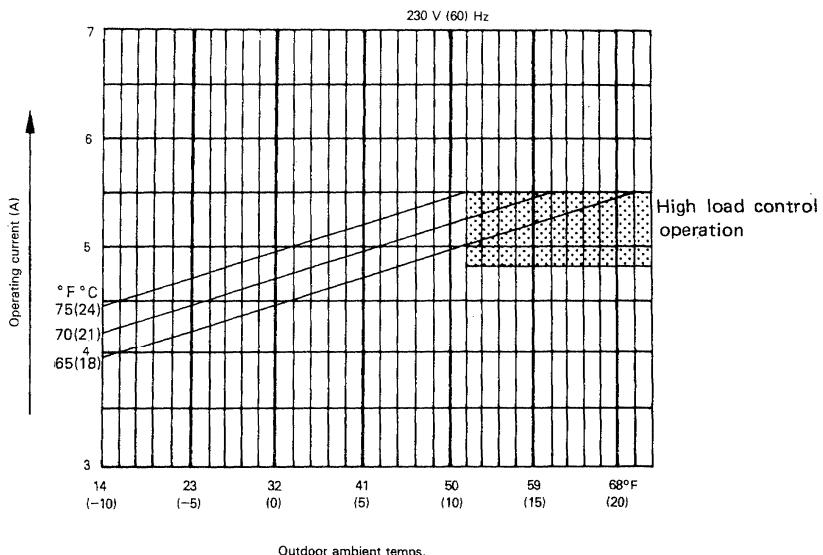
Low pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High.)



Heating characteristics Model: SAP122KCH

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

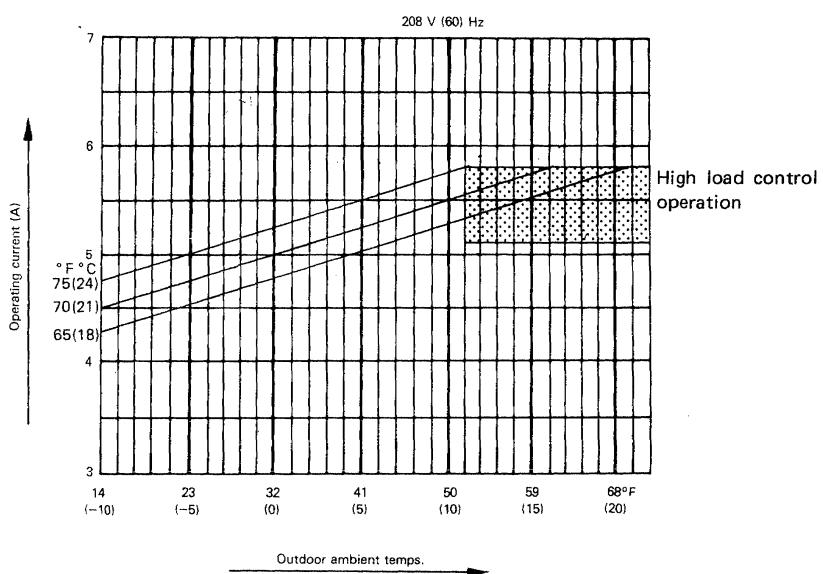
(However, the heater shall be excluded.)



Heating characteristics Model: SAP122KCH

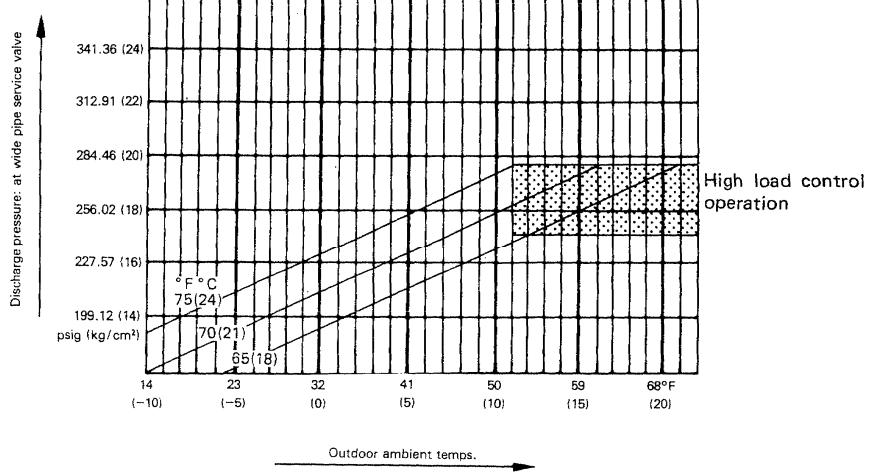
Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 75%, indoor air velocity: High, overall value for indoor and outdoor shown.)

(However, the heater shall be excluded.)



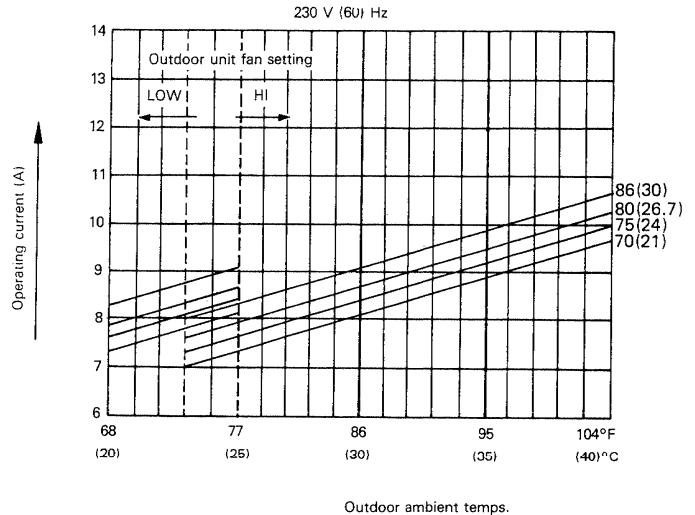
Heating characteristics Model: SAP122KCH

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



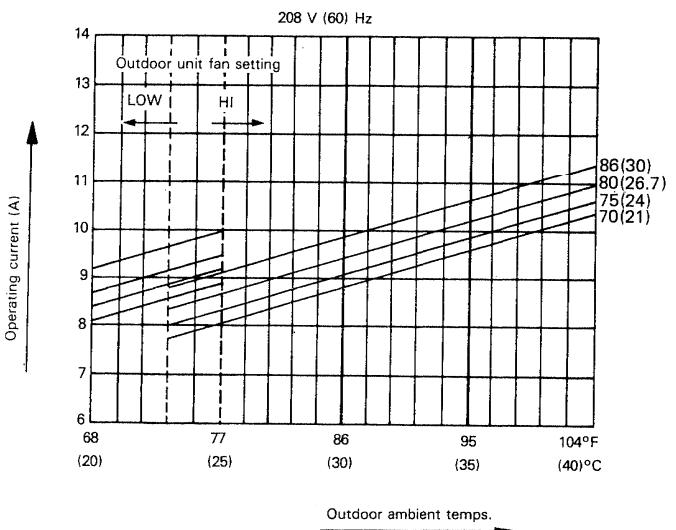
Cooling characteristics Model: SAP182KCH

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.)



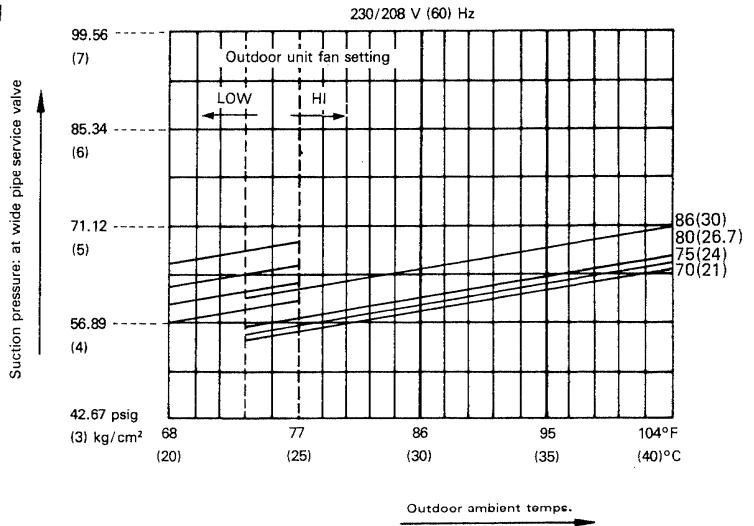
Cooling characteristics Model: SAP182KCH

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 Model: SAP182KCH

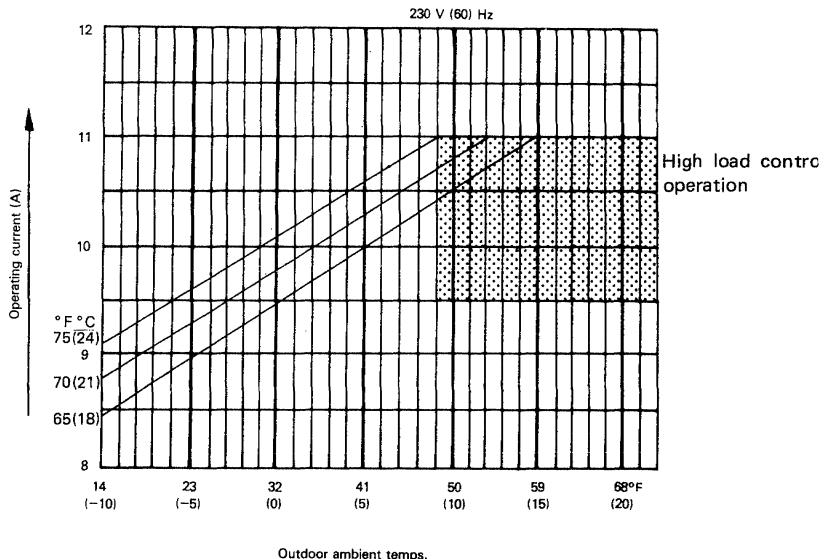
Low pressure characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 50%, indoor air velocity: High.)



Heating characteristics Model: SAP182KCH

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

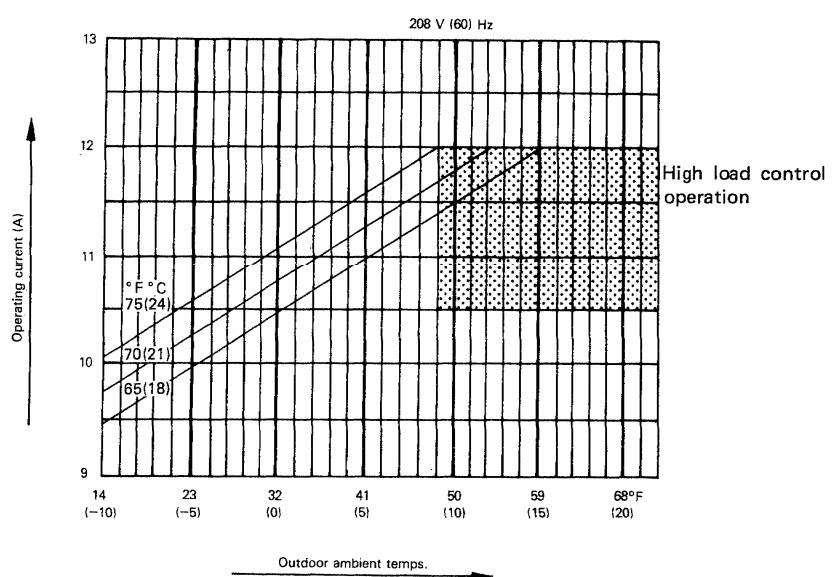
(However, the heater shall be excluded.)



Heating characteristics Model: SAP182KCH

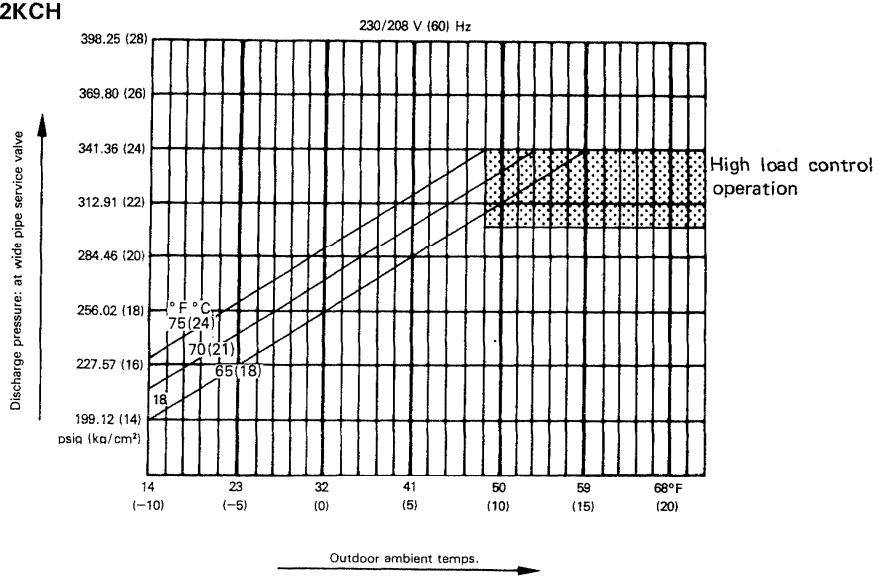
Operating current characteristics versus outdoor ambient temperature and indoor temperature (Indoor relative humidity: 75%, indoor air velocity: High, overall value for indoor and outdoor shown.)

(However, the heater shall be excluded.)



Heating characteristics Model: SAP182KCH

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



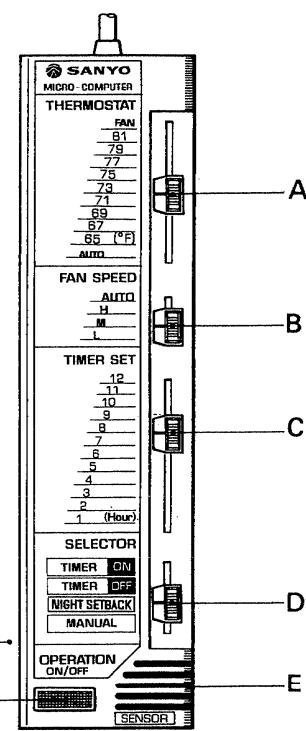
5. OPERATING INSTRUCTIONS (Cooling Only)

1. CONTROL UNIT

SAP91KC

SAP121KC

SAP181KC



A. THERMOSTAT

You can regulate room temperature to the desired comfort level by adjusting this lever. For fan operation without cooling move lever to "FAN".

B. FAN SPEED

Choose either AUTO matic speed selection or High, Medium or Low.

C. TIMER SET

Used to set hours of air conditioner running time.

D. SELECTOR

TIMER ON

TIMER OFF

NIGHT SET BK

MANUAL

* For detailed function of each position, see pages 29 and 30.

E. TEMPERATURE SENSOR

Electronically senses the room temperature and feeds data to the micro-computer.

F. OPERATION ON/OFF

This button starts and stops the air conditioner.

G. TEST RUN (Left side)

Set the lever to this position only when performing a test cooling operation.

Never leave the lever in this position. Otherwise, the evaporator coil may freeze up.

CAUTION:

Do not set a selector lever between two indicate positions. It must click into position.

2. MONITOR PANEL

TEMPERATURE SCALE

OPERATION LAMP

This lamp is lit when the unit is operating.

SAVING MODE LAMP

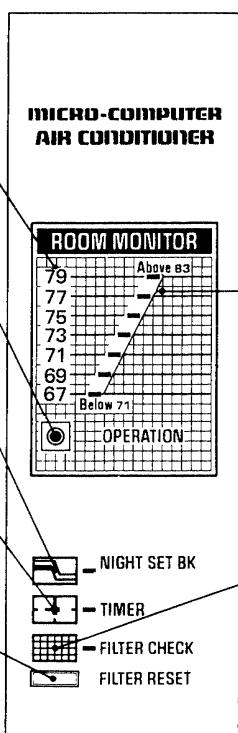
This lamp is lit when the unit is operating with the NIGHT SET BK (BACK) Feature selected.

TIMER LAMP

This lamp is lit when the unit is operating with the TIMER on.

FILTER RESET BUTTON

When the FILTER RESET button is pressed, the FILTER CHECK lamp goes off. And begins to record usage time.



ROOM TEMPERATURE GUIDE LAMPS

These lamps indicate the approx. room temperature where the control unit is installed.

NOTE:

When the room temperature is 79°F or over, the "79" lights. When the room temperature is 67°F or less, the "67" lights.

FILTER CHECK LAMP

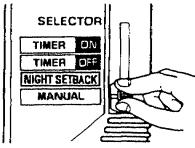
When lamp is lit, the air filter must be cleaned.

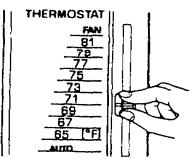
NOTE:

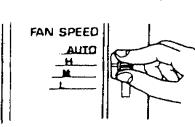
- When power is supplied to the unit, FILTER CHECK lamp is lit. After checking the condition of the filter and cleaning it if needed, depress the FILTER RESET button.
- FILTER CHECK lamp is also lit when power is interrupted. To turn off the lamp, depress FILTER RESET button.

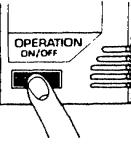
■ How to start air conditioner

(Manual cooling operation)

- 1** Set the SELECTOR lever to "MANUAL" position.


- 2** Set the THERMOSTAT lever to the desired temperature.


- 3** Set the FAN SPEED selector lever to either "AUTO", "High(H)", "Medium(M)", or "Low(L)" position.


- 4** Depress the OPERATION button.


■ How to stop

Depress the OPERATION button again to stop the air conditioner.

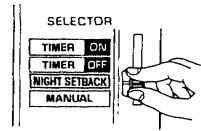
CAUTION:

When room temperature is lower than the set temperature, only the indoor fan will operate. If you want the unit to operate in the cooling mode, turn the thermostat lever towards the "65" direction.

When the operation button is depressed to start the unit, the outdoor unit will not start operating for three minutes to protect compressor from overloading. Thereafter, it will start operating normally.

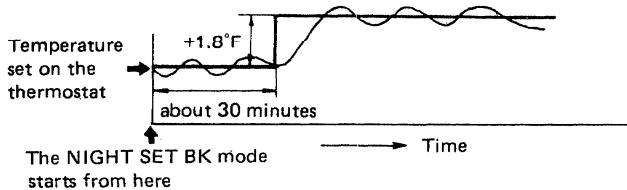
■ NIGHT SET BK operation

Set the SELECTOR lever to "NIGHT SET BK" position.



Next depress the OPERATION button.

(The NIGHT SET BK lamp and OPERATION lamp will light up.)



- In the NIGHT SET BK mode, once the thermostat is turned OFF, the temperature setting of the thermostat will automatically rise 1.8°F within 30 minutes. When the thermostat turns the compressor off, the fan will stop within 30 seconds so as to save power.

NOTE:

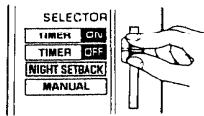
In NIGHT SET BK mode, indoor fan stops 30 seconds after the compressor is shut down. At the start of compressor, indoor fan follows immediately.

■ TIMER operation

a. SET OFF mode

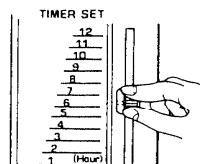
At the set time, operation will stop.

- Set SELECTOR lever to the "TIMER OFF" position.



- Set the TIMER SET lever to the desired time.

(When the timer is set at "6" as shown in the illustration at the right, the air conditioner will stop operation six hours later.)

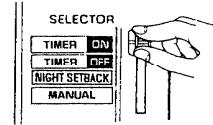


- Depress the OPERATION button.
(The TIMER lamp and OPERATION lamp will light up.)

b. SET ON mode

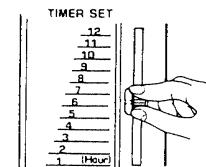
At the set time, operation will start.

- Set SELECTOR lever to the "TIMER ON" position.



- Set the TIMER SET lever to the desired time.

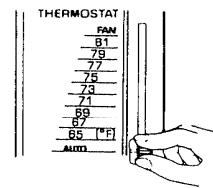
(When the timer is set at "6" as shown in the illustration at the right, the air conditioner will start operation six hours later.)



- Depress the OPERATION button.
(Only the TIMER lamp will light up.)

■ Setting the thermostat for AUTOMATIC operation

When you set the THERMOSTAT lever at the "AUTO" position, depending on the room temperature at the time of the setting, the temperature will automatically be set at:



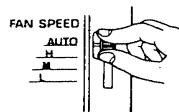
Room temperature when the unit starts	Setting temperature (Automatic)
81°F and over	75°F
Between 81 and 75°F	73°F
Below 75°F	71°F

Note: If you want the unit to operate lower than 71°F, use MANUAL selector and adjust THERMOSTAT lever.

■ FAN SPEED control

1. Automatic control of FAN SPEED

Set the FAN SPEED selector to "AUTO" position.



When fan speed is set at AUTO, the unit automatically decides the fan speed by the room temperature and the setting of thermostat.

The relationship between temperature conditions and fan speed are as shown below:

When difference between room temperature and set temperature is	FAN SPEED
3.6°F and over	High
Between 3.6 and 1.8°F	Medium
Below 1.8°F	Low

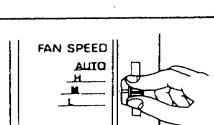
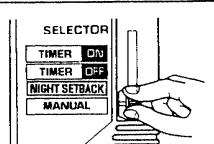
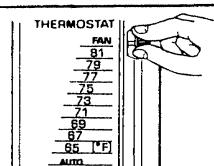
2. Manual control of FAN SPEED (Cooling Operation)

For rapid cooling of a room, set fan speed to High until desired comfort level is reached.

For continuous draft free operation set speed at Low or Medium.

3. Manual control of FAN SPEED (Fan only operation)

- Set the THERMOSTAT lever to "FAN" position.
- Set the SELECTOR lever to "MANUAL" position.
- Set the FAN SPEED to the desired level.
- Depress the OPERATION button.



Air Flow Direction Adjustment

1. Adjustment in vertical direction

The air flow can be regulated in the vertical direction as follows:

Hold at both ends of the flap and move it up or down as required.

During cooling operation, be sure to set the flap at position 1 or 2 for cooling.

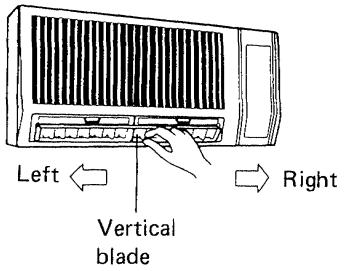
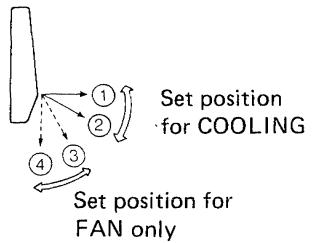
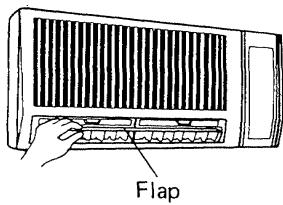
CAUTION:

- If the flap is set at position "3" or "4", condensation may form near the air outlet grille and drip on the floor.
- We recommend that position "3" or "4" be used only when the air conditioner is operating in the FAN mode.

2. Adjustment in horizontal direction

The air flow can be regulated in the horizontal direction as follows:

Move the vertical blades with fingers either left or right.



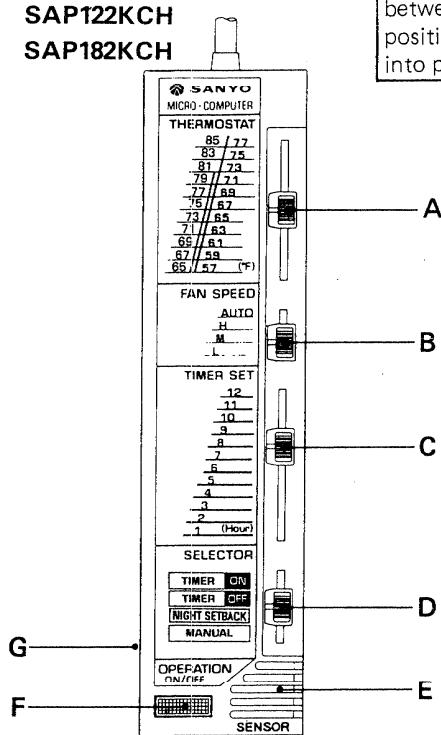
OPERATING INSTRUCTIONS (Heat Pump)

1. CONTROL UNIT

SAP92KCH

SAP122KCH

SAP182KCH



CAUTION:

Do not set a selector lever between two indicated positions. It must click into position.

A. THERMOSTAT

You can regulate room temperature to the desired comfort level by adjusting this lever. For fan operation without cooling move lever upward as far as it goes.

B. FAN SPEED

Choose either AUTOrmatic speed selection or High, Medium or Low.

C. TIMER SET

Used to set hours of air conditioner running time.

D. SELECTOR

TIMER ON	} *For detailed function of each position, see pages 33, 34 and 35.
TIMER OFF	
NIGHT SET BK	

MANUAL

E. TEMPERATURE SENSOR

Electronically senses the room temperature and feeds data to the micro-computer.

F. OPERATION ON/OFF

This button starts and stops the air conditioner.

G. TEST RUN (Left side)

Set the lever to this position only when performing a test cooling operation (or a test heating operation).

CAUTION:

Never leave the lever in this position. Otherwise, the evaporator coil may freeze up in cooling (overload condition of compressor may result in heating).

2. MONITOR PANEL

TEMPERATURE SCALE

COOLING OPERATION LAMP

This lamp is lit when the unit is operating in COOLING mode.

SAVING MODE LAMP

This lamp is lit when the unit is operating with the NIGHT SET BK (BACK) Feature selected.

TIMER LAMP

This lamp is lit when the unit is operating with the TIMER on.

FILTER CHECK LAMP

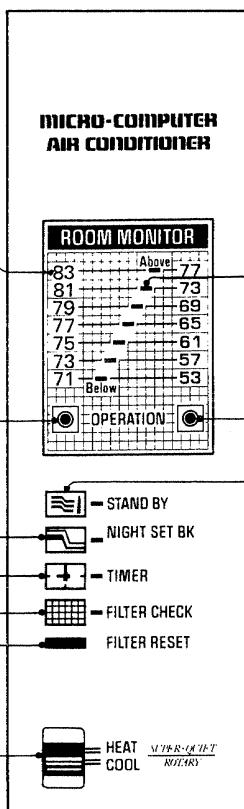
When lamp is lit, the air filter must be cleaned. → See NOTE at right.

FILTER RESET BUTTON

When the FILTER RESET button is pressed, the FILTER CHECK lamp goes off. And begins to record usage time.

COOLING/HEATING SELECTOR

This is used to select either cooling or heating operation.



ROOM TEMPERATURE GUIDE LAMPS

These lamps indicate the approx. room temperature where the control unit is installed.

HEATING OPERATION LAMP

This lamp is lit when the unit is operating in HEATING mode.

STAND BY LAMP

This lights up in the following conditions:

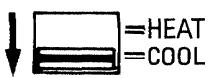
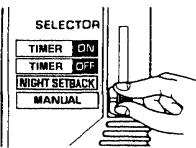
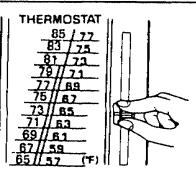
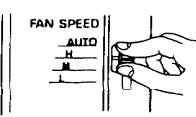
- At the start of heating (until heat exchanger coil becomes warm).
- While the thermostat stops compressor in heating mode.
- While the defrosting system is working.

NOTE:

- When power is supplied to the unit, FILTER CHECK lamp is lit. After checking the condition of the filter, and cleaning it if needed, depress the FILTER RESET button.
- FILTER CHECK lamp is also lit when power is interrupted. To turn off the lamp, depress FILTER RESET button.

■ How to start air conditioner

(Manual cooling operation)

- 1** Set the COOLING/HEATING selector lever to "COOL" side.

- 2** Set the SELECTOR lever to "MANUAL" position.

- 3** Set the THERMOSTAT lever to the desired temperature.

- 4** Set the FAN SPEED selector lever to either "AUTO", "High(H)", "Medium(M)", or "Low(L)" position.

- 5** Depress the OPERATION button.


■ How to stop

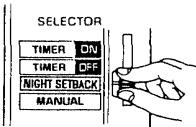
Depress the OPERATION button again to stop the air conditioner.

CAUTION:

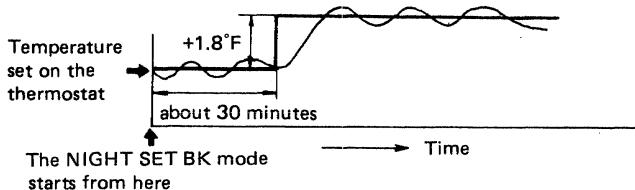
When room temperature is lower than the set temperature, only the indoor fan will operate. If you want the unit to operate in the cooling mode, turn the thermostat lever towards the "65" direction.

When the operation button is depressed to start the unit, the outdoor unit will not start operating for three minutes to protect compressor from overloading. Thereafter, it will start operating normally.

■ NIGHT SET BK operation

Set the SELECTOR lever to "NIGHT SET BK" position.


Next depress the OPERATION button.
(The NIGHT SET BK lamp and OPERATION lamp will light up.)



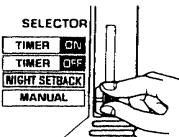
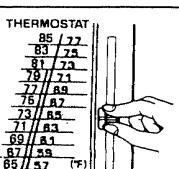
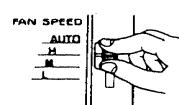
- In the NIGHT SET BK mode, once the thermostat is turned OFF, the temperature setting of the thermostat will automatically rise 1.8°F within 30 minutes. When the thermostat turns the compressor off, the fan will stop within 30 seconds so as to save power.

NOTE:

In NIGHT SET BK mode, indoor fan stops 30 seconds after the compressor is shut down. At the start of compressor, indoor fan follows immediately.

■ How to start air conditioner
(Manual heating operation)

- 1 Set the COOLING/HEATING selector lever to "HEAT" side.

- 2 Set the SELECTOR lever to "MANUAL" position.

- 3 Set the THERMOSTAT lever to the desired temperature.

- 4 Set the FAN SPEED selector lever to either "AUTO", "High(H)", Medium(M)" position.

- 5 Depress the OPERATION button.


■ How to stop

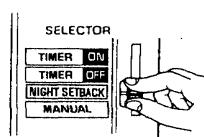
Depress the OPERATION button again to stop the air conditioner.

CAUTION:

When room temperature is higher than the set temperature, only the indoor fan will operate. If you want the unit to operate in the heating mode, turn the thermostat lever towards the "77" direction.

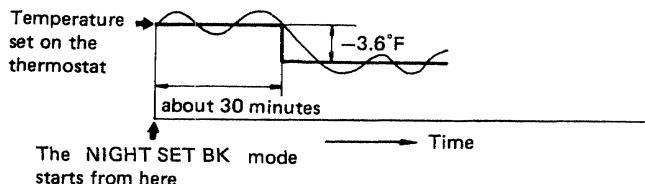
When the operation button is depressed to start the unit, the outdoor unit will not start operating for three minutes to protect compressor from overloading. Thereafter, it will start operating normally.

■ NIGHT SET BK operation

Set the SELECTOR lever to "NIGHT SETBK" position.


Next depress the OPERATION button.

(The NIGHT SET BK lamp and OPERATION lamp will light up.)



- In the NIGHT SET BK mode, once the thermostat is turned OFF, the temperature setting of the thermostat will automatically fall 3.6°F within 30 minutes.

When the thermostat turns the compressor off, the fan will stop within 30 seconds so as to save power.

NOTE:

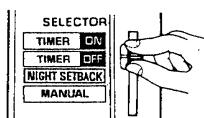
In NIGHT SET BK mode, indoor fan stops 30 seconds after the compressor is shut down. At the start of compressor, indoor fan follows immediately.

■ TIMER operation

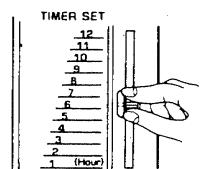
a. SET OFF mode

At the set time, operation will stop.

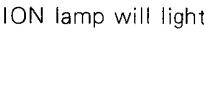
- Set SELECTOR lever to the "TIMER OFF" position.



- Set the TIMER SET lever to the desired time.
(When the timer is set at "6" as shown in the illustration at the right, the air conditioner will stop operation six hours later.)



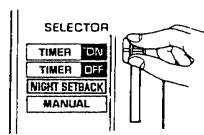
- Depress the OPERATION button.
(The TIMER lamp and OPERATION lamp will light up.)



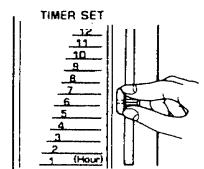
b. SET ON mode

At the set time, operation will start.

- Set SELECTOR lever to the "TIMER ON" position.



- Set the TIMER SET lever to the desired time.
(When the timer is set at "6" as shown in the illustration at the right, the air conditioner will start operation six hours later.)



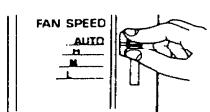
- Depress the OPERATION button.
(Only the timer lamp will light up.)



■ FAN SPEED control

1. Automatic control of FAN SPEED

Set the FAN SPEED selector to "AUTO" position.



When fan speed is set at AUTO, the unit automatically decide the most suited fan speed by the room temperature and the setting of thermostat. The relationship between temperature conditions and fan speed are as shown below:

COOLING

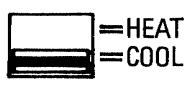
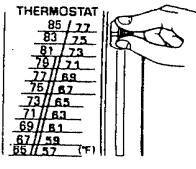
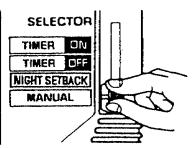
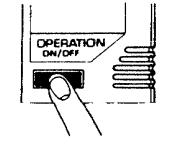
When difference between room temperature and set temperature is	FAN SPEED
3.6°F and over	High
Between 3.6 and 1.8°F	Medium
Below 1.8°F	Low

HEATING

When difference between room temperature and set temperature is	FAN SPEED
1.8°F and over	High
Below 1.8°F	Medium

2. Manual control of FAN SPEED

(Fan only operation)

- Set the COOLING/HEATING SELECTOR lever to "COOL" side.

- Set the THERMOSTAT lever at the extreme upward position.

- Set the SELECTOR lever to "MANUAL" position.

- Depress the OPERATION button.


■ HEATING PERFORMANCE

- Because this air conditioner heats a room by drawing in the heat of the outside air (heat pump system), the heating efficiency will fall off as the outdoor temperature is reduced greatly. When sufficient heating is unavailable with this air conditioner, use other heating appliances in conjunction with this unit.

■ AUTOMATIC ELECTRIC HEATER CONTROL

- The electric heater turns on when the room temperature is 1.8°F lower than the thermostat setting temperature.
- The electric heater will be turned off when the room temperature becomes the setting temperature.

■ MICROCOMPUTER DEFROSTING (in heating)

- When the outdoor temperature is low, frost will be formed on the heat exchanger coil, reducing the heating performance. When this happens, a microcomputer defrosting system operates automatically and reverses the flow of warm refrigerant to the coil. At the same time the indoor fan stops its operation and the standby lamp keeps glowing until completion of defrosting. Heating operation restarts automatically in several minutes. (Interval for recovery may vary with outdoor temperatures and condition of frost forming). This is the normal operating sequence.

■ WHEN STAND BY LAMP GLOWS

- For the initial several minutes after the start of heating operation, indoor fan will not start running until indoor heat exchanger coil is warmed up sufficiently. This is because COLD DRAFT PREVENTION SYSTEM is working. During this period STAND BY LAMP is kept glowing.
- STAND BY LAMP glows during defrosting and compressor is turned off with function of the thermostat in heating mode.
- Upon completion of the above conditions, STAND BY LAMP is turned off automatically.

Air Flow Direction Adjustment

1. Adjustment in horizontal direction

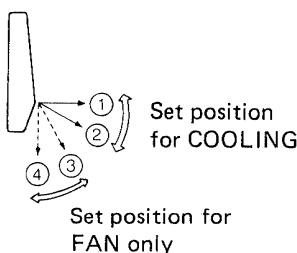
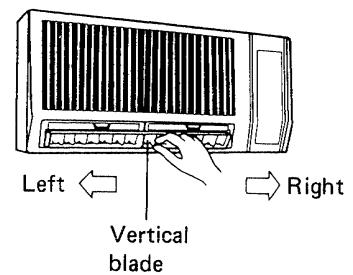
The air flow can be regulated in the horizontal direction as follows:
Move the vertical blades with fingers in either left or right.

2. Adjustment in vertical direction

The air flow can be regulated in the vertical direction as follows:
Hold at both ends of the flap and move it up or down as required.

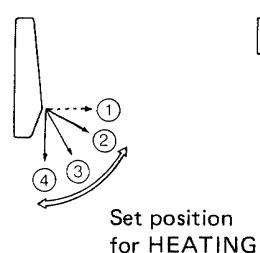
During cooling operation: be sure to set the flap at position for cooling.

During heating operation: be sure to set the flap at position for heating.



CAUTION

- If the flap is set at position "3" or "4", condensation may form near the air outlet grille and drip on the floor.
- We recommend that position "3" or "4" be used only when the air conditioner is operating in the FAN mode.



CAUTION

- Set flap position within the range ② to ④ for the effective heating.

6. INSTALLATION INSTRUCTIONS (Cooling Only)

—Split System Air Conditioner—

SAP91KC
SAP121KC
SAP181KC

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1. GENERAL

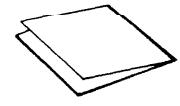
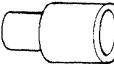
Here is a brief outline of where and how to install the unit. Please read over entire set of instructions for indoor and outdoor units and make sure all accessory parts listed are with the unit before beginning.

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

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

- | | |
|-----------------------------|------------------------|
| • Common Screwdriver | • Pipe Cutter |
| • Phillips head screwdriver | • Pipe flaring tool |
| • Knife or wire stripper | • Torque wrench |
| • Level | • Adjustable Wrench |
| • Tape measure | • Reamer or Small File |

1-2. Accessories Supplied with Unit for Installation

Parts	Figure	Q'ty	Parts	Figure	Q'ty	
Anchor		10	Insul, Nipple		1	
Cover	A  (Indoor side) B  (Outdoor side)	A : 1 B : 1	Cord Clip *		2	
Tapping Screw	Truss HD phillips 4 x 16 mm (5/8")	6	Mounting * Bracket		1	
Tapping * Screw	Flat HD phillips 3 x 10 mm (3/8")	2	Tapping * Screw	Pan HD phillips 4 x 16 mm (5/8")	2	
Drain Hose		1	Full Scale Installation Diagram		1	
Drain Hose Adaptor		1	* Parts for mounting control unit			

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 Tube and Insulation Material

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

- Deoxidized annealed copper pipe 1/4" outside dia. with a 0.0314" wall thickness, and an equal length of 3/8" outside dia. with a 0.0314" wall thickness for model SAP 91KC or 1/2" outside dia. with a 0.0314" wall thickness for model SAP 121KC or 5/8" outside dia. with a 0.0394" wall thickness for model SAP 181KC.

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

- Foamed, polyurethane or polyethylene installation 1/4" I.D., 3/8", I.D. or 1/2" I.D. or 5/8" I.D. as required to precise length of copper tubing, wall thickness of insulation should be 5/16" to 1/2" thick.
- Copper wire
Inter Unit: Min. AWG 14 in appropriate length.
Power Supply: Min. AWG 14 for model SAP 91KC, SAP 121KC or Min. AWG 12 for model SAP 181KC in appropriate length.
Caution : Check local electrical codes before buying any wire, also any specific wiring instructions or limitation.
- 3" O.D. (I.D. 2-13/16", wall thickness 3/16") PVC pipe length to match thickness of wall.

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

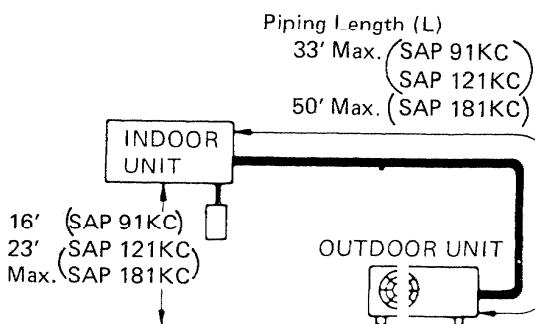
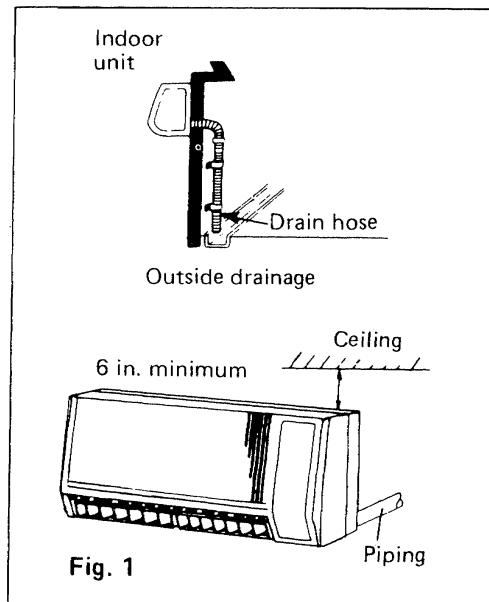
• Refrigeration (armored) tape	• Refrigeration Oil
• Insulated staples or clamps for connecting wire (See local codes)	• 3-1/2" clamp – use 1 every 4 ft. (To secure copper tubing).
• Putty (1/2 pt.)	

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 cooled. (High on the wall is best.)
 - select a location that will hold the weight of the unit.
 - select a location where piping and drain tube have shortest run to the outside. Fig. 1
 - allow room for operation and maintenance as well as unrestricted air flow around the unit.
 - install unit within 16' (SAP 91KC), 23' (SAP 121KC, SAP 181 KC) up or down of outdoor unit and within a total of 33' (SAP 91KC, SAP 121KC), 50' (SAP 181KC) from outdoor 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 air from the unit.



Outdoor Unit :

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

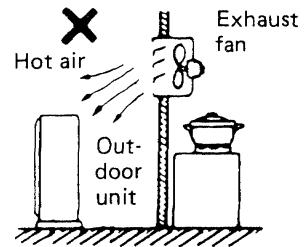


Fig.

- DO:**
- choose a place as cool as possible,
 - choose a place that is well ventilated and outside air temperature does not exceed 113°F constantly.
 - allow enough room around unit for air intake/exhaust and possible maintenance. Fig. 4
 - provide a solid base; concrete (concrete block, 4 x 4 beams or equal), about 4" above ground level to reduce humidity and possible water damage in unit and decrease service life. Fig. 5
 - use lag bolts or equal to bolt down unit, reducing vibration and noise.

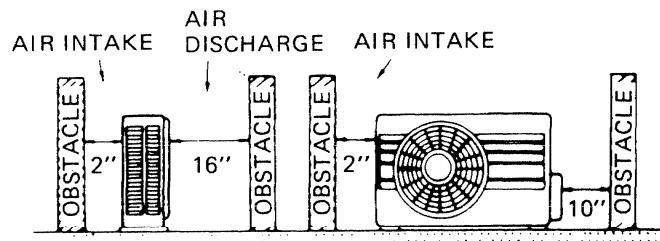


Fig.

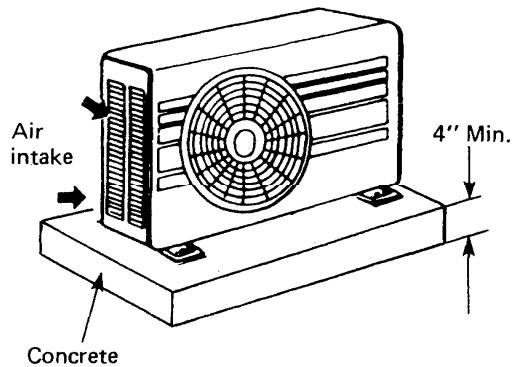


Fig.

3. HOW TO INSTALL INDOOR UNIT

3-1. Make a Hole

- a) Tape full scale installation diagram on wall at location selected, make sure unit is horizontal, use a level or tape measure to measure down from ceiling. Fig. 6
(Use rear panel for measurement, if full scale installation diagram is not at hand.)
- b) If tubing and wire are to go directly out back of unit on right side, use a hammer and a finishing nail (gypsum or panelled wall) to tap tiny holes in the plan where tube cut out is indicated to make sure wooden studs or tubes are not directly behind area to be cut out.

CAUTION: also avoid areas directly over wall outlets as wiring could be going to outlet through the wall from the ceiling.

Above precautions are also applicable if piping goes through wall in any other location.

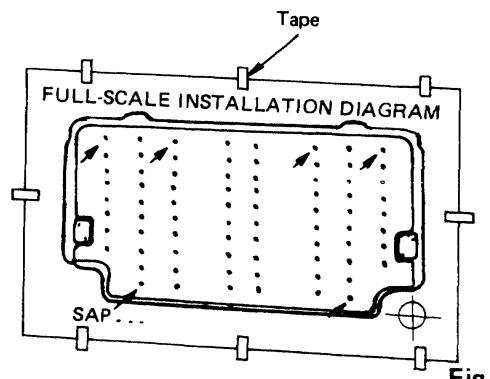


Fig.

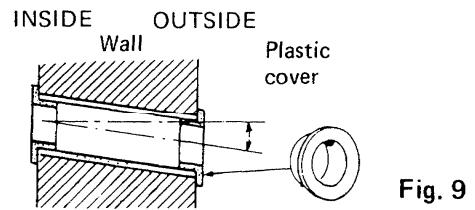
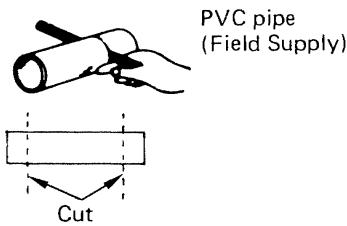
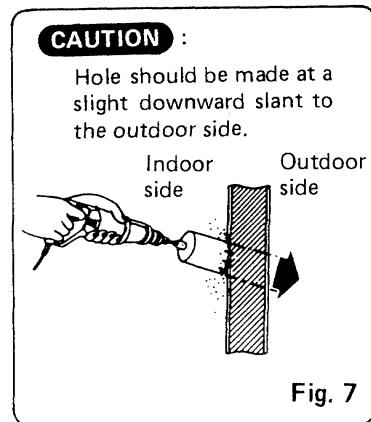
c) Using the hammer and nail method accross the diagram, you can find the studs in the wall (usually 16" apart) to assure a strong base for hanging the unit, put a pencil mark over the diagram at each stud location.

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

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

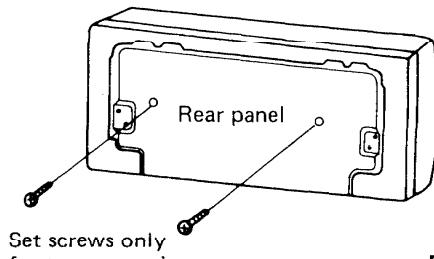
f) Measure thickness of wall from inside edge to outside edge and cut PVC pipe at a slight angle 1/4" shorter than the thickness of the wall. Fig. 8

g) Place plastic cover over end of pipe and insert in wall. Fig. 9



3-2. Remove the Rear Panel from the Unit

Remove the two set screws (discard) and take off rear panel. Fig. 10



3-3. Install the Rear panel (Panelled or gypsum walls)

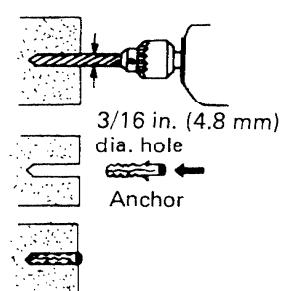
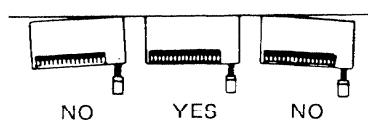
a) Use diagram as a guide mount panel to the wall with screws provided. If you are not able to line up holes in rear panel with beam locations marked on wall, use toggle bolts or anchors to go thru holes on panel or drill 1/8" dia. holes in the panel over the stud locations and mount rear panel.

b) Double check with a ruler or level that panel is level. This is important to install the unit properly. Fig. 11

c) Make sure panel is flush against wall. Any space between wall and unit will cause noise and vibration.

Block, brick, concrete or similar type walls
Make 3/16" dia. holes in the wall.

Insert anchors for appropriate mounting screws. Fig. 12



3-4. Remove the Casing in order to Install the Indoor Unit

- How to remove the casing

- a) Remove the two* set screws holding the casing to the indoor unit. (* SAP 121KC and SAP 181KC have three screws.)
- b) Pull up the casing by hand, press down on tabs on top, then withdraw the casing by pulling it back straight. Fig. 13

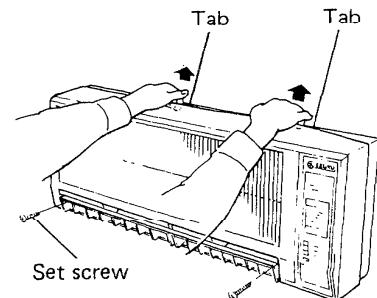


Fig. 13

3-5. Shape the Indoor Side Piping

- a) Wrap armored tape around refrigerant piping and drain hose (just long enough to clear the outside wall).
- b) Shape the refrigerant pipe so that it can easily go into the wall hole.

3-6. 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. 5 in. from the wall face. Fig. 14

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

- b) Unscrew the cover plate of the electrical component box. Then remove the bottom screw securing the electrical component box. Fig. 15

- c) Insert the wrapped piping into the hole on the wall. Temporarily set the wiring connector in the hole at the electrical component box.

- d) Hang the indoor unit on the rear panel. Fig. 16 (next page)

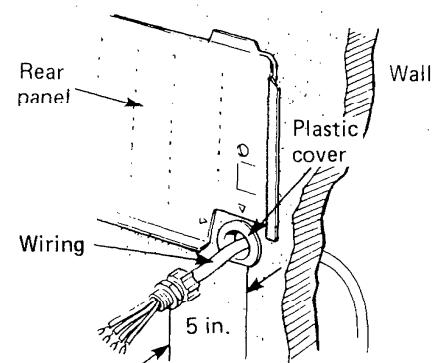


Fig. 14

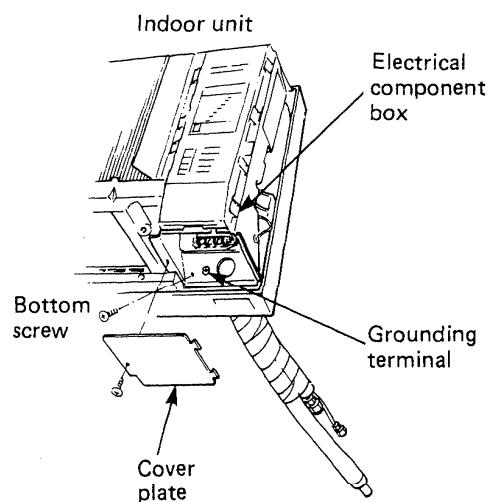


Fig. 15

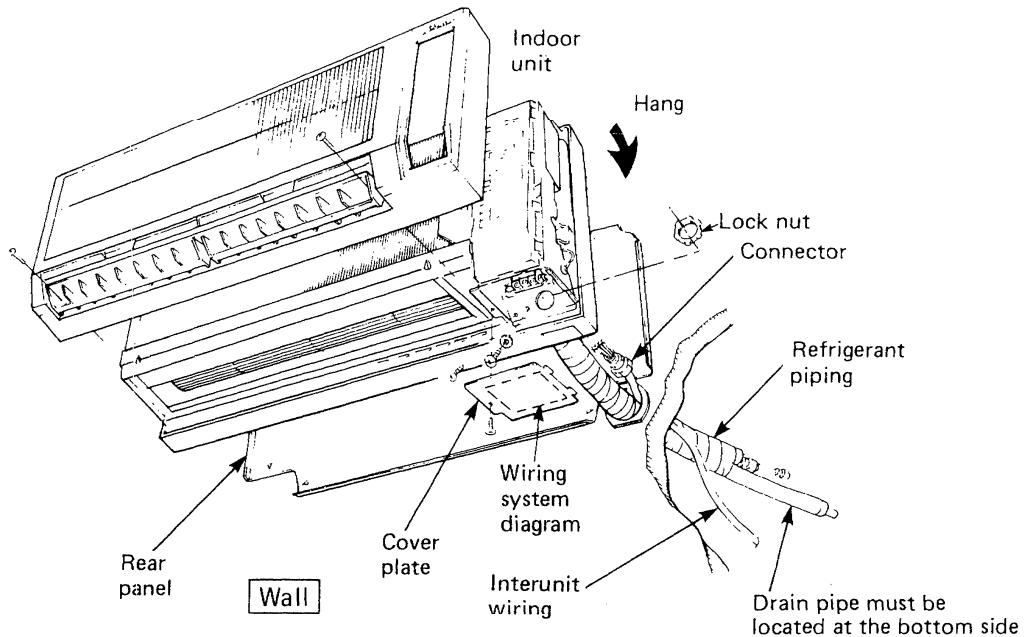


Fig. 16

- e) Lift up the underside of the electrical component box slightly and secure the conduit connector to this box with a lock nut. Fig. 17
- 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 the wiring system diagram labelled inside 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.

- g) Secure the electrical component box with the bottom screw. Then, reinstall the cover plate.

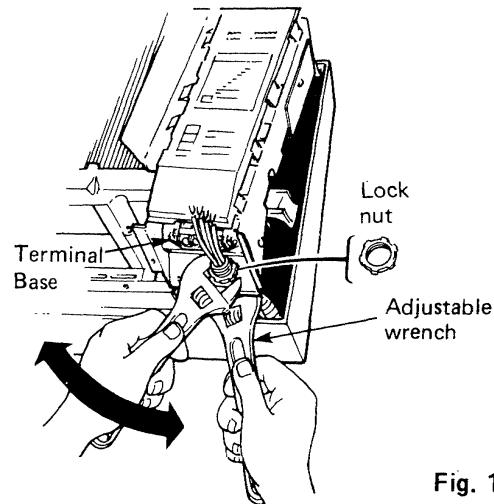


Fig. 17

3-7. Mounting

- a) Push the flexible conduit, refrigerant piping and drain hose through the hole in the wall. Adjust the indoor unit so it is securely seated on the rear panel.
- b) Bend tubing (if reqd.) to run along wall in direction of outdoor unit then tape as far as the fittings. Drain hose should come straight down wall to a level where runoff won't stain wall.

3-8. Drain Piping

- a) Drain piping should be slanted downward to outdoor. Fig. 18
 - 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* lest chilled condensation should damage furniture or floors. Fig. 19
- * Formed polyethylene or equivalent is recommended.

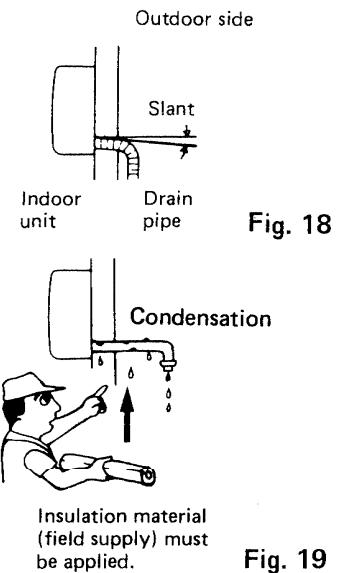


Fig. 18

Insulation material
(field supply) must
be applied.

Fig. 19

3-9. 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. 20
- b) Fix the control cord to the wall.

3-10. **WARNING**

Do not supply power to the unit or operate until piping 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 40

4-1. Wiring Instructions on Outdoor Unit

- a) To remove the access panel, remove 4 screws.
 - b) Dismount plugs on the conduit plate.
 - c) Temporarily mount conduit tubes on the conduit plate.
 - d) Properly connect both power supply and interunit lines to corresponding terminals on the terminal block.
- Refer to the wiring diagram in Fig. 21, which is labelled on the access panle.

NOTE : Connector trade size for this unit is 1/2", which ia available in a hardware store.

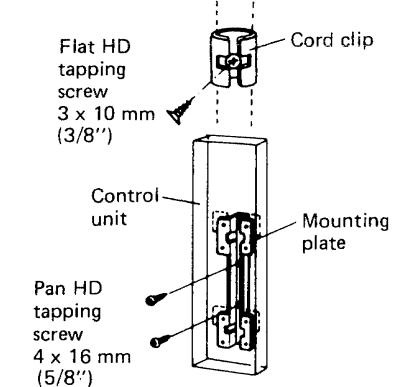
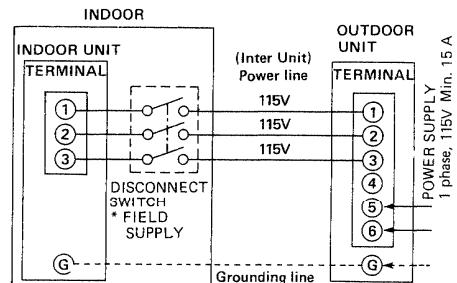


Fig. 20

WIRING SYSTEM DIAGRAM
SAP 91KC, SAP 121KC



WIRING SYSTEM DIAGRAM SAP 181KC

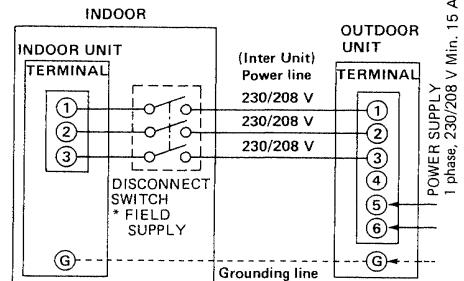


Fig. 21

- e) Ground unit in accordance with local codes.
- f) Be sure to size each wire allowing several inches longer than the required length for wiring.
- g) Fasten lock nuts to secure conduit tubes.

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 piping, compressor or any moving part.

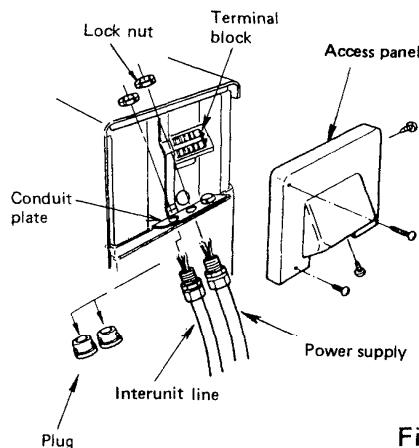


Fig. 22

5. REFRIGERANT PIPING

5-1. Use of the Flaring Method

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

5-2. Flaring procedure with a Flare Tool

- a) Cut the copper pipe to proper length with a pipe cutter. It is recommended to cut approx. 12 ~ 20 in. longer than the estimated piping length.
- b) Remove burrs at the end of the copper pipe with a pipe reamer or a file. This process is important and should be done carefully to make a good flare. Fig. 23
- Note :** When reaming, hold the pipe end downward and be sure that no copper scraps fall into the pipe. Fig. 24
- c) Remove the flare nut from the unit and be sure to mount it on the copper pipe.
- d) Make a flare at the end of copper pipe with a flare tool* Fig. 25 (*Use "RIGID" or equivalent.)
- Note :** Good flare should have following conditions:
 - Inside surface is glossy and smooth.
 - Edge is smooth.
 - Tapered sides are in uniform length.

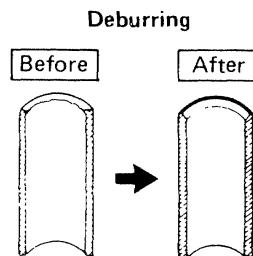


Fig. 23

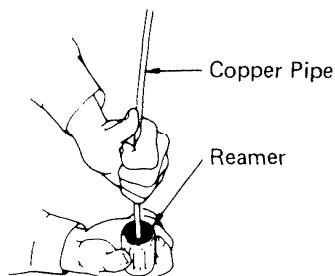


Fig. 24

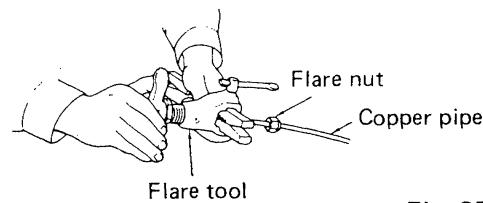


Fig. 25

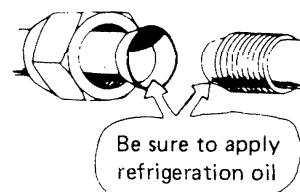
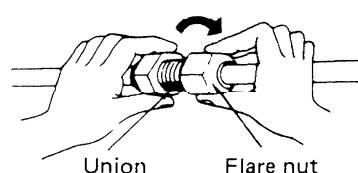


Fig. 26



5-4. Connecting Pipes between Indoor and Outdoor Units

1. Connect the indoor side refrigerant piping extended from the wall with the outdoor side piping tightly.
2. Flare nut on large dia. pipe should be torqued to 300 ~ 340 lbs. in. (SAP 91KC) or 430 ~ 470 lbs. in. (SAP 121KC) or 520 ~ 560 lbs. in. (SAP 181KC). Flare nut small dia. pipe should be torqued to 130 ~ 170 lbs. in. Fig. 28
3. After performing a leak test on the connecting part, insulate it with INSUL. NIPPLE and finish with a vinyl masking tape over it. Fig. 29

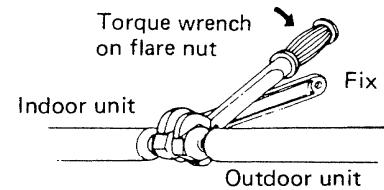


Fig. 2

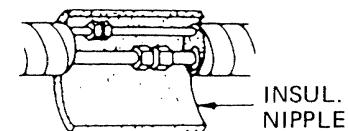


Fig. 2

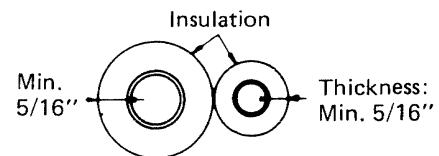


Fig. 30

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

- **Insulation material**

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

5-6. Taping the Pipes

- a) At this time, the two pipes, (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 piping.
- b) Wrap the armoring tape from the bottom of the outdoor unit to the top of the piping, where it enters the wall. As you wrap the piping cover half of each previous tape turn. Fig. 31
- c) Clamp piping bundle to wall, one clamp every 4' approx.

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

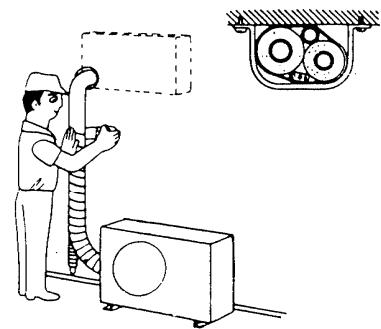


Fig. 31

5-7. Finishing the Installation

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

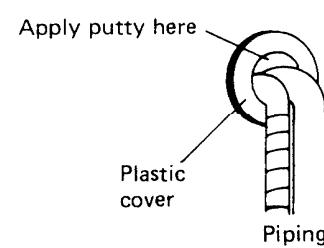
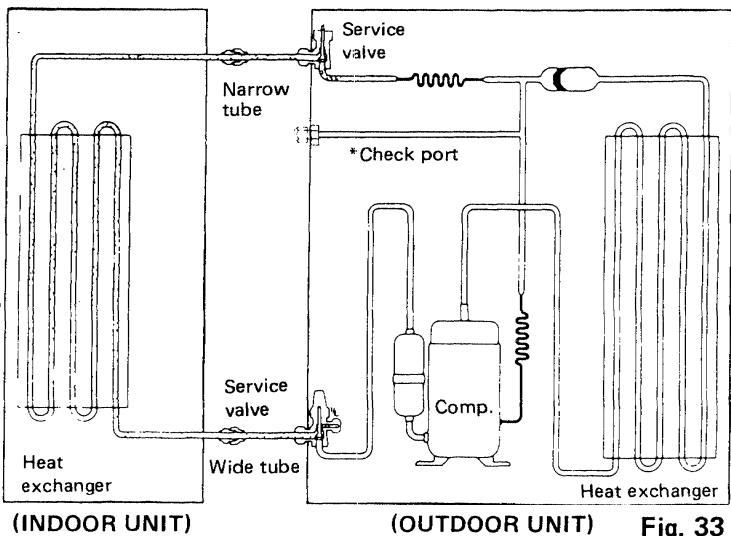


Fig. 32

6. AIR PURGING

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

6-1. Piping Diagram for Air Purging



- * Check port is provided for measuring system pressure with a pressure gauge or the like during service.

6-3. Air Purging Procedure

- a) Remove the valve caps from the service valves on the narrow and wide pipes.
 - b) Slacken off the flare nut at the charging port one full turn. Fig. 34
 - c) Open the service valve on the narrow pipe side by 90 degrees (1/4 turn).
(During this operation, air will be discharged from the charging port of the service valve on the wide pipe.)

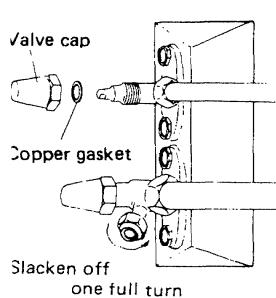
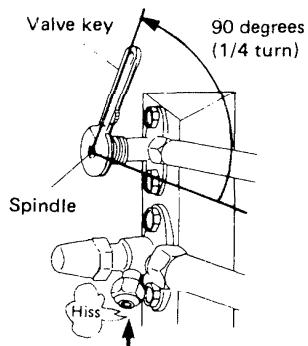


Fig. 34



After required interval, firmly tighten up with a torque wrench

- The pressure in the system rises.
 - The operating current rises.
 - Cooling 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.

6-2. Quick Air Purge System

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

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

* Interval required for air purging is only
15 seconds (SAP 91KC, SAP 121KC),
30 seconds (SAP 181KC).

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

- d) **15** seconds (SAP 91KC, SAP 121KC),
30 seconds (SAP 181KC) after opening the
spindle, tighten up the flare nut of the charging
port.
 - e) Shut the spindle of the service valve on the
narrow pipe. Fig. 35
 - f) Leak test the joints with liquid soap. Fig. 36
 - g) Fully open the spindles of the service valves on
the wide pipe and the narrow pipe.
 - h) Next, re-install the valve caps in which copper
gaskets have been inserted. Fig. 37
 - i) The all air purge procedure has been completed
and the unit is ready for trial operation.

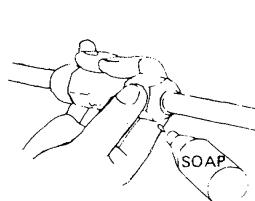


Fig. 36

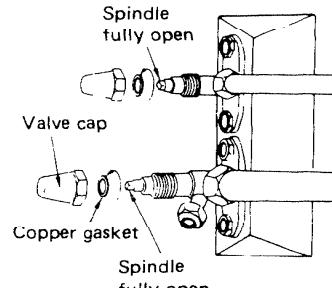


Fig. 37

7. TRIAL RUN

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

■ SERVICE VALVE CONSTRUCTION

• Valve Position -a-

The valve stems of both wide & narrow pipes are turned all the way in. The unit is shipped from the factory in this position and it is also used for PUMP DOWN. (Fig. 38-a)

• Valve Position -b-

The valve stems of both wide & narrow pipes are turned all the way out ("BACK SEAT" position). This is the normal operating position. (Fig. 38-b)

• Valve Position -c-

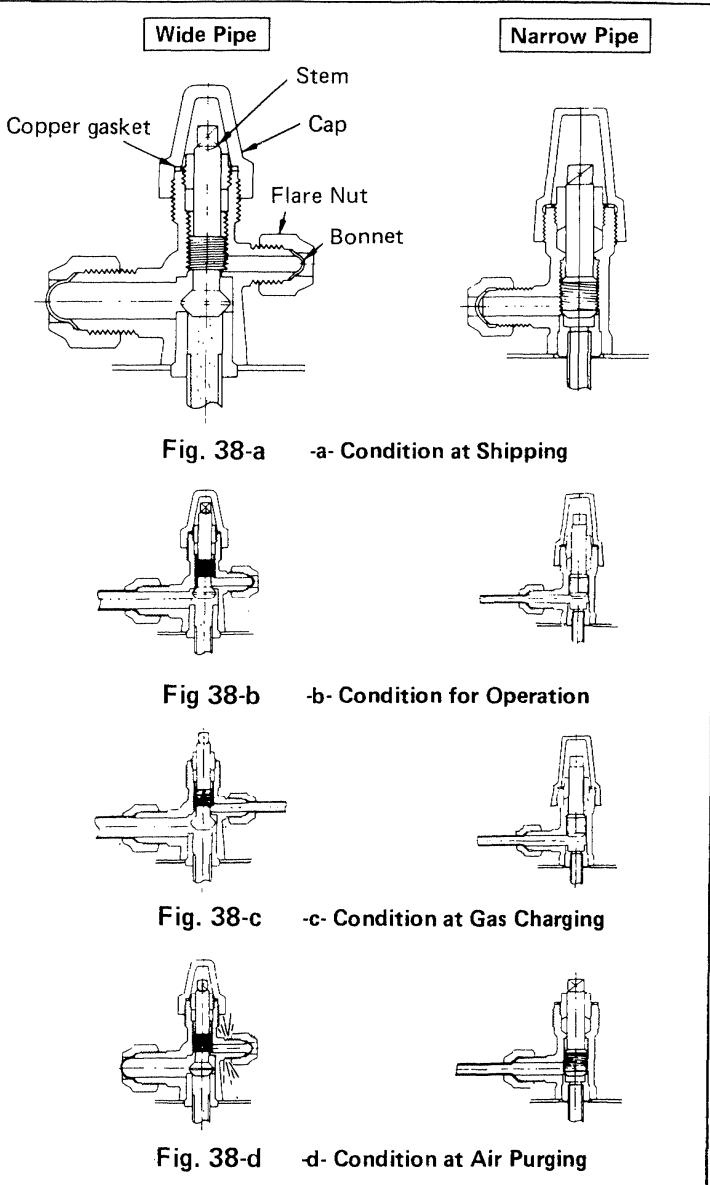
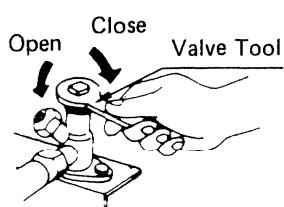
With the narrow pipe valve kept at BACK SEAT, only the wide pipe valve stem is turned halfway-down position. This position is used for pressure measurement and gas charging. (Fig. 38-c)

• Valve Position -d-

Like position -a-, but with the flare nut of wide pipe open. This position is used for air purging. (Fig. 38-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 pipe halfway (2 turns).
- 2) Close valve on narrow pipe all the way (4 turns).
- 3) Turn unit on (cooling) for approximately 3 minutes then shut off.
- 4) Close valve on wide pipe all the way (2 additional turns).
- 5) Disconnect pipes slowly allowing pressure to equalize inside and out.
- 6) When piping is disconnected provide dust covers for both valves and pipes until unit is reconnected.

6. INSTALLATION INSTRUCTIONS

—Split System Heat Pump—

**SAP92KCH
SAP122KCH
SAP182KCH**

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1. GENERAL

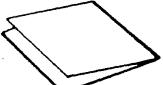
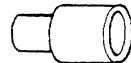
Here is a brief outline of where and how to install the unit. Please read over entire set of instructions for indoor and outdoor units and make sure all accessory parts listed are with the unit before beginning.

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

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

- Common Screwdriver
- Phillips head screwdriver
- Knife or wire stripper
- Level
- Tape measure
- Tube Cutter
- Tube flaring tool
- Torque wrench
- Adjustable Wrench
- Reamer or Small File

1-2. Accessories Supplied with Unit for Installation

Parts	Figure	Q'ty	Parts	Figure	Q'ty	
Rawl Plug		10	Insul. Nipple		1	
Cover	A  (Indoor side) B  (Outdoor side)	A : 1 B : 1	Cord Clip *		2	
Tapping Screw	Truss HD phillips 4 x 16 mm (5/8") 	6	Mounting * Bracket		1	
Tapping Screw	Flat HD phillips 3 x 10 mm (3/8") 	2	Tapping * Screw	Pan HD phillips 4 x 16 mm (5/8") 	2	
Drain Hose		1	Full Scale Installation Diagram		1	
Drain Hose Adaptor		1	* Parts for mounting control unit			

1-3. Optional Copper Tubing Kit

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

1-4. Type of Copper Tubes and Insulation Material

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

- Deoxidized annealed copper tube 1/4" outside dia. with a 0.0314" wall thickness, and an equal length 3/8" outside dia. with a 0.0314" wall thickness for model SAP 92KCH or 1/2" outside dia. with a 0.0314" wall thickness for model SAP 122KCH or 5/8" outside dia. with a 0.0394" wall thickness for model SAP 182KCH.

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

- Foamed polyethylene installation 1/4" I.D., 3/8" I.D. or 1/2" I.D. or 5/8" I.D. as required to precise length of copper tubing, wall thickness of insulation should be 5/16" to 1/2" thick.

- Copper Wire

Inter Unit: Min. AWG 14 in appropriate length.

Power Supply: Min. AWG 12 for model SAP 92KCH, SAP 122KCH or Min. AWG 10 for model SAP 182KCH in appropriate length.

Caution : Check local electrical codes before buying any wire, also any specific wiring instructions or limitaion.

- 3" O.D. (I.D. 2-13/16", wall thickness 3/16") PVC pipe length to match thickness of wall.

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

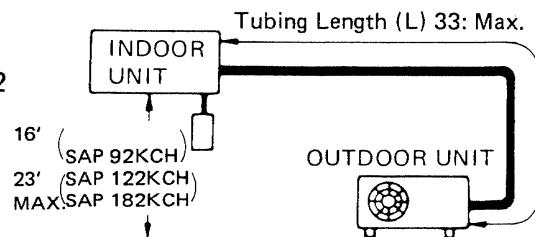
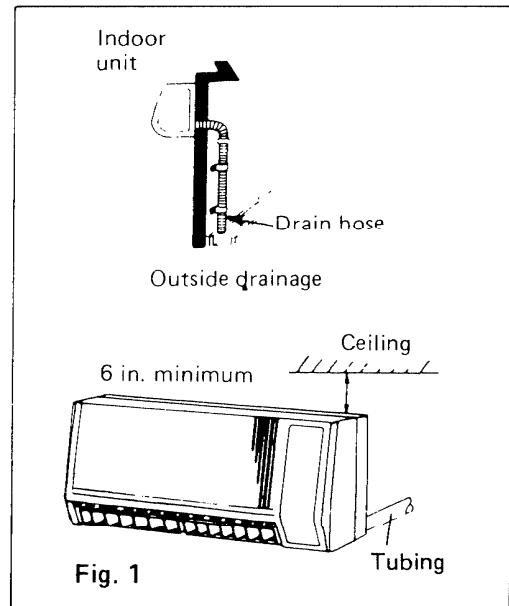
• Refrigeration (armored) tape	• Refrigeration Oil
• Insulated staples or clamps for connecting wire (See local codes)	• 3-1/2" clamp — use 1 every 4 ft. (To secure copper tubing).
• Putty	

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 cooled.
(High on the wall is best.)
 - select a location that will hold the weight of the unit.
 - select a location where tubing and drain hose have shortest run to the outside. Fig. 1
 - allow room for operation and maintenance as well as unrestricted air flow around the unit.
 - install unit within 16' (SAP92KCH), 23' (SAP122KCH, SAP182KCH) up or down of outdoor unit and within a total of 33' from outdoor 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 air from the unit.



Outdoor Unit :

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

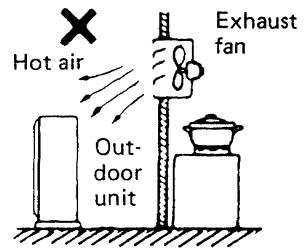


Fig. 3

- DO:**
- choose a place as cool as possible.
 - choose a place that is well ventilated and outside air temperature does not exceed 113°F constantly.
 - allow enough room around unit for air intake/exhaust and possible maintenance. Fig. 4
 - provide a solid base; concrete (concrete block, 4 x 4 beams or equal), about 4" above ground level to reduce humidity and possible water damage in unit and decrease service life. Fig. 5
 - use lag bolts or equal to bolt down unit, reducing vibration and noise.

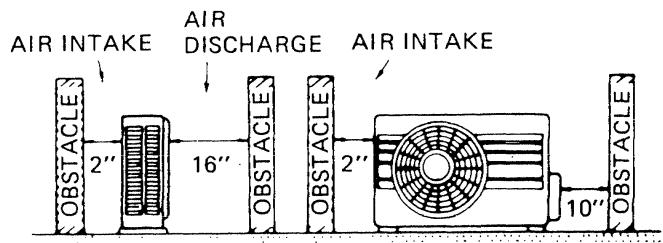


Fig. 4

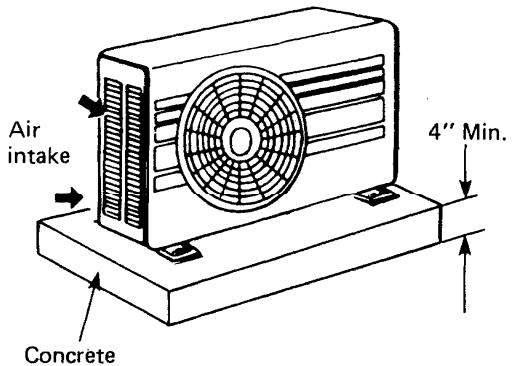


Fig. 5

3. HOW TO INSTALL INDOOR UNIT

3-1. Make a Hole

- Tape full scale installation diagram on wall at location selected, make sure unit is horizontal, use a level or tape measure to measure down from ceiling. Fig. 6
(Use rear panel for measurement, if full scale installation diagram is not at hand.)
- If tubing and wire are to go directly out back of unit on right side, use a hammer and a finishing nail (gypsum or panelled wall) to tap tiny holes in the plan where tube cut out is indicated to make sure wooden studs or tubes are not directly behind area to be cut out.

CAUTION: also avoid areas directly over wall outlets as wiring could be going to outlet through the wall from the ceiling.

Above precautions are also applicable if piping goes through wall in any other location.

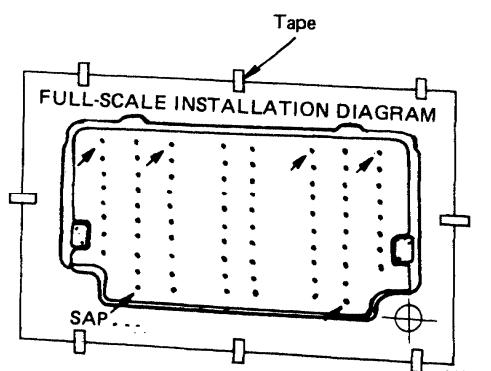


Fig. 6

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

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

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

f) Measure thickness of wall from inside edge to outside edge and cut PVC pipe at a slight angle 1/4" shorter than the thickness of the wall. Fig. 8

g) Place plastic cover over end of pipe and insert in wall. Fig. 9

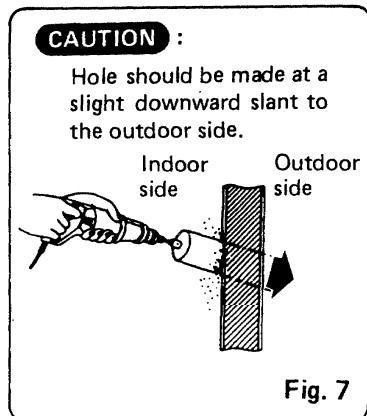


Fig. 7

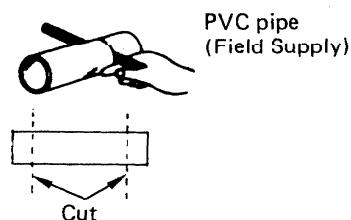


Fig. 8

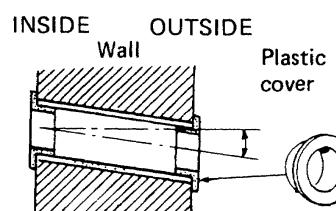


Fig. 9

3-2. Remove the Rear Panel from the Unit

Remove the two set screws (discard) and take off rear panel. Fig. 10

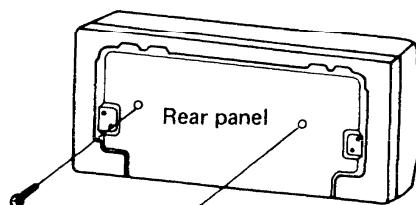


Fig. 10

3-3. Install the Rear panel (Panelled or gypsum walls)

a) Use diagram as a guide mount panel to the wall with screws provided. If you are not able to line up holes in rear panel with beam locations marked on wall, use toggle bolts or rawl plug to go thru holes on panel or drill 1/8" dia. holes in the panel over the stud locations and mount rear panel.

b) Double check with a ruler or level that panel is level. This is important to install the unit properly. Fig. 11

c) Make sure panel is flush against wall. Any space between wall and unit will cause noise and vibration.

Block, Brick, Concrete or Similar Type Walls

Make 4.8 mm dia. holes in the wall.

Insert rawl plugs for appropriate mounting screws.

Fig. 12

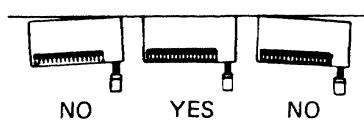


Fig. 11

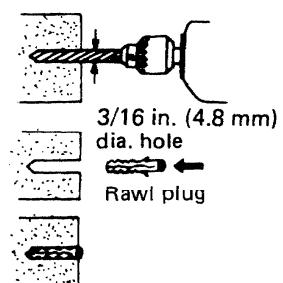


Fig. 12

3-4. Remove the Casing in order to Install the Indoor Unit

- How to remove the casing

- a) Remove the two* set screws holding the casing to the indoor unit. (* SAP 122KCH and SAP 182KCH have three screws.)
- b) Pull up the casing by hand, press down on tabs on top, then withdraw the casing by pulling it back straight. Fig. 13

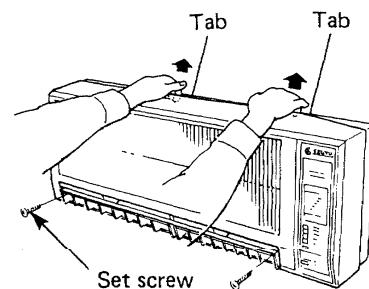


Fig. 13

3-5. Shape the Indoor Side Tubing

- a) Wrap armored tape around refrigerant tubing and drain hose (just long enough to clear the outside wall).
- b) Shape the refrigerant tube so that it can easily go into the wall hole.

3-6. Wiring Instructions for Interunit Connections

- a) Insert the interunit wiring (according to local codes) into through-the-wall PVC pipe. Run the wiring toward indoor side allowing approx. 5 in. from the wall face. Fig. 14

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

- b) Unscrew the cover plate of the electrical component box. Then remove the bottom screw securing the electrical component box. Fig. 15

- c) Insert the wrapped piping into the hole on the wall. Temporarily set the wiring connector in the hole at the electrical component box.

- d) Hang the indoor unit on the rear panel. Fig. 16 (next page)

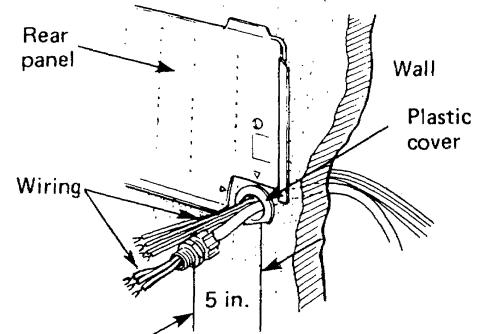


Fig. 14

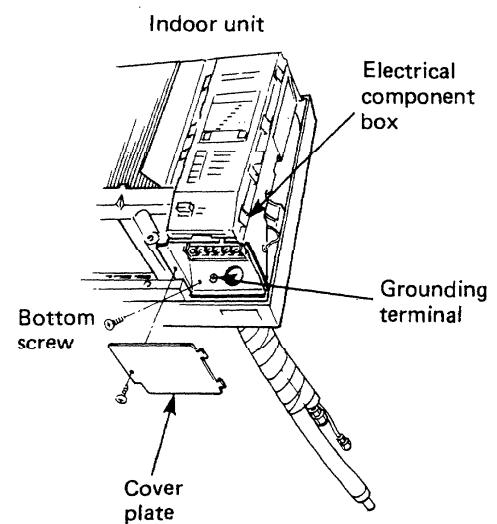


Fig. 15

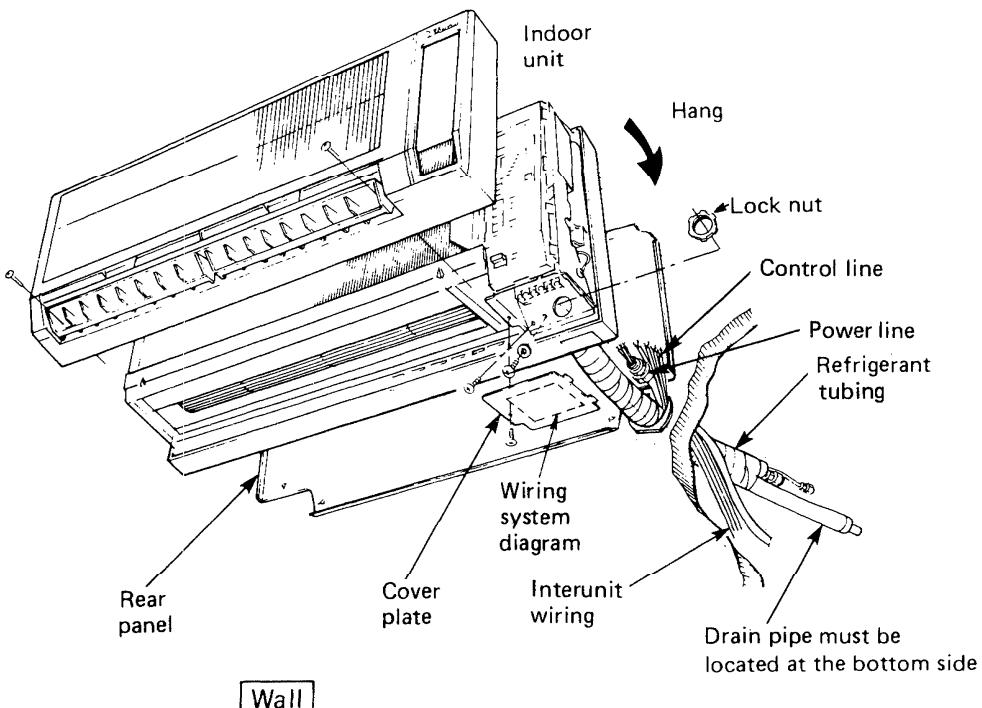


Fig. 16

e) Lift up the underside of the electrical component box slightly and secure the conduit connector to this box with a lock nut. Fig. 17

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 the wiring system diagram labelled inside 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.

g) Secure the electrical component box with the bottom screw. Then, reinstall the cover plate.

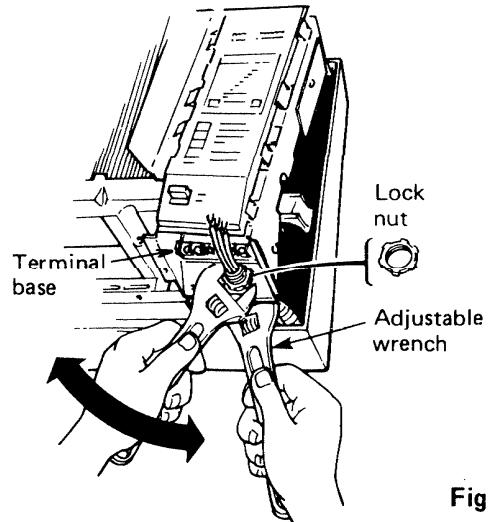


Fig. 17

3-7. Mounting

- Push the flexible conduit, refrigerant tubing and drain hose through the hole in the wall. Adjust the indoor unit so it is securely seated on the rear panel.
- Bend tubing (if reqd.) to run along wall in direction of outdoor unit then tape as far as the fittings. Drain hose should come straight down wall to a level where runoff won't stain wall.

3-8. Drain Piping

- Drain piping should be slanted downward to outdoor. Fig. 18
 - Never form a trap in the course of piping.
 - If the drain pipe will run in the room, insulate the pipe with an insulation material* lest chilled condensation should damage furniture or floors. Fig. 19
- * Foamed Polyethylene or equivalent is recommended.

3-9. 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.

- 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. 20
- Fix the control cord to the wall.

3-10. **WARNING**

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

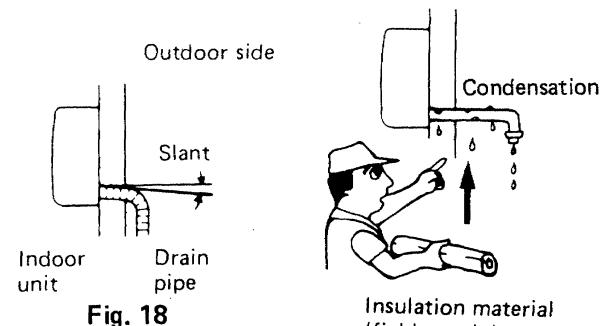


Fig. 18

Fig. 19

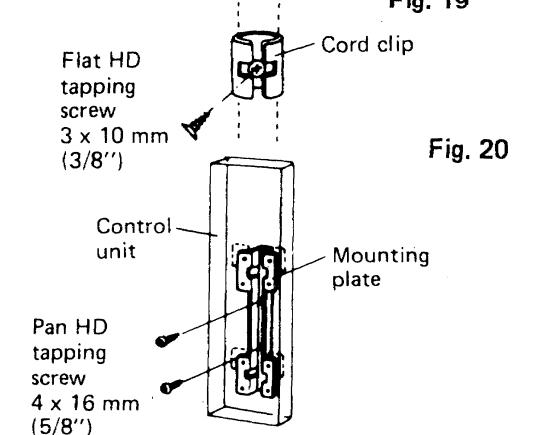


Fig. 20

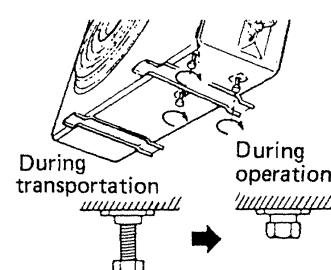


Fig. 21

4. HOW TO INSTALL OUTDOOR UNIT

- Place unit on level concrete pad, blocks or equal and anchor.
Refer to INSTALLATION SITE LOCATION given in page 52

CAUTION : (SAP122KCH only)

The compressor is fixed with the bolts for the protection against damages during transportation. Before the tubing work, tilt the unit and tighten fully clockwise the three bolts as located on the bottom. Fig. 21

4-1. Wiring Instructions on Outdoor Unit

- To remove the access panel, remove 4 screws.
- Dismount plugs on the conduit plate.
- Temporarily mount conduit tubes on the conduit plate.
- Properly connect power supply mains and interunit lines (2) to corresponding terminals on the terminal block.
Refer to the wiring diagram in Fig. 23, which is labelled on the access panel.

NOTE : Connector trade size for this unit is 1/2", which is available in a hardware store.

- Ground unit in accordance with local codes.

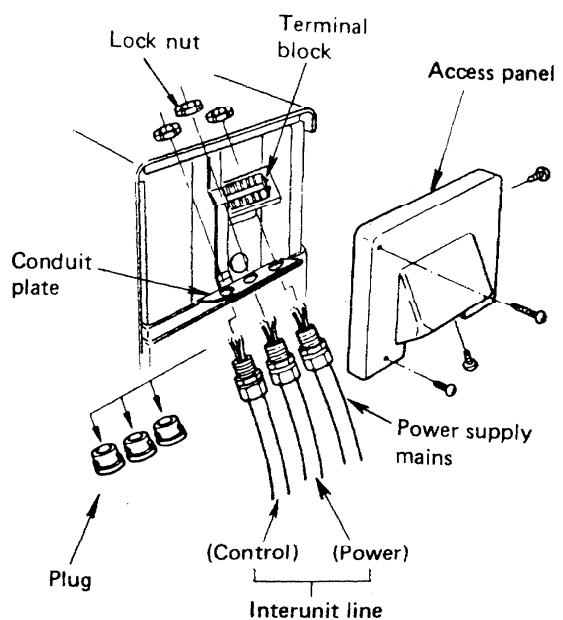


Fig. 22

- f) Be sure to size each wire allowing several inches longer than the required length wiring.
g) Fasten lock nuts to secure conduit tubes.

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.

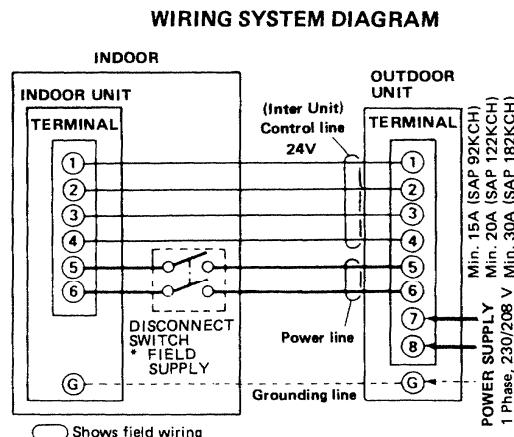


Fig. 23

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.

Deburring

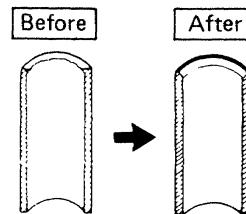


Fig. 24

5-2. Flaring Procedure with a Flaring Tool

- 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.
- Remove burrs at the end of the copper tube with a tube reamer or a file. This process is important and should be done carefully to make a good flare. Fig. 24

Note : When reaming, hold the tube end downward and be sure that no copper scraps fall into the tube. Fig. 25

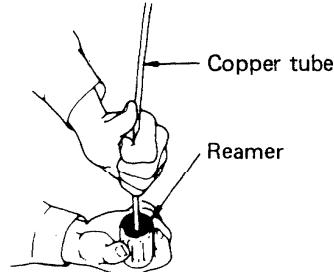


Fig. 25

- Remove the flare nut from the unit and be sure to mount it on the copper tube.
- Make a flare at the end of copper tube with a flare tool*. Fig. 26 (*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.

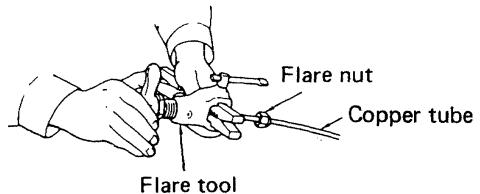


Fig. 26

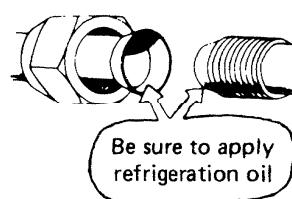


Fig. 27

5-3. Caution before Connecting Tubes Tightly

- Be sure to apply blind cap or water proof tape to prevent dust or water from getting into the tube, until it is used.
- 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. 27
- For proper connection, hold union tube and flare tube straight with each other, screw in the flare unit lightly at first to obtain smooth match. Fig. 28

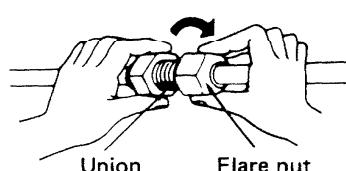


Fig. 28

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 300 ~ 340lbs. in. (SAP 92KCH) or 430 ~ 470 lbs. in. (SAP 122KCH) or 520 ~ 560 lbs. in. (SAP 182KCH). Flare nut small dia. tube should be torqued to 130 ~ 170 lbs. in. Fig. 29
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. 30

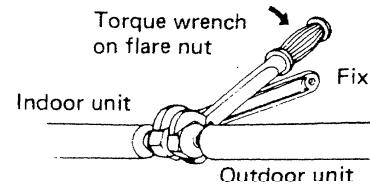


Fig. 29

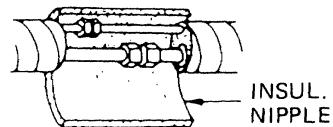


Fig. 30

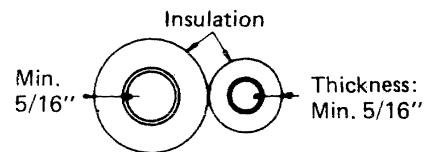


Fig. 31

5-5. Insulation of Refrigerant Tubes

Because the capillary tubing is installed in the outdoor unit, both wide and narrow tubes of this air conditioner become cold. Therefore, to prevent heat loss and wet floors due to dripping of chilled condensation, both tubes must be well insulated with proper insulation material. Thickness of insulation material should be min. 5/16". Fig. 31

- **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 polyethylene or equivalent.

5-6. Taping the Tubes

- a) At this time, the two 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. 32
- 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..

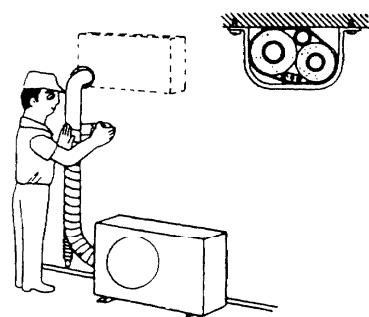


Fig. 32

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. 33

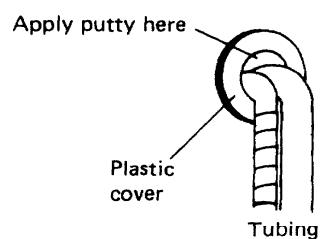


Fig. 33

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.

6-1. Tubing Diagram for Air Purging

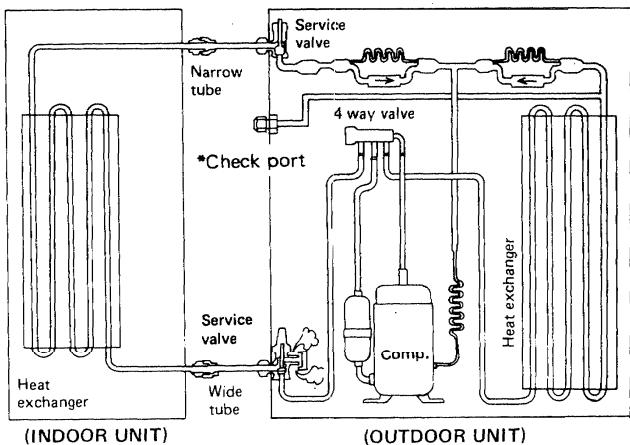


Fig. 34

6-3. Air Purging Procedure

- Remove the valve caps from the service valves on the narrow and wide tubes.
- Slacken off the flare nut at the charging port one full turn. Fig. 35
- Open the service valve on the narrow tube side by 90 degrees (1/4 turn).
(During this operation, air will be discharged from the charging port of the service valve on the wide tube.)

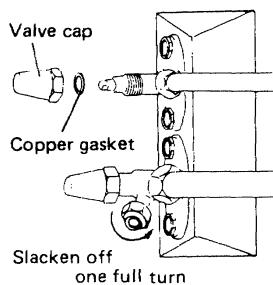


Fig. 35

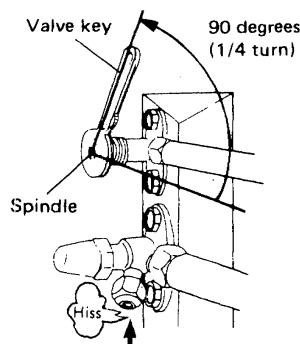


Fig. 36

- The pressure in the system 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.

6-2. Quick Air Purge System

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

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

* Interval required for air purging is only
⑯ seconds (SAP 92KCH,
SAP 122KCH), ⑰ seconds (SAP 182KCH).

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

- ⑯ seconds (SAP 92KCH,
SAP 122KCH), ⑰ seconds (SAP 182KCH) after opening the spindle, tighten up the flare nut of the charging port.
- Shut the spindle of the service valve on the narrow tube: Fig. 36
- Leak test the joints with liquid soap. Fig. 37
- Fully open the spindles of the service valves on the wide tube and the narrow tube.
- Next, re-install the valve caps in which copper gaskets have been inserted. Fig. 38
- The all air purge procedure has been completed and the unit is ready for trial operation.

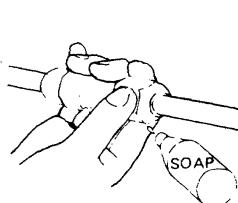


Fig. 37

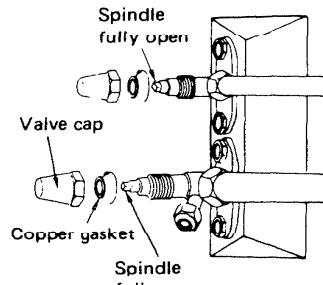


Fig. 38

7. 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.

■ 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. 39-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. 39-b)

• Valve Position -c-

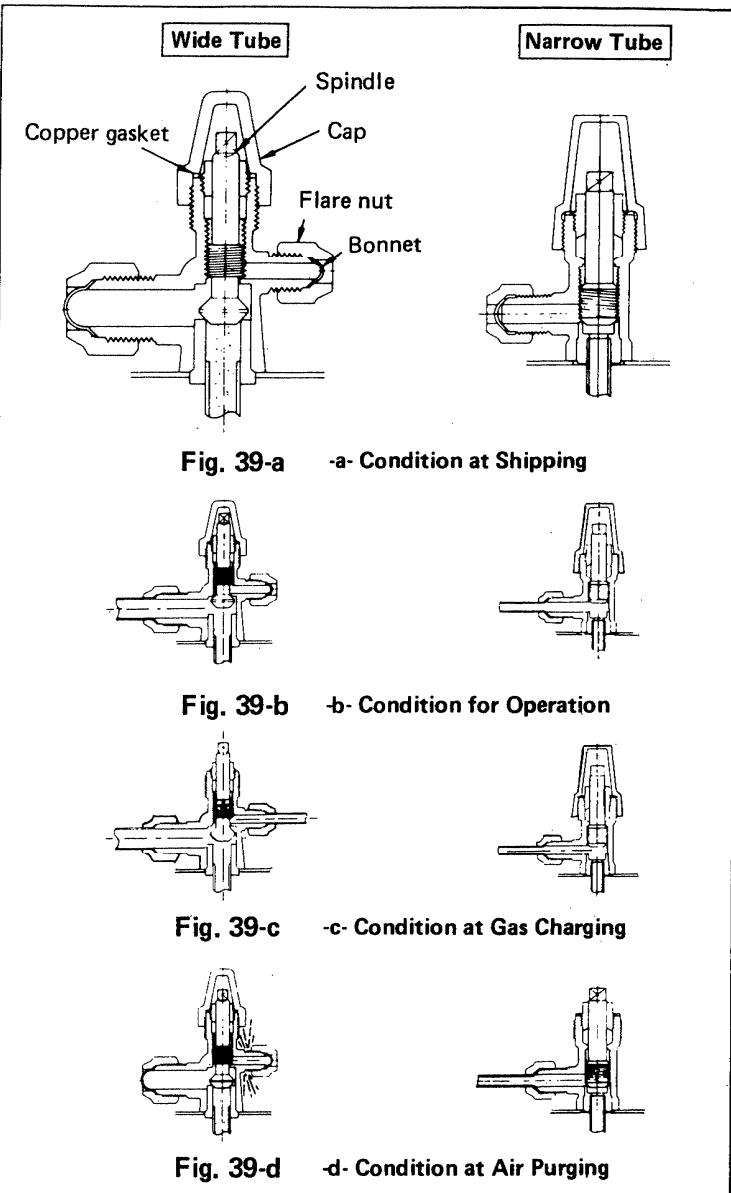
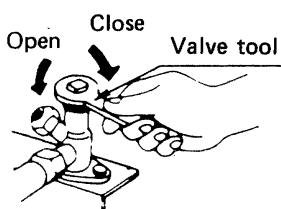
With the narrow tube valve kept at BACK SEAT, only the wide tube valve spindle is turned halfway-down position. This position is used for pressure measurement and gas charging. (Fig. 39-c)

• Valve Position -d-

Like position -a-, but with the flare nut of wide tube open. This position is used for air purging. (Fig. 39-d)

CAUTION :

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



■ PUMP DOWN

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

CAUTION :

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

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

7. TROUBLE SHOOTING

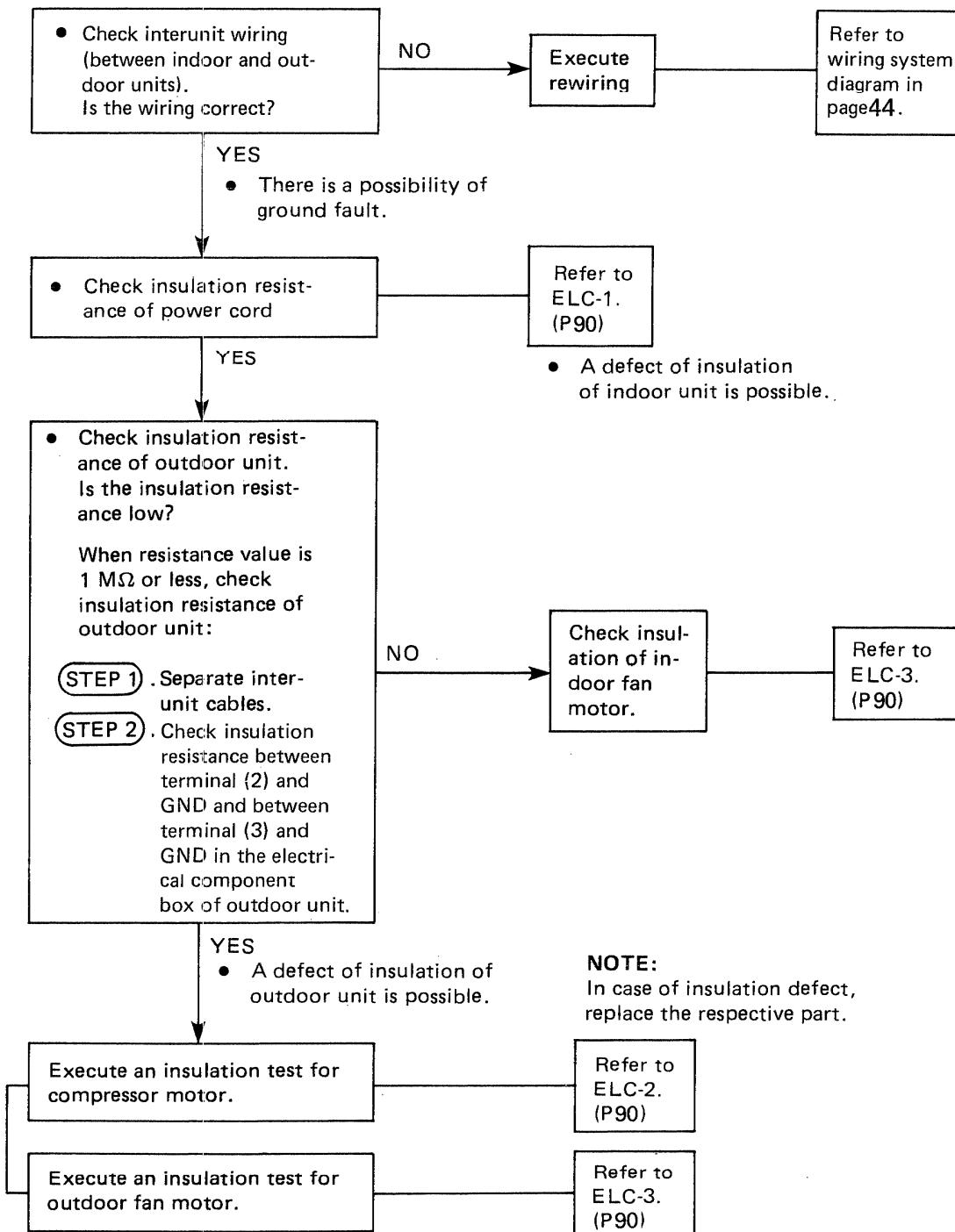
— Quick Access Index —

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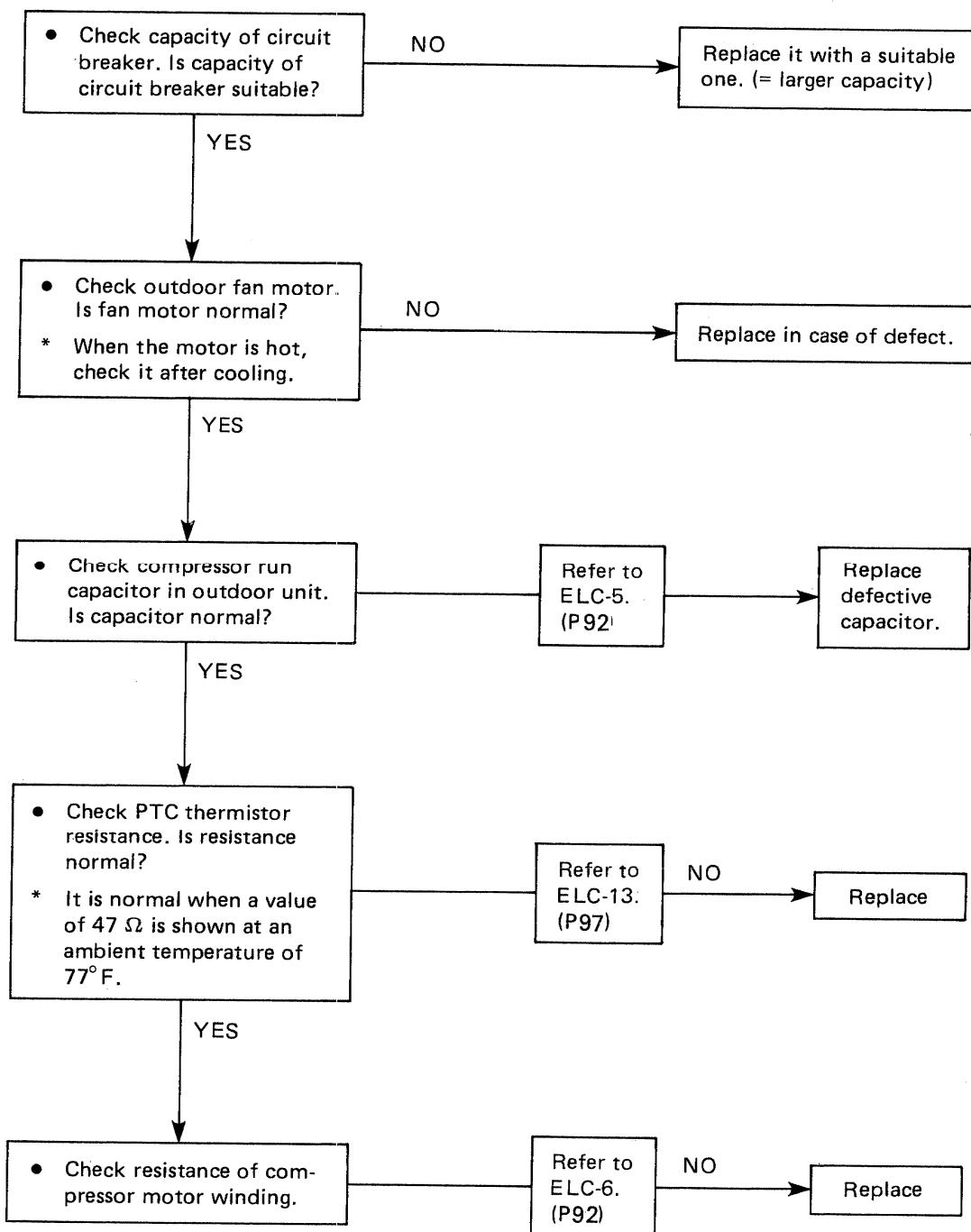
1. Air conditioner does not operate

1.1 Circuit breaker trips (or fuse blows)

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



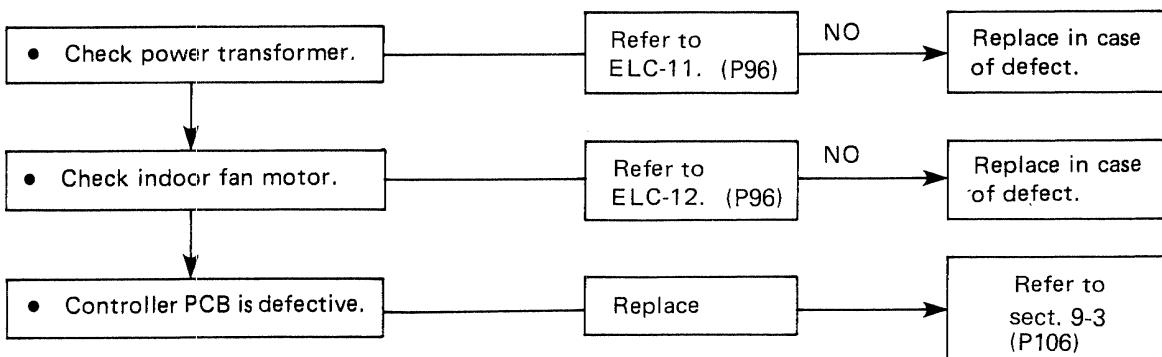
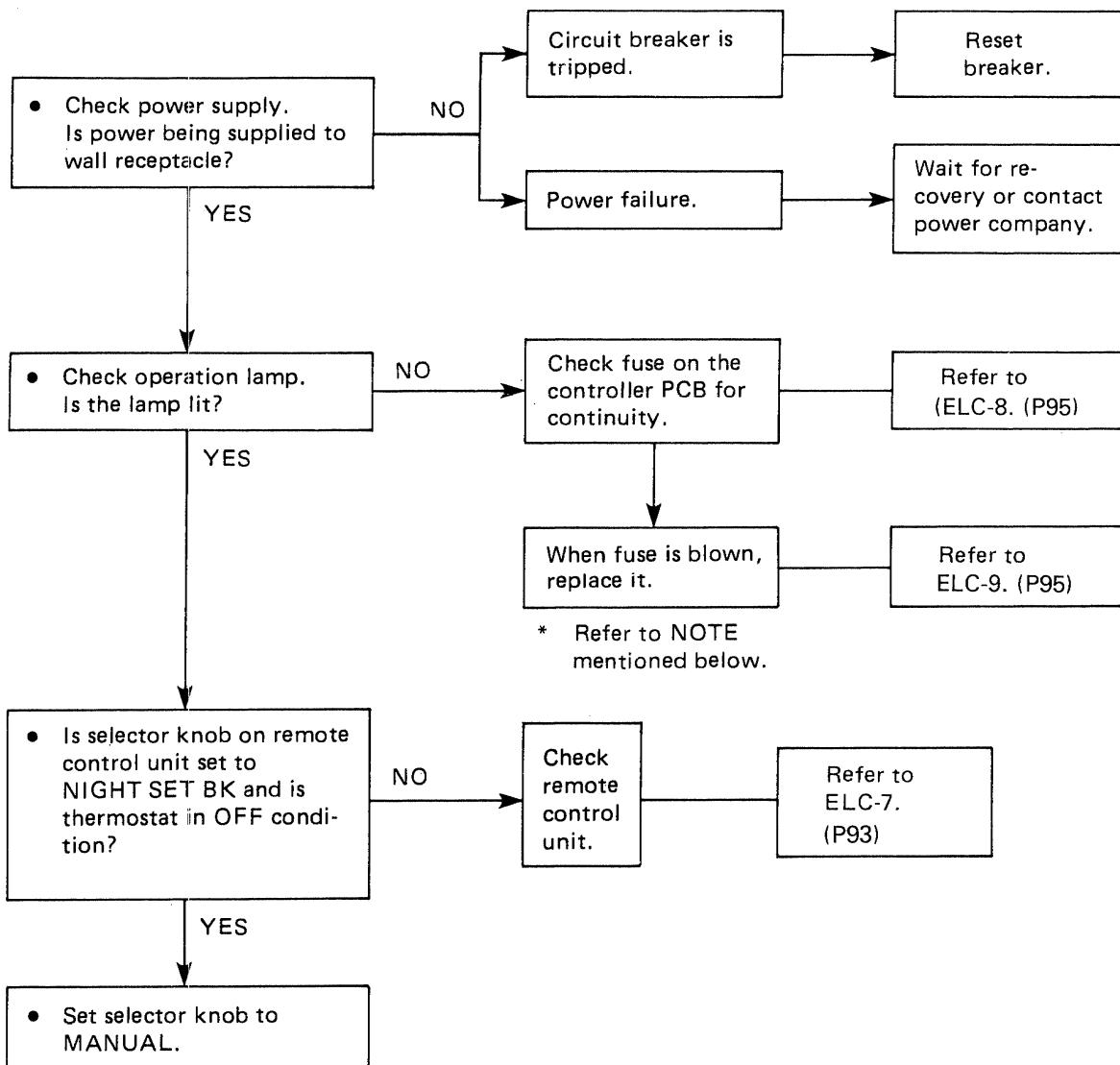
1.1.2 Circuit breaker trips when the operation switch is depressed.



NOTE:

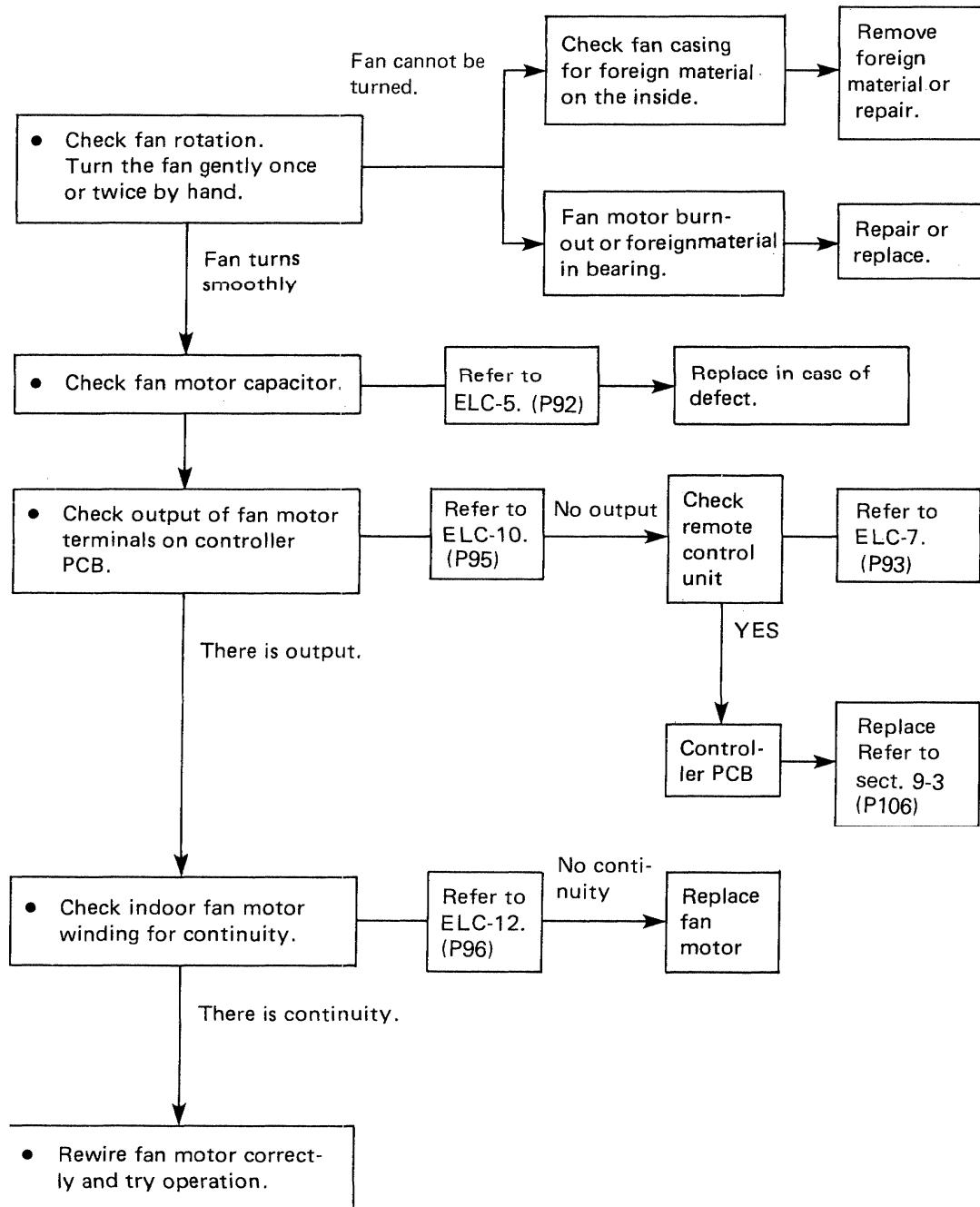
The PTC thermistor is not provided for the model SAP181C.

1.2 Neither indoor unit nor outdoor unit runs



2. Some part of air conditioner does not operate

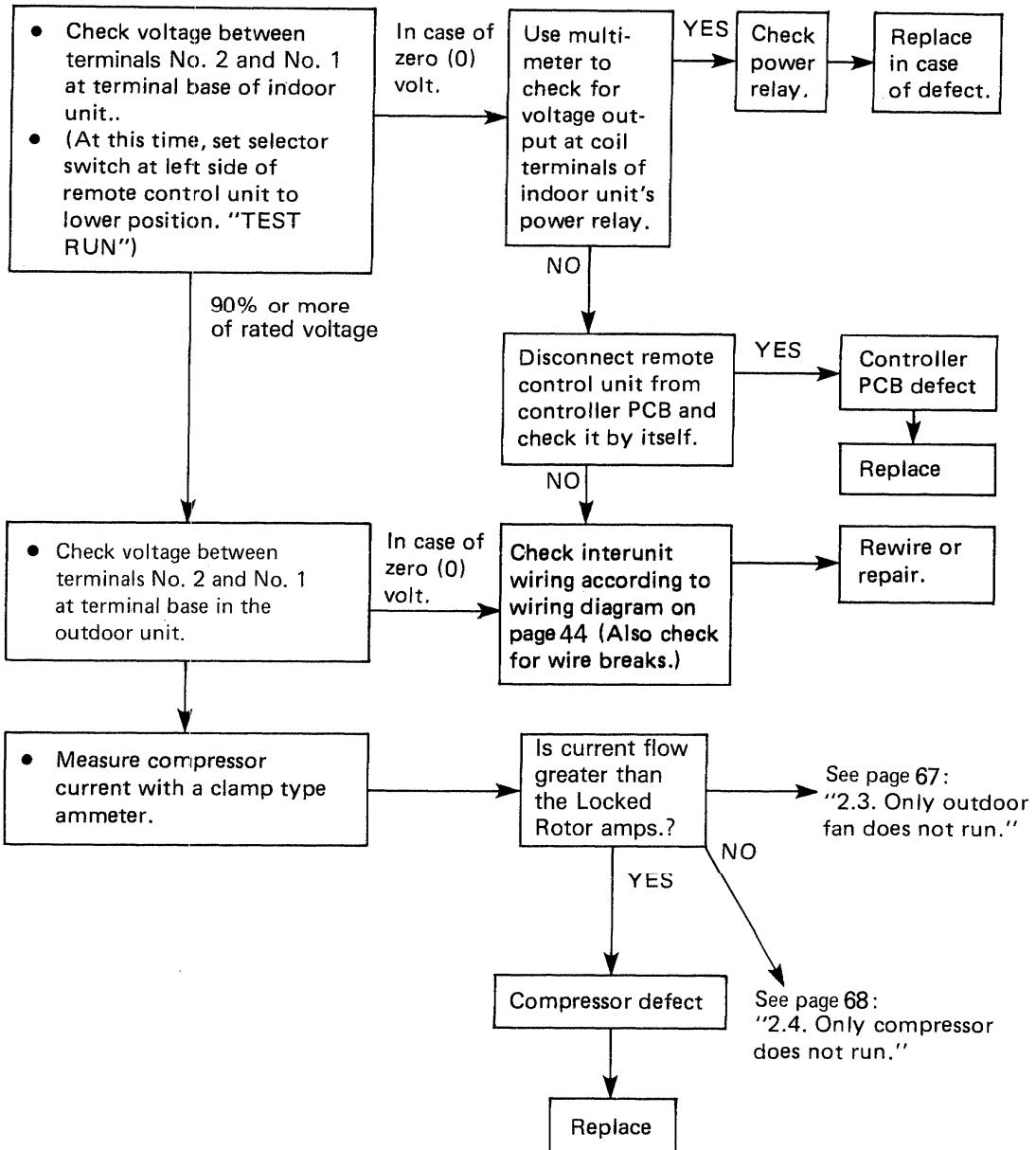
2.1 Indoor fan does not run



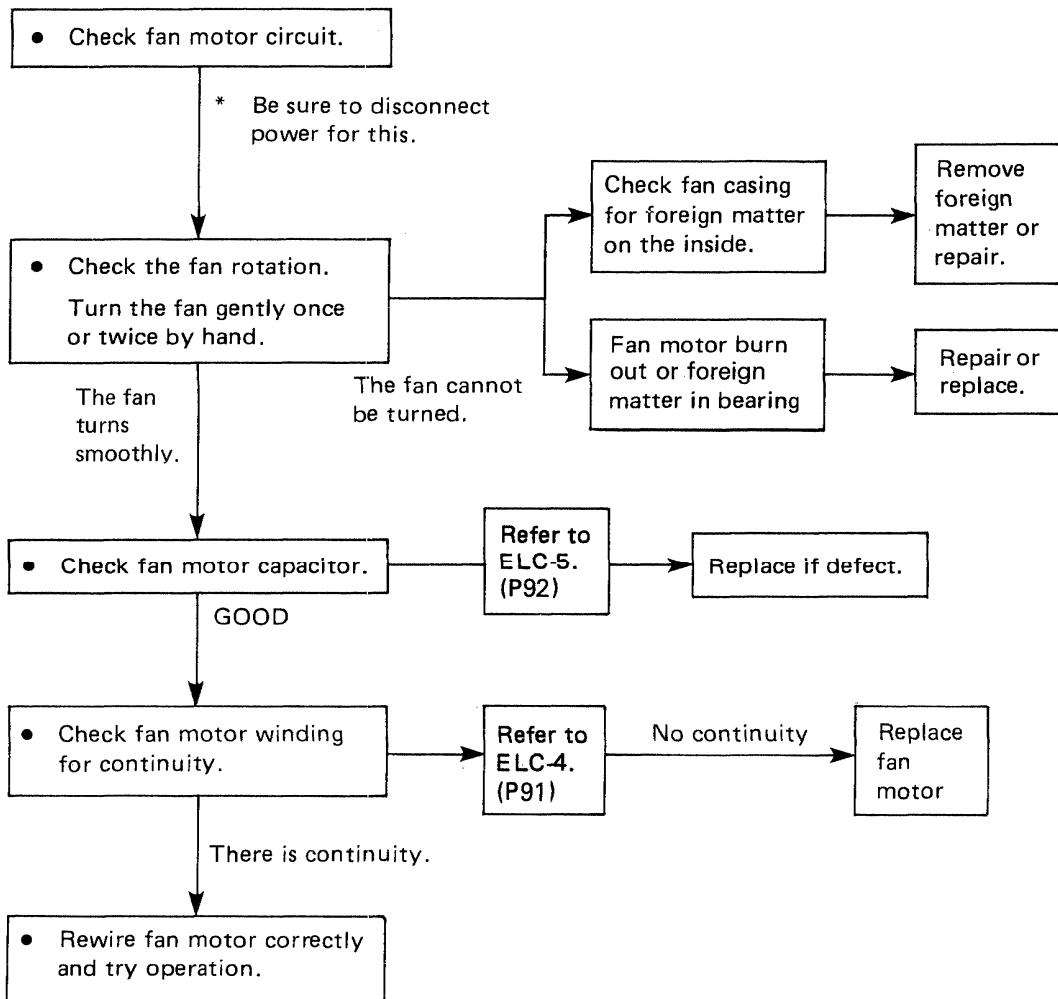
2.2 Neither outdoor fan nor compressor runs

Note: Check following points at first;

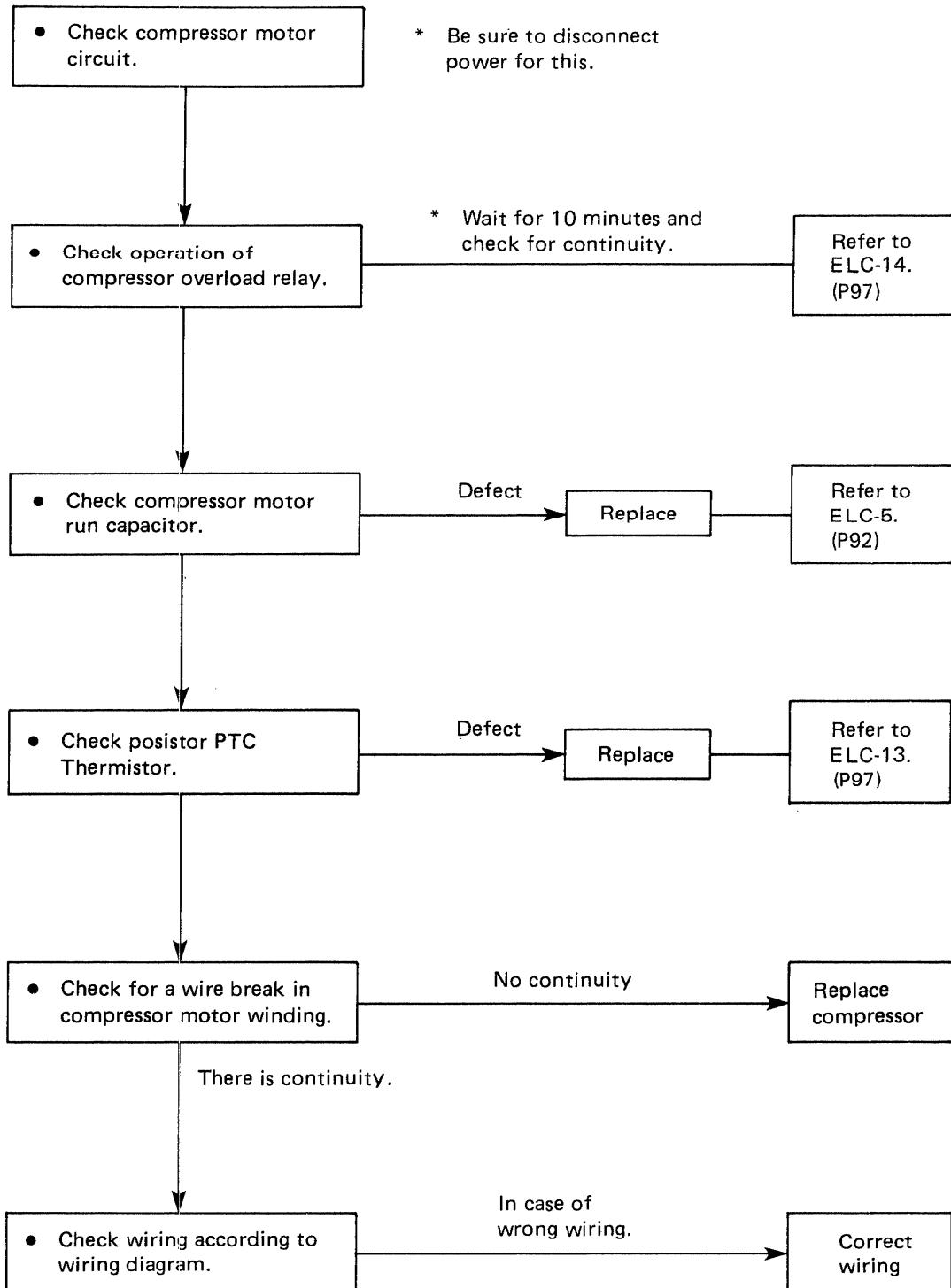
1. Is thermostat setting suitable?
2. Has 3 minute timer operated?
(No operation for 3 minutes after power ON.)



2.3 Only outdoor fan does not run



2.4 Only compressor does not run

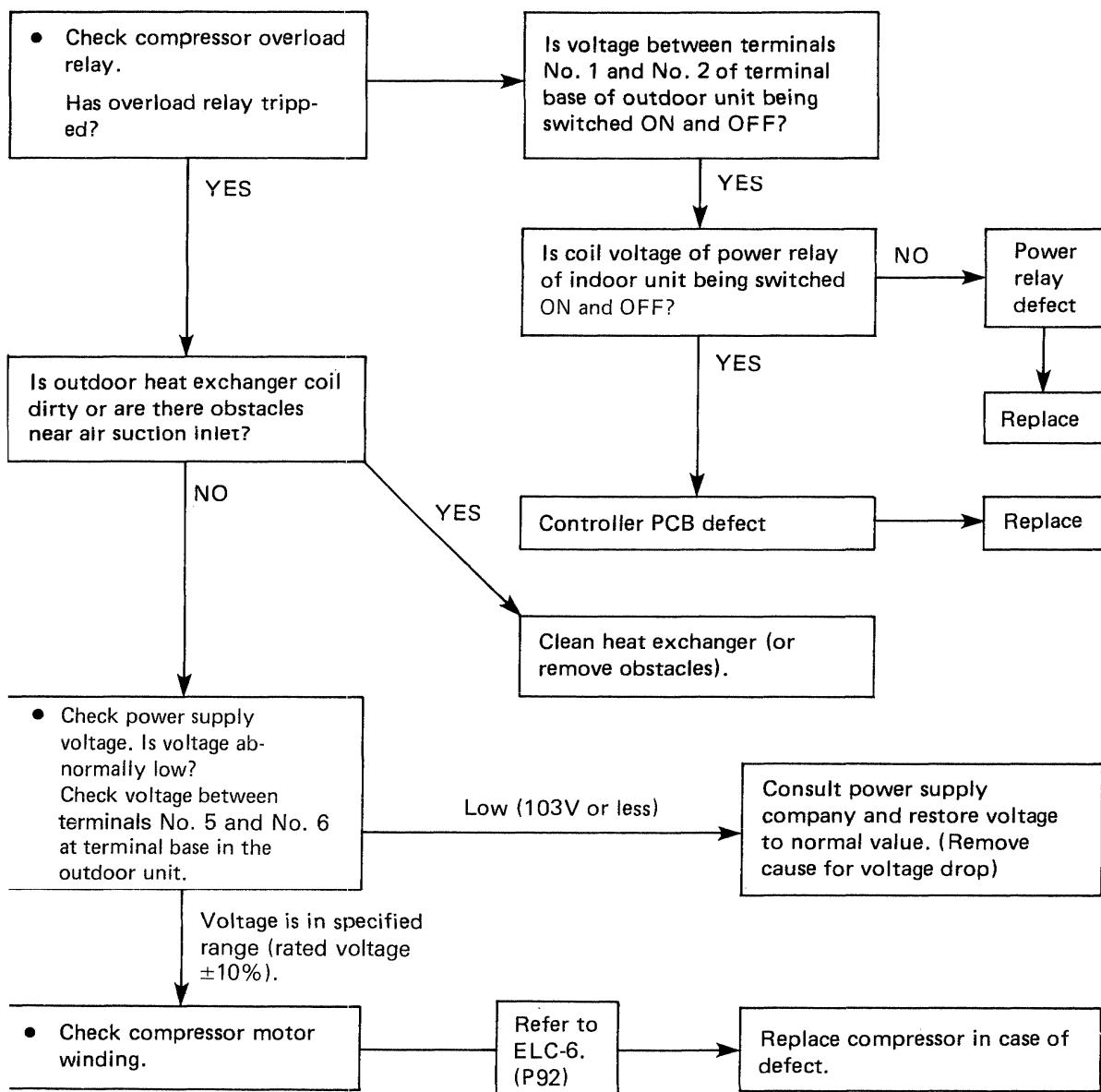


NOTE:

The PTC thermistor is not provided for the model SAP181C

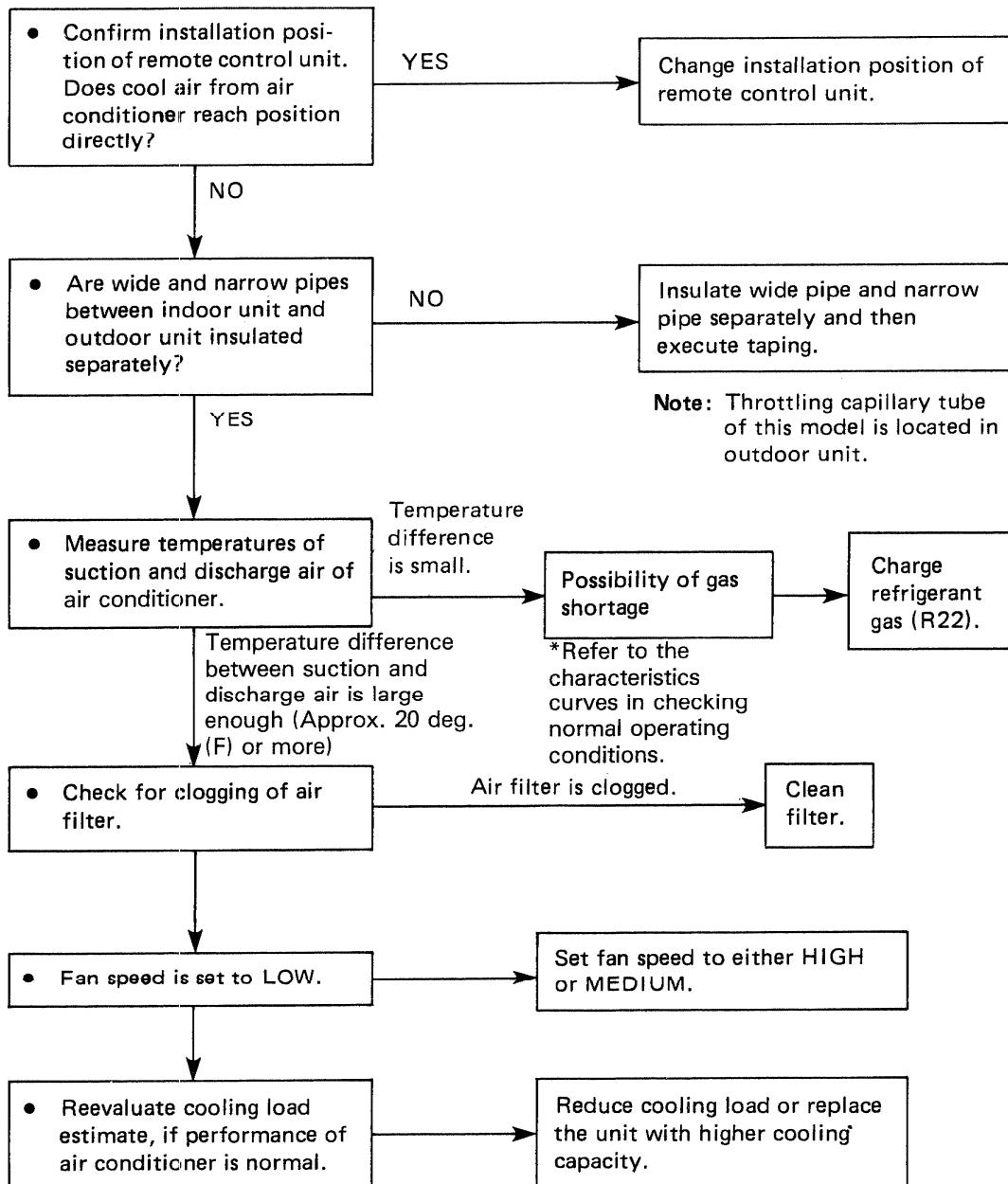
2.5 Compressor frequently repeats ON and OFF

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

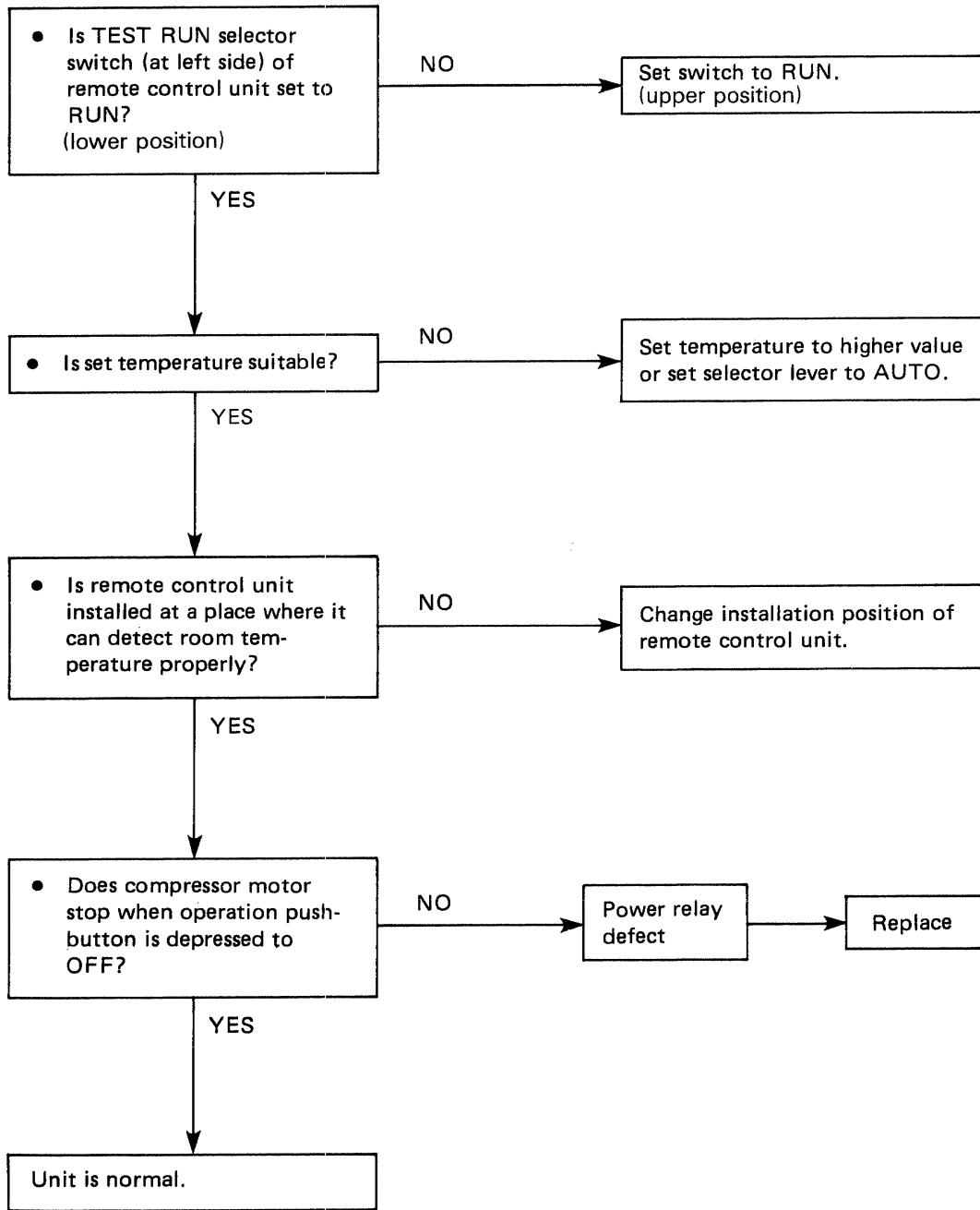


3. Air conditioner operates, but abnormalities are observed

3.1 Poor cooling



3.2 Excessive cooling



4. Description of Functions (SAP91KC/SAP121KC/SAP181KC)

SAP91KC/SAP121KC/SAP181KC
(Cooling Only)

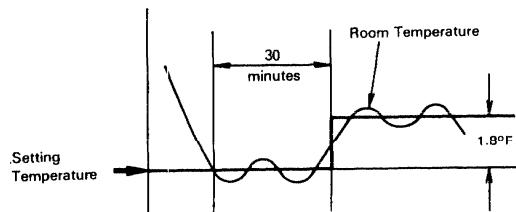
1. Mode Selection

1.1 Manual Mode

Manual mode enables normal operation of the unit.

1.2 Night Set BK Mode

In the cooling mode, the Night Set BK system takes advantage of the fact that less heat is felt at a given temperature when the humidity level is low. When the selector switch is set to the Night Set BK position, the unit automatically raises the setting temperature by 1.8°F after thirty minutes. In addition, the fan motor automatically turns off when the compressor is not operating to prevent a rise in the humidity of the room due to collected moisture being blown back into the room and to reduce energy consumption.



*The night set back lamp lights during the cooling operation. (If the thermostat is turned off when operation starts, the unit is reset after 30 minutes.)

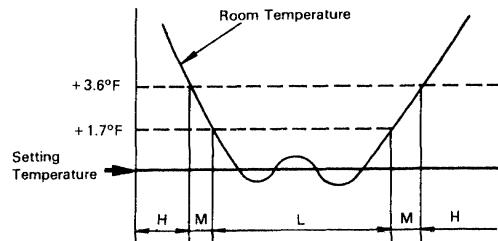
1.3 Timer ON/OFF Operation

OFF timer	The unit stops when the time set by the timer has elapsed (Normal mode).
ON timer	The unit starts when the time set by the timer has elapsed (Normal mode).

2. Air Blower Speed Change

2.1 Automatic Fan Operation

The microcomputer automatically adjusts the fan speed when the auto switch is pressed. When operation starts, the difference between the room temperature will be determined by the microcomputer and the fan speed will be switched automatically to the appropriate level (High, Medium or Low).



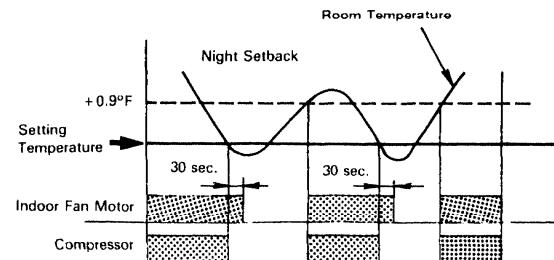
NOTE: The hold timer runs for one minute to reduce the relay noise caused when the room temperature changes suddenly.

2.2 Manual

The air blower speed that shown by the notch selected on the indicator.

3. Thermo. Cycle Operation Mode (Night Setback)

30 seconds after the compressor has been shut down due to the action of thermostat, the indoor fan motor will stop to prevent blowout of cool air.



4. Automatic Thermostat Control

When you set the THERMOSTAT lever at the "AUTO" position, depending on the room temperature at the time of the setting, the temperature will automatically be set at:

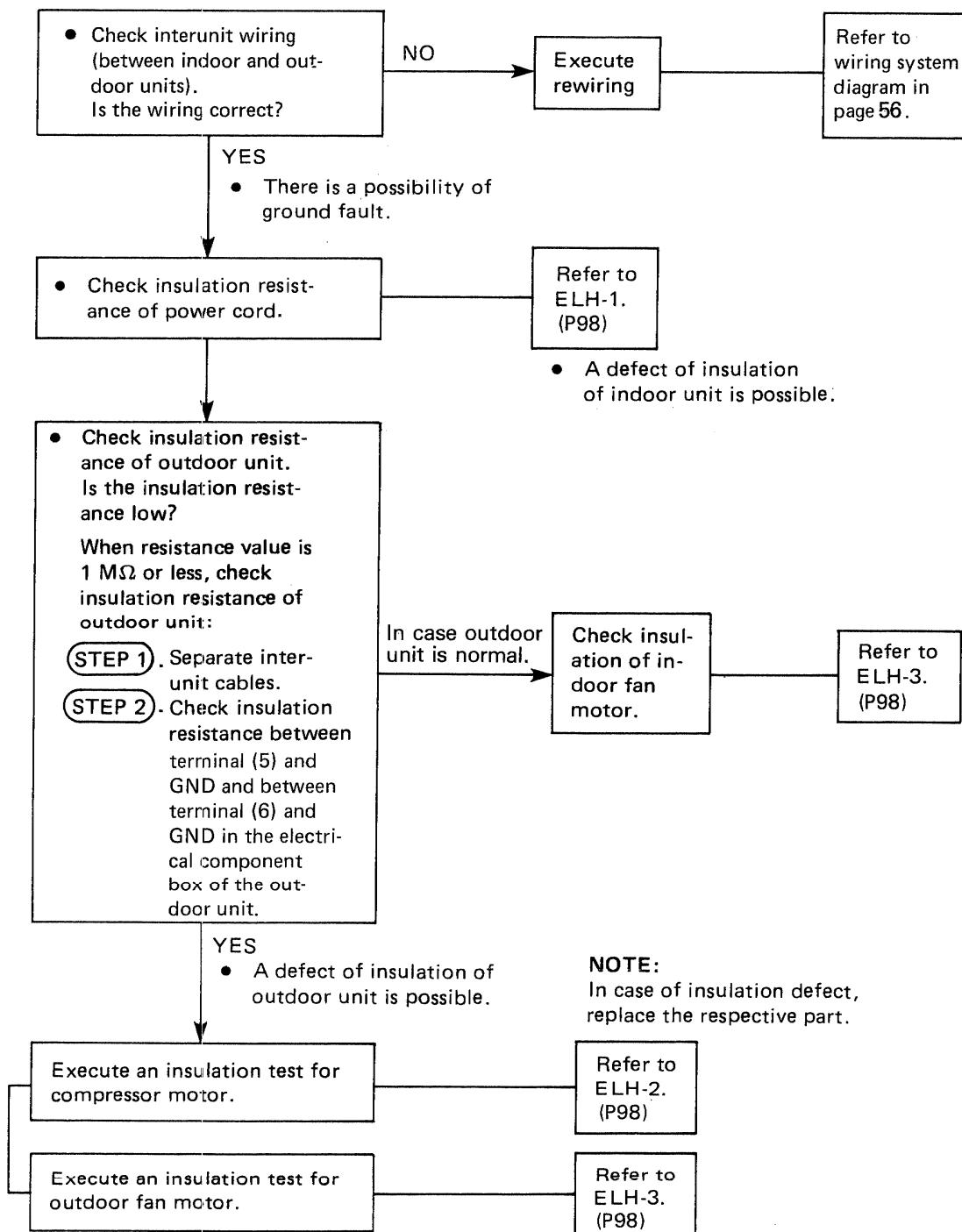
Room temperature when the unit starts	Setting temperature (Automatic)
81° F and over	75° F
Between 81 and 75° F	73° F
Below 75° F	71° F

MEMO:

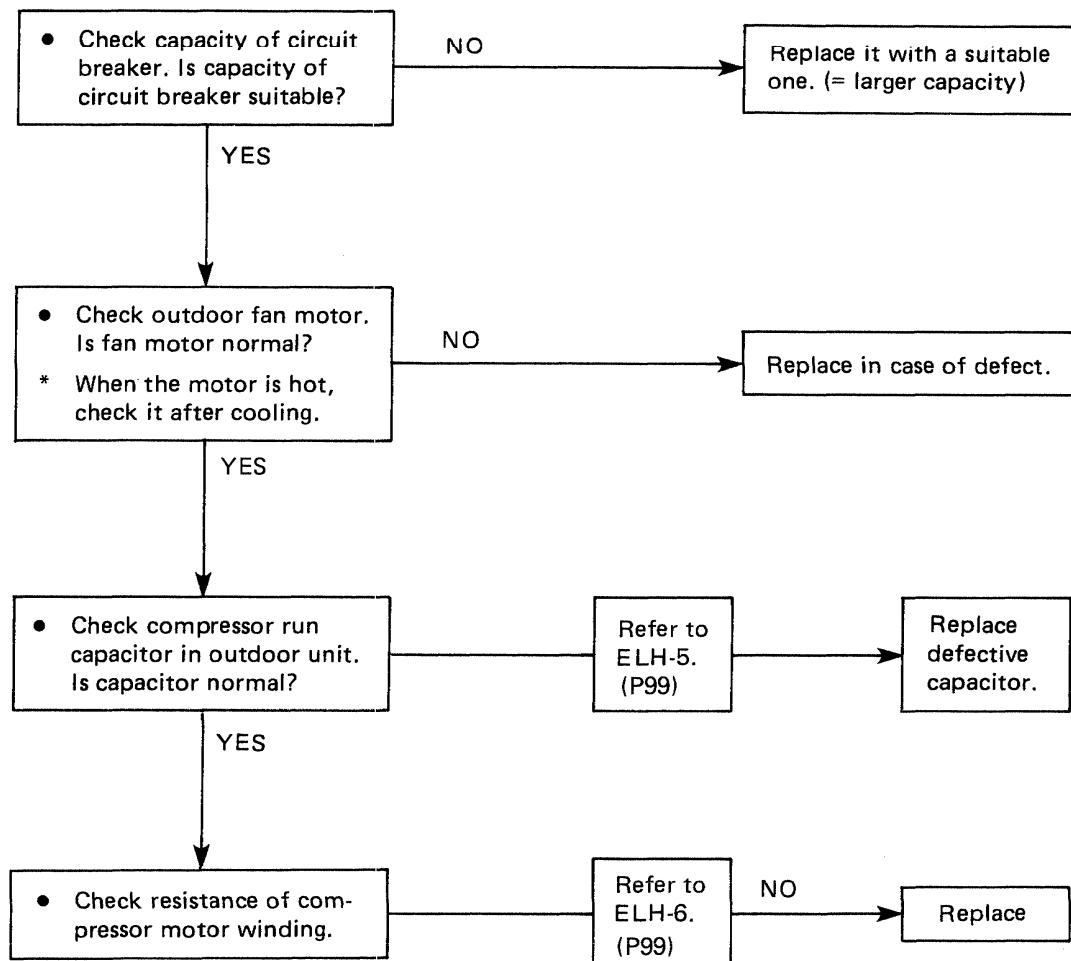
1. Air conditioner does not operate

1.1 Circuit breaker trips (or fuse blows)

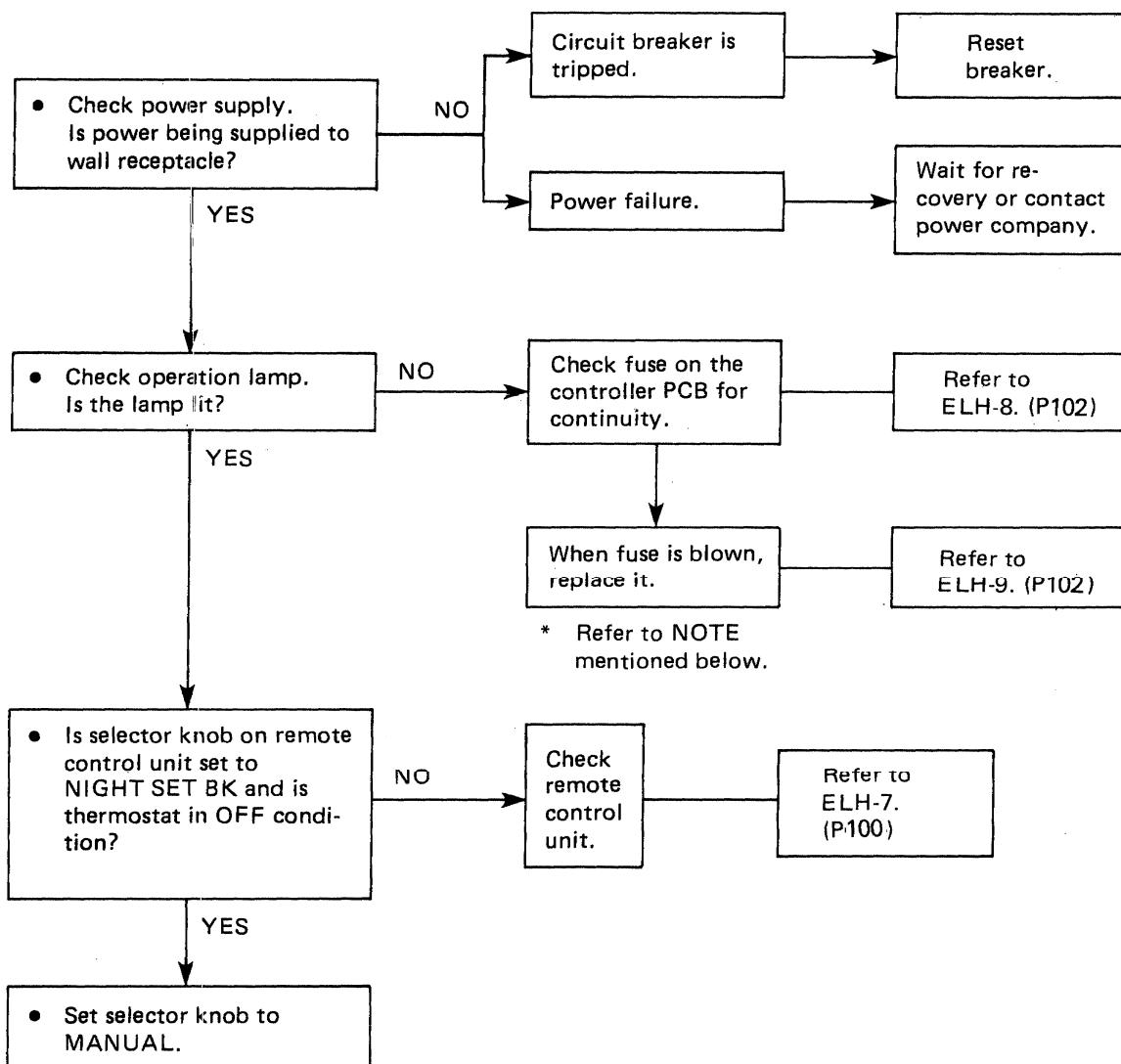
1.1.1 When circuit breaker is set to ON, it is tripped soon
(resetting is not possible)



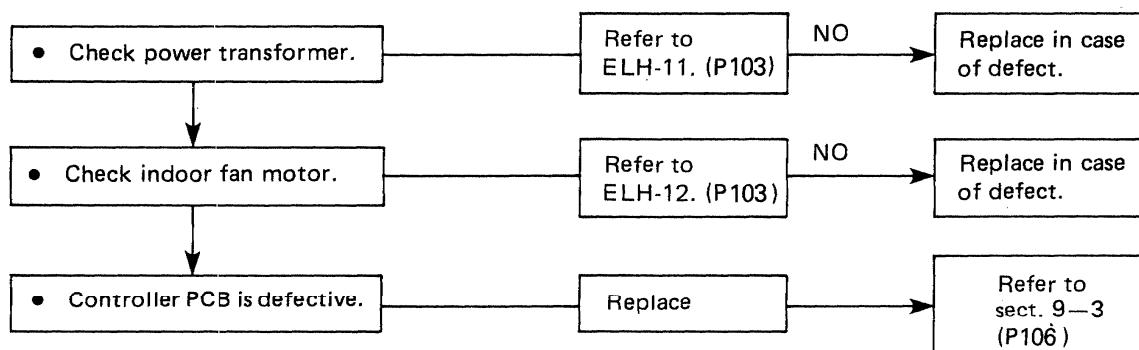
1.1.2 Circuit breaker trips when the operation switch is depressed.



1.2 Neither indoor unit nor outdoor unit runs

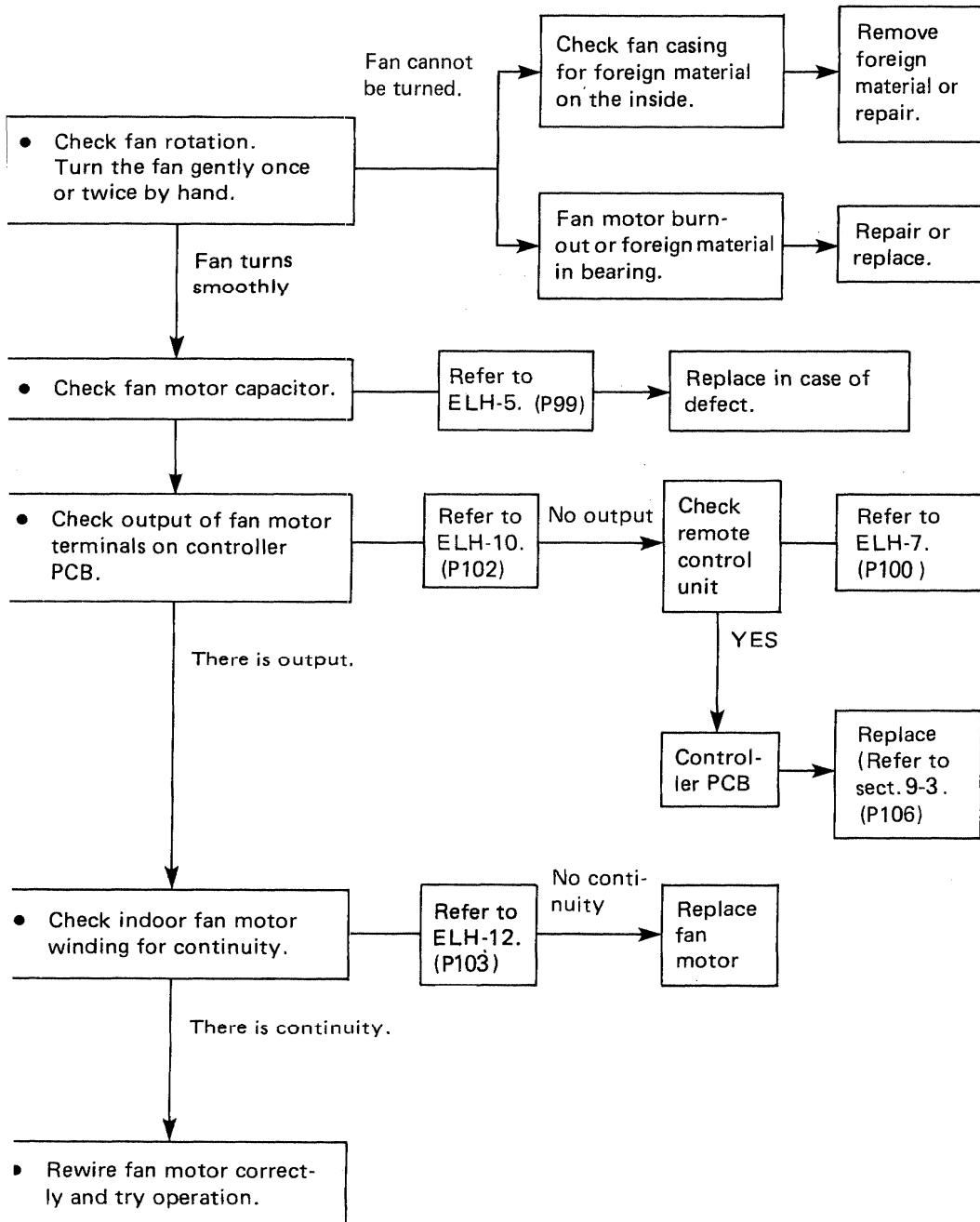


NOTE: If fuse blows again, check the following items:



2. Some part of air conditioner does not operate

2.1 Indoor fan does not run

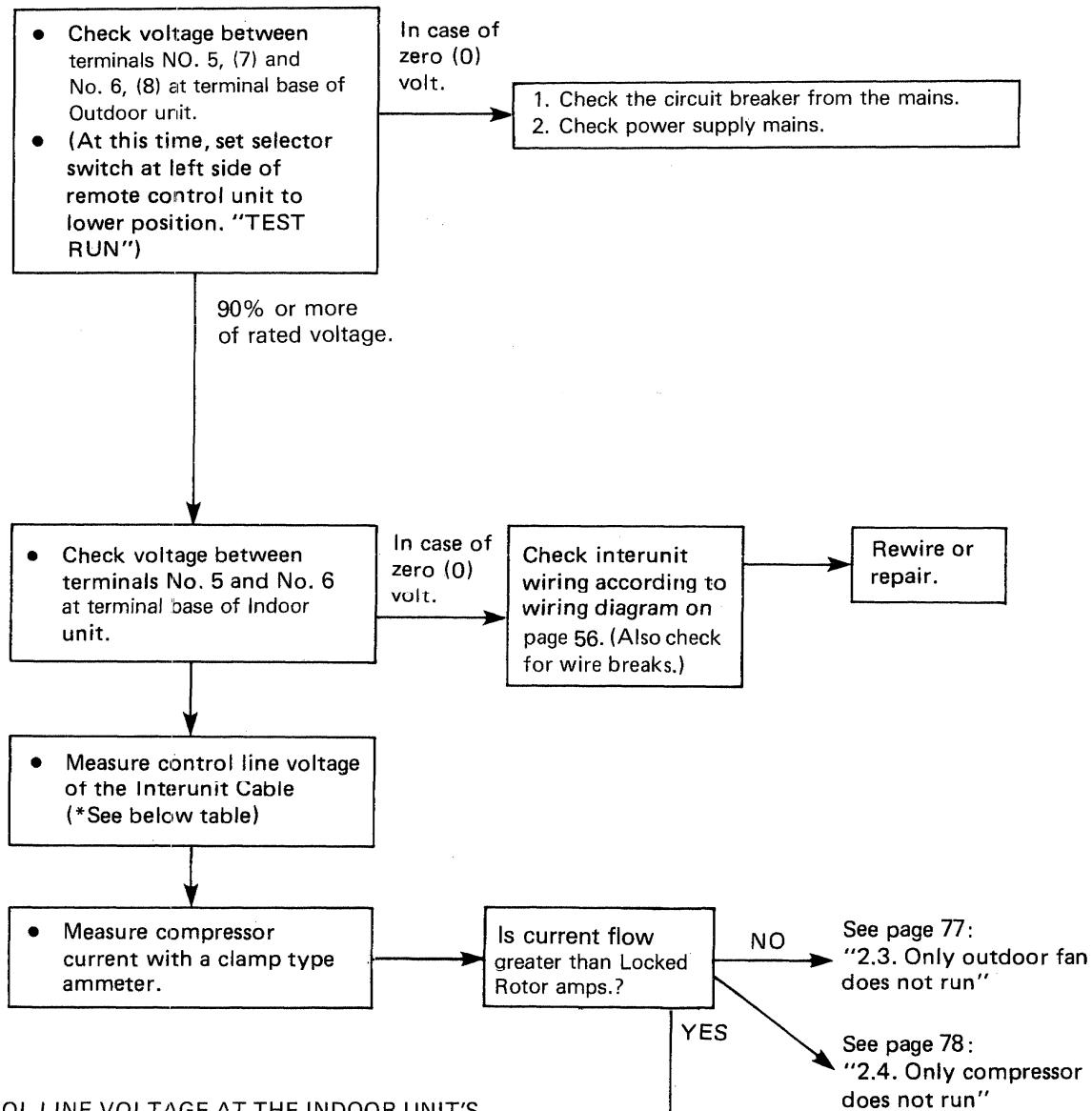


2.2 Neither outdoor fan nor compressor do not run

SAP92KCH/SAP122KCH/SAP182KCH
(Heat Pump)

Note: Check following points at first;

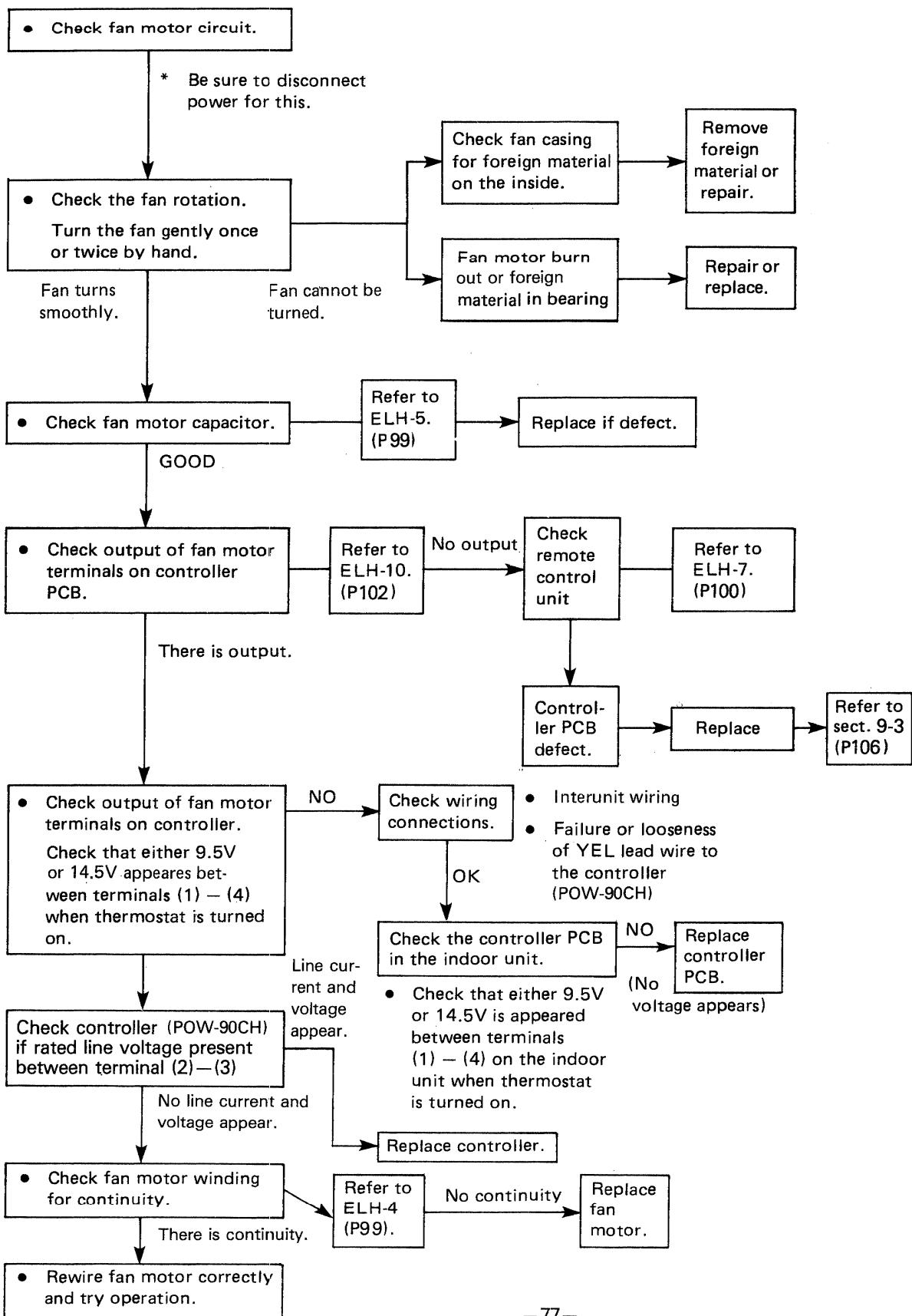
1. Is thermostat setting suitable?
2. Has 3 minute timer operated?
(No operation for 3 minutes after power ON.)



* CONTROL LINE VOLTAGE AT THE INDOOR UNIT'S TERMINAL BASE

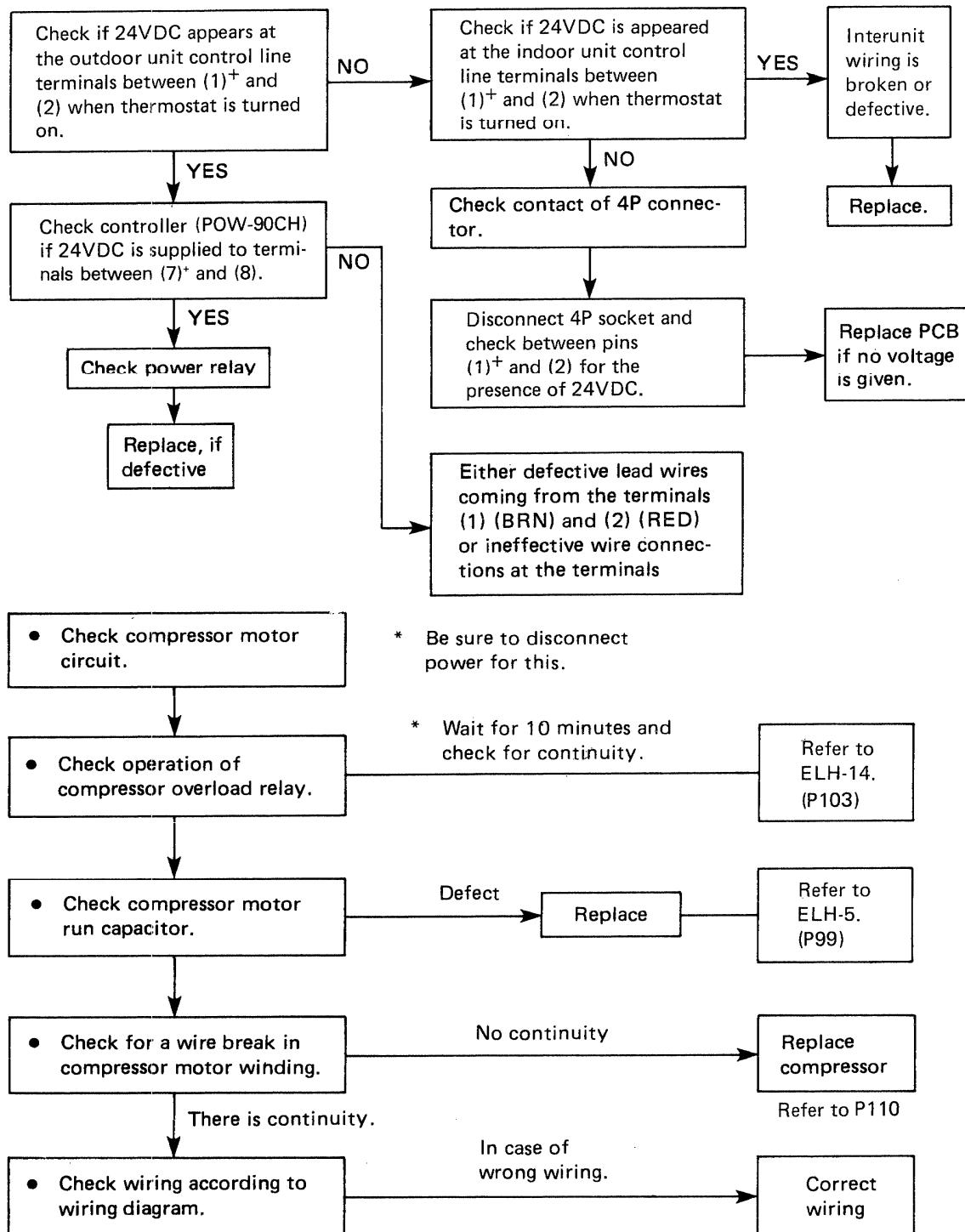
Signal	Terminal No. (to be checked)	Thermo. Cycle	Cooling Operation	Heating Operation
Compressor ON - OFF	1 - 2	ON	DC 24V	
		OFF	0 V	
Heating	1 - 3	-	0 V	DC 24 V * 0 V when defrosting
Fan motor ON - OFF	1 - 4	ON	Approx. 9.5 V or 14.5 V	
		OFF	0 V (Defrosting and Overload Condition are included)	

2.3 Only outdoor fan does not run



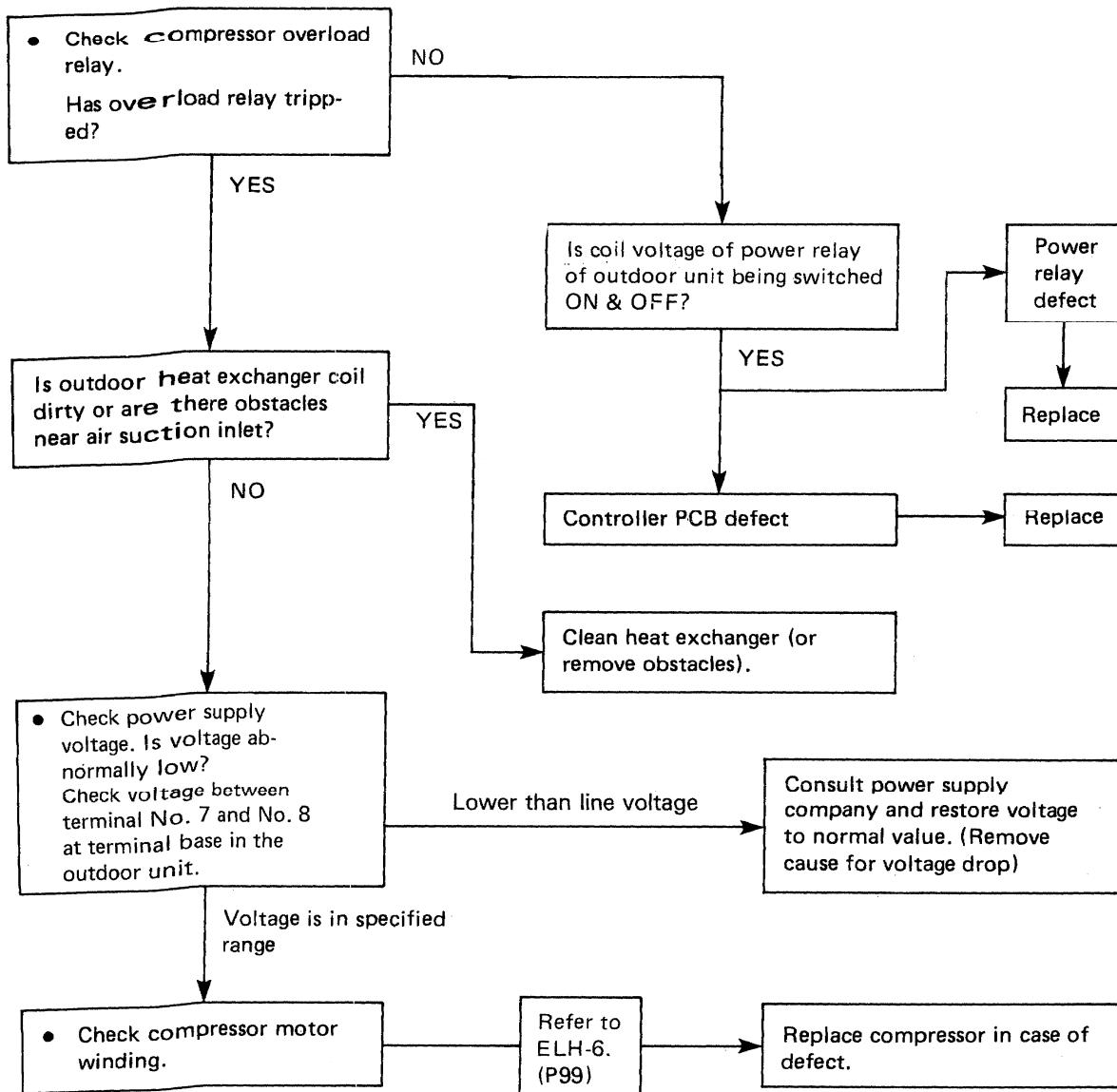
2.4 Only compressor does not run

SAP92KCH/SAP122KCH/SAP182KCH
(Heat Pump)



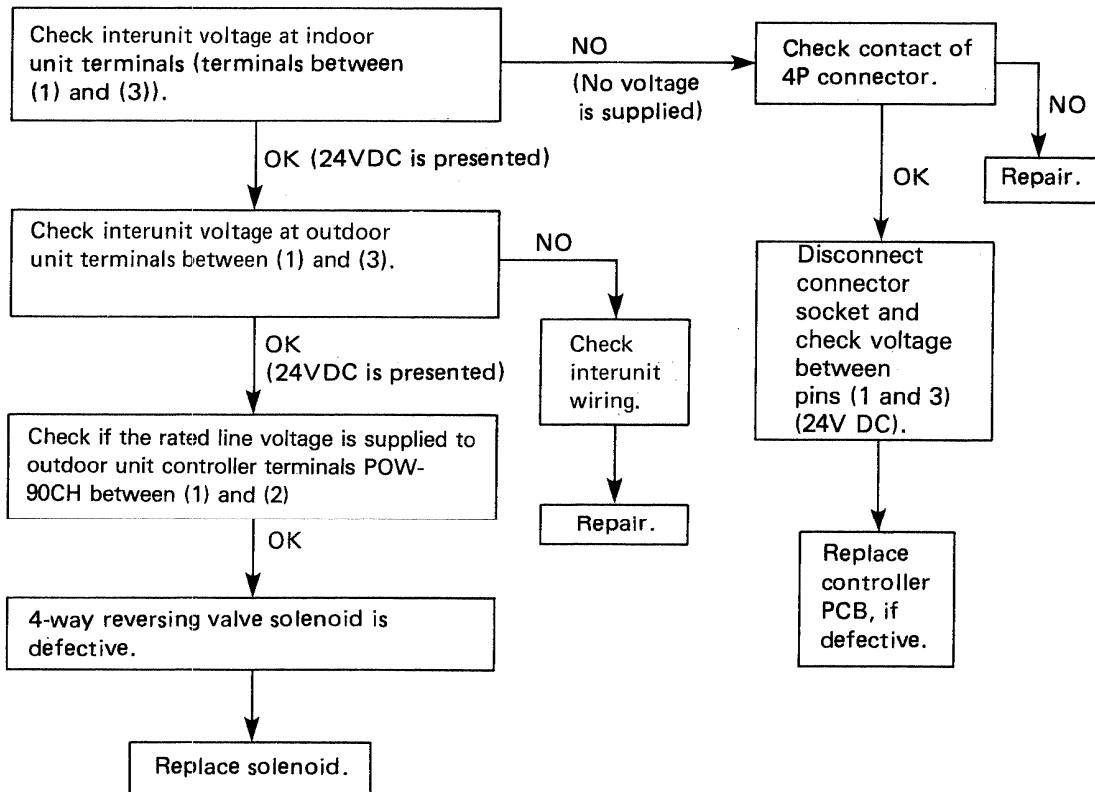
2.5 Compressor frequently repeats ON and OFF

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



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

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



2) Defrosting system malfunction (at heating)

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

- Remove defrost thermostat from the controller (outdoor unit) terminals (5) and (6) and check for conductivity.

Defrost thermostat is normal if following conditions will be satisfied:

OFF	Maximum 39°F	ON	Minimum 54°F
-----	--------------	----	--------------

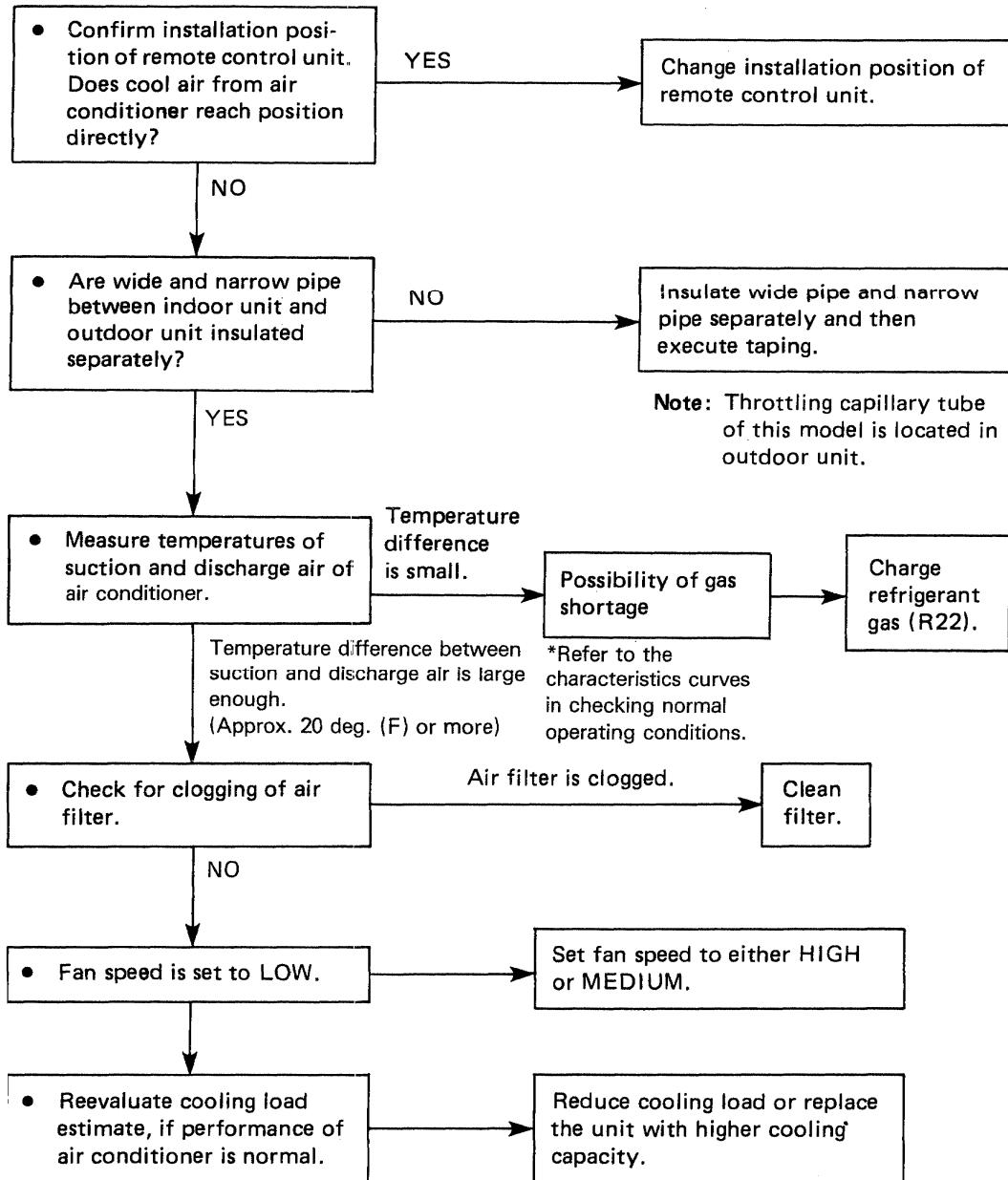
If the thermostat stays ON below 39°F, it is defective. → Replace the thermostat.

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

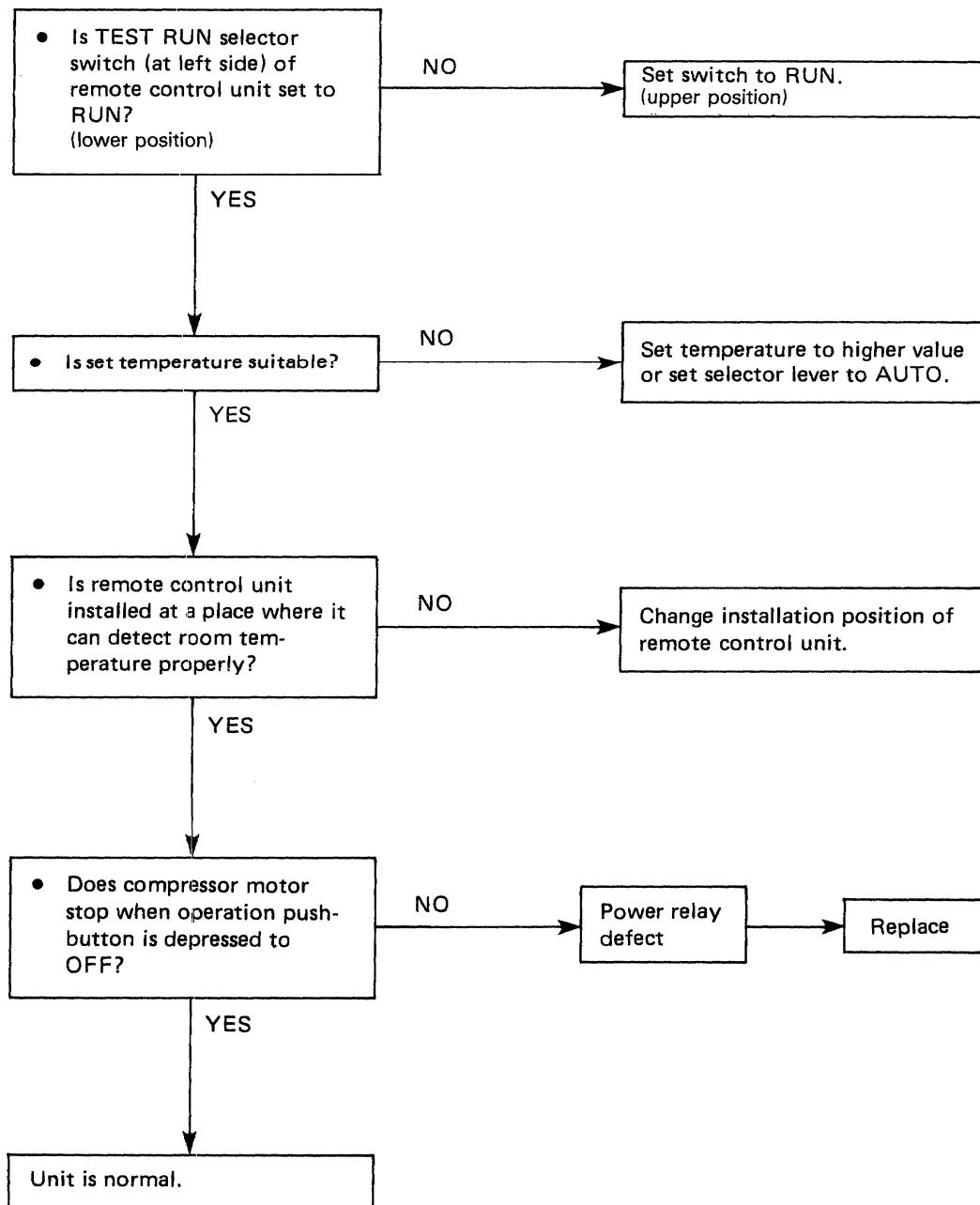
Controller PCB (indoor unit) is defective. → Replace the controller PCB.

3. Air conditioner operates, but abnormalities are observed

3.1 Poor cooling

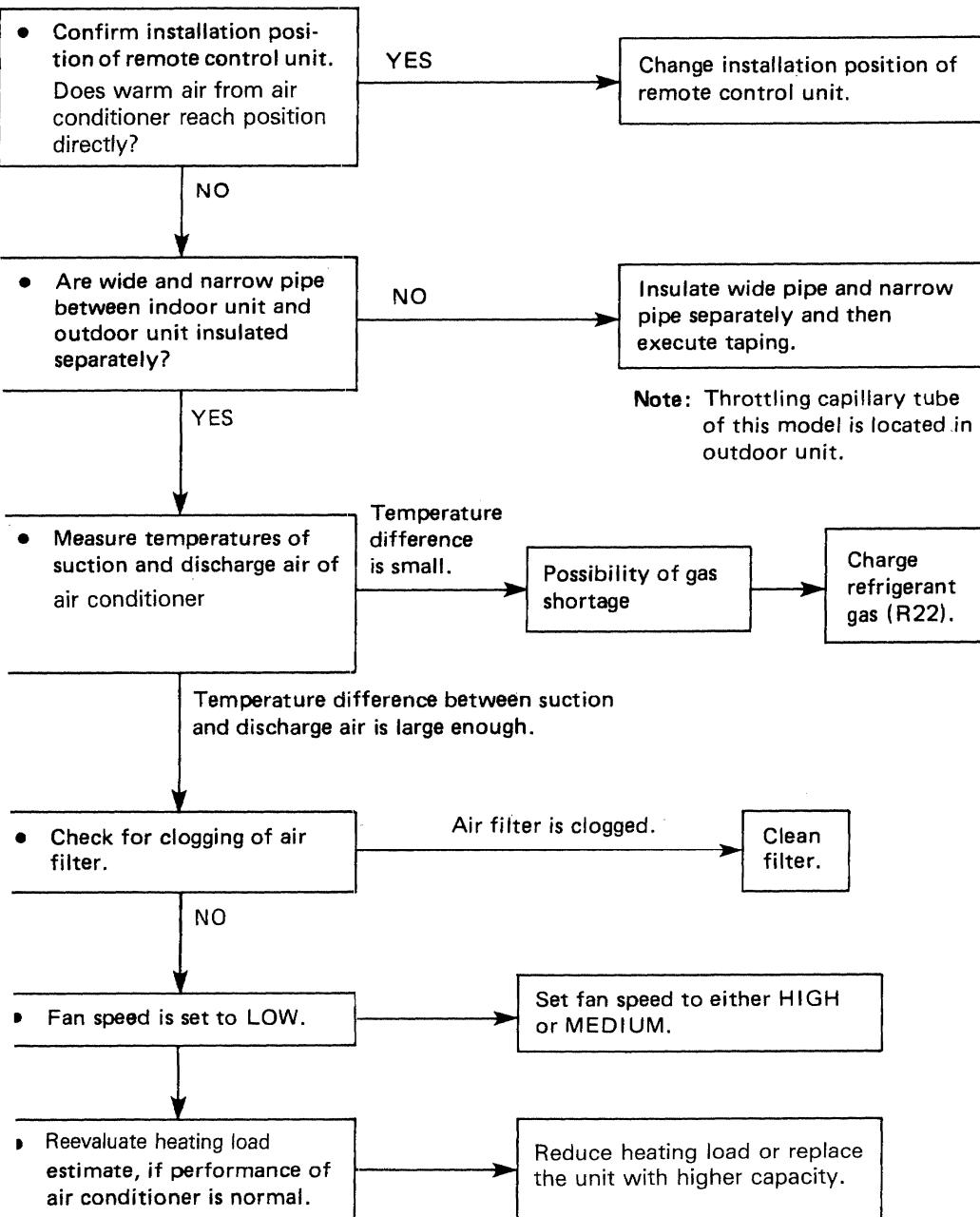


3.2 Excessive cooling



3. Air conditioner operates, but abnormalities are observed

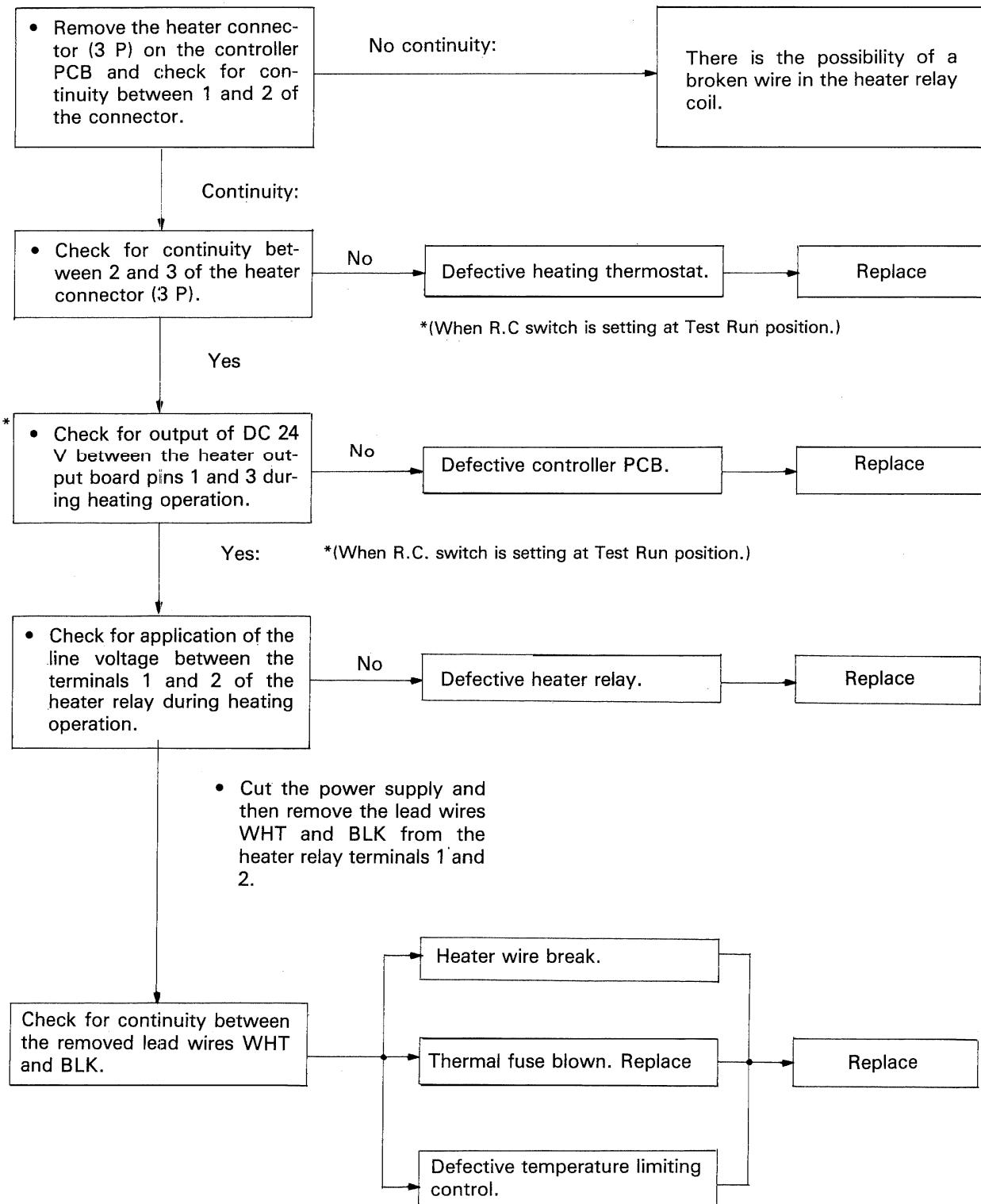
3.3 Poor heating



Heating

Note: * If outdoor ambient temp. falls below 35°F, heating capacity may be reduced greatly.
In this case, use supplementary heating appliances.

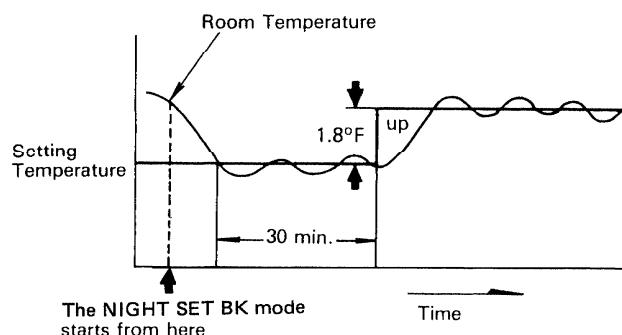
3.4. The electric heater does not work



4. Description of Functions (SAP92KCH/SAP122KCH/SAP182KCH)

1. Night Set BK-Cooling Mode

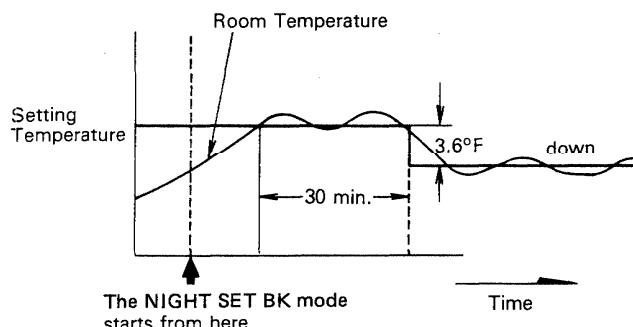
In the NIGHT SET BK mode, once the thermostat is turned OFF, the temperature setting of the thermostat will automatically rise 1.8°F within 30 minutes. When the thermostat turns the compressor off, the fan will stop within 30 seconds to save power.



Night Set BK-Heating Mode

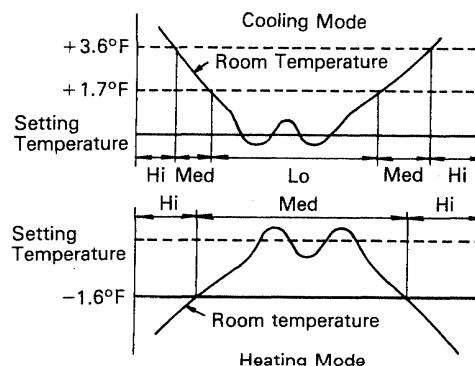
In the NIGHT SET BK mode, once the thermostat is turned OFF, the temperature setting of the thermostat will automatically fall 3.6°F within 30 minutes.

When the thermostat turns the compressor off, the indoor fan motor will stop within 30 seconds so as to save power.



2. Automatic Fan Operation

The microcomputer automatically adjusts the fan speed when the auto switch is pressed. When operation starts the difference between the room temperature and the setting temperature will be determined by the microcomputer and the fan speed will be switched automatically to the appropriate level (High, Medium or Low)

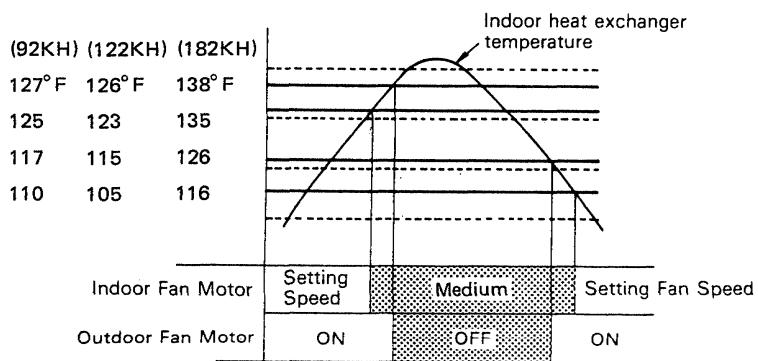


3. Overload Preventive Mechanism: Heating Mode

When the temperature in the indoor heat exchanger becomes high enough, the temperature of the indoor heat exchanger is detected by a sensor and the indoor fan motor and the outdoor fan motor will automatically stop the unit as shown in the below chart. Thus the unit is protected from overloading.

Note

Temperature factors shown here are different from those given in the old manual. Check WM-number in the cover is WM-20692. Otherwise consult with SFS CORPORATION.

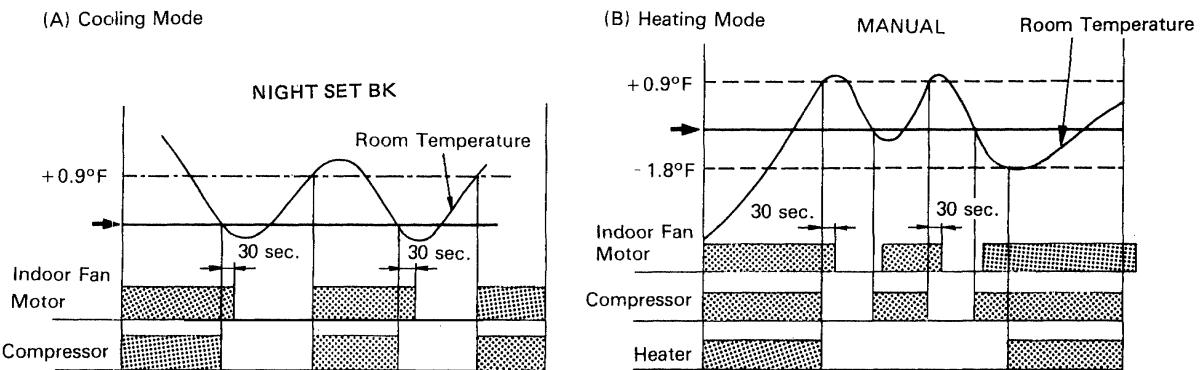


4. Thermo. Cycle Operation Mode: Heating Mode

30 seconds after the compressor has been shut down due to the action of thermostat, the indoor fan motor will stop to prevent blowout of cool air.

Differential of thermostat is 0.9°F . Once thermostat is turned off, error protection circuit holds restarting of compressor for 3 minutes.

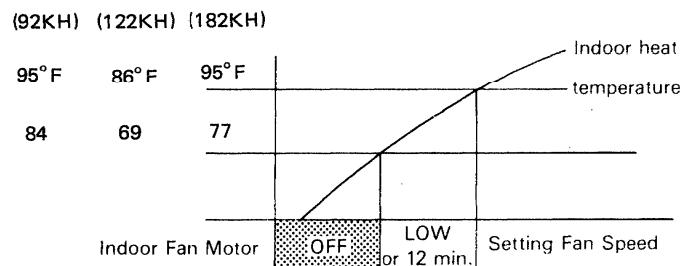
NOTE: The standby lamp will not be lit on at the time of NIGHT SET BK programs.



5. Cold Draft Prevention (= Standby) Mode: Heating Mode

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

- a) When heating operation starts
- b) When heating operation starts after defrosting
- c) When the thermostat turns on the compressor in heating operation.



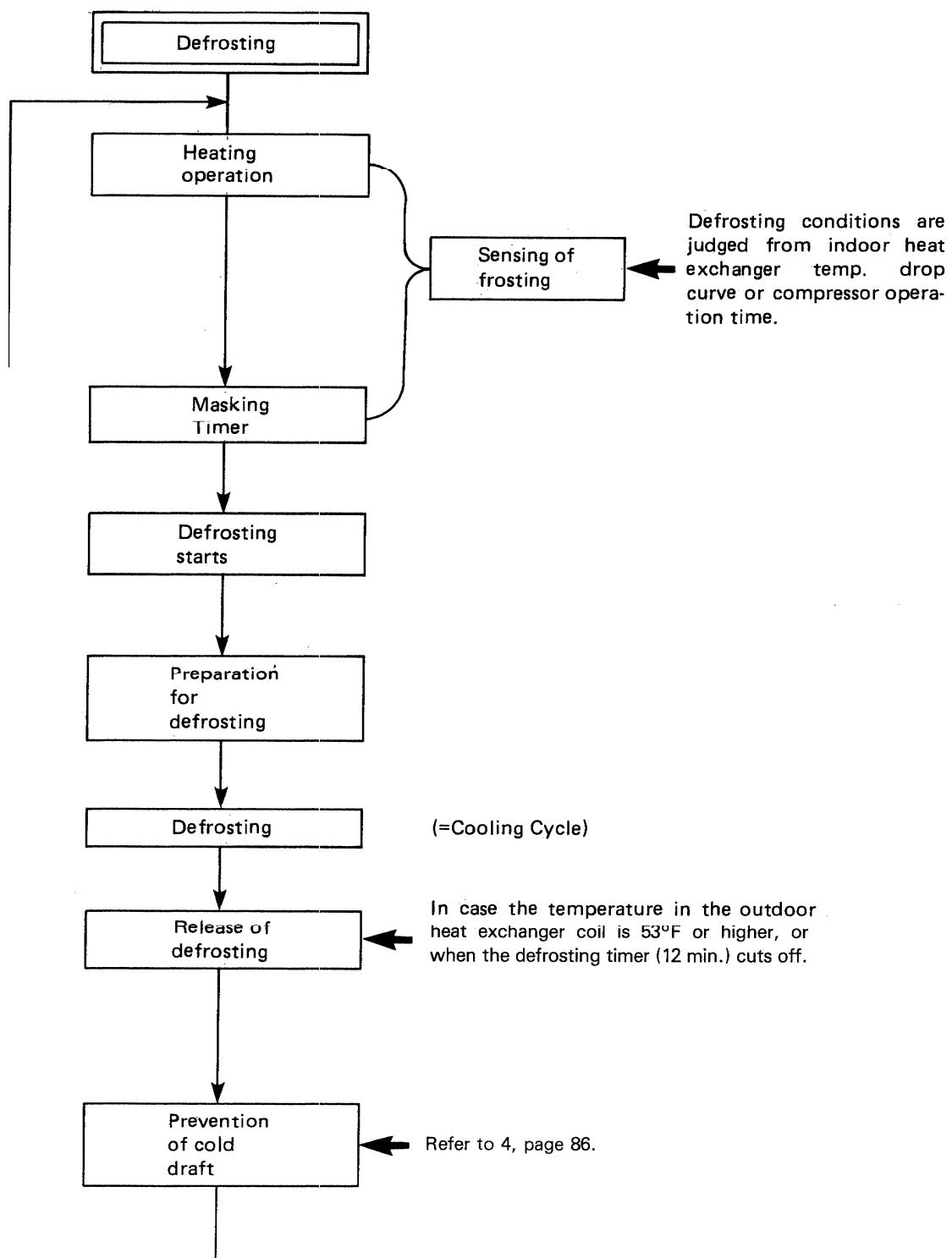
Note

Temperature factors shown here are different from those given in the old manual. Check WM-number in the cover is WM-20692. Otherwise consult with SFS CORPORATION.

6. 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 microcomputer controlled temperature sensing system, and defrosting operation is started. At this time, the indoor and outdoor fan motors will stop, only the compressor is operated, and the system is automatically changed to cooling operation mode.

Flow of Defrosting



6. CHECKING AND REPLACING ELECTRICAL COMPONENTS

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ELC-4. Checking of the Outdoor Fan Motor	91—92
ELC-5. Checking of the Motor Capacitor	
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ELH-14. Checking of the Electric Heater and Thermal Protectors.	

ELA. Connector Identification on Controller PCB
POW-181K (For SAP181KC)
POW-12KU (For SAP91KC & SAP121KC)

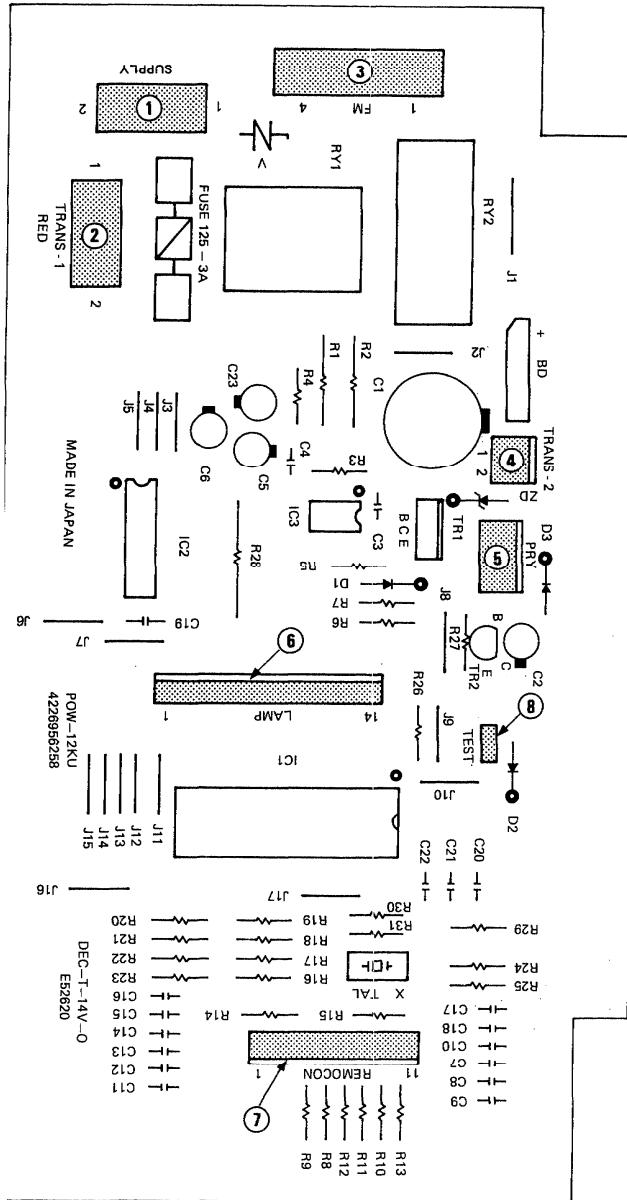


Fig. E-A (Model: POW-12KU)

1. Connector, Power Supply to PCB *
2. Connector, Transformer (Primary: *)
3. Connector, Fan Motor *
4. Connector, Transformer (Secondary: 19V)
5. Connector, Power Relay 24V
6. Connector, Lamp Board Ass'y 24V
7. Connector, Remote Control Unit 9 V
8. Connector, Test Pin 9 V

The asterisk "*" indicates that line voltage is applied.

POW-92KH (For-SAP92KCH)
POW-122KH (For SAP122KCH)
POW-182KH (For SAP182KCH)

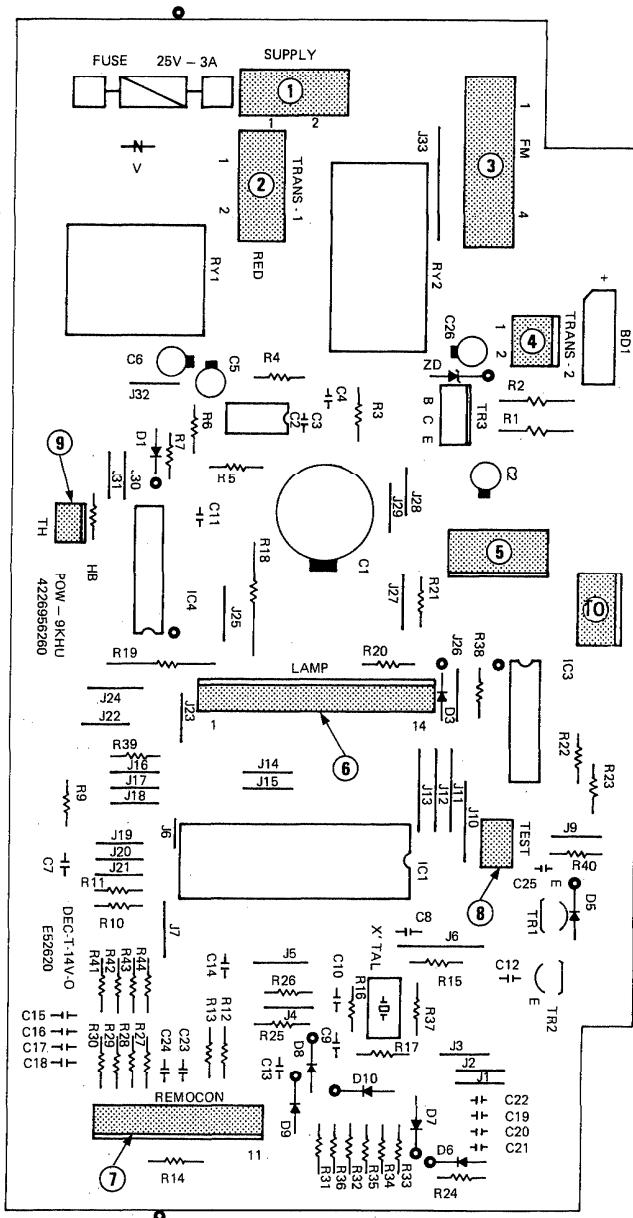


Fig. E-B (Model: POW-92KH)

1. Connector, Power Supply to PCB *
2. Connector, Transformer (Primary: *)
3. Connector, Fan Motor *
4. Connector, Transformer (Secondary: 19V)
5. Connector, Power Relay 24V
6. Connector, Lamp Board Ass'y 24V
7. Connector, Remote Control Unit 9 V
8. Connector, Test Pin 9 V
9. Connector, Thermistor Sensor 9 V
10. Connector, Heater Relay 24 V

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

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

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

SAP91KC/SAP121KC/SAP181KC
(Cooling Only)

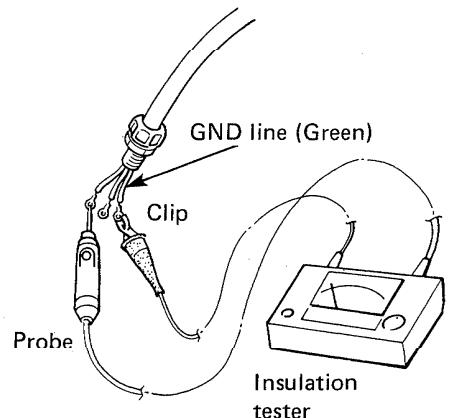


Fig. E-1

ELC-2. Measurement of Insulation Resistance of the compressor

Remove the red lead wire connected to the compressor motor from (1) on the terminal base. Clamp the removed black lead wire with a lead clip of the insulation resistance tester and measure the resistance by placing a probe of the tester to the terminal GND, to which green lead wire is connected.

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

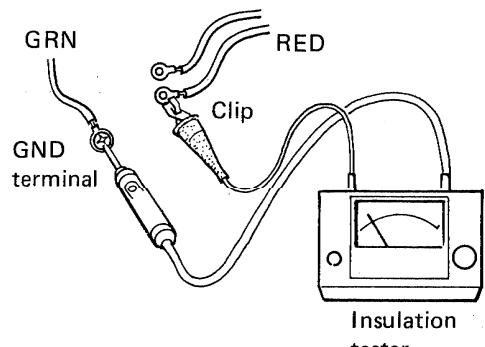


Fig. E-2

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

3.1. In case of indoor fan motor

Remove the fan motor connector from controller PCB (P89, Fig. E-A). Clamp the green lead wire (at the bear section) extended from the terminal GND in the electrical component box and measure insulation resistance by placing a probe of the insulation tester to either pole of this connector.

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

Note:

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

3.2. In case of outdoor fan motor

Remove the blue lead wire of the fan motor from (1) on the terminal base. Clamp this lead wire with a lead clip of the insulation resistance tester and measure the resistance by placing a probe of the tester to the terminal GND.

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

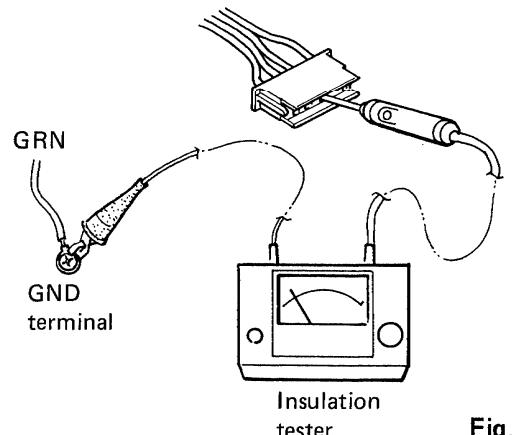


Fig. E-3

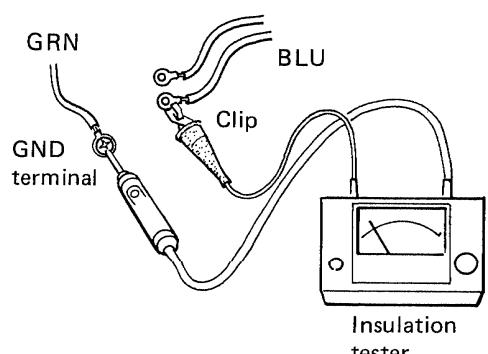


Fig. E-4

ELC-4. Checking of the outdoor fan motor (SAP91C/SAP121C)

Remove the blue (BLU) lead wire from the terminal ① then brown (BRN) and pink (PNK) lead wires from the fan motor capacitor respectively as indicated in the wiring diagram (Fig. E-5A)

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

SAP121C

Lead wire color	Coil resistance
BLU - BRN	62 Ω ±10 %
BLU - PNK	59 Ω ±10 %

(Table-1A)

SAP91C

Lead wire color	Coil resistance
BLU - BRN	69 Ω ±10 %
BLU - PNK	104 Ω ±10 %

Note: When ambient temp. is 70°F. (Table-1B)

(SAP181C)

- Remove the red (REC) lead wire from the terminal 1, then blown (BRN) and pink (PNK) lead wires from the fan motor capacitor respectively.
- Remove the grey (GRY) lead wire from the compressor capacitor.
- Check the continuity for both ends of the PNK lead wires from the fan motor and the GRY lead wires from the compressor capacitor.
- Set the resistance measuring range of the multimeter to "X1Ω" and measure the resistance between the fan motor lead wires.

SAP181C

Lead wire color	Coil resistance
WHT-BRN	86 Ω ±10%
YEL-PNK	60 Ω ±10%

(Table-1C)

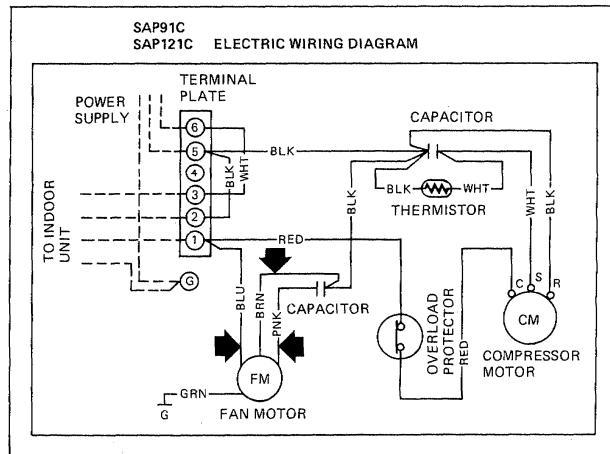


Fig. E-5A

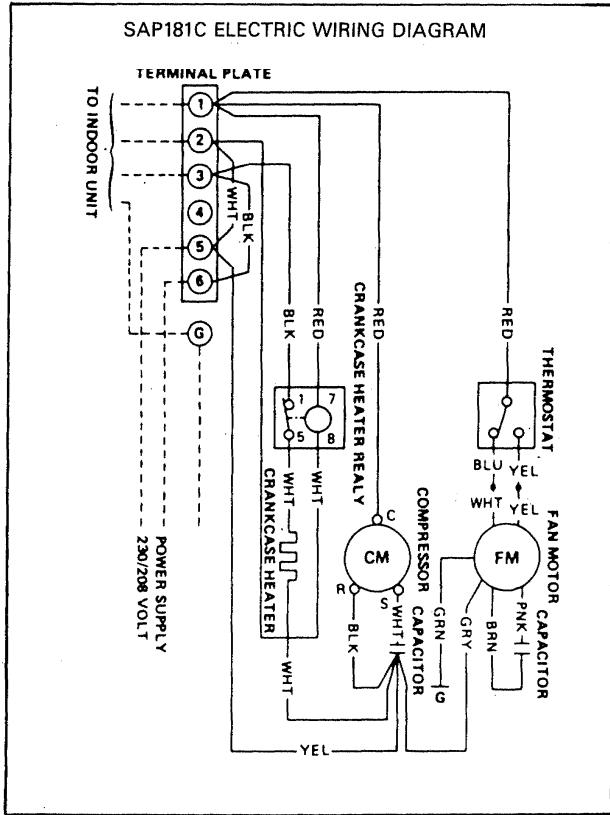


Fig. E-5B

ELC-5. Checking of the Motor Capacitor

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

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

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

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

SAP91KC/SAP121KC/SAP181KC
(Cooling Only)

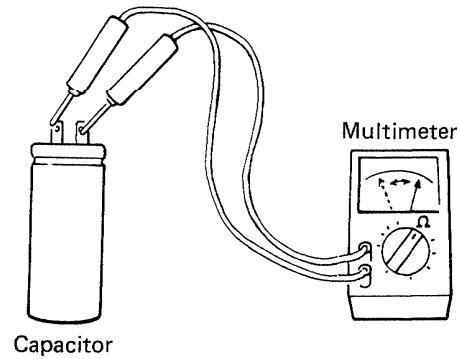


Fig. E-6

ELC-6. Checking of the Compressor Motor Winding

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

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

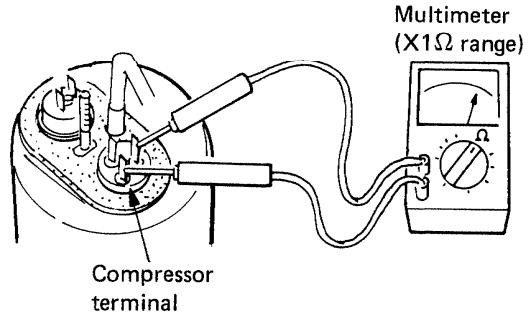


Fig. E-7

ELC-7. Checking of the Remote Control Unit Proper

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

The position of the switch which is used to operate the air conditioner for a room temperature below 70°F (21°C) is the position of the switch for this TEST RUN.

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

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

B. Checking of the Items of the Remote Control Unit

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

(1) Checking of the Room Temperature Sensor

Measure the resistance between No. 1 and No. 2 connector. (For an ambient temperature of 80°F, the resistance is about 5 kΩ).

NOTE :

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

(2) Fan Speed Selector

Check the continuity of the connector No. 5 and No. 6 against No. 8 (place the negative (-) probe on No. 8 and positive (+) probe on No. 5 and then No. 6).

Checking points	Position of the selector			
	High	Med.	Low	Auto
8 - 5	NO	YES	YES	NO
8 - 6	YES	YES	NO	NO

NOTE: YES Continuity (Table-2)
NO Discontinuity

(3) Checking of the Selector

Check the continuity of the connectors No. 5, 4 and 3 against connector No. 9.

Connector No.	Position of the Selector				
	MANUAL	NIGHT SETBACK	TIMER		OFF
			ON	OFF	
9 - 5	NO	NO	YES	NO	
9 - 4	NO	YES	YES	YES	
9 - 3	NO	YES	NO	NO	

(Table-3)

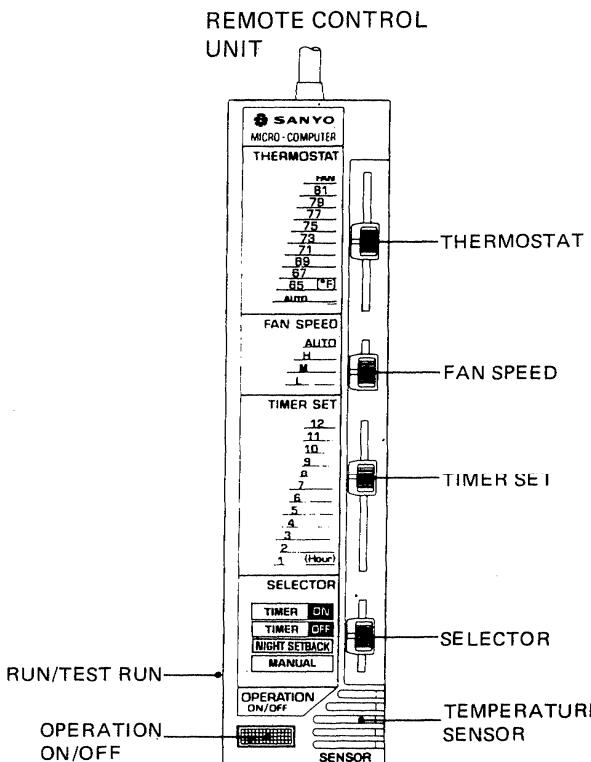


Fig. E-8

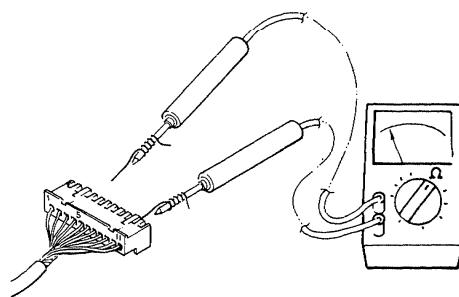


Fig. E-9

(4) Checking of the Operation Pushbutton

**SAP91KC/SAP121KC/SAP181KC
(Cooling Only)**

The operating switch is in good working condition if there is continuity between No. 9 (placing the negative (-) probe) and No. 6 (placing positive (+) probe) while the pushbutton is pressed.

(5) Checking of the Timer

Measure the continuity between No. 6, 5, 4, 3, and No. 10 (placing the negative (-) probe).

Connector No.	Position of the Selector											
	1	2	3	4	5	6	7	8	9	10	11	12
10 - 6	-	-	-	-	-	-	-	-	Y	Y	Y	Y
10 - 5	-	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y
10 - 4	-	-	Y	Y	Y	Y	-	-	-	-	Y	Y
10 - 3	-	Y	Y	-	-	Y	Y	-	-	Y	Y	-

Y for YES = There is continuity.

(Table-4)

(6) Checking of the Thermostat

Measure the continuity between No. 6, 5, 4, 3, and No. 11 (placing the negative (-) probe).

Connector No.	Position of the Selector										
	AUTO	65	67	69	71	73	75	77	79	81	FAN
11 - 6	-	-	-	-	-	Y	Y	Y	Y	Y	Y
11 - 5	-	Y	Y	Y	Y	Y	Y	Y	Y	-	-
11 - 4	-	Y	Y	-	-	-	-	Y	Y	Y	-
11 - 3	-	-	Y	Y	-	-	Y	Y	-	-	-

Y for YES = There is continuity.

(Table-5)

If there is abnormality during checking at any of the above step from (1) to (6), replace the remote control unit as it is.

CAUTION:

Do not disassemble the Remote Control Unit.

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

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

Check the continuity by the multimeter as shown in Fig. E-10.

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

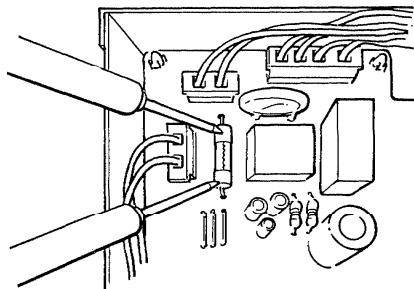


Fig. E-10

ELC-9. Method to Replace Fuse on Controller PCB

1. Remove the controller PCB according to Disassembly Procedure 9-3 (Page106).
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 (30 W or 60 W). Fig. E-11.
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).

*Fuse: 125 V or 250 V, 3 A (SAP181KC/SAP182KCH)

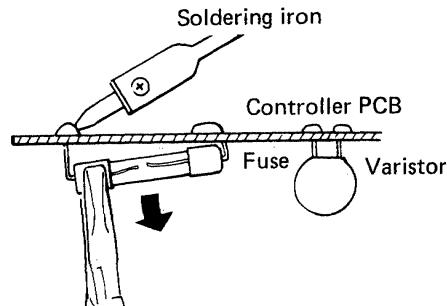


Fig. E-11

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

ELC-10. Checking of the Output of the Controller PCB for Fan Motor Terminals

Take out the fan motor connector from controller PCB and be sure that there is no danger of short circuit in other parts before supplying electricity to the unit. Then put the operation switch to ON and set the selector to MANUAL.

Now measure the voltage between these pins by the multimeter. The controller PCB is in good working condition if the voltage output becomes same as those shown in the right table.

Pair of Pins	FAN		
	Low	Med.	High
4 - 3	*	0	0
4 - 2	0	*	0
4 - 1	0	0	*

* Line voltage

Table-6

ELC-11. Checking of the Power Transformer

1. Remove connectors TRANS-1 and TRANS-2 from the controller PCB.
2. Set the resistance measuring range of multimeter to "X1Ω" and measure the resistance of the lead wires between WHT - WHT and BRN - BRN as shown in Fig. E-12.

It will be completely satisfactory if all measured values agree with those indicated in Table-7A and 7B.

SAP91K/SAP 121K

Lead wires	Value of resistance
WHT - WHT	About 36.5 Ω
BRN - BRN	About 1.15 Ω

(Table-7A)

SAP181K

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

(Table-7B)

Note: Ambient room temp 70°F

ELC-12. 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 Tables-7C, 7D and 7E

SAP121K

Lead wires	Value of resistance
BLU - BRN	About 100 Ω
BLU - VLT	30 Ω
VLT - YEL	16 Ω
YEL - PNK	92 Ω

(Table-7C)

SAP91K

Lead wires	Value of resistance
BLU - GRY	About 137 Ω
BLU - VLT	63 Ω
VLT - YEL	28 Ω
YEL - PNK	160 Ω

Table-7D

SAP181K

Lead wires	Value of resistance
WHT-BRN	About 312 Ω
WHT-VLT	69 Ω
VLT-YEL	49 Ω
YEL-PNK	260 Ω

(Table-7E)

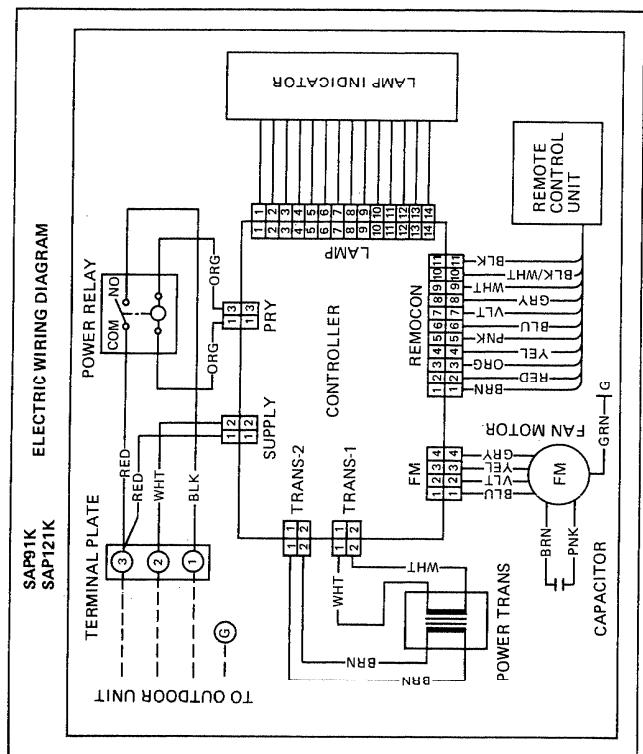


Fig. E-12

ELC-13. Checking of the PTC thermistor* (SAP91KC/SAP121KC)

* PTC thermistor is located in the electrical component box of the outdoor unit.

Remove both lead wire terminals connected to the PTC thermistor, set the resistance measuring range of the multimeter to "X1Ω" and check the continuity between terminals of the PTC thermistor as shown in Fig. E-13.

It is normal when a value of $47\ \Omega$ is shown at an ambient temperature of 77°F .

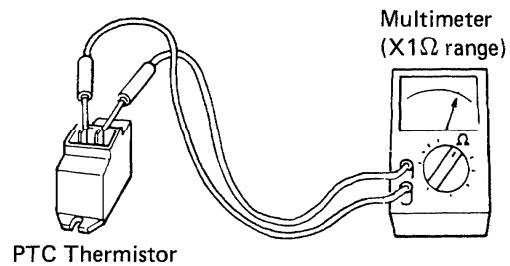


Fig. E-13

ELC-14. Checking of the Compressor Overload Relay

Remove both lead wire terminals connected to the compressor overload relay. Set the resistance measuring range of the multimeter to "X1Ω" and check the continuity between terminals of the overload relay. The overload relay is normal if there is a continuity.

SAP92KCH/SAP122KCH/SAP182KCH (Heat Pump)

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).

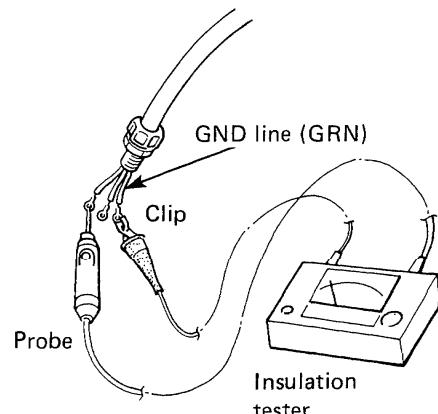


Fig. E-1H

ELH-2. Measurement of Insulation Resistance of the compressor

Remove the black lead wire connected to the compressor motor from ⑧ on the terminal base. Clamp the removed black lead wire with a lead clip of the insulation resistance tester and measure the resistance by placing a probe of the tester to the terminal GND to which green lead wire is connected.

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

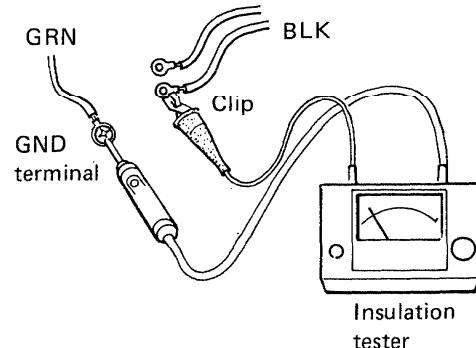


Fig. E-2H

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

3.1. In case of indoor fan motor

Remove the fan motor connector from controller PCB (P89, Fig. E-B). 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.

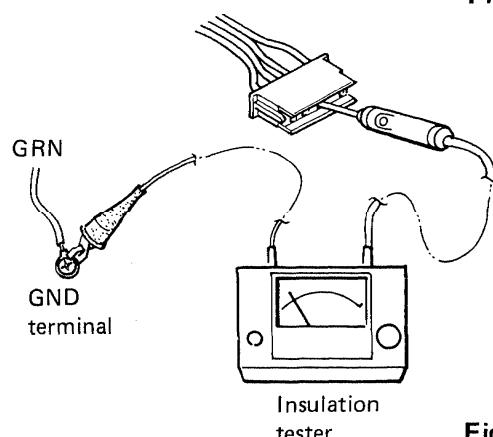


Fig. E-3H

3.2. In case of outdoor fan motor

Remove the black lead wire of the fan motor from ④ on the terminal base. 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

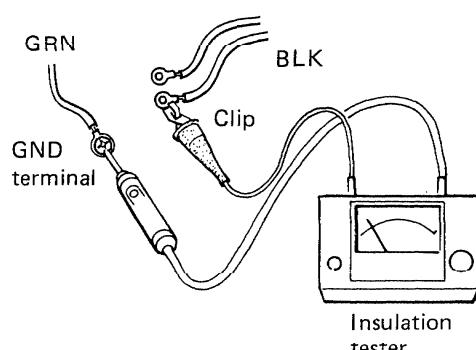


Fig. E-4H

ELH-4. Checking of the outdoor fan motor

Remove the white (WHT) lead wire from the terminal ③, then brown (BRN) and pink (PNK) lead wires from the fan motor capacitor respectively as indicated in the wiring diagram (Fig. E-5H)

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

SAP92CH/SAP122CH

Leadwire color	Coil resistance
WHT—BRN	184 Ω ±10%
WHT—PNK	157 Ω ±10%

(Table-1H)

SAP 182CH

Lead wire color	Coil resistance
WHT—BRN	86 Ω ±10%
YEL—PNK	60 Ω ±10%

(Table-2H)

Note: When ambient temp. is 70° F.

ELH-5. Checking of the Motor Capacitor

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

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

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

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

ELH-6. Checking of the Compressor Motor Winding

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

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

SAP92CH ELECTRIC WIRING DIAGRAM

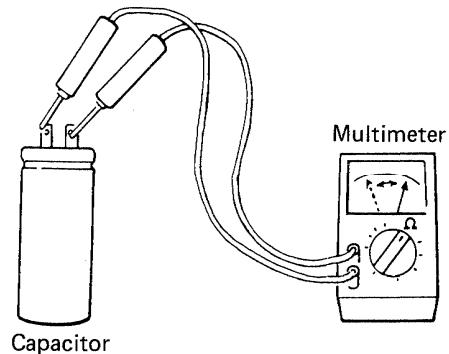
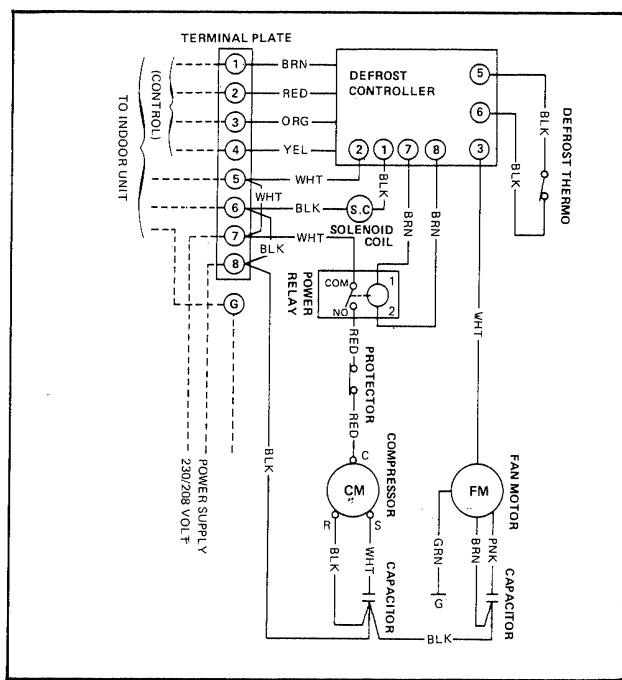


Fig. E-6H

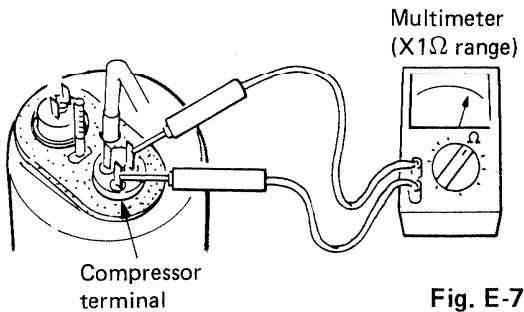


Fig. E-7H

**SAP92KCH/SAP122KCH/SAP182KCH
(Heat Pump)**

ELH-7. Checking of the Remote Control Unit Proper

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

The position of the switch which is used to operate the air conditioner for a room temperature below 70°F (21°C) is the position of the switch for this TEST RUN.

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

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

B. Checking of the Items of the Remote Control Unit

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

(1) Checking of the Room Temperature Sensor

Measure the resistance between No. 5 and No. 6 connectors. (For an ambient temperature of 80°F, the resistance is about 5 kΩ).

NOTE :

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

(2) Fan Speed Selector

Check the continuity of the connector No. 3 and No. 4 against No. 10 (place the negative (-) probe on No. 10 and positive (+) probe on No. 3 and then No. 4).

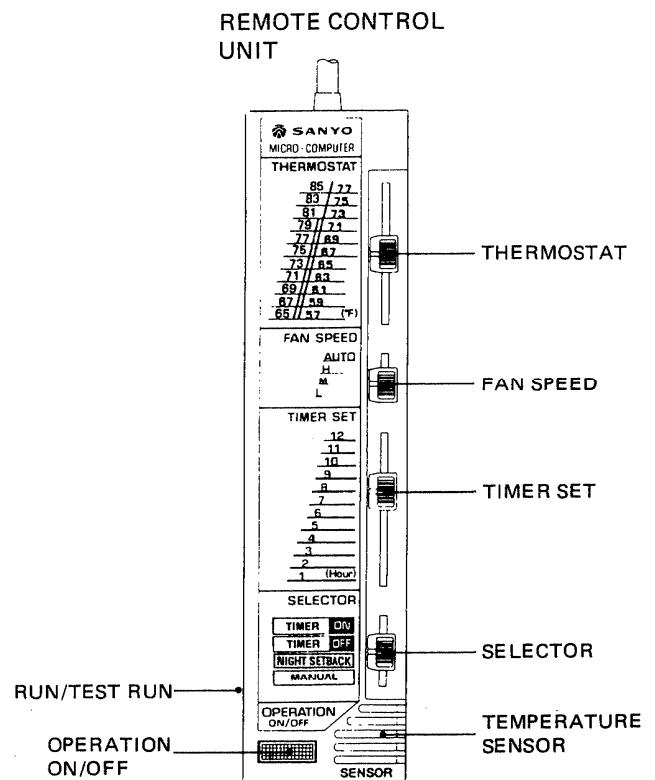


Fig. E-8H

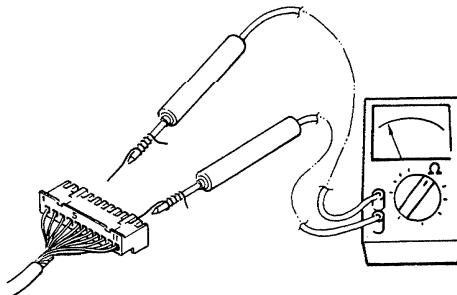


Fig. E-9H

Checking points	Position of the selector			
	High	Med.	Low	Auto
10 - 3	NO	YES	YES	NO
10 - 4	YES	YES	NO	NO

NOTE: YES Continuity (Table-2H)
NO Discontinuity

Connector No.	Position of the Selector			
	MANUAL	NIGHT SETBACK	TIMER	
			ON	OFF
9 - 3	NO	NO	YES	NO
9 - 1	NO	YES	YES	YES
9 - 2	NO	YES	NO	NO

(Table-3H)

(3) Checking of the Selector
Check the continuity of the connectors No. 3, 1 and 2 against connector No. 9.

(4) Checking of the Operation Pushbutton

The operating switch is in good working condition if there is continuity between No. 9 (placing the negative (-) probe) and No. 4 (placing positive (+) probe) while the pushbutton is pressed.

(5) Checking of the Timer

Measure the continuity between No. 4, 3, 1, 2 and No. 8 (placing the negative (-) probe).

Connector No.	Position of the Selector											
	1	2	3	4	5	6	7	8	9	10	11	12
8 - 4	-	-	-	-	-	-	-	-	Y	Y	Y	Y
8 - 3	-	-	-	-	Y	Y	Y	Y	Y	Y	Y	Y
8 - 1	-	-	Y	Y	Y	Y	-	-	-	-	Y	Y
8 - 2	-	Y	Y	-	-	Y	Y	-	-	Y	Y	-

Y for YES = There is continuity.

(Table-4H)

(6) Checking of the Thermostat

Measure the continuity between No. 4, 3, 1, 2 and No. 7 (placing the negative (-) probe).

Connector No.	Position of the Selector										
	65	67	69	71	73	75	77	79	81	83	85
7 - 4	-	-	-	-	Y	Y	Y	Y	Y	Y	Y
7 - 3	Y	Y	Y	Y	Y	Y	Y	Y	-	-	-
7 - 1	Y	Y	-	-	-	-	Y	Y	Y	Y	-
7 - 2	-	Y	Y	-	-	Y	Y	-	-	Y	Y

Y for YES = There is continuity.

(Table-5H)

If there is abnormality during checking at any of the above step from (1) to (6), replace the remote control unit as it is.

CAUTION:

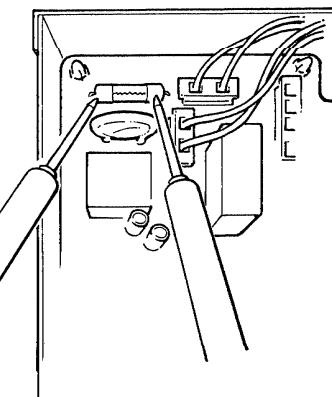
Do not disassemble the Remote Control Unit.

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-10H.

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

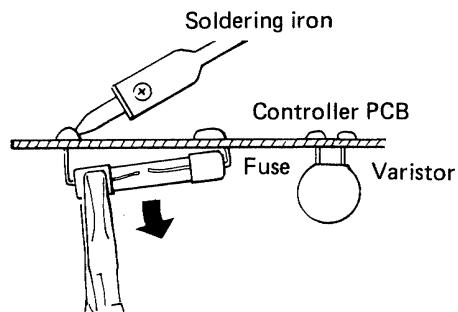


ELH-9. Method to Replace Fuse on the Controller PCB

1. Remove the controller PCB according to Disassembly Procedure 9-3 (Page 106)
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 (30 W or 60 W).
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).

*Fuse: 250 V, 3 A

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



ELH-10 Checking of the Output of the Controller PCB for Fan Motor Terminals

Take out the fan motor connector from controller PCB and be sure that there is no danger of short circuit in other parts before supplying electricity to the unit. Then put the operation switch to ON and set the selector to MANUAL.

Now measure the voltage between these pins by the multimeter. The controller PCB is in good working condition if the voltage output becomes same as those shown in the right table.

Pair of Pins	FAN		
	Low	Med.	High
1 - 4	*	0	0
1 - 3	0	*	0
1 - 2	0	0	*

* Line Voltage

Table-6H

ELH-11. Checking of the Power Transformer

1. Remove connectors TRANS-1 and TRANS-2 from controller PCB.
2. Set the resistance measuring range of multimeter to "X1Ω" and measure the resistance of the lead wires between WHT-WHT and BRN-BRN as shown in Fig. E-12H.

It will be completely satisfactory if all the measured values agree with those indicated in Table-7H.

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

Table-7H

Note: Ambient room temp. 70°F

ELH-12. 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 Tables 8H, 9H and 10H.

SAP92KH

Lead wires	Value of resistance
WHT-BRN	About 465 Ω
WHT-VLT	210 Ω
VLT-YEL	93 Ω
YEL-PNK	540 Ω

(Table-8H)

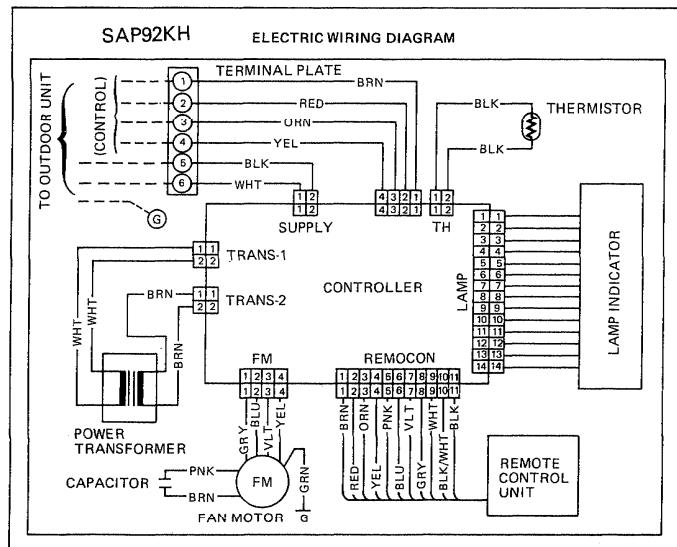


Fig. E-12H

SAP122KH

Lead wires	Value of resistance
WHT-BRN	About 321 Ω
WHT-VLT	113 Ω
VLT-YEL	54 Ω
YEL-PNK	252 Ω

(Table-9H)

SAP182KH

Lead wires	Value of resistance
WHT-BRN	About 312 Ω
WHT-VLT	69 Ω
VLT-YEL	49 Ω
YEL-PNK	260 Ω

(Table-10H)

ELH-13. Checking of the Compressor Overload Relay

Remove both lead wire terminals connected to the compressor overload relay. Set the resistance measuring range of the multimeter to "X1Ω" and check the continuity between terminals of the overload relay. The overload relay is normal if there is a continuity.

ELH-14. Checking of Electric Heater and Thermal Protectors

1. When the heater can not be switched on.

- a) Check for a wire break of the heater relay coil.

Remove the heater connector (3 P) on the controller PCB, set the multimeter to the “ Ω ” range, and check the continuity between 1 and 2 of the plug. When there is no continuity, it is possible that there is a wire break of the heater relay coil. Refer to Fig. E-15H2.

- b) Next, check for continuity between 2 and 3 of the connector.

When there is no continuity, the contact of the heating thermostat is open. When the thermostat is defective, replace it.

- c) Output voltage check on the controller side.

Leave the heater connector removed from the controller PCB. Set the test switch of the remote control unit to TEST RUN, set the cooling/heating selector to HEAT, and execute heating operation. Switch the multimeter to the DC range, and measure the voltage between the heater output board pins 1 and 3 of the controller PCB. The output should be DC 24 V. When this is not the case, the PCB is defect and should be exchanged.

- d) While heating operation is being executed, check with the multimeter (500 V AC range) for application of line voltage between the terminals 1 and 2 of the heater relay. The rated voltage should be applied over both terminals. If this is not the case, the heater relay is defect and should be replaced.

CAUTION:

At the time of checking, take care that the probes of the multimeter do not come into contact with other metal parts.

- e) Heater circuit check.

Cut the air conditioner power supply once, and remove the lead wires WHT and BLK from the heater relay terminals 1 and 2. Next, set the multimeter to the “ Ω ” range and check for continuity between WHT and BLK. There should be continuity, and any one of the following cases can be considered when there is no continuity. Refer to Fig. E-15H1.

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

Exchange the defective part after it has been identified.

SAP122KH
SAP182KH ELECTRIC WIRING DIAGRAM

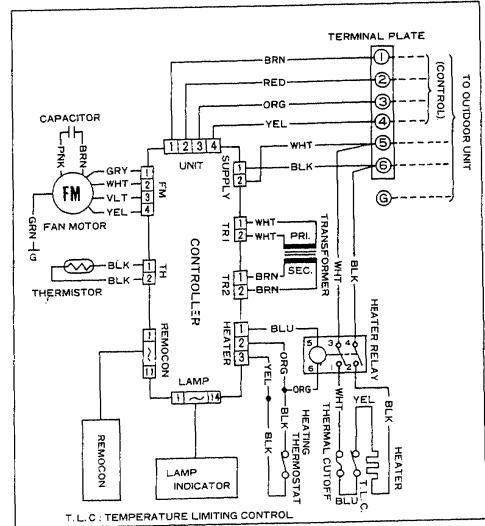


Fig. E-15H1

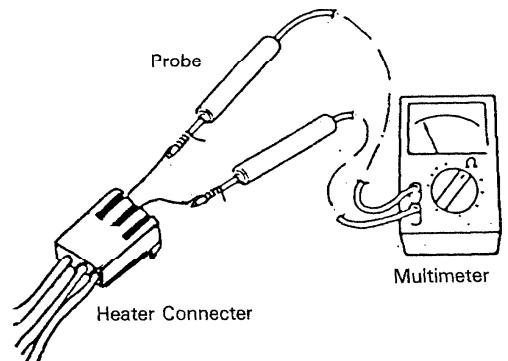


Fig. E-15H2

9. DISASSEMBLY AND SERVICE PROCEDURES

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INDOOR UNIT

9-1. Casing — Removal

- 1) Remove the two (2)* set screws holding the casing to the indoor unit with a Phillips screwdriver. (SAP91KC and SAP92KCH)

*SAP121KC, SAP122KCH, SAP181KC and SAP182KCH have three (3) screws.

- 2) Pull up the casing by hand, press down on tabs on top, then withdraw the casing by pulling it back straight. Fig. D-1.

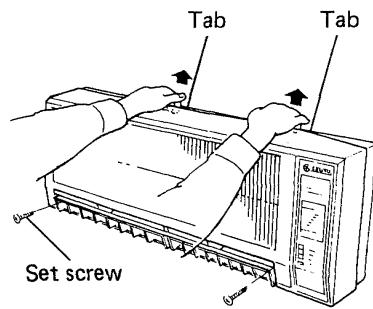


Fig. D-1

9-2. Electrical Component Box — Access and Removal

- 1) Remove casing.

- 2) Using a Phillips screwdriver, remove set screw **(A)** on the indicator lamp board ass'y. Fig. D-2.

- 3) To remove the indicator lamp board ass'y on the PCB, push the connector socket downwards slightly and pull it toward you.

CAUTION : Connector pins are thin and delicate, therefore never apply excessive force when disconnecting the socket.

- 4) Disengage the electrical component box by the following procedure:

- a) Remove screw **(B)** and the cover plate.

CAUTION : Before accessing inside the electrical component box, be sure to check that power to the unit is disconnected.

- b) Disconnect interunit wires from the terminal block.

- c) Remove screws **(C1)** **(C2)** and the grounding screw respectively. Fig. D-2.

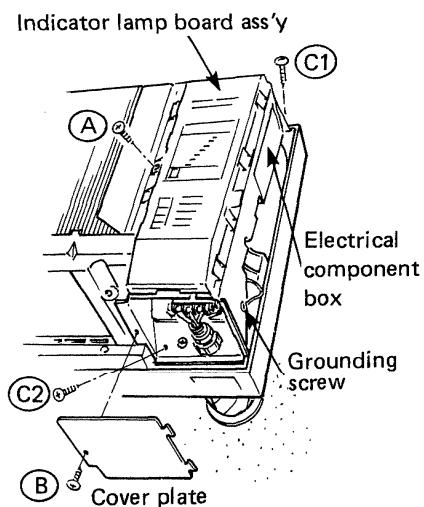


Fig. D-2

9-3. Controller PCB — Removal

- 1) Disengage the electrical component box from the chassis.

- 2) Loosen screws **(D1)** **(D2)** and remove the mounting plate. Fig. D-3.

- 3) Withdraw all of the connector or socket connected to the pins on the controller PCB. Cut wire ties, if necessary. Refer to Page 89 on connector identification.

- 4) Pinch a white plastic spacer at the corner of the controller PCB with a pliers and pull the PCB up.

There are four spacers at the corners; repeat at the other three spacers. Fig. D-4.

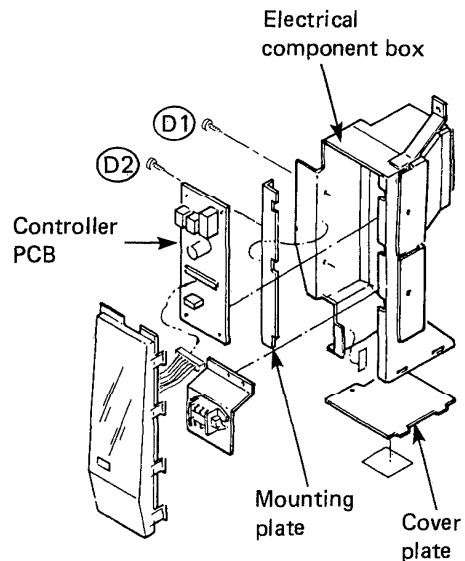


Fig. D-3

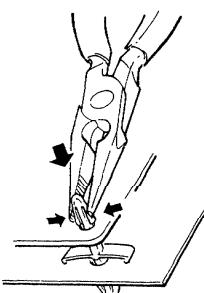
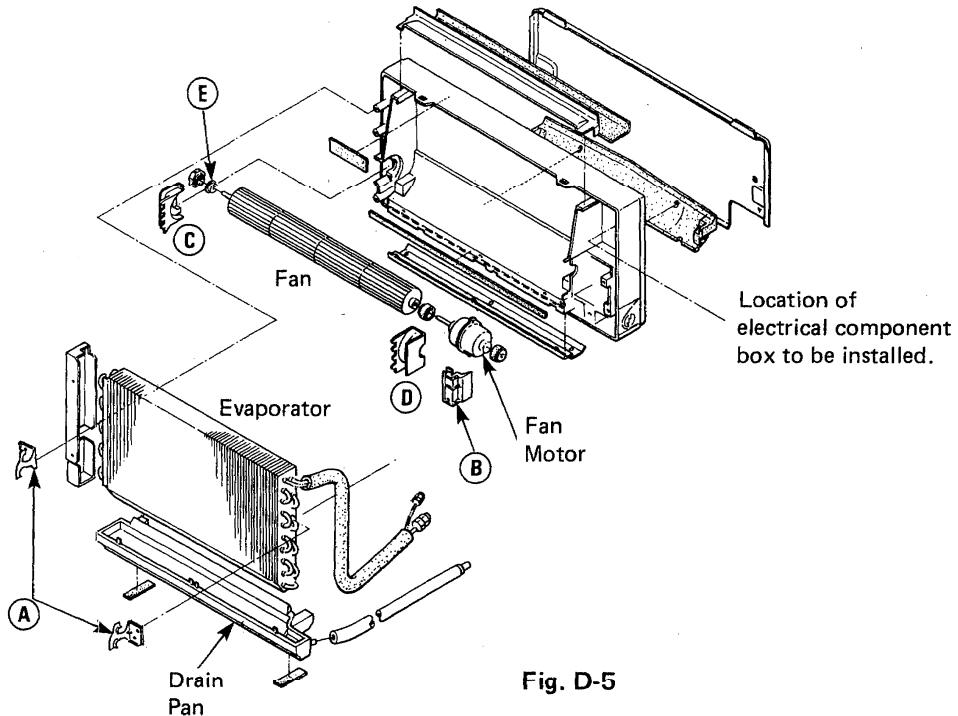


Fig. D-4

9-4. Evaporator (= Indoor Heat Exchanger) — Removal

- 1) Remove the electrical component box.
- 2) Loosen the fixing screws of the evaporator mounting plates (A) and fan motor mounting plate (B), and remove them respectively. Fig. D-5.
- 3) Lift up the evaporator with both hands, then withdraw the evaporator together with the piping. (If the piping is fixed with a clamp or saddle, first remove the clamp.)



9-5. Heater thermal protector - Removal : Heat Pump models only

- 1) Alternately remove the left and right claws of the upper plate (H) of the evaporator. (When the evaporator is in place, the upper plate (H) of the evaporator can be removed more easily by loosening the screws of the evaporator mounting plate and creating extra space above the evaporator.)

Note:

At the time of reinstallation, confirm that the claws securely engage the catches.

- 2) Remove the thermostat mounting plate after removing the screws at the right and the left. Fig.D-6.

9-6. Removal of the electric heater: Heat Pump models only

- 1) Remove the evaporator.
- 2) Remove the wiring connection screws on both sides of the heater (F).
- 3) Remove the screws of the heater mounting plate (G), and separate the installation fittings from the heater. Fig. D-6

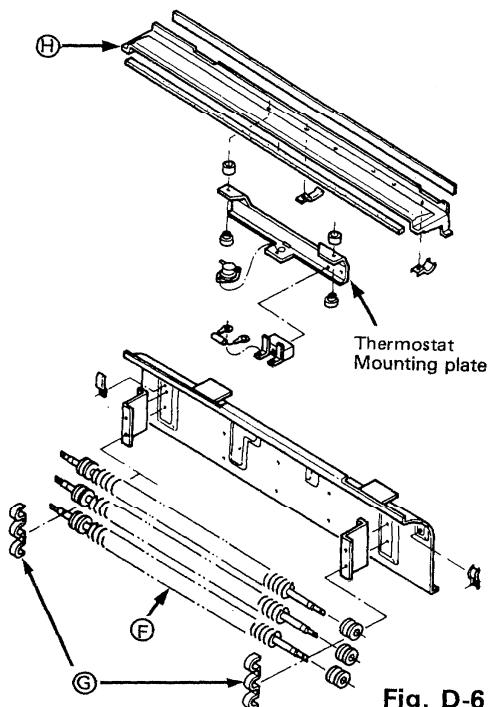


Fig. D-6

9-7. Fan and Fan Motor — Removal

- 1) As shown in Figs. D-7 and D-8, loosen the screws of the plastic mounting plates **(C)** and **(D)** which secure the fan, using a Phillips screwdriver, then remove the fan and fan motor.
- 2) When withdrawing the fan from the motor, first loosen the fan fixing bolts using a hexagonal key (Fig. D-9).
- 3) Withdraw the Bearing Ass'y **(E)** retaining the left side of the fan, by hand, then pull the fan to the left and withdraw it from the motor shaft. Fig. D-5.
- 4) Remove the fan motor by loosening the two fixing screws using a Phillips screwdriver.

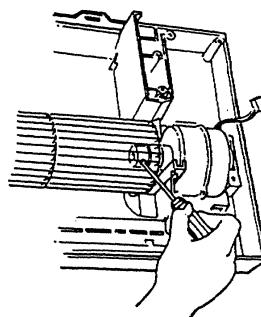
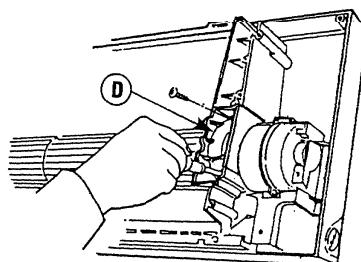
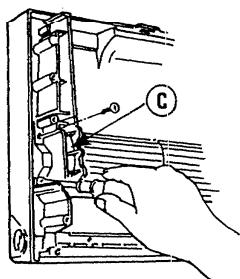


Fig. D-7

Fig.D-8

Fig.D-9

OUTDOOR UNIT

9-8. Cabinet – Removal

Remove the cabinet by removing 12 fixing screws using a Phillips screwdriver. Fig. D-9A

Note: When working only on the wiring, it is possible to gain access to the wiring terminals by simply removing the Access Panel "C". Fig. D-10.

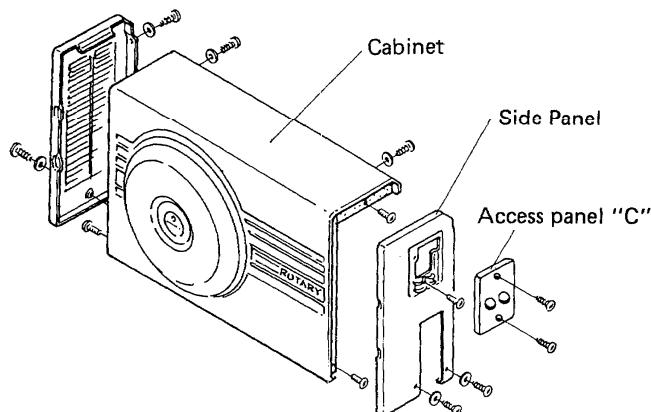


Fig. D-9A

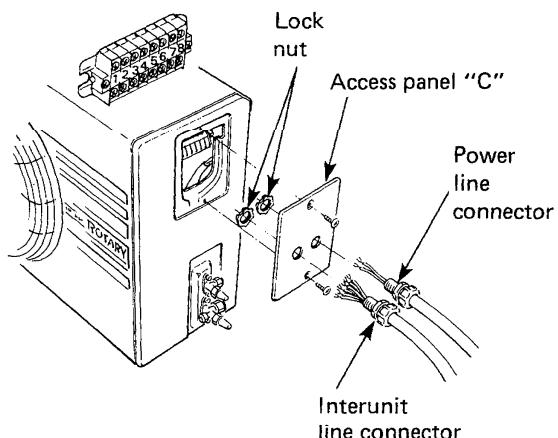


Fig. D-10

9-9. Fan and Fan Motor – Removal

- 1) Remove the fan by removing the propeller fan fixing screw using a straight blade screwdriver. Refer to Fig. D-11.
- 2) Using a pincher, cut the plastic wire ties fixing the fan motor lead wires connected to fan motor capacitor or other terminals.
- 3) Using a Phillips screwdriver, remove the three fixing screws of the fan motor, then withdraw the fan motor.

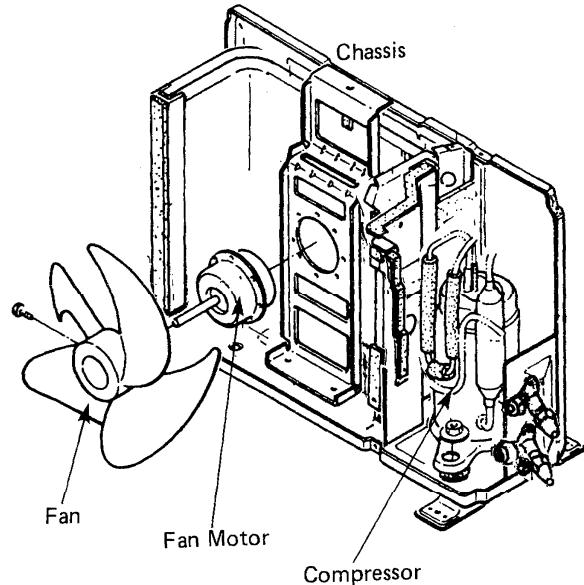


Fig. D-11

9-10. Compressor Replacement

9-10-1 Tool List for Compressor Replacement

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

9-10-2. 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 pipes, never locate face or any other parts of the human body in direct line with the pipe 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.

9-10-3. 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 piping, 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 Side Panel A of the outdoor unit with power line and inter-unit line connectors. Remove wires from terminals within the electrical component box and wrap the ends of the wires separately with the insulating tape.
- 2) Place an oil pan at the under side of the service valves. Then remove the caps of the wide pipe service valve and narrow pipe service valve with an adjustable wrench.
- 3) Leave the wide pipe service valve fully close by turning the spindle of the valve clockwise with a valve key or ratchet wrench. Close the narrow pipe service valve in the same manner.
- 4) Apply two pairs of adjustable wrenches to the union of the wide pipe service valve, then disconnect piping from the outdoor unit.
- 5) Use an adjustable wrench and a torque wrench (130 ~ 170 lbs. in.), and disconnect narrow pipe from the outdoor unit.

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

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

B. Removing the old compressor

- 1) 1. Disconnect the power supply
2. Remove parts from the unit as required to gain access to the compressor.
3. Place an oil pan under the process tube to be nicked.
4. Remove nut 5, terminal cover and gasket.
5. Remove all anchor nuts which are used to secure the compressor in the unit. Fig. D-12, 14.
6. Purge gas from the capillary tube service valve.

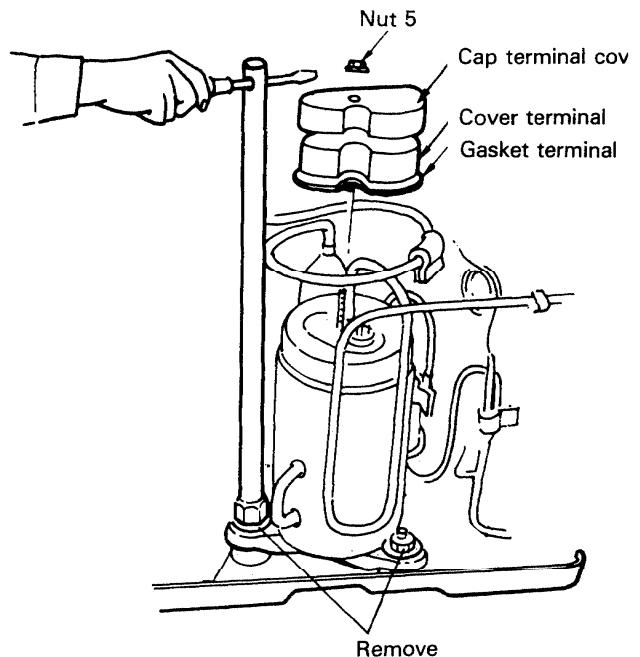


Fig. D-12

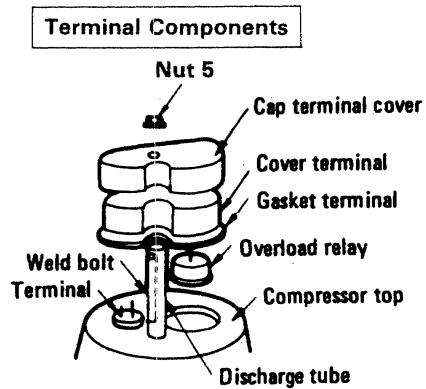


Fig. D-13

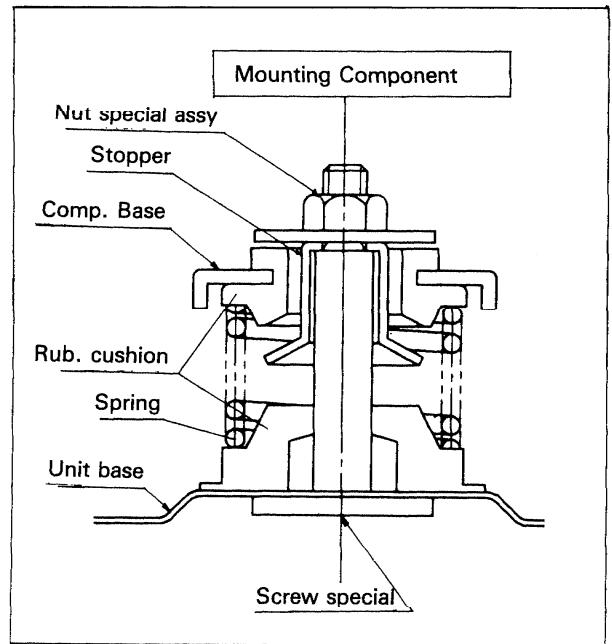


Fig. D-14

IMPORTANT NOTICE

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

- Place about 10 cc of the old compressor oil 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, 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 dryer-strainer and the oil dryer replaced with a new one.
- However, if just the compressor is replaced without sufficient system cleaning, contaminated oil may cause burning of the compressor again.
- If the oil compressor is to be scrapped, pinching the terminal section with a pair of pliers should avoid any chance of it being mistakenly used.

- 2) 1) With an Oxyacetylene torch, unbraze the joint between the suction tube and the tip of the accumulator A) and pull free with pliers
- 2) Unbraze the joints on the compressor discharge tube (B), then pull free with pliers.
- 3) Unbraze the auxiliary pipe (C) connected to the liquid injection tube. Fig. D-15

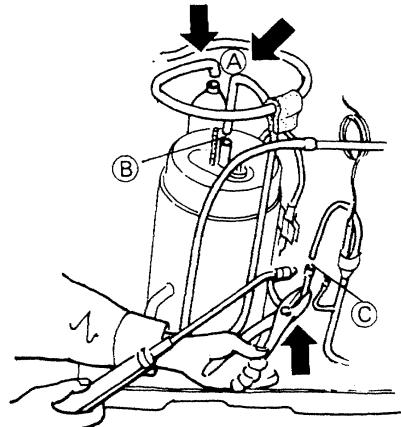


Fig. D-15

- 3) 1) Take off the 2 screws to remove the capillary tube from the compressor. Fig. D-16

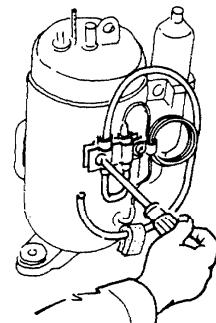


Fig. D-16

- 4) 1) Cut the portion (E) of the auxiliary tube connected to the capillary tube with a tube cutter. The auxiliary tube will be reused so should not be thrown away. Fig. D-17
- 2) To remove the compressor raise it straight and disengage from the base unit.
- 3) Remove the cushion rubbers from the old compressor (3 sets) and save them.

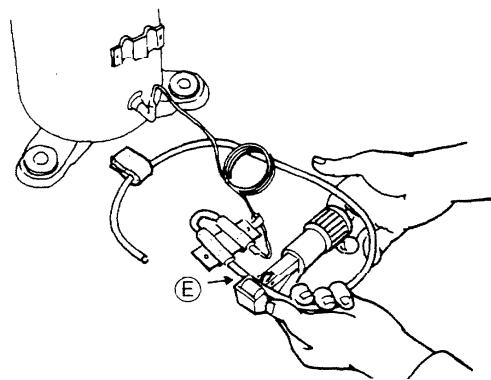


Fig. D-17

C. Installing a new compressor

- 1) 1. Nick the end of the pinched suction tube of the new compressor with a pincher and release the holding charge (Nitrogen: 29 PSIG)
2. With an oxyacetylene torch and pliers, unbend the compressor seals (a), (b) and (c) Fig. D-18

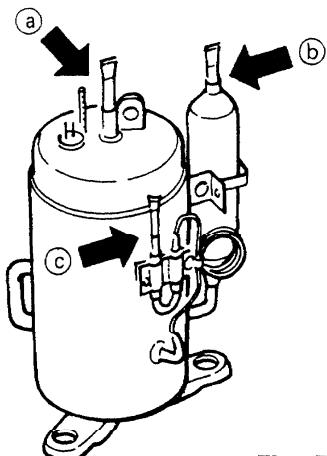


Fig. D-18

- 2) Holding it with pliers, braze the previously removed auxiliary tube onto the liquid injection tube of the new compressor. Fig. D-19

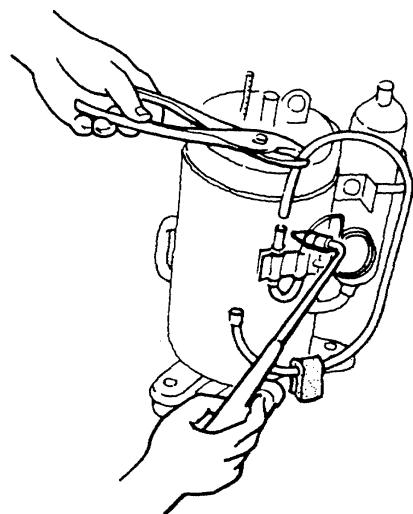


Fig. D-19

- 3) 1. Transfer cushion rubbers to the new compressor.
2. Install the new compressor in exactly the same manner as the original compressor.
3. Bend both the suction and discharge lines to bring the ends to the area of the compressor fittings and engage each tube end into the matching compressor fitting.
4. Hold tubing securely with pliers and braze connections (A) (B) and (C) carefully with torch Fig. D-20

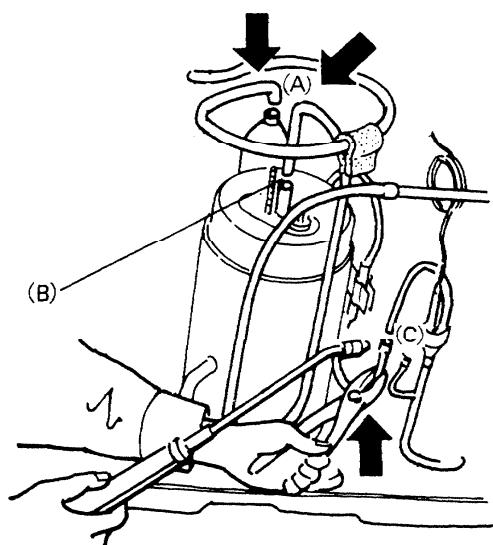


Fig. D-20

- 4) When the tube has cooled, apply soapy water to the brazed joint to check for refrigerant leaks.
- 5) Connect compressor terminal wiring.
- 6) Tighten the compressor anchor nuts (3 pcs) to the rated torque.
- 7) Turn on the power supply and start up the air conditioner.

9-11. Leak Test, Evacuation and Charging

9-11-1. Required tools and system set up

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

* One of conventional system set up and procedure for leak test, evacuation and charging is described in section 9-11 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.

9-11-2. System Leak Test at the Service Site

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. D-21
- 1) Prepare the system analyzer valve set and connect charging hoses as in Fig. D-22. 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.
- 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, and brazed liquid injection capillary section of the replaced compressor or other connection parts, and check to see change of bubbles. An electronic halogen gas leak detector, of course, may be used for this purpose.
- 5) When leaks are located, depressurize system and repair leaks.
- 6) If there are no leaks, open **V1**, purge all gas of the system and proceed for evacuation in section 9-11-3. Refer to page 116.

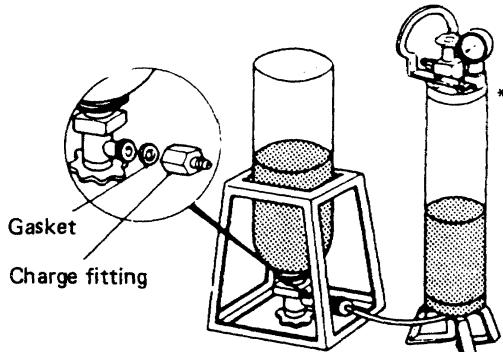


Fig. D-21

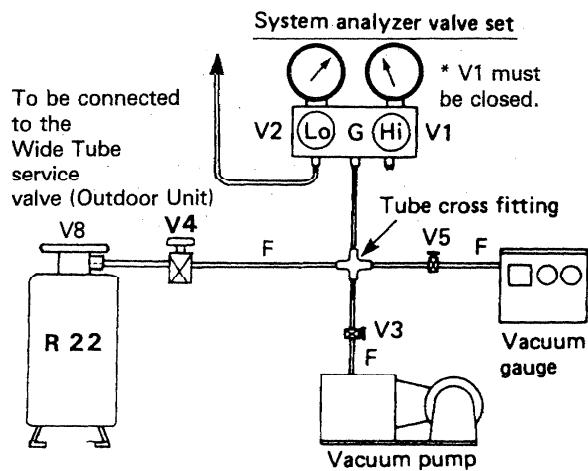


Fig. D-22

9-11-3. Evacuation

- 1) Connect instrument as in Fig. D-23
 - 2) Confirm that all connections are made correctly and check all valves are closed. * **V6** and **V7** should be opened half-way.
 - 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. D-24)
If pointer on the gauge moves to larger numbers, check system for leaks again according to the procedure in section 9-11-2. Page 115.
 - 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 9-11-4. Page 117.

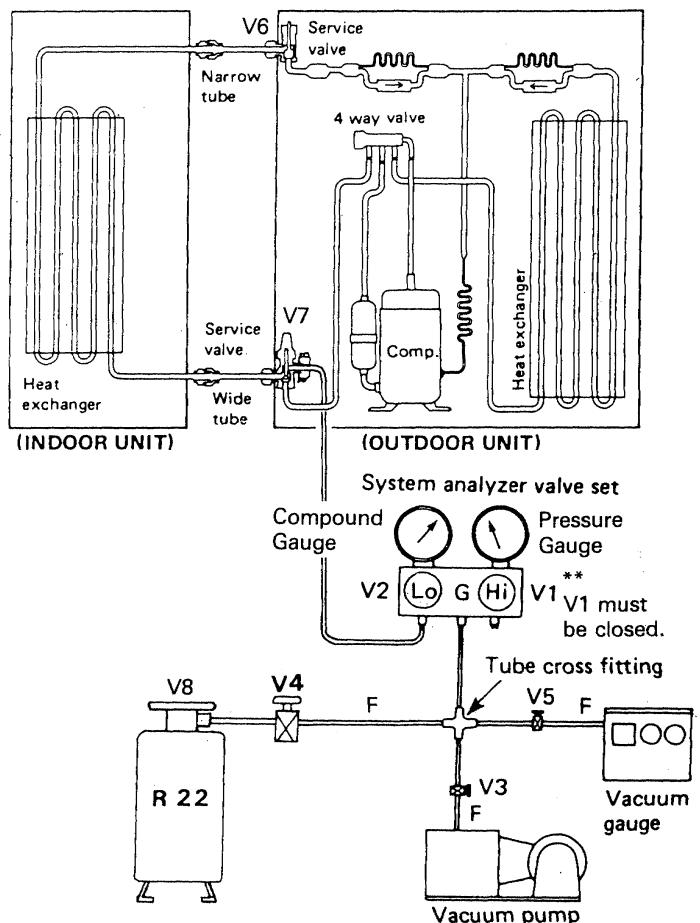


Fig. D-23

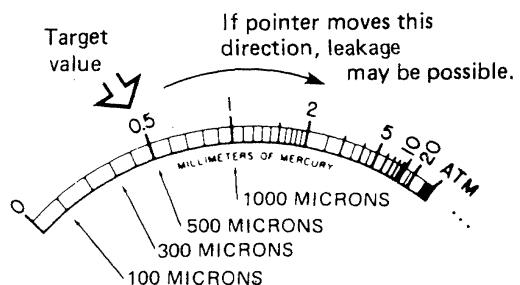


Fig. D-24

9-11-4. Charging refrigerant (R22)

• Preparation of Refrigerant

- a) Measure the net weight of the charging cylinder before charging refrigerant and memorize it.
- b) Refill required amount of refrigerant from the container to the charging cylinder. Be sure to measure the cylinder contents by weighing it. Fig. D-25

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 9-11-3
- 2) Confirm that valves **V1**, **V2**, **V3**, **V4**, **V5**, and **V8** are closed when evacuation is completed.
- 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 memories charging cylinder weight to charge exact amount of refrigerant.
- 6) Open **V4** fully to supply refrigerant gas to **V2**.
- 7) Close **V7** halfway (2 turns) for charging refrigerant. For charging refrigerant, check that **V7** is set in a halfway position.
- 8) Open **V2** gradually and let refrigerant gas entering into the system.
- 9) When full charge has entered system, close **V2** tightly.
- 10) Open **V6** and **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.

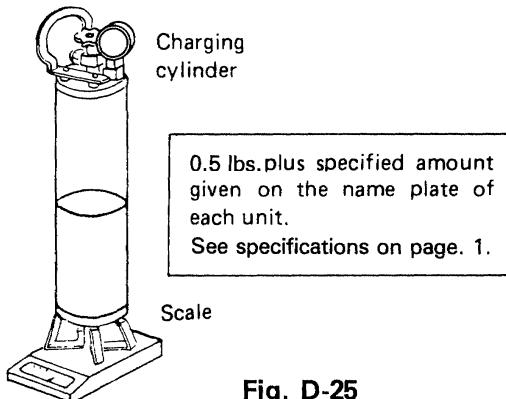


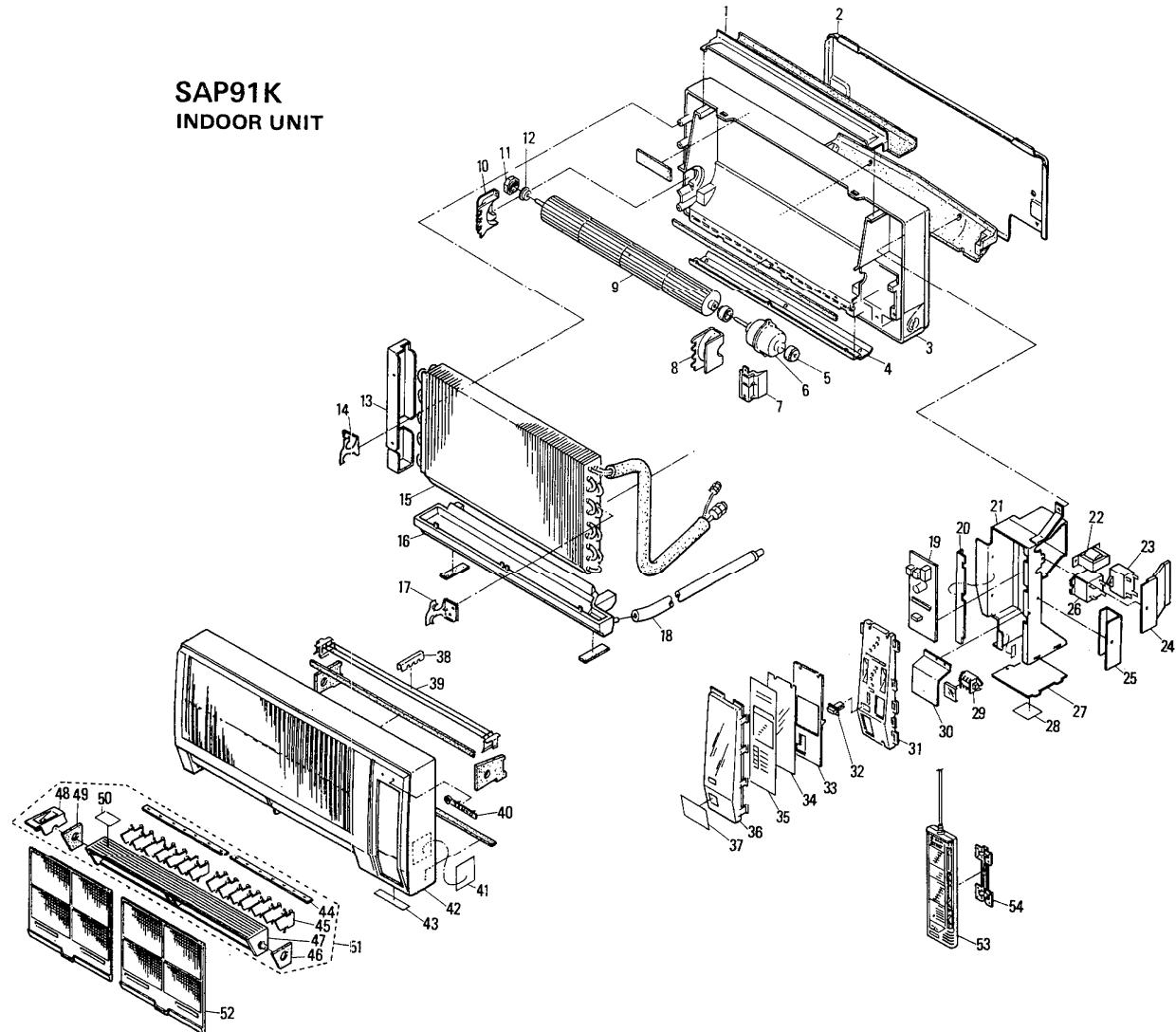
Fig. D-25

MEMO:

10. PARTS LIST (SAP91KC)

MODEL NO.	PRODUCT CODE NO.
SAP91K	85264147
SAP91C	85274085

**SAP91K
INDOOR UNIT**



■ Accessories Supplied with Unit for Installation

Parts	Figure	Q'ty	Code
Anchor		10	852-2-1311-11600
Cover		1	852-2-2369-15200
Cover		1	859-2-1124-10302
Tapping Screw, Truss	(5/8") 4x16mm	6	3-9219-41601
Tapping Screw, Flat	(3/8") 3x10mm	2	3-9222-31001
Full Scale Installation Diagram		1	852-6-4139-60000

Parts	Figure	Q'ty	Code
Insul, Nipple		1	852-2-2414-12400
Cord Clip		2	851-2-5354-00101
Mounting Bracket		1	851-2-5378-00101
Tapping Screw, Pan	(5/8") 4x16mm	2	3-9221-41601
Drain Hose		1	852-2-4204-10901
Drain hose adaptor		1	852-2-2334-13400

SAP91K

SAP91K
INDOOR UNIT

ATTENTION !

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

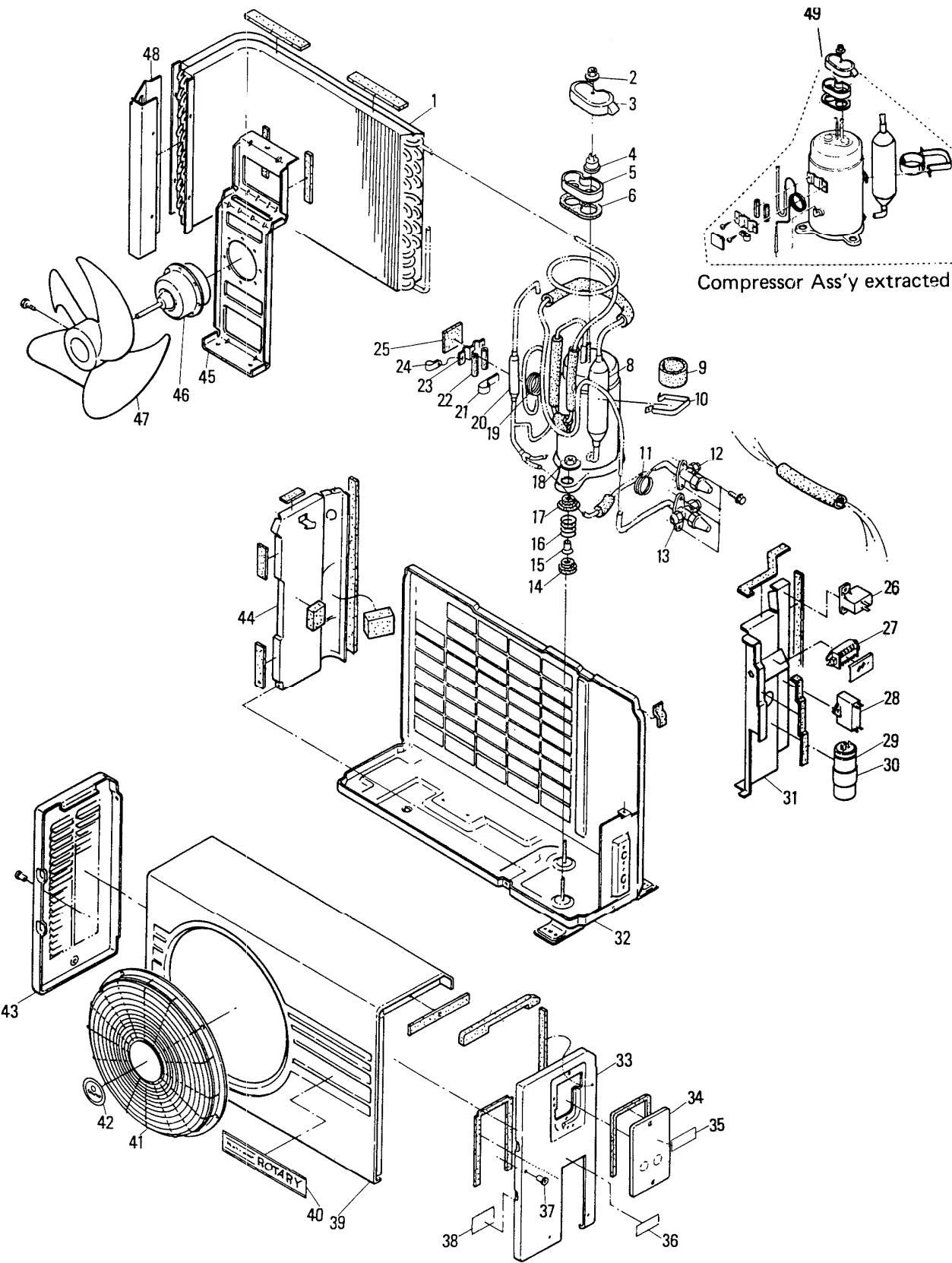
1. Part No. 2. Description 3. Q'ty 4. Volts - Hz - Ph 5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	852-2-2324-145H2	Mounting Plate Ass'y, Evaporator	1	■	852-6-4139-55800	Installation Instructions	1
2	852-2-2230-11501	Rear Panel	1				
3	852-2-2231-123H8	Frame Ass'y	1				
4	852-2-1119-11711	Cover Plate	1				
5	852-2-2511-13810	Cushion Rubber	2				
6	851-0-5290-501M1	Fan Motor Ass'y	1				
7	852-2-2520-160H2	Mounting Plate Ass'y, Fan Motor	1				
8	852-2-2520-16111	Mounting Plate, Fan	1				
9	852-0-2509-11701	Cross Fan Ass'y	1				
10	852-2-2515-13111	Cover, Fan	1				
11	852-2-2511-13610	Cushion Rubber	1				
12	852-0-2510-11900	Bearing Housing Ass'y	1				
13	852-2-2351-14301	Cover, Evaporator	1				
14	852-2-2309-33701	Mounting Plate, Evaporator	1				
15	852-0-4101-44700	Evaporator Ass'y	1				
16	852-0-2303-166H7	Drain Pan Ass'y	1				
17	852-2-2309-327U1	Mounting Plate, Evaporator	1				
18	852-0-1303-12100	Drain Hose Ass'y	1				
19	859-472-60	Controller POW-12KU	1				
20	852-2-5310-16701	Mounting Plate, Electrical Component Box	1				
21	852-0-5301-27601	Electrical Component Box Ass'y	1				
22	851-0-5290-501P1	Transformer Ass'y ATR-J121UI	1				
23	4-2239-51163	Fixed Capacitor	1				
24	852-2-5315-22601	Cover Plate	1				
25	852-2-5315-22701	Cover Plate	1				
26	4-2329-56245	Relay VF24HU	1				
27	852-2-5315-22501	Cover Plate	1				
28	851-6-4729-14600	Label	1				
29	4-2379-56159	Terminal Base	1				
30	852-2-5305-14101	Cover Plate	1				
31	859-601-41	Indicator Lamp IND-12KU	1				
32	852-2-1506-12601	Knob	1				
33	852-2-5309-14800	Cover Plate	1				
34	852-2-5328-10810	Cover	1				
35	852-2-1513-40311	Ornamental Plate	1				
36	852-2-1516-15001	Ornamental Plate	1				
37	852-2-1513-42001	Ornamental Plate	1				
38	852-2-1122-14301	Stopper	1				
39	862-0-1111-13101	Guard Ass'y	1				
40	852-2-1504-17901	Badge	1				
41	851-2-5250-61901	Wiring Diagram	1				
42	852-2-1501-181N1	Grille Ass'y (includes Key No.38, 39,40,41,43,51,52)	1				
43	852-2-1335-31100	Name Plate	1				
44	852-2-1514-23611	Mounting, Blade	2				
45	852-2-1519-17511	Blade	14				
46	852-2-1406-27200	Insulation, Flap	1				
47	852-2-1516-14511	Flap	1				
48	852-2-1514-23211	Mounting	1				
49	852-2-1406-27300	Insulation, Flap	1				
50	852-6-4159-51800	Note	1				
51	852-2-1516-145H9	Flap Ass'y	1				
52	852-0-2307-14611	Air Filter Ass'y	2				
53	859-213-97	Remote Control Switch Ass'y	1				
54	851-2-5378-00101	Mounting Plate	1				
■	852-6-4119-41900	Operation Manual	1				

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

10. PARTS LIST (SAP91KC)

SAP91C
OUTDOOR UNIT



SAP91KC

SAP91C
OUTDOOR UNIT

ATTENTION !

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

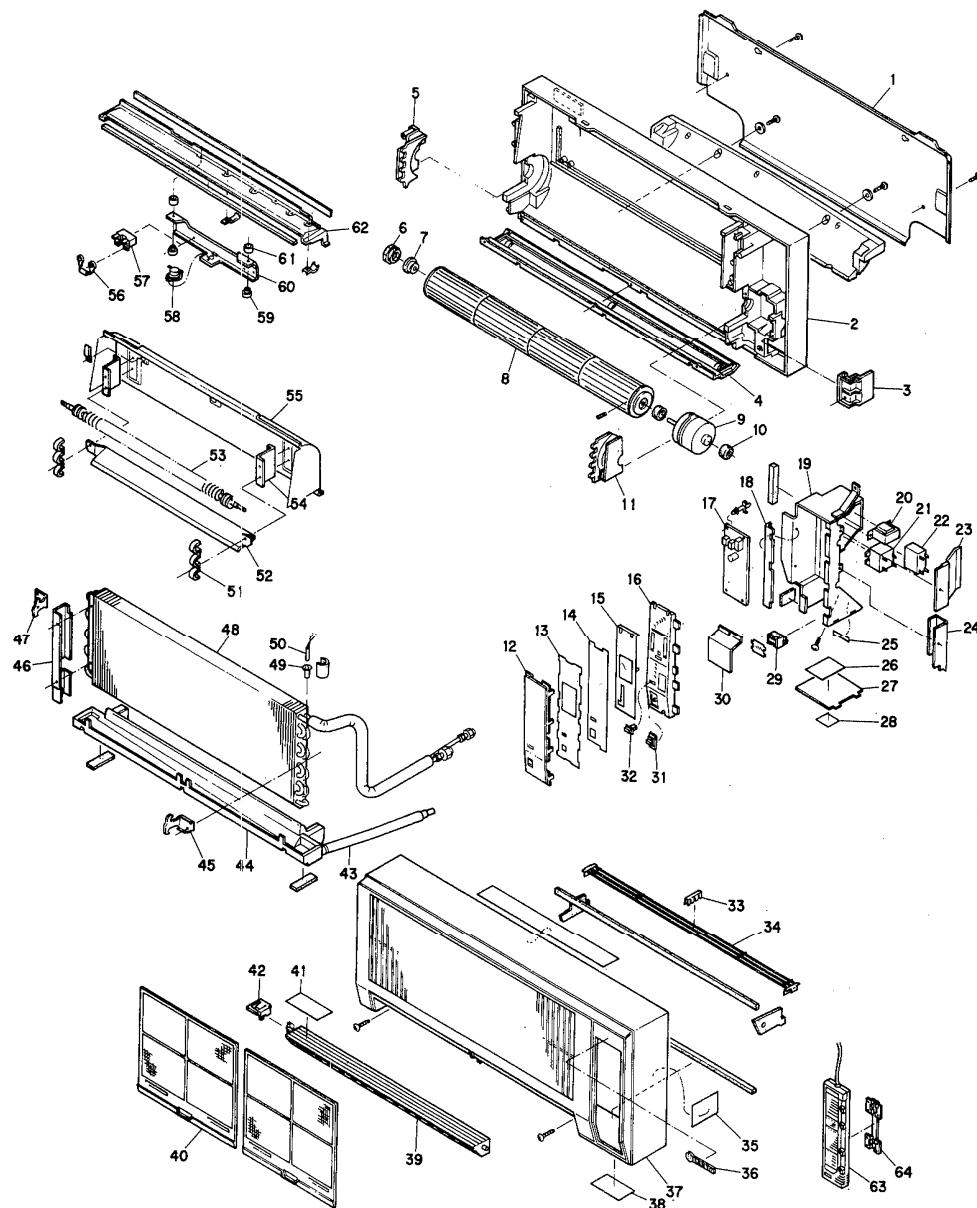
1. Part No. 2. Description 3. Q'ty 4. Volts - Hz - Ph 5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	
1	852-0-4102-2/900	Condenser Ass'y	1	
2	801-2-8305-10100	Nut 5mm	1	
3	801-2-6195-10300	Cap Terminal Cover	1	
4	4-2329-69043	Relay MRA98675	1	
5	801-2-6194-10700	Cover Terminal	1	
6	801-2-5303-12100	Gasket Terminal	1	
7	806-717-42	Compressor	1	
8	852-0-4511-14800	Accumulator Ass'y	1	
9	852-2-2353-38310	Packing, Accumulator	1	
10	852-2-2356-14601	Band Mounting, Accumulator	1	
11	852-2-4219-44800	Capillary Tube	1	
12	852-0-4501-24600	Valve Ass'y 1/4"	1	
13	852-0-4501-24500	Valve Ass'y 1/8"	1	
14	851-2-2390-13700	Cushion Rubber	1	
14	851-2-2390-13100	Cushion Rubber	2	
15	851-2-1314-17301	Stopper	3	
16	851-2-2330-13001	Spring	3	
17	851-2-2390-13600	Cushion Rubber	3	
18	851-0-2395-10501	Nut Special Ass'y	3	
19	852-0-4202-55600	Capillary Tube Ass'y	1	
20	852-0-4505-14310	Dehydrater Ass'y	1	
21	851-2-5354-00300	Clamper	1	
22	852-2-2353-19500	Packing	2	
23	852-2-2309-34101	Mounting Plate, Capillary Tube	1	
24	3-9030-00506	Clamper	1	
25	852-2-2353-19810	Packing	1	
26	4-2049-60042	Thermistor	1	
27	4-2379-56161	Thermal Base	1	
28	4-2239-51170	Fixed Capacitor, 220VAC 6MFD	1	
29	4-2239-56318	Fixed Capacitor, 350VAC 30MFD	1	
30	852-2-5301-21201	Clip, Capacitor	1	
31	852-0-5301-277H1	Electrical Component Box Ass'y	1	
32	852-0-2202-235H1	Bottom Plate Ass'y	1	
33	852-2-1114-202H1	Side Panel Ass'y, Right	1	
34	852-2-5315-224H1	Cover Plate Ass'y	1	
35	851-6-4729-14600	Label	1	
36	852-2-1335-30200	Name Plate	1	
37	852-2-2326-14302	Spacer	2	
38	851-2-5250-62001	Wiring Diagram	1	
39	852-2-1112-150D1	Cabinet Ass'y	1	
40	852-2-1316-19301	Mark	1	
41	852-0-1111-13001	Guard Ass'y	1	
42	852-2-1316-19901	Mark	1	
43	852-0-1104-14912	Side Panel Ass'y, Left	1	
44	852-2-2202-173H4	Partition Plate Ass'y	1	
45	852-2-2354-140H1	Mounting Plate Ass'y, Fan Motor	1	
46	851-0-5290-502M1	Fan Motor Ass'y	1	
47	852-0-2502-12611	Propeller Fan Ass'y	1	
48	852-2-2351-14101	Cover, Condenser	1	
49	852-0-4516-13600	Compressor Ass'y C-R70H2V	1	
■	3-9502-02210	Refrigerant R-22	*1110gr.	* This amount of refrigerant includes 40 g (=0.088 lbs.) necessary for quick purge.
■	3-9504-10310	Compressor Oil	500cc.	

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

10. PARTS LIST (SAP92KCH)

SAP 92KH
INDOOR UNIT



■ Accessories Supplied with Unit for Installation

Parts	Figure	Q'ty	Code
Anchor		10	852-2-1311-11600
Cover		1	852-2-2369-15200
Cover		1	859-2-1124-10302
Tapping Screw, Truss		6	3-9219-41601
Tapping Screw, Flat		2	3-9222-31001
Full Scale Installation Diagram		1	852-6-4139-60000

Parts	Figure	Q'ty	Code
Insul, Nipple		1	852-2-2414-12400
Cord Clip		2	851-2-5354-00101
Mounting Bracket		1	851-2-5378-00101
Tapping Screw, Pan		2	3-9221-31001
Drain Hose		1	852-2-4204-10901
Drain hose adaptor		1	852-2-2334-13400

ATTENTION !

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

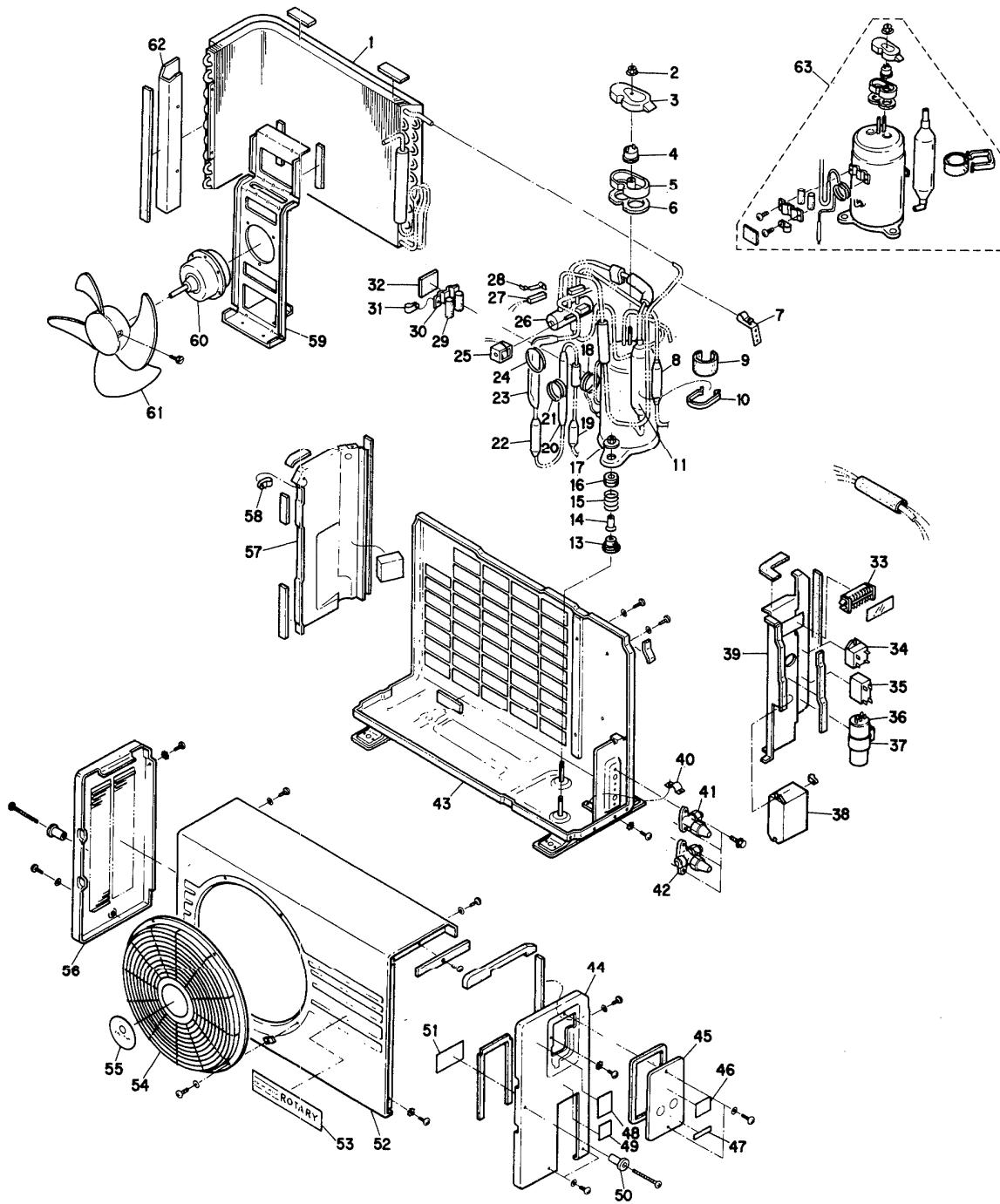
1. Part No. 2. Description 3. Q'ty 4. Volts - Hz - Ph 5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	852-2-2230-11501	Rear Panel (Hanging Wall Bracket)	1	60	852-2-2309-33301	Mounting Plate, Thermostat	1
2	852-2-2231-123J2	Frame Ass'y	1	61	345-2-5331-11000	Insulation	2
3	852-2-2520-160H2	Mounting Plate Ass'y, Fan Motor	1	62	852-2-2324-150H1	Spacer Ass'y, Evaporator	1
4	852-2-1119-11711	Cover Plate	1	63	859-213-96	Remote Control Switch Ass'y	1
5	852-2-2515-13111	Cover, Cross Fan	1	64	851-2-5378-00101	Mounting Plate	1
6	852-2-2511-13610	Cushion Rubber	1	■	852-6-4119-46400	Operation Manual	1
7	852-0-2510-11900	Bearing Housing Ass'y	1	■	852-6-4139-61600	Installation Instructions	1
8	852-0-2509-11701	Cross Fan Ass'y	1				
9	525-065-06	Fan Motor SV4T-11D6P	1				
10	852-2-2511-13810	Cushion Rubber	2				
11	852-2-2520-16111	Mounting Plate, Fan Motor	1				
12	852-2-1516-15011	Ornamental Plate	1				
13	852-2-1513-44601	Ornamental Plate	1				
14	852-2-5328-10810	Cover	1				
15	852-2-5309-14800	Cover	1				
16	859-601-40	Indicator Lamp IND-9KHU	1				
17	859-472-90	Controller POW-92KH	1				
18	852-2-5310-16701	Mounting Plate,	1				
		Electrical Component Box Ass'y	1				
19	852-0-5301-27601	Electrical Component Box Ass'y	1				
20	4-2519-56186	Transformer ATR-J122U	1				
21	4-2329-56186	Relay G4E-2123T-US	1				
22	4-2239-56215	Fixed Capacitor 440V 0.6MFD	1				
23	852-2-5315-22601	Cover Plate	1				
24	852-2-5315-22701	Cover Plate	1				
25	852-6-4729-17300	Label	1				
26	852-6-4419-23100	Label	1				
27	852-2-5315-22501	Cover Plate	1				
28	851-6-4729-14600	Label	1				
29	4-2379-56161	Terminal Base	1				
30	852-2-5305-14101	Cover Plate	1				
31	852-2-1506-12501	Knob	1				
32	852-2-1506-12601	Knob	1				
33	852-2-1122-14301	Stopper	1				
34	852-0-1111-13101	Guard Ass'y	1				
35	851-2-5250-79400	Wiring Diagram	1				
36	852-2-1504-17901	Badge	1				
37	852-2-1501-181D1	Grille Ass'y (includes Key No. 36)	1				
38	852-2-1335-45200	Name Plate	1				
39	852-2-1516-145H9	Flap Ass'y	1				
40	852-0-2307-14611	Air Filter Ass'y	1				
41	852-6-4159-51800	Label	1				
42	852-2-1514-23211	Mounting	1				
43	852-0-1303-12100	Drain Hose Ass'y	1				
44	852-0-2303-166H7	Drain Pan Ass'y	1				
45	852-2-2309-32701	Mounting Plate	2				
46	852-2-2351-14301	Cover, Evaporator	1				
47	852-2-2309-33701	Mounting Plate	1				
48	852-0-4101-44900	Evaporator Ass'y	1				
49	852-2-5304-13700	Clip, Thermistor	1				
50	4-2049-56176	Thermistor NTC-51H-S2	1				
51	852-2-2309-33501	Mounting Plate	2				
52	852-2-2310-11601	Guide	1				
53	4-2459-56199	Heater 230V-1KW	1				
54	852-2-2309-33401	Mounting Plate, Heater	2				
55	852-2-2369-15801	Heater Guard	1				
56	851-0-5261-00200	Thermal Fuse	1				
57	345-2-5317-11800	Porcelain	1				
58	4-2339-56198	Thermostat	1				
59	345-2-5331-10900	Insulation	2				

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

10. PARTS LIST (SAP92KCH)

SAP 92CH
OUTDOOR UNIT



SAP92KCH

**SAP 92CH
OUTDOOR UNIT**

ATTENTION !

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

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

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	852-0-4102-29100	Condenser Ass'y	1	60	525-066-06	Fan Motor FT6-21E6P	1
2	801-2-8305-10100	Nut 5mm	1	61	852-0-2502-12611	Propeller Fan Ass'y	1
3	801-2-6195-10300	Cap Terminal Cover	1	62	852-2-2351-141H1	Cover Ass'y, Condenser	1
4	4-2329-69141	Relay MRA98735	1	63	852-0-4516-15100	Compressor Ass'y C-R70H6V	1
5	801-2-6194-10700	Cover Terminal	1	■	3-9502-02210	Refrigerant R-22	* 1360gr.
6	801-2-5303-12100	Gasket Terminal	1	■	3-9504-10510	Compressor Oil	500cc
7	852-2-2362-15601	Mounting, Tube	1				
8	852-2-4501-11600	Muffler	1				
9	852-2-2353-38310	Packing	1				
10	852-2-2356-14601	Band Mounting	1				
11	852-0-4511-14500	Accumulator Ass'y	1				
13	851-2-2390-13700	Cushion Rubber	1				
13	851-2-2390-13100	Cushion Rubber	2				
14	851-2-1314-17301	Stopper	3				
15	851-2-2330-13001	Spring	3				
16	851-2-2390-13600	Cushion Rubber	3				
17	851-0-2395-10501	Nut Special Ass'y	3				
18	852-0-4202-55100	Capillary Tube Ass'y	1				
19	852-0-4506-15900	Strainer Ass'y	1				
20	854-0-4518-13800	Check Valve Ass'y	1				
21	852-2-4219-54600	Capillary Tube	1				
22	852-0-4505-14600	Dehydrater Ass'y	1				
23	852-0-4204-12500	Check Valve Ass'y	1				
24	852-2-4219-54700	Capillary Tube	1				
25	4-2649-56169	Solenoid, Reversing Valve L27-9072	1				
26	4-2649-56162	Reversing Valve Ass'y V26-9000	1				
27	4-2339-56186	Thermistor	1				
28	852-2-5303-12100	Mounting, Thermistor	1				
29	852-2-2353-19500	Packing	2				
30	852-2-2309-34101	Mounting Plate, Capillary Tube	1				
31	3-9030-00506	Clamper	1				
32	852-2-2353-19810	Packing	1				
33	4-2379-56171	Terminal Base	1				
34	4-2329-56282	Relay DFU24D1-F(M)	1				
35	4-2239-56219	Fixed Capacitor 440V-2.5MFD	1				
36	4-2239-56336	Fixed Capacitor 370V-17.5MFD	1				
37	852-2-5301-21201	Clip, Capacitor	1				
38	859-472-58	Controller POW-90CH	1				
39	852-0-5301-281H1	Electrical Component Box Ass'y	1				
40	852-2-2362-15701	Mounting, Tube	1				
41	852-0-4501-25600	Valve Ass'y 1/4"	1				
42	852-0-4501-24500	Valve Ass'y 3/8"	1				
43	852-0-2202-240H2	Bottom Plate Ass'y	1				
44	852-2-1114-202H1	Side Panel Ass'y, Right	1				
45	852-2-5315-224H1	Cover Plate Ass'y	1				
46	851-6-4729-14600	Label	1				
47	852-6-4729-17300	Label	1				
48	852-6-4419-23100	Label	1				
49	852-2-1335-45100	Name Plate	1				
50	852-2-2326-14302	Spacer	2				
51	851-2-5250-79500	Wiring Diagram	1				
52	852-2-1112-150D3	Cabinet Ass'y	1				
53	852-2-1316-19301	Mark	1				
54	852-0-1111-13001	Guard Ass'y	1				
55	852-2-1316-19901	Mark	1				
56	852-0-1104-14912	Side Panel Ass'y, Left	1				
57	852-2-2202-173H7	Partition Plate Ass'y	1				
58	3-9030-00507	Clamper	1				
59	852-2-2354-140H2	Mounting Plate Ass'y, Fan Motor	1				

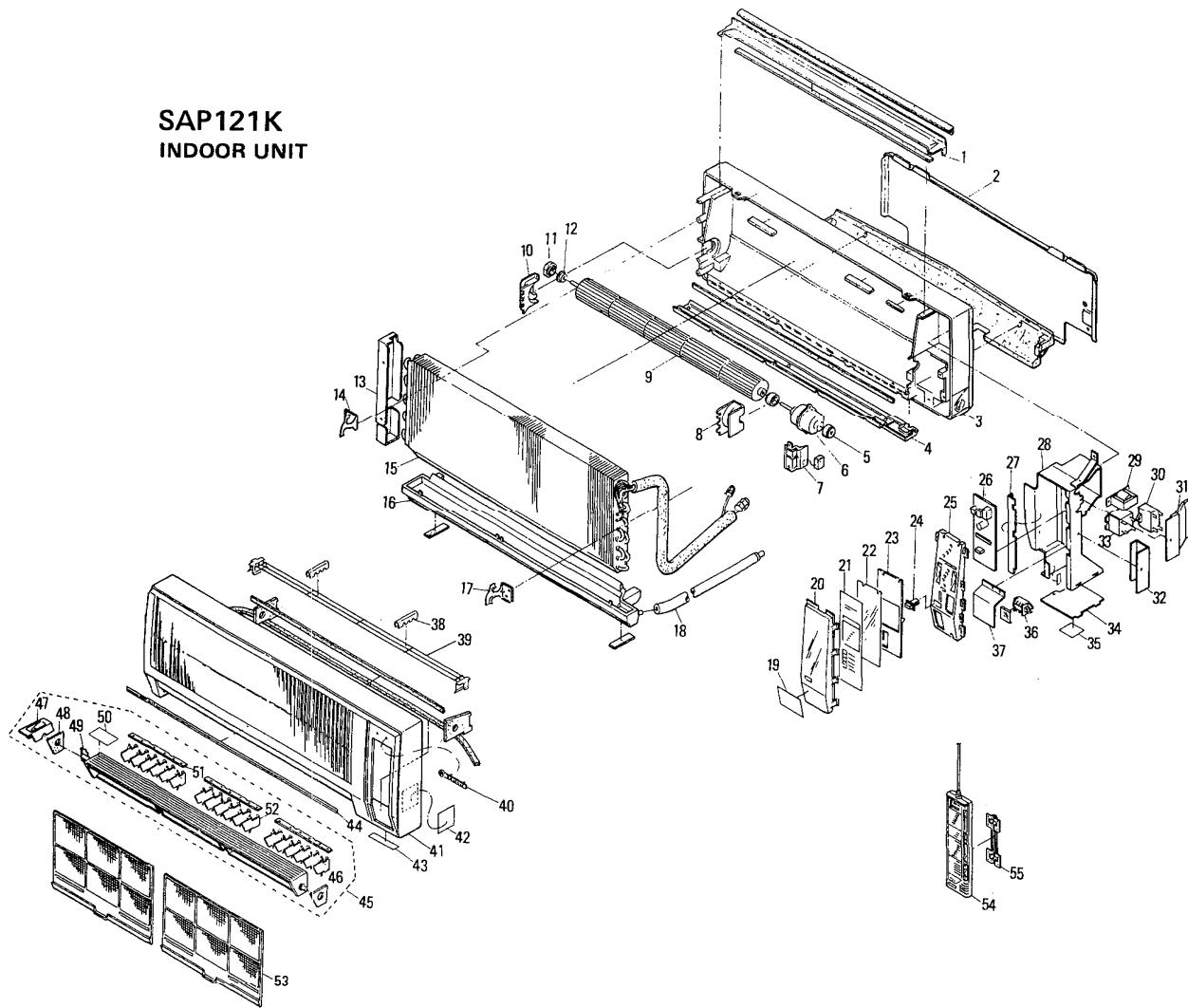
**NOTE: Metal and plastic parts will be supplied basically
with necessary heat insulating pads or packing.**

*This amount of refrigerant includes 40 g
(= 0.088 lbs) necessary for quick purge.

10. PARTS LIST (SAP121KC)

MODEL NO.	PRODUCT CODE NO.
SAP121K	85264149
SAP121C	85274087

**SAP121K
INDOOR UNIT**



■ Accessories Supplied with Unit for Installation

Parts	Figure	Q'ty	Code
Anchor		10	852-2-1311-11600
Cover		1	852-2-2369-15200
Cover		1	859-2-1124-10302
Tapping Screw, Truss	4x16mm	6	3-9219-41601
Tapping Screw, Flat	3x10mm	2	3-9222-31001
Full Scale Installation Diagram		1	852-6-4139-55700

Parts	Figure	Q'ty	Code
Insul, Nipple		1	852-2-2414-12400
Cord Clip		2	851-2-5354-00101
Mounting Bracket		1	851-2-5378-00101
Tapping Screw, Pan	4x16mm	2	3-9221-41601
Drain Hose		1	852-2-4204-10901
Drain hose adaptor		1	852-2-2334-13400

(SAP121KC)

SAP121K
INDOOR UNIT

ATTENTION !

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

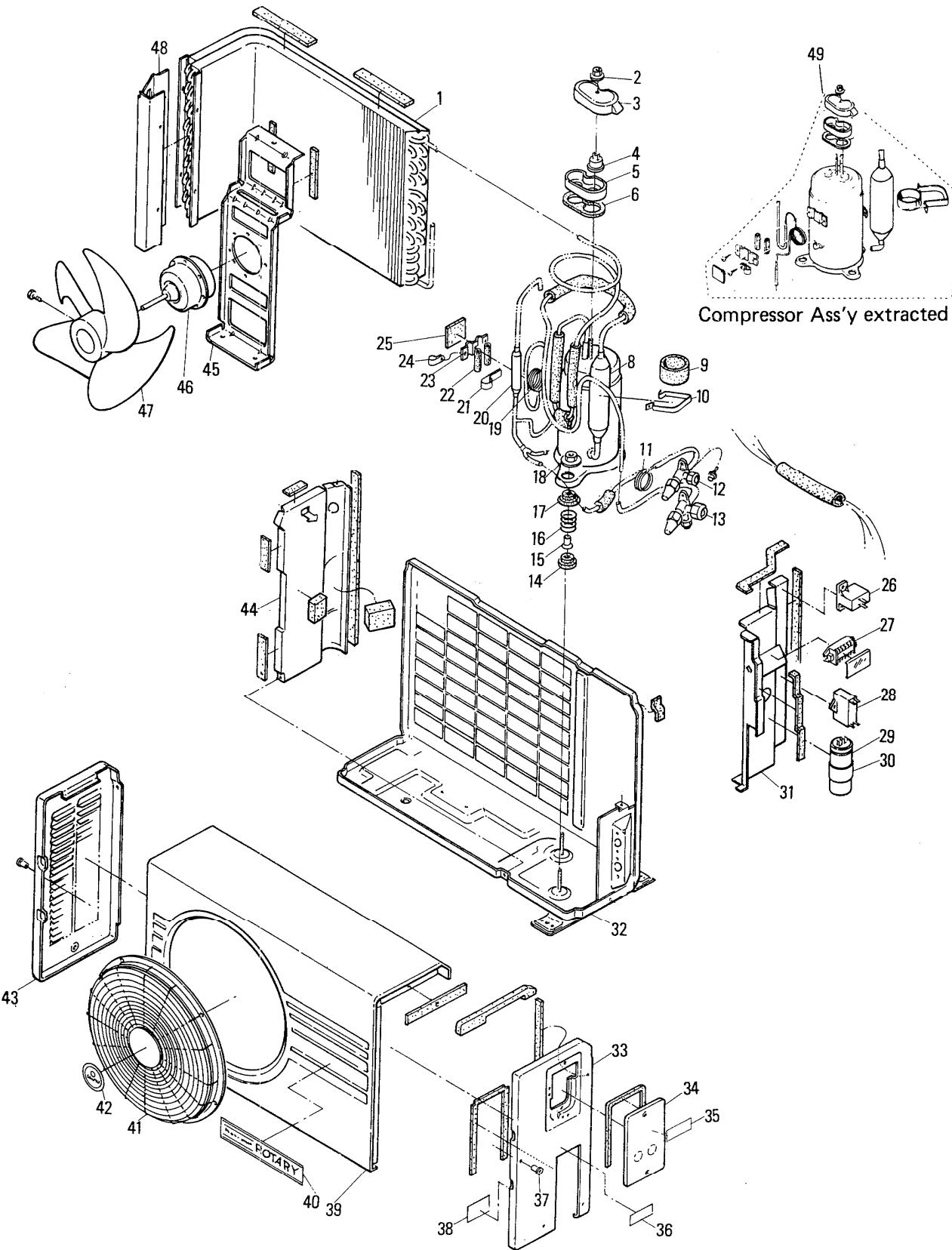
1. Part No. 2. Description 3. Q'ty 4. Volts - Hz - Ph 5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	852-2-2324-149H2	Mounting Plate Ass'y, Evaporator	1	■	852-6-4139-55800	Installation Instructions	1
2	852-2-2230-11801	Rear Panel	1				
3	852-2-2231-134H3	Frame Ass'y	1				
4	852-2-1119-11911	Cover Plate	1				
5	852-2-2511-13810	Cushion Rubber	2				
6	851-0-5290-501M2	Fan Motor Ass'y FV4T-11F1PE	1				
7	852-2-2520-160H2	Mounting Plate Ass'y, Fan Motor	1				
8	852-2-2520-16111	Mounting Plate, Fan Motor	1				
9	852-0-2509-12811	Cross Fan Ass'y	1				
10	852-2-2515-13111	Cover, Cross Fan	1				
11	852-2-2511-13610	Cushion Rubber	1				
12	852-0-2510-11900	Bearing Housing Ass'y	1				
13	852-2-2324-14901	Cover, Evaporator	1				
14	852-2-2309-33701	Mounting Plate	1				
15	852-0-4101-45200	Evaporator Ass'y	1				
16	852-0-2303-167H0	Drain Pan Ass'y	1				
17	852-2-2309-32701	Mounting Plate	1				
18	852-0-1303-12100	Drain Hose Ass'y	1				
19	852-2-1513-36913	Ornamental Plate	1				
20	852-2-1516-15001	Ornamental Plate	1				
21	852-2-1513-40311	Ornamental Plate	1				
22	852-2-5328-10810	Cover	1				
23	852-2-5309-14800	Cover Plate	1				
24	852-2-1506-12601	Knob	1				
25	859-601-41	Indicator Lamp IND-12KU	1				
26	859-472-60	Controller POW-12KU	1				
27	852-2-5310-16701	Mounting Plate, Electrical Component Box	1				
28	852-0-5301-27601	Electrical Component Box Ass'y	1				
29	851-0-5290-501P1	Transformer Ass'y ATR-J121UI	1				
30	4-2239-51164	Fixed Capacitor	1				
31	852-2-5315-22601	Cover Plate	1				
32	852-2-5315-22701	Cover Plate	1				
33	4-2329-56245	Relay VF24HU	1				
34	852-2-5315-22501	Cover Plate	1				
35	851-6-4729-14600	Note	1				
36	4-2379-56159	Terminal Base	1				
37	852-2-5305-14101	Cover Plate	1				
38	852-2-1122-14301	Stopper	2				
39	852-0-1111-13201	Guard Ass'y	1				
40	852-2-1504-17901	Badge	1				
41	852-2-1501-183H5	Grille Ass'y (includes Key No.38, 39,40,42,43,44,45,53)	1				
42	851-2-5250-61900	Wiring Diagram	1				
43	852-2-1335-31300	Name Plate	1				
44	852-2-1513-42001	Ornamental Plate	1				
45	852-2-1516-153H4	Flap Ass'y (includes Key No.45,46, 47,48,49,50,51)	1				
46	852-2-1406-27200	Insulation, Flap	1				
47	852-2-1514-23211	Mounting, Flap	1				
48	852-2-1406-27300	Insulation, Flap	1				
49	852-2-1516-15311	Flap	1				
50	852-6-4159-51200	Note	1				
51	852-2-1514-23811	Mounting	3				
52	852-2-1519-17611	Blade	18				
53	852-0-2307-14811	Air Filter Ass'y	1				
54	859-213-97	Remote Control Switch Ass'y RCS-12KU	1				
55	851-2-5378-00101	Mounting Plate	1				
	■ 852-6-4119-41900	Operation Manual	1				

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

10. PARTS LIST (SAP121KC)

SAP121C
OUTDOOR UNIT



SAP121KC

SAP121C
OUTDOOR UNIT

ATTENTION !

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

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

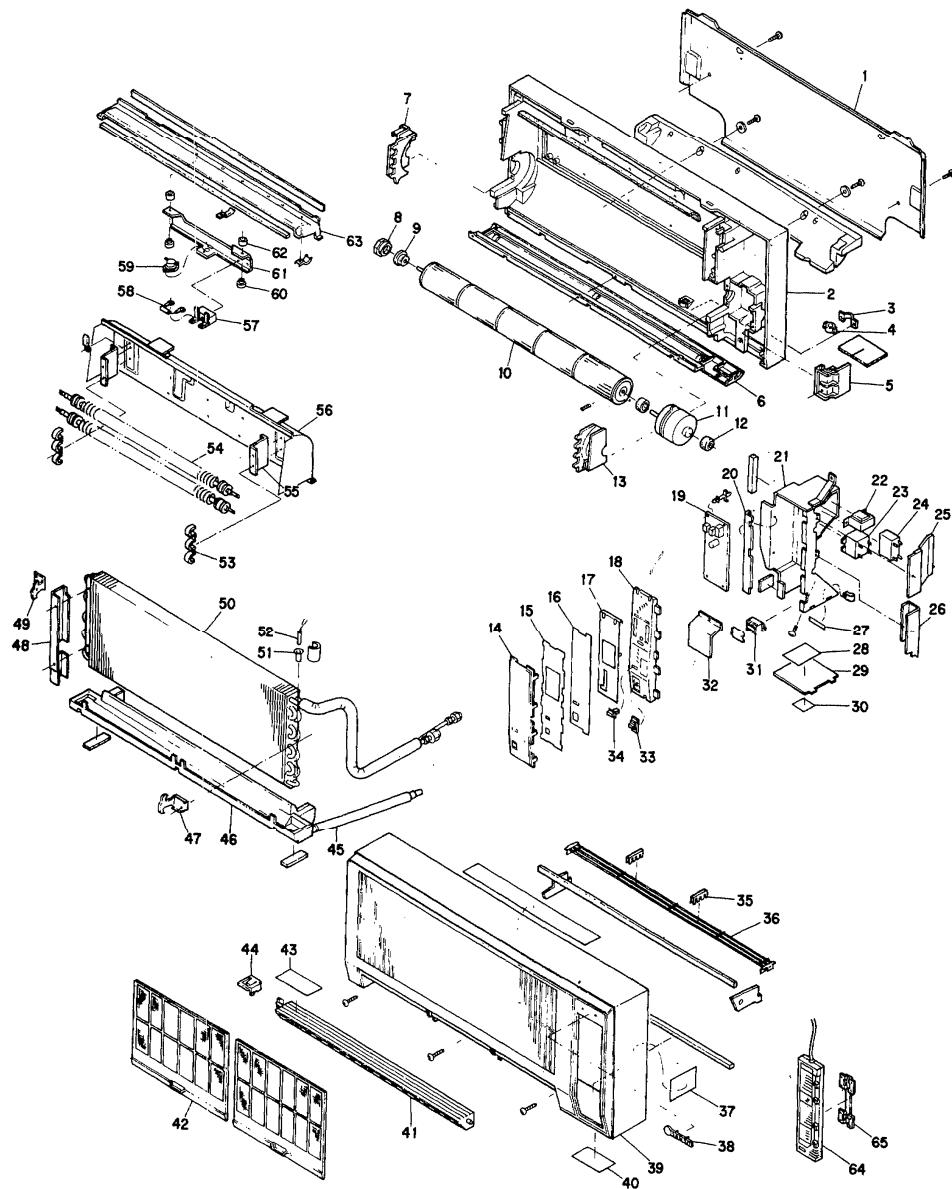
Key No.	Part No.	Description	Q'ty	
1	852-0-4102-27800	Condenser Ass'y	1	
2	801-2-8305-10100	Nut 5mm	1	
3	801-2-6195-10300	Cap Terminal Cover	1	
4	4-2329-69092	Relay MRA98693	1	
5	801-2-6194-10700	Cover Terminal	1	
6	801-2-5303-12100	Gasket Terminal	1	
8	852-0-4511-14500	Accumulator Ass'y	1	
9	852-2-2353-38310	Packing, Accumulator	1	
10	852-2-2356-14601	Band Mounting, Accumulator	1	
11	852-2-4219-49900	Capillary Tube	1	
12	852-0-4522-10100	Valve Ass'y 1/2"	1	
13	852-0-4515-10600	Valve Ass'y 1/4"	1	
14	851-2-2390-13700	Cushion Rubber	1	
14	851-2-2390-13100	Cushion Rubber	2	
15	851-2-1314-17301	Stopper	3	
16	851-2-2330-13001	Spring	3	
17	851-2-2390-13600	Cushion Rubber	3	
18	851-0-2395-10501	Nut Special Ass'y	3	
19	852-0-4202-44100	Capillary Tube Ass'y	1	
20	852-0-4505-14310	Dehydrater Ass'y	1	
21	851-2-5354-00300	Clamper	1	
22	852-2-2353-19500	Packing	2	
23	852-2-2309-34101	Mounting Plate, Capillary Tube	1	
24	3-9030-00506	Clamper	1	
25	852-2-2353-19810	Packing	1	
26	4-2049-60042	Thermistor	1	
27	4-2379-56161	Terminal Base	1	
28	4-2239-51171	Fixed Capacitor, 220VAC 8MFD	1	
29	4-2239-56319	Fixed Capacitor, 350VAC 35MFD	1	
30	852-2-5301-21201	Clip, Capacitor	1	
31	852-0-5301-277H1	Electrical Component Box Ass'y	1	
32	852-0-2202-226H1	Bottom Plate Ass'y	1	
33	852-2-1114-202H1	Side Panel Ass'y, Right	1	
34	852-2-5315-224H1	Cover Plate Ass'y	1	
35	851-6-4729-14600	Label	1	
36	852-2-1335-30300	Name Plate	1	
37	852-2-2326-14302	Spacer	2	
38	851-2-5250-62000	Wiring Diagram	1	
39	852-2-1112-150D1	Cabinet Ass'y	1	
40	852-2-1316-19301	Mark	1	
41	852-0-1111-13001	Guard Ass'y	1	
42	852-2-1316-19901	Mark	1	
43	852-0-1104-14912	Side Panel Ass'y, Left	1	
44	852-2-2202-173H4	Partition Plate Ass'y	1	
45	852-2-2354-140H1	Mounting Plate Ass'y, Fan Motor	1	
46	851-0-5290-502M2	Fan Motor Ass'y	1	
47	852-0-2502-12611	Propeller Fan Ass'y	1	
48	852-2-2351-14101	Cover, Condenser	1	
49	852-0-4516-13100	Compressor Ass'y C-R90H2S	1	
■	3-9502-02210	Refrigerant R-22	*1180gr. (= 0.088 lbs.)	necessary for quick purge.
■	3-9504-10510	Compressor Oil	650cc.	

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

* This amount of refrigerant includes 40 g
(= 0.088 lbs.) necessary for quick purge.

10. PARTS LIST (SAP122KCH)

SAP 122KH
INDOOR UNIT



■ Accessories Supplied with Unit for Installation

Parts	Figure	Q'ty	Code
Anchor		10	852-2-1311-11600
Cover		1	852-2-2369-15200
Cover		1	859-2-1124-10302
Tapping Screw, Truss	(5/8") 4x16mm	6	3-9219-41601
Tapping Screw, Flat	(3/8") 3x10mm	2	3-9222-31001
Full Scale Installation Diagram		1	852-6-4139-60000

Parts	Figure	Q'ty	Code
Insul, Nipple		1	852-2-2414-12400
Cord Clip		2	851-2-5354-00101
Mounting Bracket		1	851-2-5378-00101
Tapping Screw, Pan	(3/8") 3x10 mm	2	3-9221-31001
Drain Hose		1	852-2-4204-10901
Drain hose adaptor		1	852-2-2334-13400

(SAP122KCH)

SAP 122KH
INDOOR UNIT

ATTENTION !

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

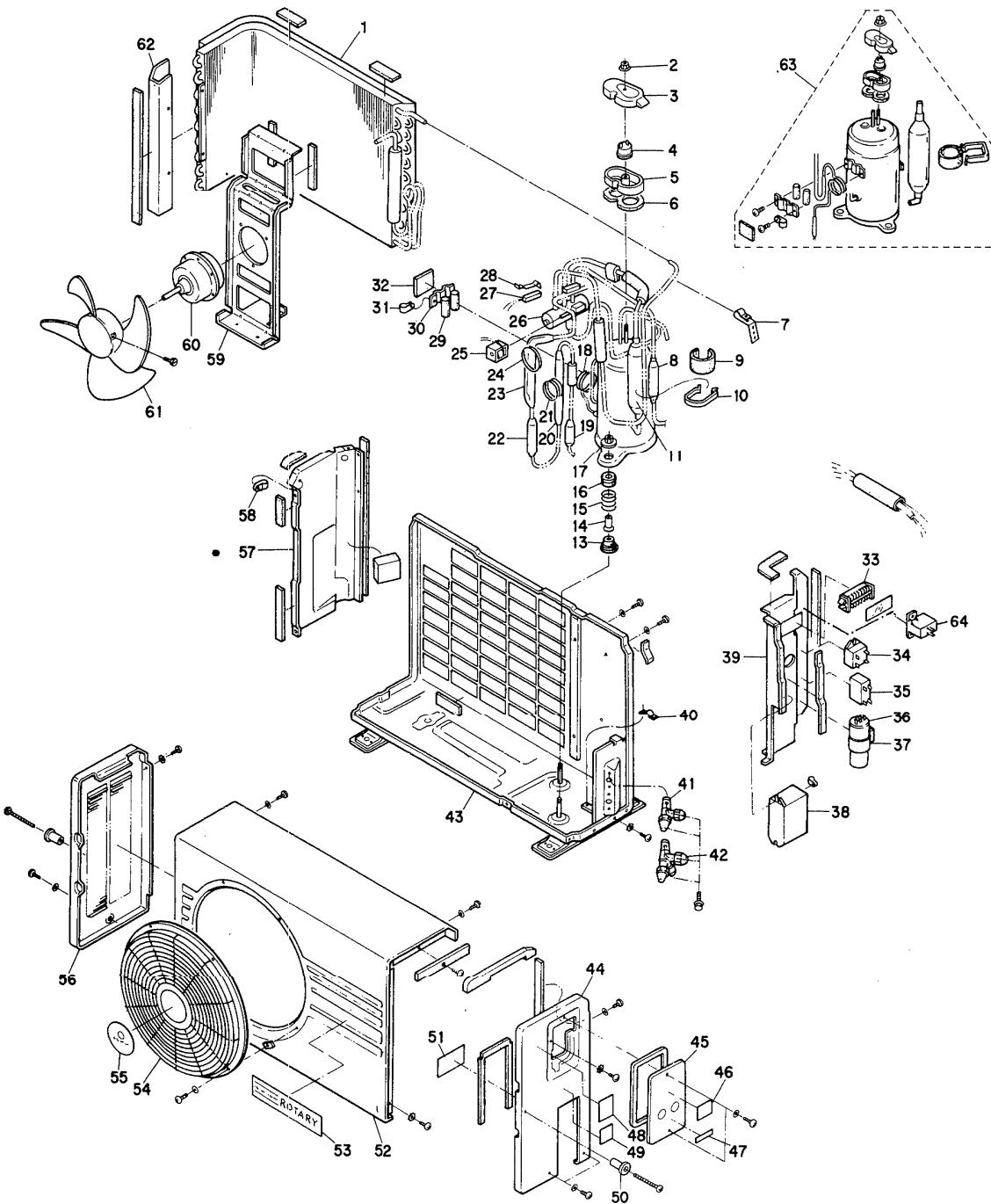
1. Part No. 2. Description 3. Q'ty 4. Volts - Hz - Ph 5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	852-2-2230-11801	Rear Panel (Hanging Wall Bracket)	1	60	345-2-5331-10900	Insulation	2
2	852-2-2231-129H6	Frame Ass'y	1	61	852-2-2309-33301	Mounting Plate, Thermostat	1
3	852-2-5303-14201	Mounting, Thermostat	1	62	346-2-5331-11000	Insulation	2
4	4-2339-56199	Thermostat CT-7L	1	63	852-2-2324-147H1	Spacer Ass'y, Evaporator	1
5	852-2-2520-160H2	Mounting Plate Ass'y, Fan Motor	1	64	859-213-96	Remote Control Switch Ass'y	1
6	852-2-1119-11911	Cover Plate	1	65	851-2-5378-00101	Mounting Plate	1
7	852-2-2515-13111	Cover, Cross Fan	1	■	852-6-4119-46400	Operation Manual	1
8	852-2-2511-13610	Cushion Rubber	1	■	852-6-4139-61600	Installation Instructions	1
9	852-0-2510-11900	Bearing Housing Ass'y	1				
10	852-0-2509-12811	Cross Fan Ass'y	1				
11	523-949-06	Fan Motor-FV4T-11F6P	1				
12	852-2-2511-13810	Cushion Rubber	2				
13	852-2-2520-16111	Mounting Plate, Fan Motor	1				
14	852-2-1516-15011	Ornamental Plate	1				
15	852-2-1513-44601	Ornamental Plate	1				
16	852-2-5328-10810	Cover	1				
17	852-2-5309-14800	Cover Plate	1				
18	859-601-40	Indicator Lamp IND-9KHU	1				
19	859-472-95	Controller POW-122KH	1				
20	852-2-5310-16701	Mounting Plate,	1				
21	852-0-5301-27601	Electrical Component Box Ass'y	1				
22	4-2519-56186	Electrical Component Box Ass'y	1				
23	4-2329-56186	Transformer ATR-J122U	1				
24	4-2239-56216	Relay G4E-2123T-US	1				
25	852-2-5315-22601	Fixed Capacitor 440V 1.0MFID	1				
26	852-2-5315-22701	Cover Plate	1				
27	852-6-4729-17300	Cover Plate	1				
28	852-6-4419-23100	Label	1				
29	852-2-5315-22501	Note	1				
30	851-6-4729-14600	Cover Plate	1				
31	4-2379-56161	Cover Plate	1				
32	852-2-5305-14101	Knob	1				
33	852-2-1506-12501	Knob	1				
34	852-2-1506-12601	Stopper	2				
35	852-2-1122-14301	Guard Ass'y	1				
36	852-0-1111-13201	Wiring Diagram	1				
37	851-2-5250-79600	Badge	1				
38	852-2-1504-17901	Grille Ass'y (includes Key No. 38)	1				
39	852-2-1501-183D1	Name Plate	1				
40	852-2-1335-45400	Flap Ass'y	1				
41	852-2-1516-153H4	Air Filter Ass'y	2				
42	852-0-2307-14811	Note	1				
43	852-6-4159-51800	Mounting	1				
44	852-2-1514-23211	Drain Hose Ass'y	1				
45	852-0-1303-12100	Drain Pan Ass'y	1				
46	852-0-2303-167H0	Mounting Plate	1				
47	852-2-2309-32701	Cover, Evaporator	1				
48	852-2-2351-14301	Mounting Plate	1				
49	852-2-2309-33701	Evaporator Ass'y	1				
50	852-0-4101-50100	Clip, Thermistor	1				
51	852-2-5304-13700	Thermistor NTC-51H-S2	1				
52	4-2049-56176	Mounting Plate	2				
53	852-2-2309-33501	Heater 230V-750W	2				
54	4-2459-56198	Mounting Plate, Heater	2				
55	852-2-2309-33401	Heater Guard Ass'y	1				
56	852-0-2309-11601	Porcelain	1				
57	345-2-5317-11800	Thermal Fuse	1				
58	851-0-5261-00200	Thermostat 1NTO1L	1				
59	4-2339-56197						

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

10. PARTS LIST (SAP122KCH)

SAP 122CH
OUTDOOR UNIT



(SAP122KCH)

SAP 122CH
OUTDOOR UNIT

ATTENTION !

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

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

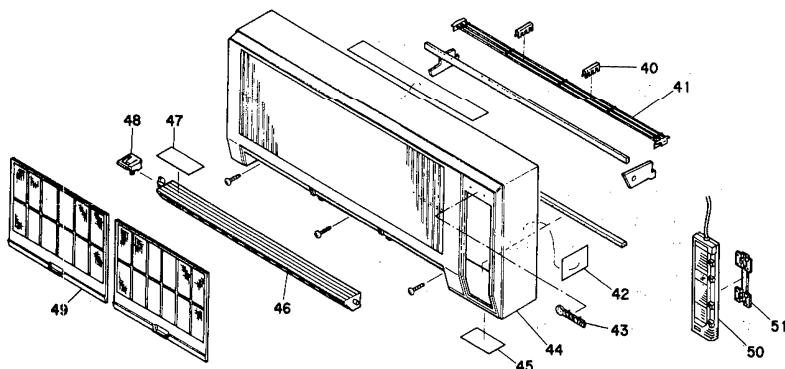
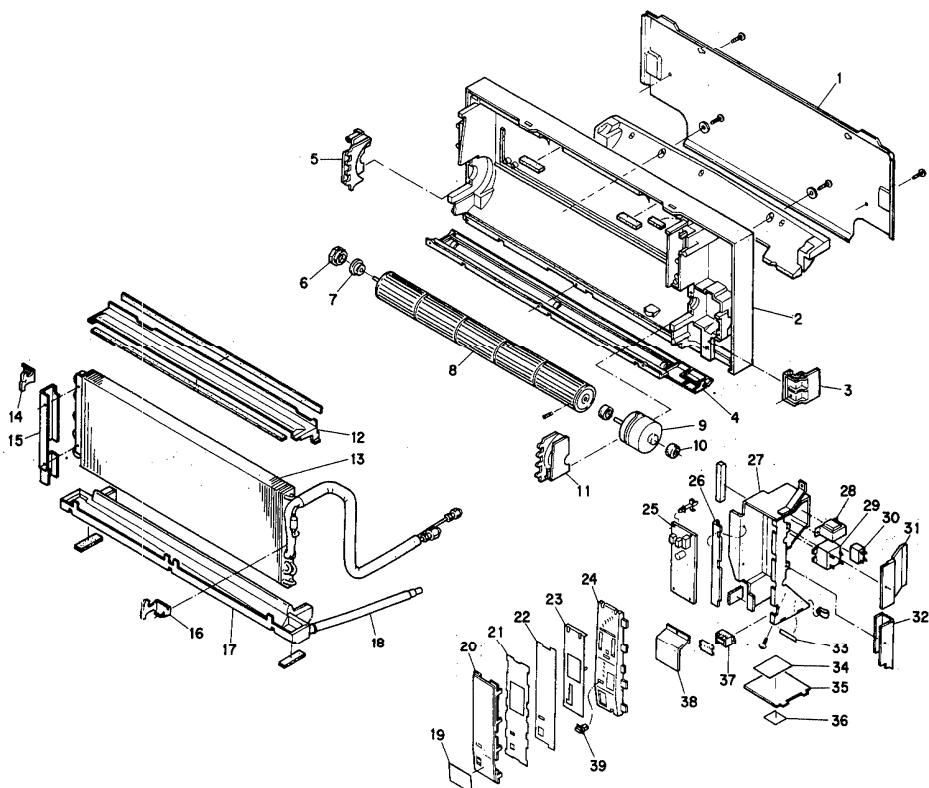
Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	852-0-4102-29100	Condenser Ass'y	1	60	525-066-06	Fan Motor FT6-21E6P	1
2	801-2-8305-10100	Nut 5mm	1	61	852-0-2502-12611	Propeller Fan Ass'y	1
3	801-2-6195-10300	Cap Terminal Cover	1	62	852-2-2351-141H2	Cover Ass'y, Condenser	1
4	4-2329-69152	Relay MSTOOAKU-9201	1	63	852-0-4516-15200	Compressor Ass'y C-R90H6S	1
5	801-2-6194-10700	Cover Terminal	1	64	4-2049-60042	Thermistor	1
6	801-2-5303-12100	Gasket Terminal	1	■	3-9502-02210	Refrigerant R-22	*1,380gr.
7	852-2-2362-15601	Mounting, Tube	1	■	3-9504-10510	Compressor Oil	650cc
8	852-2-4501-11600	Muffler	1				
9	852-2-2353-38310	Packing	1				
10	852-2-2356-14601	Band Mounting	1				
11	852-0-4511-14500	Accumulator Ass'y	1				
13	851-2-2390-13700	Cushion Rubber	1				
13	851-2-2390-13100	Cushion Rubber	2				
14	851-2-1314-17300	Stopper	3				
15	851-2-2330-13001	Spring	3				
16	851-2-2390-13600	Cushion Rubber	3				
17	851-0-2395-10501	Nut Special Ass'y	3				
18	852-0-4202-57000	Capillary Tube Ass'y	1				
19	852-0-4506-15900	Strainer Ass'y	1				
20	854-0-4518-13800	Check Valve Ass'y	1				
21	852-2-4219-56400	Capillary Tube	1				
22	852-0-4505-14600	Dehydrater Ass'y	1				
23	852-0-4204-12500	Check Valve Ass'y	1				
24	852-2-4219-56300	Capillary Tube	1				
25	4-2649-56169	Solenoid, Reversing Valve L27-9072	1				
26	4-2649-56162	Reversing Valve Ass'y V26-9000	1				
27	4-2339-56186	Thermistor	1				
28	852-2-5303-12100	Mounting, Thermistor	1				
29	852-2-2353-19500	Packing	2				
30	852-2-2309-34101	Mounting Plate, Capillary Tube	1				
31	3-9030-00506	Clamper	1				
32	852-2-2353-19810	Packing	1				
33	4-2379-56176	Terminal Base	1				
34	4-2329-56282	Relay DFU24D1-F(M)	1				
35	4-2239-56219	Fixed Capacitor 440V-2.5MFD	1				
36	4-2239-56337	Fixed Capacitor 370V-20MFD	1				
37	852-2-5301-21201	Clip, Capacitor	1				
38	859-472-58	Controller POW-90CH	1				
39	852-0-5301-281H1	Electrical Component Box Ass'y	1				
40	852-2-2362-15701	Mounting, Tube	1				
41	852-0-4501-25600	Valve Ass'y 1/4"	1				
42	852-0-4501-21800	Valve Ass'y 1/2"	1				
43	852-0-2202-228H1	Bottom Plate Ass'y	1				
44	852-2-1114-202H1	Side Panel Ass'y, Right	1				
45	852-2-5315-224H1	Cover Plate Ass'y	1				
46	851-6-4729-14600	Label	1				
47	852-6-4729-17300	Label	1				
48	852-6-4419-23100	Label	1				
49	852-2-1335-45300	Name Plate	1				
50	852-2-2326-14302	Spacer	2				
51	851-2-5251-33801	Wiring Diagram	1				
52	852-2-1112-150D3	Cabinet Ass'y	1				
53	852-2-1316-19301	Mark	1				
54	852-0-1111-13001	Guard Ass'y	1				
55	852-2-1316-19901	Mark	1				
56	852-0-1104-14912	Side Panel Ass'y, Left	1				
57	852-2-2202-173H7	Partition Plate Ass'y	1				
58	3-9030-00507	Clamper	1				
59	852-2-2354-140H2	Mounting Plate Ass'y, Fan Motor	1				

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

*This amount of refrigerant includes 40 g (=0.088 lbs.)
necessary for quick purge.

10. PARTS LIST (SAP181KC)

SAP 181K
INDOOR UNIT



■ Accessories Supplied with Unit for Installation

Parts	Figure	Q'ty	Code
Anchor		10	852-2-1311-11600
Cover		1	852-2-2369-15200
Cover		1	859-2-1124-10302
Tapping Screw, Truss	(5/8") 4x16mm	6	3-9219-41601
Tapping Screw, Flat	(3/8") 3x10mm	2	3-9222-31001
Full Scale Installation Diagram		1	852-6-4139-60000

Parts	Figure	Q'ty	Code
Insul, Nipple		1	852-2-2414-12400
Cord Clip		2	851-2-5354-00101
Mounting Bracket		1	851-2-5378-00101
Tapping Screw, Pan	(3/8") 3x10 mm	2	3-9221-31001
Drain Hose		1	852-2-4204-10901
Drain hose adaptor		1	852-2-2334-13400

(SAP181K)

SAP 181K
INDOOR UNIT

ATTENTION !

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

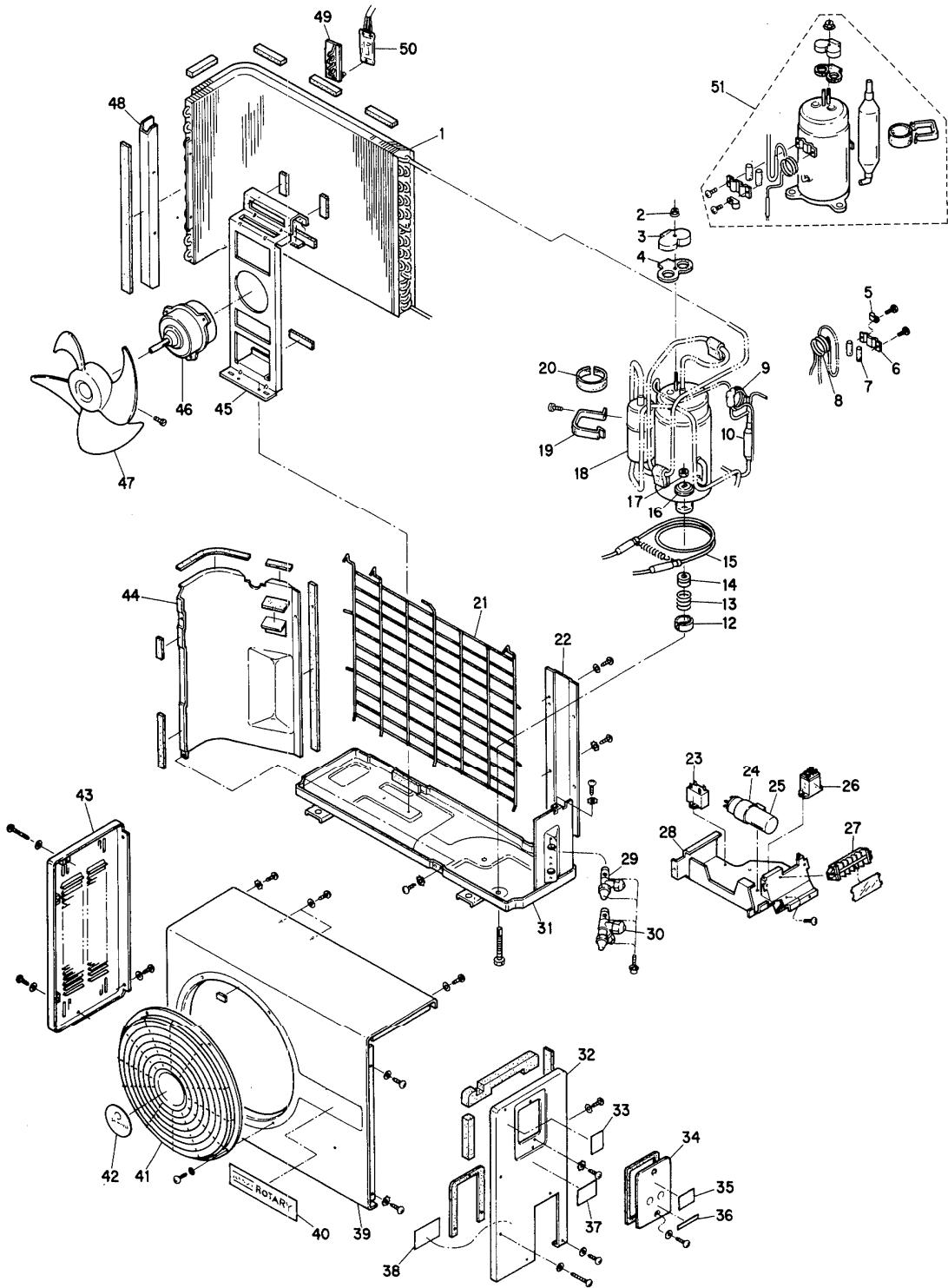
1. Part No. 2. Description 3. Q'ty 4. Volts - Hz - Ph 5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	852-2-2230-11801	Rear Panel (Hanging Wall Bracket)	1	■	852-6-4139-55800	Installation Instructions	1
2	852-2-2231-134H6	Frame Ass'y	1				
3	852-2-2520-160H2	Mounting Plate Ass'y, Fan Motor	1				
4	852-2-1119-11911	Cover Plate	1				
5	852-2-2515-13111	Cover, Cross Fan	1				
6	852-2-2511-13610	Cushion Rubber	1				
7	852-0-2510-11900	Bearing Housing Ass'y	1				
8	852-0-2509-12811	Cross Fan Ass'y	1				
9	525-068-06	Fan Motor FV4T-11L6P	1				
10	852-2-2511-13810	Cushion Rubber	2				
11	852-2-2520-16111	Mounting Plate, Fan Motor	1				
12	852-2-2324-149H3	Spacer Ass'y, Evaporator	1				
13	852-0-4101-49500	Evaporator Ass'y	1				
14	852-2-2309-33701	Mounting Plate, Evaporator	1				
15	852-2-2351-14301	Cover, Evaporator	1				
16	852-2-2309-32701	Mounting Plate, Evaporator	1				
17	852-0-2303-167H0	Drain Pan Ass'y	1				
18	852-0-1303-12100	Drain Hose Ass'y	1				
19	852-2-1513-36913	Ornamental Plate	1				
20	852-2-1516-15011	Ornamental Plate	1				
21	852-2-1513-40311	Ornamental Plate	1				
22	852-2-5328-10810	Cover	1				
23	852-2-5309-14800	Cover Plate	1				
24	859-601-41	Indicator Lamp IND-12KU	1				
25	859-472-97	Controller POW-181K	1				
26	852-2-5310-16701	Mounting Plate, Electrical Component Box Ass'y	1				
27	852-0-5301-27601	Electrical Component Box Ass'y	1				
28	4-2519-56186	Transformer ATR-J122U	1				
29	4-2329-56282	Relay DFU24D1-F	1				
30	4-2239-56216	Fixed Capacitor 440V 1.0MFD	1				
31	852-2-5315-22601	Cover Plate	1				
32	852-2-5315-22701	Cover Plate	1				
33	852-6-4729-17300	Label	1				
34	852-6-4419-23200	Label	1				
35	852-2-5315-22501	Cover Plate	1				
36	851-6-4729-14600	Label	1				
37	4-2379-56168	Terminal Base	1				
38	852-2-5305-14101	Cover Plate	1				
39	852-2-1506-12601	Knob	1				
40	852-2-1122-14301	Stopper	2				
41	852-0-1111-13201	Guard Ass'y	1				
42	851-2-5250-79800	Wiring Diagram	1				
43	852-2-1504-17901	Badge	1				
44	852-2-1501-183D1	Grille Ass'y (includes Key No. 43)	1				
45	852-2-1335-45800	Name Plate	1				
46	852-2-1516-153H4	Flap Ass'y	1				
47	852-6-4159-51200	Label	1				
48	852-2-1514-23211	Mounting, Flap	1				
49	852-0-2307-14811	Air Filter Ass'y	2				
50	859-213-97	Remote Control Switch Ass'y RCS-12KU	1				
51	851-2-5378-00101	Mounting Plate	1				
■	852-6-4119-41900	Operation Manual	1				

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

10. PARTS LIST (SAP181KC)

SAP 181C
OUTDOOR UNIT



(SAP181KC)

SAP 181C
OUTDOOR UNIT

ATTENTION !

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

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

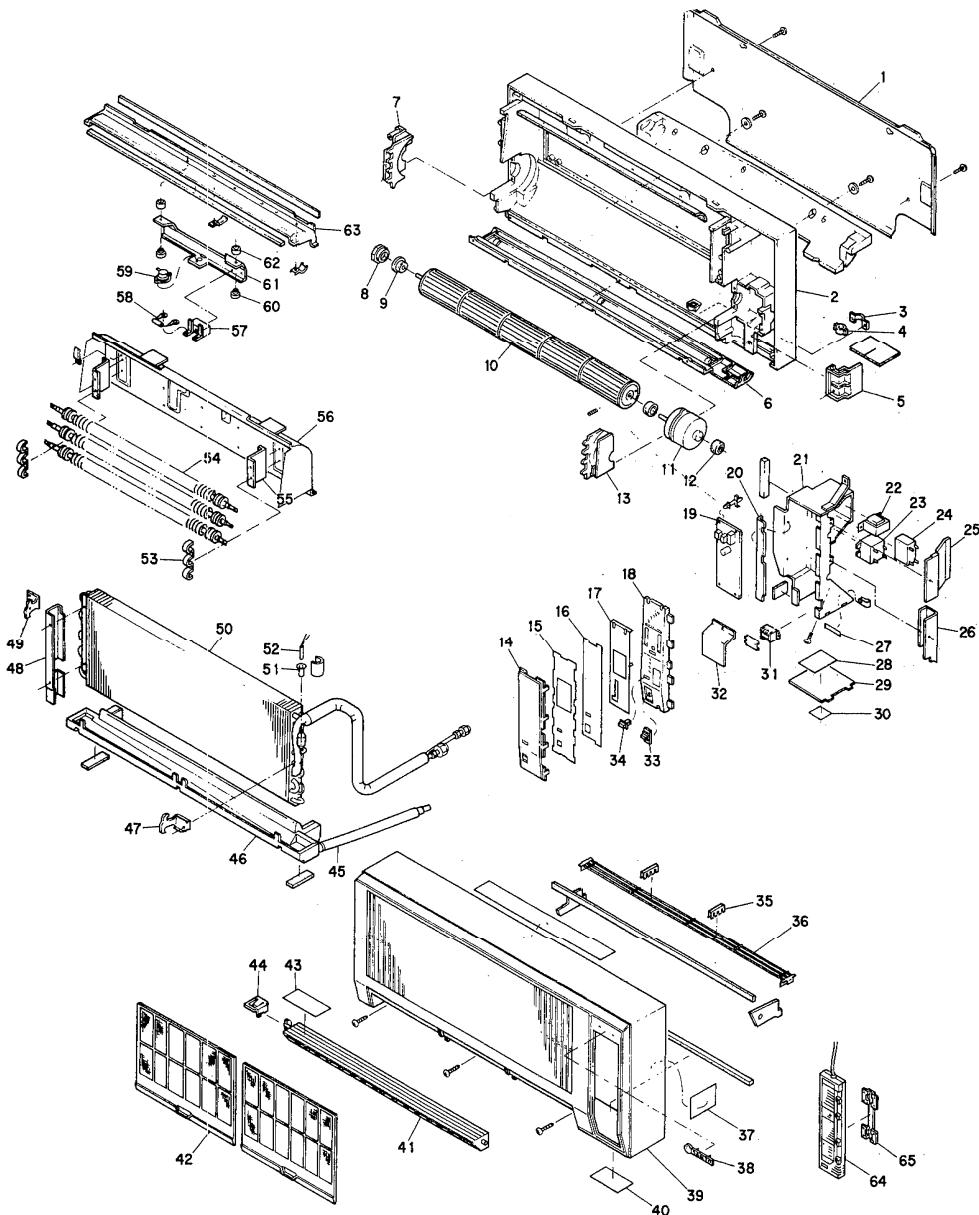
Key No.	Part No.	Description	Q'ty
1	852-0-4102-28900	Condenser Ass'y	1
2	801-2-8305-10100	Nut 5mm	1
3	801-2-6194-10800	Cover Terminal	1
4	801-2-5303-12600	Gasket Terminal	1
5	3-9030-00507	Clamper	1
6	852-2-2309-34101	Mounting Plate, Capillary Tube	1
7	852-2-2363-19500	Packing	2
8	852-0-4202-49710	Capillary Tube Ass'y	1
9	852-2-4219-50000	Capillary Tube	1
10	852-0-4505-14700	Dehydrater Ass'y	1
12	851-2-2390-14000	Cushion Rubber	3
13	851-2-2330-13201	Spring	3
14	851-2-2390-13900	Cushion Rubber	3
15	4-2459-56195	Crankcase Heater 230V-30W	1
16	852-2-2397-12100	Washer Special	3
17	3-9270-08001	Nut 8mm	3
18	852-0-4511-12901	Accumulator Ass'y	1
19	852-2-2356-10801	Band Mounting, Accumulator	1
20	852-2-2353-15110	Packing, Accumulator	1
21	852-0-1111-12701	Guard Ass'y	1
22	852-2-1120-16011	Rear Panel	1
23	4-2239-56218	Fixed Capacitor 440V-2.0MFD	1
24	852-2-5301-21201	Clip, Capacitor	1
25	4-2239-56338	Fixed Capacitor 400V-30MFD	1
26	4-2329-56287	Relay MY2F-T1-US-TS	1
27	4-2379-56170	Terminal Base	1
28	852-0-5301-26901	Electrical Component Box Ass'y	1
29	852-0-4501-23900	Valve Ass'y 1/4"	1
30	852-0-4501-24000	Valve Ass'y 5/8"	1
31	852-0-2202-23111	Bottom Plate Ass'y	1
32	852-0-1104-144H5	Side Panel Ass'y, Right	1
33	852-6-4419-23200	Label	1
34	852-2-5315-224H1	Cover Plate Ass'y	1
35	851-6-4729-14600	Label	1
36	852-6-4729-17300	Label	1
37	852-2-1335-45700	Name Plate	1
38	851-2-5250-79900	Wiring Diagram	1
39	852-2-1112-153H2	Cabinet Ass'y	1
40	852-2-1316-21201	Mark	1
41	852-0-1111-13001	Guard Ass'y	1
42	852-2-1316-19901	Mark	1
43	852-0-1104-14311	Side Panel Ass'y, Left	1
44	852-0-2209-105H5	Partition Plate Ass'y	1
45	852-2-2354-142H5	Mounting Plate Ass'y, Fan Motor	1
46	525-069-06	Fan Motor	1
47	852-0-2502-12011	Propeller Fan Ass'y	1
48	852-2-2351-145H1	Cover Ass'y, Condenser	1
49	852-2-5303-14110	Mounting Plate, Thermostat	1
50	4-2339-56201	Thermostat	1
51	852-0-4516-15400	Compressor Ass'y C-R150H6M	1
■	3-9502-02210	Refrigerant R-22	*1,700gr.
■	3-9504-10510	Compressor Oil	1,200cc

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

*This amount of refrigerent includes 80g (=0.176 lbs.)
necessary for quick purge.

10. PARTS LIST (SAP182KCH)

SAP 182KH
INDOOR UNIT



■ Accessories Supplied with Unit for Installation

Parts	Figure	Q'ty	Code
Anchor		10	852-2-1311-11600
Cover		1	852-2-2369-15200
Cover		1	859-2-1124-10302
Tapping Screw, Truss		6	3-9219-41601
Tapping Screw, Flat		2	3-9222-31001
Full Scale Installation Diagram		1	852-6-4139-60000

Parts	Figure	Q'ty	Code
Insul, Nipple		1	852-2-2414-12400
Cord Clip		2	851-2-5354-00101
Mounting Bracket		1	851-2-5378-00101
Tapping Screw, Pan		2	3-9221-31001
Drain Hose		1	852-2-4204-10901
Drain hose adaptor		1	852-2-2334-13400

(SAP182KCH)

SAP 182KH
INDOOR UNIT

ATTENTION !

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

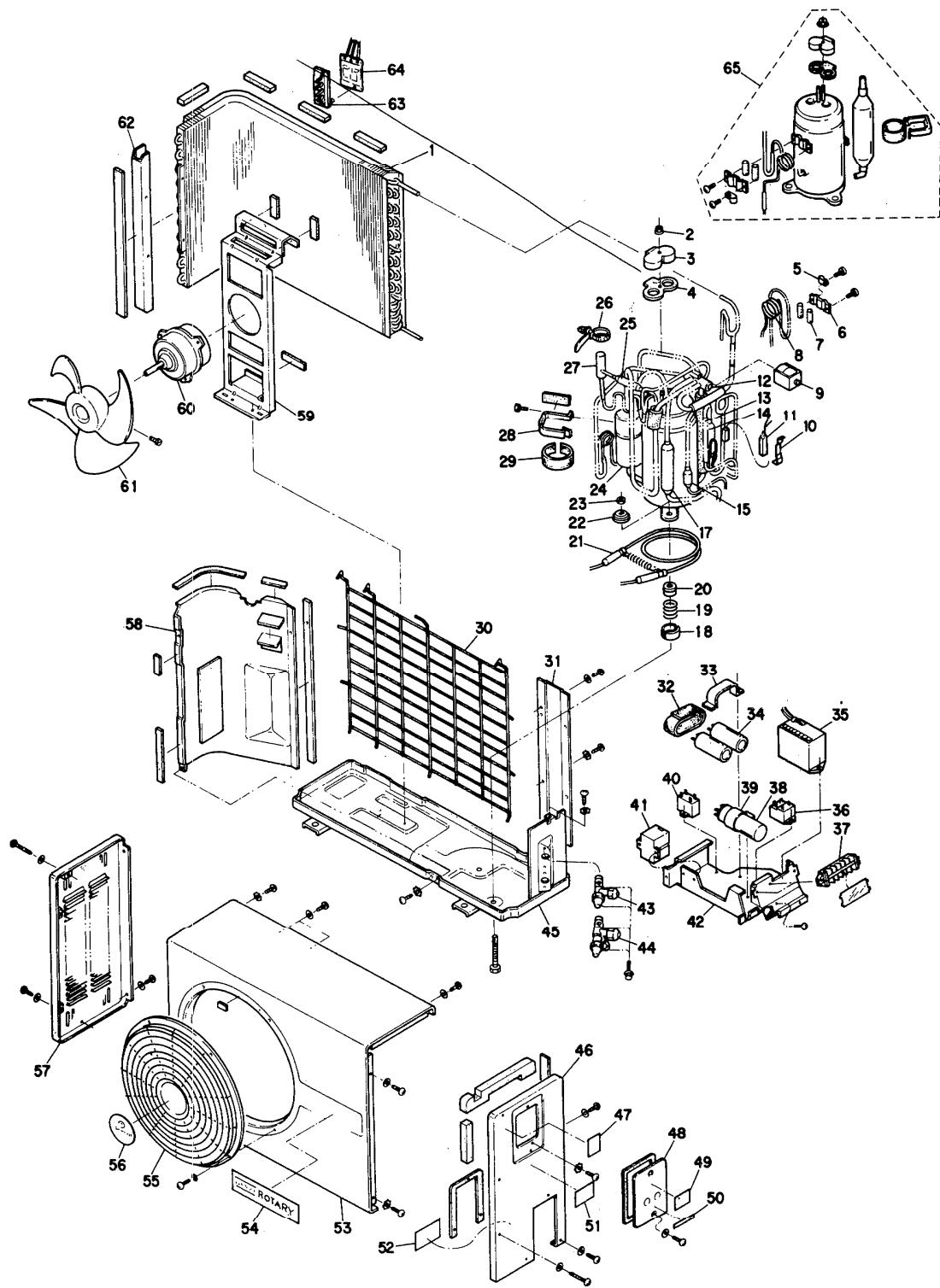
1. Part No. 2. Description 3. Q'ty 4. Volts - Hz - Ph 5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	852-2-2230-11801	Rear Panel (Hanging Wall Bracket)	1	60	345-2-5331-10900	Insulation	2
2	852-2-2231-129H6	Frame Ass'y	1	61	852-2-2309-33301	Mounting Plate, Thermostat	1
3	852-2-5303-14201	Mounting, Thermostat	1	62	345-2-5331-11000	Insulation	2
4	4-2339-56200	Thermostat CT-7L	1	63	852-2-2324-147H1	Spacer Ass'y, Evaporator	1
5	852-2-2520-160H2	Mounting Plate Ass'y, Fan Motor	1	64	859-213-96	Remote Control Switch Ass'y	1
6	852-2-1119-11911	Cover Plate	1	65	851-2-5378-00101	Mounting Plate	1
7	852-2-2515-13111	Cover, Cross Fan	1	■ 852-6-4119-46400	Operation Manual	1	
8	852-2-2511-13610	Cushion Rubber	1	■ 852-6-4139-61600	Installation Instructions	1	
9	852-0-2510-11900	Bearing Housing Ass'y	1				
10	852-0-2509-12811	Cross Fan Ass'y	1				
11	525-068-06	Fan Motor FV4T-11L6P	1				
12	852-2-2511-13810	Cushion Rubber	2				
13	852-2-2520-16111	Mounting Plate, Fan Motor	1				
14	852-2-1516-15011	Ornamental Plate	1				
15	852-2-1513-44601	Ornamental Plate	1				
16	852-2-5328-10810	Cover	1				
17	852-2-5309-14800	Cover Plate	1				
18	859-601-40	Indicator Lamp IND-9KHU	1				
19	859-472-96	Controller POW-182KH	1				
20	852-2-5310-16701	Mounting Plate,	1				
21	852-0-5301-27601	Electrical Component Box Ass'y	1				
22	4-2519-56186	Electrical Component Box Ass'y	1				
23	4-2329-56186	Transformer ATR-J122U	1				
24	4-2239-56216	Relay G4E-2123T-US	1				
25	852-2-5315-22601	Fixed Capacitor	1				
26	852-2-5315-22701	Cover Plate	1				
27	852-6-4729-17300	Cover Plate	1				
28	852-6-4419-23100	Label	1				
29	852-2-5315-22501	Note	1				
30	851-6-4729-14600	Cover Plate	1				
31	4-2379-56161	Note	1				
32	852-2-5305-14101	Terminal Base	1				
33	852-2-1506-12501	Cover Plate	1				
34	852-2-1506-12601	Cover Plate	1				
35	852-2-1122-14301	Knob	1				
36	852-0-1111-13201	Knob	1				
37	851-2-5250-79600	Stopper	2				
38	852-2-1504-17901	Guard Ass'y	1				
39	852-2-1501-183D1	Wiring Diagram	1				
40	852-2-1335-45600	Badge	1				
41	852-2-1516-153H4	Grille Ass'y (includes Key No. 38)	1				
42	852-0-2307-14811	Name Plate	1				
43	852-6-4159-51800	Flap Ass'y	1				
44	852-2-1514-23211	Air Filter Ass'y	2				
45	852-0-1303-12100	Note	1				
46	852-0-2303-167H0	Mounting	1				
47	852-2-2309-32701	Drain Hose Ass'y	1				
48	852-2-2351-14301	Drain Pan Ass'y	1				
49	852-2-2309-33701	Mounting Plate	1				
50	852-0-4101-49800	Mounting Plate	1				
51	852-2-5304-13700	Evaporator Ass'y	1				
52	4-2049-56176	Clip, Thermistor	1				
53	852-2-2309-33501	Thermistor	1				
54	4-2459-56197	Mounting Plate, Heater	2				
55	852-2-2309-33401	Heater 230V-600W	3				
56	852-0-2309-11601	Mounting Plate	2				
57	354-2-5317-11800	Heater Guard Ass'y	1				
58	851-0-5261-00200	Porcelain	1				
59	4-2339-56197	Thermal Fuse	1				
		Thermostat 1INT01L	1				

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

10. PARTS LIST (SAP182KCH)

SAP 182CH
OUTDOOR UNIT



(SAP182KCH)

SAP 182CH
OUTDOOR UNIT

ATTENTION !

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

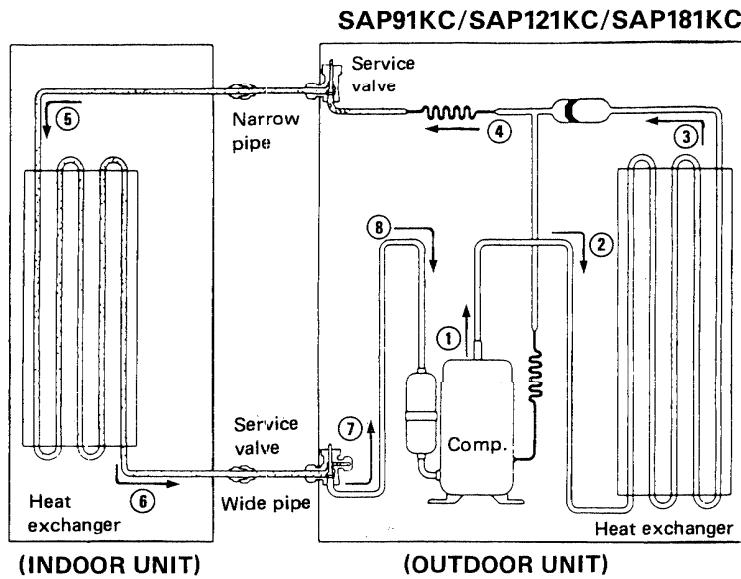
1. Part No. 2. Description 3. Q'ty 4. Volts - Hz - Ph 5. PRODUCT MODEL NO.

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
1	852-0-4102-28700	Condenser Ass'y	1	61	852-0-2502-12011	Propeller Fan Ass'y	1
2	801-2-8305-10100	Nut 5mm	1	62	852-2-2351-144H1	Cover Ass'y, Condenser	1
3	801-2-6194-10800	Cover Terminal	1	63	852-2-5303-14110	Mounting, Thermistor	1
4	801-2-5303-12600	Gasket Terminal	1	64	4-2339-56194	Thermostat	1
5	3-9030-00507	Clamper	1	65	852-0-4516-15300	Compressor Ass'y C-R150H6M	1
6	852-2-2309-34101	Mounting Plate, Capillary Tube	1	■	3-9502-02210	Refrigerant R-22	2,180gr.
7	852-2-2353-19500	Packing	2	■	3-9504-10510	Compressor Oil	1,200cc
8	852-0-4202-59000	Capillary Tube Ass'y	1				
9	4-2649-56169	Solenoid, Reversing Valve	1				
10	852-2-5303-12000	Mounting, Thermistor	1				
11	4-2339-56186	Thermistor TRSO2-12MSR	1				
12	4-2649-56162	Reversing Valve Ass'y V26-9000	1				
13	854-0-4518-13700	Check Valve Ass'y	1				
14	852-0-4505-14700	Dehydrater Ass'y	1				
15	852-0-4506-16000	Strainer Ass'y	1				
17	852-2-4501-11700	Muffler	1				
18	851-2-2390-14000	Cushion Rubber	3				
19	851-2-2330-13201	Spring	3				
20	851-2-2390-13900	Cushion Rubber	3				
21	4-2459-56195	Crankcase Heater 230V-30W	1				
22	852-2-2397-12100	Washer Special	3				
23	3-9270-08001	Nut 8mm	3				
24	852-0-4511-12901	Accumulator Ass'y	1				
25	852-2-4501-11800	Muffler	1				
26	851-2-5354-00300	Clamper	1				
27	852-0-4205-10300	Discharge Pressure Regulator Ass'y	1				
28	852-2-2356-10801	Band Mounting, Accumulator	1				
29	852-2-2353-15110	Packing, Accumulator	1				
30	852-0-1111-12701	Guard Ass'y	1				
31	852-2-1120-16011	Rear Panel	1				
32	852-2-2353-46200	Packing	1				
33	852-2-5301-23501	Clip, Capacitor	1				
34	4-2239-60210	Fixed Capacitor 160V-100MFD	2				
35	859-472-58	Controller POW-90CH	1				
36	4-2329-56286	Relay DFU24D1F	1				
37	4-2379-56176	Terminal Base	1				
38	4-2239-56338	Fixed Capacitor 400V-30MFD	1				
39	852-2-5301-21201	Clip, Capacitor	1				
40	4-2239-56218	Fixed Capacitor 440V-2MFD	1				
41	4-2329-69070	Relay V1-235172A	1				
42	852-0-5301-26901	Electrical Component Box Ass'y	1				
43	852-0-4501-23200	Valve Ass'y 1/4"	1				
44	852-0-4501-23300	Valve Ass'y 5/8"	1				
45	852-0-2202-23111	Bottom Plate Ass'y	1				
46	852-0-1104-144H5	Side Panel Ass'y, Right	1				
47	852-6-4419-23100	Label	1				
48	852-2-5315-224H1	Cover Plate Ass'y	1				
49	851-6-4729-14600	Label	1				
50	852-6-4729-17300	Label	1				
51	852-2-1335-45500	Name Plate	1				
52	851-2-5250-79700	Wiring Diagram	1				
53	852-2-1112-153H2	Cabinet Ass'y	1				
54	852-2-1316-21201	Mark	1				
55	852-0-1111-13001	Guard Ass'y	1				
56	852-2-1316-19901	Mark	1				
57	852-0-1104-14311	Side Panel Ass'y, Left	1				
58	852-0-2209-103H2	Partition Plate Ass'y	1				
59	852-2-2354-142H4	Mounting Plate Ass'y, Fan Motor	1				
60	525-069-06	Fan Motor SG6S-51C6P	1				

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

*This amount of refrigerant includes 80g (=0.176 lbs) necessary for quick purge.

11. REFRIGERANT SCHEMATIC DIAGRAM



NOTE :

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

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

COOLING CYCLE

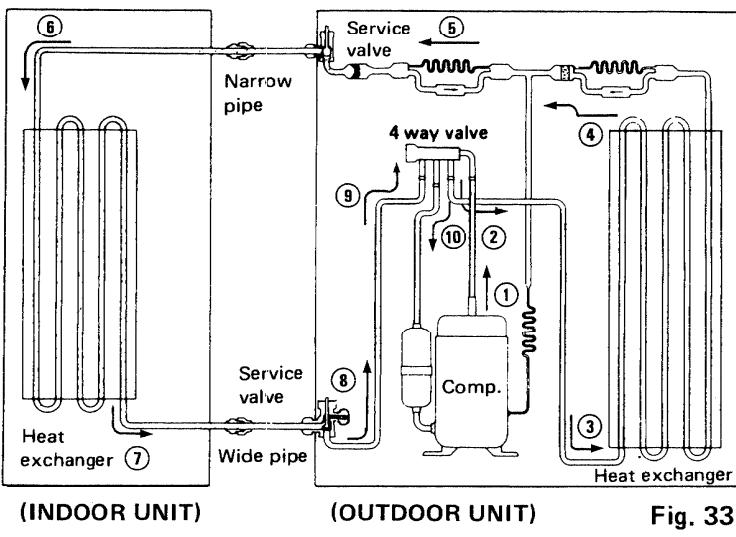


Fig. 33

HEATING CYCLE

SAP92KCH/SAP122KCH

ANSWER

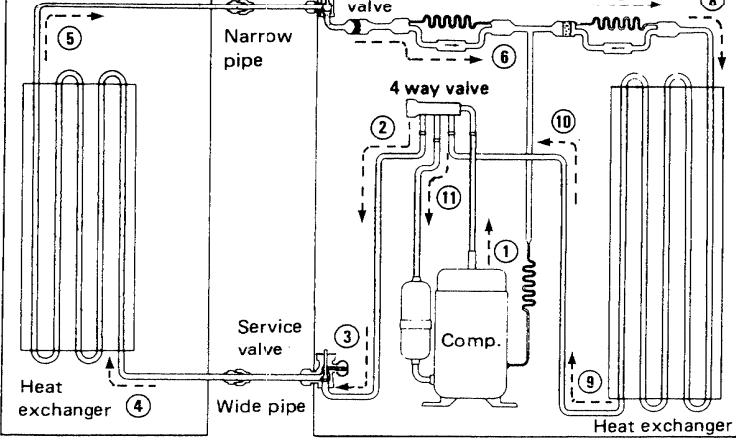
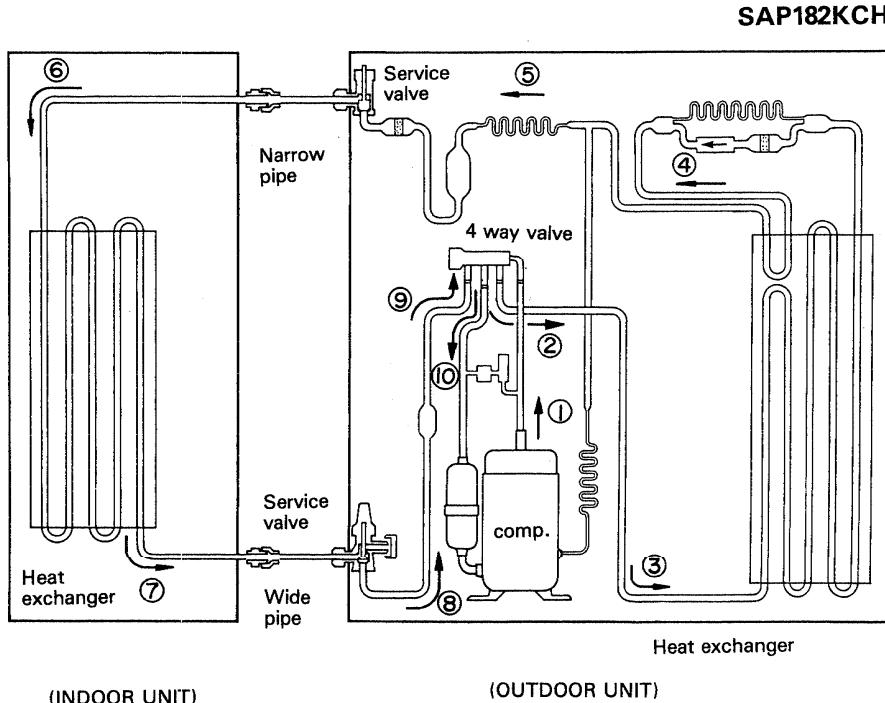


Fig. 33

11. REFRIGERANT SCHEMATIC DIAGRAM (CONTINUED)

COOLING CYCLE

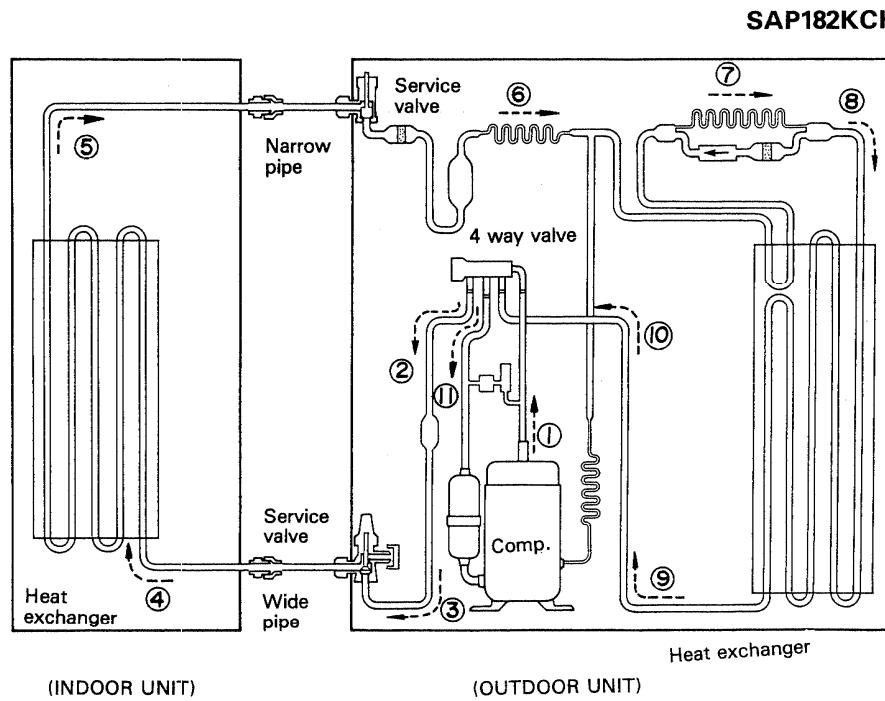


NOTE:

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

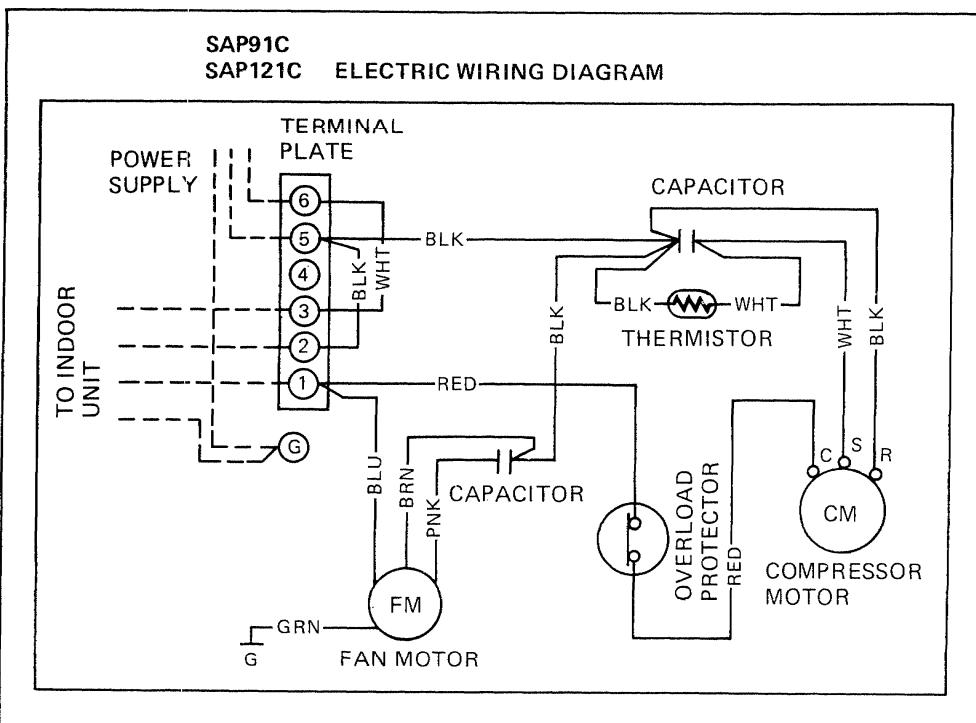
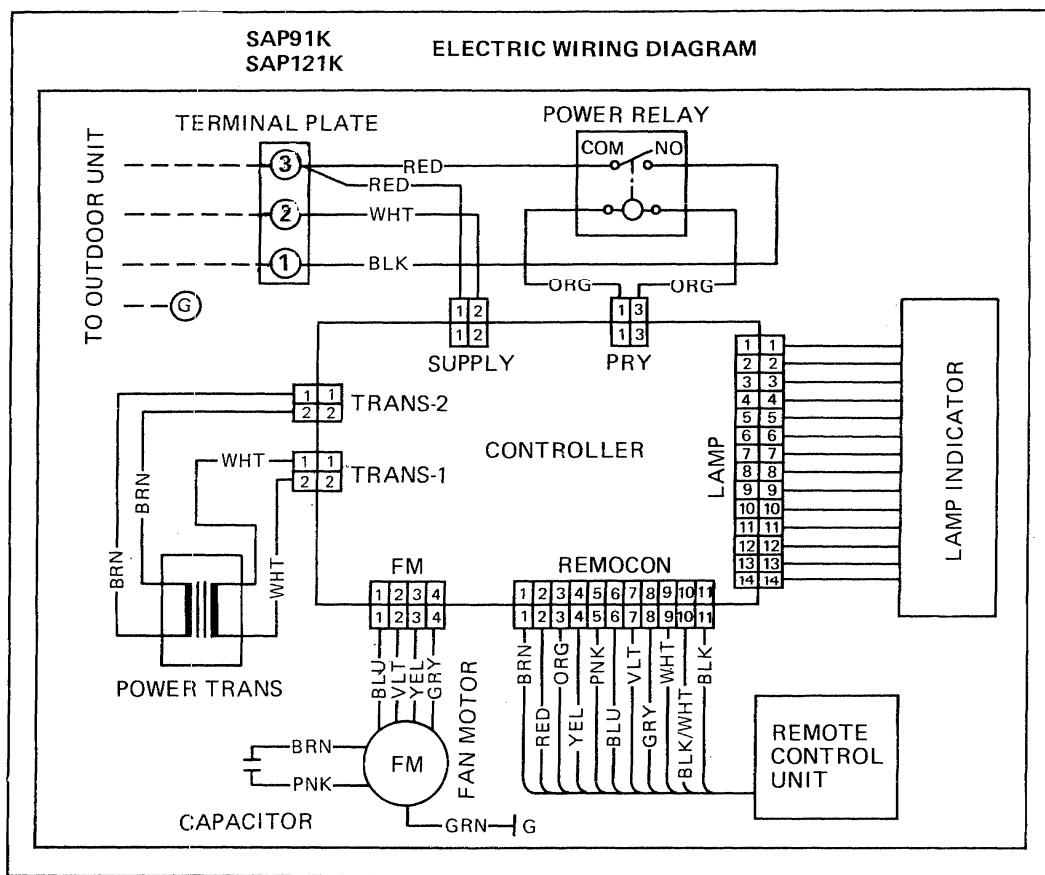
---> with sequential number shows flow of refrigerant in HEATNG (= Reverse CYCLE).

HEATING CYCLE



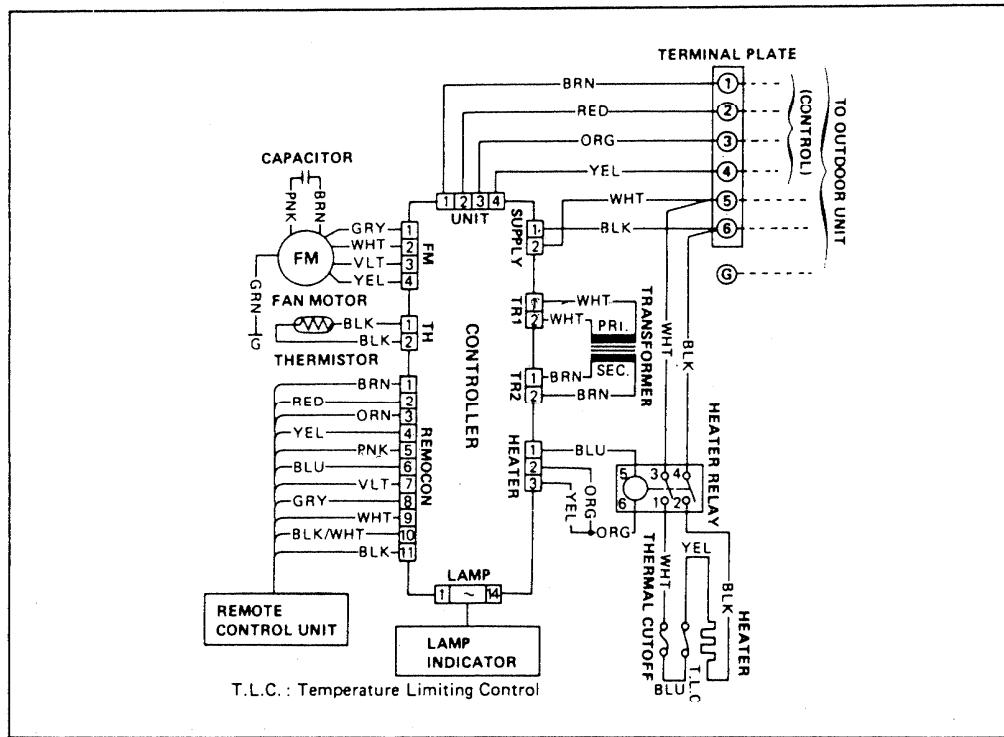
- 144 -

12. ELECTRIC WIRING DIAGRAM

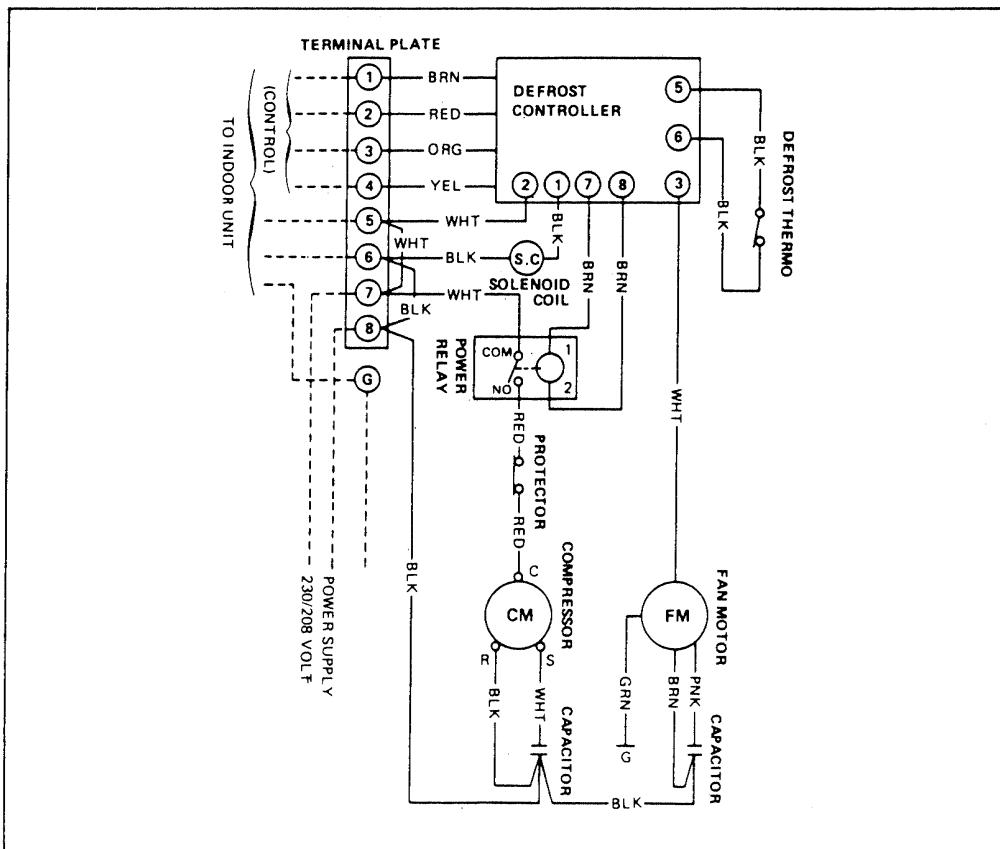


12. ELECTRIC WIRING DIAGRAM

SAP92KH ELECTRIC WIRING DIAGRAM

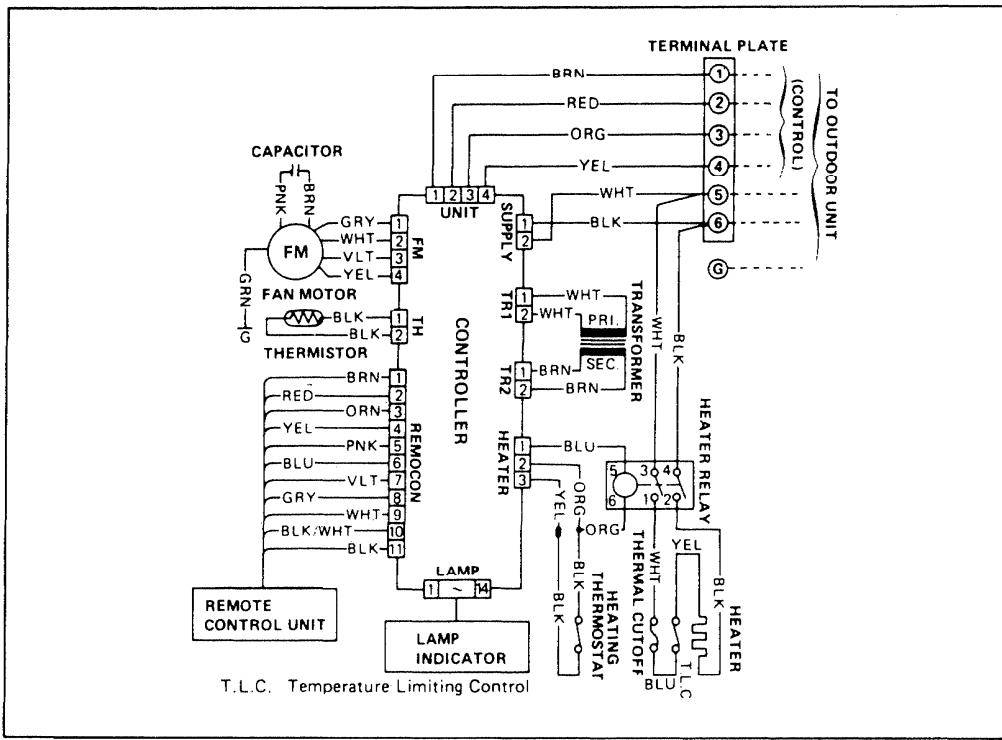


SAP92CH ELECTRIC WIRING DIAGRAM

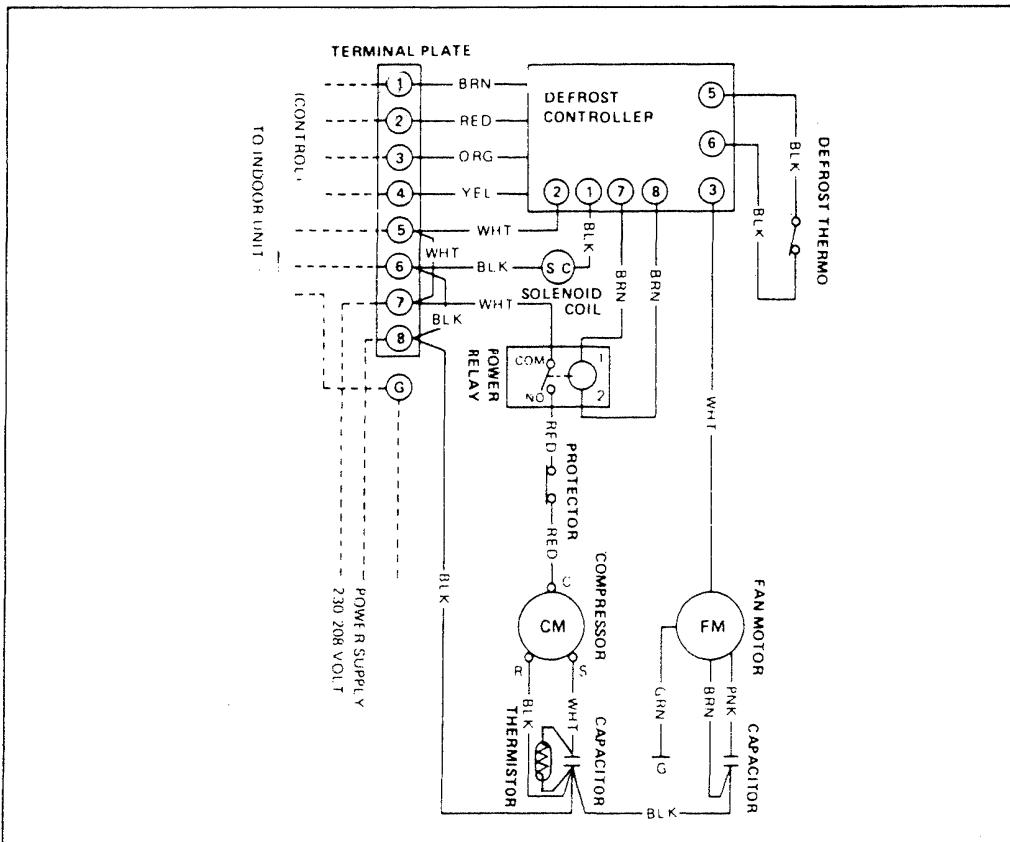


12. ELECTRIC WIRING DIAGRAM

SAP122KH ELECTRIC WIRING DIAGRAM

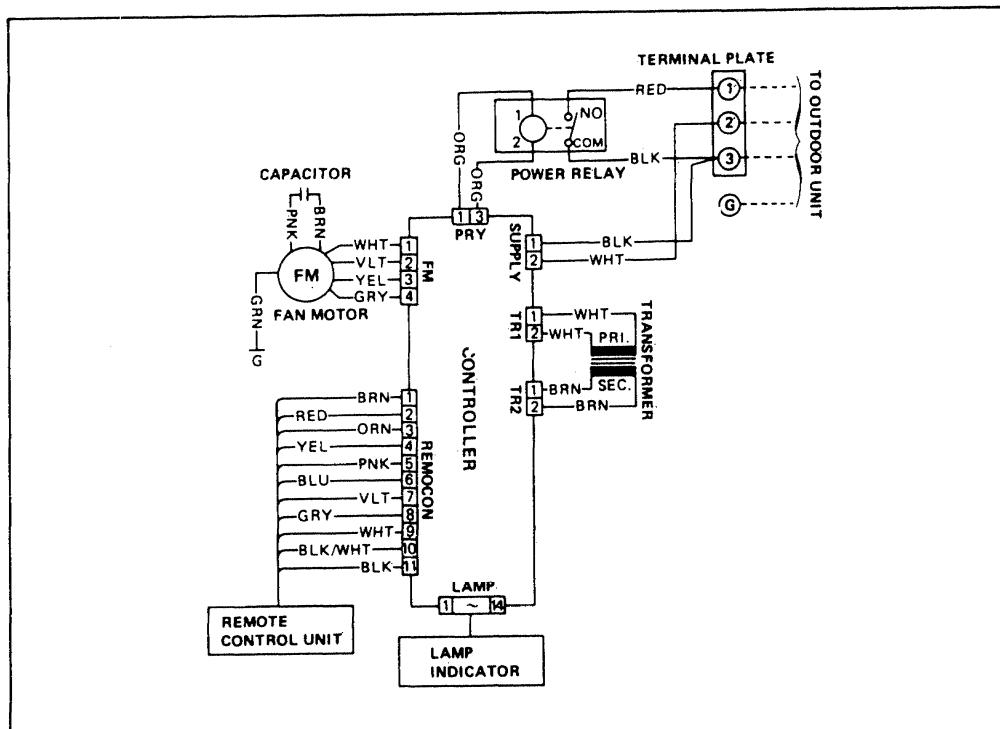


SAP122CH ELECTRIC WIRING DIAGRAM

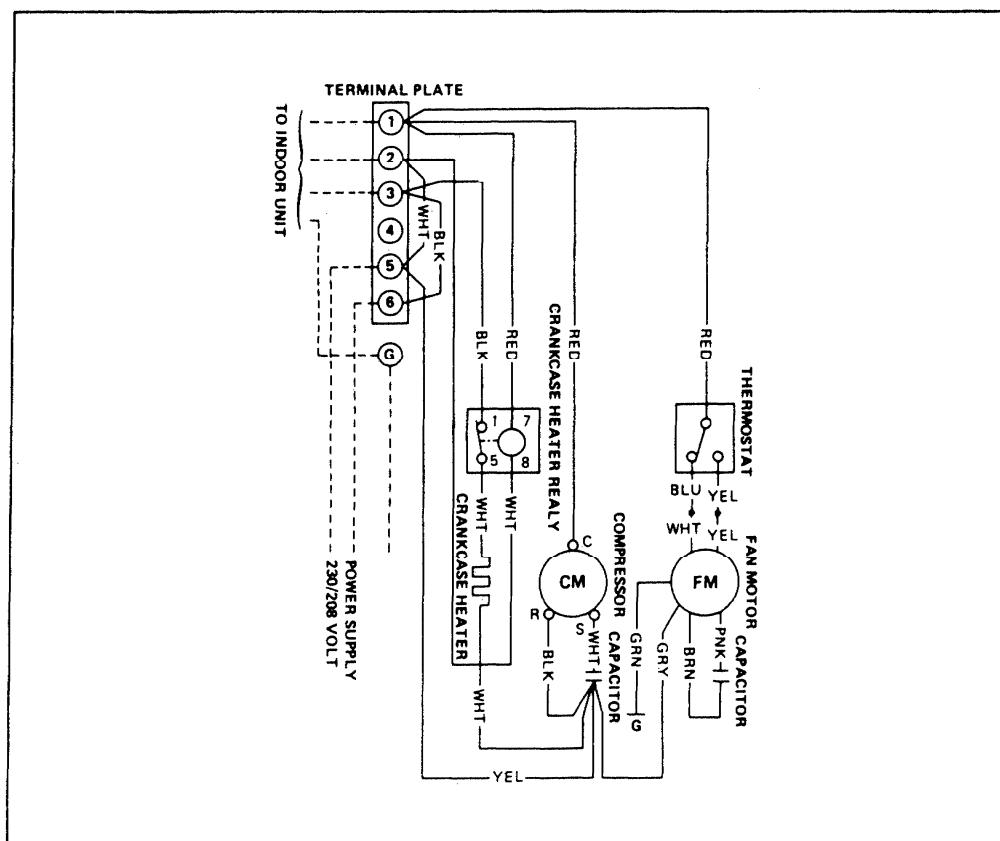


12. ELECTRIC WIRING DIAGRAM

SAP181K ELECTRIC WIRING DIAGRAM

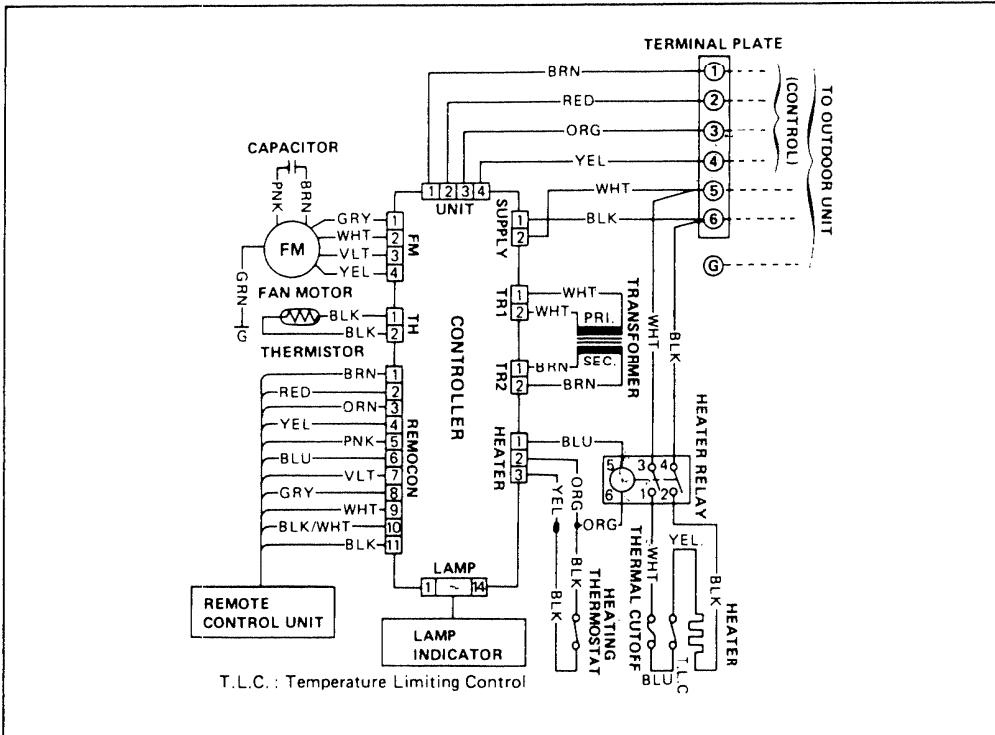


SAP181C ELECTRIC WIRING DIAGRAM

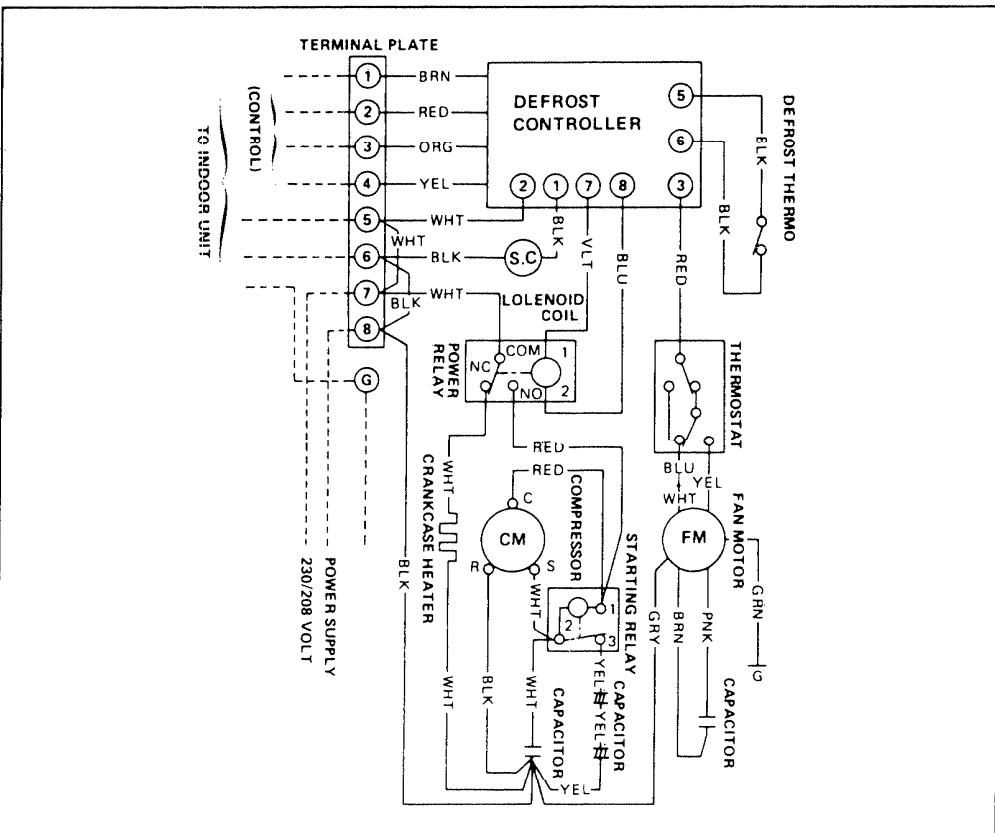


12. ELECTRIC WIRING DIAGRAM

SAP182KH ELECTRIC WIRING DIAGRAM



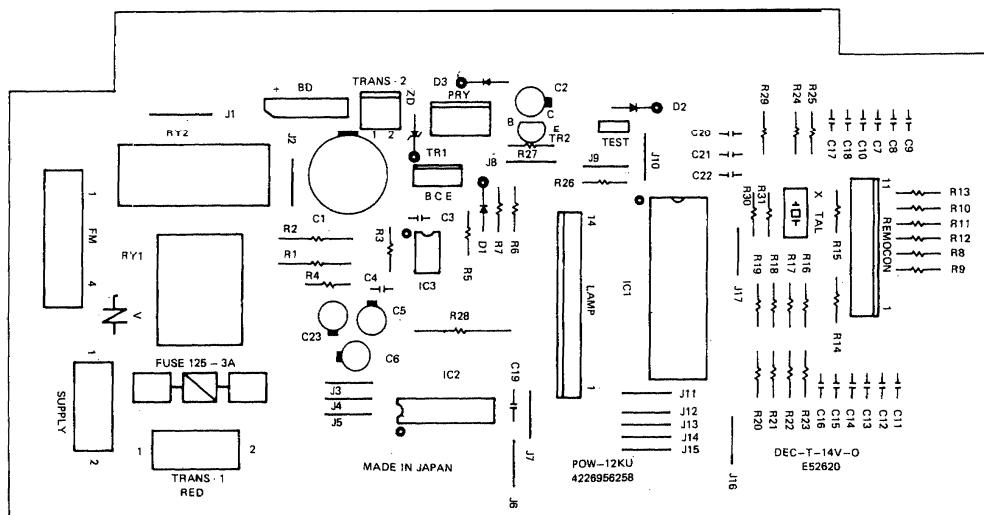
SAP182CH ELECTRIC WIRING DIAGRAM



12. ELECTRIC WIRING DIAGRAM

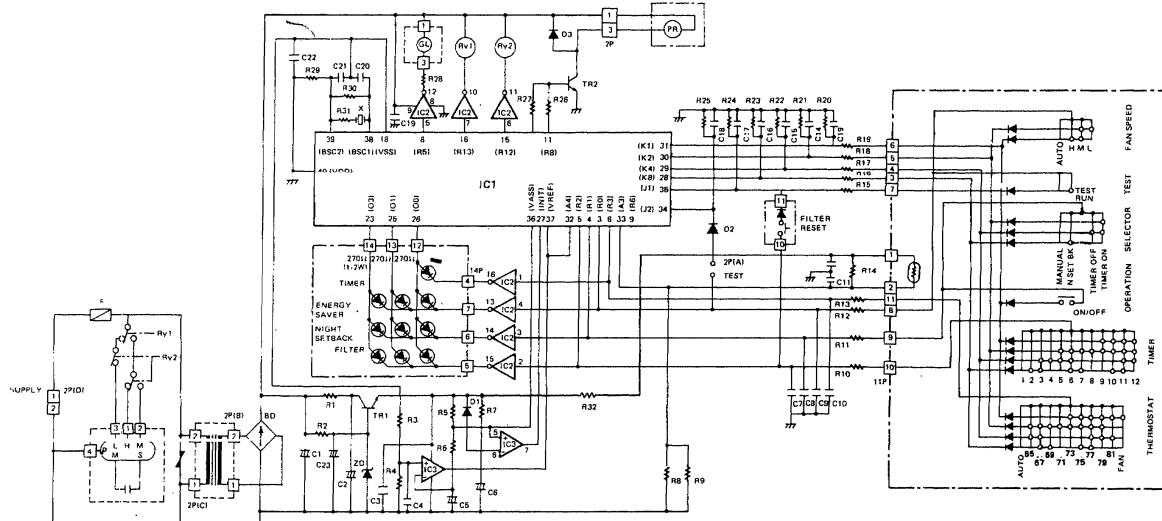
SAP91KC/SAP121KC/SAP181KC

CONTROLLER PCB(PRINTED PATTERN)



ELECTRIC WIRING DIAGRAM(CONTROLLER PCB)

SAP91KC/SAP121KC

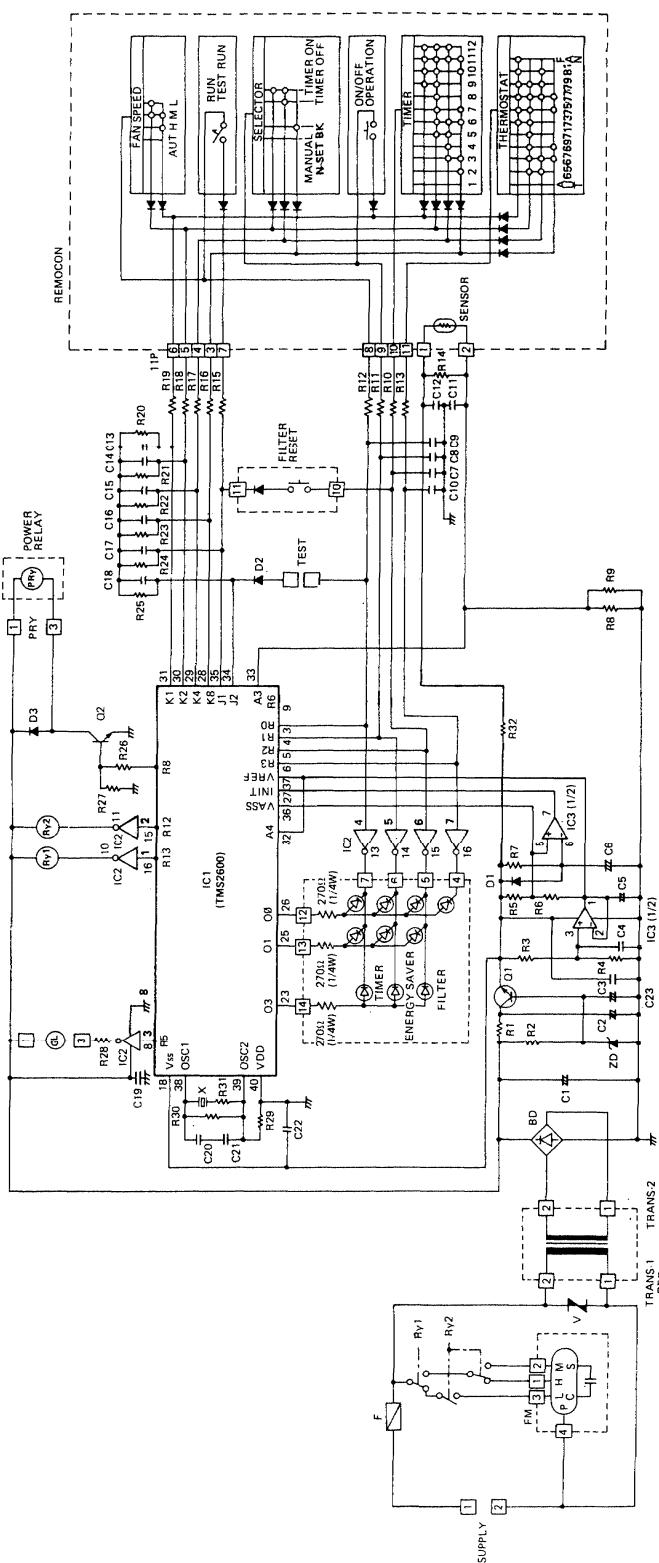


Key No.	Description	Key No.	Description	Key No.	Description	Key No.	Description
R1	Resistor 1W 100Ω	R20	Resistor 1/4W 56kΩ	C7	Capacitor 50V 0.0047μF	D1	Diode, DS442X
R2	Resistor 1W 1kΩ	R21	Resistor 1/4W 56kΩ	C8	Capacitor 50V 0.0047μF	D2	Diode, DS442X
R3	Resistor 1/4W 13kΩ	R22	Resistor 1/4W 56kΩ	C9	Capacitor 50V 0.0047μF	D3	Diode, DS442X
R4	Resistor 1/4W 10kΩ	R23	Resistor 1/4W 56kΩ	C10	Capacitor 50V 0.0047μF	BD	Diode, DBA10C
R5	Resistor 1/4W 3.6kΩ	R24	Resistor 1/4W 22kΩ	C11	Capacitor 50V 0.01μF	ZD	Diode, GZA9.1Z
R6	Resistor 1/4W 3.3kΩ	R25	Resistor 1/4W 10kΩ	C12	Capacitor 50V 0.022μF		
R7	Resistor 1/4W 56kΩ	R26	Resistor 1/4W 10kΩ	C13	Capacitor 50V 0.0047μF		
R8	Resistor 1/4W 39kΩ	R27	Resistor 1/4W 5.6kΩ	C14	Capacitor 50V 0.0047μF	TR1	Transistor, 2SD313EF
R9	Resistor 1/4W 6.8kΩ	R28	Resistor 2W 150Ω	C15	Capacitor 50V 0.0047μF	TR2	Transistor, 2SC2274
R10	Resistor 1/4W 100Ω	R29	Resistor 1/4W 5.6kΩ	C16	Capacitor 50V 0.0047μF	F	Fuse, 125V 3A
R11	Resistor 1/4W 100Ω	R30	Resistor 1/4W 56kΩ	C17	Capacitor 50V 0.01μF	Ry1	Relay, LZG-24HE
R12	Resistor 1/4W 100Ω	R31	Resistor 1/4W 100Ω	C18	Capacitor 50V 0.022μF	Ry2	Relay, VB24TBU
R13	Resistor 1/4W 100Ω	R32	Resistor 1/4W 100Ω	C19	Capacitor 50V 0.047μF	V	Varistor
R14	Resistor 1/4W 18kΩ	C1	Capacitor 50V 470μF	C20	Capacitor 50V 270pF	X	Cristal
R15	Resistor 1/4W 470Ω	C2	Capacitor 50V 1μF	C21	Capacitor 50V 100pF		
R16	Resistor 1/4W 470Ω	C3	Capacitor 50V 0.047μF	C22	Capacitor 50V 0.047μF	IC1	IC, TMS 2600
R17	Resistor 1/4W 470Ω	C4	Capacitor 50V 0.022μF	C23	Capacitor 16V 10μF	IC2	IC, PA2004C
R18	Resistor 1/4W 470Ω	C5	Capacitor 50V 1μF			IC3	IC, LA6458D
R19	Resistor 1/4W 470Ω	C6	Capacitor 50V 0.47μF				

CONTROLLER P.C.B (POW-181K)

Mark	Material	Spec.	Mark	Material	Spec.
R1	Resistor	100Ω/1W	R21	Resistor	56K
R2	Resistor	1KΩ/1W	R22	Resistor	56K
R3	Resistor	3K ± 1%	R23	Resistor	56K
R4	Resistor	10K ± 1%	R24	Resistor	22K
R5	Resistor	3K ± 1%	R25	Resistor	10K
R6	Resistor	1.1K ± 1%	R26	Resistor	10K
R7	Resistor	56K	R27	Resistor	56K
R8	Resistor	38K	R28	Resistor	150Ω/2W
R9	Resistor	3.8K ± 1%	R29	Resistor	5.6K -1%
R10	Resistor	100Ω	R30	Resistor	100Ω
R11	Resistor	100Ω	R31	Resistor	100Ω
R12	Resistor	100Ω	R32	Resistor	100Ω
R13	Resistor	18K ± 1%	R14	Resistor	18K
R15	Resistor	10Ω	R16	Resistor	17Ω
R17	Resistor	17Ω	R18	Resistor	17Ω
R18	Resistor	17Ω	R19	Resistor	17Ω
R20	Resistor	36K			

Mark	Material	Spec.	Mark	Material	Spec.
C1	Capacitor	470μF/50V	C2	Capacitor	150P F Type
C2	Capacitor	1μF/50V	C3	Capacitor	10μF/16V
C3	Capacitor	223	C4	Capacitor	1μF/50V
C4	Capacitor	223	C5	Capacitor	0.4μF/50V
C5	Capacitor	472	C6	Zener diode	DBA10C
C6	Capacitor	472	C7	Zener diode	GZ5012
C7	Capacitor	472	C8	Diode	DS2X
C8	Capacitor	472	C9	Diode	DS42X
C9	Capacitor	472	C10	Diode	DS42X
C10	Capacitor	472	C11	Capacitor	103K
C11	Capacitor	223	C12	Capacitor	223
C12	Capacitor	472	C13	Capacitor	472
C13	Capacitor	472	C14	Capacitor	472
C14	Capacitor	472	C15	Capacitor	472
C15	Capacitor	472	C16	Capacitor	472
C16	Capacitor	472	C17	Capacitor	472
C17	Capacitor	472	C18	Capacitor	472
C18	Capacitor	472	C19	Capacitor	472
C19	Capacitor	472	C20	Capacitor	472
C20	Capacitor	472			



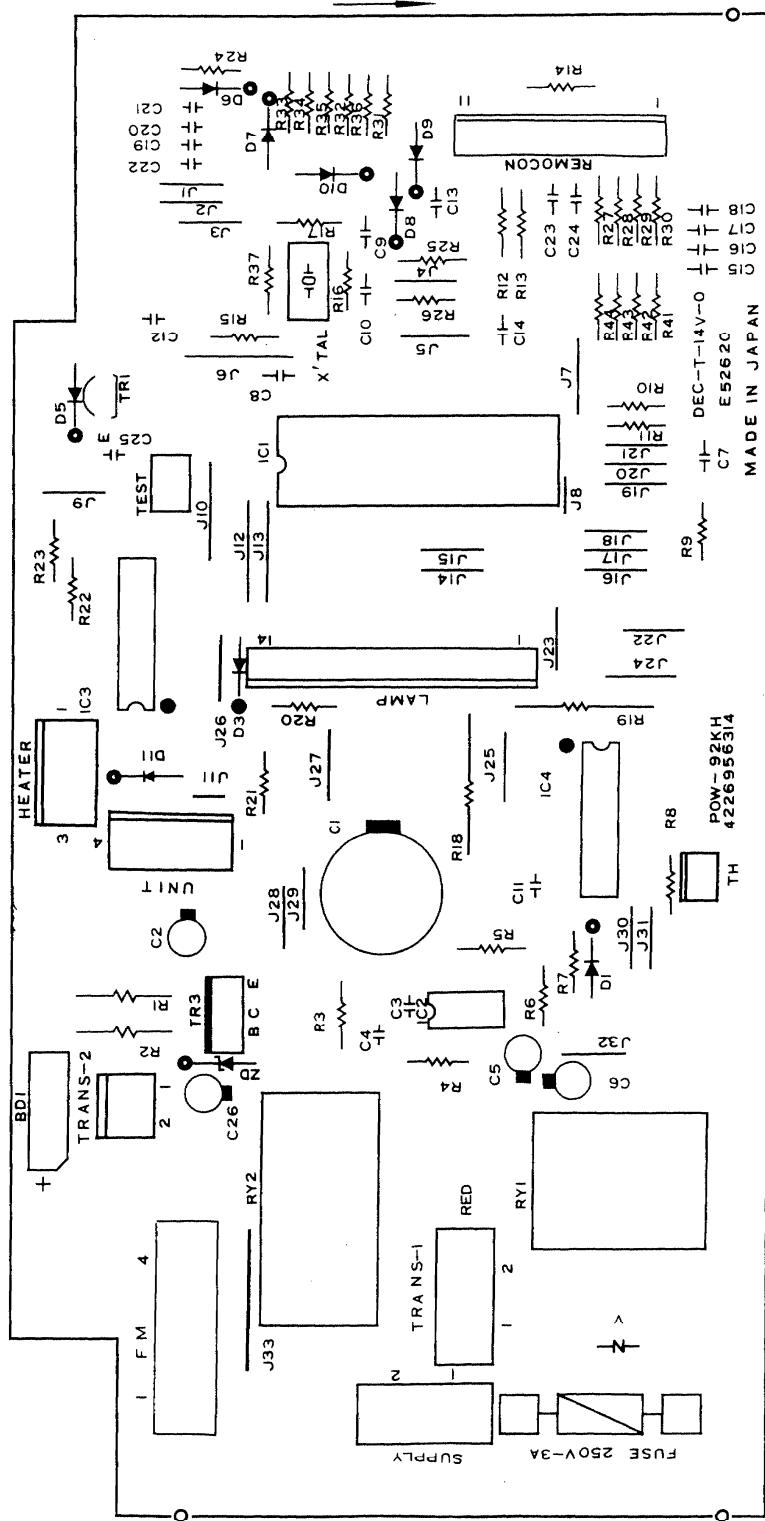
Notes:

1. Allowance ±5% unless otherwise specified
2. Capacitance 1/4N unless otherwise specified

12. ELECTRIC WIRING DIAGRAM

SAP92KCH/SAP122KCH/SAP182KCH

CONTROLLER P.C.B MODEL. POW-92KH (PRINTED PATTERN)

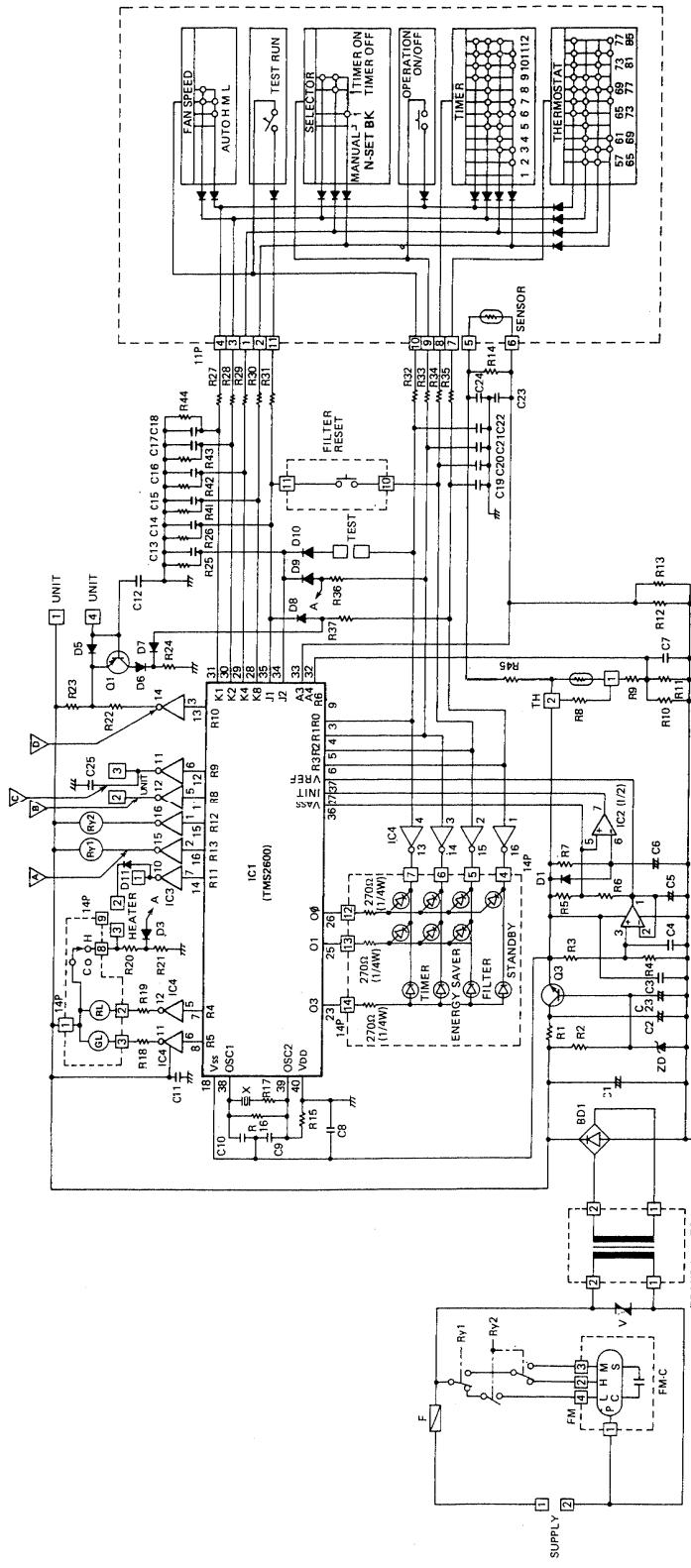


12. ELECTRIC WIRING DIAGRAM

SAP92KCH/SAP122KCH/SAP182KCH

CONTROLLER P.C.B (MODEL: POW-122KH)

Mark	Material	Spec.
R1	Resistor	100Ω/1W
R2	Resistor	1KΩ/1W
R3	Resistor	3.3K
R4	Resistor	10K ± 1%
R5	Resistor	2K
R6	Resistor	3K
R7	Resistor	1.3K ± 1%
R8	Resistor	1.1K ± 1%
R9	Resistor	10K
R10	Resistor	22K
R11	Resistor	10K ± 1%
R12	Resistor	56K
R13	Resistor	20K ± 1%
R14	Resistor	9.1K ± 1%
R15	Resistor	9.1K ± 1%
R16	Resistor	56K
R17	Resistor	10K
R18	Resistor	4.3K
R19	Resistor	15K
R20	Resistor	22K
R40	Resistor	5.6K



- Notes:
1. Allowance ±5% unless otherwise specified.
 2. Capacitance 1/4W unless otherwise specified.
 3. The base controller PCB is model pow 122KH. Combination of resistors (R10 and R11) are different from other controller PCB models as listed below:

	POW92KH	POW122KH	POW182KH
R10	68K	100K	62K
R11	—	160K	390K