

# Service Manual

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Model: GWH18RC-K3DBA5E  
GWH18RC-K3DBA3E  
GWH24RD-K3DBA5E  
GWH24RD-K3DBA3E  
GWH24RD-K3DBA2A  
GWH24RD-K3DBA3A  
(Refrigerant R410A)

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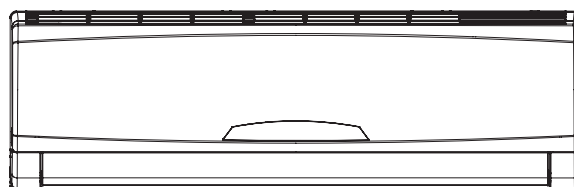
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# Part I : Technical Information

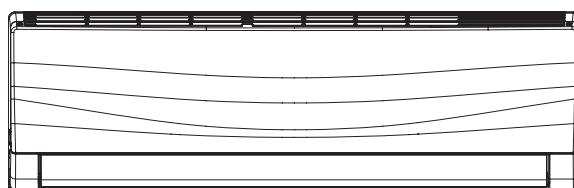
## 1. Summary

### Indoor Unit:

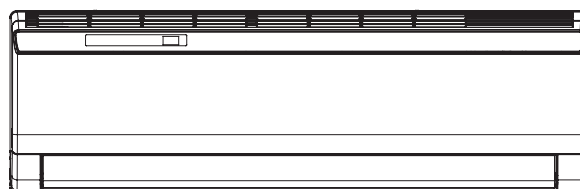
GWH18RC-K3DBA5E/I  
GWH24RD-K3DBA5E/I



GWH18RC-K3DBA3E/I  
GWH24RD-K3DBA3E/I  
GWH24RD-K3DBA3A/I

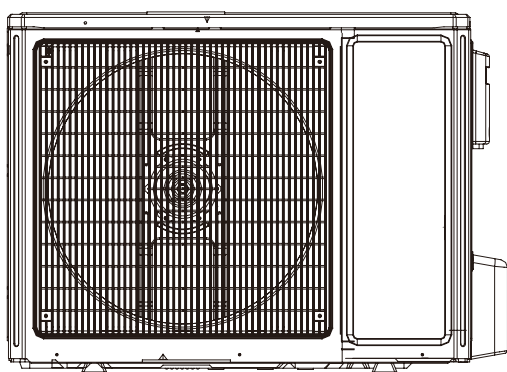


GWH24RD-K3DBA2A/I

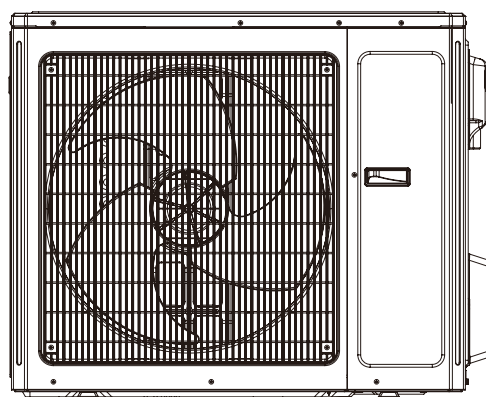


### Outdoor Unit:

GWH18RC-K3DBA5E/O



GWH24RD-K3DBA5E/O  
GWH24RD-K3DBA2A/O



### Remote Controller:

YAA1FB





## 2. Specifications

### 2.1 Specification Sheet

Parameter		Unit	Value	
Model			GWH18RC-K3DBA5E GWH18RC-K3DBA3E	GWH24RD-K3DBA5E GWH24RD-K3DBA3E
Product Code			CB304001600 CB302002300	CB304001500 CB302002400
Power Supply	Rated Voltage	V~	220-240	220-240
	Rated Frequency	Hz	50	50
	Phases		1	1
Power Supply Mode			Outdoor	Outdoor
Cooling Capacity		W	5275	6450
Heating Capacity		W	5600	6450
Cooling Power Input		W	1620	1940
Heating Power Input		W	1650	1910
Cooling Power Current		A	7.19	9.0
Heating Power Current		A	7.10	9.0
Rated Input		W	2500	4000
Rated Current		A	12.42	17.40
Air Flow Volume(SH/H/M/L/SL)		m <sup>3</sup> /h	850/780/740/300/-	1000/800/700/600/-
Dehumidifying Volume		L/h	1.8	2.5
EER		W/W	3.26	3.32
COP		W/W	3.39	3.38
SEER		W/W	/	/
HSPF		W/W	/	/
Application Area		m <sup>2</sup>	23-34	23-34
Indoor Unit	Model of indoor unit		GWH18RC-K3DBA5E/I GWH18RC-K3DBA3E/I	GWH24RD-K3DBA5E/I GWH24RD-K3DBA3E/I
	Fan Type		Cross-flow	Cross-flow
	Diameter Length(DXL)	mm	Φ98X710	Φ98X765
	Fan Motor Cooling Speed (SH/H/M/L/SL)	r/min	1350/1200/1000/800/-	1350/1150/950/850/-
	Fan Motor Heating Speed (SH/H/M/L/SL)	r/min	1420/1250/1100/950/-	1400/1200/1000/900/-
	Output of Fan Motor	W	20	35
	Fan Motor RLA	A	0.31	0.31
	Fan Motor Capacitor	μF	1.5	2.5
	Input of Heater	W	/	/
	Evaporator Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ7	Φ7
	Row-fin Gap	mm	2-1.4	2-1.5
	Coil Length (LXDXW)	mm	715X25.4X304.8	765X25.4X342.9
	Swing Motor Model		MP28VB	MP35XX
	Output of Swing Motor	W	2	2
	Fuse	A	3.15	3.15
	Sound Pressure Level (SH/H/M/L/SL)	dB (A)	48/46/37/33/-	50/45/39/36/-
	Sound Power Level (SH/H/M/L/SL)	dB (A)	58/56/47/43/-	63/58/54/51/-
	Dimension (WXHxD)	mm	945X298X211	1018X315X223
	Dimension of Carton Box (LXWXH)	mm	1010X380X285	1083X395X313
	Dimension of Package (LXWXH)	mm	1013X383X300	1086X398X328
	Net Weight	kg	12	14
	Gross Weight	kg	15	17.5

Outdoor Unit	Model of Outdoor Unit		GWH18RC-K3DBA5E/O	GWH24RD-K3DBA5E/O
	Compressor Manufacturer/Trademark		ZHUHAI LANDA COMPRESSOR CO., LTD	ZHUHAI LANDA COMPRESSOR CO.,LTD
	Compressor Model		QXA-B141zF030A	QXAS-D23zX090B
	Compressor Oil		68EP	RB68EP
	Compressor Type		Rotary	Rotary
	L.R.A.	A	25.00	25.00
	Compressor RLA	A	7.20	11.50
	Compressor Power Input	W	1440	2550
	Overload Protector		1NT11L-6233	1NT11L-6233
	Throttling Method		Capillary	Capillary
	Operation temp	°C	16~30	16~30
	Ambient temp (cooling)	°C	-15~43	-15~43
	Ambient temp (heating)	°C	-20~24	-20~24
	Condenser Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ7	Φ7.94
	Rows-fin Gap	mm	2-1.4	2-1.4
	Coil Length (LXDXW)	mm	821.5X38.1X660	955X38X748
	Fan Motor Speed(H/M/L)	rpm	800/300	780
	Output of Fan Motor	W	60	90
	Fan Motor RLA	A	0.58	0.48
	Fan Motor Capacitor	μF	/	/
	Air Flow Volume of Outdoor Unit	m³/h	3200	4000
	Fan Type		Axial-flow	Axial-flow
	Fan Diameter	mm	Φ520	Φ550
	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)	56/-/-	58/52/50
	Sound Power Level (H/M/L)	dB (A)	66/-/-	70/68/66
	Dimension (WXHXD)	mm	963X700X396	1000X790X427
	Dimension of Carton Box (LXWXH)	mm	1026X455X735	1080X485X840
	Dimension of Package (LXWXH)	mm	1029X458X750	1083X488X855
	Net Weight	kg	48	68
	Gross Weight	kg	52.5	73
	Refrigerant		R410A	R410A
	Refrigerant Charge	kg	1.30	2.0
Connection Pipe	Length	m	5	5
	Gas Additional Charge	g/m	40	15
	Outer Diameter Liquid Pipe	mm	Φ6	Φ6
	Outer Diameter Gas Pipe	mm	Φ12	Φ16
	Max Distance Height	m	10	10
	Max Distance Length	m	25	25
Note:The connection pipe applies metric diameter.				

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

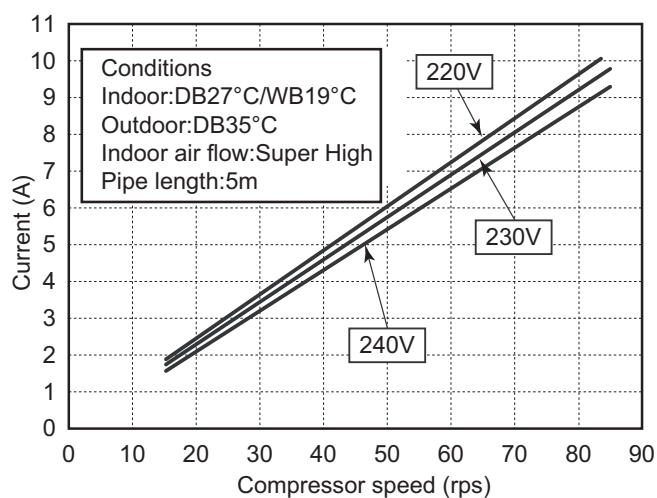
Parameter		Unit	Value
Model			GWH24RD-K3DBA2A GWH24RD-K3DBA3A
Product Code			CB301001900 CB302001300
Power Supply	Rated Voltage	V~	220-240
	Rated Frequency	Hz	50
	Phases		1
Power Supply Mode			Outdoor
Cooling Capacity		W	6450
Heating Capacity		W	6450
Cooling Power Input		W	1925
Heating Power Input		W	1925
Cooling Power Current		A	9.0
Heating Power Current		A	9.0
Rated Input		W	3800
Rated Current		A	17.40
Air Flow Volume(SH/H/M/L/SL)		m <sup>3</sup> /h	1000/800/700/600/-
Dehumidifying Volume		L/h	2.5
EER		W/W	3.35
COP		W/W	3.35
SEER		W/W	/
HSPF		W/W	/
Application Area		m <sup>2</sup>	23-34
Indoor Unit	Model of indoor unit		GWH24RD-K3DBA2A/I GWH24RD-K3DBA3A/I
	Fan Type		Cross-flow
	Diameter Length(DXL)	mm	Φ98X765
	Fan Motor Cooling Speed (SH/H/M/L/SL)	r/min	1350/1150/950/850/-
	Fan Motor Heating Speed (SH/H/M/L/SL)	r/min	1400/1200/1000/900/-
	Output of Fan Motor	W	35
	Fan Motor RLA	A	0.31
	Fan Motor Capacitor	μF	2.5
	Input of Heater	W	/
	Evaporator Form		Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ7
	Row-fin Gap	mm	2-1.5
	Coil Length (LXDXW)	mm	765X25.4X342.9
	Swing Motor Model		MP35XX
	Output of Swing Motor	W	2.5
	Fuse	A	3.15
	Sound Pressure Level (SH/H/M/L/SL)	dB (A)	50/47/39/36/-
	Sound Power Level (SH/H/M/L/SL)	dB (A)	63/58/54/51/-
	Dimension (WXHDX)	mm	1018X315X223
	Dimension of Carton Box (LXWXH)	mm	1083X395X313
	Dimension of Package (LXWXH)	mm	1086X398X328
	Net Weight	kg	14
	Gross Weight	kg	17.5

Outdoor Unit	Model of Outdoor Unit		GWH24RD-K3DBA2A/O
	Compressor Manufacturer/Trademark		ZHUHAI LANDA COMPRESSOR CO,LTD
	Compressor Model		QXAT-D20zF030
	Compressor Oil		RB68EP
	Compressor Type		Rotary
	L.R.A.	A	25.00
	Compressor RLA	A	11.00
	Compressor Power Input	W	2476
	Overload Protector		1NT11L-6233/HPC115/95/KSD115℃
	Throttling Method		Capillary
	Operation temp	℃	16~30
	Ambient temp (cooling)	℃	-15~43
	Ambient temp (heating)	℃	-20~24
	Condenser Form		Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ7
	Rows-fin Gap	mm	2-1.4
	Coil Length (LXDXW)	mm	945X38.1X748
	Fan Motor Speed(H/M/L)	rpm	780
	Output of Fan Motor	W	90
	Fan Motor RLA	A	0.48
	Fan Motor Capacitor	μF	/
	Air Flow Volume of Outdoor Unit	m <sup>3</sup> /h	4000
	Fan Type		Axial-flow
	Fan Diameter	mm	Φ550
	Defrosting Method		Automatic Defrosting
	Climate Type		T1
	Isolation		I
	Moisture Protection		IP24
	Permissible Excessive Operating Pressure for the Discharge Side	MPa	4.3
	Permissible Excessive Operating Pressure for the Suction Side	MPa	2.5
	Sound Pressure Level (H/M/L)	dB (A)	58/52/50
	Sound Power Level (H/M/L)	dB (A)	70/68/66
	Dimension (WXHXD)	mm	1000X790X427
	Dimension of Carton Box (LXWXH)	mm	1080X485X840
	Dimension of Package (LXWXH)	mm	1083X488X855
	Net Weight	kg	64.5
	Gross Weight	kg	69.5
	Refrigerant		R410A
	Refrigerant Charge	kg	1.9
Connection Pipe	Length	m	5
	Gas Additional Charge	g/m	15
	Outer Diameter Liquid Pipe	mm	Φ6
	Outer Diameter Gas Pipe	mm	Φ16
	Max Distance Height	m	10
	Max Distance Length	m	25
Note:The connection pipe applies metric diameter.			

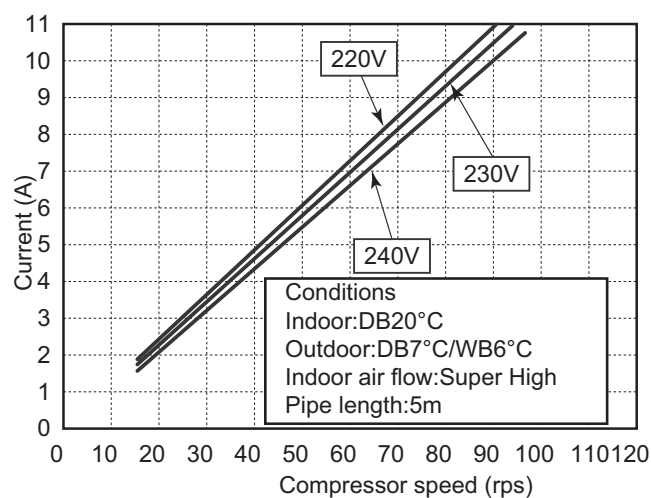
The above data is subject to change without notice; please refer to the nameplate of the unit.

## 2.2 Operation Characteristic Curve

Cooling

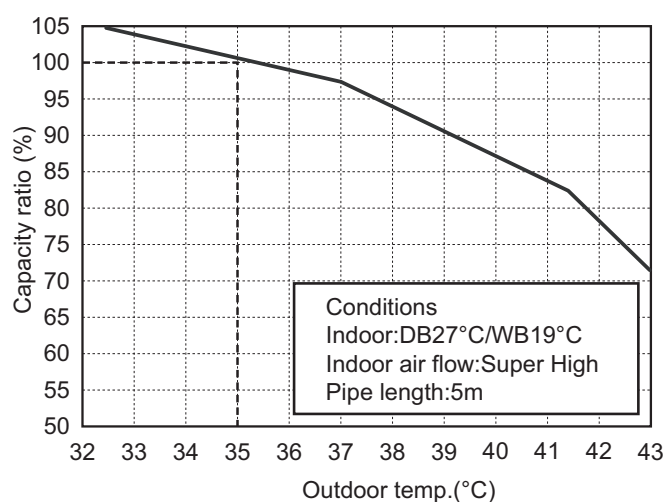


Heating

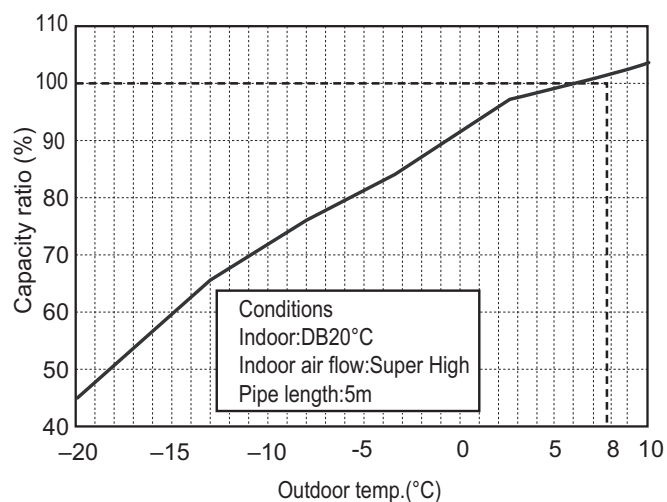


## 2.3 Capacity Variation Ratio According to Temperature

Cooling



Heating



2.4 Cooling and Heating Data Sheet in Rated Frequency

Cooling:

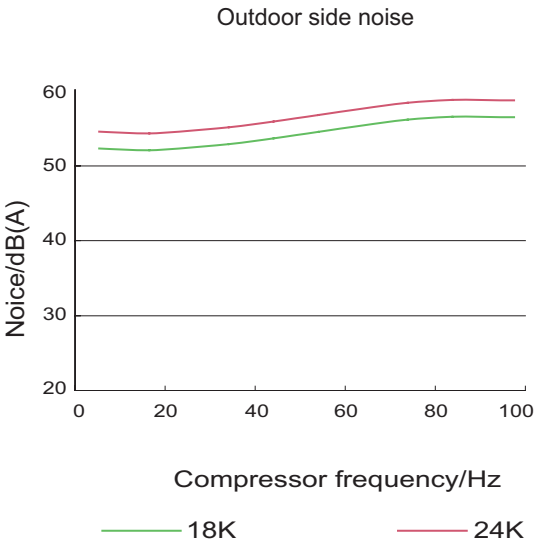
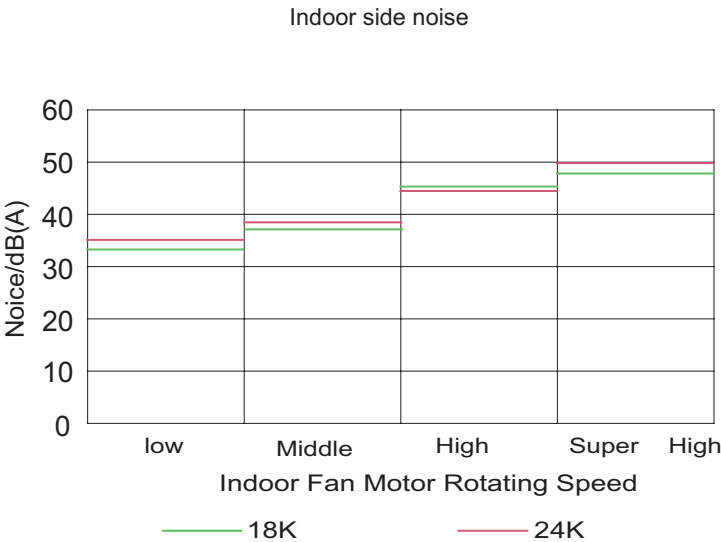
Rated cooling condition(℃ ) (DB/WB)		Model	Pressure of gas pipe connecting indoor and outdoor unit	Inlet and outlet pipe temperature of heat exchanger		Fan speed of indoor unit	Fan speed of outdoor unit	Compressor revolution (rps)
Indoor	Outdoor		P (MPa)	T1 (℃ )	T2 (℃ )			
27/19	35/24	18K	0.9~1.1	in:12~14 out:10~12	in:75~85 out:37~43	Super High	High	70
27/19	35/24	24K	0.9~1.1	in:12~14 out:10~12	in:75~85 out:37~43	Super High	High	53

Heating:

Rated heating condition(℃ ) (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	Compressor revolution (rps)
Indoor	Outdoor		P (MPa)	T1 (℃ )	T2 (℃ )			
20/15	7/6	18K	2.2~2.4	in:75~85 out:37~43	in:1~3 out:2~5	Super High	High	73
20/15	7/6	24K	2.2~2.4	in:75~85 out:37~43	in:1~3 out:2~5	Super High	High	68

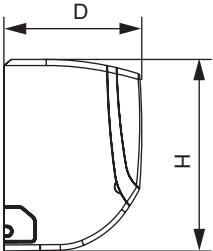
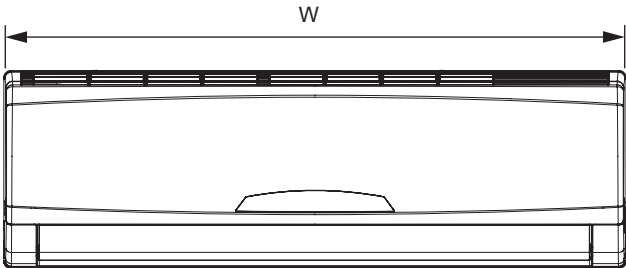
**Instruction:**  
T1: Inlet and outlet pipe temperature of evaporator  
T2: Inlet and outlet pipe temperature of condenser  
P: Pressure at the side of big valve  
Connection pipe length: 5 m.

2.5 Noise Curve

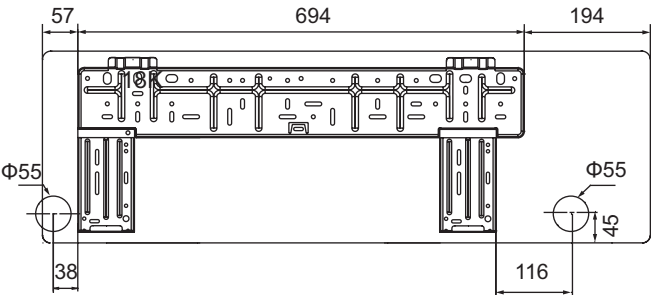


### 3. Outline Dimension Diagram

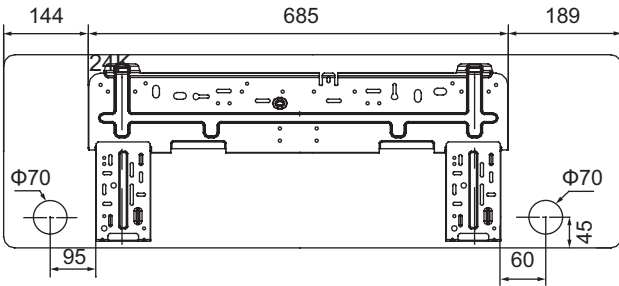
#### 3.1 Indoor Unit



18K:



24K:

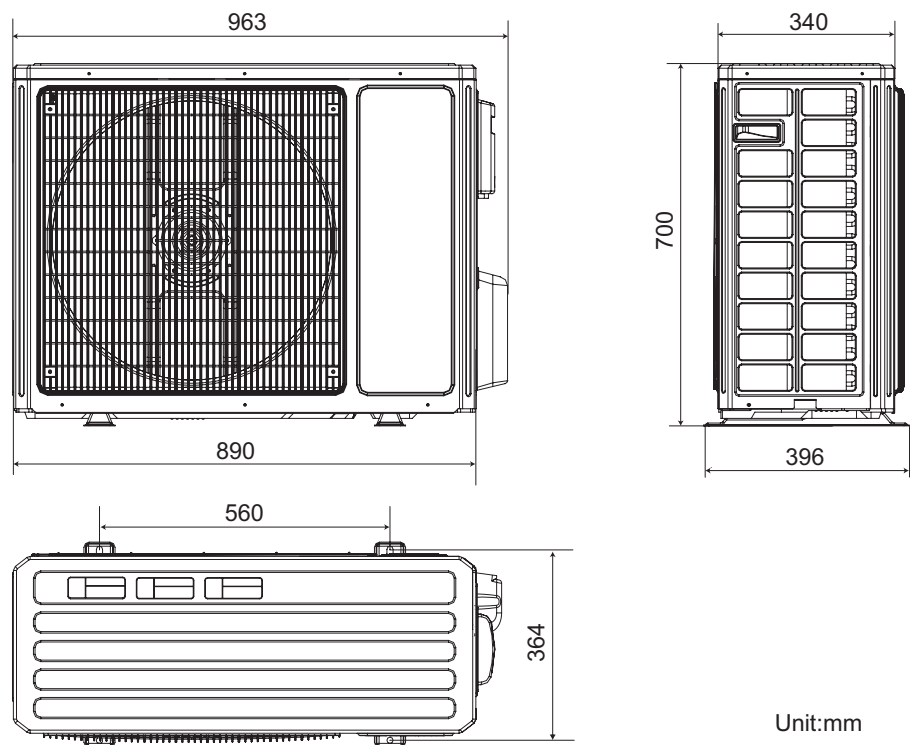


Unit:mm

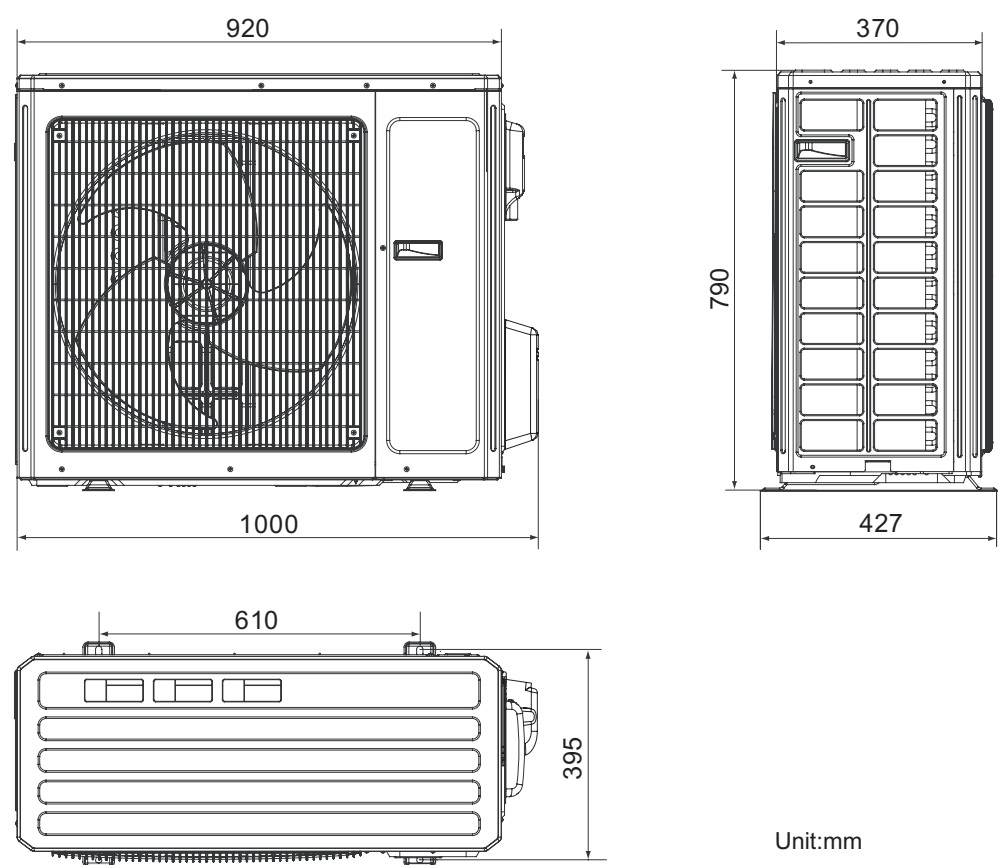
Models	W	H	D
18K	945	298	211
24K	1018	315	223

### 3.2 Outdoor Unit

18K

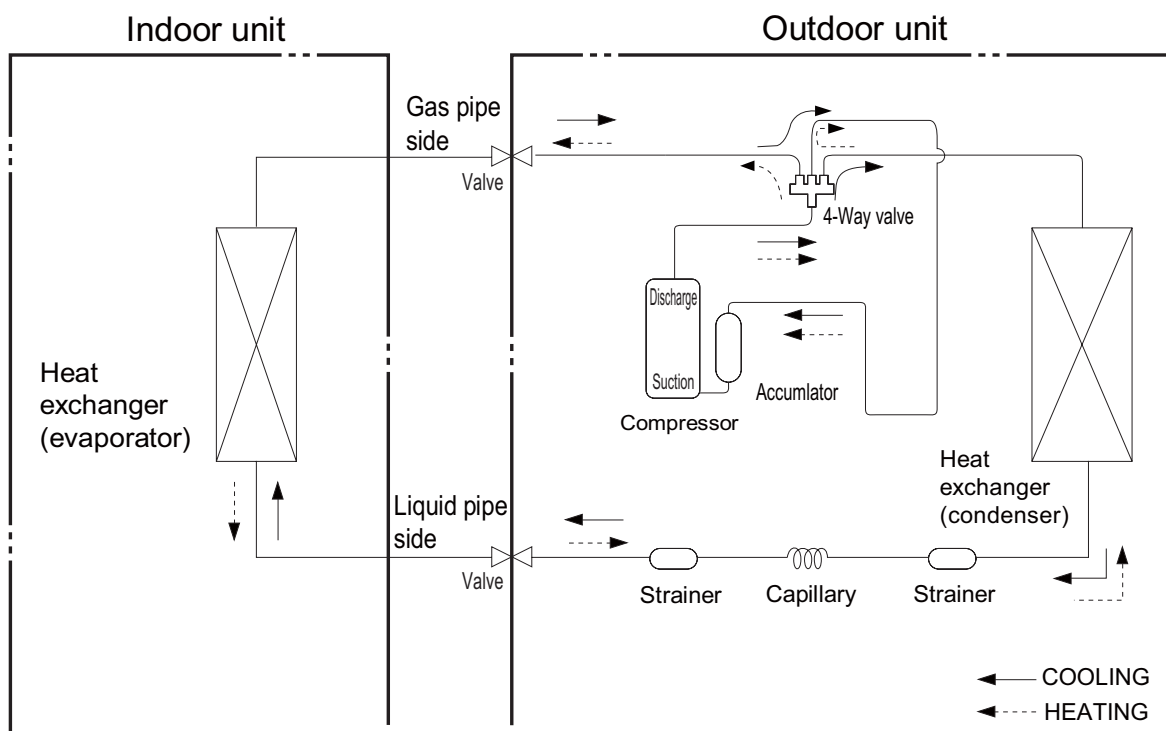


24K





## 4. Refrigerant System Diagram



Connection pipe specification:

Liquid pipe: 1/4" (6mm)

Gas pipe: 1/2" (12mm) 18K

Gas pipe: 5/8" (16mm) 24K

# 5. Electrical Part

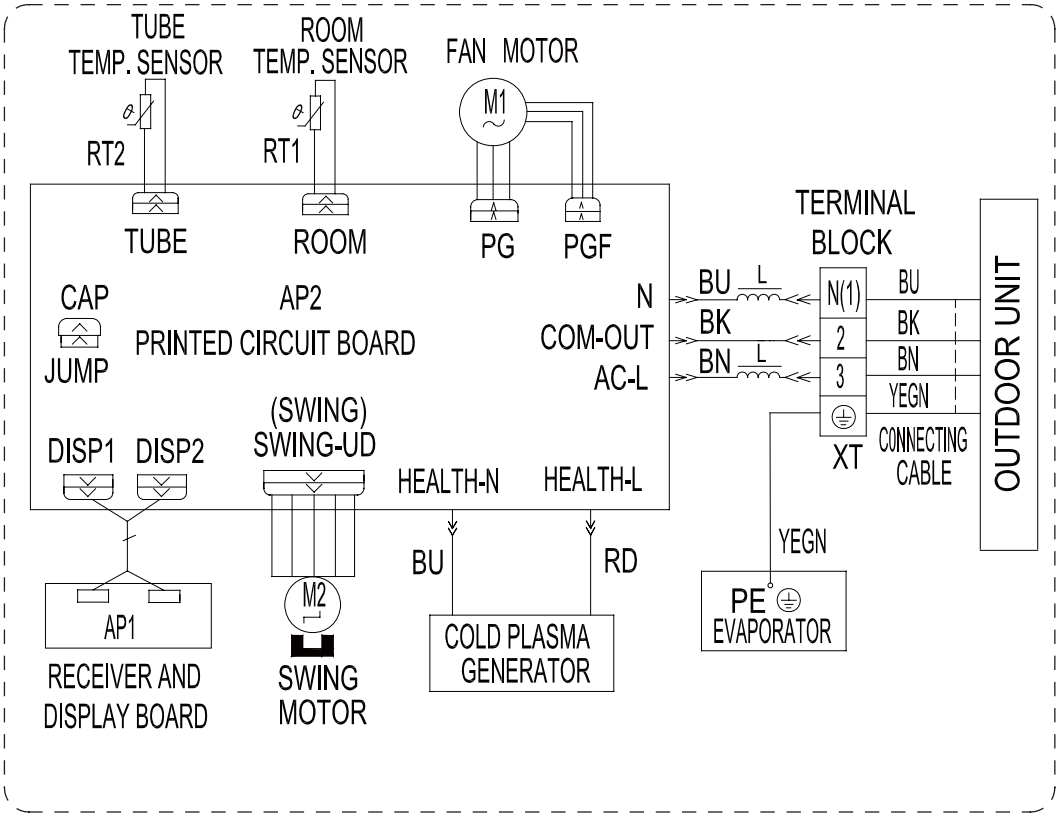
## 5.1 Wiring Diagram

●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	/	/

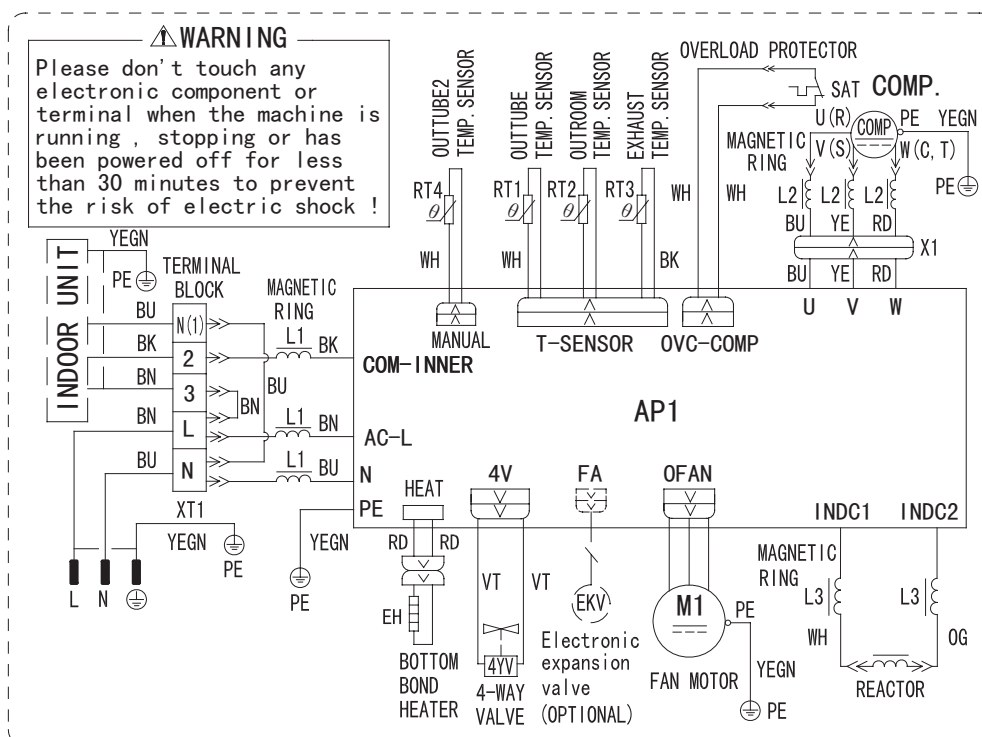
Note: Jumper cap is used to determine fan speed and the swing angle of horizontal lover for this model.

● Indoor Unit

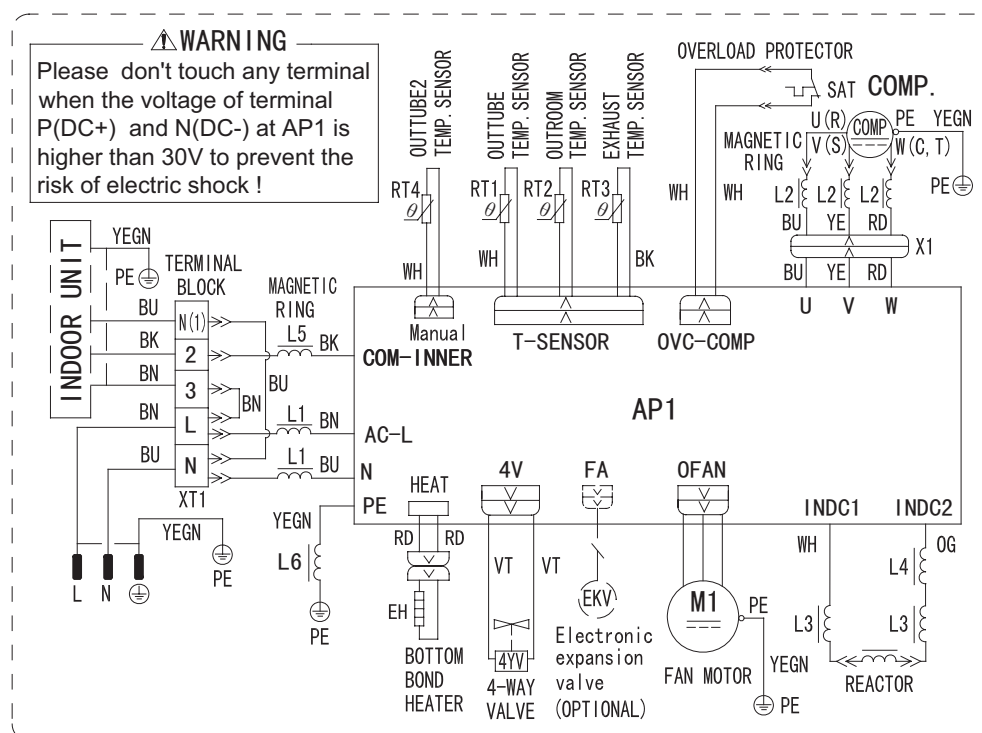


- **Outdoor Unit**

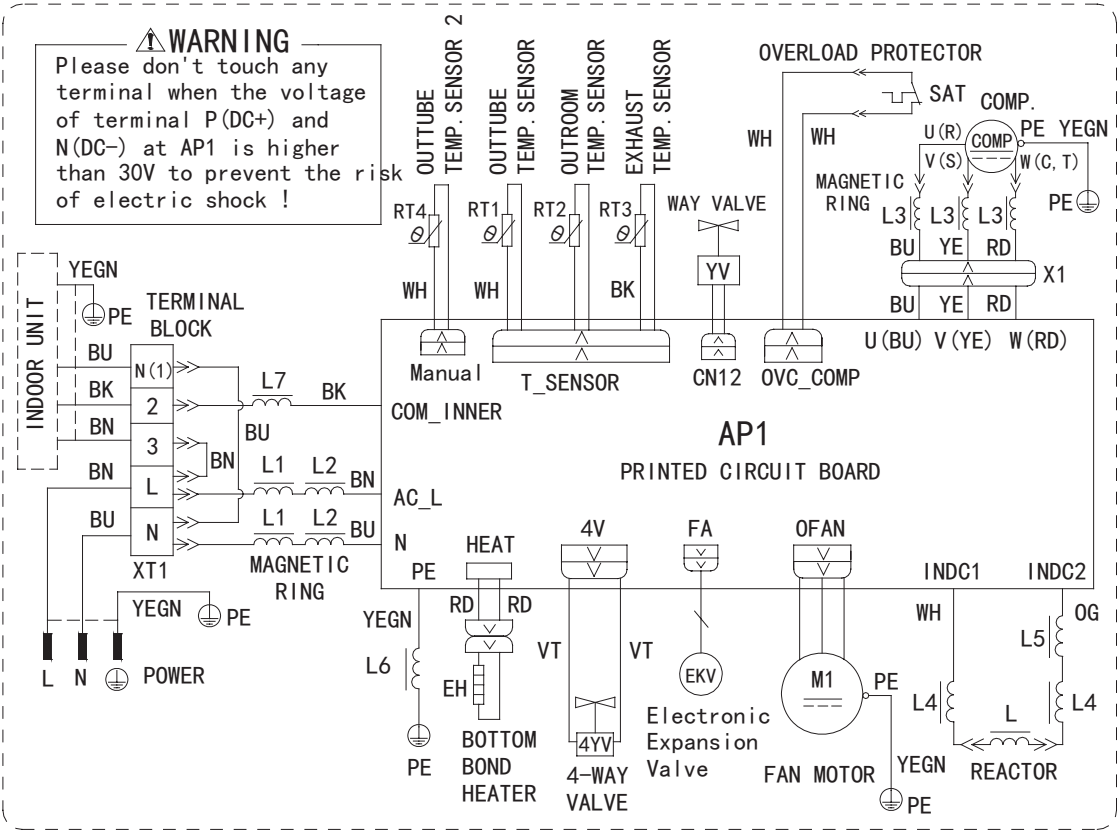
GWH18RC-K3DBA5E/O



GWH24RD-K3DBA5E/O



GWH24RD-K3DBA2A/O

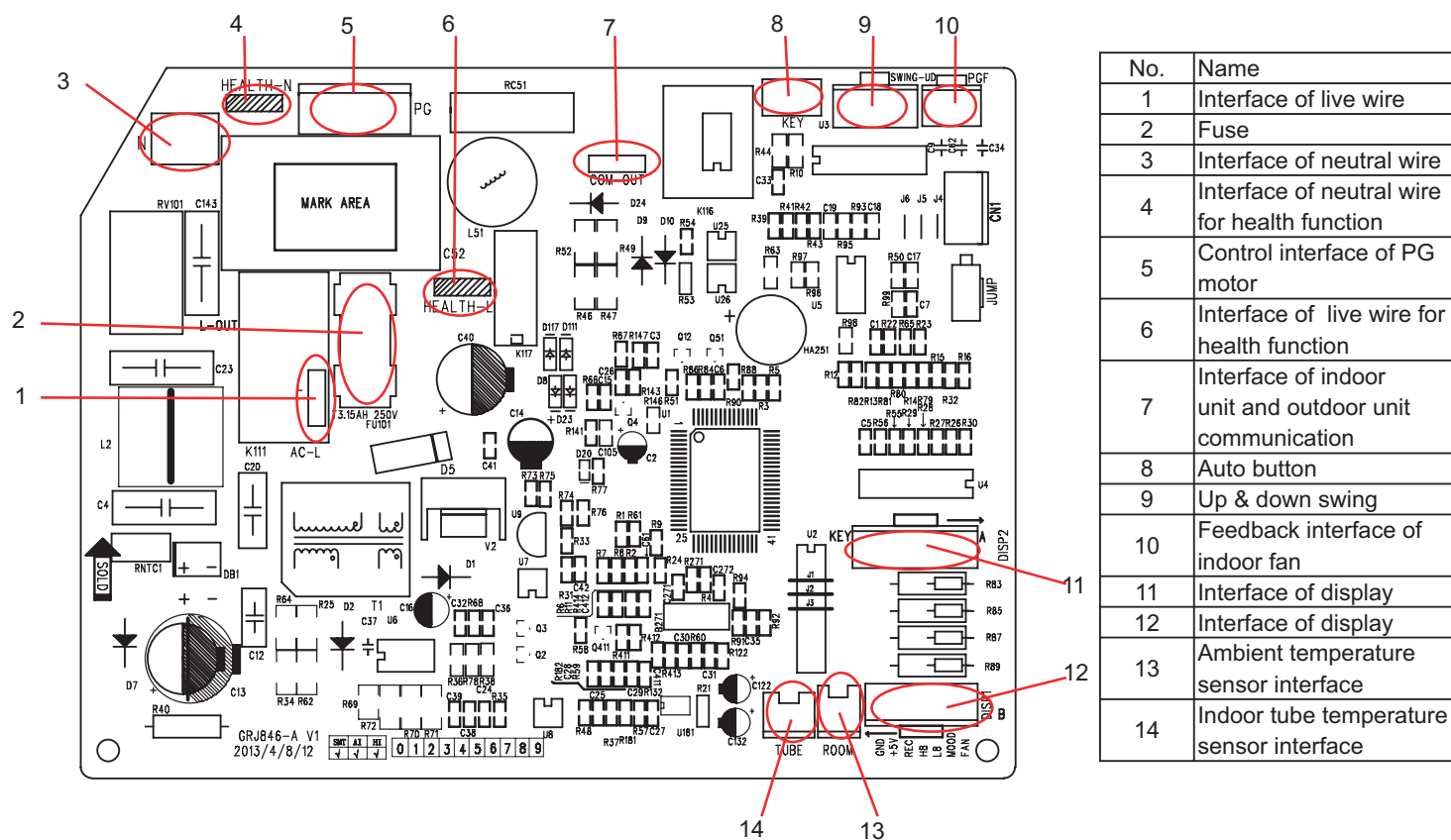


These wiring diagrams are subject to change without notice; please refer to the one supplied with the unit.

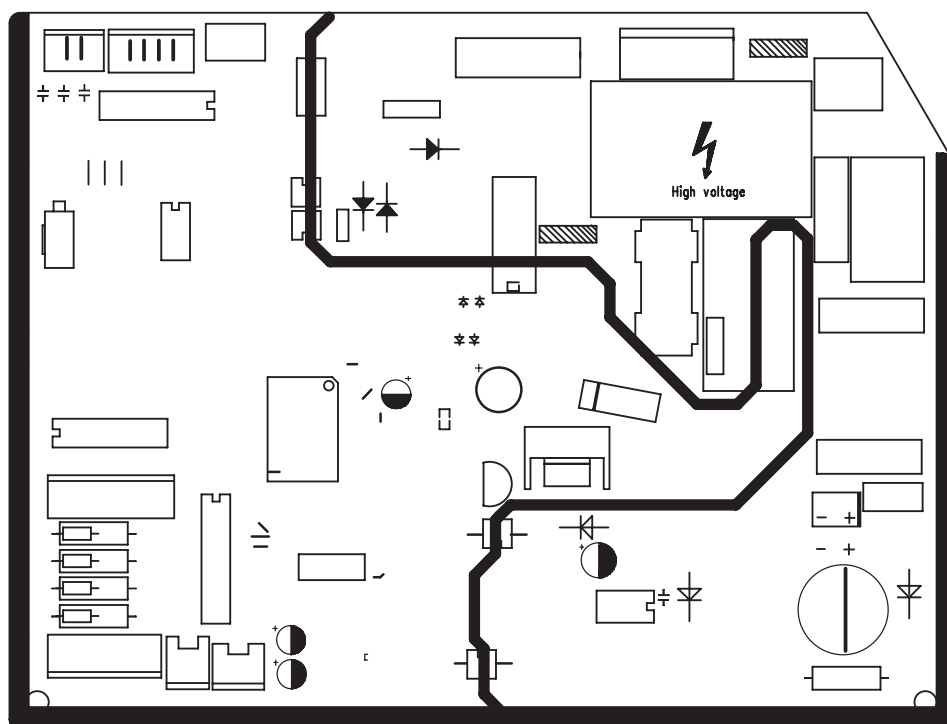
## 5.2 PCB Printed Diagram

**Indoor Unit:**

- TOP VIEW



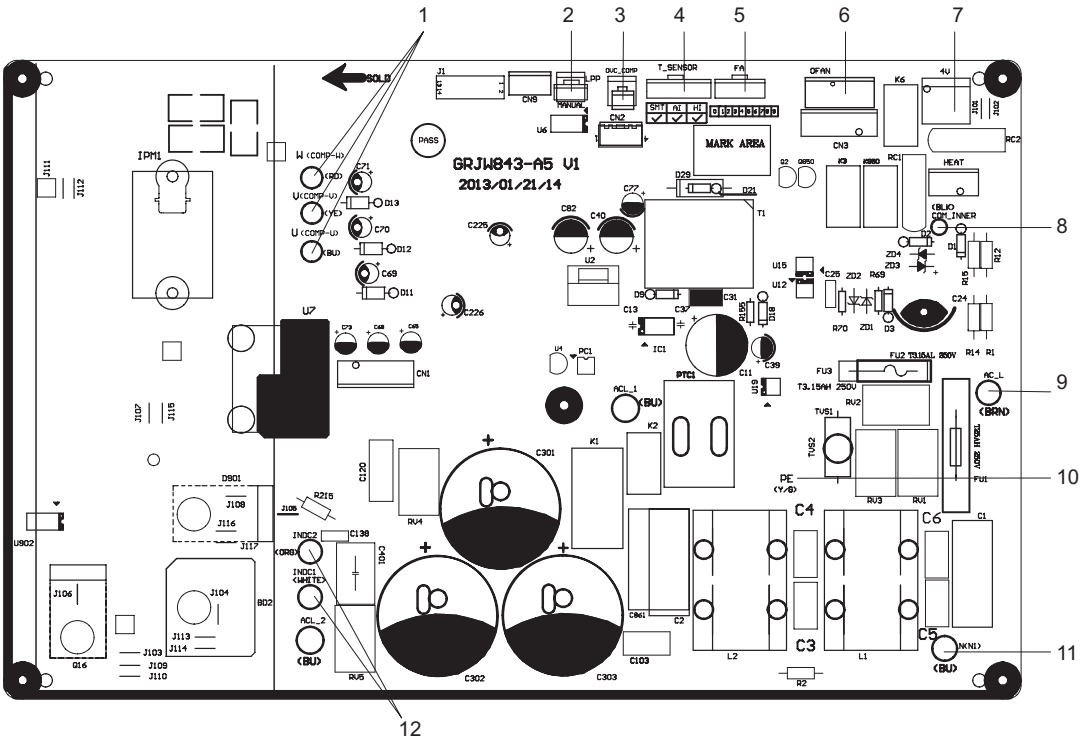
- BOTTOM VIEW



Outdoor Unit

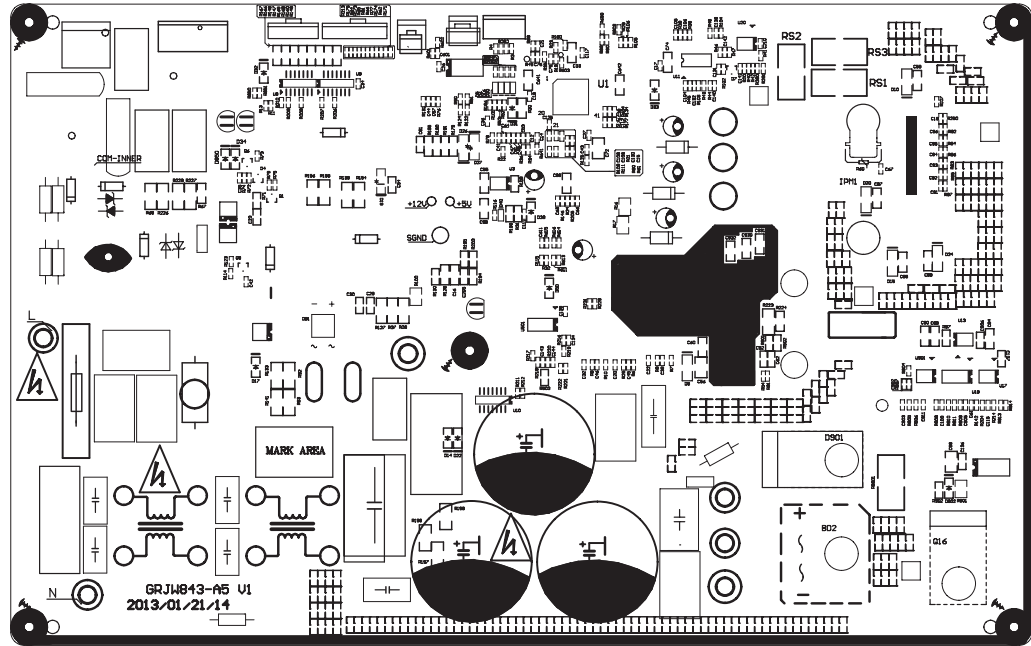
GWH18RC-K3DBA5E/O

• Top view



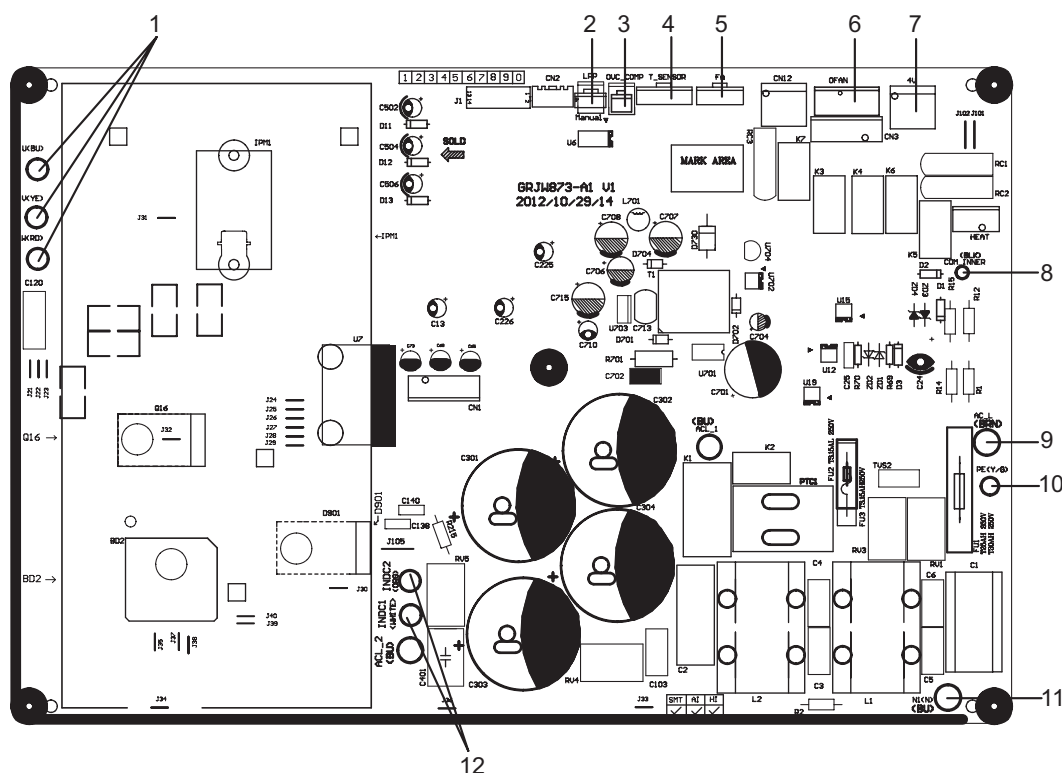
No.	Name
1	Terminal of compressor wire
2	Terminal of outdoor tube temperature sensor
3	Terminal of compressor overload protection
4	Terminal of outdoor temperature sensor
5	Terminal of electronic expansion valve
6	Terminal of outdoor fan
7	Terminal of 4-way valve
8	Wiring terminal of chassis electric heating
9	Power supply live wire
10	Earthing wire
11	Power supply neutral wire
12	PFC induction wire

• Bottom view



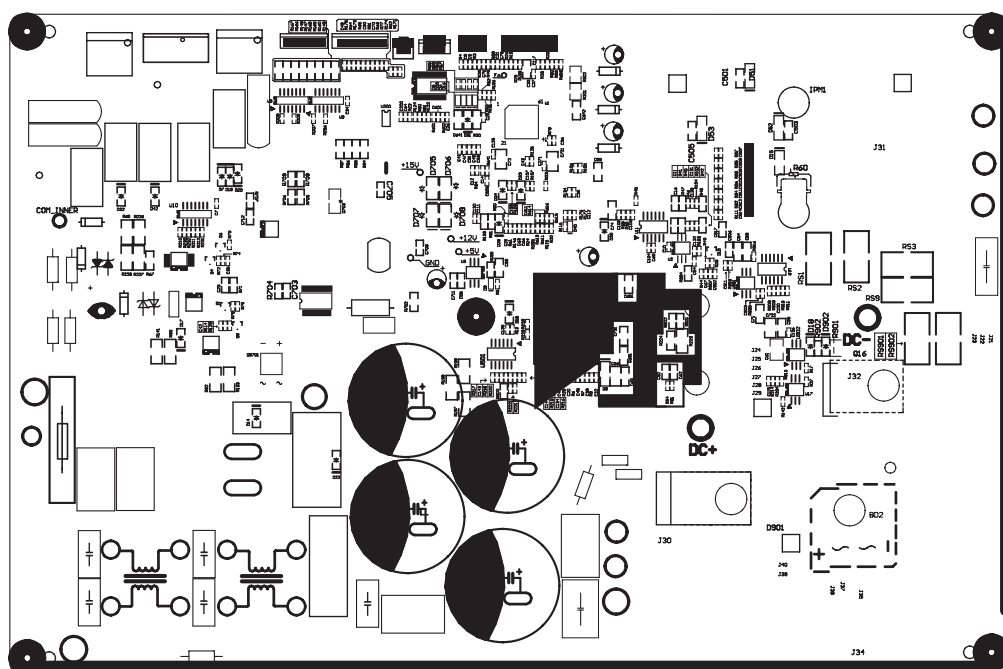
GWH24RD-K3DBA5E/O GWH24RD-K3DBA2A/O

## • Top view



No.	Name
1	Terminal of compressor wire
2	Terminal of low pressure protection
3	Terminal of compressor overload protection
4	Terminal of outdoor temperature sensor
5	Terminal of electronic expansion valve
6	Terminal of outdoor fan
7	Terminal of 4-way valve
8	Communication wire with indoor unit
9	Power supply live wire
10	Earthing wire
11	Power supply neutral wire
12	PFC induction wire

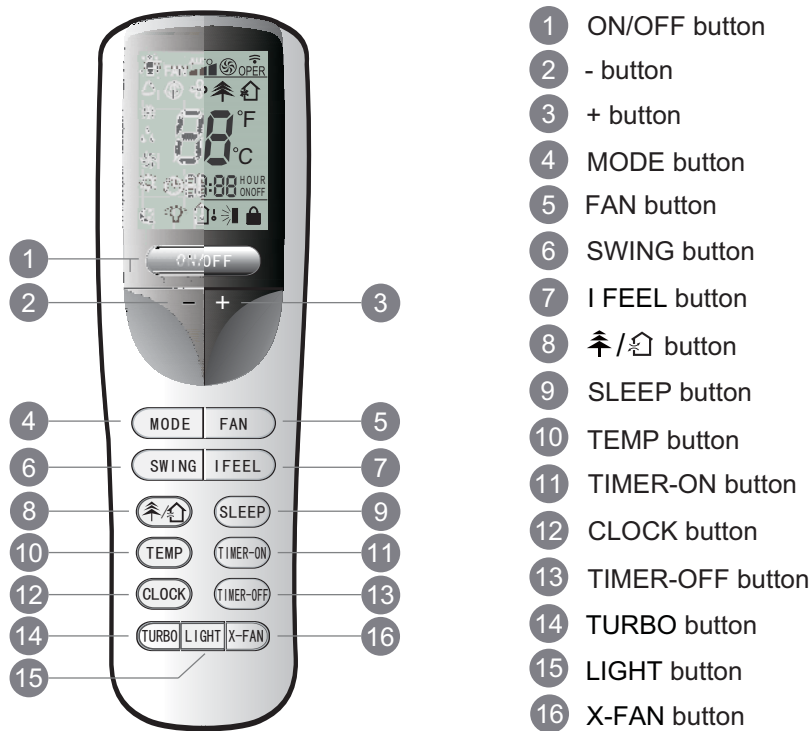
## • Bottom view



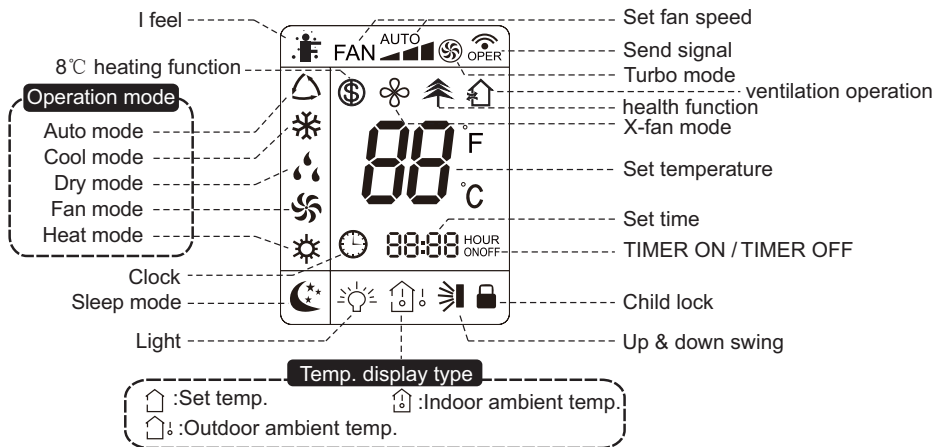
# 6. Function and Control

## 6.1 Remote Controller Introduction

### Buttons on Remote Controller



### Introduction for Icons on Display Screen



### Introduction for Buttons on Remote Controller

**Note:**

- After putting through the power, the air conditioner will give out a sound. Operation indicator " " is ON (red indicator). After that, you can operate the air conditioner by using remote controller.
- Under on status, pressing the button on the remote controller, the signal icon " " on the display of remote controller will blink once and the air conditioner will give out a "de" sound, which means the signal has been sent to the air conditioner.
- Under off status, set temperature and clock icon will be displayed on the display of remote controller (If timer on, timer off and light functions are set, the corresponding icons will be displayed on the display of remote controller at the same time); Under on status, the display will show the corresponding set function icons.

#### 1. ON/OFF Button



Press this button to turn on the unit. Press this button again to turn off the unit.

## 2. - Button

Press this button to decrease set temperature. Holding it down above 2 seconds rapidly decreases set temperature. In AUTO mode, set temperature is not adjustable.

## 3. + Button

Press this button to increase set temperature. Holding it down above 2 seconds rapidly increases set temperature. In AUTO mode, set temperature is not adjustable.

## 4. MODE Button

Each time you press this button, a mode is selected in a sequence that goes from AUTO, COOL, DRY, FAN, and HEAT\*, as the following:




AUTO ► COOL ► DRY ► FAN ► HEAT\*

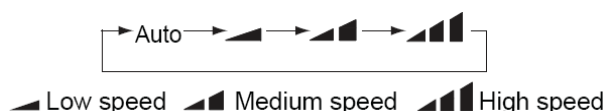


\*Note: Only for models with heating function.

After energization, AUTO mode is defaulted. In AUTO mode, the set temperature will not be displayed on the LCD, and the unit will automatically select the suitable operation mode in accordance with the room temperature to make indoor room comfortable. (As for cooling only unit, it won't have any action when it receives the signal of heating operation.)

## 5. FAN Button











This button is used for setting Fan Speed in the sequence that goes from AUTO, ,  to , then back to Auto.



## 6. SWING Button

Press this button to set up & down swing angle, which circularly changes as below:







This remote controller is universal. If any command ,  or  is sent out, the unit will carry out the command as  indicates the guide louver swings as: , , , , , .

## 7. I FEEL Button

Press this button to turn on I FEEL function. The unit automatically adjust temperature according to the sensed temperature. Press this button again to cancel I FEEL function.

## 8. / Button

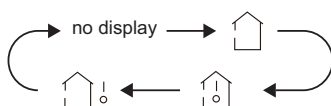
Press this button to achieve the on and off of healthy and scavenging functions in operation status. Press this button for the first time to start scavenging function; LCD displays "". Press the button for the second time to start healthy and scavenging functions simultaneously; LCD displays " and "". Press this button for the third time to quit healthy and scavenging functions simultaneously. Press the button for the fourth time to start healthy function; LCD display "". Press this button again to repeat the operation above. (This function is applicable to partial of models)

## 9. SLEEP Button

Press this button to go into the SLEEP operation mode. Press it again to cancel this function. This function is available in COOL, HEAT (Only for models with heating function) mode to maintain the most comfortable temperature for you.

## 10. TEMP Button


Press this button can see indoor set temperature, indoor ambient temperature or outdoor ambient temperature on indoor unit's display. Temperature is set circularly by remote controller as below:



When selecting "  " by remote controller or no display, temperature indicator on indoor unit displays set temperature.

When selecting "  " by remote controller, temperature indicator on indoor unit displays indoor ambient temperature.


When selecting "  " by remote controller, temperature indicator on indoor unit displays outdoor ambient temperature.

Outdoor ambient temperature display may can't be selected for some models. When indoor unit receives "  " signal, it displays indoor set temperature.



Only for the model whose indoor unit has dual-8 display.

#### 11. TIMER-ON Button

Press this button to initiate the auto-ON timer. To cancel the auto-timer program, simply press this button again.

After press of this button,  disappears and "ON" blinks. 00:00 is displayed for ON time setting. Within 5 seconds, press + or - button to adjust the time value. Every press of either button changes the time setting by 1 minute. Holding down either button rapidly changes the time setting by 1 minute and then 10 minutes. Within 5 Seconds after setting, press TIMER ON button to confirm.

#### 12. CLOCK Button

Press CLOCK button, blinking.  Within 5 seconds, pressing + or - button adjusts the present time. Holding down either button above 2 seconds increases or decreases the time by 1 minute every 0.5 second and then by 10 minutes every 0.5 second. During blinking after setting, press CLOCK button again to confirm the setting, and  then will be constantly displayed.



#### 13. TIMER-OFF Button

Press this button to initiate the auto-off timer. To cancel the auto-timer program, simply press the button again. TIMER OFF setting is the same as TIMER ON.


#### 14. TURBO Button

Press this button to activate / deactivate the Turbo function which enables the unit to reach the preset temperature in the shortest time. In COOL mode, the unit will blow strong cooling air at super high fan speed. In HEAT mode, the unit will blow strong heating air at super high fan speed.

#### 15. LIGHT Button



Press LIGHT button to turn on the display's light and press this button again to turn off the display's light. If the light is turned on,  is displayed. If the light is turned off,  disappears.

#### 16. X-FAN Button

Pressing X-FAN button in COOL or DRY mode, the icon  is displayed and the indoor fan will continue operation for 2 minutes in order to dry the indoor unit even though you have turned off the unit.

After energization, X-FAN OFF is defaulted. X-FAN is not available in AUTO, FAN or HEAT mode.

#### Combination of "+" and "-" buttons: About lock

Press "+" and "-" buttons simultaneously to lock or unlock the keypad. If the remote controller is locked,  is displayed. In this case, pressing any button,  blinks three times.


#### Combination of "MODE" and "-" buttons: About switch between Fahrenheit and centigrade

At unit OFF, press "MODE" and "-" buttons simultaneously to switch between °C and °F.

#### Combination of "TEMP" and "CLOCK" buttons: About Energy-saving Function

Press "TEMP" and "CLOCK" simultaneously in COOL mode to start energy-saving function. Nixie tube on the remote controller displays "SE". Repeat the operation to quit the function.

#### Combination of "TEMP" and "CLOCK" buttons: About 8°C Heating Function

Press "TEMP" and "CLOCK" simultaneously in HEAT mode to start 8°C Heating Function. Nixie tube on the remote controller displays "  " and a selected temperature of "8°C". (46°F if Fahrenheit is adopted). Repeat the operation to quit the function.

#### About Back-lighting Function

The unit lights for 4s when energizing for the first time, and 3s for later press.

#### About HEALTH function (COLD PLASMA)

Turn on the unit, start up the fan (Breezing and X-FAN are excluded) and press HEALTH button on remote controller to start health function (If there is not HEALTH button on remote controller, the unit defaults health function ON.)

#### Operation guide

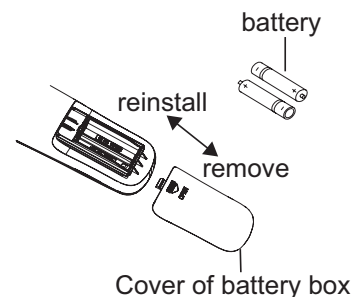
1. After putting through the power, press "ON/OFF" button on remote controller to turn on the air conditioner.
2. Press "MODE" button to select your required mode: AUTO, COOL, DRY, FAN, HEAT.
3. Press "+" or "-" button to set your required temperature. (Temperature can't be adjusted under auto mode).
4. Press "FAN" button to set your required fan speed: auto, low, medium and high speed.
5. Press "SWING" button to select fan blowing angle.

## Replacement of Batteries in Remote Controller

1. Press the back side of remote controller marked with "OPEN" as shown in the fig, and then push out the cover of battery box along the arrow direction.
2. Replace two 7# (AAA 1.5V) dry batteries, and make sure the position of "+" polar and "-" polar are correct.
3. Reinstall the cover of battery box.

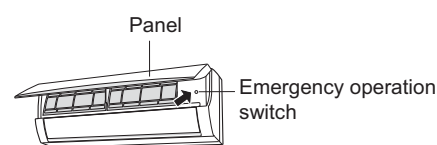
### Note:

- During operation, point the remote control signal sender at the receiving window on indoor unit.
- The distance between signal sender and receiving window should be no more than 8m, and there should be no obstacles between them.
- Signal may be interfered easily in the room where there is fluorescent lamp or wireless telephone; remote controller should be close to indoor unit during operation.
- Replace new batteries of the same model when replacement is required.
- When you don't use remote controller for a long time, please take out the batteries.
- If the display on remote controller is fuzzy or there's no display, please replace batteries.



## Emergency Operation

If remote controller is lost or damaged, please use auxiliary button to turn on or turn off the air conditioner. The operation in details are as below: As shown in the fig. Open panel, press aux. button to turn on or turn off the air conditioner. When the air conditioner is turned on, it will operate under auto mode.



## 6.2 Brief Description of Modes and Functions

### Indoor Unit

#### Temperature Parameter

- ◆ Room setting temperature ( $T_{\text{preset}}$ )
- ◆ Room ambient temperature ( $T_{\text{amb}}$ ) (temperature sensor :15K, partial pressure resistance:15K)
- ◆ Surface temperature of copper pipe for indoor heat exchanger ( $T_{\text{indoor tube}}$ ) (temperature sensor: 20K, partial pressure resistance: 20K)

#### 1. Basic Functions of System

##### (1) Cooling Mode

1. In this mode, indoor fan and swing will operate according to the setting status. The temperature setting range is 16~30°C.(Fahrenheit: 61~86°C).
  2. When the unit stop operation due to malfunction of outdoor unit or protection, indoor unit will keep original operating status. Malfunction code will be displayed.
  3. When  $0 \leq (T_{\text{preset}} - T_{\text{amb}})$ , if the indoor unit is operating at high fan speed, the speed of fan will change to medium fan speed; if the indoor unit is operating at medium or low fan speed, the speed of fan will keep the same; (This condition can only be carried out after the compressor is started up);
- Theres no change for super-high fan speed; when  $(T_{\text{amb}} - T_{\text{preset}}) \geq 1^\circ\text{C}$ , the fan speed will resume setting fan speed;

##### (2) Dry Mode

1. In this mode, fan will operate at low fan speed and swing will operate at setting status. The temperature setting range is 16~30°C.(Fahrenheit: 61~86°F).
2. When the unit stop operation due to malfunction of outdoor unit or protection, indoor unit will keep original operating status. Malfunction code will be displayed.

##### (3) Fan Mode

1. In this mode, indoor fan will operate at high, medium, low or auto fan speed. Compressor, indoor fan and the four-way valve will all stop operation.
2. In this mode, the temperature setting range is 16~30°C.(Fahrenheit: 61~86°F).

##### (4) Heating Mode

1. In this mode, the temperature setting range is 16~30°C. (Fahrenheit: 61~86°F).
2. Working condition and process of heating: when the unit is turned on in heating mode, indoor unit enters into anti-cold air condition; when the unit is tuned off, the unit will enter into the condition of blowing residual heat.
3. Protection function: in heating mode, when the compressor is stopped due to malfunction, indoor fan will operate at the condition of blowing residual heat.
4. Defrosting control: after receiving the defrosting signal from outdoor unit, Indoor Indicator Display (during blinking, ON 0.5s and OFF 0.5s).
5. Anti-cold function
6. Blowing residual heat function;
  - a. During heating operation, when the stopping condition for the compressor is reached, the compressor and the outdoor fan motor stop operation. The upper& down horizontal louver will rotate to the horizontal position L. The indoor fan will be stopped after operating for 60s at setting speed.
  - b. Due to the blockage of PG motor, horizontal louver will keep the stop position when the unit is turned off. (In other modes) When the unit is stopped due to other malfunctions, up&down horizontal louver will rotate to horizontal position L. The indoor fan will be stopped after operating for 60s at setting speed.
  - c. If the unit is turned off when the compressor is operating in heating mode or auto heating mode, up&down horizontal louver will rotate to horizontal position L. The indoor fan will be stopped after operating for 60s at setting speed.

##### (5) Auto Mode

1. When  $T_{\text{amb}} \geq 26^\circ\text{C}$ , the unit will operate in cooling mode. The implied setting temperature is 25°C. ((Fahrenheit: 77°F).
2. Heat pump type: when  $T_{\text{amb}} \leq 22^\circ\text{C}$ , the unit will operate in heating mode. The implied setting temperature is 20°C. (Fahrenheit: 68°F).
3. Cooling only unit: when  $T_{\text{amb}} \leq 22^\circ\text{C}$ , the unit will operate in fan mode. The implied setting temperature is 25 °C. (Fahrenheit: 77°F).
4. When  $23^\circ\text{C} \leq T_{\text{indoor amb.}} \leq 25^\circ\text{C}$ , the unit will operate in auto fan mode if the unit is turned on and enters into the auto mode for the first time. If the unit is switched to auto mode from other mode, it will keep the previous operation mode (if the unit is switched to auto mode from dry mode, the unit will operate at auto fan mode).

#### 2. Display Status of Indoor Indicator

##### (1) Status of Indoor Display Board

1. After energization, all the icons will be displayed and then only the power indicator is bright. When the unit is turned on by remote controller, the operation indicator will be bright. Meanwhile, the current setting operation mode will be displayed.
2. During defrosting, Indoor Indicator Display (during blinking, ON 0.5s and OFF 0.5s).
3. "Dual-8" displays setting temperature.

##### ➤Display of Operation Icon and Mode Icon

After energization, all the icons will be displayed for once. In standby status, the operation indicator will be in red. If turn on the unit by remote controller, the operating indication icon will be bright. Meanwhile, the current setting operation mode will be displayed (mode indicator: cooling indicator, heating indicator, dry indicator). If turn off the light button, all displays will be turned off.

##### ➤Temperature display control mode for split type unit

1. When user set the remote controller as the setting temperature display status, the current setting temperature will be displayed on remote controller.
2. Only when the remote control signal is switched to indoor ambient temperature display status from other display status, controller will display the indoor ambient temperature for 3s and then turn back to display the setting temperature.
3. When user hasnt set the temperature displaying status, it will be displayed according to the setting temperature.

##### (2)Malfunction Display of Indoor Unit

When multiple malfunctions occurred simultaneously, malfunction protection codes will be displayed in cycle.

### 3.Other Control Target

#### (1) Up&down swing function: the mode for swing motor is MP28VB(18K),MP35XX(24K).

After energization, up & down swing motor will firstly let the horizontal louver anticlockwise rotate to position 0 to close air outlet.

If swing function has not been set after startup of the unit, up & down horizontal louver will clockwise turn to position D in HEAT mode, or clockwise turn to level position L in other modes.

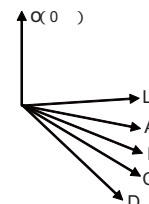
If setting swing function while starting up the unit, the horizontal louver will swing between L and D.

There are 7 kinds of swing status of horizontal louver: Positions L, A, B, C and D, swing between L and D and stop at any position between L and D.

Upon turning off the unit, the horizontal louver will close at position 0. Swing function is available only when swing function set and indoor fan is operating.

Note: If the position is set between L and B, A and C or B and D by remote controller, the horizontal louver will swing between L and D.

L----A----B----C----D



#### (2) Buzzer

Upon energization and operation, the buzzer will give out sound.

#### (3) Auto Button

After pressing this button, the unit will operate in auto mode. Indoor fan will operate at auto fan speed and swing motor will operate. Press this button again to turn off the unit. The complete unit is energized when pressing the button and the complete unit will enter into fast testing status. After energization, if its detected that the auto button is pressed down and the complete unit is at fast testing status, the fast testing status will be exited.

#### (4) Sleep Function

This mode is only valid in cooling and heating mode. The unit will select the appropriate sleeping curve to operate according to the different setting temperature.

##### During cooling mode:

(1) When the initial temperature is set as 16~23°C, after starting up the sleep function, the temperature will increase by 1°C every one hour. After the temperature has increased by 3°C, the unit will keep this temperature. When the unit has operated for 7 hours, the temperature will decrease by 1°C and then the unit will operate at this temperature all the time;

(2) When the initial temperature is set as 24~27°C, after starting up the sleep function, the temperature will increase by 1°C every one hour. After the temperature has increased by 2°C, the unit will keep this temperature. When the unit has operated for 7 hours, the temperature will decrease by 1°C and then the unit will operate at this temperature all the time;

(3) When the initial temperature is set as 28~29°C, after starting up the sleep function, the temperature will increase by 1°C every one hour. After the temperature has increased by 1°C, the unit will keep this temperature. When the unit has operated for 7 hours, the temperature will decrease by 1°C and then the unit will operate at this temperature all the time;

(4) When the initial temperature is set as 30°C, the unit will operate at this temperature. After the unit has operate for 7hours, the temperature will decrease by 1°C and then the unit will operate at this temperature all the time.

##### During Heating Mode:

(1) When the initial temperature is set at 16°C, the unit will operate at this temperature all the time;

(2)When the initial temperature is set as 17~20°C, after starting up the sleep function, the temperature will decrease by 1°C every one hour. After the temperature is decreased by 1°C, the unit will operate at this temperature;

(3)When the initial temperature is set as 21~27°C, after starting up the sleep function, the temperature will decrease by 1°C every one hour. After the temperature is decreased by 2°C, the unit will operate at this temperature;

(3)When the initial temperature is set as 28~30°C, after starting up the sleep function, the temperature will decrease by 1°C every one hour. After the temperature is decreased by 3°C, the unit will operate at this temperature;

General timer and clock timer functions are compatible by equipping different functions of remote controller.

#### (5) Timer Function

General timer and clock timer functions are compatible by equipping different functions of remote controller.

##### General timer:

Timer ON:

If timer ON is set during operation of the unit, the unit will continue to operate. If timer ON is set at unit OFF, upon ON time reaches the unit will start to operate according to previous setting status.

Timer OFF:

If timer OFF is set at unit OFF, the system will keep standby status. If timer OFF is set at unit ON, upon OFF time reaches the unit will stop operation.

##### Clock timer

(1) Timer ON:

If Timer ON is set when the system runs,it will continue to run;if Timer ON is set when the system is off,the system will start to run in the original setting mode when timer on time is reached.

(2) Timer OFF:

If Timer OFF is set when the system is off,the system keeps stand-by status;if Timer OFF is set when the system is on,the system stops when reaching timer off time.

### (3) Timer Change:

Timer ON and Timer OFF can be set via remote ON/OFF button, Timer time can be reset and the system will operate according to the latest setting.

When the unit is on and Timer ON and Timer OFF are both set, the system will operate according to the set state. When the timer off time is reached, the system will stop.

When the system stops, and Timer On and Timer OFF are both set, the system will remain stop until timer on time is reached. After that, the unit will operate according to the set mode everyday when the Timer on time is reached. When the Timer OFF time is reached, the system will stop. If timer on time is the same as timer off time, the system will stop.

### (6) Blow Function

Blow function can be set in cooling and dry mode.

### (7) Indoor Fan Control

Indoor fan can be set at super-high, high, medium or low. Meanwhile, the fan will operate at super-high, high, medium and low fan speed respectively and it can also set at auto fan speed.

### (8) Memory Function

Memory content includes mode, up & down swing, light, set temperature and set fan speed, general timer (clock timer can't be memorized). Upon power failure, the unit after power recovery will automatically start operation according to memorized content. The unit, without timer setting before power failure, will operate according to the last setting after power recovery. The unit, with general timer setting which has not been fulfilled before power failure, will memorize the time setting and re-calculate the time after power recovery. If there is timer function in the last remote controller command but setting time has reached, the system will act as timer on/off setting before power failure. After power failure, the system memorizes the operation states before power failure without timer action. Clock timer can not be memorized.

### (9) Locked protection to PG motor

If the indoor fan motors rotational speed after startup keeps slow for a continuous period of time, the unit will stop operation and display "H6".

### (10) Turbo Function

This function can be set in cooling or heating mode to quickly cool or heat the room (Turbo function is not available in auto, dry and fan mode). After pressing the turbo button, indoor fan will operate at super-high fan speed.

## 4. Malfunction Detection for Temperature sensor

### (1) Indoor ambient temperature sensor:

Malfunction of temperature sensor will be detected at any time;

### (2) Indoor tube temperature sensor

Malfunction of temperature sensor won't be detected during defrosting period. It starts detecting the malfunction of temperature sensor after defrosting is finished for 5 mins. Malfunction of temperature sensor will be detected at any other time.

### (3) Protection of temperature sensor

1. When the temperature sensor is detected short circuit for 5s successively:

The detected temperature by the temperature sensor is too high and the complete unit will stop operation, meanwhile, the protection and malfunction of temperature sensor will be displayed accordingly.

2. When the temperature sensor is detected open circuit for 5s successively: The unit will stop operation due to protection and the corresponding malfunction of temperature sensor will be displayed directly.

## 5. Refrigerant Recycling Function (applicable when changing installation location or in maintenance)

### (1) Enter refrigerant recycling function

Within 5min after energizing (unit ON or OFF status is ok), continuously press LIGHT button for 3 times within 3s to enter refrigerant recycling mode; Fo is displayed and refrigerant recycling function is started. At this moment, the maintenance people closes liquid valve. After 5min, stick the thimble of maintenance valve with a tool. If there is no refrigerant spraying out, close the gas valve immediately and then turn off the unit to remove the connection pipe.

### (2) Exit refrigerant recycling function

After entering refrigerant recycling mode, when receive any remote control signal or enter refrigerant recycling mode for 25min, the unit will exit refrigerant recycling mode automatically. If the unit is in standby mode before refrigerant recycling, it will be still in standby mode after finishing refrigerant recycling; if the unit is in ON status before refrigerant recycling, it will still run in original operation mode.

## 6. Compulsory Defrosting Function

### (1) Start up compulsory defrosting function

Under ON status, set heating mode with remote controller and adjust the temperature to 16°C. Press "+, -, +, -, +, -" button successively within 5s and the complete unit will enter into compulsory defrosting status. Meanwhile, heating indicator on indoor unit will ON 10s and OFF 0.5s successively. (Note: If complete unit has malfunction or stops operation due to protection, compulsory defrosting function can be started up after malfunction or protection is resumed.)

### (2) Exit compulsory defrosting mode

After compulsory defrosting is started up, the complete unit will exit defrosting operation according to the actual defrosting result, and the complete unit will resume normal heating operation.



## Outdoor Units

### 1. Input Parameter Compensation and Calibration

#### (1) Check the input parameter compensation function

As the instruction feature of split unit, concerning the comfortable, in heating mode, the indoor ambient temperature of compressor stopping time is higher than preset temperature.

#### (2) Check effective judgment controls of parameters

Effective judgment function of the outdoor exhaust temperature thermo-bulb

When conditions a and b are satisfied, the outdoor exhaust temperature thermo-bulb is judged not to be connected into place, the mainboard of outer units will display failure of the outdoor exhaust temperature thermo-bulb (not connected into place), stop the unit for repairing, and resume it by remote controls of ON/OFF.

### 2. Basic Functions

#### (1) Cooling Mode

##### 1. Conditions and processes of cooling operation:

(1) If the compressor is stop, and  $[T_{\text{preset}} - (T_{\text{indoor ambient}} - \Delta T_{\text{cooling indoor ambient temperature compensation}})] \leq 0.5^{\circ}\text{C}$ , start up the unit for cooling, and start to cooling operation;

(2) During operations of cooling, if  $0^{\circ}\text{C} \leq [T_{\text{preset}} - (T_{\text{indoor ambient}} - \Delta T_{\text{cooling indoor ambient temperature compensation}})] < 2^{\circ}\text{C}$ , the cooling operation will be still running;

(3) During operations of cooling, if  $2^{\circ}\text{C} \leq [T_{\text{preset}} - (T_{\text{indoor ambient}} - \Delta T_{\text{cooling indoor ambient temperature compensation}})]$ , the cooling operation will stop after reaching to the temperature point.

##### 2. Temperature setting range

(1) If  $T_{\text{outdoor ambient}} \geq [T_{\text{low-temperature cooling}}]$ , the temperature can be set at: 16~30°C (Cooling at room temperature);

(2) If  $T_{\text{outdoor ambient}} < [T_{\text{low-temperature cooling}}]$ , the temperature can be set at: 25~30°C (Cooling at low temperature), that is, the minimum setting temperature for outdoor unit judgment is 25°C.

#### (2) Dry Mode

1. Conditions and processes of dry operations: Same as the cooling mode;

2. The temperature setting range is: 16~30°C;

#### (3) Fan Mode

1. The compressor, outdoor fan and four-way valve are switched off;

2. The temperature setting range is: 16~30°C.

#### (4) Heating Mode

1. Conditions and processes of heating operations: ( $T_{\text{indoor ambient}}$  is the actual detection temperature of indoor environment thermo-bulb,  $\Delta T_{\text{heating indoor ambient temperature compensation}}$  is the indoor ambient temperature compensation during heating operations)

(1) If the compressor is stop, and  $[(T_{\text{indoor ambient}} - \Delta T_{\text{heating indoor ambient temperature compensation}}) - T_{\text{preset}}] \leq 0.5^{\circ}\text{C}$ , start the machine to enter into heating operations for heating;

(2) During operations of heating, if  $0^{\circ}\text{C} \leq [(T_{\text{indoor ambient}} - \Delta T_{\text{heating indoor ambient temperature compensation}}) - T_{\text{preset}}] < 2^{\circ}\text{C}$ , the heating operation will be still running;

(3) During operations of heating, if  $2^{\circ}\text{C} \leq [(T_{\text{indoor ambient}} - \Delta T_{\text{heating indoor ambient temperature compensation}}) - T_{\text{preset}}]$ , the heating operation will stop after reaching the temperature point.

2. The temperature setting range in this mode is: 16~30°C.

#### (5) Defrosting Control

1. After the time for defrosting is judged to be satisfied, if the temperature for defrosting is satisfied after detections for continuous 3minutes, the defrosting operation will start.

2. Start to defrost: Compressor stops and starts up 55S later;

3. Defrosting finish: Compressor stops and starts up 55S later;

4. Conditions of finishing defrosting

The defrosting operation can exit when any of the conditions below is satisfied:

(1)  $T_{\text{outdoor pipe}} \geq 12^{\circ}\text{C}$ ;

(2)  $T_{\text{outdoor ambient}} < -5^{\circ}\text{C}$ , and the  $T_{\text{outdoor pipe}} \geq 6^{\circ}\text{C}$  last more than 80S;

(3) The continuous running time of defrosting reaches to 8min.

#### (6) Compressor Control

1. The frequency of compressor will be controlled with the relationship of ambient temperature and preset temperature and changing speed of ambient temperature;
2. Start the compressor after starting cooling, heating, dry operations, and the outdoor fan start for 5s;
3. When the unit is off, in safety stops and switching to fan mode, the compressor will stop immediately;
4. In all modes: once the compressor starts up, it will not be allowed to stop until having run for the  $[T_{\text{min. Compressor running time}}]$  (Note: including cases of shutdown when the temperature point is reached; except the cases requiring stopping the compressor such as fault protection, remote shutdown, mode switching etc.);
5. In all modes: once the compressor stops, it will be allowed be restart after 3-minute delay (Note: The indoor units have a function of power memory, the machine can be restarted after remote shutdown and powering up again without delay).

#### (7) Outdoor Fan Control

1. When the unit is off by remote control, in safety stops and stop after reaching to the temperature point.
2. In fan mode: The outdoor fan stops;
3. Start to defrost: Outdoor fan will stop after compressor stops for 50S;
4. Defrosting finish: Outdoor fan will start up when the compressor is stopping.

#### (8) 4-way valve control

1. The 4-way valve control under the modes of Cooling, dehumidification and fan: closing;
2. When the unit is on in heating mode, the 4-way valve is energized;
3. When the unit is on in heating mode and heating mode shift to other modes, the 4-way valve will be de-energized after compressor stops for 2min;
4. After protection stops, the 4-way valve will be de-energized after 4min;
5. Start to defrost: The power of 4-way valve will be de-energized after the compressor stops;
6. Defrosting finish: The 4-way valve will be energized after the compressor stops.

#### (9) Current protection

1. If  $12A \leq I_{\text{alternating-current}}$ , running frequency of compressor will be decreased or stop to increase will be occurred;
2. If  $17A \leq I_{\text{alternating-current}}$ , the unit will stop; and compressor has stopped for 3min, the unit will resume running;
3. If the unit stops as compressor discharge temperature for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF. During operation, if the time exceeds compressor running time, the time of compressor discharge temperature stop will zero clearing.

#### (10) Drop off voltage

During compressor operation, the system will stop and malfunction of drop off voltage if voltage downward fluctuates rapidly, and it will restart up automatically 3min later.

#### (11) Communication malfunction

If the unit does not receive correct signal from indoor unit for 3min continuously, the unit will stop as communication malfunction protection; if communication malfunction resume and compressor has stopped for 3min, the unit will resume running.

#### (12) IPM module protection

When the compressor starts, if there is overcurrent or control voltage low for IPM module as some abnormal results, IPM will detect module protection signal as the unit is on. Once the module protective signal is detected, stop the unit with module protection immediately. If the module protection is resumed and compressor has stopped for 3min, the unit will be allowed to operate. If the module protection continuously occurs for three times, it should not be resumed automatically, and you should press the ON/OFF button to resume. If the running time of compressor exceeds the  $[t_{\text{Protection times clearing of module}}]$ , the module protection is cleared to recount.

#### (13) Compressor overload protection

1. If the switch of compressor overload de-energized is detected for 3S continuously, the system will stop as protection;
2. If the overload protection is resumed and compressor has stopped for 3min, the unit will be allowed to operate.
3. If the unit stops as compressor overload protection occurred for 3 times continuously, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF; and the times of compressor overload protection will be cleared after the compressor has run for 30min.



# 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:

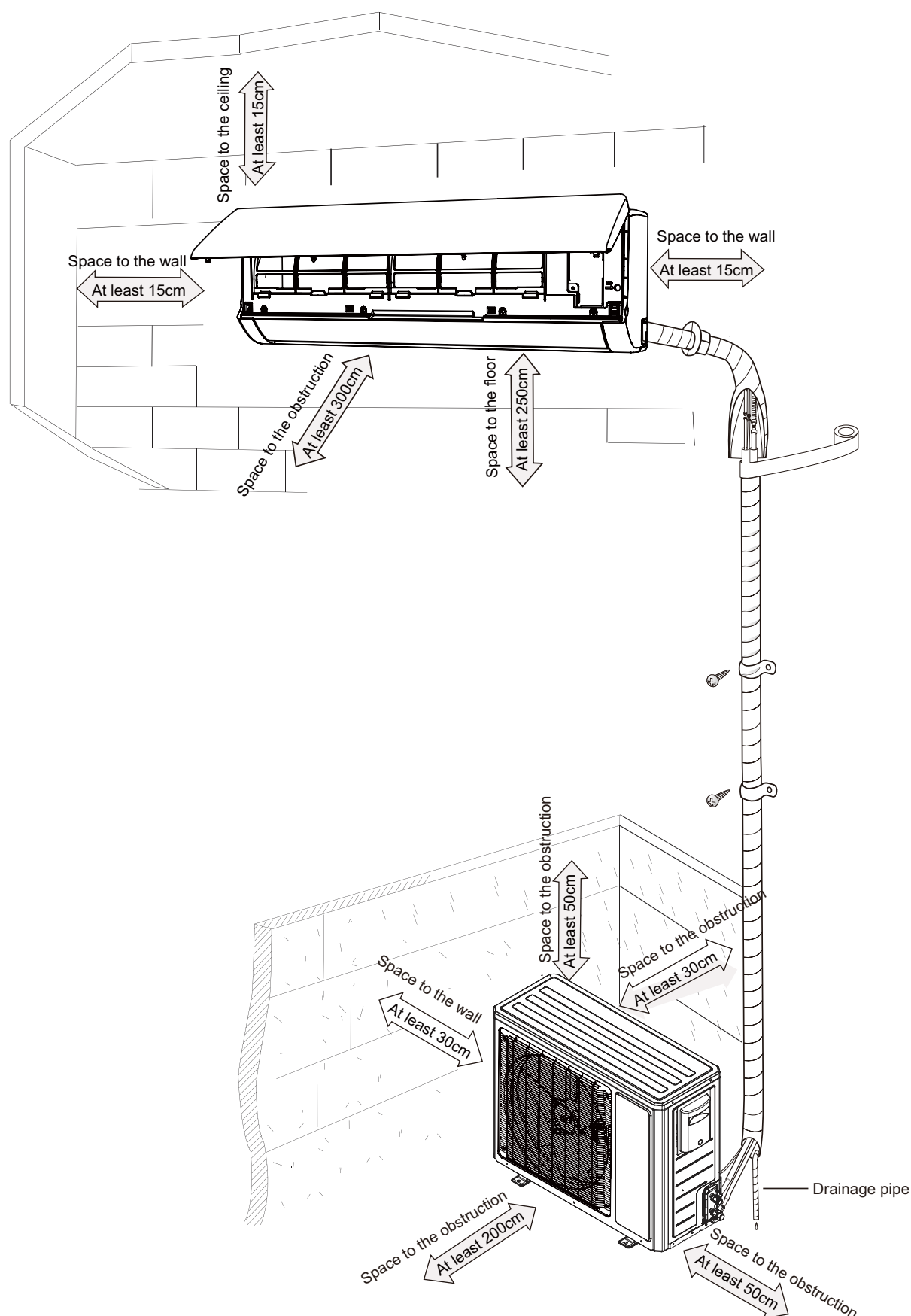
1. Avoid contact between refrigerant and fire as it generates poisonous gas; Prohibit prolong the connection pipe by welding.
2. Apply specified refrigerant only. Never have it mixed with any other refrigerant. Never have air remain in the refrigerant line as it may lead to rupture or other hazards.
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.

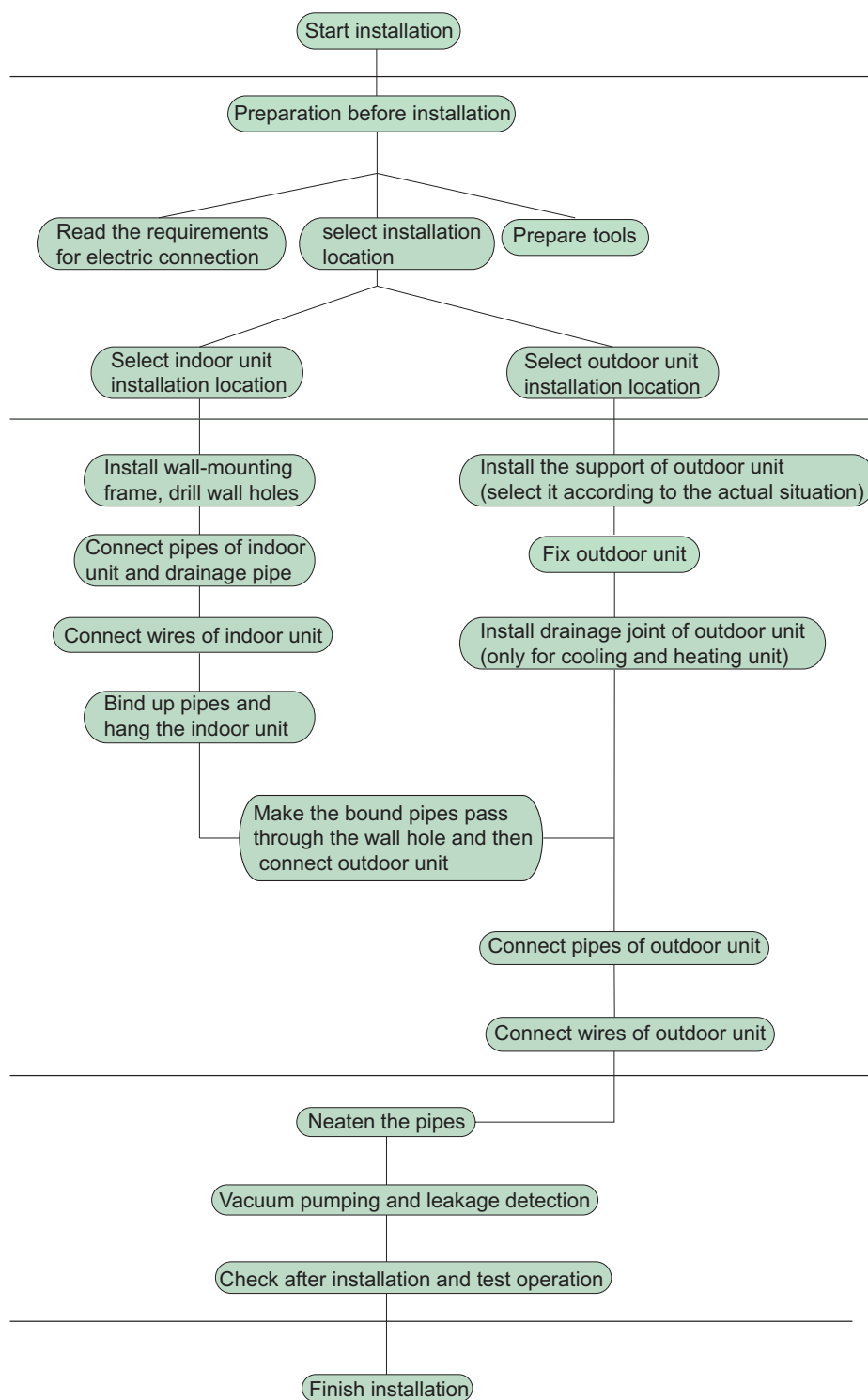
<p>1. Level meter, measuring tape</p> 	<p>2. Screw driver</p> 	<p>3. Impact drill, drill head, electric drill</p> 
<p>4. Electroprobe</p> 	<p>5. Universal meter</p> 	<p>6. Torque wrench, open-end wrench, inner hexagon spanner</p> 
<p>7. Electronic leakage detector</p> 	<p>8. Vacuum pump</p> 	<p>9. Pressure meter</p> 
<p>10. Pipe pliers, pipe cutter</p> 	<p>11. Pipe expander, pipe bender</p> 	<p>12. Soldering appliance, refrigerant container</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. 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
18K	16A
24K	25A

- (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

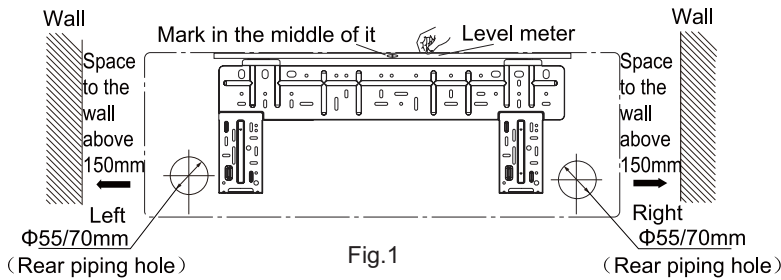
- (1) Hang the wall-mounting frame on the wall; adjust it in horizontal position with the level meter and then point out the screw fixing holes on the wall.
- (2) Drill the screw fixing holes on the wall with impact drill (the specification of drill head should be the same as the plastic expansion particle)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

in the holes.

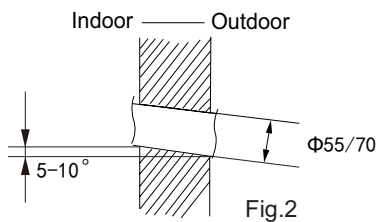
(3) Fix the wall-mounting frame on the wall with tapping screws (ST4.2X25TA) and then check if the frame is firmly installed by pulling the frame. If the plastic expansion particle is loose, please drill another fixing hole nearby.

### 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)



(2) Open a piping hole with the diameter of Φ55 or Φ70 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 5-10°. (As show in Fig.2)

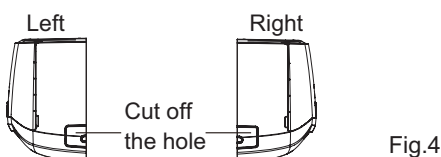
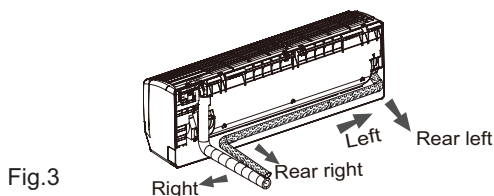


#### ⚠ Note:

- (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.

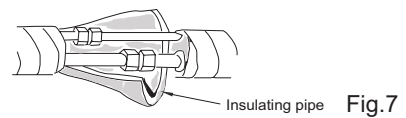
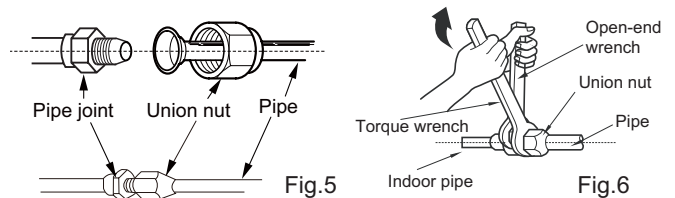
### 4. Outlet pipe

- (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)



### 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)

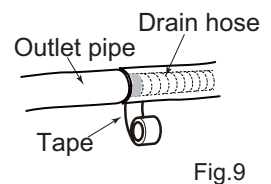
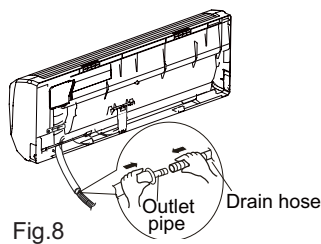


Refer to the following table for wrench moment of force:

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

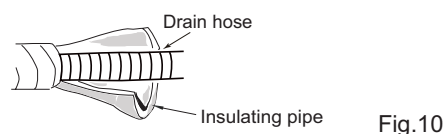
### 6. Install Drain Hose

- (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)



#### ⚠ Note:

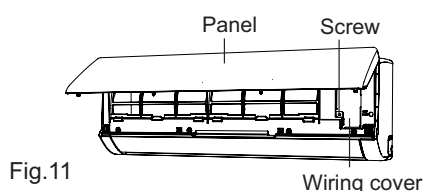
- (1) Add insulating pipe in the indoor drain hose in order to prevent condensation.
- (2) The plastic expansion particles are not provided. (As show in Fig.10)



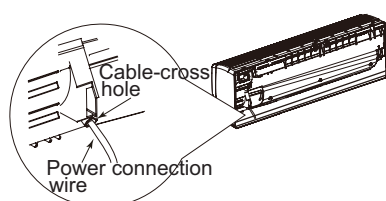


## 7. Connect Wire of Indoor Unit

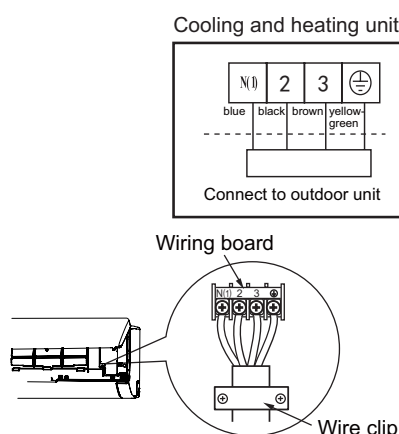
(1) Open the panel, remove the screw on the wiring cover and then take down the cover.(As show in Fig.11)



(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)



(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)



Note: The wiring connect is for reference only, please refer to the actual one

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.

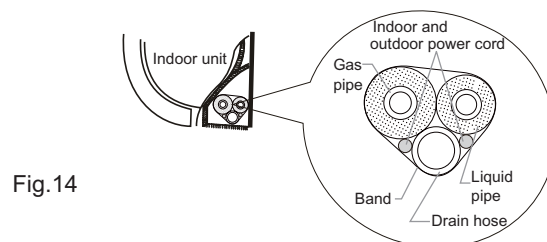


Fig.14

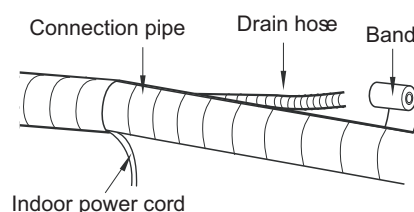


Fig.15

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

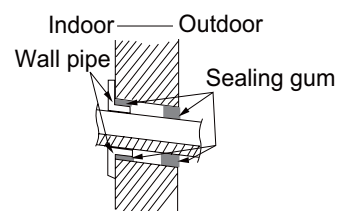


Fig.16

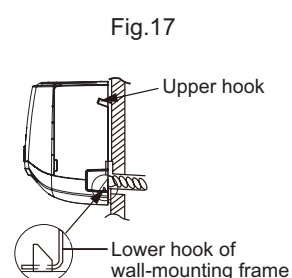


Fig.17

### ⚠ 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.

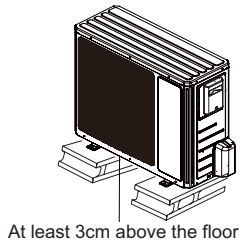


Fig.18

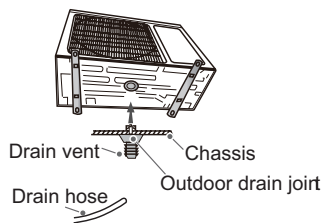


Fig.19

### 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)

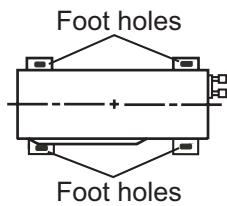


Fig.20

### 4. Fix Outdoor Unit

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

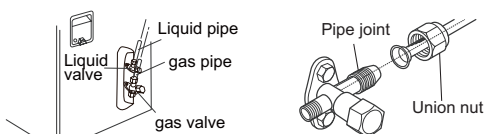


Fig.21

- (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 and power cord to the wiring terminal according to the color; fix them with screws.(As show in Fig.22)

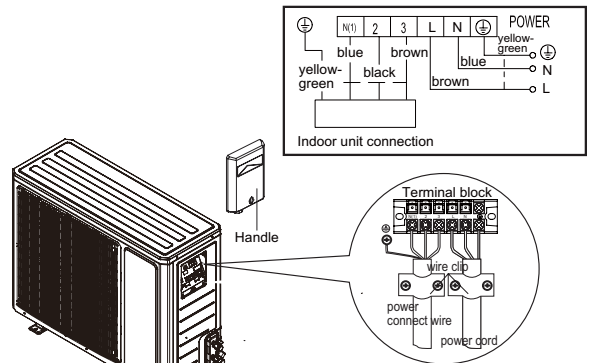


Fig.22

Note: The wiring connect is for reference only, please refer to the actual one

- (2) Fix the power connection wire and power cord 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.23)

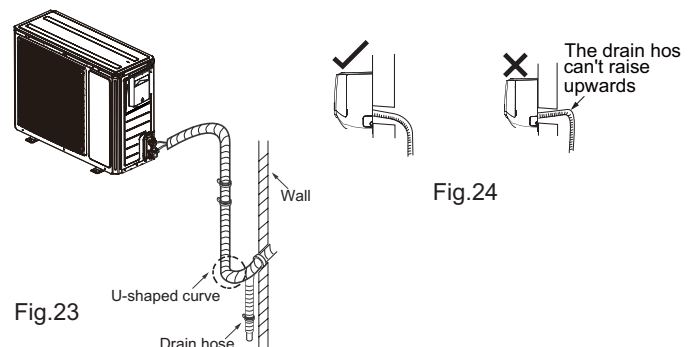


Fig.23

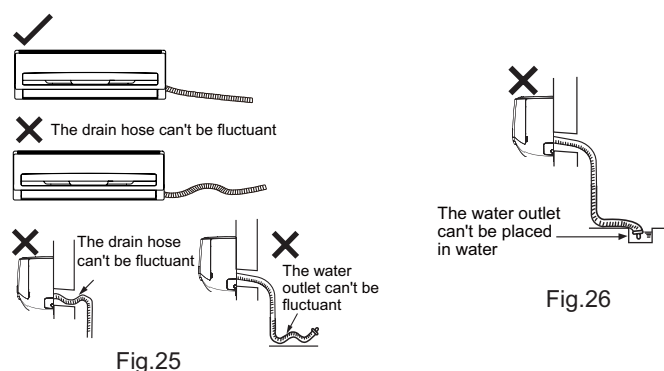
Fig.24

#### ⚠ 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.24)
- (2) Slant the drain hose slightly downwards. The drain hose can't be curved, raised and fluctuant, etc.(As show in Fig.25)



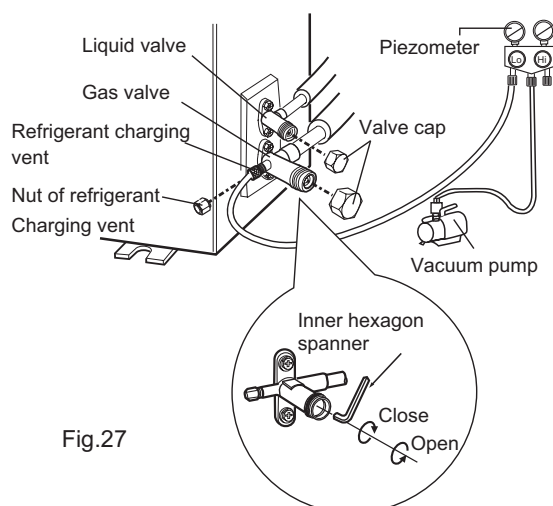
(3) The water outlet can't be placed in water in order to drain smoothly.(As show in Fig.26)



## 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.27)



### 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℃, the air conditioner can't start cooling.

## 9. Maintenance

### 9.1 Precautions before Maintenance

There are high-capacity electrolytic capacitors on the outdoor mainboard. Thus, even the power is cut off, there is high voltage inside the capacitors and it needs more than 20min to reduce the voltage to safety value. Touching the electrolytic capacitor within 20min after cutting the power will cause electric shock. If maintenance is needed, follow the steps below to discharge electricity of electrolytic capacitor after power off.

(1) Open the top cover of outdoor unit and then remove the cover of electric box.

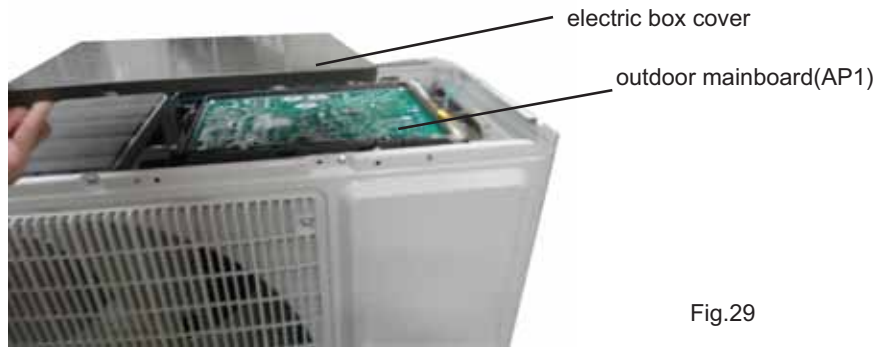


Fig.29

(2) As shown in the fig below, connect the plug of discharge resistance (about 100ohm, 20W) (if there is no discharge resistance, you can use the plug of soldering iron) to point A and B of electrolytic capacitor. There will be sparks when touching them. Press them forcibly for 30s to discharge electricity of electrolytic capacitor.

outdoor mainboard(AP1)

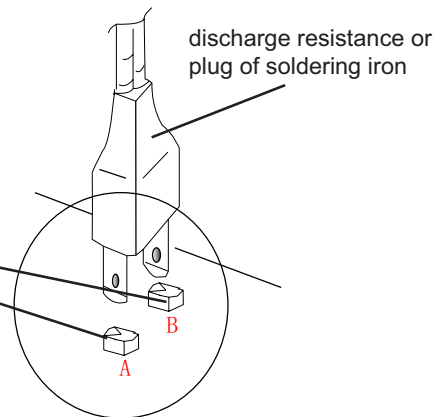
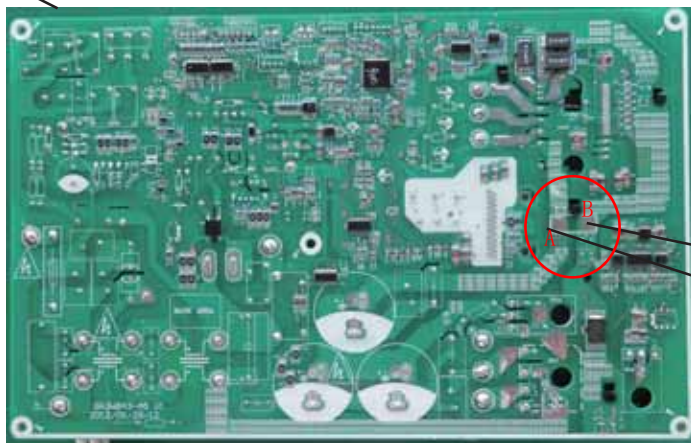


Fig.30

(3) After finish discharging electricity, measure the voltage between point A and B with universal meter to make sure if electricity discharging is completed, in order to prevent electric shock. If the voltage between the two points is below 20V, you can perform maintenance safely.

## 9.2 Error Code List

No.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit (Indicator has 3 kinds of display status and they will be displayed circularly every 5s.)				A/C status	Possible Reasons
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)			<input type="checkbox"/> OFF <input checked="" type="checkbox"/> Illuminated ☆ Blink					
			Operation Indicator	Cool Indicator	Heating Indicator	D5 (D40)	D6 (D41)	D16 (D42)	D30 (D43)		
1	Antifreezing protection	E2	OFF 3S and blink twice			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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.
2	High discharge temperature protection of compressor	E4	OFF 3S and blink 4 times			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	☆	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).
3	Overcurrent protection	E5	OFF 3S and blink 5 times			<input type="checkbox"/>	<input checked="" type="checkbox"/>	☆	<input type="checkbox"/>	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.
4	Communication Malfunction	E6	OFF 3S and blink 6 times			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	☆	During cooling operation, compressor stops while indoor fan motor operates. During heating operation, the complete unit stops.	Refer to the corresponding malfunction analysis.
5	High temperature resistant protection	E8	OFF 3S and blink 8 times			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	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).

6	Indoor unit motor no feedback	H6	off 3s blink 11 times							Whole unit will stop to run	1.Poor insert for GPF 2.Indoor control board AP1 malfunction 3.Indoor motor M1 malfunction
7	Jump wire cap malfunction protection	C5	off 3s blink 15 times							Whole unit will stop to run	Indoor control board AP1 jump cap poor connected please reinsert or replace the jump cap
8	Indoor ambient sensor open circuit,short circuit	F1		off 3s blink once						Cooling dehumidifying: indoor fan motor is running other overloads will stop;heating whole unit will stop to run.	1.Room temp sensor is not connected with the control panel AP1 2.Room temp sensor is damaged
9	Indoor evaporator temperature sensor is open/short circuited	F2		OFF 3S and blink twice						During cooling and drying operation, indoor unit will operate while other loads will stop; During heating operation, the complete unit will stop operation.	1.Room temperature sensor hasnt been connected well with indoor units control panel AP1 (refer to the wiring diagram for indoor unit); 2.Room temperature sensor is damaged (please refer to the resistance table of temperature sensor)
10	Outdoor ambient temperature sensor is open/short circuited	F3		OFF 3S and blink 3 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)
11	Outdoor condenser temperature sensor is open/short circuited	F4		OFF 3S and blink 4 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)
12	Outdoor discharge temperature sensor is open/short circuited	F5		OFF 3S and blink 5 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
13	Limit/decrease frequency due to overload	F6		OFF 3S and blink for 6 times		■	□	☆	☆	All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
14	Decrease frequency due to overcurrent	F8		OFF 3S and blink 8 times		■	■	□	■	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
15	Decrease frequency due to high air discharge	F9		OFF 3S and blink 9 times		■	■	□	□	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)
16	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.

17	Defrosting				ON 10s and OFF 0.5s					Defrosting will occur in heating mode. Compressor will operate while indoor fan will stop operation.	Its the normal state
18	Overload protection for compressor	H3			OFF 3S and blink 3 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)
19	IPM protection	H5			OFF 3S and blink 5 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.
20	PFC protection	HC			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
21	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)
22	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
23	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

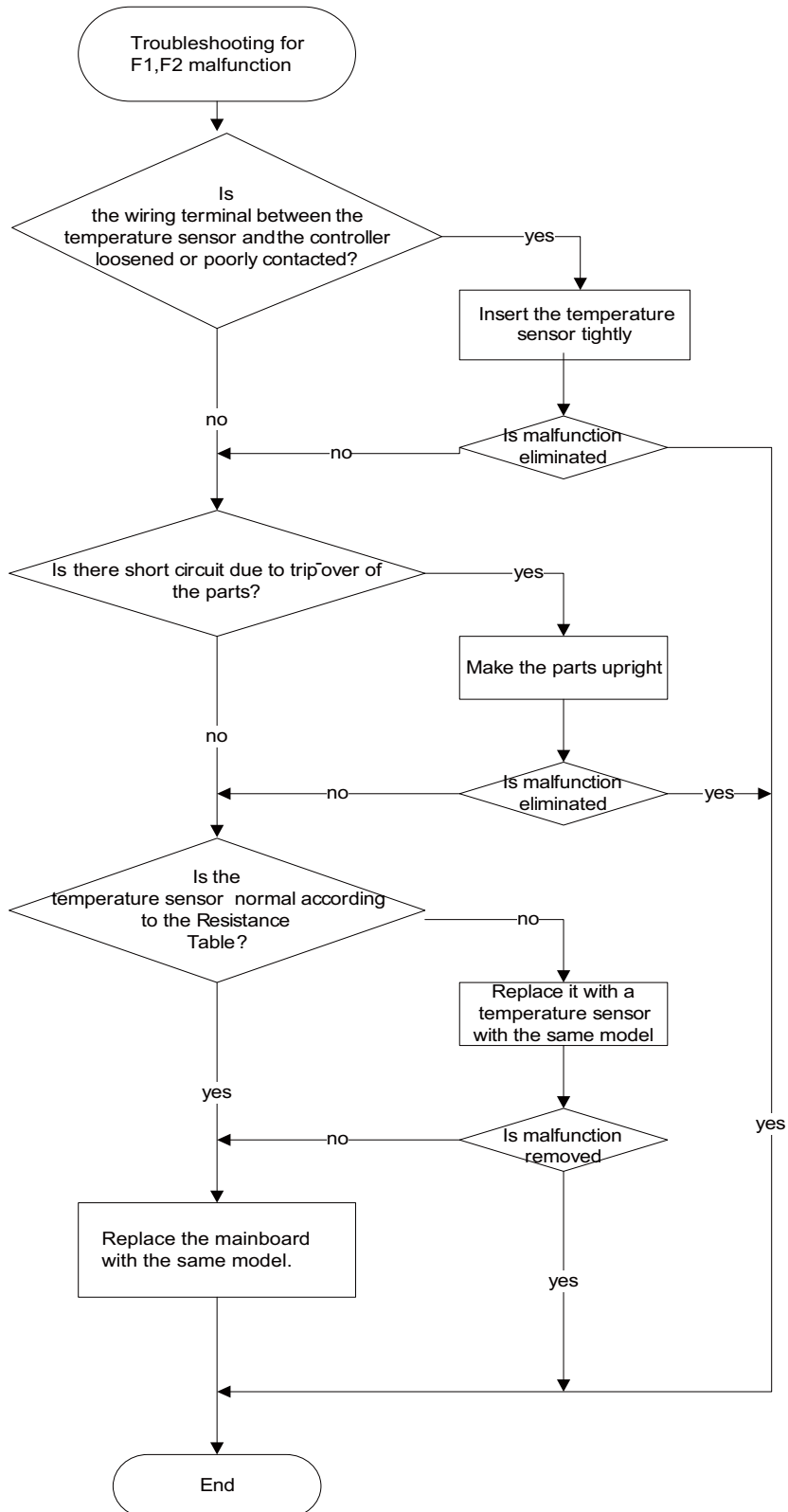
24	EEPROM malfunction	EE			OFF 3S and blink 15 times	□	□	□	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
25	Charging malfunction of capacitor	PU			OFF 3S and blink 17 times	□	■	□	■	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
26	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
27	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.
28	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
29	Voltage of DC bus-bar is too low	PL			OFF 3S and blink 21 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)
30	DC generatrix voltage is too high	PH	Off 3s blink 11times			□	■	□	☆	Cooling,dehumidifying,com pressor stop running fanmotor works.Heating:all will stop	1.Testing wire terminal Land N positionIf higher than 265VAC,please cut off the power supplyand restart until back to normal 2. If input voltage is normal, testingthe voltage of electrolytic capacitoron AP1 after turn on the unit.There may be some problem andreplace the AP1 if the electrolyticcapacitor voltage range at 200-280V
31	Compressor current overcurrent protection	P5	Off 3sblink 15time			□	☆	□	□	Cooling, dehumidifying;compressor stops running,indoor fan motor works.Heating: all will stoprunning	Please refer to troubleshooting(IPM protection, compressor lose steps, compressor current overcurrent protection)



32	Malfunction of zero-cross detection	U8	Off 3s and blink 17 times							Whole unit will stop to run	1.Power supply is abnormal 2.Detection circuit of indoor control mainboard is abnormal
33	Compressor lose steps	H7			Off 3s blink 7 times	□	☆	■	☆	Cooling dehumidifying;compressor stops running,indoor fan motor works.Heating:all will stop running	Pls refer to troubleshooting
34	IPM temp.is too limit/decrease frequency	EU				■	■	■	☆	Over load normal works,compressor runing frequency declines	Whole unit break for 20 mins and discharge,check the outdoor control board AP1's IPM module coolant whether is short,the radiator is tightened.If above phenomenon is not OK,Please improve or replace the control board AP1
35	Four-way valve abnormal	U7				■	□	☆	□	This malfunction happened,only in heating mode,all will stop to run.	1.Power supply voltage is lower than AC175V 2.Wire terminal 4V loosen or wire break 3.4V damaged,replace 4V
36	Anti-freezing limit/decrease frequency	FH				■	■	■	□	All loads work normally but the running frequency limited or decrease	Indoor unit air return is poor or fan speed is to low

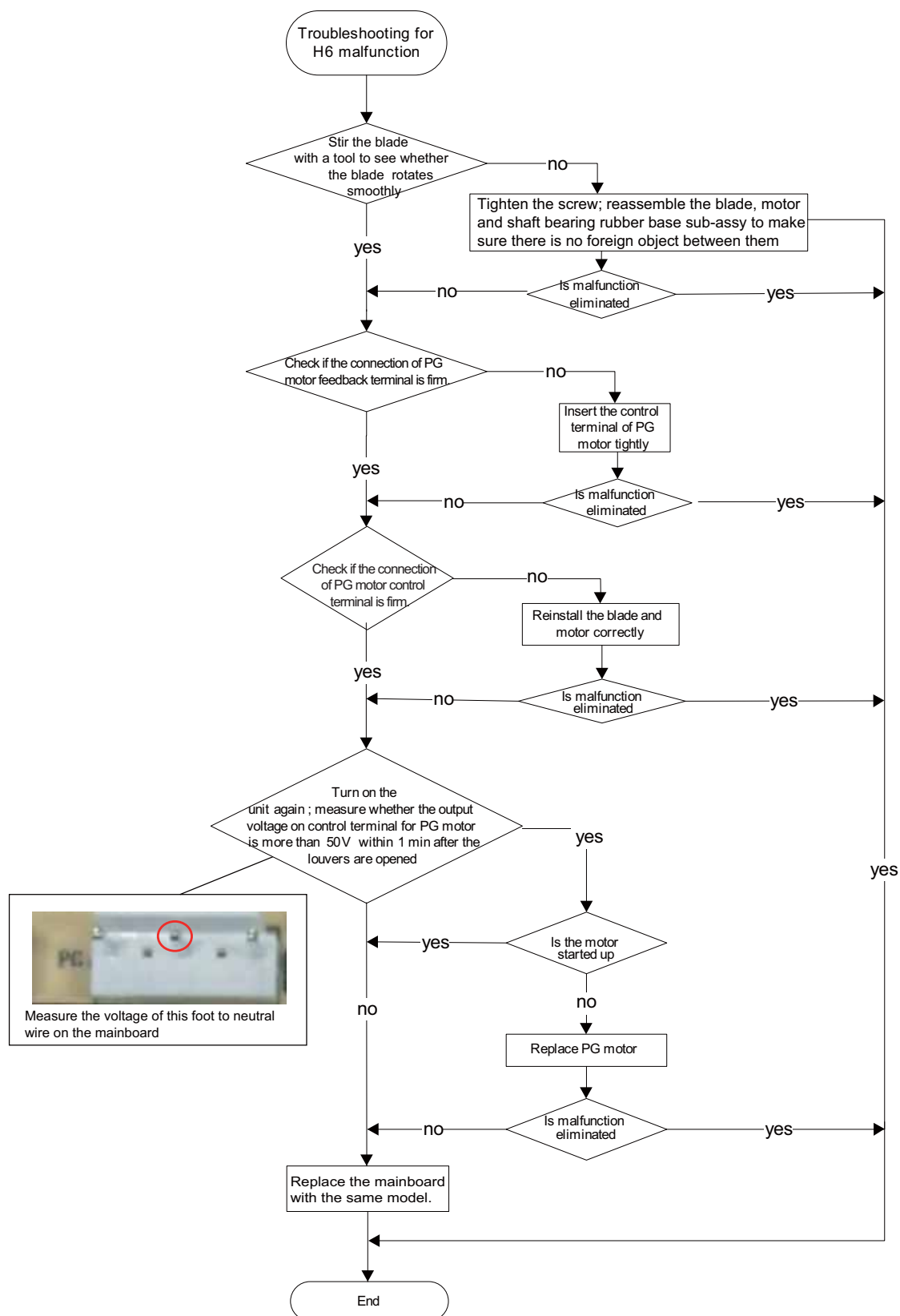
## 9.3 Troubleshooting for Main Malfunction

### 1. Malfunction of Temperature Sensor F1, F2

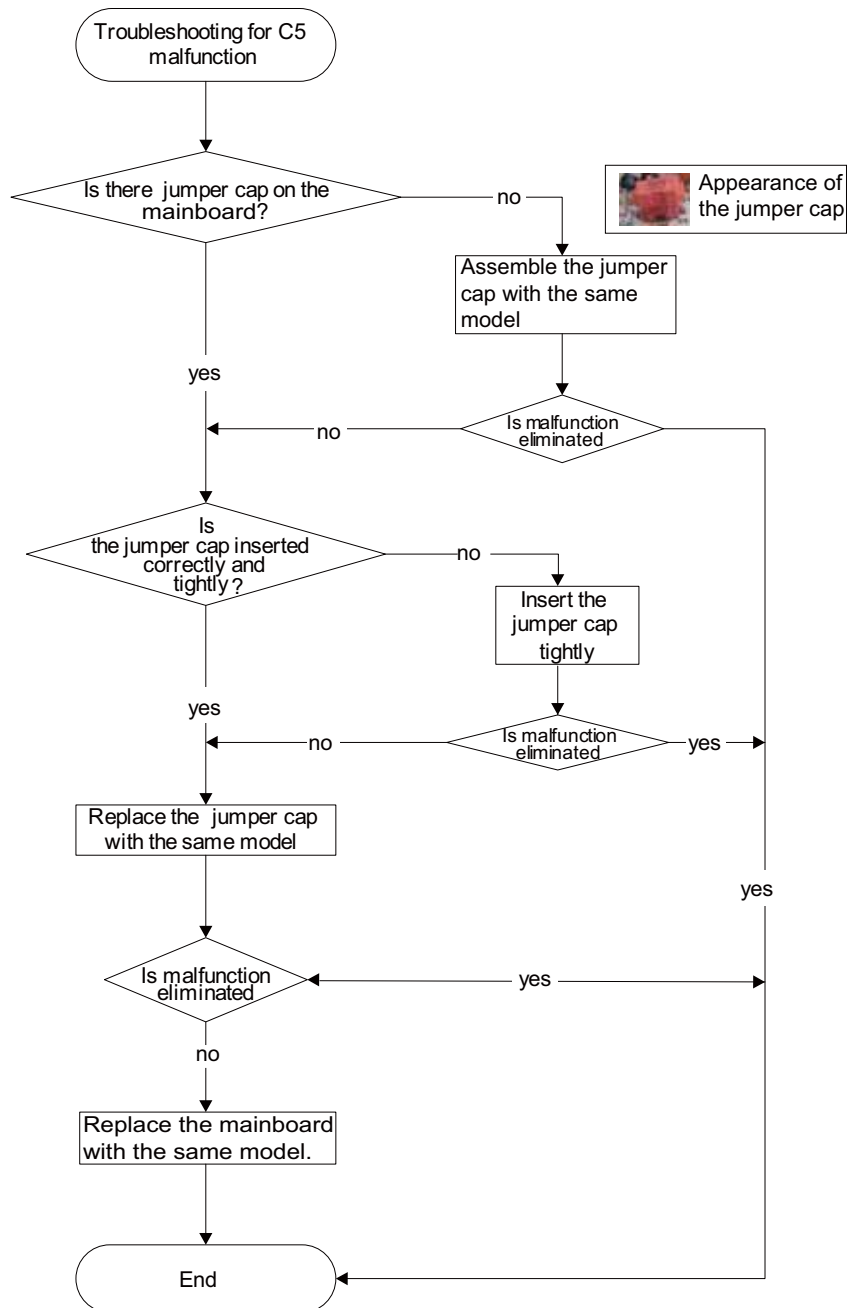




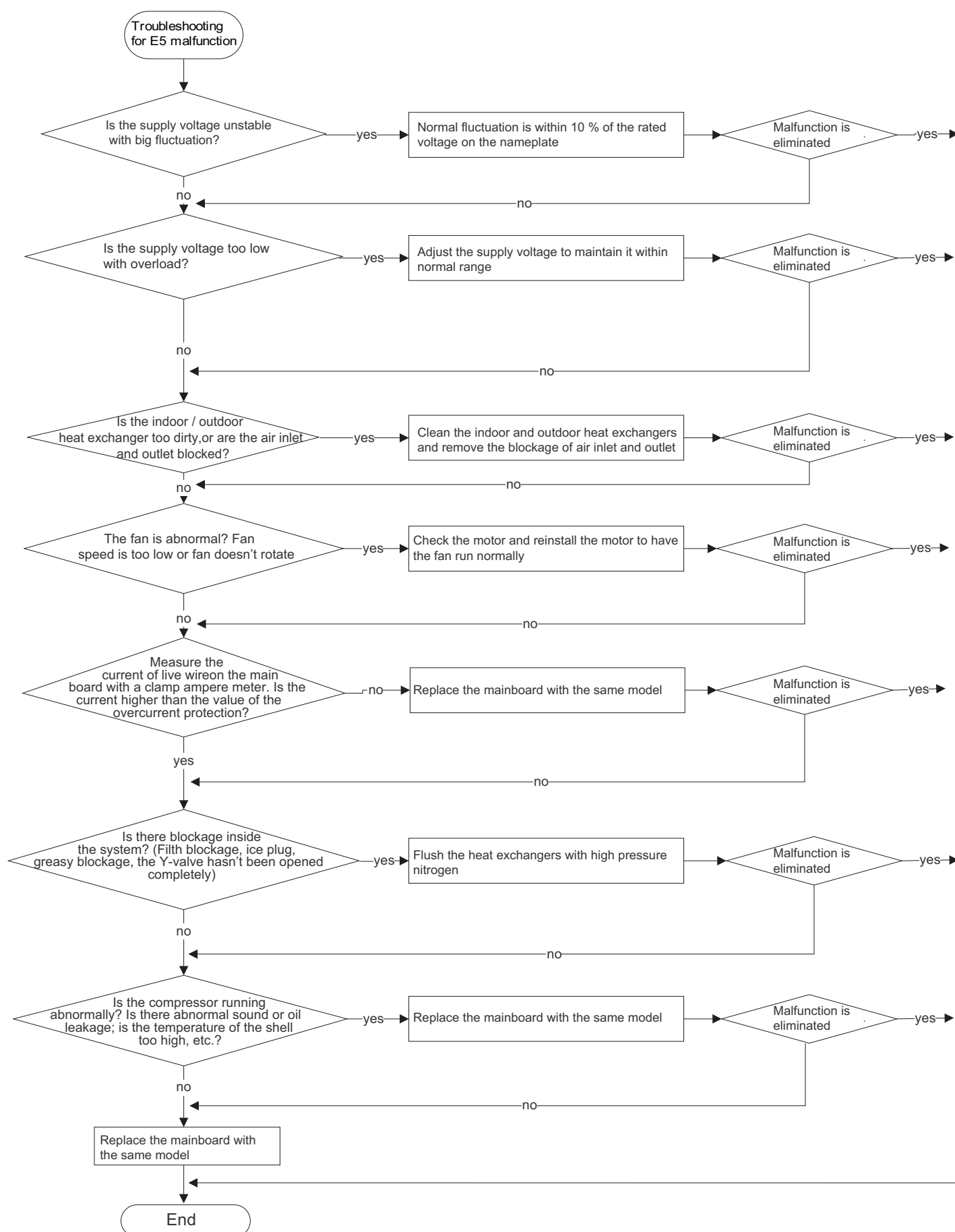
## 2. Malfunction of Blocked Protection of IDU Fan Motor H6



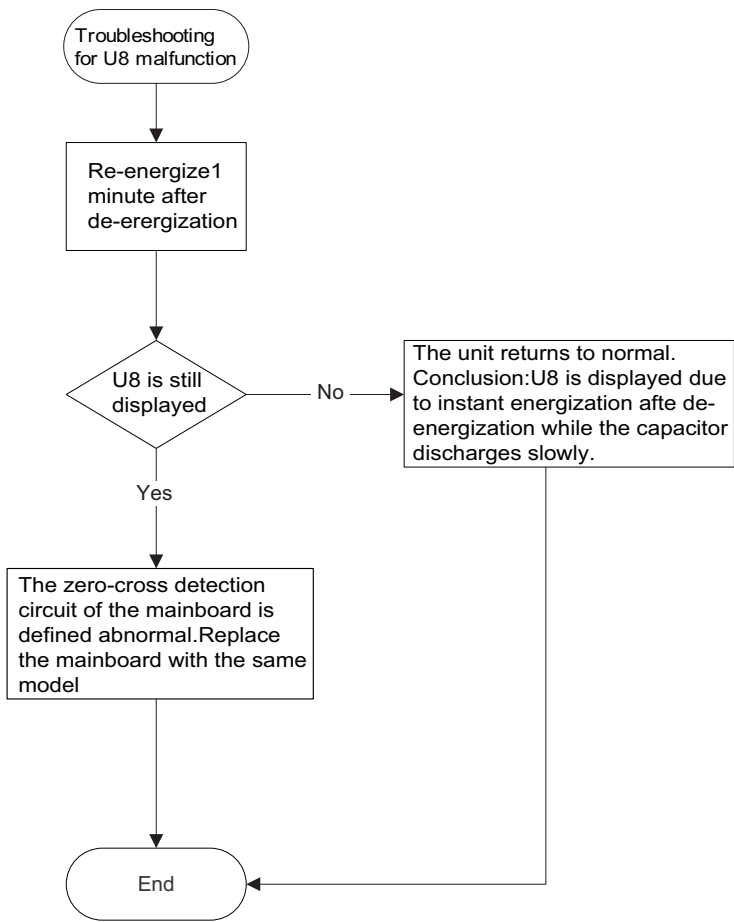
### 3. Malfunction of Protection of Jumper Cap C5



## 4. Malfunction of Overcurrent Protection E5



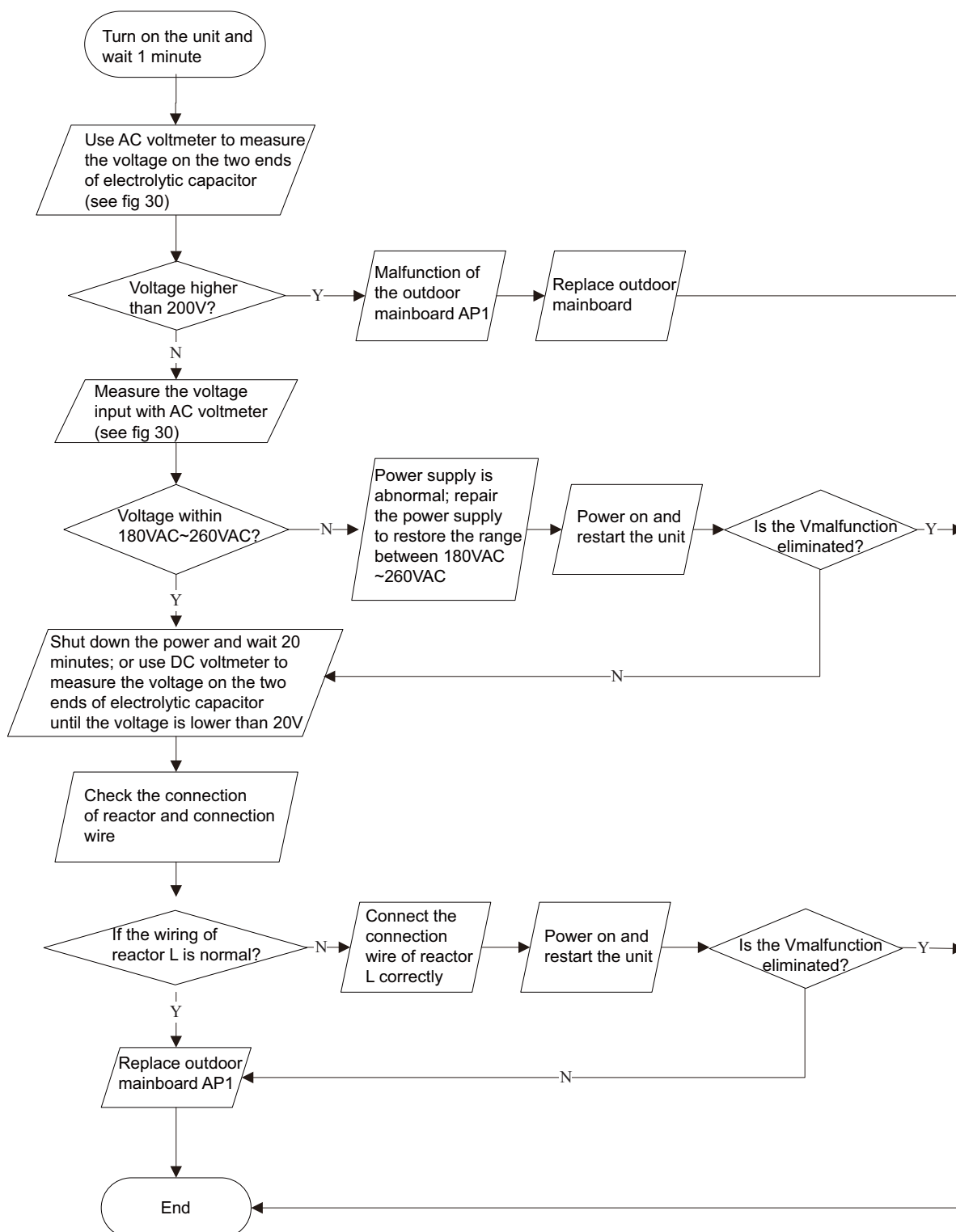
5. Malfunction of Zero-crossing Inspection Circuit Malfunction of the IDU Fan Motor U8



## 6.Capacity charging malfunction (outdoor unit malfunction) (AP1 below means control board of outdoor unit)

Main detection points:

- Detect if the voltage of L and N terminal of XT wiring board is between 210VAC-240VAC by alternating voltage meter;
- Is reactor (L) well connected? Is connection wire loosened or pulled out? Is reactor (L) damaged?

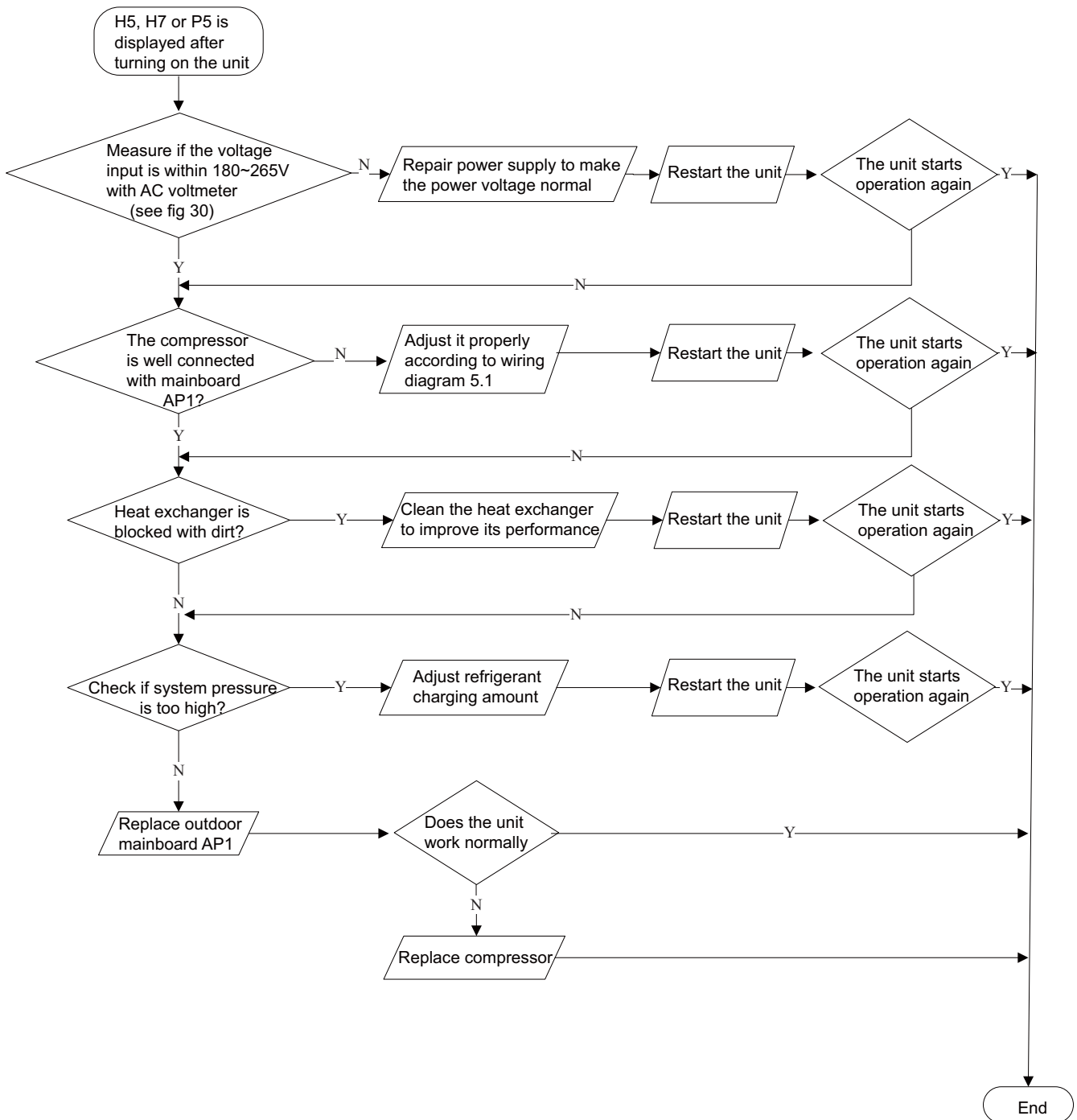


## 7. IPM protection (H5), desynchronizing malfunction (H7), overcurrent of compressor phase current (P5) (AP1 below means control board of outdoor unit)

Main detection points:

- Is voltage input within the normal range
- If the control board AP1 is well connected with compressor COMP? If they are loosened? If the connection sequence is correct?
- Heat exchange of unit is not good (heat exchanger is dirty and unit radiating environment is bad);
- If the system pressure is too high?
- If the refrigerant charging amount is appropriate?
- If coil resistance of compressor is normal? Is compressor coil insulating to copper pipe well?
- If the work load of unit is heavy? If radiating of unit is good?

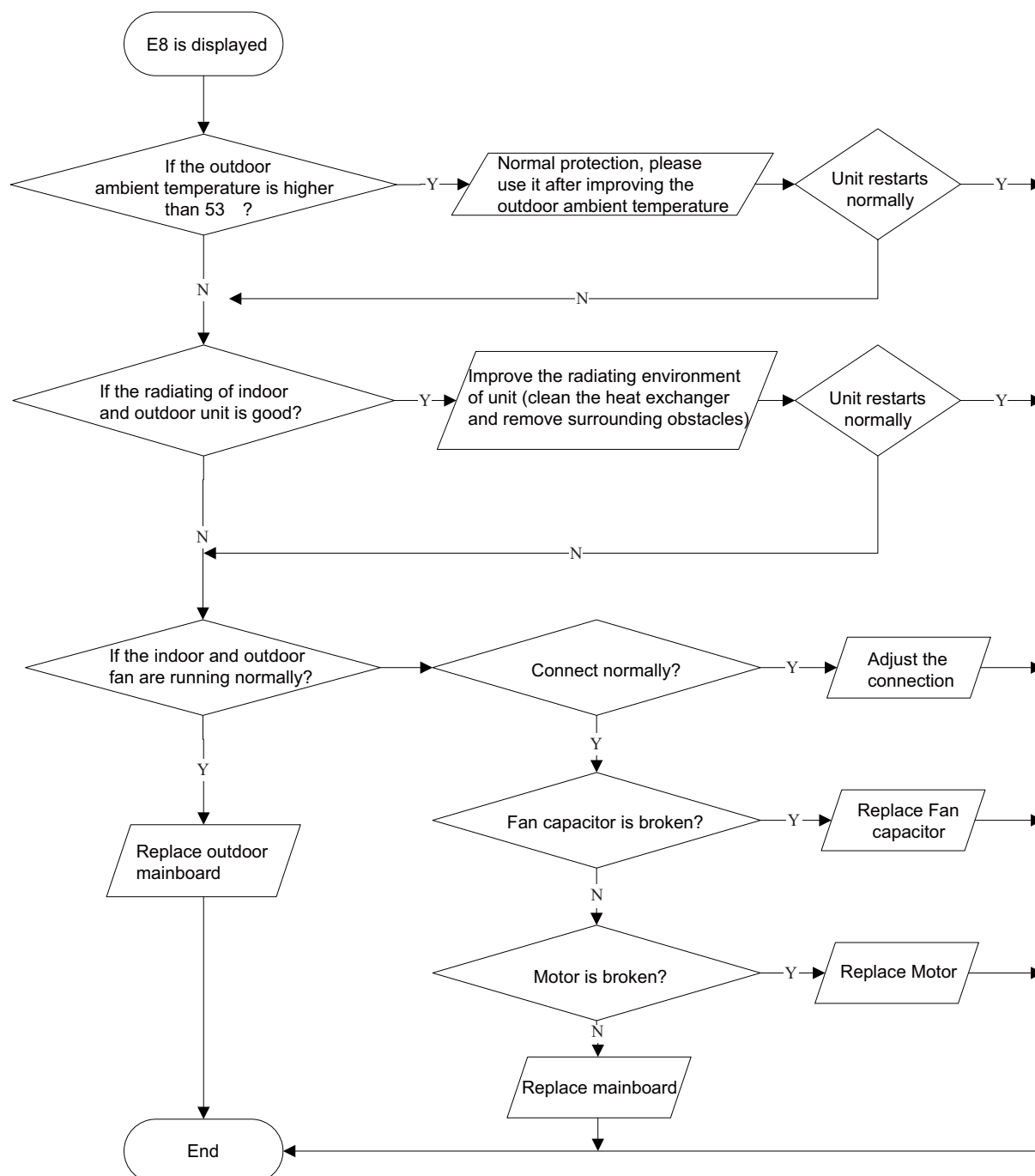
Malfunction diagnosis process:



## 8.High temperature and overload protection (E8)(AP1 below means control board of outdoor unit)

Main detection points:

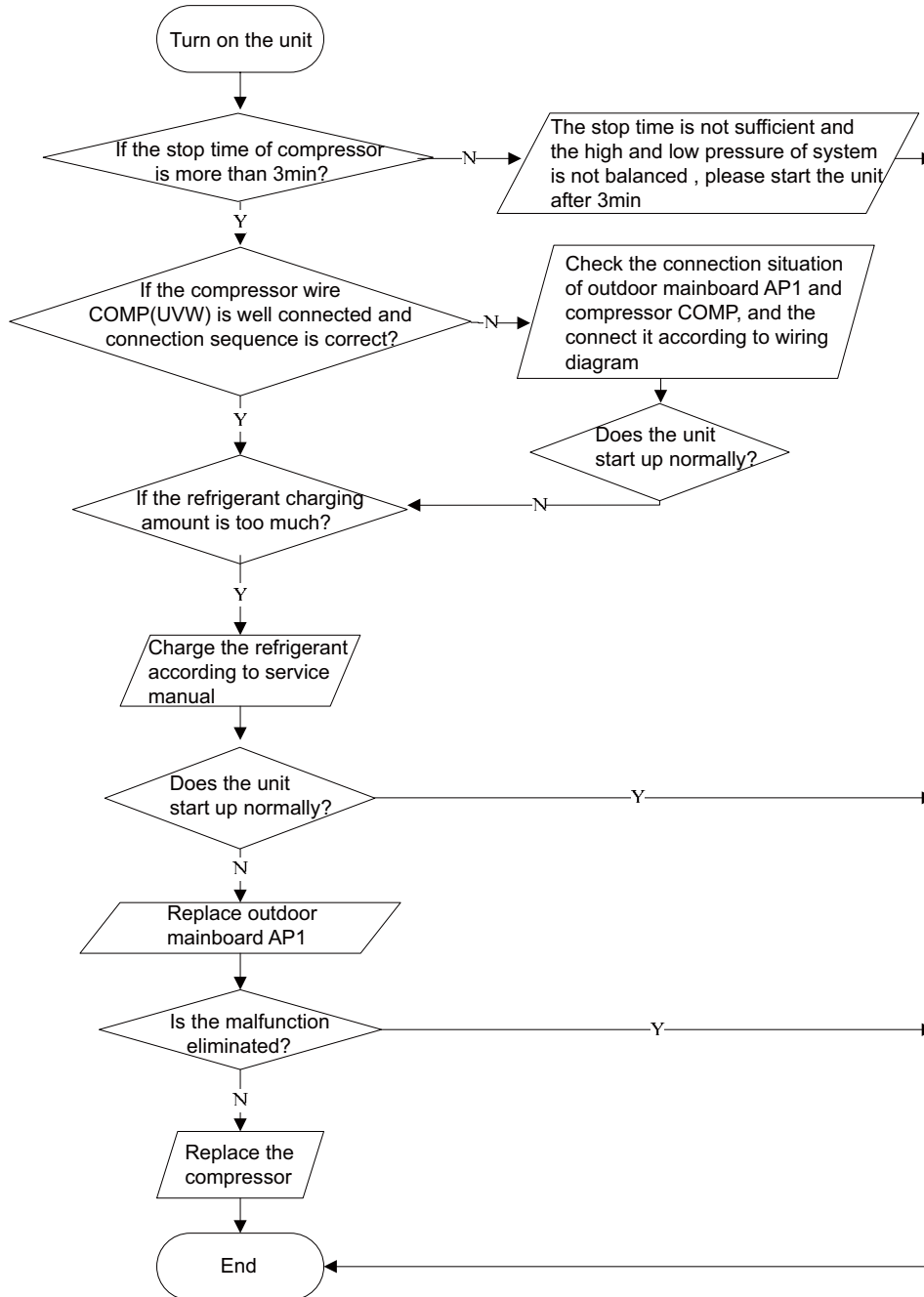
- If the outdoor ambient temperature is in normal range;
- If the indoor and outdoor fan are running normally;
- If the radiating environment of indoor and outdoor unit is good.



### 9.Start-up failure (LC) (AP1 below means control board of outdoor unit)

Main detection points:

- If the compressor wiring is correct?
- If the stop time of compressor is sufficient?
- If the compressor is damaged?
- If the refrigerant charging amount is too much?

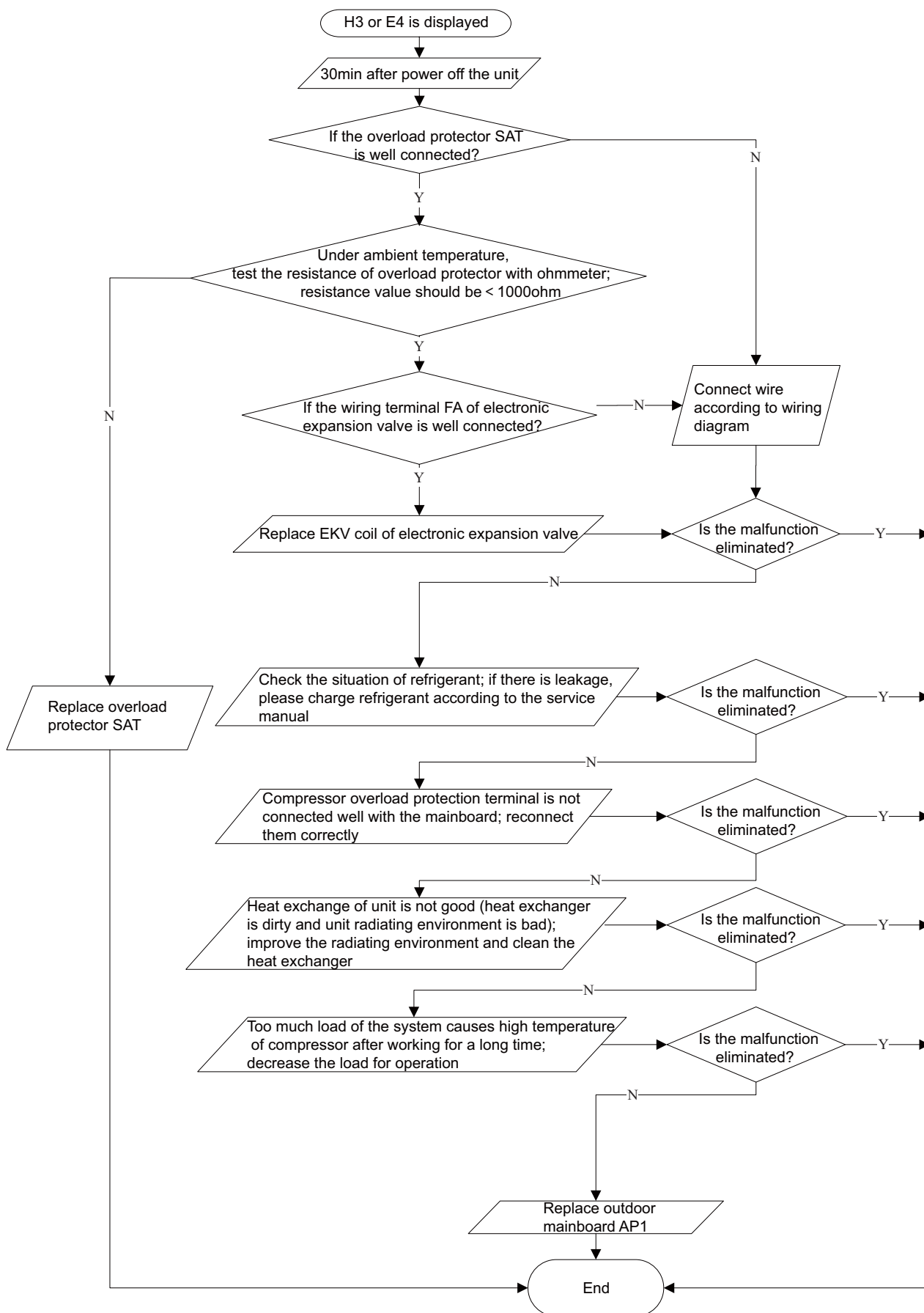




## 10. Overload and high discharge temperature malfunction

Main detection points:

- If the electronic expansion valve is connected well? Is the electronic expansion valve damaged?
- If the refrigerant is leaked?
- The compressor overload protection terminal is not connected well with the mainboard?
- If the overload protector is damaged?
- Heat exchange of unit is not good? (heat exchanger is dirty and unit radiating environment is bad)
- Too much load of the system causes high temperature of compressor after working for a long time?
- Malfunction of discharge temperature sensor?

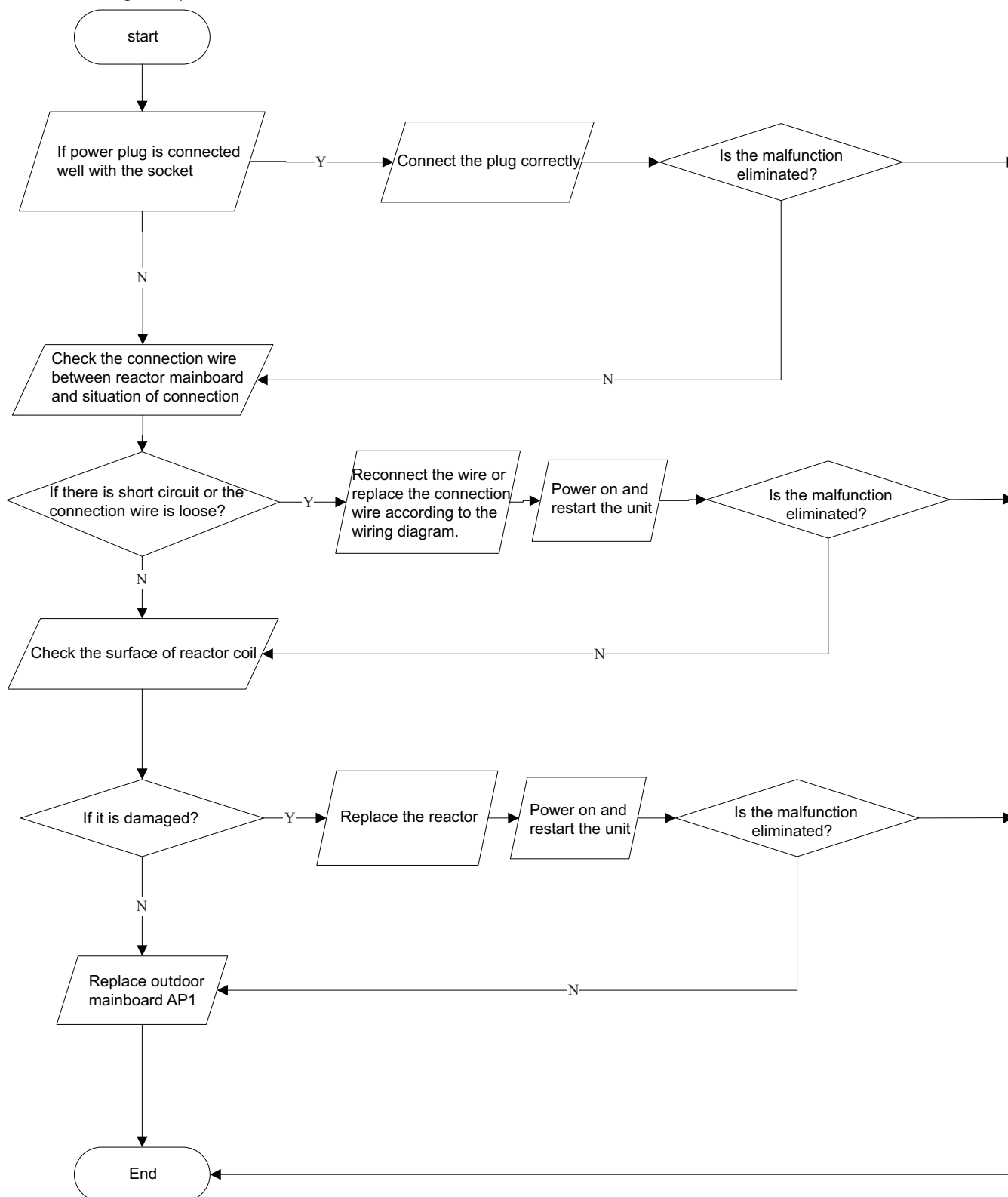


## 11.PFC (correction for power factor) malfunction (outdoor unit malfunction)

Main detection points:

- Check if power plug is connected well with the socket
- Check if the reactor of outdoor unit is damaged?

Malfunction diagnosis process:

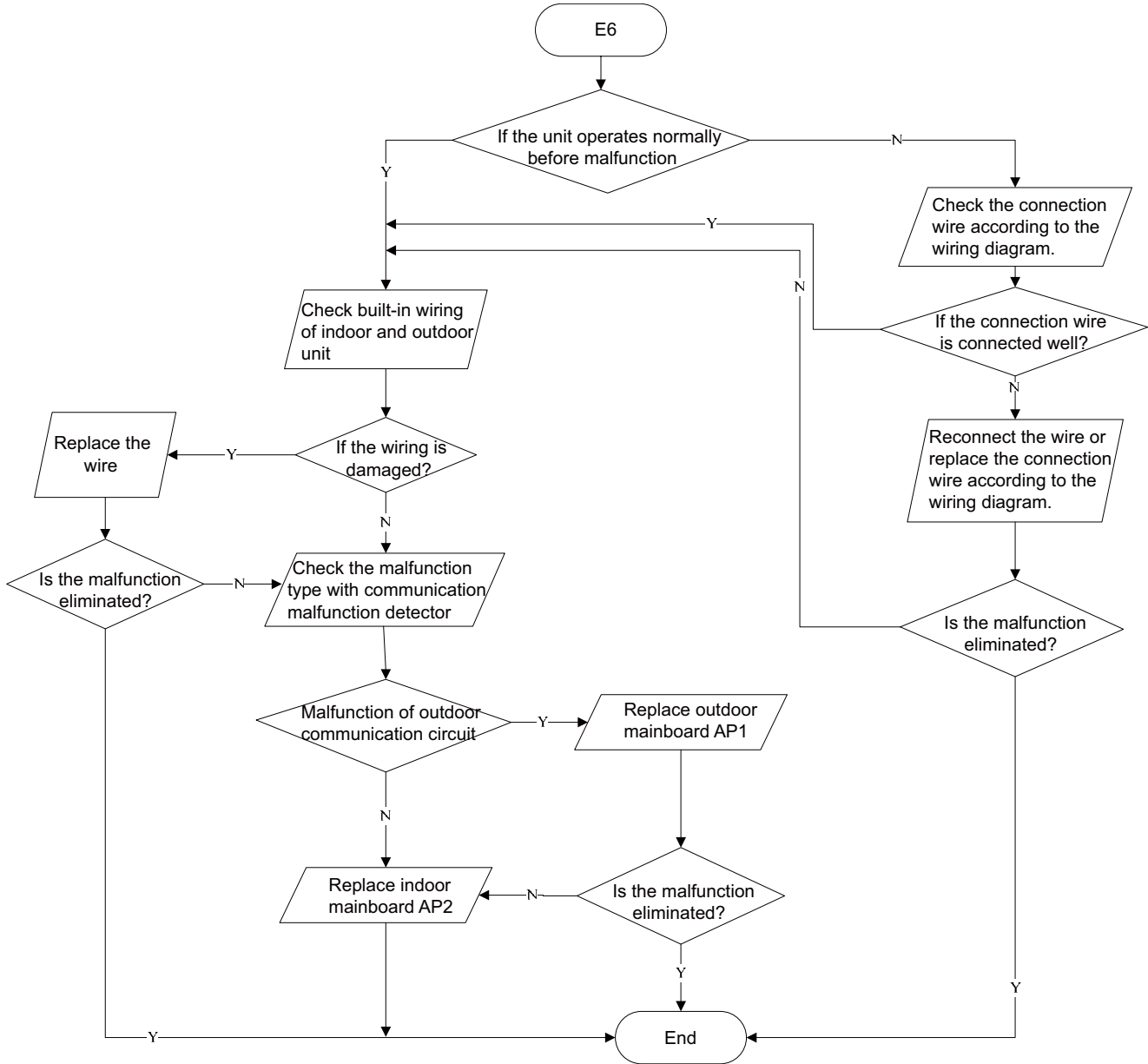


## 12. Communication malfunction (E6)

Main detection points:

- Check if the connection wire and the built-in wiring of indoor and outdoor unit are connected well and without damage;
- If the communication circuit of indoor mainboard is damaged? If the communication circuit of outdoor mainboard (AP1) is damaged?

Malfunction diagnosis process:



## 9.4 Troubleshooting for Normal Malfunction

### 1. Air Conditioner Can't be Started Up

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
No power supply, or poor connection for power plug	After energization, operation indicator isn't bright and the buzzer can't give out sound	Confirm whether it's due to power failure. If yes, wait for power recovery. If not, check power supply circuit and make sure the power plug is connected well.
Wrong wire connection between indoor unit and outdoor unit, or poor connection for wiring terminals	Under normal power supply circumstances, operation indicator isn't bright after energization	Check the circuit according to circuit diagram and connect wires correctly. Make sure all wiring terminals are connected firmly
Electric leakage for air conditioner	After energization, room circuit breaker trips off at once	Make sure the air conditioner is grounded reliably Make sure wires of air conditioner is connected correctly Check the wiring inside air conditioner. Check whether the insulation layer of power cord is damaged; if yes, place the power cord.
Model selection for air switch is improper	After energization, air switch trips off	Select proper air switch
Malfunction of remote controller	After energization, operation indicator is bright, while no display on remote controller or buttons have no action.	Replace batteries for remote controller Repair or replace remote controller

### 2. Poor Cooling (Heating) for Air Conditioner

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Set temperature is improper	Observe the set temperature on remote controller	Adjust the set temperature
Rotation speed of the IDU fan motor is set too low	Small wind blow	Set the fan speed at high or medium
Filter of indoor unit is blocked	Check the filter to see it's blocked	Clean the filter
Installation position for indoor unit and outdoor unit is improper	Check whether the installation position is proper according to installation requirement for air conditioner	Adjust the installation position, and install the rainproof and sunproof for outdoor unit
Refrigerant is leaking	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range	Find out the leakage causes and deal with it. Add refrigerant.
Malfunction of 4-way valve	blow cold wind during heating	Replace the 4-way valve
Malfunction of capillary	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked	Replace the capillary
Flow volume of valve is insufficient	Pressure at the valve is much lower than the regulated range	Open the valve completely
Malfunction of horizontal louver	Horizontal louver can't swing	Refer to point 3 of maintenance method for details
Malfunction of the IDU fan motor	The IDU fan motor can't operate	Refer to troubleshooting for H6 for maintenance method in details
Malfunction of the ODU fan motor	The ODU fan motor can't operate	Refer to point 4 of maintenance method for details
Malfunction of compressor	Compressor can't operate	Refer to point 5 of maintenance method for details

### 3. Horizontal Louver Can't Swing

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Stepping motor is damaged	Stepping motor can't operate	Repair or replace stepping motor
Main board is damaged	Others are all normal, while horizontal louver can't operate	Replace the main board with the same model

## 4. ODU fan Motor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of the ODU fan motor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the capacity of fan
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Motor of outdoor unit is damaged	When unit is on, cooling/heating performance is bad and ODU compressor generates a lot of noise and heat.	Change compressor oil and refrigerant. If no better, replace the compressor with a new one

## 5. Compressor Can't Operate

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly
Capacity of compressor is damaged	Measure the capacity of fan capacitor with an universal meter and find that the capacity is out of the deviation range indicated on the nameplate of fan capacitor.	Replace the compressor capacitor
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator
Coil of compressor is burnt out	Use universal meter to measure the resistance between compressor terminals and it's 0	Repair or replace compressor
Cylinder of compressor is blocked	Compressor can't operate	Repair or replace compressor

## 6. Air Conditioner is Leaking

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
Drain pipe is blocked	Water leaking from indoor unit	Eliminate the foreign objects inside the drain pipe
Drain pipe is broken	Water leaking from drain pipe	Replace drain pipe
Wrapping is not tight	Water leaking from the pipe connection place of indoor unit	Wrap it again and bundle it tightly

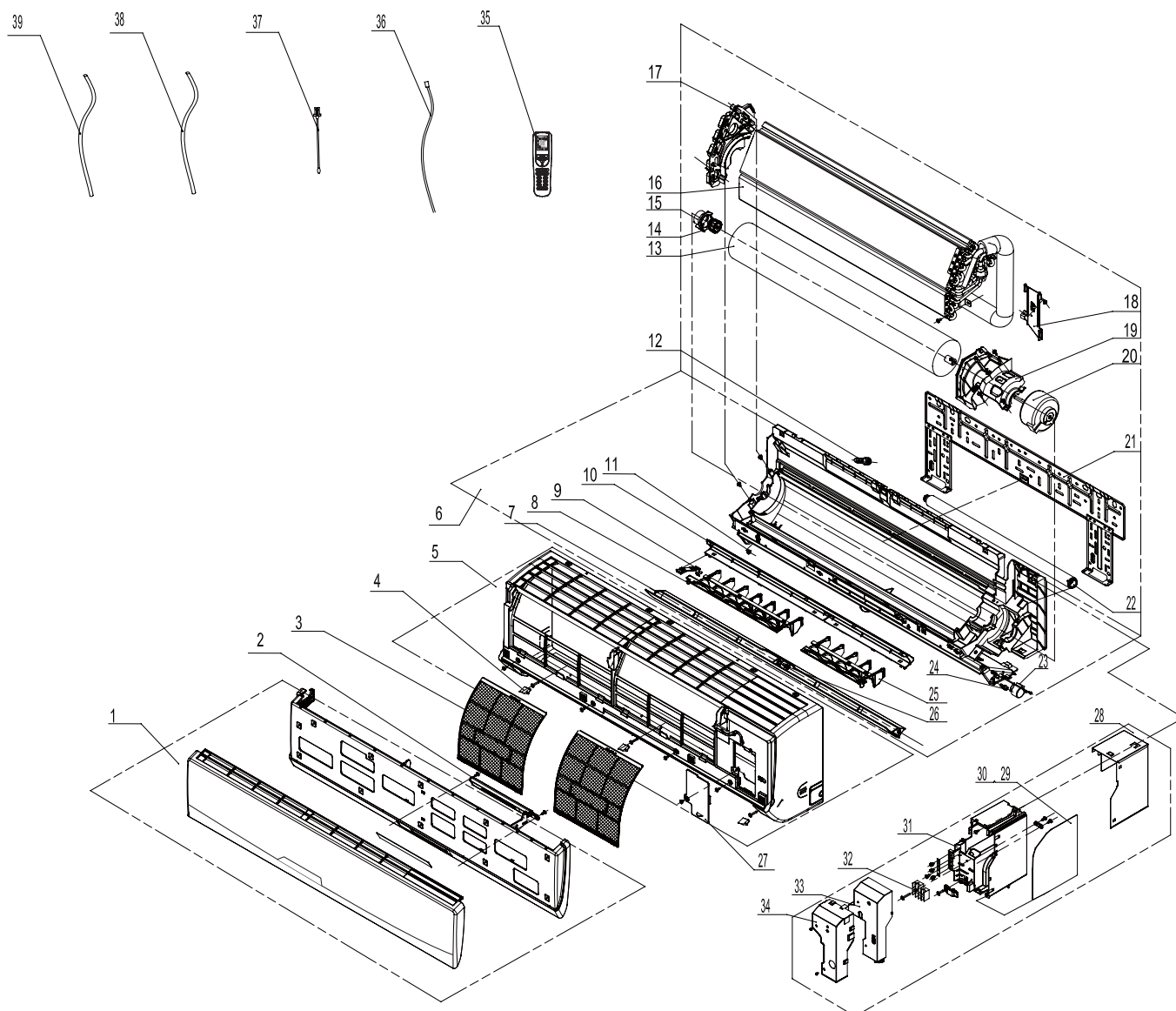
## 7. Abnormal Sound and Vibration

Possible causes	Discriminating method (air conditioner status)	Troubleshooting
When turn on or turn off the unit, the panel and other parts will expand and there's abnormal sound	There's the sound of "PAPA"	Normal phenomenon. Abnormal sound will disappear after a few minutes.
When turn on or turn off the unit, there's abnormal sound due to flow of refrigerant inside air conditioner	Water-running sound can be heard	Normal phenomenon. Abnormal sound will disappear after a few minutes.
Foreign objects inside the indoor unit or there're parts touching together inside the indoor unit	There's abnormal sound fro indoor unit	Remove foreign objects. Adjust all parts' position of indoor unit, tighten screws and stick damping plaster between connected parts
Foreign objects inside the outdoor unit or there're parts touching together inside the outdoor unit	There's abnormal sound fro outdoor unit	Remove foreign objects. Adjust all parts' position of outdoor unit, tighten screws and stick damping plaster between connected parts
Short circuit inside the magnetic coil	During heating, the way valve has abnormal electromagnetic sound	Replace magnetic coil
Abnormal shake of compressor	Outdoor unit gives out abnormal sound	Adjust the support foot mat of compressor, tighten the bolts
Abnormal sound inside the compressor	Abnormal sound inside the compressor	If add too much refrigerant during maintenance, please reduce refrigerant properly. Replace compressor for other circumstances.

## 10. Exploded View and Parts' List

### 10.1 Indoor Unit

GWH18RC-K3DBA3E/I GWH18RC-K3DBA5E/I

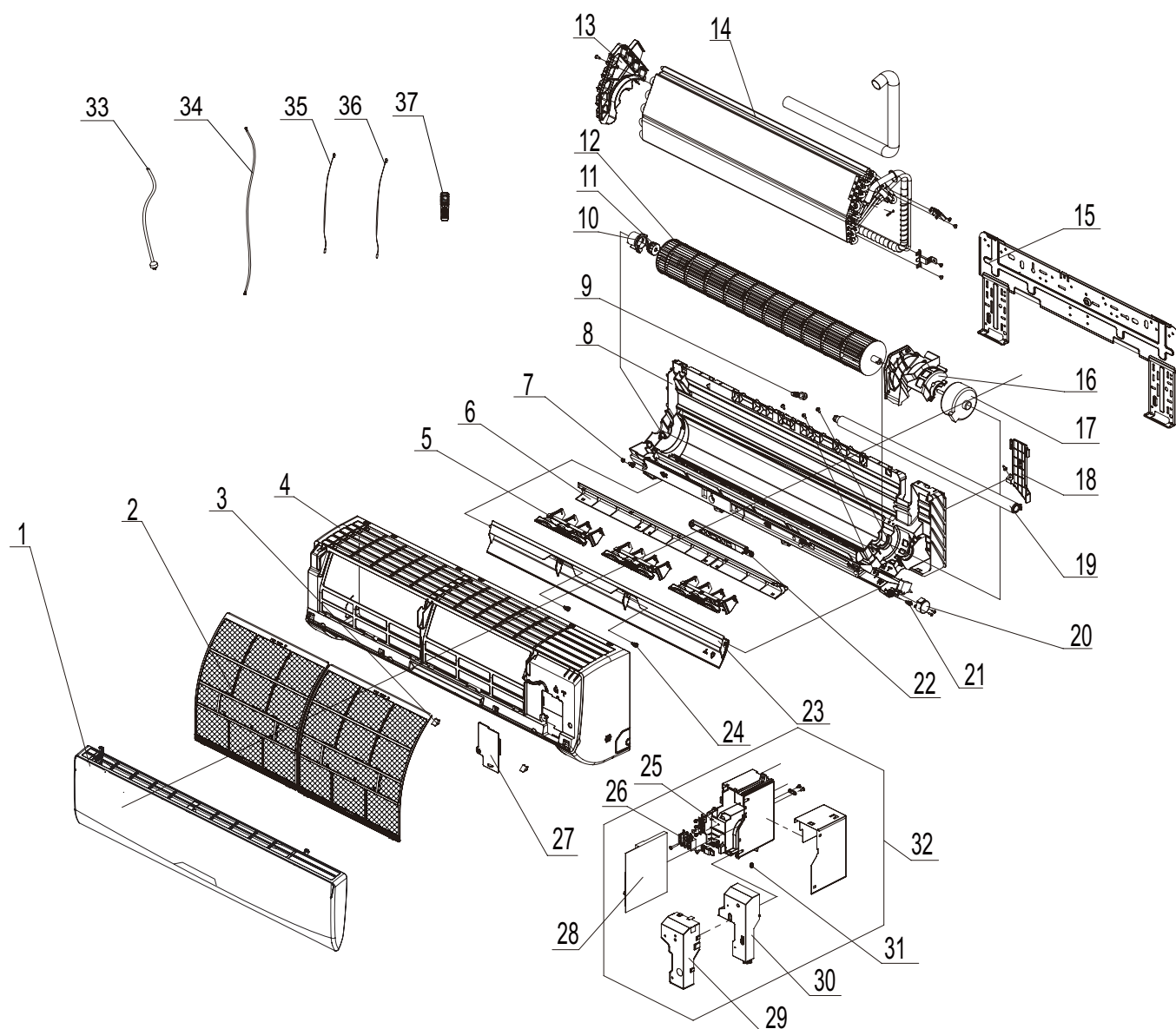


NO.	Description	Part Code		Qty
		GWH18RC-K3DBA5E/I	GWH18RC-K3DBA3E/I	
	Product Code	CB304N01600	CB302N02300	
1	Front Panel Assy	20012914	20012760	1
2	Display Board	30565139	30565121	1
3	Filter Sub-Assy	11122089	11122089	2
4	Screw Cover	242520179	24252016	3
5	Front Case Sub-Assy	2001266701	20012667	1
6	Rear Case assy	22202193	22202193	1
7	Guide Louver	1051220501	10512205	1
8	Air Louver 1	1051211602	1051211602	1
9	Baffle Plate	2611222802	2611222802	1
10	Helicoid Tongue	2611223802	2611223802	1
11	Left Axile Bush	10512037	10512037	1
12	Rubber Plug (Water Tray)	76712012	76712012	1
13	Cross Flow Fan	10352019	10352019	1
14	O-Gasket sub-assy of Bearing	7651205102	7651205102	1
15	Ring of Bearing	26152022	26152022	1
16	Evaporator Assy	01002937	01002937	1
17	Evaporator Support	24212133	24212133	1
18	Pipe Clamp	2611216401	2611216401	1
19	Motor Press Plate	26112494	26112494	1
20	Fan Motor	15012146	15012146	1
21	Wall Mounting Frame	01252218	01252218	1
22	Drainage hose	05230014	05230014	1
23	Step Motor	15012086	15012086	1
24	Crank	10582070	10582070	1
25	Air Louver 2	1051211702	1051211702	1
26	Axile Bush	10542036	10542036	1
27	Electric Box Cover2	2012214204	20122142	1
28	Electric Box Assy	20403061	20102000310	1
29	Main Board	30138000007	30148879	1
30	Jumper	4202300121	4202300121	1
31	Electric Box	20112108	20112108	1
32	Terminal Board	42011233	42011233	1
33	Electric Box Cover1	20122154	20122154	1
34	Shield Cover of Electric Box	01592092	01592092	1
35	Remote Controller	30510125	30510125	1
36	Ambient Temperature Sensor	390000453	390000453	1
37	Tube Sensor	390000591	390000591	1
38	Connecting Cable	4002052317	4002052317	0
39	Connecting Cable	400205401	400205401	0

Above data is subject to change without notice.



GWH24RD-K3DBA3E/I GWH24RD-K3DBA5E/I GWH24RD-K3DBA2A/I GWH24RD-K3DBA3A/I



NO.	Description	Part Code		Qty
		GWH24RD-K3DBA5E/I	GWH24RD-K3DBA3E/I	
	Product Code	CB304N01500	CB302N02400	
1	Front Panel Assy	20012957	20012871	1
2	Filter Sub-Assy	1112209105	1112209101	2
3	Screw Cover	242520179	24252016	3
4	Front Case Assy	2001297401	2001297402	1
5	Air Louver 1	1051215901	1051215901	3
6	Helicoid Tongue	2611218702	2611218702	1
7	Left Axile Bush	10512037	10512037	1
8	Rear Case assy	2220219701	2220219701	1
9	Rubber Plug (Water Tray)	76712012	76712012	1
10	Ring of Bearing	26152025	26152025	1
11	O-Gasket sub-assy of Bearing	7651205102	7651205102	1
12	Cross Flow Fan	10352030	10352030	1
13	Evaporator Support	24212103	24212103	1
14	Evaporator Assy	0100257205	0100257205	1
15	Wall Mounting Frame	01252032	01252032	1
16	Motor Press Plate	26112316	26112316	1
17	Fan Motor	15012098	15012098	1
18	Connecting pipe clamp	2611218801	2611218801	1
19	Drainage Hose	0523001405	0523001405	1
20	Stepping Motor	1521300101	1521300101	1
21	Axile Bush	10542036	10542036	2
22	Display Board	30565139	30565125	1
23	Guide Louver	1051220801	10512208	1
24	Crank	10582070	10582070	1
25	Electric Box	20112108	20112108	1
26	Terminal Board	42011233	42011233	1
27	Electric Box Cover2	2012214204	20122142	1
28	Main Board	30138000008	30138000117	1
29	Shield Cover of Electric Box	01592092	01592092	1
30	Electric Box Cover1	20122154	20122154	1
31	Jumper	4202300124	4202300124	1
32	Electric Box Assy	20102000018	20102000337	1
33	Connecting Cable	4002052317	4002052317	0
34	Connecting Cable	400205402	400205402	0
35	Temperature Sensor	390000453	390000453	1
36	Ambient Temperature Sensor	390000591	390000591	1
37	Remote Controller	30510125	30510125	1

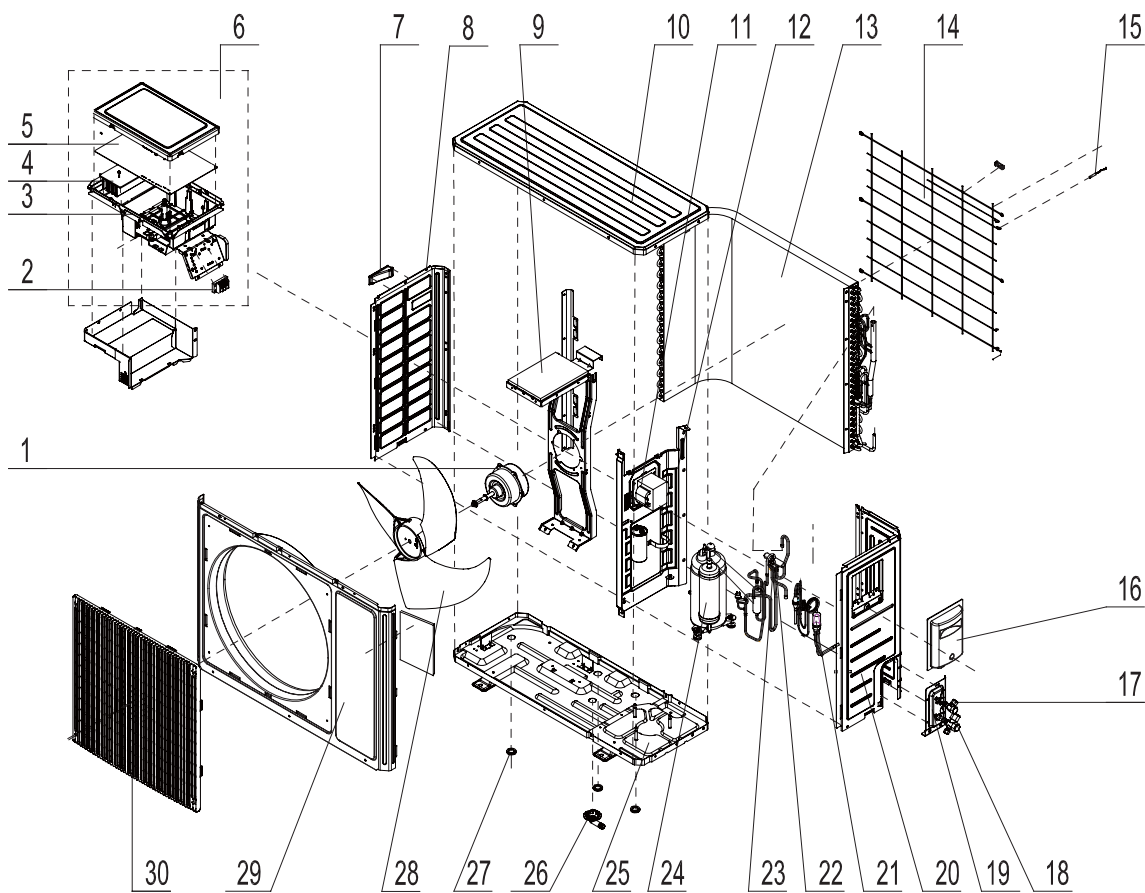
Above data is subject to change without notice.

NO.	Description	Part Code		Qty
		GWH24RD-K3DBA3A/I	GWH24RD-K3DBA2A/I	
	Product Code	CB302N01300	CB301N01900	
1	Front Panel Assy	20012871	20012757	1
2	Filter Sub-Assy	11122091	11122091	2
3	Screw Cover	24252016	242520179	3
4	Front Case Assy	2001297402	2001297401	1
5	Air Louver 1	1051215901	1051215901	3
6	Helicoid Tongue	2611218702	2611218702	1
7	Left Axile Bush	10512037	10512037	1
8	Rear Case assy	20022555	20022555	1
9	Rubber Plug (Water Tray)	76712012	76712012	1
10	Ring of Bearing	26152025	26152025	1
11	O-Gasket sub-assy of Bearing	7651205102	7651205102	1
12	Cross Flow Fan	10352030	10352030	1
13	Evaporator Support	24212139	24212139	1
14	Evaporator Assy	01002386	01002386	1
15	Wall Mounting Frame	01252032	01252032	1
16	Motor Press Plate	26112330	26112330	1
17	Fan Motor	15012098	15012098	1
18	Connecting pipe clamp	2611218801	2611218801	1
19	Drainage Hose	0523001405	0523001405	1
20	Stepping Motor	1521300101	1521300101	1
21	Axile Bush	10542036	10542036	2
22	Display Board	30565125	30565120	1
23	Guide Louver	10512208	1051220801	1
24	Crank	10582070	10582070	1
25	Electric Box	20112108	20112108	1
26	Terminal Board	42011233	42011233	1
27	Electric Box Cover2	20122142	2012214204	1
28	Main Board	30138000117	30138000008	1
29	Shield Cover of Electric Box	01592092	01592092	1
30	Electric Box Cover1	20122154	20122154	1
31	Jumper	4202300124	4202300124	1
32	Electric Box Assy	20102000248	20102000207	1
33	Connecting Cable	4002052317	4002052317	0
34	Connecting Cable	400205402	400205402	0
35	Temperature Sensor	390000453	390000453	1
36	Ambient Temperature Sensor	390000591	390000591	1
37	Remote Controller	30510125	30510125	1

Above data is subject to change without notice.

# 10.2 Outdoor Unit

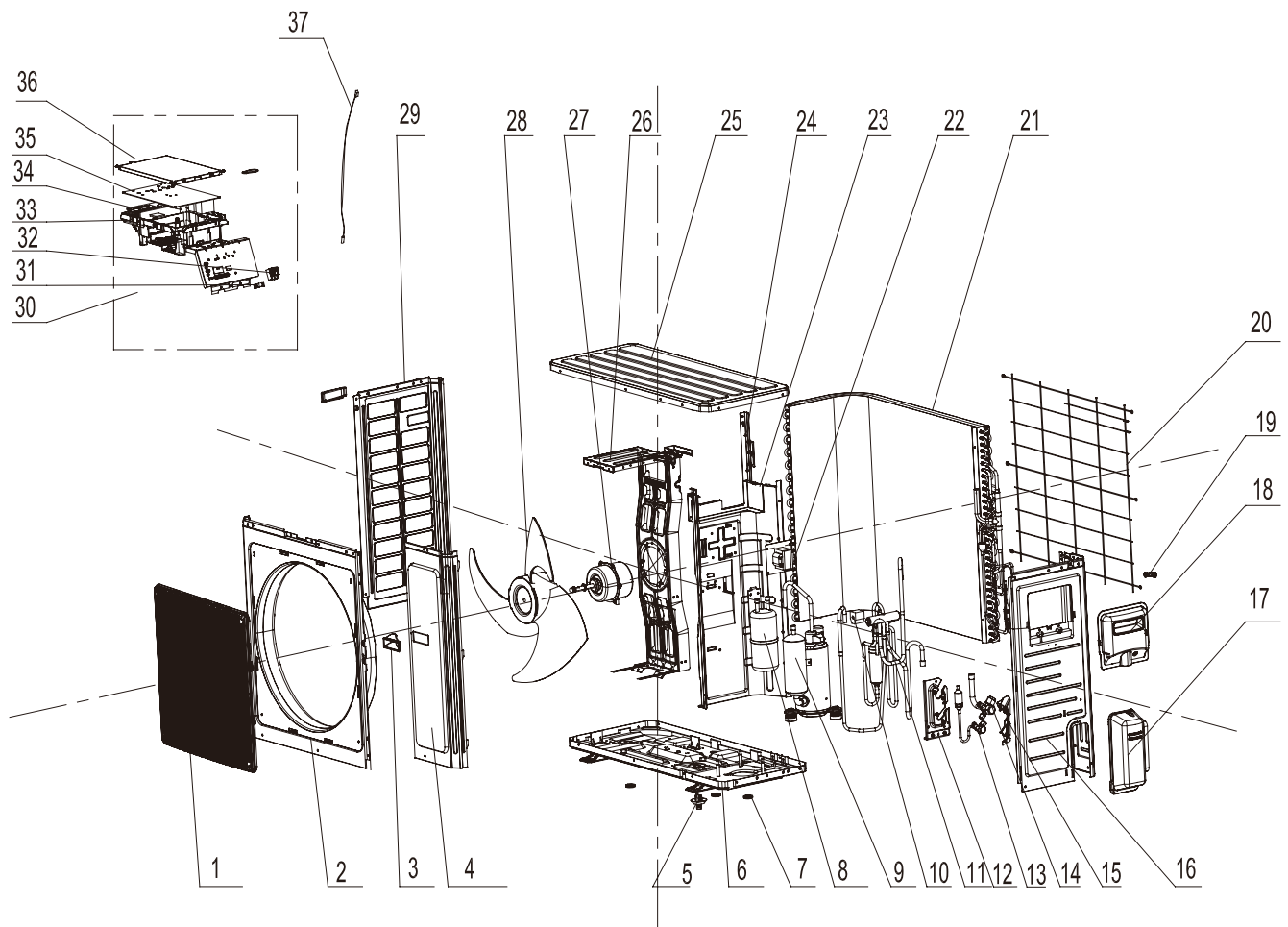
GWH18RC-K3DBA5E/O



NO.	Description	Part Code	Qty
		GWH18RC-K3DBA5E/O	
		Product Code	
		CB304W01600	
1	Fan Motor	1501506402	1
2	Terminal Board	42010194	1
3	Electric Box	20113027	1
4	Radiator	49010252	1
5	Main Board	30148799	1
6	Electric Box Assy	02613949	1
7	Left Handle	26233053	1
8	Left Side Plate	01305093P	1
9	Motor Support Sub-Assy	01705036	1
10	Coping	01255005P	1
11	Reactor	43130025	1
12	Clapboard Sub-Assy	01232902	1
13	Condenser Assy	01163487	1
14	Rear Grill	/	0
15	Temperature Sensor	39000072	1
16	Handle	26233053	1
17	Cut off Valve Sub-Assy	07133058	1
18	Cut off Valve	07130239	1
19	Valve Support Sub-Assy	01715010P	1
20	Right Side Plate	0130509402P	1
21	Capillary Sub-assy	81020167	1
22	4-Way Valve Assy	03073116	1
23	Magnet Coil	4300040033	1
24	Compressor and Fittings	00105249G	1
25	Chassis Sub-assy	02803323P	1
26	Drainage Connector	/	0
27	Drainage hole Cap	/	0
28	Axial Flow Fan	10335008	1
29	Front Panel	01535013P	1
30	Front Grill	22415002	1

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GWH24RD-K3DBA5E/O GWH24RD-K3DBA2A/O



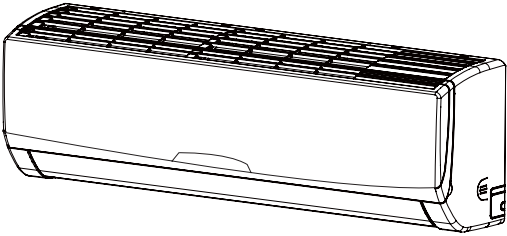
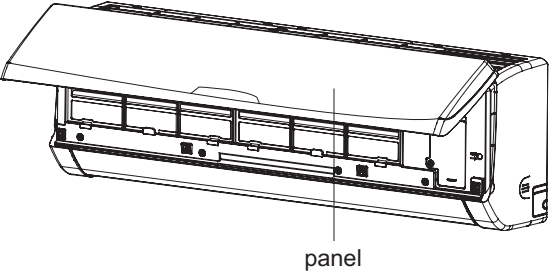
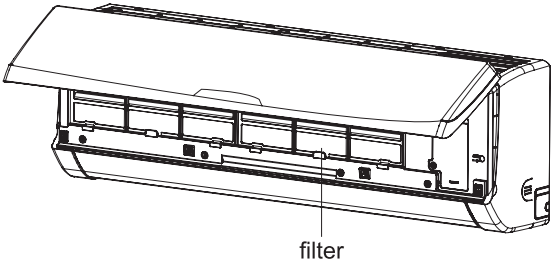
No.	Description	Part Code		Qty
		GWH24RD-K3DBA5E/O	GWH24RD-K3DBA2A/O	
	Product Code	CB304W01500	CB301W01900	
1	Front Grill	22415003	22413026	1
2	Cabinet	01435004P	01435004P	1
3	left handle	26235401	26235401	2
4	Front Side Plate	01305086P	01305086P	1
5	Drainage Connector	/	/	/
6	Chassis Sub-assy	02803316P	02803315P	1
7	Drainage hole Cap	/	/	/
8	Gas-liquid Separator Assy	/	/	/
9	Compressor and fittings	0010524501G	00105251	1
10	Magnet Coil	4300040033	4300040045	1
11	4-Way Valve Assy	03073124	03025497	1
12	Valve Support Sub-Assy	0171501201P	0170506101P	1
13	Cut off Valve Sub-Assy	07133812	07133934	1
14	Cut off Valve	07133157	07130239	1
15	Baffle(Valve Support)	01365435P	/	1
16	Right Side Plate	0130504401P	0130504401P	1
17	Valve cover	22245003	22245003	1
18	Big Handle	26235001	26235001	1
19	Wiring Clamp	26115004	26115004	1
20	Rear Grill	/	/	/
21	Condenser Assy	01103000039	01103000145	1
22	Reactor	43130024	43130024	1
23	Clapboard Assy	01235040	01235091	1
24	Condenser Support Plate	01175092	01175092	1
25	Coping	01255006P	01255006P	1
26	Motor Support Sub-Assy	01705025	01705025	1
27	Fan Motor	1501403402	1501403402	1
28	Axial Flow Fan	10335014	10335014	1
29	Left Side Plate	01305043P	01305043P	1
30	Electric Box Assy	02613942	01403000003	1
31	Wire Clamp	71010102	71010102	1
32	Terminal Board	42010194	42010194	1
33	Electric Box	20115002	20115003	1
34	Radiator	49015215	49015215	1
35	Main Board	30138000079	30138000118	1
36	Insulated Board (Cover of Electric Box)	20125002	20125002	1
37	Temperature Sensor	39000072	39000072	1

Above data is subject to change without notice.

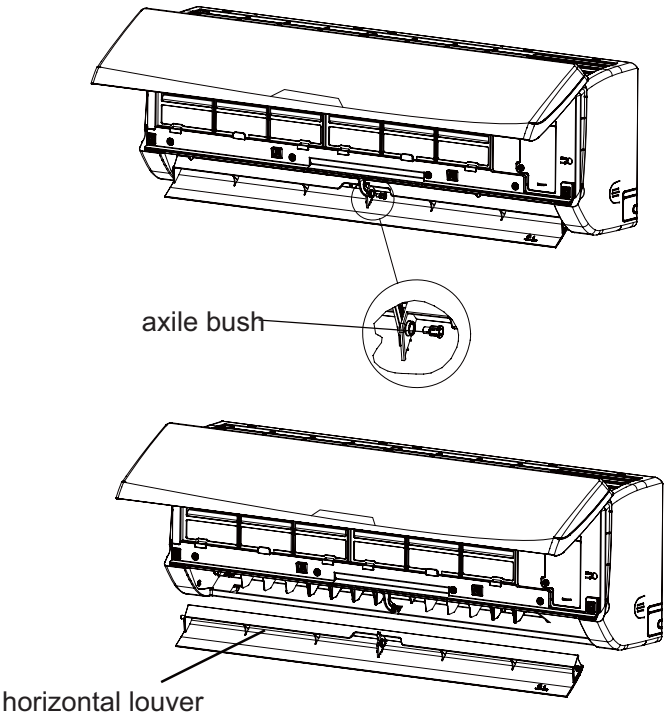
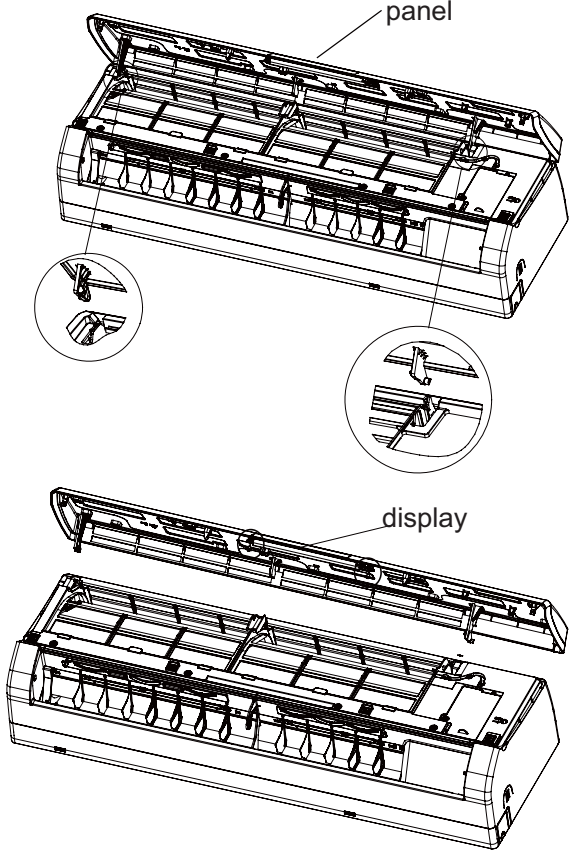
# 11. Removal Procedure

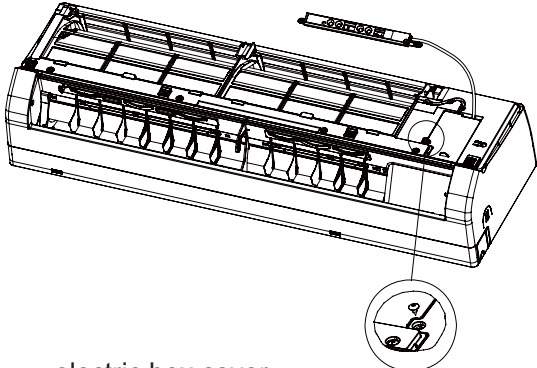
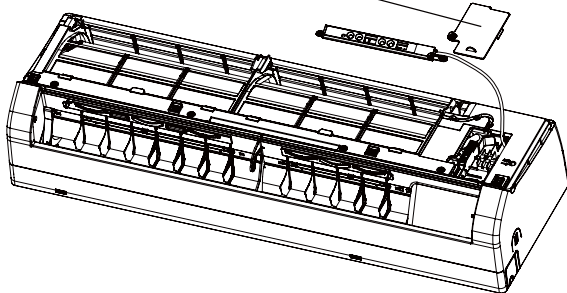
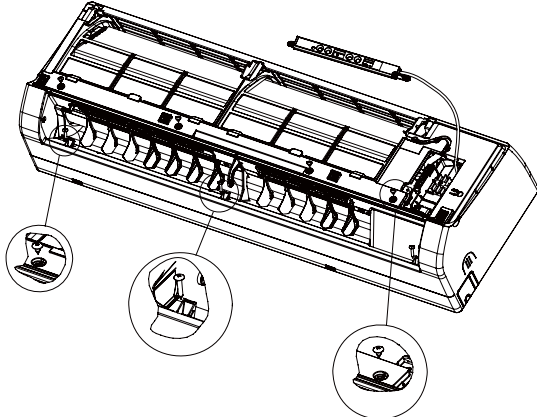
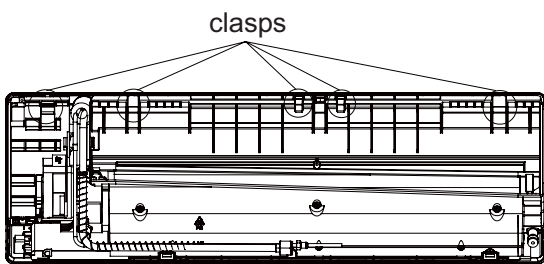
 **Caution:** discharge the refrigerant completely before removal.

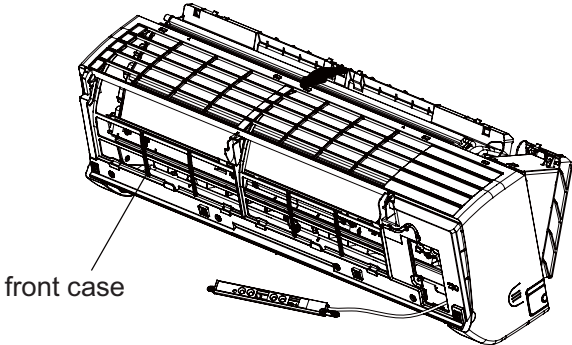
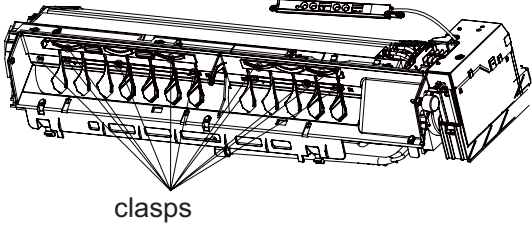
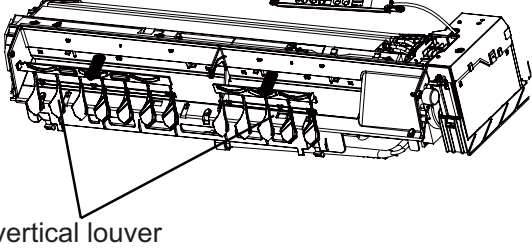
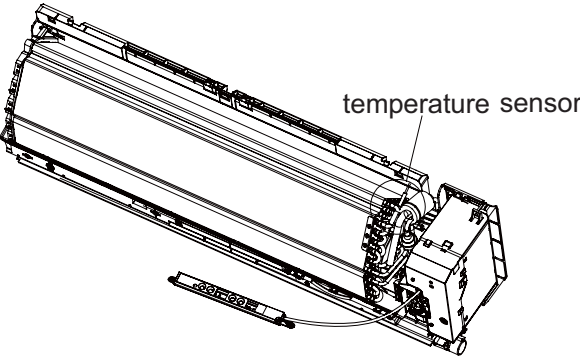
## 11.1 Removal Procedure of Indoor Unit

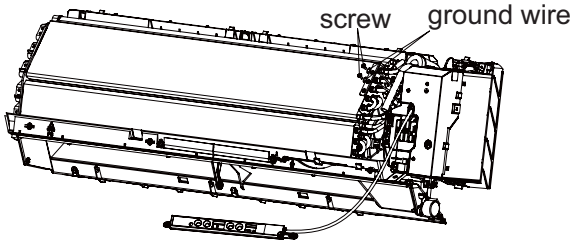
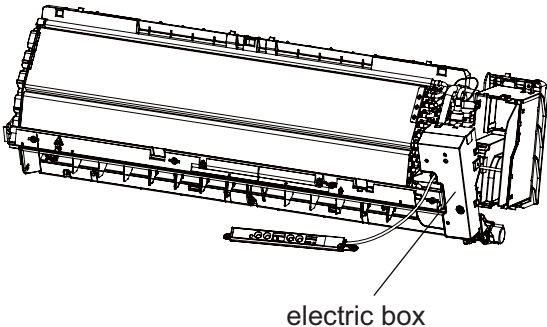
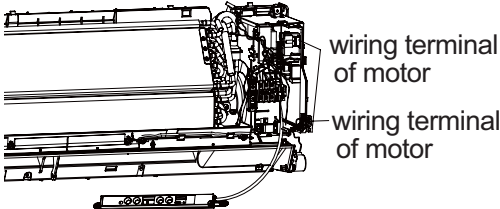
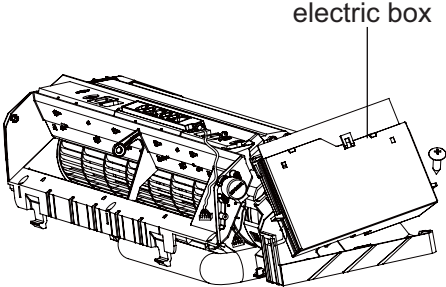
Steps	Procedure	
1. Before disassembly		
	Before disassembly	
2. Remove the filter		 
1	Open the front panel.	
2	Push the filter upward and then pull it outward to remove it.	

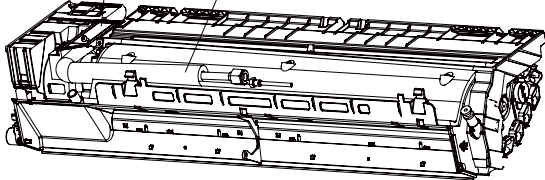
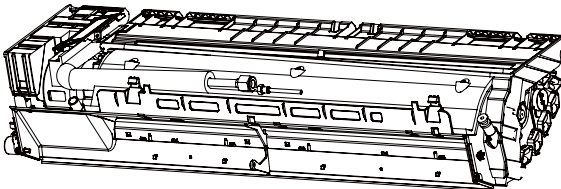
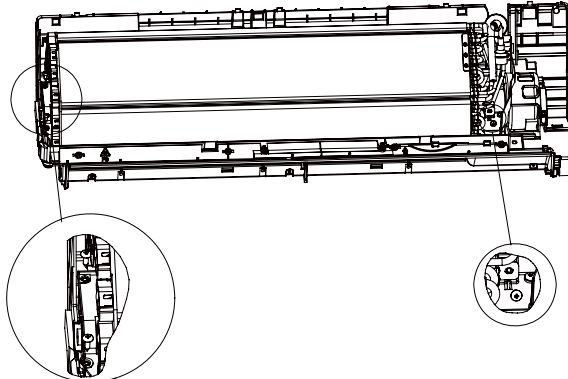


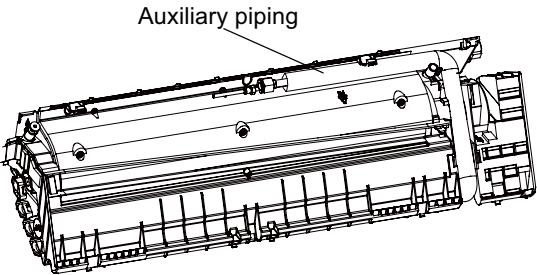
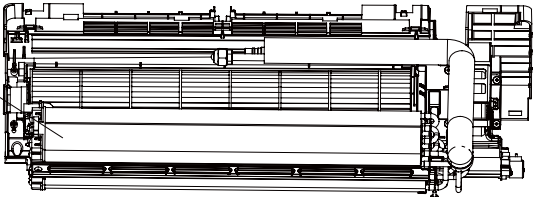
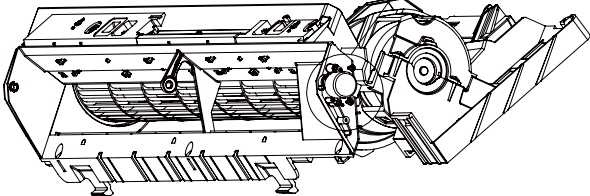
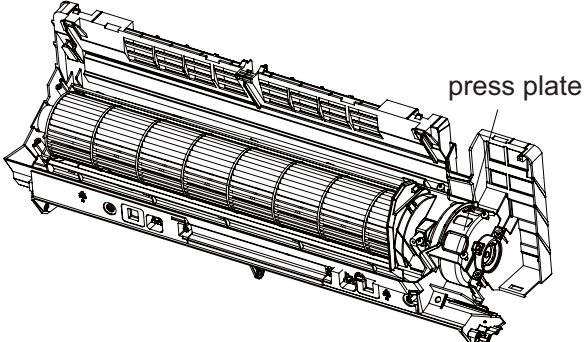
Steps		Procedure
3. Remove the horizontal louver		
1	Remove the axile bush on the horizontal louver.	
2	Pull the horizontal louver outward to remove it.	
4. Remove the panel		
1	Loosen the screws fixing the indicator. Remove the indicator.	
2	Along the groove fixing front panel, slide the rotor shaft outward to remove the front panel.	

Steps	Procedure	
5. Remove the electric box cover		
1	Loosen the screw of the electric box cover.	
2	Remove the electric box cover.	
6. Remove the front case		
1	Open the screw cap on the front case. Remove the screws fixing the front case.	
2	Loosen the clasps of the front case.	


Steps	Procedure	
3	Remove the front case.	
7. Remove the vertical louver		
1	Loosen the 10 clasps connecting the vertical louver and bottom case subassembly.	
2	Remove the vertical louver.	
8. Remove the electric box subassembly		
1	Disconnect the indoor tube temperature sensor.	

Steps	Procedure	
2	Remove the screws at the joint of the ground wire and evaporator.	 <p>The diagram shows a side view of the evaporator unit. A screw is being removed from the joint where the ground wire is connected to the evaporator. Labels point to the 'screw' and the 'ground wire'.</p>
3	Loosen the clasp at the joint of the electric box cover and the electric box.	 <p>The diagram shows the electric box cover being loosened from the electric box. A label points to the 'electric box'.</p>
4	Disconnect the wiring terminal of the motor and step motor on the electric box.	 <p>The diagram shows the wiring terminals of the motor and step motor being disconnected from the electric box. Labels point to the 'wiring terminal of motor' and the 'wiring terminal of motor'.</p>
5	Loosen the screws fixing the electric box and remove the electric box.	 <p>The diagram shows the electric box being loosened from the main unit. A label points to the 'electric box'.</p>

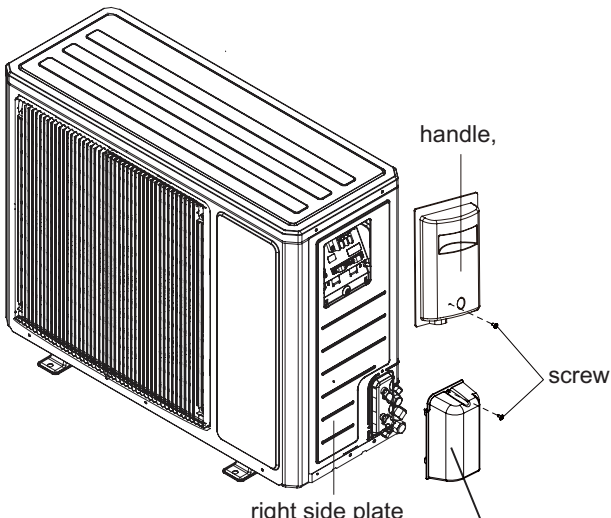
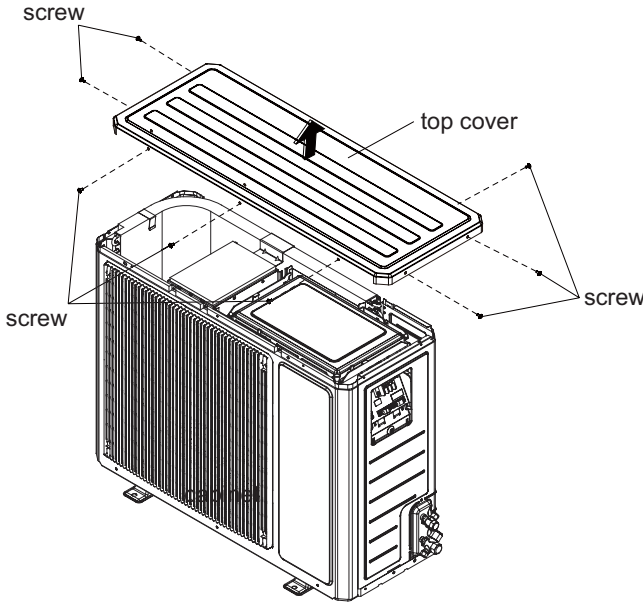
Steps		Procedure
9. Remove press plate of connecting pipe		
1	Remove the screws of the press plate of connecting pipe.	<div>Pipe Clamp    Auxiliary piping</div>  
2	Remove press plate of connecting pipe.	
10. Remove the evaporator		
1	Remove the screws at the joint of the evaporator and bottom case.	

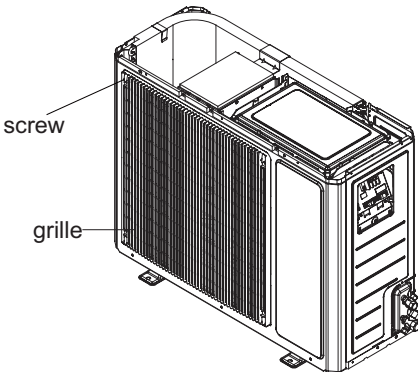
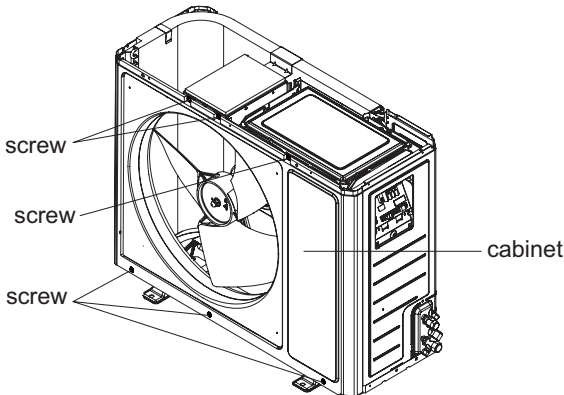
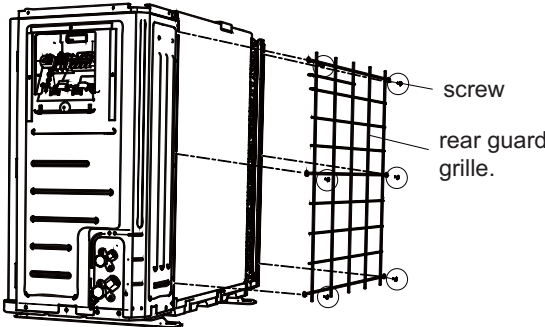
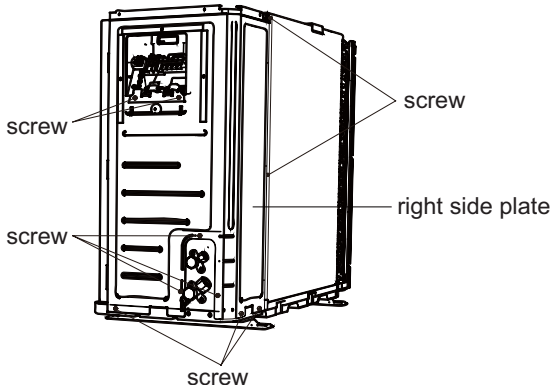
Steps	Procedure	
2	Adjust the pipe slightly to separate the connecting pipe and the evaporator.	 <p>Auxiliary piping</p>
3	Remove the evaporator.	 <p>evaporator</p>
11. Remove motor and cross flow fan		
1	Remove the screw of the step motor and remove the step motor.	 <p>step motor</p>
2	Remove the screw of the motor press plate. Remove the press plate.	 <p>press plate</p>

# 11.2 Removal Procedure of Outdoor Unit

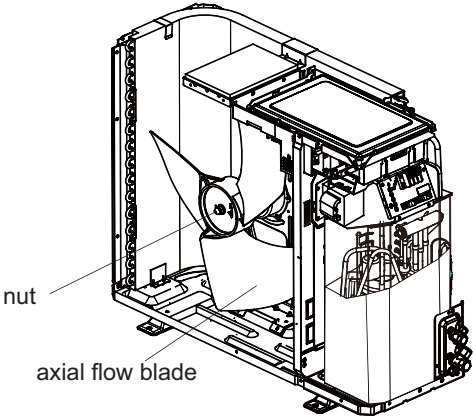
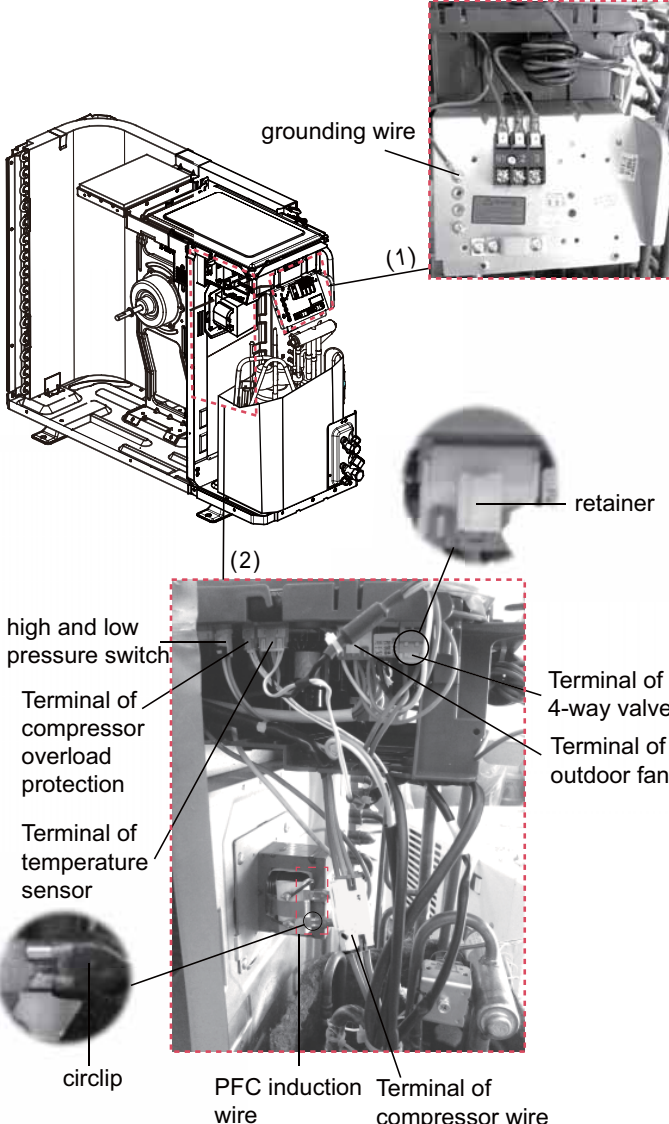
 **Warning:** Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

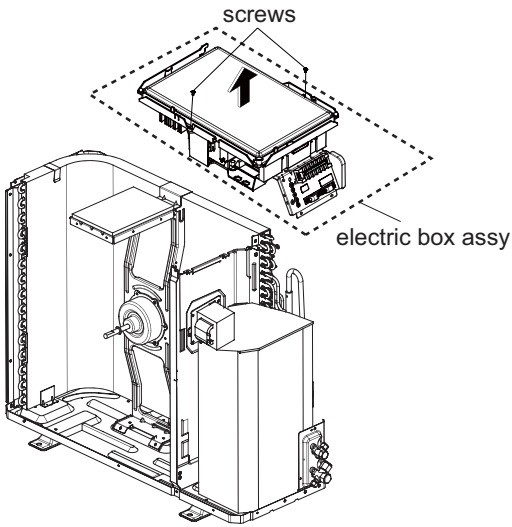
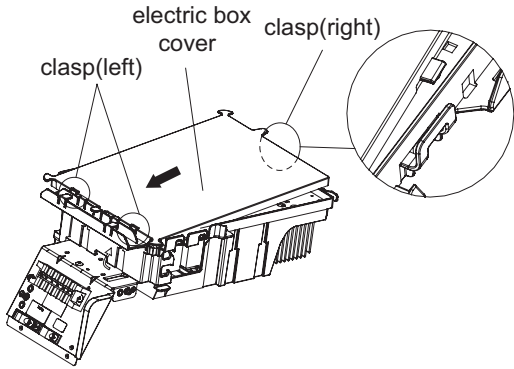
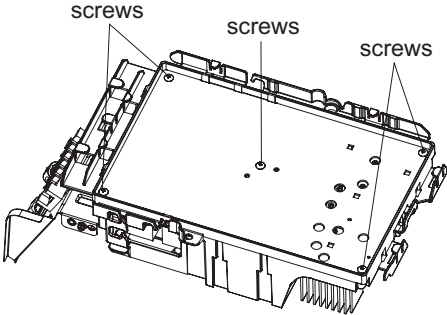
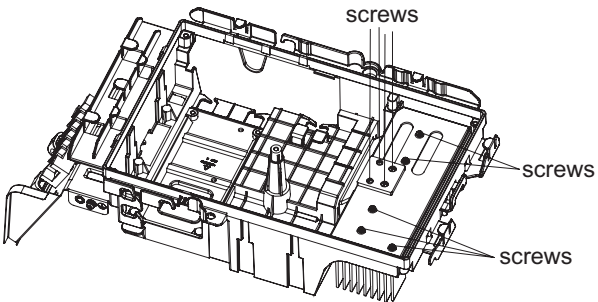
GWH18RC-K3DBA5E/O

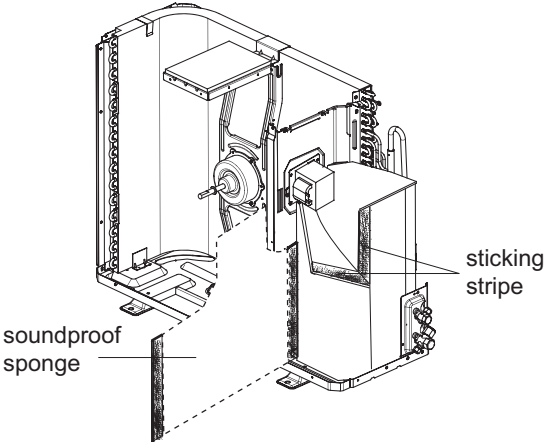
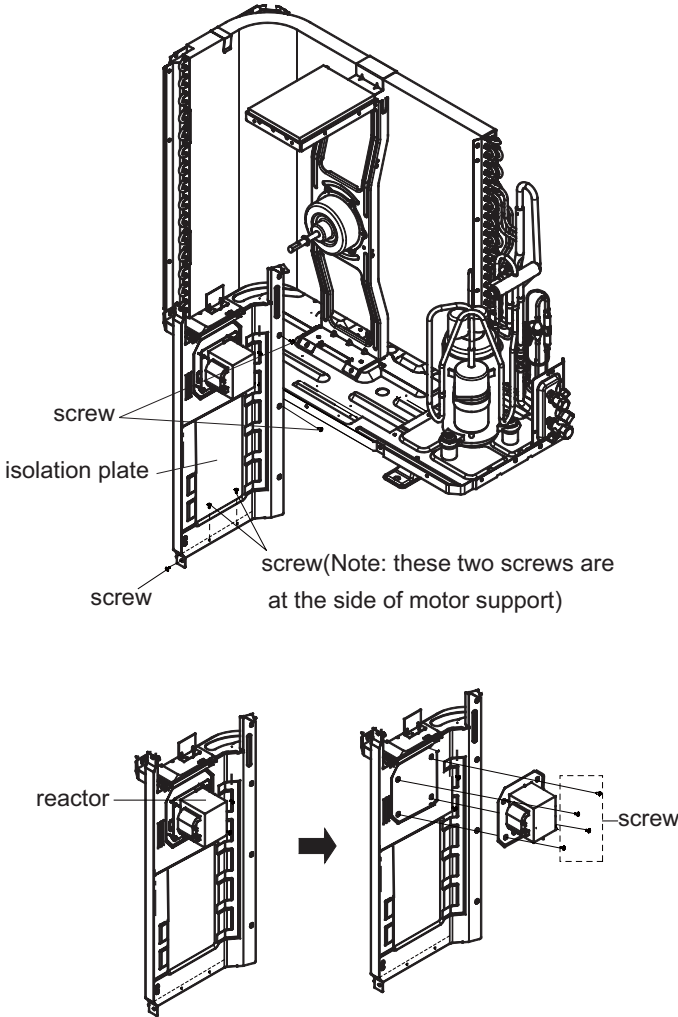
Step	Procedure	
1. Remove big handle, valve cover and top cover		
a	<p>Remove the screw connecting the big handle and right side plate, and then remove the big handle.</p> <p>Remove the screw connecting the valve cover and right side plate, and then remove the valve cover.</p>	
b	<p>Remove the screws connecting the top cover with outer case, right side plate and left side plate; lift the top cover upwards to remove it.</p>	

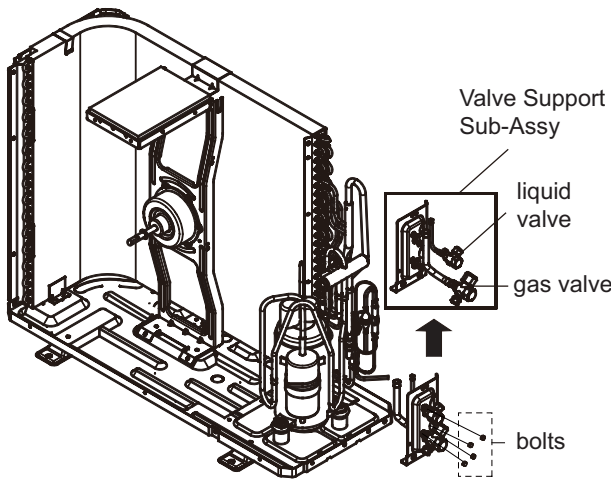
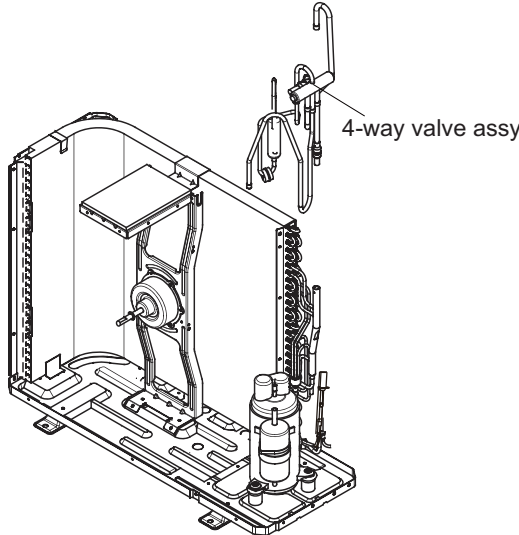
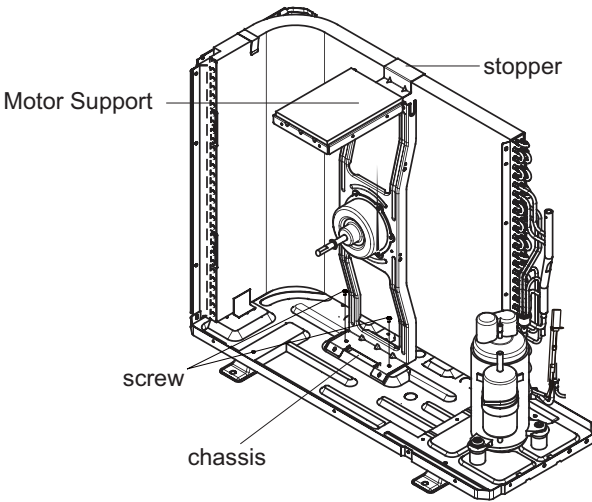
Step	Procedure	
2. Remove grille and cabinet		
a	Remove the 4 screws connecting the grille and outer case, and then remove the panel grille.	
b	Remove the screws connecting the outer case with motor support, isolation plate and chassis; lift the outer case upwards; loosen the clasps of outer case with right side plate and left side plate, and then remove the outer case.	
3. Remove rear guard grille and right side plate		
a	Remove the 3 screws connecting the grille with right side plate and left side plate, and then remove the rear guard grille.	
b	Remove the screws connecting the right side plate with electric box assy, valve support, chassis and condenser side plate, and then remove the right side plate.	

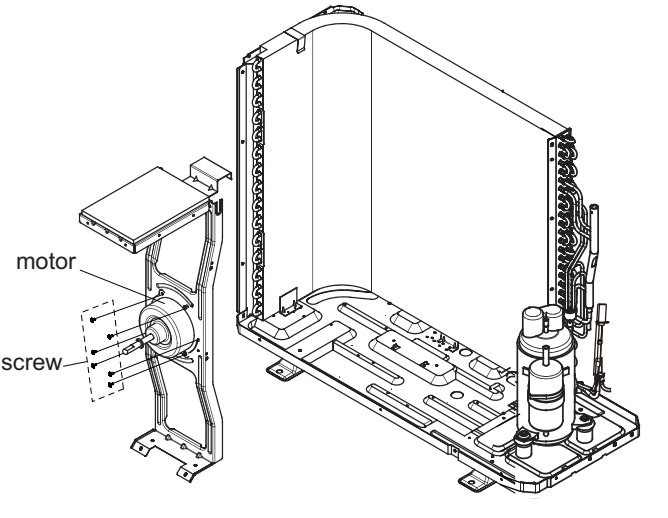
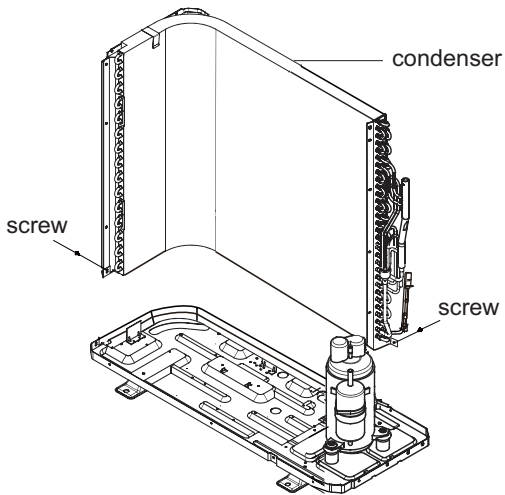
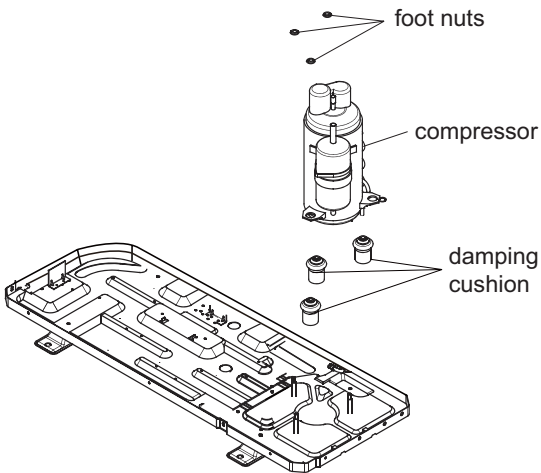


Step	Procedure
4. Remove axial flow blade	
	<p data-bbox="236 465 738 528">Remove the nut fixing axial flow blade and then remove the blade.</p>  <p data-bbox="903 591 938 613">nut</p> <p data-bbox="938 667 1098 689">axial flow blade</p>
5.Remove electric box assy	
<p data-bbox="140 1032 156 1055">a</p> <p data-bbox="236 1032 738 1117">Remove the grounding wire screw on the electric box assy and then remove the grounding wire. (See fig 1)</p> <p data-bbox="140 1406 156 1429">b</p> <p data-bbox="236 1406 738 1648">Disconnect the wiring terminals of reactor, compressor, high and low pressure switch, compressor overload protector, temperature sensor, outdoor fan motor and 4-way valve. (See fig 2) Note: keep pressing the circlip when disconnecting the wiring terminal of reactor; keep pressing the retainer when disconnecting other wiring terminals.</p> <p data-bbox="140 1742 156 1765">c</p> <p data-bbox="236 1742 675 1765">Remove the wire inside the wiring groove.</p>	 <p data-bbox="1070 949 1225 972">grounding wire</p> <p data-bbox="1193 1077 1225 1099">(1)</p> <p data-bbox="1034 1375 1066 1397">(2)</p> <p data-bbox="1385 1323 1465 1346">retainer</p> <p data-bbox="815 1451 975 1496">high and low pressure switch</p> <p data-bbox="815 1518 959 1630">Terminal of compressor overload protection</p> <p data-bbox="815 1653 959 1720">Terminal of temperature sensor</p> <p data-bbox="874 1899 938 1921">circlip</p> <p data-bbox="1023 1906 1134 1951">PFC induction wire</p> <p data-bbox="1182 1906 1294 1951">Terminal of compressor wire</p> <p data-bbox="1358 1503 1481 1525">Terminal of 4-way valve</p> <p data-bbox="1358 1570 1481 1592">Terminal of outdoor fan</p>

Step	Procedure	
d	Remove the 2 screws fixing the electric box assy and then lift the electric box assy upwards to remove it.	
e	Push the electric box cover in the direction of arrow to make the clasp at the right side separate from the groove; then pull it in the opposite direction to make the clasp at the left side separate from the groove and then remove the electric box cover.	
f	Remove the 5 screws connecting the mainboard and then remove the mainboard.	
g	Remove the 9 screws fixing the radiator and then remove the radiator.	

Step	Procedure	
6.remove the soundproof sponge.		
	Tear off the sticking stripe and then remove the soundproof sponge.	
7.remove the isolation plate and reactor		
a	Remove the 2 screws connecting the isolation plate and condenser side plate; remove the 3 screws connecting the isolation plate and chassis, and then remove the isolation plate.	
b	Remove the 4 screws connecting the reactor and isolation plate, and then remove the reactor	

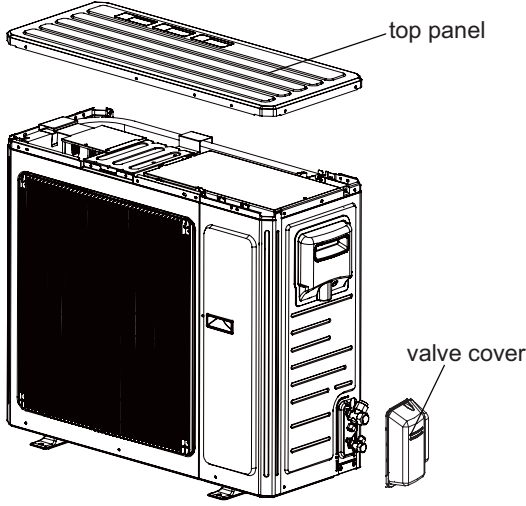
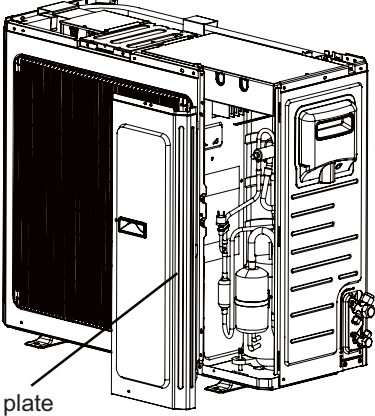
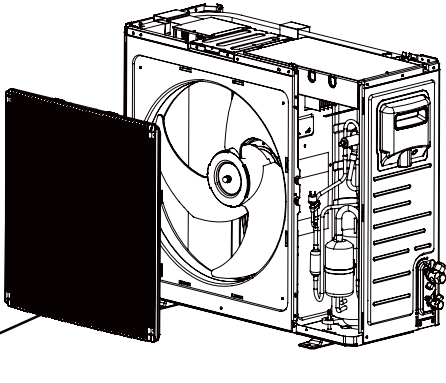
Step	Procedure	
8.Valve Support Sub-Assy		
	<p>Unsolder the welding joint connecting the valve with capillary and condenser; unsolder the welding joint connecting the gas valve and air-return pipe; remove the 2 bolts fixing the gas valve to remove the gas valve.</p> <p>Unsolder the welding joint connecting the liquid valve and Y-shaped pipe; remove the 2 bolts fixing the liquid valve to remove the liquid valve.</p> <p>Note:</p> <p>Before unsoldering the welding joint, wrap the gas valve with a wet cloth completely to avoid damage to the valve caused by high temperature.</p>	
9.Remove 4-way valve assy		
	<p>Unsolder the welding joints connecting the 4-way valve assy with capillary sub-assy, compressor and condenser; remove the 4-way valve.</p> <p>Note:</p> <p>Before unsoldering the welding joint, wrap the 4-way valve with a wet cloth completely to avoid damage to the valve caused by high temperature.</p>	
10.Motor Support Sub-Assy and motor		
a	<p>Remove the 2 screws connecting the motor support and chassis, and then loosen the stopper to remove the motor support.</p>	

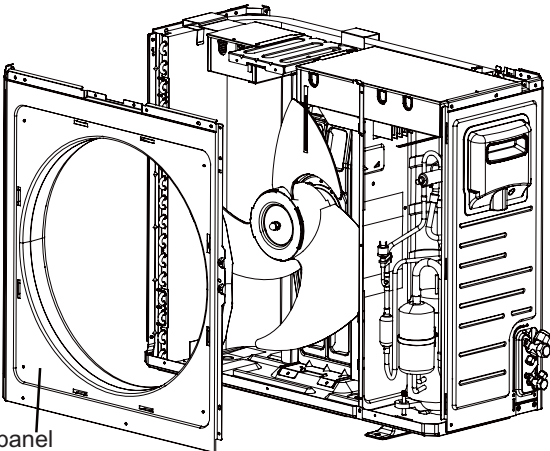
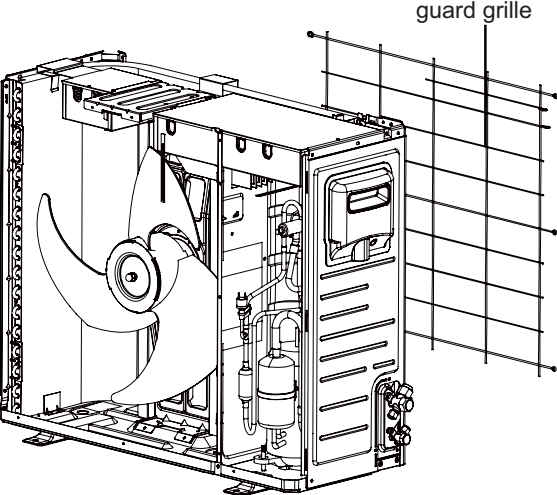
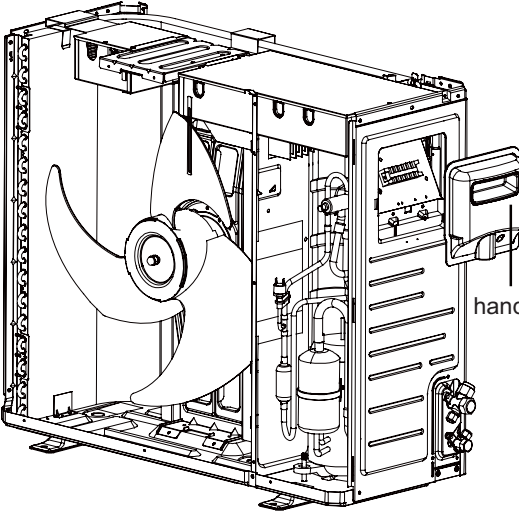
Step	Procedure	
b	Remove the 6 screws fixing the motor and then remove the motor.	
11.Remove condenser		
12.Remove compressor		
	<p>Remove the 3 foot nuts fixing compressor and then lift the compressor upwards to remove the compressor and damping cushion.</p> <p>Note: Keep the ports of discharge pipe and suction pipe from foreign objects.</p>	

GWH24RD-K3DBA5E/O GWH24RD-K3DBA2A/O

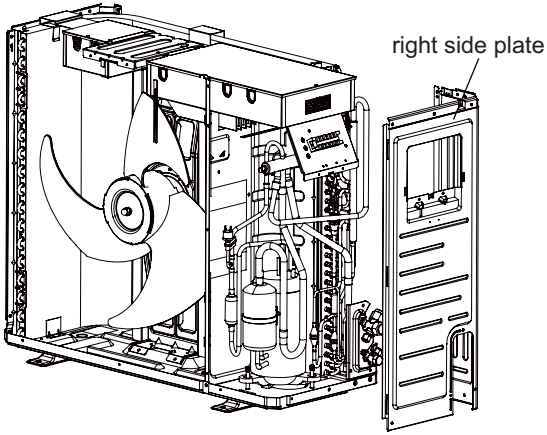
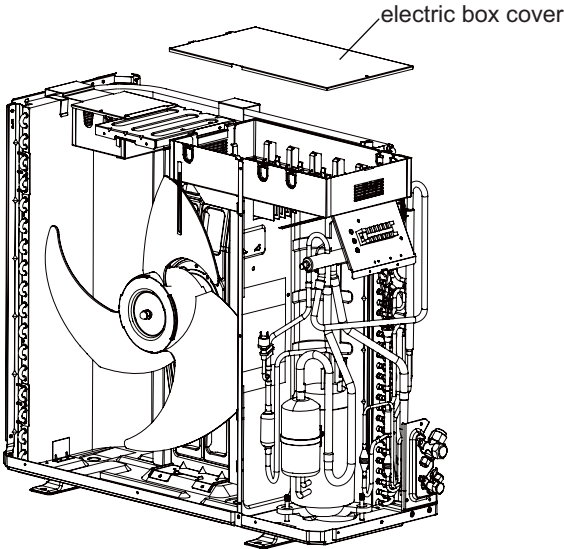
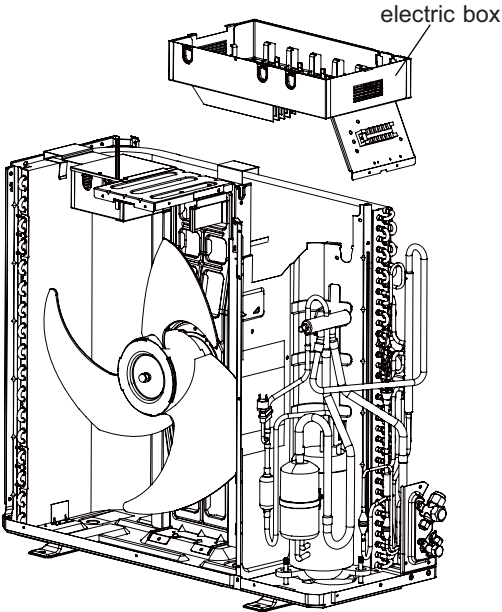


**Warning:** Be sure to wait for a minimum of 20 minutes after turning off all power supplies and discharge the refrigerant completely before removal.

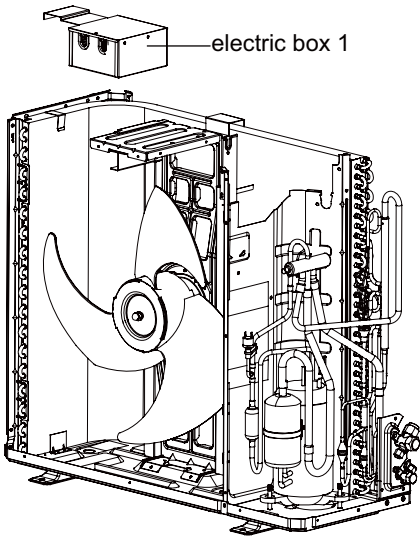
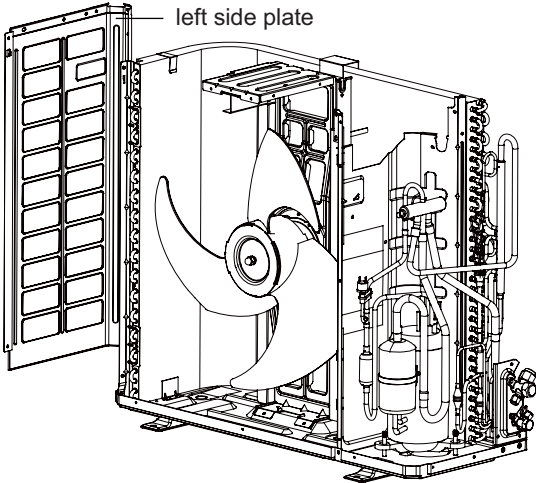
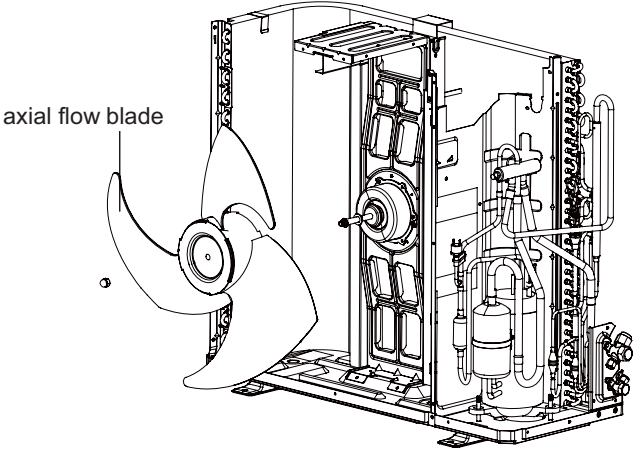
Steps		Procedure
1. Remove top cover and front side plate		 
a	Use the screwdriver to remove the screws connecting the top panel and panel and side panels. Remove the top panel. Loosen the screws fixing the valve cover and then remove the valve cover.	
b	Loosen the screws connecting the front side panel and mask and chassis. Remove the front side panel.	
2. Remove grille		
	Twist off the screws connecting the grille and panel, and then remove the grille.	

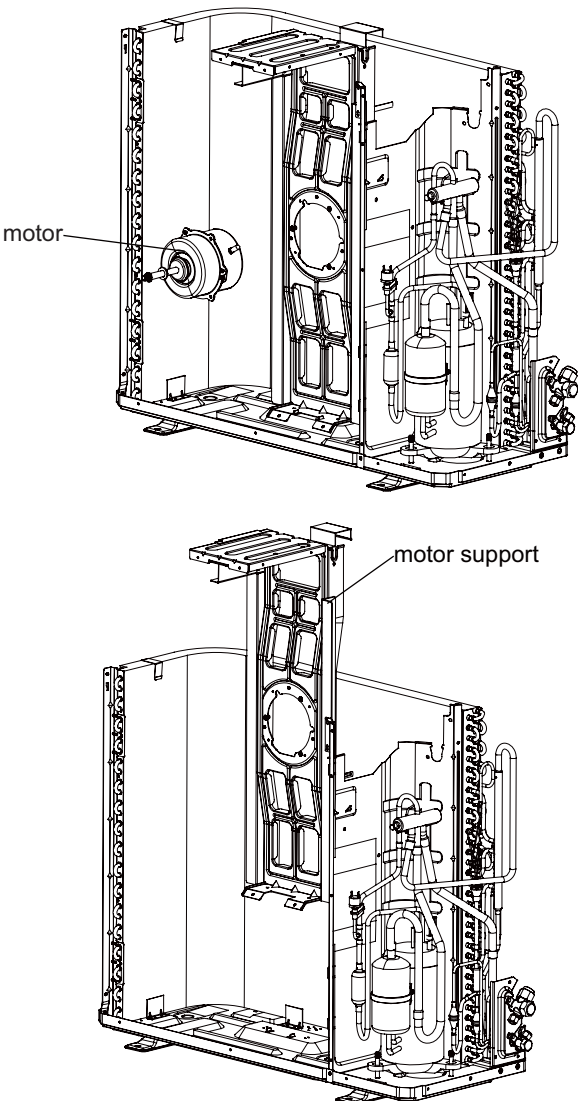
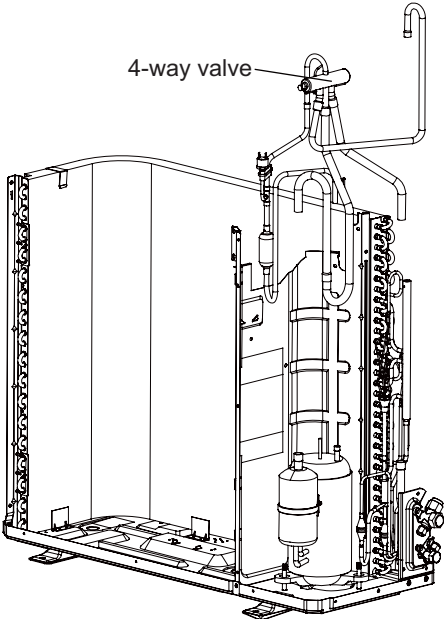
Steps	Procedures
3. Remove panel	<p data-bbox="161 488 564 568">Twist off the screws connecting the panel, chassis and motor support with screwdriver, and then remove the panel.</p>  <p data-bbox="810 779 863 801">panel</p>
4. Remove guard grille	<p data-bbox="161 1137 564 1196">Twist off the screws fixing the guard grille and then remove the guard grille.</p>  <p data-bbox="1187 949 1305 972">guard grille</p>
5. Remove handle	<p data-bbox="161 1711 564 1769">Twist off the screws fixing the handle and then remove the handle.</p>  <p data-bbox="1315 1800 1385 1823">handle</p>

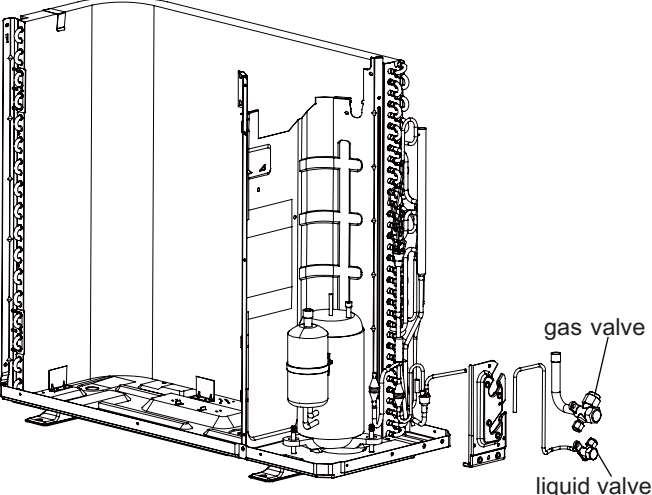
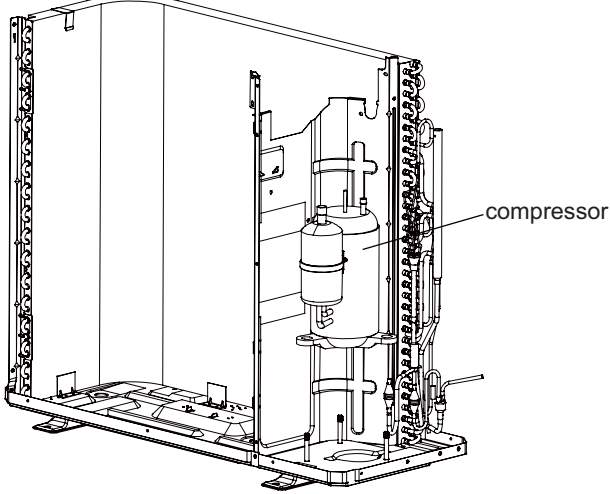
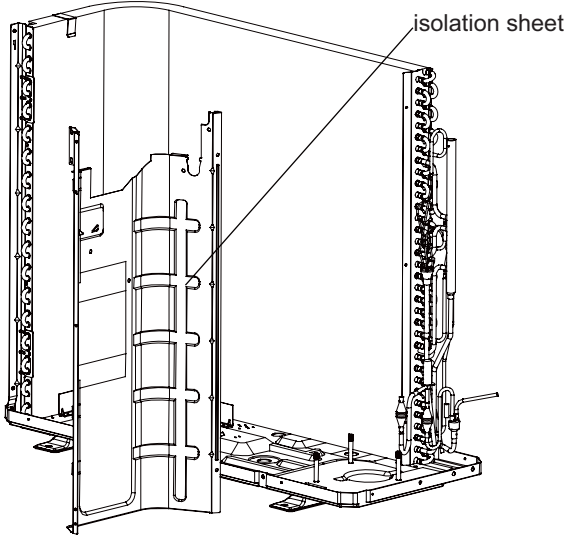


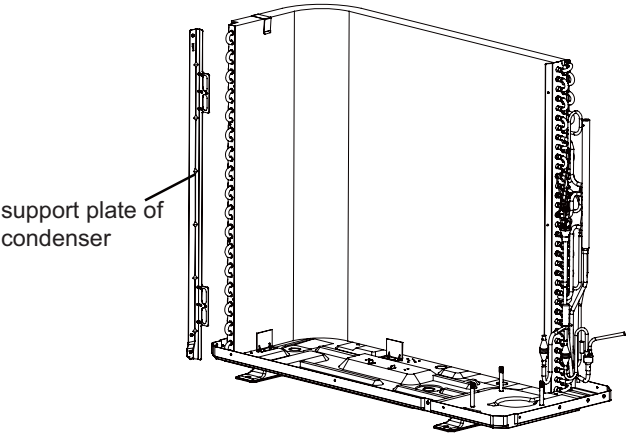
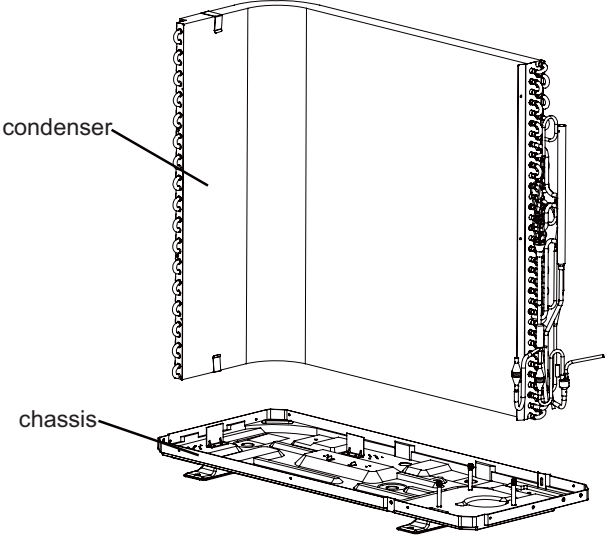
Steps	Procedure
6. Remove right side plate	
7. Remove electric box	<div><div><p>a Twist off the screws on electric box cover with screwdriver, and then remove the electric box cover.</p></div><div><p>b Twist off the screws on electric box, cut off the tieline with scissors or pliers, pull out the wiring terminal, pull it upwards to remove the electric box.</p></div></div>



Steps	Procedure	
c	Twist off the screws between electric box 1 and left side plate with screwdriver, pull it upwards to remove the electric box 1.	 <p>The diagram shows a side view of the unit's internal components. An 'electric box 1' is shown being lifted away from the top of the chassis. The box is a small, rectangular metal enclosure with two screws visible on its front face. The chassis contains a large axial flow fan, various pipes, and other mechanical parts.</p>
8. Remove left side plate		 <p>The diagram shows the left side plate of the unit being removed. The plate is a rectangular metal frame with a grid of rectangular openings. It is shown being pulled away from the left side of the chassis. The internal components, including the fan and pipes, are visible through the opening.</p>
9. Remove axial flow blade		 <p>The diagram shows the axial flow blade being removed from the unit. The blade is a large, curved metal piece with a central hub. It is shown being pulled away from the fan assembly. The fan assembly is mounted on the chassis, and the blade is being removed from its hub. The label 'axial flow blade' points to the blade.</p>

Steps		Procedure
10. Remove motor and motor support		 <p>The diagram consists of two parts. The top part shows a side view of the unit with the motor highlighted by a label 'motor' and a leader line. The bottom part shows the same unit with the motor support structure highlighted by a label 'motor support' and a leader line.</p>
a	Twist off the tapping screws fixing the motor, pull out the pin of leading wire for motor and then remove the motor.	
b	Twist off the tapping screws fixing the motor support, pull it upwards and then remove the motor support.	
11. Remove 4-way valve		 <p>The diagram shows a side view of the unit with the 4-way valve highlighted by a label '4-way valve' and a leader line.</p>
	Unsolder the pipeline between compressor, condenser, gas and liquid valve, and then remove the 4-way valve. (note: release all refrigerant before unsoldering).	

Steps	Procedure
<p>12. Remove gas valve and liquid valve</p> <p>Twist off the 2 bolts fixing the valve sub-assy. Unsolder the soldering joint between gas valve and air-return pipe and then remove the gas valve. (note: when unsoldering the soldering joint, wrap the gas valve with wet cloth completely to avoid the damage to valve, and release all refrigerant completely at first). Unsolder the soldering joint between liquid valve and connection pipe of liquid valve, and then remove the liquid valve.</p>	
<p>13. Remove compressor</p> <p>Twist off the 3 foot nuts on compressor and then remove the compressor.</p>	
<p>14. Remove isolation sheet</p> <p>Twist off the screws connecting isolation sheet and end plate of condenser and chassis, and then remove the isolation sheet.</p>	

Steps	Procedure	
15. Remove support plate of condenser	<p>Twist off the screws connecting the support plate of condenser and condenser with screwdriver, and then remove the support plate of condenser.</p>	
16. Remove chassis and condenser		
	<p>Pull it upwards to separate the chassis and condenser.</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

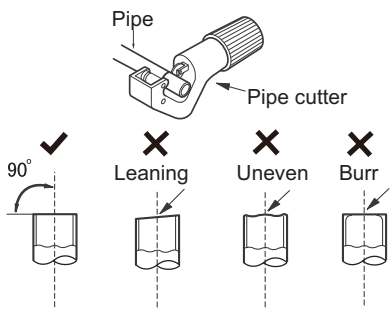
# Appendix 3: Pipe Expanding Method

**Note:**

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

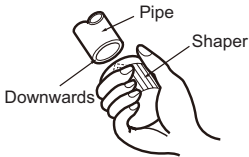
A: Cut the pipe

- 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

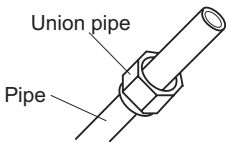
- Remove the burrs with shaper and prevent the burrs from getting into the pipe.



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.



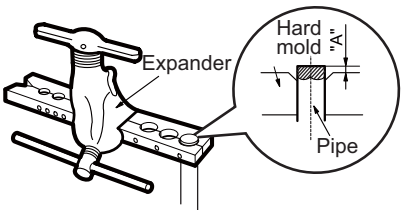
E: Expand the port

- Expand the port with expander.

**Note:**

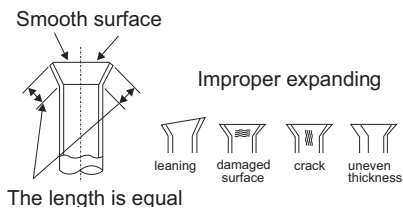
- "A" is different according to the diameter, please refer to the sheet below:

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 Ambient 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 Ambient Temperature Sensor for Indoor and Outdoor Units(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 Ambient Temperature Sensor for Indoor and Outdoor Units(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

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For product improvement, specifications and appearance in this manual are subject to change without prior notice.