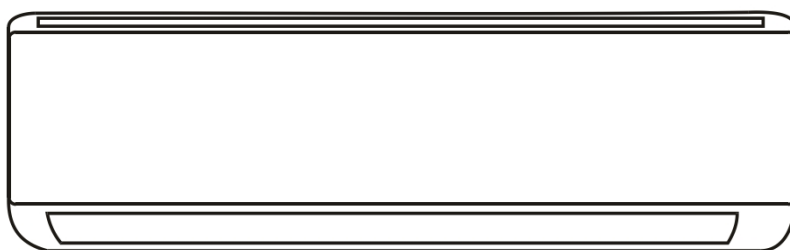


# Service Manual

## ComfortStar®



CFU12CA(I)(O)(28N)(28P)  
CFU12CD(I)(O)(28Q)(28R)  
CFU18CD(I)(O)(28S)(28T)  
CFU24CD(I)(O)(28U)(28V)  
CT32-12CA(I)(O)(27X)(27Y)  
CT32-12CD(I)(O)(27Z)(281)  
CT32-18CD(I)(O)(282)(283)  
CT32-24CD(I)(O)(284)(285)

CC32-12CA(I)(O)(286)(287)  
CC32-12CD(I)(O)(288)(289)  
CC32-18CD(I)(O)(28A)(28B)  
CC32-24CD(I)(O)(28C)(28D)  
CH32-12CA(I)(O)(28E)(28F)  
CH32-12CD(I)(O)(28G)(28H)  
CH32-18CD(I)(O)(28J)(28K)  
CH32-24CD(I)(O)(28L)(28L)

### IMPORTANT NOTE:



Read this manual carefully before operating your new air conditioning unit. Make sure to save this manual for future reference.

Please check the applicable models, technical data, F-GAS(if any) and manufacturer information from the "Owner's Manual - Product Fiche " in the packaging of the outdoor unit.

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## **Part I Technical Information**

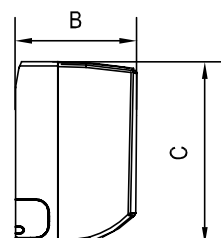
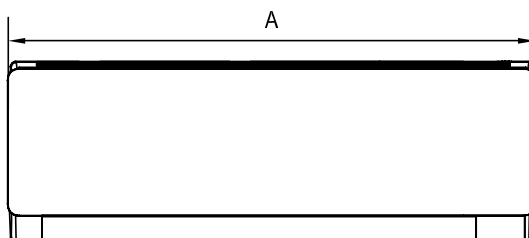
### **1. Important Notice**

This service manual is intended for use by individuals possessing adequate backgrounds of electrical, electronic and mechanical experience. Any attempt to repair the appliance may result in personal injury and property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

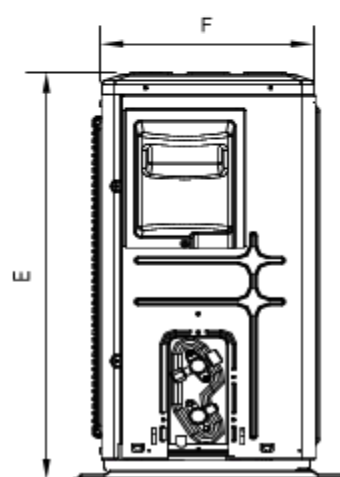
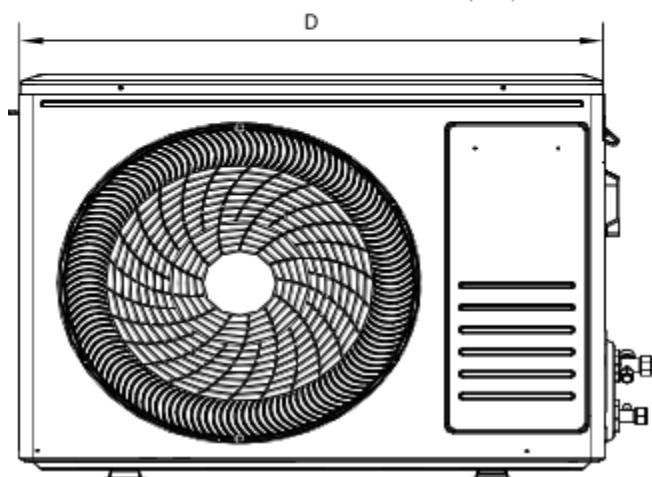
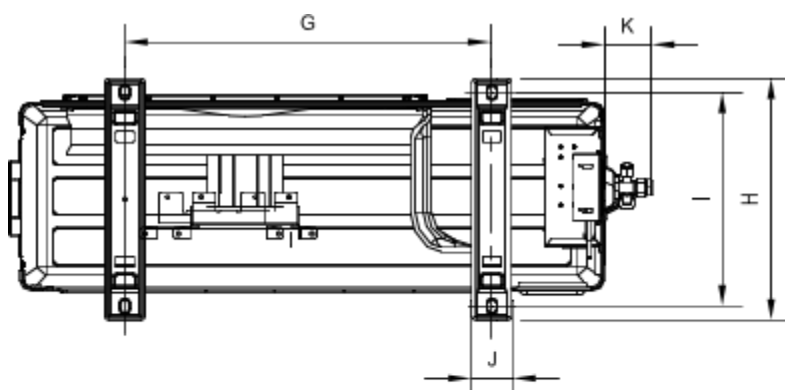
The information, specifications and parameter are subject to change due to technical modification or improvement without any prior notice. The accurate specifications are presented on the nameplate label.

## 2. Product Dimensions

### Indoor Unit:



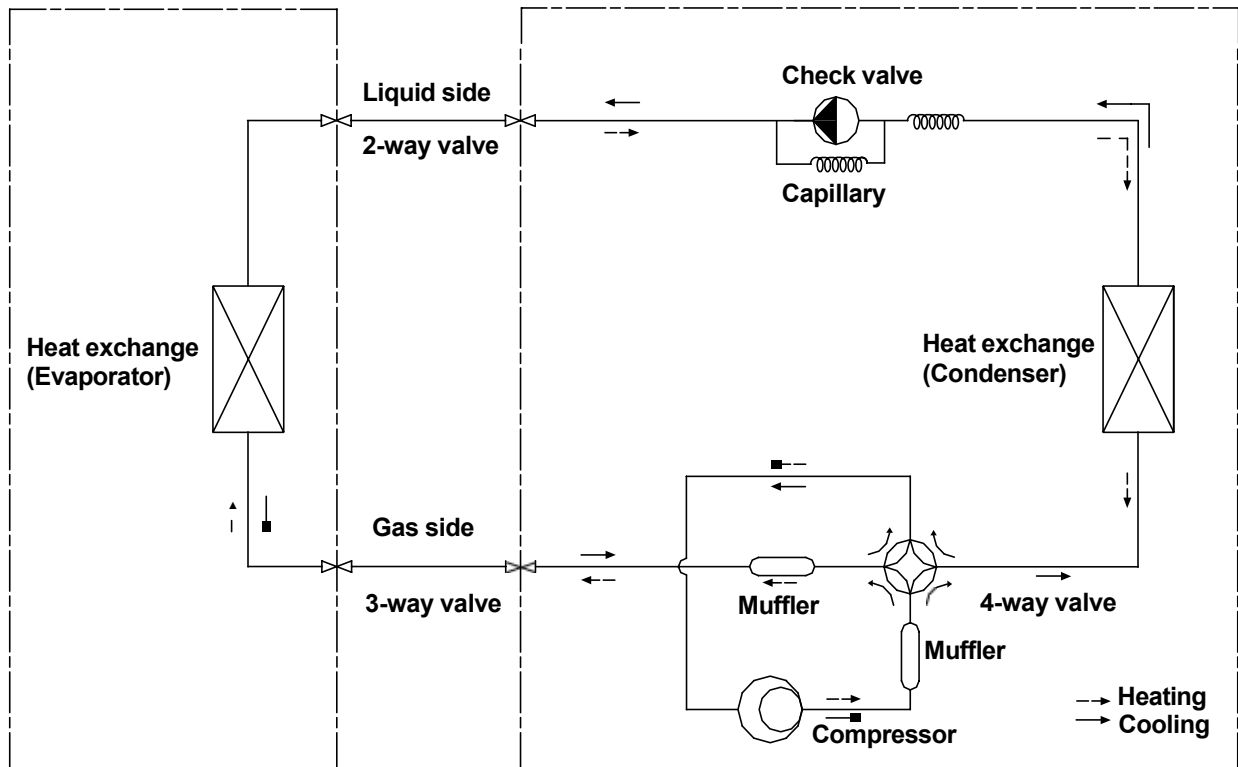
### Outdoor Unit:



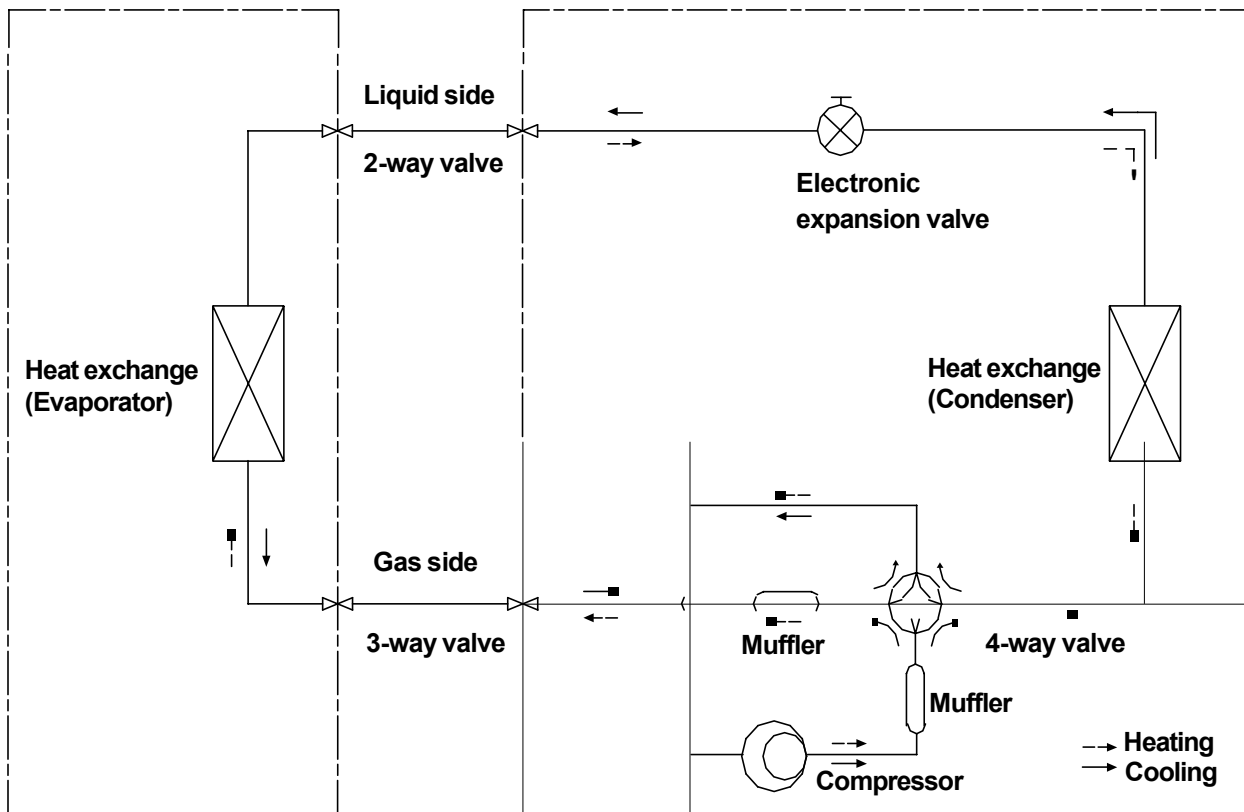
Model	Indoor unit			Outdoor unit							
	A	B	C	D	E	F	G	H	I	J	K
9K	698	190	255	660	459	224	362	276	256.2	48	52
12K (other)	765	205	305	660	510	256	470	302	278	48	53
18K (other)	970	230	310	760	550	256	508	302	278	48	57
24K (other)	1030	230	310	820	597	310	541	378	347	63	57
12K (CFU)	800	190	292	760	550	256	508	302	278	48	57
18K (CFU)	850	190	292	760	550	256	508	302	278	48	57
24K (CFU)	970	230	310	820	597	310	541	378	347	63	57

### 3. Refrigeration cycle diagram

#### Heat pump



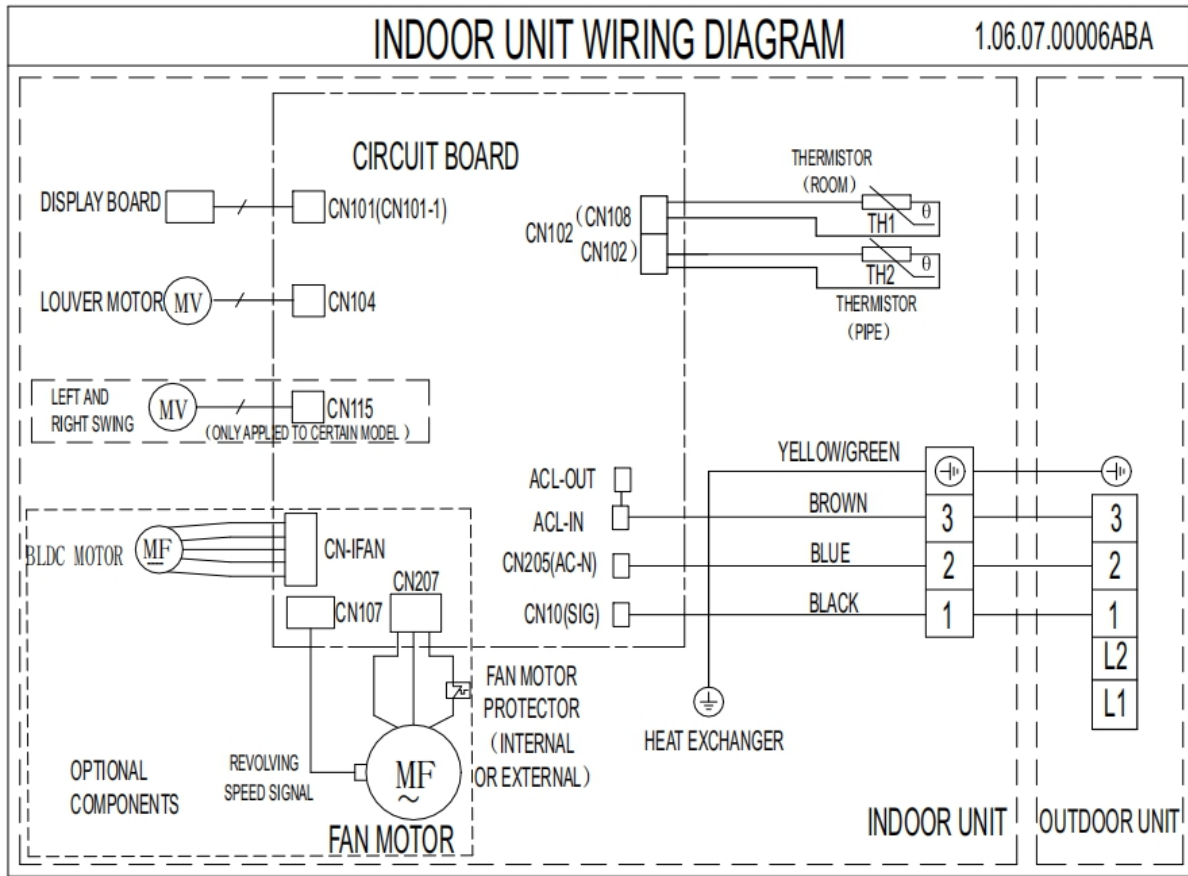
or



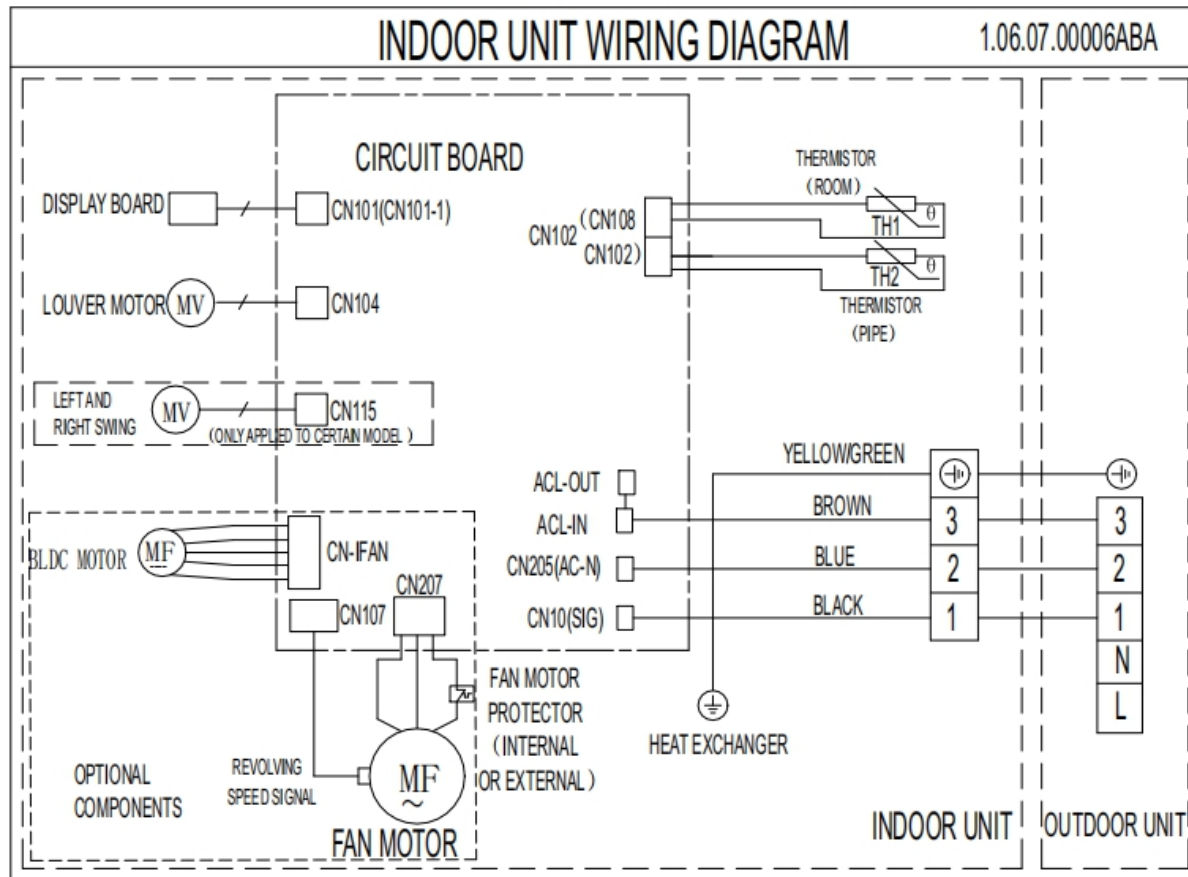
## 4. Wiring Diagram

INDOORUNIT:

230V model

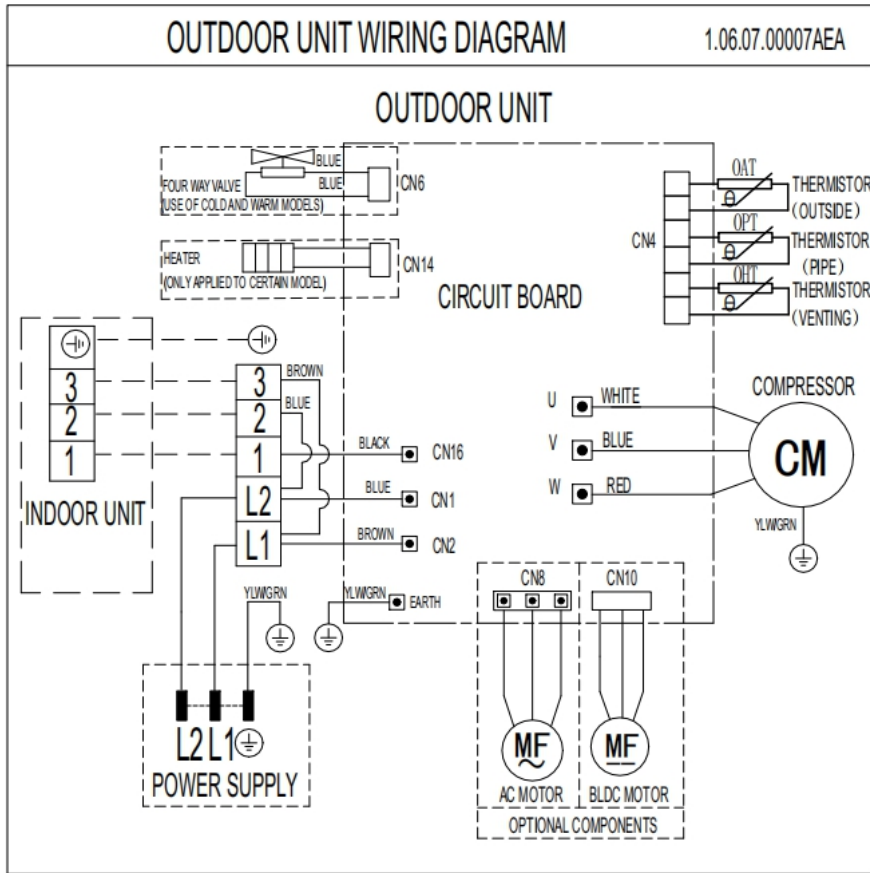


115V model

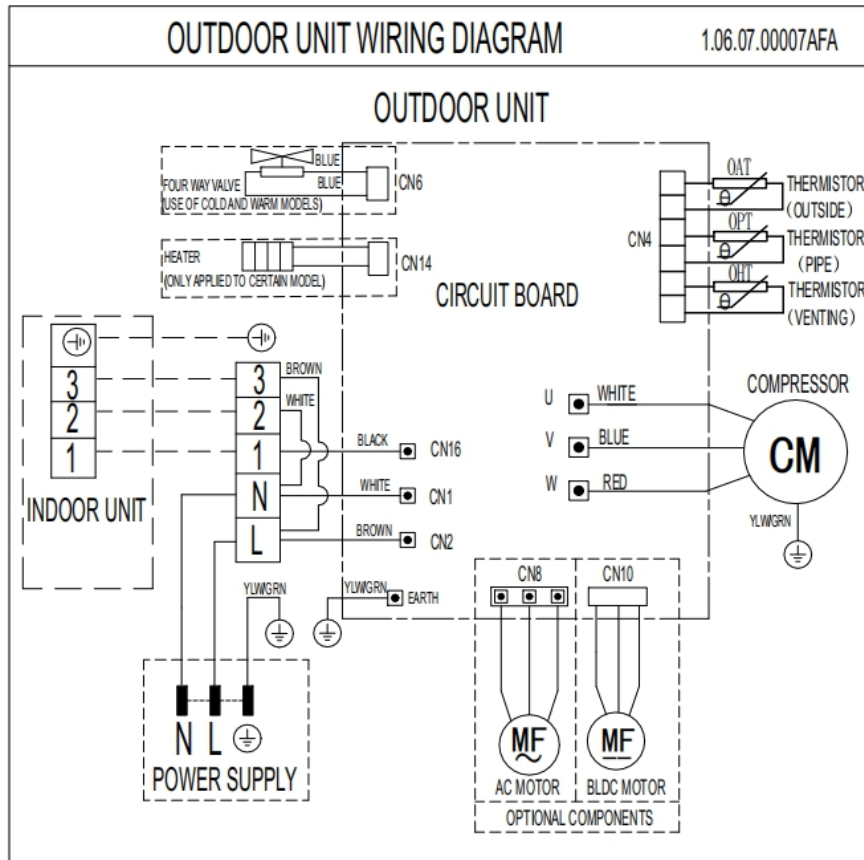


OUTDOOR UNIT:

230V model



115V model



## 5. Electronic Controller Introduction

### 5.1 Electronic Controller

RT-----Room Temperature.

IPT-----Indoor Pipe (Coil) Temperature.

ST-----Indoor Setting Temperature.

OPT---Outdoor Pipe Temperature.

OAT---Outdoor Ambient Temperature.

ODT---Outdoor Discharge Temperature.

CRT---Compensated Room Temperature.

IDU--- Indoor unit

ODU---Outdoor unit.

**Note:** When AC finishing installation, because of the air ventilation and the distance of temperature test sensor to different location of the house, the temperature for IDU PCB control need compensation.

1. Cooling mode. CRT=RT;

2. Heating mode. CRT=RT-3℃-----Split AC.

#### 5.1.1 Auto mode

Auto mode according to the table below to determine the entry of cooling/heating/Dry/fan mode.

Heating and cooling unit

MODE	Start RT	Start ST
cooling	$RT \geq 26^{\circ}\text{C}$	$23^{\circ}\text{C}$
Dry	$26^{\circ}\text{C} > RT \geq 20^{\circ}\text{C}$	$RT - 2^{\circ}\text{C}$
heating	$RT < 20^{\circ}\text{C}$	$23^{\circ}\text{C}$

cooling only unit

MODE	Start RT	Start ST
cooling	$RT \geq 26^{\circ}\text{C}$	$23^{\circ}\text{C}$
Dry	$26^{\circ}\text{C} > RT \geq 20^{\circ}\text{C}$	$RT - 2^{\circ}\text{C}$
Fan	$RT < 20^{\circ}\text{C}$	/

In auto mode (auto cooling or auto heating), When the temperature up and down signal of the remote control is received, the set temperature ST is adjusted to the current room temperature plus or minus  $1^{\circ}\text{C}$ , and the automatic mode adjustment temperature range is  $\pm 2^{\circ}\text{C}$ .

Auto Dry, The compressor can be started at  $RT \geq 14^{\circ}\text{C}$ . When  $RT < 14^{\circ}\text{C}$ , the compressor cannot be started.

#### 5.1.2 Cooling mode

1. Temperature control :  $16-31^{\circ}\text{C}$ , and the operation of fan speed and vane position according to preset.

#### 2. Compressor and process control

1). When  $RT - ST \geq 0.5^{\circ}\text{C}$ , the compressor starts up working, AC operates as customer preset;

2). When

a.  $RT - ST \leq -2^{\circ}\text{C}$  and compressor keeps 5 seconds continuously; or

b.  $RT - ST \leq -1^{\circ}\text{C}$  and compressor works in lowest frequency for 1 hour continuously;

The compressor stops operation.

3). The compressor frequency control: Based on relation of RT & ST, and the changing speed of RT.

4). The compressor will also stop working while unit:

a. switched off.

b. under protection.

c. changed to fan mode.

5). In the process of unit operation, once the compressor ceased, it should be 3 min delay for the next procedure.

#### 3. ODU Fan motor control:

1). While unit:



- a. switched off.
- b. under protection.
- c. to the set temperature.

After compressor ceased, In 30 seconds, the fan motor stops working.

- 2). When switch on unit on cooling mode, compressor will delay 5s after ODU fan motor starts up.

#### **4. When ODU failure or stops for protection, IDU works as preset.**

#### **5. Anti-frosting protection**

Control the unit operation frequency and the frequency changing rate to achieve anti-frosting protection.

- 1). Frequency Slowly Increasing(FSI):

a. If  $6^{\circ}\text{C} \leq \text{IPT} < 8^{\circ}\text{C}$ , the frequency increasing rate is 1Hz/25s, slowly increasing operation speed.

b. When  $\text{IPT} \geq 7^{\circ}\text{C}$ , unit quit from protection.

- 2). Frequency Limitation:

If  $5^{\circ}\text{C} \leq \text{IPT} < 6^{\circ}\text{C}$ , the compressor frequency forbidden to increase

- 3). Normal Frequency Decreasing (NFD):

If  $3^{\circ}\text{C} \leq \text{IPT} < 5^{\circ}\text{C}$ , the frequency decreasing rate is 3Hz/40s, until to the lower frequency limit.

- 4). Fast Frequency Decreasing (FFD):

If  $1^{\circ}\text{C} \leq \text{IPT} < 3^{\circ}\text{C}$ , the frequency decreasing rate is 3Hz/20s, until to the lower frequency limit.

- 5). Unit stop:

a. When  $\text{IPT} < 1^{\circ}\text{C}$  for 5seconds continuously, unit stops working for anti-defrosting protection.

b. While  $\text{IPT} > 7^{\circ}\text{C}$ , and the unit stopped for 3 min already, can the unit recover to operation.

#### **5.1.3 Dry mode**

- 1. Fan speed: low

Vane blade position: as customer preset

- 2. When ODU failure or stops for protection, IDU works as preset.

- 3. Failure protection: as cooling mode.

- 4. Sleep mode: Invalid.

#### **5.1.4 Heating mode**

- 1. Temperature control:  $16\text{--}31^{\circ}\text{C}$ .

#### **2. Compressor and process control.**

- 1). When  $\text{ST-CRT} \geq 0.5^{\circ}\text{C}$ , the compressor starts up working, AC operates as customer preset;;

- 2). When

a.  $\text{ST-CRT} \leq -2^{\circ}\text{C}$  and compressor keeps 5 seconds continuously; or

b.  $\text{ST-CRT} \leq -1^{\circ}\text{C}$  and compressor works in lowest frequency for 1 hour continuously;

The compressor stops operation.

- 3). The compressor frequency control: Based on relation of RT & ST, and the changing speed of RT.

- 4). The compressor will also stop working while unit:

- a. switched off.
- b. under protection.
- c. changed to fan mode.

- 5). In the process of unit operation, once the compressor ceased, it should be 3 min delay for the next procedure.

**3. IDU time delay:** When compressor stops or unit switches off while in heating mode, IDU fan motor will work for a few seconds more to prevent overheat.

#### **4: ODU Fan motor control:**

- 1). While unit:

- a. To be switched off
- b. Under protection.
- c. To the set temperature

After compressor ceased, In 30 seconds, the fan motor stops working.

- 2). When switch on unit on cooling mode, compressor will delay 5s after ODU fan motor starts up.

- 3). in the process of defrosting, the fan motor will stop operation 30s delay after compressor stopped.
- 4). defrosting finish, the compressor stops operation, the fan motor will start working simultaneously.

#### 5. 4-way valve control

- 1). On Cooling/Dry/Fan mode, 4-way valve: **OFF**, when unit switched on heating mode, 4-way valve: **ON**.
- 2). When heating mode switched off, or changed from heating to other modes, the 4-way valve will be **OFF** 90 s delay after the compressor stops working.
- 3). Unit stops working caused by any kind of protection, the 4-way valve will be **OFF** 90 s delay.
- 4). In the process of defrosting, 4-way valve will be **OFF** 30s delay after compressor stopped.
- 5). When defrosting finish, the compressor stops operation, 4-way valve will be **ON** after 30s delay.

#### 6. Defrost

After heating fixed operation for 40 minutes, one of the following conditions is met, the AC can enter the defrosting:

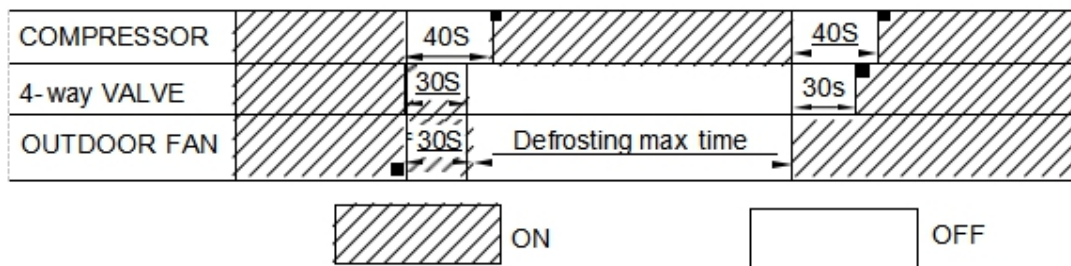
- (1) OPT < -7 ° C and decrease by more than 2.5 ° C
- (2) Continue to run for more than 300 seconds, OPT < -5 ° C and drop more than 3 ° C
- (3) When OAT ≥ -18 ° C, OPT < -23 ° C and lasts for more than 150 seconds
- (4) Continue to run for more than 70 minutes, and OPT < -14 ° C

**Defrosting start up:** Compressor stops working, and re-starts to working after 50s delay;

Conditions for quitting defrosting

- a. The defrosting operation time of the compressor is more than 12 minutes
- b. When OAT ≥ -23 ° C, OPT > 8 ° C for 75 seconds  
When OAT < -23 ° C, OPT > 5 ° C for 75 seconds
- c. When OAT ≥ -23 ° C, OPT > 15 ° C  
When OAT < -23 ° C, OPT ≥ 10 ° C

When AC meet any of condition a, b or c, defrosting finish.



**Defrosting end off:** Compressor stops working, and re-starts to working after 40s delay;

**Defrosting end off:** Compressor stops working, and re-starts to working after 40s delay;

#### 7. Cold air prevention:

This function intends to prevent cold air from being discharged when the heating operation starts up

- 1). IDU fan motor cold air prevention

When compressor not started:

ITP ≥ 34 ° C : fan motor will work according to preset fan speed.

34 ° C > ITP > 27 ° C : low fan speed.

If ITP < 25 ° C, fan motor stops.

When compressor not started:

ITP ≥ 34 ° C : fan motor will work according to preset fan speed.

31 ° C > ITP > 27 ° C : low fan speed.

ITP < 27 ° C : fan motor stops.

**Note:**

1. If the fan does not start, stop the fan if the inner disk temperature is less than or equal to 5 ° C after the compressor runs for 4 minutes. Inner disk temperature 25 ° C > IPT > 5 ° C, enter the micro-risk control system, inner disk temperature IPT ≥ 25 ° C, according to the set wind speed operation.

2. When the heating is in the cold air proof state, the heating running light of the display board flashes.

- 2). Vane blade operation for cold air prevention.

If the vane works on status of **non-swing**: While IPT increase to a special degree, the vane blade will change the position to:

Default angle; or

Previous position; or

Customer preset.

The above operation can work one time only, when compressor stops working, the unit will once again inspect the function.

If the vane works on **swing**: When IDU quits from cold air prevention, vane operate as preset.

### **5.1.5 Fan mode**

1. Fan speed and vane position: as preset.

2. ODU always OFF.

### 5.1.6 Timer

The unit has times control, when the unit meet the timer preset, it will be switched on or off automatically.

#### TIMER ON

- 1). TIMER ON can be set only when the air conditioner is OFF.
- 2). Press TIMER on the remote control ONCE to enter time setting.
- 3). Press “▲” or “▼” to set the time for unit to start working.
- 4). Set other function as MODE, FAN SPEED, SWING etc.
- 5). Press TIMER ONCE AGAIN to confirm the TIME ON setting

#### TIMER OFF

- 1). TIMER OFF can be set only when the air conditioner is ON.
- 2). Press TIMER on the remote control ONCE to enter time setting.
- 3). Press “▲” or “▼” to set the time for unit to stop working.
- 4). Press TIMER ONCE AGAIN to confirm the TIME OFF setting

Note: In case of no selection for the time setting within 10s, the timer function will be OFF automatically

### 5.1.7 Sleeping mode

While AC works in sleeping mode, the light of Mode light always ON, and the temperature display will be OFF after 5s.

In this mode, the AC unit works according to the SLEEP CURVE as designed.

Sleeping mode the unit can work 10 hours continuously, after that it will automatic shutdown.

### 5.1.8 Emergency switch

When the EMERGENCY switch is pressed one time, COOLING mode is selected and if it pressed again within 3s, HEATING mode selected, while press once again, the unit will be switched off.

When the remote controller out of function, batteries lost power, for example, the EMERGENCY button in the front of indoor unit can be used for function test.

NOTE: Do not press the EMERGENCY switch during normal operation.

### 5.1.9 Auto-restart function

While air conditioner is operating in one mode, all of its operation data, such as working mode, preset temperature etc. would be memorized into IC by main PCB. If power supply cut off due to reasons and recover again, the AUTO-RESTART function will set synchronously and the air conditioner would work at the same mode as before.

### 5.1.10 Protection

#### 5.1.10.1 Overload protection

##### 1. Overload protection for Cooling or Dry mode

- 1). if:
  - a.  $OPT \geq 65^{\circ}\text{C}$ , unit stops working for overload protection.
  - b.  $OPT < 54^{\circ}\text{C}$ , after compressor stopped for 3 min, can the unit be started to operate.
- 2). When  $OPT \geq 57^{\circ}\text{C}$ , the compressor will be frequency limited/reduced for over load protection.
- 3). If unit have 6 times of over load stop-working protection continuously, this protection can't be recovered unless press ON/OFF button, and unit will show failure code.

In the process of operation, once the compressor runs continuously more than 6 min, the counter of over load stop-working protection will be reset to zero and start a new counting process.

The failure and times for protection will eliminate immediately once the unit to be switched off, on fan mode or changed to be heating mode from others.

Note: If the defective failure can't be recovered, the failure can't eliminate even if operation mode changed.

##### 2. Overload protection for Heating mode

- 1). If:
  - a.  $IPT \geq 64^{\circ}\text{C}$ , unit stops working for overload protection.
  - b.  $IPT < 54^{\circ}\text{C}$ , after compressor stopped for 3 min, can the unit be started to operate.
- 2). When  $IPT \geq 57^{\circ}\text{C}$ , the compressor will be frequency limited/reduced for over load protection.
- 3). If unit have 6 times of over load stop-working protection continuously, this protection can't be recovered unless press ON/OFF button, and unit will show failure code.

In the process of operation, once the compressor runs continuously more than 6 min, the counter of over load stop-working protection will be reset to zero and start a new counting process.

The failure and times for protection will eliminate immediately once the unit to be switched off, on fan mode or changed to be heating mode from others.

Note: If the defective failure can't be recovered, the failure can't eliminate even if operation mode changed.

#### 5.1.10.2 The compressor discharge temperature protection

1. If  $ODT \geq 115^{\circ}\text{C}$ , unit stops working for over temperature protection;

While  $ODT < 90^{\circ}\text{C}$ , & after compressor stopped for 3 min, the unit can be started to operate.

2. If  $ODT \geq 102^{\circ}\text{C}$ , the compressor will be frequency limited/reduced for over temperature protection.
3. If unit have 6 times of **discharge over temperature stop working protection** continuously, this protection can't be recovered unless press ON/OFF button, and unit will show failure code.

In the process of operation, once the compressor runs continuously more than 6 min, the counter of discharge over temperature stop working protection will be reset to zero and start a new counting process.

The failure and times for protection will eliminate immediately once the unit to be switched off, or changed to fan mode.

Note: If the defective failure can't be recovered, the failure can't eliminate even if operation mode changed.

#### 5.1.10.3 The current protection

1. If the unit A/C working current more than **Limited current ( $I_{LC}$ )**, the compressor will be frequency limited / reduced for over current protection.
2. When unit A/C working current more than **Stopped current ( $I_{SC}$ )**, AC unit stops working. Only when the compressor stops for 3 min can the unit be recovered operation.
3. If unit have 6 times of **over current stop-working protection** continuously, this protection can't be recovered unless press ON/OFF button.

In the process of unit operation, once the compressor runs continuously more than 6 min, the counter of stop-working protection will be reset to zero and re-start a new counting process.

Note: For different models,  $I_{LC}$  and  $I_{SC}$  have different programmed value.

#### 5.1.10.4 IPM overheating protection

1. When IPM temperature  $T_{IPM} \geq 90^{\circ}\text{C}$ , the compressor will be frequency limited / reduced for IPM over temperature protection.
2. When  $T_{IPM} \geq 100^{\circ}\text{C}$ , the AC unit stops working for AC system protection.

If  $T_{IPM} < 85^{\circ}\text{C}$ , and after compressor stopped for 3 min, can the unit be started to operate.

3. If unit have 6 times of **IPM over temperature stop working protection** continuously, this protection can't be recovered unless press ON/OFF button, and unit will show failure code.

In the process of operation, once the compressor runs continuously more than 6 min, the counter of over load stop working protection will be reset to zero and re-start a new counting process.

Note: If the defective failure can't be recovered, the failure can't eliminate even if operation mode changed.

### 5.1.11 Complementary

#### 5.1.11.1 TURBO

Function effective on Cooling, Heating modes, and fan speed operates on highest.

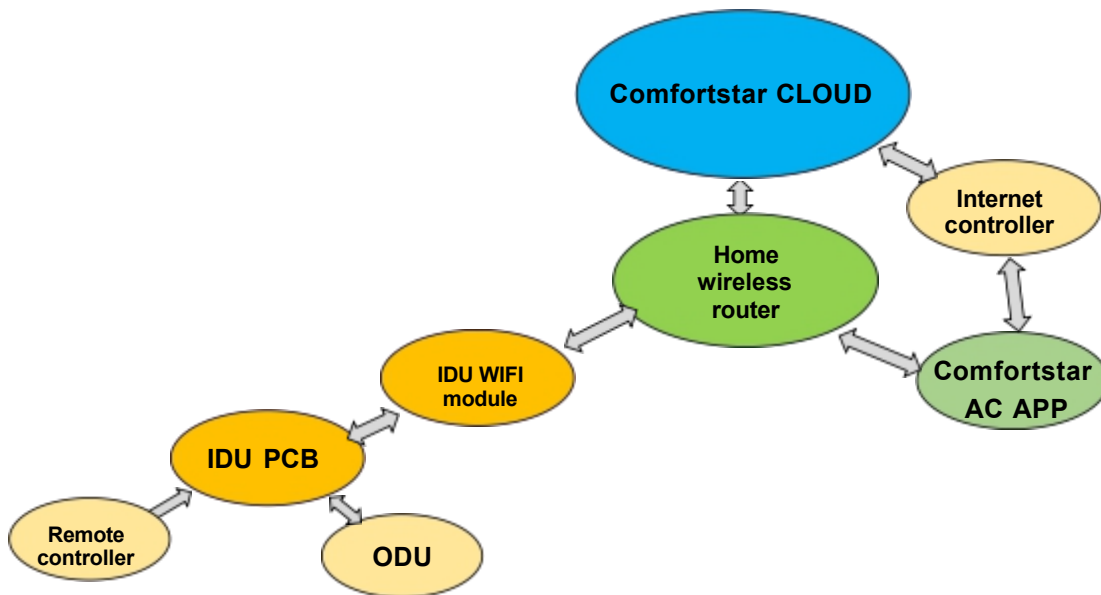
#### 5.1.11.2 The communication control

If ODU PCB can't get signal feedback from IDU for 2 min continuously, AC unit stops working and shows E6 error code as IDU/ODU communication failure.

Once the IDU & ODU communication recovery, and also the compressor stopped for 3 min already, can the unit be recovered to operate.

## 5.2 WIFI OPERATION MAUAL

### 5.2.1 The WIFI control logic



### 5.2.2 Download and installation

Customer can scan the QR in the user manual or from appliance APP store to download the APP and install it in the cell phone, while installation achieved, there would be an icon as picture created on the desktop. Register the account and add the device to system, customer can control the air conditioner by internet or LAN.

#### Smart Life APP



## **PART II Installation and Maintenance**

### **1. Notes for installation and maintenance**

#### **Safety Precautions**

##### **Important!**

Please read the safety of 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 licensed technician according to local regulations and 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 conditioner 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 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 then 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 Precaution**

- 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 supporter is firm.
- 4) Ware 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.

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

Safety precautions for Installing and Relocating the unit.

To ensure safety, please be mindful of the following precautions.

### Warnings

When installing or relocating the unit, be sure to keep the refrigerant circuit free from air or substances other than the specified refrigerant.

Any presence of air or other foreign substance in the refrigerant circuit will cause system pressure rise or compressor rupture, resulting in injury.

When installing or moving this unit, do not charge the refrigerant which is not comply with that on the nameplate or unqualified refrigerant.

Otherwise, it may cause abnormal operation, wrong action, mechanical malfunction or even series safety accident.

When refrigerant needs to be recovered during relocating or repairing the unit, be sure that the unit is running in cooling mode. Then, fully close the valve at high pressure side (two-way valve). About 30-40 seconds later, fully close the valve at low pressure side (3-way valve), immediately stop the unit and disconnect power. Please note that the time for refrigerant recover should not exceed 1 minute.

If refrigerant recovery takes too much time, may be cause compressor overheat, resulting in injury.

During refrigerant recovery, make sure that two-way valve and 3-way valve are fully closed and power is disconnected before detaching the connecting pipe.

If compressor starts running when the valves is open and connecting pipe is not yet connected, air will be sucked in and cause pressure rise and then compressor overheat or gas leak, resulting in injury.

When installing the unit, make sure that connecting pipe is securely connected before the compressor starts running.

If compressor starts running when the valves is open and connecting pipe is not yet connected, air will be sucked in and cause pressure rise and then compressor overheat or gas leak, resulting in injury.

Prohibit installing the unit at the place where there may be leaked corrosive gas or flammable gas.

If there leaked gas around the unit, it may cause explosion and other accidents.

Do not use extension cords for electrical connections. If the electric wire is not long enough, please contact a local service center authorized and ask for a proper electric wire.

Poor connection may lead to electric shock or fire.

Use the specified types of wires for electrical connections between the indoor and outdoor units. Firmly clamp the wires so that their terminals receive no external stresses.

Electric wires with insufficient capacity, wrong wire connections and insecure wire terminals may cause electric shock or fire.

## Introduction R32, R290 air conditioner installation

### Introduction to Refrigerants R32 & R290

The refrigerants used for air conditioners are environmentally friendly hydrocarbons R32 and R290. The two kinds of refrigerants are combustible and odorless. Moreover, they can burn and explode under certain condition. However, there will be no risk of burning and explosion if you comply with the following table to install your air conditioner in a room with an appropriate area and use it correctly.

Compared with ordinary refrigerants, Refrigerants R32 & R290 are environmentally friendly and do not destroy the ozone sphere and that their values of greenhouse effect are also very low.

### R32/R290 air conditioner installation area requirement

$$m1=(4m^3)\times LFL, m2=(26m^3)\times LFL, m3=(130m^3)\times LFL$$

Where LFL is the lower flammable limit in  $kg/m^3$ , R290 LFL is  $0.038kg/m^3$ , R32 LFL is  $0.306kg/m^3$ .

#### For the appliances with a charge amount $m1 < M < m2$ :

The maximum charge in a room shall be in accordance with the flowing:  $M_{max}=2.5 \times (LFL)^{(5/4)} \times h_0 \times A^{1/2}$

The required minimum floor area  $A_{min}$  to install an appliance with refrigerant charge  $M(kg)$  shall be in accordance with following:  $A_{min}=(M/(2.5 \times (LFL)^{(5/4)} \times h_0))^2$

Where:

$M_{max}$  is the allowable maximum charge in a room, in kg;

$M$  is the refrigerant charge amount in appliance, in kg;

$A_{min}$  is the required minimum room area, in  $m^2$ ;



A is the room area, in m<sup>2</sup>;

LFL is the lower flammable limit, in kg/m<sup>3</sup>;

h<sub>0</sub> is the installation height of the appliance, in meters for calculating M<sub>max</sub> or A<sub>min</sub>, 1.8 m for wall mounted;

**Table GG.1 - Maximum charge (kg)**

Category	LFL (kg/m <sup>3</sup> )	h <sub>0</sub> (m)	Floor area (m <sup>2</sup> ) Maximum charge (kg)						
			4	7	10	15	20	30	50
R290	0.038	0.6	0.05	0.07	0.08	0.1	0.11	0.14	0.18
		1	0.08	0.11	0.03	0.06	0.09	0.2	0.3
		1.8	0.15	0.2	0.24	0.29	0.34	0.41	0.53
		2.2	0.18	0.24	0.29	0.36	0.41	0.51	0.65
R32	0.306	0.6	0.68	0.9	1.08	1.32	1.53	1.87	2.41
		1	1.14	1.51	1.8	2.2	2.54	3.12	4.02
		1.8	2.05	2.71	3.24	3.97	4.58	5.61	7.254
		2.2	2.5	3.31	3.96	4.85	5.6	6.86	8.85

**Table GG.2 - Minimum room area (m<sup>2</sup>)**

Category	LFL (kg/m <sup>3</sup> )	h <sub>0</sub> (m)	Charge amount (M) (kg) Minimum room area (m <sup>2</sup> )						
			0.152kg	0.228kg	0.304kg	0.456kg	0.608kg	0.76kg	0.988kg
R290	0.038								
		0.6	/	82	146	328	584	912	1514
		1	/	30	53	118	210	328	555
		1.8	/	9	16	36	65	101	171
		2.2	/	6	11	24	43	68	115
R32	0.306		1.224kg	1.836kg	2.448kg	3.672kg	4.896kg	6.12kg	7.956kg
		0.6	/	29	51	116	206	321	543
		1	/	10	19	42	74	116	196
		1.8	/	3	6	13	23	36	60
		2.2	/	2	4	9	15	24	40

### Caution:

- Please contact the nearest after-sale service center when maintenance is necessary. At the time of maintenance, the maintenance personnel must strictly comply with the Operation Manual provided by the corresponding manufacturer and any non-professional is prohibited to maintain the air conditioner.
- It is necessary to comply with the provisions of gas-related national laws and regulations.
- It is necessary to clear away the refrigerant in the system when maintaining or scrapping an air conditioner.
- When filling the combustible refrigerant, any of your rude operations may cause serious injury or injuries to human body or bodies and object or objects.
- A leak test must be done after the installation is completed.
- It is a must to do the safety inspection before maintaining or repairing an air conditioner using combustible refrigerant in order to ensure that the fire risk is reduced to minimum.

## 1) Installation Safety

### Installation Safety Principles

#### Site Safety



Open Flames Prohibited



Ventilation Necessary

#### Operation Safety

Open Flames Prohibited



Mind Static Electricity    Must wear protective clothing and anti-static gloves    Don't use mobile phone

#### Installation Safety

- Refrigerant Leak Detector
- Appropriate Installation Location



The left picture is the schematic diagram of a refrigerant leak detector.

### Caution:

- The installation should be in a well-ventilated condition location.
- When you installing or maintaining an air conditioner using Refrigerant R32/R290, the location should be free fire from open or any other goods temperature higher than 370 °C for R290/548 °C for R32 which easily produces open fire include welding, smoking, drying oven.
- When installing an air conditioner of R32/R290, it is necessary to take appropriate anti-static measures such as wear anti-static clothing and gloves.
- It is necessary to choose the location for installation or maintenance where in the air inlets and outlets of the indoor and outdoor units should be not surrounded by obstacles or close to any heat source or combustible and/or explosive environment.
- If the indoor unit suffers refrigerant leak during the installation, it is necessary to immediately turn off the valve of the outdoor unit and all the personnel should go out till the refrigerant leaks completely for 15 minutes. If the product is damaged, it is a must to carry such damaged product back to the maintenance station and it is prohibited to weld the refrigerant pipe or conduct other operations on the user's site.
- It is necessary to choose the place where the inlet and outlet air of the indoor unit is even.
- It is necessary to avoid the places where there are other electrical products, power switch plugs and sockets, kitchen cabinet, bed, sofa and other valuables right under the lines on two sides of the indoor unit.

### Special tools:

Tool Name	Requirement(s) for Use
Mini Vacuum Pump	It should be an explosion-proof vacuum pump; can ensure certain precision and its vacuum degree should be lower than 10Pa.

Filling Device	It should be a special explosion-proof filling device; have certain precision and its filling deviation should be less than 5g.
Leak Detector	It should be calibrated regularly; and its annual leak rate should not exceed 10g.
Concentration Detector	<p>A) The maintenance site should be equipped with a fixed-type combustible refrigerant concentration detector and connected to a safeguard alarm system; its error must be not more than 5%.</p> <p>B) The installation site should be equipped with a portable combustible refrigerant concentration detector which can realize two-level audible and visual alarm; its error must be not more than 10%.</p> <p>C) The concentration detectors should be calibrated regularly.</p> <p>D) It is necessary to check and confirm the functions before using the concentration detectors.</p>
Pressure Gauge	<p>A) The pressure gauges should be calibrated regularly.</p> <p>B) The pressure gauge used for Refrigerant 22 can be used for Refrigerants R290 and R161; the pressure gauge used for R410A can be used for Refrigerant 32.</p>
Fire Extinguisher	It is necessary to carry fire extinguisher(s) when installing and maintaining an air conditioner. On the maintenance site, there should be two or more kinds of dry powder, carbon dioxide and foam fire extinguishers and that such fire extinguishers should be placed at stipulated positions, with eye-catching labels and in handy places.

## Maintenance

### 1). Inspections before maintenance.

#### (1) Inspection of maintenance environment

- There should be no leaked refrigerant in the room before operation.
- It is only allowed to operate in a room which meets the area requirement on the nameplate.
- It is necessary to make the room keep a continuous ventilation state at the time of maintenance.
- The room in the maintenance should be free from fire or welding, smoking, drying oven or any other goods temperature higher than 370 °C (R290)/548 °C (R32) which easily produces fire.
- During the maintenance, it is necessary to ensure that any person's any mobile phone or any electronic product with radiation in the room is powered off.
- The maintenance area should be equipped with a drying powder or carbon dioxide fire extinguisher and that such fire extinguisher can work.

#### (2) Inspection of maintenance equipment

- Check the maintenance equipment is applicable to the refrigerant or not and it is only allowed to use the professional equipment recommended by the air conditioner manufacturer.
- Check the refrigerant leak detector whether has been calibrated. The set maximum alarm concentration of the refrigerant leak detector should not exceed 25% of the lower explosion limit (LEL), the refrigerant leak detector must be working during maintenance.

### 2) Inspection of air conditioner

- It is necessary to ensure that the air conditioner is in reliable ground connection before maintenance.
- Make sure powered supply to air conditioner is off. Before maintenance, it is necessary to cut off the power and discharge the capacitor power which used in the air conditioner. If it is a must to need the power supply during the maintenance, it is necessary to do ongoing leak detection at the most dangerous position/point in order to avoid potential danger.
- Check the warning labels on the air conditioner whether are in good condition. It is necessary to replace

the damaged or smeared warning labels.

### **3). Leak inspection before maintenance**

Before maintenance, use the leak detector or concentration detector (pump-type) recommended by the corresponding air conditioner manufacturer to check the air conditioner leak or not.

#### **Warning**

If leak may exist, it is necessary to move all the fire out from the site or extinguish fire and then immediately shut off the air conditioner. Meanwhile, it is necessary to make sure well-ventilated.

### **4). Safety principles during the maintenance**

- At the time of maintenance, it is necessary to ensure well-ventilation on the site.
- It is prohibited to use fire including welding, smoking or other purposes. It is prohibited to use mobile phones.
- At the time of maintenance, if the relative humidity is lower than 40%, it is necessary to wear anti-static clothing and gloves.
- If the combustible refrigerant is found leaking during the maintenance, it is a must to immediately take forced ventilation and plug up the leak source.
- If the product is damaged to the extent that it is a must to open the refrigerating system for maintenance, it is a must to carry the product back to the maintenance station for maintenance. (It is prohibited to weld the refrigerant pipe and do other operations on the user's site.)
- It is necessary to return the air conditioner to its initial state if it is necessary to provide visiting service again due to lacking spare part during the maintenance. Moreover, it is a must to ensure that the refrigerating system is in secure ground connection.
- If it is necessary to provide visiting service with a refrigerant cylinder, the volume of refrigerant filled in such refrigerant cylinder should not exceed the stipulated value. When such cylinder is stored in a vehicle or placed on the installation or maintenance site, it is necessary to place it vertically and securely and keep it away from any place where there is any heat source, combustion source, radiation source or electrical equipment.

### **5). Requirements for the site of maintenance-station**

- The maintenance location should be well-ventilated, with leveled ground and not in a basement.
- The maintenance should be divided into welding and non-welding areas both of which should be labeled clearly. There should be a certain safety distance between the two areas. The maintenance location should be equipped with ventilating and air-exhausting equipment to prevent the refrigerant gas from aggregating.
- It is necessary to provide some relevant instruments such as combustible refrigerant leak detector and have a leak detecting instrument management system. It is necessary to confirm that the leak detector can work normally before maintenance.
- The main power switch should be set outside the maintenance location and equipped with protective (explosion-proof) devices.
- It is necessary to provide firefighting devices such as dry powder or carbon dioxide fire extinguisher appropriate for extinguishing the electrical fire and keep such firefighting devices in a usable condition.
- Temporary wires and sockets are prohibited on the maintenance location.

### **6). Requirements for fill the refrigerants**

- It is necessary to use nitrogen to clear the cyclic system before operating the refrigerating system and vacuumize the outdoor unit for 30 minutes at least.
- It is necessary to ensure that there is no cross contamination among different refrigerants when the refrigerant filling device is used. The total length including the refrigerant pipeline should be as short

as possible in order to reduce the residual refrigerant inside such pipeline.

- It is necessary to vertically place the refrigerant storage tanks.
- It is necessary to ensure that the refrigerating system is in ground connection before the refrigerant is filled.
- When filling the refrigerant, it is necessary to fill corresponding type and volume of refrigerant as per the requirements on the product nameplate and overfilling is prohibited.
- It is necessary to seal the system in a safe sealing way after maintaining the refrigerating system.
- It is necessary to ensure that the maintenance will not damage or reduce the safety protection grade of the original system.

#### **7). In-maintenance welding**

- It is necessary to ensure that the maintenance location is well-ventilated.
- Before welding the outdoor unit, it is a must to confirm that the refrigerating system has been drained and the system has been cleaned and ensure that there has been no refrigerant in the outdoor unit.
- It is necessary to close the stop valve of the outdoor unit when using a welding gun to do the maintenance work such as cutting and welding.

#### **8). Maintenance of electrical components**

- It is necessary to use a special leak detector to check whether the maintained electrical parts location have the leak refrigerant.
- It is not allowed to refit, remove or cancel any component with the safety protection function after finishing the maintenance process.
- When maintaining the sealed parts, it is necessary to turn off the power of air conditioner before opening the sealing cover. When power supply is needed, it is necessary to do the ongoing leak detection at the most dangerous position in order to prevent potential danger.
- It is necessary to specially note that the maintenance of electrical components will not affect the replacement of protective cover.
- In order to ensure that the sealing function is not damaged after maintenance or the sealing material will not lose the effect of preventing the combustible gas leak due to ageing. So the substitute components should meet the requirements recommended by the air conditioner manufacturer.

## **Warning**

Before doing the trial operation after finishing the maintenance, it is a must to use a practical leak detector to inspect the leakage and reliability of ground connection in order to ensure that no refrigerant leakage and reliable ground connection.

The refrigerant storage tanks should be separately placed in a well-ventilated place at the temperature ranging from -10℃ to 50℃ and label them with warning labels.

#### **9). Emergency Accident Handling**

A maintenance station should establish emergency handling plans. It is necessary to take appropriate precautionary measures in work. For example, it is prohibited to enter the location with any kindling material and it is prohibited to wear clothing or shoes which easily produce static.

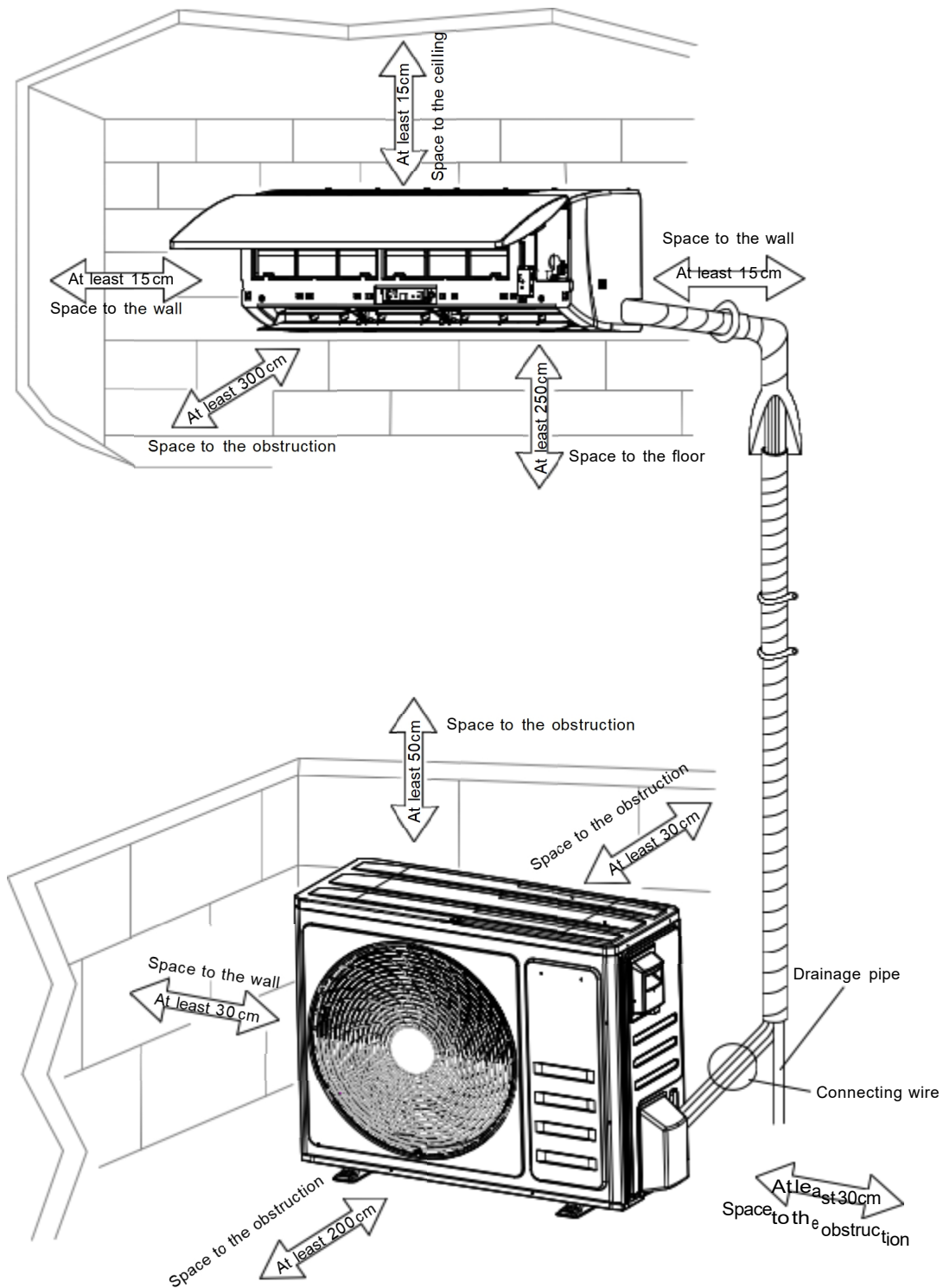
Handling suggestions when a large amount of combustible refrigerant leaks:

- It is necessary to immediately operate the ventilating equipment while cutting off other power supply and evacuating the affected personnel urgently from the location.
- It is necessary to inform near residents of evacuating for over 20 meters from the location, make an alarm call, set the emergency area and prohibit irrelevant personnel and vehicles from approaching.
- The professional firefighters should wear anti-static clothing to handle the emergency on the site and cut off the source of leak.
- It is necessary to use nitrogen for blowing the site, especially the low-lying positions, clear away the


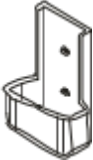
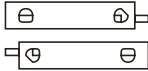


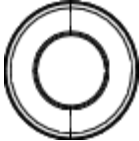

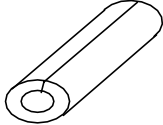
residual combustible refrigerant gas from any area nearby and surrounding the leak point and use a handheld detector for detection and not clear the alarm until the concentration of refrigerant is zero.

## 2 Installation


















### 2.1 Installation Dimension Diagram



## 2.2 Accessory

<b>Remote controller</b> 	<b>Remote controller supporter</b> 	<b>Batteries</b> 	<b>Vinyl tape</b> 
<b>Drain hose</b> 	<b>Hole cover</b> 	<b>Screw</b> 	<b>Insulation material</b> 

## 2.3 Tools

Tool name	Picture	Tool name	Picture	Tool name	Picture
Standard Wrench		Pipe Cutter		Vacuum Pump	
Adjustable/ Crescent Wrench		Screw drivers (Phillips & Flat blade)		Safety Glasses	
Torque Wrench		Manifold and Gauges		Work Gloves	
Hex Keys or Allen Wrenches		Level		Refrigerant Scale	
Drill & Drill Bits		Flaring tool		Micron Gauge	
Hole Saw		Clamp on Amp Meter			



## 2.4 Position

### Indoor unit

- Install the indoor unit level on a strong wall that is not subject to vibrations
- The inlet and outlet ports should not be obstructed: the air should be able to blow all over the room.
- Do not install the unit near a source of heat, steam or flammable gas.
- Do not install the unit in too windy or dusty places.
- Do not install the unit where people often pass. Select a place where the air discharge and operating sound level will not disturb the neighbors.
- Install the unit where connection between indoor and outdoor unit is as easy as possible.
- Install the unit where it is easy to drain the condensed water.
- Check the machine operation regularly and leave the necessary spaces as shown in the picture.
- Install the indoor unit where the filter can be easily accessible.

### OUTDOOR UNIT

- Do not install the outdoor unit near sources of heat, steam or flammable gas.
- Do not install the unit in too windy or dusty places.
- Do not install the unit where people often pass. Select a place where the air discharge and operating sound level will not disturb the neighbors.
- Avoid installing the unit where it will be exposed to direct sunlight (other wise use a protection, if necessary, that should not interfere with the air flow).
- Leave the spaces as shown in the picture for
- The air to circulate freely.
- Install the outdoor unit in a safe and solid place.
- If the outdoor unit is subject to vibration, place rubber gaskets onto the feet of the unit.
- Install the indoor unit in the room to be air conditioning, avoiding to installation in corridors or communal areas.
- Install the indoor unit at a height of at least 2.5m from the ground.

Minimum space to be left (mm) showing in the picture.

## 2.5 Electricity and wiring

### 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.

The power cord should be selected according to the following specifications sheet.

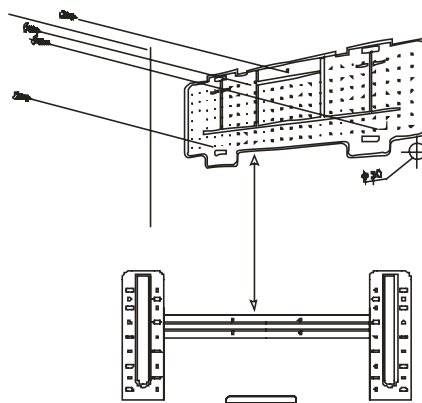
Appliance Amps(A)	Wire Size (mm <sup>2</sup> )
5	0.75
10	1.0
13	1.5
18	1.6
25	2.0
30	2.5

## 2.6 IDU Installation

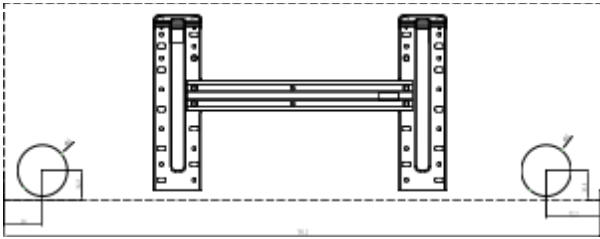
### To install, proceed as follows:

#### 2.6.1 Installation of the mounting plate.

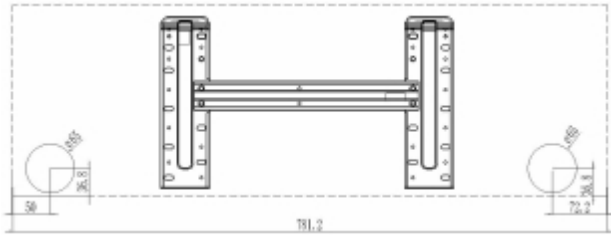
- 1) By using a level, put the mounting plate in a perfect square position vertically and horizontally.
- 2) Drill 32mm deep holes in the wall to fix the plate.
- 3) Insert the plastic anchors into the hole.
- 4) Fix the mounting plate by using the provided tapping screws.
- 5) Check that the mounting plate is correctly fixed.



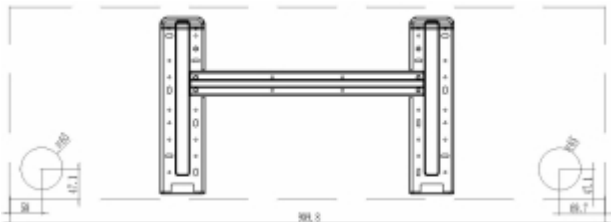
9K(698X)



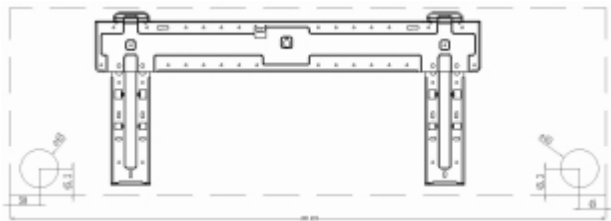
12K(770X)



18K(900X)



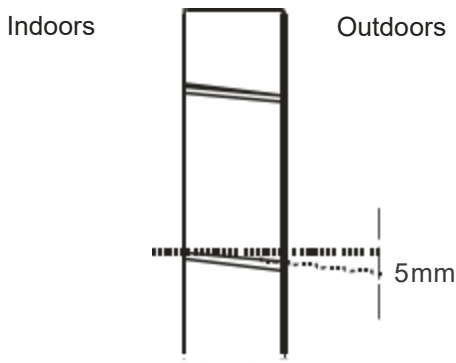
24K(1010X)



**Note:** The shape of the mounting plate may be different from the one above, but installation method is similar.

### 2.6.2 Drilling a hole in the wall for the piping

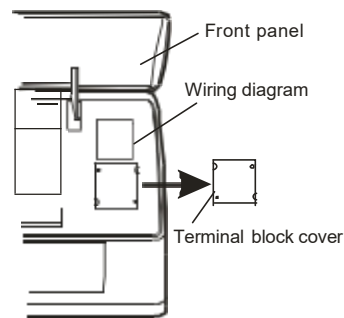
- 1) Decide where to drill the hole in the wall for the piping (if necessary) according to the position of the mounting plate
- 2) Install a flexible flange through the hole in the wall to keep the latter intact and clean.



The hole must slope downwards towards the exterior.  
Note: Keep the drain pipe down towards the direction of the wall hole, otherwise leakage may occur.

### 1.6.3 Electrical connections---Indoor unit

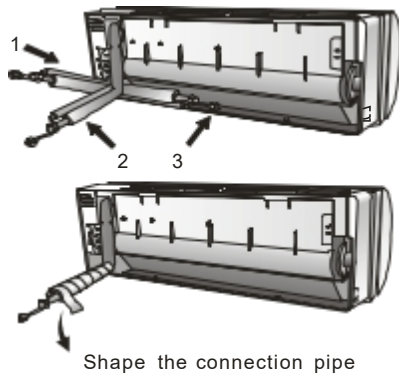
- 1).Lift the front panel.
- 2).Take off the cover as indicated in the picture (by removing a screw or by breaking the hooks).
- 3).For the electrical connections, see the circuit diagram on the right part of the unit under the front panel.
- 4).Connect the cable wires to the screw terminals by following the numbering, Use wire size suitable to the electric power input (see name plate on the unit) and according to all current national safety code requirements.
- 5).The cable connecting the outdoor and indoor units must be suitable for outdoor use.
- 6).The plug must be accessible also after the appliance has been installed so that it can be pulled out if necessary.
- 7).An efficient earth connection must be ensured.
- 8).If the power cable is damaged, it must be replaced by an authorized Service Centre.



### ★ Refrigerant piping connection

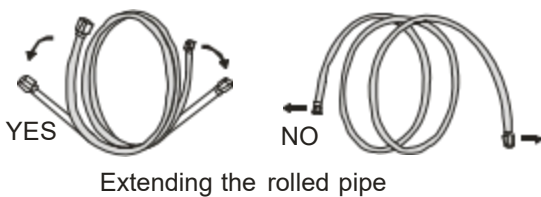
The piping can be run in the 3 directions indicated by numbers in the picture. When the piping is run in direction 1 or 3, cut a notch along the groove on the side of the indoor unit with a cutter.

Run the piping in the direction of the wall hole and bind the copper pipes, the drain pipe and the power cables together with the tape with the drain pipe at the bottom, so that water can flow freely.



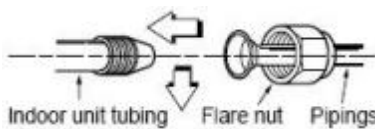
#### 1.6.4 Connecting the pipes.

- Do not remove the cap from the pipe until connecting it, to avoid dampness or dirt from entering.
- If the pipe is bent or pulled too often, it will become stiff. Do not bend the pipe more than three times at one point.
- When extending the rolled pipe, straighten the pipe by unwinding it gently as shown in the picture.

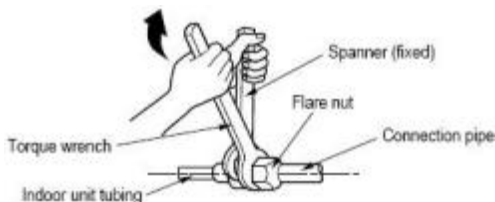


#### 2.6.5 Connections to the indoor unit

- 1). Remove the indoor unit pipe cap (check that there is no debris inside).
- 2). Insert the flare nut and create a flare at the extreme end of the connection pipe.



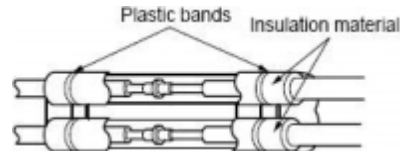
- 3). Tighten the connections by using two wrenches working in opposite directions.



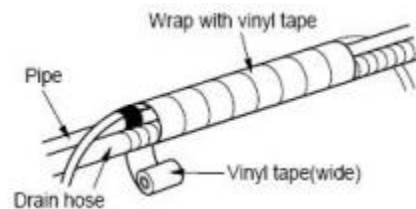
When extending the drain hose at the indoor unit, install the drain pipe.

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

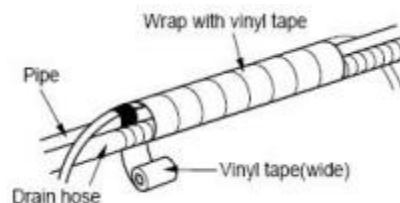
- Overlap the connection pipe insulation material and the indoor unit pipe insulation material. Bind them together with vinyl tape so that there is no gap.



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



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



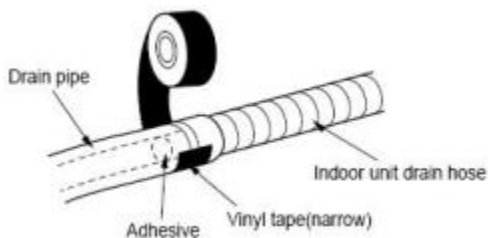
#### 2.6.6 Indoor unit condensed water drainage

The indoor unit condensed water drainage is fundamental for the success of the installation.

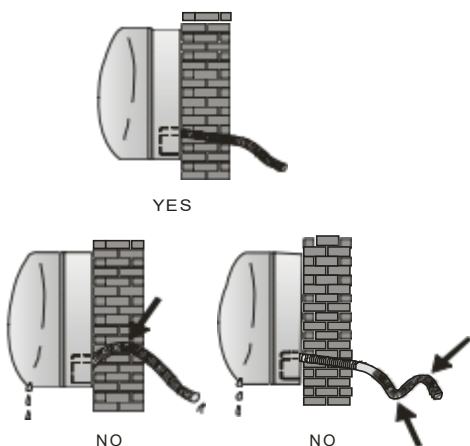
- 1). Place the drain hose below the piping, taking care not to create siphons.
- 2). The drain hose must slant downwards to aid drainage.
- 3). Do not bend the drain hose or leave it protruding or twisted and do not put the end of it in water. If an extension is connected to the drain hose, ensure that it is lagged when it passes into the indoor unit.
- 4). If the piping is installed to the right, the pipes,

Capacity (Btu/h)	Pipe Size (Torque)	
	Gas	Liquid
7/9/ 12K	3/8" (31-35N.m)	1/4" (15-20N.m)
18K	3/8" (31-35N.m)	1/4" (15-20N.m)
24K	1/2" (45-50N.m )	1/4" (15-20N.m)

power cable and drain hose must be lagged and secured onto the rear of the unit with a pipe connection.



- Insert the pipe connection into the relative slot.
- Press to join the pipe connection to the base.



## 2.7 ODU Installation

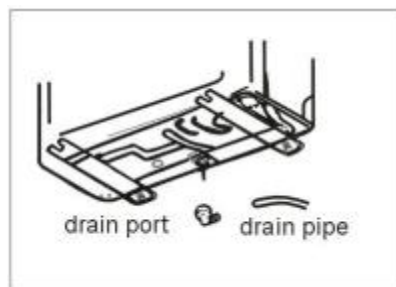
- The outdoor unit should be installed on a solid wall and fastened securely.
- The following procedure must be observed before connecting the pipes and connecting cables :  
decide which is the best position on the wall and leave enough space to be able to carry out maintenance easily.
- Fasten the support to the wall using screw anchors which are particularly suited to the type of wall;
- Use a larger quantity of screw anchors than normally required for the weight they have to bear to avoid vibration during operation and remain fastened in the same position for years without the screws becoming loose.
- The unit must be installed following the national regulations.

### Outdoor unit condensed water drainage (only for heat pump models)

The condensed water and the ice formed in the outdoor

unit during heating operation can be drained away through the drain pipe.

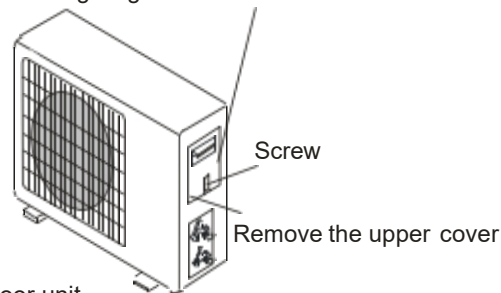
- 1) Fasten the drain port in the 25mm hole placed in the part of the unit as shown in the picture.
- 2) Connect the drain port and the drain pipe.  
Pay attention that water is drained in a suitable place.



### Electronic connections

1. Take the cover away.
2. Connect the cable wires to the terminal board using the same numbering as in the indoor unit.
3. For the electrical connections, see the wiring diagram on the back of the cover
4. Fasten the cables with a cable-clamp.
5. An efficient earth connection must be ensured.
6. Replace the covers.

Wiring diagram on the back of the cover

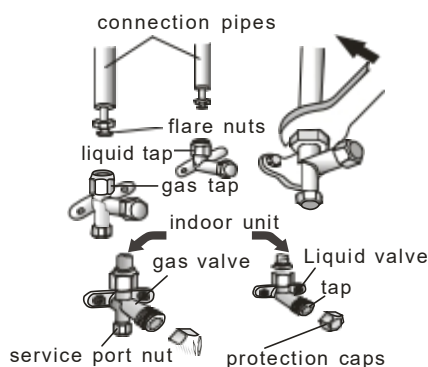


Outdoor unit

### Connecting the pipe

Screw the flare nuts to the outdoor unit coupling with the same tightening procedures described for the indoor unit.

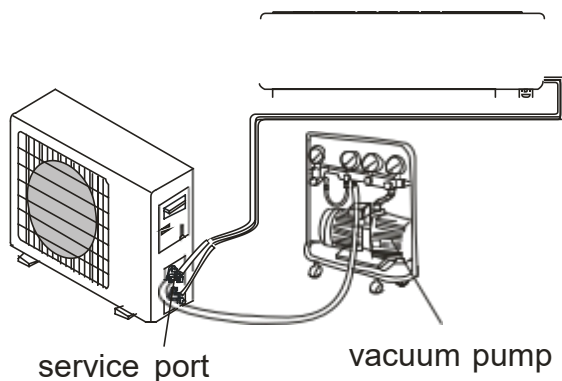
Note: If the tightening torque is not sufficient, there will probably be some leakage. With excessive tightening torque there will also be some leakage, as the flange could be damaged.



## 2.8 Vacuum and gas leakage test

### 1. Use vacuum Pump

- 1) Air and humidity left inside the refrigerant circuit can cause compressor malfunction. After having connected the indoor and outdoor units, bleed the air and humidity from the refrigerant circuit by using a vacuum pump.
- 2) Open the piezometer and operation for 10-15 minutes to check if the pressure of piezometer remains in -0.1Mpa.
- 3) 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 decrease, there may be leakage.
- 4) Remove the piezometer, open the valve core of liquid valve and gas valve completely.
- 5) Tighten the screw caps of valve and refrigerant charging vent.



### 2. Leakage Detection

- 1). With leakage detection.

Check if there is leakage with leakage detection.

- 2). With soap water. If leakage detection 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 a leakage.

## 2.9 Final test

### 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 the select AUTO, COOL, DRY, FAN and HEAT to check whether the operation is normal or not.

If ambient temperature is lower than 16°C, the air conditioner can't start cooling.

### 3. Maintenance

#### 3.1 Failure code

Code	Fault name	Check the repair method
E1	Indoor fan failure	<ol style="list-style-type: none"> <li>1. Confirm whether the indoor unit fan is well installed;</li> <li>2. Confirm whether the indoor motor wiring is good;</li> <li>3. Replace the main control board of the indoor unit;</li> <li>4. Replace the motor of the indoor unit.</li> </ol>
E3	Failure of the temperature sensor of the indoor coil	<ol style="list-style-type: none"> <li>1. Check whether the ring temperature/tube temperature sensor is well plugged in;</li> <li>2. Whether the resistance value of the measurement ring temperature/tube temperature sensor is within a reasonable range (5KΩ-20KΩ):               <ol style="list-style-type: none"> <li>(1) Replace the sensor with an open circuit or a resistance value outside a reasonable range;</li> <li>(2) If the resistance value is within a reasonable range, change the main control board of the indoor unit.</li> </ol> </li> </ol>
E4	Failure of the indoor ambient temperature sensor	
E0	Outdoor EE failure	Directly replace the main control board of the outdoor unit
E6	Indoor and outdoor communication failures	<ol style="list-style-type: none"> <li>1. Confirm whether the wiring of the connecting cable to the terminal of the outdoor unit is correct-L (brown)/N (blue)/1 (black)</li> <li>2. Replace the main control board of the outdoor unit.</li> <li>3. Replace the main control board of the indoor unit.</li> <li>4. Replace the connection cable of the indoor and outdoor units.</li> </ol>
F1	The compressor starts abnormally	<ol style="list-style-type: none"> <li>1. The press cannot be started normally, and the fault is reported as soon as it starts:               <ol style="list-style-type: none"> <li>(1) Confirm whether the compressor wiring (press end and external main control board end) is correct, U phase (white) / V phase (blue) / W phase (red);</li> <li>(2) Confirm whether the press coil is normal - measure the 3-phase terminal of the press, the resistance between any 2-phase terminal is generally within 1Ω-10 Ω, if the open circuit/resistance value is very large, the compressor needs to be replaced</li> <li>(3) If there is no problem in (1)/(2), replace the main control board of the outdoor unit.</li> </ol> </li> <li>2. The press can be started normally, and the fault will be reported after running for a period of time:               <ol style="list-style-type: none"> <li>(1) Confirm the system status:                   <p>whether the high and low pressure valves are all open;</p> <p>whether the system pressure is within the normal range;</p> <p>Confirm whether the indoor and outdoor installation environment of the air conditioner is good;</p> <p>whether the cooling and heating are normal; wait</p> </li> <li>(2) If (1) confirm that there is no problem, replace the main control board of the outdoor unit.</li> </ol> </li> </ol>

F2	IPFCfault	Replace the main control board of the outdoor unit.
F5	Exhaust gas temperature sensor malfunction	1. Check whether the exhaust sensor is well plugged in; 2. Measure whether the resistance value of the outer ring/outer disk sensor is within a reasonable range (20KΩ-200KΩ): (1) Replace the sensor with an open circuit or a resistance value outside a reasonable range; (2) If the resistance value is within a reasonable range, change the main control board of the indoor unit.
F7	Outdoor coil temperature sensor malfunction	ODU discharge sensor and ODU PCB. ODU PCB , compressor, etc.
F8	Outdoor environment temperature sensor malfunction	
F9	Outdoor DC fan failure	1. Check whether the outdoor motor is well wired; 2. Replace the outdoor motor; 3. Replace the outdoor main control board
P1	Outdoor AC current protection	(1) Check whether there is a problem with the system status; (2) If there is no problem with the system status, directly replace the main control board of the outdoor unit.
P2	The press phase current is overcurrent	1. The press cannot be started normally, and the fault is reported as soon as it starts: - Replace the main control board of the outdoor unit. 2. The press can be started normally, and the fault will be reported after running for a period of time: (1) Confirm the system status: whether the high and low pressure valves are all open; whether the system pressure is within the normal range; Confirm whether the indoor and outdoor installation environment of the air conditioner is good; whether the cooling and heating are normal; wait (2) If (1) confirm that there is no problem, replace the main control board of the outdoor unit.
P3	AC voltage is overvoltage and undervoltage	1. Check whether the input voltage of the external unit is within the normal range of 165~265; 2. Replace the main control board of the outdoor unit.
P4	DC bus overvoltage and undervoltage	
P5	IPM Overtemperature	Normal function protection, such as continuous fault reporting, the main control board of the outdoor unit can be replaced.
P6	The exhaust temperature is too high.	Normal function protection, e.g. continuous fault reporting: (1) Check whether there is a problem with the system status; (2) If there is no problem with the system status, directly replace the main control board of the outdoor unit.
P7	The refrigeration inner coil is too low	
P8	The refrigeration outer coil is too high	
P9	The inner coil of heating is too high	
PA	The outdoor ambient temperature is above the normal range	Normal function protection, the temperature of the refrigeration outer ring is lower than 0 degrees, and the temperature of the heating outer ring is higher

		than 30 degrees, and the fault can be reset.
PC	Inner disc protection	<ol style="list-style-type: none"> <li>1. Check the system for leaks, add refrigerant if necessary, and ensure that the operating pressure is between 0.8 and 1.2MPa;</li> <li>2. High- and low-pressure valves are fully opened;</li> <li>3. Re-plug the copper connector into the temperature sensor;</li> <li>4. Replace the inner disc sensor;</li> <li>5. Replace the evaporator or re-weld the flow path that has been blocked by welding;</li> <li>6. Replace the four-way valve or condenser;</li> <li>7. Replace the control board</li> </ol>

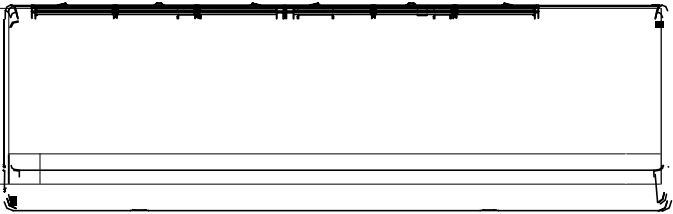
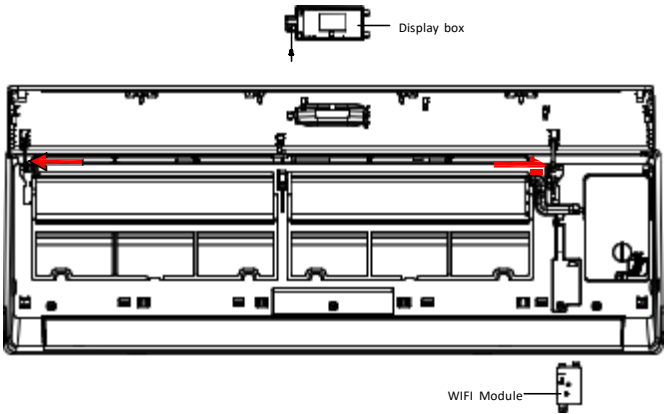
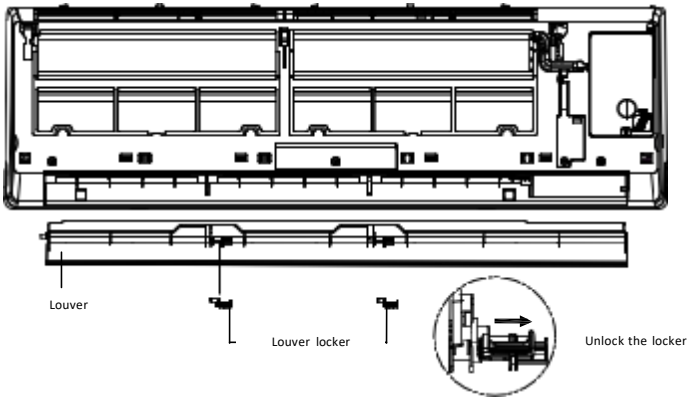
### Note: Remote controller FAILURE CODE Querying function

As shown in the failure codes, some of the codes (Fb~bj) need to press remote control for inspection. While unit on operation, press the ECO button 8 times with 8 seconds, the buzzer BIBI 2 times, you can inspect the special failure



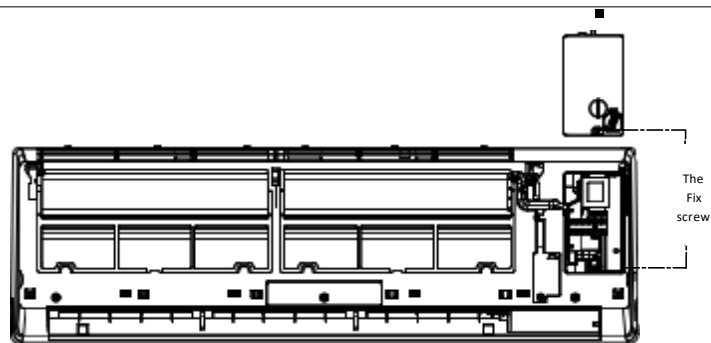
## 4. Disassembly IDU & ODU

### 4.1. IDU Disassembly

Steps	Reference photo
1. Before disassembly	
<p>The original status.</p>	
<p>2. Disassembly front panel, display board and WIFI module.</p> <p>A. Open front panel.  B. Remove one screw and take the display box out from the panel.  C. Release panel axis which shown in red arrows out from middle frame and take the panel out.  D. Unscrew and take the WIFI module out from middle frame.</p>	
3. Remove the louver.	
<p>Unlock the louver lockers (clip), bend the louver slightly by hands and remove it out from middle frame and stepping motor.</p>	

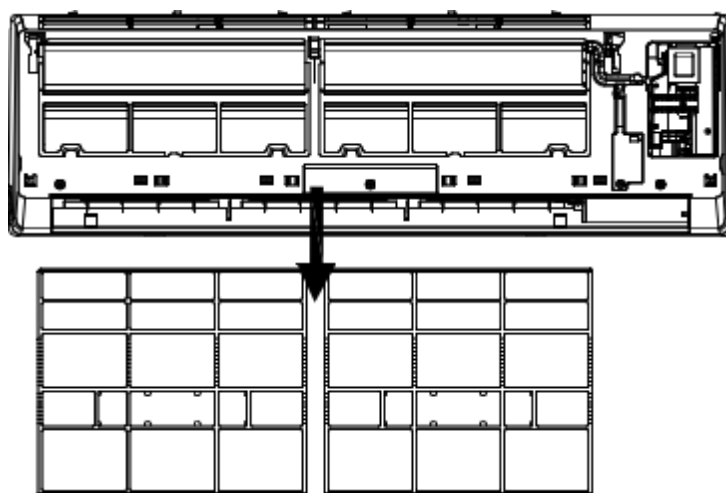
## 4. Remove the electric control box cover

Unfix one screw on the cover of electric box, and remove the cover.



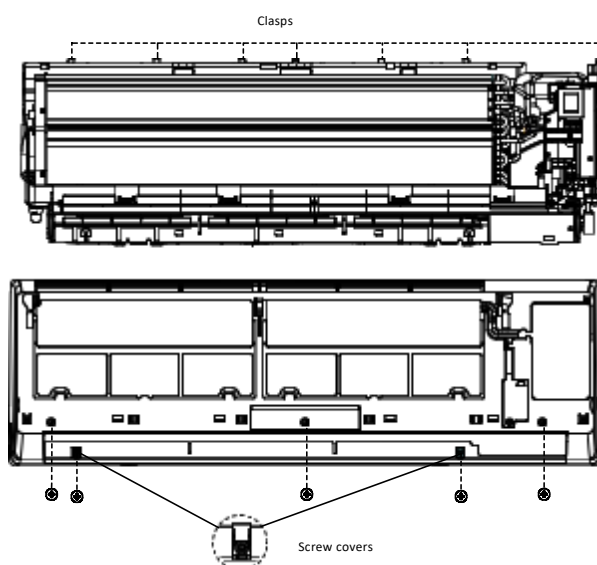
## 5. Remove the filter

Push the filter upwards a little, you can take it out from unit.



## 6. Disassembly the middle frame.

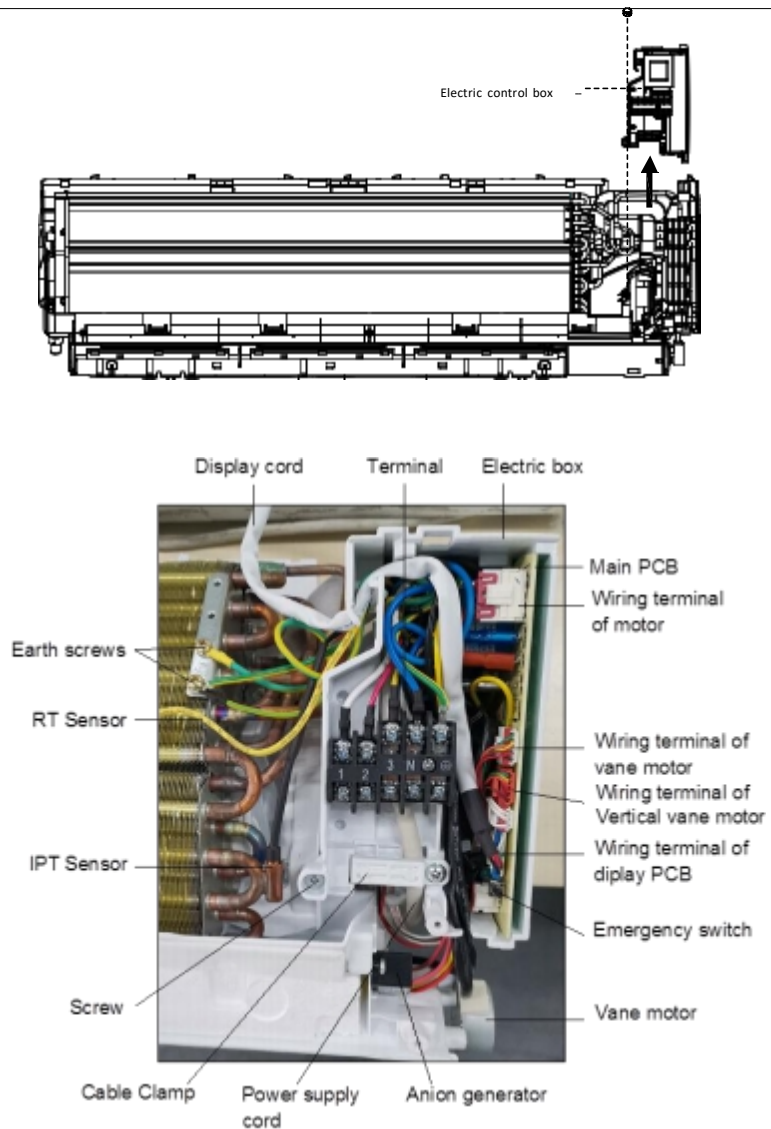
- A. Open the screw cover, and unfix screw with cross screwdriver.
- B. Remove the middle frame by loosing the clasps with the unit base as shown in the picture and take the frame out.



## 7. Disassembly the electric control box.

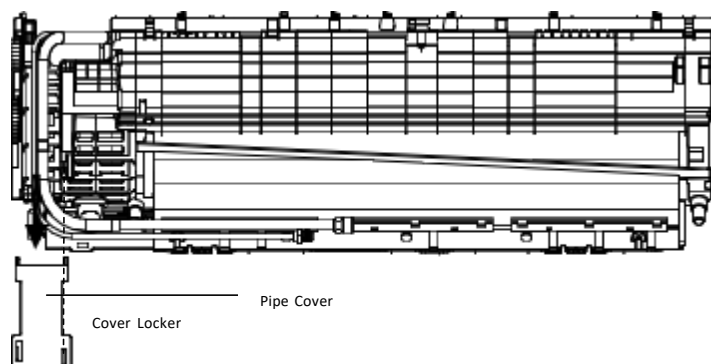
- A. Remove the RT & IPT out from evaporator;
- B. Unscrew all the earth ground wirings on the evaporator.
- C. Take all the connectors out from PCB.
- D. Unfix one screw of the control box with unit BASE FRAME, and take the control box out from unit.

Note: The right picture for your reference only, for the exact model the wiring connection may have a little difference.



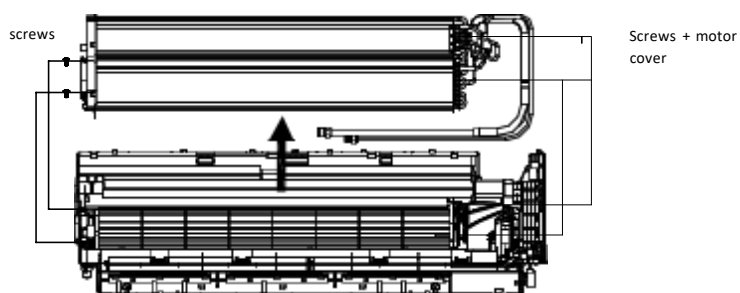
## 8. Remove the PIPE COVER

Loosing the lower edge of the PIPE COVER from BASE FRAME, and take the COVER out from unit.



## 9. Disassembly the evaporator

- A. Unfix 2 screws of left side shown as picture.
- B. Unfix 2 screws of right side on motor cover/right support plate.
- C. Take the evaporator out from unit by uplifting the IUPUT/OUTPUT pipes slightly.



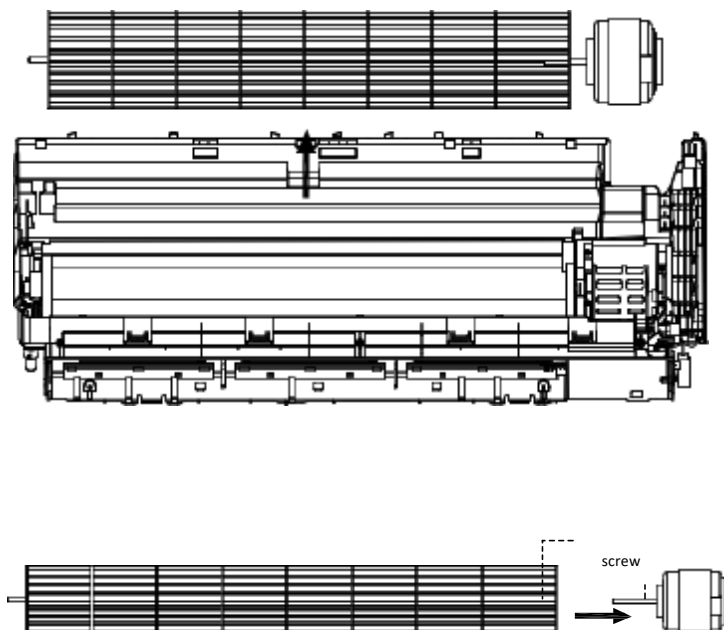
## 10. Remove the MOTOR COVER

Unfix 4 screws on the motor cover with base frame.

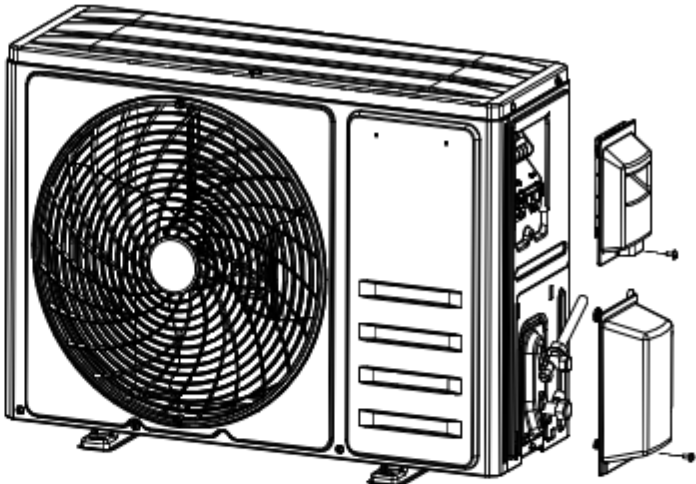
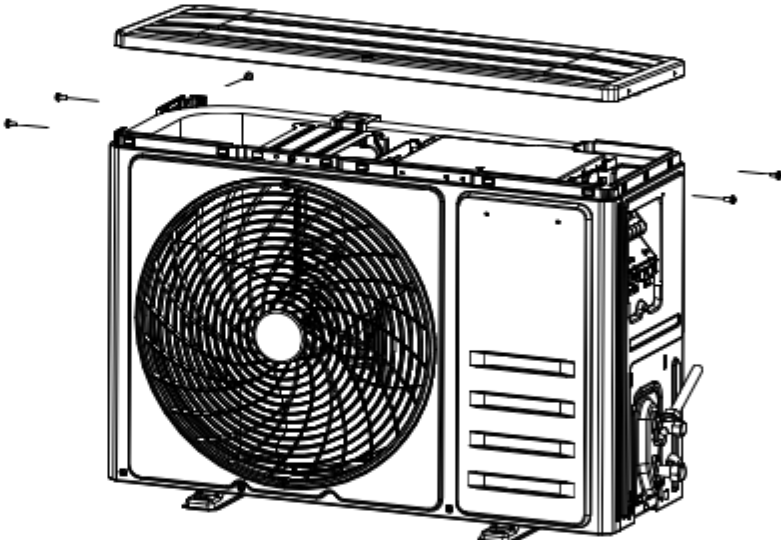
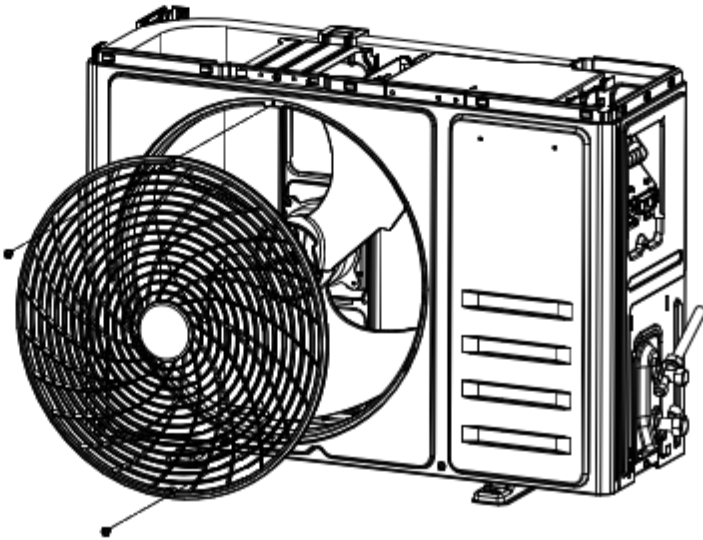


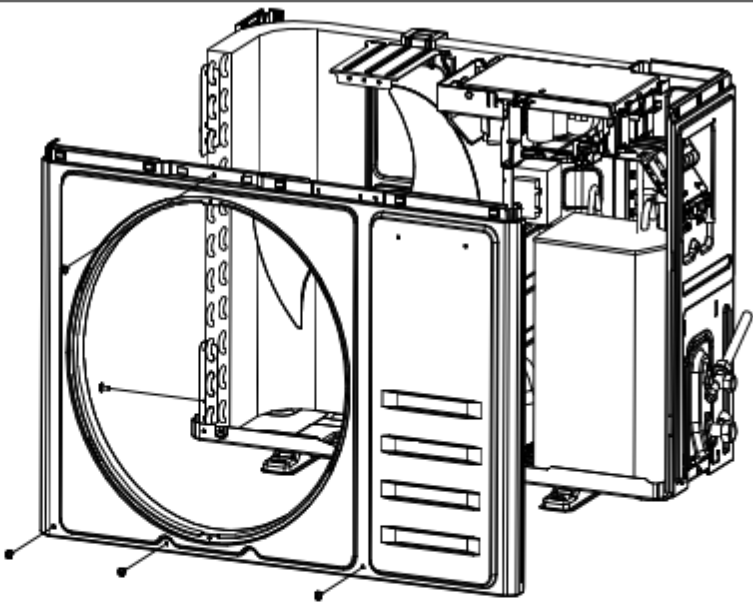
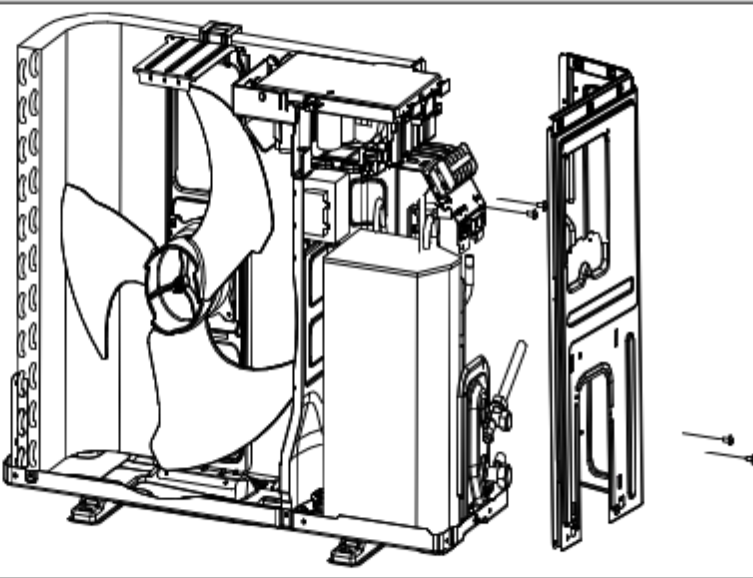
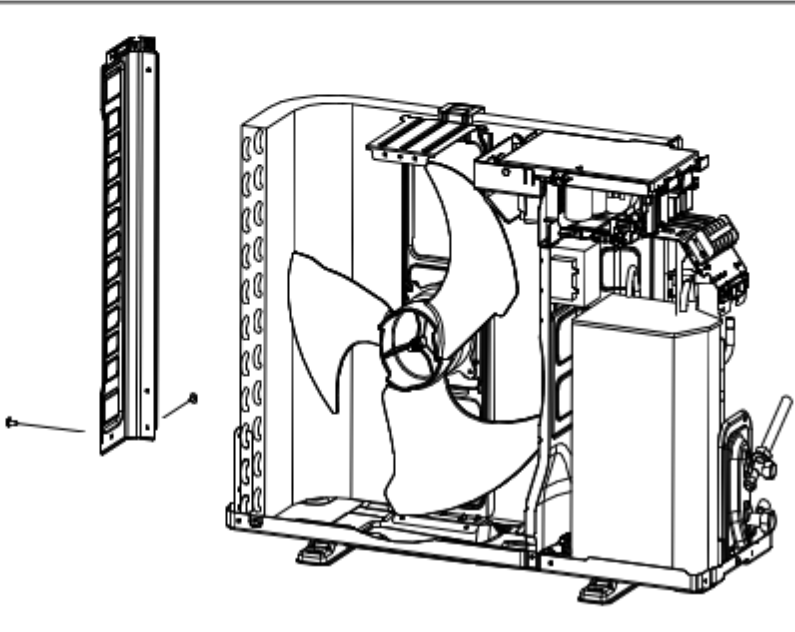
## 11. Disassembly fan motor and fan blade.

- A. Uplift the fan blade and fan motor, take the base frame out.
- B. Unfix one screw on the axis of fan motor, and you can get fan blade and fan motor separately.



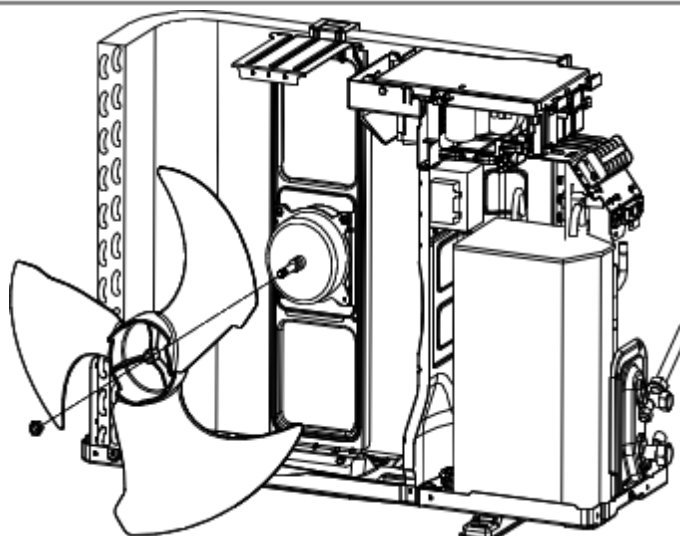
## 4.2 ODU Assembly

Step	Reference picture
<b>step1: Remove the PCB Cover , valve Cover and top cover</b>	
<p>A</p> <p>1). Unfix one screw on the PCB cover, you can take the cover out from unit.</p> <p>2). Unfix one screw on the valve cover, you can take it out easily.</p>	
<p>B</p> <p>Unfix screws btw the top cover with front panel, left and right plate, then you can take the top cover out.</p>	
<b>step2: Disassemble the Fan Guard and Front Panel</b>	
<p>A</p> <p>Unfix screws on front panel with fan guard.</p>	

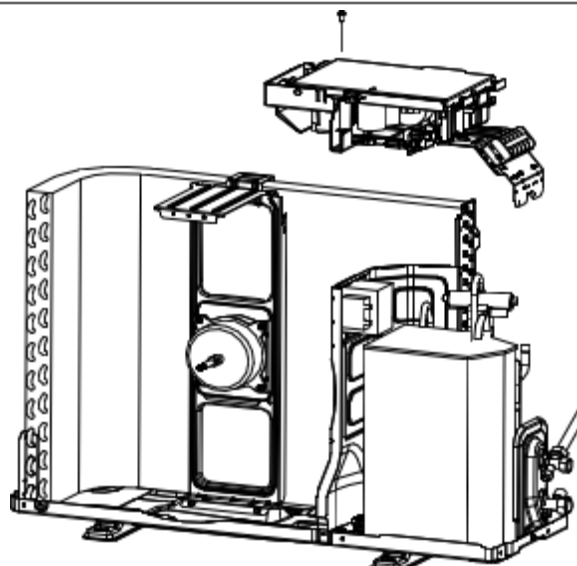
B	<p>ODU middle separate plate and base plate, uplift front panel you can take it out from unit.</p>	
<b>step3: Disassemble the Left and Right plate.</b>		
A	<p>Unfix screws btw <b>Right Plate</b> and the <b>Electric Box assembly, Valve Plate , Base Plate</b>, then you can take the Right plate out.</p>	
B	<p>Unfix screws btw Left Plate, Base plate and Condenser plate, you can take the left plate out.</p>	

**step4: Disassemble the Axis Fan Blade**

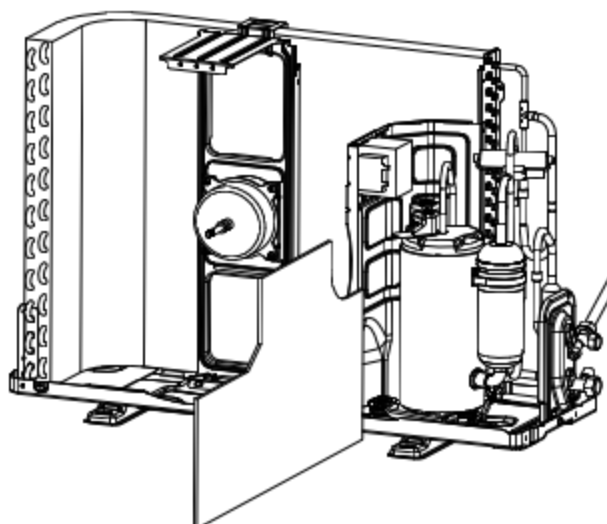
A Unscrew the fan blade nut, and take the blade out.

**step5: Disassemble the electric box**

Unfix screw btw Electric Box and motor supporter etc. loosen the wiring clamp, then you can take the control box out.

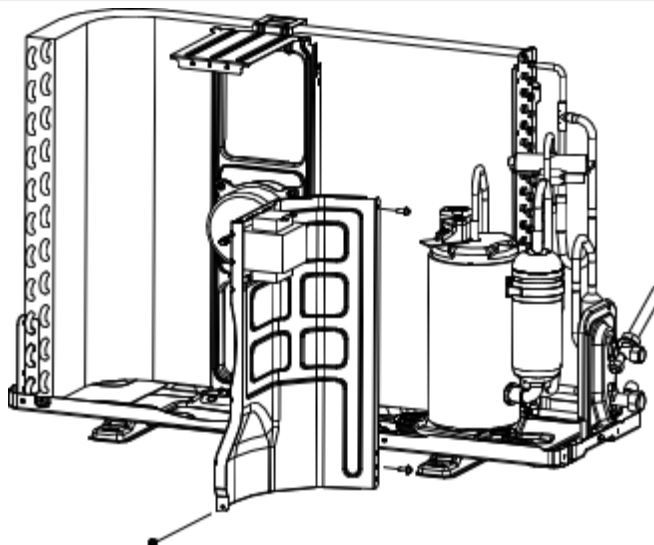
**step6: take out the noise cotton**

A Shown as picture to take the cotton out



**step7: Disassemble the separate plate**

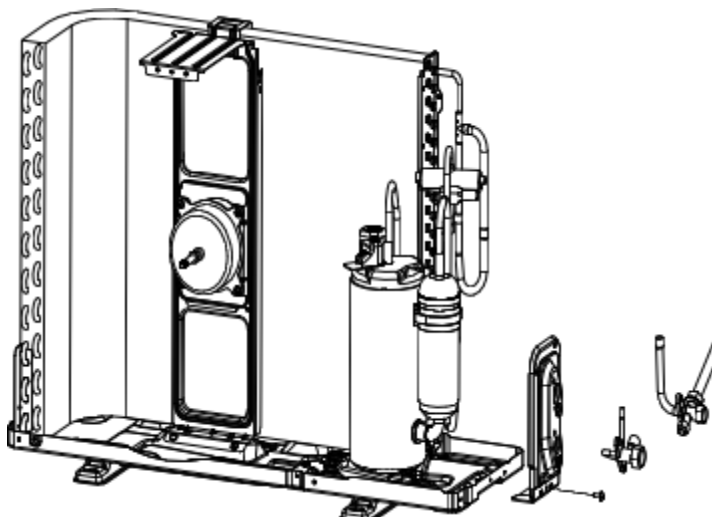
Unfix the screw btw  
separate plate and  
unit, and take it out

**step8: Disassemble the 2 and 3-way valve**

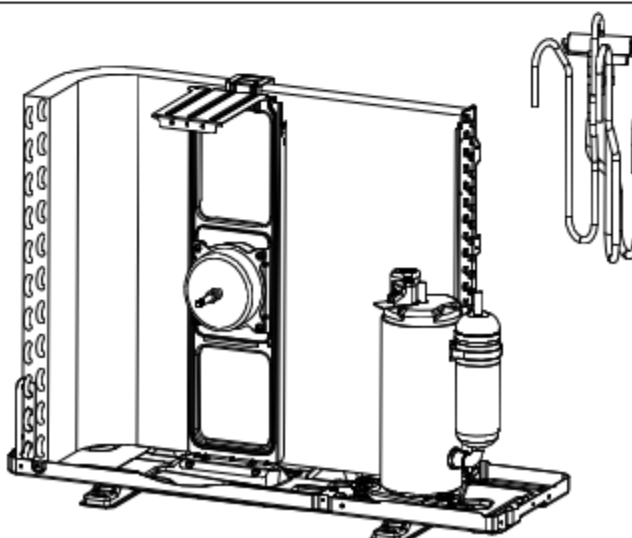
Unfix screw btw  
Valve plate and  
base, you can take  
the 2-way and 3-way  
valve out by welding.

Note:

- 1). The welding can  
only place while no  
gas in the unit.
- 2). Pay attention to  
the fire to prevent  
any injury.

**step9: Disassemble the 4-way valve assembly**

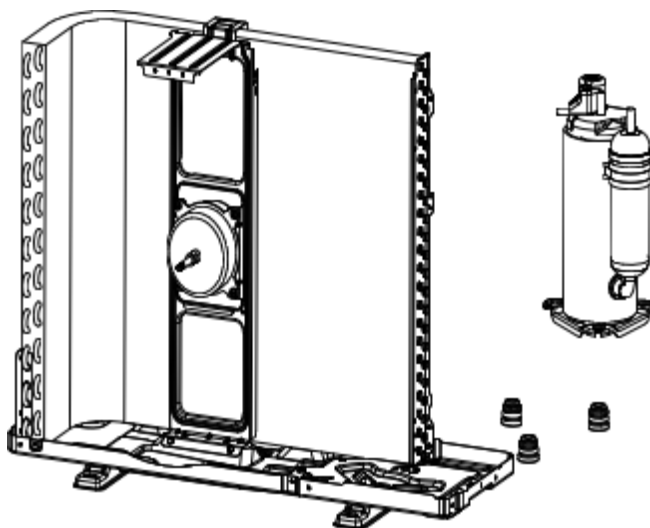
Take the 4-way  
valve out from  
system by welding.  
Make sure no hurt to  
the compressor and  
nameplate, etc.





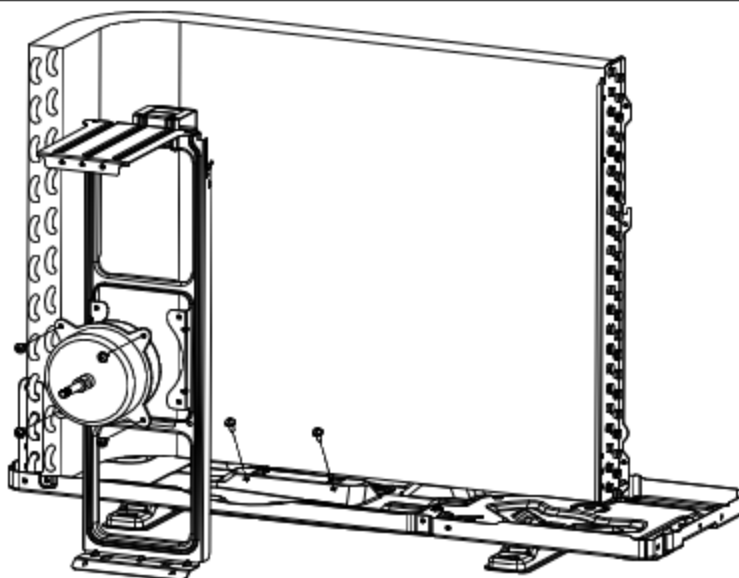
**step10: Disassemble the compressor.**

Unscrew the nuts  
and take the  
compressor out.

**step11: Remove the fan motor and fan supporter.**

Unfix screws btw fan  
motor with  
supporter, and  
supporter with base  
plate.

Note:  
Pay attention to the  
motor wiring, it can't  
be taken out by  
force.

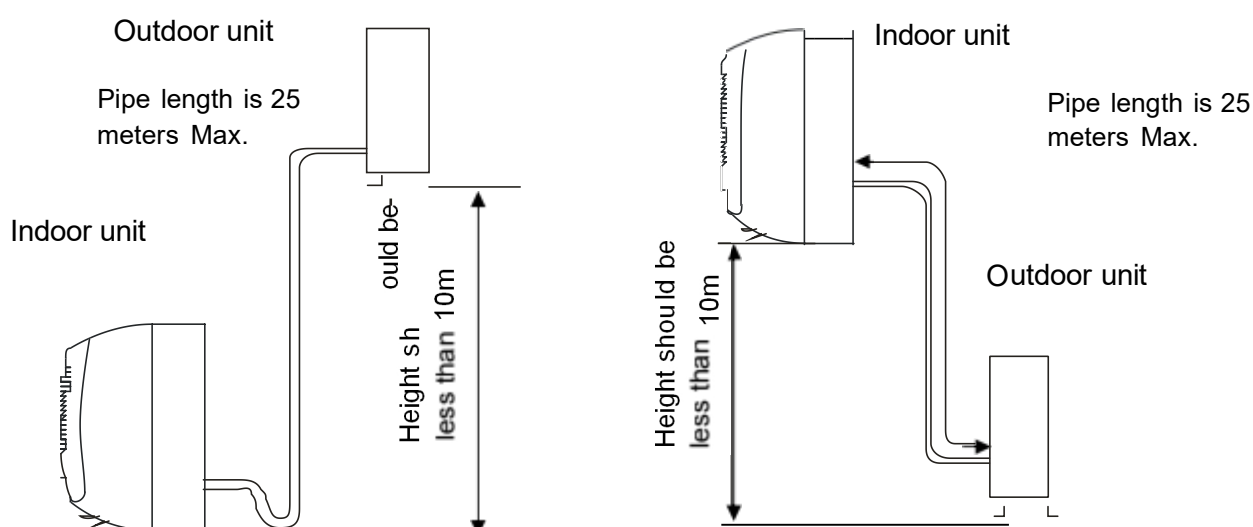


## APPENDIX

### Appendix 1 The comparison table of Celsius-Fahrenheit 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

### Appendix 2 The Pipe length and Gas charging



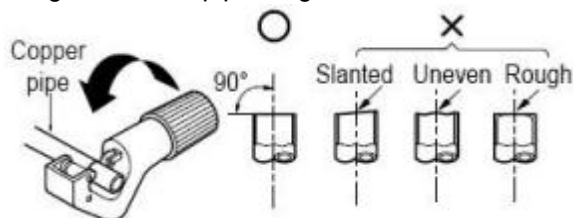
Mode	Standard length (m)	Refrigerant piping Max. length (m) A	Additional refrigerant charging: $Xg = B * (A - 5m)$ B
9K	3.0	25	20g/m
12K	3.0	25	20g/m
18K	3.0	25	30g/m
24K	3.0	25	30g/m
30K	3.0	25	30g/m
36K	3.0	25	30g/m

## Appendix 3 Pipes Flaring

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

### A. Cut the pipes and the cable.

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



### B. Burrs removal

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

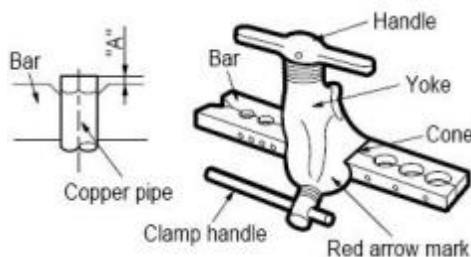


### C. Flaring work

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

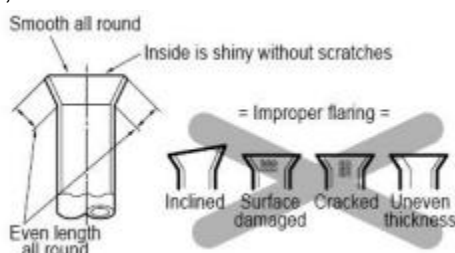
Outside diameter		A
mm	inch	mm
ø6.35	1/4	1.0~1.3
ø9.52	3/8	0.8~1.0
ø12.7	1/2	0.5~0.8
ø15.88	5/8	0.5~0.8

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



### D. Check

- 1) Compare the flared work with figure below.
- 2) If flare is noted to be defective, cut off the flared section and do flaring work again.



## Appendix 4 THERMISTOR TEMPERATURE CHARACTERISTICS

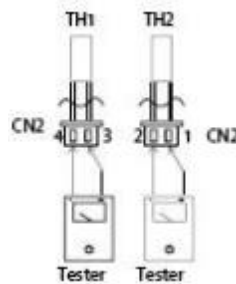
### 1). Indoor unit and outdoor exchange temperature and outside air temperature sensor temperature characteristics

TEMP. (°C)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	TEMP. (°C)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	TEMP. (°C)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)
-30	60.343	64.104	68.080	21	5.716	5.846	5.977	72	0.974	1.010	1.047
-29	57.157	60.666	64.375	22	5.498	5.620	5.742	73	0.944	0.980	1.016
-28	54.139	57.413	60.870	23	5.290	5.404	5.518	74	0.917	0.952	0.988
-27	51.301	54.355	57.579	24	5.091	5.198	5.305	75	0.890	0.924	0.959
-26	48.630	51.480	54.487	25	4.900	5.000	5.100	76	0.864	0.897	0.931
-25	46.115	48.776	51.582	26	4.713	4.811	4.909	77	0.839	0.871	0.904
-24	43.748	46.232	48.850	27	4.533	4.630	4.727	78	0.814	0.846	0.879
-23	41.517	43.836	46.279	28	4.362	4.457	4.552	79	0.791	0.822	0.854
-22	39.415	41.581	43.861	29	4.199	4.292	4.386	80	0.769	0.799	0.830
-21	37.432	39.456	41.585	30	4.042	4.133	4.225	81	0.746	0.776	0.807
-20	35.581	37.473	39.462	31	3.892	3.982	4.072	82	0.725	0.754	0.784
-19	33.798	35.565	37.421	32	3.748	3.836	3.925	83	0.705	0.733	0.762
-18	32.134	33.785	35.519	33	3.611	3.697	3.784	84	0.685	0.713	0.742
-17	30.561	32.105	33.725	34	3.479	3.564	3.649	85	0.666	0.693	0.721
-16	29.077	30.520	32.033	35	3.353	3.436	3.520	86	0.647	0.674	0.701
-15	27.673	29.023	30.437	36	3.232	3.313	3.395	87	0.629	0.655	0.682
-14	26.347	27.609	28.931	37	3.116	3.195	3.275	88	0.613	0.638	0.664
-13	25.092	26.273	27.508	38	3.004	3.082	3.161	89	0.595	0.620	0.646
-12	23.905	25.010	26.165	39	2.898	2.974	3.051	90	0.580	0.604	0.629
-11	22.782	23.816	24.896	40	2.795	2.870	2.946	91	0.563	0.587	0.611
-10	21.720	22.687	23.697	41	2.697	2.770	2.844	92	0.549	0.572	0.596
-9	20.713	21.618	22.562	42	2.604	2.675	2.748	93	0.534	0.557	0.580
-8	19.759	20.607	21.490	43	2.513	2.583	2.654	94	0.520	0.542	0.565
-7	18.855	19.649	20.475	44	2.426	2.494	2.564	95	0.506	0.528	0.550
-6	17.999	18.742	19.515	45	2.343	2.410	2.478	96	0.493	0.514	0.536
-5	17.187	17.883	18.606	46	2.263	2.328	2.395	97	0.480	0.501	0.522
-4	16.416	17.068	17.745	47	2.186	2.250	2.315	98	0.468	0.488	0.509
-3	15.685	16.296	16.930	48	2.111	2.174	2.238	99	0.456	0.476	0.497
-2	14.991	15.563	16.156	49	2.041	2.102	2.164	100	0.444	0.464	0.484
-1	14.332	14.868	15.423	50	1.972	2.032	2.093	101	0.433	0.452	0.472
0	13.766	14.270	14.792	51	1.906	1.965	2.025	102	0.422	0.441	0.460
1	13.111	13.582	14.069	52	1.844	1.901	1.959	103	0.412	0.430	0.449
2	12.546	12.987	13.443	53	1.783	1.839	1.896	104	0.401	0.419	0.437
3	12.008	12.422	12.849	54	1.724	1.779	1.835	105	0.391	0.409	0.427
4	11.497	11.885	12.284	55	1.668	1.721	1.776	106	0.381	0.399	0.416
5	11.012	11.375	11.749	56	1.614	1.666	1.719	107	0.372	0.388	0.406
6	10.548	10.889	11.239	57	1.562	1.613	1.665	108	0.362	0.379	0.395
7	10.109	10.428	10.756	58	1.512	1.562	1.613	109	0.353	0.369	0.386
8	9.689	9.988	10.295	59	1.463	1.512	1.562	110	0.344	0.360	0.376
9	9.289	9.570	9.858	60	1.417	1.465	1.514	111	0.335	0.351	0.367
10	8.909	9.172	9.441	61	1.372	1.419	1.467	112	0.327	0.342	0.357

11	8.545	8.792	9.044	62	1.328	1.374	1.421	113	0.319	0.333	0.349
12	8.199	8.431	8.667	63	1.287	1.332	1.378	114	0.311	0.325	0.340
13	7.870	8.087	8.308	64	1.247	1.291	1.336	115	0.303	0.317	0.332
14	7.554	7.758	7.965	65	1.208	1.251	1.295	116	0.296	0.309	0.324
15	7.254	7.445	7.639	66	1.171	1.213	1.256	117	0.288	0.302	0.315
16	6.968	7.147	7.329	67	1.135	1.176	1.218	118	0.281	0.294	0.308
17	6.694	6.862	7.032	68	1.100	1.140	1.181	119	0.274	0.287	0.301
18	6.433	6.590	6.749	69	1.067	1.106	1.146	120	0.268	0.280	0.293
19	6.183	6.331	6.480	70	1.035	1.073	1.112				
20	5.945	6.083	6.223	71	1.004	1.041	1.079				

**R—Resistance**

**Resistance at 25°C: 5 kΩ.**



**TH1: indoor room temperature sensor and outside air temperature sensor**

**TH2: indoor exchange temperature sensor and outside exchange temperature sensor**

**Before measuring resistance, disconnect connectors as shown above.**

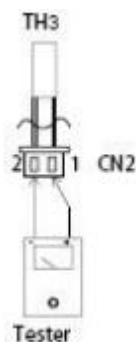
#### 1) Outdoor unit discharge sensor temperature characteristics

TEMP. (°C)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	TEMP. (°C)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	TEMP. (°C)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)
-30	288.879	337.780	386.68	23	20.114	21.847	23.579	76	2.733	2.835	2.937
-29	272.641	318.219	263.797	24	19.263	20.900	22.538	77	2.646	2.742	2.839
-28	257.401	299.897	342.392	25	18.453	20.000	21.547	78	2.561	2.653	2.745
-27	243.09*2	282.727	322.363	26	17.681	19.143	20.605	79	2.480	2.567	2.654
-26	299.654	266.633	303.613	27	16.945	18.327	19.710	80	2.401	2.484	2.567
-25	217.028	251.541	286.054	28	16.243	17.551	18.858	81	2.326	2.404	2.483
-24	205.162	237.383	269.604	29	15.575	16.811	18.047	82	2.183	2.253	2.324
-23	194.005	224.097	254.188	30	14.937	16.106	17.275	83	2.183	2.253	2.324
-22	183.513	211.625	239.736	31	14.328	15.434	16.541	84	2.115	2.182	2.249
-21	173.642	199.912	226.181	32	13.748	14.794	15.841	85	2.050	2.113	2.176
-20	164.353	188.909	213.465	33	13.194	14.184	15.175	86	1.984	2.047	2.109
-19	155.608	178.569	201.530	34	12.665	13.602	14.540	87	1.921	1.983	2.045
-18	147.373	168.850	190.326	35	12.160	13.048	13.935	88	1.860	1.921	1.982
-17	139.616	159.710	179.803	36	11.678	12.518	13.358	89	1.801	1.862	1.922
-16	132.307	151.112	169.917	37	11.217	12.013	12.809	90	1.744	1.804	1.864
-15	125.417	143.022	160.627	38	10.777	11.531	12.248	91	1.690	1.749	1.808
-14	118.921	135.407	151.893	39	10.357	11.071	11.784	92	1.637	1.695	1.754
-13	112.794	128.236	143.679	40	9.955	10.631	11.307	93	1.586	1.644	1.701
-12	107.014	121.483	135.952	41	9.571	10.211	10.852	94	1.537	1.594	1.651
-11	101.559	115.120	128.680	42	9.203	9.810	10.417	95	1.490	1.546	1.602
-10	96.410	109.123	121.836	43	8.852	9.427	10.002	96	1.444	1.500	1.555

-9	91.548	103.469	115.391	44	8.516	9.061	9.606	97	1.400	1.455	1.509
-8	86.956	98.138	109.320	45	8.194	8.711	9.228	98	1.358	1.412	1.465
-7	82.617	93.108	103.600	46	7.886	8.376	8.866	99	1.317	1.370	1.423
-6	78.516	88.362	98.209	47	7.591	8.056	8.520	100	1.277	1.329	1.382
-5	74.640	83.883	93.126	48	7.309	7.750	8.190	101	1.239	1.290	1.342
-4	70.974	79.653	88.332	49	7.039	7.750	8.190	102	1.202	1.253	1.303
-3	67.507	75.659	83.810	50	6.780	7.176	7.572	103	1.166	1.216	1.266
-2	64.227	71.885	79.543	51	6.532	6.908	7.283	104	1.132	1.181	1.230
-1	61.123	68.319	75.515	52	6.294	6.650	7.007	105	1.099	1.147	1.195
0	58.184	64.948	71.712	53	6.066	6.404	6.743	106	1.066	1.114	1.162
1	55.402	61.761	68.120	54	5.847	6.168	6.489	107	1.035	1.082	1.129
2	52.766	58.746	64.726	55	5.638	5.942	6.247	108	1.005	1.051	1.098
3	50.269	55.894	61.519	56	5.437	5.726	6.015	109	0.976	1.022	1.067
4	47.903	53.195	58.488	57	5.244	5.518	5.793	110	0.948	0.993	1.038
5	45.661	50.641	55.621	58	5.059	5.319	5.580	111	0.921	0.965	1.009
6	43.543	48.222	52.910	59	4.882	5.129	5.376	112	0.895	0.938	0.981
7	41.517	45.931	50.345	60	4.711	4.946	5.180	113	0.869	0.912	0.955
8	39.604	43.761	47.917	61	4.548	4.770	4.993	114	0.845	0.887	0.929
9	37.789	41.704	45.619	62	4.39	4.602	4.813	115	0.821	0.862	0.904
10	36.066	39.755	43.443	63	4.240	4.440	4.641	116	0.798	0.839	0.879
11	34.431	37.907	41.383	64	4.094	4.285	4.475	117	0.776	0.816	0.856
12	32.787	36.154	39.430	65	3.955	4.136	4.317	118	0.754	0.794	0.833
13	31.403	34.491	37.580	66	3.821	3.993	4.164	119	0.733	0.772	0.811
14	30.001	32.914	35.826	67	3.693	3.855	4.018	120	0.713	0.751	0.789
15	28.670	31.417	34.163	68	3.569	3.723	3.878	121	0.694	0.731	0.769
16	27.404	29.995	32.586	69	3.450	3.596	3.743	122	0.675	0.712	0.749
17	26.200	28.645	31.090	70	3.335	3.475	3.614	123	0.657	0.693	0.729
18	25.056	27.363	29.671	71	3.225	3.357	3.490	124	0.639	0.675	0.710
19	23.967	26.145	28.324	72	3.119	3.245	3.370	125	0.622	0.657	0.692
20	22.931	24.988	27.044	73	3.017	3.136	3.225				
21	21.946	23.888	25.830	74	2.919	3.032	3.145				
22	21.007	22.842	24.676	75	2.824	2.932	3.093				

**R—Resistance**

**Resistance at 25°C:20 kΩ**



**TH3: Outdoor unit discharge pipe sensor**

**Before measuring resistance, disconnect connectors as shown above.**