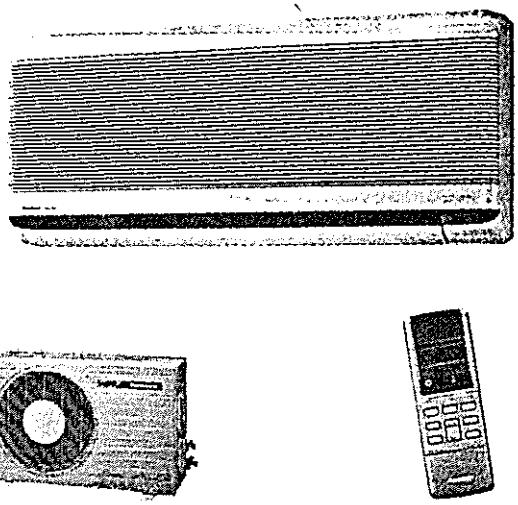
Service Manual

Room Air Conditioners

CS-971KE/CU-971KE



Contents

Panasonic

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

Functions

Remote Control

Operation Start/Stop

Operation Mode Selection

- Automatic Operation Mode (high, standard temperature, low)
- Cooling Operation Mode
  Soft Dry Operation Mode
  Heating Operation Mode

Indoor Fan Speed Selection

Room Temperature Setting

Keep Operation Mode

Timer Operation

Airflow Direction Control

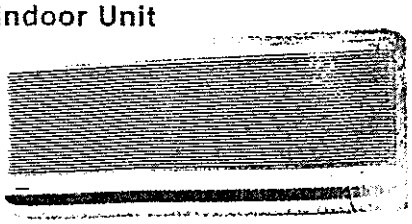
- Airflow Direction Auto-control
- Airflow Direction Manual Control

Other Remote controls

Sleep Mode Auto Operation	Quiet Operation Mode	Powerful Operation Mode
Automatic Operation Mode 1	Automatic Operation Mode 2	Automatic Operation Mode 3

✋ symbol=manual

Indoor Unit



Same for All Operations

Power Switch ON/OFF

Operation Indication Lamp

- Operation
- Keep
- Timer
- Sleep Mode
- Abnormal Indication
  (DC Peak, Indoor Unit/Outdoor Unit Abnormal Communication, Indoor Sensor Malfunction)

Forced Operation ON/OFF

Cooling Test Operation ON/OFF

- When turned on, set temperature is ignored and goes into cooling operation.

Sensing Temperature

- Intake Air Temperature Heat Exchanger Temperature

Time Delay Safety Control

- Restating is inhibited for 2 minutes, but excluding when power switch is turned ON or OFF.

Indoor Fan Speed Control

Automatic Operation Mode

- Automatic selection of operation mode, set temperature, fan speed and airflow direction in accordance with room temperature and outdoor ambient temperature.
- Automatic Operation Mode 1, 2 or 3 is memorized when set.

Keep Operation Mode

- Keeps Heating at approx. 11°C, Soft Dry at approx. 27°C, Cooling at approx. 30°C.
- Operates at 20Hz and fan speed at Lo (SLo when Soft Dry)

Powerful Operation Mode

- When set at Powerful Operation Mode, the set temperature is shifted Heating 6°C higher, Dry 3°C lower and Cooling 4°C lower than originally set temperature.

Delayed "ON" Timer Control

- Room and Outdoor ambient temperatures are detected an hour before set time, and preparatory operation is carried out (5~60min) in accordance to conditions.

Cooling Operation

Room Temperature Control

82~20Hz

Airflow Direction Control

- During Automatic Airflow Direction. Swings 30 degrees up and down.
- Airflow Direction Manual Control. Airflow direction can be downwards 20~50 degrees at will.

Indoor Fan Speed Control

- When Automatic Operation Mode 1, 2 or 3 or Automatic Fan Speed...3 fan speeds can be randomly selected every 10 seconds and changed.

Anti-Freezing Control

- When the heat exchange temperature falls below 2°C in 6 minutes, then compressor operation stops.
  Re-starts when temperature over 12°C.

Quiet Operation Mode

- Day...Compressor Operation frequency limited to 75Hz.
  Indoor fan speed reduced by 1 rank.
- Night...Frequency limited to 57Hz. Outdoor fan speed reduced by 2 ranks.

Sleep Mode Control

- When the Room temperature reaches set temperature (maximum 1hr), Sleep Mode Control goes into operation.
  Fan speed goes into low fan, the set temperature is increased by 1°C, and 1 hour later increased by another 1°C.
- 5 hours after Sleep Mode Control, stops if outdoor ambient temperature falls below 27°C (max. 7 hours).
- Sleep Mode indication lamp goes off after 7 seconds.

Soft Dry Operation

Soft Dry Control

- During cooling cycle, compressor operation frequency is 20~36Hz, operating at super-low fan speed.

Airflow Direction Control

(Same as during Cooling Operation)

Sleep Mode Control

(Same as during Cooling Operation)
However, in Soft Dry, indoor fan speed is super-low.

Heating Operation

Room Temperature Control

118~20Hz

Airflow Direction Control

- In Automatic Airflow Direction
  Angle of airflow changes according to Heat Exchanger temperature.
  Over 31°C Downward flow 75 degrees
  Below 28°C Downward flow 20 degrees
- Airflow direction manual control.
  Airflow direction can be set at will.

Anti-Cold Draft Control

- Indoor Fan Speed switchovers according to Heat Exchanger temperature.
  Over 14°C SLo
  Over 20°C Lo
  Over 38°C Set Fan Speed

Hot Start Control

- Indoor Fan stops until Heat Exchanger temperature reaches 14°C.
  (Operation indication LED blinks during indoor fan stopping)

Indoor Fan Speed Control

- Fan speed gradually increases as Heat Exchanger temperature rises during Automatic Operation Modes 1, 2, 3 or Automatic Indoor Fan Speed.

Over Current Control

- Limits Compressor Operation frequency according to Heat Exchanger temperature, Outdoor Ambient temperature.

Quiet Operation

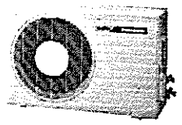
- Day...Compressor Operation Frequency limited to 91Hz.
  Outdoor Fan Speed is reduced by 1 rank.
- Night...Compressor Operation Frequency limited to 85Hz.
  Outdoor Fan Speed is reduced by 2 ranks.

Sleep Mode Control

- When room temperature reaches set temperature (max. 1 hour), Sleep Mode control starts.
  Indoor Fan speed becomes low, set temperature is dropped by 2°C, and an hour later by another 3°C.
- Operation stops 5 hours after starting sleep mode control.

Functions

Outdoor Unit



DE-ICE Control

DC Peak Current Control

- When Inverter Current goes over DC approx 21 A, Compressor Operation stops.
- Abnormal Indication Operation, Keep, Sleep and Timer indication LEDs all blink.

Total Running Current Control

- Detects Outdoor Unit Current, switching over Compressor Operation Frequency or stopping compressor.

Outdoor Ambient Temperature Control

- Detects outdoor ambient temperature, and limits Compresser Operation Frequency.

Outdoor Fan Speed Control

	Cooling/ Soft Dry	Heating
3-speed (Hi)	Over 73 Hz	Over 57 Hz
2-speed (Me)	43~67 Hz	43~55 Hz
1-speed (Lo)	Below 36 Hz	Below 36 Hz

Sensing Heat Exchanger Temperature

- Heat Exchanger Temperature Sensor (Thermistor)

Sensing Outdoor Ambient Temperature

- Outdoor Ambient Temperature Sensor (Thermistor)

Sensing Discharge Temperature For Compressor

- Discharge Temperature Sensor (Thermistor)

Sensing Outdoor Illuminance

- Photo sensor (CDS)

Over Heating Protection Control For Compressor

- Operating temperature 125°C
  Re-start temperature 110°C

Over Heating Protection Control For Power Transistor

- Operating temperature 110°C
  Re-start temperature 95°C

Discharge Temperature Control For Compressor

- Operating temperature 135°C
  Re-start temperature 90°C

30 SEC. Forced Operation Control

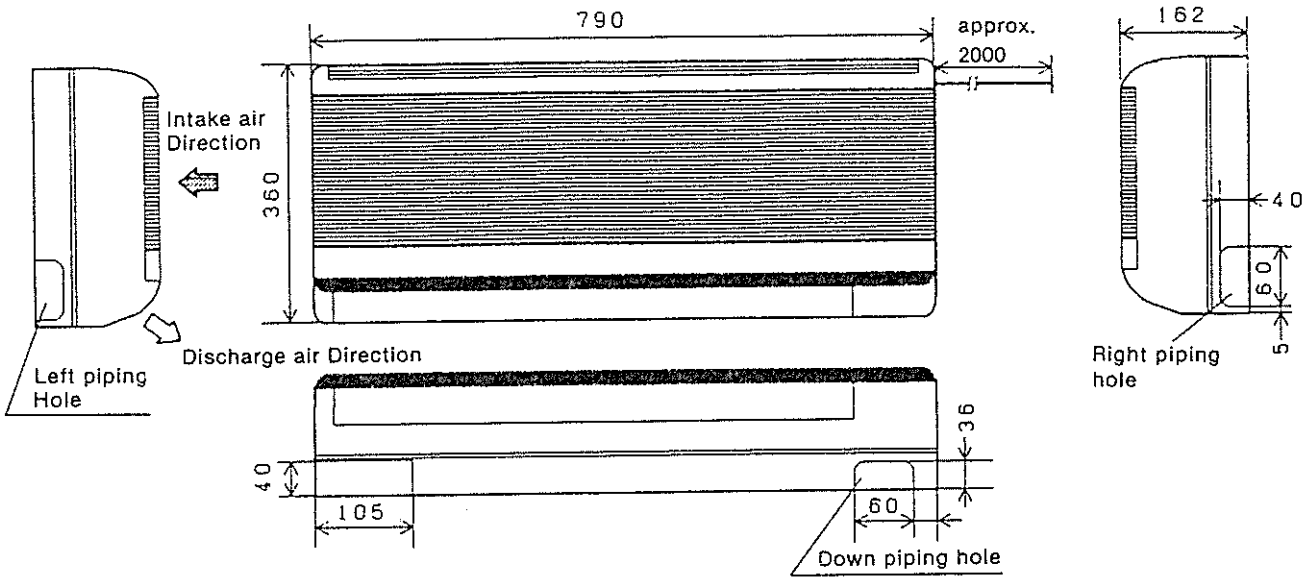
- Once Compressor starts operating, doesn't stop for 30 seconds
- Indoor temperature-based frequency change over 30 seconds.
- Instant stopping during remote control stopping.

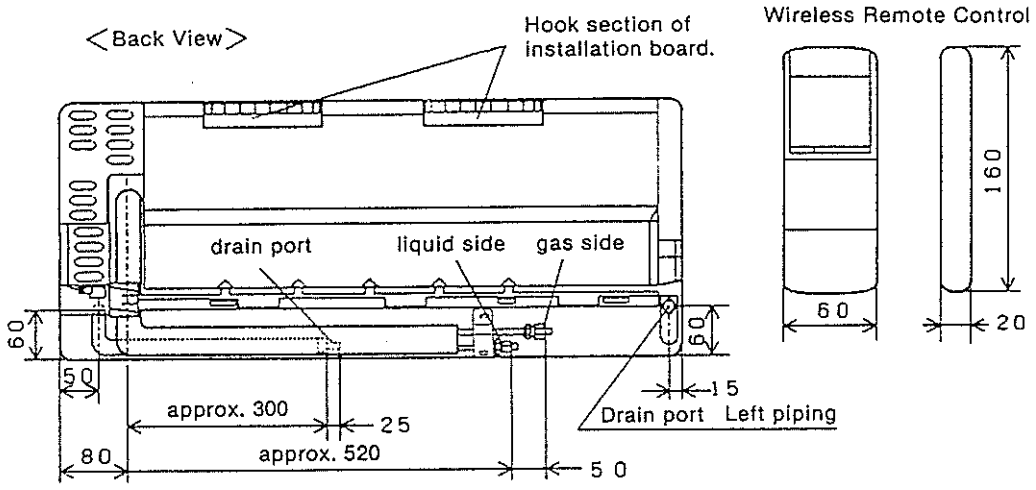
PRODUCT SPECIFICATIONS

		Unit	CS-971KE	CU-971KE
Cooling Capacity		W	2590 (MIN. 830~MAX. 2900)	
		Kcal/h	2220 (MIN. 710~MAX. 2490)	
Heating Capacity		W	3350 (MIN. 750~MAX. 4800)	
		Kcal/h	2880 (MIN. 640~MAX. 4130)	
Moisture Removal		l/h	1.6	
		Pint/h	3.4	
Power source		V Cycle	Single 220 50	
Airflow Method		OUTLET INLET	SIDE VIEW	TOPVIEW
Air circulation		m3/min.	9.0	
		cft/min.	320	
Noise level	Cooling	dB (A)	35 (Hi) 28 (Lo)	39
	Heating		39 (Hi) 28 (Lo)	41
Electrical Data	Input	W	Cooling; 810 (240~910)	Heating; 990 (225~1320)
	Running Current	A	Cooling; 4.1 (MAX. 4.6)	Heating; 5.0 (MAX. 6.7)
	E.E.R.	W/W. h	Cooling; 3.2	Heating; 3.4
	Starting Current	A	5.0	
Piping Connection Port (Flare piping)		inch	L; Half Union 1/4	L; 2-way valve 1/4
		inch	G; Half Union 3/8	G; 3-way valve 3/8
Pipe Size (Flare piping)		inch	G (gas side); 3/8	G (gas side); 3/8
		inch	L (liquid side); 1/4	L (liquid side); 1/4
Drain hose	Inner dia.	mm	15.5	——
	Length	mm	400	——
Power Cord	Length	m	2.0	——
	Number of core-wire		3 Core-wire	——
Rated Fuse (power supply)		A	15	——
Dimensions	Height	inch (mm)	14-3/16 (360)	19-29/32 (505)
	Width	inch (mm)	31-3/32 (790)	30-23/32 (780)
	Depth	inch (mm)	6-3/8 (162)	9-21/32 (245)
Net. Weight		lb (Kg)	21 (9.5)	77 (35)
Compressor	Type		——	Rotary (1 cylinder) rolling piston type
	Motor Type		——	Induction (2-pole)
	Rated Output	W	——	750
Air Circulation	Type		Cross-flow Fan	Propeller Fan
	Motor Type		Transistormotor	Induction (6 pole)
	Input	W	29	47
	Rated Output	W	20	15
Heat Exchanger		Rows/Stage	Plate fin configration, forced draft 2/14 21 FPI	1/19 16 FPI
Refrigerant Control Device			——	Capillary Tube
Refrigeration Oil		cc		SUNISO 4GDID. 260
Refrigerant (R-22)		g (oz)		820 (29.0)
Thermostat			Electronic Control	
Protection Device				Overload Protector Over current Detection
Timer			24-hour, dual ON/OFF	
Air Filter			P.P. Honeycomb	
Parts Provided		1 2 3 4 5 6 7 8	Installation plate Remote control Battery (2 pcs.) Insulation material (indoor) Holder for Remote control Plastic band (2 pcs.) Screw for Holder-R.control (2 pcs.) Drain Elbow (OUTDOOR UNIT)	

Dimensions

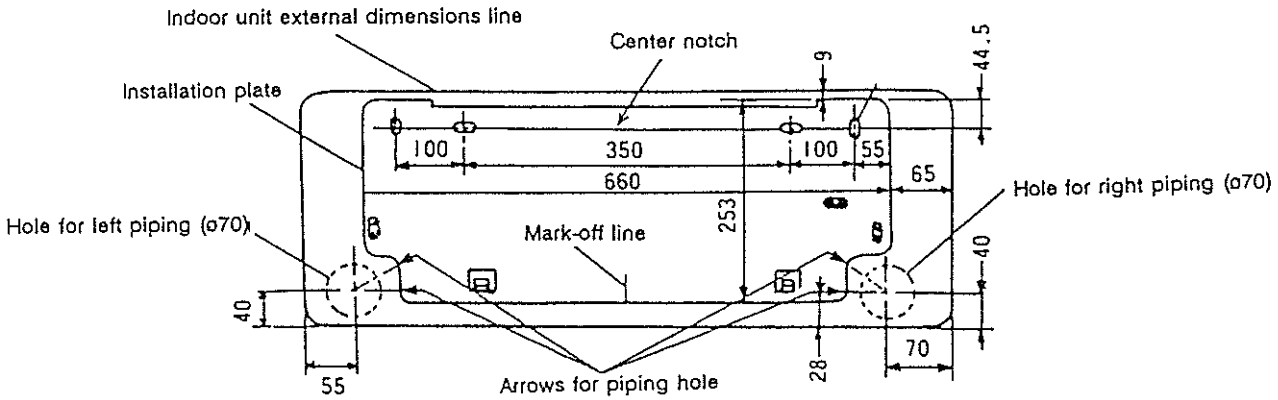
- CS-971KE

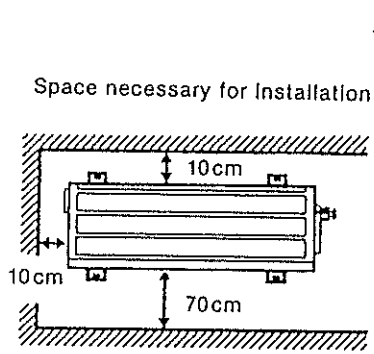


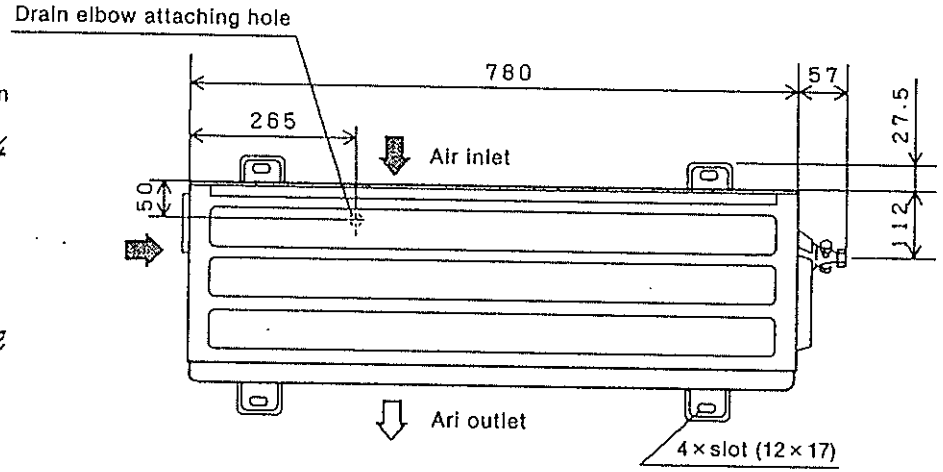


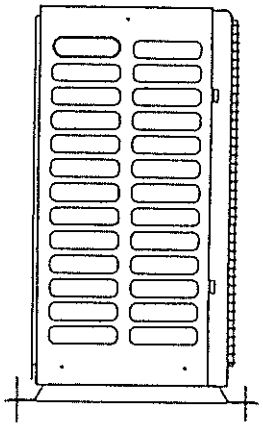
installation plate positioning (Frontal Diagram)

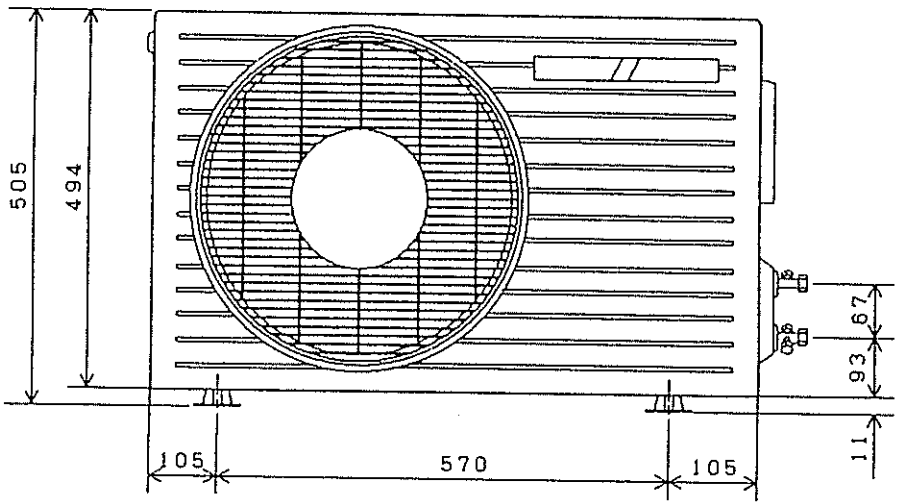
Relative position between the indoor unit and the installation plate

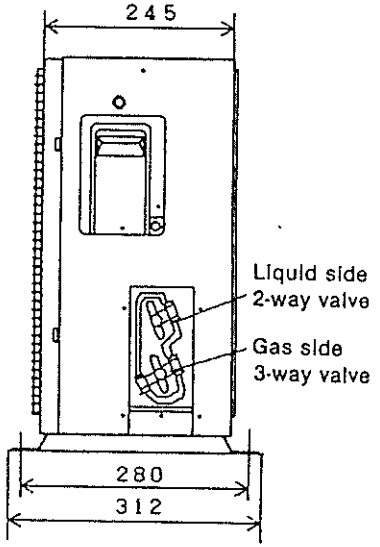



Space necessary for Installation
10cm
10cm
70cm
Anchor Bolt Pitch
280×570

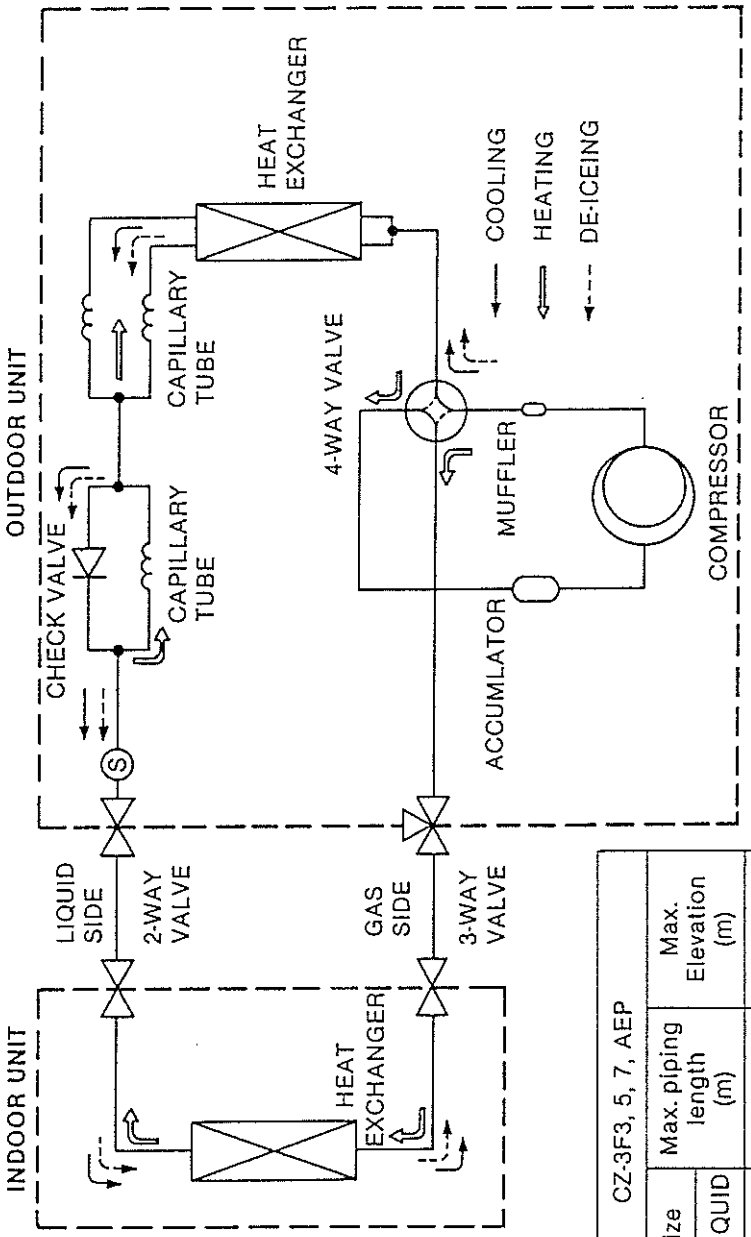

Drain elbow attaching hole
780
57
265
27.5
Air inlet
50
112
Ari outlet
4×slot (12×17)




505
494
67
93
11
105
570
105


245
Liquid side
2-way valve
Gas side
3-way valve
280
312

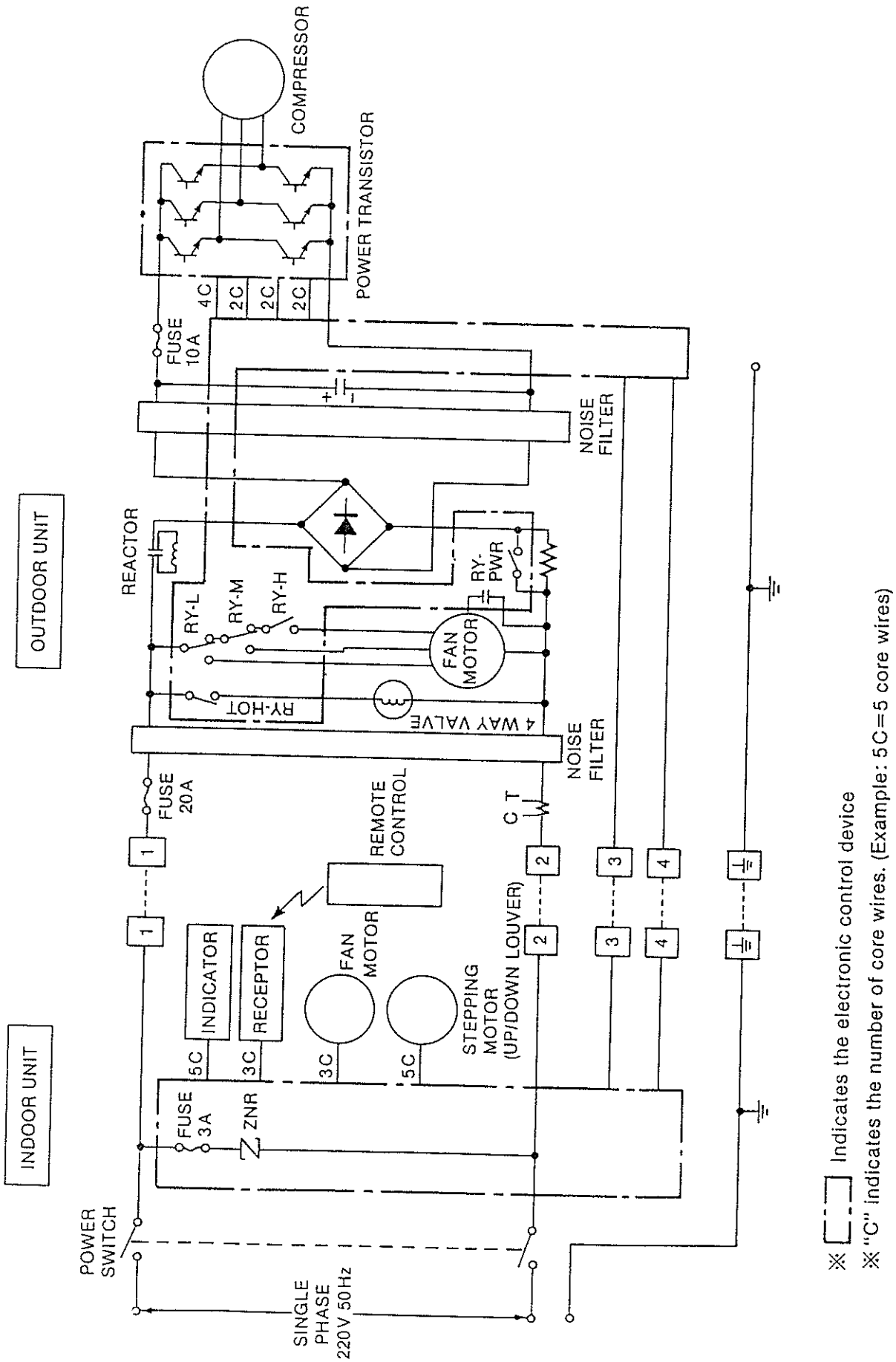
Refrigeration Cycle Diagram



• PIPING

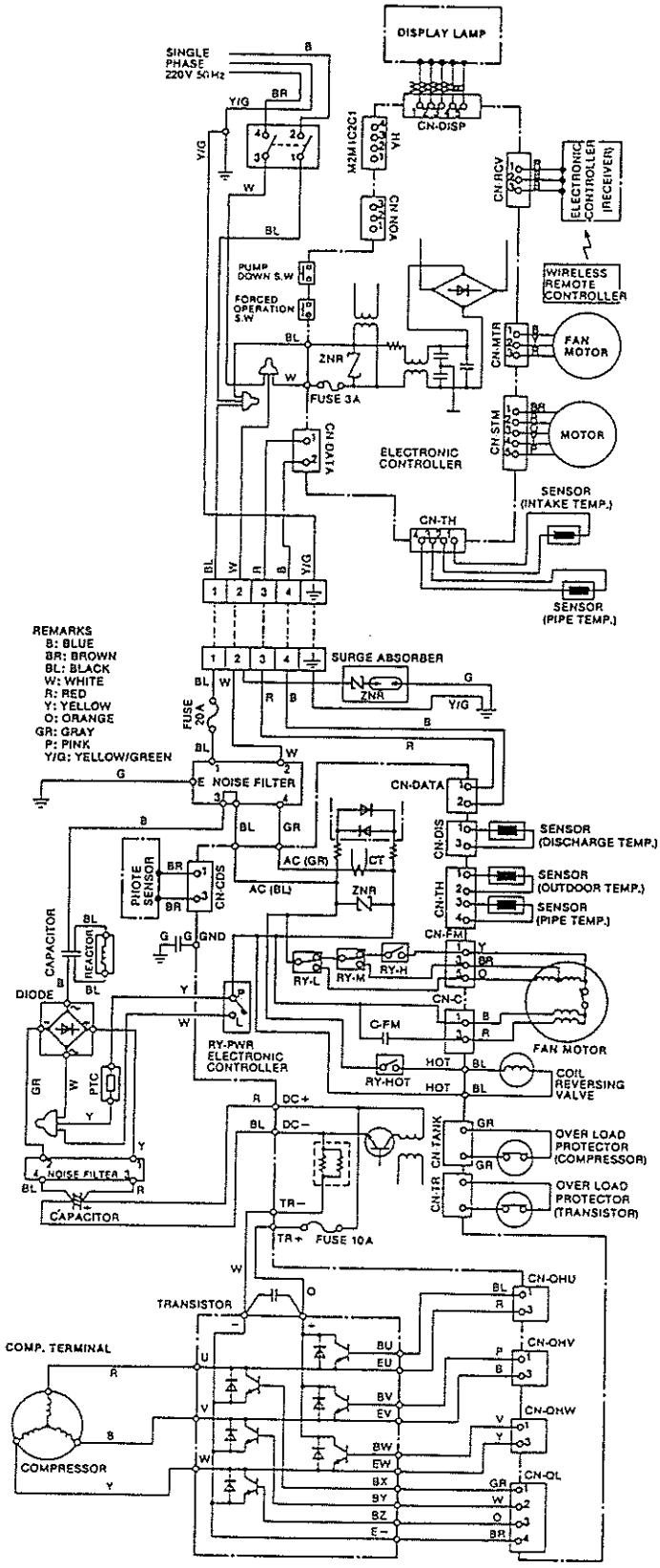
CZ-3F3, 5, 7, AEP			
Pipe Size		Max. piping length (m)	Max. Elevation (m)
GAS	LIQUID		
3/8"	1/4"	7	5

Block Diagram



Wiring Diagram

- CS-971KE
- CU-971KE



Resisance of Outdoor Fan Motor Windings

CONNECTION	CWA95232 (Ω)
ORENGE — BROWN	47.1
BROWN — YELLOW	23.1
BLUE — RED	831.8

Operation Details

1) Cooling Operation

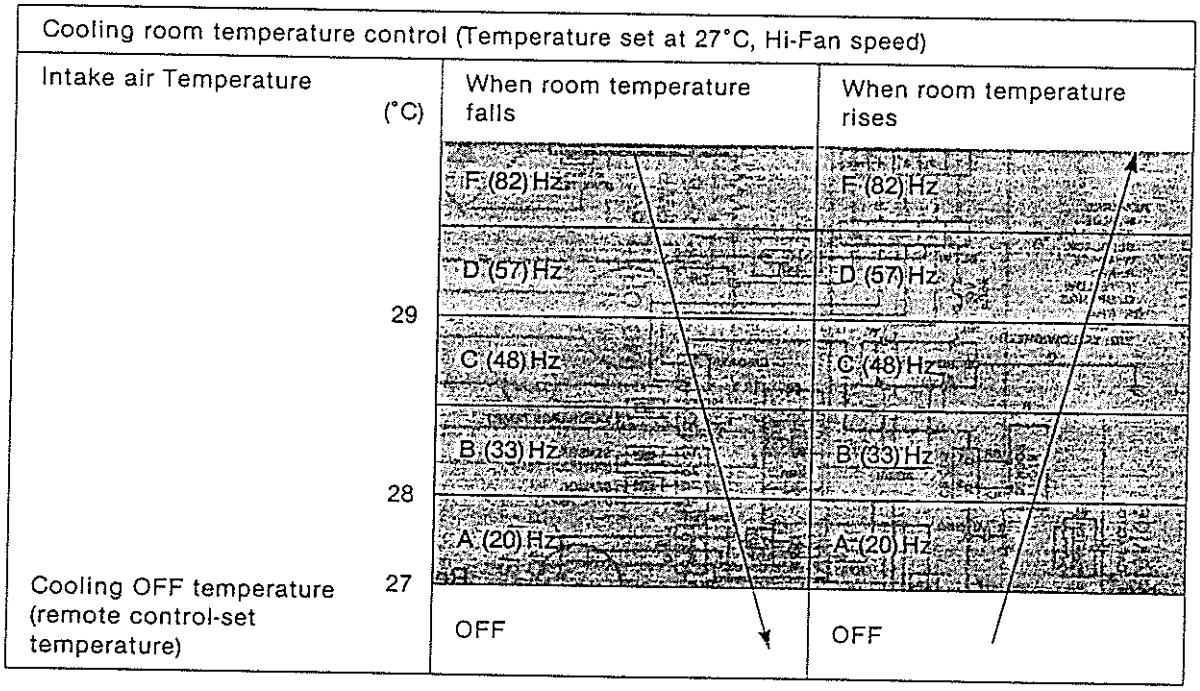
1. Room Temperature Control

- In accordance with difference in temperature between the remote-control set temperature and room temperature (intake air temperature sensor), the compressor operation frequency is altered (see diagram), adjusting room temperature.

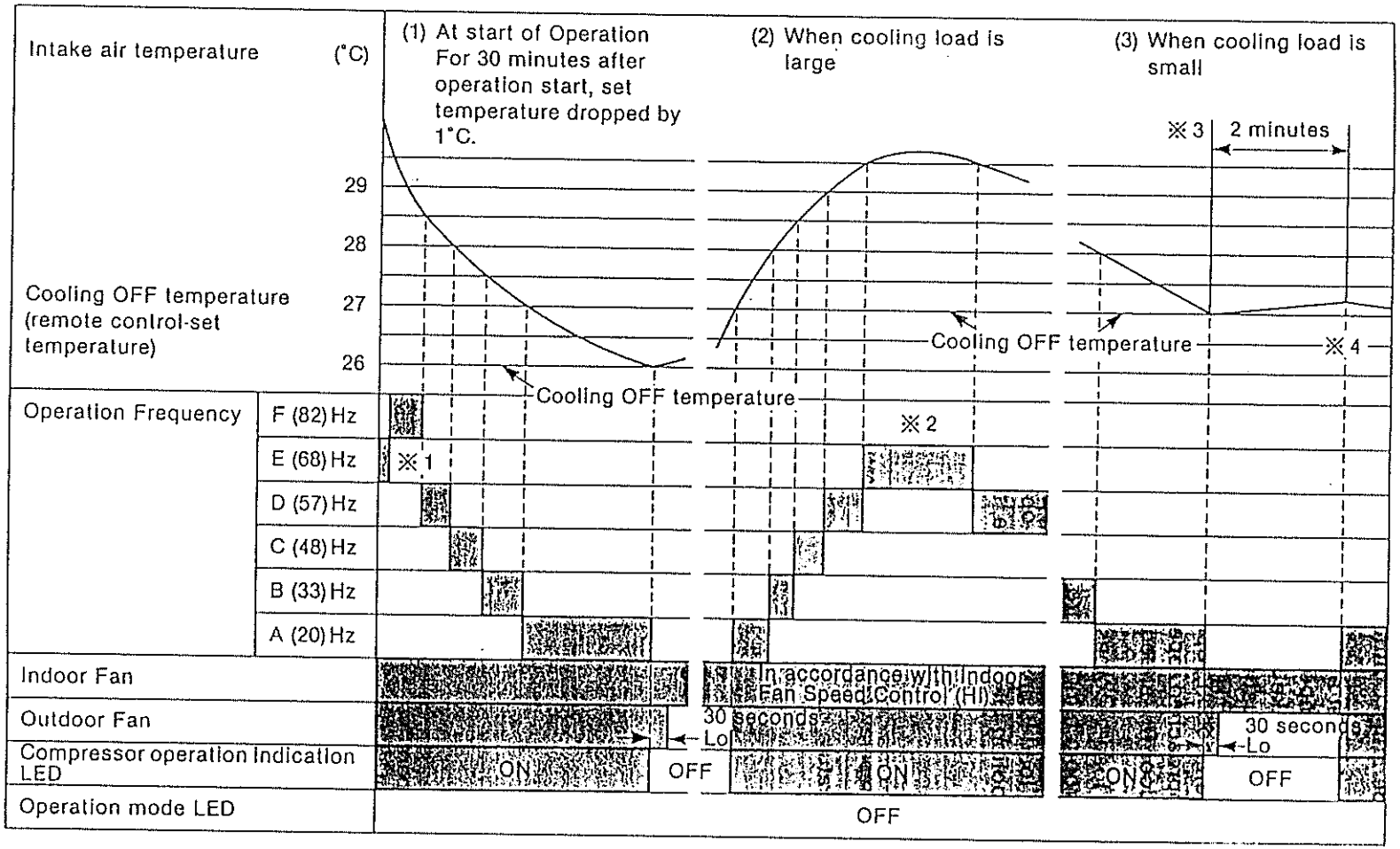
① At start of operation, cooling operation is carried out with high frequency, and when the set temperature is approached, the operation frequency is reduced and room temperature stabilised.

② When the cooling load becomes too large, the operation frequency is highered, and the room temperature quickly reduced.

③ When the cooling load is small, operates at low frequency, and when the room temperature falls below the set temperature, the compressor stops.



[Room Temperature Control (Set temperature at 27°C, Hi-Fan speed)]



※1 Maximum E (68) Hz for 1 minute after compressor start.
※2 Maximum frequency after 30 minutes after operation start is E (68) Hz.
※3 Re-start control during compressor stopping is 2 minutes.
Outdoor fan stops after 30 seconds during compressor stopping.
※4 If temperature is over the Cooling OFF temperature 2 minutes after compressor stopping, the compressor operates.

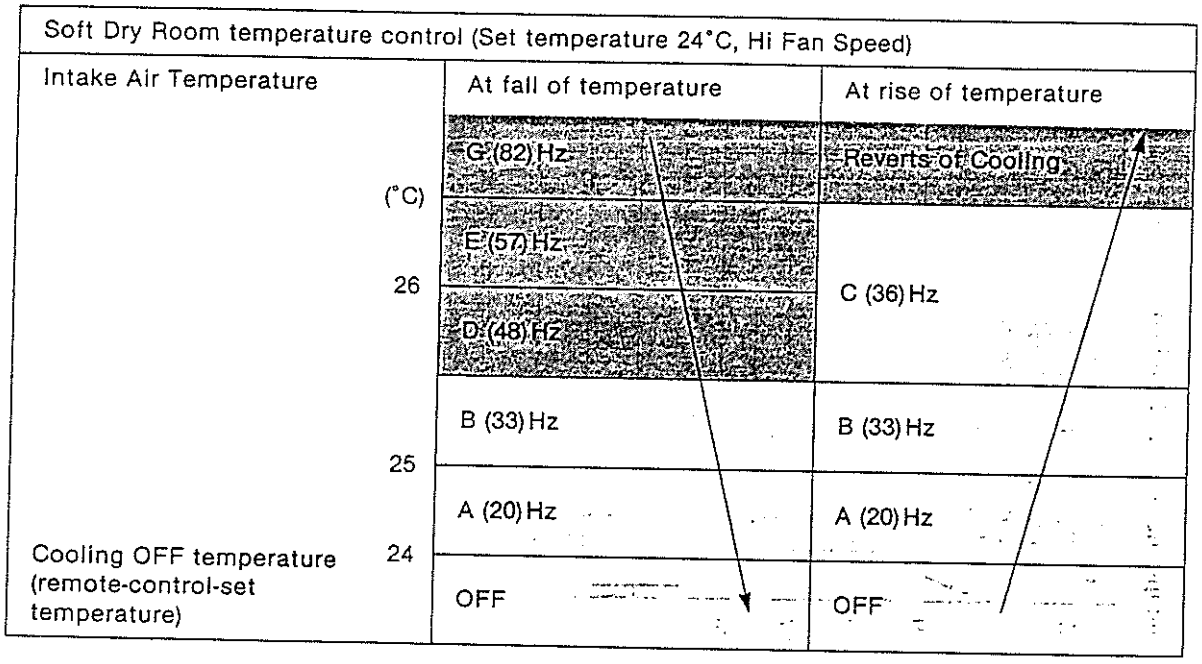
2. Soft Dry Room Temperature Control

- When remote control is set at soft dry, then it goes into soft dry operation mode. In accordance with the temperature difference between remote control-set temperature and the room temperature (intake air temperature sensor), the compressor operation frequency is altered (see diagram), adjusting room temperature.

① At start of operation, cooling operation is carried out with high frequency, and when the set temperature is approached, operation switches over into Soft Dry (Compressor frequency 20 Hz to 36 Hz, Indoor fan speed SLo) and the room temperature stabilised.

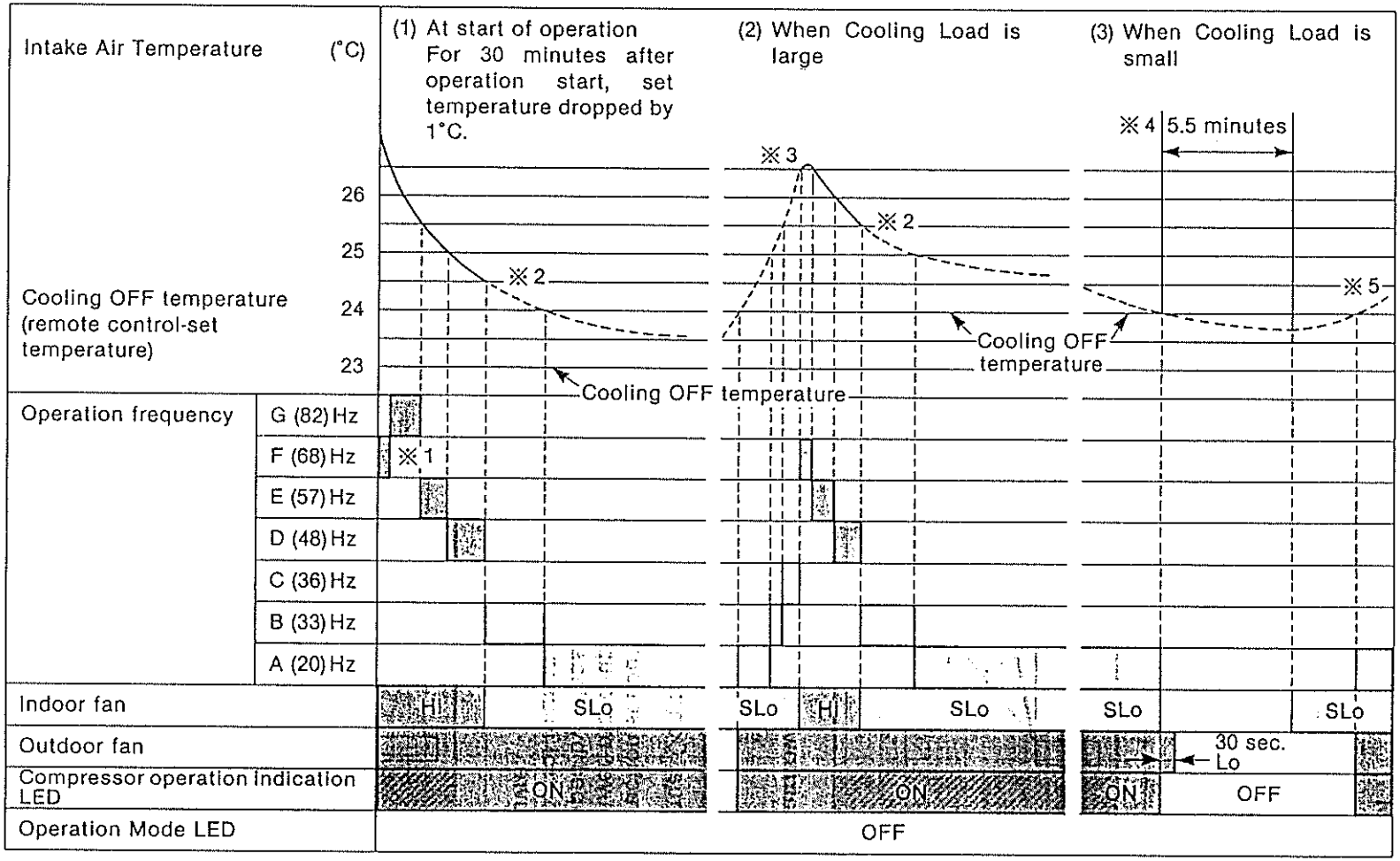
② When the cooling load becomes large and the room temperature rises, operation reverts to Cooling, and the room temperature is quickly lowered.

③ When the cooling load is small, Soft Dry operation continues, and if the room temperature falls below the Cooling OFF temperature, the compressor stops.



[Room Temperature Control (Set temperature 24°C Hi Fan Speed)]

.....Softdry, —— Cooling Operation

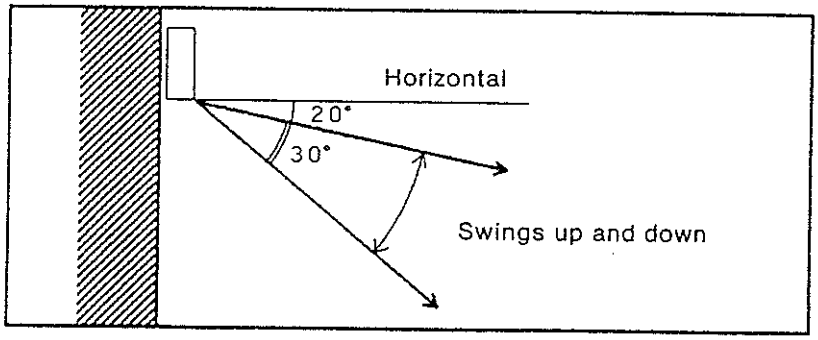


※1 Maximum frequency F (68 Hz) for one minute after compressor first goes into operation.
※2 When room temperature falls below Cooling OFF temperature plus 0.5°C, switches over to Soft Dry operation.
※3 When the room temperature rises above cooling OFF temperature plus 2.5°C, reverts to Cooling operation.
If at this time, 30 minutes has passed since operation start, the maximum frequency is F (68 Hz).
※4 The time delay safety control is 2 minutes.
During compressor stopping, the indoor fan stops too.
(If after a maximum of 5.5 minutes, the Room temperature falls below cooling OFF temperature, then operates in SLo)
The outdoor fan stops operating after 30 seconds.
※5 2 minutes after compressor stopping, if the Room temperature exceeds cooling off temperature, the compressor operates.

3. Airflow Direction Control

① Airflow Direction Auto-control

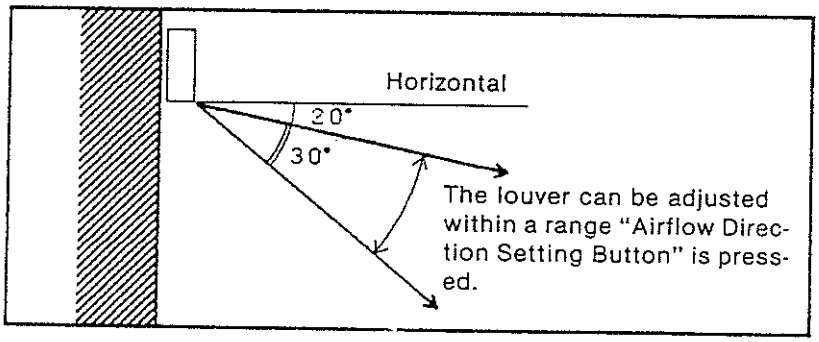
- When set at Airflow Direction Auto-control with remote control, the louver swings up and down as shown in the diagram.
- The louver does not swing when the Indoor Fan stops during Soft Dry Operation.
- When stopped with remote control, the discharge vent is closed with the louvre.



※ The left and right airflow direction louvres can be adjusted manually.

② Airflow Direction Manual Control

- When the airflow direction set button is pressed, the automatic airflow is released and the airflow direction louver move up and down in the range shown in the diagram. The louvres can be stopped by releasing the button at the desired louver position.
- When the remote control is used to stop the operation, the discharge vent is closed with airflow direction louvre.



※ The left and right airflow direction louvres can be adjusted manually.

4. Indoor Fan Speed Control

① Automatic indoor fan speed control

- When the remote control is used to set at Automatic Operation Mode 1, 2, 3 or is set at automatic indoor fan speed by manual operation, the maximum and minimum fan speeds are set as shown in the diagram below, and the fan speed is altered every 10 seconds.

② Manual Indoor Fan Speed Control

- The basic fan speed settings (5 settings from low to high) using the Indoor Fan Speed Selection button are as seen in the diagram below.
  When unit is set at Soft Dry operation, the fan speed becomes SLo.

O=Automatically-set Fan Speeds

Mode \ Fan Speed		High-Speed ← → Low Speed															
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	Stop
Cooling	Manual					High Hi		● M+		Med. Me		● M−		Low Lo	○★ SLo		
	Manual Control with													◎	○ SLo		
	Fan Speed Auto-Control								◎ Max.	◎	◎ Min.						
	Fan Speed Auto-Control with							◎ Max.	◎	◎ Min.							
	Fan Speed Auto-Control with									◎ Max.	◎	◎ Min.					
	Fan Speed Auto-Control with													◎	○ SLo		
Soft Dry	Manual														○ SLo		○
	Fan Speed Auto-Control														○ SLo		○

※ When used with when in manual, the fan speed is increased by one rank, and when used with , fan speed is decreased by one rank.

★ Only during Lo Fan Speed.

2) Heating Operation

1. Room Temperature Control

- In accordance with the difference in temperature between the remote-control set temperature and room temperature (intake air sensor), room temperature is adjusted by altering compressor operation (see diagram).

① At start of operation, heating operation is carried out at high frequency, and when temperature approaches the set temperature, room temperature is stabilised by reducing operating frequency.

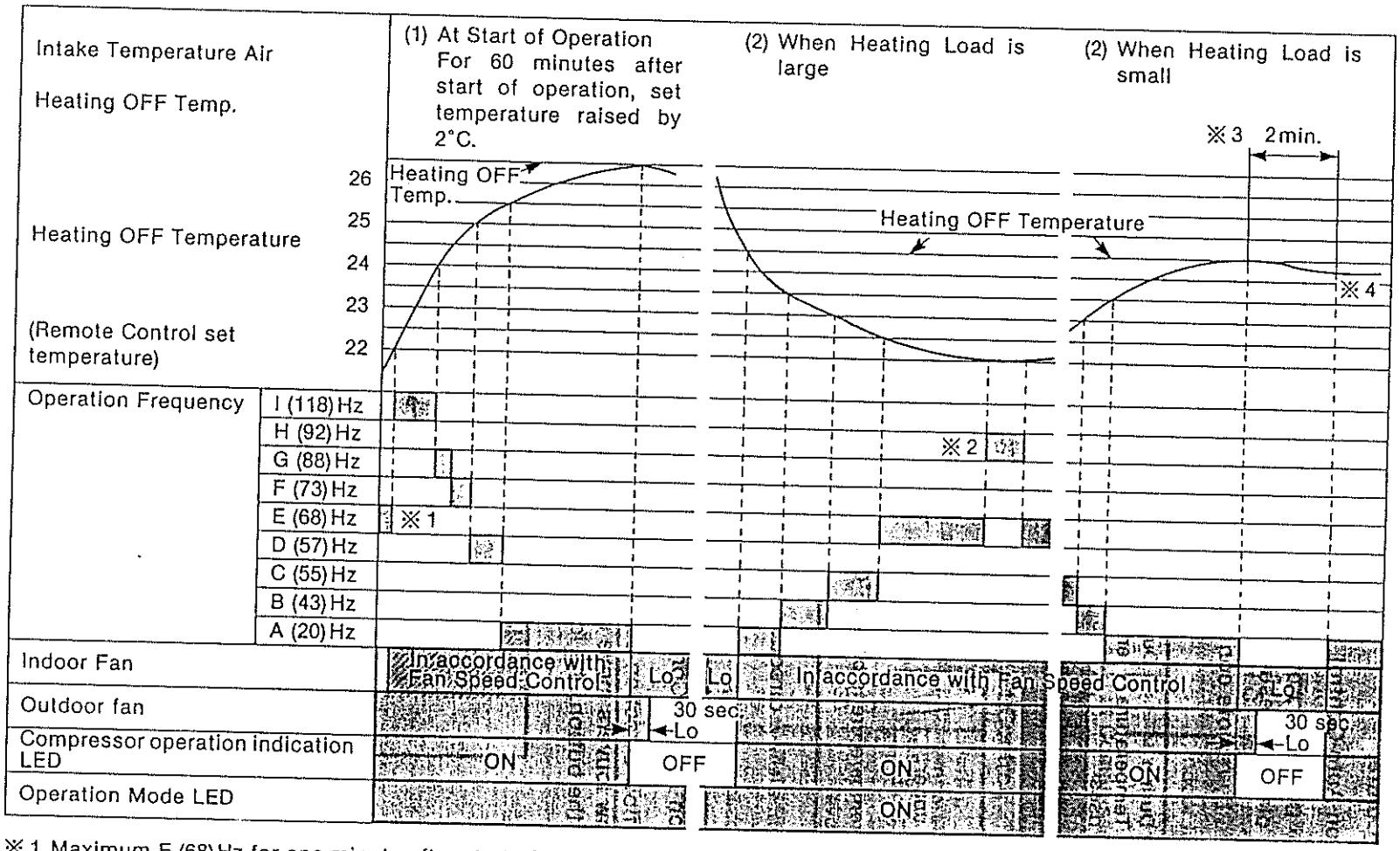
② When the heating load becomes large, the operation frequency is increased, quickly raising room temperature.

③ When the heating load is small, operates at low frequency, and when the room temperature exceeds heating OFF temperature, the compressor is stopped.

Heating Room Temperature Control (Temperature set at 22°C, Hi-Fan Speed)

Intake Air Temperature	(°C)	During Room Temperature rises	During Room Temperature falls
		OFF	OFF
Heating OFF Temperature	24	A (20) Hz	A (20) Hz
		D (57) Hz	B (43) Hz
	23	F (73) Hz	C (55) Hz
		G (88) Hz	E (68) Hz
Remote Control Set Temperature	22	I (118) Hz	I (118) Hz

[Room Temperature Control (Set temperature 22°C Hi fan speed)]

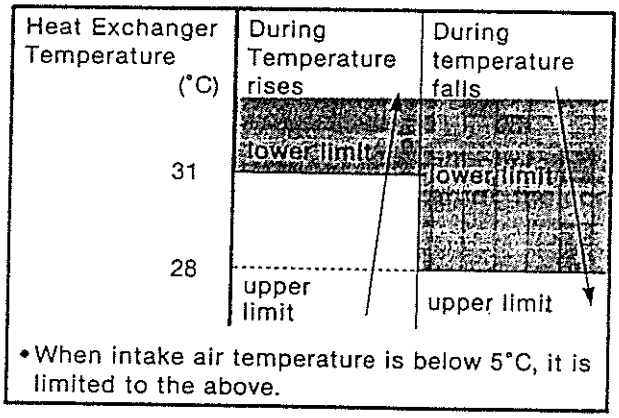


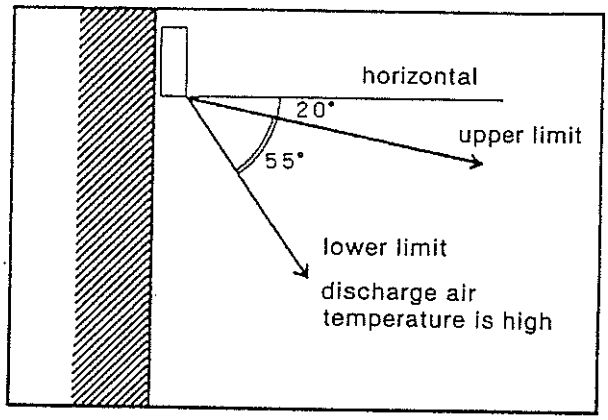
※1 Maximum E (68) Hz for one minute after start of compressor.
※2 When Hi Fan speed is selected by remote control, if Outdoor Ambient Temperature exceeds 4°C and intake air temperature 17°C for one hour, the maximum frequency is E (68) Hz.
※3 The time delay control is two minutes.
The Outdoor Fan stops after 30 seconds during compressor stopping.
※4 If the temperature drops below the Heating OFF temperature after 2 minutes of compressor stopping, the compressor starts operating.

2. Airflow Direction Control

① Airflow Direction Auto-Control

- When Airflow Direction Auto-control is set by remote control, the louver is controlled as shown in the diagram, resulting in cold draft prevention.
- When stopped by remote control, the Air Discharge vent is closed with the louver.

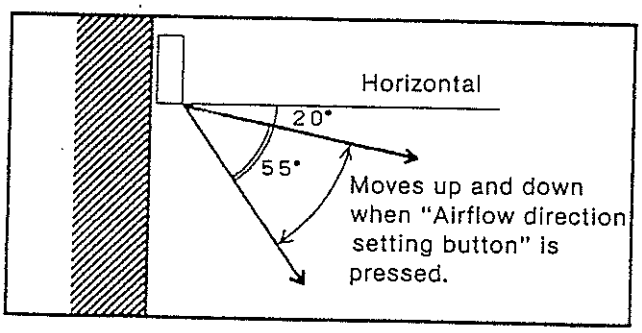




※ The left and right airflow direction louvres are adjusted manually.

② Airflow Direction Manual Control

- When the Airflow Direction button is pressed, the airflow direction auto-control is released and the airflow louvers move up and down within the range shown in the diagram. By releasing the button, the louver can be adjusted in the desired position.



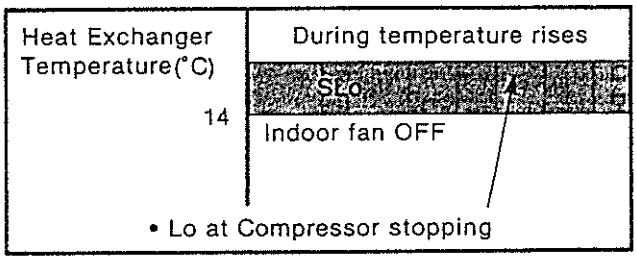
※ The left and right airflow direction louvres are adjusted manually.

3. Fan Speed Control

① Hot Start Control

- Stops the indoor fan during the start of Heating, until the indoor Heat Exchanger temperature reaches 14°C. The operation indication will LED start to blink.

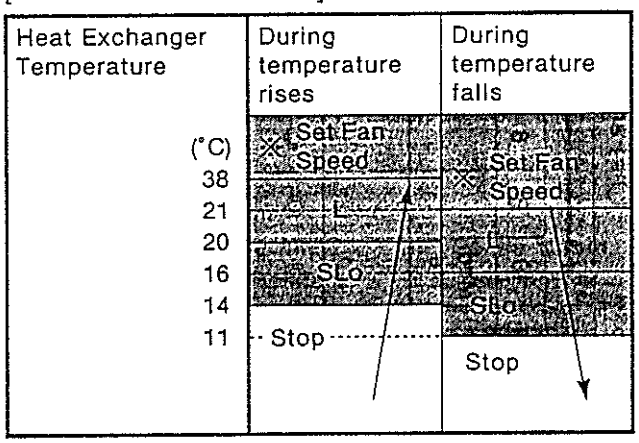
[Hot Start Control]



② Anti-Cold Draft Control

- Detects the Indoor Heat Exchanger temperature, and when low, controls the fan speed as shown in the diagram on the right.

[Anti-Cold Draft Control]



③ Fan Speed Auto-Control

- When it is set at Automatic Operation Mode 1, 2 or 3, or Fan Speed Auto-Control, the fan speed is increased from the minimum speed to maximum, step by step in accordance with the rise in the indoor Heat Exchanger temperature.

④ Fan Speed Manual Control

- The basic fan speed when controlled by the Indoor Fan Speed Selection button is as follows:

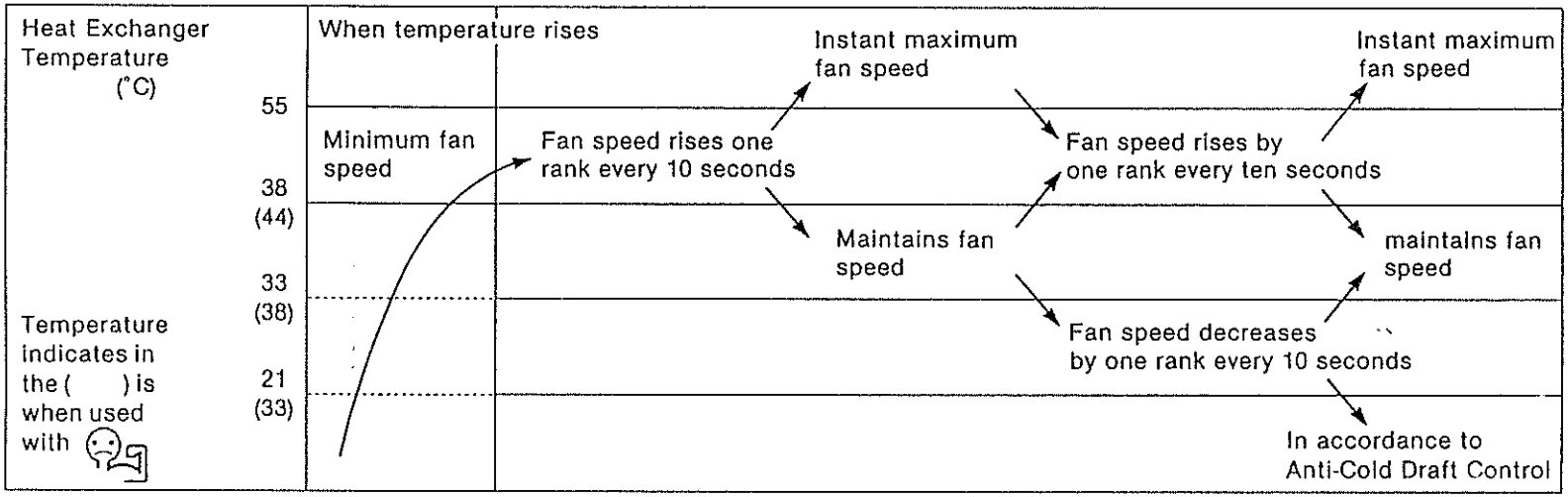
[Fan Speed Control]

○=Fan speed when using Anti-Cold Draft Control

Mode \ Fan Speed	High Speed ←															→ Low Speed
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	Stop
※ Manual	High Hi	● M^+				Med. Me			● M^-		Low Lo		○ L^-		○ SLo	○
Manual with													◎ Max. L^-		○ SLo	○
Automatic Fan Speed				◎ Max.	◎	◎	◎	◎	◎	◎	◎ Min.		○ L^-		○ SLo	○
Automatic Fan Speed with		◎ Max.	◎	◎		◎	◎	◎	◎	◎ Min.			○ L^-		○ SLo	○
Automatic Fan Speed with							◎ Max.	◎	◎	◎	◎	◎	◎ Min. L^-		○ SLo	○
Automatic Fan Speedwith													◎ Max. L^-		○ SLo	○

※ When and manual used together, the fan speed increases by one rank, when used with fan speed decreases by one rank.

[Fan Speed Auto-Control]



4. De-Ice Control

- When the outdoor heat exchanger temperature falls below 3 degrees, the de-ice timer operates, and then when the outdoor heat exchanger temperature falls below the operation temperature for a period for 3 minutes, it goes into de-ice operation.

① Changes the 4-way valve and removes frost in the cooling cycle

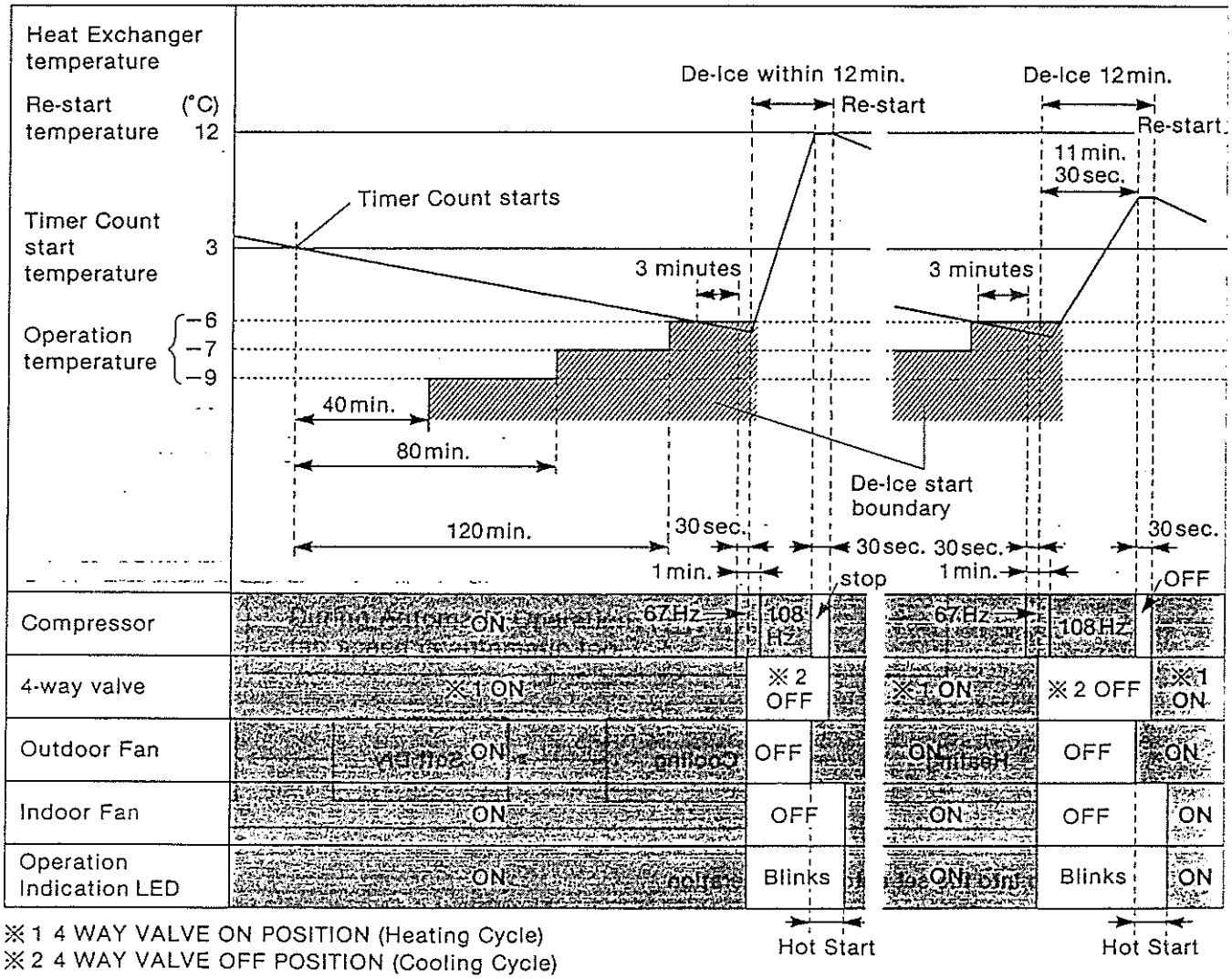
② After start of De-Ice, stops after 12 minutes or when heat exchanger temperature rises more than 12°C.

[De-Ice Characteristics]

	Start of De-ice			End
Time	40min.	80min.	120min.	12min.
Heat Exchanger Operation Temperature	−9°C	−7°C	−6°C	12°C

4-way valve	Outdoor fan	Indoor fan	Operation-indication LED
Cooling cycle	Stop	Stop	Blinks

[De-Ice Operation]



※1 4 WAY VALVE ON POSITION (Heating Cycle)
※2 4 WAY VALVE OFF POSITION (Cooling Cycle)

Operation Details

3) Automatic Operation Mode

- The Automatic Operation Mode, depending on the room temperature (Operation Modes 1, 2 or 3) or the Automatic Operation mode.

① When setting the automatic control by room. When the remote control door is opened, you will see the Automatic Operation Mode 1, 2 and 3 buttons. Pressing either of these button in accordance with the room sets the mode. (e.g. when Automatic Operation Mode 1 is pressed, "Automatic Operation Mode 1" is indicated.)

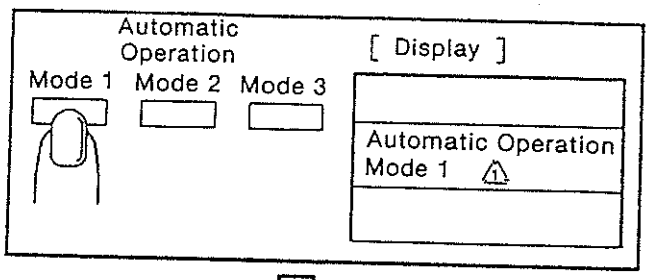
② When Automatic Operation is selected by room. For example, when "Automatic Operation Mode 1" is pressed, and Automatic Operation Mode 2 is to be selected, simply press Mode 2. "Automatic Operation Mode 2" will be set.

③ When switching-over to the automatic control mode. For example, when "Automatic Control Mode 2" is set, and the Mode 2 button is pressed, it will switch over to the automatic control. The indication will go off.

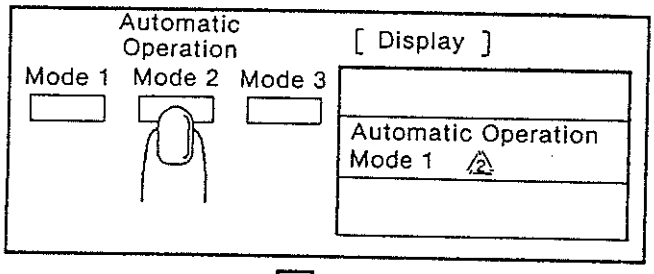
④ After setting the desired Automatic Control, close the remote control door. Then, simply by pressing the remote control OPERATION START/STOP button, automatic control is carried out.

⑤ When switching over to Automatic Operation Mode. When the Automatic Control Selection button is pressed, it will switch-over as shown in the diagram on the right.

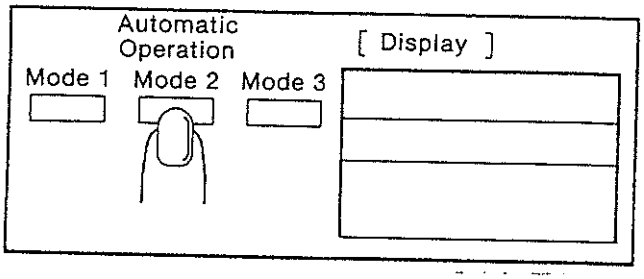
When Automatic Operation Mode 1 is pressed

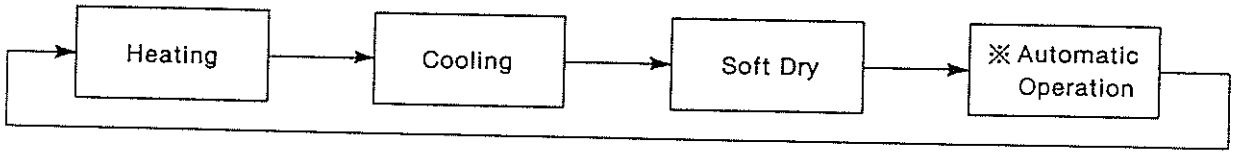


When Automatic Operation Mode 2 is pressed



When Automatic Operation Mode 2 is pressed again

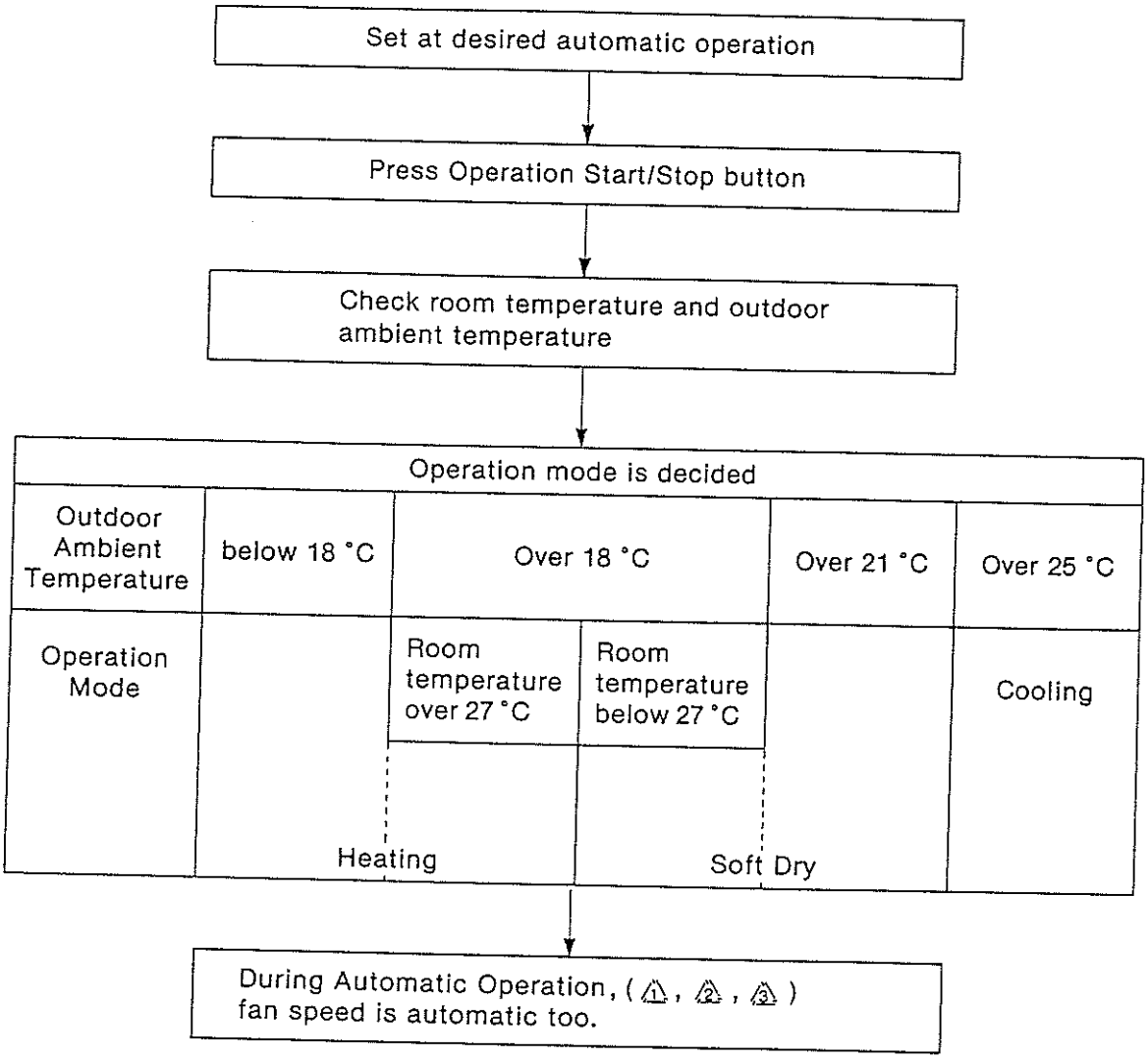




※ It will go into the set automatic operation

• After start of Operation the "Operation Indication LED" will keep blinking for 20 seconds. Durir this time Indoor Fan Operation will commence, automatically selecting operation mode, s temperature and fan speed, after which operation mode will be selected every 3 hours.

[Operation Mode]



Operation Details

[Set Temperature]

Operation Mode / Automatic Operation types	Cooling			Soft Dry			Heating		
	Outdoor ambient temperature (°C)			Outdoor ambient Temperature (°C)			Outdoor ambient Temperature (°C)		
	~ 27	~ 30	~	~ 21	~ 25	~	~ 0	~ 10	~
Automatic Operation Mode 1 ①	28	27	26	25	24	23	23	22	21
Automatic Operation Mode 2 ②	25	26	27	23	24	25	21	20	19
Automatic Operation Mode 3 ③	27	28	29	25	26	27	25	24	23
Automatic Operation	27	27	27	24	24	24	22	22	22

- Thermostat setting can be set "highter" (2°C higher) or "lower" (2°C lower).
- When set with the Sleep Mode , the set temperature will be shifted.
- When set with Powerful Mode , the set temperature will be shifted.
- When set with Quiet Mode , the frequency and fan speed are limited, and the set temperature might not be reached.

[Fan Speed]

Types of automatic operation	Fan Speed
Mode 1 ① Mode 2 ② Mode 3 ③	※ Fan Speed Auto-control
Automatic Operation	The desired Fan Speed can be set.

※ Refer to Fan Speed Control (Cooling, Soft Dry, Heating) for Fan Speed Auto-control.

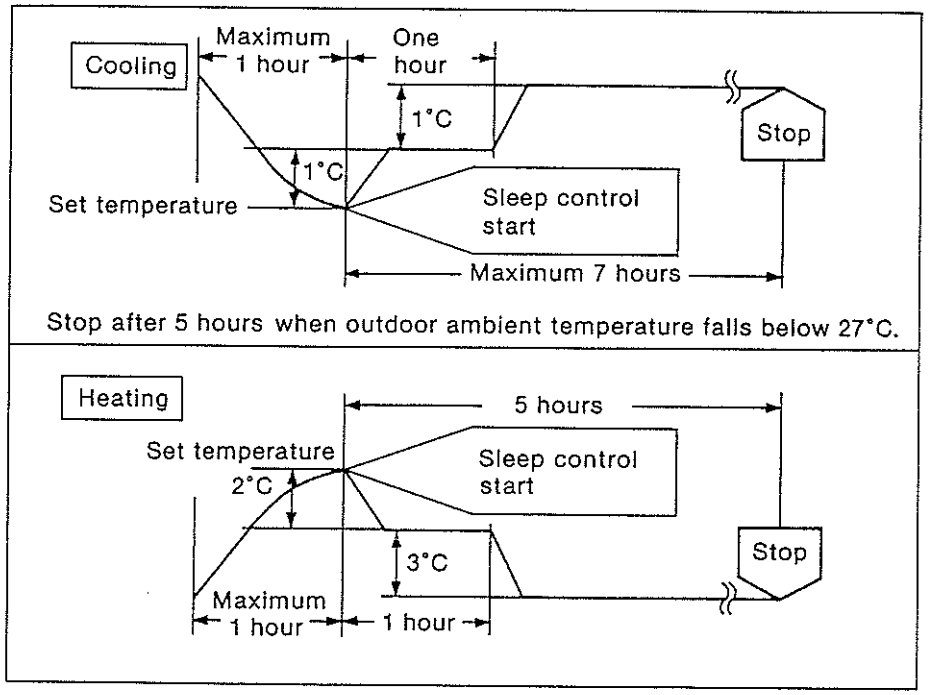
4) Sleep Operation

- When Sleep is set by remote control, after 1 hour after start of operation, or when the room temperature reaches the set temperature, the Sleep control operates.
  (Sleep operation indication LED lights On)
- Control the set temperature as shown, and it will stop the operation automatically.
- Outdoor photo sensor distinguishes between Day mode and night mode, and carries out the appropriate quiet operation.

※ The indicator on remote control lights On for 7 seconds when Sleep button is pressed, then goes off.

※ When Sleep button is pressed when (Sleep Operation indication LED) is on, then it will go off, and revert to normal cooling and heating operation.

[Sleep Operation]



5) Quiet Operation

- When Quiet is set by remote control, the operation sound becomes quiet.
- Outdoor Photo sensor distinguishes between day mode and night mode, and carries out the appropriate operation.

Operation Details

6) Powerful Operation

- When Powerful is set by remote control, a strong cooling and heating operation is carried out.
- The set temperature is shifted and fan speed is increased.

	Cooling	Soft Dry	Heating
Set temperature	4°C down	3°C down	6°C up
Fan Speed	1 rank up	SLo	1 rank up

7) Programmed Automatic Operation

- Press a button to select 3 different patterns for one day. The programmed automatic operation buttons "Sleep, Quiet and Powerful" are used in conjunction with the cooling and heating operation.

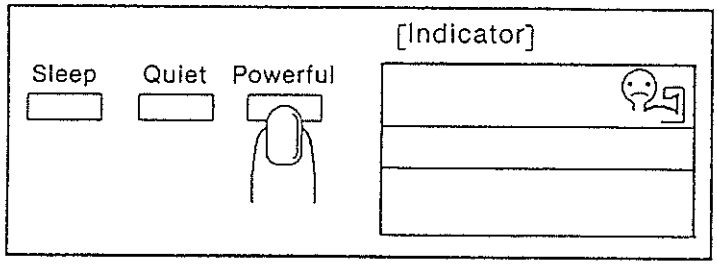
① When setting the Programmed Automatic Operation Mode:
Set by pressing either the remote control Sleep, Quiet or Powerful buttons. For example, when the Power button is pressed, ( ) is indicated.

② When switching over the Programmed Automatic Operation Mode:
For example, when ( ) is set, and Quiet is selected, ( ) is released, press the Quiet button.
( ) is indicated.

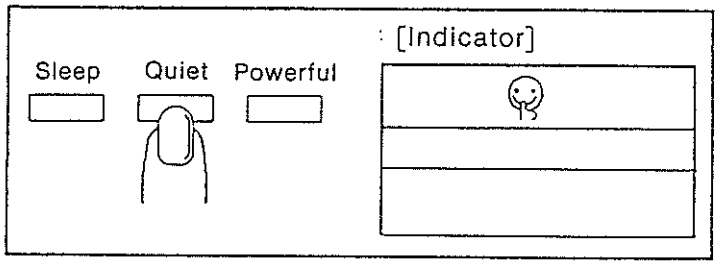
③ When releasing Programmed Automatic Operation Mode:
For example, when ( ) is set, and the Quiet button is pressed, then it is released, reverting to normal cooling and heating operation.
When this happens, the indicator goes off.

④ Sleep operation can only be set during normal cooling and heating operation.
When Sleep operation is set, "Indicator — Sleep" lights on.
When ( ) indicated on the remote control goes off after 7 seconds.

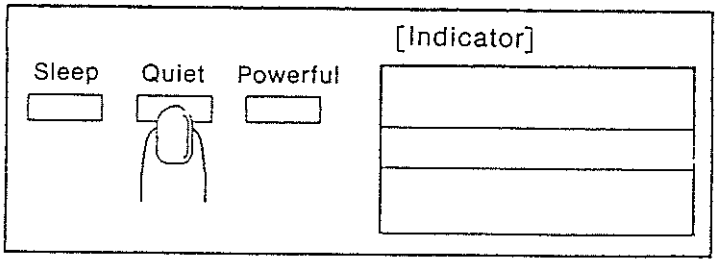
When Powerful is pressed:



When Quiet is pressed:



When Sleep is pressed once more:



8) Low Sound Operation

- When operated as in the chart below, the indoor, outdoor fan and the compressor maximum frequency are limited, reducing operation sound.

[During Cooling Operation]

Operation types	Quiet operation		Sleep Mode operation Preparatory operation of On timer	
	Day mode	Night mode	Day mode	Night mode
Indoor fan	1 rank down	1 rank down	Lo	Lo
Outdoor fan	1 rank down	2 ranks down	1 rank down	2 ranks down
MAX. Frequency (Hz)	75	57	57	57

[During Heating Operation]

Operation Types	Quiet operation		Sleep mode operation Preparatory operation of On timer	
	Day mode	Night mode	Day mode	Night mode
Indoor fan	1 rank down	1 rank down	Lo	Lo
Outdoor fan	2 ranks down	2 ranks down	2 ranks down	2 ranks down
MAX. Frequency (Hz)	91	85	73	73

9) Delayed "ON" Timer Control

- Room and Outdoor ambient temperatures are detected on hour before set time, and preparatory operation is carried out (5~60minutes) in accordance to conditions.

Operation Details

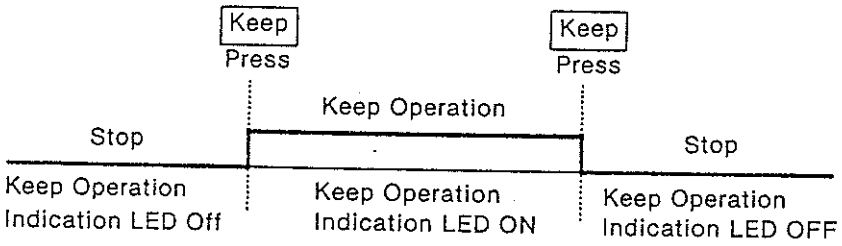
10) Keep Operation

- The Keep Operation Mode is a basic operation to maintain a light air conditioning. As both cooling and heating is carried out beforehand with low power, and its power displayed when you want to quickly heat up or cool down a room. And, because room temperature unevenness is minimised.

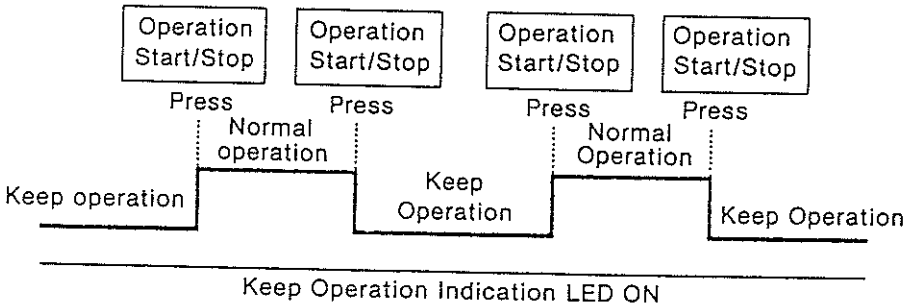
	Cooling	Soft Dry	Heating
※1 Set Temperature	30°C	27°C	11°C
Operation Frequency	20Hz	20Hz	20Hz
Fan Speed	Lo	SLo	Lo
※2 Airflow Direction	facing 20° down	facing 20° down	facing 75° down

※1 The set temperature indicated is Thermostat Off temperature.
※2 The Airflow Direction indicated is Airflow Direction Auto-control.
Airflow Direction manual control louver can be set in the desired position.

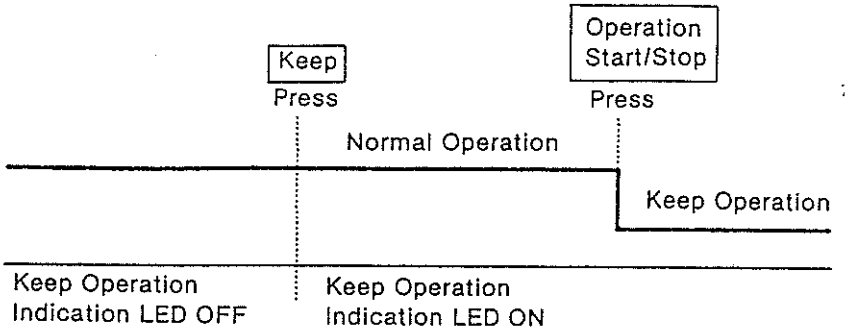
① When the air conditioner is stopped, Keep operation can be carried out by pressing the remote control. (Keep operation indication LED lights on). When pressed again, Keep Operation is released (Keep operation indication LED goes off).



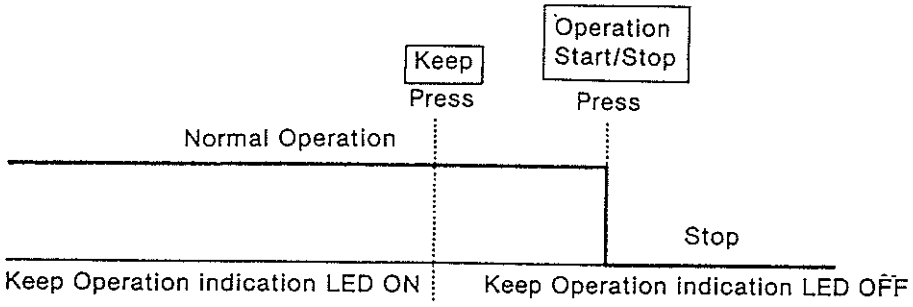
② When the remote control Operation Start/Stop is pressed during Keep Operation, goes into normal cooling and heating operation. When pressed once more, it goes into Keep Operation.



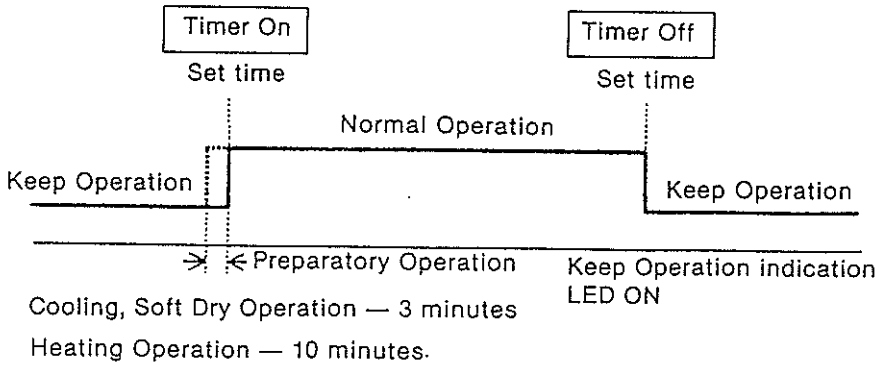
③ When Keep is pressed when the Keep operation indication LED is off, and during normal air conditioner operation, the Keep operation indication LED lights up, and after stopping, Keep Operation starts.



④ When Keep is pressed when the Keep operation indication LED during normal air conditioner operation, the Keep Lamp operation is released. (Keep operation indication LED goes off)



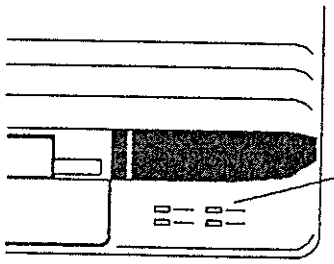
⑤ Preparatory Operation time is reduced during Keep Operation and when timer "On" is set.



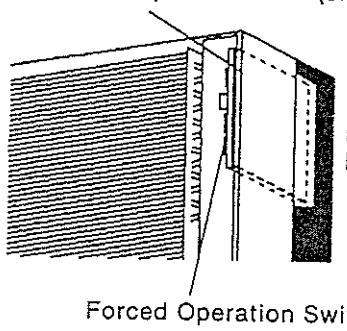
Operation Details

11) Protection Control

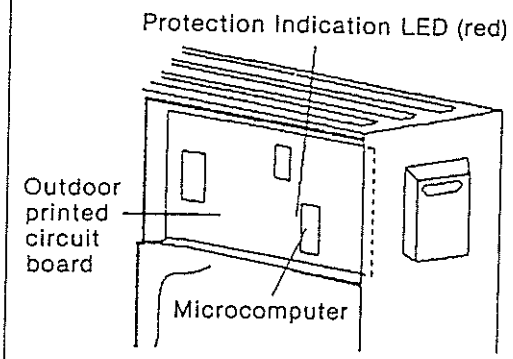
1. Lighting pattern for Indication for Protection LED.

• When the Operation indicator lights on, it conveys to the user that the air conditioner operation can not be carried out.	Lighting Pattern of operation indicator	
Indoor Unit  	Indoor sensor Malfunction	Timer operation indication LED lights on once every 5 seconds ※ ☼●●●●●●●●●☼● 5 second cycle
	Indoor unit/outdoor unit abnormal communication	Timer operation indication LED lights on twice every 5 seconds ※ ☼●☼●●●●●●●●☼● 5 second cycle
	DC Peak	All indication LED's light on 5 times every 5 seconds ☼●☼●☼●☼●☼●☼● 5 second cycle

※ Lights on one minute after atart of operation.

Indoor Unit	Comp operation indication LED (orange) lighting pattern	
Compressor Operation LED (orange)  	When normal	When Thermo ON, lights On • When Thermo Off, light off
	Indoor Sensor Malfunction	lights on once every 5 seconds ☼●●●●●●●●●☼● 5 second cycle
	Forced Operation Takes Over During Indoor Sensor Malfunction	
	When the Forced Operation switch is pressed, continued operation takes place at fan speed "low" and operation frequency of "40Hz".	

Outdoor Unit

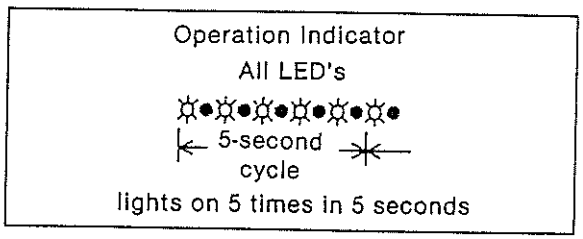


Lighting pattern for Protection Indication LED (red).	
When normal	Light off
DC Peak	Blinks once every ten seconds 10-second cycle
Total Running Current	Blinks twice every 10 seconds 10-second cycle
Tank temperature abnormality	Blinks 3 times everys 10 seconds 10-second cycle
Indoor unit/outdoor unit abnormal communication	10-second cycle
	Blinks 5 times every 10 seconds 10-second cycle
Outdoor sensor malfunction	Blinks 6 times every 10 seconds 10-second cycle

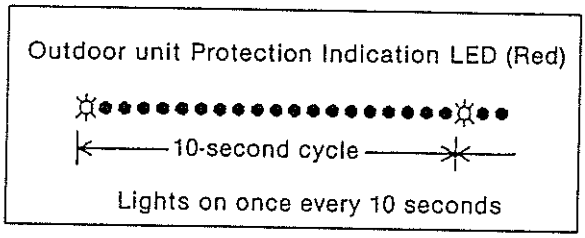
Note:
(☼) indicates 0.5 second light on.
(●) indicates 0.5 second light off.

2. **DC Peak Current Control**
   - When the electric current supply to the Power Transistor exceeds the set value of 21 A, the Compressor stops, and the outdoor Printed circuit board Protection Indication (red) starts blinking.
   - If the set value is exceeded twice consecutively within 30 seconds after start of operation of compressor, the abnormal indicator goes into operation (All LED's on indoor unit start blinking) and indoor and outdoor operation stops.
   - Operation will re-start by re-setting the power switch after repairs are completed.
   - This control has the highest priority above all other controls.

〔Abnormal Indication〕

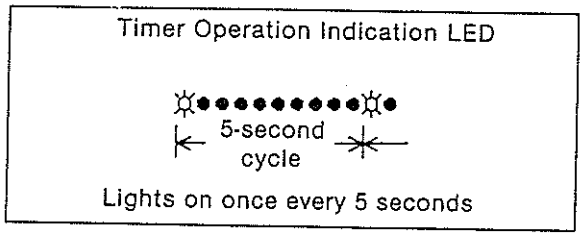


〔Lighting Pattern〕

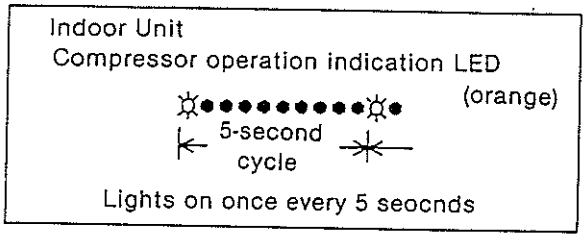


3. **Indoor Sensor Abnormality Control**
   - If the indoor intake air temperature or pipe sensor is open or shorts, the compressor is stopped and the indoor printed circuit board Comp operation indication LED (orange) starts blinking.
     The indoor timer operation indication LED also shows abnormal indication.

〔Abnormal Indication〕

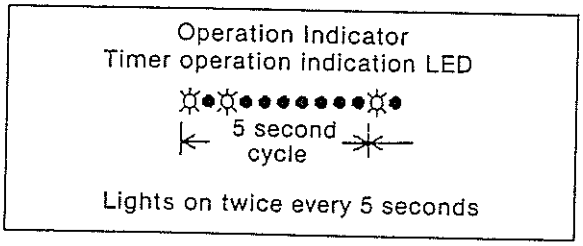


〔Lighting Pattern〕

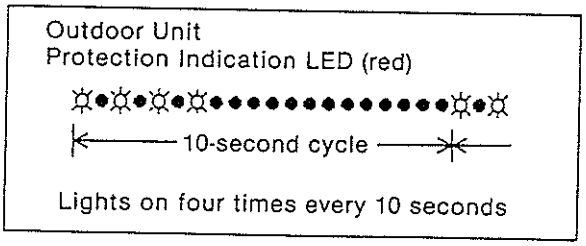


4. **Indoor Unit/Outdoor Unit Abnormal Communication Control**
   - When Communication between indoor and outdoor microcomputers is not working, the compressor is stopped and the outdoor printed circuit board Protection Indicator LED (red) lights on.
     And, the indoor unit timer operation indication LED also shows abnormal indication.

〔Abnormal Indication〕



〔Lighting Pattern〕



5. Total Running Current Control

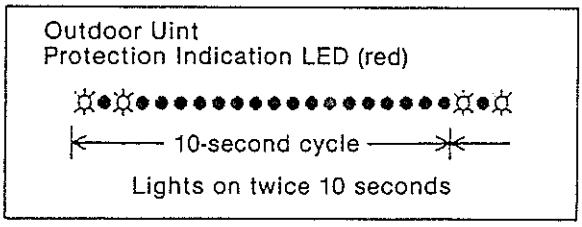
<During Cooling>

- When the Outdoor Unit total running current (alternative current) exceeds 5.7 A the frequency is lowered by a rank. If 5.7 A is not exceeded every 30 seconds the frequency is highered by a rank at a time.
- When it is over 7.65 A the compressor stops, and the outdoor printed circuit board Protection Indicaton LED (red) starts to blink.

<During Heating>

- When the Outdoor Unit total running current (alternative current) exceeds 6.5 A the frequency is lowered by a rank. If 6.5 A is not exceeded every 30 seconds the frequency is highered by a rank at a time.
- When it is over 7.65 A the compressor stops, and the outdoor printed circuit board Protection Indicaton LED (red) starts to blink.

[Lighting Pattern]



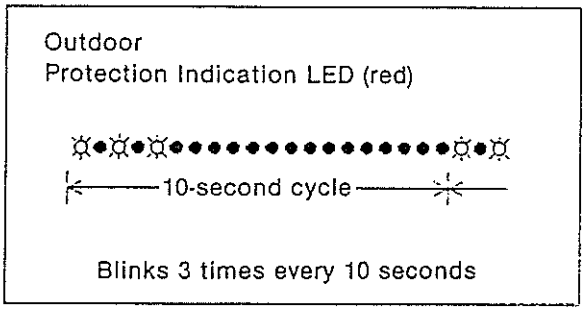
6. Overheating Prevention Control

- When the power transistor overheats, the OLP goes into operation, the compresor stops, and the Outdoor Printed Circuit Board Protection Indicaton LED (red) starts to blink.
- Compressor Overheating Prevention Control
- When the compresor overheats, the OLP goes into operation, and the compressor is stopped and the outdoor printed circuit board Protection Indicaton LED (red) starts to blink.

[Set Values]

	OLP for Power Transistor	OLP for Compressor
Operation Temperature (On)	100°C	125°C
Re-start temperature (Off)	95°C	110°C

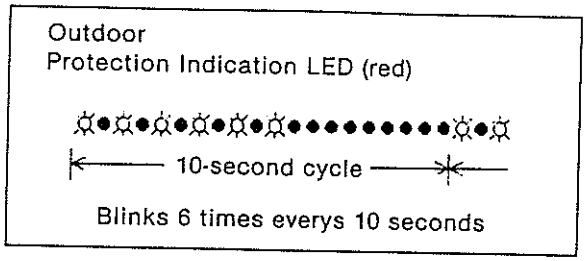
[Lighting Pattern]



7. Outdoor Sensor Abnormality Control

- When the outdoor pipe temperature, the outside ambient temperature and the discharge temperature sensor are open or short, the compressor is stopped, and the outdoor printed circuit board Protection Indicator LED (red) starts to blink.

〔Lighting Pattern〕



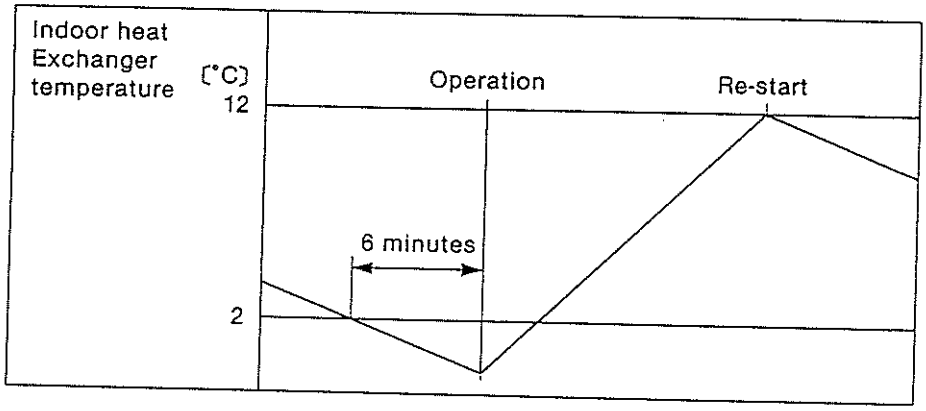
8. Indoor Fan Motor Abnormality control

- When there is an over-current flows to the Fan Motor due to an indoor fan motor breakdown or fan lock, operation is stopped. (Operation indication LED Off)

9. Anti-Freeze Control (Cooling)

- When the temperature of the indoor heat exchanger becomes low, the compressor is stopped to prevent freezing of indoor heat exchanger.

〔Anti-Freeze Control〕

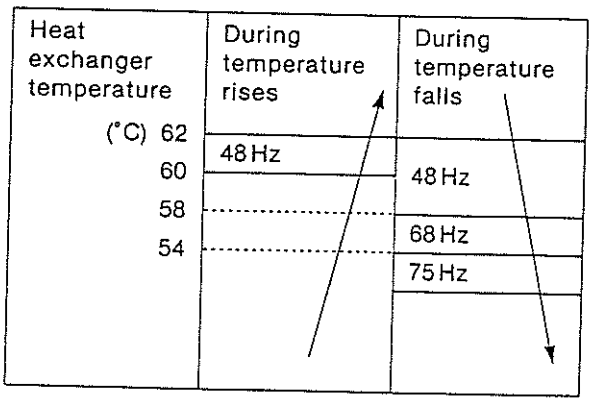


※1. Operates when falls below 2°C for a continued Period of 6 minutes.
※2. Re-starts when temperature rises above 12°C.

10. Over-Current Control (Heating)

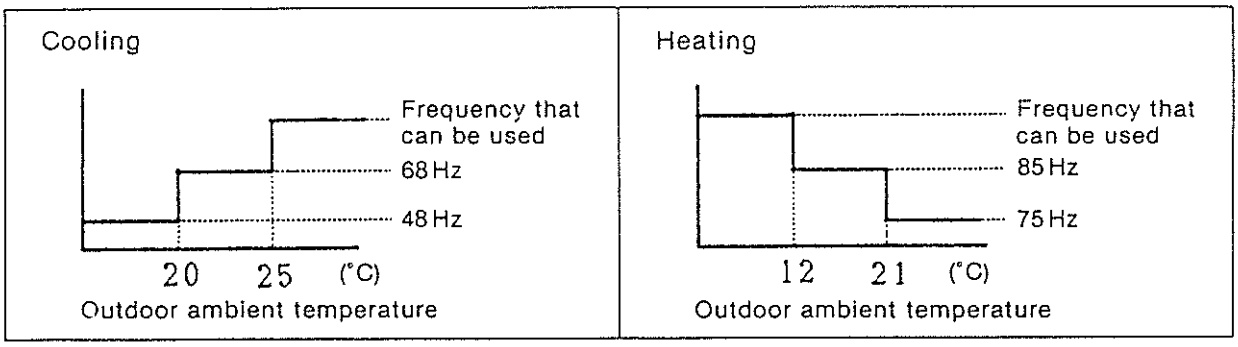
(A) Control by Indoor Heat Exchanger Temperature Through the Indoor Heat Exchanger Temperature, as shown in the diagram to the right, the operating current is controlled by limiting frequency or stopping the compressor.

(B) Control by Intake Air Temperature. Through the intake air temperature, the over current is controlled by limiting the compressor frequency as shown in the diagram to the right.



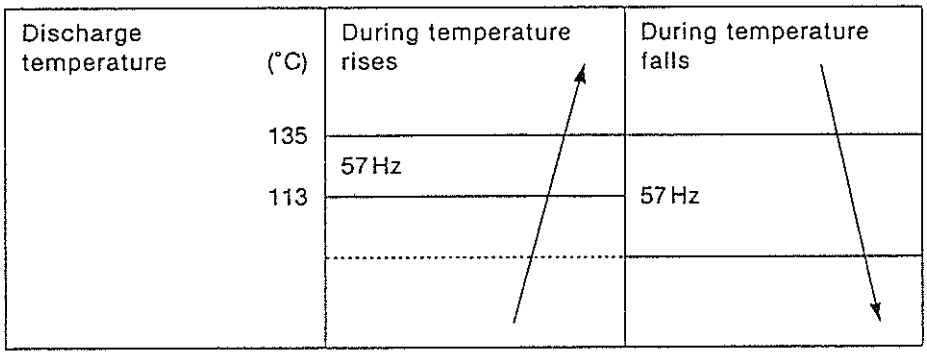
11. Ambient Temperature Control

- Through the outdoor ambinent temperature, the over current is controlled by limiting the compressor frequency as shown in the diagram.

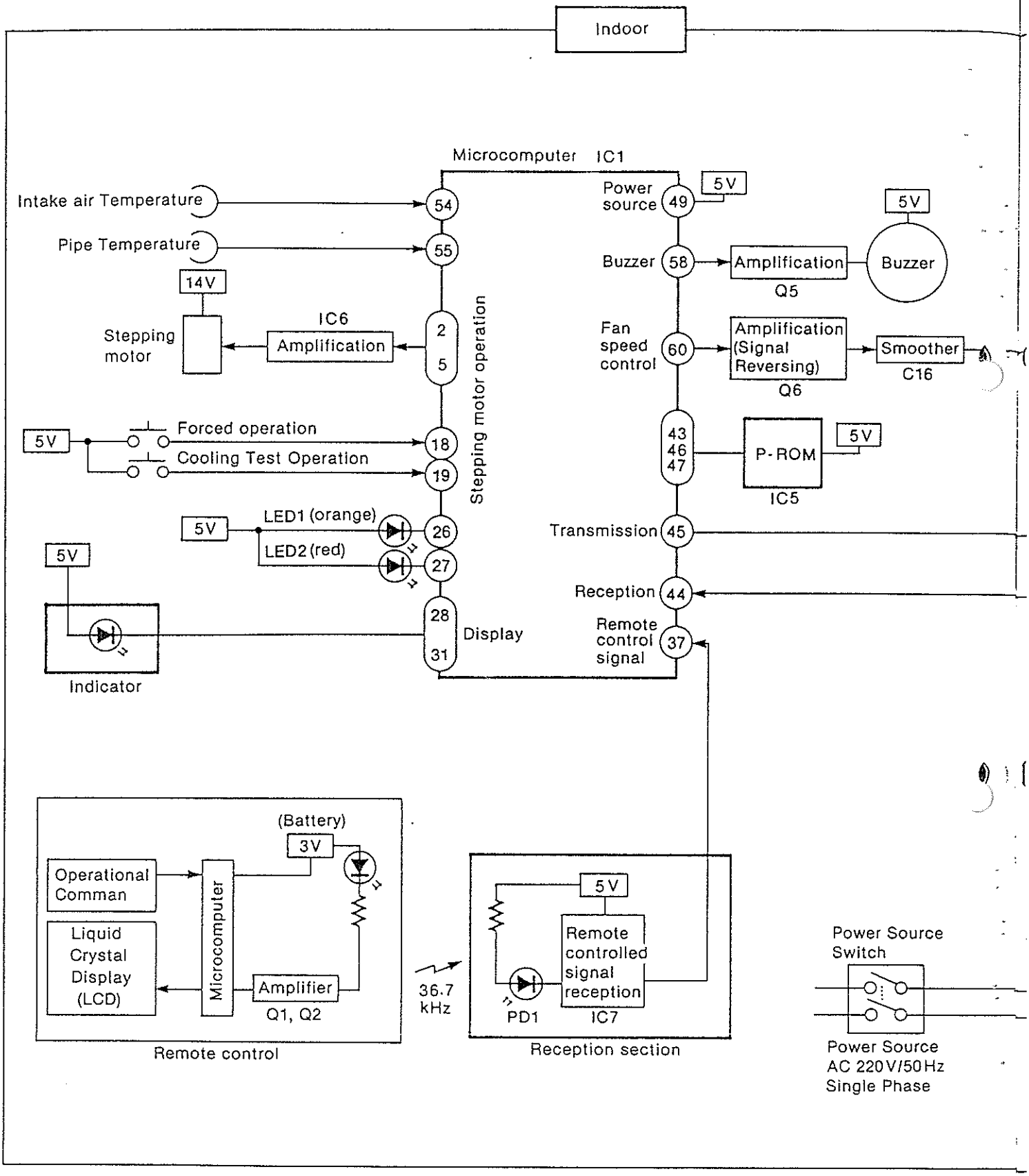


12. Discharge Temperature Control

- When the discharged temperature of Compressor becomes high, frequency is limited as shown in the diagram or the compressor stopped.



Construction of Electronic Circuit



Outdoor

O.L.P. (for power TR)

O.L.P. (for compressor)

5V

Microcomputer IC1

31 O.L.P.

Pipe temperature sensor → 56

Outdoor ambient temperature sensor → 55

Discharge temperature sensor → 54

Photo sensor → 57

IC2 P-ROM → 43 46 47

Total running current detection → 53

Transmission → 45

Reception → 44

Power source → 49

9 10 19 21 8 54 1 2 3 4 5

5C

14V

RY—PWR
RY—HOT
RY—H
RY—M
RY—L

Q4

Regulator IC4

6V

Amplifier

PC4 PC9

Frequency number control

DC Peak → 7

LED1(red)

36

PC1

R7

DC Peak current detection

Switching power source Q1 T1

Fan motor

IC3b OSC

Pulsing IC3a

Switching power source Q1 Q2 T1 T2

moother C1

uzzer

Q4 IC4b

Data communication

Indoor terminal 3 4

Outdoor terminal 3 4

PC3 Q2

Data communication

Data communication indicator LED 2 (green)

Indoor Unit Terminal 1 2

Outdoor Unit Terminal 1 2

Power Source Circuitry

5V

14V

Fuse (20A)

Noise Filter

C.T

RY—H

RY—L

RY—M

RY—HOT

Fan Motor

4 Way Valve Coil

RY—PWR

Diode Bridge

Fuse (10A)

DC 310V

Power Transistor

U V W

Compressor

ource
/50Hz
ase

Construction of Electronic Circuit

1. Outline of Electronic Circuitry
   1. Remote controlled instruction
      - When the remote control button is pressed, a code signal is transmitted on a carrier wave of 36.7 Hz.

   2. Power Supply
      - When the power switch is ON, "5V" and "14V" are supplied. Voltage of indoor unit and outdoor unit is supplied in the following way.
        AC V → DC V → switching power source
      - When the remote control button is pressed, RY-PWR is turned ON, and DC V is 310V, supplying voltage to the compressor operation.

   3. Temperature and illuminance data Input
      - Indoor data on intake air temperature (room temperature) and pipe temperature, and outdoor data on ambient temperature, pipe temperature and compressor discharge temperature data are each detected by the sensor (thermistor), and input into the microcomputer.
      - And, through the photo sensor (CDS), the outdoors illuminance data is detected and input into the microcomputer.

   4. Indoor Fan Motor Control
      - The fan speed control signal output from the microcomputer passes through amplification (signal reversing) smoothness→pulsing→switching power source, supplying an voltage to make the motor rotate in ratio to the number of rotations.
      - The motor utilises a transistor motor, and electronic circuitry built in the motor.

   5. Data Communication
      - The indoor and outdoor microcomputers exchange data by passing through 3 and 4 in the indoor unit and outdoor unit connection wire. Data such as "Compressor ON, Operation Frequency Setting, Outdoor Fan ON, 4-way valve ON" is transmitted from indoors to outdoors, while "Operation condition of outdoor unit", "Signals such as abnormalities such as DC peak" are transmitted from outdoors to indoors.

   6. Compressor Operation Frequency Control
      - By passing through the data communication circuitry, based on the compressor operation frequency instructions sent from the outdoor microcomputer, microcomputer → PC4-PC9 → power transistor goes into operation and the compressor is operated by three-phase A.C.

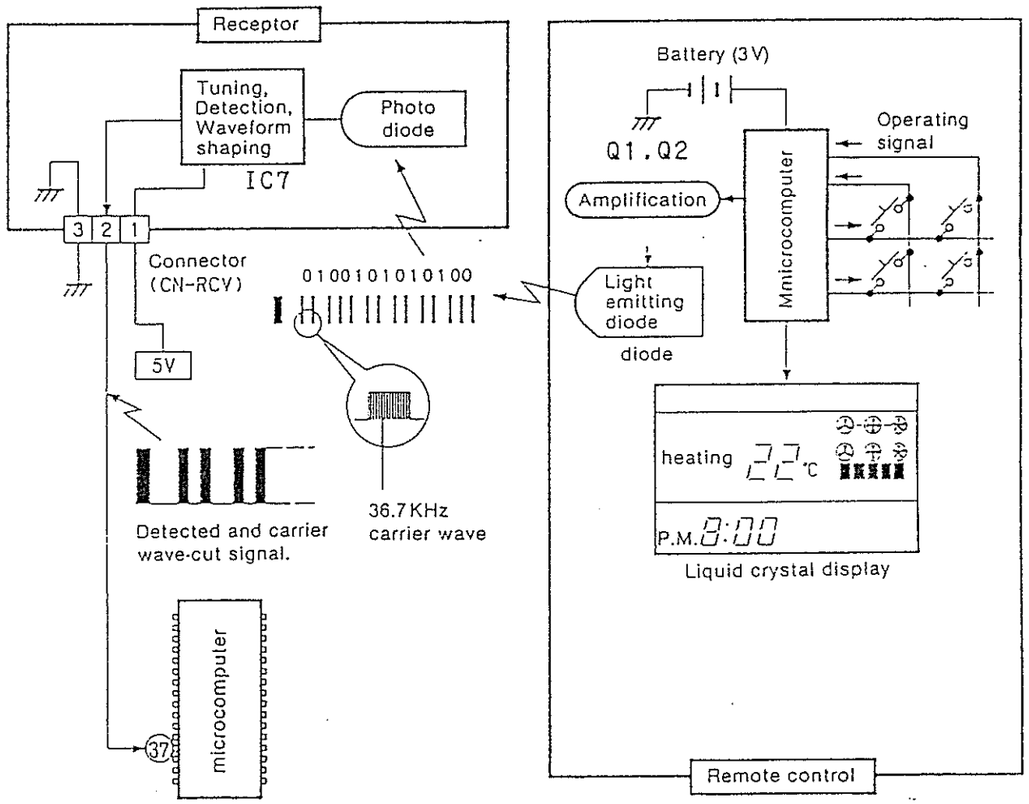
   7. DC Peak Current Detection
      - When an over current flows through the (−) line of the power transistor, in order to protect the circuitry, a signal is sent into the microcomputer, stopping the compressor.

   8. LED Indication
      - The indoor LED1 (orange) lights on during compressor operation, and starts blinking during "Indoor temperature sensor malfunction". LED2 (red) lights on during heating, and goes off during Cooling and Soft Dry.
      - The outdoor LED1 (red) starts blinking at "DC Peak", "Current control", "Overload relay (O.L.P.) operation", "Indoor and outdoor abnormal communication" as well as "Outdoor sensor malfunction".
        LED2 (green) starts blinking during data communication.

2) Wireless remote controlled transmission, reception Circuitry

[Summary of Circuit Operation]

- When the wireless remote control button is pressed, the code signal in accordance to the remote control command is transmitted on a carrier wave of 36.7 KHz.



3) **Transistor Motor Control Circuitry**

[Operating Voltage]

Indoor fan speed selection voltage of each section is as follows.

		High speed ←→ Low speed															
		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	Stop
Operation Selection	Cooling					High		■		Med.		■		Low			
	Soft Dry														○		
	heating	High	■				Med.			■		Low					
Voltage of each part (V)	microcomputer (60) pin	1.8							→ Voltage Increase →							3.8	5
	CN-MTR (3) pin	29.0	27.0	26.0	25.0	23.0	22.5	22.0	21.0	20.5	19.5	17.5	17.0	16.0	13.0	9.0	0

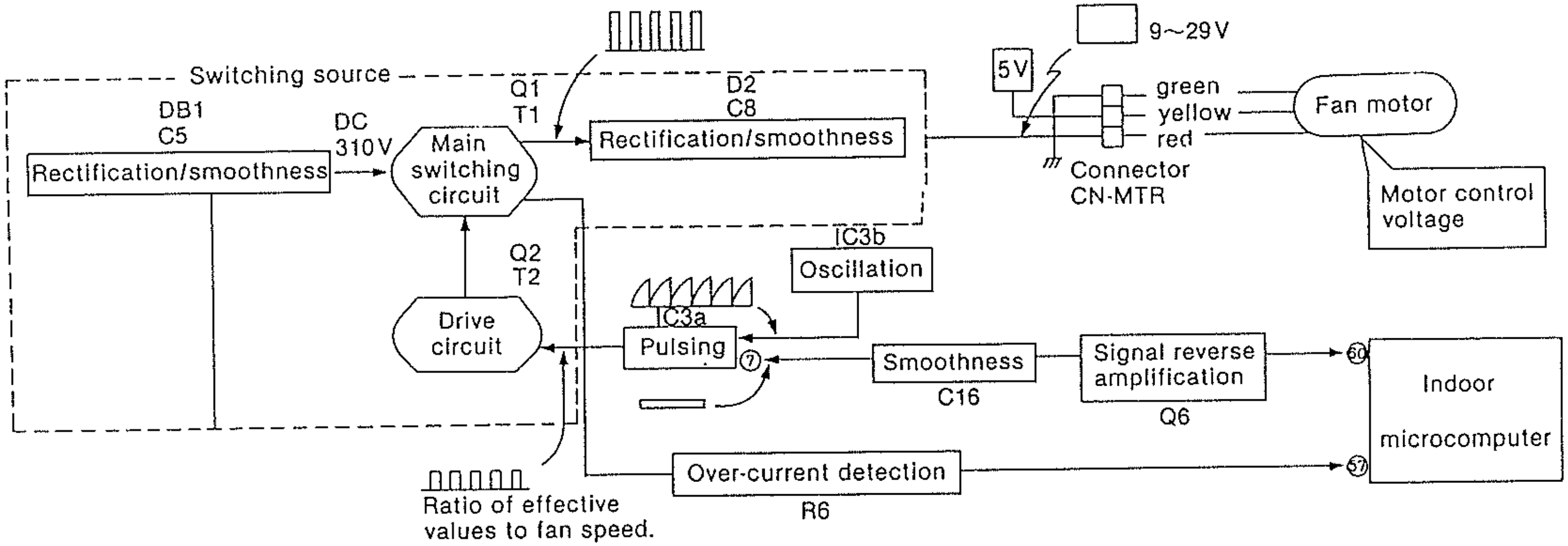
[Summary of Circuit Operation]

① A transistor motor in which the number of rotations can be selected at will inside the inverter air conditioner indoor fan motor, and a printed circuit board is also built in the motor.

② 5V is supplied as the in-motor printed circuit board's voltage, and the motor circuit's speed is in ratio to the motor control voltage.

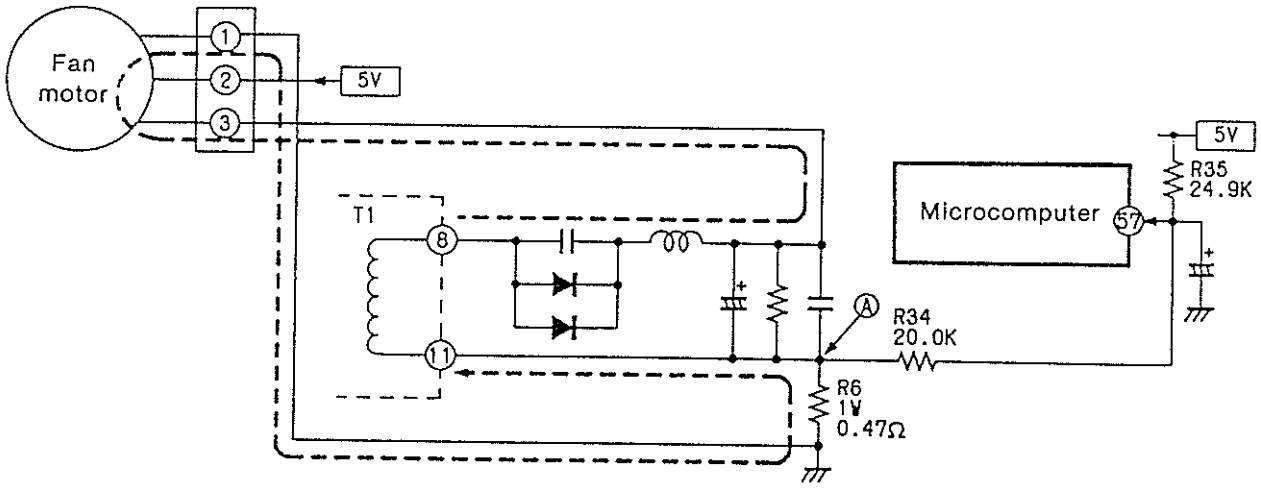
③ The pulse signal output from the microcomputer is reversed and amplified, becoming smoothed and D.C. Voltage in relation to the fan speed.
In order to amplify this voltage to a value which can control the motor, it is first pulsed, then becomes motor control voltage through switching source.

④ When the over current flows when the motor locked, a reset signal is input into the microcomputer, and all operation is stopped.



Construction of Electronic Circuit

[Microcomputer Re-setting Through Overcurrent Flow]



① When the voltage of the microcomputer (57) pin is reduced, the fan motor over current control works, and the microcomputer is reset and operation stopped.
It will not re-operate until the operation button is pressed.

② For example, when the motor is locked, over-current flows along this line ⇢, and as the voltage at point (A) becomes minus voltage, the microcomputer (57) pin voltage is reduced, and reset takes place.

[Servicing Tip]

◆ When everything stops immediately after start of indoor fan operation:

Turn OFF power switch, take out the connector CN-MTR, and re-operate

↓

If operation continues smoothly
(fan motor doesn't rotate)

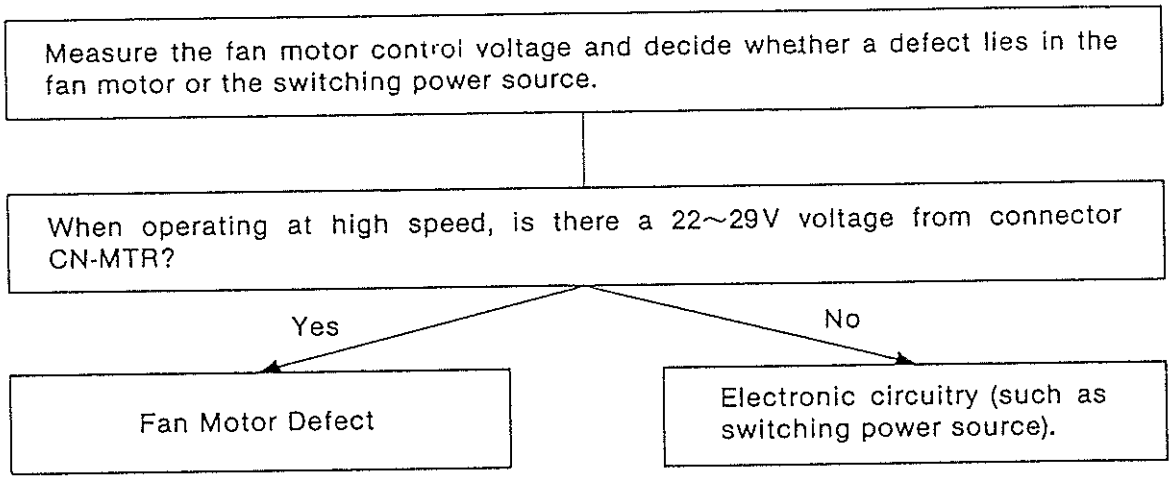
↓

Fan motor defect

(Caution)
If the connector CN-MTR is pulled out while electricity is still flowing, there is a danger of other parts being burnt.

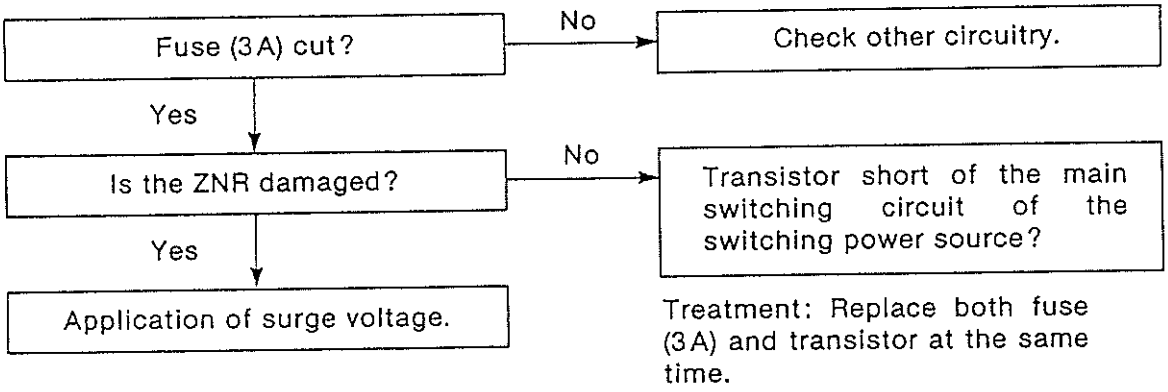
[Servicing Tip]

◆ When the Indoor Fan doesn't rotate



[Servicing Tip]

◆ When it doesn't operate at all



Treatment: Replace both fuse (3A) and transistor at the same time.

Construction of Electronic Circuit

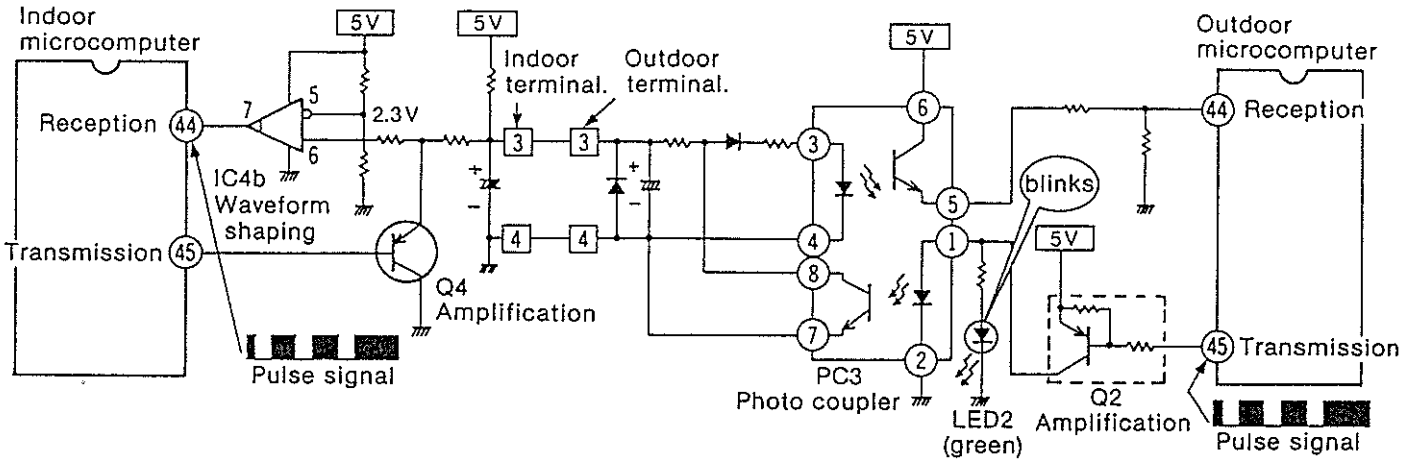
4) Data Transmission Circuit

- Summary of Operation Indication Circuit

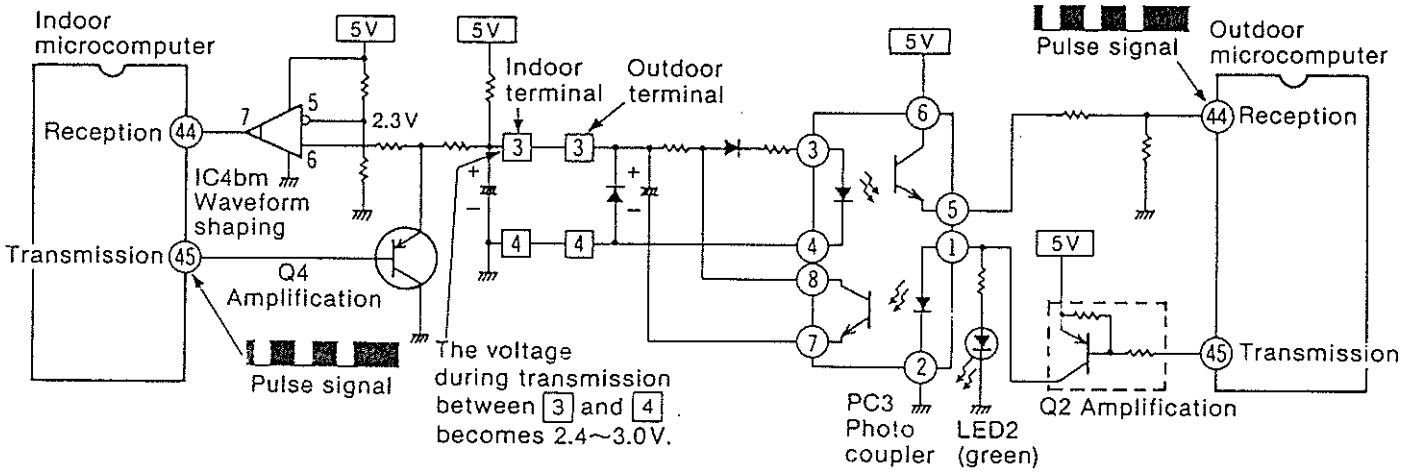
> A green LED is on the outdoor printed circuit board which indicates the fact that the data is being transmitted, blinking during data transmission.

In general signals are first transmitted from outdoors, to which the indoor unit responds.

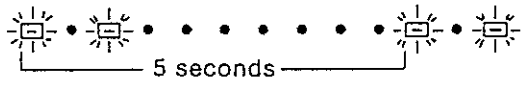
- Data Transmission From Outdoors To Indoors
  Data is transmitted from the outdoor microcomputer ㊺ pin, but as the microcomputer output electricity current is small, the transistor is used to amplify it. Next, from the photo coupler, the noise generated during power transistor switching is prevented from being transmitted indoors, and by waveform shaping with IC4b, the signal is input into the ㊹ pin in the indoor microcomputer.

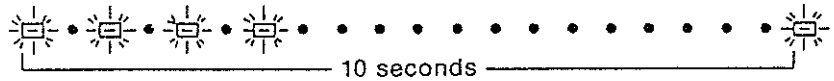


- Transmission of Data From Indoor To Outdoors
  When the signal from outdoors is received, then next, the indoor microcomputer ㊺ pin sends a signal to the outdoor microcomputer ㊹ pin.



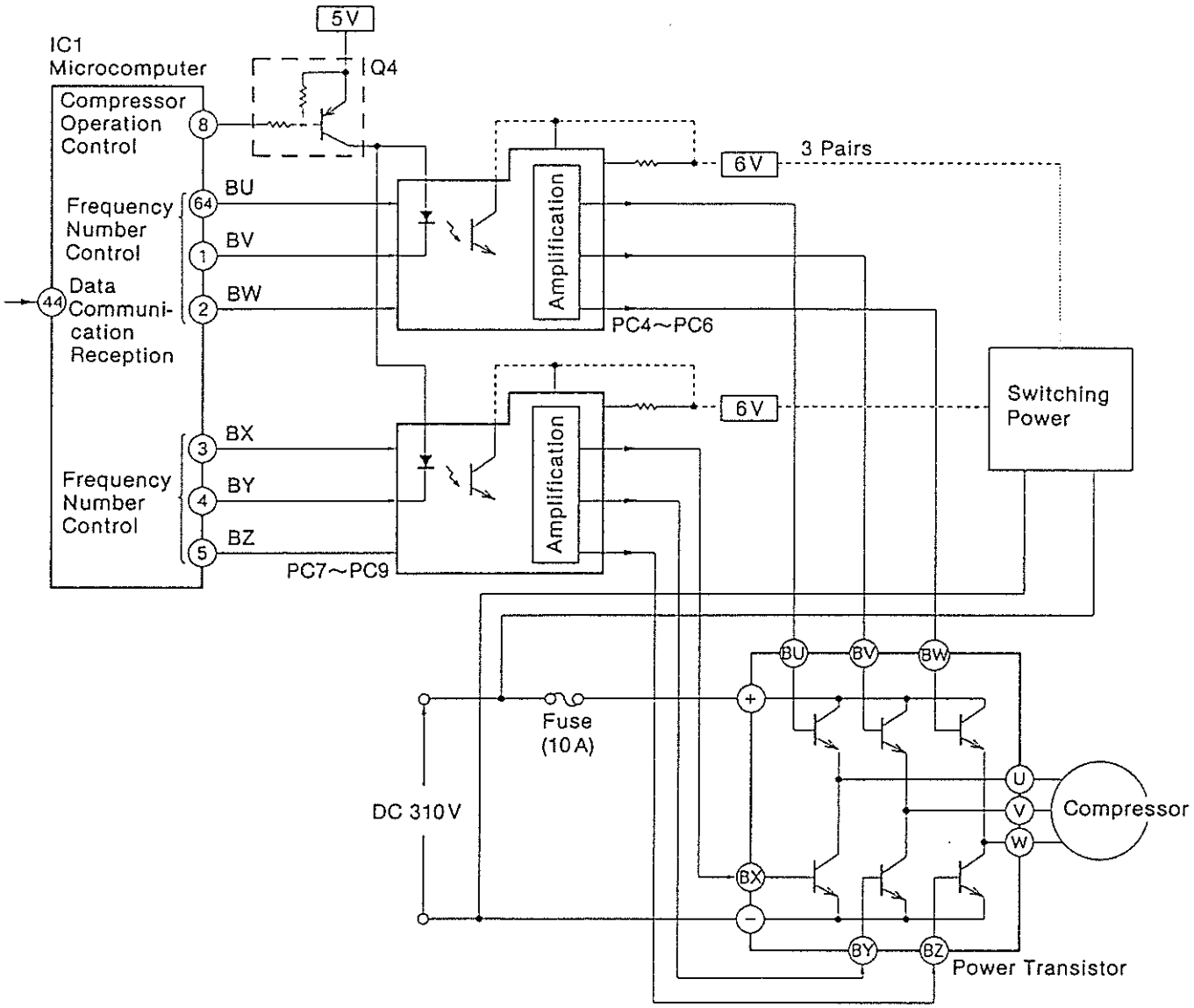
• Indication During Indoor And Outdoor Abnormal Communication
When there are abnormalities in the circuit and no data transmission takes place, the timer operation indication LED which located in the indoor unit and the outdoor print board LED both indicate an abnormality.

Indicator section name	timer operation indication LED
colour	orange
Location	Indoor unit • Operation Indicator
Abnormality Indication pattern	 5 seconds — Starts indicating after 1 minute operation

Indicator section name	Protection Indicaton LED	LED 1
colour	Red	
Location	Outdoor printed circuit board	
Abnormality Indication pattern	 10 seconds	

Construction of Electronic Circuit

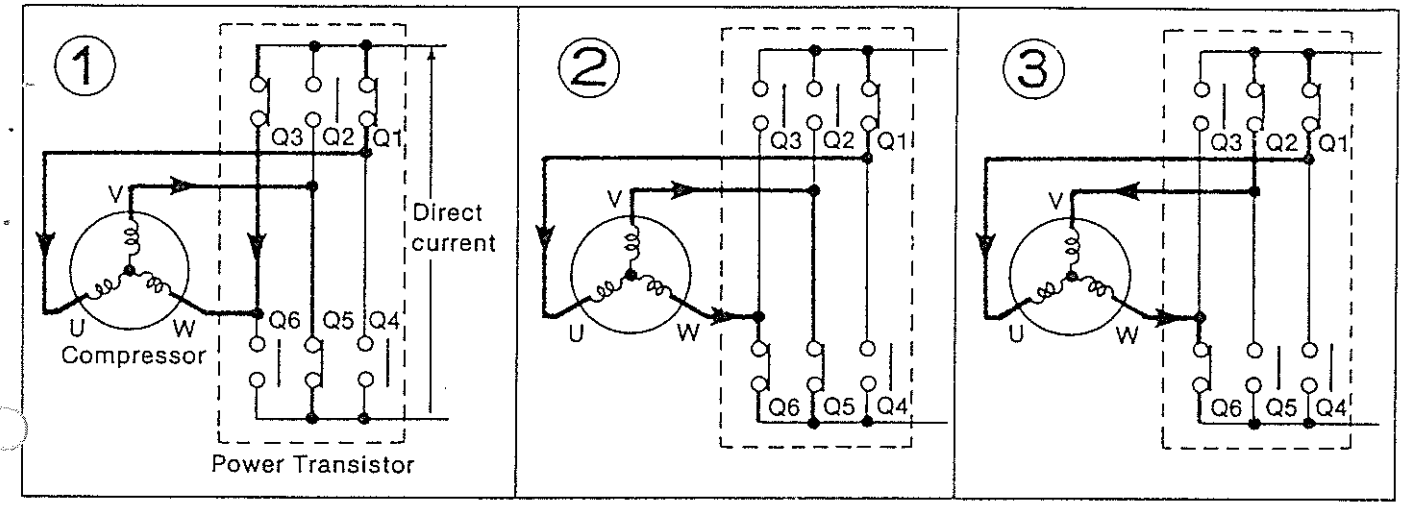
5) The Control Signal From The Microcomputer To The Power Transistor
[The workings behind the circuitry]

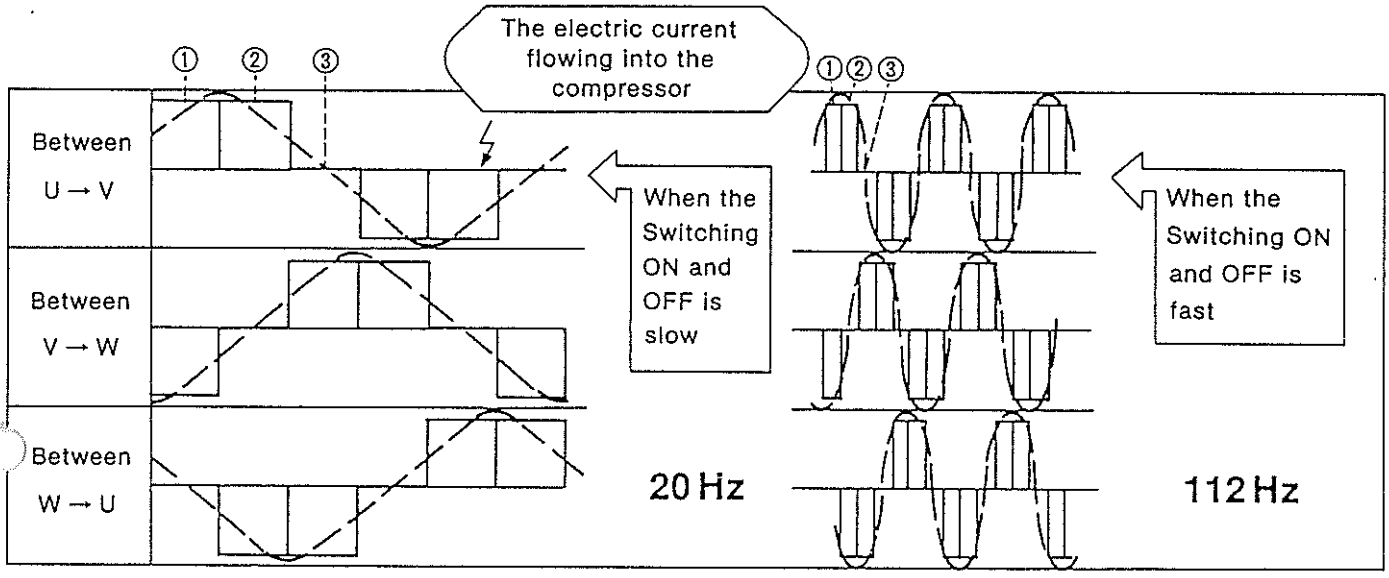


- When a "compressor ON" command enters the outdoor microcomputer through the data transmission circuit from indoors, first the microcomputer ⑧ pin becomes 0V, then the Q4 comes on, and a receipt possible mode occurs for the power transistor control signal from the microcomputer which is transmitted to the photo coupler.
- Next, the signal controlling the power transistor is output from the ㊹, ①, ②, ③, ④, ⑤ pins of the microcomputer. This signal is amplified by the photo coupler and is entered into the power transistor.
  When this signal is transmitted, approximately 2.4 volts is appeared from six terminals of the microcomputer (5V at time of stoppage).

6) The Workings Behind Creating 3 Phase AC

- 3 phase AC is created by switching 3 switches of the power transistor on at once by micro-computer control.



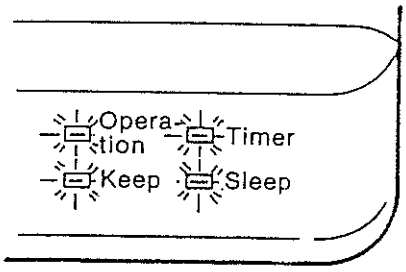


Construction of Electronic Circuit

7) DC Peak Detection Circuitry

[What is a DC Peak]

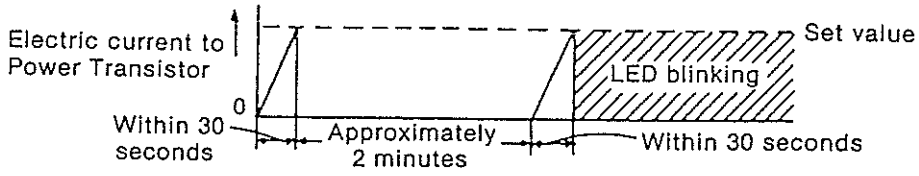
When over current is flowing to the compressor or power transistor, then to protect these parts, all operation is stopped, and the indoor operation indicator LED's all blink to indicate the abnormality. ...this is called a "DC PEAK" DC Peake means that the direct current flow has exceeded the peak.



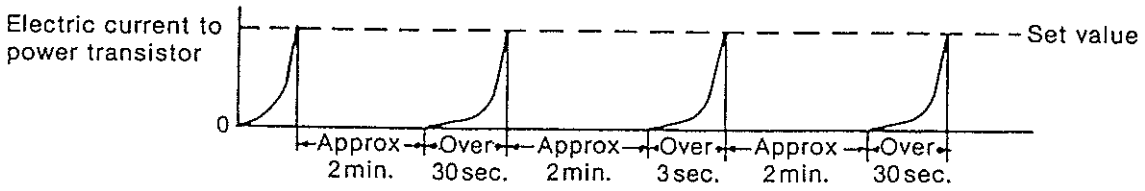
[Summary of Circuit Operation]

① When the electric current to the power TR exceeds the set value, the compressor is stopped and the outdoor printed circuit board Protection Indication LED (red) starts blinking.

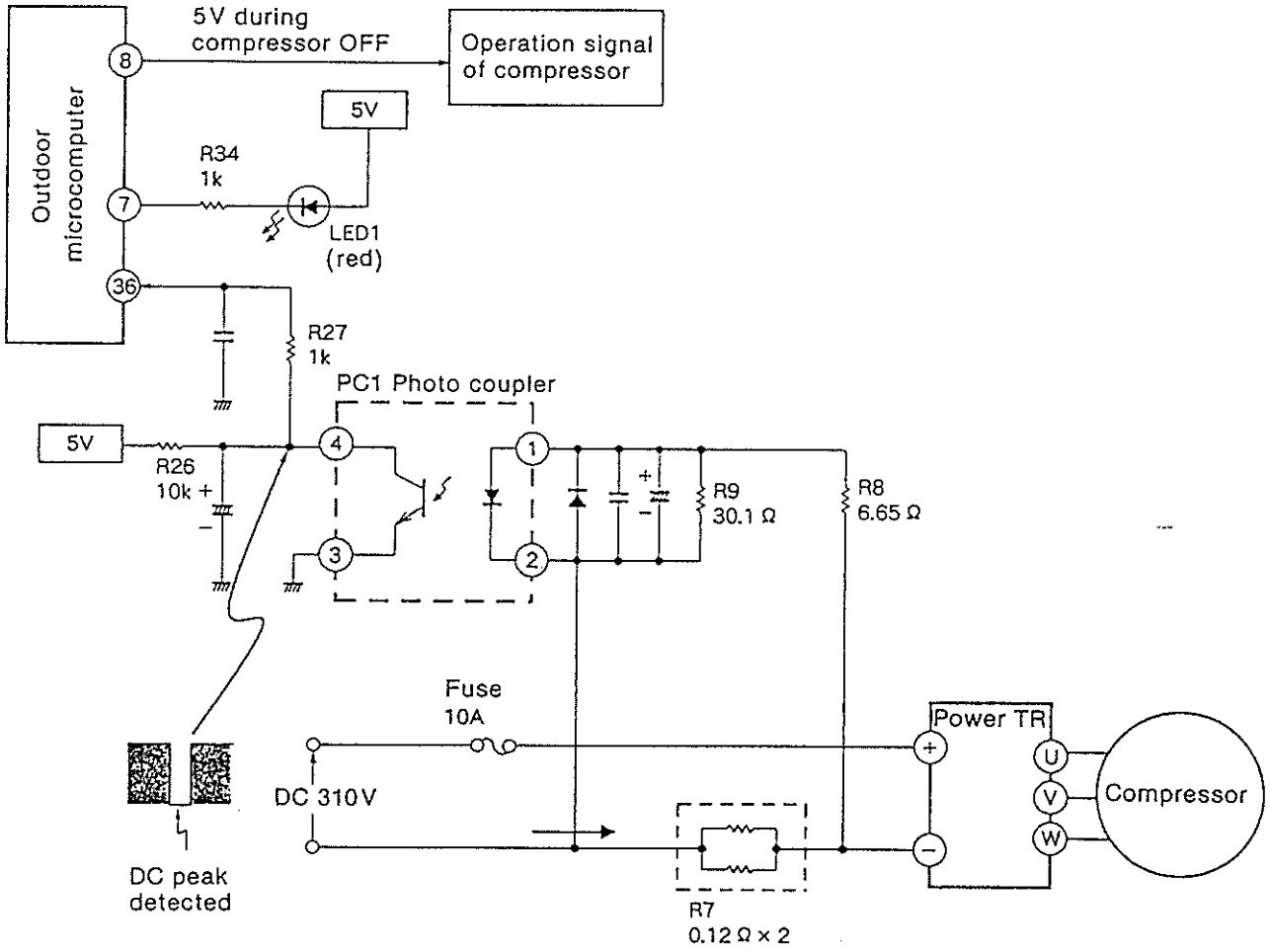
- If the set value is exceeded for a period of 30 seconds after re-start of operation, then both indoor and outdoor operation are stopped, and the indicator LED starts blinking.
- This operation will continue as long as the power switch is not OFF → ON and reset.



② When the set value is exceeded after 30 seconds after re-start of operation, the indoor operation indicator does not start to blink and instead, after a 2 minute rest-from-operation, re-start is repeated. During compressor stopping, the outdoor printed circuit board Protection Indication LED (red) blinks.



[Workings of Circuitry]



① When the → flowing electric current exceeds the set value, as the voltage of both ends of the resistor R7 increases, and the primary voltage of the photo coupler PC1 increases, it goes ON, and in the secondary side of the photo coupler, instantly becomes 0V.

② When this signal enters the microcomputer ㊱ pin, the microcomputer judges that it is a DC peak.

③ At this time, the microcomputer ⑧ pin becomes 5V, and immediately stops compressor. Through the signal from the microcomputer ⑦ pin, during stopping of compressor, the LED 1 (red) keeps blinking once every 10 seconds.

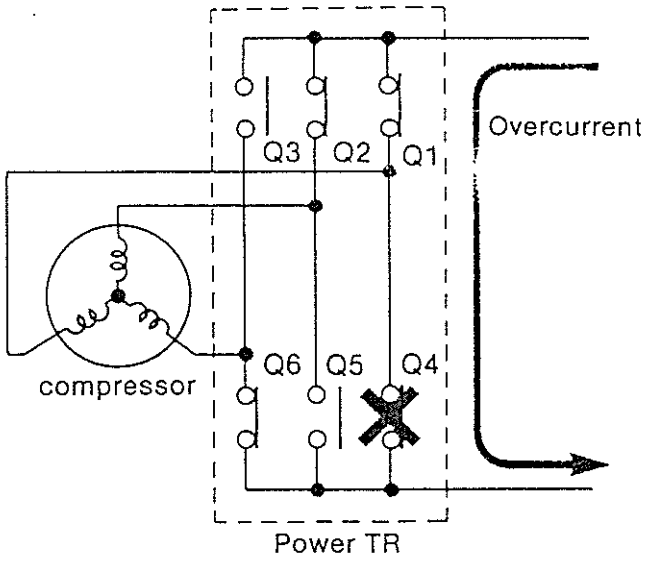
Construction of Electronic Circuit

[Major Reasons For DC Peak]

[Symptom 1]

The compressor doesn't operate at all, and Indoor operation indicator showns abnormality 2 minutes after start of operation.

① A Power TR short due to outdoor electronic circuit defect
- Diode defect (on the P.C. Board) → power TR short



[Symptom 2]

The compressor operates for a few minutes, stopping now and then.
(When the compressor stops, the LED (Red on the outdoor printed circuit board starts to blink)
If the symptom progresses, the indoor may start to indicate abnormality.

① Outdoor electronic circuit defect
- amplification IC defect
- diode defect (on the P.C. Board)
- defect in microcomputer

② Excessive Amount of Refrigerant

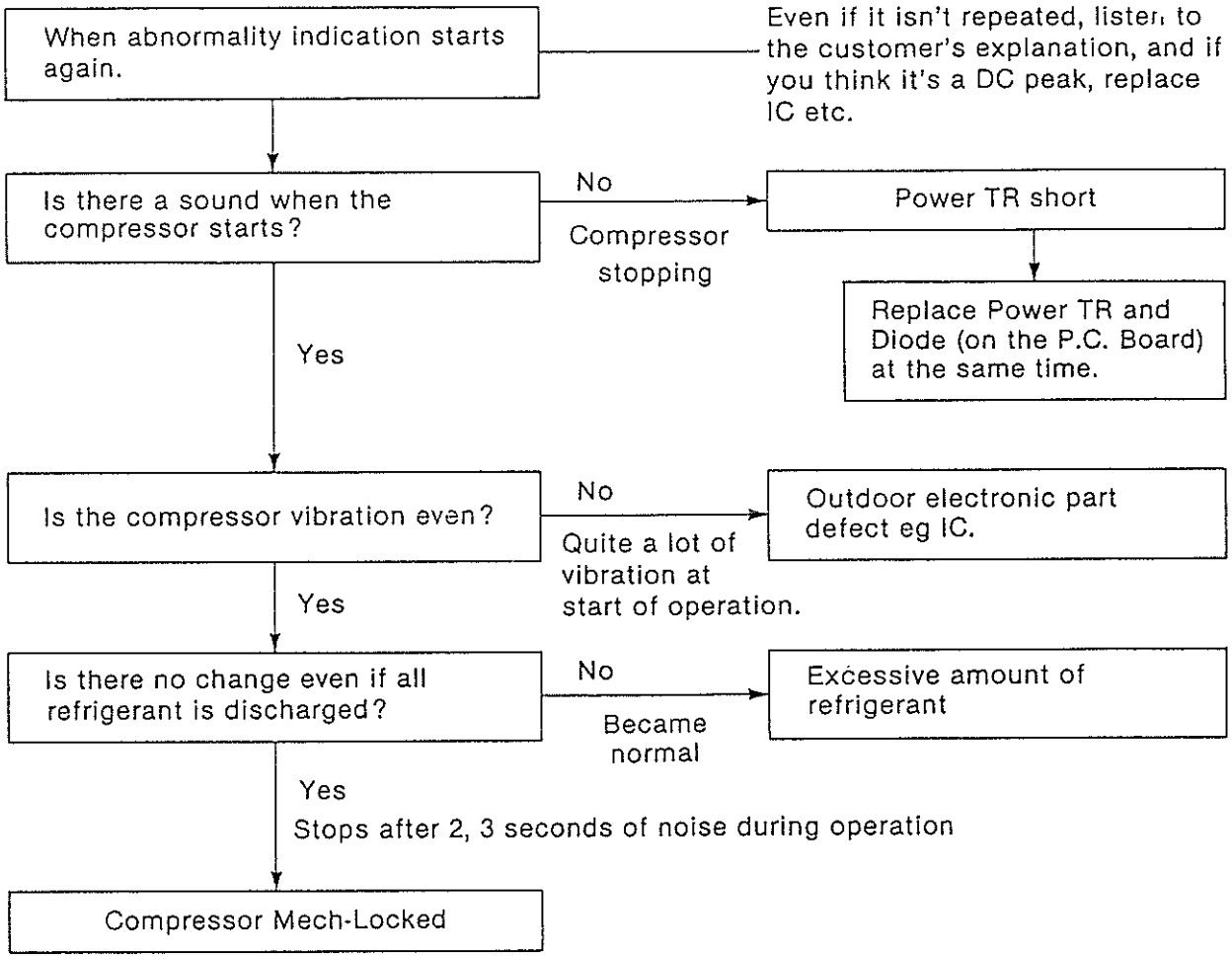
③ Heating operation while the 2-way value or 3-way valve are closed.

[Symptom 3]

When the compressor operation sound continues for 2 to 3 seconds then stops, then the indoor display lamp indicates abnormality after 2 minutes.
- compressor mecha-locked

(DC Peak Causes Lie in the Outdoor Side)

Servicing Tip — Checking Procedure of DC Peak



Easy Checking Method

If DC Peak continues even after removing the terminal (U, V, W) which connects the Power TR and the compressor.

↓

Power TR short

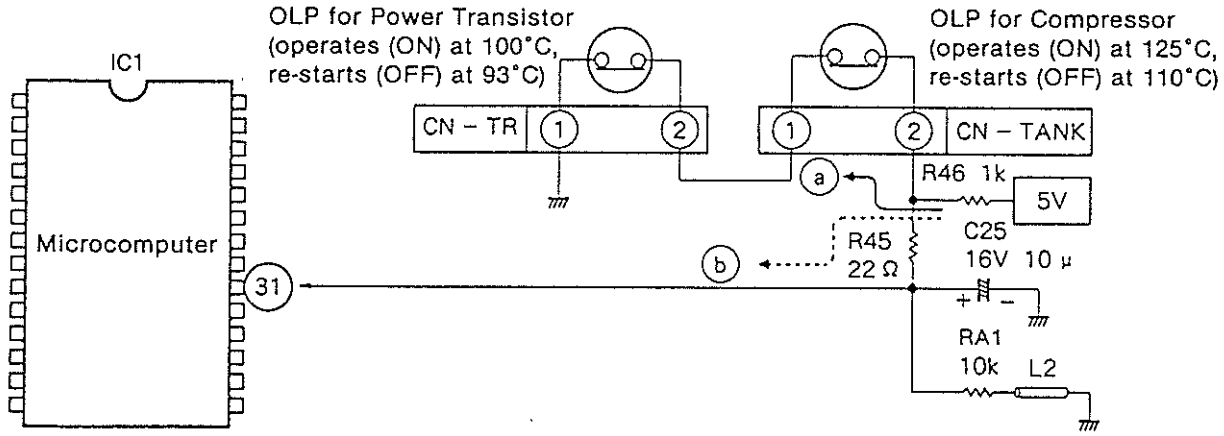
Construction of Electronic Circuit

8) Over Current Relay Operation

[Operation Detail]

When the temperature of the compressor exceeds 125°C, or when the power TR temperature goes over 100°C, then the Over-Heating relay goes into operation. stopping the compressor and the outdoor Protection Indication LED starts blinking. At this time, the Indoor printed circuit boards's compressor Operation Indication LED (orange) is off.

[Summary of Circuit Operation]



① When the Over Current Relay (OLP) is not in operation, the current flows as shown in ⓐ and signal is not input into the microcomputer.
② When the Over Current Relay goes into operation, the electricity flows as in ⓑ and signal input into the microcomputer.

[The Cause behind Over Current Relay operation]

- When the unit operates in a gas-leak condition, the compressor temperature rises, and the over current relay may go into operation
- Inproper heat radiation (The Heat Exchanger is soiled, or a object is present in front of air discharge grille of outdoor unit)
- When the unit is operated during cooling mode with the outdoor fan off.
- When the unit is operated during heating mode with the indoor fan off.

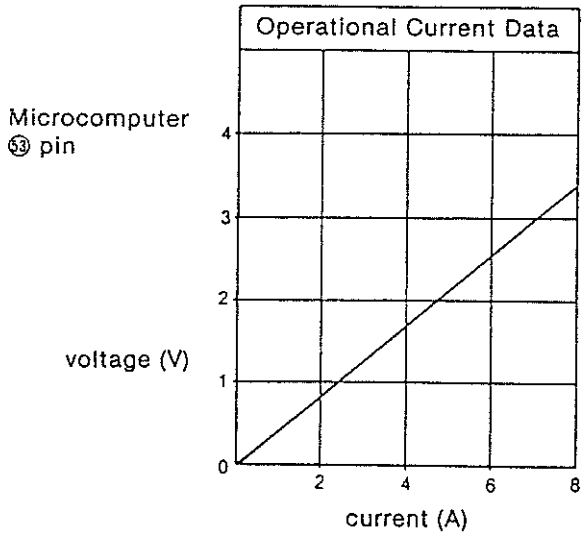
9) Total Running Current

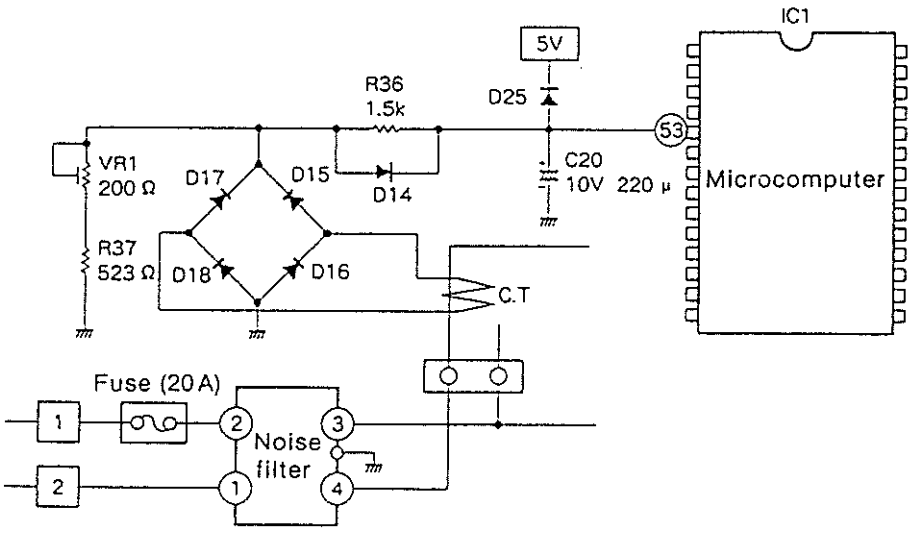
[Operation Details]

- During cooling — If the outdoor unit electricity current exceeds 5.7 A, frequency is lowered by rank. Electric current is detected every 30 seconds, and if it is below 5.7 A, the frequency is increased by a rank. If it is exceeds 7.65 A then the compressor is stopped.
- During heating — If the Outdoor unit electric current exceeds 6.5 A, the frequency is reduced by a rank. Then, every 30 seconds, an electric current is detected, and if it is below 6.5 A then the frequency is increased by a rank. If it is over 7.65 A then the compressor is stopped.
- When this control goes into operation and terminates the compressor, then the outdoor printed circuit board Protection Indication LED (red) starts to blink. At this time, the outdoor printed circuit board Compressor Operation Indication LED (orange) is on.

[Summary of Circuit Operation]

- The outdoor unit current (alternating current) is detected with C.T. and converted to voltage. This signal, once it is rectified through the bridge diode, is smoothed with the capacitor C20, and as a direct current, is input into the microcomputer ㊸ pin.
- The alternating current and the microcomputer input voltage is described to the right.





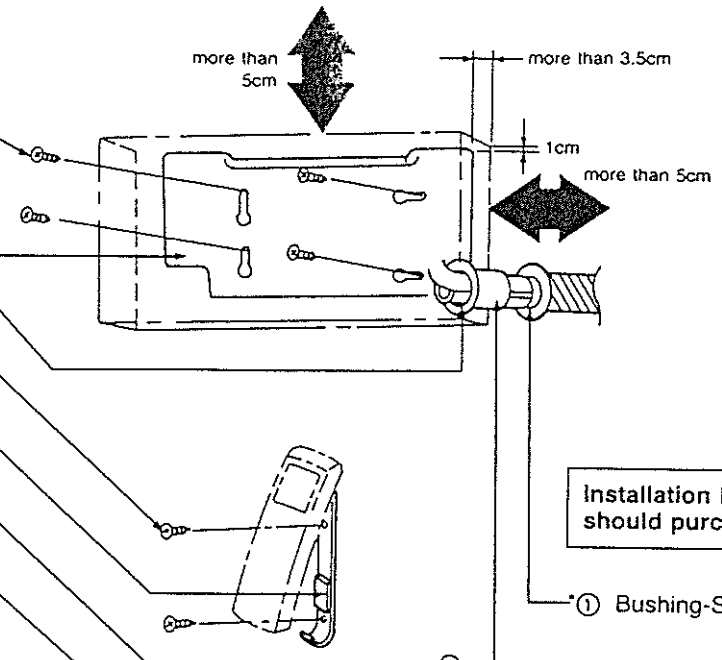
[The Reason for the Total Running Current Control Working]

- Power source voltage drops
- Excessive amout of refrigerant
- Inproper heat radiation

Installation

Installation Parts Provided

① Type "A" Screw
② Installation Plate
③ Drain hose insulated
④ Type "B" screw
⑤ Holder Remote-Controller
⑥ Insulation material
⑦ Plastic band



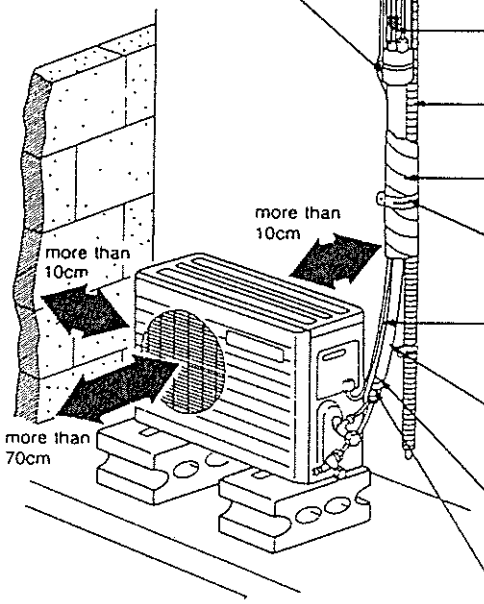
Installation Parts you should purchase

*① Bushing-Sleeve
*② Sleeve
*③ Putty (Gum Type Sealer)
*④ 1/4" copper pipe (Liquid slide)
*⑤ 3/8" copper pipe (Gas side)
*⑥ Additional drain hose
*⑦ Vinyl tape (Wide)
*⑧ Saddle
⑨ Connecting Cable (5-core wire/3.5mm²)
*⑩ Insulation material (for Gas side piping)
*⑪ Insulation material (for Liquid side piping)
*⑫ Vinyl tape (narrow)

Accessories Flaring piping kit

CZ-3F3, 5, 7AEP
Contents

① Bushing-Sleeve
② Sleeve
③ 1/4" flared pipe with insulation
④ 3/8" flared pipe with insulation
⑤ Additional Drain hose
⑥ Vinyl tape (wide)
⑦ Saddle (6 pieces)
⑧ Screw-Saddle (6 pieces)
⑨ Vinyl tape (narrow)
⑩ Putty (Gum Type Sealer)



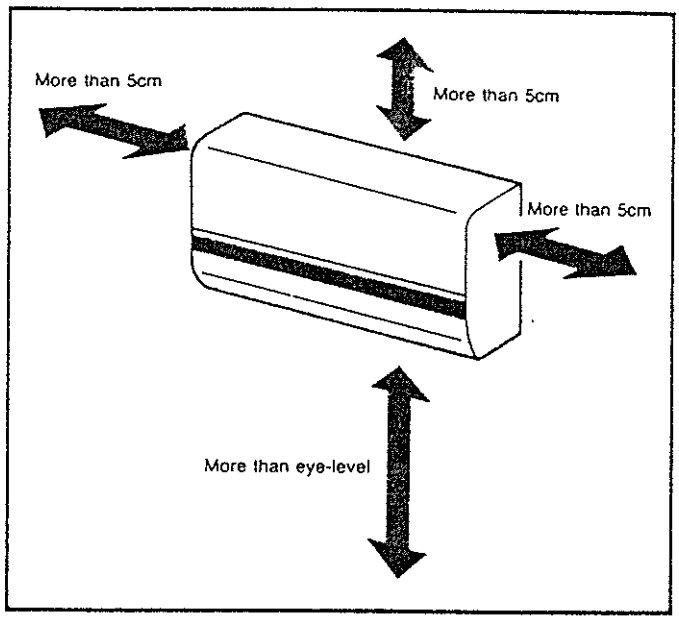
Out-line of Installation

Installation works	Installation Parts	Required tools
1. Installation of Indoor , Outdoor unit		
1) Selection of the best location ..Page 57 2) Indoor unit Installation.....Page 58	• Installation Plate • Four Type "A" screws • Connecting cable (5-core wire/3.5mm^2)	• a level • Phillips screw driver • Electric drill, hole core drill. (ϕ70mm) • Side cutter or Electrical plires
2. Piping and Drainage of Indoor unit		
1) Preparation of Pipings .....Page 59 2) Connection of Pipings.....Page 60~61 For the left pipings.....Page 61~64	• Pipes: Gas side ..... 3/8" Liquid side ..... 1/4" • Drain hose insulated • Insulation materials *(CZ-3F3, 5, 7AEP)	• Flaring Tools set • Specified Torque Wrenches 1.8kg·m...Liquid side piping 4.2kg·m...Gas side piping Spanner...Half union
3. Connecting Pipings and the cable to Outdoor unit		
1) Connection of Pipings..... Page 65 2) Connection of the cable..... Page 65	• Additional Drain hose (Outer Dia....15.5mm)	• Specified Torque Wrenches 1.8kg·m...Liquid side piping 4.2kg·m...Gas side piping
4. Air Purging of the Pipings and Indoor unit		
1) Air Purging..... Page 66 2) Checking a gas-leakage Page 66~67	• Insulation Material provided • Plastic Band provided	• Hexagonal Wrench (4mm) • Gas-leak Detector
5. Checking the Drainage and Connecting the cable to Indoor unit		
1) Checking the Drainage..... Page 68 2) Connecting the Cable..... Page 69 3) Form the pipings..... Page 69		• a glass of water • Phillips screw driver
6. Test running		
1) Connection of Power Supply..... Page 70 2) Evaluation of the Performance ..... Page 70	• Two Type "B" screws	• Circuit Breaker or Time Delay fuse (Consult an Electrician) • Operating Instructions • Thermometer

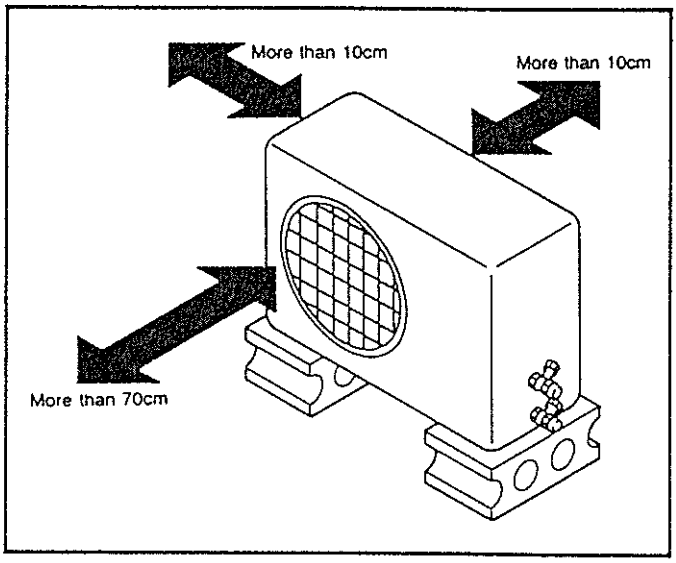
1 Installation of Indoor, Outdoor unit

1) Select the best location

1. Indoor unit
   - There should not be any heat source or steam near the unit.
   - There should not be any obstacles to prevent the air circulation.
   - A place where air circulation in the room will be good.
   - A place where drainage can be easily obtained.
   - A place where noise prevention is taken into consideration.
   - Do not install the unit near the door way.
   - Ensure the spaces indicated by arrows from the wall, ceiling, fance, or other obstacles.

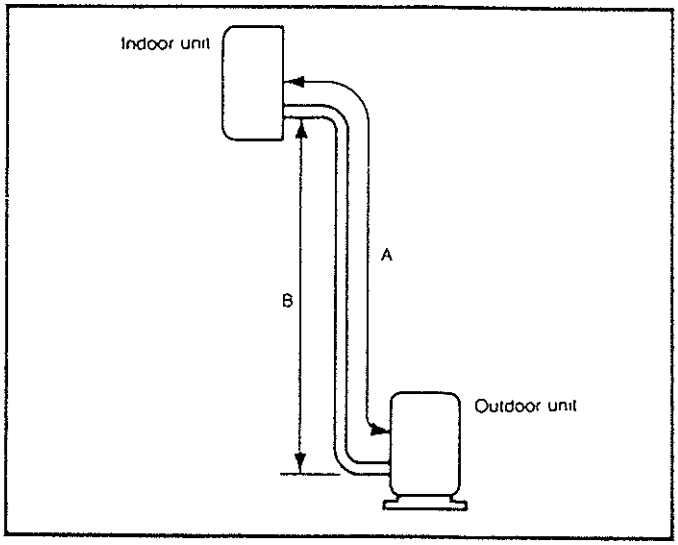


2. Outdoor unit
   - If an awning is built over the unit to prevent direct sunlight or rain exposure, be careful that heat radiation from the condenser is not restricted.
   - There should not be any animals or plants which could affected by hot air discharged.
   - Ensure the spaces indicated by arrows from the wall, ceiling, fance, or other obstacles.



3. Piping length and the elevation

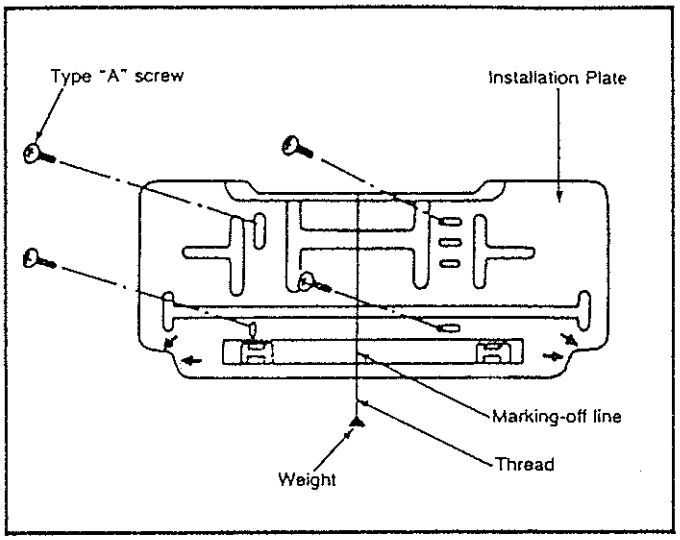
Model	Pipe Size		Max. piping length Ⓐ (m)	Max. Elevation Ⓑ(m)
	GAS	LIQUID		
CS-971KE	3/8"	1/4"	7	5



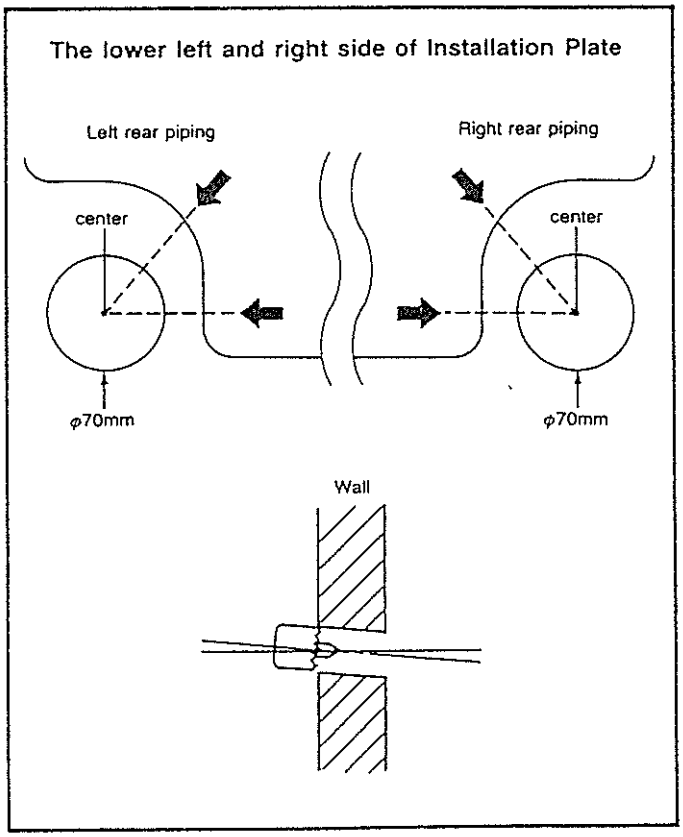
2) Indoor unit Installation

The mounting wall is strong and solid enough to prevent it from the vibration.

1. **Mount the installation plate on the wall with four Type "A" screws.**
   (if mounting the unit on the concrete wall, consider using anchor bolts.)
   - Always mount the Installation Plate horizontally by aligning the marking-off line with the thread and using a level.



2. **Drill the piping hole with 70mm dia. hole-core drill.**
   - Line according to the arrows marked on the lower left and right side of the Installation Plate.
     The meeting point of the extended line is the center of the hole.
   - Drill the Piping hole at either the right or the left and the hole should be slightly slant to the outdoor side.

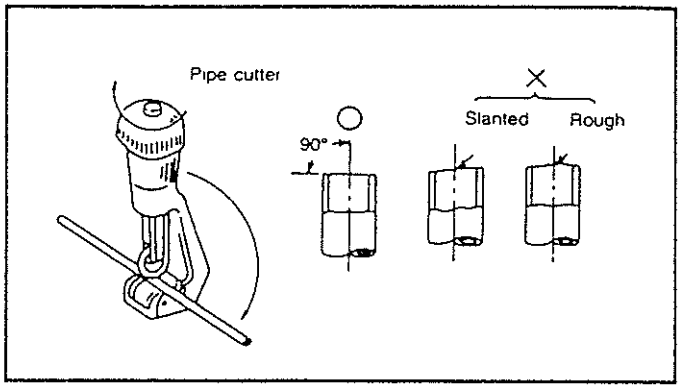


2 Piping and Drainage of indoor unit

1) Preparation of pipings

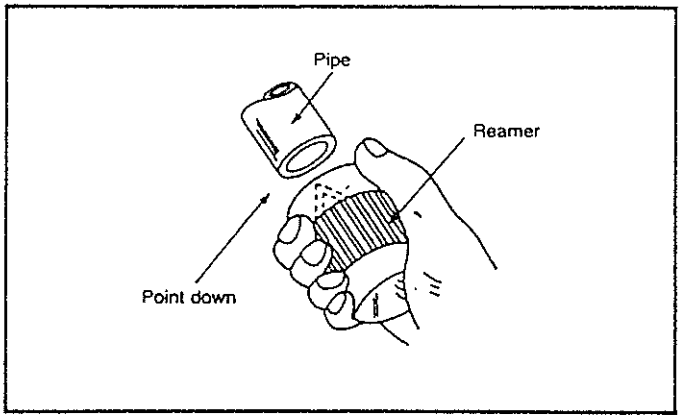
1. Cut the pipes and the cable
   - Use the accessory piping kit or the pipes purchased locally.
   - Measure the distance between the indoor and the outdoor unit.
   - Cut the pipes a little longer than measured distance.
   - Cut the cable a 1.5m longer than the pipe length.

Model	Pipe Size	
	GAS	LIQUID
CS-971KE	3/8"	1/4"

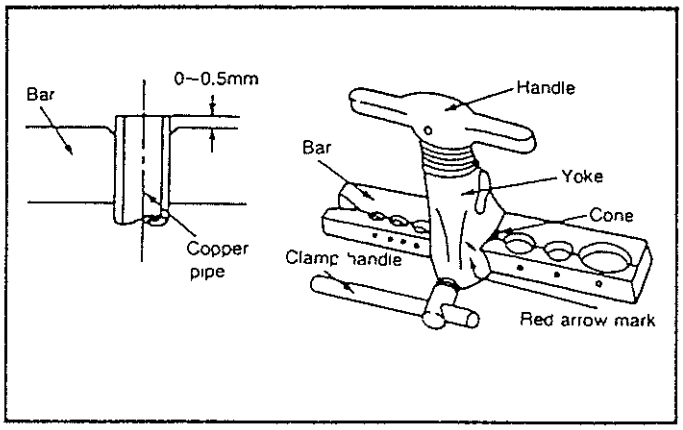


2: Remove burrs
   - Remove burrs from cut edges of pipes.
   - Turn the pipe end down to avoid the metal powder entering the pipe.

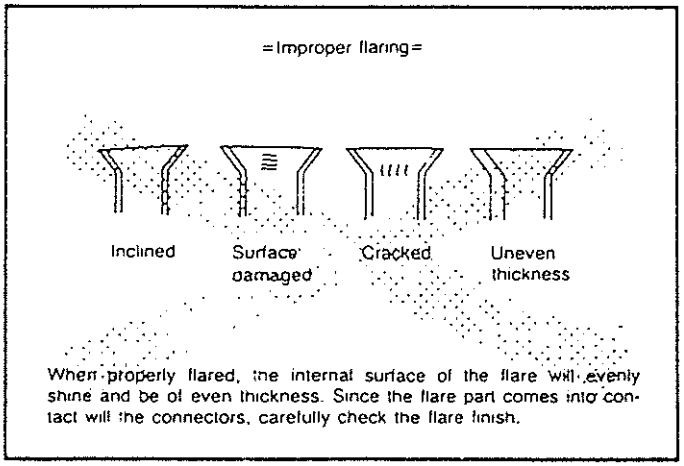
Caution:
If burrs are not removed, they may cause a gas leakage.



3. Flaring the pipes
   - Insert the flare nuts, mounted on the connection ports of both indoor and outdoor unit, onto the copper pipes. Some refrigerant gas may leak, when the flare nuts are removed from the indoor unit, as some gas is charged to prevent the inside of the pipe from rusting.
   - Fit the copper pipe end into the Bar of flare tool about 0-0.5mm higher. (See illustration.)
   - Flare the pipe ends.

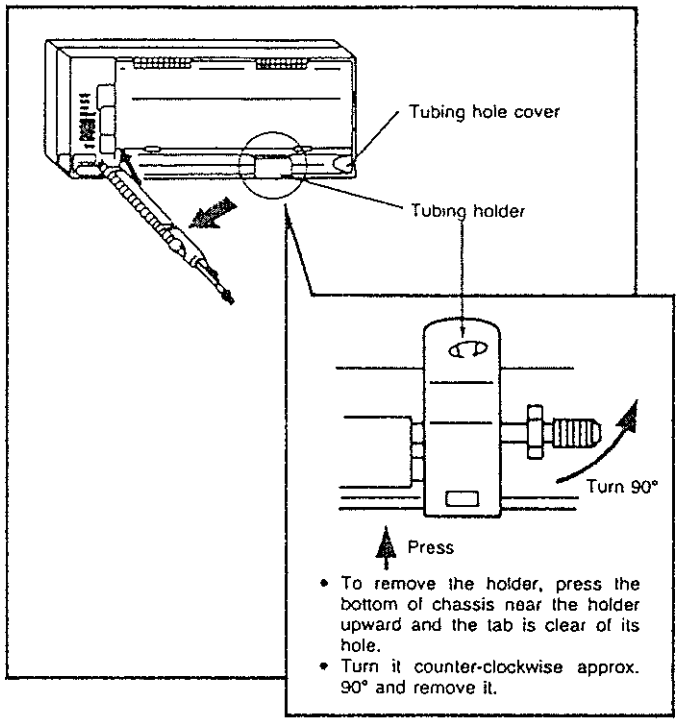


4. Tape the flaring portion to protect it from the dust or damages.



2) Connection of Pipings

1. Remove the indoor tubing with Drain hose to the hole.
   - Remote tubing holder and pull the tubing out the chassis.



For right rear piping

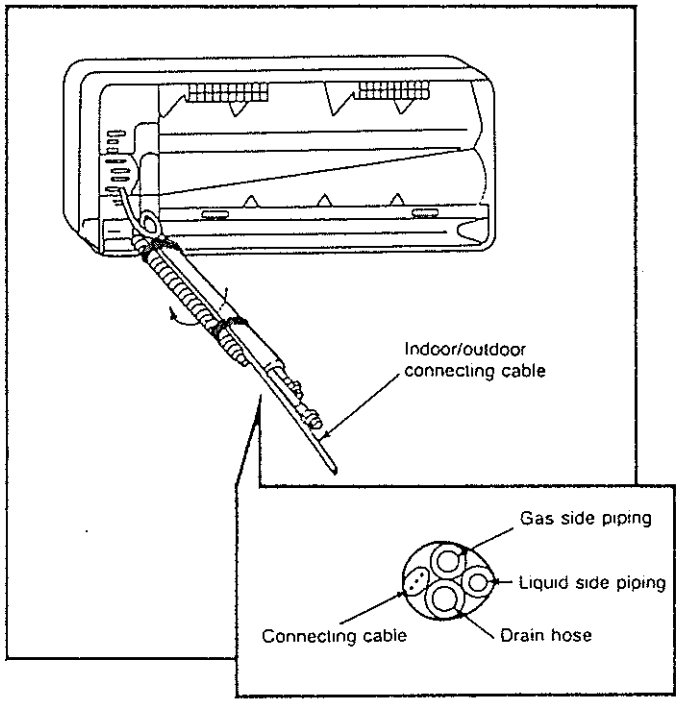
2. Replace the tubing holder into original position.

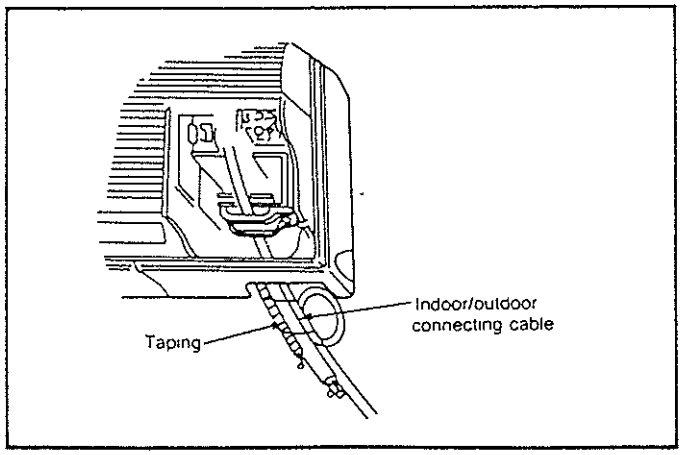
In case of the left piping, refer Page 61~64.

3. Route the tubing and the drain hose straight backwards.

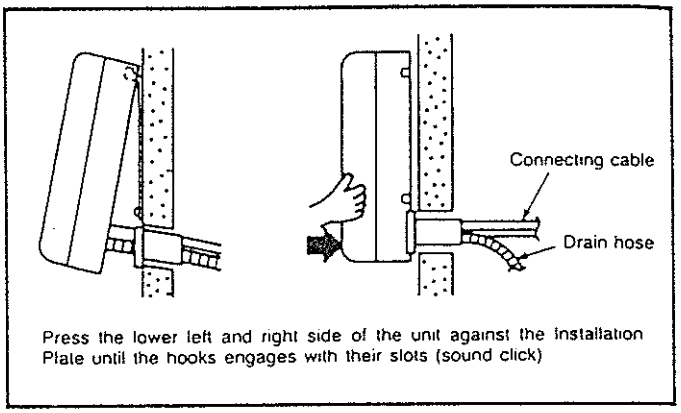
4. Insert the connecting cable into the indoor unit through the hole.
   * Do not connect the cable to the indoor unit.
   * Make a small loop with the cable for easy connection later.

5. Tape the tubing, drain hose and the connecting cable.





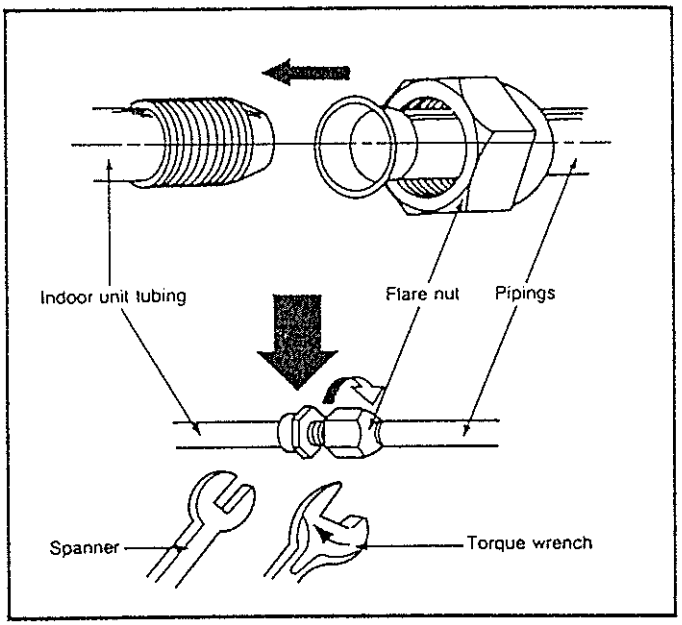
6. Indoor unit installation.
   - Hook the indoor unit onto the upper portion of installation plate. (Engage the two hooks of the rear top of the indoor unit with the upper edge of the installation plate.)
     Ensure the hooks are properly seated on the installation plate by moving it in left and right.



Press the lower left and right side of the unit against the installation Plate until the hooks engages with their slots (sound click)

7. Connecting the pipings to the indoor unit
   - Align the center of the pipings and sufficiently tighten the flare nut with fingers.
   - Finally, tighten the flare nut with torque wrench until the wrench clicks.
     When tightening the flare nut with torque wrench, ensure the direction for tightening follows the arrow on the wrench.

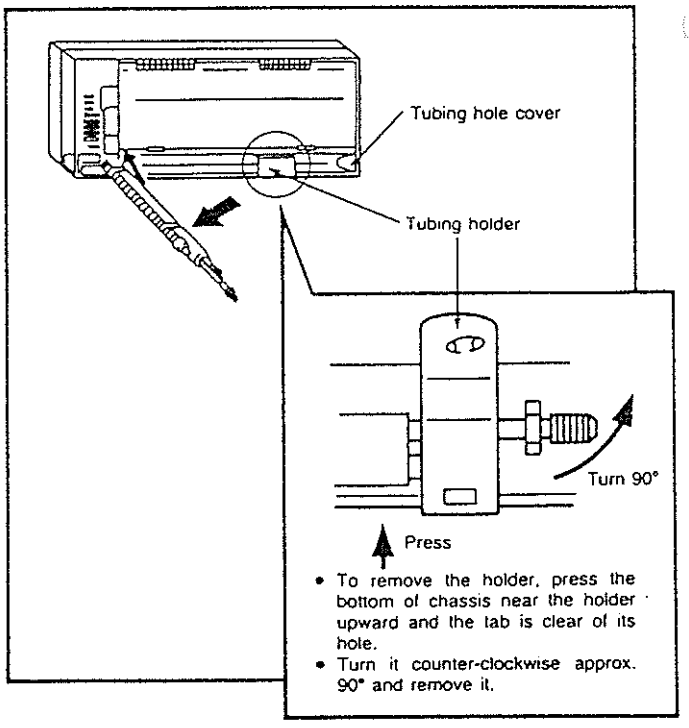
Pipe Size	Torque
Liquid Side 1/4"	1.8 kg·m
Gas Side 3/8"	4.2 kg·m



For the left pipings

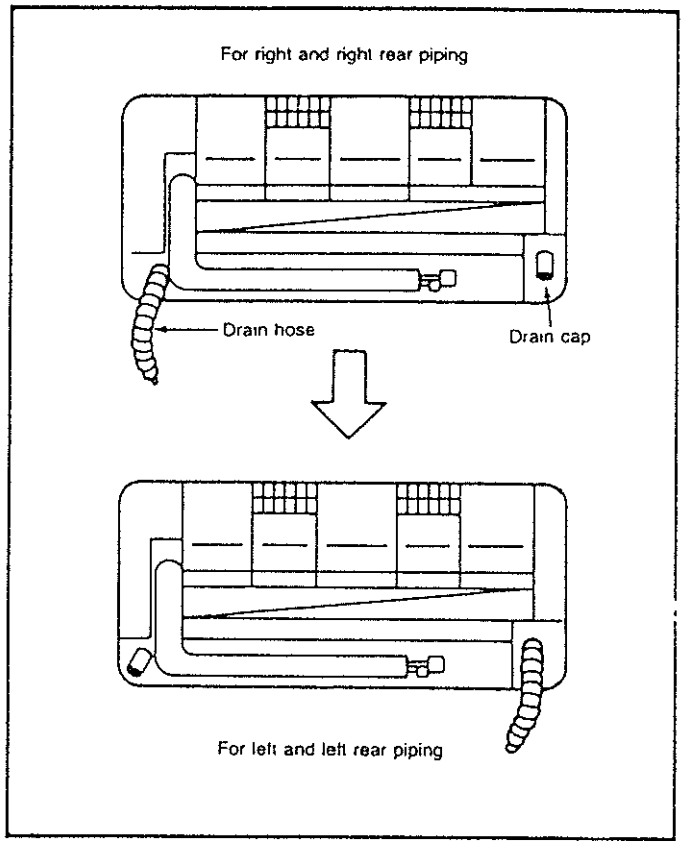
1) Route the indoor tubing with the drain hose to the hole.

1. Remove tubing holder and pull the tubing out the chassis.

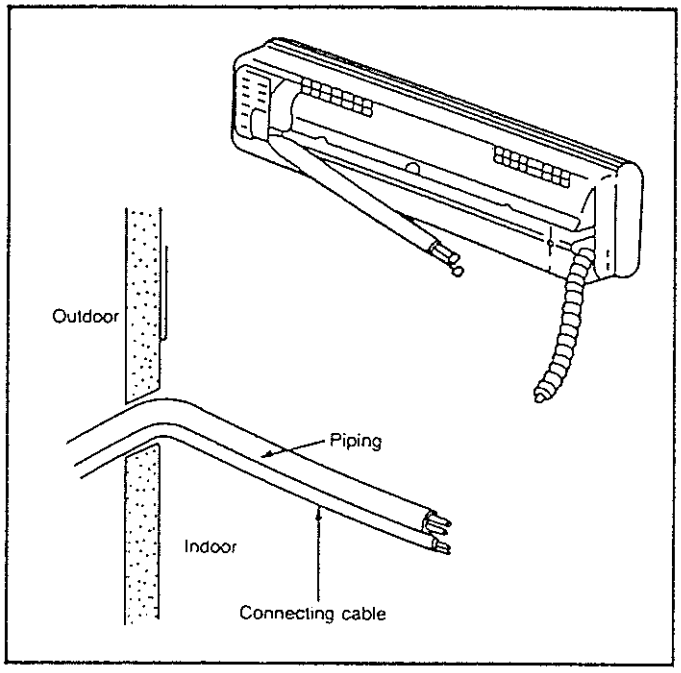


- To remove the holder, press the bottom of chassis near the holder upward and the tab is clear of its hole.
- Turn it counter-clockwise approx. 90° and remove it.

2. Exchange the Drain hose and the cap.

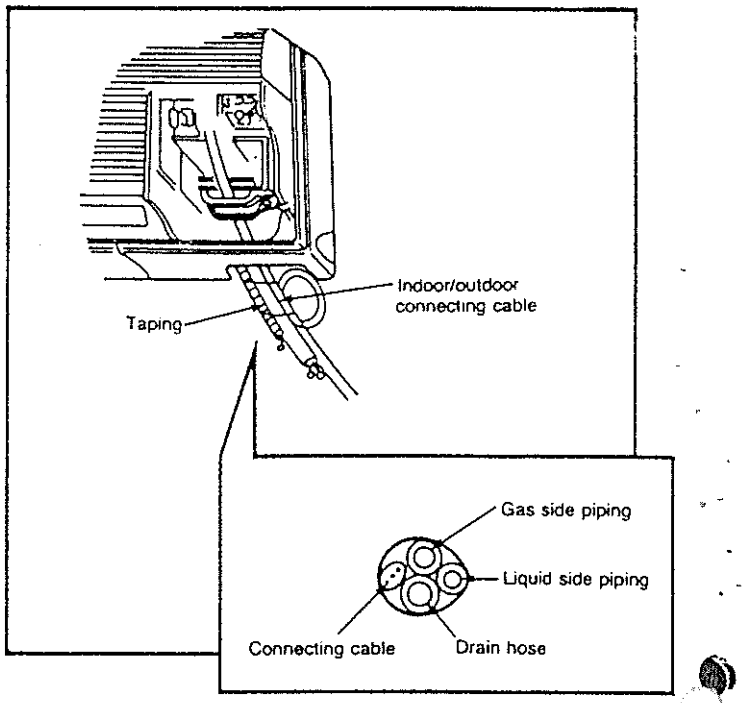


3. Insert the pipings and connecting cable to indoor side through the hole.



4. **Insert the connecting cable into the indoor unit**
   * Do not connect the cable to the indoor unit.
   * Make a small loop with the cable for easy connection later.

5. **Tape the tubing, drain hose and the connecting cable.**

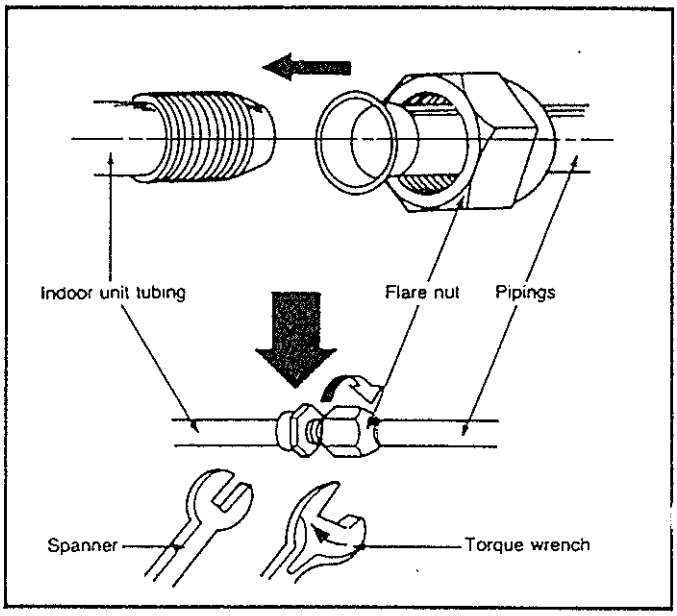


2) Connecting the pipings to the Indoor unit

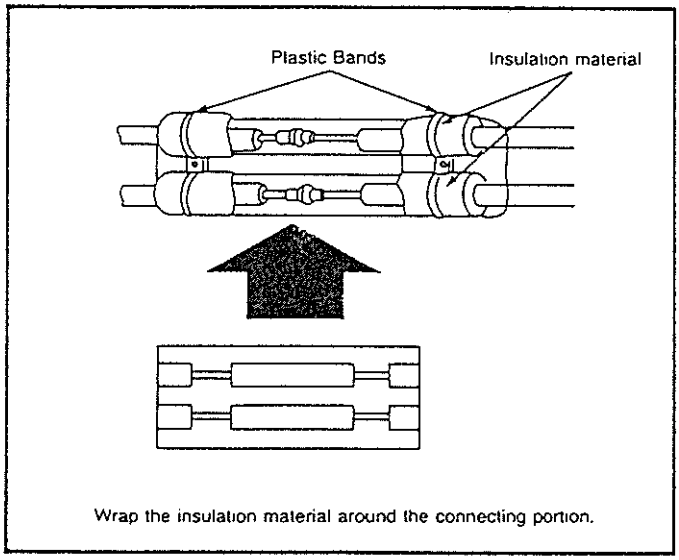
1. **Align the center of the pipings and sufficiently tighten the flare nut with fingers.**

2. **Finally, tighten the flare nut with torque wrench until the wrench clicks.**
   - When tightening the flare nut with torque wrench, ensure the direction for tightening follows the arrow on the wrench.

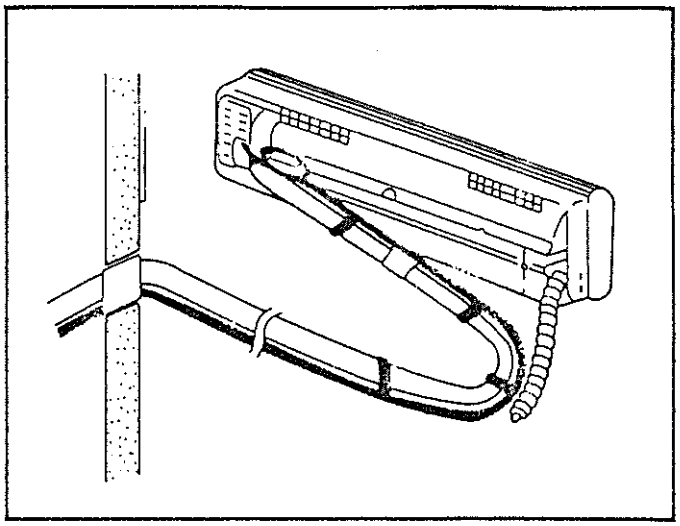
Pipe Size	Torque
Liquid Side 1/4"	1.8 kg·m
Gas Side 3/8"	4.2 kg·m



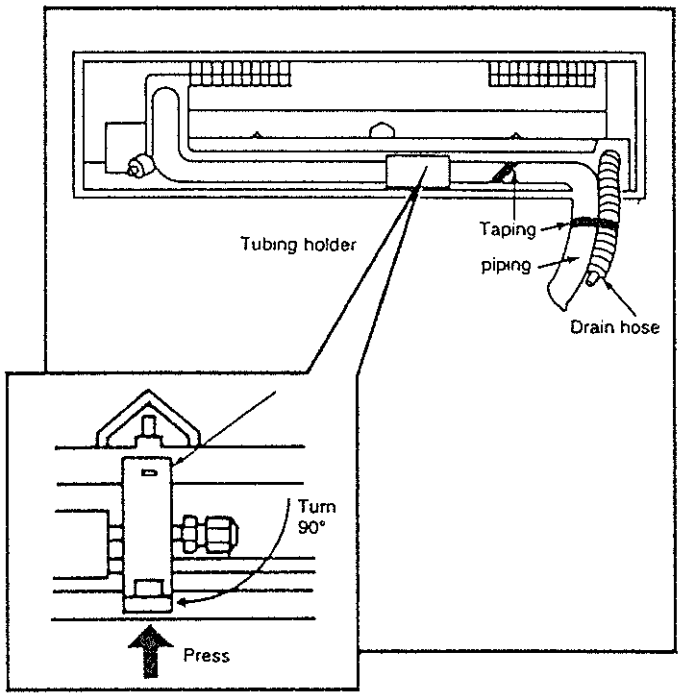
3. **Wrap the insulation material around the connecting portion.**



4. **Set the pipings and the connecting cable to the back of the chassis with the tubing holder.**

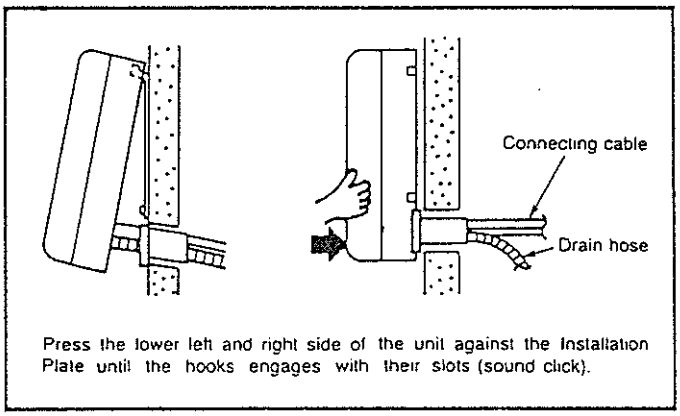


- Turn 90° in the direction of the arrow, push up on the bottom of chassis frame, and affix the tubing holder.



. Indoor unit installation

- Hook the indoor unit onto the upper portion of installation plate. (Engage the two hooks of the rear top of the indoor unit with the upper edge of the installation plate.)
  Ensure the hooks are properly seated on the installation plate by moving it in left and right.



Press the lower left and right side of the unit against the Installation Plate until the hooks engages with their slots (sound click).

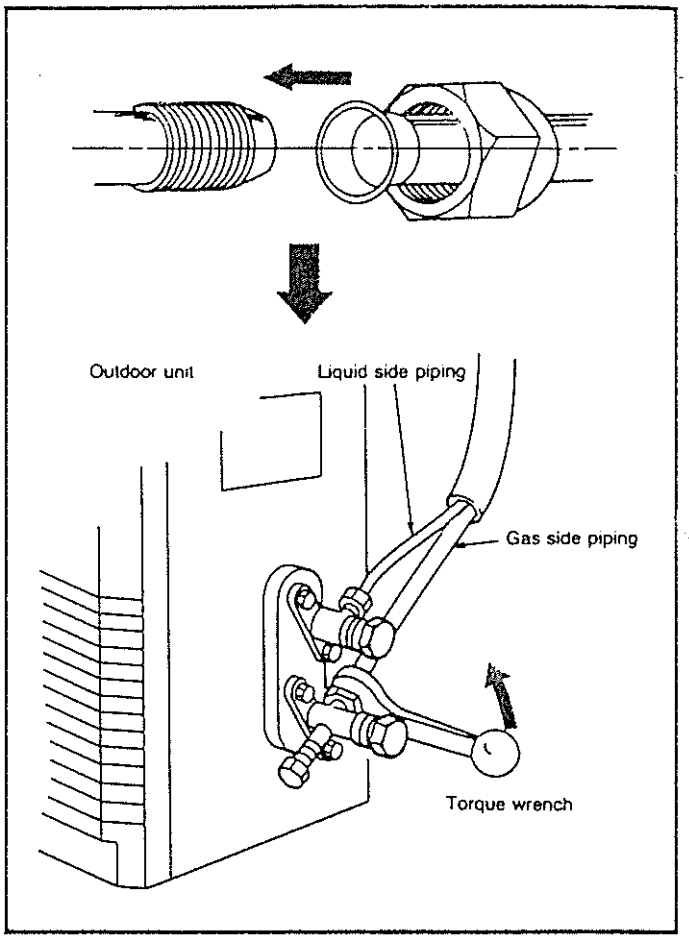
3 Connecting Pipings and the cable to Outdoor unit

1) Connecting the pipings to the Outdoor unit

1. Align the center of the pipings and sufficiently tighten the flare nut with fingers.

2. Finally, tighten the flare nut with torque wrench until the wrench clicks.
   - When tightening the flare nut with torque wrench, ensure the direction for tightening follows the arrow on the wrench.

Pipe Size	Torque
Liquid Side 1/4"	1.8 kg·m
Gas Side 3/8"	4.2 kg·m



2) Connecting the cable

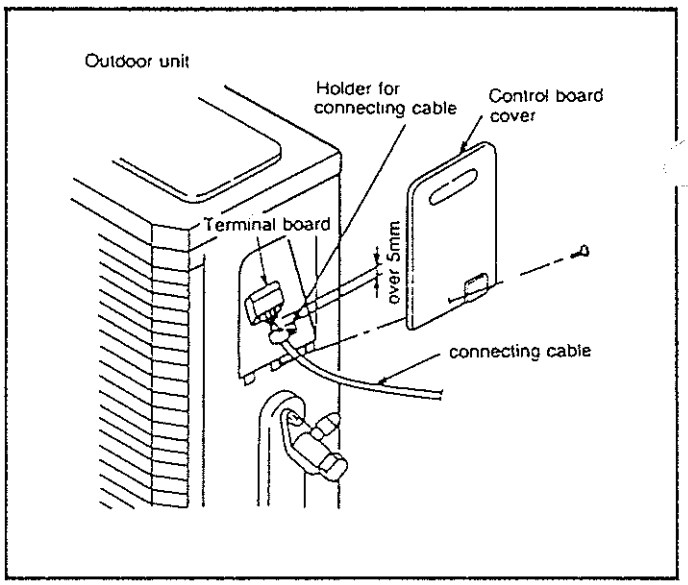
1. Remove the control boad cover from the unit by loosening the screw.

2. Connect the wires to the terminals on the control board individually.

Terminals on the outdoor unit	1	2	3	4	⏚
Color of wires					
Terminals on the indoor unit	1	2	3	4	⏚

3. Secure the cable onto the control board with the holder (clamper).

4. Attach the control board cover to the original position with the screw.

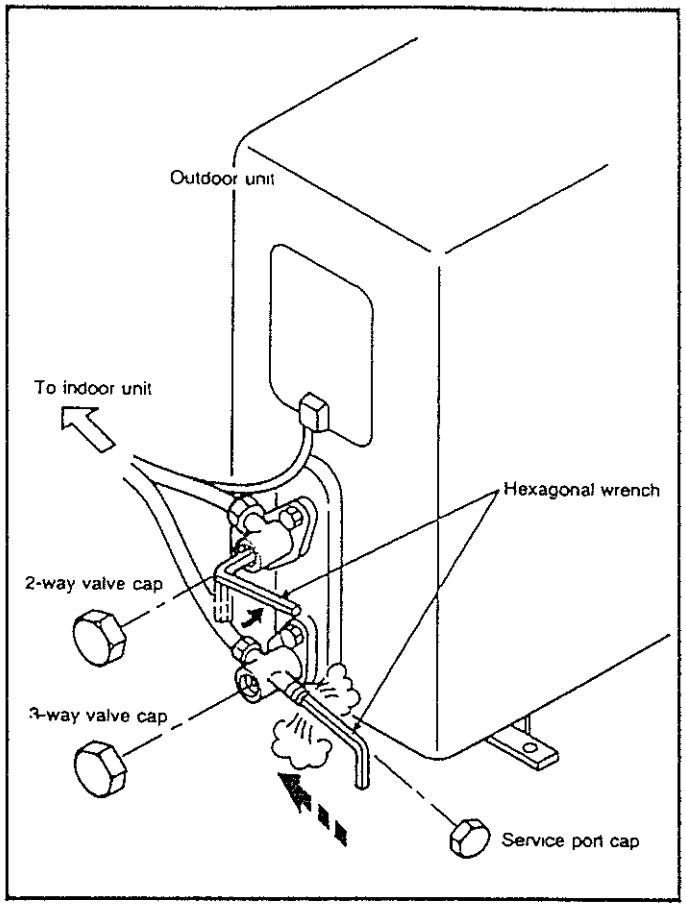


4 Air Purging of the Pipings and Indoor unit

1) Air purging

The air which contains a moisture is remaining in the Refrigeration cycle may cause a malfunction on the compressor.

1. Remove the caps from the 2-way and 3-way valves.
2. Remove the service-port cap from the 3-way valve.
3. To open the valve, turn the valve stem of 2-way valve counter-clockwise approx. 90° and hold it there for ten seconds, then close it.



4. Check a gas-leakage of the connecting portion of the pipings.

* for the left pipings, refer Page 12.

No leakage found

Result

leakage found

5. To open 2-way valve again, turn the valve stem counter-clockwise until it stops.

- Re-tighten the connecting portion with torque wrenches.

leakage seased

leakage persists

locate a repair leak

leakage seased

6. To purge the air, push the pin on the service port of 3-way valve for three seconds using with a hexagonal wrench and set it free for one minute.
   - Repeat this three times

7. Set the both 2-way and 3-way valves to open position with the Hexagonal wrench for the unit operation.

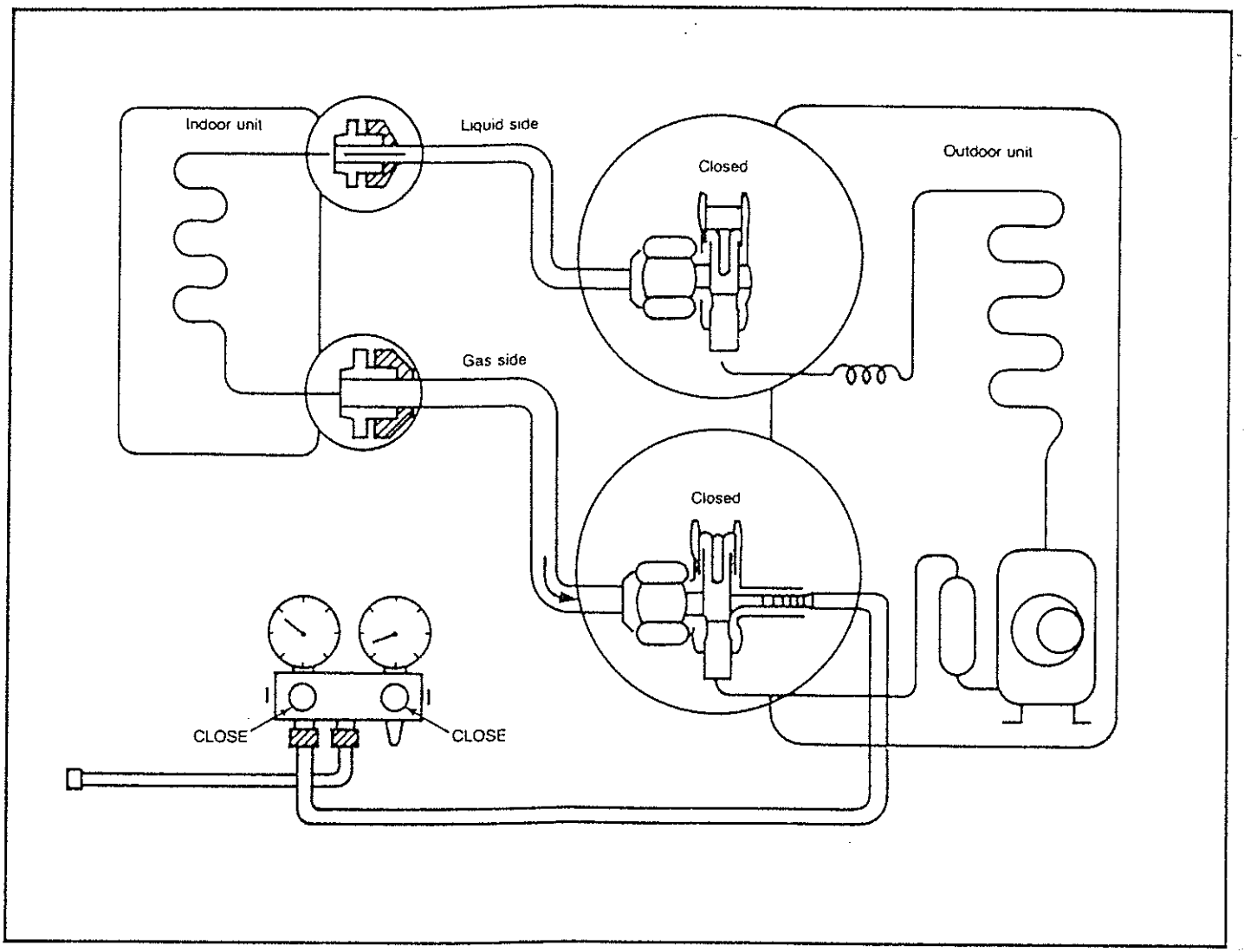
4' Checking a gas leakage for the left piping

(1)* Connect the manifold gauge to the service port of 3-way valve.

* Measure the pressure.

(2)* Keep it for 5-10 minutes.

* Ensure if the pressure indicated on the gauge is as same as that of measured at first time.

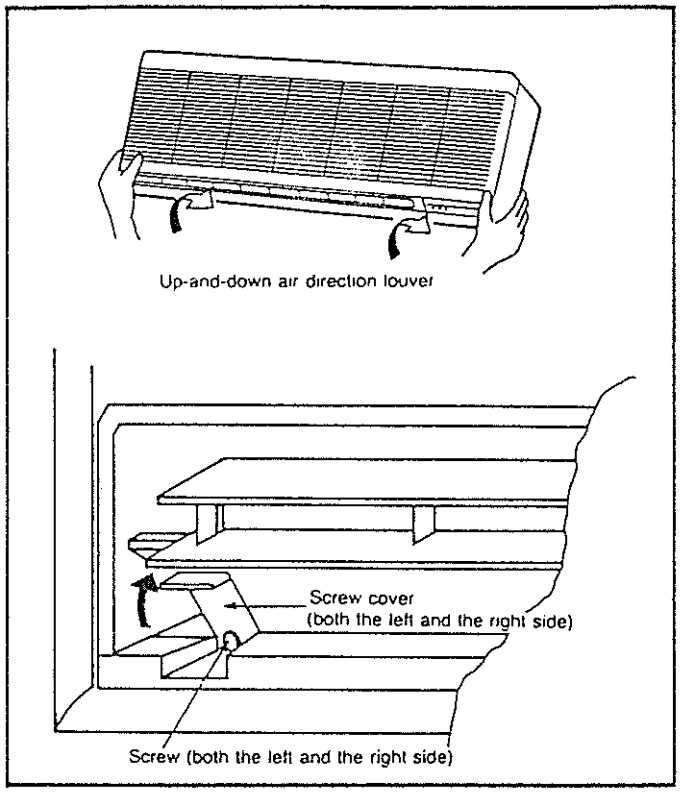


Follow the Result of the right side piping.

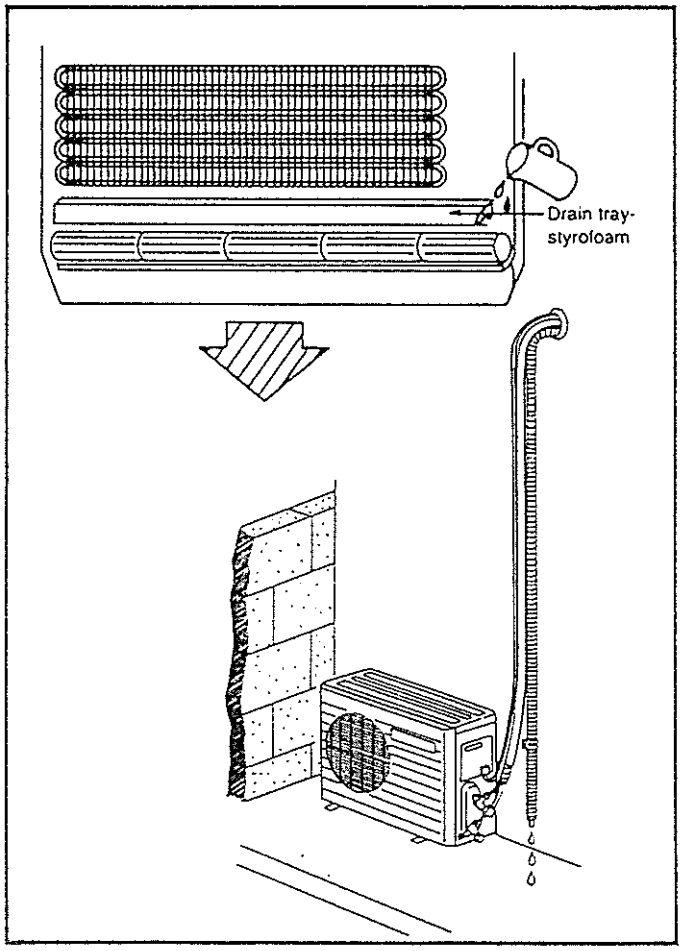
5 Checking the Drainage and Connecting the cable to Indoor unit

1) Checking the Drainage

1. Remove the Grille from the cabinet.
   - Set the up-and-down air direction louver to open position (horizontally) by finger pressure.
   - Open the screw covers upward and remove the securing screws.
   - To remove the Grille, pull the lower left and right side of the grille toward you (slightly tilted) and lift it straight upward (Two tabs on the top inside edge of the grille are clear of their slots).



2. Check the drainage
   - Pour a glass of water into the Drain tray-styrofoam.
   - Ensure if water flows drain hose of indoor unit.

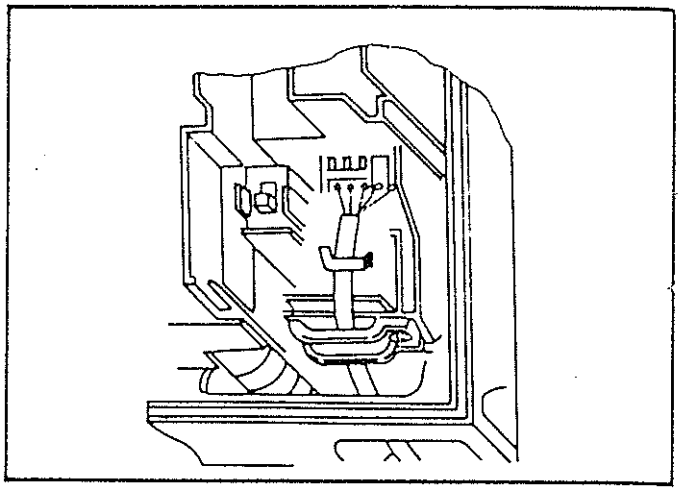


2) Connect the cable to the indoor unit

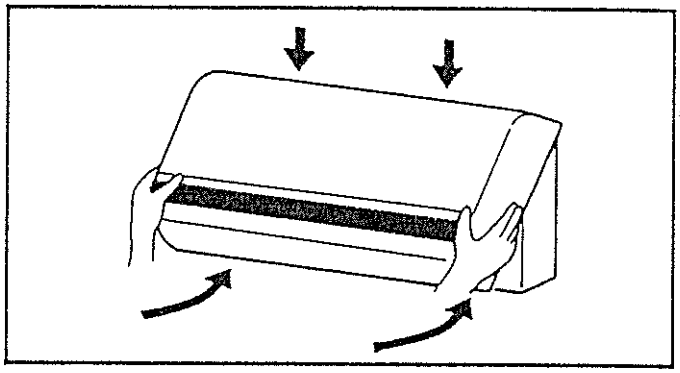
1. **Connect the wires to the terminals on the control board individually according to the outdoor unit connection.**
   - Ensure the color of wires of outdoor unit and the terminal No.s are the same to the indoor's respectively.

Terminals on the outdoor unit	1	2	3	4	⏚
Color of wires					
Terminals on the indoor unit	1	2	3	4	⏚

   - Secure the cable onto the control board with the holder (clamper).



2. **Attach the Grille onto the cabinet**
   - Grasp the lower left and right side of the Grille and engage two tabs on the top inside edge of the grille with two slots on the cabinet's top front edge.
   - Press the Grille toward to the cabinet untill it will be back into place.
   - Secure the grille to the cabinet with two screws.



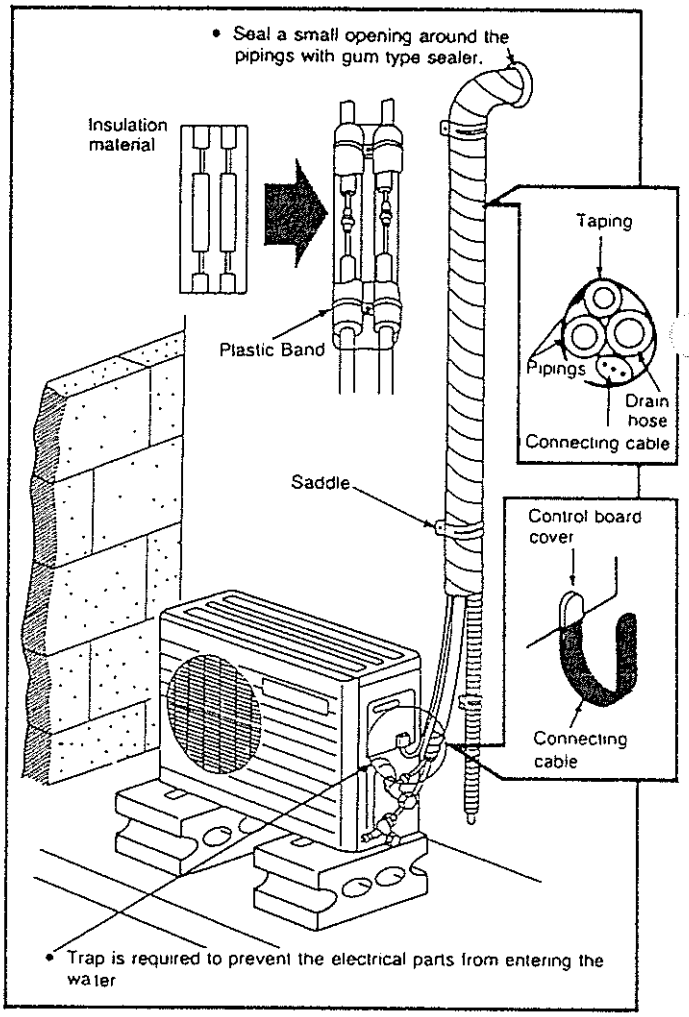
3) Form the pipings

1. **Wrap the connecting portion of indoor unit with the insulation material and secure it with two Plastic Bands. (for the right pipings)**
   - If you may connect an additional drain hose, the end of the drain-outlet should keep distance from the ground. (Do not dip it into water, and fix it on the wall to avoid swinging in the wind.)

In case of the Outdoor unit is installed bellow position of the Indoor unit.

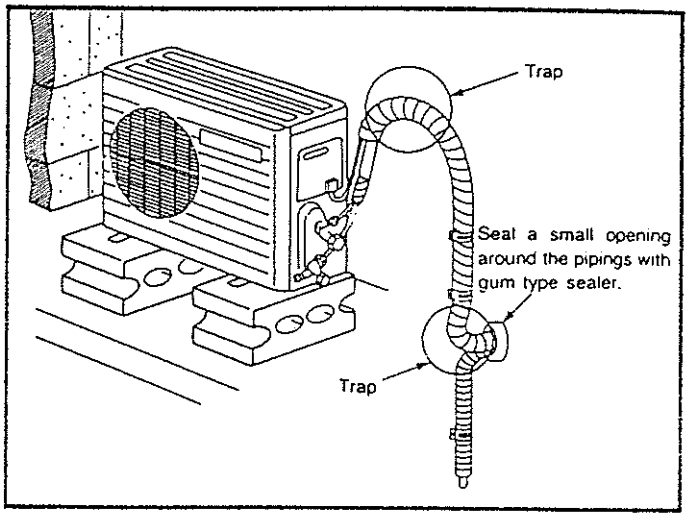
2. **Tape the Pipings, drain hose and Connecting Cable from down to up.**

3. **Form the pipings gathered by taping along the exterior wall and fix it onto the wall by saddle or equivalent.**



In case of the Outdoor unit is installed upper position of the Indoor unit

2. Tape the Pipings and Connecting cable from down to up.
3. Form the pipings gathered by taping along the exterior wall and the Trap is required to prevent the room from entering the water.
4. Fix the pipings onto the wall by saddle or equivalent.



6 Test running

1) Connect the power supply

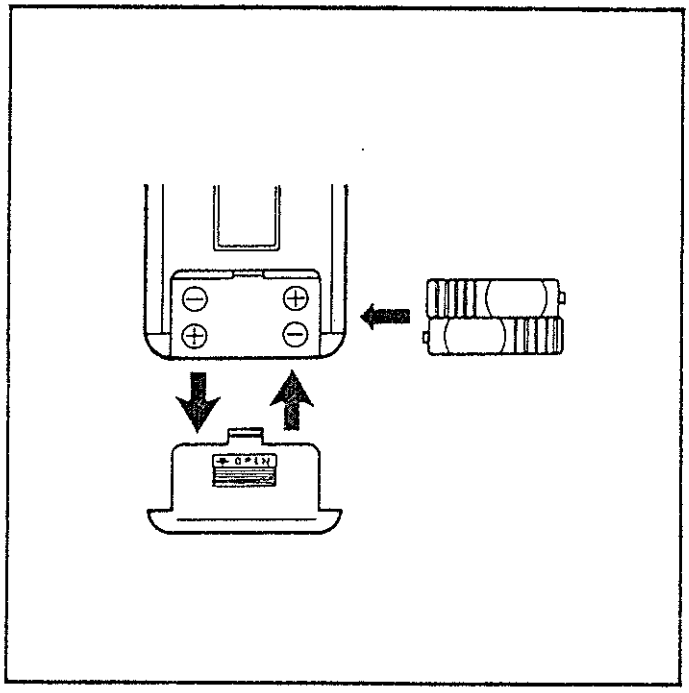
1. **Connect the power supply cord to independent power supply.**

2. **Prepare the remote control**
   - Insert two batteries provided.
     Remove the cover from the back of the remote control.
   - Slide the cover according to the arrow direction.

     Insert the two batteries.
     (Two SUM-4 Panasonic dry-cell batteries or equivalent.)
   - Be sure that the (+) and (−) directions are correct.
   - Be sure that both batteries are new.

     Re-attach the cover.
   - Slide it back into position.

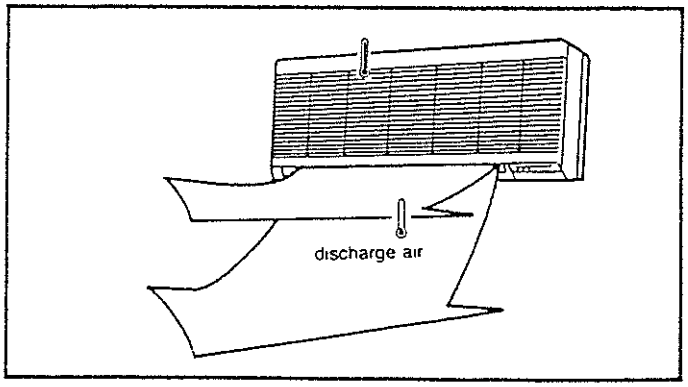
3. **Operate the unit at cooling operation mode for fifteen minutes or more.**



2) Evaluation of the performance

1. **Measure the temperature of the intake and discharge air.**

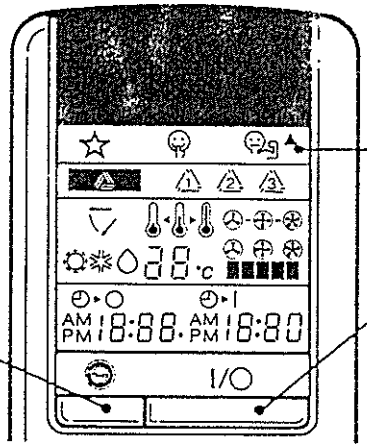
2. **Ensure the difference between the intake temperature and the discharge one is more than 8°C.**



Name and Function-Remote Control

Remote Control

Signal transmitter

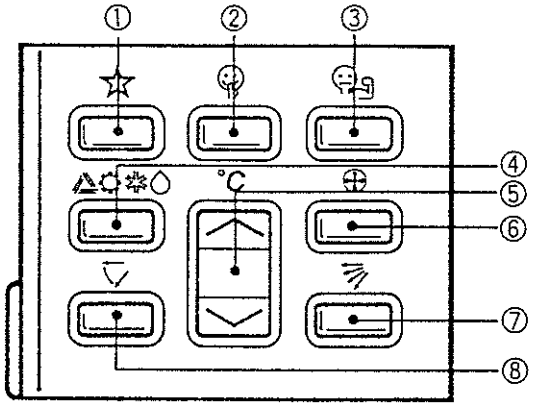


Operation Display
Display the Operation Condition

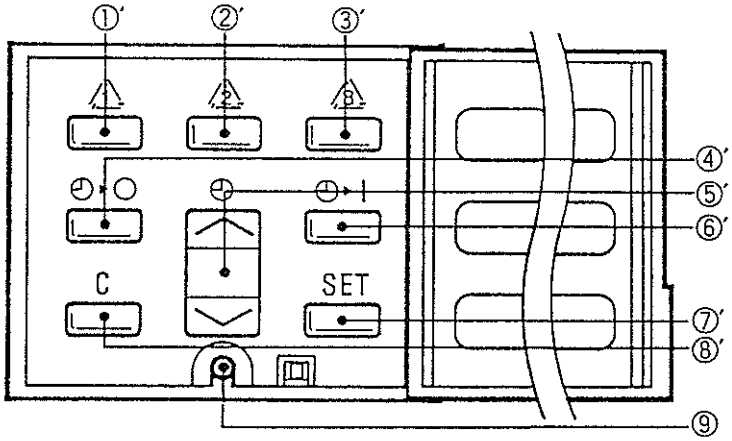
Start/Stop Button
Operation will start when the button is pressed, and stop when the button is pressed again.

Keep Mode
ON/OFF Button

Closed the panel



Open the panel



Automatic Operation Mode Select Buttons (Page 10)

① Sleep Mode Auto Button For Sleep Mode Auto Operation

② Quiet Operation Mode Button

③ Powerfull Operation Mode Button

④ Operation Mode Select Button
- Automatic Operation Mode...[1]
- Heating Operation Mode
- Cooling Operation Mode
- Soft Dry Operation Mode ..... [2]

⑤ Room Temperature Setting Button
Used to adjust the temperature.

⑥ Indoor Fan Speed Selector
Used to select the desired fan speed in five steps.

⑦ Airflow Direction Manual Control Button
Press to set the desired airflow direction.

⑧ Airflow Direction Auto-Control Button
For Automatic Airflow Direction Control.

①′ /1\ : Automatic Operation Mode 1

②′ /2\ : Automatic Operation Mode 2

③′ /3\ : Automatic Operation Mode 3

④′: OFF Timer Button
Press to select the OFF Timer operation.

⑤′: Time Setting Button
Press to set the Time.
(for Timer and/or Clock)

⑥′: ON Timer Button
Press to select the ON Timer operation.

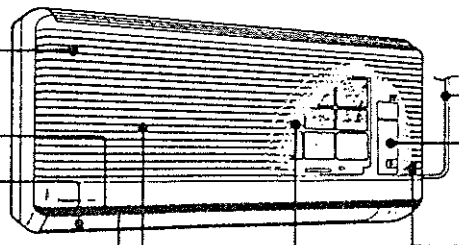
⑦′: Timer SET Button
Press to set the Timer operation.

⑧′: Timer CANCEL Button
Press to cancel the Timer operation.

⑨: Clock Set/Reset Button
Press to Set/Reset the Time for the Clock.

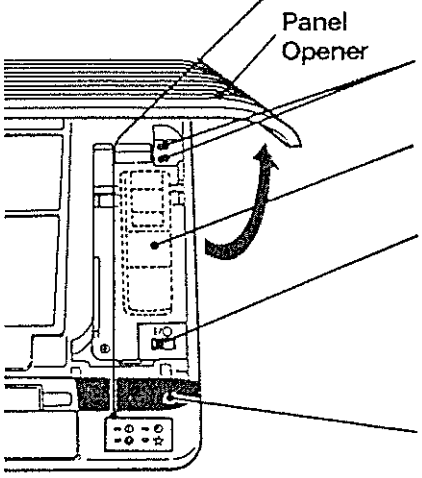
Indoor Unit, Outdoor Unit

Indoor Unit



Indoor unit controls and indicators

Open the front panel.
Press the panel openers (left and right, the place of mark) and open the panel upward.



Operation Indication Lamps

- On: Lights up while the air conditioner is in operation. (Blinks on and off at the start of automatic operation.)
- Timer: Lights up during timer operation.
- Keep: Lights up during keep operation.
- Sleep Mode: Lights up during Sleep Mode Auto operation.

Forced Operation Button

Used for operation when the remote control cannot be used.

Remote Control Storage

Remote Control can be stored here or using the holder.

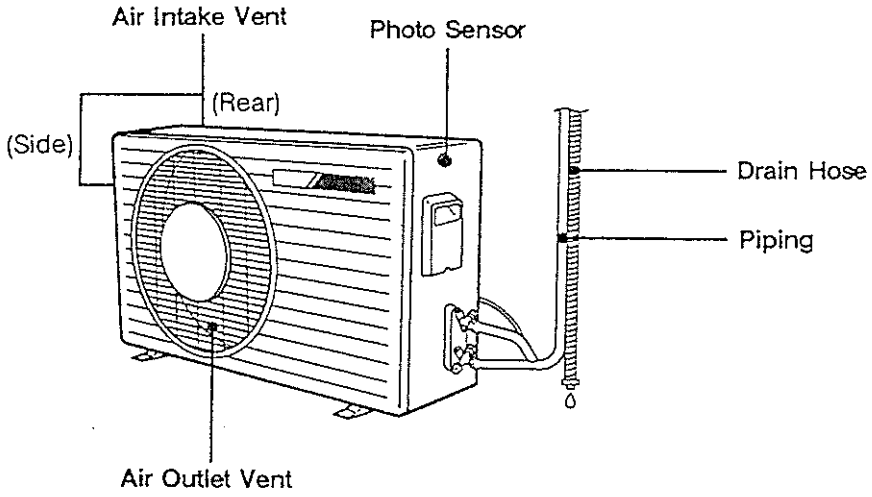
Power Switch

Set to "on" during the season when the air conditioner is in use.
Set to off at the end of the season.
(When operation is stopped by the remote control, the room air conditioner consumes approximately 6 W of electricity.)

Signal Receptor

Receives the signals from the remote control.
(Signal received sound: two short beeps or one long beep)

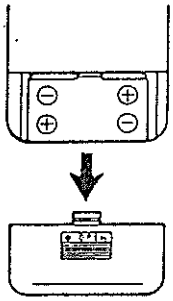
Outdoor Unit



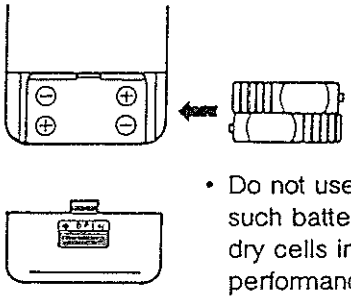
Remote Control Preparation

How to insert batteries

1 Remove the cover from the back of the remote control.
- Slide the cover according to the arrow direction.

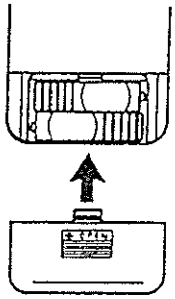


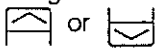
2 Insert the two batteries.
(Two SUM-4 Panasonic dry-cell batteries or equivalent.)
- Be sure that the (+)and(−) directions are correct.
- Be sure that both batteries are new.



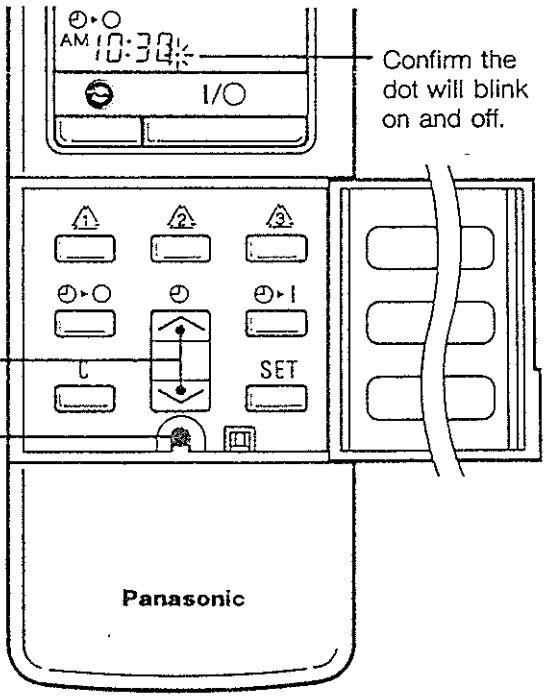
- Do not use rechargeable batteries, such batteries differ from standard dry cells in shape, dimensions, and performance.

3 Re-attach the cover.
- Slide it back into position.
- Remove the batteries from the remote control if the air conditioner is not going to be used for an extended length of time.



4 Set the time.
① Open the panel and press the Time Setting Button either
 or

② Press the Clock Set/Reset Button.



Confirm the dot will blink on and off.

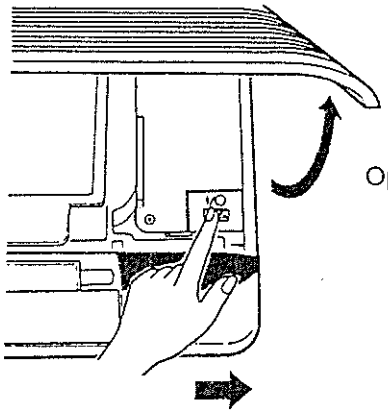
Note

The Time should be set exactly so that the Timer Operation will activate properly.

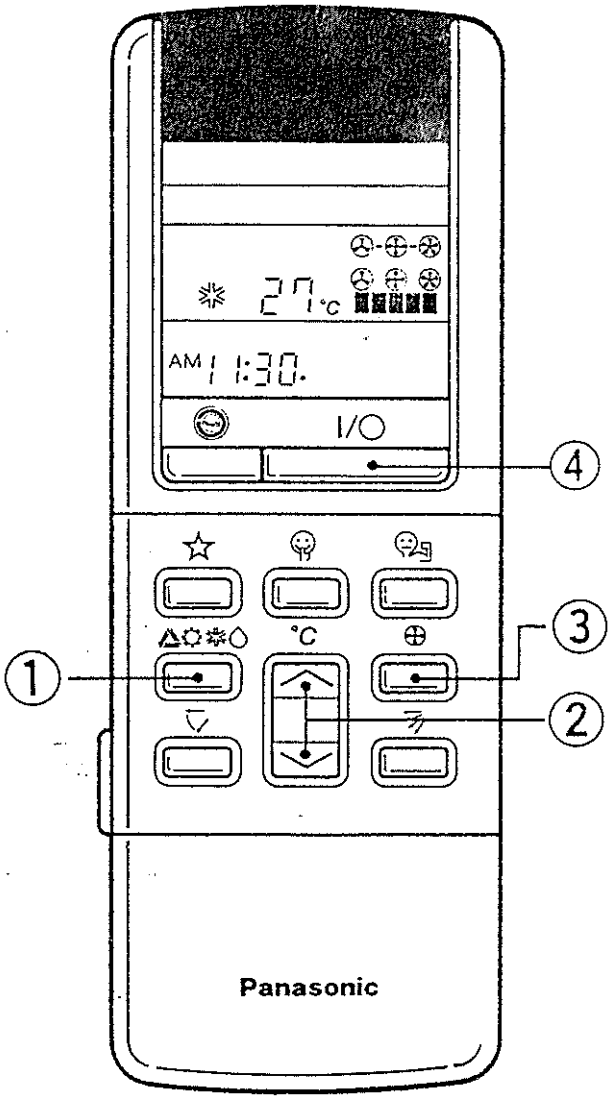
Air Conditioner Operation

(1) Operation Procedure

Indoor Unit



Open the Panel



Set the Power Switch to "ON"

① Operation Mode Selection Button

② Room Temperature Setting Button

③ Indoor Fan Speed Selector

④ Start/Stop Button

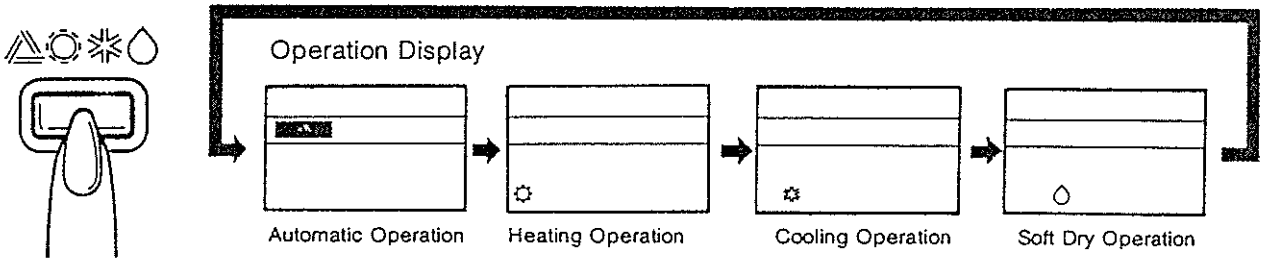
Combination of Air Conditioner Operation

	Cooling Operation Mode	Heating Operation Mode	Soft Dry Operation Mode	Automatic Operation Mode
* Sleep Mode	○	○	○	○
* Quiet Operation Mode	○	○	○	○
* Powerfull Operation Mode	○	○	○	○
Auto Airflow Direction	○	○	○	○
24-hour Real Timer	○	○	○	○

※Either one control can be selected.

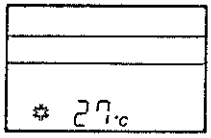
① Cooling Operation Mode

1 Select Cooling Operation.
Press the Operation Mode Selection Button.
Each time the button is pressed, the operation mode is shifted in the arrow direction.

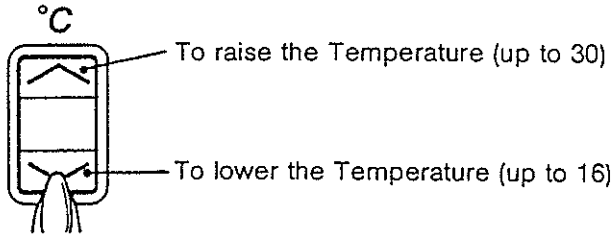


2 Set the temperature.

Operation Display

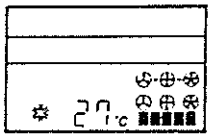


- The temperature can be set within a range of 16 to 30℃ by 1℃.

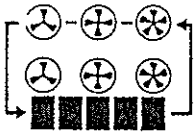


3 Set the fan speed.

Operation Display

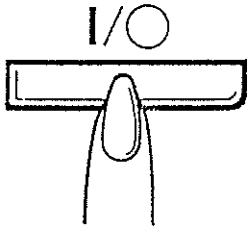


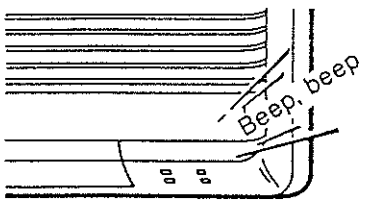
- Select the fan speed in five steps.
- The indicator shows the Fan Speed you selected.



Each time the button is pressed, the Fan speed is shifted in the arrow direction.

4 Press the Start/Stop Button.

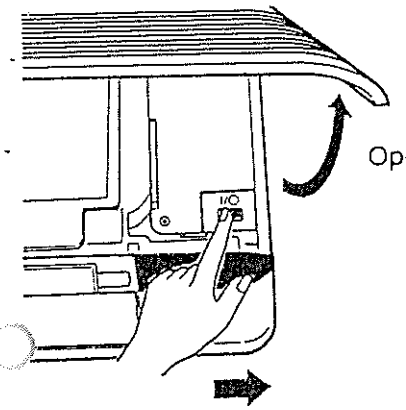




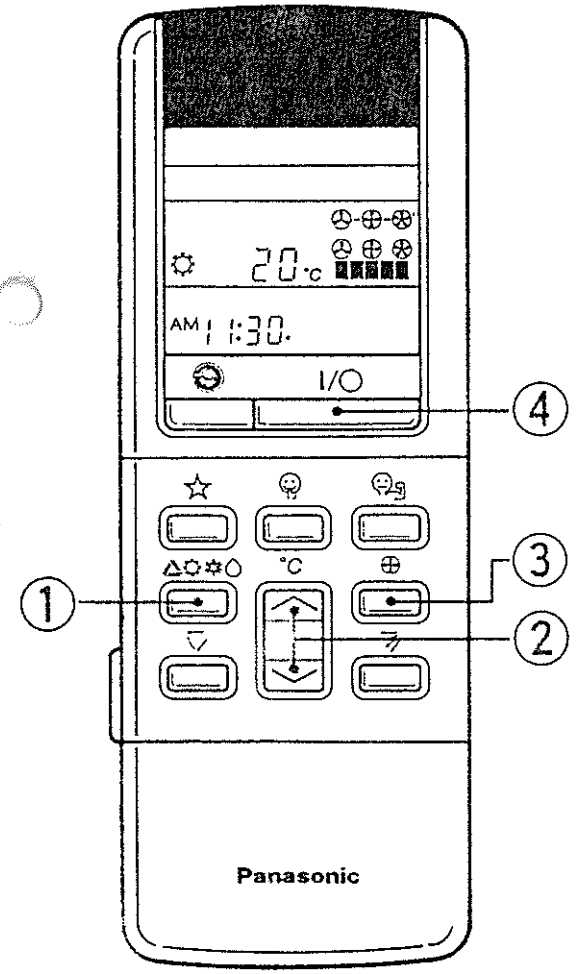
- Two short beep will sound and the operation lamp will light up.

② Heating Operation Mode Operation Procedure

Indoor Unit

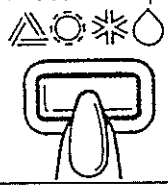


Remote control

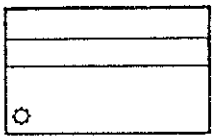


Set the Power Switch to "on"

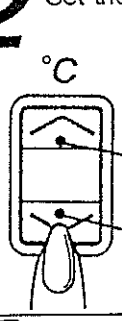
1 Select Heating Operation.
Press the Operation Mode Selection Button.



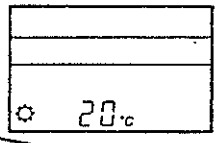
Operation Display



2 Set the temperature.



Operation Display



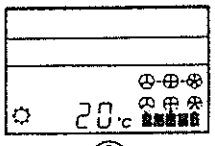
- Usually 20~ 24°C is a recommended setting temperature.

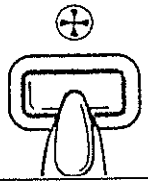
To raise the Temperature (up to 30)

To lower the Temperature (up to 16)

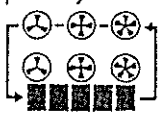
3 Set the Fan Speed.

Operation Display



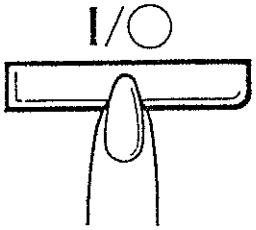


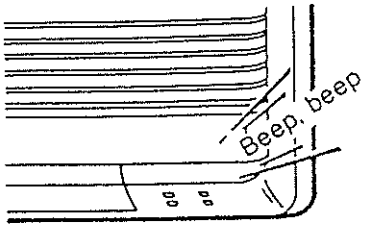
- Select the fan speed in five steps.
- The indicator shows the Fan Speed you selected.



Each time the button is pressed, the Fan speed is shifted in the arrow direction.

4 Press the Start/Stop Button.





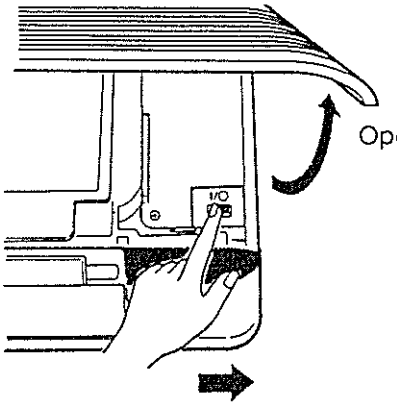
- Two short beep will sound and the operation lamp will light up.

③ Soft Dry Operation Mode

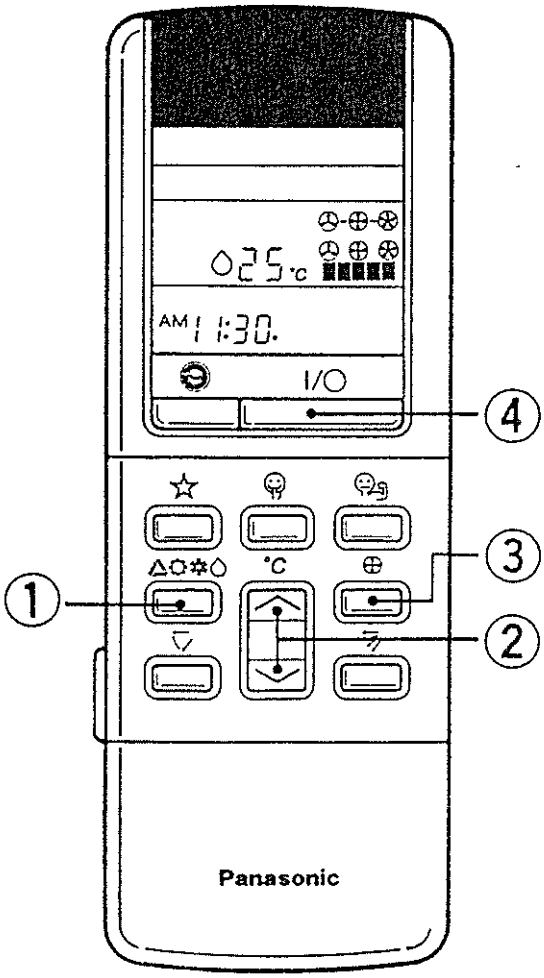
This mode dehumidifies without overcooling.

Operation Procedure

Indoor Unit

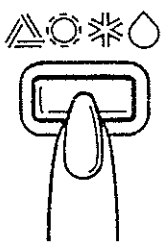


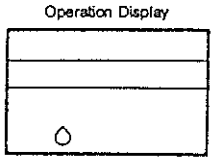
Remote Control



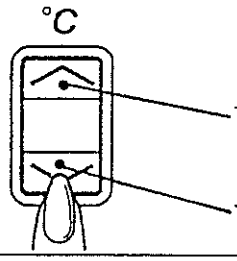
Set the Power Switch to "on"

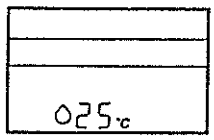
1 Select Soft Dry Operation.
Press the Operation Mode Selection Button.





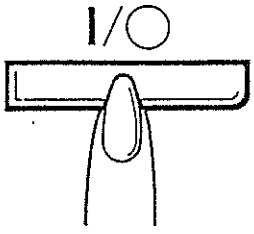
2 Set the temperature.

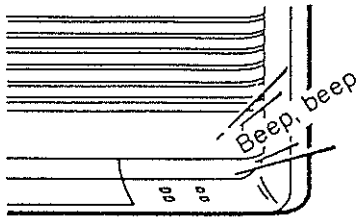




3 The fan speed is automatically set to low.
(The indicator will not be chaged.)

4 Press the Start/Stop Button.

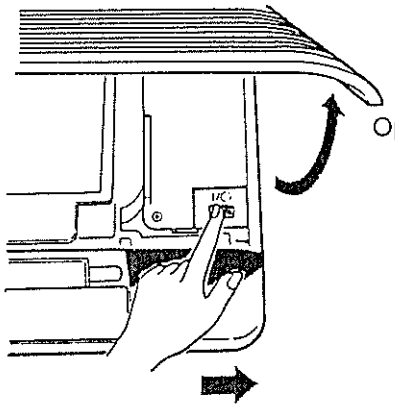




• Two short beep will sound and the operation lamp will light up.

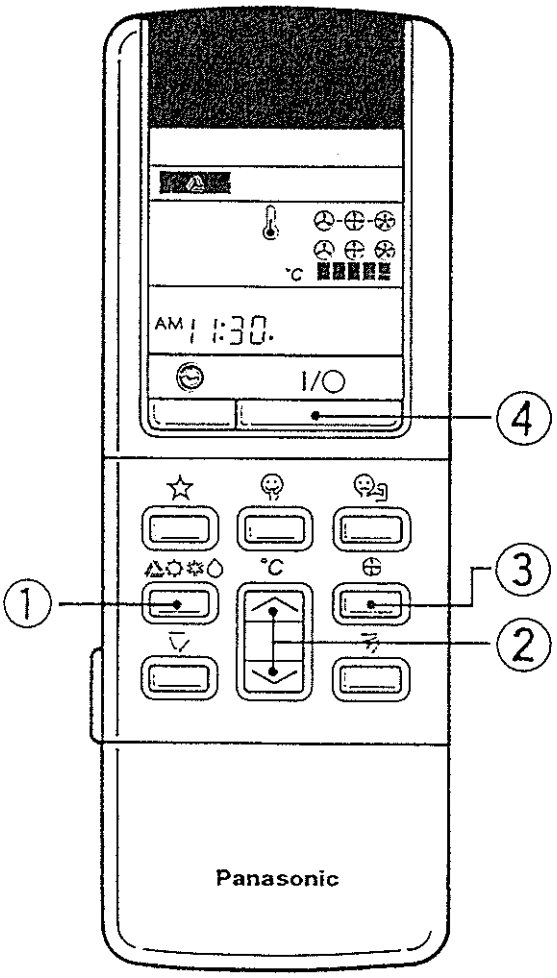
④ Automatic Operation Mode Operation Procedure

Indoor Unit



Open the Panel

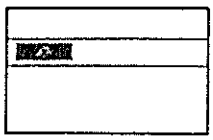
Remote Control



Set the Power Switch to "on"

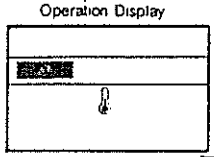
1 Select Automatic Operation.
Press the Operation Mode Selection Button.

Operation Display

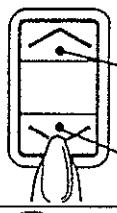


2 Set the temperature.

Operation Display



°C



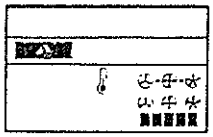
To raise the Temperature 2°C

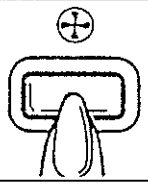
To lower the Temperature 2°C

- Depending on your personal preference, clothing, etc, the set temperature can be set to 2°C higher or lower than the standard if desired.

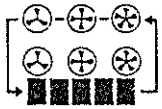
3 Set the fan speed.

Operation Display



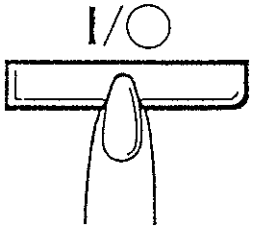


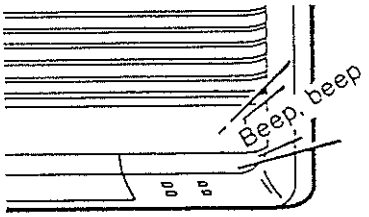
- Select the fan speed in five steps.
- The indicator shows the Fan Speed you selected.



Each time the button is pressed, the Fan speed is shifted in the arrow direction.

4 Press the Start/Stop Button.





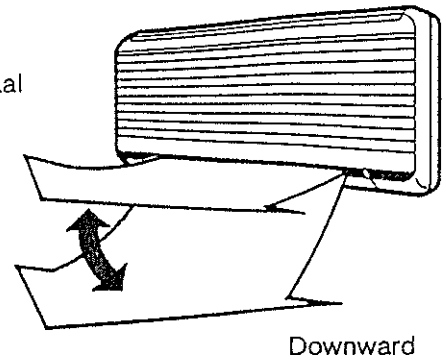
- Two short beep will sound and the operation lamp will light up.
  (For automatic operation, the operation lamp will first blink on and off for 20 seconds and then remain lit.)

Airflow Direction Procedure

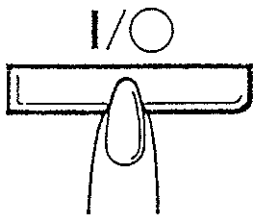
1 Vertical Airflow Direction Control

① Airflow Direction Manual-Control

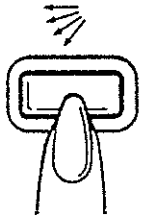
The airflow direction can be adjusted as desired by using the remote control.
This is effective when you want to cool yourself directly, such as when coming out of the bath.
The louver can be adjusted within a range between the horizontal and 45 degrees downward at Cooling and Soft Dry Operation, and between the horizontal and 75 degrees downward at Heating Operation.



Press Start/Stop Button.
(Confirm the unit on operation)



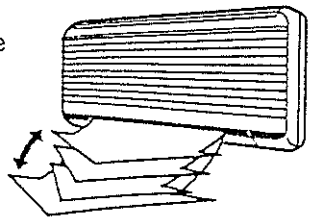
5 Hold the Airflow Direction Manual Control Button pressed, and release at the desired airflow direction.



② Automatic airflow direction control

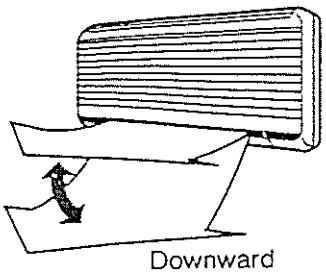
At Cooling and Soft Dry Operating

The louver will automatically swing up and down to create the feeling of refreshing breeze.



Swings up and down

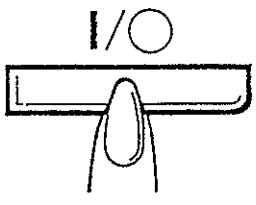
At Heating Operation



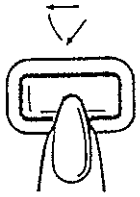
Horizontal
When the airflow temperature is low

Downward
When the airflow temperature become warm

Press Start/Stop Button.
(Confirm the unit on operation)



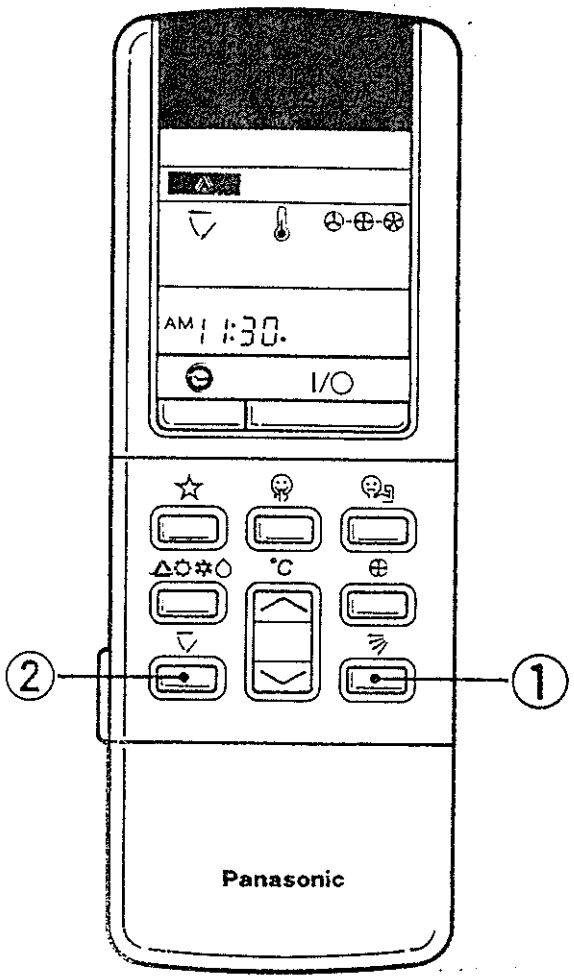
5 Press the Airflow Direction Auto-Control Button.



automatic airflow direction

To switch to manual airflow direction setting, simply press the airflow direction setting button.

Remote Control



① Airflow Direction Manual Control Button

② Airflow Direction Auto-Control Button

Note

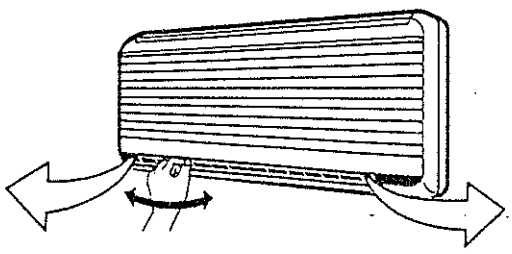
- Once the power switch has been set to "off" the air conditioner will be set automatic airflow direction operation when it is set back to "on".

Caution

- Always use the remote control to adjustment the airflow direction.Manually moving the vertical airflow direction louver by hand could cause operation errors. If this occurs, set the power switch to "off" and then back to "on" so that the louver returns to the correct position.
- When air conditioner operation is stopped, the vertical airflow direction louver will close the air conditioner's air outlet vent.

2 Horizontal Airflow Direction Control

- Adjust the horizontal airflow direction by manually moving the horizontal airflow direction louver by hand.



Timer Setting

Remote Control

24-hour ON/OFF Real Timer.

Timer Settings are possible for both ON/OFF at the real time Operation during the season.
(Setting the timer at once, it is activating until it will be cancelled.)

For setting the OFF Timer (Procedure)

(5) OFF Timer Button ①

(6) Time Setting Button ②

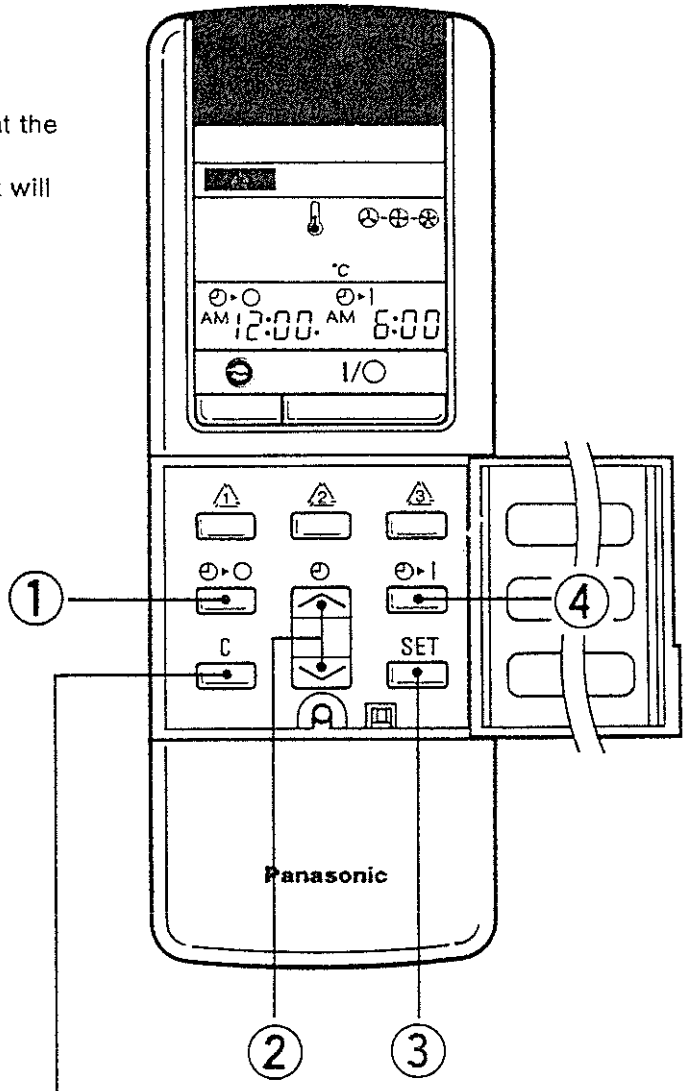
(7) Timer SET Button ③

For setting the ON Timer (Procedure)

(8) ON Timer Button ④

(9) Time Setting Button ②

(10) Timer SET Button ③



To chage the Timer Settings

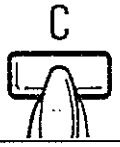
Follow the procedure above.

If the settings are cancelled by a power failure

Press the Timer SET Button.

To cancel the Timer Operation

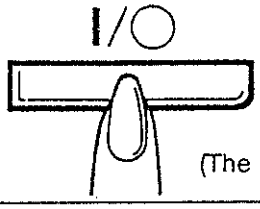
Press the Timer CANCEL Button



(The timer lamp on the air conditioner and the display will go out)

Timer setting procedure

Press the Start/Stop Button.(Confirm the unit on operation.)



(The operation lamp on the room air conditioner will light up.)

OFF Timer

5 Press the OFF Timer Button.

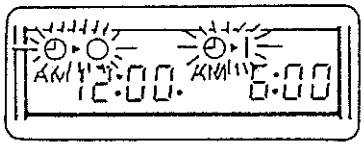
6 Set the Time
Press the Time Setting Button until the desired Time is obtained.

7 Press the Timer SET Button.

ON Timer

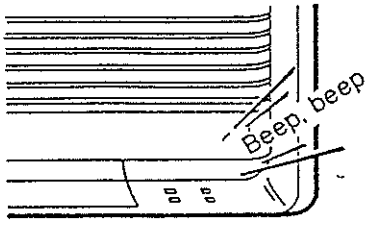
8 Press the ON Timer Button

Display



9 Set the Time
Press the Time Setting Button until the desired Time is obtained.

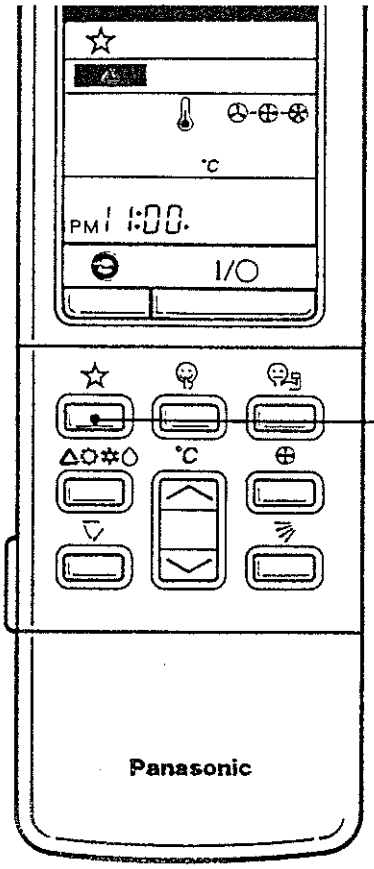
10 Press the Timer SET Button.



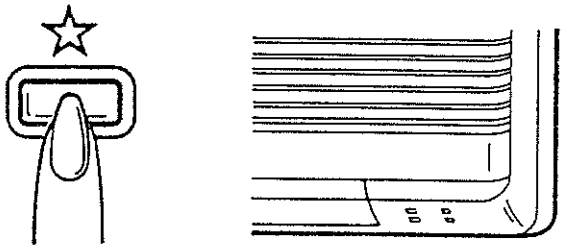
- Two short beeps will Sound and the Timer lamp will light up.

Sleep Mode Auto Control Setting

Sleep Mode operates to match your sleeping conditions.



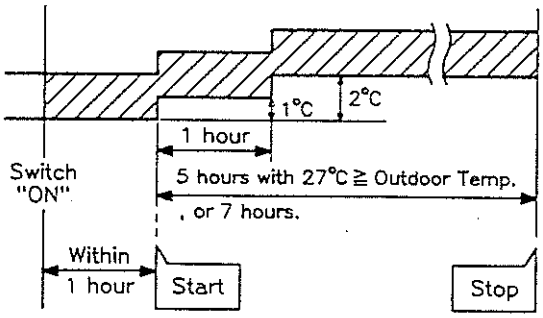
Press the Sleep Mode Auto Button.



- The Sleep Mode Auto LED of the room air conditioner will light up.
- The Fan is automatically set to low.

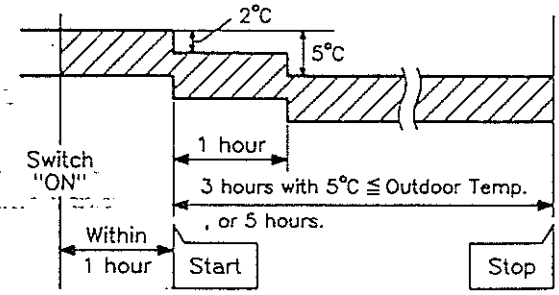
① At Cooling or Soft Dry Operation

- The setting temperature will be rise by 1°C when the room temperature is reached or in one hour, and by 1°C one hour later
- The operation will stop after 5 hours or 7 hours.



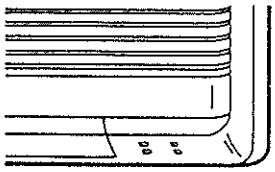
② At Heating Operation

- The setting temperature will be dropped by 2°C when the room temperature is reached or in one hour, and by 3°C one hour later.
- The operation will stop after 3 hours or 5 hours.



3. Keep Operation

- Press the Keep Operation Button. (Press it again to reset)

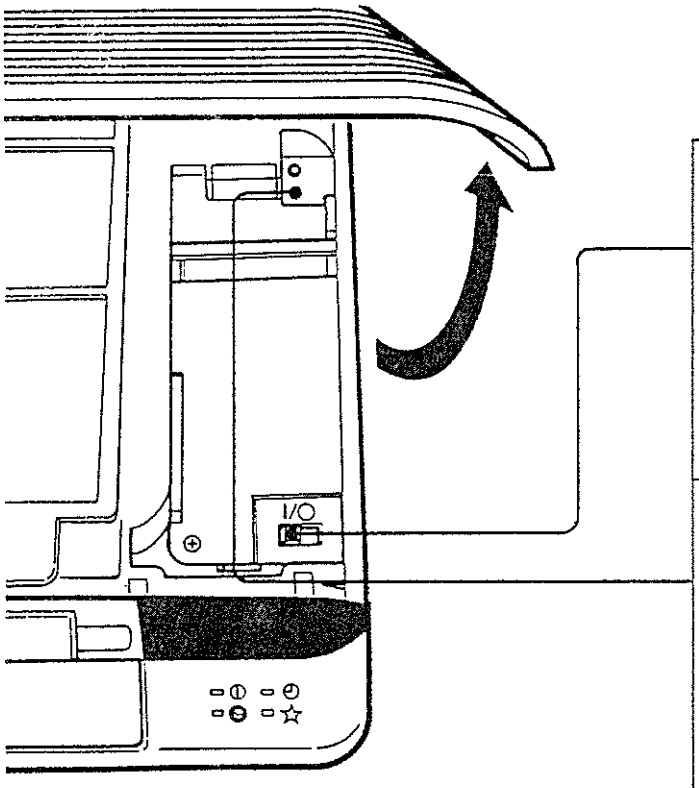


- The keep mode is the basic air conditioning mode for keeping the room in a soft coolness and warmth.

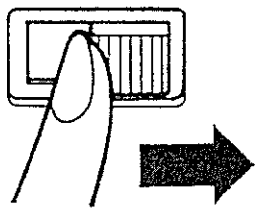
Type of Operation	Setting Temperature	Fan Speed
Heating	11°C	Low
Soft Dry	27°C	Low
Cooling	30°C	Low

4. Forced Operation

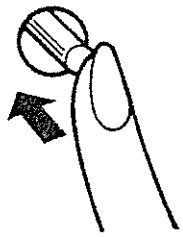
When the remote control can't be used.
Operation procedures
Forced operation is automatic operation, the airflow direction setting will be automatic.



1 Set the Power Switch to "on"



2 Press the Forced Operation Button.

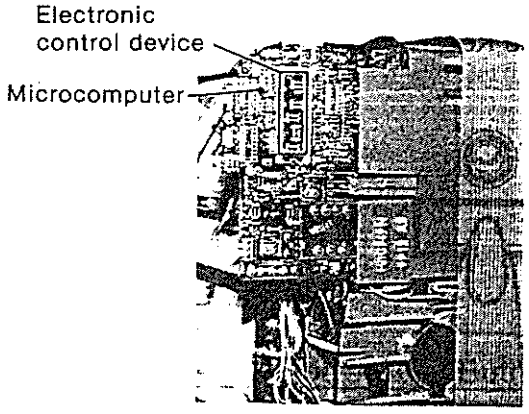


Disassembly of the Parts

- **Inspecting the Indoor Unit's Electronic Control Device**

① The electronic control device can be removed by pressing on the tabs and pulling.

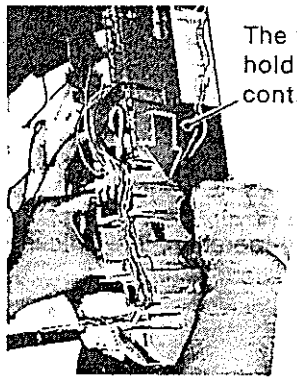
② The electronic control device can be inspected during operation by securely attaching it to the control box.



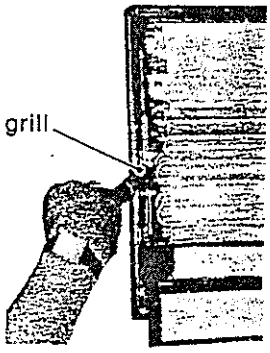
- **Removing the Indoor Unit's Fan Motor**

① Remove the connectors (CN-MTR) and (CN-TH) from the P.C. Board.

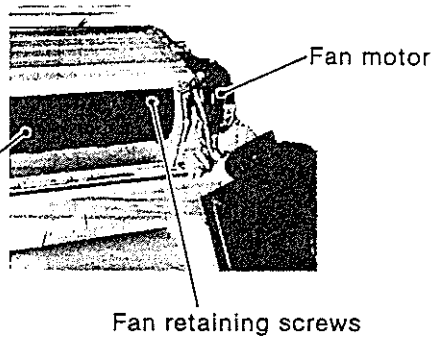
② Remover the control box. Removing the two tabs holding the control box and in place will allow it to be removed as shown in the illustration at the right.



③ Remove the airdischarge grill. Pushing on the tab (one) and pulling down will allow it to be removed.



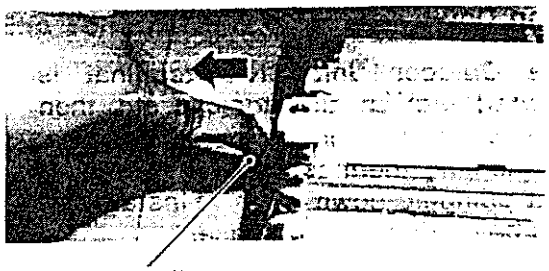
④ Remove the fan motor. This can be accomplished by unscrewing the retaining screws holding the fan motor in place.



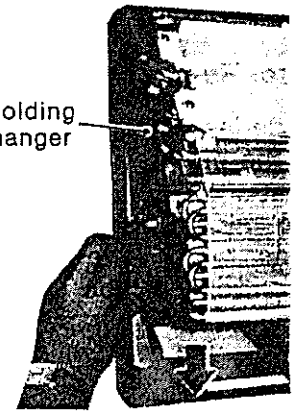
- **Removing the Indoor Unit's fan**

① Remove the fan's retaining screws (see Removing the Indoor Unit's Fan Motor)

② Remove the tab holding left side of heat exchanger pulling left side of heat exchanger as shown in the illustration at the right.



The tab holding heat exchanger

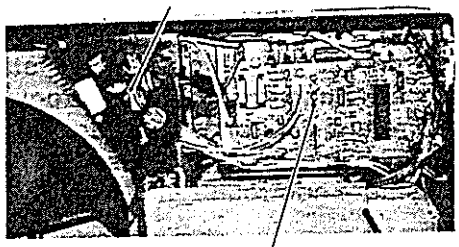


The tab holding heat exchanger

- **Inspection Method for the Outdoor Unit**

① Removing the front panel of the outdoor unit allows access to the electronic control device.

Heat Sink Cover



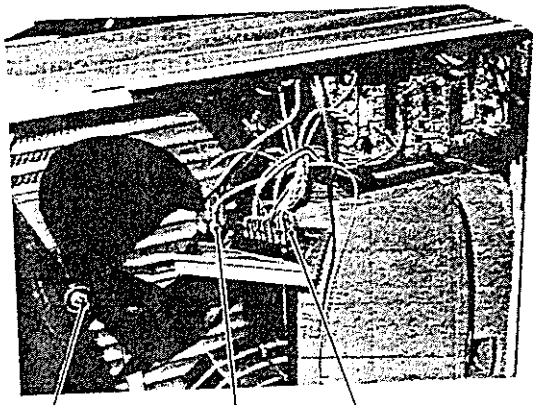
Electronic Control Device

<WARNING>

- Be sure to return the wiring to its original opsition
- There are many high voltage components within the heat sink cover so never touch the interior during operation. Wait at least one minute after power has been turned OFF.

② Removing the screws on the cover of the heat sink allows the unit (along with the Power transtor module and diode) to be removed.

③ The propeller fan can be removed by removing the retaining screw (turn clockwise to loosen).



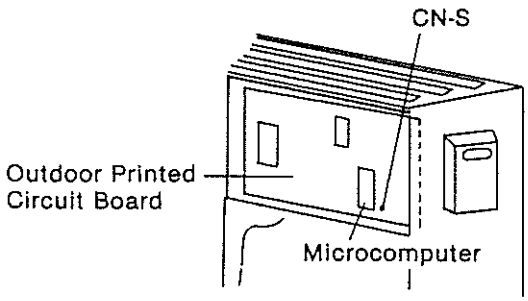
Fan Retaining Screw

Diode

Power Transistor Module

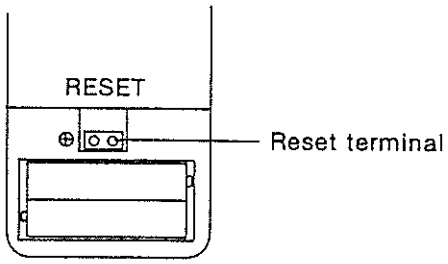
• Pump Down

The Outdoor Unit CN-S terminal is shorted with an alligator clip etc, then even when the room temperature is low, the cooling thermostat remains ON, so that pumping down when re-installation can be carried out with ease.



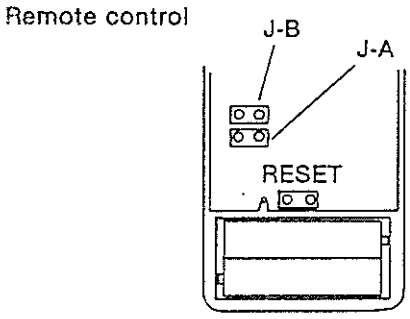
• Remote Control Re-set

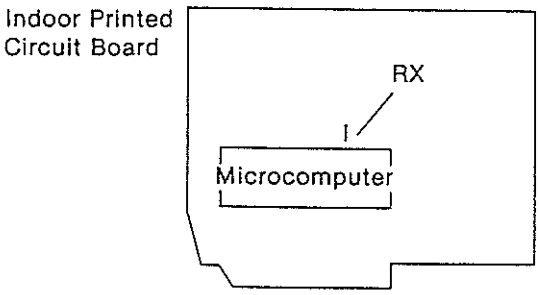
When the batteries are inserted for the first time, or the batteries are replaced, all the indications will blink and the remote control might not work.
If this happens, remove the back lid of the remote control and you will find a resetting terminal, and by shorting it with a minus screwdriver, it will return to normal.



• Changing the wireless remote control transmission code

When several air conditioners are installed in the same room, then by adding parts to the remote control and the indoor electronic control device as shown below, it is possible to select from 4 different transmission codes.
In case when the code is the same, then several air conditioners will operate at the same time by remote control.



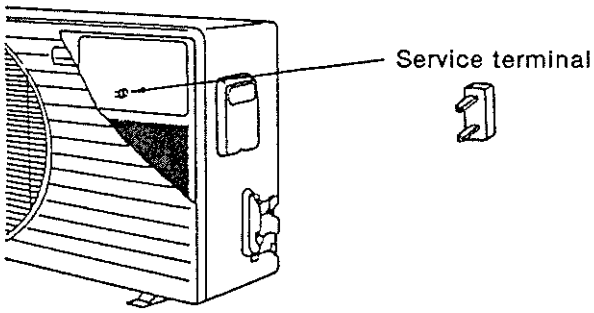


◦ By adding a jumper wire to the remote control side and a carbon resistor (1/4W) to the indoor electronic control device, as shown in the diagram, it is possible to select from 4 types of transmission codes including the condition at time of delivery condition (1).

	Remote control		Indoor printed circuit board	Note
	J-A	J-B	RX	
1	——	——	——	At product delivery
2	Jumper wire	——	27kΩ	
3	——	Jumper wire	12kΩ	
4	Jumper wire	Jumper wire	6.2kΩ	

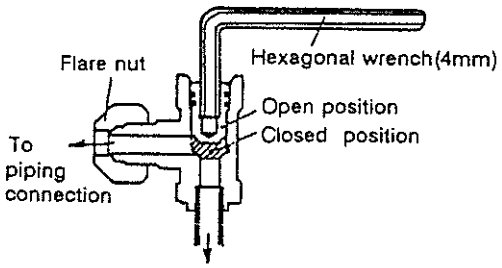
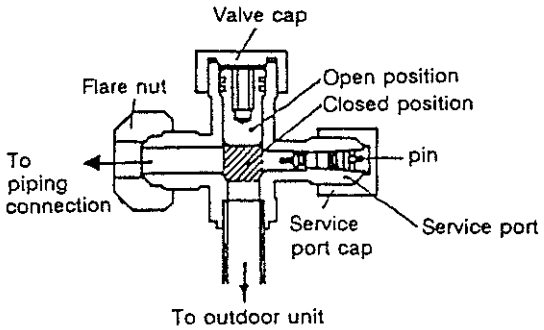
• **Rated Frequency Operation Setting by Servicing Terminal**

When the service terminal (CN-S) of the outdoor printed circuit board is short circuited, the cooling and rated frequency operates.



① The remote control to set at 'cooling' and '30°C', and first let the indoor fan rotate.
② If the Outdoor printed circuit board service terminal (CN-S) is short circuited, it operates at cooling and rated frequency.
③ If the short circuit is released, the outdoor unit stops. (After release, it will continue to operate for a while, but this is not an abnormality)

2-way. 3-way Valve

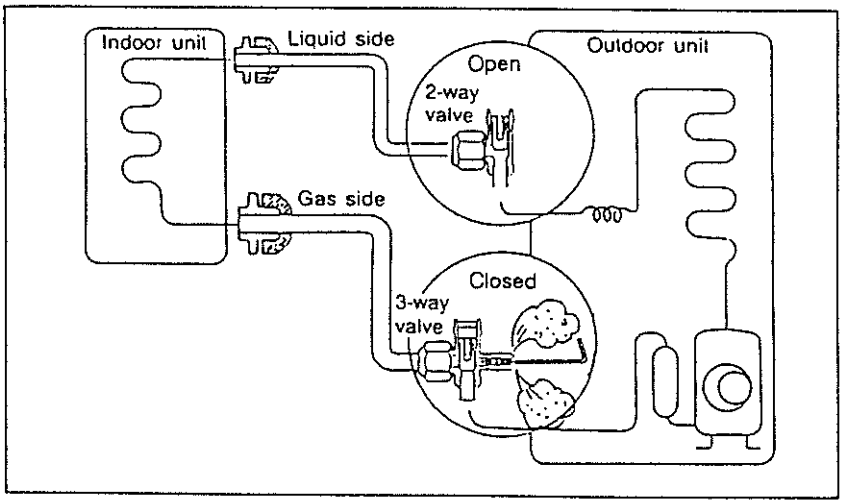
	2-way Valve (Liguid Side)	3-way Valve (Gas Side)	
			
Works	Shaft position	Shaft position	Service port
Shipping	Closed (with valve cap)	Closed (with valve cap)	closed (with cap)
1. Air purging (Installation)	Open (Counter-Clockwise)	Closed (Clockwise)	Open (push-pin)
Operation	Open (With valve cap)	Open (With valve cap)	Closed (with cap)
2. Pumping down (Transfering)	Closed (Clockwise)	Open (Counter-clockwise)	Open (Connected manifold gauge)
3. Evacuation (Servicing)	Open	Open	" With Vacuum pump
4. Gas charging (Servicing)	Open	Open	" with Charging cylinder
Pressure check (Servicing)	Open	Open	"
Gas releasing (Servicing)	Open	Open	"

1 Air purging

Required tools: hexagonal wrench, adjustable wrench, torque wrenches, wrench to hold the joints, and gas leak detector.

The additional gas for air purging has been charged in the outdoor unit.
However, if the flare connections have not been done correctly and there gas leaks, a gas cylinder and the charge set will be needed.

The air in the indoor unit and in the piping must be purged. If air remains in the refrigeration pipes, it will affect the compressor, reduce to cooling capacity, and could lead to a malfunction.



Service port nut
Be sure, using a torque wrench to tighten the service port nut (after using the service port), so that it prevents the gas leakage from the refrigeration cycle.

• Procedure

(1) Recheck the piping connections.

(2) Open the valve stem of the 2-way valve counterclockwise approximateiy 90°, wait 10 seconds, and then set it to closed position.
- Be sure to use a hexagonal wrench to operate the valve stem.

(3) Check for gas leakage.
- Check the flare connections for gas leakage.

(4) Purge the air from the system.
- Set the 2-way valve to the open position and remove the cap from the 3-way valve's service port.
- Using the hexagonal wrench to press the valve core pin, discharge for three seconds and then wait for one minute. Repeat this three times.

(5) Use torque wrench CWH AD-9211 to tighten the service port nut to a torque of 1.8 kg-cm.

(6) Set the 3-way valve to the back seat.

(7) Mount the valve stem nuts to the 2-way and 3-way valves.

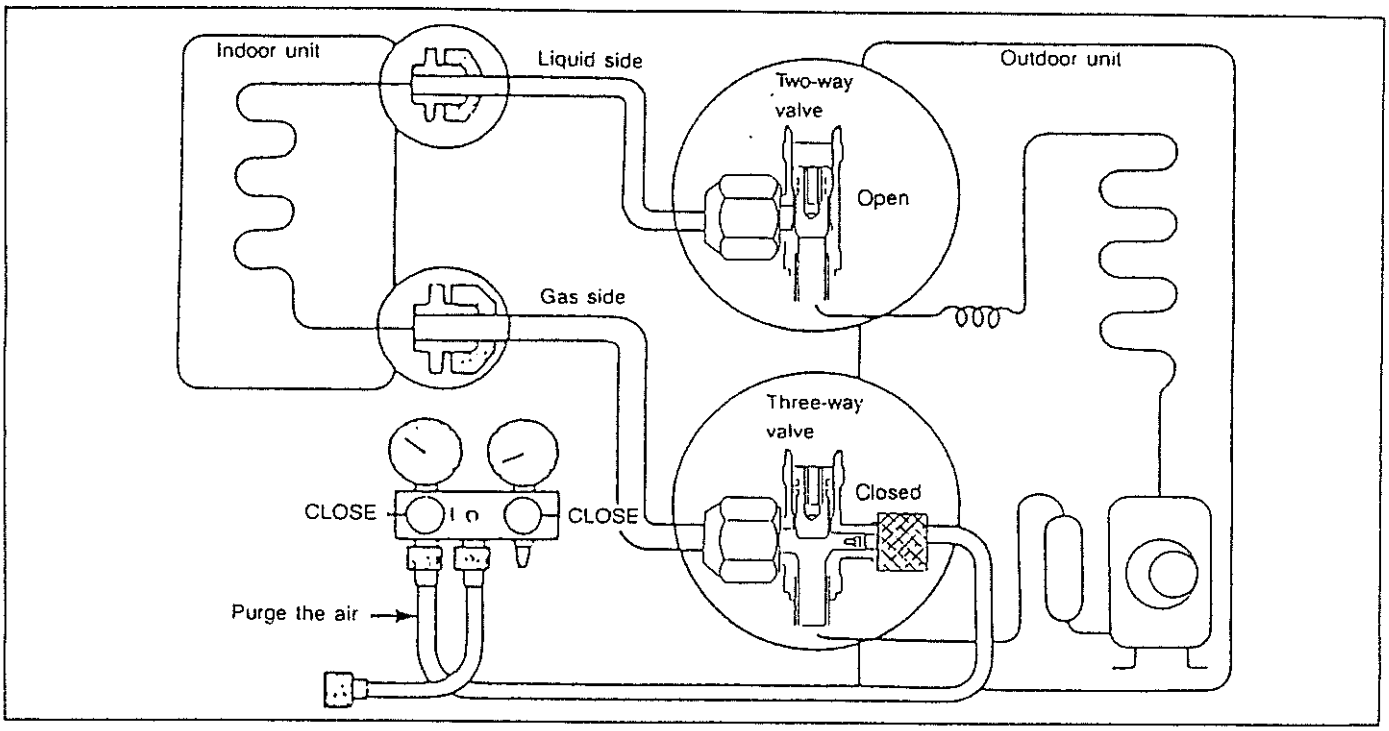
(8) Check for gas leakage.
- At this time, especially check for gas leakage from the 2-way and 3-way valve's stem nuts, and from the service port nut.

Caution

If gas leakage are discovered in step (3) above, take the following measures:

If the gas leaks stop when the piping connections are tightened further, continue working from step (4).
If the gas leaks do not stop when the connections are retightened, repair the location of the leak, discharge all of the gas through the service port, and then recharge with the specified amount of gas from a gas cylinder.

2 Pumping down



Procedure

(1) Confirm that both the 2-way and 3-way velves are set to the open position.
- Remove the valve stem caps and confirm that the valve stems are in the raised position.
- Be sure to use a hexagonal wrench to operate the valve stems.

(2) Operate the unit for 10 to 15 minutes.

(3) Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.
- Connect the charge hose with the push pin to the service port.

(4) Air purging of the charge hose.
- Open the low-pressure valve on the charge set slightly to air purge from the charge hose.

(5) Set the 2-way valve to the closed position.

(6) Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 1 kg/cm^{2}G.

If the unit can not be operated at the cooling (weather is rather cool), short the Pumping Down pins (BLUE) on the Main Control P.C.B.

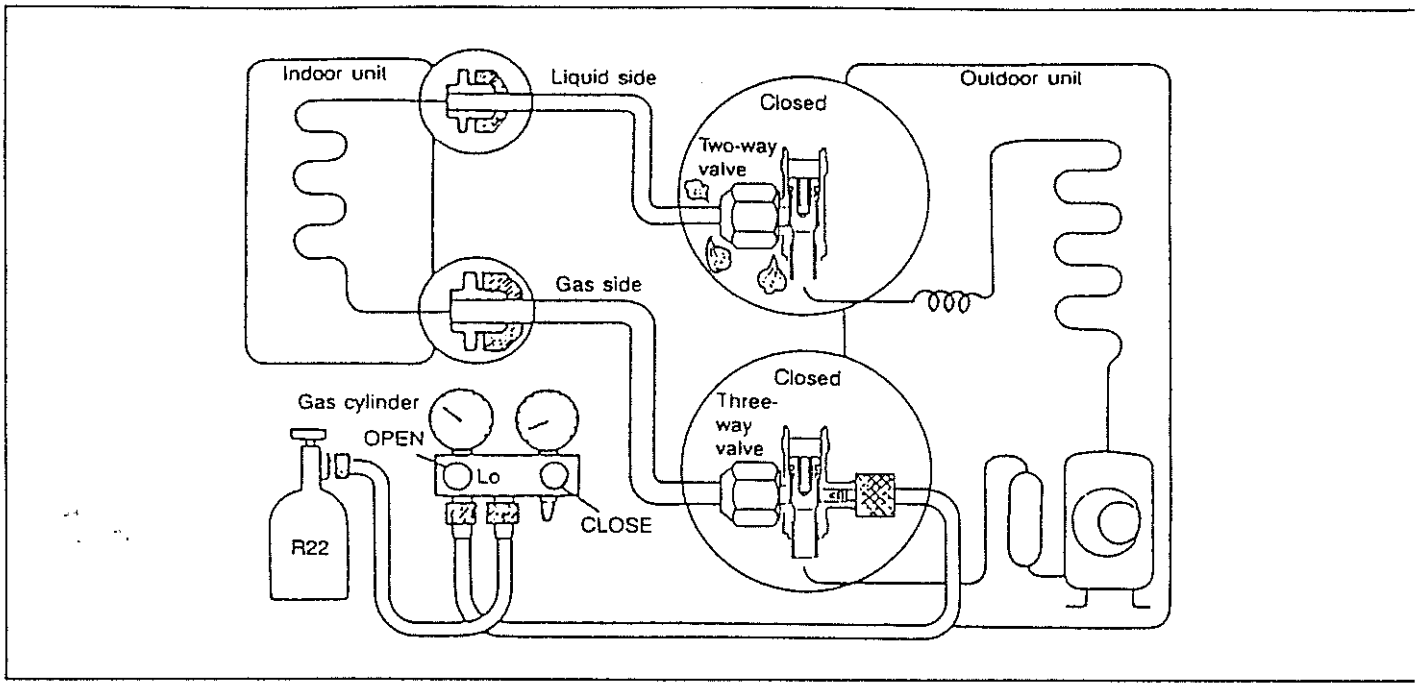
So that the unit can be operated.

(7) Immediately set the 3-way valve to the closed position
- Do this quickly so that the gauge ends up indicating 3 to 5 kg/cm^{2}G.

(8) Disconnect the charge set, and mount the 2-way and 3-way valve's stem nuts and the service port nut.
- Use torque wrench CWHAD-9211 to tighten the service port nut to a torque of 1.8 kg.m.
- Be sure to check for gas leakage.

2-1 Re-air purging

(Re-installation)



Procedure

(1) Confirm that both the 2-way valve and the 3-way valve are set to the closed position.

(2) Connect the charge set and a gas cylinder to the service port of the 3-way valve.
- Leave the valve on the gas cylinder closed.

(3) Air purging
- Open the valves on the gas cylinder and the cahrge set. Purge the air by loosening the flare nut on the 2-way valve approximately 45° for 3 seconds then closing it for 1 minute; repeat 3 times.
- After purging the air, use a torque wrench to tighten the flare nut on the 2-way valve.

(4) Check for gas leakage.
- Check the flare connections for gas leakage.

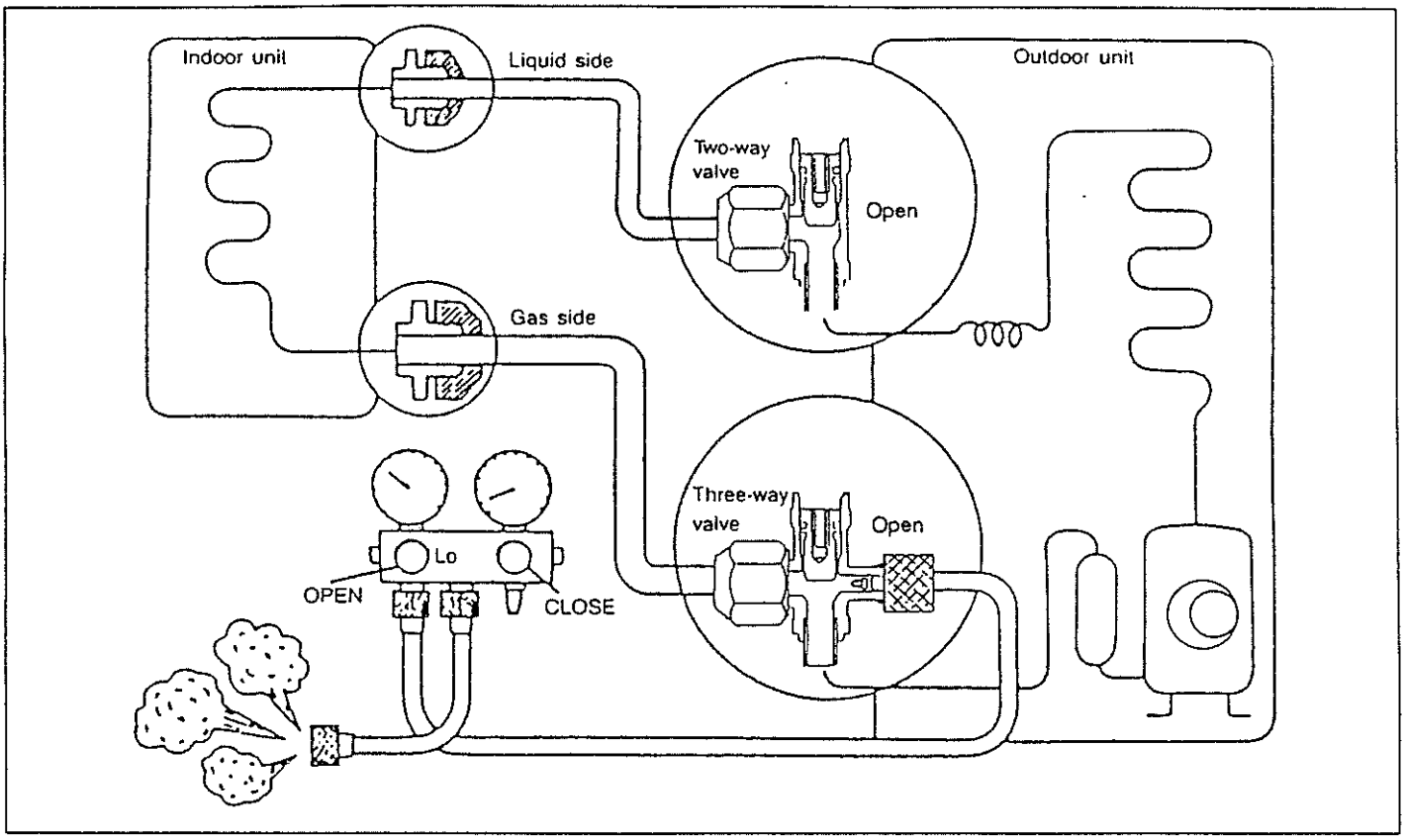
(5) Discharge the refrigerant.
- Close the valve on the gas cylinder and discharge the refrigerant until the gauge indicates 3 to 5 kg/cm^{2}G.

(6) Disconnect the charge set and the gas cylinder, and set the 2-way and 3-way valves to the open position.
- Be sure to use a hexagonal wrench to operate the valve stems.

(7) Mount the valve stem nuts and the service port nut.
- Use torque wrench CWHAD-9211 to tighten the service port nut to a torque of 1.8 kg.m.
- Be sure to check for gas leakage.

2-2 Balance refrigerant of the 2-way,3-way valves

(Gas leakage)



Procedure

(1) **Confirm that both the 2-way and 3-way velves are set to the back seat.**

(2) **Connect the charge set to the 3-way valve's port.**

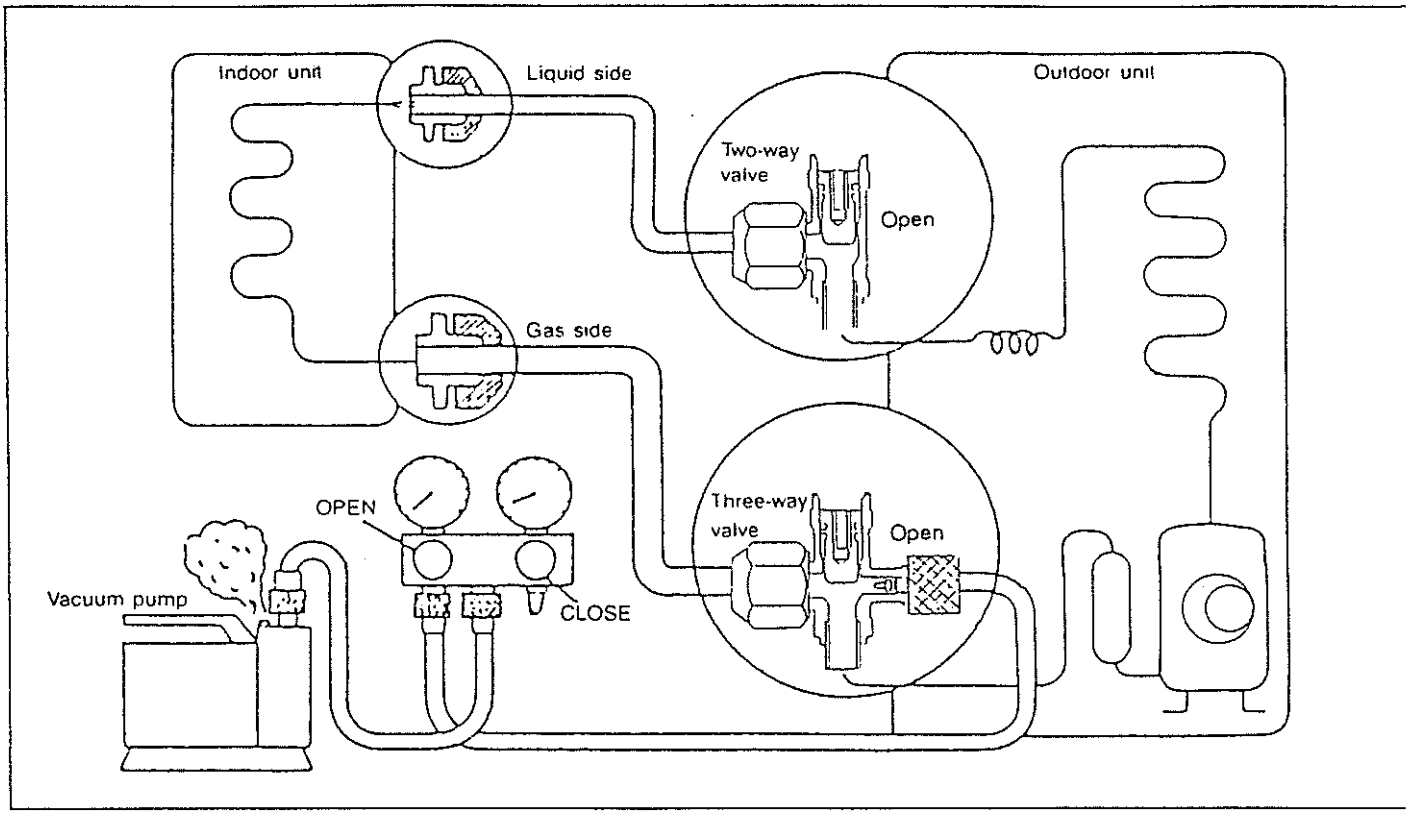
- Leave the valve on the charge set closed.
- Connect the charge hose with the push pin to the service port.

(3) **Open the valve (Lo side) on the charge set and discharge the refrigerant until the gauge indicates 0 kg/cm^{2}G.**

- If there is no air in the refrigerant cycle (the pressure when the air conditioner is not running is higher than 1 kg/cm^{2}G,discharge the refrigerant until the gauge indicates 0.5 to 1 kg/cm^{2}G. If this is the case, it will not be necessary to apply a evacuation.
- Discharge the refrigerant gradually; if it is discharged too suddenly, the refrigeration oil will also be discharged.

3 Evacuation

(All amount of refrigerant leaked)



Procedure

(1) Connect the vacuum pump to the charge set's center hose.

(2) Evacuation for approximately one hour.

- Confirm that the gauge needle has moved toward -76 cmHg (vacuum of 4 mmHg or less.)

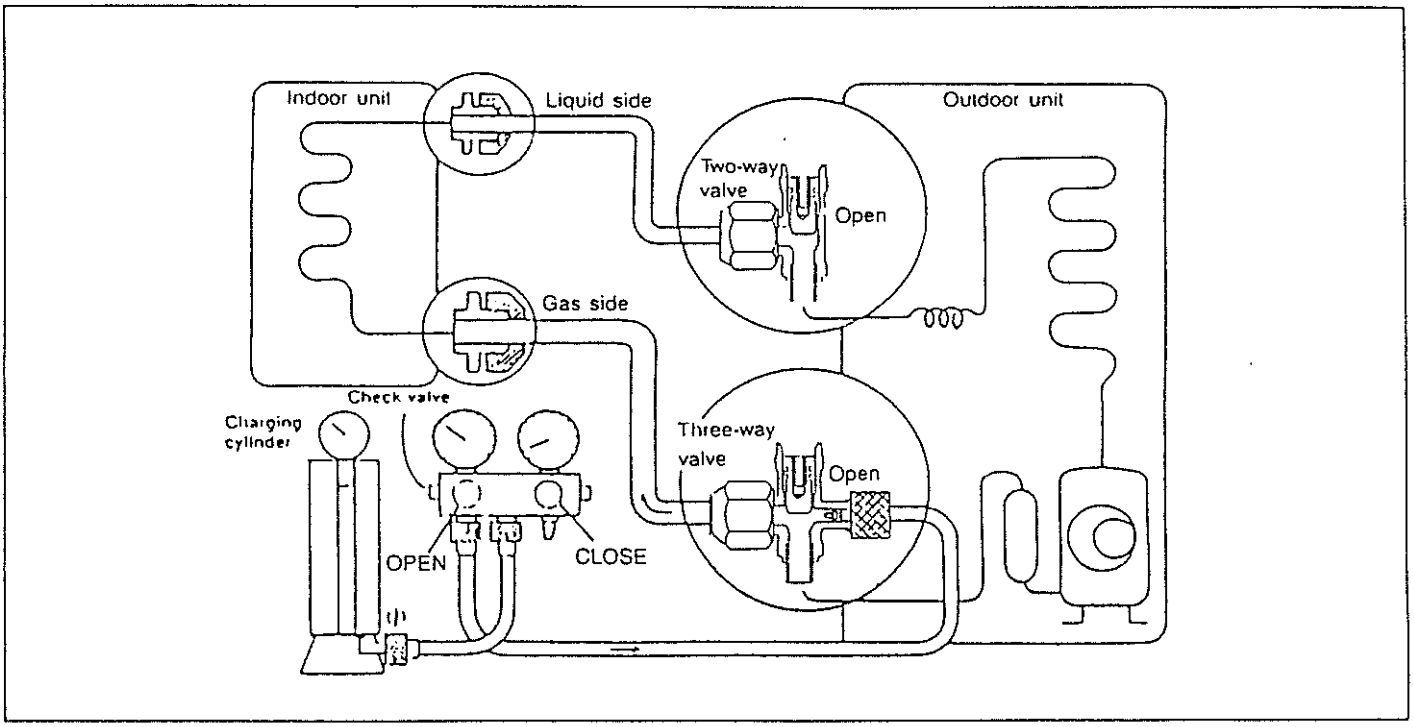
(3) Close the valve (Lo side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

(4) Disconnect the charge hose from the vacuum pump.

- Vacuum pump oil
  If the vacuum pump oil becomes dirty or depleted, replenish as needed.

4 Gas Charging

(After Evacuation)



Procedure

(1) Connect the charge hose to the charging cylinder.

- Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cvlinder.
- If you are using a gas cylinder, also use a scale and revers the cylinder so that the system can be charged with liquid.

(2) Purge the air from the charge hose.

- Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air. (Be careful of the liquid refrigerant). The procedure is the same if using a gas cylinder.

(3) Open the valve (Lo side) on the charge set and charge the system with liquid refrigerant.

- If the system can not be charged with the specified amount of refrigerant, it can be charged with a little at a time (approximately 150g each time) while operating the air conditioner in the cooling cycle; howwver, one time is not sufficient, wait approximately 1 minute and then repeat the procedure.(pumping down-pin)

This is different from previous procedures. Because you are charging with liquid refrigerant form the gas side, absolutely do not attempt to charge with largere amounts of liquid refrigerant while operating the air conditioner.

(4) Immediately disconnect the charge hose from the 3-way valve's service port.

- Stopping partway will allow the gas to be discharged.
- If the system has been charged with liquid refrigerant while operationg the air conditioner, turn off the air conditioner before disconnecting the hose.

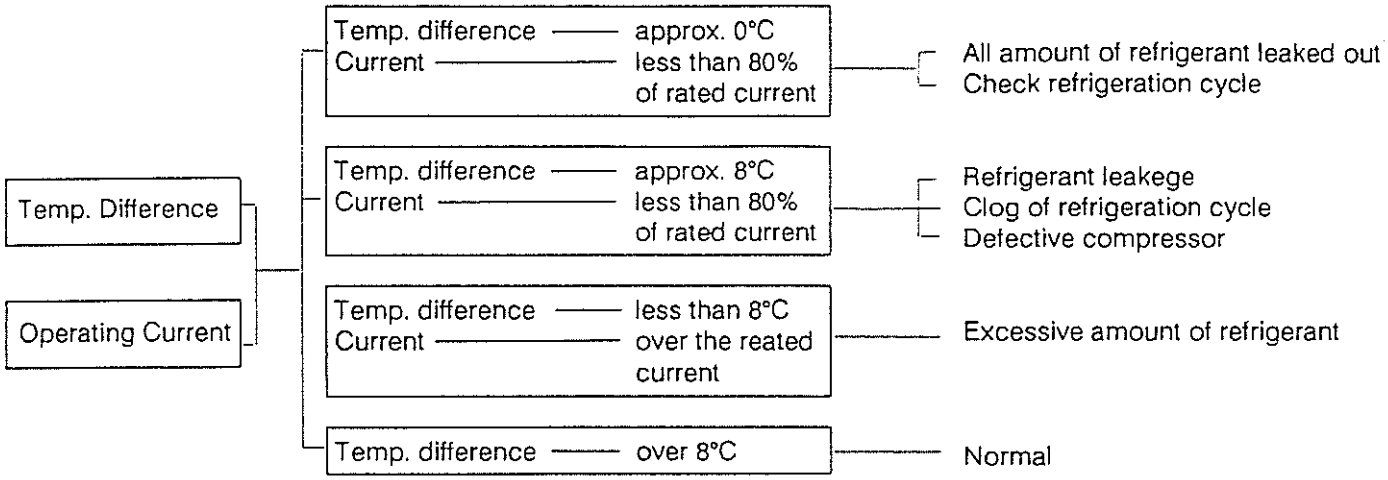
(5) Mount the valve stem nuts and the service port nut.

- Use torque wrench CWHAD-9211 to tighten the service port nut to a torque of 1.8 kg.m.
- Be sure to check for gas leakage.

Trouble Shooting Guide

Trouble analysis

1. Check temperature difference between intake and discharge air, and operating current



Notice

Temperature difference between intake and discharge air depends on room air humidity. When the room air humidity is relativery higher, temperature difference is smaller. When the room air humidity is relativery lower, temperature difference is larger.

2. Check temperature and pressure of refrigeration cycle

Suction pressure (Compared with the normal value)	Temperature (Compared with the normal value)	Cause of Trouble	Description
Higher	Higher	Defective compressor Defective 4-way reverse valve	Current is low
	Normal	Excessive amount of refrigerant	High pressure does not quickly rise at the beginning of operation.
Lower	Higher	Insufficient amount of refrigerant (Leakage) Clogging	Current is low Current is low

Notice

1. The suction pressure is usually 4.5-6.0 kg/cm^{2}G at normal condiion.

2. The temperature can be measured by attaching the thermometer to the low pressure tubing and wrap it with putty.

Trouble Shooting Guide

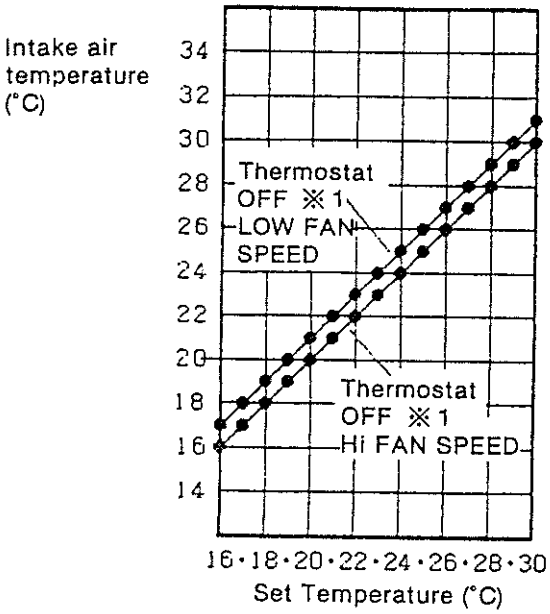
[Summary Inverter Airconditioner Trouble Shooting]

		CHECK POINT	CAUSE
1	Absolutely no operation.	• Operates if forced button is pressed • ZNR, fuse (3A) breakage • fuse (3A) breakage	① Remote control battery dead, insertion error ② Electric serge ③ Transistor short
2	Operates for a moment then everything stops (Stops when the inside fan starts to rotate.)	• OK if connector CN-MTR is removed.	① Indoor fan motor
3	Indoor fan doesn't rotate.	• Voltage is appearing from CN-MTR (2) pin, (3) pin • Transistor check of switching source	① Indoor fan motor ② Transistor short
4	Outdoor fan doesn't operate (Compressor doesn't operate).	• AC 220V is not supplied to diode bridge of outdoor voltage rectification section. • Outdoor printed circuit board DC fuse (10A) break. • Outdoor printed circuit board 5V, 5.5V not supplied. • Outdoor printed circuit board IC damage. • During heating, outdoor unit operates when the indoor printed circuit board connector CN-TH is removed. • Indoor outdoor transmission abnormality.	① Error in wiring of connecting lines between outdoor and indoor units. ② AC fuse (20A) breakage. ③ RY-PWR section fixed resistor lines disconnection. ④ Diode defect (on the P.C. Board) → power TR short → fuse break ⑤ Diode defect → power Tr → IC damaged ⑥ Indoor pipe sensor malfunction ⑦ Indoor printed circuit board (microcomputer etc.)
5	2-minutes after start of operation, indoor indication shows DC peak.	• Same thing happens even when U.V. and W terminal leads wires of the Power TR are removed and operated. • At start of operation, the compressor sound continues for 2, 3 seconds.	① Diode defect (on the P.C. Board) → power TR short ② Compressor mecha-lock
6	After compressor operates for a while, indoor indicator shows DC peak.	• Voltage check of Power Transistor Control circuitry. • OK if Discharge the refrigerant.	① Amplification IC defect ② Outdoor microcomputer defect ③ Diode defect (on the P.C. Board) ④ Excesive amount of refrigerant.
7	Outdoor unit at times. (During stopping, the outdoor P.C. Board board Protection Indicator LED (red) starts blinking).	• Over Current Relay, OFF • Over Current Relay, ON	① Gas leakage. ② Inproper heat radiation. ③ Total running control in operation
8	The outdoor fan doesn't rotate	• The outdoor printed circuit board CN-MTR's (2) pin, (3) pin → voltage is appearing	① Outdoor fan motor defect

Technical Data

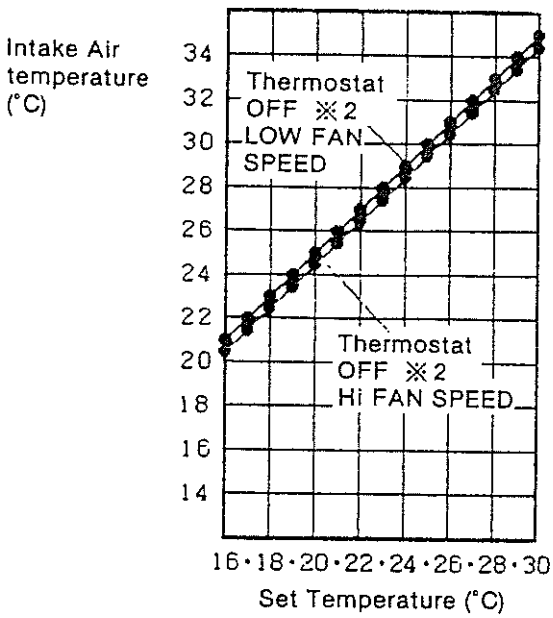
◆ Thermostat characteristics

• Cooling operation



※1 Cooling thermostat ON
If 2 minutes after compressor stopping, the temperature is more than the thermostat OFF temperature, then the compressor operates.

• Heating Operation

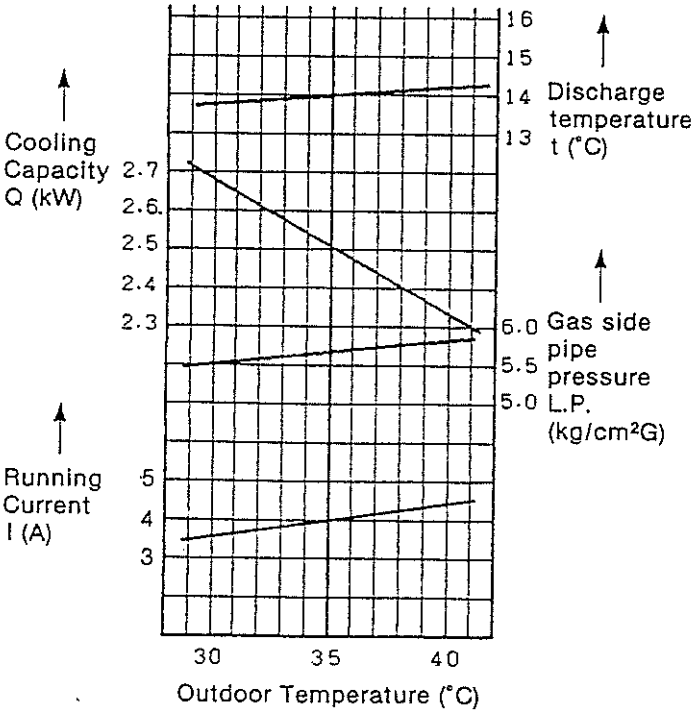


※2 Heating thermostat ON
2 minutes after the compressor stopping, the temperature is below the thermostat OFF temperature, then the compressor operates.

◆ Operation characteristics

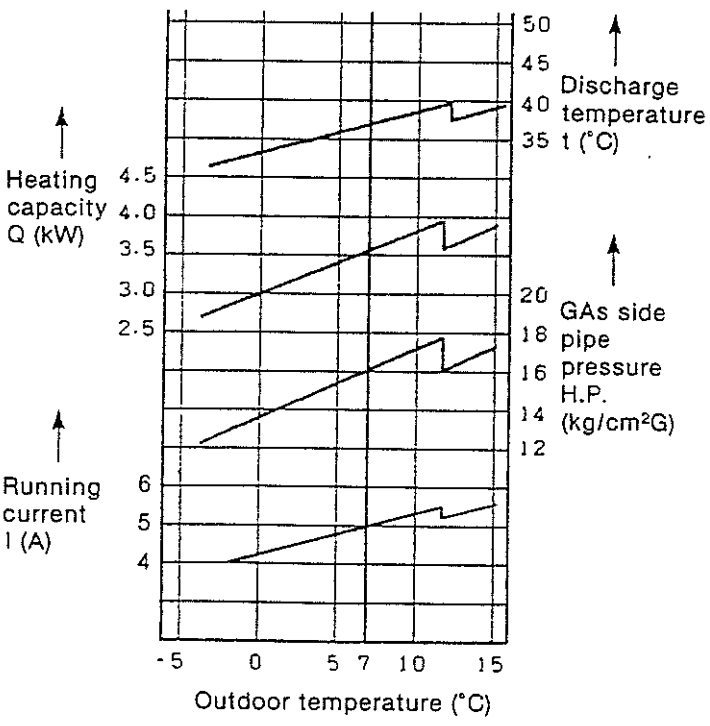
<Various cooling characteristics
– outdoor temperature>

Conditions: indoor 27°C
High Fan Speed
Operating frequency 68 Hz.



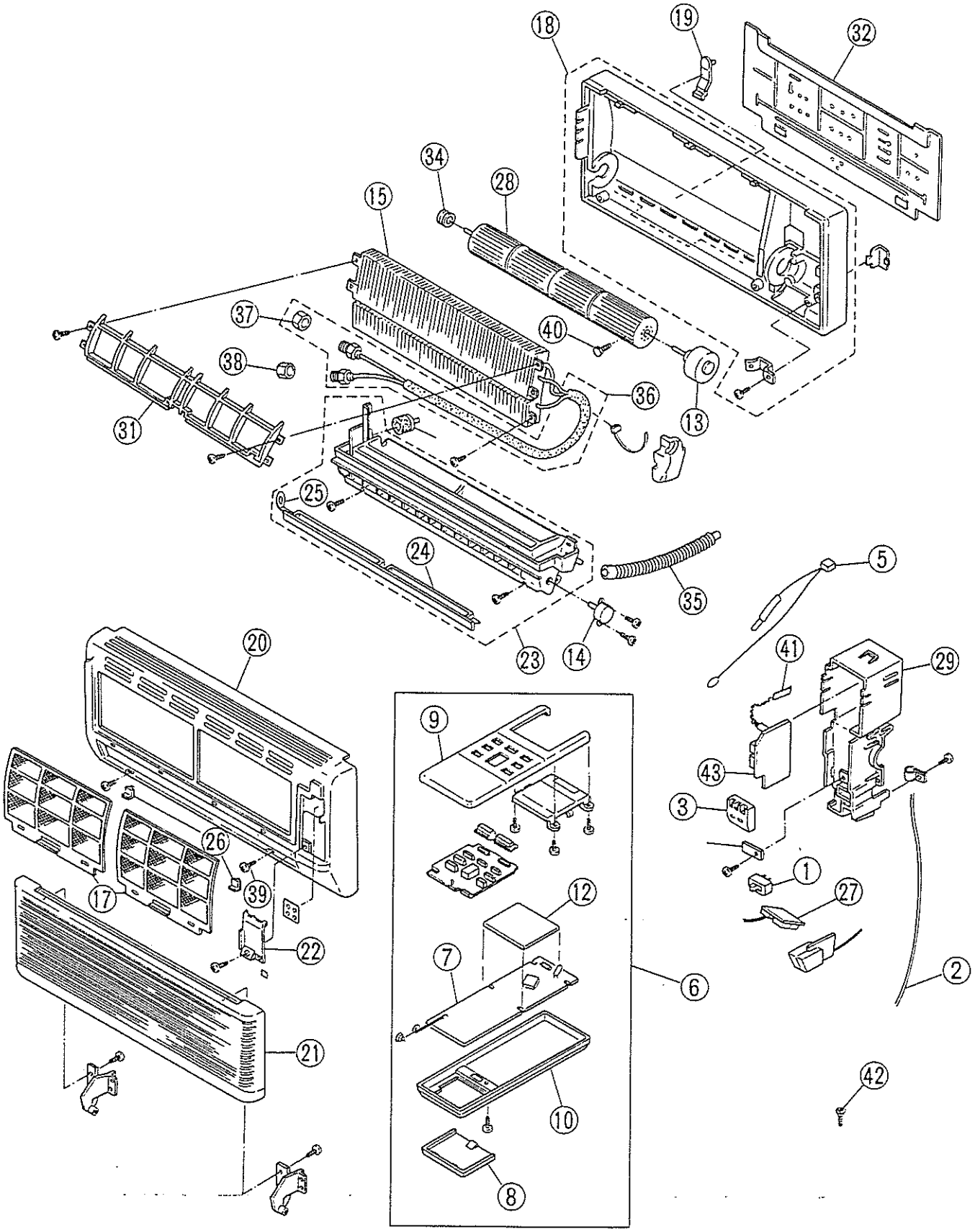
<Various Heating characteristis
– Outdoor temperature>

Conditions: Indoor 21°C
High Fan Speed
Operating frequency 92 Hz



Exploded View

CS-971KE

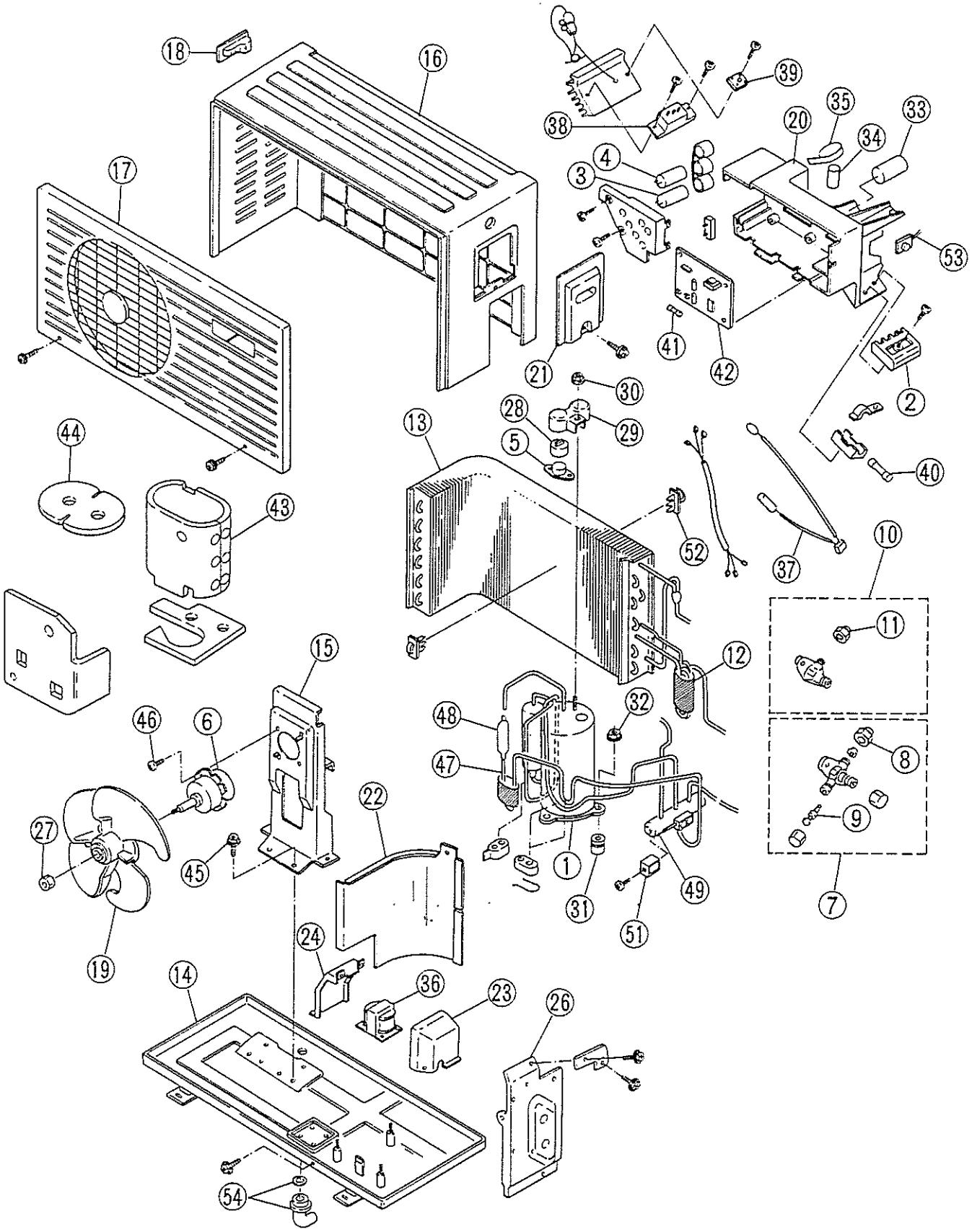


Replacement Parts List

NO.	DESCRIPTION & NAME	Q'TY	PART NO.
1	POWER SWITCH	1	CWA04014
2	POWER SUPPLY CORD	1	CWA20C403
3	TERMINAL BOARD POWER SUPPLY	1	CWA28K160
5	SENSOR-COMPLETE	1	CWA50C264
6	REMOTE CONTROL COMPLETE	1	CWA75C250
7	P.C.B-REMOTE CONTROL	1	CWA73705
8	BACK COVER	1	CWB80040
9	UPPER CASE-REMOTE CONTROL	1	CWE15C118
10	LOWER CASE-REMOTE CONTROL	1	CWE15126
12	INDICATOR	1	CWE39154
13	FAN MOTOR	1	CWA98081
14	MOTOR-AIR SWING	1	CWA98074
15	EVAPORATOR	1	CWB30C016
17	AIR FILTER	2	CWD00107
18	BASE ASS'Y	1	CWD50C039
19	PIPE HOLDER	1	CWD93574
20	FRONT GRILLE COMPLETE	1	CWE10C896
21	GRILLE DOOR	1	CWE14107
22	CONTROL PANEL	1	CWE31498
23	DISCHARGE GRILLE COMPLETE	1	CWE20C215
24	VANE-AIR SWING	1	CWE24218
25	BEARING FOR VANE	1	CWH64060
26	CAP-FRONT GRILLE MOUNT SCREW	2	CWH52104
27	INDICATOR COMPLETE	1	CWE39C127
28	CROSS-FLOW FAN	1	CWH02K062
29	CONTROL BOARD	1	CWH10676
31	FRAME FOR AIR FILTER	1	CWD01018
32	INSTALLATION PLATE	1	CWH36057
33	CAP-DRAIN TRAY	1	CWH4612086
34	BEARING	1	CWH64K007
35	DRAIN HOSE	1	CWH85075A
36	TUBE ASS'Y-COMPLETE	1	CWT00C638
37	FLARE NUT	1	CWH6002140
38	FLARE NUT	1	CWT25005
39	SCREW-FRONT MOUNT	2	XTN4+16C
40	SCREW-CROSS FAN	1	CWH4580304
41	FUSE	1	XBA2C30NS1
42	SCREW-INSTALLATION	4	CWG87C244
43	P.C. BOARD-MAIN	1	CWA73934
45	RECEIVER COMPLETE	1	CWA73717
	OPERATING INSTRUCTION	1	CWF56276
	INSTALLATION INSTRUCTION	1	CWF60742

Exploded View

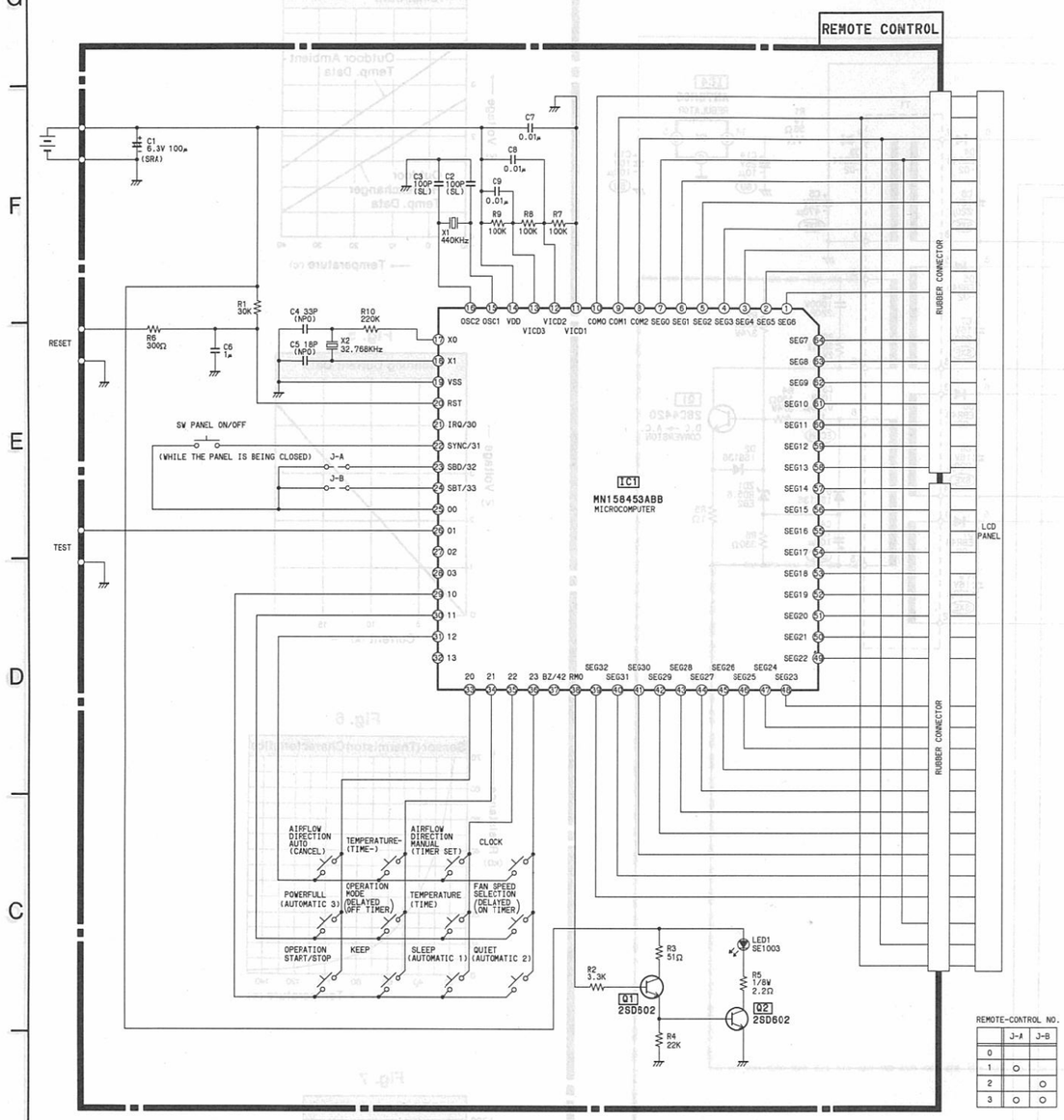
CU-971KE



Replacement Parts List

NO.	DESCRIPTION & NAME	Q'TY	PART NO.
1	COMPRESSOR	1	2RV110N5CA02
2	TERMINAL BOARD ASS'Y	1	CWH4711100
3	CAPACITOR (175V 45MF)	1	CWA31512
4	CAPACITOR (400V 1300MF)	1	CWA30101
5	OVERLOAD PROTECTOR	1	CWA12077
6	FAN MOTOR	1	CWA95232
7	3-WAY VALVE	1	CWB01230
8	FLARE NUT (3/8")	1	CWT25005
9	VALVE CORE	1	CWB62003
10	2-WAY VALVE	1	CWB02147
11	FLARE NUT	1	CWH6002140
12	TUBE ASS'Y (STRAINER, CAPILLARY)	1	CWT00C581
13	CONDENSER	1	CWB32C103
14	BASE PAN	1	CWD50K509A
15	FAN MOTOR BRACKET	1	CWD54130
16	CABINET ASS'Y	1	CWE00K202A
17	CABINET FRONT PLATE-COMPLETE	1	CWE06C050A
18	HANDLE	1	CWE16037
19	PROPELLER FAN	1	CWH03K002
20	CONTROL BOARD	1	CWH10675
21	CONTROL BOARD COVER	1	CWH13234
22	SOUND-PROOF PLATE	1	CWH15099
23	PARTICULAR PLATE	1	CWD90714
24	PARTICULAR PLATE	1	CWD90712
26	HOLDER-COUPLING	1	CWH35091A
27	NUT PROPELLER FAN	1	CWH56053
28	HOLDER-OVERLOAD PROTECTOR	1	CWH34002
29	TERMINAL COVER	1	CWH17006
30	NUT FOR TERMINAL COVER	1	CWH7080300
31	BUSHING-COMP	3	CWH50077
32	NUT-COMP MOUNT	3	CWH4582065
33	NOISE FILTER	1	CWA49082
34	NOISE FILTER	1	CWA49058
35	HOLDER-NOISE FILTER	1	CWH30123
36	REACTOR	1	CWA42063
37	SENSOR-COMPLETE	1	CWA50C224
38	POWER TRANSISTOR COMPLETE	1	MG20G6EL1
39	DIODE	1	S15VBA60
40	FUSE (20A)	1	XBACW12
41	FUSE (10A)	1	XBA2E100NR5
42	P.C. BOARD COMPLETE	1	CWA73935
43	SOUND PROOF MATERIAL-COMP	1	CWG30506
44	SOUND PROOF MATERIAL-COMP	1	CWG30523
45	SCREW-FAN MOTOR BRACKET	4	CWH4580399
46	SCREW-FAN MOTOR MOUNT	2	CWH55027
47	TUBE ASS'Y (CAPILLARY, CHECK VALVE)	1	CWT00C643
48	TUBE ASS'Y (RECEIVER)	1	CWT01450
49	TUBE ASS'Y (4-WAY VALVE)	1	CWT01488
50	STRAINER	1	CWB11025
51	4-WAY VALVE COIL	1	CWA43C441
52	HOLDER-SENSOR	1	CWH32035
53	PHOTO SENSOR COMPLETE	1	CWA73606
54	DRAIN ELBOW	1	CWG86C117

ELECTRONIC CIRCUIT DIAGRAMS



How to Use Electronic Diagram

Before using the circuit diagram, read the following carefully.

* Voltage measurement
  Voltage has been measured with a digital tester when the indoor fan is set at high Fan speed under the following conditions without setting the timer.
  Use them for servicing.
  Voltage indication is in red.

	Inlet air temperature	Temperature setting	Outlet air temperature	Heat exchanger temperature
Cooling	27°C	16°C	17°C	15°C
Heating	20°C	30°C	40°C	50°C

* Indications for resistance
  a. K...KΩ M...MΩ
  W...watt Not indicated...1/4W
  b. Type
  Not indicated .....carbon resister Tolerance±5%
  .....metal oxide resister Tolerance±1%

* Indication for capacitor
  a. Unit μ...μF P...PF
  b. Type Not indicated...ceramic capacitor
  (S) .....S series aluminium electrolytic capacitor
  (Z).....Z series aluminium electrolytic capacitor
  (SU).....SU series aluminium electrolytic capacitor
  (K) .....K series aluminium electrolytic capacitor
  (P) .....P series polyester system
  (SXE).....SXE series aluminium electrolytic capacitor
  (SRA)....SRA series aluminium electrolytic capacitor
  (KME)....KME series aluminium electrolytic capacitor
* Diode without indication MA165
※ Circuit Diagram is subject to change without notice for further development.

TIMER NAME

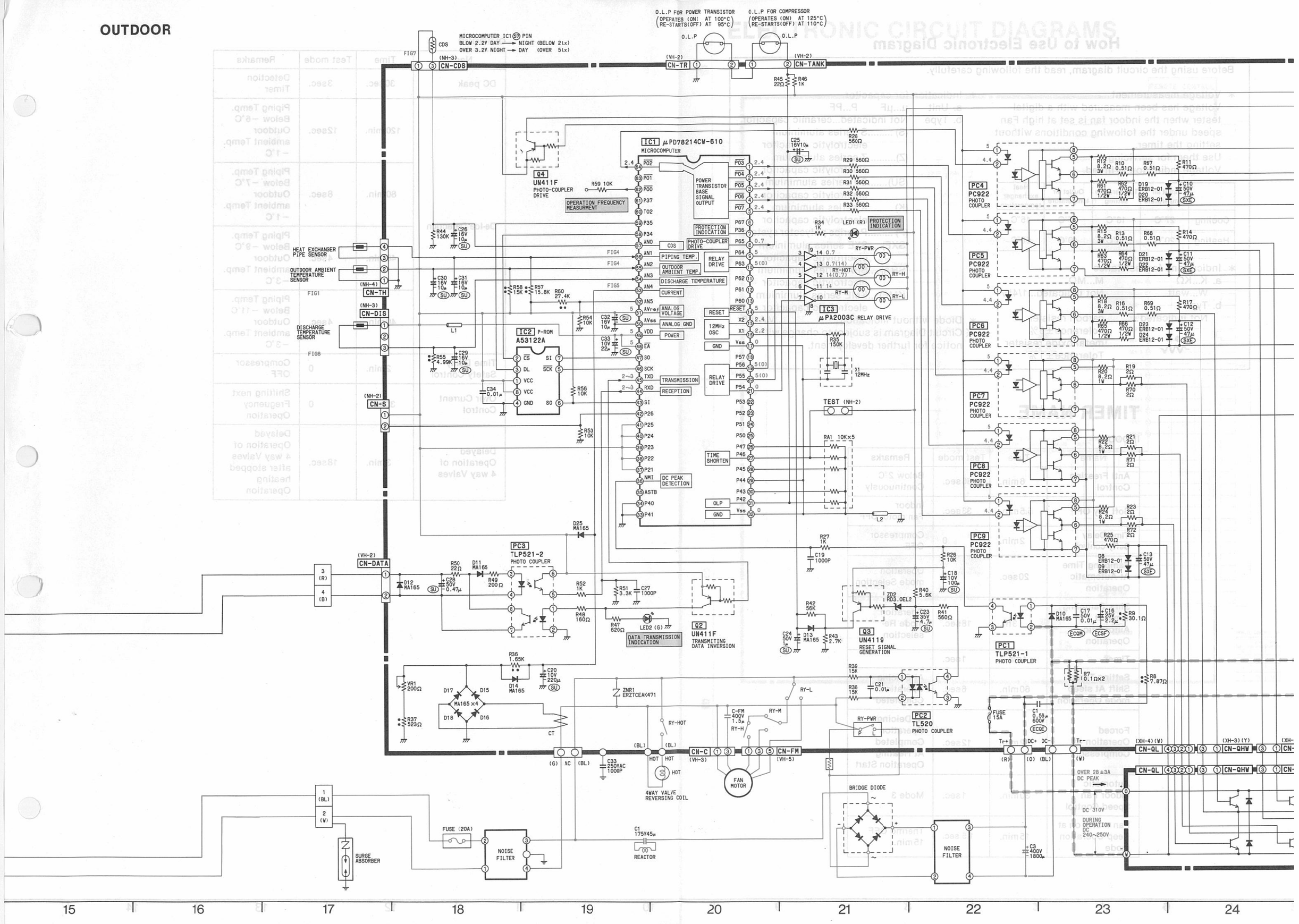
INDOOR

Name	Time	Test mode	Remarks
Anti Freezing Control	6min.	36sec.	Below 2°C Continuously
Soft Dry OFF	5.5min.	33sec.	Indoor Fan motor OFF
Time Delay Sefty control	2min.	0	Compressor OFF
Sampling Time At Automatic Operation	20sec.	0	Operation mode Selection
3hrs Sampling Time At Automatic Operation	3hr.	18sec.	Operation mode Re-selection
Timer	1min.	1sec.	
Setting Temp. Shift At sleep mode Operation	60min.	6sec.	At Deicing Operation Completed
Forced Operation of Compressor	2min.	12sec.	At Deicing Operation Completed At Heating Operation Start
Automatic Indoor Fan Speed Control	30min.	1sec.	Mode 3
Fan motor on at Keep Operation mode	15min.	1.5 sec.	Thermo OFF 15min.

OUTDOOR

Name	Time	Test mode	Remarks
DC peak	30sec.	3sec.	Detection Timer
De-Ice Detection	120 min.	12sec.	Piping Temp. Below −6°C Outdoor ambient Temp. −1°C
	80min.	8sec.	Piping Temp. Below −7°C Outdoor ambient Temp. −1°C
	40min.	4sec.	Piping Temp. Below −9°C Outdoor ambient Temp. −3°C
	40min.	4sec.	Piping Temp. Below −11°C Outdoor ambient Temp. −3°C
Time Delay Safety Control	2min.	0	Compressor OFF
Over Current Control	30sec.	0	Shifting next Freguency Operation
Delayed Operation of 4 way Valves	3min.	18sec.	Delayed Operation of 4 way Valves after stopped heating Operation

OUTDOOR


O.L.P FOR POWER TRANSISTOR (OPERATES (ON) AT 100°C (RE-STARTS(OFF) AT 95°C)
O.L.P FOR COMPRESSOR (OPERATES (ON) AT 125°C RE-STARTS(OFF) AT 110°C)
MICROCOMPUTER IC1 (57) PIN BLOW 2.2V DAY → NIGHT (BELOW 2lx) OVER 3.2V NIGHT → DAY (OVER 5lx)
CDS
O.L.P
CN-CDS
CN-TR
CN-TANK
IC1 μPD78214CW-610 MICROCOMPUTER
POWER TRANSISTOR BASE SIGNAL OUTPUT
OPERATION FREQUENCY MEASURMENT
PROTECTION INDICATION
PHOTO-COUPLER DRIVE
RELAY DRIVE
CDS
PIPING TEMP.
OUTDOOR AMBIENT TEMP.
DISCHARGE TEMPERATURE
CURRENT
ANALOG VOLTAGE
ANALOG GND
POWER
TRANSMISSION
RECEPTION
TIME SHORTEN
DC PEAK DETECTION
OLP
RESET
12MHz OSC
Q4 UN411F PHOTO-COUPLER DRIVE
IC3 μPA2003C RELAY DRIVE
RY-PWR
RY-HOT
RY-H
RY-M
RY-L
TEST (NH-2)
X1 12MHz
RA1 10K×5
L1
L2
HEAT EXCHANGER PIPE SENSOR
OUTDOOR AMBIENT TEMPERATURE SENSOR
DISCHARGE TEMPERATURE SENSOR
CN-TH
CN-DIS
CN-S
IC2 P-ROM A53122A
PC4 PC922 PHOTO COUPLER
PC5 PC922 PHOTO COUPLER
PC6 PC922 PHOTO COUPLER
PC7 PC922 PHOTO COUPLER
PC8 PC922 PHOTO COUPLER
PC9 PC922 PHOTO COUPLER
PC3 TLP521-2 PHOTO COUPLER
Q2 UN411F TRANSMITING DATA INVERSION
DATA TRANSMISSION INDICATION
Q3 UN4119 RESET SIGNAL GENERATION
PC1 TLP521-1 PHOTO COUPLER
PC2 TL520 PHOTO COUPLER
CN-DATA
CN-C
CN-FM
CN-QL
CN-QHW
FAN MOTOR
4WAY VALVE REVERSING COIL
CT
ZNR1 ERZTCEAK471
BRIDGE DIODE
FUSE (20A)
FUSE 15A
SURGE ABSORBER
NOISE FILTER
REACTOR
OVER 28±3A DC PEAK
DC 310V
DURING OPERATION DC 240~250V

PRINTED CIRCUIT BOARD

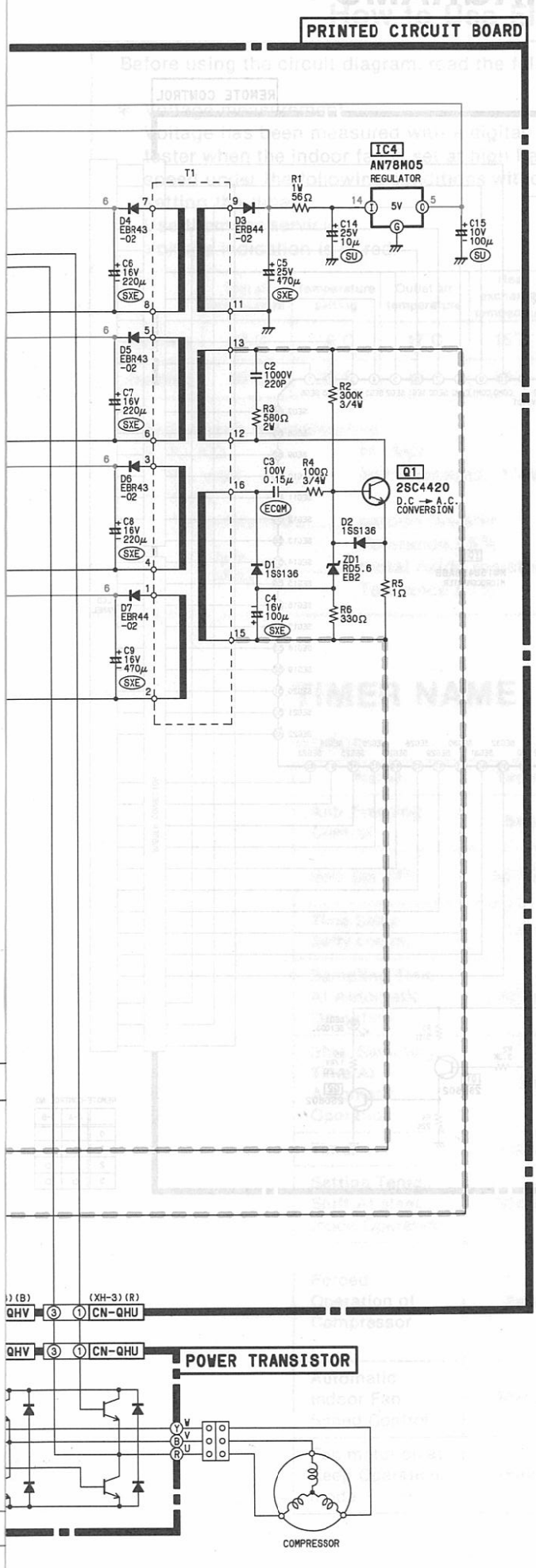


Fig. 4

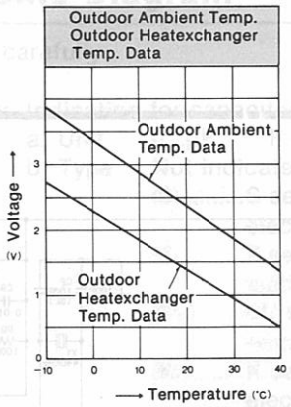


Fig. 5

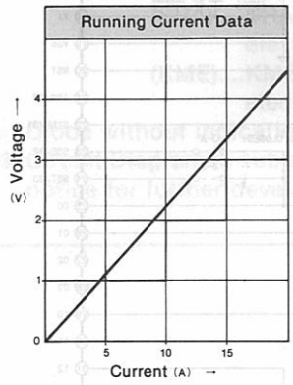


Fig. 6

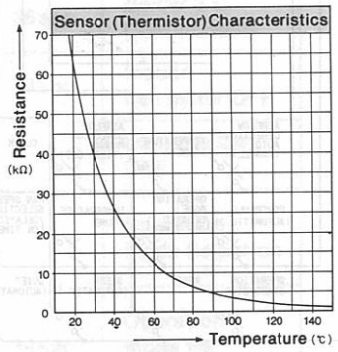
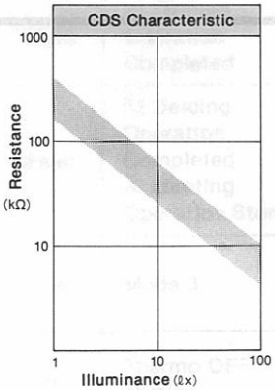
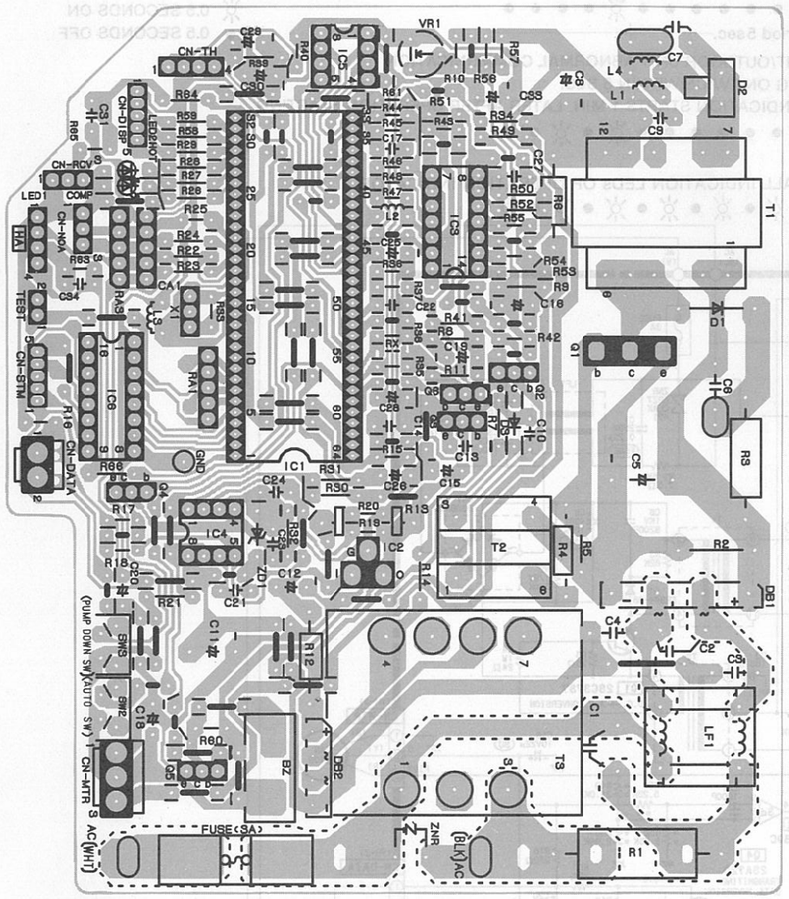


Fig. 7





PRINT PATTERN

INDOOR UNIT PRINTED CIRCUIT BOARD

Receptor

DISPLAY

OUTDOOR UNIT PRINTED CIRCUIT BOARD

<This diagram shows the Component side combined with the rear side printed pattern.>

CS-1271KE

ELECTRONIC CIRCUIT DIAGRAMS

• CS-1271KE/CU-1271KE

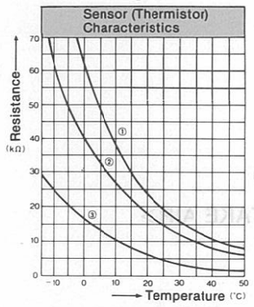
INDOOR

Fig. 3

Indoor Fan Speed

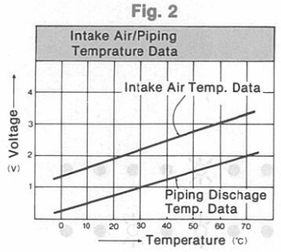
	Hi Speed ←													→ Lo Speed	
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	Stop
CN-MTR 3 PIN (V)	31.0	28.0	27.5	27.0	25.5	24.5	23.5	23.0	21.0	20.0	18.5	18.0	16.5	14.5	9.0	0
Cooling		Hi					■		Me		■		Lo			
Soft Dry														○		
Heating	Hi	■				Me			■		Lo					

Fig. 1

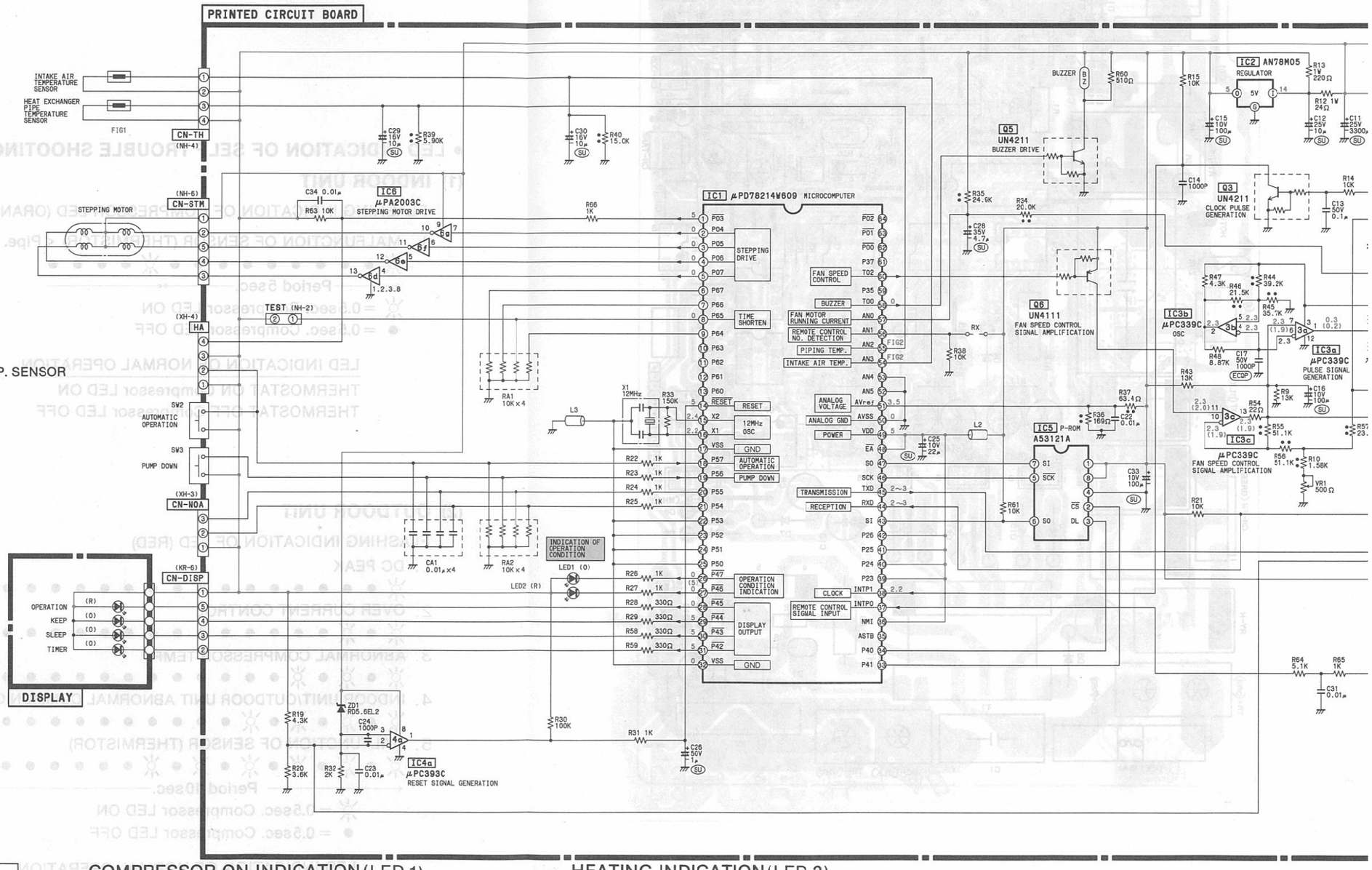


① INDOOR PIPE SENSOR
② INTAKE AIR SENSOR
OUTDOOR AMBIENT TEMP. SENSOR
③ OUTDOOR PIPE SENSOR

Fig. 2



PRINTED CIRCUIT BOARD



REMOTE-CONTROL NO.	RX
0	——
1	27K
2	12K
3	6.2K

COMPRESSOR ON INDICATION (LED 1)

COMPRESSOR ON ..... LED ON

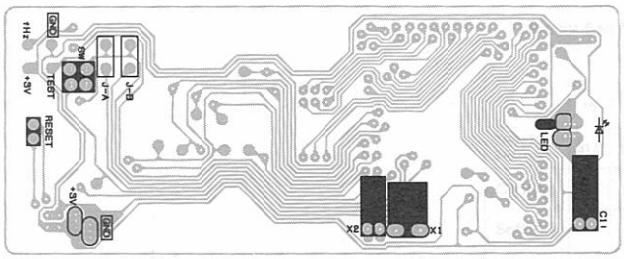
COMPRESSOR OFF ..... LED OFF

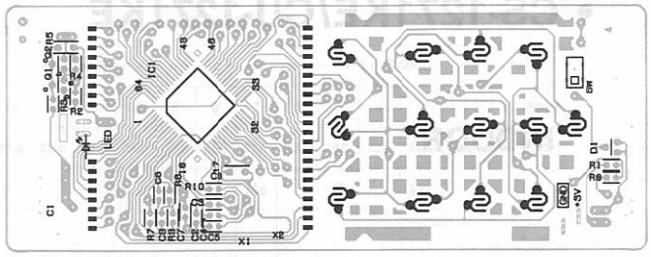
HEATING INDICATION (LED 2)

HEATING ..... LED ON

COOLING/SOFT DRY ..... LED OFF

REMOTE CONTROL





• LED INDICATION OF SELF TROUBLE SHOOTING

(1) INDOOR UNIT

FLASHING INDICATION OF COMPRESSOR LED (ORANGE)

1. MALFUNCTION OF SENSOR (THERMISTOR) <Pipe. INTAKE AIR>

☼ ● ● ● ● ● ● ● ● ☼ ● ● ● ●

←——— Period 5 sec. ———→

☼ = 0.5 sec. Compressor LED ON

● = 0.5 sec. Compressor LED OFF

LED INDICATION OF NORMAL OPERATION

THERMOSTAT ON Compressor LED ON

THERMOSTAT OFF Compressor LED OFF

(2) OUTDOOR UNIT

FLASHING INDICATION OF LED (RED)

1. DC PEAK

☼ ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ☼ ● ● ● ●

2. OVER CURRENT CONTROL

☼ ● ☼ ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ☼ ● ☼ ● ●

3. ABNORMAL COMPRESSOR TEMP.

☼ ● ☼ ● ☼ ● ● ● ● ● ● ● ● ● ● ● ● ● ☼ ● ☼ ● ☼

4. INDOOR UNIT/OUTDOOR UNIT ABNORMAL COMMUNICATION

☼ ● ☼ ● ☼ ● ☼ ● ● ● ● ● ● ● ● ● ● ● ☼ ● ☼ ● ☼

5. MALFUNCTION OF SENSOR (THERMISTOR)

☼ ● ☼ ● ☼ ● ☼ ● ☼ ● ☼ ● ● ● ● ● ● ● ● ☼ ● ☼ ● ☼

←——— Period 10 sec. ———→

☼ = 0.5 sec. Compressor LED ON

● = 0.5 sec. Compressor LED OFF

LED INDICATION OF NORMAL OPERATION

Compressor LED OFF (RED)

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