



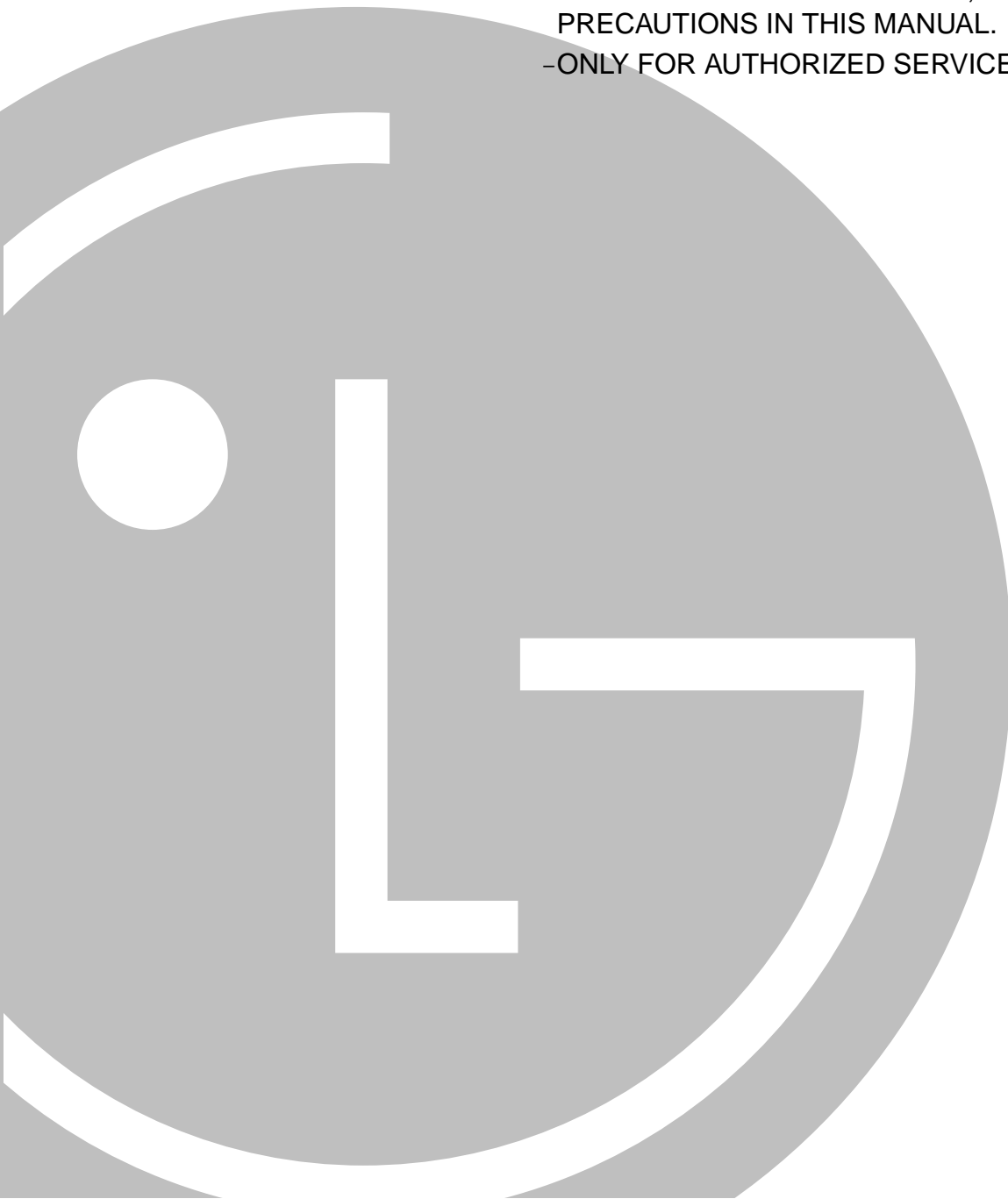
WEBSITE <http://biz.LGservice.com>

# Room Air Conditioner

## **SERVICE MANUAL**

### **CAUTION**

- BEFORE SERVICING THE UNIT, READ THE SAFETY PRECAUTIONS IN THIS MANUAL.
- ONLY FOR AUTHORIZED SERVICE PERSONNEL.



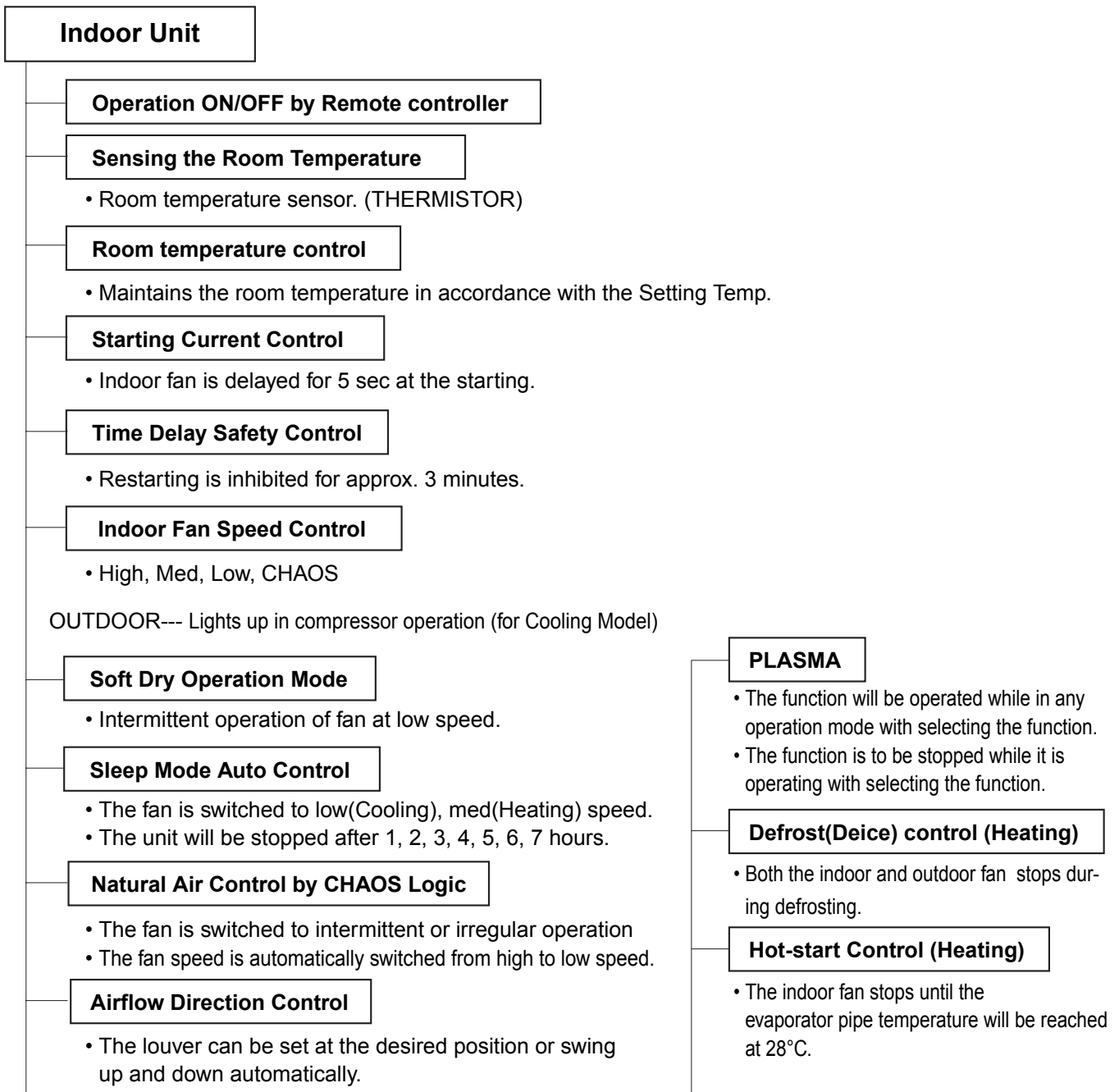
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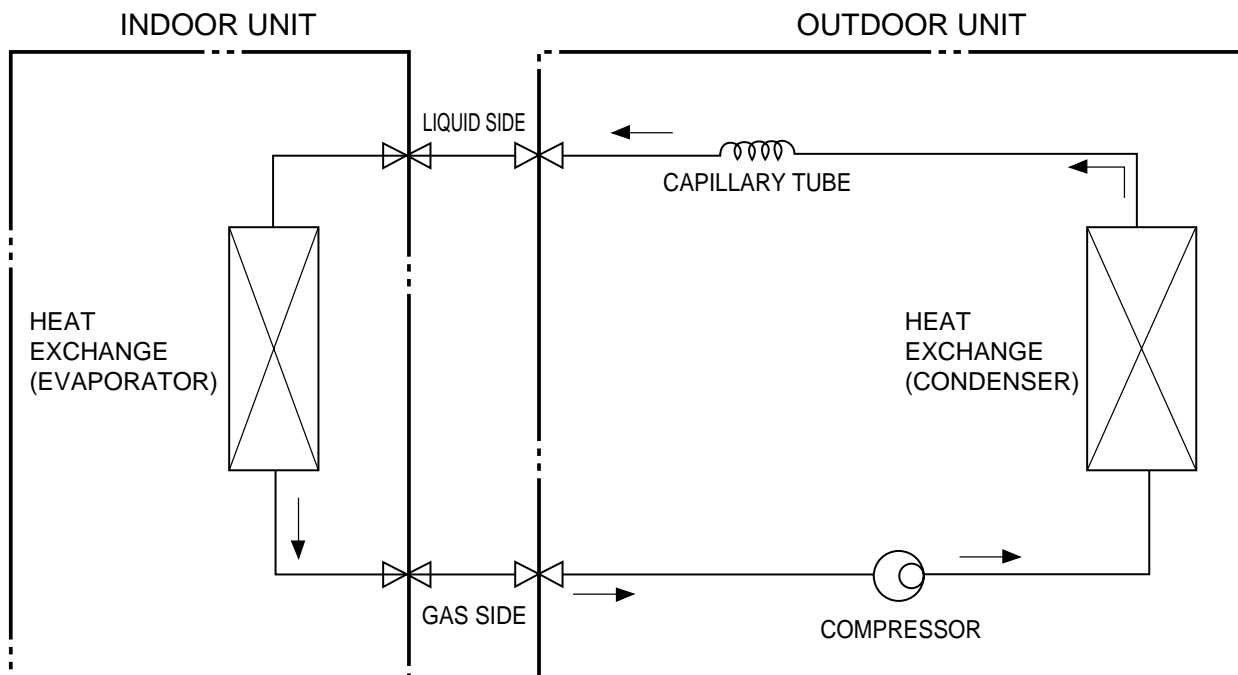
# Functions

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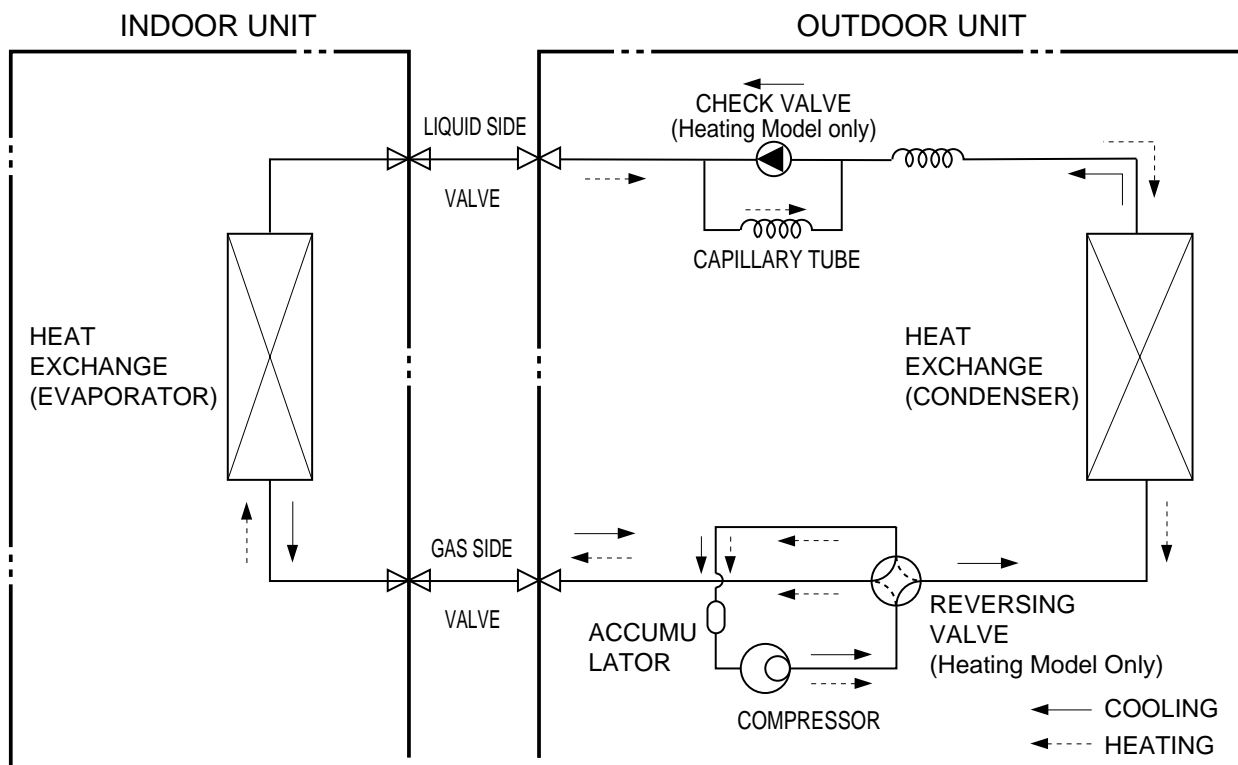


# Refrigeration Cycle Diagram

## (1) Cooling Only Models



## (2) Cooling & Heating Models



# Operation Details

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## 1. MAIN UNIT FUNCTION

### • DISPLAY

#### 1) C/O Model

##### Operation Indicator

- ON while in appliance operation, OFF while in appliance pause.
- Flashing while in disconnection or short in Thermistor. (3 sec off / 0.5 sec on)

##### Sleep Timer Indicator

- ON while in sleep timer mode, OFF when sleep timer cancel or appliance operation pause.

##### Timer Indicator

- ON while in timer mode (on/off), OFF when timer mode is completed or canceled.

##### Comp. Running Indicator

- While in appliance operation, ON while in outdoor unit compressor running, OFF while in compressor off.

#### 2) H/P Model

##### Operation Indicator

- ON while in appliance operation, OFF while in appliance pause.
- Flashing while in disconnection or short in Thermistor. (3 sec off / 0.5 sec on)

##### Sleep Timer Indicator

- ON while in sleep timer mode, OFF when sleep timer cancel or appliance operation pause.

##### Timer Indicator

- ON while in timer mode (on/off), OFF when timer mode is completed or canceled.

##### Defrost Indicator

- OFF except when hot start during heating mode operation or while in defrost control.

### ■ Cooling Mode Operation

- When the intake air temperature reaches 0.5°C below the setting temp, the compressor and the outdoor fan stop.
- When it reaches 0.5°C above the setting temp, they start to operate again.
  - Compressor ON Temp                      ➤ Setting Temp+0.5°C
  - Compressor OFF Temp                      ➤ Setting Temp-0.5°C
- While in compressor running, operating with the airflow speed set by the remote control. While in compressor not running, operating with the low airflow speed regardless of the setting.

### ■ Healthy Dehumidification Mode

- When the dehumidification operation input by the remote control is received, the intake air temperature is detected and the setting temp is automatically set according to the intake air temperature.
  - 26°C ≤ Intake Air Temp                      ➤ 25°C
  - 24°C ≤ Intake Intake Air Temp < 26°C                      ➤ Intake Air Temp-1°C
  - 18°C ≤ Intake Intake Air Temp < 24°C                      ➤ Intake Air Temp-0.5°C
  - Intake Air Temp < 18°C                      ➤ 18°C

- While in compressor off, the indoor fan repeats low airflow speed and pause.
- While the intake air temp is between compressor on temp. and compressor off temp., 10-min dehumidification operation and 4-min compressor off repeat.  
Compressor ON Temp.    ▶ Setting Temp+0.5°C  
Compressor OFF Temp.   ▶ Setting Temp-0.5°C
- In 10-min dehumidification operation, the indoor fan operates with the low airflow speed.

## ■ Heating Mode Operation

- When the intake air temp reaches +3°...above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.  
Compressor ON Temp.    ▶ Setting Temp.  
Compressor OFF Temp.   ▶ Setting Temp.+3°C
- While in compressor on, the indoor fan is off when the indoor pipe temp. is below 20°C, when above 28°C , it operates with the low or setting airflow speed. When the indoor pipe temp is between 20°C and 28°C, it operates with Super-Low(while in sleep mode, with the medium airflow speed).
- While in compressor off, the indoor fan is off when the indoor pipe temp is below 33°C, when above 35°C , it operates with the low airflow speed.
- If overloaded while in heating mode operation, in order to prevent the compressor from OLP operation, the outdoor fan is turned on/off according to the indoor pipe temp.
- While in defrost control, both of the indoor and outdoor fans are turned off.

## ■ Defrost Control

- While in heating mode operation in order to protect the evaporator pipe of the outdoor unit from freezing, reversed to cooling cycle to defrost the evaporator pipe of the outdoor unit.
- After 40 min heating mode operation, at 4 min interval, whether to carry out defrost control or not and the time of defrost control are determined according to the following conditions.
  - 1) While in heating mode operation, the maximum of the indoor pipe temperature is measured and it is compared with the present indoor pipe temperature to get the difference of the indoor pipe temperatures (=the maximum temperature of indoor pipe ? the present temperature of indoor pipe), according to which, whether to carry out defrost control or not is determined.
  - 2) According to the need of defrost control shown above and the elapsed time of heating mode operation at that moment, the defrost control time is determined.
  - 3) When the determined time of defrost control is below 7 min, heating mode operation continues without carrying out defrost control. According to the procedure stated above, the determination is made again. When the defrost control time is 7 min or longer, defrost control is then carried out.
- While in defrost control, the minimum temp of the indoor pipe is measured and it is compared with the present temp of the indoor pipe to get the difference of the indoor pipe temperatures (=the present temperature of the indoor pipe ? the minimum temperature of the indoor pipe). When the difference is 5°C or higher, defrost control is completed and heating mode operation is carried out.
- While in defrost control, if the defrost time determined before the start of defrost control is completed, defrost control stops and heating mode operation is carried out regardless of the above condition.
- When the indoor pipe temp is 42°C or above, defrost control is not carried out even if the condition is one of the defrost conditions above.
- While in defrost control, the compressor is on and the indoor fan, the outdoor fan, and the 4 way valve are off.

## ■ Fuzzy Operation (C/O Model)

- According to the temperature set by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.  
Compressor ON Temp                      ➤ Setting Temp + 0.5°C  
Compressor OFF Temp                    ➤ Setting Temp + 0.5°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
26°C ≤ Intake Air Temp                    ➤ 25°C  
24°C ≤ Intake Air Temp < 26°C           ➤ Intake Air Temp + 1°C  
22°C ≤ Intake Air Temp < 24°C           ➤ Intake Air Temp + 0.5°C  
18°C ≤ Intake Air Temp < 22°C           ➤ Intake Air Temp  
Intake Air Temp < 18°C                    ➤ 18°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature.

## ■ Fuzzy Operation (H/P Model)

- When any of operation mode is not selected like the moment of the power on or when 3 hrs has passed since the operation off, the operation mode is selected.
- When determining the operation mode, the compressor, the outdoor fan, and the 4 way valve are off and only the indoor fan is operated for 15 seconds. Then an operation mode is selected according to the intake air temp at that moment as follows.  
24°C ≤ Intake Air Temp                    ➤ Fuzzy Operation for Cooling  
21°C ≤ Intake Air Temp < 24°C           ➤ Fuzzy Operation for Dehumidification  
Intake Air Temp < 21°C                    ➤ Fuzzy Operation for Heating
- If any of the operation modes among cooling / dehumidification / heating mode operations is carried out for 10 sec or longer before Fuzzy operation, the mode before Fuzzy operation is operated.

### 1) Fuzzy Operation for Cooling

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.  
Compressor ON Temp                      ➤ Setting Temp + 0.5°C  
Compressor OFF Temp                    ➤ Setting Temp + 0.5°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
26°C ≤ Intake Air Temp                    ➤ 25°C  
24°C ≤ Intake Air Temp < 26°C           ➤ Intake Air Temp + 1°C  
22°C ≤ Intake Air Temp < 24°C           ➤ Intake Air Temp + 0.5°C  
18°C ≤ Intake Air Temp < 22°C           ➤ Intake Air Temp  
Intake Air Temp < 18°C                    ➤ 18°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature.

## 2) Fuzzy Operation for Dehumidification

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.  
Compressor ON Temp                      ➤ Setting Temp + 0.5°C  
Compressor OFF Temp                    ➤ Setting Temp+0.5°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
26°C ≤ Intake Air Temp                ➤ 25°C  
24°C ≤ Intake Air Temp < 26°C       ➤ Intake Air Temp+1°C  
22°C ≤ Intake Air Temp < 24°C       ➤ Intake Air Temp+0.5°C  
18°C ≤ Intake Air Temp < 22°C       ➤ Intake Air Temp  
Intake Air Temp < 18°C                ➤ 18°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan repeats the low airflow speed or pause as in dehumidification operation.

## 3) Fuzzy Operation for Heating

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is 3°C or more above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.  
Compressor ON Temp                      ➤ Setting Temp  
Compressor OFF Temp                    ➤ Setting Temp + 3°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
20°C ≤ Intake Air Temp                ➤ Intake Air Temp + 0.5°C  
Intake Air Temp < 20°C                ➤ 20°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is set to the high or the medium according to the intake air temperature and the setting temperature.

## ■ Airflow Speed Selection

- The airflow speed of the indoor fan is set to high, medium, low, or chaos (auto) by the input of the airflow speed selection key on the remote control.

## ■ On-Timer Operation

- When the set time is reached after the time is input by the remote control, the appliance starts to operate.
- The timer LED is on when the on-timer is input. It is off when the time set by the timer is reached.
- If the appliance is operating at the time set by the timer, the operation continues.



## ■ Off-Timer Operation

- When the set time is reached after the time is input by the remote control, the appliance stops operating.
- The timer LED is on when the off-timer is input. It is off when the time set by the timer is reached.
- If the appliance is on pause at the time set by the timer, the pause continues.

## ■ Off-Timer ↔ On-Timer Operation

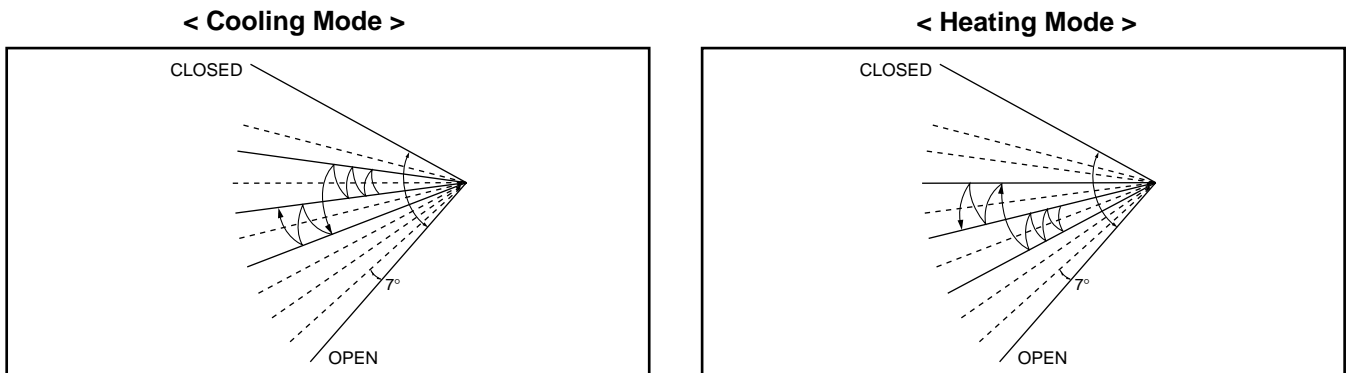
- When the set time is reached after the on/off time is input by the remote control, the on/off-timer operation is carried out according to the set time.

## ■ Sleep Timer Operation

- When the sleep time is reached after <1,2,3,4,5,6,7,0(cancel) hr> is input by the remote control while in appliance operation, the operation of the appliance stops.
- While the appliance is on pause, the sleep timer mode cannot be input.
- While in cooling mode operation, 30 min later since the start of the sleep timer, the setting temperature increases by 1°C. After another 30 min elapse, it increases by 1°C again.
- When the sleep timer mode is input while in cooling cycle mode, the airflow speed of the indoor fan is set to the low.
- When the sleep timer mode is input while in heating cycle mode, the airflow speed of the indoor fan is set to the medium.

## ■ Chaos Swing Mode

- By the Chaos Swing key input, the upper/lower vane automatically operates with the Chaos Swing or they are fixed to the desired direction.
- While in Chaos Swing mode, the angles of cooling and heating cycle operations are different.



## ■ Chaos Natural Wind Mode

- When the Chaos Natural Wind mode is selected and then operated, the high, medium, or low speed of the airflow mode is operated for 2~15 sec. randomly by the Chaos Simulation.

## ■ Forced Operation

- Operation procedures when the remote control can't be used.
- The operation will be started if the power button is pressed.
- If you want to stop operation, re-press the button.

	Cooling Model	Heat pump Model		
		Room Temp. $\geq 24^{\circ}\text{C}$	$21^{\circ}\text{C} \leq \text{Room Temp.} < 24^{\circ}\text{C}$	Room Temp. $< 21^{\circ}\text{C}$
Operating mode	Cooling	Cooling	Healthy Dehumidification	Heating
Indoor FAN Speed	High	High	High	High
Setting Temperature	22°C	22°C	23°C	24°C

- While in forced operation, the key input by the remote control has no effect and the buzzer sounds 10 times to indicate the forced operation.

## ■ Test operation

- During the TEST OPERATION, the unit operates in cooling mode at high speed fan, regardless of room temperature and resets in  $18 \pm 1$  minutes.
- During test operation, if remote controller signal is received, the unit operates as remote controller sets.  
If you want to use this operation, open the front panel upward and Press the power button let it be pressed for about 3 seconds.
- If you want to stop the operation, re-press the button.

## ■ Auto restart

- In case the power comes on again after a power failure, Auto Restarting Operation is the function to operate procedures automatically to the previous operating conditions.

## ■ Remote Control Operation Mode

- When the remote control is selected by the slide switch on the main unit, the appliance operates according to the input by the remote control.

## ■ Protection of the evaporator pipe from frosting

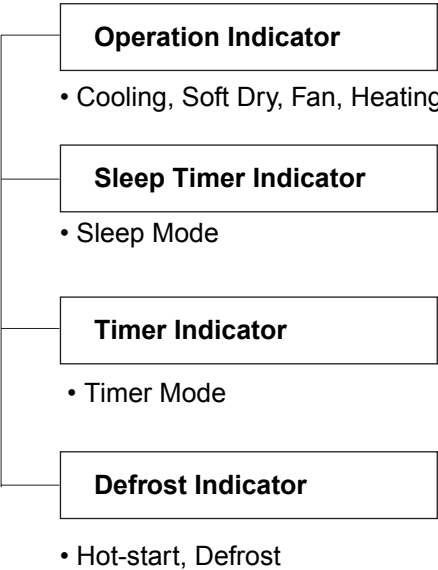
- If the indoor pipe temp is below 0°C in 7 min. after the compressor operates without any pause while in cooling cycle operation mode, the compressor and the outdoor fan are turned off in order to protect the indoor evaporator pipe from frosting.
- When the indoor pipe temp is 7°C or higher after 3 min. pause of the compressor, the compressor and the outdoor fan is turned on according to the condition of the room temperature.

## ■ Buzzer Sounding Operation

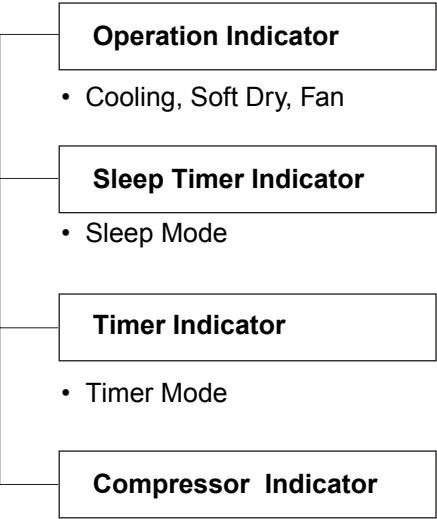
- When the appliance-operation key is input by the remote control, the short "beep-beep-" sounds.
- When the appliance-pause key is input by the remote control, the long "beep—" sounds.
- When a key is input by the remote control while the slide switch on the main unit of the appliance is on the forced operation position, the error sound "beep-beep-beep-beep-beep-" is made 10 times to indicate that the remote control signal cannot be received.

# Display Function

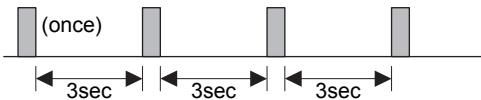
## 1. Heating Model



## 2. Cooling Model



# Self-diagnosis Function

Error Code	Error Display LED (Indoor body operation LED)	Error contents	SVC check point
1		<ul style="list-style-type: none"><li>• Indoor room temperature thermistor open/short</li><li>• Indoor pipe temperature thermistor open/short.</li></ul>	<ul style="list-style-type: none"><li>• Indoor Thermistor assembly check</li></ul>

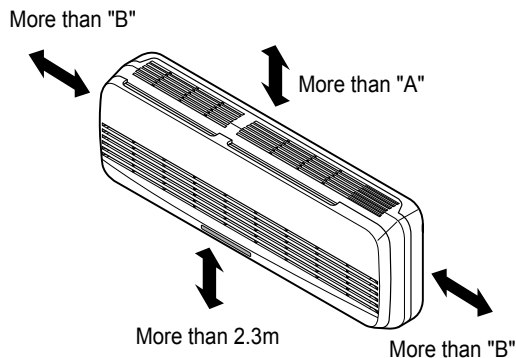
# Installation

## 1. Installation of indoor, Outdoor unit

### 1) Selection of the best location

#### 1. Indoor unit

- Do not have any heat or steam near the unit.
- Select a place where there are no obstacles in front of the unit.
- Make sure that condensation drainage can be conveniently routed away.  
Do not install near a doorway.
- Ensure that the space around the left and right of the unit is more than "A". The unit should be installed as high on the wall as possible, allowing a minimum of "B" from ceiling.
- Use a stud finder to locate studs to prevent unnecessary damage to the wall.



#### **CAUTION**

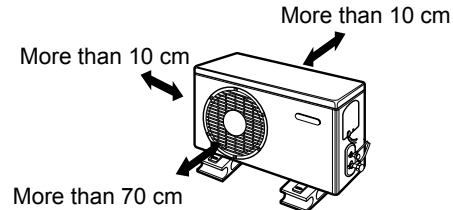
Install the indoor unit on the wall where the height from the floors more than 2.3 meters.

Grade	Clearance(cm)	
	A	B
7K~28K	10	5
30K~38K	30	12

#### 2. Outdoor unit

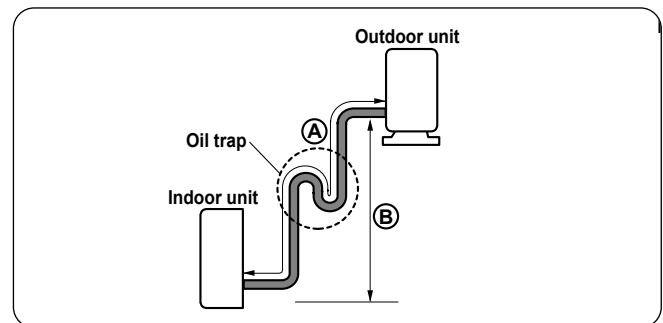
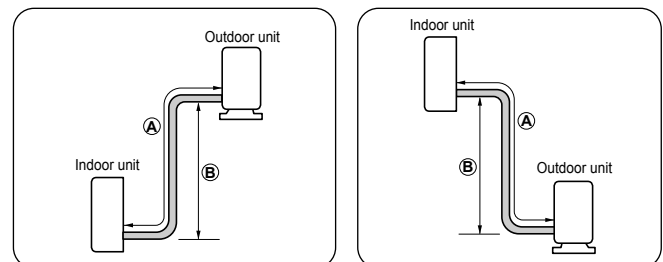
- If an awning is built over the unit to prevent direct sunlight or rain exposure, make sure that heat radiation from the condenser is not restricted.
- Ensure that the space around the back and sides is more than 10cm. The front of the unit should have more than 70cm of space.
- Do not place animals and plants in the path of the warm air.
- Take the air conditioner weight into account and select a place where noise and vibration are minimum.

- Select a place so that the warm air and noise from the air conditioner do not disturb neighbors.



### 2) Piping length and elevation

Capacity (Btu/h)	Pipe Size		Standard Length (m)	Max. Elevation B (m)	Max. Length A (m)	Additional Refrigerant (g/m)
	GAS	LIQUID				
7k~14k	3/8"(Ø9.52)	1/4"(Ø6.35)	4 or 7.5	7	15	20
	1/2"(Ø12.7)	1/4"(Ø6.35)	4 or 7.5	7	15	20
18k~28k	1/2"(Ø12.7)	1/4"(Ø6.35)	4 or 7.5	15	30	20
	5/8"(Ø15.88)	1/4"(Ø6.35)	4 or 7.5	15	30	20
30k~38k	5/8"(Ø15.88)	3/8"(Ø9.52)	4 or 7.5	15	30	30
	3/4"(Ø19.05)	3/8"(Ø9.52)	7.5	15	30	50



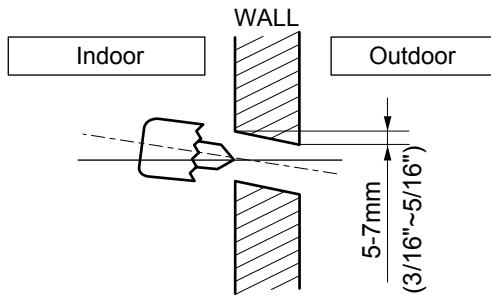
If case more than 5m

#### **CAUTION**

- Capacity is based on standard length and maximum allowance length is on the basis of reliability.
- Oil trap should be installed every 5~7 meters.

### 3) Drill a hole in the wall

- Drill the piping hole with a  $\varnothing 70\text{mm}$  hole core drill. Drill the piping hole at either the right or the left with the hole slightly slanted to the outdoor side.



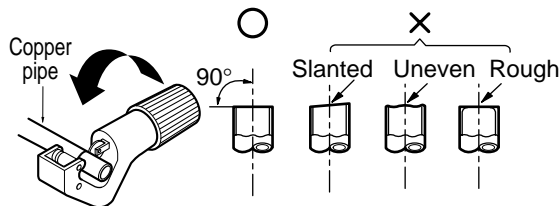
## 2. Flaring Work and Connection of Piping

### 1) Flaring work

Main cause for refrigerant leakage is due to defect in the flaring work. Carry out correct flaring work using the following procedure.

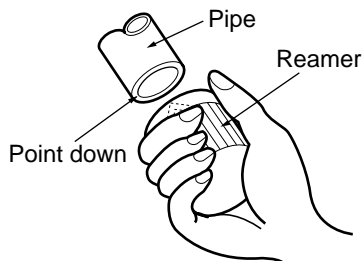
#### 1. Cut the pipes and the cable.

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



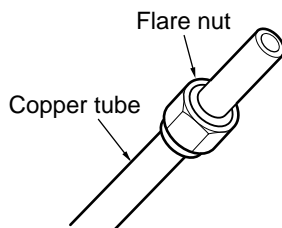
#### 2. Burr removal

- Completely remove all burrs from the cut cross section of pipe/tube.
- Put the end of the copper tube/pipe in a downward direction as you remove burrs in order to avoid dropping burrs into the tubing.



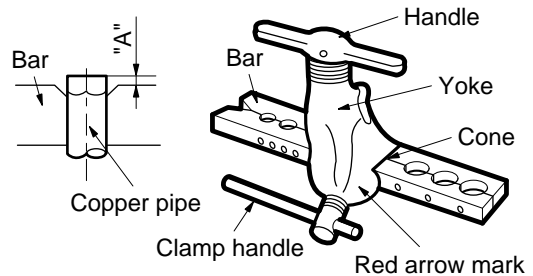
#### 3. Putting nut on

- Remove flare nuts attached to indoor and outdoor unit, then put them on pipe/tube having completed burr removal.
- (not possible to put them on after flaring work)



### 4. Flaring work

- Firmly hold copper pipe in a die in the dimension shown in the table above.

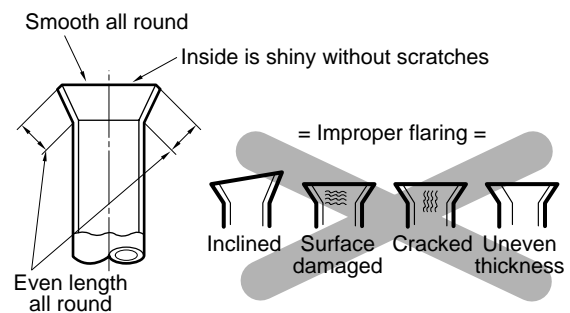


- Carry out flaring work using flaring tool as shown below.

Outside diameter		
mm	inch	mm
Ø6.35	1/4	0~0.5
Ø9.52	3/8	0~0.5
Ø12.7	1/2	0~0.5
Ø15.88	5/8	0~1.0
Ø19.05	3/4	1.0~1.3

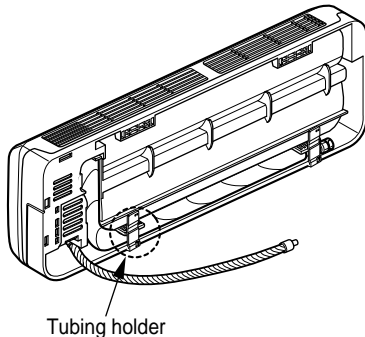
### 5. Check

- Compare the flared work with figure below.
- If flare is noted to be defective, cut off the flared section and re-flare it.



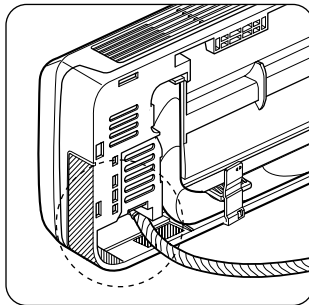
## 2) Connection of piping Indoor

- Preparing the indoor unit's piping and drain hose for installation through the wall.
- Remove the plastic tubing retainer(see illustration below) and pull the tubing and drain hose away from chassis.
- Replace the plastic tubing holder in the original position.



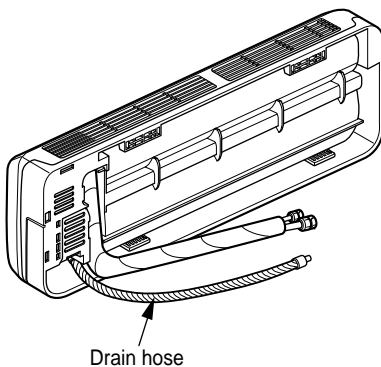
### ⚠ CAUTION

When install, make sure that the remaining parts must be removed clearly so as not to damage the piping and drain hose, especially power cord and connecting cable.



### For right rear piping

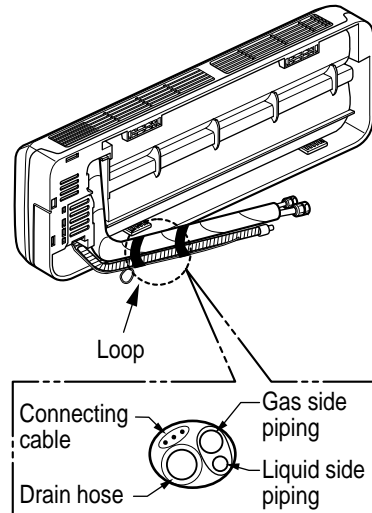
1. Route the indoor tubing and the drain hose in the direction of rear right.



2. Insert the connecting cable into the indoor unit from the outdoor unit through the piping hole.

- Do not connect the cable to the indoor unit.
- Make a small loop with the cable for easy connection later.

3. Tape the tubing, drain hose, and the connecting cable. Be sure that the drain hose is located at the lowest side of the bundle. Locating at the upper side can cause drain pan to overflow inside the unit.

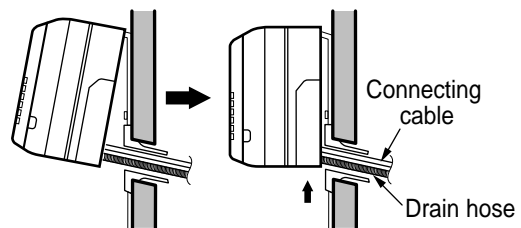


**NOTE:** If the drain hose is routed inside the room, insulate the hose with an insulation material\* so that dripping from "sweating"(condensation) will not damage furniture or floors.

\*Foamed polyethylene or equivalent is recommended.

## 4. Indoor unit installation

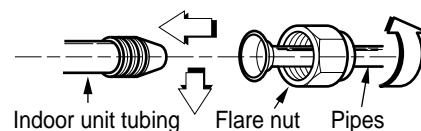
- Hook the indoor unit onto the upper portion of the installation plate.(Engage the two hooks of the rear top of the indoor unit with the upper edge of the installation plate.) Ensure that the hooks are properly seated on the installation plate by moving it left and right.



Press the lower left and right sides of the unit against the installation plate until the hooks engage into their slots(clicking sound).

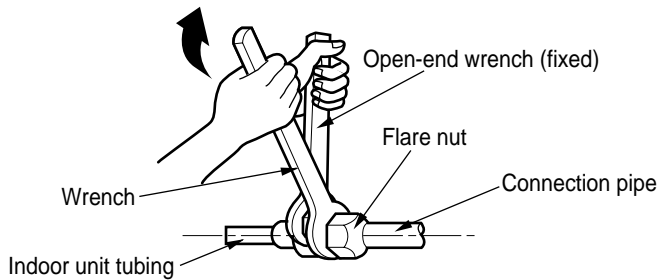
## 4. Connecting the pipings to the indoor unit and drain hose to drain pipe.

- Align the center of the pipes and sufficiently tighten the flare nut by hand.



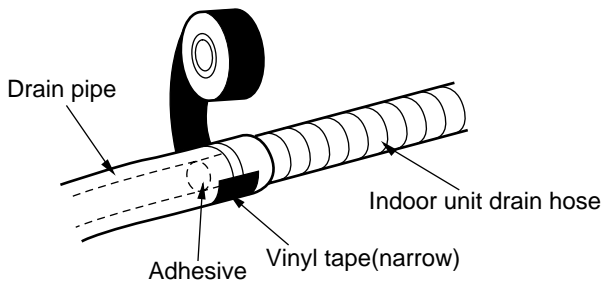


- Tighten the flare nut with a wrench.



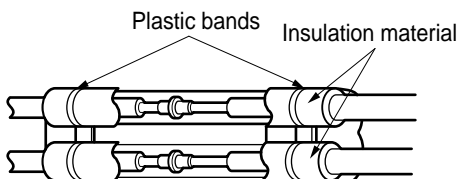
Outside diameter		Torque
mm	inch	kg-m
Ø6.35	1/4	1.8
Ø9.52	3/8	4.2
Ø12.7	1/2	5.5
Ø15.88	5/8	6.6
Ø19.05	3/4	6.6

- When extending the drain hose at the indoor unit, install the drain pipe.

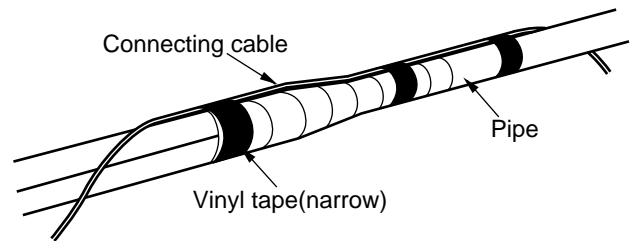
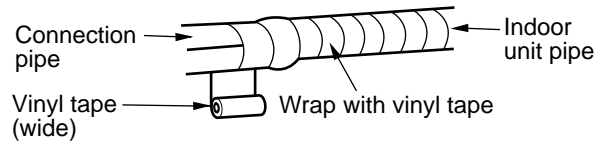


## 5. Wrap the insulation material around the connecting portion.

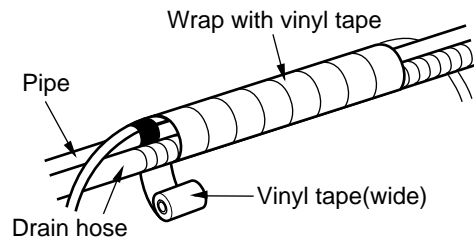
- Overlap the connection pipe insulation material and the indoor unit pipe insulation material. Bind them together with vinyl tape so that there is no gap.



- Wrap the area which accommodates the rear piping housing section with vinyl tape.

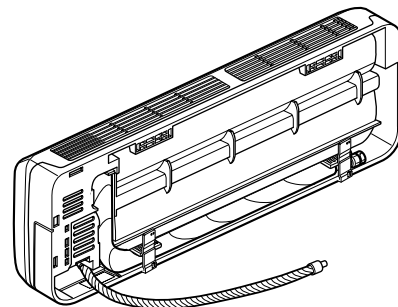


- Bundle the piping and drain hose together by wrapping them with vinyl tape for enough to cover where they fit into the rear piping housing section.

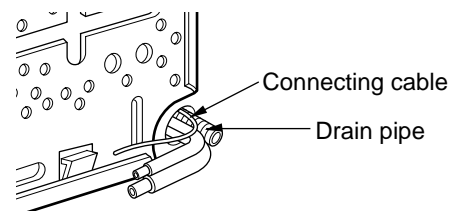


## For left rear piping

1. Route the indoor tubing and the drain hose to the required piping hole position.



2. Insert the piping, drain hose, and the connecting cable into the piping hole.

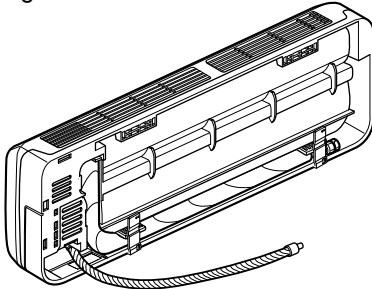


### 3. Insert the connecting cable into the indoor unit.

- Don't connect the cable to the indoor unit.
- Make a small loop with the cable for easy connection later.

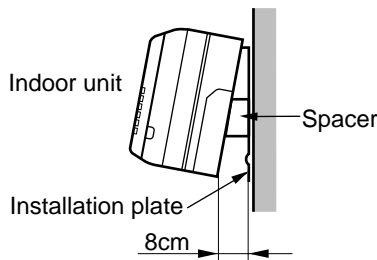
### 4. Tape the drain hose and the connecting cable.

- Connecting cable



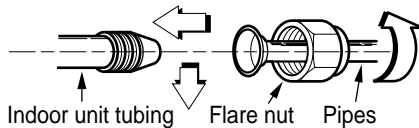
### 5. Indoor unit installation

- Hang the indoor unit from the hooks at the top of the installation plate.
- Insert the spacer etc. between the indoor unit and the installation plate and separate the bottom of the indoor unit from the wall.

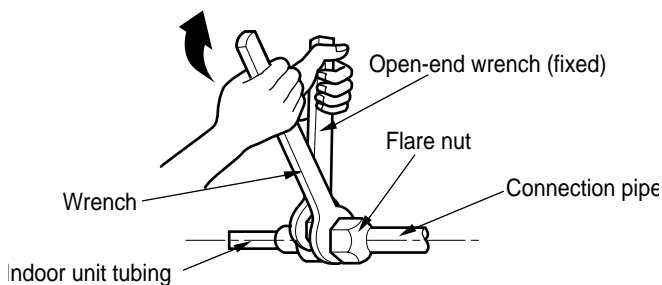


### 6. Connecting the pipings to the indoor unit and the drain hose to drain pipe.

- Align the center of the pipes and sufficiently tighten the flare nut by hand.

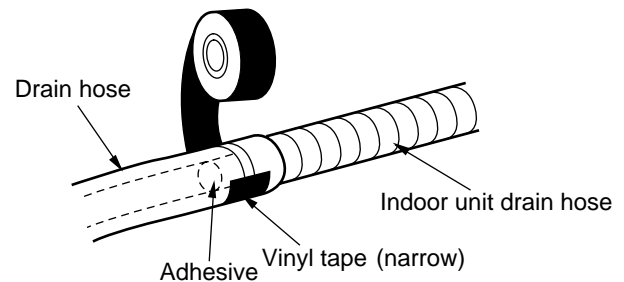


- Tighten the flare nut with a wrench.



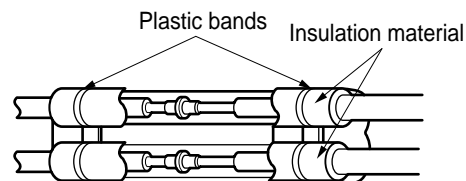
Outside diameter		Torque
mm	inch	kg·m
Ø6.35	1/4	1.8
Ø9.52	3/8	4.2
Ø12.7	1/2	5.5
Ø15.88	5/8	6.6
Ø19.05	3/4	6.6

- When extending the drain hose at the indoor unit, install the drain pipe.

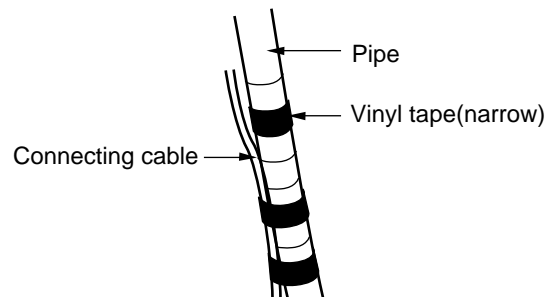
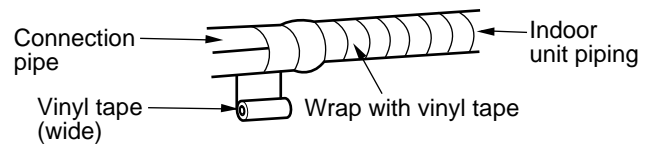


### 7. Wrap the insulation material around the connecting portion.

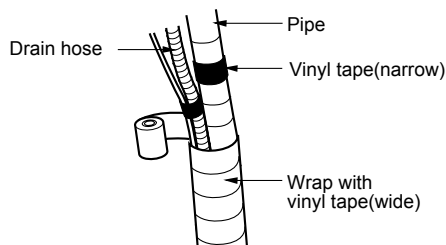
- Overlap the connection pipe heat insulation and the indoor unit pipe heat insulation material. Bind them together with vinyl tape so that there is no gap.



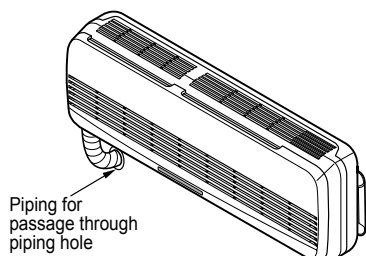
- Wrap the area which accommodates the rear piping housing section with vinyl tape.



- Bundle the piping and drain hose together by wrapping them with cloth tape over the range within which they fit into the rear piping housing section.

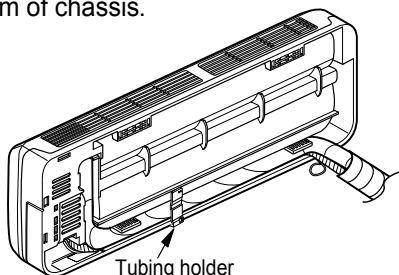


### 8. Reroute the pipings and the drain hose across the back of the chassis.



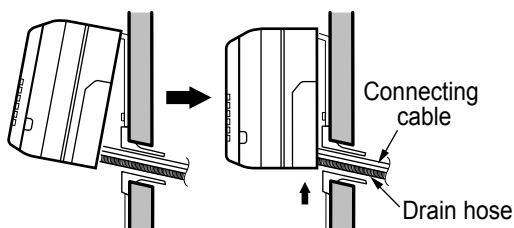
### 9. Set the pipings and the drain hose to the back of the chassis with the tubing holder.

- Hook the edge of tubing holder to tap on chassis and push the bottom of tubing holder to be engaged at the bottom of chassis.



### 10. Indoor unit installation

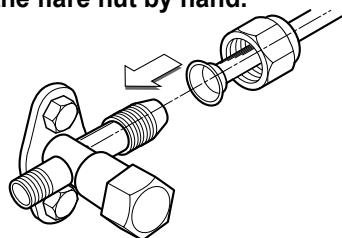
- Remove the spacer.
- Ensure that the hooks are properly seated on the installation plate by moving it left and right.



Press the lower left and right sides of the unit against the installation plate until the hooks engage into their slots(clicking sound).

## 3) Connection of the pipes-Outdoor

### 1. Align the center of the pipings and sufficiently tighten the flare nut by hand.

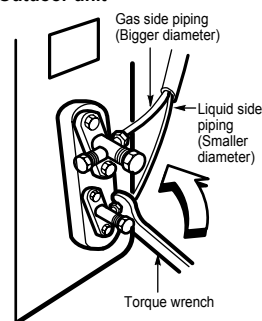


### 2. Finally, tighten the flare nut with torque wrench until the wrench clicks.

- When tightening the flare nut with torque wrench, ensure the direction for tightening follows the arrow on the wrench.

Outside diameter		Torque
mm	inch	kg-m
Ø6.35	1/4	1.8
Ø9.52	3/8	4.2
Ø12.7	1/2	5.5
Ø15.88	5/8	6.6
Ø19.05	3/4	6.6

Outdoor unit



### 3. Connecting The Cable Between Indoor Unit and Outdoor Unit

#### 1) Connect the cable to the Indoor unit.

- Connect the cable to the indoor unit by connecting the wires to the terminals on the control board in **dividually according to the outdoor unit connection**. (Ensure that the color of the wires of the outdoor unit and the terminal No. are the same as those of the indoor unit.)

**The earth wire should be longer than the common wires.**

- When installing, refer to the circuit diagram on the Control Box of Indoor Unit.
- When installing, refer to the wiring diagram on the Control Cover Inside Outdoor Unit.

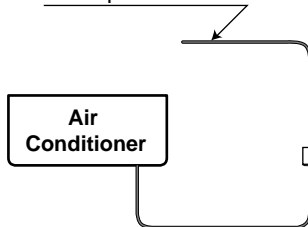
#### CAUTION

- The above circuit diagram is subject to change without notice.
- Be sure to connect wires according to the wiring diagram.
- Connect the wires firmly, so that not to be pulled out easily.
- Connect the wires according to color codes by referring the wiring diagram.

#### CAUTION

If a power plug is not to be used, provide a circuit breaker between power source and the unit as shown below.

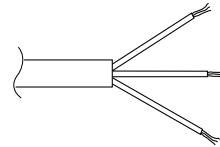
Main power source



**Circuit Breaker**  
Use a circuit breaker or time delay fuse.

#### CAUTION

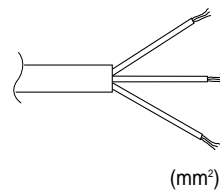
The power cord connected to the "A" unit should be complied with the following specifications (Type "B" approved by HAR or SAA).



(mm<sup>2</sup>)

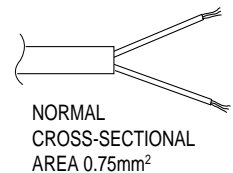
NORMAL CROSS-SECTIONAL AREA	Grade					
	5k~9k	12k~14k	18k	24k~28k	30k, 32k	36k, 38k
Unit(A)	Indoor	Indoor	Indoor	Indoor	Outdoor	Outdoor
Cable Type(B)	H05VV-F	H05VV-F	H05VV-F	H05VV-F	H05RN-F	H05RN-F

The power connecting cable connected to the indoor and outdoor unit should be complied with the following specifications (Type "B" approved by HAR or SAA).

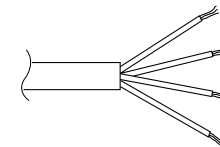


(mm<sup>2</sup>)

NORMAL CROSS-SECTIONAL AREA	Grade			
	5k~9k	12k~14k	18k	24k~28k
Unit(A)	Indoor	Indoor	Indoor	Indoor
Cable Type(B)	H07RN-F	H07RN-F	H07RN-F	H07RN-F



NORMAL CROSS-SECTIONAL AREA 0.75mm<sup>2</sup>



(mm<sup>2</sup>)

NORMAL CROSS-SECTIONAL AREA	Grade	
	30k, 32k	36k, 38k
Unit(A)	Outdoor	Outdoor
Cable Type(B)	H07RN-F	H07RN-F

## 2) Connect the cable to the outdoor unit

1. Remove the control cover from the unit by loosening the screw.  
Connect the wires to the terminals on the control board individually.
2. Secure the cable onto the control board with the cord clamp.
3. Refix the control cover to the original position with the screw.
4. Use a recognized circuit breaker "A"  
between the power source and the unit.  
A disconnecting device to adequately disconnect all supply lines must be fitted.

Circuit Breaker (A)	Grade				
	7k~14k	18k	24k~28k	30k, 32k	36k, 38k
	15	20	30	30	40

### CAUTION

After the confirmation of the above conditions, prepare the wiring as follows:

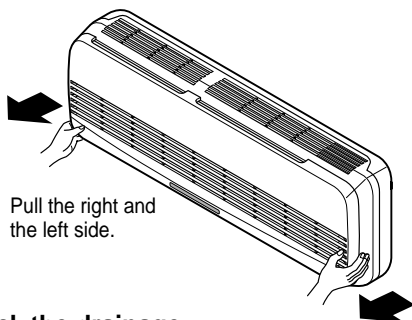
- 1) **Never fail to have an individual power circuit specifically for the air conditioner. As for the method of wiring, be guided by the circuit diagram posted on the inside of control cover.**
- 2) **The screw which fasten the wiring in the casing of electrical fittings are liable to come loose from vibrations to which the unit is subjected during the course of transportation. Check them and make sure that they are all tightly fastened. (If they are loose, it could cause burn-out of the wires.)**
- 3) **Specification of power source.**
- 4) **Confirm that electrical capacity is sufficient.**
- 5) **See to that the starting voltage is maintained at more than 90 percent of the rated voltage marked on the name plate.**
- 6) **Confirm that the cable thickness is as specified in the power source specification.  
(Particularly note the relation between cable length and thickness. (Refer to page 28))**
- 7) **Always install an earth leakage circuit breaker in a wet or moist area.**
- 8) **The following would be caused by voltage drop.**
  - Vibration of a magnetic switch, which will damage the contact point, fuse breaking, disturbance of the normal function of the overload.
- 9) **The means for disconnection from a power supply shall be incorporated in the fixed wiring and have an air gap contact separation of at least 3mm in each active(phase) conductors.**

## 4. Checking the Drainage and Forming the Pippings

### 1) Checking the drainage

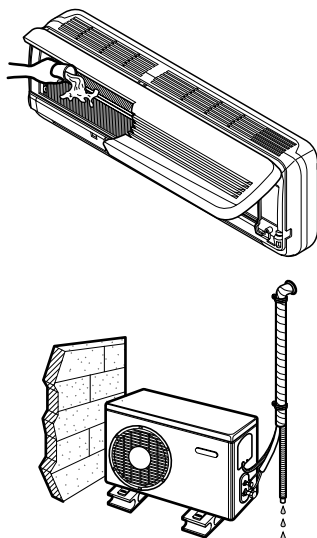
#### 1. To remove the front panel from the indoor unit.

- Set the air direction louvers up-and-down to the position(horizontally) by hand.
- Remove the securing screws that retain the front panel. Pull the lower left and right sides of the grille toward you and lift it off.



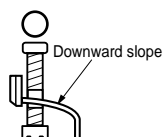
#### 2. To check the drainage.

- Pour a glass of water on the evaporator.
- Ensure the water flows through the drain hose of the indoor unit without any leakage and goes out the drain exit.

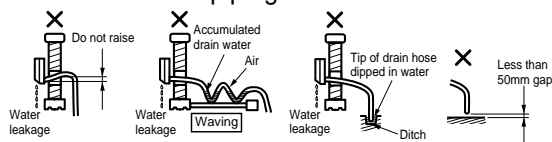


### 3. Drain piping

- The drain hose should point downward for easy drain flow.



- Do not make drain piping.



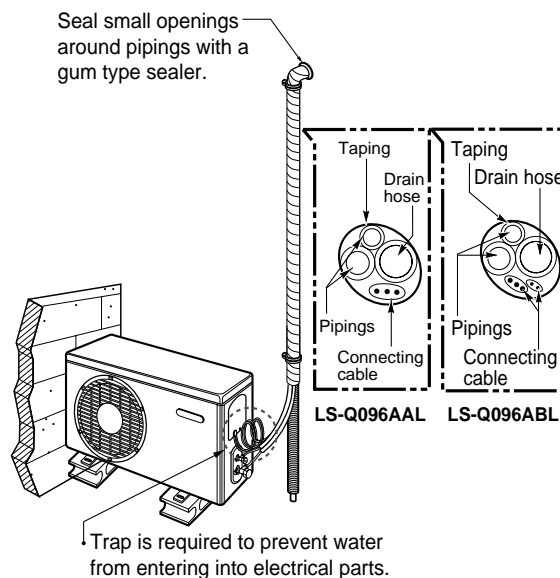
### 2) Form the piping

#### 1. Form the piping by wrapping the connecting portion of the indoor unit with insulation material and secure it with two kinds of vinyl tapes.

- If you want to connect an additional drain hose, the end of the drain outlet should be routed above the ground. Secure the drain hose appropriately.

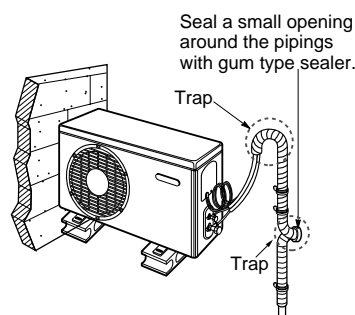
#### 2. In cases where the outdoor unit is installed below the indoor unit perform the following.

- Tape the piping, drain hose and connecting cable from down to up.
- Secure the tapped piping along the exterior wall using saddle or equivalent.



#### 3. In cases where the Outdoor unit is installed above the Indoor unit perform the following.

- Tape the piping and connecting cable from down to up.
- Secure the taped piping along the exterior wall. Form a trap to prevent water entering the room.
- Fix the piping onto the wall by saddle or equivalent.

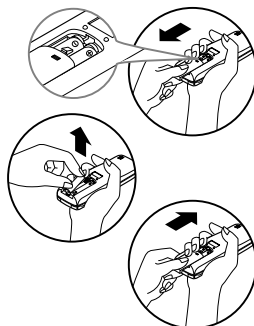


## 5. Test Running

1. Check that all tubing and wiring have been properly connected.
2. Check that the gas and liquid side service valves are fully open.

### 1. Prepare remote control

1. Remove the battery cover by pulling it according to the arrow direction.
2. Insert new batteries making sure that the (+) and (-) of battery are installed correctly.
3. Reattach the cover by pushing it back into position.

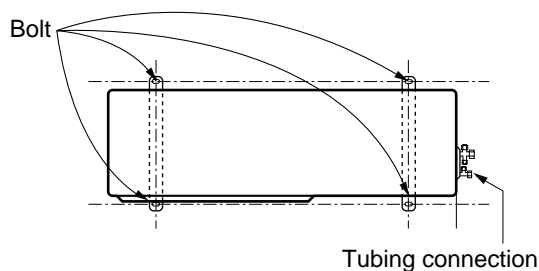


#### NOTE:

- Use 2 AAA(1.5volt) batteries. Do not use rechargeable batteries.
- Remove the batteries from the remote control if the system is not going to be used for a long time.

### 2. Settlement of outdoor unit

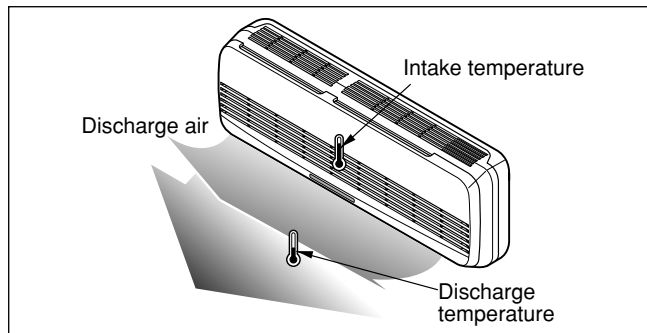
- Anchor the outdoor unit with a bolt and nut(ø10mm) tightly and horizontally on a concrete or rigid mount.
- When installing on the wall, roof or rooftop, anchor the mounting base securely with a nail or wire assuming the influence of wind and earthquake.
- In the case when the vibration of the unit is conveyed to the hose, secure the unit with an anti-vibration bushing.



### 3. Evaluation of the performance

Operate unit for 15~20 minutes, then check the system refrigerant charge:

1. Measure the pressure of the gas side service valve.
2. Measure the temperature of the intake and discharge of air.
3. Ensure the difference between the intake temperature and the discharge is more than 8°C(46°F) (Cooling) or (Heating).



4. For reference; the gas side pressure of optimum condition is as below.(Cooling)

Refrigerant	Outside ambient TEMP.	The pressure of the gas side service valve.
R-22	35°C (95°F)	4~5kg/cm <sup>2</sup> G(56.8~71.0 P.S.I.G.)

**NOTE:** If the actual pressure is higher than shown, the system is most likely over-charged, and charge should be removed. If the actual pressure are lower than shown, the system is most likely undercharged, and charge should be added.

The air conditioner is now ready for use.

### PUMP DOWN

**This is performed when the unit is to be relocated or the refrigerant circuit is serviced.**

Pump Down means collecting all refrigerant in the outdoor unit without loss in refrigerant gas.

#### CAUTION:

Be sure to perform Pump Down procedure with the unit cooling mode.

#### Pump Down Procedure

1. Connect a low-pressure gauge manifold hose to the charge port on the gas side service valve.
2. Open the gas side service valve halfway and purge the air from the manifold hose using the refrigerant gas.
3. Close the liquid side service valve(all the way in).
4. Turn on the unit's operating switch and start the cooling operation.
5. When the low-pressure gauge reading becomes 1 to 0.5kg/cm<sup>2</sup> G(14.2 to 7.1 P.S.I.G.), fully close the gas side valve stem and then quickly turn off the unit. At that time, Pump Down has been completed and all refrigerant gas will have been collected in the outdoor unit.

# Disassembly of the parts (Indoor unit)

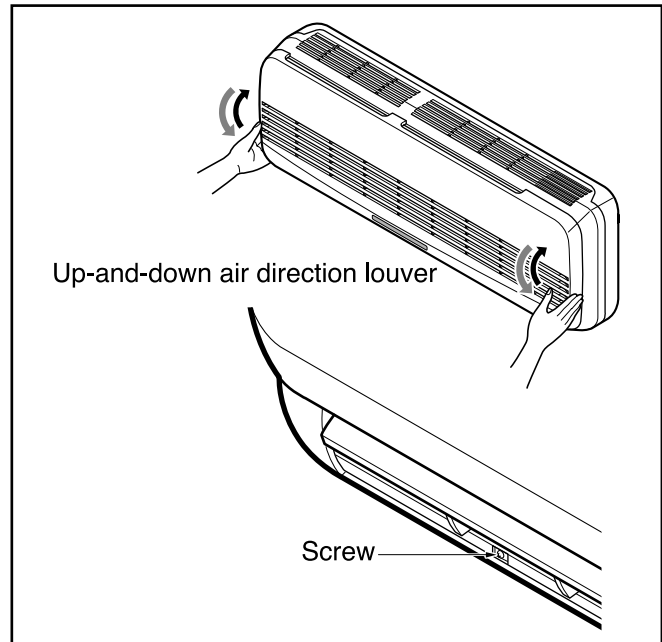
## Warning :

Disconnect the unit from power supply before making any checks.

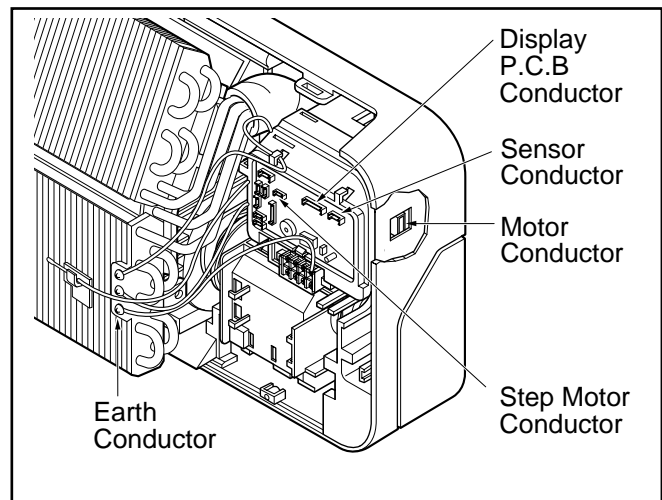
Be sure the power switch is set to "OFF".

## To remove the Grille from the Chassis.

- Set the up-and-down air discharge louver to open position (horizontally) by finger pressure.
- 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.



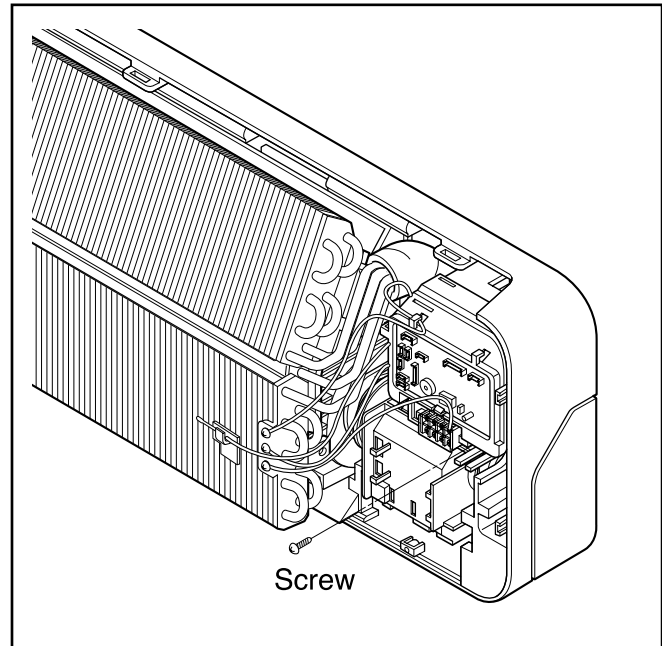
1. Before removing the control box, be sure to take out the wire screwed at the other end.





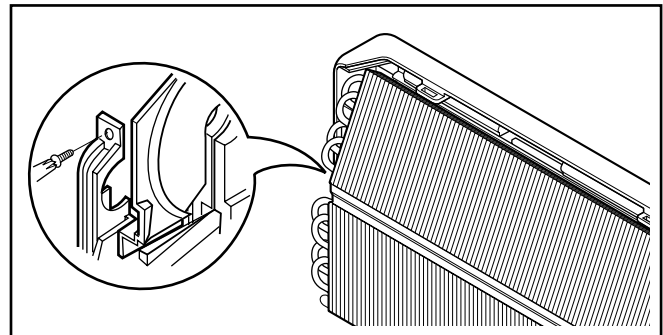
## 2. To remove the Control Box.

- Remove securing screws.
- Pull the control box out from the chassis carefully.



## 3. To remove the Discharge Grille.

- Unhook the discharge grille and pull the discharge grille out from the chassis carefully.

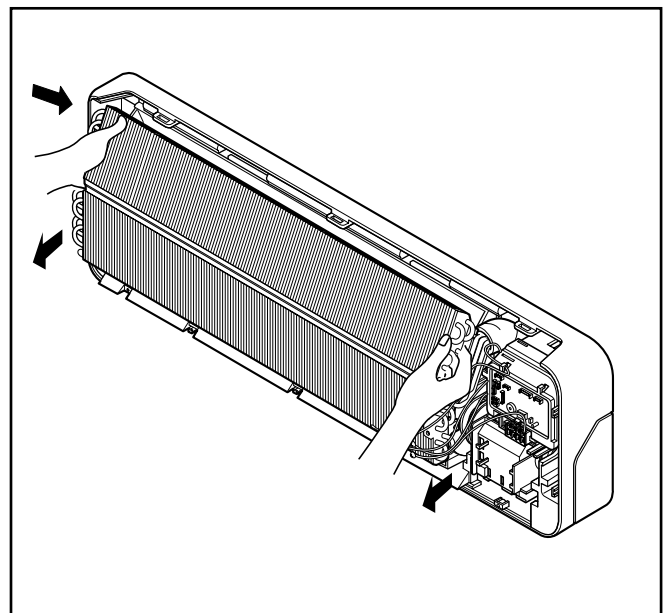


## 4. To remove the Evaporator.

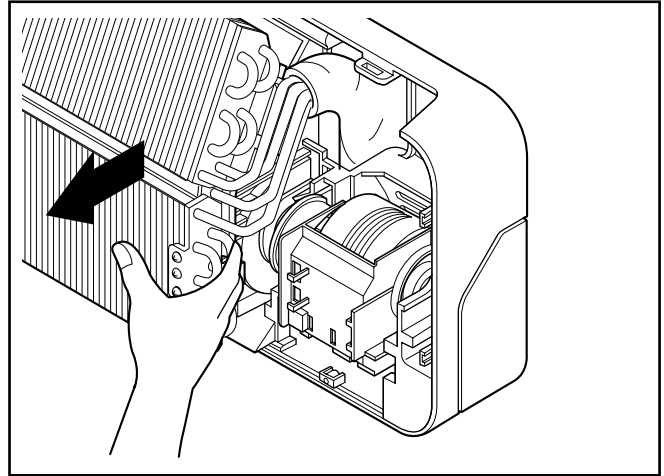
- Remove 3 screws securing the evaporator(at the left 2EA in the Eva Holder, at the right 1EA).

 **Caution label**

**When repair, do not damage the Caution label.**

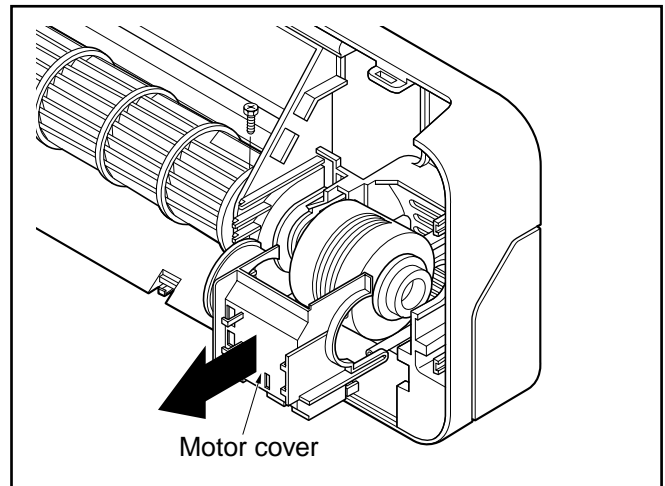


- Unhook the tab on the right inside of the chassis at the same time, slightly pull the evaporator toward you until the tab is clear of the slot.



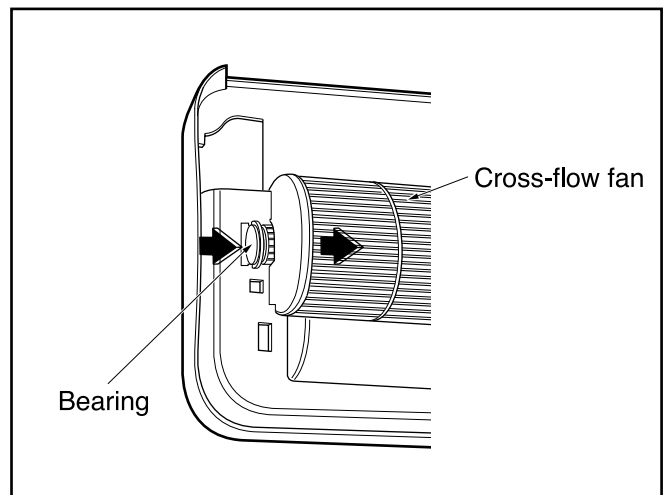
#### 5. To remove the Motor Cover

- Remove 2 securing screw.
- Pull the motor cover out from the chassis carefully.



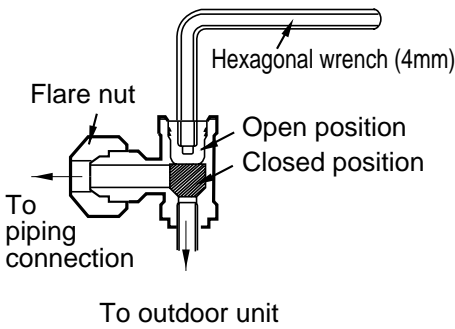
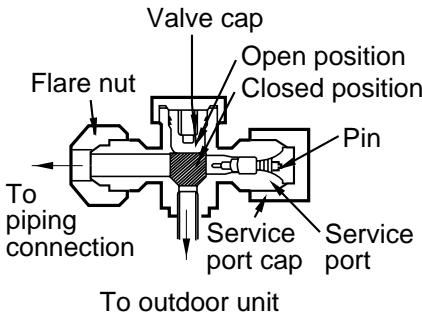
#### 6. To remove the Cross-Flow Fan

- Loosen the screw securing the cross-flow fan to the fan motor (do not remove).
- Lift up the right side of the cross-flow fan and the fan motor, separate the fan motor from the cross-flow fan.



- Remove the left end of the cross-flow fan from the self-aligning bearing.

## 2-way, 3-way Valve

		2-way Valve (Liquid 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 or with vacuum pump)
Operation		Open (with valve cap)	Open (with valve cap)	Closed (with cap)
2.	Pumping down (Transferring)	Closed (clockwise)	Open (counter-clockwise)	Open (connected manifold gauge)
3.	Evacuation (Servicing)	Open	Open	Open (with charging cylinder)
4.	Gas charging (Servicing)	Open	Open	Open (with charging cylinder)
5.	Pressure check (Servicing)	Open	Open	Open (with charging cylinder)
6.	Gas releasing (Servicing)	Open	Open	Open (with charging cylinder)

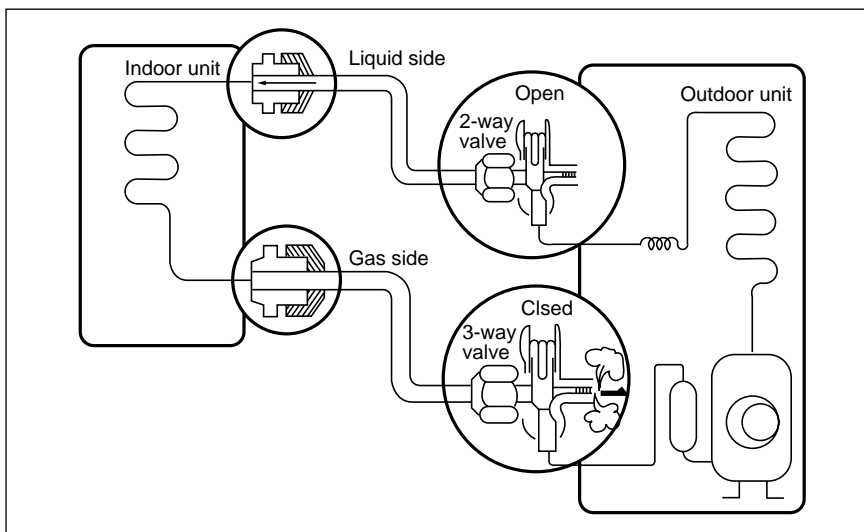
# 1. Air purging

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 be 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.

\* ⚠ **CAUTION : Do not leak the gas in the air during Air purging.**

## • Procedure

- (1) **Recheck the piping connections.**
- (2) **Open the valve stem of the 2-way valve counterclockwise approximately 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 to tighten the service port nut to a torque of 1.8kg.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.**

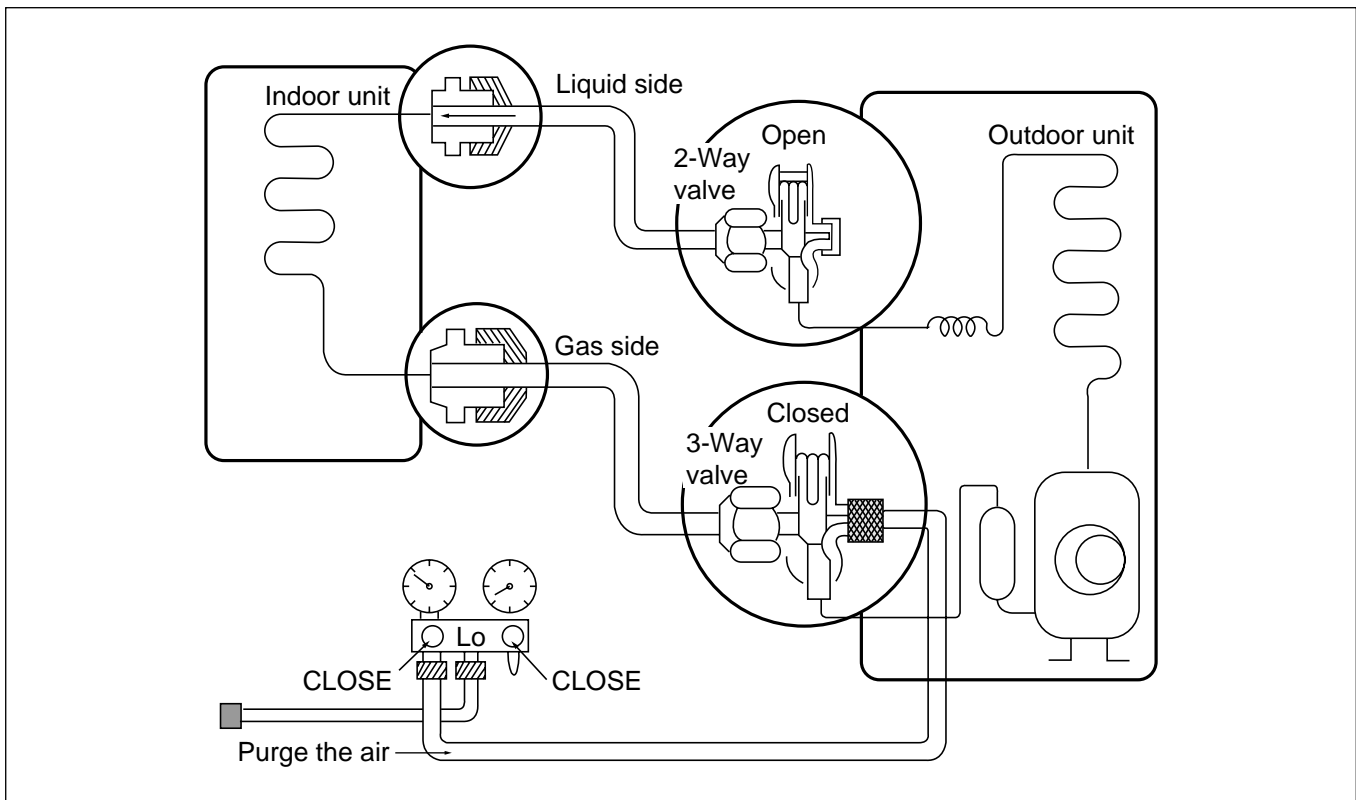
- At this time, especially check for gas leakage from the 2-way and 3-way valve's stem nuts, and from the service port nut.

### ⚠ **Caution**

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

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.

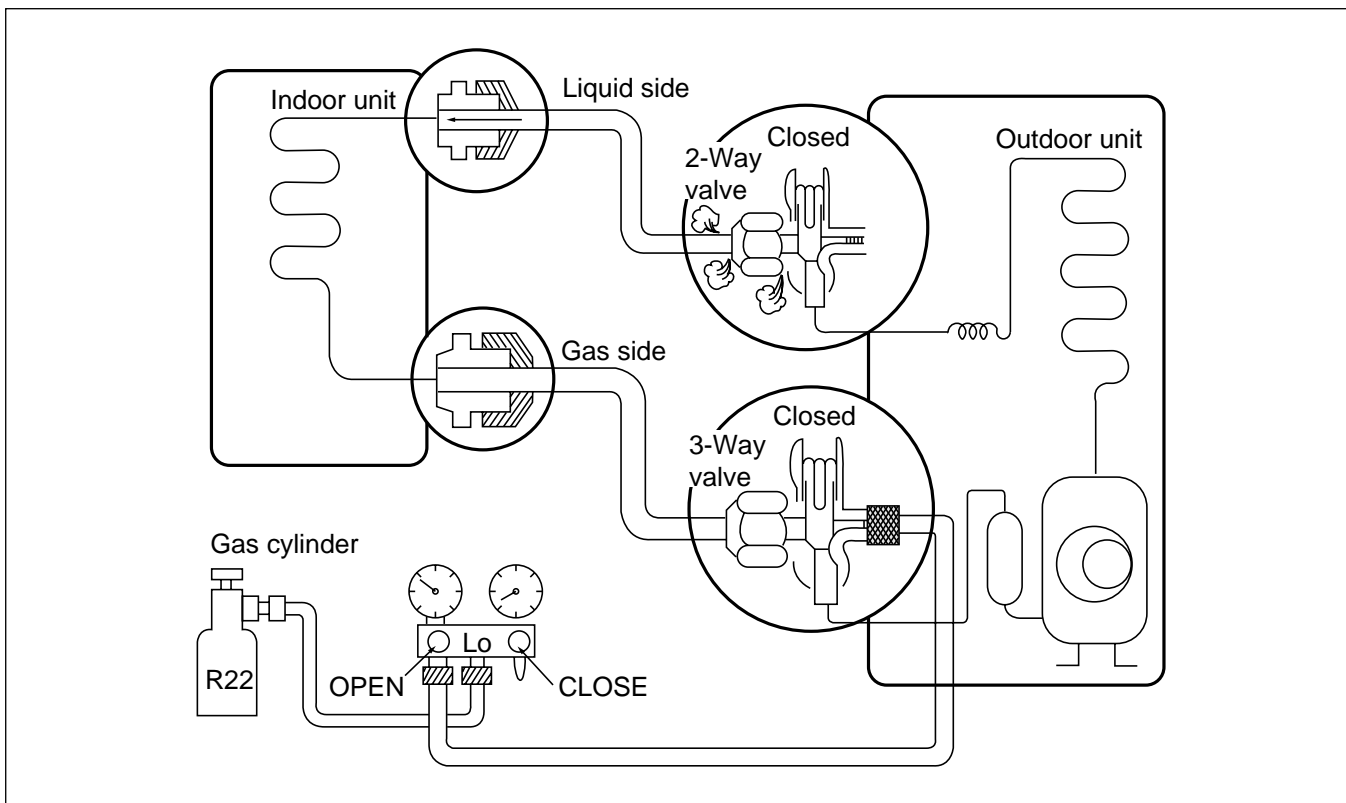
## 2. Pumping down



### • Procedure

- (1) **Confirm that both the 2-way and 3-way valves 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 1kg/cm<sup>2</sup>g.**
- (7) **Immediately set the 3-way valve to the closed position.**
  - Do this quickly so that the gauge ends up indicating 3 to 5kg/cm<sup>2</sup>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 to tighten the service port nut to a torque of 1.8 kg.m.
  - Be sure to check for gas leakage.

## 1) Re-air purging (Re-installation)



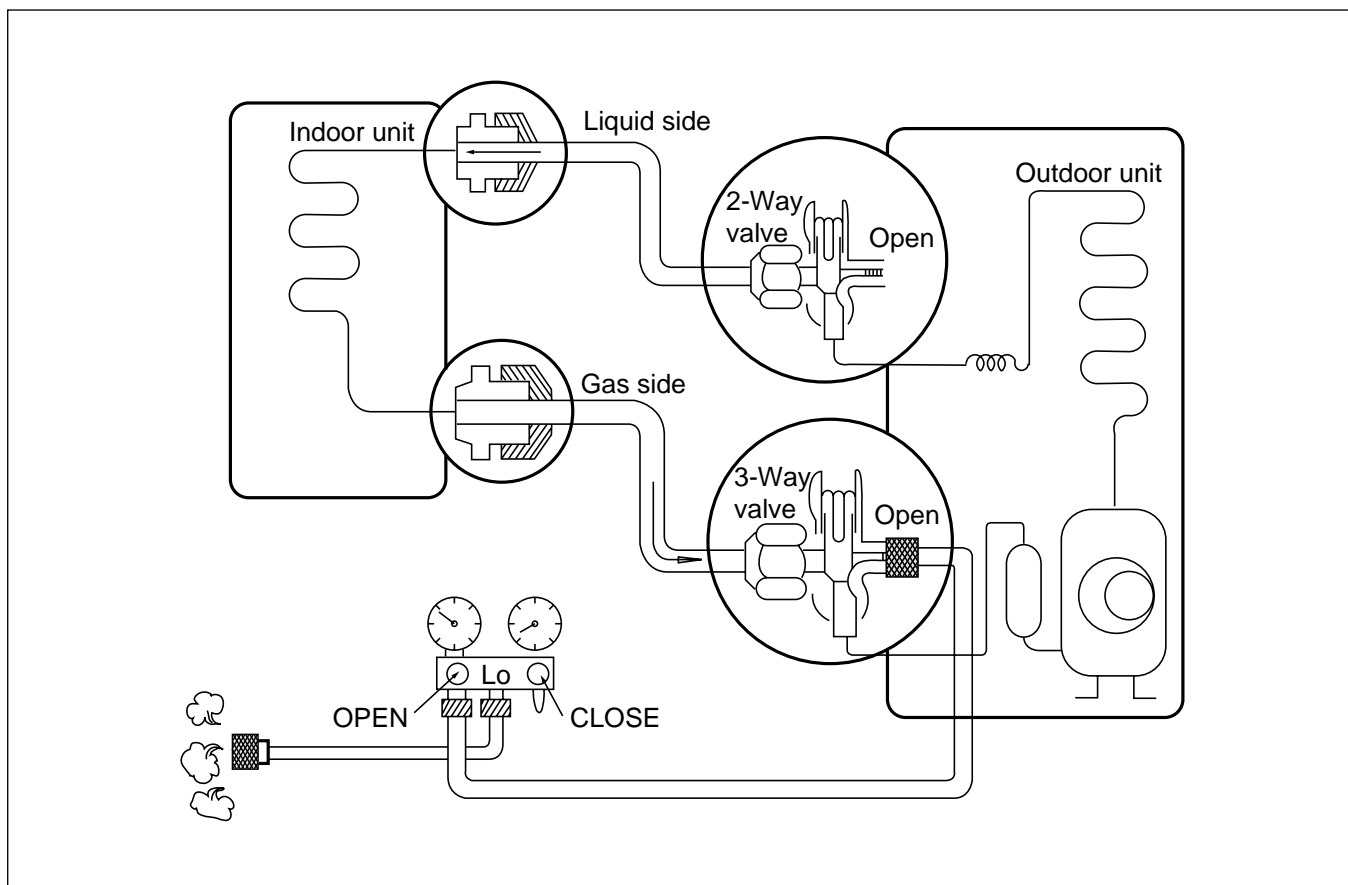
### • Procedure

- (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 charge 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<sup>2</sup>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 to tighten the service port nut to a torque of 1.8 kg.m.
  - Be sure to check for gas leakage.

\* **⚠ CAUTION:**  
Do not leak the gas in the air during Air Purging.

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

(Gas leakage)



### • Procedure

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

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

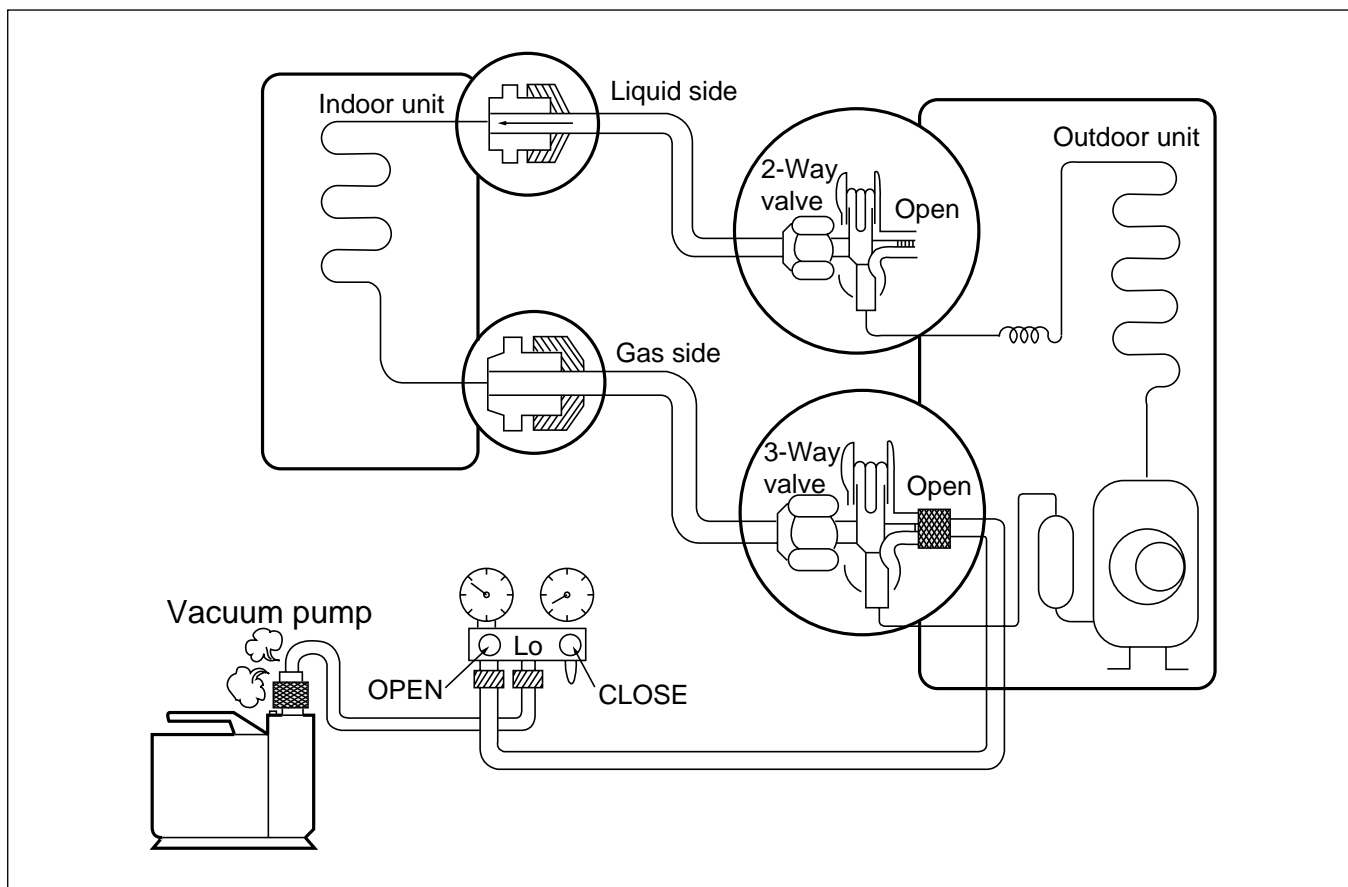
- Leave the valve on the charge set closed.
- Connect the charge hose with the push pin to the service port.

(3) Open the valve (Lo side) on the charge set and discharge the refrigerant until the gauge indicates 0 kg/cm<sup>2</sup>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<sup>2</sup>G), discharge the refrigerant until the gauge indicates 0.5 to 1 kg/cm<sup>2</sup>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.

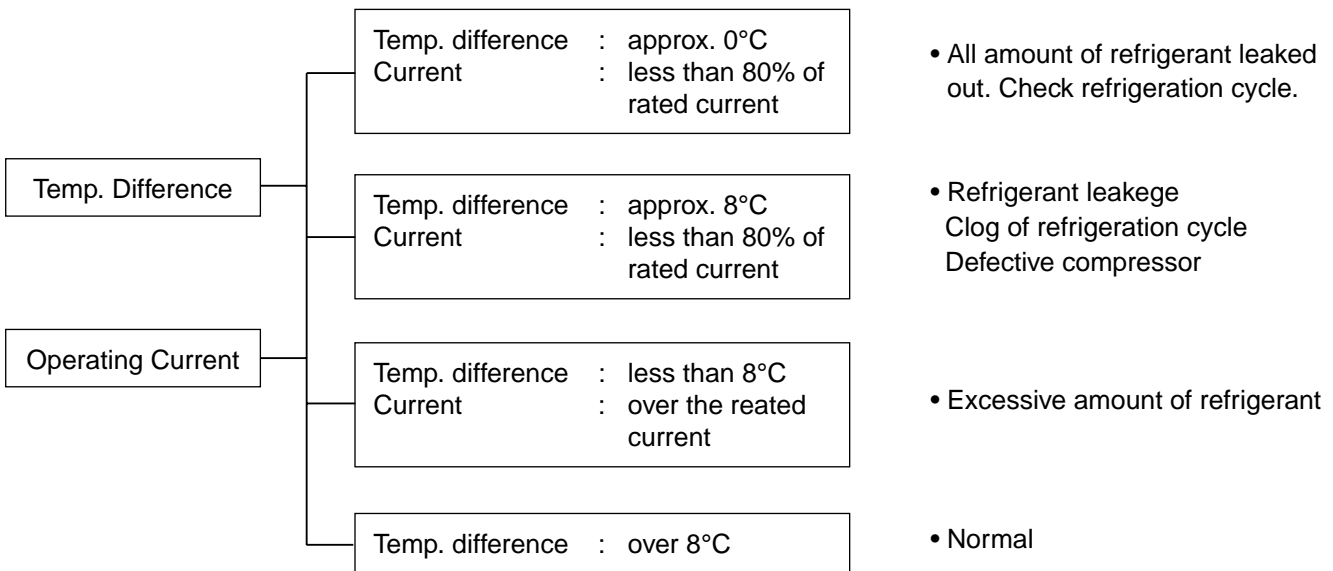
If the vacuum pump oil becomes dirty or depleted, replenish as needed.



# Cycle Troubleshooting 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 relatively higher, temperature difference is smaller. When the room air humidity is relatively lower temperature difference is larger.

2. Check temperature and pressure of refrigeration cycle.

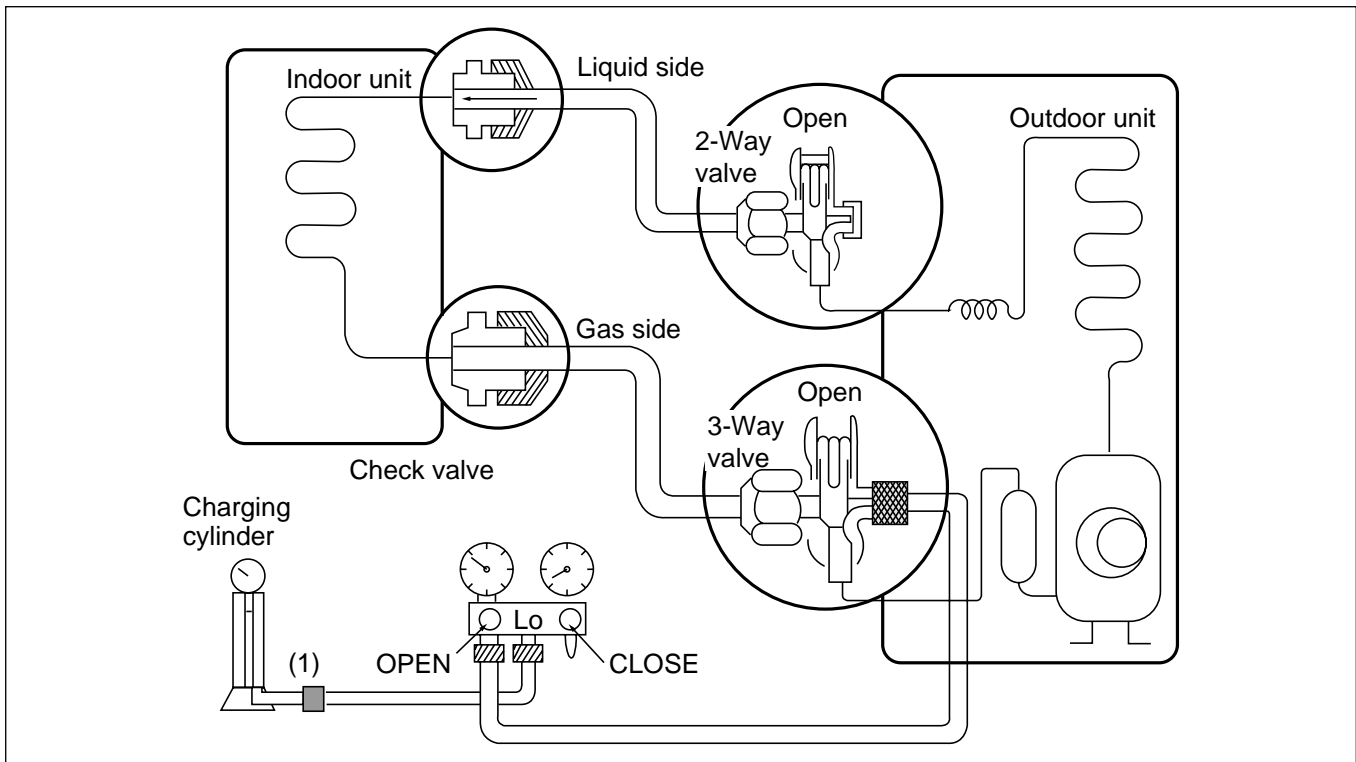
Suction pressure (Compared with the normal value)	Temperature (Compared with the normal valve)	Cause of Trouble	Description
Higher	High	Defective compressor Defective 4-way reverse valve	Current is low.
	Normal	Excessive amount of refrigerant	High pressure does not quickly rise at the beginning of operation.
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<sup>2</sup>G(Cooling) at normal condition.
2. The temperature can be measured by attaching the thermometer to the low pressure tubing and wrap it with putty.

## 4. Gas Charging

(After Evacuation)



### • Procedure

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

- Connect the charge hose which you dis-connected from the vacuum pump to the valve at the bottom of the cylinder.
- If you are using a gas cylinder, also use a scale and reverse 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; however, 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 from the gas side, absolutely do not attempt to charge with larger 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 operating the air conditioner turn off the air conditioner before disconnecting the hose.

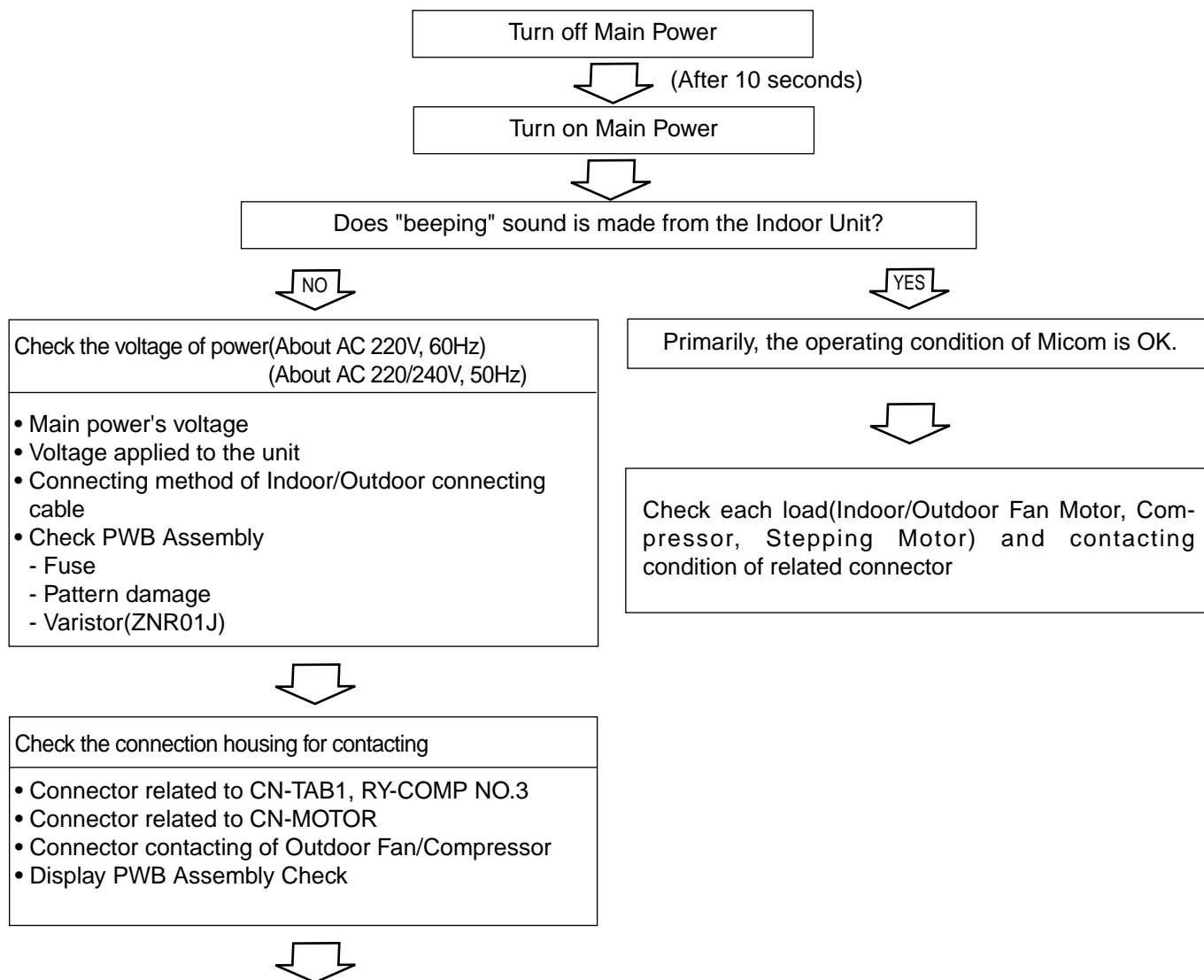
#### (5) Mount the valve stem nuts and the service port nut.

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

# Electronic Parts Troubleshooting Guide

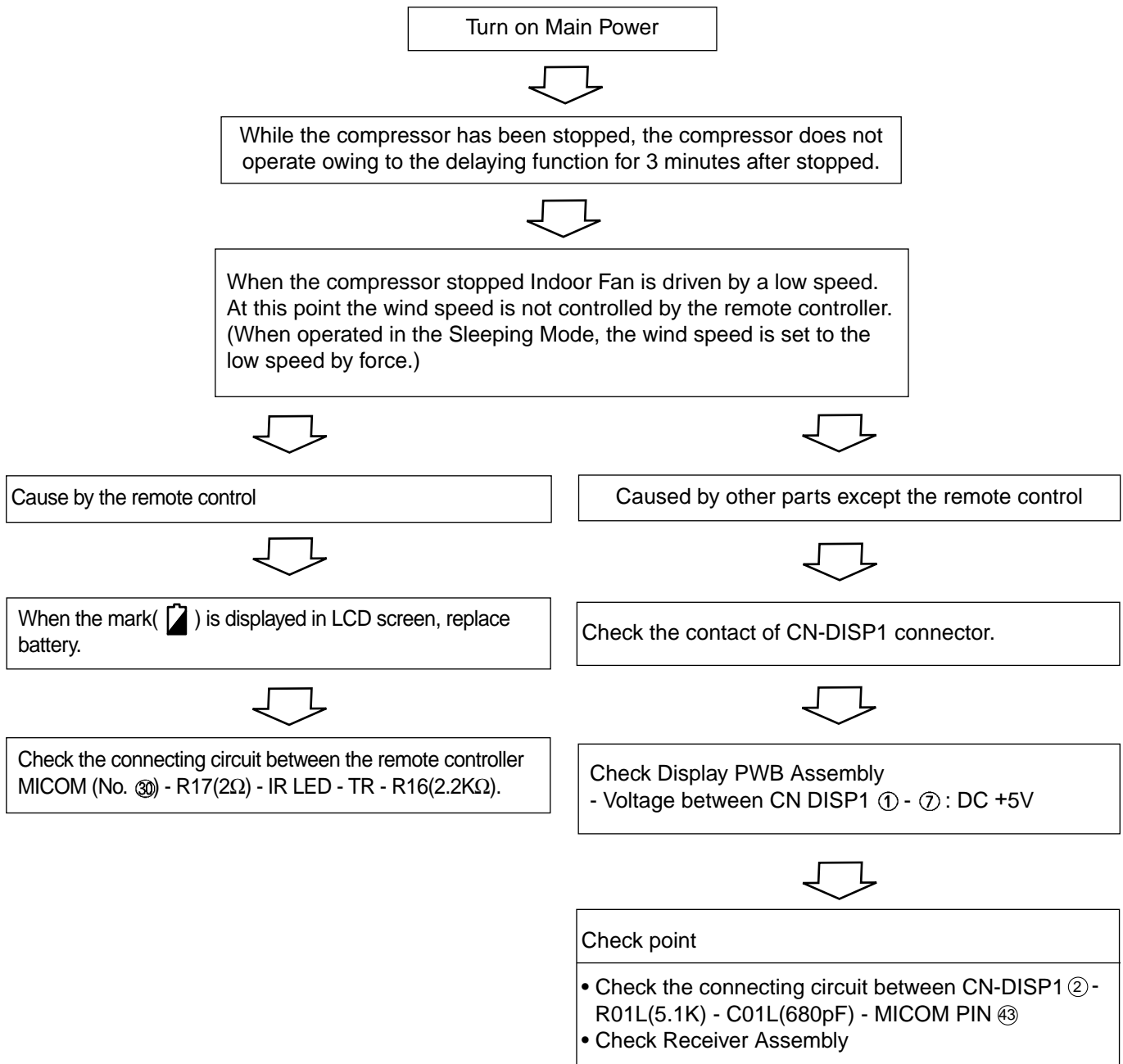
## 1. Product does not operate at all.

(\* Refer to Electronic Control Device drawing and Schematic diagram.)

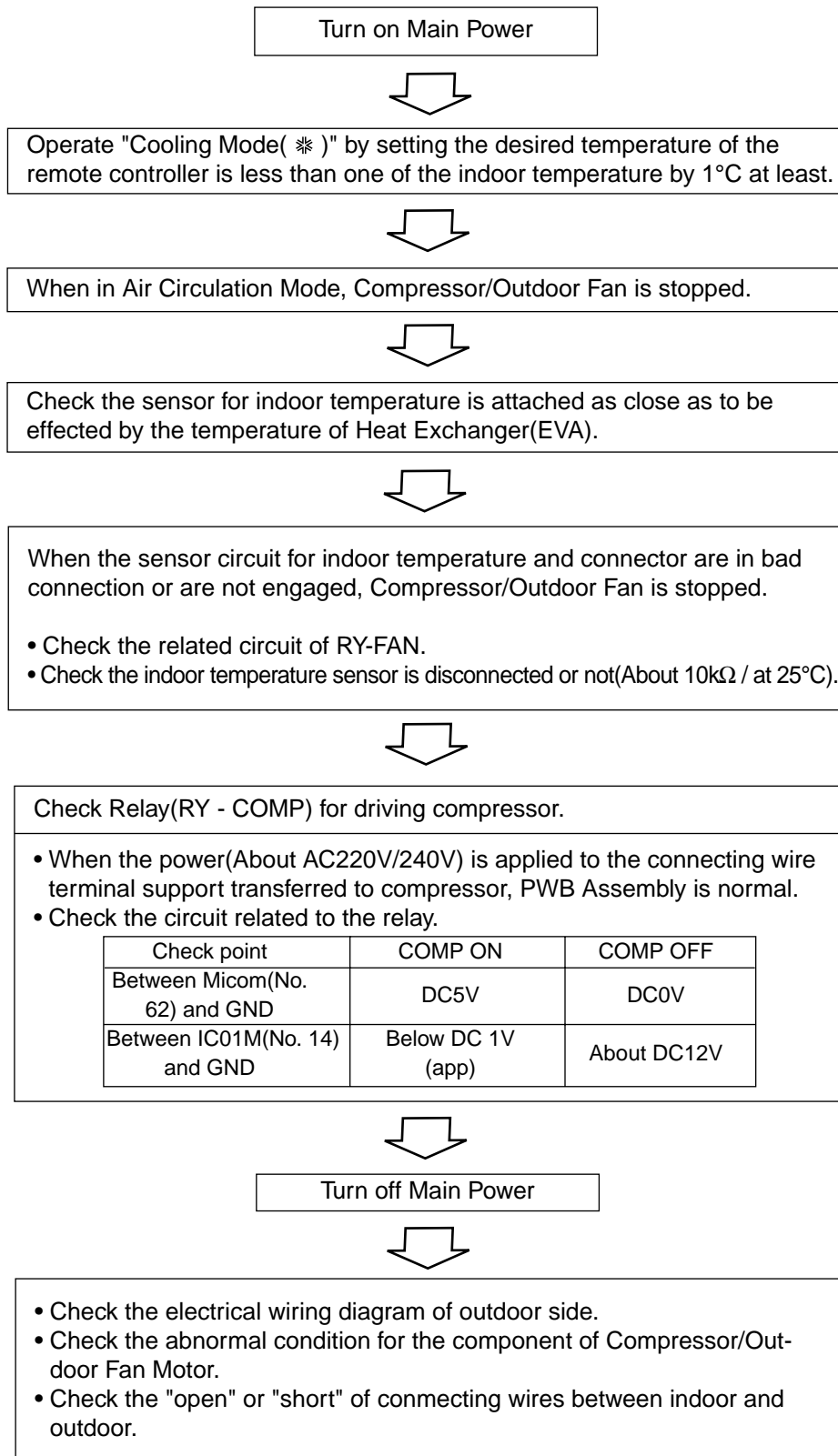


Main PCB Board Operation Check		
Items	Content	Remedy
<ul style="list-style-type: none"> <li>• SMPS Transformer (Indoor unit)               <ul style="list-style-type: none"> <li>- Input Voltage</li> <li>- Output Voltage(ZD02D)</li> </ul> </li> <li>↓</li> <li>• IC04D(7805) Output (Indoor/Outdoor unit)</li> <li>↓</li> <li>• IC01A(KIA7036, Reset IC) X01(8MHz)</li> </ul>	<ul style="list-style-type: none"> <li>- About AC220V/240V±10% - Check the power voltage</li> <li>- About DC12V</li> <li>• DC +5V</li> <li>• Voltage of Micom No. 2, (DC +4.5V over) and Soldering condition.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace Trans</li> <li>• Replace IC04D</li> <li>• Replace faulty parts</li> </ul>

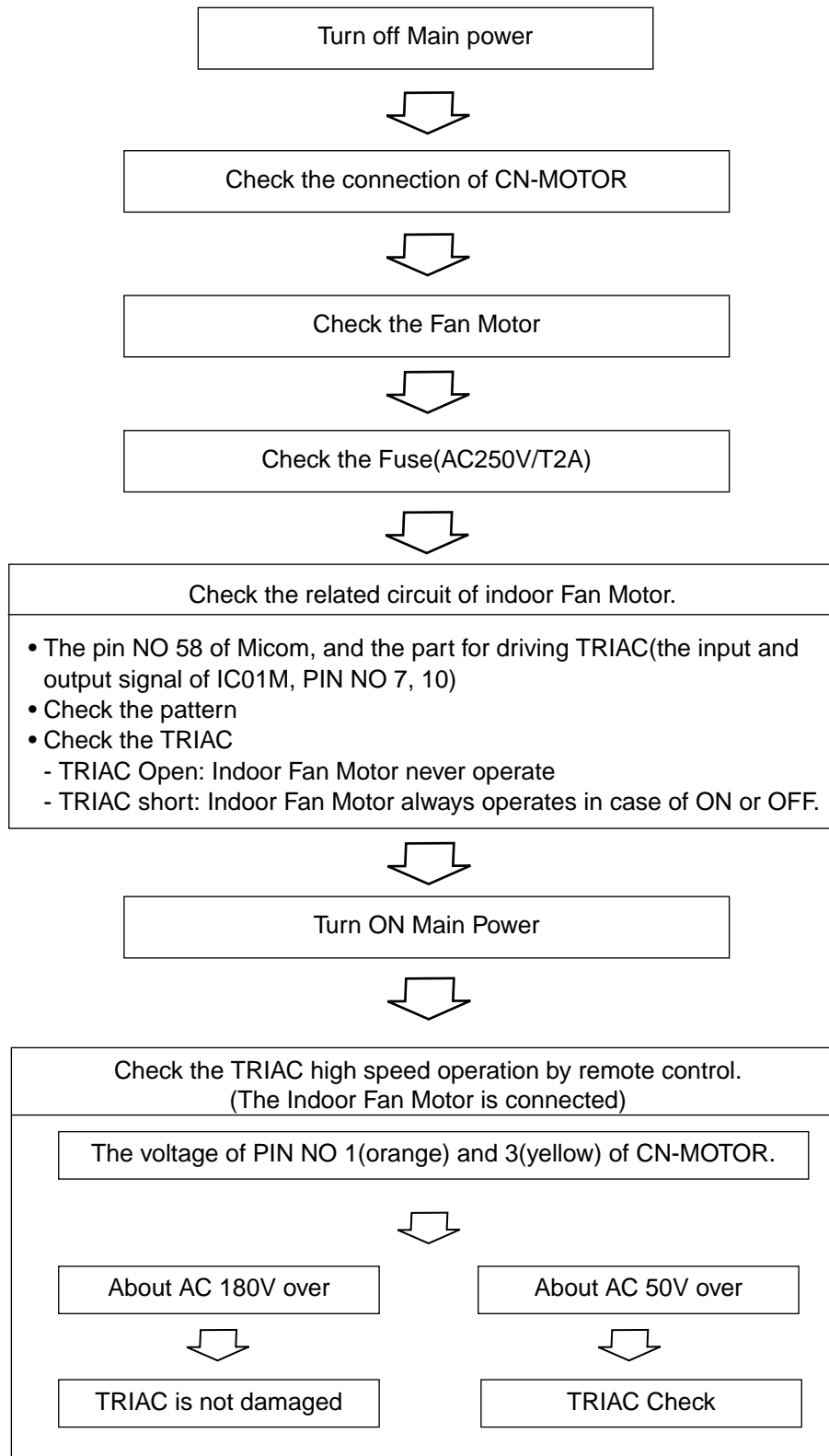
## 2. The product is not operate with the remote control.



### 3. Compressor/Outdoor Fan are unable to drive.



#### 4. When indoor Fan does not operate.



## 5. When Vertical Louver does not operate.

- Confirm that the Vertical Louver is normally geared with the shaft of Stepping Motor.
- If the regular torque is detected when rotating the Vertical Louver with hands ⇒ Normal



- Check the connecting condition of CN-U/D Connector
- Check the soldering condition(on PWB) of CN-U/D Connector



### Check the operating circuit of the Vertical Louver

- Confirm that there is DC +12V between pin①(RED) of CN-U/D and GND.
- Confirm that there is a soldering short at following terminals.
  - Between ⑥①, ⑥② and ⑥③ of MICOM
  - Between ②, ③, ④ and ⑤ of IC01M
  - Between ①⑤, ①④, ①③ and ①② of IC01M



### If there are no problems after above checks

- Confirm the assembly conditions that are catching and interfering parts in the rotation radial of the Vertical Louver

## 6. When Heating does not operate

Turn ON Main Power



Operate "Heating Mode(☀)" by setting the desired temperature of the remote control is higher than one of the indoor temperature by 2°C at least.



In heating Mode, the indoor fan operates in case the pipe temperature is higher than 28°C.



Check the connector of intake and pipe sensor(thermistors)

- Check the related circuit of RY-4WAY
- Check the indoor room temperature is disconnected or not (about 10K $\Omega$ /at 25°C).
- Check the indoor pipe temperature is disconnected or not (about 5K $\Omega$ /at 25°C).



Check the DC voltage on the PWB ASSEMBLY

- The details of check are as followings

- Comp Relay.

Check point	Comp ON	Comp OFF
Between Micom (NO.59) and GND	DC 5V	DC 0V
Between IC01M (NO.11) and GND	Below DC 1V	About DC 12V

- Outdoor fan Relay

Check point	Fan ON	Fan OFF
Between Micom (NO.53) and GND	DC 5V	DC 0V
Between IC02M (NO.12) and GND	Below DC 1V	About DC 12V

- 4 way Relay

Check point	4 way ON	4 way OFF
Between Micom (NO.51) and GND	DC 5V	DC 0V
Between IC02M (NO.11) and GND	Below DC 1V	About DC 12V





Turn off Main Power



- Check the electrical wiring diagram of outdoor side.
- Check the abnormal condition for the component of Compressor/Outdoor Fan Motor, 4 way.
- Check the "open" or "short" of connecting wires between indoor and outdoor.



