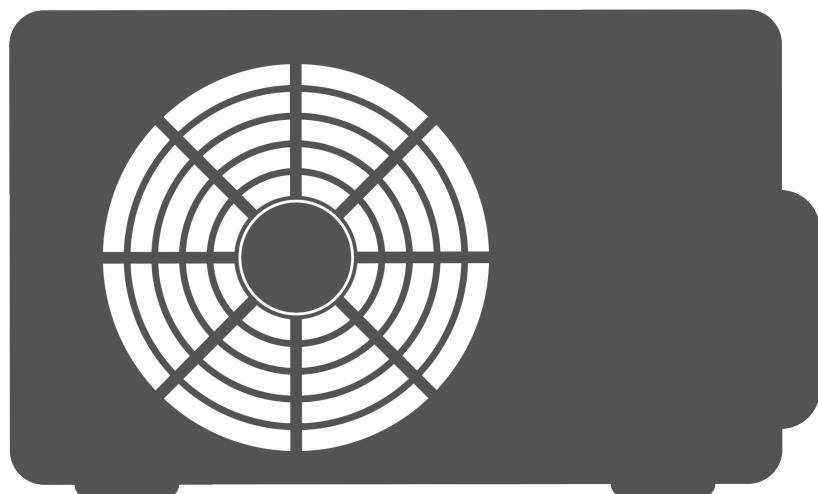
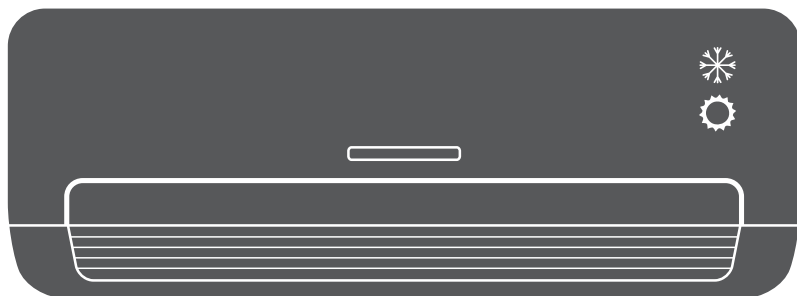




# AIR CONDITIONING SYSTEMS

## WALL MOUNTED UNIT

### • SERVICE MANUAL



#### MODELS:

L3VI-09ION / L3VO -09

L3VI-12ION / L3VO-12





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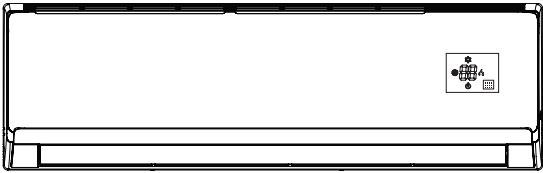


# Part I : Technical Information

## 1. Summary

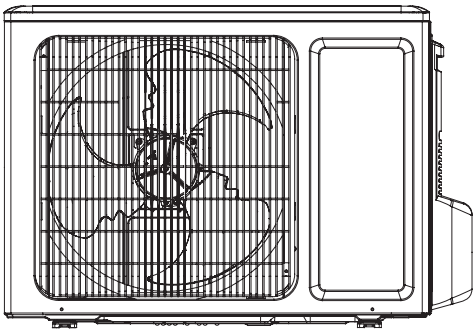
Indoor Unit:

- L3VI-09
- L3VI-12

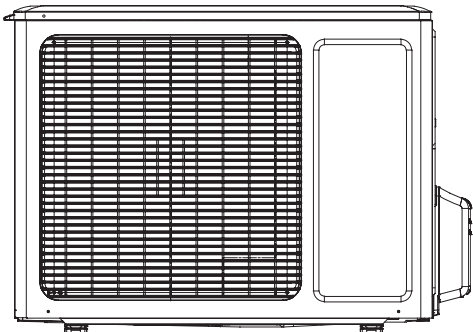


Outdoor Unit:

- L3V0-09



- L3V0-12



Remote Controller:



## 2. Specifications

### 2.1 Specification Sheet

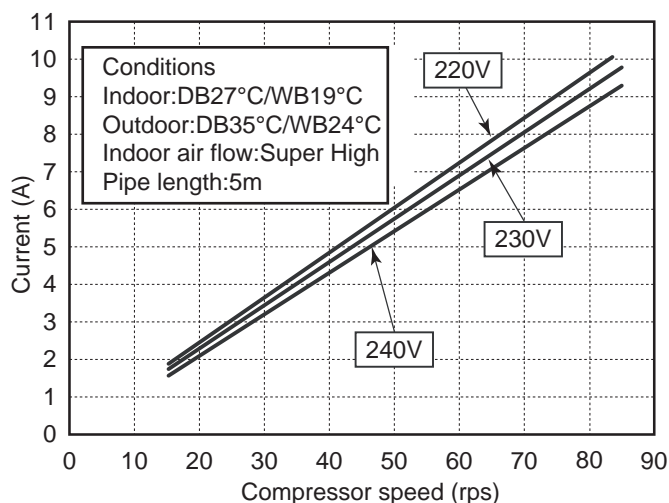
Model			L3VI-09	L3VI-12
Power Supply	Rated Voltage	V~	220-240	220-240
	Rated Frequency	Hz	50	50
	Phases		1	1
Power Supply Mode			Outdoor	Outdoor
Cooling Capacity(Min~Max)		W	2500(600~2800)	3200(600~3600)
Heating Capacity(Min~Max)		W	2800(600~3200)	3400(600~3800)
Cooling Power Input(Min~Max)		W	780(120~1300)	997(120~1400)
Heating Power Input(Min~Max)		W	775(120~1400)	942(120~1500)
Cooling Current Input		A	3.6	4.50
Heating Current Input		A	3.5	4.4
Rated Input		W	1400	1500
Rated Current		A	6.7	7.2
Air Flow Volume(SH/H/M/L/SL)		m³/h	480/370/320/210/-	560/480/410/290/-
Dehumidifying Volume		L/h	0.8	1.4
EER		W/W	3.21	3.21
COP		W/W	3.61	3.61
SEER			6.1	6.1
HSPF			/	/
Application Area		m²	12-18	15-22
Indoor Unit	Indoor Unit Model		L3VI-09	L3VI-12
	Fan Type		Cross-flow	Cross-flow
	Fan Diameter Length(DXL)	mm	Φ98X580	Φ98X580
	Cooling Speed(SH/H/M/L/SL)	r/min	1300/1200/1050/800/-	1350/1200/1050/750/-
	Heating Speed(SH/H/M/L/SL)	r/min	1300/1200/1050/900/-	1350/1200/1050/850/-
	Fan Motor Power Output	W	20	20
	Fan Motor RLA	A	0.215	0.215
	Fan Motor Capacitor	μF	1	1
	Evaporator Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Evaporator Pipe Diameter	mm	Φ5	Φ5
	Evaporator Row-fin Gap	mm	2-1.4	2-1.4
	Evaporator Coil Length(LXDXW)	mm	584X22.8X266.7	584X22.8X266.7
	Swing Motor Model		MP24AA	MP24AA
	Swing Motor Power Output	W	1.5	1.5
	Fuse Current	A	3.15	3.15
	Sound Pressure Level(SH/H/M/L/SL)	dB (A)	40/36/34/29/-	42/37/35/29/-
	Sound Power Level(SH/H/M/L/SL)	dB (A)	50/46/44/39/-	52/47/45/39/-
	Dimension(WXHXD)	mm	790X275X200	790X275X200
	Dimension of Carton Box(LXWXH)	mm	850X262X339	850X262X339
	Dimension of Package(LXWXH)	mm	853X265X354	853X265X354
	Net Weight	kg	9	9
	Gross Weight	kg	11	11

Outdoor Unit	Model of Outdoor Unit		L3VO-09	L3VO-12
	Compressor Model		QXA-A091zE190A	1GDY23AXD
	Compressor Oil		68EP	FVC50K
	Compressor Type		Rotary	Swing
	L.R.A.	A	16.5	16.5
	Compressor RLA	A	4.5	4
	Compressor Power Input	W	942	845
	Overload Protector		1NT11L-6233	KSD115/HPC115/95
	Throttling Method		Capillary	Capillary
	Operation temp	°C	16~30	16~30
	Ambient temp (cooling)	°C	-15~48	-15~48
	Ambient temp (heating)	°C	-22~24	-22~24
	Condenser Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ7	Φ7.94
	Rows-fin Gap	mm	1-1.4	1-1.4
	Coil Length (LXDXW)	mm	710X19.05X506	731X19.05X550
	Fan Motor Speed	rpm	900	900
	Output of Fan Motor	W	30	30
	Fan Motor RLA	A	0.4	0.4
	Fan Motor Capacitor	μF	/	/
	Air Flow Volume of Outdoor Unit	m³/h	1600	2200
	Fan Type		Axial-flow	Axial-flow
	Fan Diameter	mm	Φ400	Φ438
	Defrosting Method		Automatic Defrosting	Automatic Defrosting
	Climate Type		T1	T1
	Isolation		I	I
	Moisture Protection		IP24	IP24
	Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3	4.3
	Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5	2.5
	Sound Pressure Level (H/M/L)	dB (A)	51/-/-	52/-/-
	Sound Power Level (H/M/L)	dB (A)	60/-/-	61/-/-
	Dimension (WXHDXD)	mm	776X540X320	842X596X320
	Dimension of Carton Box (LXWXH)	mm	820X355X580	878X360X630
	Dimension of Package (LXWXH)	mm	823X358X595	881X363X645
	Net Weight	kg	26.5	31
	Gross Weight	kg	29	34
	Refrigerant		R410A	R410A
	Refrigerant Charge	kg	0.7	0.85
Connection Pipe	Length	m	5	5
	Gas Additional Charge	g/m	20	20
	Outer Diameter Liquid Pipe	mm	Φ6	Φ6
	Outer Diameter Gas Pipe	mm	Φ9.52	Φ9.52
	Max Distance Height	m	10	10
	Max Distance Length	m	15	20
Note: The connection pipe applies metric diameter.				

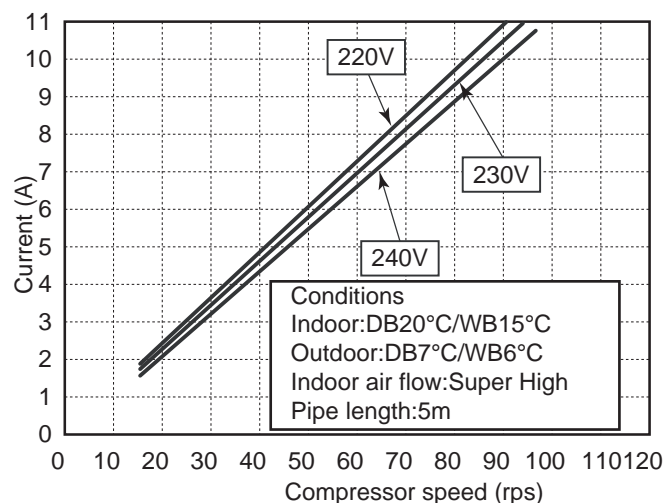
The above data is subject to change without notice; please refer to the nameplate of the unit.

## 2.2 Operation Characteristic Curve

Cooling

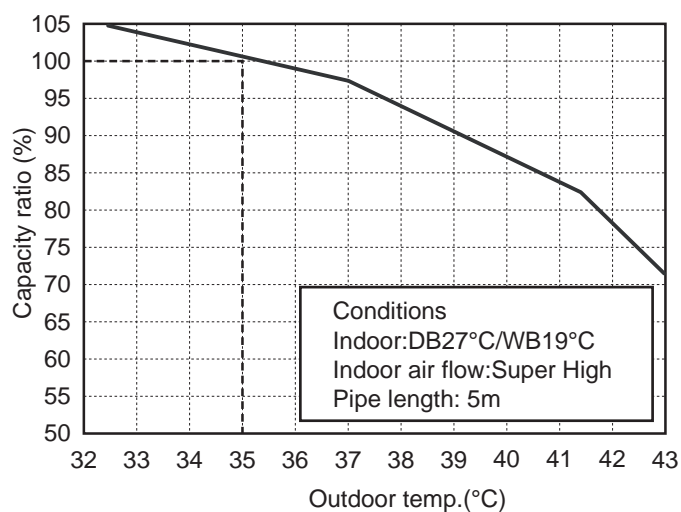


Heating

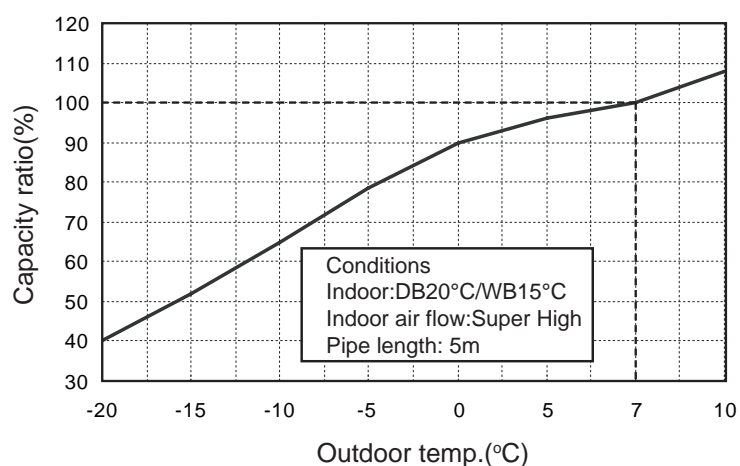


## 2.3 Capacity Variation Ratio According to Temperature

Cooling



Heating



## 2.4 Cooling and Heating Data Sheet in Rated Frequency

Cooling:

Rated cooling condition(°C) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit
Indoor	Outdoor			T1 (°C)	T2 (°C)		
27/19	35/24	09/12K	0.8 ~ 1.1	11 to 14	38 to 41	Super High	High

Heating:

Rated heating condition(°C) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit
Indoor	Outdoor			T1 (°C)	T2 (°C)		
20/15	7/6	09/12K	2.8 ~ 3.2	38 to 41	2 to 5	Super High	High

### Instruction:

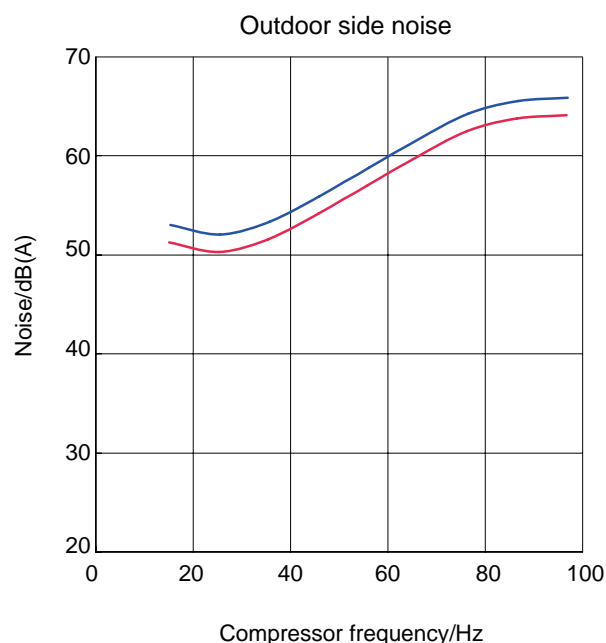
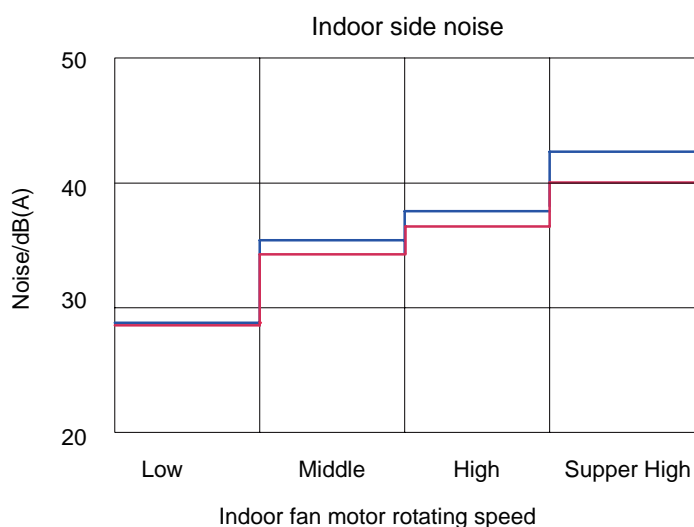
T1: Inlet and outlet pipe temperature of evaporator

T2: Inlet and outlet pipe temperature of condenser

P: Pressure at the side of big valve

Connection pipe length: 5 m.

## 2.5 Noise Curve

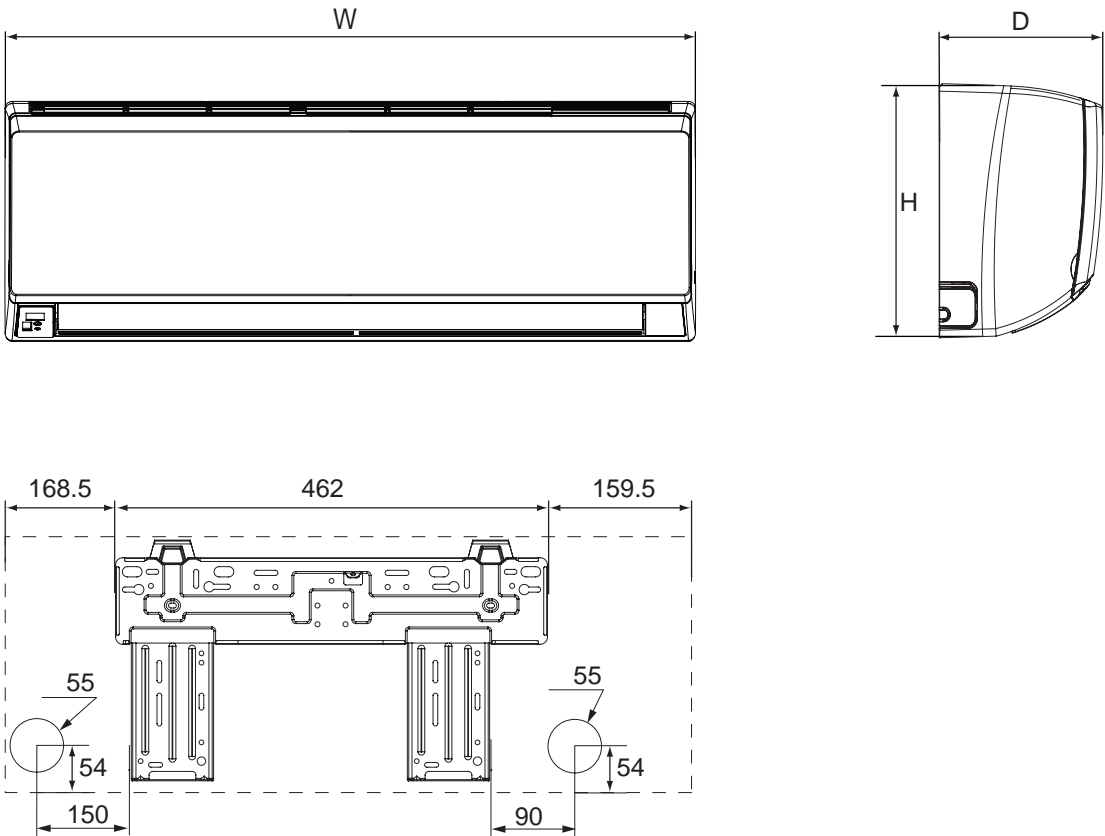


— 09K

— 12K

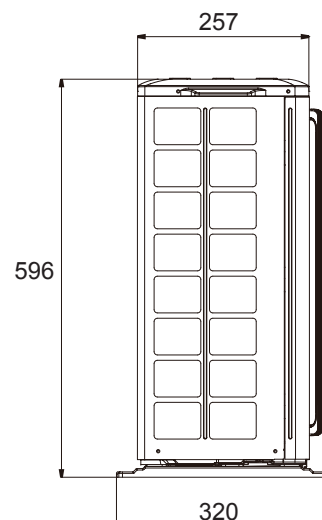
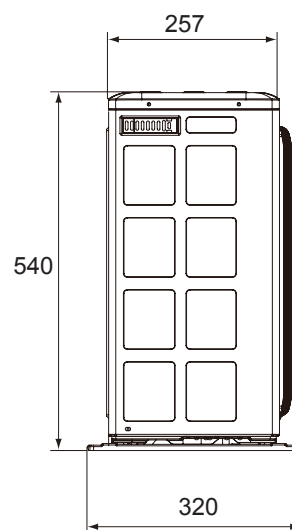
### 3. Outline Dimension Diagram

#### 3.1 Indoor Unit



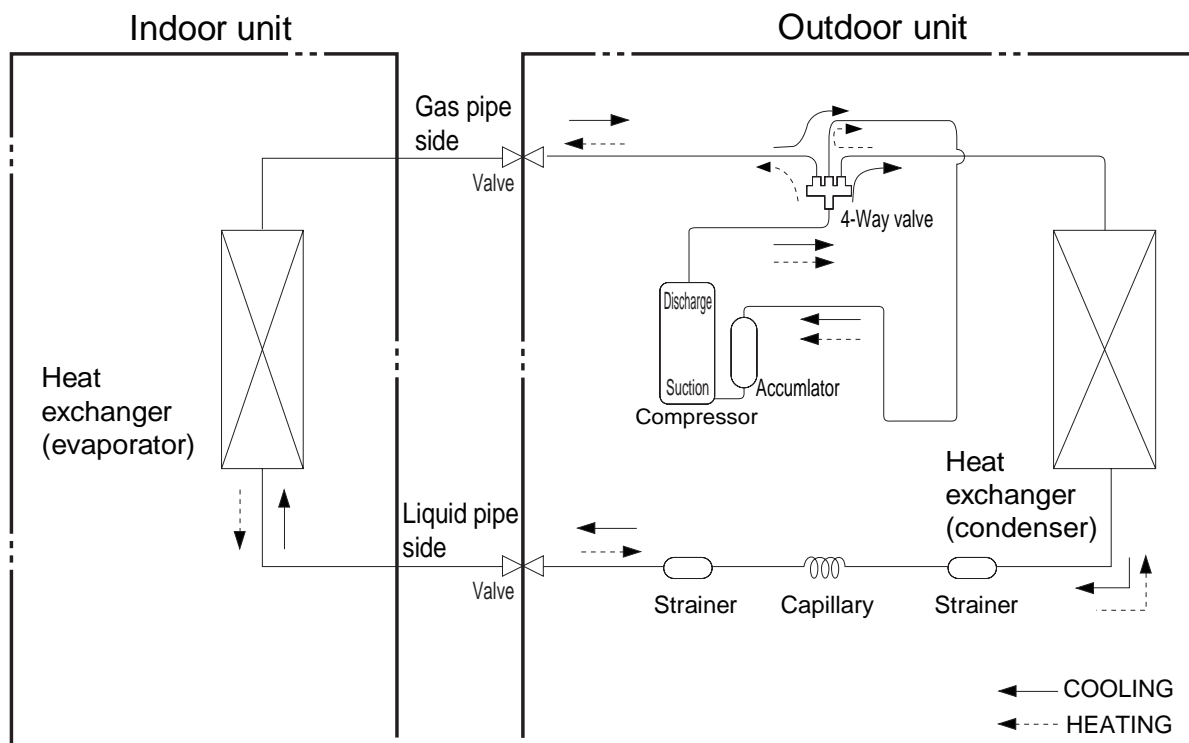
Unit:mm

Models	W	H	D
09/12K	790	275	200



## 4. Refrigerant System Diagram

### Cooling and heating model



Connection pipe specification:

Liquid pipe: 1/4" (6mm)


Gas pipe: 3/8" (9.52mm)



# 5. Electrical Part

## 5.1 Wiring Diagram

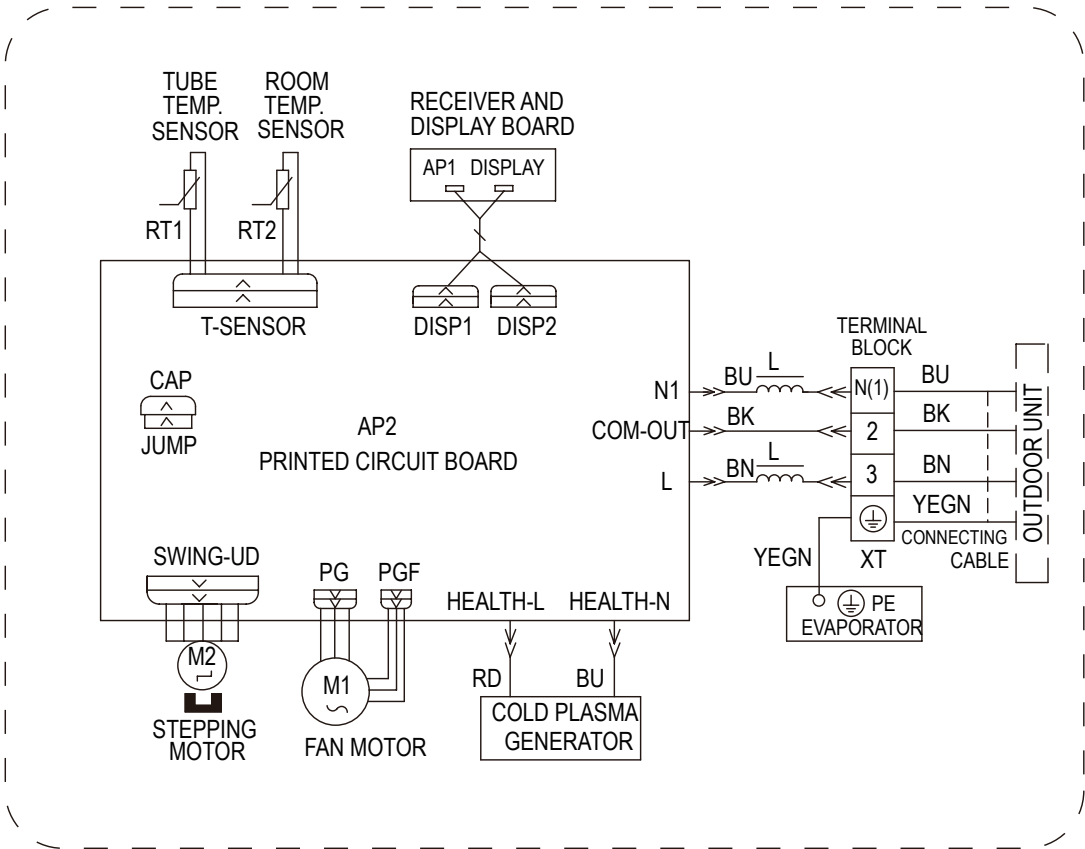
●Instruction

Symbol	Symbol Color	Symbol	Symbol Color	Symbol	Name
WH	White	GN	Green	CAP	Jumper cap
YE	Yellow	BN	Brown	COMP	Compressor
RD	Red	BU	Blue		Grounding wire
YEGN	Yellow/Green	BK	Black	/	/
VT	Violet	OG	Orange	/	/

Note: Jumper cap is used to determine fan speed and the swing angle of horizontal lover for this model.

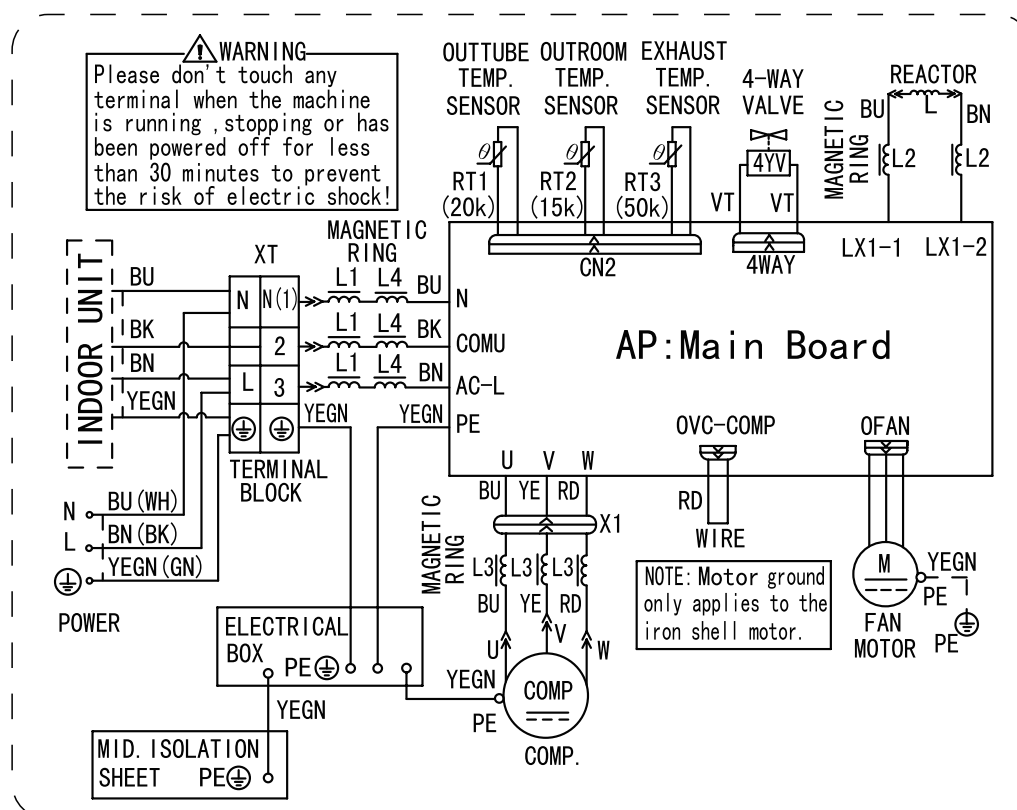
● Indoor Unit

L3VI-09, L3VI-12

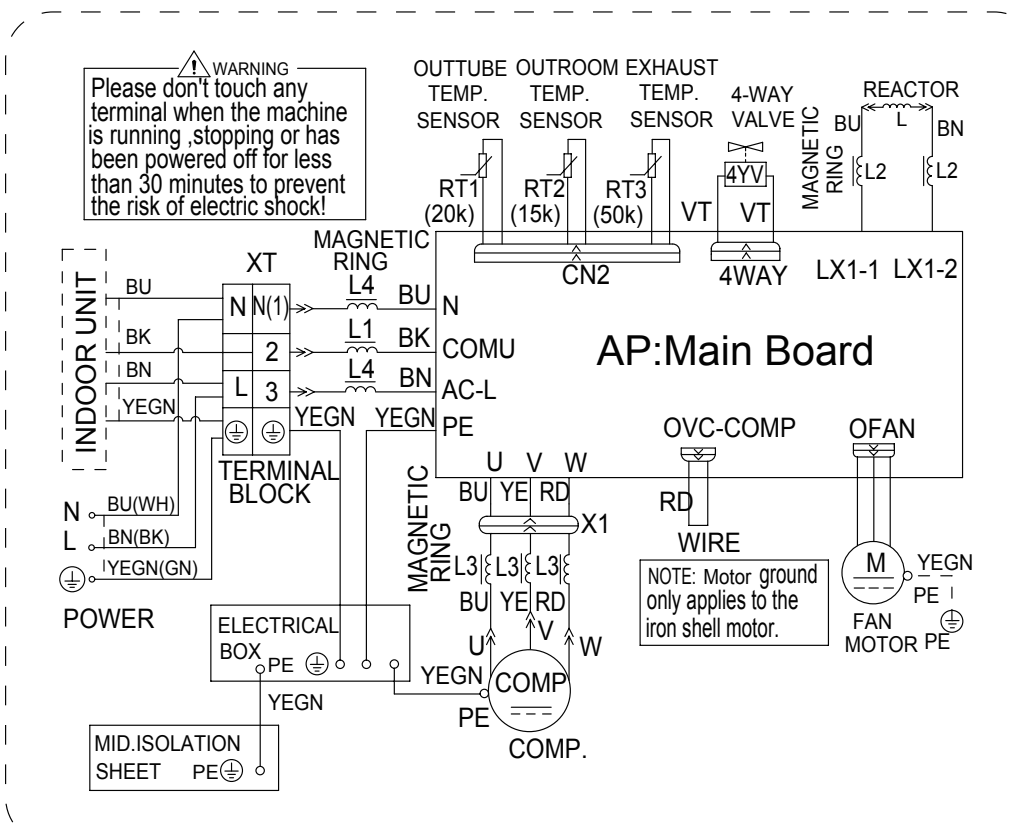


# • Outdoor Unit

L3V0-09



L3V0-12

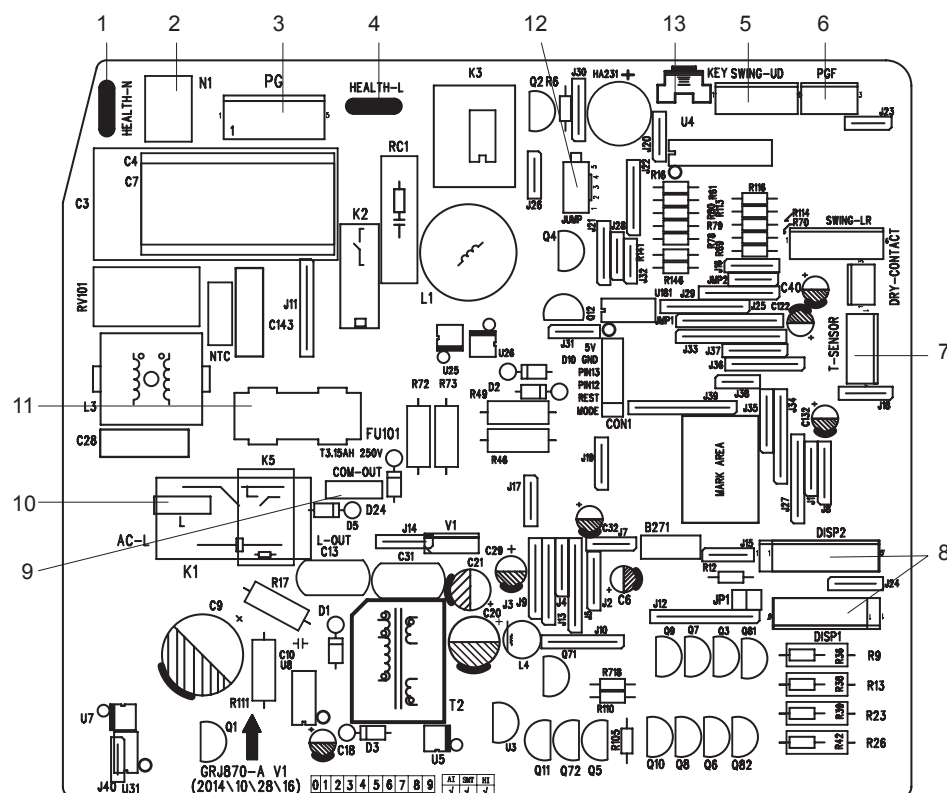


These wiring diagrams are subject to change without notice; please refer to the one supplied with the unit.

## 5.2 PCB Printed Diagram

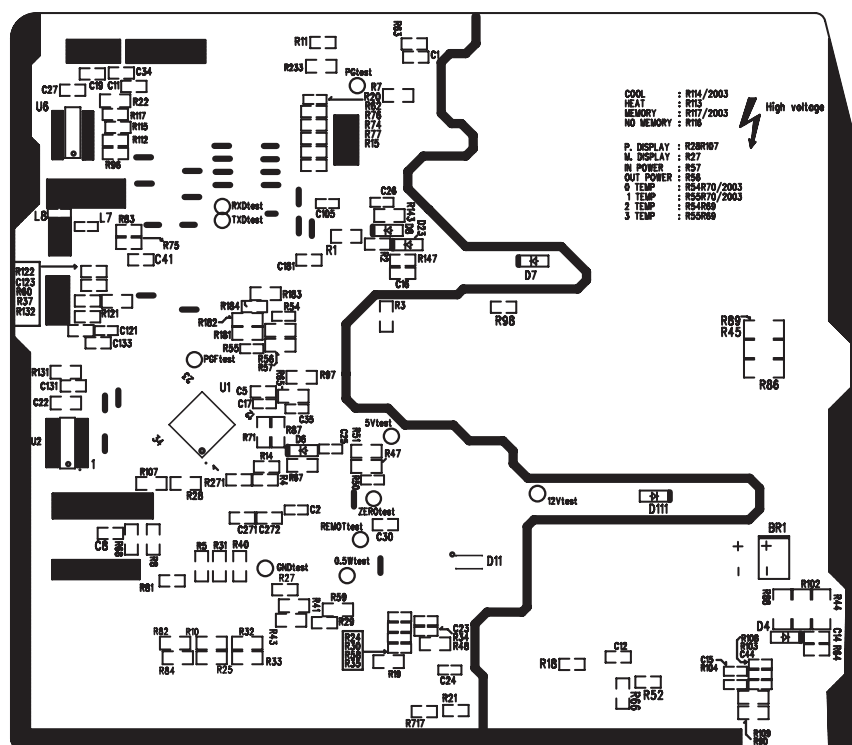
### Indoor Unit

#### • Top view



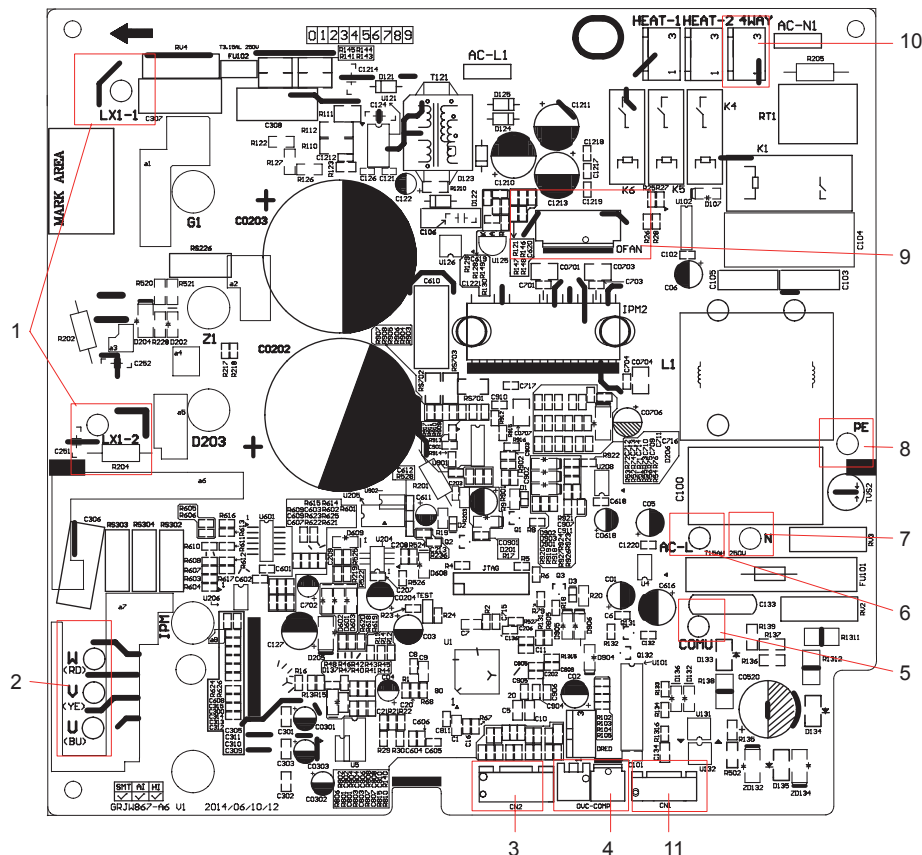
No	Name
1	Neutral wire interface of cold plasma(Only for the model with this function)
2	Neutral wire interface of power supply
3	Interface of PG motor
4	Live wire interface of cold plasma(Only for the model with this function)
5	Interface of up & down swing motor
6	Interface of indoor fan feedback
7	Interface of temperature sensor
8	Interface of display
9	Communication wire
10	Live wire interface of power supply
11	Interface of fuse
12	Jumper
13	Auto button

#### • Bottom view



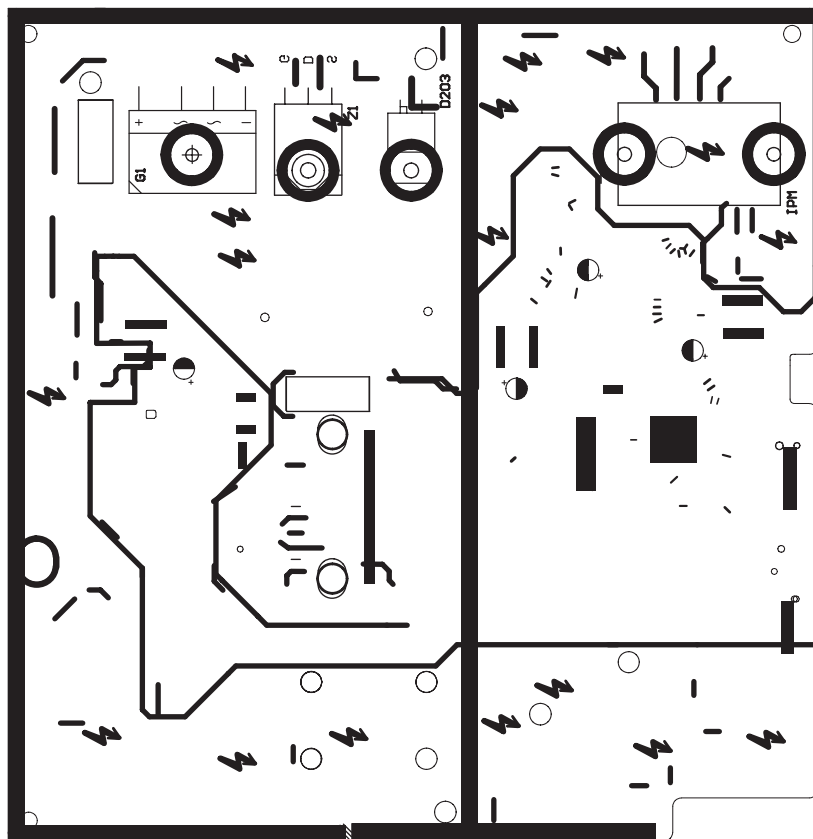
## Outdoor Unit

## • Top view



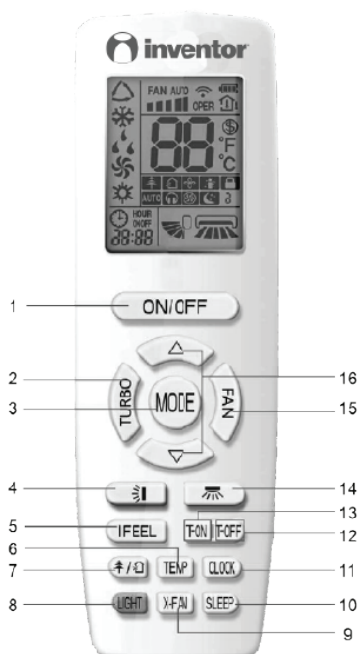
No.	Name
1	Reactor wiring terminal
2	Compressor wiring terminal
3	Terminal of outdoor unit temperature sensor
4	Compressor overload protection terminal
5	Terminal with indoor unit communication wire
6	Terminal of power supply live wire terminal
7	Terminal of power supply neutral wire
8	Interface of earthing wire
9	Terminal of outdoor fan
10	Interface of 4-way valve
11	Terminal of electronic expansion valve

## • Bottom view



## 6. Function and Control

### 1. Remote Controller Introduction



No.	Button name	Function
1	ON/OFF	Turn on or turn off the unit
2	TURBO	Set turbo function
3	MODE	Set operation mode
4		Set up&down swing status
5	I FEEL	Set I FEEL function
6	TEMP	Switch temperature displaying type on the unit's display
7		Set health function and air function
8	LIGHT	Set light function
9	X-FAN	Set X-FAN function
10	SLEEP	Set sleep function
11	CLOCK	Set clock of the system
12	TOFF	Set timer off function
13	TON	Set timer on function
14		Set left&right swing status
15	FAN	Set fan speed
16		Set temperature and time

### 2 Preparation before operation

When using the remote controller for the first time or after replacing the batteries, please set the time of the system according to current time in the following steps:

- (1). Pressing CLOCK button, is blinking.
- (2). Pressing or button, the clock time will increase or decrease rapidly.
- (3). Press CLOCK button again to confirm the time and return to display current time.

### 3 Introduction of operation function

- (1). Selecting operation mode

In unit on status, press MODE button to select operation mode in following sequence:



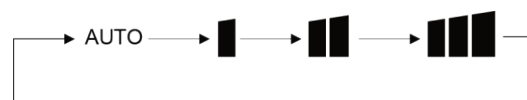
- (2). Setting temperature

In unit on status, press button to increase setting temperature and press button to decrease setting temperature. The range of temperature is from 16°C to 30°C.

**Note:** Under auto mode, manual adjustment of temperature is not needed.

- (3). Adjusting fan speed

In unit on status, press FAN button to adjust fan speed in following sequence:



**Notes:**

- ①. When operation mode changes, fan speed is memoried;
- ②. Under dry mode, fan speed is low and can not be adjusted.


- (4). Setting swing function

◆ Setting left&right swing



- 1). Under simple swing status, press button to adjust left&right swing status;

- 2). Under fixed-angle swing status, press  button to adjust left&right swing angle circularly as below:




**Note:** operate continuously left&right swing in 2 seconds, swing states will change according to above-mentioned order, or switch closed state and  state.

#### ◆ Setting up&down swing

- 1). Under simple swing status, press  button to adjust up&down swing status;
- 2). Under fixed-angle swing status, press  button to adjust up&down swing angle circularly as below:



**Note:** operate continuously left&right swing in 2 seconds, swing states will change according to above-mentioned order, or switch closed state and  state

#### (5). Setting turbo function

Under cool or heat mode, press TURBO button to set turbo function.

When  is displayed, turbo function is on.

When  is not displayed, turbo function is off.

When turbo function is on, the unit operates in super high speed to achieve quick cooling or heating. When turbo function is off, the unit operates in setting fan speed.

#### (6). Setting light function

The light on the receiver light board will display present operation status. If you want to turn off the light, please press LIGHT button. Press this button again to turn on the light.

#### (7). Viewing ambient temperature

In unit on status, receiver light board or wired controller is defaulted to display setting temperature. Press TEMP button to view indoor or outdoor ambient temperature.

When  is displayed, it means the displayed temperature is setting temperature.


When  is displayed, it means the displayed temperature is indoor ambient temperature.

When  is displayed, it means the displayed temperature is outdoor ambient temperature.

**Note:** setting temperature is always displayed in Remote Controller.

#### (8). Setting X-FAN function

In cool or dry mode, press X-FAN button to set X-FAN function.

When  is displayed, X-FAN function is on.

When  is not displayed, X-FAN function is off.

When X-FAN function is on, the water on the evaporator will be blown away until turning off the unit to avoid mildew.

#### (9). Setting health function

In unit on status, press  button to set health function.

When  is displayed, health function is on.

When  is not displayed, health function is off.

Health function is available when the unit is equipped with anion generator. When health function is on, the anion generator will start operation, adsorbing the dusts and killing the bacteria in the room.

#### (10). Setting air function



Press  button until  is displayed, then air function is turned on.

Press  button until  is disappeared, then air function is turned off.

When the indoor unit is connected with fresh air valve, air function setting can control the connection of fresh air valve, which can control the fresh air volume and improve the air quality inside the room.

## (11). Setting sleep function

In unit on status, press SLEEP button to turn on or turn off sleep function.

- ◆ When  is displayed, sleep function is on.
- ◆ When  is not displayed, sleep function is off.

**Notes:**

- ①. Sleep function can not be set in auto and fan mode;
- ②. When turning off the unit or switching mode, sleep function is cancelled;

## (12). Setting I FEEL function

In unit on status, press I FEEL button to turn on or turn off I FEEL function.

When  is displayed, I FEEL function is on.

When  is not displayed, I FEEL function is off.



When I FEEL function is turned on, the unit will adjust temperature according to the temperature detected by the remote controller to achieve the best air-conditioning effect. In this case, you should place the remote controller within the valid receiving range.

## (13). Setting timer



You can set the operation time of unit as you need. You can also set timer on and timer off in combination.

Before setting, check if the time of the system is the same as the current time. If not, please set the time according to current time.

## 1). Setting timer off


- ①. Pressing TOFF button, "OFF" is blinking and time displaying zone displays the timer time of last setting
- ②. Press  or  button to adjust the timer time.
- ③. Press TOFF button again to confirm setting. OFF is displayed and time displaying zone resumes to display current time.
- ④. Press TOFF button again to cancel timer and OFF is not displayed.

## 2). Setting timer on

- ①. Pressing TON button, "ON" is blinking and time displaying zone displays the timer time of last setting.
- ②. Press  or  button to adjust the timer time.
- ③. Press TON button again to confirm setting. ON is displayed and time displaying zone resumes to display current time.
- ④. Press TON button again to cancel timer and ON is not displayed.

## 4 Introduction of special functions

## (1). Setting child lock

Press  and  button simultaneously to lock the buttons on remote controller and  is displayed.

Press  and  button simultaneously again to unlock the buttons on remote controller and is not displayed.



If the buttons are locked,  blinks 3 times when pressing the button and any operation on the button is invalid.

## (2). Switching temperature scale

In unit off status, press MODE button and  button simultaneously to switch temperature scale between °C and °F.

## (3). Setting energy-saving function

In unit on status and under cool mode, press CLOCK and TEMP button simultaneously to enter energy-saving mode.


- ◆ When  is displayed, energy-saving function is on.
- ◆ When  is not displayed, energy-saving function is off.

If you want to turn off the energy-saving function, press CLOCK and TEMP button and  is not displayed.

**Note:** energy-saving function is only available in cooling mode and it will be exited when switching mode or setting sleep function.

## (4). Absence function

In unit on status and under heat mode, press CLOCK and TEMP button simultaneously to enter absence function.

Temperature displaying zone displays 8 and  is displayed.

Press CLOCK and TEMP button simultaneously again to exit absence function.

Temperature displaying zone resumes previous display and is not displayed.

In winter, absence function can keep the indoor ambient temperature above 0°C to avoid freezing.

**Note:** Absence function is only available in heating mode and it will be exited when switching mode or setting sleep function.

## 5 Replacing batteries in remote controller and notes

- (1). Lift the cover along the direction of arrow (as shown in Fig 1 ①).
- (2). Take out the original batteries (as shown in Fig 1 ②).
- (3). Place two 7# (AAA 1.5V) dry batteries, and make sure the position of "+" polar and "-" polar is correct (as shown in Fig 2 ③).
- (4). Reinstall the cover (as shown in Fig 2 ④).

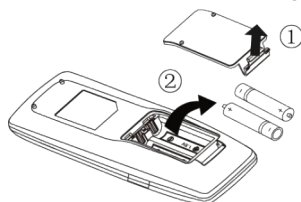


Fig.1

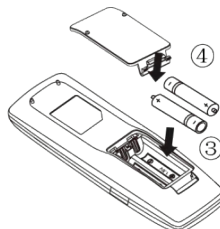



Fig.2

### Notes:

- ①. The remote controller should be placed 1m away from the TV set or stereo sound sets.
- ②. The operation of remote controller should be performed within its receiving range.
- ③. If you need to control the main unit, please point the remote controller at the signal receiving window of the main unit to improve the receiving sensibility of main unit.
- ④. When the remote controller is sending signal, "  " icon will be blinking for 1 second. When the main unit receives valid remote control signal, it will give out a sound
- ⑤. If the remote controller does not operate normally, please take the batteries out and reinsert them after 30 seconds. If it still can't operate properly, replace the batteries.
- ⑥. When replacing the batteries, do not use old or different types of batteries, otherwise, it may cause malfunction.
- ⑦. When you won't use the remote controller for a long time, please take out the batteries.



## 6.2 Brief Description of Modes and Functions

### 1. Temperature Parameters

- ◆ Indoor preset temperature ( $T_{\text{preset}}$ )
- ◆ Indoor ambient temperature ( $T_{\text{amb.}}$ )

### 2. Basic Functions

Once energized, in no case should the compressor be restarted within less than 3 minutes. In the situation that memory function is available, for the first energization, if the compressor is at stop before de-energization, the compressor will be started without a 3-minute lag; if the compressor is in operation before de-energization, the compressor will be started with a 3-minute lag; and once started, the compressor will not be stopped within 6 minutes regardless of changes in room temperature;

#### (1) Cooling Mode

##### ① Working conditions and process of cooling

##### Cooling conditions and process(09k)

- a. When  $T_{\text{amb.}} \geq T_{\text{preset}}$  the unit starts cooling. In this case, the IDU fan motor, ODU fan motor and compressor run, and the IDU fan motor runs at set speed;
- b. When  $T_{\text{amb.}} = T_{\text{preset}} - 3^{\circ}\text{C}$ , the compressor continuously operates below the frequency of 15Hz (not including 15Hz) for 15mins. If  $T_{\text{amb.}} = T_{\text{set}} - 3^{\circ}\text{C}$  still keeps the same, the compressor stops operation;
- c. When  $T_{\text{amb.}} \leq T_{\text{preset}} - 4^{\circ}\text{C}$ , the compressor stops operation; ODU fan motor stops operation with a delay of 30s and IDU fan motor operates at set speed;
- d. When  $T_{\text{preset}} - 2^{\circ}\text{C} < T_{\text{amb.}} < T_{\text{set}}$ , the unit will maintain its previous running status.

##### Cooling conditions and process(12k)

- a. When  $T_{\text{amb.}} + T_{\text{indoor supplementary}} \geq T_{\text{preset}}$ , the unit starts cooling. In this case, the IDU fan motor, ODU fan motor and compressor run, and the IDU fan motor runs at set speed;
  - b. When  $T_{\text{amb.}} + T_{\text{indoor supplementary}} \leq T_{\text{preset}} - 2^{\circ}\text{C}$ , the compressor stops operation; ODU fan motor stops operation with a delay of 30s and IDU fan motor operates at set speed;
  - c. When  $T_{\text{preset}} - 2^{\circ}\text{C} < T_{\text{indoor amb.}} + T_{\text{indoor supplementary}} < T_{\text{preset}}$ , the unit will maintain its previous running status.
- Under this mode, the four-way valve will be de-energized and temperature can be set within a range from 16 to  $30^{\circ}\text{C}$ .  
If the compressor is shut down for some reason, the indoor fan and the swing device will operate at original state.

##### ② Protection

##### ◆ Antifreeze protection

Under cooling and dehumidifying mode, 6 minutes after the compressor is started:

If  $T_{\text{evap}} \leq 2^{\circ}\text{C}$ , the compressor will operate at reduced frequency.

If  $T_{\text{evap}} \leq -1^{\circ}\text{C}$  is detected for durative 3 minutes, the compressor will stop, and after 30 seconds, the outdoor fan will stop; and under cooling mode, the indoor fan and the swing motor will remain at the original state.

If  $T_{\text{evap.}} \geq 10^{\circ}\text{C}$  and the compressor has remained at OFF for at least 3 minutes, the compressor will resume its original operation state.

##### ◆ Total current up and frequency down protection

If  $I_{\text{total}} \leq 6$ , frequency rise will be allowed; if  $I_{\text{total}} \geq 7$ , frequency rise will not be allowed; if  $I_{\text{total}} \geq 8$ , the compressor will run at reduced frequency; and if  $I_{\text{total}} \geq 9$ , the compressor will stop and the outdoor fan will stop with a time lag of 30s.

#### (2) Dehumidifying Mode

##### ① Working conditions and process of dehumidifying

If  $T_{\text{amb.}} > T_{\text{preset}}$ , the unit will enter cooling and dehumidifying mode, in which case the compressor and the outdoor fan will operate and the indoor fan will run at low speed.

If  $T_{\text{preset}} - 2^{\circ}\text{C} \leq T_{\text{amb.}} \leq T_{\text{preset}}$ , the compressor remains at its original operation state.

If  $T_{\text{amb.}} < T_{\text{preset}} - 2^{\circ}\text{C}$ , the compressor will stop, the outdoor fan will stop with a time lag of 30s, and the indoor fan will operate at low speed.

##### ② Protection

Protection is the same as that under the cooling mode.

#### (3) Heating Mode

### ① Working conditions and process of heating

If  $T_{amb} \leq T_{preset} + 2^{\circ}\text{C}$ , the unit enters heating mode, in which case the four-way valve, the compressor and the outdoor fan will operate simultaneously, and the indoor fan will run at preset speed in the condition of preset cold air prevention.

If  $T_{amb} \geq T_{preset} + 5^{\circ}\text{C}$ , the compressor will stop, the outdoor fan will stop with a time lag of 30s, and the indoor fan will stop after 60-second blow at low speed

If  $T_{preset} + 2^{\circ}\text{C} < T_{amb} < T_{preset} + 5^{\circ}\text{C}$ , the unit will maintain its original operating status.

Under this mode, the four-way valve is energized and temperature can be set within a range of 16 - 30°C. The operating symbol, the heating symbol and preset temperature are revealed on the display.

### ② Condition and process of defrost

When duration of successive heating operation is more than 45 minutes, or accumulated heating time more than 90 minutes, and one of the following conditions is reached, the unit will enter the defrost mode after 3 minutes.

(1)  $T_{outdoor\ ambient} > 5^{\circ}\text{C}$ ,  $T_{outdoor\ tube} \leq -2^{\circ}\text{C}$ ;

(2)  $-2^{\circ}\text{C} \leq T_{outdoor\ ambient} < 5^{\circ}\text{C}$ ,  $T_{outdoor\ tube} \leq -6^{\circ}\text{C}$ ;

(3)  $-5^{\circ}\text{C} \leq T_{outdoor\ ambient} < -2^{\circ}\text{C}$ ,  $T_{outdoor\ tube} \leq -8^{\circ}\text{C}$ ;

(4)  $-10^{\circ}\text{C} \leq T_{outdoor\ ambient} < -5^{\circ}\text{C}$ ,  $T_{outdoor\ tube} - T_{compensatory} \leq (T_{outdoor\ ambient} - 3^{\circ}\text{C})$

(5)  $T_{outdoor\ ambient} < -10^{\circ}\text{C}$ ,  $T_{outdoor\ tube} - T_{compensatory} \leq (T_{outdoor\ ambient} - 3^{\circ}\text{C})$

(after energizing,  $T_{compensatory} = 0^{\circ}\text{C}$  during the first defrosting; if it is not the first defrosting,  $T_{compensatory}$  is confirmed by  $T_{outdoor\ tube}$  of quitting last defrosting:

a. when  $T_{outdoor\ tube} > 2^{\circ}\text{C}$ ,  $T_{compensatory} = 0^{\circ}\text{C}$ ; b. when  $T_{outdoor\ tube} \leq 2^{\circ}\text{C}$ ,  $T_{compensatory} = 3^{\circ}\text{C}$ )

At that time, the indoor fan stops and the compressor stops, and after 30 seconds the outer fan will stop, and then after 30 seconds, the four-way valve will stop. After 30 seconds, the compressor is initiated for raising the frequency to defrost frequency.

When the compressor has operated under defrost mode for 7.5 minutes, or  $T_{outdoor\ ambient} \geq 10^{\circ}\text{C}$ , the compressor will be converted to 46Hz operation. After 30 seconds, the compressor will stop. And after another 30 seconds, the four-way valve will be opened, and after 60 seconds, the compressor and the outer fan will be started, the indoor fan will run under preset cold air prevention conditions, and H1 will be displayed at temperature display area on the display panel. Defrost frequency is 85Hz.

### ③ Protection

#### ◆ Cold air prevention

The unit is started under heating mode (the compressor is ON):

① In the case of  $T_{indoor\ amb.} < 24^{\circ}\text{C}$ : if  $T_{tube} \leq 40^{\circ}\text{C}$  and the indoor fan is at stop state, the indoor fan will begin to run at low speed with a time lag of 2 minutes. Within 2 minutes, if  $T_{tube} > 40^{\circ}\text{C}$ , the indoor fan also will run at low speed; and after 1-minute operation at low speed, the indoor fan will be converted to operation at preset speed. Within 1-minute low speed operation or 2-minute non-operation, if  $T_{tube} > 42^{\circ}\text{C}$ , the fan will run at present speed.

② In the case of  $T_{indoor\ amb.} \geq 24^{\circ}\text{C}$ : if  $T_{tube} \leq 42^{\circ}\text{C}$ , the indoor fan will run at low speed, and after one minute, the indoor fan will be converted to preset speed. Within one-minute low speed operation, if  $T_{tube} > 42^{\circ}\text{C}$ , the indoor fan will be converted to preset speed.

Note:  $T_{indoor\ amb.}$  indicated in ① and ② refers to, under initially heating mode, the indoor ambient temperature before the command to start the compressor is performed according to the program, or after the unit is withdrawn from defrost, the indoor ambient temperature before the defrost symbol is cleared.

#### ◆ Total current up and frequency down protection

If the total current  $I_{total} \leq 6$ , frequency rise will be allowed; if  $I_{total} \geq 7$ , frequency rise will not be allowed; if  $I_{total} \geq 8$ , the compressor will run at reduced frequency; and if  $I_{total} \geq 9$ , the compressor will stop and the outdoor fan will stop with a time lag of 30s.

### (4) Fan Mode

Under the mode, the indoor fan will run at preset speed and the compressor, the outdoor fan, the four-way valve and the electric heater will stop.

Under the mode, temperature can be set within a range of 16 - 30°C.

### (5) AUTO Mode

#### ① Working conditions and process of AUTO mode

a. When  $T_{ambient} \geq 26^{\circ}\text{C}$ , the unit will operate in Cool mode. The set temperature is 25°C.

b. When  $T_{ambient} \leq 22^{\circ}\text{C}$ , the heat pump unit will operate in Heat mode., set temperature be 20°C; the cooling only unit will operate in Fan mode, set temperature be 25°C.

c. When  $23^{\circ}\text{C} \leq T_{ambient} \leq 25^{\circ}\text{C}$ , the unit will operate in the previous state. If it is energized for the first time, it will operate in Fan mode.

d. Under auto mode, if its cooling mode, operation frequency is same as that under cooling mode; if its heating mode, operation frequency is same as that under heating mode.

## ② Protection

- a. In cooling operation, protection is the same as that under the cooling mode;
- b. In heating operation, protection is the same as that under the heating mode;
- c. When ambient temperature changes, operation mode will be converted preferentially. Once started, the compressor will remain unchanged for at least 6 minutes.

## (6) Common Protection Functions and Fault Display under COOL, HEAT, DRY and AUTO Modes

### ① Overload protection

T tube: measured temperature of outdoor heat exchanger under cooling mode; and measured temperature of indoor heat exchanger under heating mode.

#### 1) Cooling overload

- a. If  $T_{\text{tube}} \leq 52^{\circ}\text{C}$ , the unit will return to its original operation state.
- b. If  $T_{\text{tube}} \geq 55^{\circ}\text{C}$ , frequency rise is not allowed.
- c. If  $T_{\text{tube}} \geq 58^{\circ}\text{C}$ , the compressor will run at reduced frequency.
- d. If  $T_{\text{tube}} \geq 62^{\circ}\text{C}$ , the compressor will stop and the indoor fan will run at preset speed.

#### 2) Heating overload

- a. If  $T_{\text{tube}} \leq 50^{\circ}\text{C}$ , the unit will return to its original operation state.
- b. If  $T_{\text{tube}} \geq 53^{\circ}\text{C}$ , frequency rise is not allowed.
- c. If  $T_{\text{tube}} \geq 56^{\circ}\text{C}$ , the compressor will run at reduced frequency.
- d. If  $T_{\text{tube}} \geq 60^{\circ}\text{C}$ , the compressor will stop and the indoor fan will blow residue heat and then stop.

### ② Exhaust temperature protection of compressor

- a. If exhaust temperature  $\geq 98^{\circ}\text{C}$ , frequency is not allowed to rise.
- b. If exhaust temperature  $\geq 103^{\circ}\text{C}$ , the compressor will run at reduced frequency.
- c. If exhaust temperature  $\geq 110^{\circ}\text{C}$ , the compressor will stop.
- d. If exhaust temperature  $\leq 90^{\circ}\text{C}$  and the compressor has stayed at stop for at least 3 minutes, the compressor will resume its operation.

### ③ Communication fault

If the unit fails to receive correct signals for durative 3 minutes, communication fault can be justified and the whole system will stop.

### ④ Module protection

Under module protection mode, the compressor will stop. When the compressor remains at stop for at least 3 minutes, the compressor will resume its operation. If module protection occurs six times in succession, the compressor will not be started again.

### ⑤ Overload protection

If temperature sensed by the overload sensor is over  $115^{\circ}\text{C}$ , the compressor will stop and the outdoor fan will stop with a time lag of 30 seconds. If temperature is below  $95^{\circ}\text{C}$ , the overload protection will be relieved.

### ⑥ DC bus voltage protection

If voltage on the DC bus is below 150V or over 420V, the compressor will stop and the outdoor fan will stop with a time lag of 30 seconds. When voltage on the DC bus returns to its normal value and the compressor has stayed at stop for at least 3 minutes, the compressor will resume its operation.

### ⑦ Faults of temperature sensors

Designation of sensors	Faults
Indoor ambient temperature	The sensor is detected to be open-circuited or short-circuited for successive 30 seconds
Indoor tube temperature	The sensor is detected to be open-circuited or short-circuited for successive 30 seconds
Outdoor ambient temperature	The sensor is detected to be open-circuited or short-circuited for successive 30 seconds
Outdoor tube temperature	The sensor is detected to be open-circuited or short-circuited for successive 30 seconds, and no detection is performed within 10 minutes after defrost begins.
Exhaust	After the compressor has operated for 3 minutes, the sensor is detected to be open-circuited or short-circuited for successive 30 seconds.
Overload	After the compressor has operated for 3 minutes, the sensor is detected to be open-circuited or short-circuited for successive 30 seconds.
Zero-crossing inspection circuit malfunction of the IDU fan motor	Zero-crossing signal is not detected for continuously 3s; Or the interval between the zero-crossing signals in 3s $> 25\text{ms}$ (power frequency: 50Hz)

## Indoor Units

### (1) ON/OFF

Press the remote button ON/OFF: the on-off state will be changed once each time you press the button.

### (2) Mode Selection

Press the remote button MODE, then select and show in the following ways: AUTO, COOL, DRY, FAN, HEAT, AUTO.

### (3) Temperature Setting Option Button

Each time you press the remote button TEMP+ or TEMP-, the setting temperature will be up or down by 1°C. Regulating Range: 16~30°C, the button is useless under the AUTO mode.

### (4) Time Switch

You should start and stop the machine according to the setting time by remote control.

### (5) SLEEP State Control

a. When the air conditioner is under the mode of COOL, DRY, and the SLEEP mode has been set well, after the SLEEP state keeps about 1 hour, the pre-setting T will raise 1°C, and it will raise 1°C again after 2 hours, so it raise 2°C in 2 hours, then it will run on at the setting temperature and wind speed.

b. When the air conditioner is under the mode of HEAT, and the Timer has been set well, after the SLEEP state keeps about 1 hour, the pre-setting T will reduce 1°C, and it will reduce 1°C again after 2 hours, so it reduce 2°C in 2 hours, then it will run on at the setting temperature and wind speed.

c. The setting temperature keeps the same under the FAN mode and AUTO mode.

### (6) Buzzer Control

a. Cooling only model: The buzzer will send a “Di Di” sound when the air conditioner is powered up or received the information sent by the remote control or there is a button input, the single tube cooler doesn't receive the remote control ON signal under the mode of heating mode.

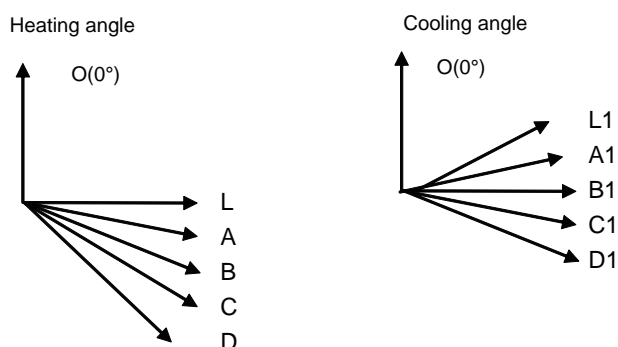
b. Cooling and heating model: The buzzer will send a “Di” sound when the air conditioner is powered up or received the information sent by the remote control or there is a button input, the single tube cooler doesn't receive the remote control ON signal under the mode of heating mode.

### (7) Auto button

If the controller is on, it will stop by pressing the button, and if the controller is off, it will be automatic running state by pressing the button, swing on and light on, and the main unit will run based on the remote control if there is remote control order.

### (8) Up-and-Down Swinging Control

When power on, the up-and-down motor will firstly move the air deflector to counter-clockwise, close the air outlet. After starting the machine, if you don't set the swinging function, heating mode and auto-heating mode, the up-and-down air deflector will move to D clockwise; under other modes, the up-and-down air deflector will move to L1. If you set the swinging function when you start the machine, then the wind blade will swing between L and D. The air deflector has 7 swinging states: Location L, Location A, Location B, Location C, Location D, Location L to Location D, stop at any location between L-D (the included angle between L~D is the same). The air deflector will be closed at 0 Location, and the swinging is effectual only on condition that setting the swinging order and the inner fan is running. The indoor fan and compressor may get the power when air deflector is on the default location.



### (9) Display

#### ① Operation pattern and mode pattern display

All the display patterns will display for a time when the power on, the operation indication pattern will display in red under standby status. When the machine is start by remote control, the indication pattern will light and display the current operation mode (the mode light includes:

Cooling, heating and dehumidify). If you close the light key, all the display patterns will close.

## ② Double-8 display

According to the different setting of remote control, the nixie light may display the current temperature (the temperature scope is from 16°C to 30°C) and indoor ambient temperature. The set temperature displayed in auto cooling and fan mode is 25°C, The set temperature displayed in auto heating mode is 20°C and the temperature will display H1 under the defrosting mode. (If you set the fahrenheit temperature display, the nixie light will display according to fahrenheit temperature)

## (10) Protection function and failure display

E2: Freeze-proofing protection    E4: Exhausting protection    E5: Overcurrent protection

E6: Communication failure    H4: Overload protection

F1: Indoor ambient sensor start and short circuit (continuously measured failure in 30S)

F2: Indoor evaporator sensor start and short circuit (continuously measured failure in 30S)

F3: Outdoor ambient sensor start and short circuit (continuously measured failure in 30S)

F4: Outdoor condenser sensor start and short circuit (continuously measured failure in 30S, and don't measure within 10 minutes after defrosted)

F5: Outdoor exhausting sensor start and short circuit (continuously measured failure in 30S after the compressor operated 3 minutes)

H3: Overload protection of compressor    H5: Module protection

PH: High-voltage protection    PL: Low-voltage protection

P1: Nominal cooling and heating    P2: Maximum cooling and heating

P3: Medium cooling and heating    P0: Minimum cooling and heating

## (11) Drying Function

You may start or stop the drying function under the modes of cooling and dehumidify at the starting status (The modes of automatism, heating and air supply do not have drying function). When you start the drying function, after stop the machine by pressing the switch button, you should keep running the inner fans for 10 minutes under low air damper (The swing will operate as the former status within 10 minutes, and other load is stopped), then stop the entire machine; When you stop the drying function, press the switch button will stop the machine directly. When you start the drying function, operating the drying button will stop the inner fans and close the guide louver.

## (12) Memory function when interrupting the power supply

Memory content: mode, swing function, light, set temperature and wind speed. After interrupted the power supply, the machine will start when recovering the power according to the memory content automatically. If the last remote control command has not set the timed function, the system will remember the last remote control command and operate according to it. If the last remote control command has set timed function and the power supply is interrupted before the timed time, the system will remember the timed function of the last remote control command, the timed time will recounted from power on. If the last remote control command has set timed function, the time is out and the system is start or stop according to the set time when the power supply is interrupted, the system will remember the operation status before the power supply was interrupted, and do not carry out timed action; The timed clock will not remembered.

## (13) Sleep function

In this mode, the system will select proper sleep curve to operate according to different set temperature.

① If start up sleep function under cooling or drying mode, the system will increase set temperature automatically within a certain range to operate.

② If start up sleep function under heating mode, the system will decrease set temperature automatically within a certain range to operate.

# Part II : Installation and Maintenance

## 7. Notes for Installation and Maintenance

### Safety Precautions: Important!

Please read the safety precautions carefully before installation and maintenance.

The following contents are very important for installation and maintenance.

Please follow the instructions below.

- The installation or maintenance must accord with the instructions.
- Comply with all national electrical codes and local electrical codes.
- Pay attention to the warnings and cautions in this manual.
- All installation and maintenance shall be performed by distributor or qualified person.
- All electric work must be performed by a licensed technician according to local regulations and the instructions given in this manual.
- Be caution during installation and maintenance. Prohibit incorrect operation to prevent electric shock, casualty and other accidents.



### Warnings

#### Electrical Safety Precautions:

1. Cut off the power supply of air conditioner before checking and maintenance.
2. The air condition must apply specialized circuit and prohibit share the same circuit with other appliances.
3. The air conditioner should be installed in suitable location and ensure the power plug is touchable.
4. Make sure each wiring terminal is connected firmly during installation and maintenance.
5. Have the unit adequately grounded. The grounding wire can't be used for other purposes.
6. Must apply protective accessories such as protective boards, cable-cross loop and wire clip.
7. The live wire, neutral wire and grounding wire of power supply must be corresponding to the live wire, neutral wire and grounding wire of the air conditioner.
8. The power cord and power connection wires can't be pressed by hard objects.
9. If power cord or connection wire is broken, it must be replaced by a qualified person.

10. If the power cord or connection wire is not long enough, please get the specialized power cord or connection wire from the manufacture or distributor. Prohibit prolong the wire by yourself.

11. For the air conditioner without plug, an air switch must be installed in the circuit. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.

12. Make sure all wires and pipes are connected properly and the valves are opened before energizing.

13. Check if there is electric leakage on the unit body. If yes, please eliminate the electric leakage.

14. Replace the fuse with a new one of the same specification if it is burnt down; don't replace it with a cooper wire or conducting wire.

15. If the unit is to be installed in a humid place, the circuit breaker must be installed.

#### Installation Safety Precautions:

1. Select the installation location according to the requirement of this manual.(See the requirements in installation part)
2. Handle unit transportation with care; the unit should not be carried by only one person if it is more than 20kg.
3. When installing the indoor unit and outdoor unit, a sufficient fixing bolt must be installed; make sure the installation support is firm.
4. Wear safety belt if the height of working is above 2m.
5. Use equipped components or appointed components during installation.
6. Make sure no foreign objects are left in the unit after finishing installation.

#### Refrigerant Safety Precautions:

1. Avoid contact between refrigerant and fire as it generates poisonous gas; Prohibit prolong the connection pipe by welding.
2. Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture or other hazards.
3. Make sure no refrigerant gas is leaking out when installation is completed.
4. If there is refrigerant leakage, please take sufficient measure to minimize the density of refrigerant.
5. Never touch the refrigerant piping or compressor without wearing glove to avoid scald or frostbite.

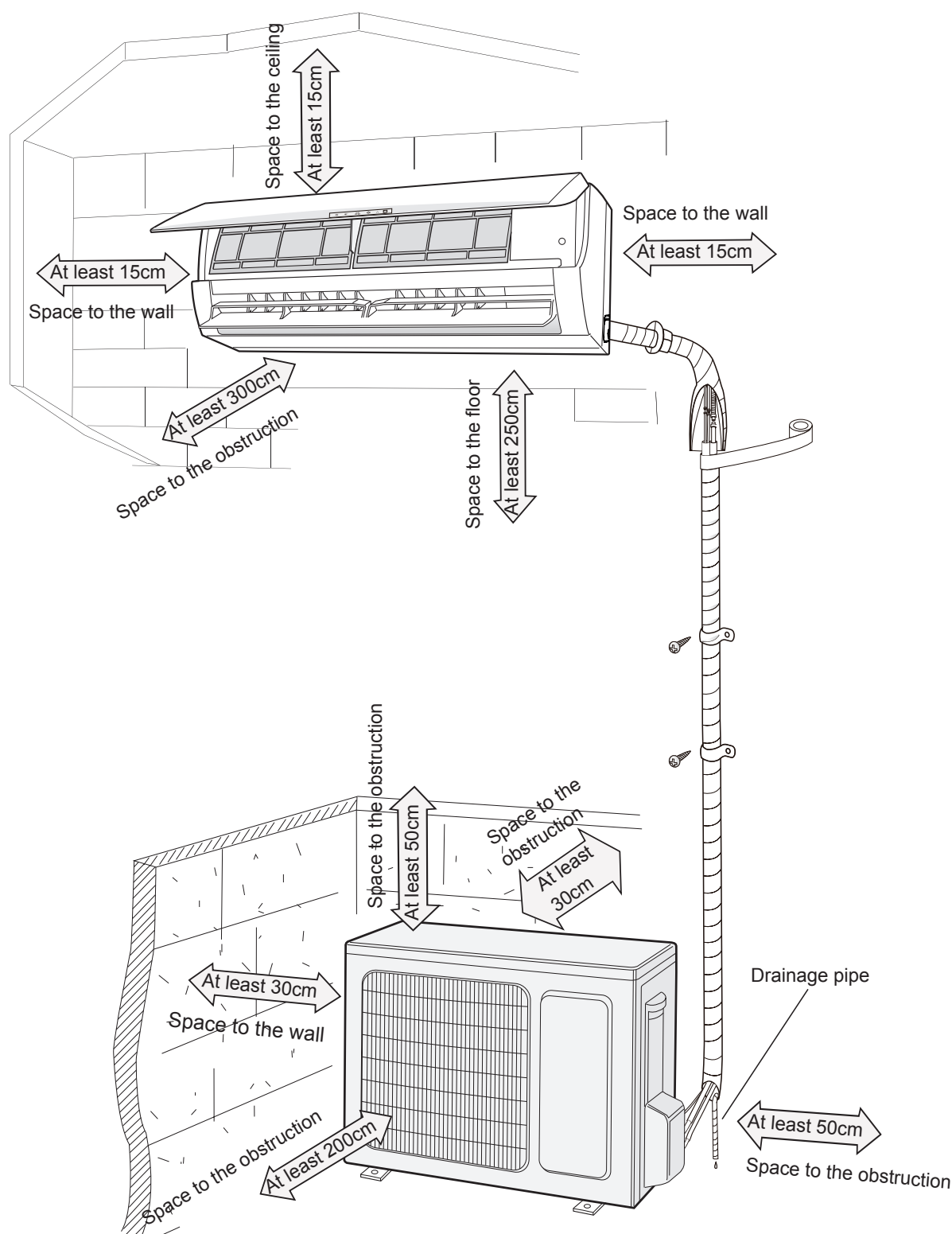
Improper installation may lead to fire hazard, explosion, electric shock or injury.



<p><b>1. Level meter, measuring tape</b></p> 	<p><b>2. Screw driver</b></p> 	<p><b>3. Impact drill, drill head, electric drill</b></p> 
<p><b>4. Electroprobe</b></p> 	<p><b>5. Universal meter</b></p> 	<p><b>6. Torque wrench, open-end wrench, inner hexagon spanner</b></p> 
<p><b>7. Electronic leakage detector</b></p> 	<p><b>8. Vacuum pump</b></p> 	<p><b>9. Pressure meter</b></p> 
<p><b>10. Pipe pliers, pipe cutter</b></p> 	<p><b>11. Pipe expander, pipe bender</b></p> 	<p><b>12. Soldering appliance, refrigerant container</b></p> 

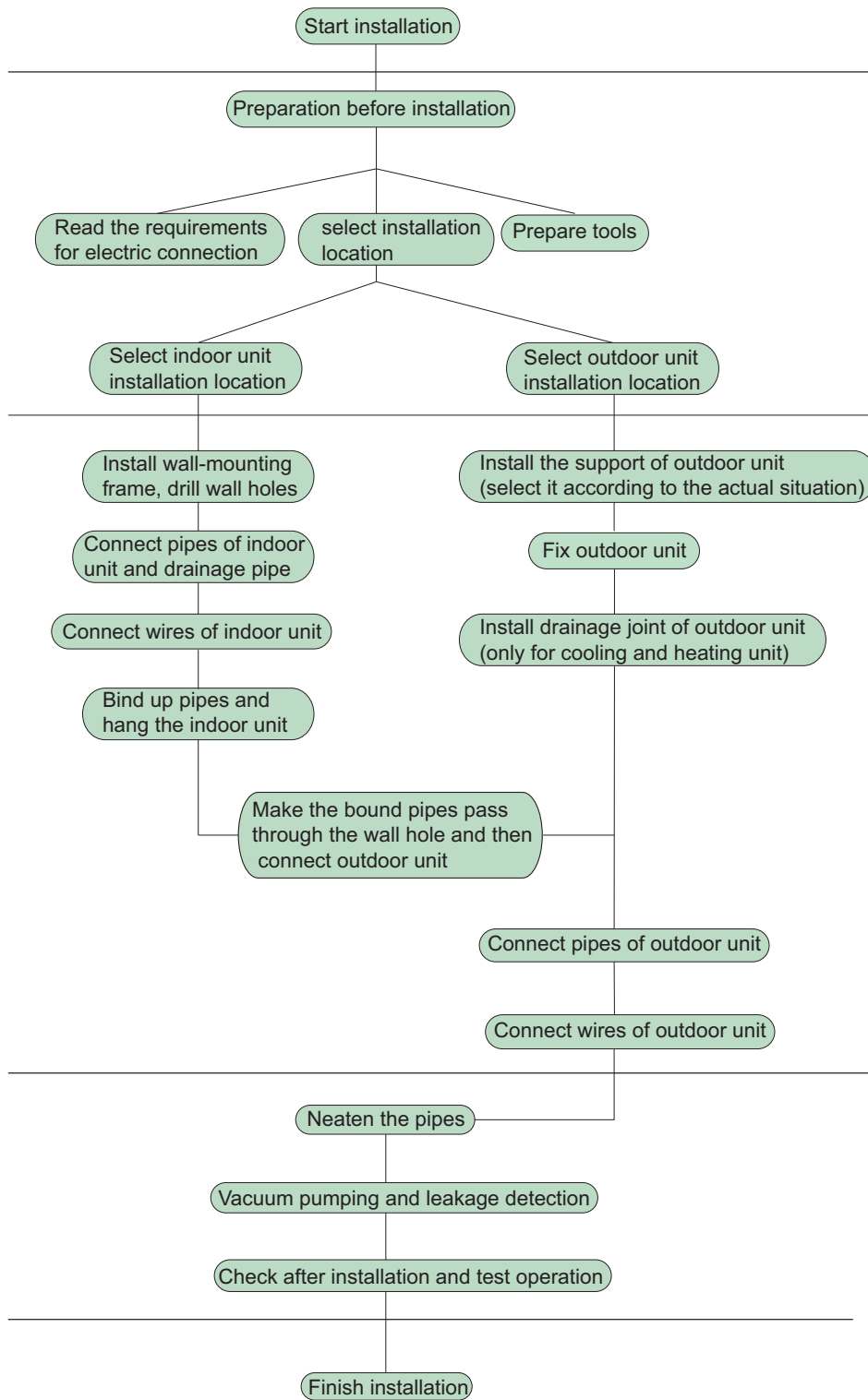
## 8. Installation

### 8.1 Installation Dimension Diagram





## Installation procedures



Note: this flow is only for reference; please find the more detailed installation steps in this section.

## 8.2 Installation Parts-checking

No.	Name	No.	Name
1	Indoor unit	8	Sealing gum
2	Outdoor unit	9	Wrapping tape
3	Connection pipe	10	Support of outdoor unit
4	Drainage pipe	11	Fixing screw
5	Wall-mounting frame	12	Drainage plug(cooling and heating unit)
6	Connecting cable(power cord)	13	Owner's manual, remote controller
7	Wall pipe		

### ⚠ Note:

- 1.Please contact the local agent for installation.
- 2.Don't use unqualified power cord.

## 8.3 Selection of Installation Location

### 1. Basic Requirement:

Installing the unit in the following places may cause malfunction. If it is unavoidable, please consult the local dealer:

- (1) The place with strong heat sources, vapors, flammable or explosive gas, or volatile objects spread in the air.
- (2) The place with high-frequency devices (such as welding machine, medical equipment).
- (3) The place near coast area.
- (4) The place with oil or fumes in the air.
- (5) The place with sulfured gas.
- (6) Other places with special circumstances.

### 2. Indoor Unit:

- (1) There should be no obstruction near air inlet and air outlet.
- (2) Select a location where the condensation water can be dispersed easily and won't affect other people.
- (3) Select a location which is convenient to connect the outdoor unit and near the power socket.
- (4) Select a location which is out of reach for children.
- (5) The location should be able to withstand the weight of indoor unit and won't increase noise and vibration.
- (6) The appliance must be installed 2.5m above floor.
- (7) Don't install the indoor unit right above the electric appliance.
- (8) The appliance shall not be installed in the laundry.

### 3. Outdoor Unit:

- (1) Select a location where the noise and outflow air emitted by the outdoor unit will not affect neighborhood.
- (2) The location should be well ventilated and dry, in which the outdoor unit won't be exposed directly to sunlight or strong wind.
- (3) The location should be able to withstand the weight of outdoor unit.
- (4) Make sure that the installation follows the requirement of installation dimension diagram.
- (5) Select a location which is out of reach for children and far away from animals or plants.If it is unavoidable, please add fence for safety purpose.

## 8.4 Electric Connection Requirement

### 1. Safety Precaution

- (1) Must follow the electric safety regulations when installing the unit.
- (2) According to the local safety regulations, use qualified power supply circuit and air switch.
- (3) Make sure the power supply matches with the requirement of air conditioner. Unstable power supply or incorrect wiring may result in electric shock, fire hazard or malfunction. Please install proper power supply cables before using the air conditioner.

Air-conditioner	Air switch capacity
09/12K	10A

- (4) Properly connect the live wire, neutral wire and grounding wire of power socket.
- (5) Be sure to cut off the power supply before proceeding any work related to electricity and safety.
- (6) Do not put through the power before finishing installation.
- (7) For appliances with type Y attachment,the instructions shall contain the substance of the following.If the supply cord is damaged,it must be replaced by the manufacturer,its service agent or similarly qualified persons in order to avoid a hazard.
- (8) The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.

### 2. Grounding Requirement:

- (1) The air conditioner is first class electric appliance. It must be properly grounding with specialized grounding device by a professional. Please make sure it is always grounded effectively, otherwise it may cause electric shock.
- (2) The yellow-green wire in air conditioner is grounding wire, which can't be used for other purposes.
- (3) The grounding resistance should comply with national electric safety regulations.
- (4) The appliance must be positioned so that the plug is accessible.
- (5) An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.
- (6) Including an air switch with suitable capacity, please note the following table. Air switch should be included magnet buckle and heating buckle function, it can protect the circuit-short and overload. (Caution: please do not use the fuse only for protect the circuit)

## 8.5 Installation of Indoor Unit

### 1. Choosing Installation location

Recommend the installation location to the client and then confirm it with the client.

### 2. Install Wall-mounting Frame

- (1) Hang the wall-mounting frame on the wall; adjust it in horizontal position with the level meter and then point out the screw fixing holes on the wall.
- (2) Drill the screw fixing holes on the wall with impact drill (the specification of drill head should be the same as the plastic expansion particle) and then fill the plastic expansion particles

in the holes.

(3) Fix the wall-mounting frame on the wall with tapping screws (ST4.2X25TA) and then check if the frame is firmly installed by pulling the frame. If the plastic expansion particle is loose, please drill another fixing hole nearby.

### 3. Install Wall-mounting Frame

(1) Choose the position of piping hole according to the direction of outlet pipe. The position of piping hole should be a little lower than the wall-mounted frame.(As show in Fig.1)

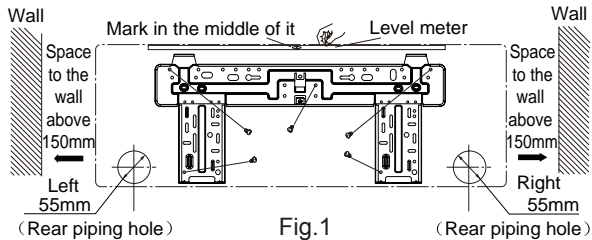


Fig.1

(2) Open a piping hole with the diameter of  $\Phi 55\text{mm}$  on the selected outlet pipe position. In order to drain smoothly, slant the piping hole on the wall slightly downward to the outdoor side with the gradient of  $5\sim 10^\circ$ .(As show in Fig.2)

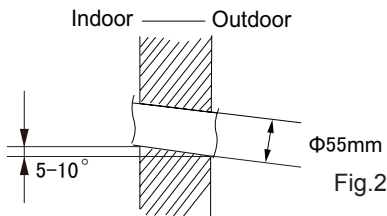


Fig.2

#### ⚠ Note:

- (1) Pay attention to dust prevention and take relevant safety measures when opening the hole.
- (2) The plastic expansion particles are not provided and should be bought locally.

### 4. Outlet Pipe

- (1) The pipe can be led out in the direction of right, rear right, left or rear left.(As show in Fig.3)
- (2) When selecting leading out the pipe from left or right, please cut off the corresponding hole on the bottom case.(As show in Fig.4)

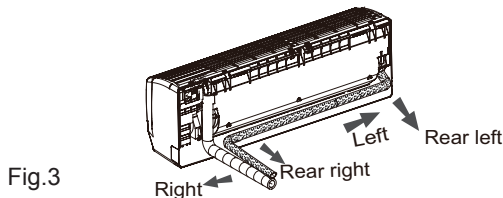


Fig.3

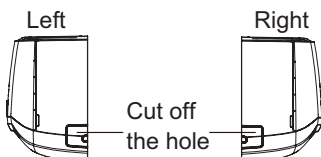


Fig.4

### 5. Connect the Pipe of Indoor Unit

- (1) Aim the pipe joint at the corresponding bellmouth.(As show in Fig.5)
- (2) Pretightening the union nut with hand.
- (3) Adjust the torque force by referring to the following sheet. Place the open-end wrench on the pipe joint and place the torque wrench on the union nut. Tighten the union nut with torque wrench.(As show in Fig.6)
- (4) Wrap the indoor pipe and joint of connection pipe with insulating pipe, and then wrap it with tape.(As show in Fig.7)

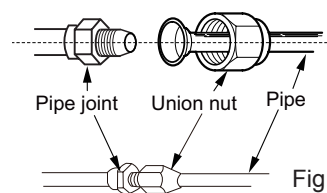


Fig.5

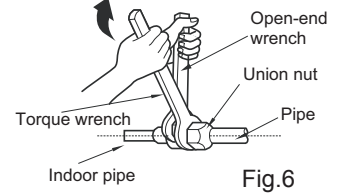


Fig.6

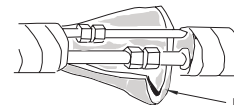


Fig.7

Refer to the following table for wrench moment of force:

Hex nut diameter(mm)	Tightening torque(N·m)
$\Phi 6$	15~20
$\Phi 9.52$	30~40
$\Phi 12$	45~55
$\Phi 16$	60~65
$\Phi 19$	70~75

### 6. Install Drain Hose

- (1) Connect the drain hose to the outlet pipe of indoor unit.(As show in Fig.8)
- (2) Bind the joint with tape.(As show in Fig.9)

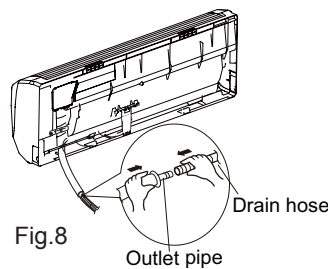


Fig.8

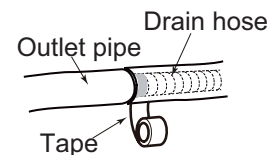


Fig.9

#### ⚠ Note:

- (1) Add insulating pipe in the indoor drain hose in order to prevent condensation.
- (2) The plastic expansion particles are not provided.(As show in Fig.10)

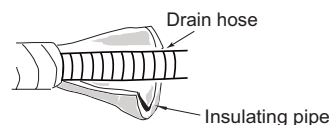
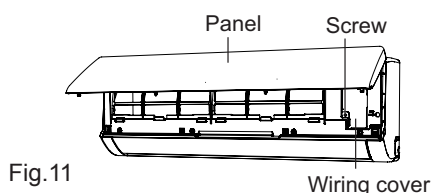


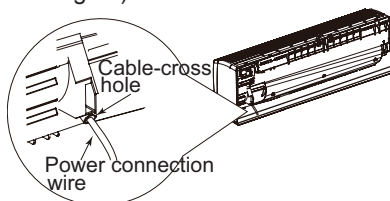
Fig.10

## 7. Connect Wire of Indoor Unit

(1) Open the panel, remove the screw on the wiring cover and then take down the cover.(As show in Fig.11)



(2) Make the power connection wire go through the cable-cross hole at the back of indoor unit and then pull it out from the front side.(As show in Fig.12)



Note: This step only applicable for N.American models.

Fig.12

(3) Remove the wire clip; connect the power connection wire to the wiring terminal according to the color; tighten the screw and then fix the power connection wire with wire clip.(As show in Fig.13)

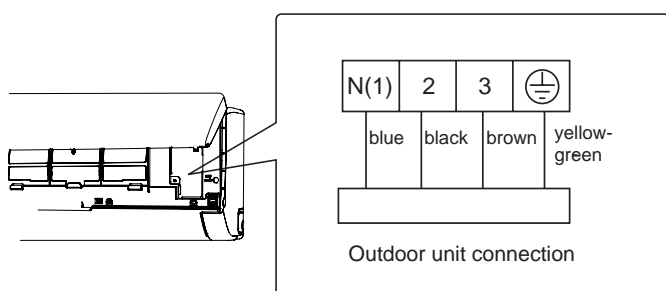


Fig.13

(4) Put wiring cover back and then tighten the screw.

(5) Close the panel.

### ⚠ Note:

- (1) All wires of indoor unit and outdoor unit should be connected by a professional.
- (2) If the length of power connection wire is insufficient, please contact the supplier for a new one. Avoid extending the wire by yourself.
- (3) For the air conditioner with plug, the plug should be reachable after finishing installation.
- (4) For the air conditioner without plug, an air switch must be installed in the line. The air switch should be all-pole parting and the contact parting distance should be more than 3mm.

## 8. Bind up Pipe

(1) Bind up the connection pipe, power cord and drain hose with the band.(As show in Fig.14)

(2) Reserve a certain length of drain hose and power cord for installation when binding them. When binding to a certain degree, separate the indoor power and then separate the drain hose.(As show in Fig.15)

(3) Bind them evenly.

(4) The liquid pipe and gas pipe should be bound separately at the end.

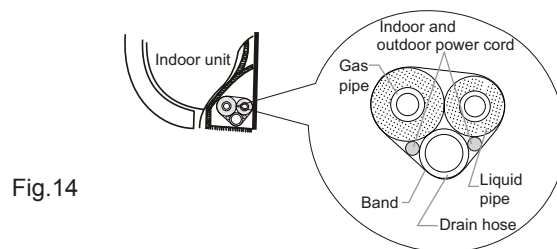


Fig.14

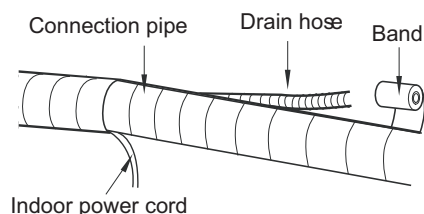


Fig.15

### ⚠ Note:

- (1) The power cord and control wire can't be crossed or winding.
- (2) The drain hose should be bound at the bottom.

## 9. Hang the Indoor Unit

(1) Put the bound pipes in the wall pipe and then make them pass through the wall hole.

(2) Hang the indoor unit on the wall-mounting frame.

(3) Stuff the gap between pipes and wall hole with sealing gum.

(4) Fix the wall pipe.(As show in Fig.16)

(5) Check if the indoor unit is installed firmly and closed to the wall.(As show in Fig.17)

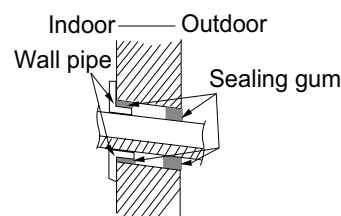


Fig.16

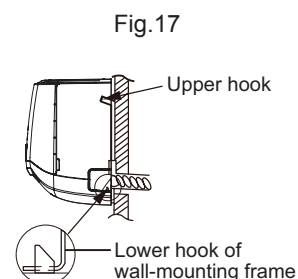


Fig.17

### ⚠ Note:

Do not bend the drain hose too excessively in order to prevent blocking.

## 8.6 Installation of Outdoor Unit

### 1. Fix the Support of Outdoor Unit(Select it According to the Actual Installation Situation)

- (1) Select installation location according to the house structure.
- (2) Fix the support of outdoor unit on the selected location with expansion screws.

#### ⚠ Note:

- (1) Take sufficient protective measures when installing the outdoor unit.
- (2) Make sure the support can withstand at least four times the unit weight.
- (3) The outdoor unit should be installed at least 3cm above the floor in order to install drain joint.(As show in Fig.18)
- (4) For the unit with cooling capacity of 2300W~5000W, 6 expansion screws are needed; for the unit with cooling capacity of 6000W~8000W, 8 expansion screws are needed; for the unit with cooling capacity of 10000W~16000W, 10 expansion screws are needed.

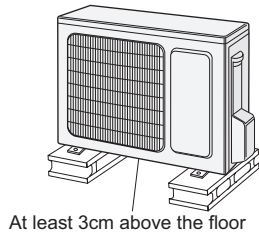


Fig.18

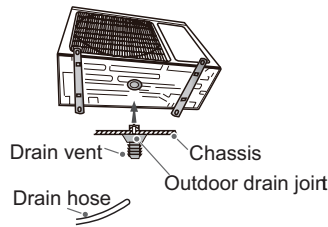


Fig.19

### 2. Install Drain Joint(Only for cooling and heating unit)

- (1) Connect the outdoor drain joint into the hole on the chassis.
- (2) Connect the drain hose into the drain vent.(As show in Fig.19)

### 3. Fix Outdoor Unit

- (1) Place the outdoor unit on the support.
- (2) Fix the foot holes of outdoor unit with bolts.(As show in Fig.20)

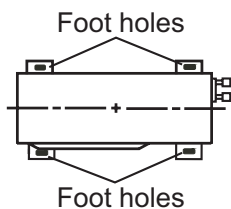


Fig.20

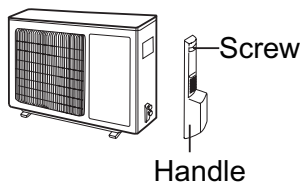


Fig.21

### 4. Connect Indoor and Outdoor Pipes

- (1) Remove the screw on the right handle of outdoor unit and then remove the handle.(As show in Fig.21)
- (2) Remove the screw cap of valve and aim the pipe joint at the bellmouth of pipe.(As show in Fig.22)

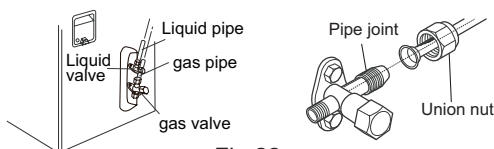


Fig.22

- (3) Pretightening the union nut with hand.
- (4) Tighten the union nut with torque wrench.

Refer to the following table for wrench moment of force:

Hex nut diameter(mm)	Tightening torque(N·m)
Φ6	15~20
Φ9.52	30~40
Φ12	45~55
Φ16	60~65
Φ19	70~75

### 5. Connect Outdoor Electric Wire

- (1) Remove the wire clip; connect the power connection wire to the wiring terminal according to the color; fix the power connection wire with screws.(As show in Fig.23)

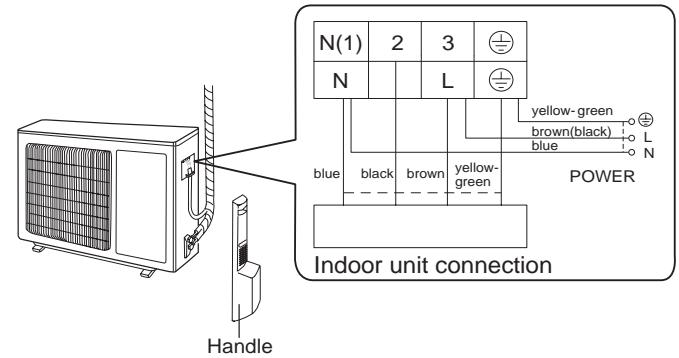


Fig.23

- (2) Fix the power connection wire with wire clip.

#### ⚠ Note:

- (1) After tightening the screw, pull the power cord slightly to check if it is firm.
- (2) Never cut the power connection wire to prolong or shorten the distance.

### 6. Neaten the Pipes

- (1) The pipes should be placed along the wall, bent reasonably and hidden possibly. Min. semidiameter of bending the pipe is 10cm.
- (2) If the outdoor unit is higher than the wall hole, you must set a U-shaped curve in the pipe before pipe goes into the room, in order to prevent rain from getting into the room.(As show in Fig.24)

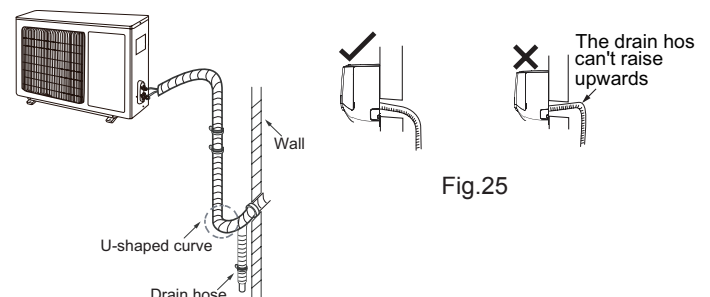


Fig.25

Fig.24

#### ⚠ Note:

- (1) The through-wall height of drain hose shouldn't be higher than the outlet pipe hole of indoor unit.(As show in Fig.25)
- (2) Slant the drain hose slightly downwards. The drain hose can't be curved, raised and fluctuant, etc.(As show in Fig.26)



(3) The water outlet can't be placed in water in order to drain smoothly.(As show in Fig.27)

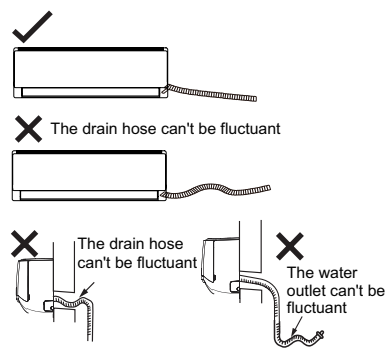


Fig.26

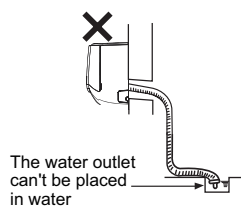


Fig.27

## 8.7 Vacuum Pumping and Leak Detection

### 1. Use Vacuum Pump

- (1) Remove the valve caps on the liquid valve and gas valve and the nut of refrigerant charging vent.
- (2) Connect the charging hose of piezometer to the refrigerant charging vent of gas valve and then connect the other charging hose to the vacuum pump.
- (3) Open the piezometer completely and operate for 10-15min to check if the pressure of piezometer remains in -0.1MPa.
- (4) Close the vacuum pump and maintain this status for 1-2min to check if the pressure of piezometer remains in -0.1MPa. If the pressure decreases, there may be leakage.
- (5) Remove the piezometer, open the valve core of liquid valve and gas valve completely with inner hexagon spanner.
- (6) Tighten the screw caps of valves and refrigerant charging vent.(As show in Fig.28)

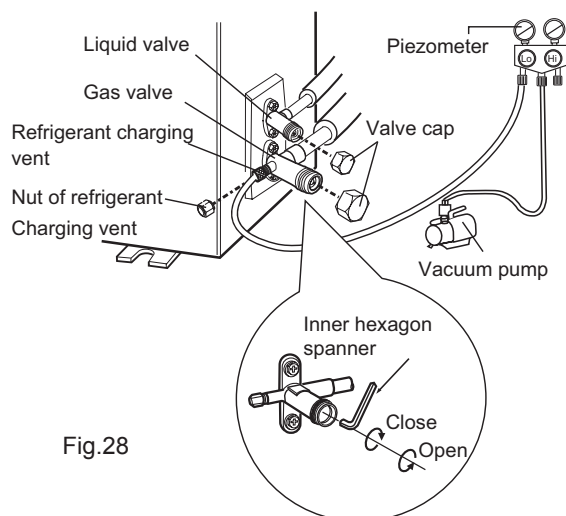


Fig.28

### 2. Leakage Detection

- (1) With leakage detector:  
Check if there is leakage with leakage detector.
- (2) With soap water:  
If leakage detector is not available, please use soap water for leakage detection. Apply soap water at the suspected position and keep the soap water for more than 3min. If there are air bubbles coming out of this position, there's a leakage.

## 8.8 Check after Installation and Test Operation

### 1. Check after Installation

Check according to the following requirement after finishing installation.

No.	Items to be checked	Possible malfunction
1	Has the unit been installed firmly?	The unit may drop, shake or emit noise.
2	Have you done the refrigerant leakage test?	It may cause insufficient cooling (heating) capacity.
3	Is heat insulation of pipeline sufficient?	It may cause condensation and water dripping.
4	Is water drained well?	It may cause condensation and water dripping.
5	Is the voltage of power supply according to the voltage marked on the nameplate?	It may cause malfunction or damage the parts.
6	Is electric wiring and pipeline installed correctly?	It may cause malfunction or damage the parts.
7	Is the unit grounded securely?	It may cause electric leakage.
8	Does the power cord follow the specification?	It may cause malfunction or damage the parts.
9	Is there any obstruction in air inlet and air outlet?	It may cause insufficient cooling (heating).
10	The dust and sundries caused during installation are removed?	It may cause malfunction or damaging the parts.
11	The gas valve and liquid valve of connection pipe are open completely?	It may cause insufficient cooling (heating) capacity.

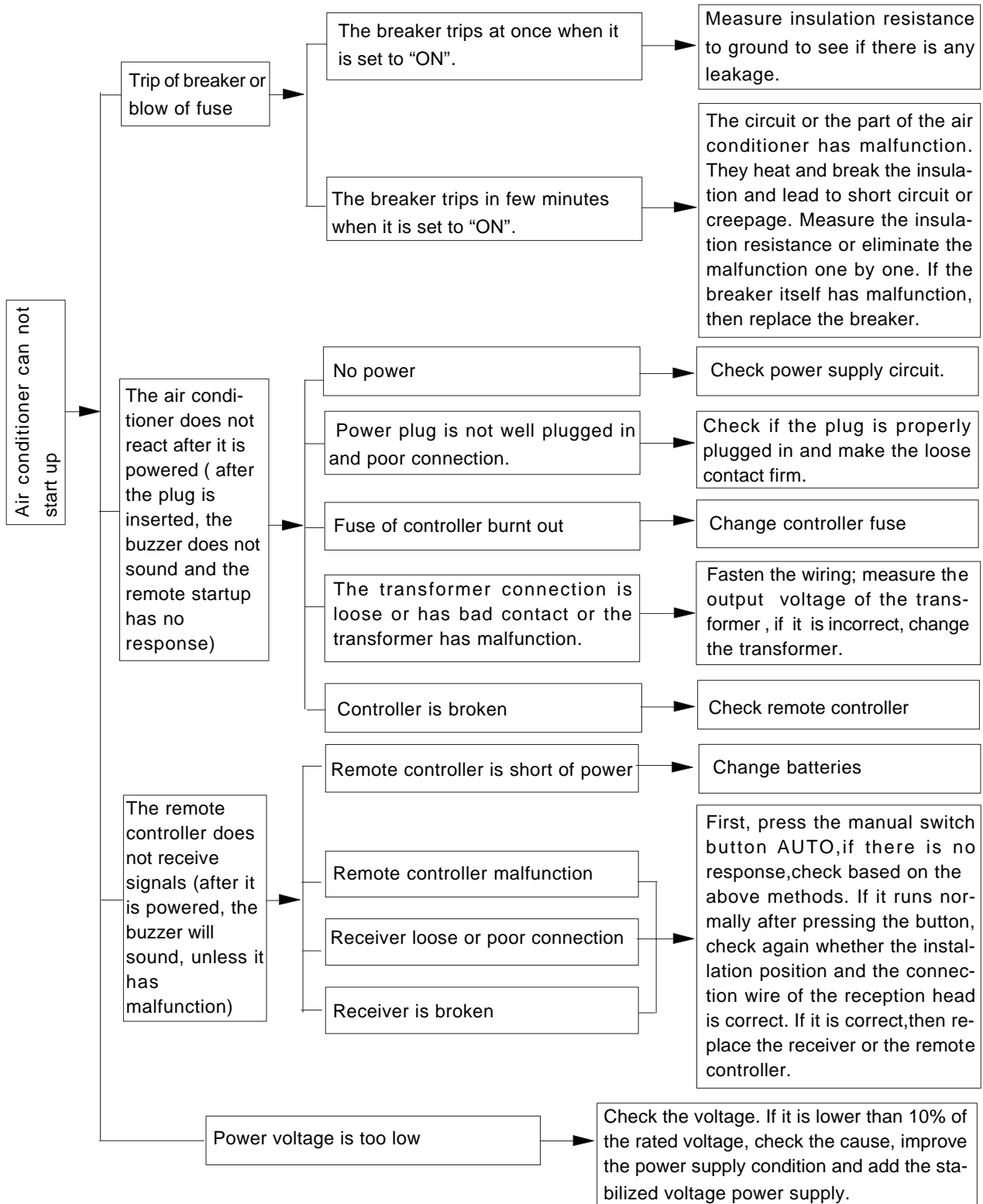
### 2. Test Operation

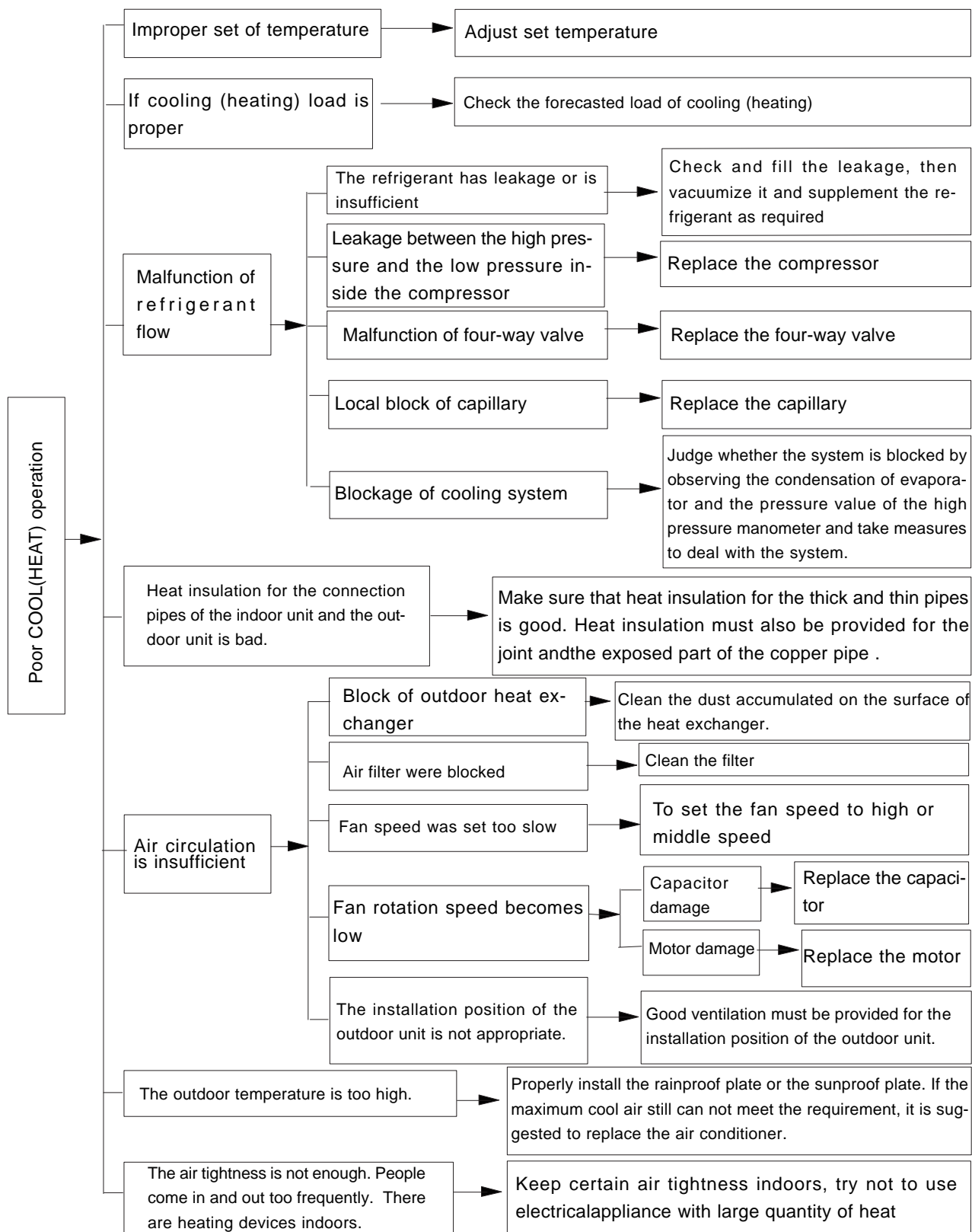
- (1) Preparation of test operation
  - The client approves the air conditioner installation.
  - Specify the important notes for air conditioner to the client.
- (2) Method of test operation
  - Put through the power, press ON/OFF button on the remote controller to start operation.
  - Press MODE button to select AUTO, COOL, DRY, FAN and HEAT to check whether the operation is normal or not.
  - If the ambient temperature is lower than 16°C, the air conditioner can't start cooling.

## 9. Maintenance

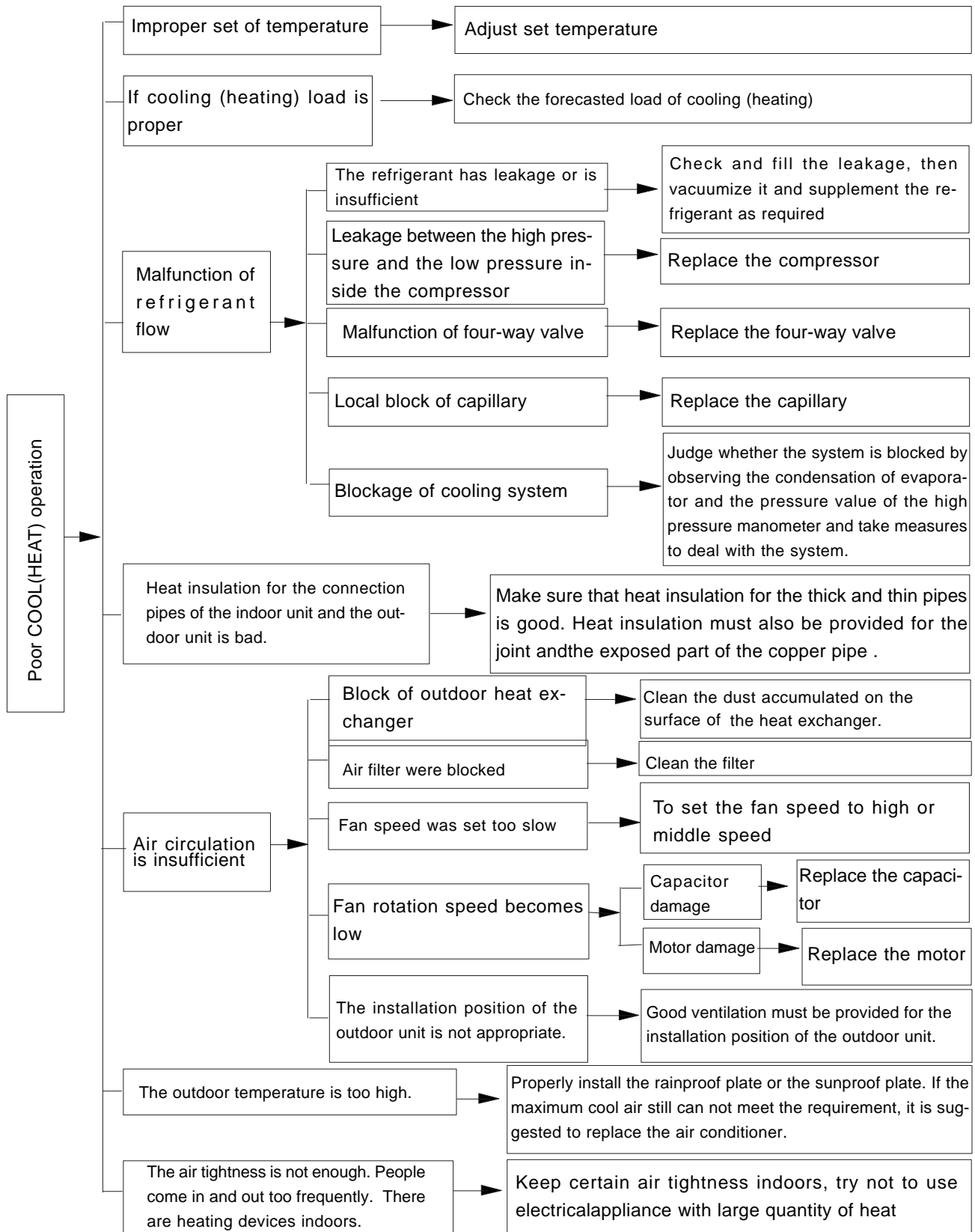
### 9.1 Malfunction Analysis

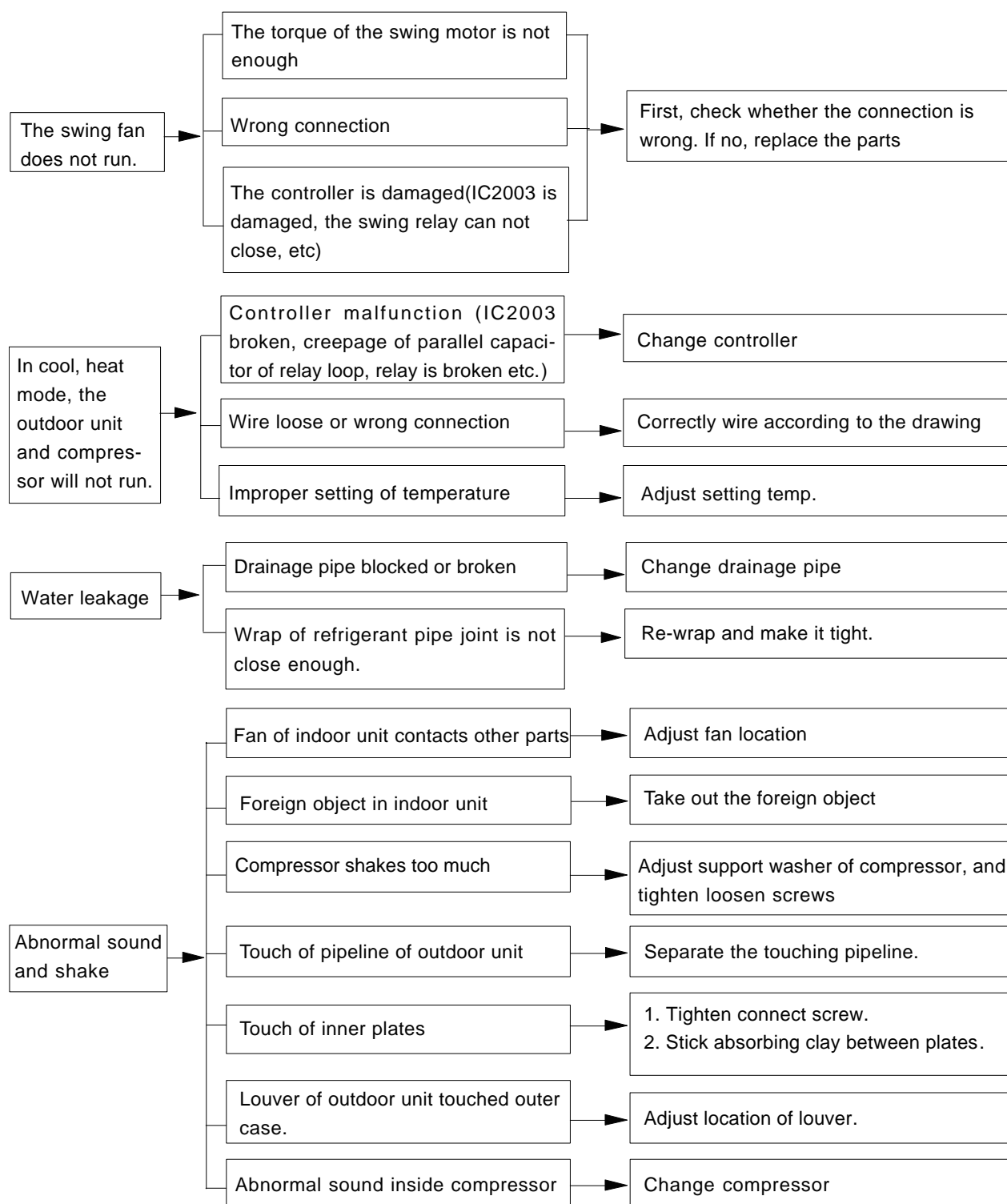
Note: When replacing the controller, be sure to insert the wire jumper into the new controller, otherwise the unit will display C5











## 9.2 Flashing LED of Indoor/Outdoor Unit and Primary Judgement

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
1	High pressure protection of system	E1	OFF 3s and blink once						During cooling and drying operation, except indoor fan operates, all loads stop operation. During heating operation, the complete unit stops.	Possible reasons: 1. Refrigerant was superabundant; 2. Poor heat exchange (including filth blockage of heat exchanger and bad radiating environment ); Ambient temperature is too high.
2	Antifreezing protection	E2	OFF 3S and blink twice			OFF 3S and blink 3 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates.	1. Poor air-return in indoor unit; 2. Fan speed is abnormal; 3. Evaporator is dirty.
3	System block or refrigerant leakage	E3	OFF 3S and blink 3 times				OFF 3S and blink 9 times		The Dual-8 Code Display will show E3 until the low pressure switch stop operation.	1.Low-pressure protection 2.Low-pressure protection of system 3.Low-pressure protection of compressor
4	High discharge temperature protection of compressor	E4	OFF 3S and blink 4 times			OFF 3S and blink 7 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	Please refer to the malfunction analysis (discharge protection, overload).
5	Overcurrent protection	E5	OFF 3S and blink 5 times			OFF 3S and blink 5 times			During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	1. Supply voltage is unstable; 2. Supply voltage is too low and load is too high; 3. Evaporator is dirty.
6	Communi-cation Malfunction	E6	OFF 3S and blink 6 times					OFF	During cooling operation, compressor stops while indoor fan motor operates. During heating operation, the complete unit stops.	Refer to the corresponding malfunction analysis.
7	High temperature resistant protection	E8	OFF 3S and blink 8 times			OFF 3S and blink 6 times			During cooling operation: compressor will stop while indoor fan will operate. During heating operation, the complete unit stops.	Refer to the malfunction analysis (overload, high temperature resistant).
8	EEPROM malfunction	EE			OFF 3S and blink 15 times	OFF 3S and blink 11 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
9	Limit/ decrease frequency due to high temperature of module	EU		OFF 3S and blink 6 times	OFF 3S and blink 6 times				All loads operate normally, while operation frequency for compressor is decreased	Discharging after the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.
10	Malfunction protection of jumper cap	C5	OFF 3S and blink 15 times						Wireless remote receiver and button are effective, but can not dispose the related command	1. No jumper cap insert on mainboard. 2. Incorrect insert of jumper cap. 3. Jumper cap damaged. 4. Abnormal detecting circuit of mainboard.

NO.	Malfunction Name	Display Method of Indoor Unit			Display Method of Outdoor Unit			A/C status	Possible Causes	
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator			Green Indicator
11	Gathering refrigerant	Fo	OFF 3S and blink 1 times	OFF 3S and blink 1 times					When the outdoor unit receive signal of Gathering refrigerant ,the system will be forced to run under cooling mode for gathering refrigerant	Nominal cooling mode
12	Indoor ambient temperature sensor is open/short circuited	F1		OFF 3S and blink once					During cooling and drying operation, indoor unit operates while other loads will stop; during heating operation, the complete unit will stop operation.	1. Loosening or bad contact of indoor ambient temp. sensor and mainboard terminal. 2. Components in mainboard fell down leads short circuit. 3. Indoor ambient temp. sensor damaged.(check with sensor resistance value chart) 4. Mainboard damaged.
13	Indoor evaporator temperature sensor is open/short circuited	F2		OFF 3S and blink twice					AC stops operation once reaches the setting temperature. Cooling, drying: internal fan motor stops operation while other loads stop operation; heating: AC stop operation	1. Loosening or bad contact of Indoor evaporator temp. sensor and mainboard terminal. 2. Components on the mainboard fall down leads short circuit. 3. Indoor evaporator temp. sensor damaged.(check temp. sensor value chart for testing) 4. Mainboard damaged.
14	Outdoor ambient temperature sensor is open/short circuited	F3		OFF 3S and blink 3 times			OFF 3S and blink 6 times		During cooling and drying operating, compressor stops while indoor fan operates; During heating operation, the complete unit will stop operation	Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
15	Outdoor condenser temperature sensor is open/short circuited	F4		OFF 3S and blink 4 times			OFF 3S and blink 5 times		During cooling and drying operation, compressor stops while indoor fan will operate; During heating operation, the complete unit will stop operation.	Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
16	Outdoor discharge temperature sensor is open/short circuited	F5		OFF 3S and blink 5 times			OFF 3S and blink 7 times		During cooling and drying operation, compressor will sop after operating for about 3 mins, while indoor fan will operate; During heating operation, the complete unit will stop after operating for about 3 mins.	1.Outdoor temperature sensor hasnt been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor) 2.The head of temperature sensor hasnt been inserted into the copper tube
17	Limit/ decrease frequency due to overload	F6		OFF 3S and blink for 6 times			OFF 3S and blink 3 times		All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
18	Decrease frequency due to overcurrent	F8		OFF 3S and blink 8 times			OFF 3S and blink once		All loads operate normally, while operation frequency for compressor is decreased	The input supply voltage is too low; System pressure is too high and overload

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
19	Decrease frequency due to high air discharge	F9		OFF 3S and blink 9 times			OFF 3S and blink twice		All loads operate normally, while operation frequency for compressor is decreased	Overload or temperature is too high; Refrigerant is insufficient; Malfunction of electric expansion valve (EKV)
20	Limit/ decrease frequency due to antifreezing	FH		OFF 3S and blink 2 times	OFF 3S and blink 2 times		OFF 3S and blink 4 times		All loads operate normally, while operation frequency for compressor is decreased	Poor air-return in indoor unit or fan speed is too low
21	Voltage for DC bus-bar is too high	PH		OFF 3S and blink 11 times		OFF 3S and blink 13 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 265VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)
22	Voltage of DC bus-bar is too low	PL			OFF 3S and blink 21 times	OFF 3S and blink 12 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 150VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if its normal, theres malfunction for the circuit, please replace the control panel (AP1)
23	Compressor Min frequency in test state	P0		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during min. cooling or min. heating test
24	Compressor rated frequency in test state	P1		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during nominal cooling or nominal heating test
25	Compressor maximum frequency in test state	P2		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during max. cooling or max. heating test

NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
26	Compressor intermediate frequency in test state	P3		(during blinking, ON 0.25s and OFF 0.25s)	(during blinking, ON 0.25s and OFF 0.25s)					Showing during middle cooling or middle heating test
27	Overcurrent protection of phase current for compressor	P5		OFF 3S and blink 15 times					During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
28	Charging malfunction of capacitor	PU			OFF 3S and blink 17 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Refer to the part three—charging malfunction analysis of capacitor
29	Malfunction of module temperature sensor circuit	P7			OFF 3S and blink 18 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
30	Module high temperature protection	P8			OFF 3S and blink 19 times				During cooling operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	After the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If its no use, please replace control panel AP1.
31	Decrease frequency due to high temperature resistant during heating operation	H0			OFF 3S and blink 10 times				All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
32	Static dedusting protection	H2			OFF 3S and blink twice					
33	Overload protection for compressor	H3			OFF 3S and blink 3 times	OFF 3S and blink 8 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Wiring terminal OVC-COMP is loosened. In normal state, the resistance for this terminal should be less than 1ohm. 2.Refer to the malfunction analysis (discharge protection, overload)

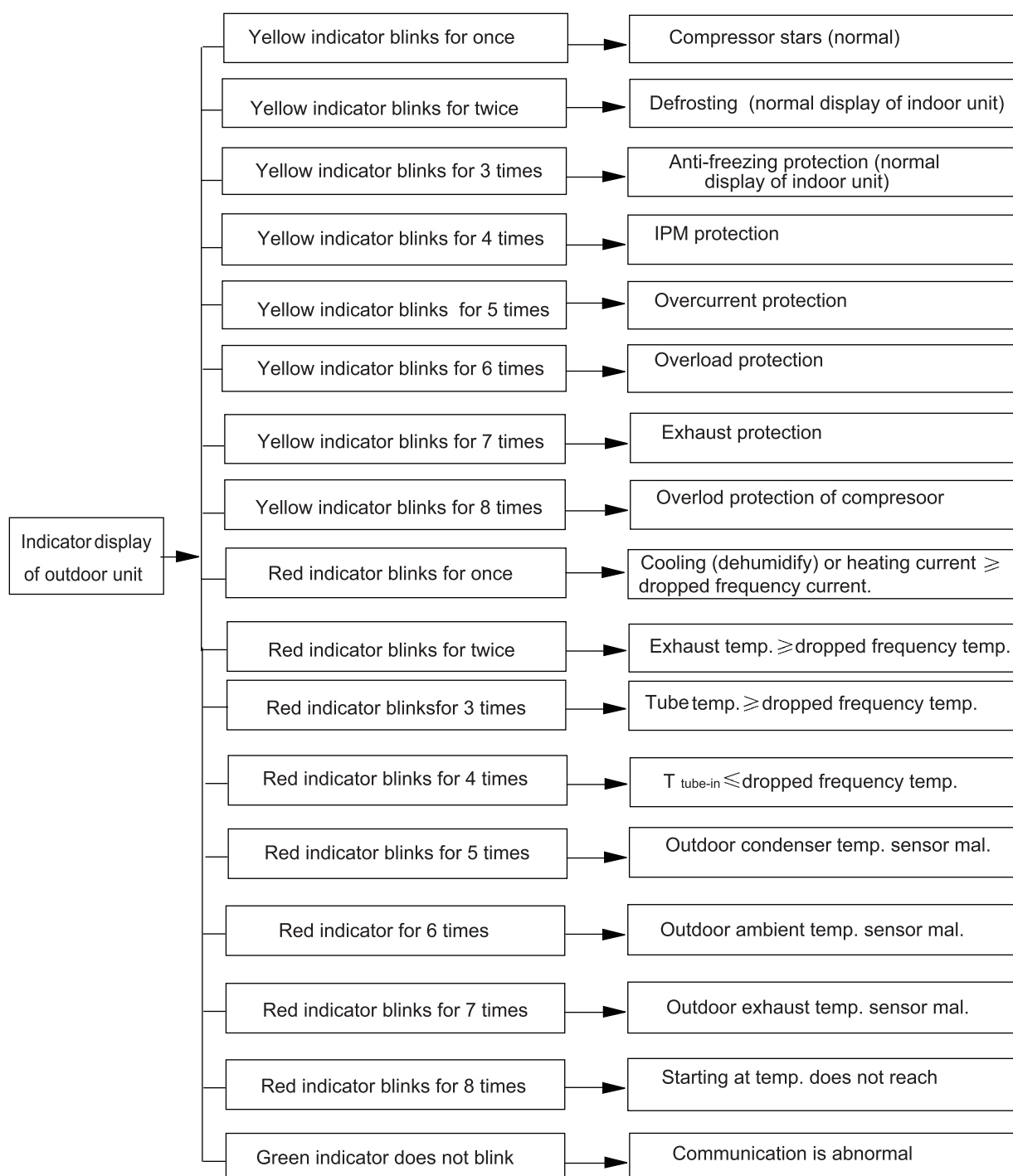
NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
34	System is abnormal	H4			OFF 3S and blink 4 times	OFF 3S and blink 6 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (overload, high temperature resistant)
35	IPM protection	H5			OFF 3S and blink 5 times	OFF 3S and blink 4 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
36	Module temperature is too high	H5			OFF 3S and blink 5 times	OFF 3S and blink 10 times				
37	Internal motor (fan motor) do not operate	H6	OFF 3S and blink 11 times						Internal fan motor, external fan motor, compressor and electric heater stop operation,guide louver stops at present location.	1. Bad contact of DC motor feedback terminal. 2. Bad contact of DC motor control end. 3. Fan motor is stalling. 4. Motor malfunction. 5. Malfunction of mainboard rev detecting circuit.
38	Desynchronizing of compressor	H7			OFF 3S and blink 7 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
39	PFC protection	HC			OFF 3S and blink 6 times	OFF 3S and blink 14 times			During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis
40	Outdoor DC fan motor malfunction	L3	OFF 3S and blink 23 times				OFF 3S and blink 14 times		Outdoor DC fan motor malfunction lead to compressor stop operation,	DC fan motor malfunction or system blocked or the connector loosed
41	power protection	L9	OFF 3S and blink 20 times			OFF 3S and blink 9 times			compressor stop operation and Outdoor fan motor will stop 30s latter , 3 minutes latter fan motor and compressor will restart	To protect the electronical components when detect high power
42	Indoor unit and outdoor unit doesn't match	LP	OFF 3S and blink 19 times			OFF 3S and blink 16 times			compressor and Outdoor fan motor can't work	Indoor unit and outdoor unit doesn't match
43	Failure start-up	LC			OFF 3S and blink 11 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis



NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
44	Malfunction of phase current detection circuit for compressor	U1			OFF 3S and blink 13 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
45	Malfunction of voltage dropping for DC bus-bar	U3			OFF 3S and blink 20 times				During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Supply voltage is unstable
46	Malfunction of complete units current detection	U5		OFF 3S and blink 13 times					During cooling and drying operation, the compressor will stop while indoor fan will operate; During heating operating, the complete unit will stop operation.	Theres circuit malfunction on outdoor units control panel AP1, please replace the outdoor units control panel AP1.
47	The four-way valve is abnormal	U7		OFF 3S and blink 20 times					If this malfunction occurs during heating operation, the complete unit will stop operation.	1.Supply voltage is lower than AC175V; 2.Wiring terminal 4V is loosened or broken; 3.4V is damaged, please replace 4V.
48	Zero-crossing malfunction of outdoor unit	U9	OFF 3S and blink 18 times						During cooling operation, compressor will stop while indoor fan will operate; during heating,the complete unit will stop operation.	Replace outdoor control panel AP1
49	Frequency limiting (power)						OFF 3S and blink 13 times			
50	Compressor is open-circuited					OFF 3S and blink once				
51	The temperature for turning on the unit is reached						OFF 3S and blink 8 times			
52	Frequency limiting (module temperature)						OFF 3S and blink 11 times			



NO.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit			A/C status	Possible Causes
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			Indicator has 3 kinds of display status and during blinking, ON 0.5s and OFF 0.5s				
			Operation Indicator	Cool Indicator	Heating Indicator	Yellow Indicator	Red Indicator	Green Indicator		
53	Normal communication							continously		
54	Defrosting				OFF 3S and blink once (during blinking, ON 10s and OFF 0.5s)	OFF 3S and blink twice			Defrosting will occur in heating mode. Compressor will operate while indoor fan will stop operation.	Its the normal state
55	Zero-crossing inspection circuit malfunction of the IDU fan motor	U8	Flash 17 times every 3s					Operation of remote controller or control panel is available, but the unit won't act.	1. Discharging speed of capacitor is slow, which lead to wrong judgement of controller.	Refer to maintenance flowchart
									Zero-crossing detection circuit of main board is abnormal	



**Analysis or processing of some of the malfunction display:**

**1. Compressor discharge protection**

Possible causes: shortage of refrigerant; blockage of air filter; poor ventilation or air flow short pass for condenser; the system has noncondensing gas (such as air, water etc.); blockage of capillary assy (including filter); leakage inside four-way valve causes incorrect operation; malfunction of compressor; malfunction of protection relay; malfunction of discharge sensor; outdoor temperature too high.

Processing method: refer to the malfunction analysis in the above section.

**2. Low voltage overcurrent protection**

Possible cause: Sudden drop of supply voltage.

**3. Communication malfunction**

Processing method: Check if communication signal cable is connected reliably.

**4. Sensor open or short circuit**

Processing method: Check whether sensor is normal, connected with the corresponding position on the controller and if damage of lead wire is found.

**5. Compressor over load protection**

Possible causes: insufficient or too much refrigerant; blockage of capillary and increase of suction temp.; improper running of compressor, burning in or stuck of bearing, damage of discharge valve; malfunction of protector.

Processing method: adjust refrigerant amount; replace the capillary; replace the compressor; use universal meter to check if the contactor of compressor is fine when it is not overheated, if not replace the protector.

**6. System malfunction**

i.e. overload protection. When tube temperature (Check the temperature of outdoor heat exchanger when cooling and check the temperature of indoor heat exchanger when heating) is too high, protection will be activated.

Possible causes: Outdoor temperature is too high when cooling; insufficient outdoor air circulation; refrigerant flow malfunction.

please refer to the malfunction analysis in the previous section for handling method.

**7. IPM module protection**

Processing method: Once the module malfunction happens, if it persists for a long time and can not be self-canceled, cut off the power and turn off the unit, and then re-energize the unit again after about 10 min. After repeating the procedure for several times, if the malfunction still exists, replace the module.

## 9.3 How to Check Simply the Main Part

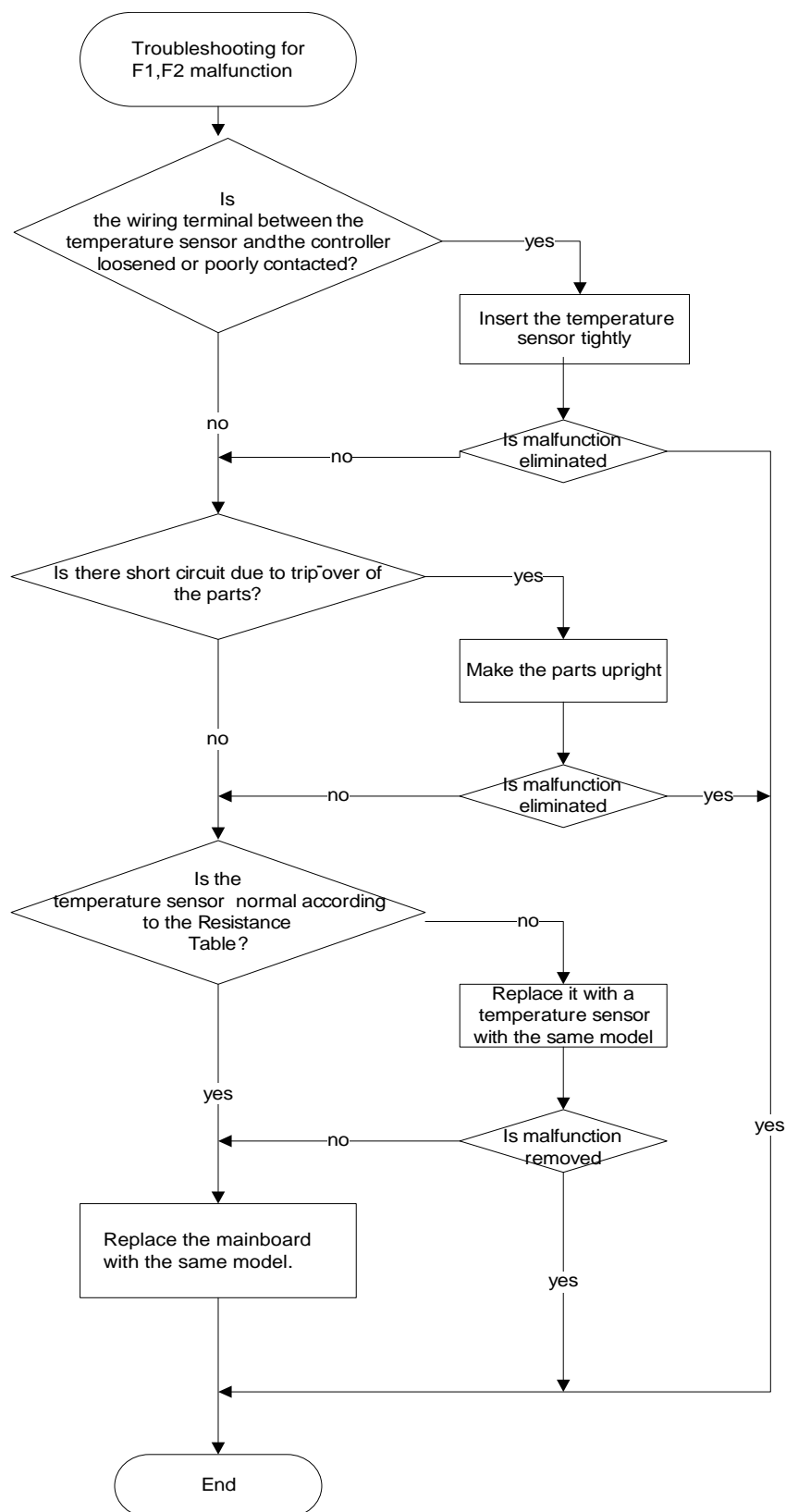
### Indoor Unit

#### (1) Malfunction of Temperature Sensor F1, F2

Main detection points:

- Is the wiring terminal between the temperature sensor and the controller loosened or poorly contacted?
- Is there short circuit due to trip-over of the parts?
- Is the temperature sensor broken?
- Is mainboard broken?

Malfunction diagnosis process:

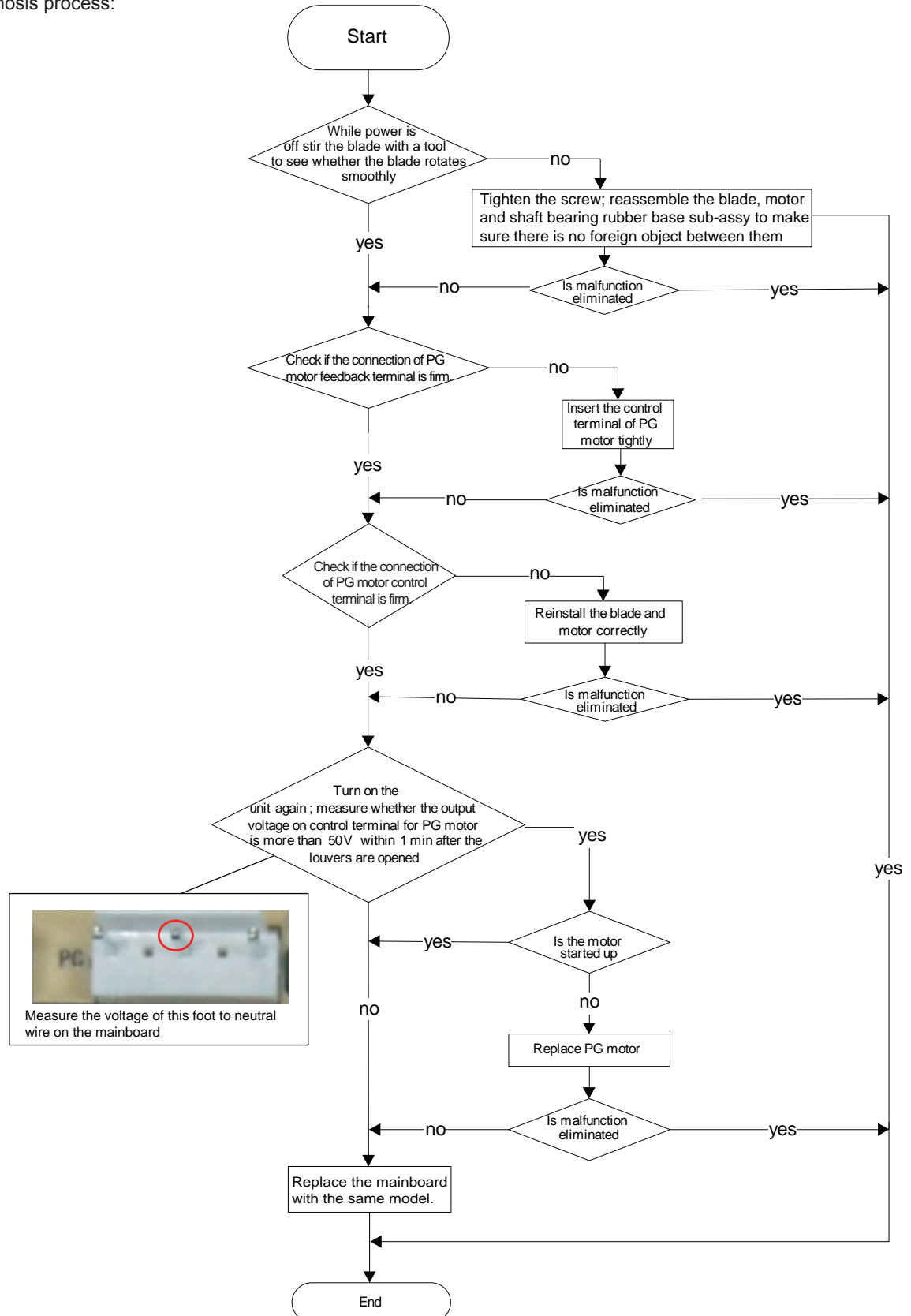


## (2) Malfunction of Blocked Protection of IDU Fan Motor H6

Main detection points:

- Is the control terminal of PG motor connected tightly?
- Is the feedback interface of PG motor connected tightly?
- The fan motor can't operate ?
- The motor is broken?
- Detection circuit of the mainboard is defined abnormal?

Malfunction diagnosis process:

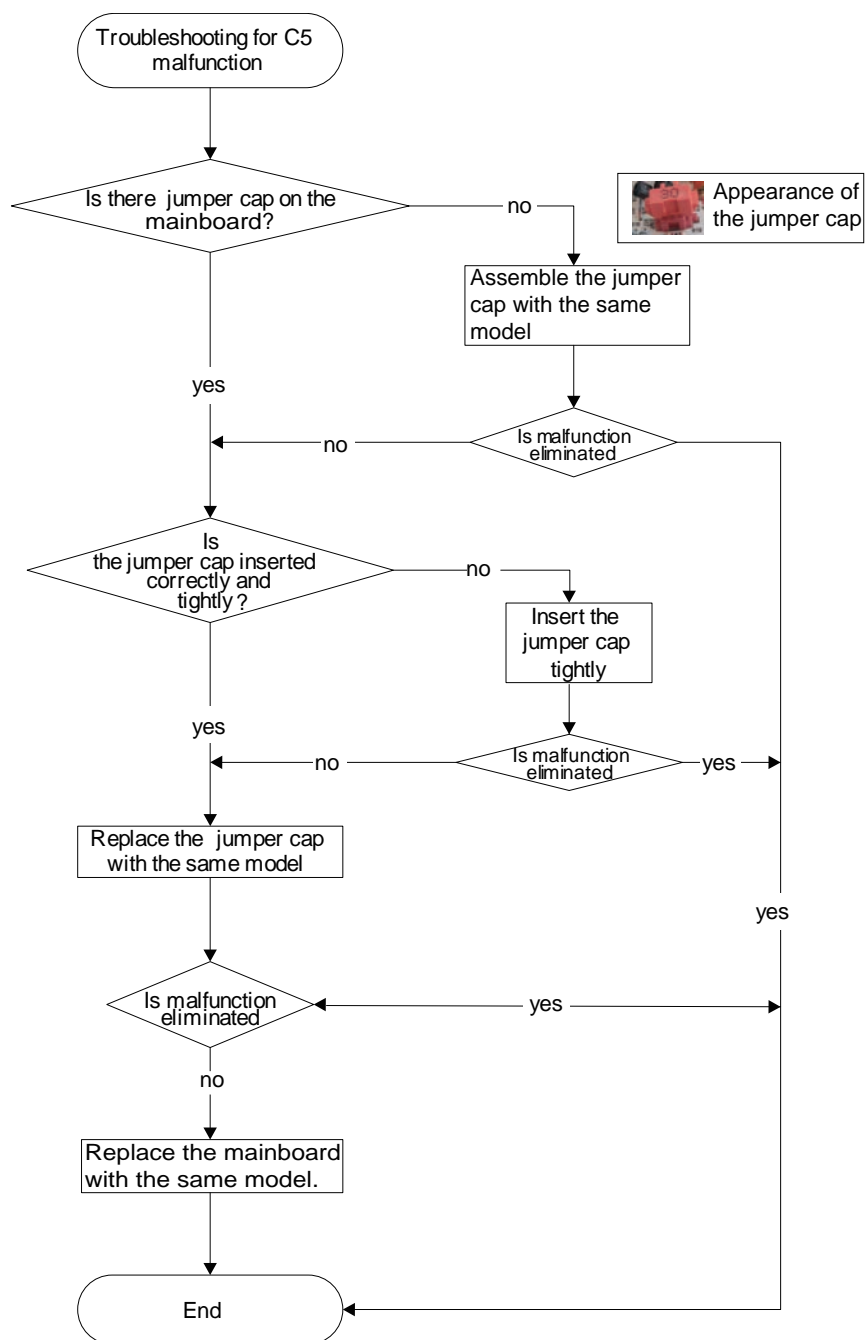


### (3) Malfunction of Protection of Jumper Cap C5

Main detection points:

- Is there jumper cap on the mainboard?
- Is the jumper cap inserted correctly and tightly?
- The jumper is broken?
- Detection circuit of the mainboard is defined abnormal?

Malfunction diagnosis process:

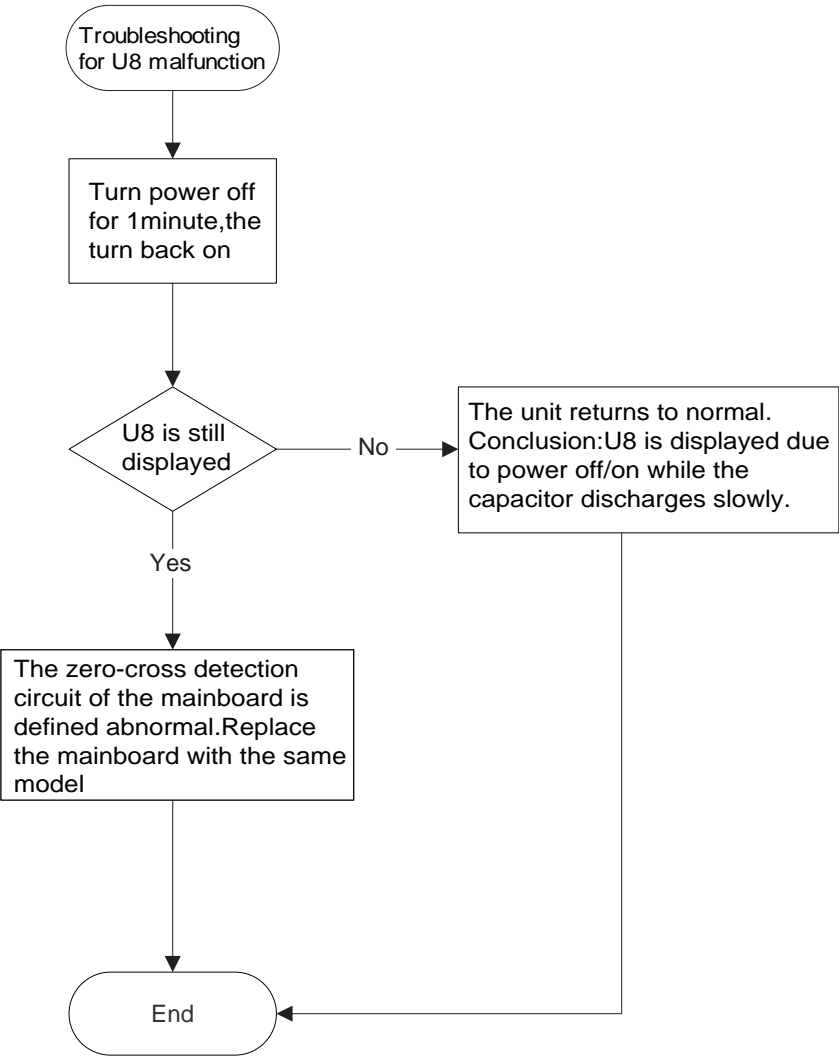


(4) Malfunction of Zero-crossing Inspection Circuit Malfunction of the IDU Fan Motor U8

Main detection points:

- Instant energization after de-energization while the capacitor discharges slowly?
- The zero-cross detection circuit of the mainboard is defined abnormal?

Malfunction diagnosis process:



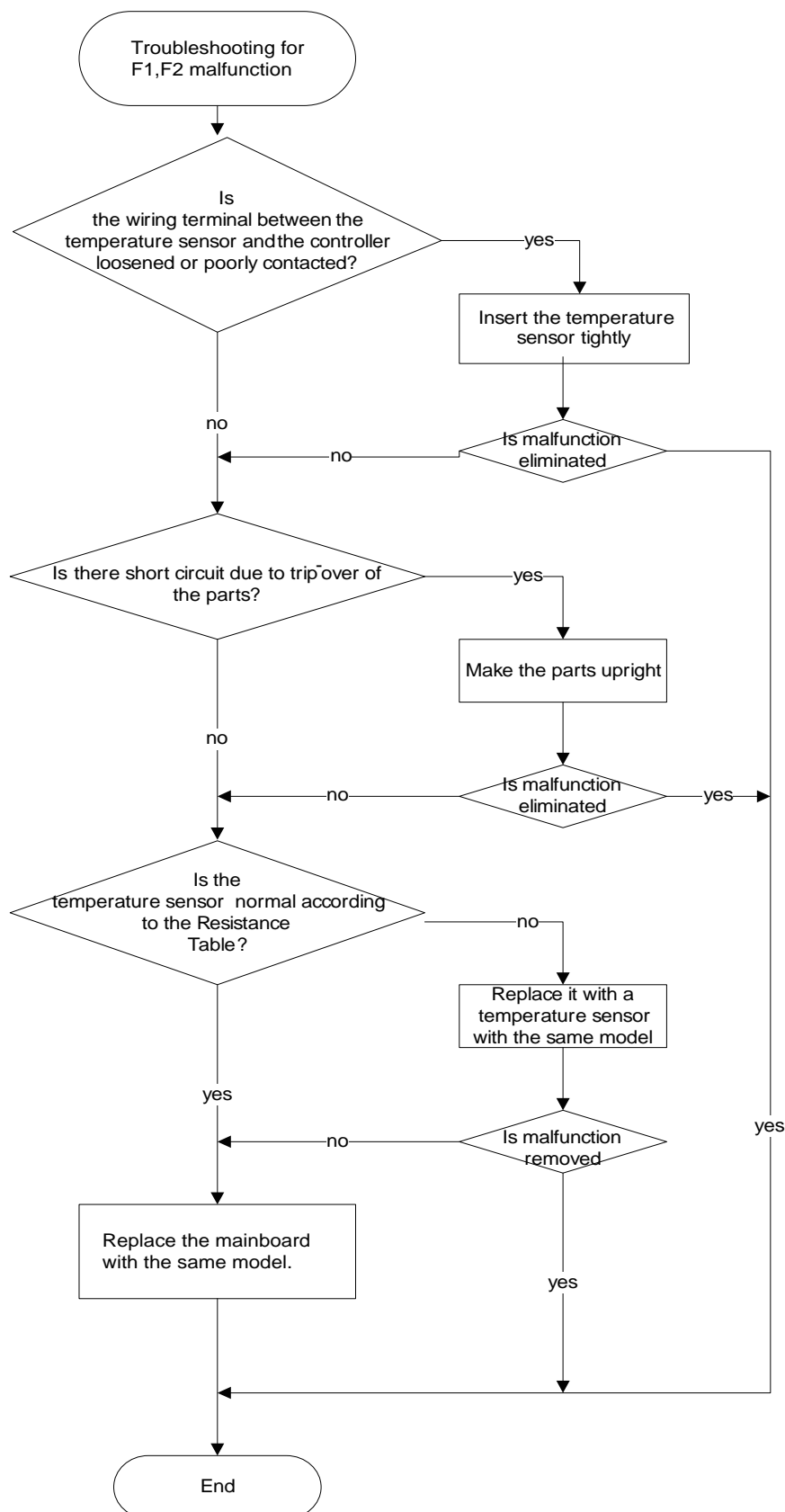
## Outdoor Unit

### (1) Capacitor charge fault (Fault with outdoor unit) (AP1 below refers to the outdoor control panel)

Main Check Points:

- Use AC voltmeter to check if the voltage between terminal L and N on the wiring board is within 210VAC~240VAC.
- Is the reactor (L) correctly connected? Is the connection loose or fallen? Is the reactor (L) damaged?

Fault diagnosis process:



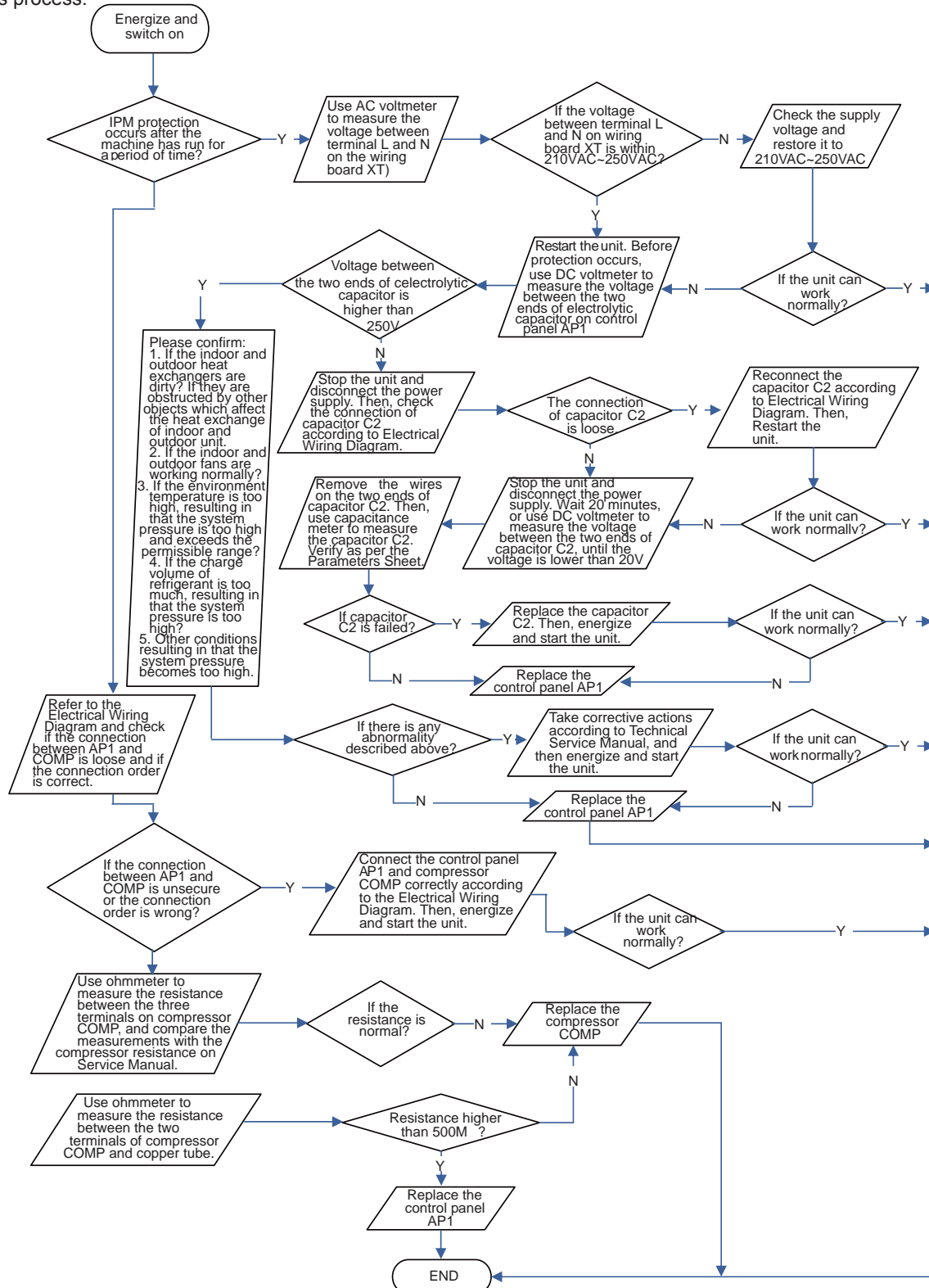


## (2) IPM Protection, Out-of-step Fault, Compressor Phase Overcurrent (AP1 below refers to the outdoor control panel)

Main check points:

- Is the connection between control panel AP1 and compressor COMP secure? Loose? Is the connection in correct order?
- Is the voltage input of the machine within normal range? (Use AC voltmeter to measure the voltage between terminal L and N on the wiring board XT)
- Is the compressor coil resistance normal? Is the insulation of compressor coil against the copper tube in good condition?
- Is the working load of the machine too high? Is the radiation good?
- Is the charge volume of refrigerant correct?

Fault diagnosis process:

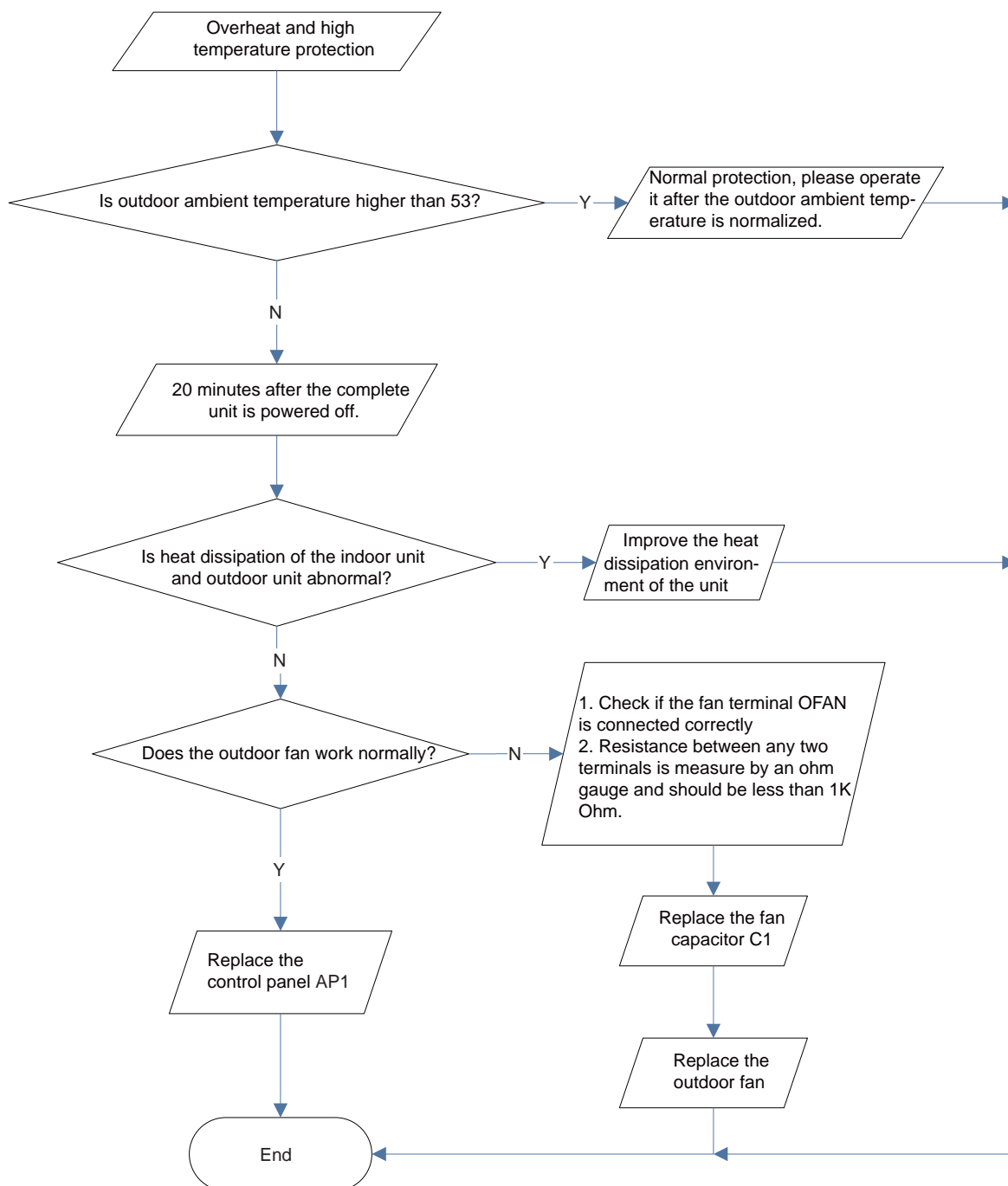


### (3) High temperature and overload protection diagnosis (AP1 hereinafter refers to the control board of the outdoor unit)

Mainly detect:

- Is outdoor ambient temperature in normal range?
- Are the outdoor and indoor fans operating normally?
- Is the heat dissipation environment inside and outside the unit good?

Fault diagnosis process:

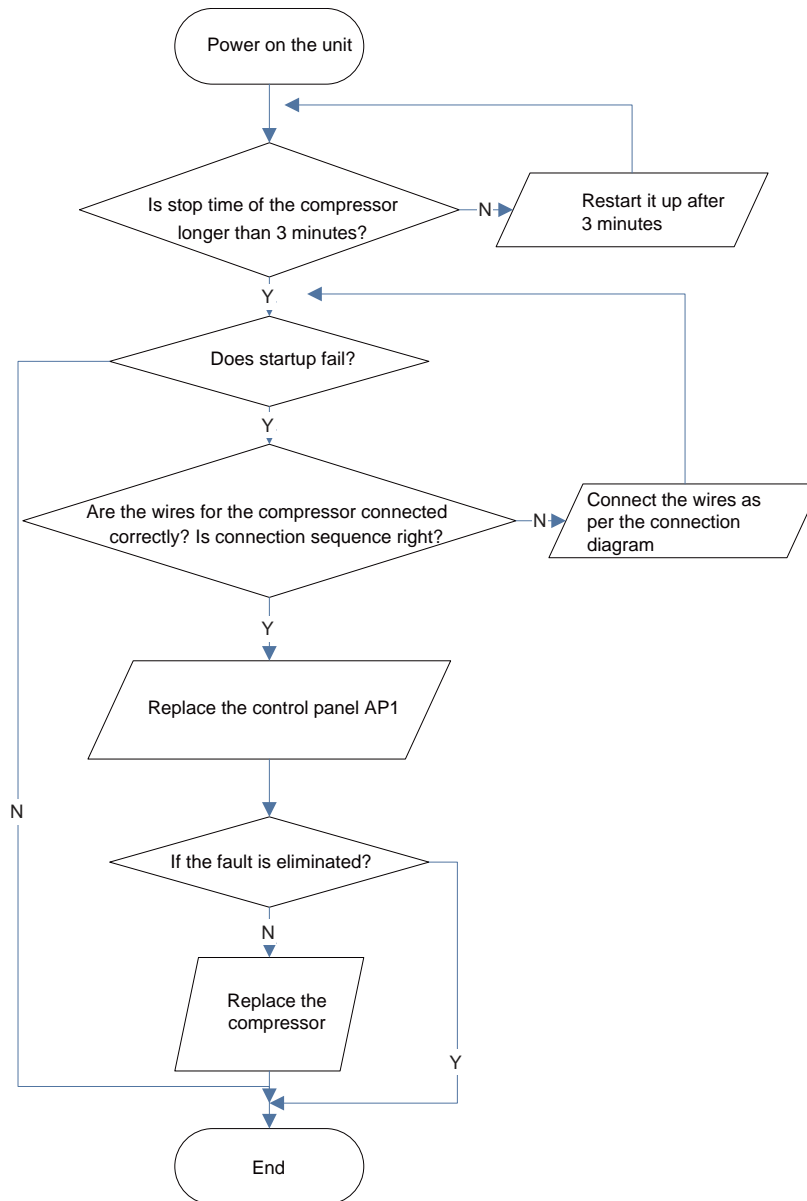


#### (4) Start-up failure (following AP1 for outdoor unit control board)

Mainly detect:

- Whether the compressor wiring is connected correct?
- Is compressor broken?
- Is time for compressor stopping enough?

Fault diagnosis process:

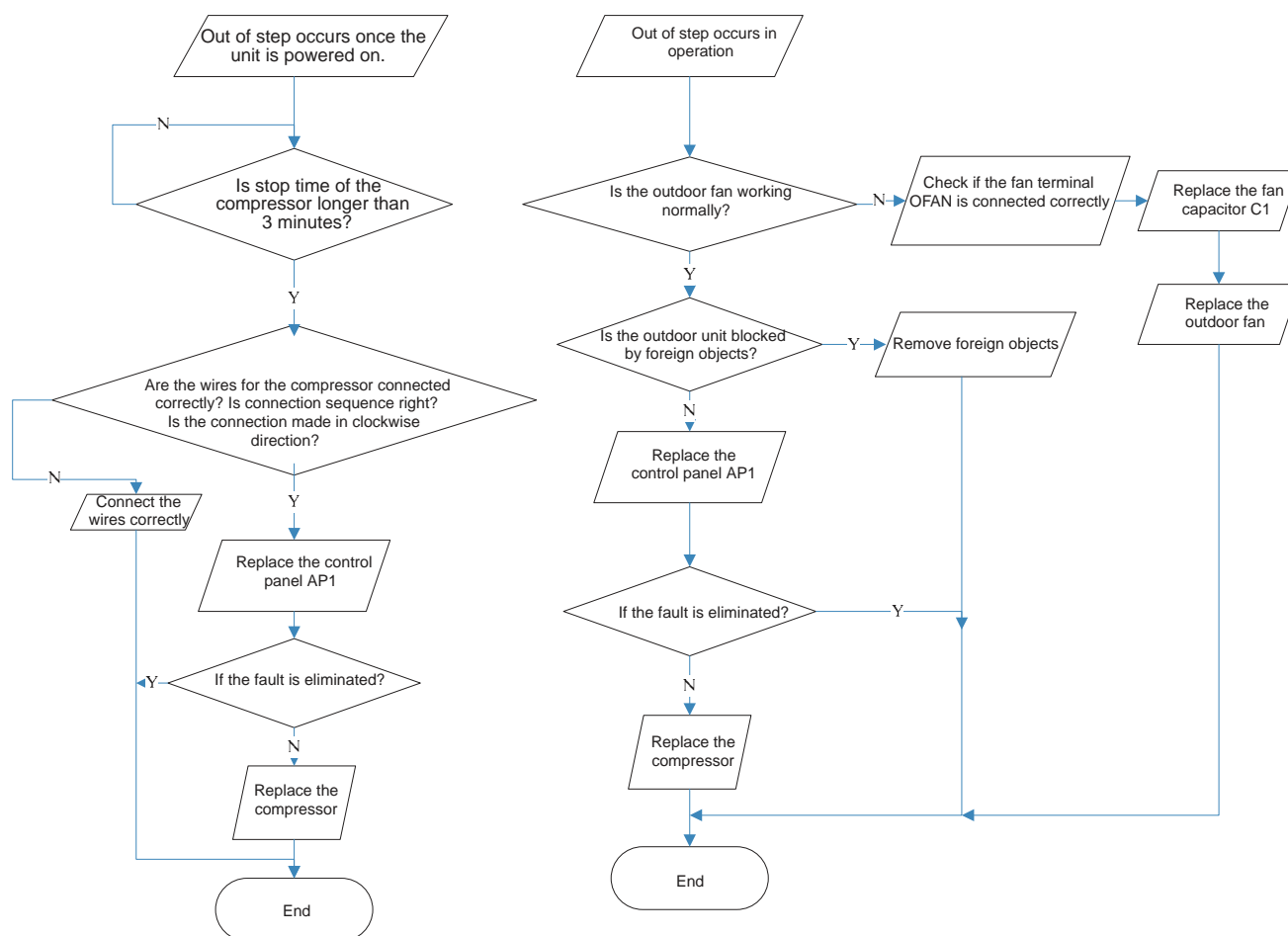


## (5) Out of step diagnosis for the compressor (AP1 hereinafter refers to the control board of the outdoor unit)

Mainly detect:

- Is the system pressure too high?
- Is the input voltage too low?

Fault diagnosis process:

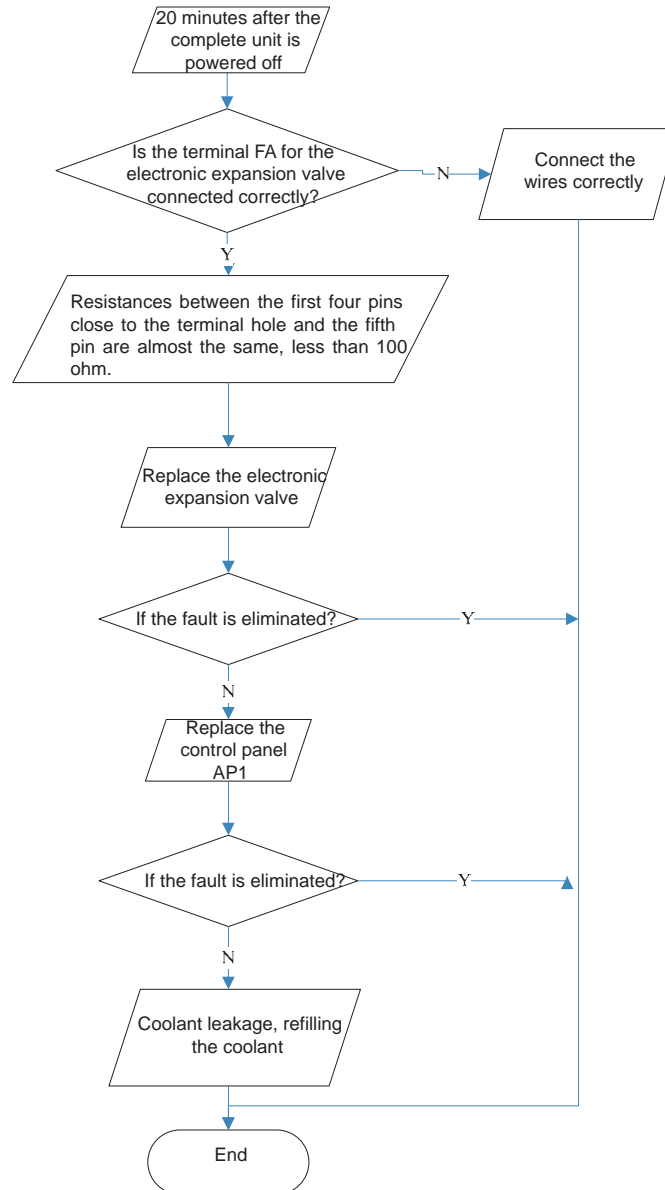


## (6) Overload and air exhaust malfunction diagnosis (following AP1 for outdoor unit control board)

Mainly detect:

- Is the PMV connected well or not? Is PMV damaged?
- Is refrigerant leaked?

Fault diagnosis process:

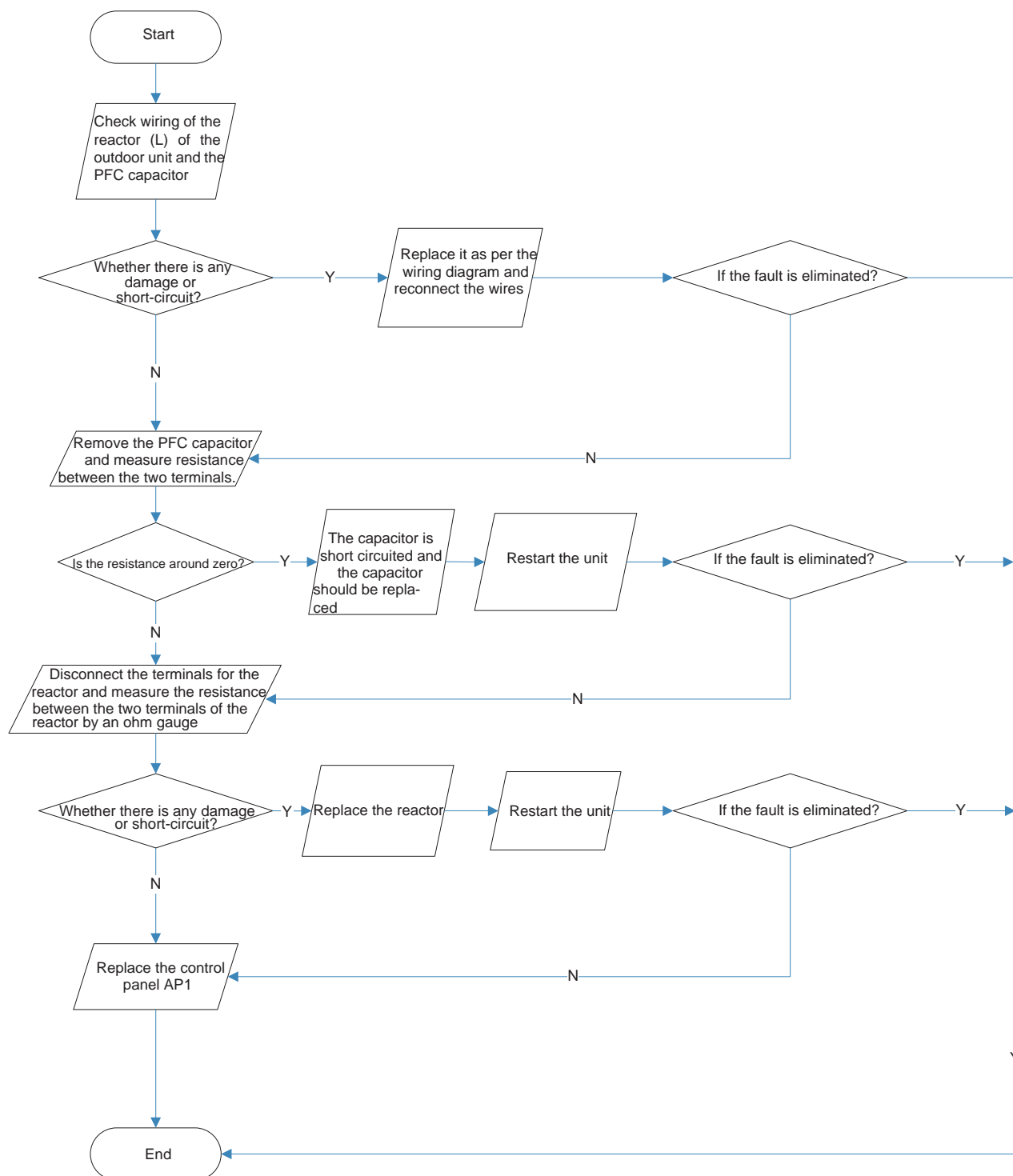


## (7) Power factor correct or (PFC) fault (a fault of outdoor unit) (AP1 hereinafter refers to the control board of the outdoor unit)

Mainly detect:

- Check if the reactor (L) of the outdoor unit and the PFC capacitor are broken

Fault diagnosis process:

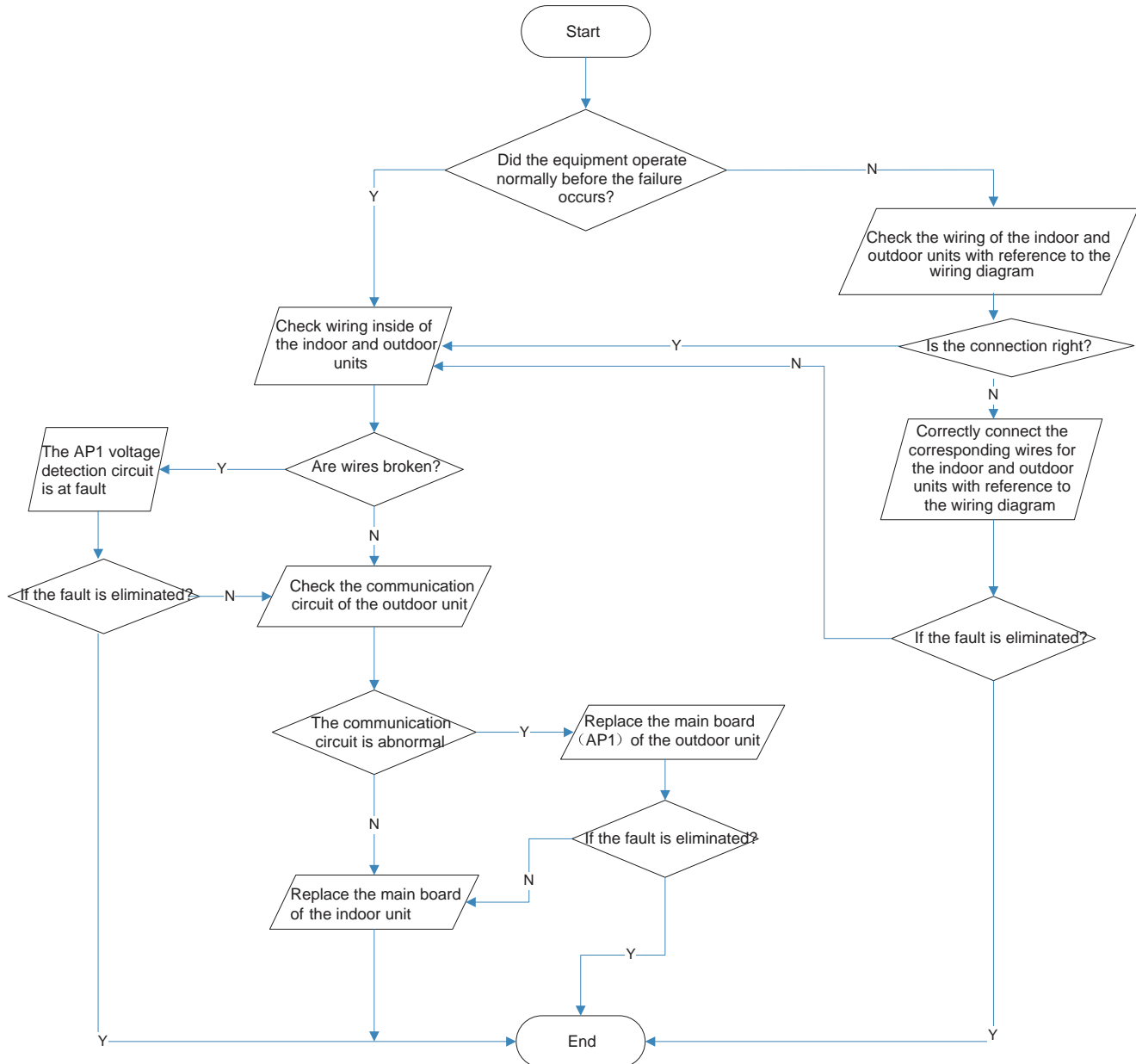


**(8) Communication malfunction: (following AP1 for outdoor unit control board)**

Mainly detect:

- Is there any damage for the indoor unit mainboard communication circuit? Is communication circuit damaged?
- Detect the indoor and outdoor units connection wire and indoor and outdoor units inside wiring is connect well or not, if is there any damage?

Fault diagnosis process:

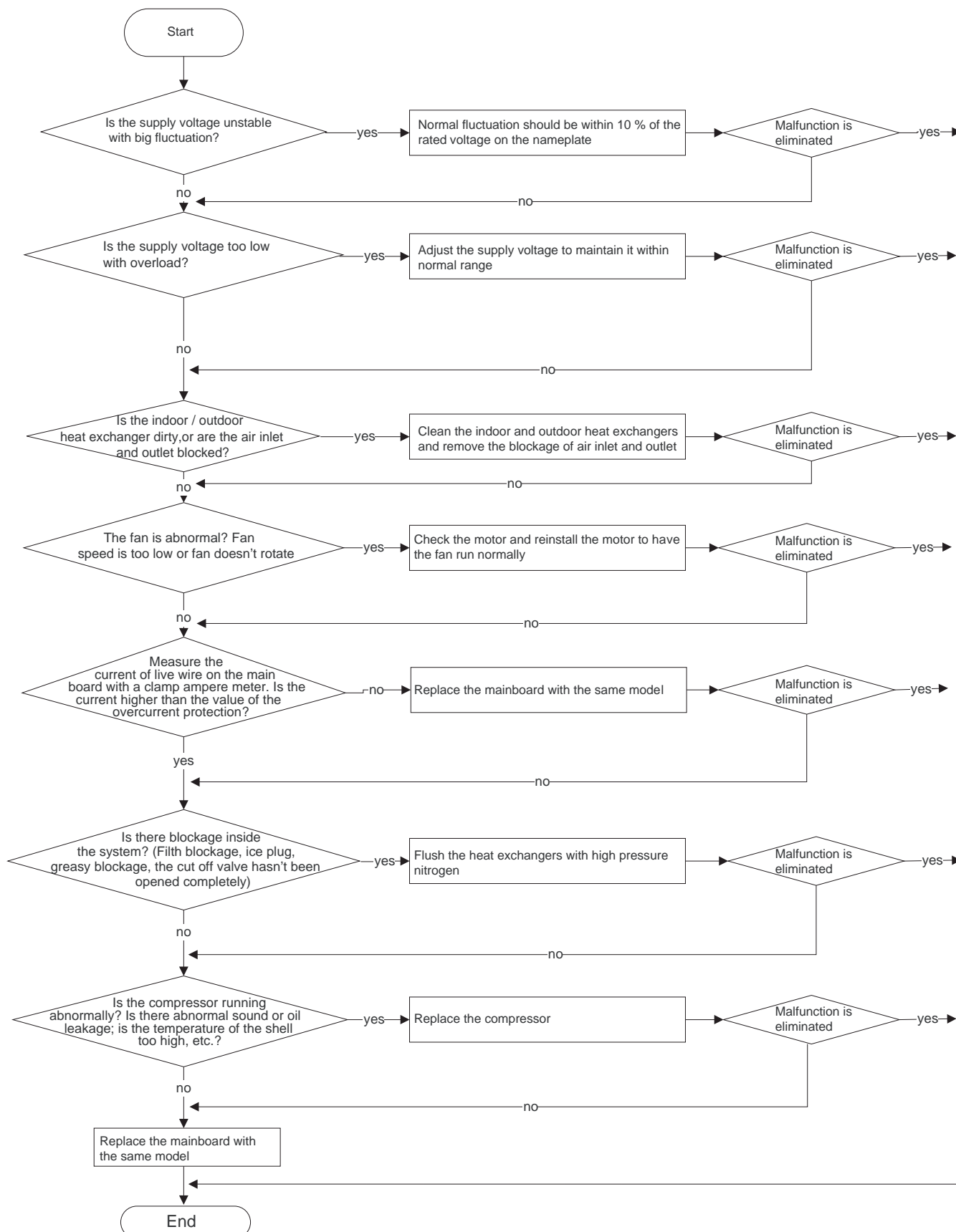


## (9) Malfunction of Overcurrent Protection E5

Main detection points:

- Is the supply voltage unstable with big fluctuation?
- Is the supply voltage too low with overload?
- Hardware trouble?

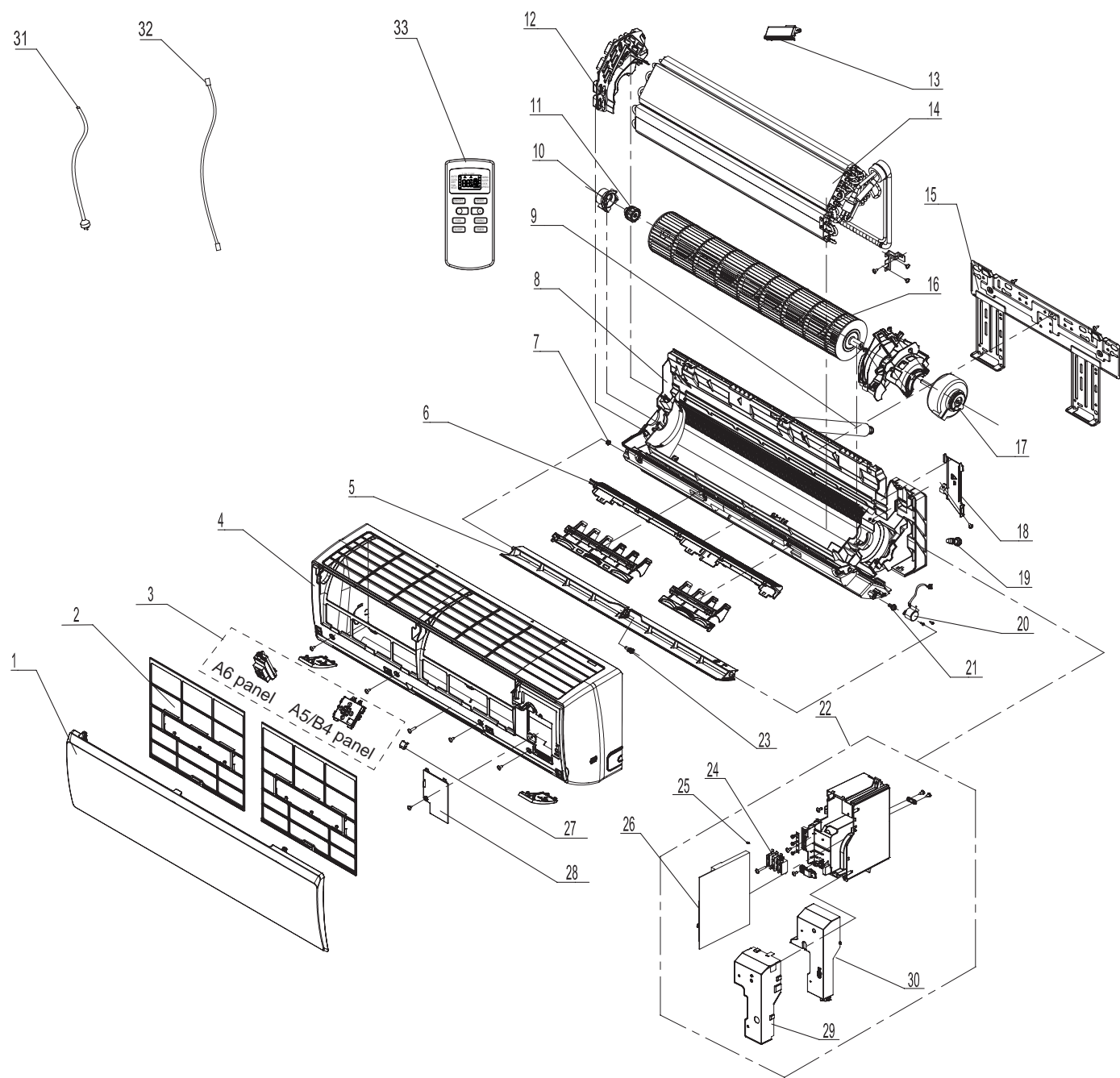
Malfunction diagnosis process:





# 10. Exploded View and Parts List

## 10.1 Indoor Unit

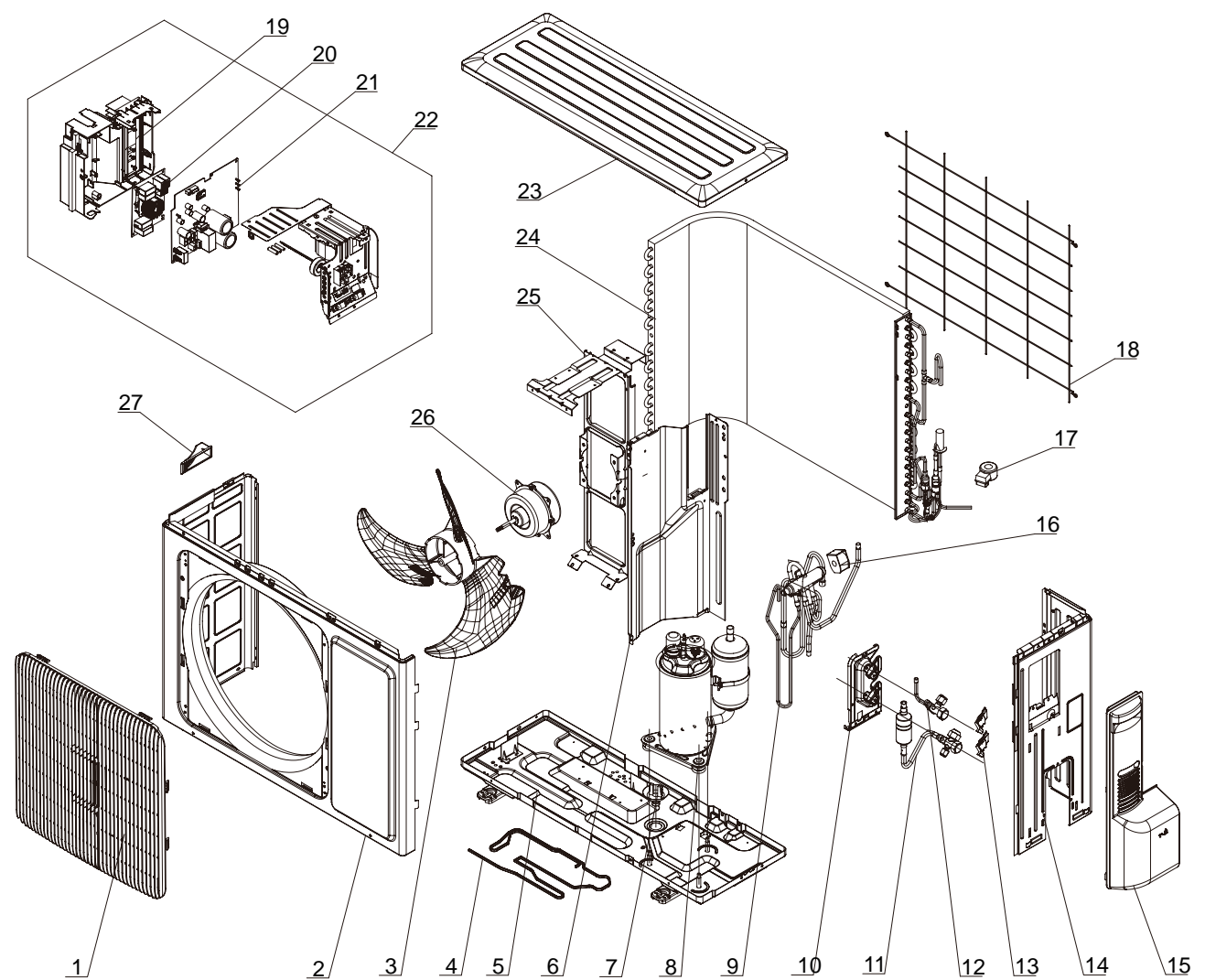


No.	Description	Part Code		Qty
		L3VI-09	L3VI-12	
1	Front Panel	2002269601S	2002269601S	1
2	Filter Sub-Assy	11122219	11122219	2
3	Display Board	30565265	30565265	1
4	Front Case Assy	2002273001	2002273001	1
5	Guide Louver	1051276301	1051276301	1
6	Helicoid Tongue	26112508	26112508	1
7	Left Axile Bush	10512037	10512037	1
8	Rear Case assy	20162010	20162010	1
9	Drainage Hose	0523001408	0523001408	1
10	Ring of Bearing	26152022	26152022	1
11	O-Gasket sub-assy of Bearing	7651205102	7651205102	1
12	Evaporator Supper 2	24212180	24212180	1
13	Cold Plasma Generator	1114001602	1114001602	1
14	Evaporator Assy	01002000044	01002000044	1
15	Wall Mounting Frame	01252043	01252043	1
16	Cross Flow Fan	10352059	10352059	1
17	Fan Motor	150120874	150120874	1
18	Connecting pipe clamp	2611216401	2611216401	1
19	Rubber Plug (Water Tray)	76712012	76712012	1
20	SteppingMotor	1521212901	1521212901	1
21	Crank	73012005	73012005	1
22	Electric Box Assy	10000202351	10000202351	1
23	Axile Bush	10542036	10542036	1
24	Terminal Board	42011233	42011233	1
25	Jumper	4202300104	4202300111	1
26	Main Board	30148820	30148820	1
27	Screw Cover	2425203001	2425203001	1
28	Electric Box Cover Sub-Assy	01402065	01402065	1
29	Shield Cover of Electric Box Cover	01592150	01592150	1
30	Electric Box Cover	20112207	20112207	1
31	Connecting Cable	400204643	400204643	1
32	Connecting Cable	4002052317	4002052317	0
33	Remote Controller	30510065	30510065	1

Above data is subject to change without notice.

# 10.2 Outdoor Unit

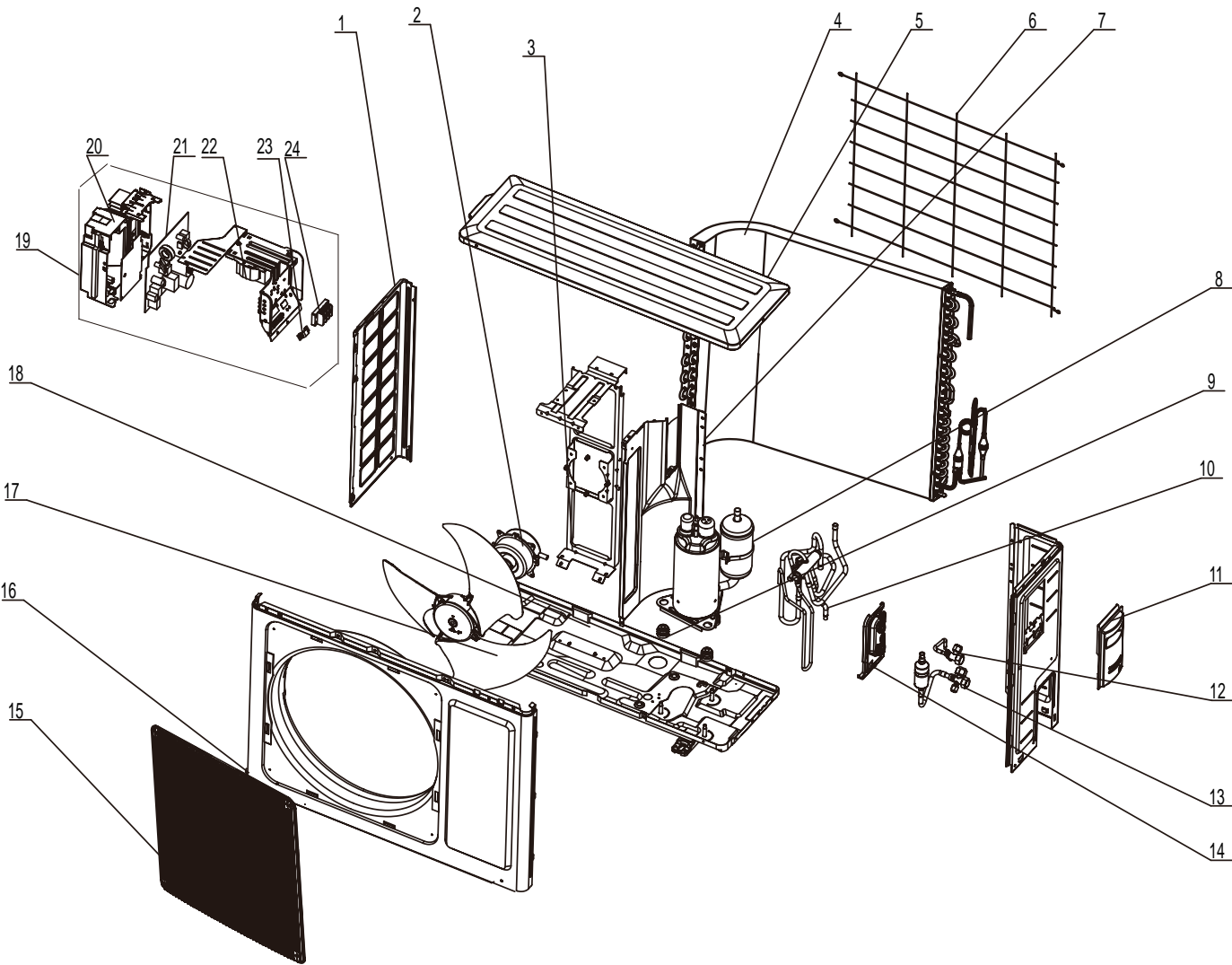
L3V0-09



No.	Description	Part Code	Qty
		L3V0-09	
1	Front Grill	22413043	1
2	Cabinet Sub-assy	0000030001510	1
3	Axial Flow Fan	10333004	1
4	Electrical Heater	/	/
5	Chassis Sub-assy	02803037P	1
6	Clapboard Sub-Assy	0123338502	1
7	Drainage Connector	06123401	1
8	Compressor and Fittings	0010389603	1
9	4-Way Valve Assy	03073151	1
10	Valve Support	01713142P	1
11	Cut off Valve Assy	07133474	1
12	Valve	07130239	1
13	Valve Support Block	26113017	2
14	Right Side Plate Sub-Assy	01303178	1
15	Big Handle	2623343106	1
16	Magnet Coil	/	/
17	Magnet Coil	4300040050	1
18	Rear Grill	01473009	1
19	Electric Box	20113032	1
20	Filter Board	/	/
21	Main Board	30138000849	1
22	Electric Box Assy	10000100576	1
23	Top Cover Sub-Assy	0125307002	1
24	Condenser Assy	01100200412	1
25	Motor Support	01703104	1
26	Fan Motor	1501308506	1
27	Small Handle	26233100	1

Above data is subject to change without notice.


L3V0-12



No.	Description	Part Code	Qty
		L3V0-12	
1	Left Side Plate	01303200P	1
2	Fan Motor	15013085	1
3	Motor Support	01703136	1
4	Condenser Assy	01100200426	1
5	Top Cover Sub-Assy	01253081	1
6	Rear Grill	01475014	1
7	Clapboard Sub-Assy	01233180	1
8	Compressor and Fittings	0010389201	1
9	Compressor Gasket	76713027	3
10	4-Way Valve Assy	03073386	1
11	Big Handle	2623343106	1
12	Cut off Valve	07130239	1
13	Cut off Valve	07133474	1
14	Valve Support	01713142P	1
15	Front Grill	22413044	1
16	Cabinet	01433033P	1
17	Axial Flow Fan	10333011	1
18	Chassis Sub-assy	01700000033P	1
19	Electric Box Assy	10000100575	1
20	Electric Box	20113032	1
21	Main Board	30138000845	1
22	Reactor	43130184	1
23	Wire Clamp	71010103	1
24	Terminal Board	42010313	1

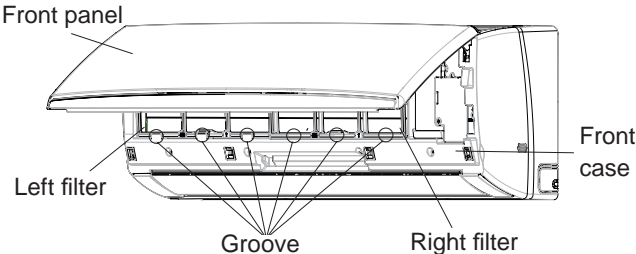
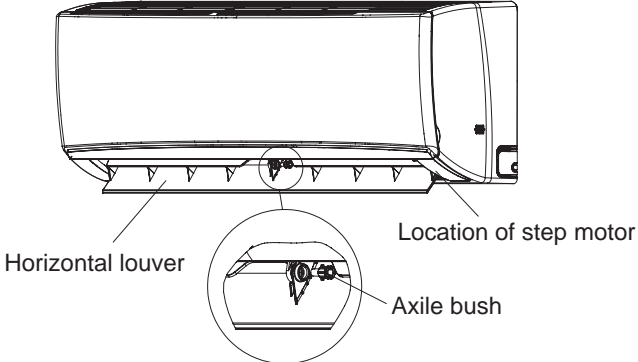
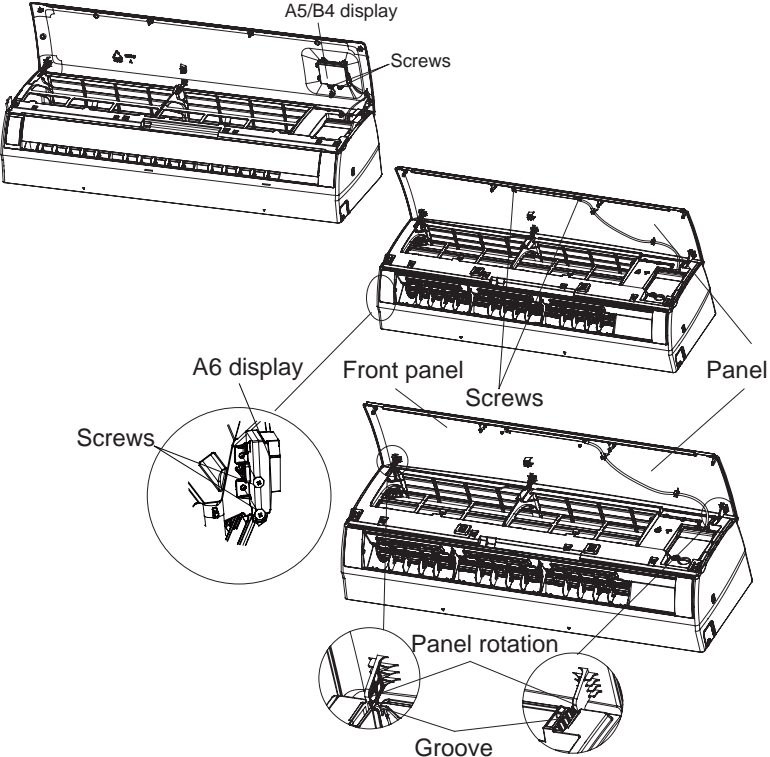
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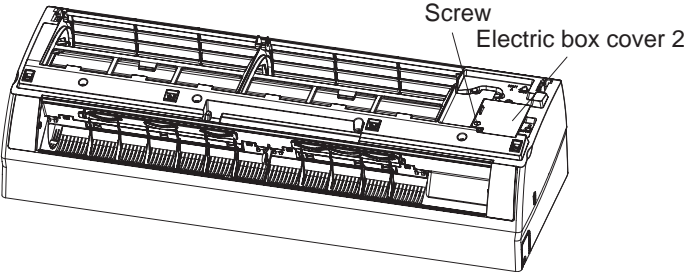
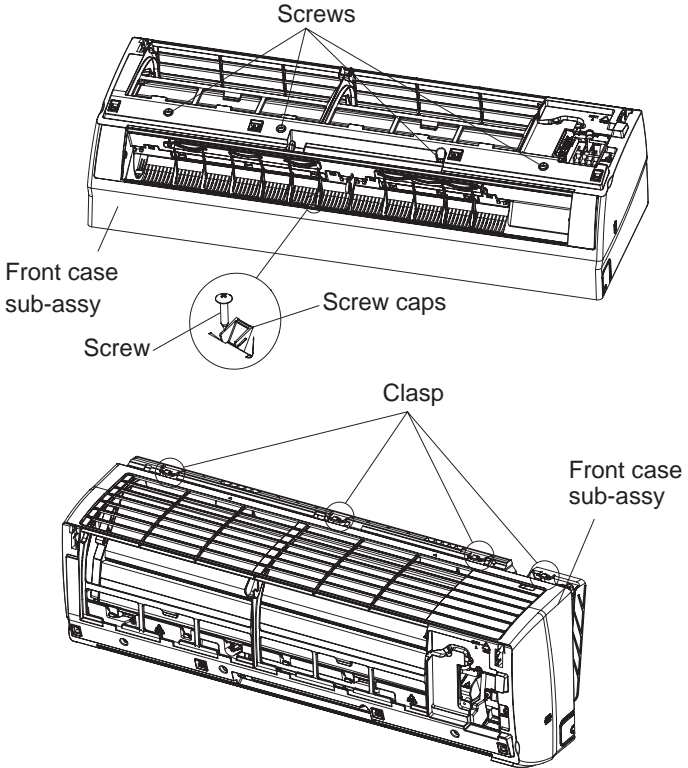
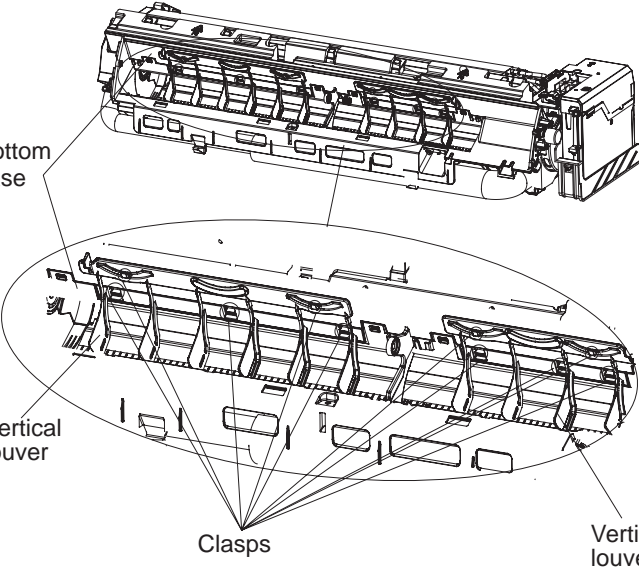
# 11. Removal Procedure

 **Caution: discharge the refrigerant completely before removal.**

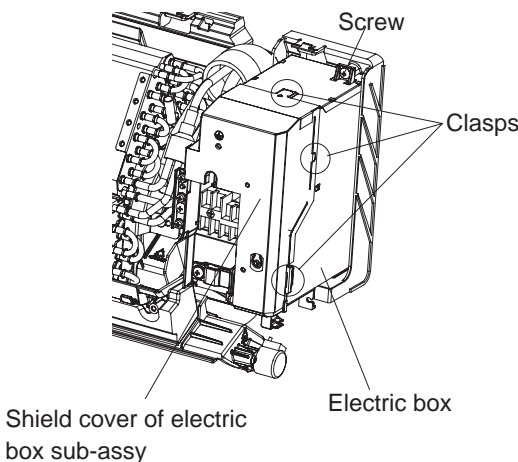
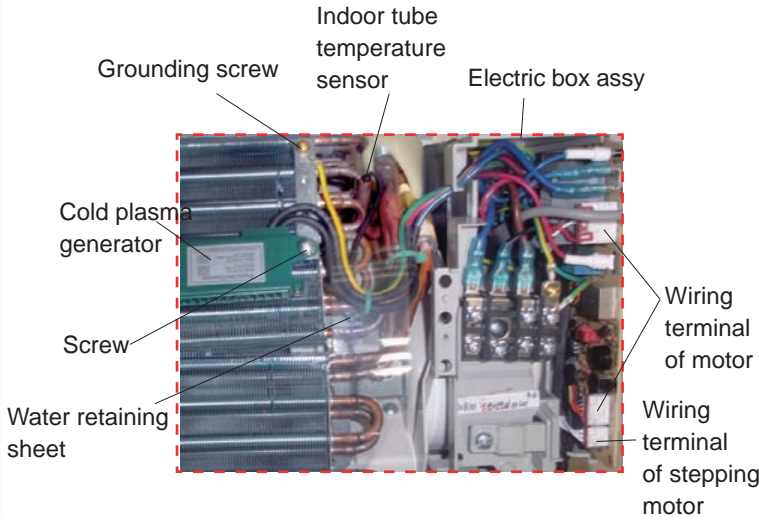
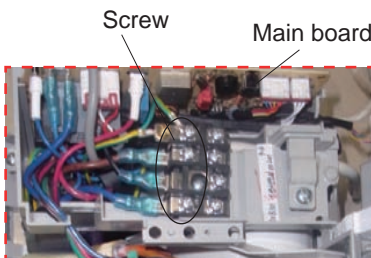
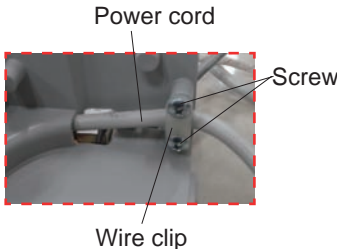
## 11.1 Removal Procedure of Indoor Unit


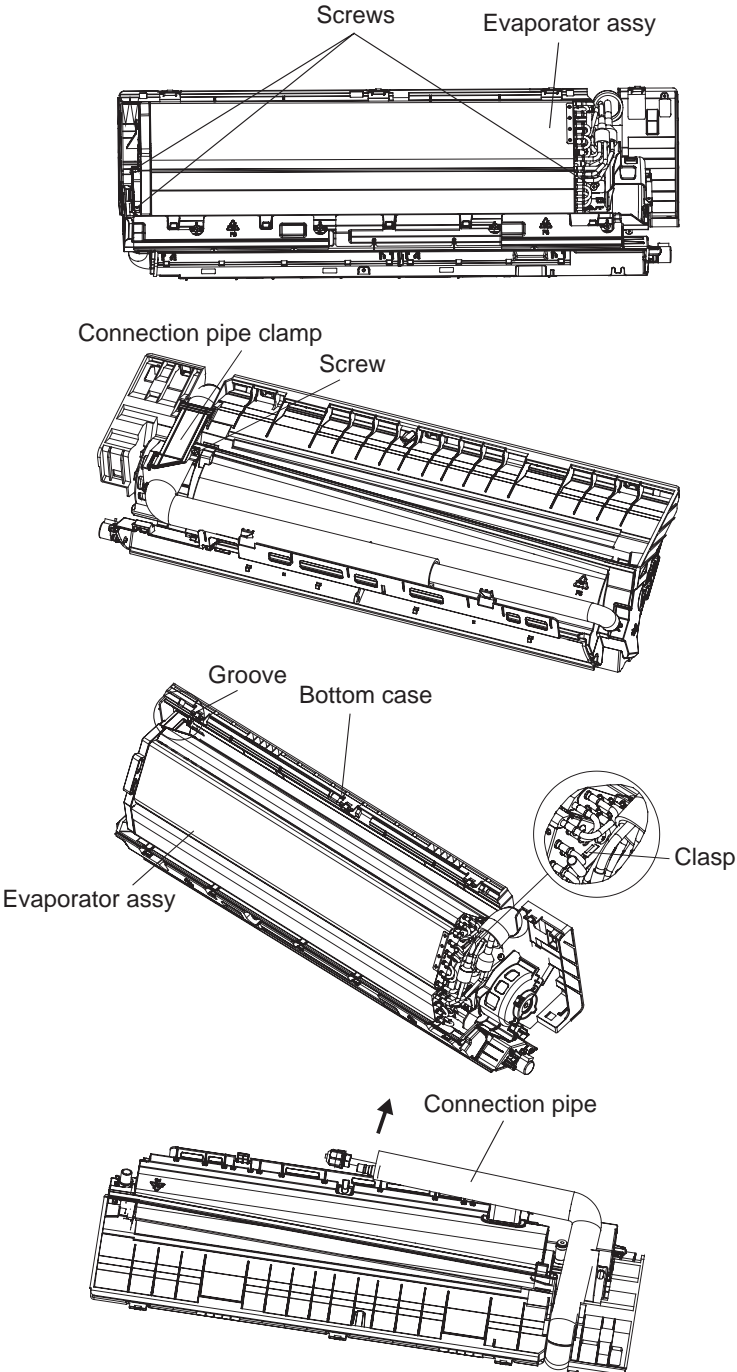
NOTE: Take A6 panel for an example.

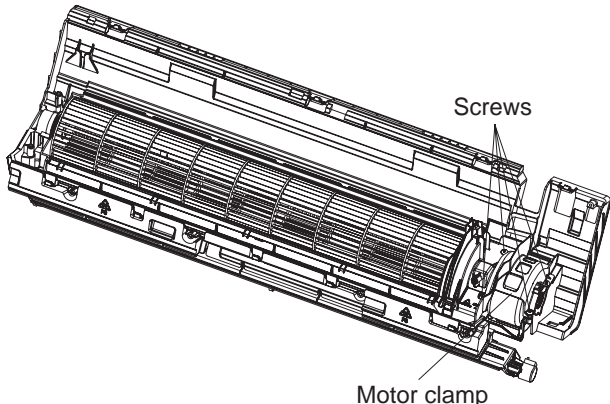
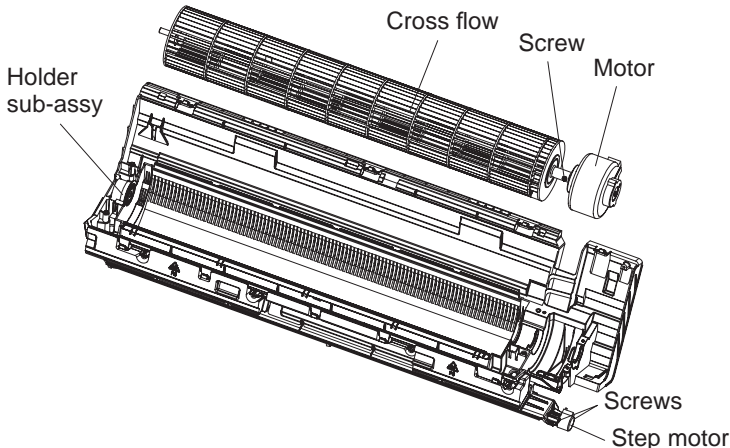
Step	Procedure
1. Remove filter assembly	<div><div><p>Open the front panel. Push the left filter and right filter until they are separate from the groove on the front panel. Remove the left filter and right filter respectively.</p></div><div></div></div>
2. Remove horizontal louver	<div><div><p>Push out the axle bush on horizontal louver. Bend the horizontal louver with hand and then separate the horizontal louver from the crankshaft of step motor to remove it.</p></div><div></div></div>
3. Remove panel and display	<div><div><p>a Screw off the 2 screws that are locking the display board.</p><p>b Separate the panel rotation shaft from the groove fixing the front panel and then removes the front panel.</p></div><div></div></div>

Step	Procedure
<p>4. Remove electric box cover 2</p> <p>Remove the screws on the electric box cover 2 to remove the electric box cover 2.</p>	 <p>Screw</p> <p>Electric box cover 2</p>
<p>5. Remove front case sub-assy</p> <p>a Remove the screws fixing front case.</p> <p>Note: 1.Open the screw caps before removing the screws around the air outlet. 2.The quantity of screws fixing the front case sub-assy is different for different models.</p> <p>b Loosen the connection clasps between front case sub-assy and bottom case. Lift up the front case sub-assy and take it out.</p>	 <p>Screws</p> <p>Front case sub-assy</p> <p>Screw caps</p> <p>Screw</p> <p>Clasp</p> <p>Front case sub-assy</p>
<p>6. Remove vertical louver</p> <p>Loosen the connection clasps between vertical louver and bottom case to remove vertical louver.</p>	 <p>Bottom case</p> <p>Vertical louver</p> <p>Clasps</p> <p>Vertical louver</p>



Step	Procedure	
7. Remove electric box assy		
a	<p>Loosen the connection clasps between shield cover of electric box sub-assy and electric box, and then remove the shield cover of electric box sub-assy.</p> <p>Remove the screw fixing electric box assy .</p>	
b	<p>① Take off the water retaining sheet.</p> <p>Remove the cold plasma generator by screwing off the locking screw on the generator.</p> <p>② Take off the indoor tube temperature sensor.</p> <p>③ Screw off 1 grounding screw.</p> <p>④ Remove the wiring terminals of motor and stepping motor.</p> <p>⑤ Remove the electric box assy.</p>	
c	<p>Twist off the screws that are locking each lead wire and rotate the electric box assy.</p> <p>Twist off the screws that are locking the wire clip. Loosen the power cord and remove its wiring terminal. Lift up the main board and take it off.</p>	 

Step	Procedure	
	<p>Instruction: Some wiring terminal of this product is with lock catch and other devices. The pulling method is as below:</p> <p>1.Remove the soft sheath for some terminals at first, hold the circlip and then pull out the terminals.</p> <p>2.Pull out the holder for some terminals at first (holder is not available for some wiring terminal), hold the connector and then pull the terminal.</p>	
8. Remove evaporator assy		 <p>a Remove 3 screws fixing evaporator assy.</p> <p>b At the back of the unit, remove the screw fixing connection pipe clamp and then remove the connection pipe clamp.</p> <p>c First remove the left side of the evaporator from the groove of bottom case and then remove the right side from the clasp on the bottom case.</p> <p>d Adjust the position of connection pipe on evaporator slightly and then lift the evaporator upwards to remove it.</p>

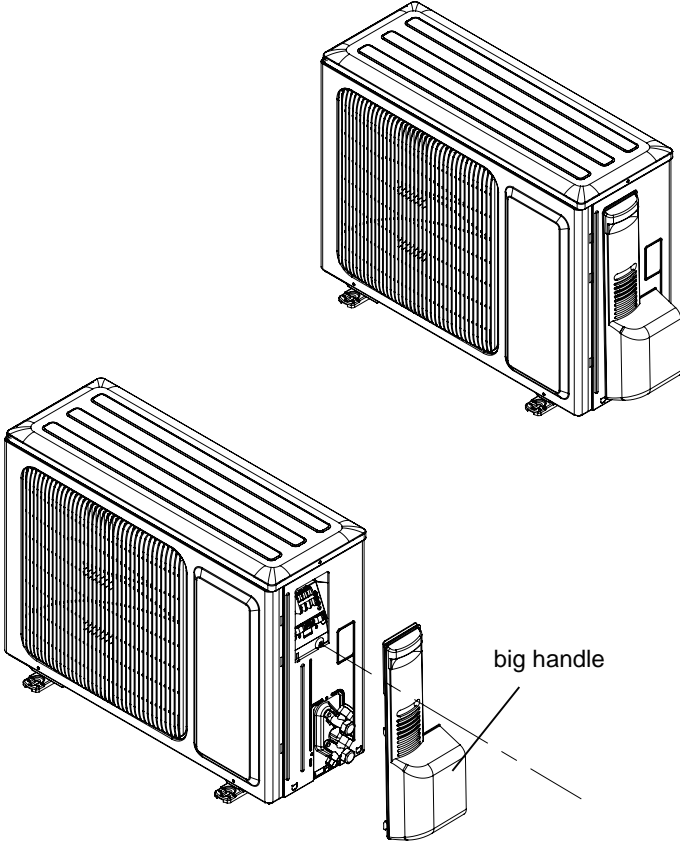
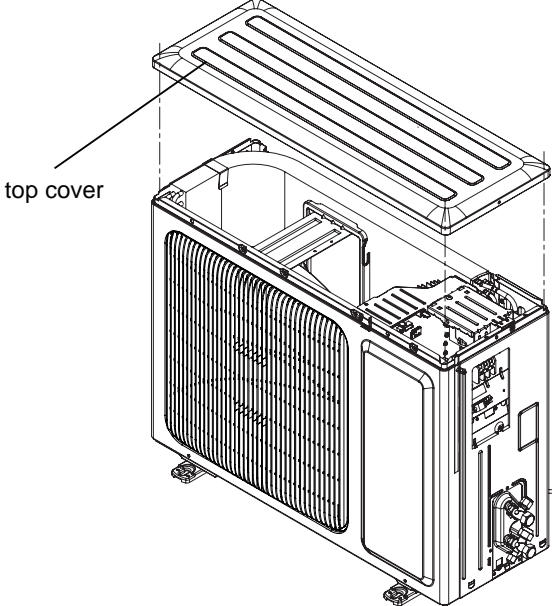
Step	Procedure	
9. Remove motor and cross flow blade		
a	Remove the screws fixing motor clamp and then remove the motor clamp.	
b	Remove the screws at the connection place of cross flow blade and motor; lift the motor and cross flow blade upwards to remove them. Remove the bearing holder sub-assy. Remove the screw fixing step motor and then remove the step motor.	

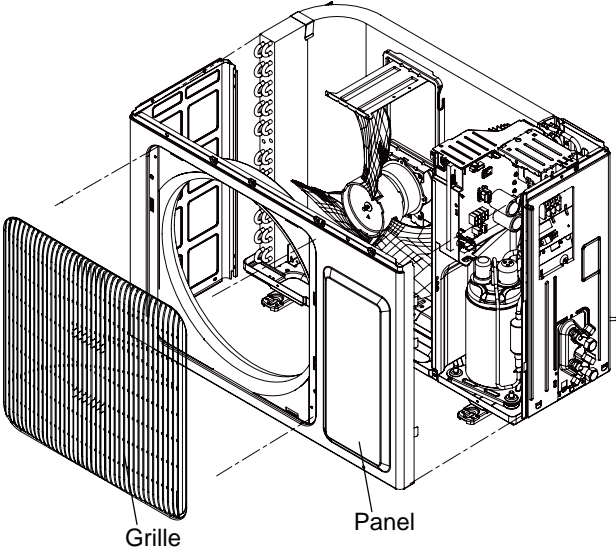
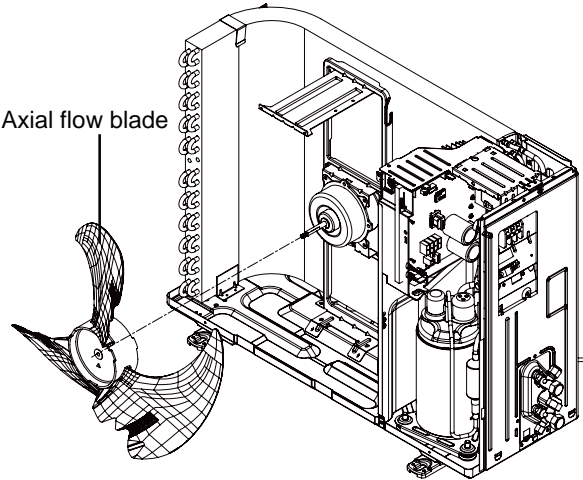
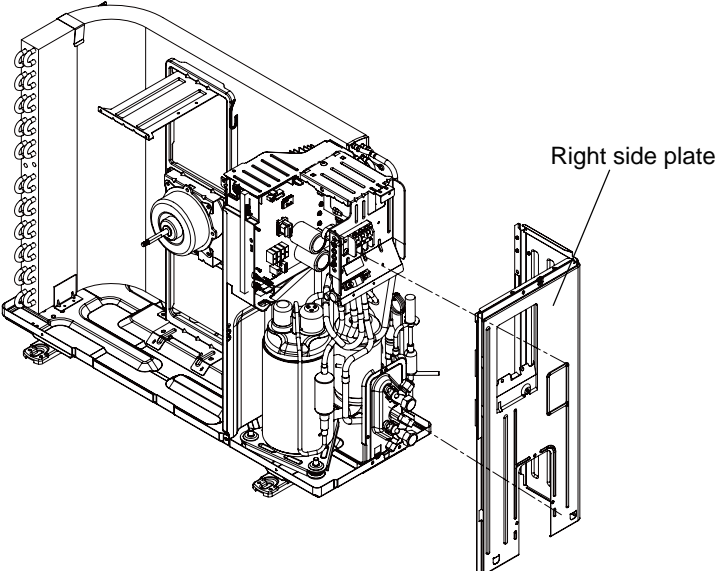
## 11.2 Removal Procedure of Outdoor Unit

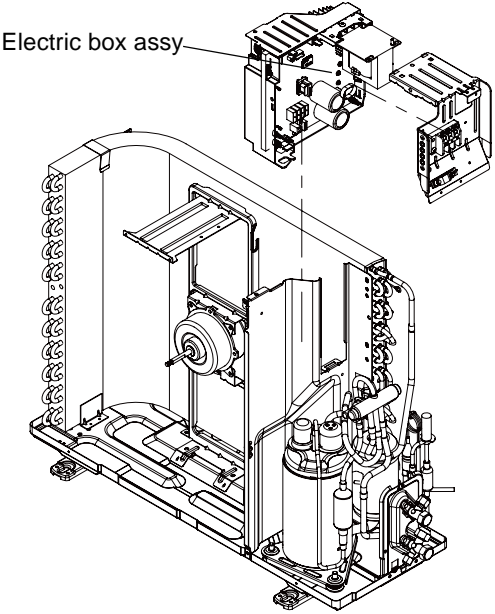
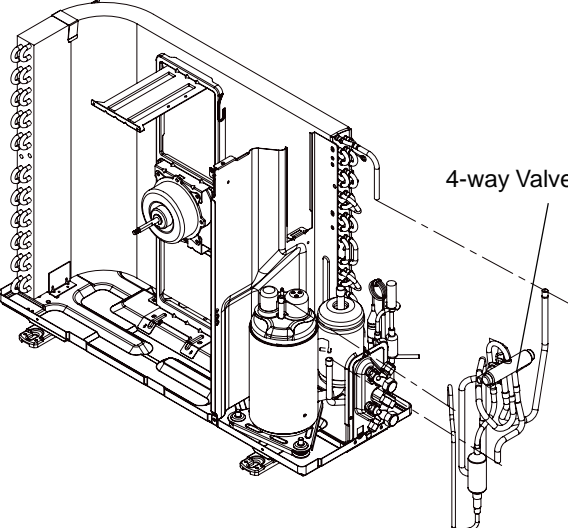
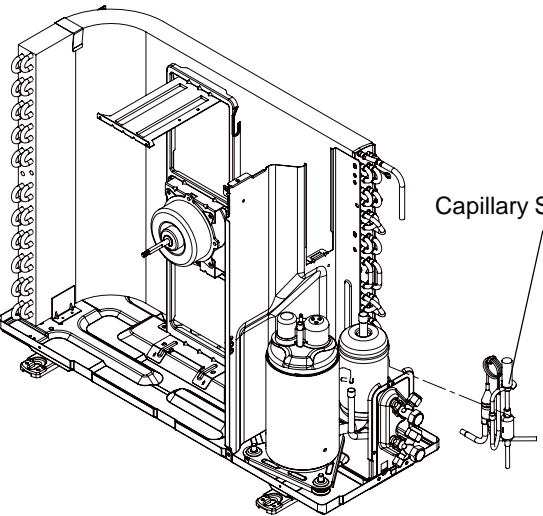


**Warning:** Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

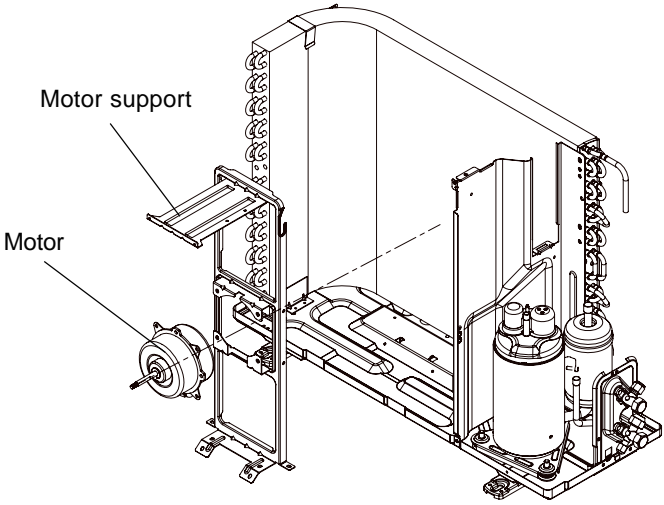
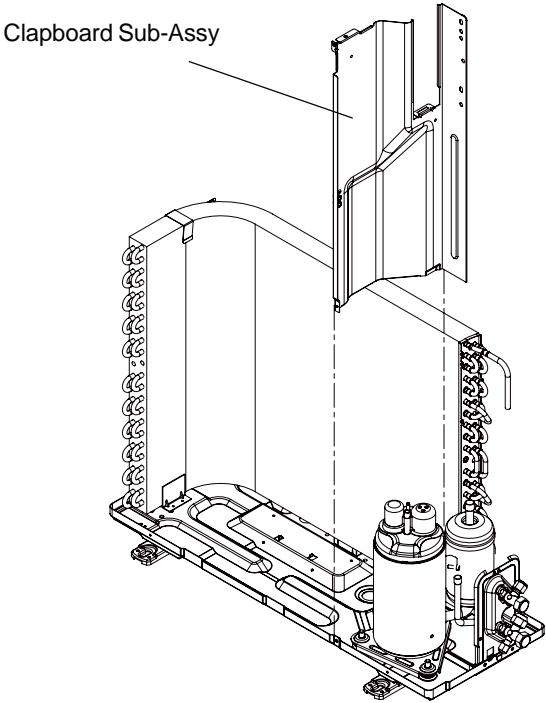
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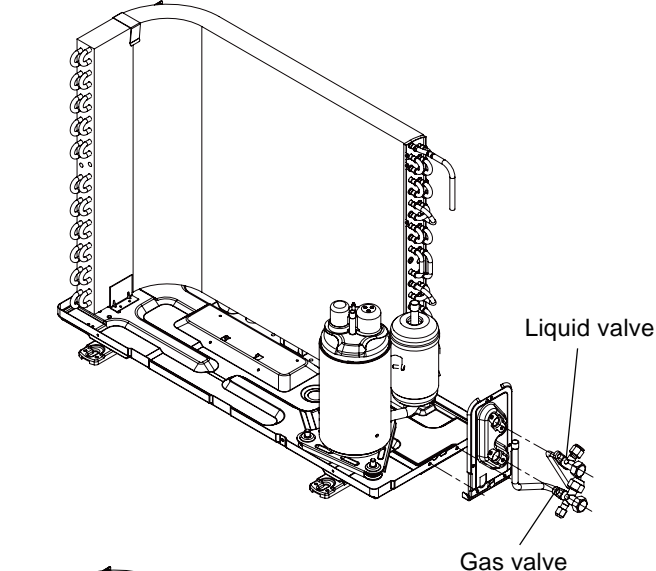
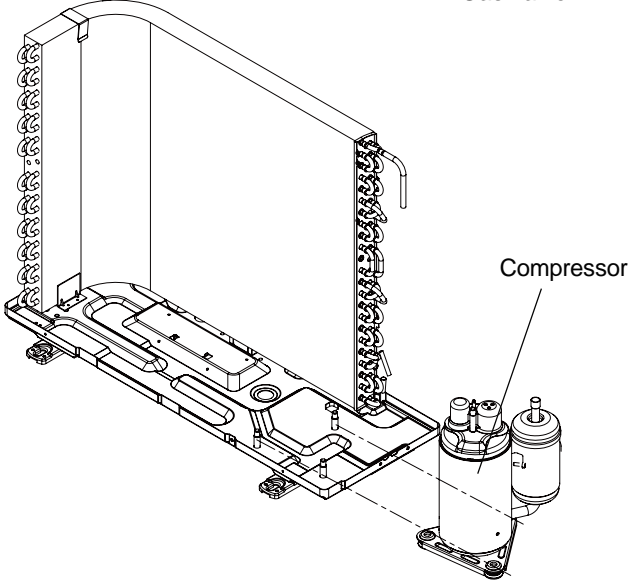
Steps	Procedure
<p><b>1.Remove big handle</b></p> <p>Before disassamble.</p> <p>Remove 1 connection screw fixing big handleand then removethe big handle.</p>	
<p><b>2. Remove top cover</b></p> <p>Remove 3 connection screws among top cover plate, front panel and right sideplate. Then remove top cover plate.</p>	

Steps	Procedure	
3.Remove grille and front panel	<p>Remove connection screws between the front grille and the front panel. Then remove the front grille. Remove connection screws connecting the front panel with the chassis and the motor support, and then remove the front panel.</p>	
4.Remove axial flow blade		
5.Remove right side plate	<p>Remove connection screws connecting the right side plate with the valve support and the electric box. Then remove the right side plate.</p>	
		

Steps	Procedure
<p><b>6.Remove electric box assy</b></p> <p>Remove the 2 screws fixing the cover of electric box. Lift to remove the cover. Loosen the wire and disconnect the terminal. Lift to remove the electric box assy.</p>	 <p>Electric box assy</p>
<p><b>7.Remove 4-way valve assy</b></p> <p>Unscrew the fastening nut of the 4-way Valve Assy coil and remove the coil. Wrap the 4-way Valve Assy with wet cotton and unsolder the 4 weld spots connecting the 4-way Valve Assy to take it out.(Note: Refrigerant should be discharged firstly.) Welding process should be as quickly as possible and keep wrapping cotton wet all the time. Be sure not to burn out the lead-out wire of compressor.</p>	 <p>4-way Valve Assy</p>
<p><b>8.Remove capillary sub-assy</b></p> <p>Unsolder weld point of capillary Sub-assy, valve and outlet pipe of condensator. Then remove the capillary Sub-assy. Do not block the capillary when unsoldering it. (Note: before unsoldering,discharge refrigerants completely)</p>	 <p>Capillary Sub-assy</p>

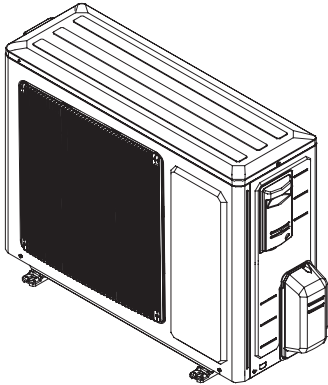
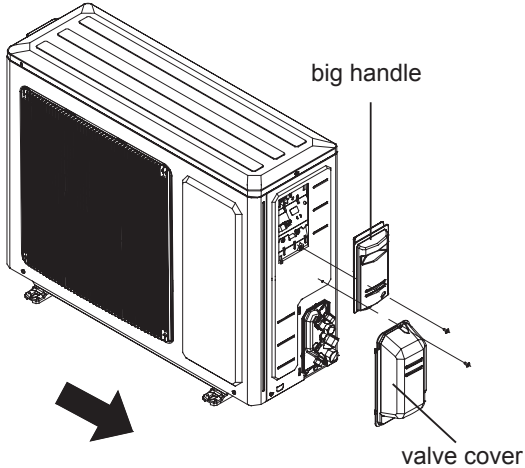
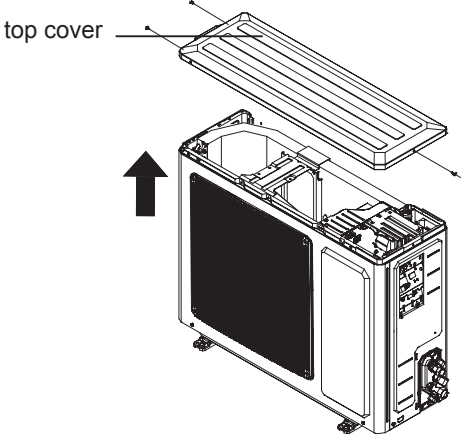


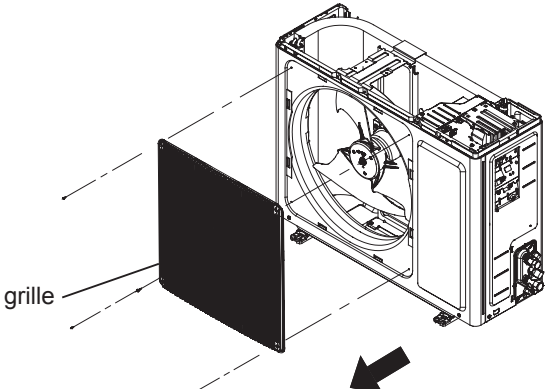
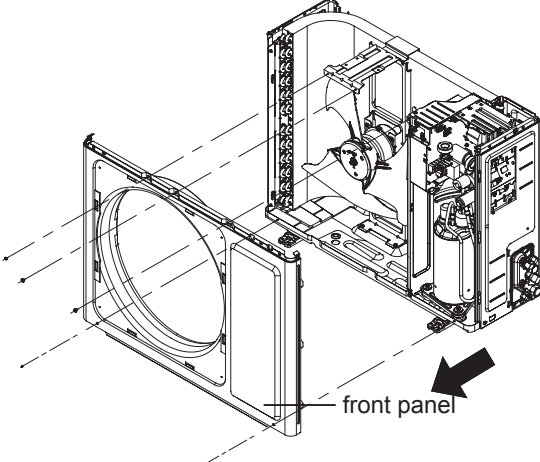
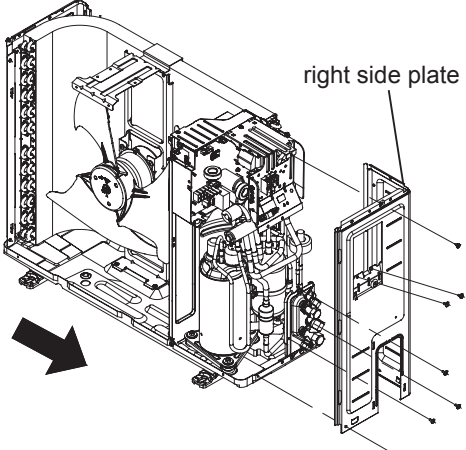
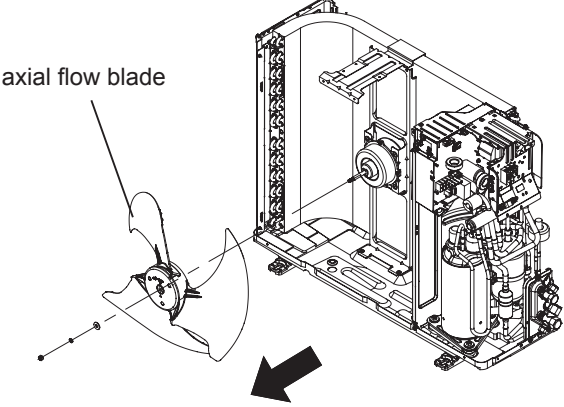
Steps	Procedure	
9.Remove motor and motor support		
	<p>Remove the 4 tapping screws fixing the motor. Pull out the lead-out wire and remove the motor. Remove the 2 tapping screws fixing the motor support. Lift motor support to remove it.</p>	
10.Remove clapboard sub-assy		
	<p>Loosen the screws of the Clapboard Sub-Assy . The Clapboard Sub-Assy has a hook on the lower side. Lift and pull the Clapboard Sub-Assy to remove.</p>	

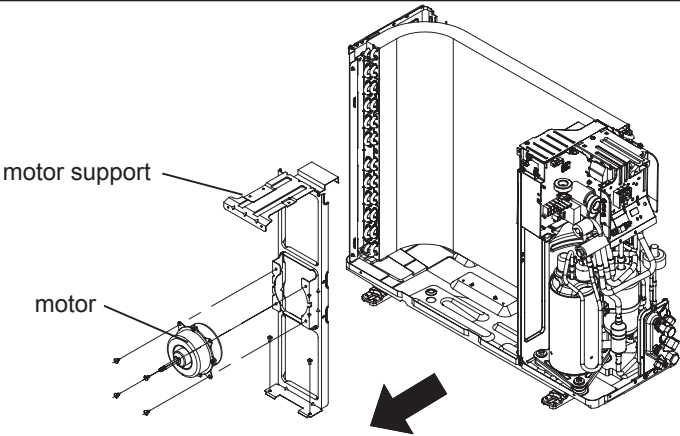
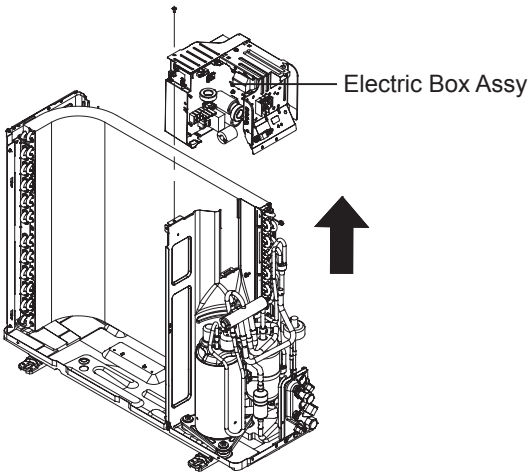
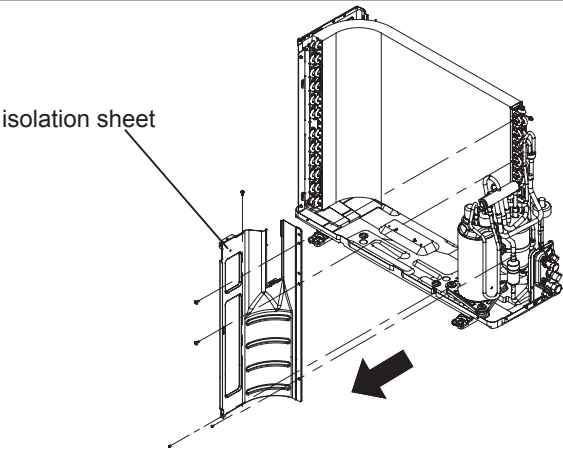
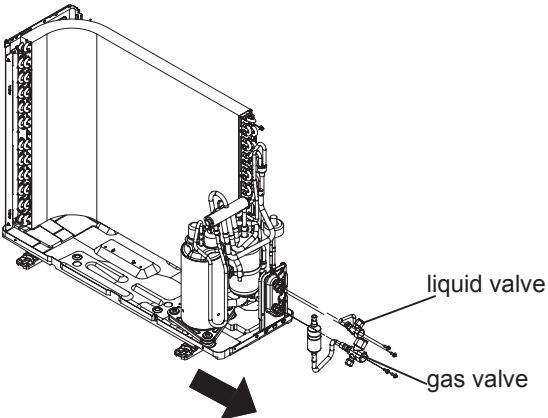
Steps	Procedure	
11.Remove Compressor		
a	Remove the 2 screws fixing the gas valve. Unsolder the welding spot connecting gas valve and air return pipe and remove the gas valve. (Note: it is necessary to warp the gas valve when unsoldering the welding spot.) Remove the 2 screws fixing liquid valve. Unsolder the welding spot connecting liquid valve and remove the liquid valve.	
b	Remove the 3 footing screws of the compressor and remove the compressor.	

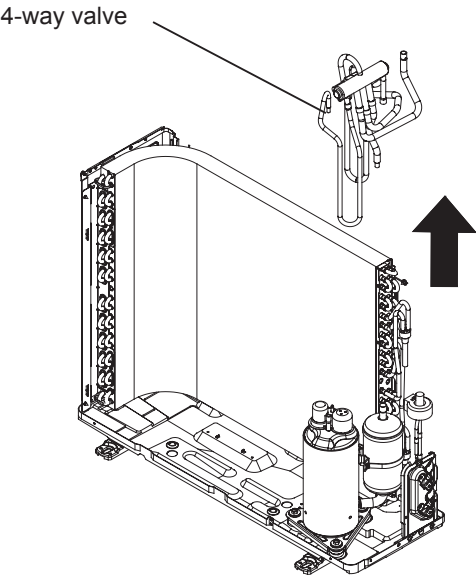
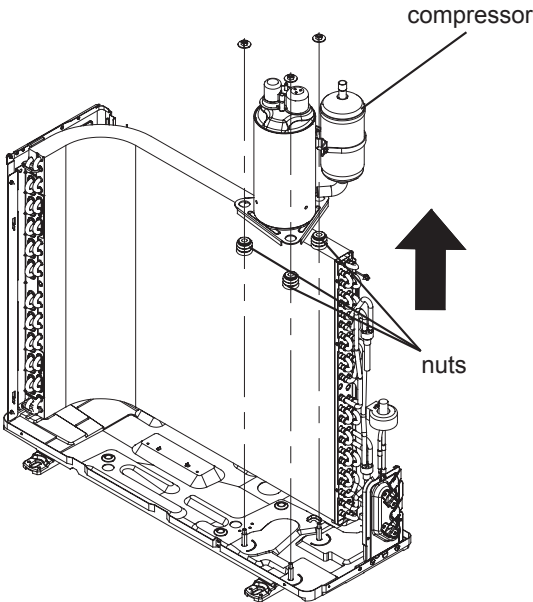


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Steps	Procedure	
1. Before disassembly		
2. Remove big handle and valve cover	<p>Remove the connection screw fixing the big handle and then remove the valve cover.</p>	
3. Remove top cover	<p>Remove connection screws connecting the top panel with the front panel and the right side plate, and then remove the top panel.</p>	

Steps	Procedure
<p><b>4. Remove grille</b></p> <p>Remove connection screws between the front grille and the front panel. Then remove the grille.</p>	 <p>grille</p>
<p><b>5. Remove front panel</b></p> <p>Remove connection screws connecting the front panel with the chassis and the motor support and then remove the front panel.</p>	 <p>front panel</p>
<p><b>6. Remove right side plate</b></p> <p>Remove connection screws connecting the right side plate with the valve support and the electric box. Then remove the right side plate.</p>	 <p>right side plate</p>
<p><b>7. Remove axial flow blade</b></p> <p>Remove the nut on the blade and then remove the axial flow blade.</p>	 <p>axial flow blade</p>

Steps	Procedure	
8. Remove motor and motor support		 <p>motor support</p> <p>motor</p>
	Remove the tapping screws fixing the motor and disconnect the leading wire insert of the motor. Then remove the motor. Remove the tapping screws fixing the motor support and lift the motor support to remove it.	
9. Remove Electric Box Assy		 <p>Electric Box Assy</p>
	Remove screws fixing the electric box subassembly; loosen the wire bundle and unplug the wiring terminals. Then lift the electric box to remove it.	
10. Remove isolation sheet		 <p>isolation sheet</p>
	Remove the screws fixing the isolation sheet and then remove the isolation sheet.	
11. Remove compressor		 <p>liquid valve</p> <p>gas valve</p>
a	Unsolder the welding joint connecting the capillary, valves and the outlet pipe of condenser to remove the capillary. Do not block the capillary with welding slag during unsoldering.	

Steps	Procedure	
b	<p>Remove the 2 screws fixing the gas valve and unsolder the welding joint between the gas valve and the air-return pipe to remove the gas valve. (NOTE: Discharge the refrigerant completely before unsoldering; when unsoldering, wrap the gas valve with a wet cloth completely to avoid damage to the valve caused by high temperature).</p> <p>Remove the 2 screws fixing the liquid valve and unsolder the welding joint connecting the liquid valve to the Y-type pipe to remove the liquid valve.</p>	
c	<p>Unsolder pipes connecting with compressor.</p>	
d	<p>Remove the 3 foot nuts on the compressor and then remove the compressor.</p>	

# Appendix:

## Appendix 1: Reference Sheet of Celsius and Fahrenheit

Conversion formula for Fahrenheit degree and Celsius degree:  $T_f = T_c \times 1.8 + 32$

Set temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
61	60.8	16	69/70	69.8	21	78/79	78.8	26
62/63	62.6	17	71/72	71.6	22	80/81	80.6	27
64/65	64.4	18	73/74	73.4	23	82/83	82.4	28
66/67	66.2	19	75/76	75.2	24	84/85	84.2	29
68	68	20	77	77	25	86	86	30

Ambient temperature

Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)	Fahrenheit display temperature (°F)	Fahrenheit (°F)	Celsius (°C)
32/33	32	0	55/56	55.4	13	79/80	78.8	26
34/35	33.8	1	57/58	57.2	14	81	80.6	27
36	35.6	2	59/60	59	15	82/83	82.4	28
37/38	37.4	3	61/62	60.8	16	84/85	84.2	29
39/40	39.2	4	63	62.6	17	86/87	86	30
41/42	41	5	64/65	64.4	18	88/89	87.8	31
43/44	42.8	6	66/67	66.2	19	90	89.6	32
45	44.6	7	68/69	68	20	91/92	91.4	33
46/47	46.4	8	70/71	69.8	21	93/94	93.2	34
48/49	48.2	9	72	71.6	22	95/96	95	35
50/51	50	10	73/74	73.4	23	97/98	96.8	36
52/53	51.8	11	75/76	75.2	24	99	98.6	37
54	53.6	12	77/78	77	25			

## Appendix 2: Configuration of Connection Pipe

1. Standard length of connection pipe

- 5m, 7.5m, 8m.

2. Min. length of connection pipe is 3m.

3. Max. length of connection pipe and max. high difference.

4. The additional refrigerant oil and refrigerant charging required after prolonging connection pipe

- After the length of connection pipe is prolonged for 10m at the basis of standard length, you should add 5ml of refrigerant oil for each additional 5m of connection pipe.

- The calculation method of additional refrigerant charging amount (on the basis of liquid pipe):

Cooling capacity	Max length of connection pipe	Max height difference
5000 Btu/h(1465 W)	15 m	5 m
7000 Btu/h(2051 W)	15 m	5 m
9000 Btu/h(2637 W)	15 m	10 m
12000 Btu/h(3516 W)	20 m	10 m
18000 Btu/h(5274 W)	25 m	10 m
24000 Btu/h(7032 W)	25 m	10 m
28000 Btu/h(8204 W)	30 m	10 m
36000 Btu/h(10548 W)	30 m	20 m
42000 Btu/h(12306 W)	30 m	20 m
48000 Btu/h(14064 W)	30 m	20 m

- When the length of connection pipe is above 5m, add refrigerant according to the prolonged length of liquid pipe. The additional refrigerant charging amount per meter is different according to the diameter of liquid pipe. See the following sheet.

- Additional refrigerant charging amount = prolonged length of liquid pipe X additional refrigerant charging amount per meter

Additional refrigerant charging amount for R22, R407C, R410A and R134a			
Diameter of connection pipe		Outdoor unit throttle	
Liquid pipe(mm)	Gas pipe(mm)	Cooling only(g/m)	Cooling and heating(g/m)
Φ6	Φ9.5 or Φ12	15	20
Φ6 or Φ9.5	Φ16 or Φ19	15	20
Φ12	Φ19 or Φ22.2	30	120
Φ16	Φ25.4 or Φ31.8	60	120
Φ19	/	250	250
Φ22.2	/	350	350

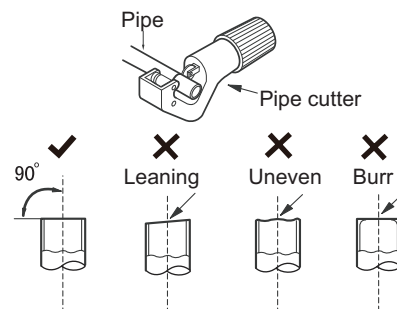
## Appendix 3: Pipe Expanding Method

### ⚠ Note:

**Improper pipe expanding is the main cause of refrigerant leakage. Please expand the pipe according to the following steps:**

#### A: Cut the pip

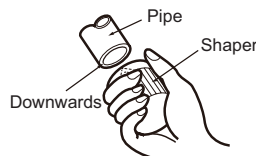
- Confirm the pipe length according to the distance of indoor unit and outdoor unit.
- Cut the required pipe with pipe cutter.



#### B: Remove the burrs

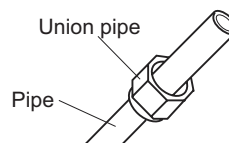
- Remove the burrs with shaper and prevent the burrs from getting into the pipe.

#### C: Put on suitable insulating pipe



#### D: Put on the union nut

- Remove the union nut on the indoor connection pipe and outdoor valve; install the union nut on the pipe.



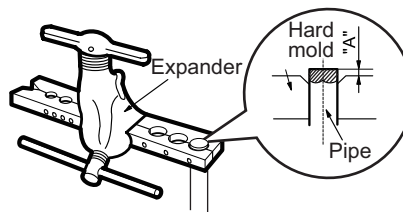
#### E: Expand the port

- Expand the port with expander.

### ⚠ Note:

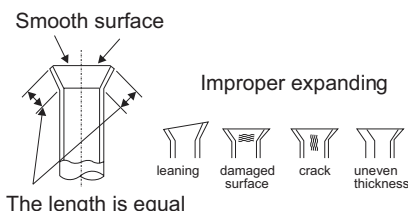
- "A" is different according to the diameter, please refer to the sheet below:

Outer diameter(mm)	A(mm)	
	Max	Min
Φ6 - 6.35 (1/4")	1.3	0.7
Φ9.52 (3/8")	1.6	1.0
Φ12 - 12.70 (1/2")	1.8	1.0
Φ16 - 15.88 (5/8")	2.4	2.2



#### F: Inspection

- Check the quality of expanding port. If there is any blemish, expand the port again according to the steps above.



## Appendix 4: List of Resistance for Temperature Sensor

Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor Units (15K)

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-19	138.1	20	18.75	59	3.848	98	1.071
-18	128.6	21	17.93	60	3.711	99	1.039
-17	121.6	22	17.14	61	3.579	100	1.009
-16	115	23	16.39	62	3.454	101	0.98
-15	108.7	24	15.68	63	3.333	102	0.952
-14	102.9	25	15	64	3.217	103	0.925
-13	97.4	26	14.36	65	3.105	104	0.898
-12	92.22	27	13.74	66	2.998	105	0.873
-11	87.35	28	13.16	67	2.896	106	0.848
-10	82.75	29	12.6	68	2.797	107	0.825
-9	78.43	30	12.07	69	2.702	108	0.802
-8	74.35	31	11.57	70	2.611	109	0.779
-7	70.5	32	11.09	71	2.523	110	0.758
-6	66.88	33	10.63	72	2.439	111	0.737
-5	63.46	34	10.2	73	2.358	112	0.717
-4	60.23	35	9.779	74	2.28	113	0.697
-3	57.18	36	9.382	75	2.206	114	0.678
-2	54.31	37	9.003	76	2.133	115	0.66
-1	51.59	38	8.642	77	2.064	116	0.642
0	49.02	39	8.297	78	1.997	117	0.625
1	46.6	40	7.967	79	1.933	118	0.608
2	44.31	41	7.653	80	1.871	119	0.592
3	42.14	42	7.352	81	1.811	120	0.577
4	40.09	43	7.065	82	1.754	121	0.561
5	38.15	44	6.791	83	1.699	122	0.547
6	36.32	45	6.529	84	1.645	123	0.532
7	34.58	46	6.278	85	1.594	124	0.519
8	32.94	47	6.038	86	1.544	125	0.505
9	31.38	48	5.809	87	1.497	126	0.492
10	29.9	49	5.589	88	1.451	127	0.48
11	28.51	50	5.379	89	1.408	128	0.467
12	27.18	51	5.197	90	1.363	129	0.456
13	25.92	52	4.986	91	1.322	130	0.444
14	24.73	53	4.802	92	1.282	131	0.433
15	23.6	54	4.625	93	1.244	132	0.422
16	22.53	55	4.456	94	1.207	133	0.412
17	21.51	56	4.294	95	1.171	134	0.401
18	20.54	57	4.139	96	1.136	135	0.391
19	19.63	58	3.99	97	1.103	136	0.382

Resistance Table of Tube Temperature Sensors for Outdoor and Indoor (20K)

Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)	Temp(°C)	Resistance(kΩ)
-19	181.4	20	25.01	59	5.13	98	1.427
-18	171.4	21	23.9	60	4.948	99	1.386
-17	162.1	22	22.85	61	4.773	100	1.346
-16	153.3	23	21.85	62	4.605	101	1.307
-15	145	24	20.9	63	4.443	102	1.269
-14	137.2	25	20	64	4.289	103	1.233
-13	129.9	26	19.14	65	4.14	104	1.198
-12	123	27	18.13	66	3.998	105	1.164
-11	116.5	28	17.55	67	3.861	106	1.131
-10	110.3	29	16.8	68	3.729	107	1.099
-9	104.6	30	16.1	69	3.603	108	1.069
-8	99.13	31	15.43	70	3.481	109	1.039
-7	94	32	14.79	71	3.364	110	1.01
-6	89.17	33	14.18	72	3.252	111	0.983
-5	84.61	34	13.59	73	3.144	112	0.956
-4	80.31	35	13.04	74	3.04	113	0.93
-3	76.24	36	12.51	75	2.94	114	0.904
-2	72.41	37	12	76	2.844	115	0.88
-1	68.79	38	11.52	77	2.752	116	0.856
0	65.37	39	11.06	78	2.663	117	0.833
1	62.13	40	10.62	79	2.577	118	0.811
2	59.08	41	10.2	80	2.495	119	0.77
3	56.19	42	9.803	81	2.415	120	0.769
4	53.46	43	9.42	82	2.339	121	0.746
5	50.87	44	9.054	83	2.265	122	0.729
6	48.42	45	8.705	84	2.194	123	0.71
7	46.11	46	8.37	85	2.125	124	0.692
8	43.92	47	8.051	86	2.059	125	0.674
9	41.84	48	7.745	87	1.996	126	0.658
10	39.87	49	7.453	88	1.934	127	0.64
11	38.01	50	7.173	89	1.875	128	0.623
12	36.24	51	6.905	90	1.818	129	0.607
13	34.57	52	6.648	91	1.736	130	0.592
14	32.98	53	6.403	92	1.71	131	0.577
15	31.47	54	6.167	93	1.658	132	0.563
16	30.04	55	5.942	94	1.609	133	0.549
17	28.68	56	5.726	95	1.561	134	0.535
18	27.39	57	5.519	96	1.515	135	0.521
19	26.17	58	5.32	97	1.47	136	0.509



Resistance Table of Discharge Temperature Sensor for Outdoor (50K)

Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)		Temp(°C)	Resistance(kΩ)
-29	853.5		10	98		49	18.34		88	4.75
-28	799.8		11	93.42		50	17.65		89	4.61
-27	750		12	89.07		51	16.99		90	4.47
-26	703.8		13	84.95		52	16.36		91	4.33
-25	660.8		14	81.05		53	15.75		92	4.20
-24	620.8		15	77.35		54	15.17		93	4.08
-23	580.6		16	73.83		55	14.62		94	3.96
-22	548.9		17	70.5		56	14.09		95	3.84
-21	516.6		18	67.34		57	13.58		96	3.73
-20	486.5		19	64.33		58	13.09		97	3.62
-19	458.3		20	61.48		59	12.62		98	3.51
-18	432		21	58.77		60	12.17		99	3.41
-17	407.4		22	56.19		61	11.74		100	3.32
-16	384.5		23	53.74		62	11.32		101	3.22
-15	362.9		24	51.41		63	10.93		102	3.13
-14	342.8		25	49.19		64	10.54		103	3.04
-13	323.9		26	47.08		65	10.18		104	2.96
-12	306.2		27	45.07		66	9.83		105	2.87
-11	289.6		28	43.16		67	9.49		106	2.79
-10	274		29	41.34		68	9.17		107	2.72
-9	259.3		30	39.61		69	8.85		108	2.64
-8	245.6		31	37.96		70	8.56		109	2.57
-7	232.6		32	36.38		71	8.27		110	2.50
-6	220.5		33	34.88		72	7.99		111	2.43
-5	209		34	33.45		73	7.73		112	2.37
-4	198.3		35	32.09		74	7.47		113	2.30
-3	199.1		36	30.79		75	7.22		114	2.24
-2	178.5		37	29.54		76	7.00		115	2.18
-1	169.5		38	28.36		77	6.76		116	2.12
0	161		39	27.23		78	6.54		117	2.07
1	153		40	26.15		79	6.33		118	2.02
2	145.4		41	25.11		80	6.13		119	1.96
3	138.3		42	24.13		81	5.93		120	1.91
4	131.5		43	23.19		82	5.75		121	1.86
5	125.1		44	22.29		83	5.57		122	1.82
6	119.1		45	21.43		84	5.39		123	1.77
7	113.4		46	20.6		85	5.22		124	1.73
8	108		47	19.81		86	5.06		125	1.68
9	102.8		48	19.06		87	4.90		126	1.64

## NOTES





# AIR CONDITIONING SYSTEMS

## WALL MOUNTED UNIT



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