ComfortStar®

Air Conditioning & Heating Products

Multi Inverter Air Conditioner

Service Manual

Orbit series™

AIR CONDITIONING & HEATING PRODUCTS

INVERTER

Models

CMIT-19-2Z	**Dual（2 Zones）**
CMIT-27-3Z	**Triple（3 Zones）**
CMIT-40-4Z	**Quad（4 Zones）**
CMIT-55-5Z	**Quint（5 Zones）**

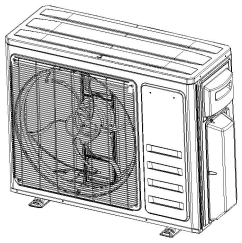
CONTENT

1. Technical Information

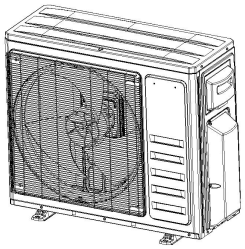
1.1. Summary

1.1.1. Outdoor Unit

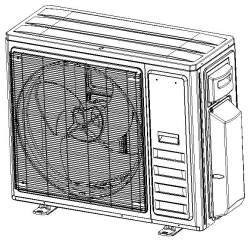
CMIT-19-2Z



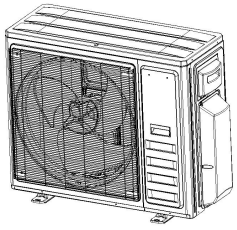
CMIT-27-3Z



CMIT-40-4Z



CMIT-55-5Z



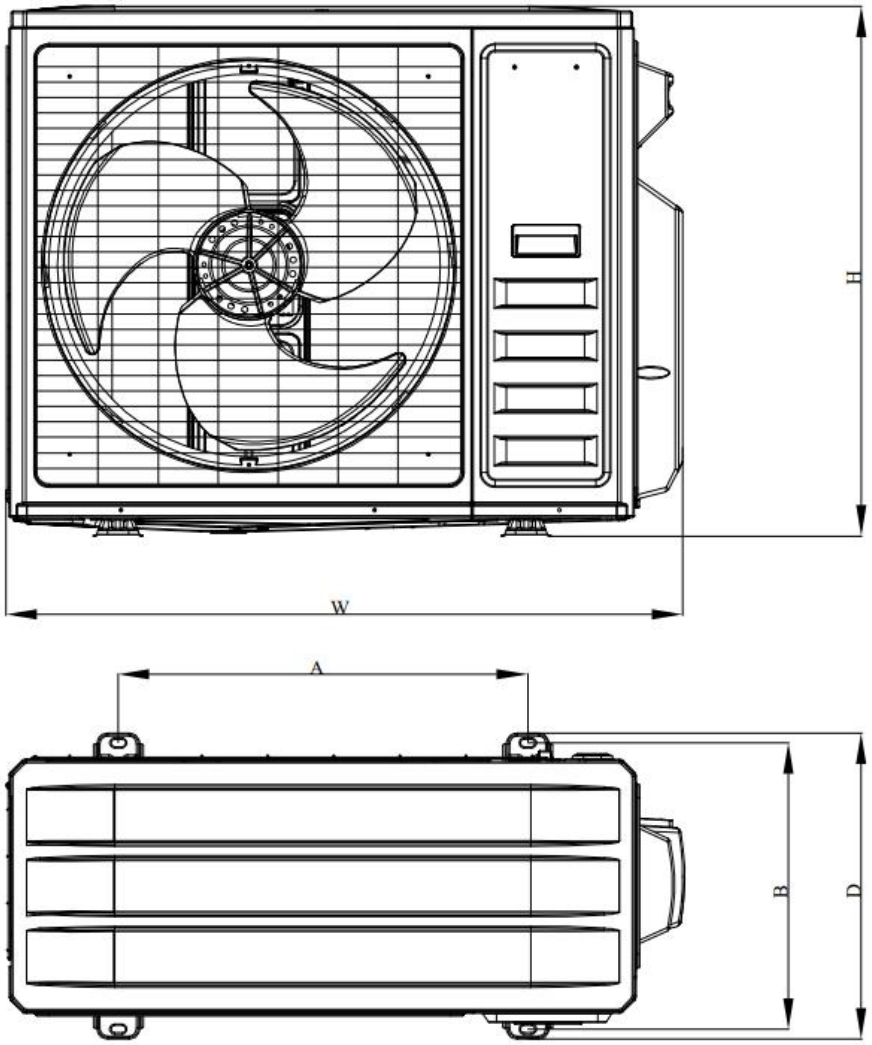
2. Unit Dimension

2.1. Specification Sheet

MODEL NUMBER			CMIT-19-2Z	CMIT-27-3Z	CMIT-40-4Z	CMIT-55-5Z
System Type			Heat Pump			
Number of Zones			2	3	4	5
SYESTEM PERFORMANCE (Non-Ducted Indoor Units)						
Cooling at 95°C (35°C)	Capacity (Min - Max)	BTU/h	18000 (4400~20500)	27000 (5900~31000)	35000 (6900~37000)	42000 (8700~47000)
	Rated Input Power	W	1400	2160	2750	3400
	Rated Current	A	6.1	9.4	12.0	14.8
	SEER2 / EER2		24.5/13	24.5/12.5	23/12	22.5/12
Heating at 47°F (8.3°C)	Capacity (Min - Max)	BTU/h	19000 (4400~23200)	27000 (5900~33500)	36000 (6900~41000)	42000 (8700~47000)
	Rated Input Power	W	1500	2100	2750	3200
	Rated Current	A	6.5	9.1	12.0	13.9
	HSPF2 / COP		10/3.5	10/3.5	9.5/3.5	9.5/3.5
Heating at 17°F (-8.3°C)	Rated Capacity	BTU/H	16800	19800	26000	32000
Heating at 5°F (-15°C)	Rated Capacity	BTU/h	15800	19800	25400	30000
	COP		2.00	2.00	2.00	2.00
ENERGY STAR® Certified			Yes	Yes	Yes	Yes
SYESTEM PERFORMANCE (Ducted Indoor Units)						
Cooling at 95°C (35°C)	Capacity (Min - Max)	BTU/h	18000 (4400~20500)	27000 (5900~31000)	35000 (6900~37000)	42000 (8700~47000)
	Rated Input Power	W	1460	2250	2870	3550
	Rated Current	A	6.4	9.8	12.5	15.4
	SEER2 / EER2		21/12	22/12	20/11.7	20/11.7
Heating at 47°F (8.3°C)	Capacity (Min - Max)	BTU/h	19000 (4400~23200)	27000 (5900~33500)	36000 (6900~41000)	42000 (8700~47000)
	Rated Input Power	W	1560	2190	2870	3350
	Rated Current	A	6.8	9.5	12.5	14.6
	HSPF2 / COP		9.5/3.5	9/3.4	8.5/3.2	8.5/3.2
Heating at 17°F (-8.3°C)	Rated Capacity	BTU/H	16800	19100	22400	29500
Heating at 5°F (-15°C)	Rated Capacity	BTU/h	16000	19000	25200	30500
	COP		1.90	1.90	1.90	1.90
ENERGY STAR® Certified			Yes	Yes	Yes	Yes
SYESTEM PERFORMANCE (Mixed Ducted & Non-Ducted Indoor Units)						
Cooling	Capacity (Min - Max)	BTU/h	18000 (4400~20500)	27000 (5900~31000)	35000 (6900~37000)	41000 (8700~47000)
	SEER2 / EER2		23/12.5	23/12.2	21.5/11.8	21/11.8
Heating at 47F	Capacity (Min - Max)	BTU/h	19000 (4400~23200)	27000 (5900~33500)	36000 (6900~41000)	42000 (8700~47000)
	HSPF2 / COP		9.8/3.5	9.5/3.4	9/3.4	9/3.4
ENERGY STAR® Certified			NO	NO	NO	NO
ELECTRICAL						
Power Supply			208/230V~/60Hz/1P	208/230V~/60Hz/1P	208/230V~/60Hz/1P	208/230V~/60Hz/1P
Voltage Range (Min - Max)			175~265	175~265	175~265	175~265
Min. Circuit Ampacity - MCA		A	16	18	22	28
Max. Circuit Breaker (MOPA)		A	25	30	35	45
Max. FUSE Size		A	25	30	35	45
Main Power Wire Size		AWG	Per Local Code			
Connection Wiring		AWG	14 / 4 standard, unshielded			
Commiunication Protocal Btwn. IDU & ODU			Current Loop			

REFRIGERANT PIPING						
Refrigerant Type / Charged		oz	R454b / 60.01	R454b / 77.66	R454b / 98.84	R454b / 120.02
Pre-Charge Length Total		ft (m)	49 (15)	74 (22.5)	98 (30)	123 (37.5)
Additional Charge	Φ6.35 (1/4") liquid pipe	oz/ft	0.11	0.11	0.11	0.11
	Φ9.52 (3/8") liquid pipe	oz/ft	0.22	0.22	0.22	0.22
Design Pressure		PSIG				
Port Size (Liquid - Gas)		in	2 x 1/4 - 3/8	3 x 1/4 - 3/8	4 x 1/4 - 3/8	5 x 1/4 - 3/8
Lineset Length (Min - Max) - Each		ft (m)	82 (25)	98 (30)	98 (30)	98 (30)
Lineset Length (Min - Max) - Total		ft (m)	131 (40)	197 (60)	263 (80)	295 (90)
Max. Lineset Height Difference Btwn. ODU & Furthest IDU		ft (m)	49 (15)	49 (15)	49 (15)	49 (15)
Max. Lineset Height Difference Btwn.IDU		ft (m)	33 (10)	33 (10)	33 (10)	33 (10)
OUTDOOR UNIT DATA						
Refrigerant Type			R454b			
Throttle Type			Capillary +EXV			
Compressor & Motor Type			INVERTER, DC			
Air Flow		CFM	1471	1647	1882	2000
Sound Pressure Level		dB(A)	58	62	65	65
Cooling Temperature Range		℉ (℃)	5 - 133 (-15 - 55)	5 - 133 (-15 - 55)	5 - 133 (-15 - 55)	5 - 133 (-15 - 55)
Heating Temperature Range		℉ (℃)	-13 - 86 (-25 - 30)	-13 - 86 (-25 - 30)	-13 - 86 (-25 - 30)	-13 - 86 (-25 - 30)
External Dimensions (W x H x D)		in	33 5/16 x 27 1/2 x 14 15/16	35 13/16 x 31 5/8 x 14 1/8	40 3/16 x 31 5/8 x 14 1/8	40 3/16 x 31 5/8 x 14 1/8
		cm	845 x 699 x 380	910 x 803 x 359	1020 x 853 x 468	1020 x 853 x 468
Package Dimensions (W x H x D)		in	37 1/2 x 28 13/16 x 16 3/4	40 1/4 x 32 7/8 x 18 7/8	44 11/16 x 38 3/16 x20 7/8	44 11/16 x 38 3/16 x20 7/8
		cm	952 ×732 ×425	1022 × 835 ×480	1135 × 970 ×530	1135 × 970 ×530
Weight (Net / Gross)		lbs	92.6 / 99.2	119 / 127.9	145.5 / 169.8	174.2 / 198.4
		kgs	42 / 45	54 / 58	66 / 77	79 / 90

2.2. ODU Dimension

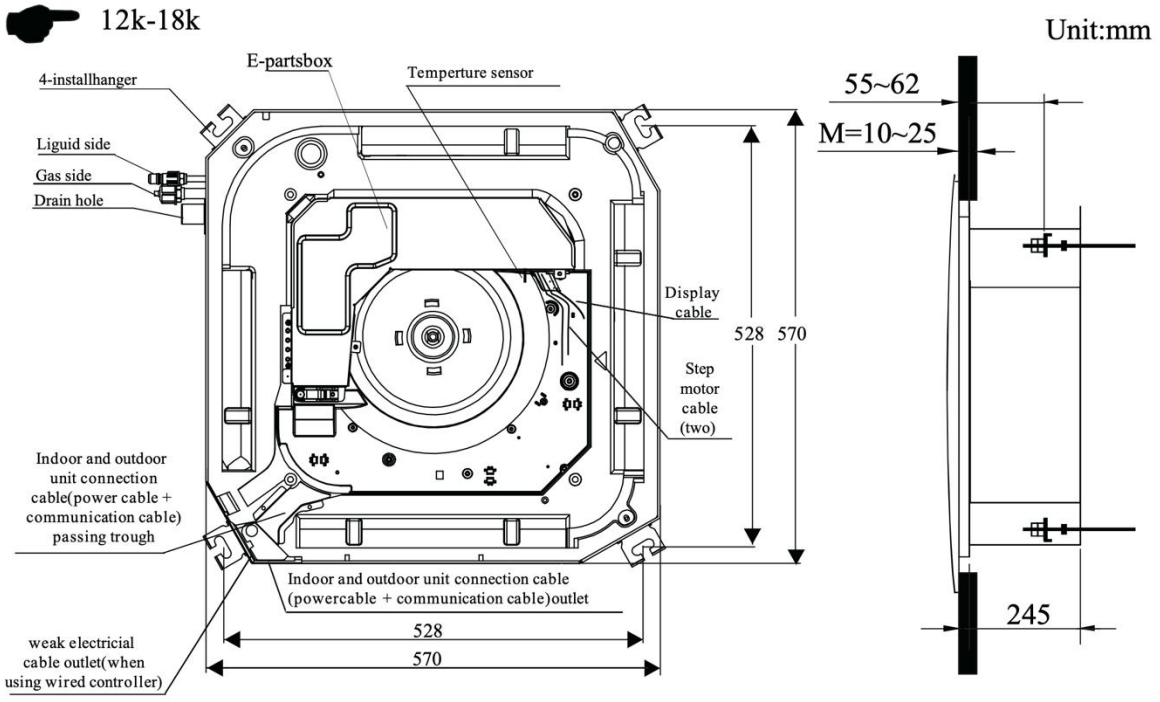


Outdoor Model	Outdoor Unit Dimensions mm（in.）	Mounting Dimensions mm（in.）	
	W *H *D	A	B
CMIT-19-2Z	927*699*375（36.5*27.5*14.8）	586（23.1）	348（13.7）
CMIT-27-3Z	984*804*412（38.8*31.7*16.2）	607（23.9）	390（15.4）
CMIT-40-4Z	1094*858*494（43.1*33.8*119.5）	660（26.0）	462（18.2）
CMIT-55-5Z			

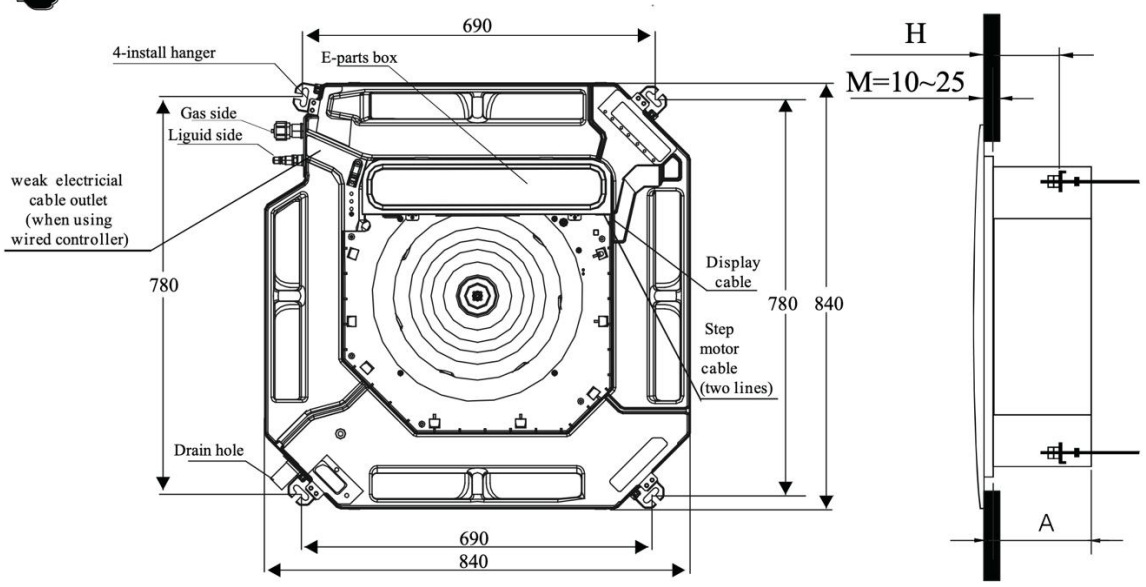
2.3. IDU Dimension

1. Cassette

12k-18k



24k



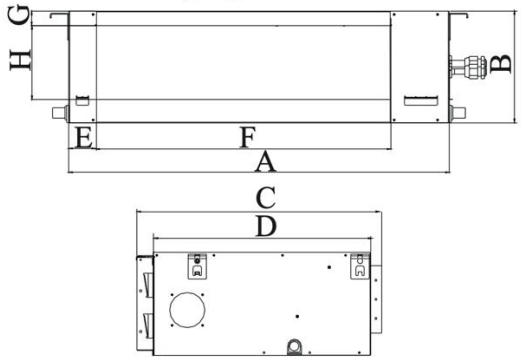
Dimension

Unit:mm

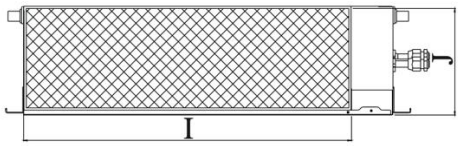
Model	A	H
9-18K	245	130-135
24K	245	130-135

2. Duct

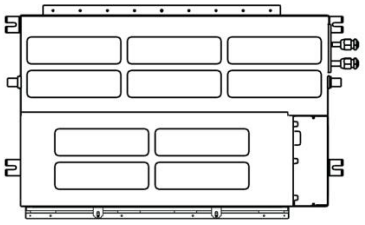
1.The positioning of elling hole,indoor unit and hanging screw bolts.



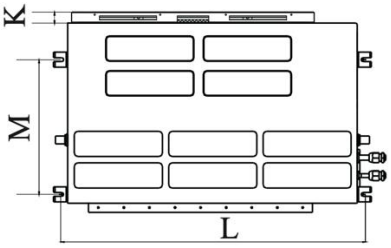
Air inlet size



Position size of descensional ventilation opening.



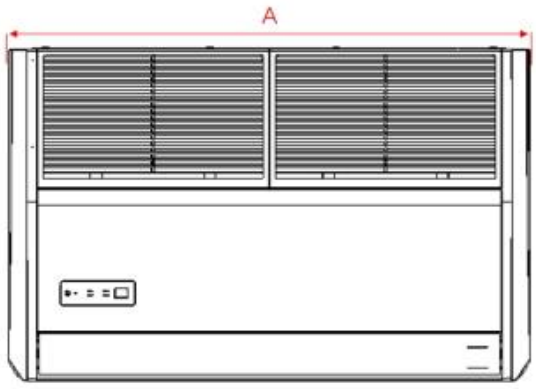
Size of mounted hook

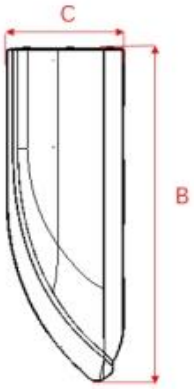


Unit:mm

Model	Outline dimension				Air outlet opening size				Air return opening size			Size of mounted lug	
	A	B	C	D	E	F	G	H	I	J	K	L	M
9~18k	700	200	490	450	45	510	17	140	600	187	35	738	298
18k	920	200	490	450	45	730	17	140	820	187	35	958	298
24k	1100	200	490	450	27	930	17	140	1030	183	35	960	365

3. Ceiling Floor

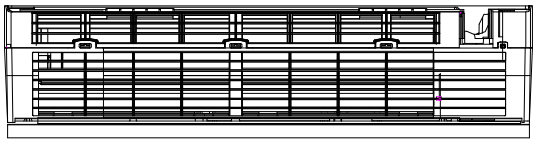


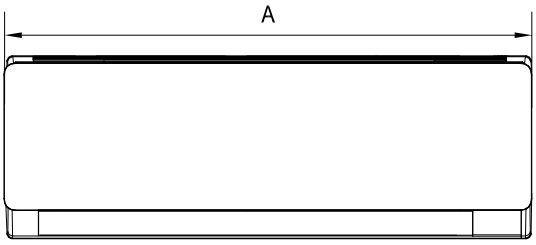


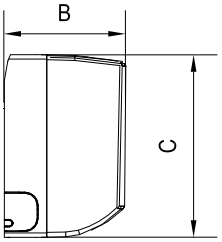
Unit:mm

Model	Indoor unit		
	A	B	C
18K	1053	675	235
24K	1053	675	235

4. Mini split







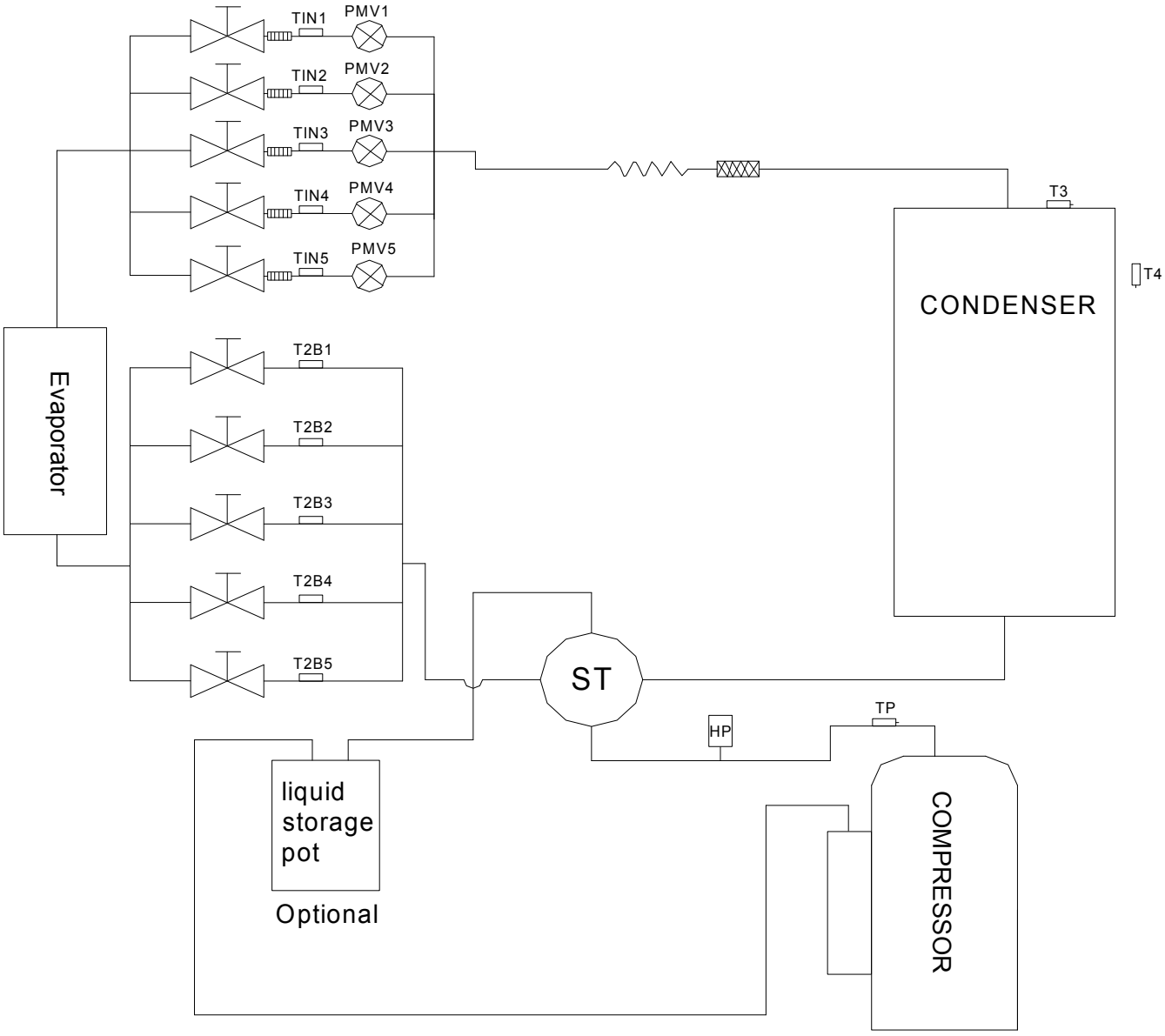
Unit:mm

Model	Indoor unit		
	A	B	C
9K	811	292	205
12K	811	292	205
18K	1010	315	220
24K	1186	340	268

3. Refrigerant System Diagram

Schematic Diagram of Free Match Series Inverter Heat Pump System:

Take CMIT-55-5Z for refference

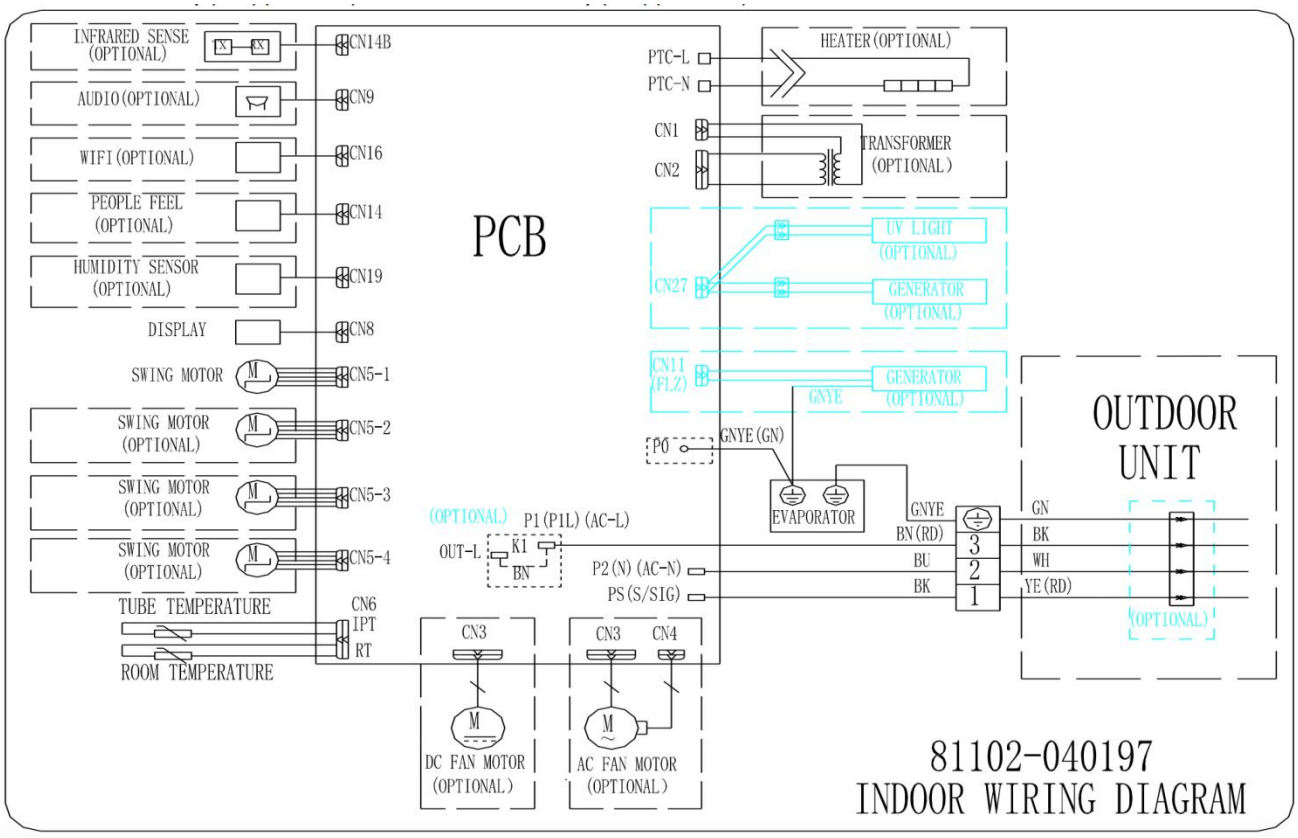


4. Electrical Part

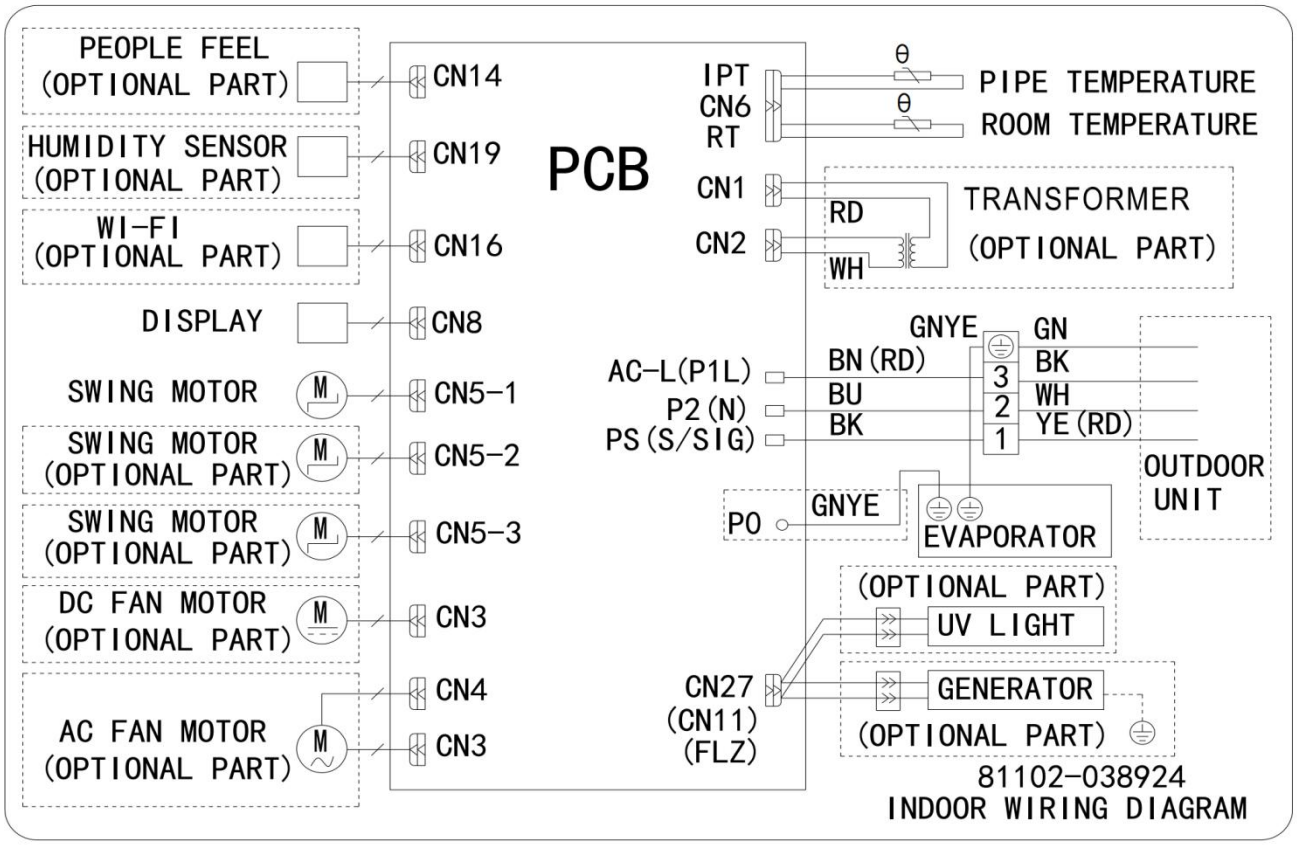
4.1. Wiring Diagram

Indoor Unit

Mini split 9K 12K 18K

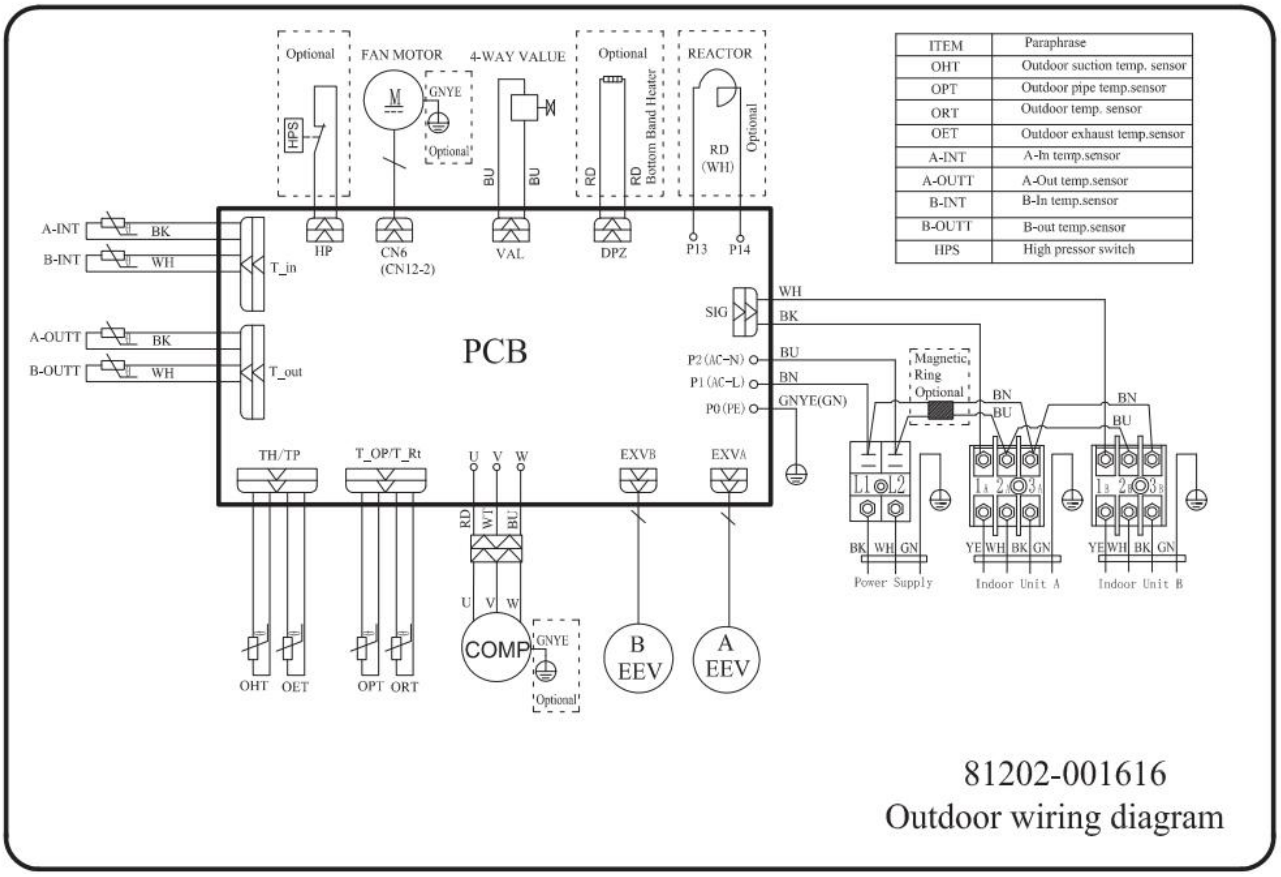


Mini split 24K

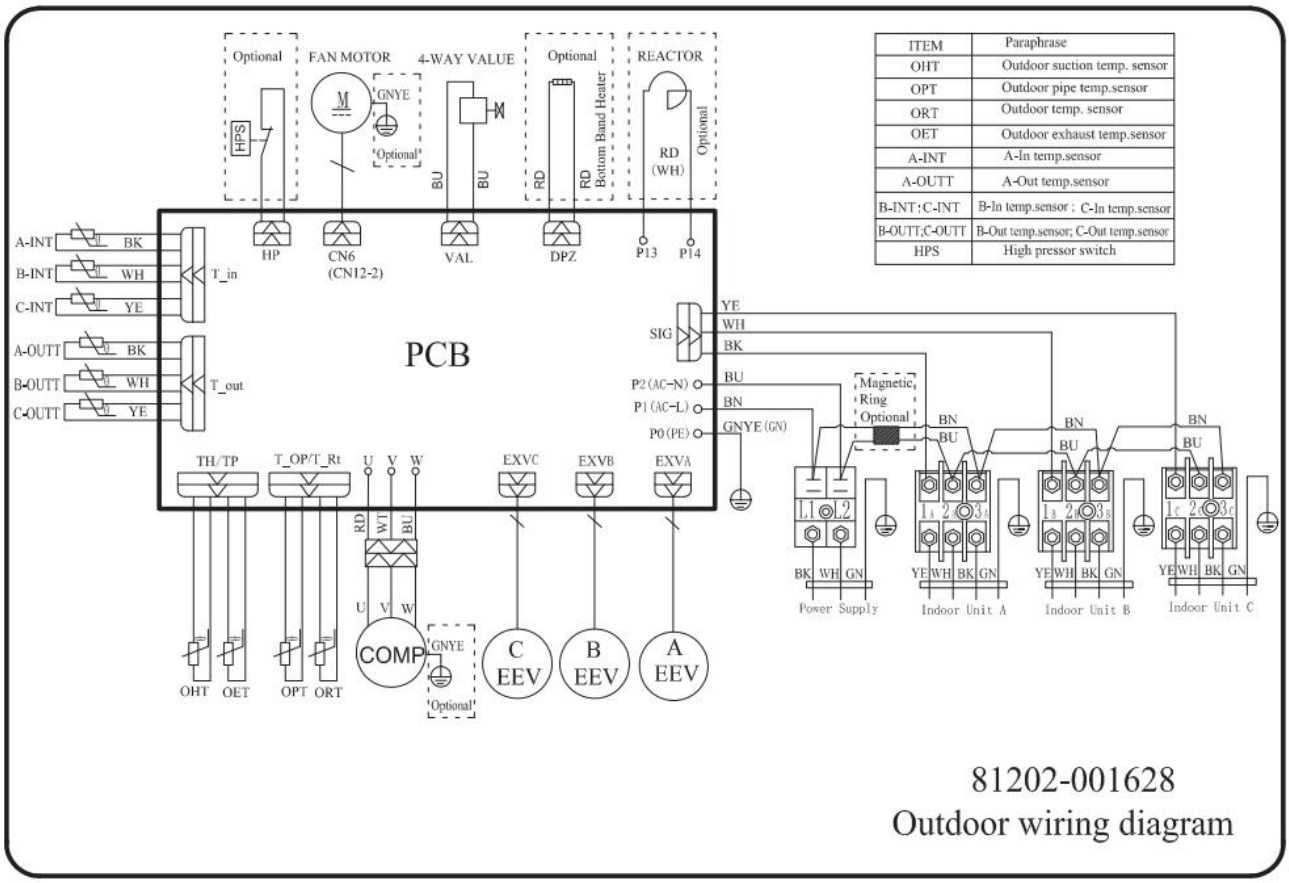


Outdoor Unit

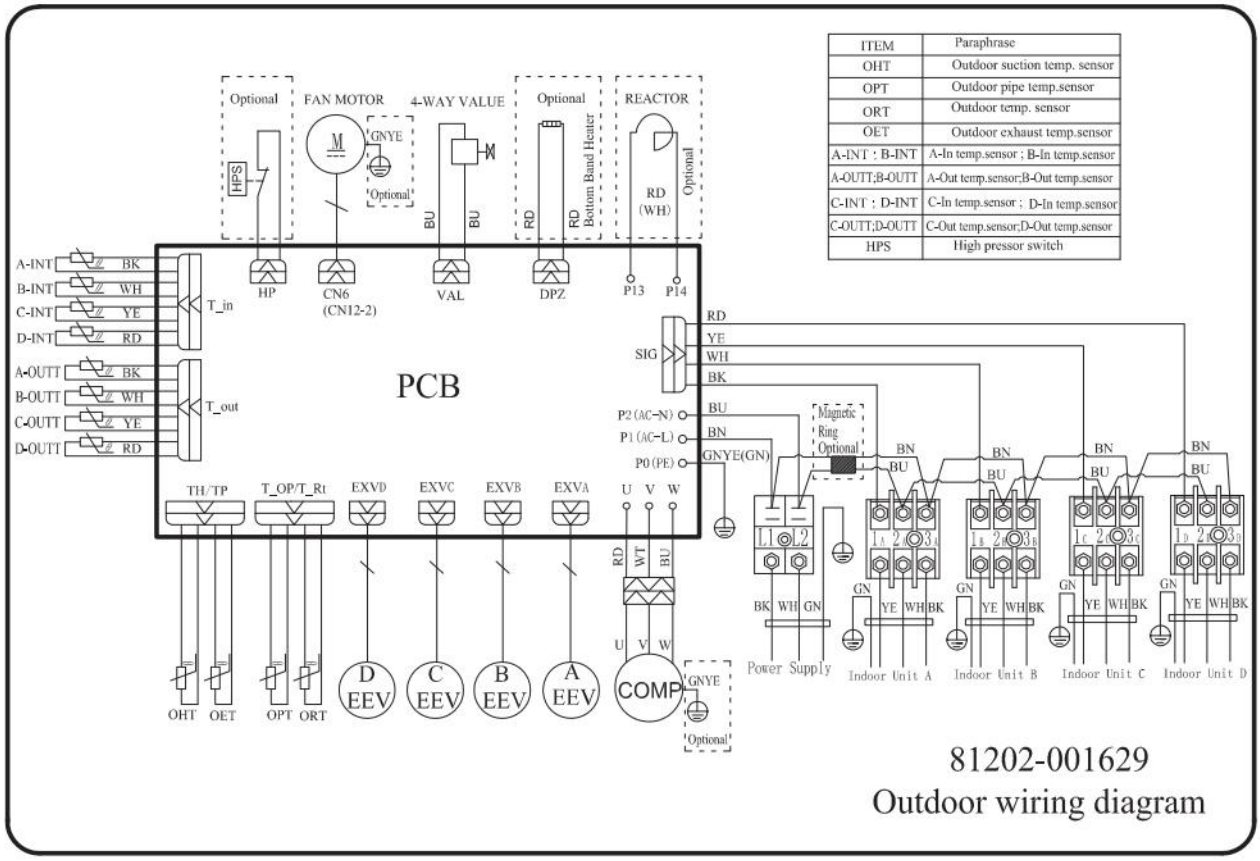
CMIT-19-2Z



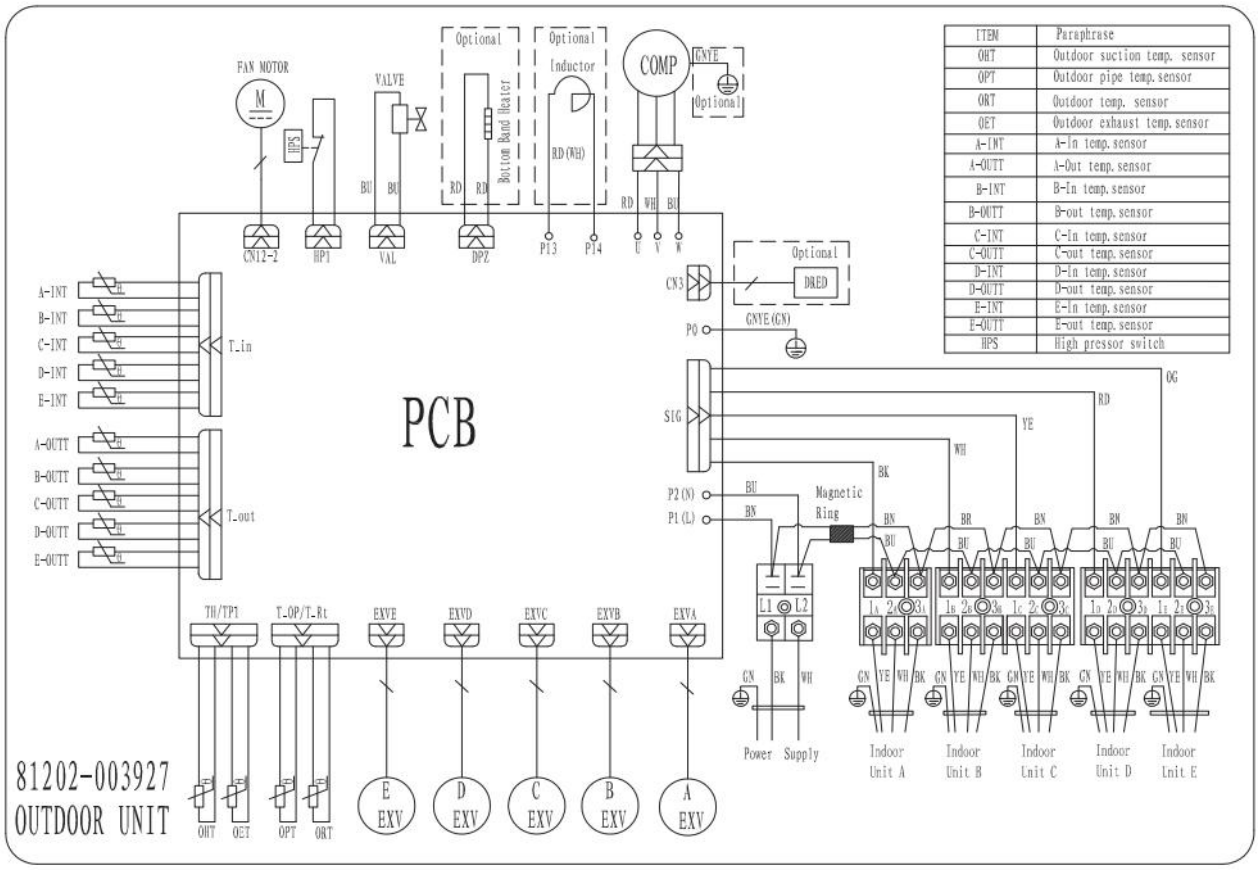
CMIT-27-3Z



CMIT-40-4Z



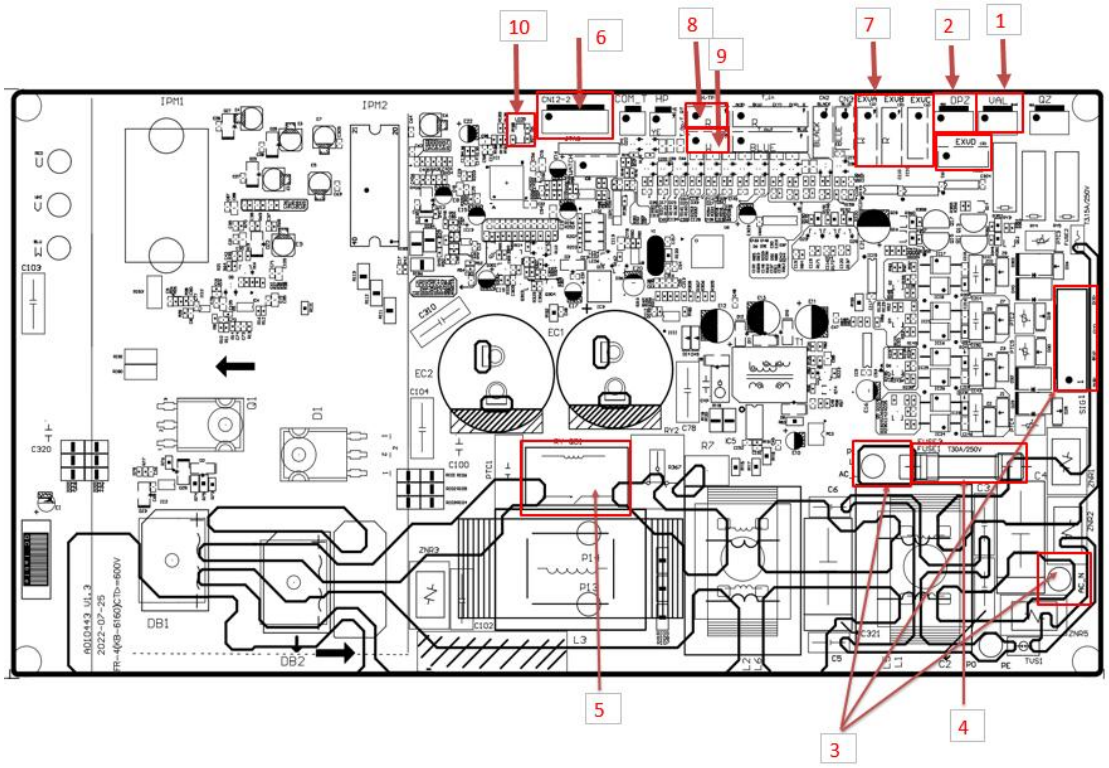
CMIT-55-5Z



4.2. ODU PCB Printed Diagram

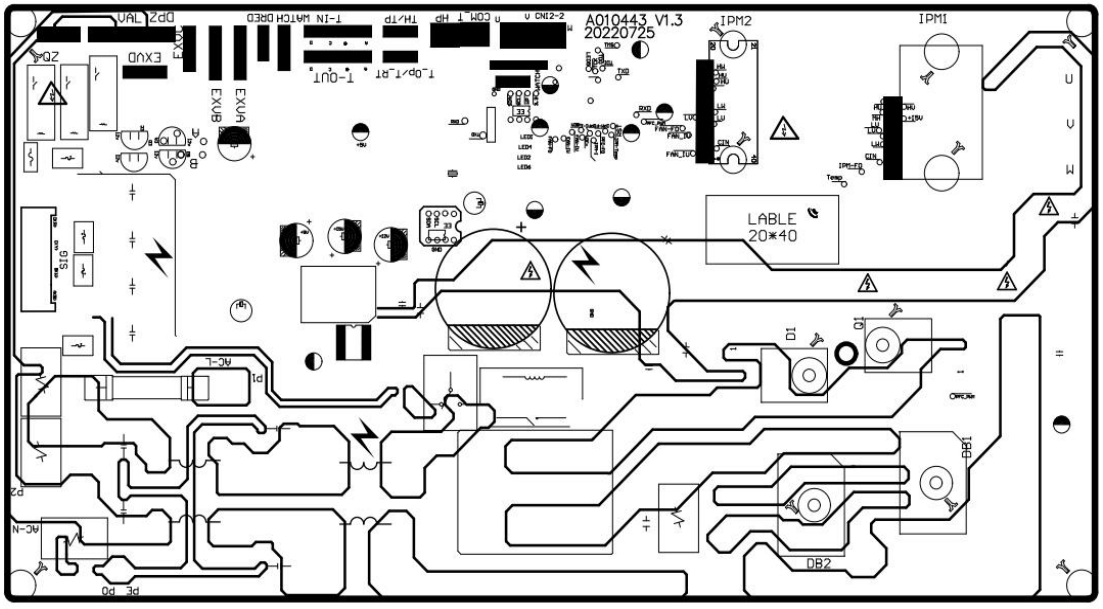
Model: CMIT-19-2Z CMIT-27-3Z CMIT-40-4Z

Top View:



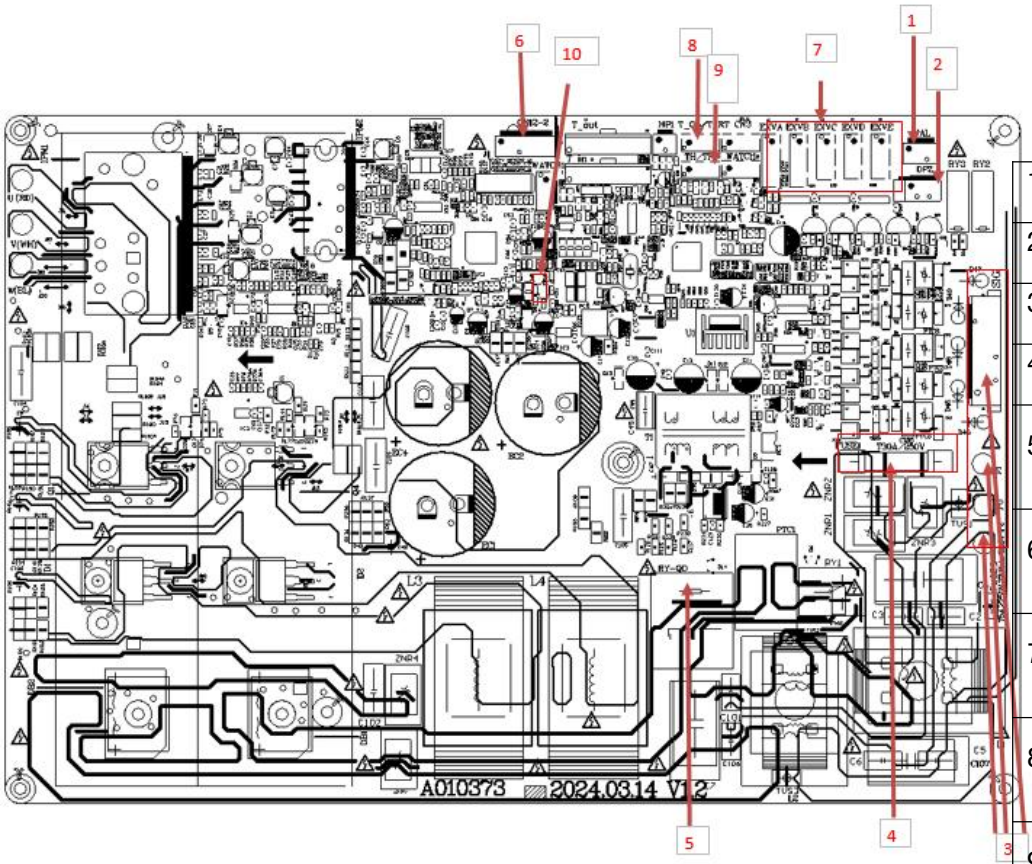
1	4-way valve
2	Heater
3	L,N&Communication
4	Fuse
5	ODU PCB Mainl relay
6	DC and AC Motor connector
7	Discharge sensor connector
8	OAT/OPT sensor connector
9	LED5

Bottom view:



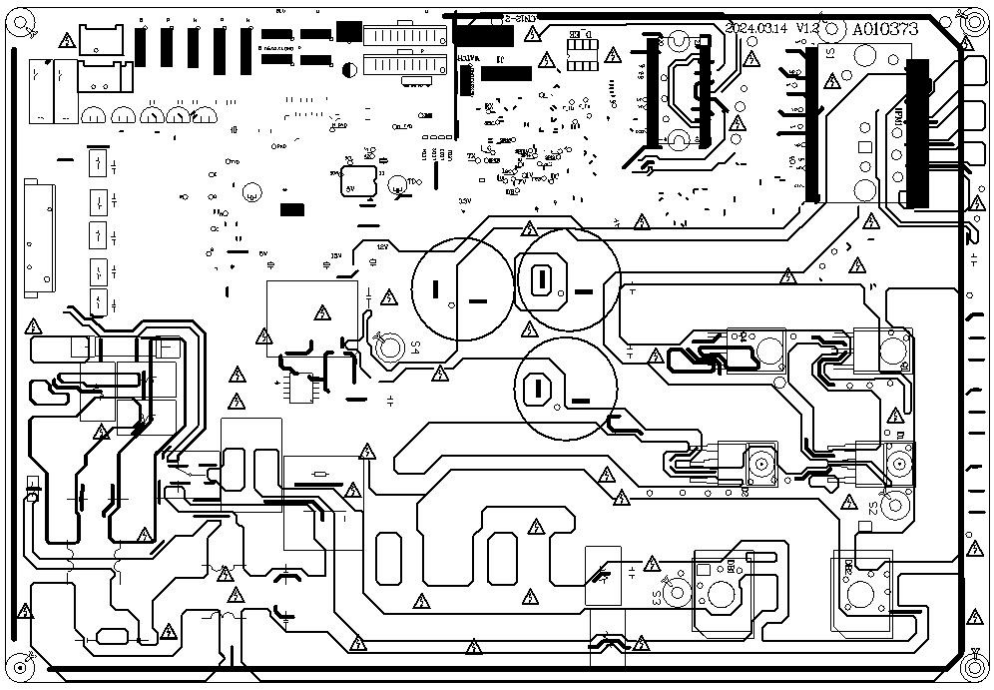
Model: CMIT-55-5Z

Top View:



1	4-way valve
2	Heater
3	L,N&Communication
4	Fuse
5	ODU PCB Mainl relay
6	DC and AC Motor connector
7	Electronic expansion valve
8	Discharge sensor connector
9	OAT/OPT sensor connector
10	LED5

Bottom view:



4.3. Function and Control

4.3.1. Function Control

1. "COOLING" Mode Operation

(1) Compressor frequency control

According to difference room temperature and set temperature (**δt = RT-ST**), running frequency of compressor is controlled by electronic controller. When room temperature is much higher than set temperature, the compressor will start at a high frequency, and as room temperature goes down, the compressor running frequency will go down. When room temperature is lower than set temperature, the compressor will run at very low frequency. In general, unit will change its running frequency according to **δt** to make room temperature closing to set temperature.

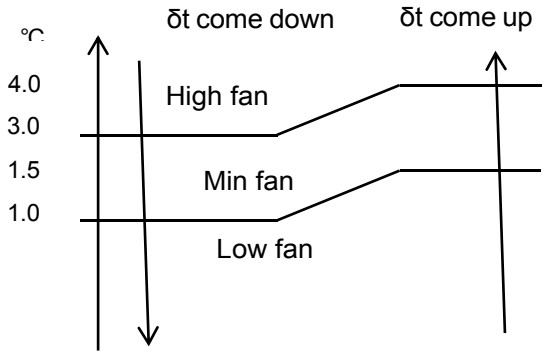
(2) Outdoor temperature affects running frequency of the compressor

Outdoor temperature affect compressor's running frequency. Difference inlet temperature of outdoor unit is adapted by difference compressor running frequency. While outdoor temperature is about 30℃, the compressor will run in high frequency.

If unit run in "cooling" mode and outdoor temperature is less than -2℃,the controller will shut down compressor and show error code, while the ambient temperature is over 1℃, the compressor will run automatically.

(3) Auto fan control in cooling mode

In cooling mode (include cooling in "Feel" mode), fan speed is determined by **δt**, as the following diagram:



2. "DRY" Mode Operation

(1) The system for DRY operation used the same refrigerant circle as the cooling one.

(2) When the system operates in DRY mode, at first it operates in cooling mode, the set temperature (**ST**) is "RT-2℃". After that, the system will operate in cooling mode with lowest fan speed. During the course of this operation, you can't use remote controller to adjust the fan speed but you can control the vane direction.

(3) In the dry mode, when RT≤12℃, the compressor will stop and operates again at RT≥14℃.

3. "HEATING" Mode Operation (available for Heat Pump only)

(1) Frequency control

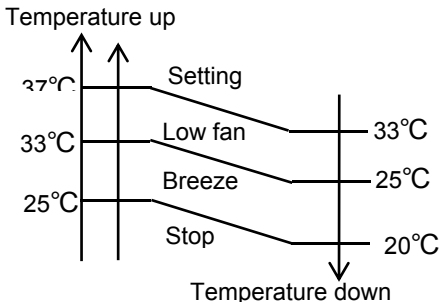
Same as the frequency control in cooing mode, the running frequency of compressor is controlled by controller. Unit change its running frequency according to **δt** to make the room temperature closing to the set temperature.

(2) Indoor fan motor control

1) Cold Air Prevention Control

- The function is intended to prevent cold air from being discharged when heating mode selected or while in defrosting.
- The indoor fan speed will be controlled as following.

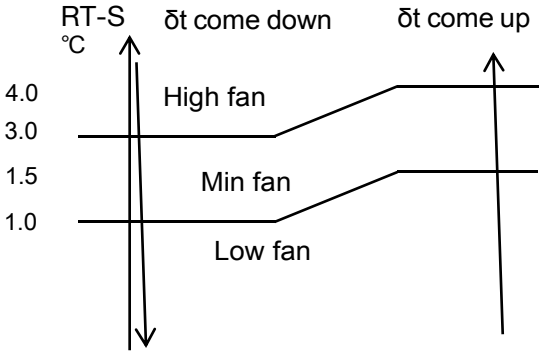
Indoor pipe Temperature



- In heating operation, if air conditioner turn off, the indoor fan motor will run most for 30 seconds since the stop of compressor.

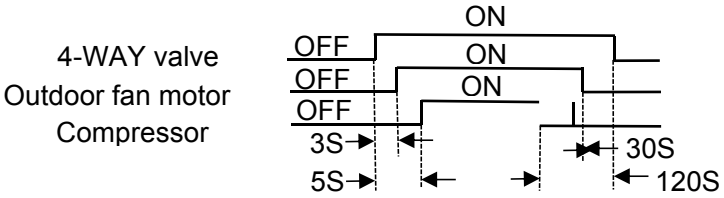
2) Auto fan control (heating)

In heating mode (include in "feel" mode) , fan speed is determined by **δt** as the following:



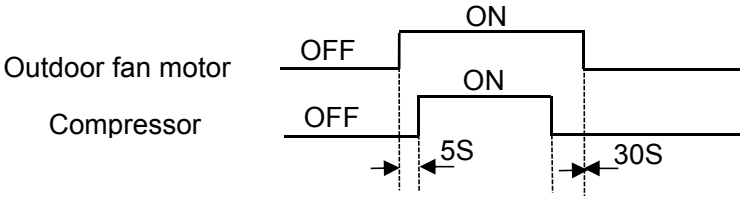
(3) 4-way valve control

In heating mode, 4-way valve will power on ahead of compressor for 8 seconds, and cut off for 2 minutes later than compressor. 4-way valve will not power off unless the machine to be switched off, mode changed or on the process of defrosting.



(4) Outdoor fan motor control

In heating mode, the outdoor fan motor will power on ahead of compressor 5 seconds, and cut off for 30seconds later than compressor.



(5) Defrosting

Defrosting is controlled by the microprocessor.

When the unit operate 30 minutes accumulated and the compressor operation more than 3 minutes continuously, one of the following conditions is satisfied, unit comes into defrosting:

a. When FrostDeg ≥ -5℃, and OPT ≤ -5℃, the .2 times defrosting interval time is 45 minutes.
b. When -10℃≤ FrostDeg < -5℃, and OPT < FrostDeg , the .2 times defrosting interval time is 45 minutes.
c. When -13℃≤ FrostDeg < -10℃, and OPT < FrostDeg , the .2 times defrosting interval time is 45

minutes.

d. When -15℃≤ FrostDeg < -13℃, and OPT < FrostDeg , the .2 times defrosting interval time is 65 minutes.

e. When -15℃≤ FrostDeg < -10℃, and OPT < FrostDeg , the .2 times defrosting interval time is 75 minutes.

f. When FrostDeg < -15℃, and OPT < -15℃, the .2 times defrosting interval time is 75 minutes.

FrostDeg = C*OAT-α

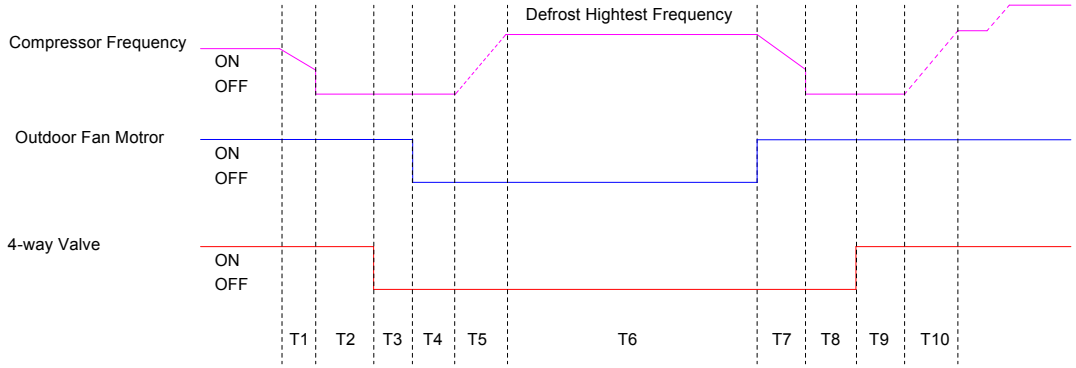
OAT: Outdoor environment temperature.

When OAT< 0℃, C=0.8, when OAT≥ 0℃, C=0.6

α=8

Before the air con comes into defrosting, compressor running frequency drop down to a lower frequency firstly, then the compressor shuts down.

In defrosting, all protection function are available.



T	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Times	Drop frequency or stop	50s	5s	5s	Rise frequency	2-11Min	Stop Defrost	50s	10s	Rise frequency

In defrosting, LED showing by winking.

No matter what AC come into or out of defrosting, indoor fan motor speed is the same as Cold Air Prevention Control.

While one of the following conditions is satisfied, unit comes out of defrosting and shifts to heating mode:

a. Outdoor coil Temperature (OPT) >5℃ and keeps 30 seconds.

b. Outdoor coil Temperature (OPT) >10℃ and keeps 2 seconds.

c. Continue 11minutes defrost Operation.

(5) Indoor exchanger overheat protection

When Indoor exchanger Temperature (IPT) is higher than 54℃, unit comes into indoor exchanger overheat protection. The compressor drops its frequency.

If IPT≥65℃ and keep for 30 seconds, control system shut down compressor, and recover while IPT drop less than 52℃.

4. "SLEEP" mode

When the SLEEP button is pressed, the AC operates as following:

- The indoor fan speed is set at low speed, the power lamp and the sleep lamp is on, the display of temperature will close after 30 seconds.
- When selecting COOLING/DRY operation with SLEEP mode, the set temperature will be raised by 1℃ 1 hour later and by 2℃ 2 hour later, after 3 hours, the set temperature will be raise by 3℃ and keeps 2hours. And then the temperature is Set+2℃, after 1 hour, the temperature is set temperature and keep.
- When selecting HEATING operation with SLEEP mode, the set temperature will be dropped by 1℃1

hour later and 2℃ 2 hours later, after 3 hours, the set temperature will be dropped by 3℃ and keep 2 hours. And then the temperature is Set-2℃, after 1 hour, the temperature is set temperature and keep.

5. EMERGENCY Operation

When the EMERGENCY Operation switch is pressed, “Beep” a short sound, COOLING mode is selected, two short sound the HEATING mode selected, and a long sound the unit off of 3s.

During the unit operation in emergency operation, when the unit receive the signal of remote controller, the unit will operates by remote.

When the remote controller missing, failed or the batteries run down, press the EMERGENCY Operation switch on front of the indoor unit for function test.

NOTE: Do not press the EMERGEMCY Operation switch during normal operation.

6. AUTO-RESTART Function (Option)

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.

7. Auto-restart Pre-setting (optional):

If Auto-restart function is needed, follow the steps below to activate this function:

1) Pulling the air-con's plug out of socket.
2) Pressing and holding the Emergency button (ON/OFF) on the indoor, then insert the plug into the socket again.
3) Keep pressing the Emergency button for more than 10 seconds until three short beeps heard, the Auto-restart function been activated.
4) When the unit in operation, press the timer button 10 times in 8s, the Auto-restart function will be active， if the Auto-restart is active, the Auto-restart off.

8. Water pump control(cassette and duct type)

When the unit operates in cool or dry mode, the water pump operates, once the compressor off or change to other mode, the water pump stop after 10 minutes.

Anytime, when the unit check the water full, the water pump operates, the unit stop and display the water full code. When full water protection is eliminated, the pump will maintain for 10 minutes and then turn off

When check the water pump switch open for 8 seconds continuous, enter water full protection, and check the water pump switch on for 180 seconds continuous, the water full protection exit.

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11. Protection and Failure Display

- When protection display is available, controller will show error code, digital LED shows error code and setting temperature by turns.
- If there is more than one failure, it will show error codes according to the error list sequence.
- To insure the signal communication of indoor and outdoor unit, any failure code relates to outdoor unit will remain display for 2 minutes maximum after it's recovered.
- Among all the failure codes, sensor failure can be recovery automatically once it comes normal.

4.3.2. Protection Function

1. Mode conflict protection of indoor units

When the setting mode is different of different indoor unit, the unit runs in below status:

a. The system mode is determined by the first turning on indoor unit except indoor unit is in fan mode. Cooling mode (dry mode) is in

conflict with heating mode.

b. If the first turning on unit is fan mode, and the second turning on unit is cooling or heating mode, then the system will run in cooling or heating mode

2. Time Delay for Safety protection

a.3 minutes delay for compressor ---The compressor is ceased for 3minutes before restarting to balance the pressure in the refrigeration cycle in order to protect the compressor.

b.150 seconds delay for 4-way valve---The 4-way valve will be ceased for 150 seconds late after compressor to prevent the refrigerant-gas abnormal noise when the HEATING operation is OFF or switch to the other operation mode.

3. Discharge temperature protection

There is a temperature sensor on discharge pipe, when temperature on discharge pipe exceeded the limit 115℃, system control will shut down the compressor and the display board will show the error code.

4. Lower voltage protection

When AC voltage <160V, DC voltage<170V, unit will be shut down for protection and recover while the AC voltage >170 V, DC voltage >190V.

5. Over voltage protection

When AC voltage > 275V, DC voltage >400V unit will be shut down and recover while AC voltage<255V, DC voltage<390 V.

6. Over current protection

When the current of outdoor unit is overload, controller will drop the operation frequency or shut down the unit immediately and show error code.

7. Condenser temperature protection

When condenser temperature≥ 65℃ and keep 10s, the air conditioner will shut down, and show error code, and recover while condenser temperature<52 ℃ and the compressor stop for 3minutes.

8. IPM module protection

IPM module has high temperature & over current protection itself, if there is signal feedback to

IPM, the outdoor unit will shut down, LED on outdoor PCB will show the error code.

9. Evaporator freeze protection.

When evaporator temperature<2℃, the controller will drop compressor operate frequency.

When evaporator temperature<0℃ and keep 1 minute, the expand valve of the unit will stop.

When all of the operating unit enter freeze protect, the compressor will stop and recover while evaporator temperature and stop for 3 minutes.

5.Installation Manual

5.1.Installation For Service

1. Check the information in this manual to find out the dimensions of space needed for proper installation of the device, including the minimum distances allowed compared to adjacent structures.
2. Appliance shall be installed, operated and stored in a r oom with a floor area larger than 4m .
3. The installation of pipe-work shall be kept to a minimum.
4. The pipe-work shall be protected from physical damage , and shall not be installed in an 2 unventilated space if the space is smaller than 4m .
5. The compliance with national gas regulations shall be observed.
6. The mechanical connections shall be accessible for maintenance purposes.
7. Follow the instructions given in this manual for handling, installing, cleaning, maintaining and disposing of the refrigerant.
8. Make sure ventilation openings clear of obstruction.
9. Notice: The servicing shall be performed only as recommended by the manufacturer.
10. Warning: The appliance shall be stored in a well-ventilated area whe re the room size corresponds to the room area as specified for operation.
11. Warning: The appliance shall be stored in a room without continuously operating ope n flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).
12. The appliance shall be stored so as to prevent mechanical damage from occurring.
13. It is appropriate that anyone who is called upon to w ork on a refrigerant circuit should hold a valid and up-to-date certificate from an assessment authority accr edited by the industry and recognizing their competence to handle refriger ants, in accordance with the assessment specification recognized in the industrial sector concerned. Service operations should only be carried out in accordance with the recommendations of the equipment manufacturer.Maintenance and repair operations that require the assistance of other qualified persons must be conducted under the supervision of the person competent for the use of flammable refrigerants.
14. Every working procedure that affects safety means shall only be carried out by competent persons.
15. Warning:

* Do not use any means to accelerate the defrosting pr ocess or clean the frost on your own. Follow the recommended guidelines from the manufacturer.

* The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater .

* Do not pierce or burn.

* Be aware that refrigerants may not contain an odor .

Read operator's manual

Operating instructions

Read technical manual

16. Information on servicing:

1) Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

2) Work procedure

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.

3) General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material

4) Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

5) Presence of fire extinguisher

If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO 2 fire extinguisher adjacent to the charging area.

6) No ignition sources

No person carrying out work in relation to a refrigeration system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

7) Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any work that will produce heat. A degree of ventilation shall continue during the period that the

work is carried out.

The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

8) Checks to the refrigeration equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using flammable refrigerants:

-- The charge size is in accordance with the room size within which the refrigerant containing

parts are installed;

-- The ventilation machinery and outlets are operating adequately and ar e not obstructed;

-- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;

-- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;

-- Refrigeration pipe or components are installed in a position where they are unlik ely to be exposed to any substance which may corrode refrigerant containing componen ts, unless the components are constructed of materials which are inher ently resistant to being corroded or are suitably protected against being so corroded.

9) Checks to electrical devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety , then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue oper ation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.Initial safety checks shall include:

-- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;

-- That no live electrical components and wiring are exposed while charging, recovering or purging the system;

-- That there is continuity of earth bonding.

17. Repairs to sealed components

1) During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

2) Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way tha t the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc. Ensure that apparatus is mounted securely. Ensure that seals or sealing materials have

not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

NOTE: The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

18. Repair to intrinsically safe components

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating. Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

19. Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

20. Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

21. Leak detection methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.

Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/ extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

22. Removal and evacuation

When breaking into the refrigerant circuit to make repairs or for any other purpose conventional procedures shall be used. However, it is important that best practice is followed since inflammability is a consideration. The following procedure shall be adhered to:

-- Remove refrigerant;

-- Purge the circuit with inert gas;

-- Evacuate;

-- Purge again with inert gas;

-- Open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recov ery cylinders. The system shall be flushed with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task.Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

23. Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically.

c) Before attempting the procedure,ensure that:

. mechanical handling equipment is available,if required,for handling refrigerant cylinders;

. all personal protective equipment is available and being used correctly;

. the recovery process is supervised at all times by a competent person;

. recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system,if possible.

e) If a vacuum is not possible,make a manifold so that refrigerant can be removed from variousparts of the system.

F) Make sure that cylinder is situated on the scales before recovery takes place.

g) Start the recovery machine and operate in accordance with manufacturer's instructions.

h) Do not overfill cylinders.(No more than 80% volume liquid charge).

i) Do not exceed the maximum working pressure of the cylinder,even temporarily.

J) When the cylinders have been filled correctly and the process completed,make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.

K) Recovered refrigerant shall not be charged into another refrigeration system unless it has beencleaned and checked.

24. Labeling

Equipment shall be labled stating that it has been de-commissioned and emptied of refrigerant.The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

25. Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed.Ensure that the correct number of cylinders for holding the total systemcharge are available.All cylinders to be used are designated for the recovered refrigerant and labled for that refrigerant(i.e.Special cylinders for he recovery of refrigerant).Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order.Empty recovery cylinders are evacuated and,if possible,cooled before recovery occurs.The recovery equipment shall be in good working order with a set of instructions concerning theequipment that is at hand and shall be suitable for the recovery of all appriate refrigerants includeing, when applicable,flammable refrigerants.In addition,a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.Before using the recovery machine,check that it is in satisfactoryworking order,has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release.Consult manufacturer if in doubt.The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovercylinder,and the relevant waste transfer note arranged.Do not mix refrigerants in recovery unitsand especiallly not in cylinders.If compressors or compressor oils are to be removed, ensure that they have been evacuated to anacceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

5.2. Installation precautions

5.2.1. Important Considerations

1. The air conditioner must be installed by professional personnel and the Installation manual is used only for the professional installation personnel! The installation specifications should be subject to our after-sale service regulations.

2. When filling the combustible refrigerant, any of your rude operations may cause serious injury or injuries to human body and objects.

3. A leak test must be done after the installation completed.

4. 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.

5. It is necessary to operate the machine under a controlled procedure in order to ensure that any risk arising from the combustible gas or vapor during the operation is reduced to minimum.

6. Requirements for the total weight of filled refrigerant and the area of a room to be equipped with an air conditioner (are shown as in the following Tables GG.1 and GG.2)

Table GG.1 - Maximum charge (kg)

Category	LFL(kg/m^3)	h_0(m)	Floor area (m^2)						
			4	7	10	15	20	30	50
R454B	0.296	1	0.6	1.04	1.48	2.11	2.44	2.99	3.86
		1.8	1.1	1.86	2.66	3.81	4.39	5.38	6.95
		2.2	1.3	2.28	3.26	4.65	5.37	6.58	8.49
		2.5	1.5	2.59	3.70	5.28	6.10	7.47	9.65

Table GG.2 - Minimum room area (m^2)

Category	LFL(kg/m^3)	h_0(m)	Charge amount (M) (kg) Minimum room area (m^2)						
			1.224kg	1.836kg	2.448kg	3.672kg	4.896kg	6.12kg	7.956kg
R454B	0.296	0.6	/	31	56	126	223	349	590
		1	/	12	20	45	80	126	212
		1.8	/	7	9	14	25	39	66
		2.2	/	6	8	11	17	26	44

Installation Safety Principles

1. Site Safety

Open Flames Prohibited

Ventilation Necessary

2. operation safety

Mind Static Electricity

Must wear protective clothing and anti-static gloves

Don`t use mobile phone

5.2.2. Installation Safety

1)Refrigerant Leak Detector

2)Appropriate Installation Location

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

Please note that:

1. The installation site should be well-ventilated.

2. The sites for installing and maintaining an air conditioner using Refrigerant R454B should be free from open fire or welding, smoking, drying oven or any other heat source higher than 548 which easily produces open fire.

3. When installing an air conditioner, it is necessary to take appropriate anti-static measures such as wear anti-static clothing and/or gloves.

4. It is necessary to choose the site convenient for installation or maintenance wherein 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.

5. 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.

6. It is necessary to choose the place where the inlet and outlet air of the indoor unit is even.

7. 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.

Suggested Tools

Tool	Picture	Tool	Picture	Tool	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			

5.2.3. Safety Rules And Recommendations For The Installer

1. Read this guide before installing and using the appliance.

2. During the installation of the indoor and outdoor units, access to the working area should be forbidden to children. Unforeseeable accidents could happen.

3. Make sure that the base of the outdoor unit is firmly fixed.

4. Check that air cannot enter the refrigerant system and check for refrigerant leaks when moving the air conditioner.

5. Carry out a test cycle after installing the air conditioner and record the operating data.

6. Protect the indoor unit with a fuse of suitable capacity for the maximum input current or with another overload protection device.

7. Ensure that the mains voltage corresponds to that stamped on the rating plate. Keep the switch or power plug clean. Insert the power plug correctly and firmly into the socket, thereby a voiding the risk of electric shock or fire due to insufficient contact.

8. Check that the socket is suitable for the plug , otherwise have the socket changed.

9. The appliance must be fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under "over voltage category III conditions", and these means must be incorporated in the fixed wiring in accordance with the wiring rules.

10. The air conditioner must be installed by professional or qualified persons.

11. Do not install the appliance at a distance of less than 50 cm from inflammable substances (alcohol, etc.) Or from pressurized containers (e.g. spray cans).

12. If the appliance is used in areas without the possibility of ventilation, precautions must be taken to prevent

any leaks of refrigerant gas from remaining in the environment and creating a danger of fire.

13. The packaging materials are recyclable and should be disposed of in the separate waste bins.Take the air conditioner at the end of its useful life to a special waste collection center for disposal.

14. Only use the air conditioner as instructed in this booklet. These instructions are not intended to cover every possible condition and situaion. As with any electrical household appliance, common sense and cauion are therefore always recommended for installation, operation and maintenance.

15. The appliance must be installed in accordance with applicable national regulaions.

16. Before accessing the terminals, all the power circuits must be disconnected from the power supply.

17. The appliance shall be installed in accordance with naional wiring regulaions.

18. This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and under stand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

19. Do not try to install the conditioner alone, always contact specialized technical personnel.

20. Cleaning and maintenance must be carried out by specialized technical personnel. In any case disconnect the appliance from the mains electricity supply before carrying out any cleaning or maintenance.

21. Ensure that the mains voltage corresponds to that stamped on the rating plate. Keep the switch or power plug clean. Insert the power plug correctly and firmly into the socket, thereby avoiding the risk of electric shock or fire due to insufficient contact.

22. Do not pull out the plug to switch off the appliance when it is in operation, since this could create a spark and cause a fire, etc.

23. This appliance has been made for air conditioning domestic environments and must not be used for any other purpose, such as for drying clothes, cooling food, etc.

24. Always use the appliance with the air filter mounted. The use of the conditioner without air filter could cause an excessive accumulation of dust or waste on the inner parts of the device with possible subsequent failures.

25. The user is responsible for having the appliance installed by a qualified technician, who must check that earthing/grounding is done in accordance with current legislation and insert a thermos magnetic circuit breaker.

26. The batteries in the remote controller must be recycled or disposed of properly. For disposal of scrap batteries, please discard the batteries as sorted municipal waste at the accessible collection point.

27. Never remain directly exposed to the flow of cold air for a long time. The direct and prolonged exposition to cold air could be dangerous for your health. Particular care should be taken in the rooms where there are children, old or sick people.

28. If the appliance gives off smoke or there is a smell of burning, immediately cut off the power supply and contact the Service Center.

29. The prolonged use of the device in such conditions could cause fire or electrocution.

30. Have repairs carried out only by an authorised Service Center of the manufacturer. Incorrect repair could expose the user to the risk of electric shock, etc.

31. Unhook the automatic switch if you foresee not to use the device for a long time. The airflow direction must be properly adjusted.

32. The flaps must be directed downwards in the heating mode and upwards in the cooling mode.

33. Ensure that the appliance is disconnected from the power supply when it will remain inoperative for a long period and before carrying out any cleaning or maintenance.

34. Selecting the most suitable temperature can prevent damage to the appliance.

5.2.4. Safety Rules And Prohibitions

1. Do not bend, tug or compress the power cord since this could damage it. Electrical shocks or fire are probably due to a damaged power cord. Specialized technical personnel only must replace a damaged power cord.

2. Do not use extensions or gang modules.

3. Do not touch the appliance when barefoot or parts of the body are wet or damp.

4. Do not obstruct the air inlet or outlet of the indoor or the outdoor unit. The obstruction of these openings causes a reduction in the operative efficiency of the conditioner with possible consequent failures or damages.

5. In no way alter the characteristics of the appliance.

6. Do not install the appliance in environments where the air could contain gas, oil or sulphur or near sources of heat.

7. This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

8. Do not climb onto or place any heavy or hot objects on top of the appliance.

9. Do not leave windows or doors open for long when the air conditioner is operating.

10. Do not direct the airflow onto plants or animals.

11. A long direct exposition to the flow of cold air of the conditioner could have negative effects on plants and animals.

12. Do not put the conditioner in contact with water. The electrical insulation could be damaged and thus causing electrocution.

13. Do not climb onto or place any objects on the outdoor unit.

14. Never insert a stick or similar object into the appliance. It could cause injury.

15. Children should be supervised to ensure that they do not play with the appliance. 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.

5.3. Installation Preparation

5.3.1. Notice on Installation

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 bellow.

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

5.3.2. Selection of Installation Location

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.

5.3.3.

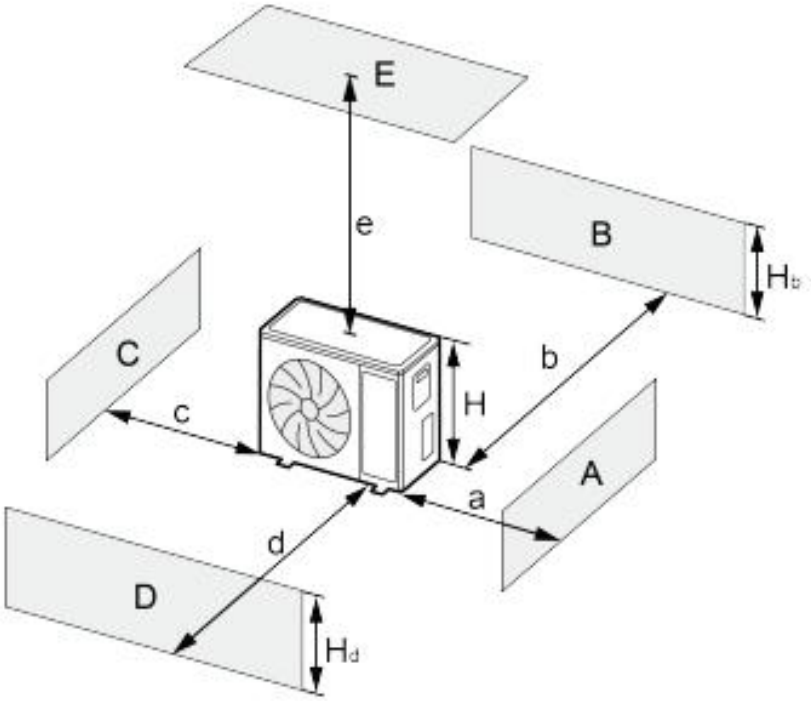
WARNING!
(1) Install the indoor unit in a location which can withstand a load of at least five times the weight of the main unit and which will not amplify sound or vibration.
(2) If the installation location is not strong enough, the indoor unit may fall and cause injuries.
(3) If the job is done with the panel frame only, there is a risk that the unit will come loose. Please take care.

5.3.4. Diagram of Unit Installation Space and Location

5.3.4.1. Diagram of installation space and location for outdoor unit

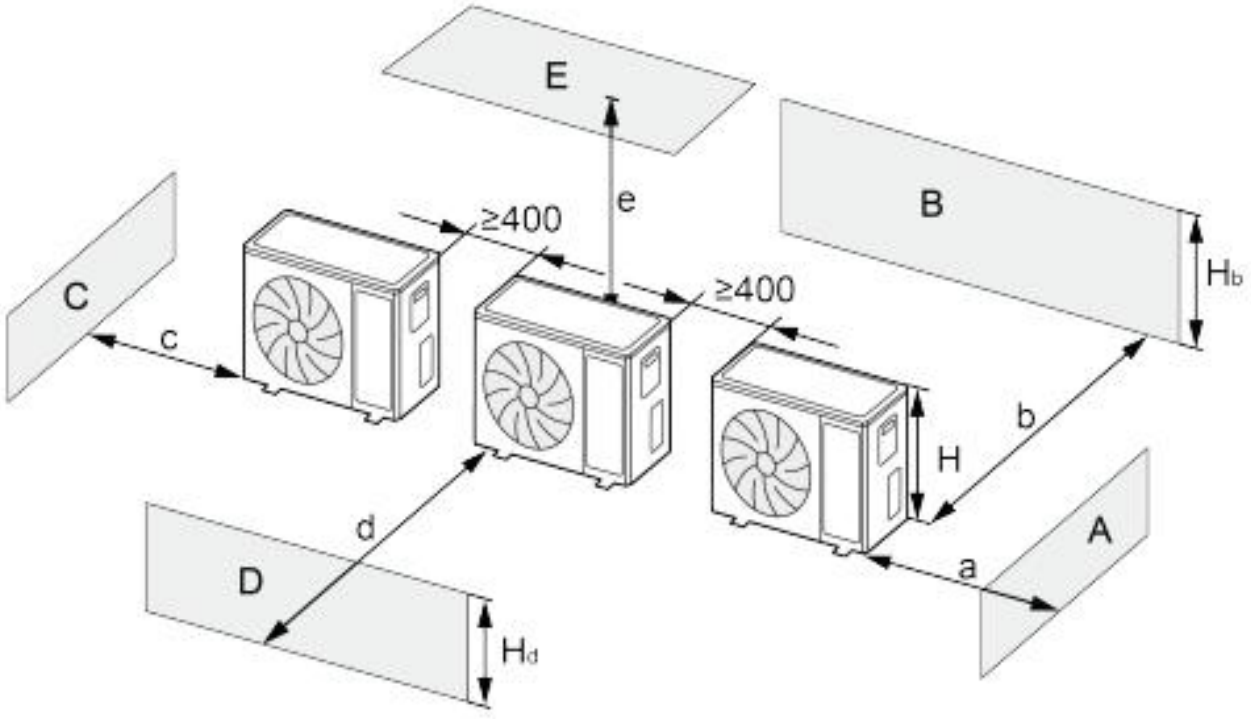
Notice: for best performance of the outdoor unit, make sure its installation space conforms to the following installation dimensions.

（1）When one outdoor unit is to be installed.



A~E	Hb Hd H		(mm)				
			a	b	C	d	e
B	——		——	⩾100	——	——	——
A、B、C	——		⩾300	⩾100	⩾100	——	——
B、E	——		——	⩾100	——	——	⩾1000
A、B、C、E	——		⩾300	⩾150	⩾150	——	⩾1000
D	——		——	——	——	⩾1000	——
D、E	——		——	——	——	⩾1000	⩾1000
B、D	Hb<Ha	Hd>H	——	⩾100	——	⩾1000	——
	Hb>Hd	Ha<H	——	⩾100	——	⩾1000	——
B、D、E	Hb<Ha	Hb⩽1/2H	——	⩾250	——	⩾2000	⩾1000
		1/2H<Hb⩽H	——	⩾250	——	⩾2000	⩾1000
		Hb>H	Prohibited				
	Hb>Ha	Ha⩽1/2H	——	⩾100	——	⩾2000	⩾1000
		1/2H<Hd⩽H	——	⩾200	——	⩾2000	⩾1000
		Hd>H	Prohibited				

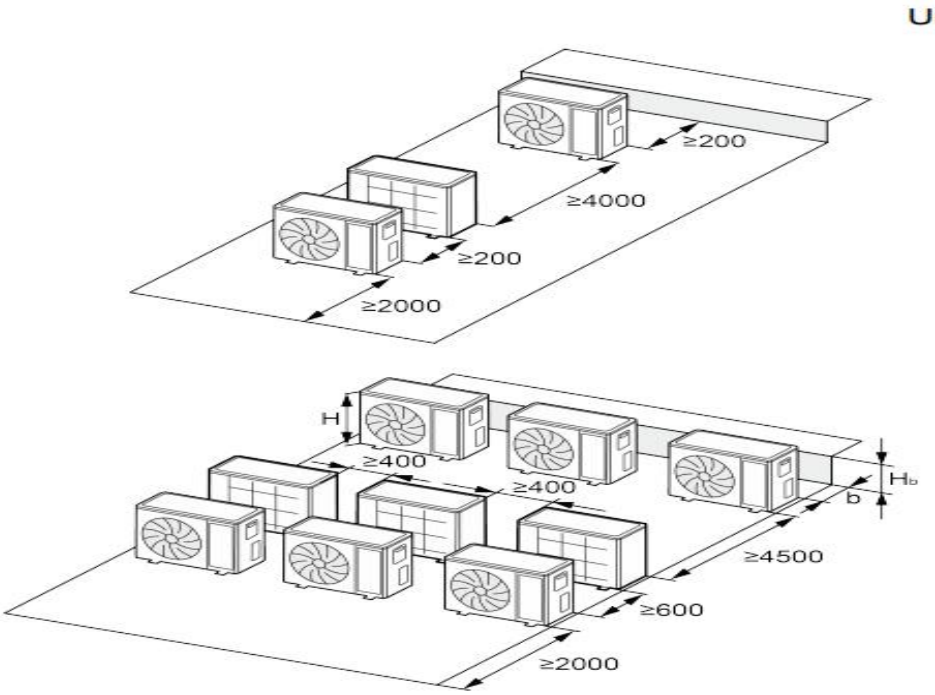
（2）When two or more outdoor units are to be installed side by side



A~E	Hb Hd H		(mm)				
			a	b	C	d	e
A、B、C	——		⩾300	⩾300	⩾1000	——	——
A、B、C、E	——		⩾300	⩾300	⩾1000	——	⩾1000
D	——		——	——	——	⩾2000	——
D、E	——					⩾2000	⩾1000
B、D	Hb<Ha	Hd>H	——	⩾300	——	⩾2000	——
	Hb>Ha	Hd⩽1/2H	——	⩾250	——	⩾2000	——
		1/2H<Hd⩽H	——	⩾300	——	⩾2500	——
B、D、E	Hb<Ha	Hb⩽1/2H	——	⩾300	——	⩾2000	⩾1000
		1/2H<Hb⩽H	——	⩾300	——	⩾2500	⩾1000
		Hb>H	Prohibited				
	Hb>Ha	Hd⩽1/2H	——	⩾250	——	⩾2500	⩾1000
		1/2H<Hd⩽H	——	⩾300	——	⩾2500	⩾1000
		Hd>H	Prohibited				

（3）When outdoor units are installed in rows.

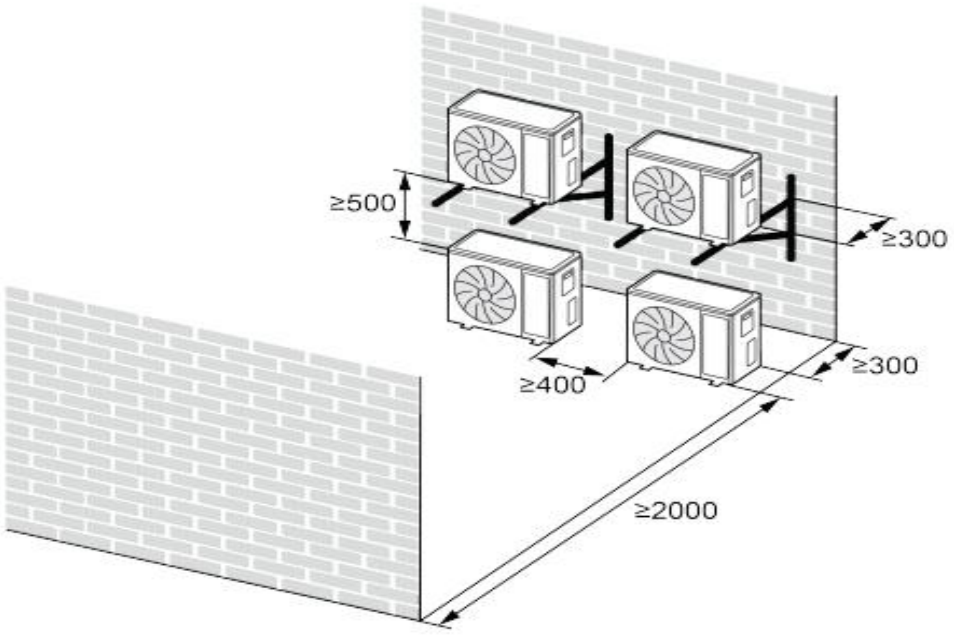
Unit: mm



Hb　H	(mm)
Hb≤1/2H	b≥250
1/2H<Hb≤H	b≥300
Hb>H	Prohibited

（4）When outdoor units are installed one above another.

Unit: mm

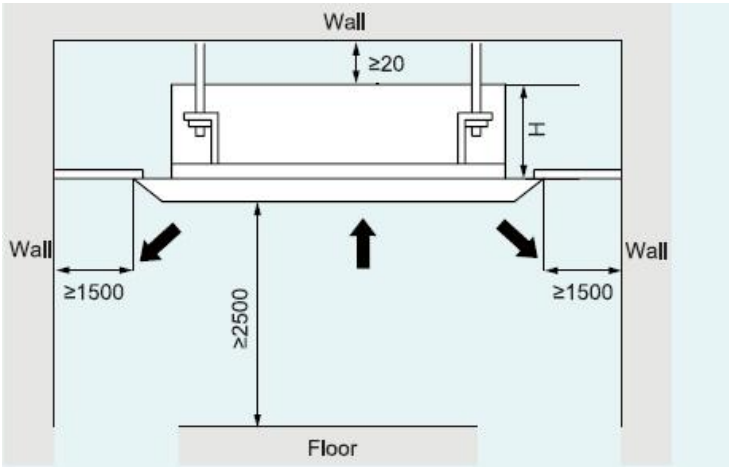


5.3.4.2. Diagram of installation space and location for outdoor unit

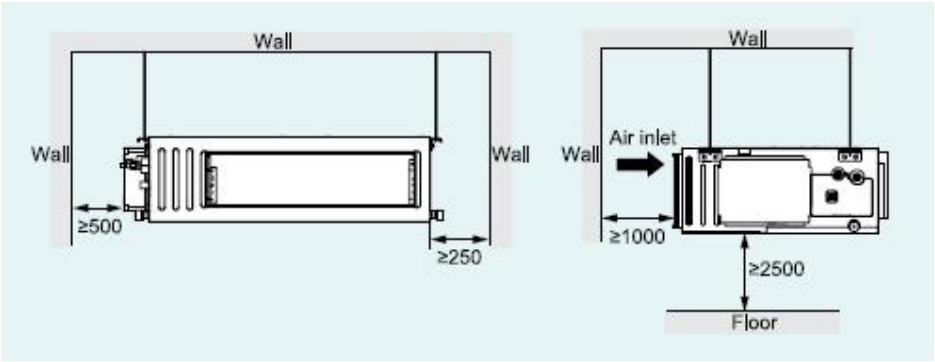
Diagram of installation location and space for indoor unit

Notice: For the best performance of indoor unit, make sure its installation space conforms to the following installation dimensions

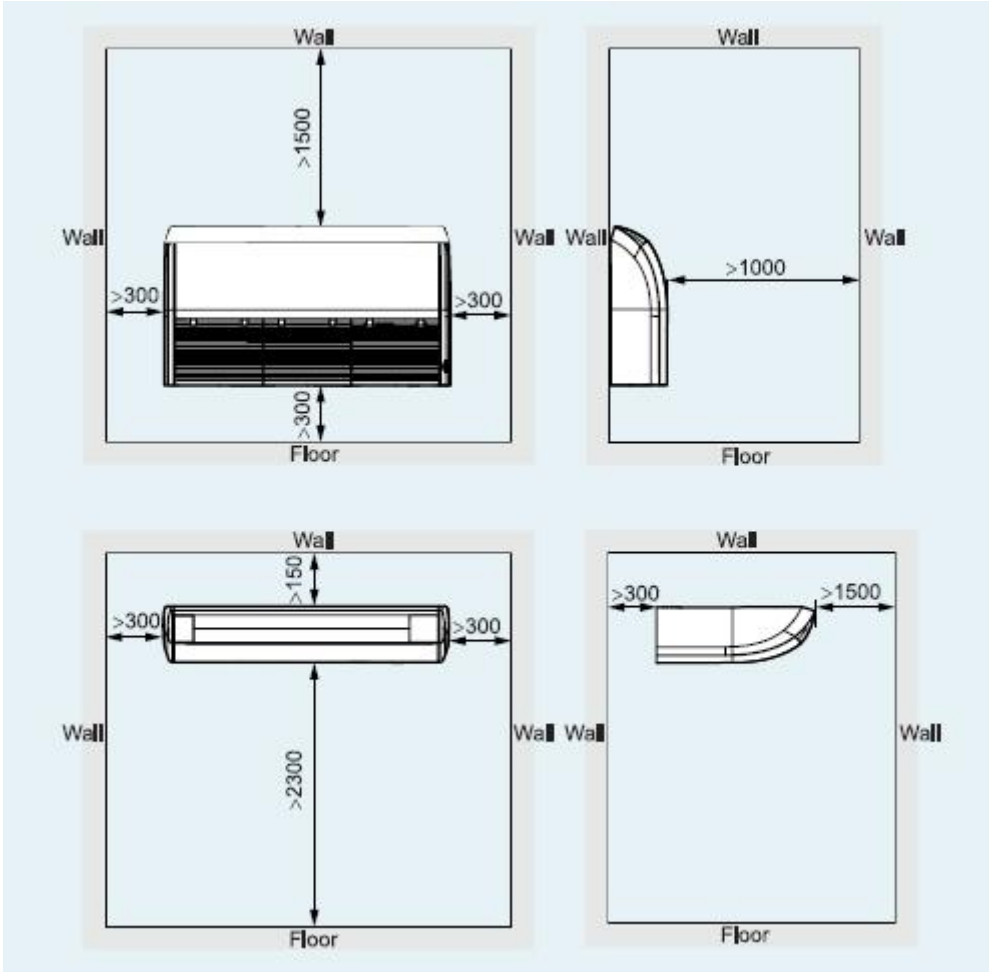
1. Cassette



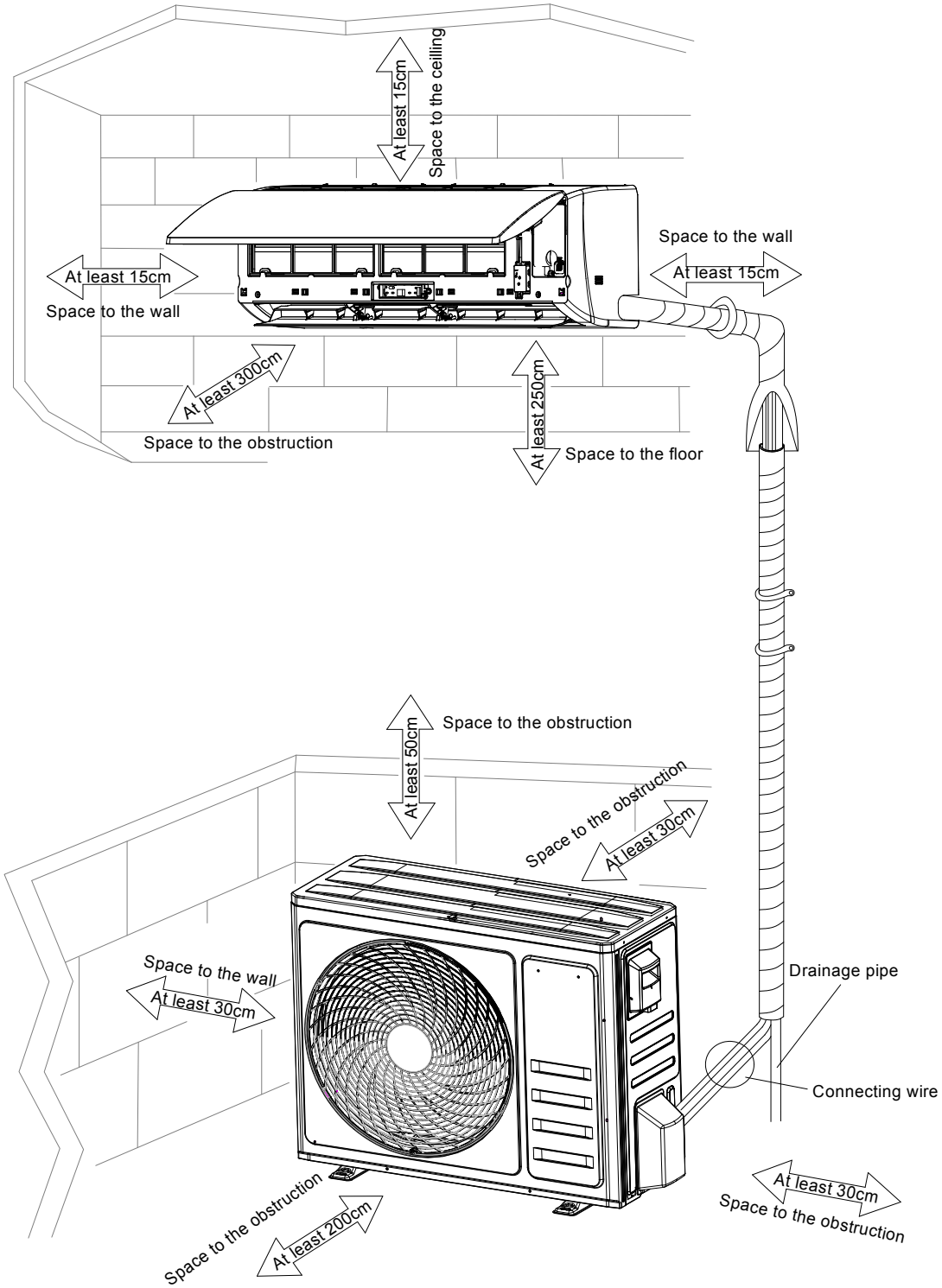
2. Duct



3. Ceiling Floor


Wall
>1500
Wall
Wall
>300
>300
>300
Floor
Wall
Wall
Wall
>1000
Floor
Wall
>150
>300
>300
Wall
Wall
>2300
Floor
Wall
>300
>1500
Wall
Wall
Floor

4. Mini Split


At least 15cm
Space to the ceilling
Space to the wall
At least 15cm
At least 15cm
Space to the wall
At least 300cm
Space to the obstruction
At least 250cm
Space to the floor
Space to the obstruction
At least 50cm
Space to the obstruction
At least 30cm
Space to the wall
At least 30cm
Drainage pipe
Connecting wire
At least 30cm
Space to the obstruction
Space to the obstruction
At least 200cm

5.4. Unit Installation

5.4.1. Indoor Unit Installation

5.4.1.1 Preparation for Installing the Indoor Unit

1. Cassette

■HEIGHT BETWEEN CEILING AND FLOOR

The installation height between ceiling and floor must be greater 2.5m.

■CEILING HOLE AND THE HOOK INSTALLATION

Preparation Work on the Ceiling

- Installation method should be changed under the different construction structure. Please consult the professional for the detailed information.
- After opening a hole, the ceiling should be horizontal and strong to prevent vibration.
  Cut the beams at the hole and remove them.
  Reinforcing the beams that have been cut and the beams fixing the ceiling.

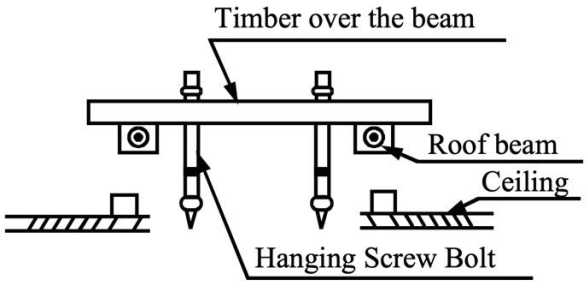
Installation of the hanging screw bolt

Bolt with M10 whorl is to be used. The center distance between the bolts is decided by the size of the unit.

Use the following method to install:

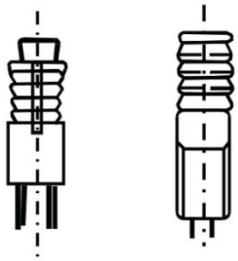
Wooden construction

Put the square timber over the roof beam, then install the hanging screw bolts.



For finished concrete bricks

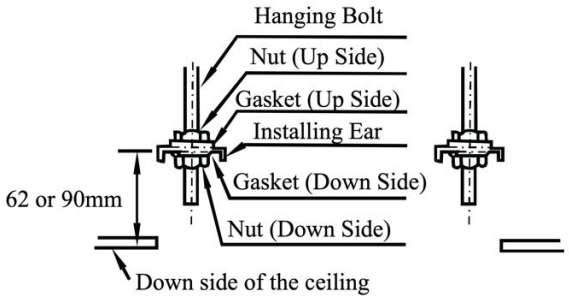
Install the hanging hook with expansible bolt into the concrete deep to 45~50mm to prevent loose.



Overhanging the indoor unit

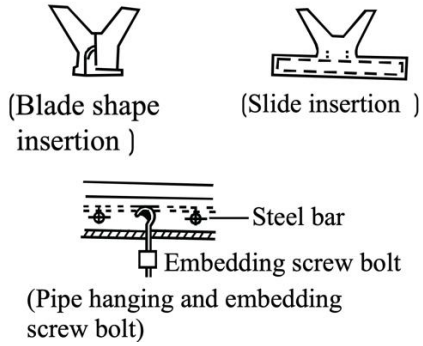
Cassette: Adjust the gasket (downside) to 90mm over the ceiling.

Compact cassette: Adjust the gasket (downside) to 62mm over the ceiling.



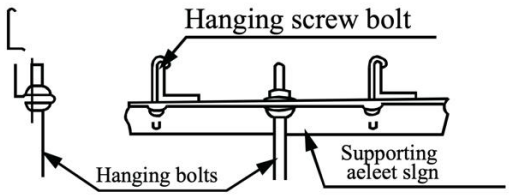
New Concrete Bricks

Inlaying or embedding the screw bolts.



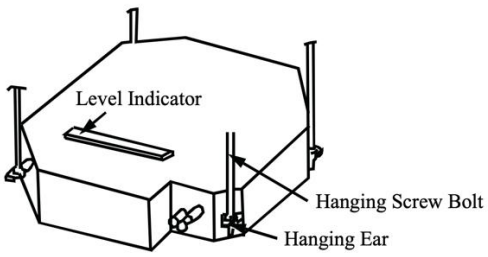
Steel roof beam structure

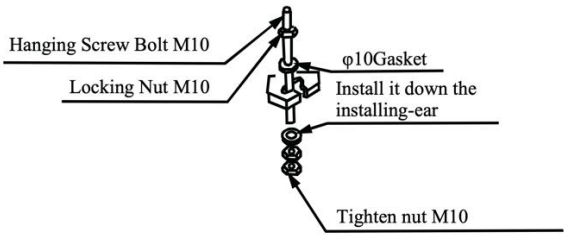
Install the supporting angle steel.



- Install the hanging bolt into T groove of the hanging tool.

Over hang the indoor unit and ensure it is level using a level indicator.





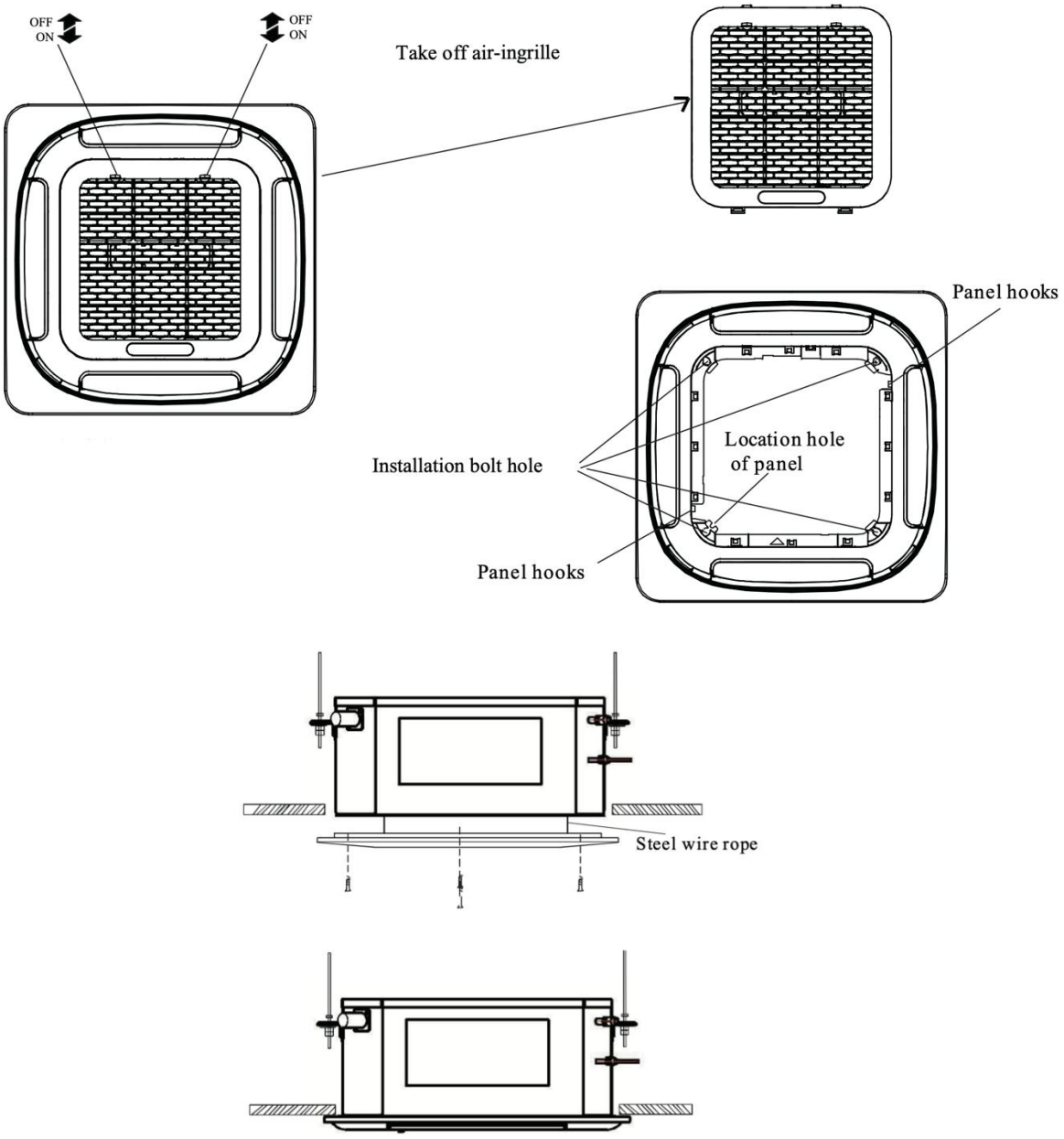
PANEL INSTALLATION

- Panel installation should be done after piping and wiring.
- Be sure that the indoor unit and ceiling hole installation size is right before installation.

CAUTION

Be sure to seal the connection parts between the panel-the ceiling and the panel-the indoor unit , or even small gaps may cause wind/water leakage or condensing water.

- **CASSETTE DIMENSION:18K**

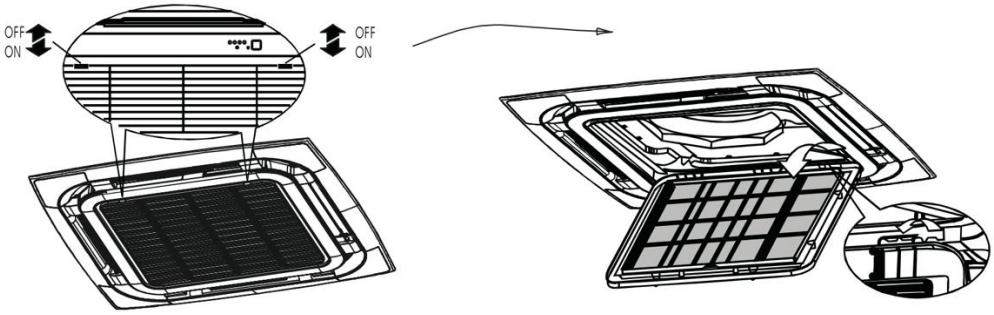


1. Please screw two M5*20 bolts at the oppsite angles of indoor unit , before fixing screws, determine the
   orientation of the panel: Align the positioning holes on the panel with the positioning pins on the box.
2. Please connect step motor wire, display board wire to the electrical box according to ELECTRIC WIRING DIAGRAM on the electrical box.
3. Then screw the other two M5*20 bolts through the holes of panel into indoor unit.
4. Adjust the location and direction of panel to tally louver of panel with outlet of outdoor, screw all the bolts fasten to make the panel and indoor unit pressed together.
5. Return the air-in grille and panel back to the indoor unit.

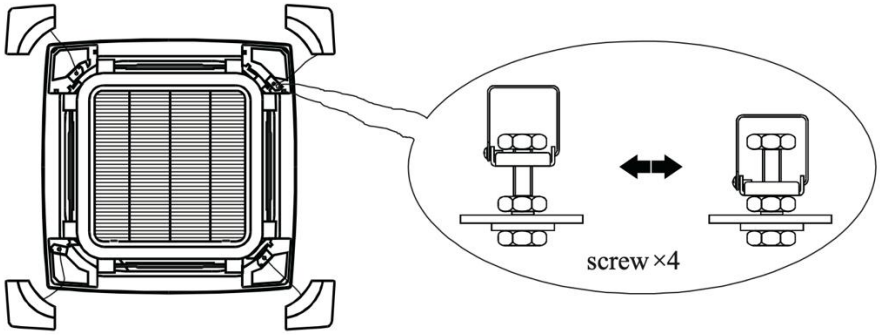
- **CASSETTE DIMENSION:24K**

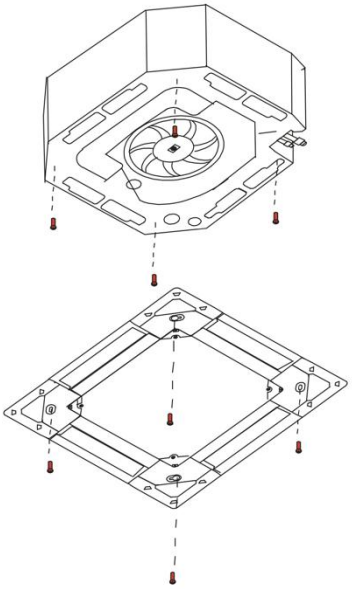
Unloadair-in grille

Take off air-in grille



Unload panel installation cap





1. Please screw M10 gasket and M6*20 bolt at the corner of indoor unit, before screwing them fasten, screw other two additional bolts which locates red bolt showing as figure and notice that the direction of red arrow on the electrical box aligns the one on the panel.
2. Please connect step motor wire, display board wire to the electrical box according to ELECTRIC WIRING DIAGRAM on the electrical box.
3. Then screw the other two M6*20 bolts with M10 gasket through the hole of panel into indoor unit.
4. Adjust the location and direction of panel to tally louver of panel with outlet of outdoor, screw all the bolts fasten to make the panel and indoor unit pressed together.
5. Return the air-in grille and panel back to the indoor unit.

2. Duct

Please confirm the indoor unit dimension according to the picture below M10 whorl is to be installed. (4 sets)

◆ Please refer to the following for the center distance between the bolts.

◆ M 10 whorl is used.

◆ Please consult professional for your specific ceiling arrangement.

1. Dismantle scale of the ceiling, please keep ceiling its level. Strengthen the beam to avoid vibration.
2. Break the beam of the ceiling.
3. Strengthen the breaking point of the ceiling and reinforce the ceiling beam.

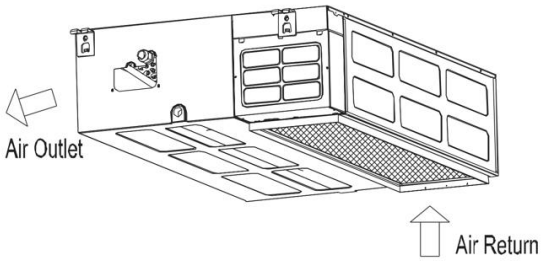
◆ After the main body hanging is finished, arrangement of pipe and line will be done in the ceiling. The direction of the pipe is determined after the installation location is chosen. If the ceiling has existed, please arrange the refrigerant pipe, drainage pipe, indoor and outdoor connecting line.

◆ Installation of the hanging screw bolt.

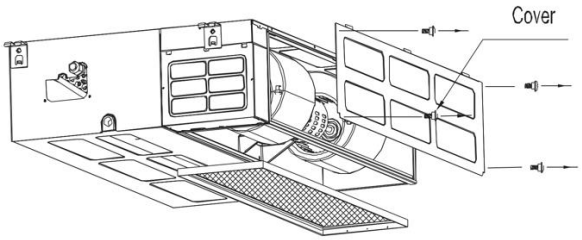
CHOICE OF AIR RETURN WAYS

This indoor unit is fitted with downward air return, which can be changed to its backward counterpart if necessary. Please follow the steps below to change it into the mode of air return backward.

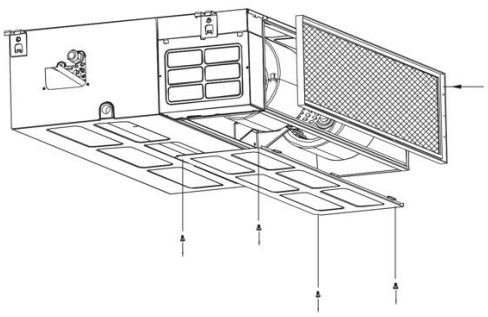
1. Air return downward



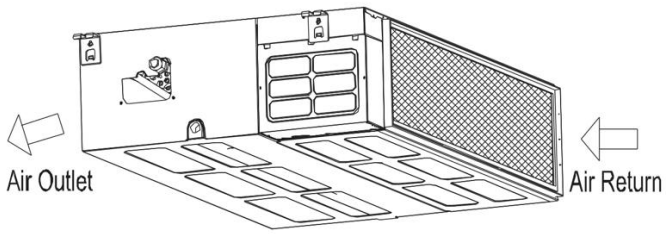
2. Loose the nut and dismantle flannel plate and filter; Loose the nut dismantel the back over .



3. Install the flannel plate and filter at the backside; Install the cover to the downside.

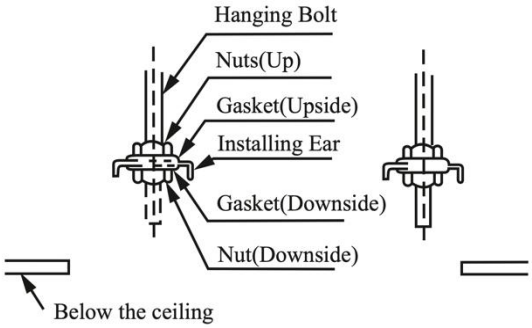


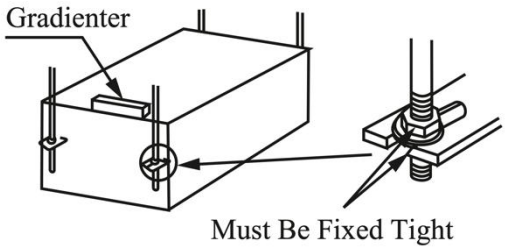
4. Air return backward.



HANGING & INSTALLATION OF INDOOR UNIT

1. Adjust the nut position while the gap between gasket (downside) and ceiling should be confirmed according to actual situations.





Hang the nut inside the U slot of the installation panel.

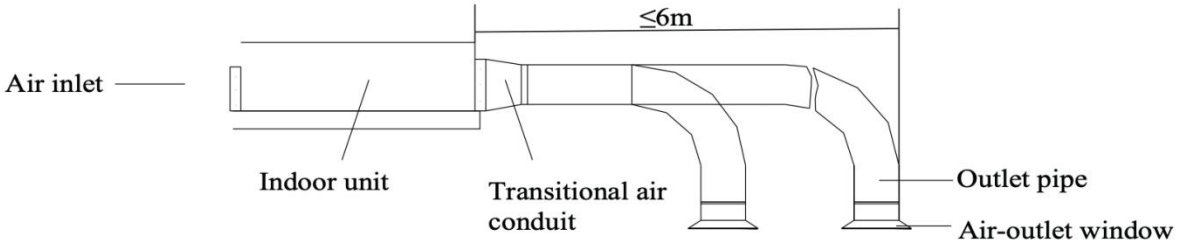
To confirm level degree with gradienter.

(Leaning downside toward non-draining side is prohibited)

The suspension height is not less than 2.4 meters.

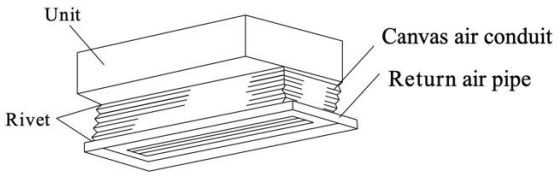
2. How to mount outlet pipe

- Generally, we have two types of outlet pipe available, i.e. rectangular or round ones.
- Rectangular air conduit can be directly connected to air outlet of indoor unit by rivets. For outlet dimensions, see outline drawing of the unit.
- Round air conduit should be connected to a piece of transitional air conduit before it is connected to air outlet of indoor unit, the other end of it can be separately connected to air conduit window or connected to air conduit window after air flow diversion, and the total length should not be over 6m. As shown in figure below, air speeds at all air outlets should be set to basically consistent so as to meet the room air-conditioning requirements.

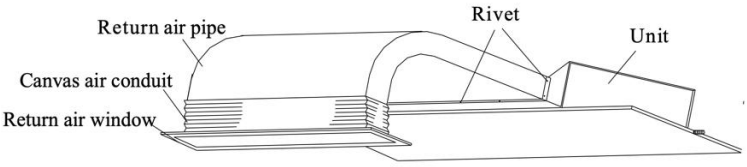


3. Installation method for return air pipe

- In case sidewise air intake is adopted, return air pipe should be fabricated and rivet-connected to return air orifice, and the other end of it should be connected to return air window.
- In case of underside air intake, purchase or fabricate a section of pleated canvas air conduit serving as transition joint for return air orifice and return air window. in this way , it can be freely adjusted according to height of indoor ceiling board; in addition, during operation of the unit , canvas air conduit may avoid vibration of ceiling board, as shown in figure below.



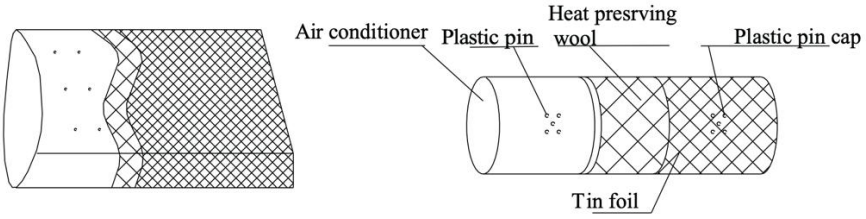
Installation mode for underside air intake



Installation mode for sidewise air intake

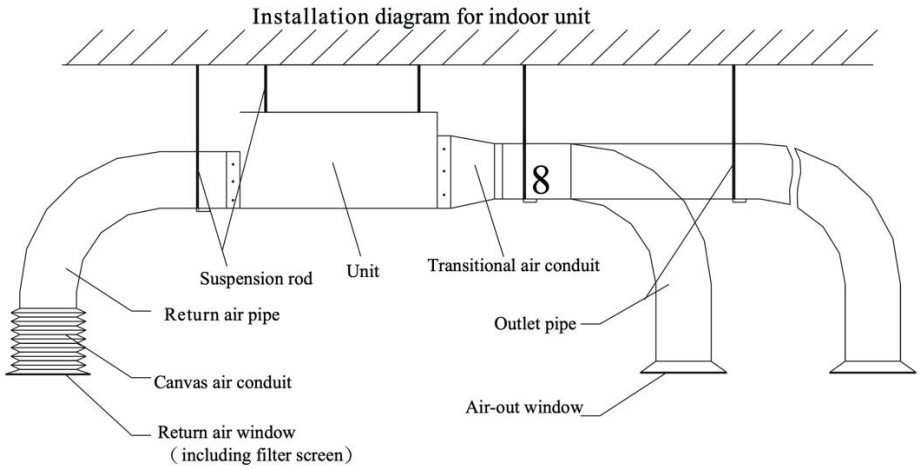
4. Tips for installation of return air pipe and outlet pipe

- To minimize energy loss occurring in transmission process and condensed water during heating operation, return air pipe and outlet pipe should be equipped with heat-insulating layer as shown in the figure.



- Return air pipe and outlet pipe should be fixed to floor precast slabs by iron stand; in addition, all ports of the air conduit should be tightly sealed by gasket cement, and it is advisable that the edge clearance of return air pipe should be 150mm at least.
- Drainpipe for condensed water should be installed with minimum gradient of 1%,and the drainpipe should be insulated with heat-preserving pipe casing as well.

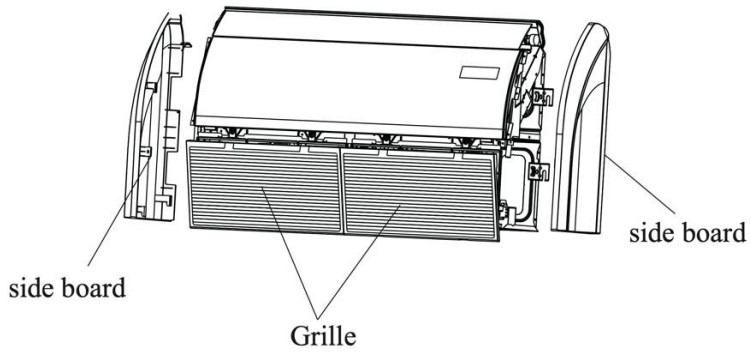
Installation diagram for indoor unit



3. Floor ceiling

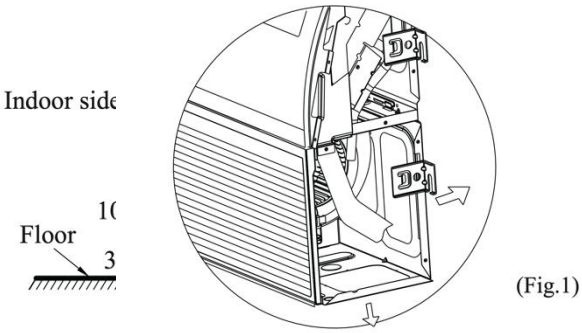
Installation procedure

Please remove the grille and the sideboard.



Floor console type

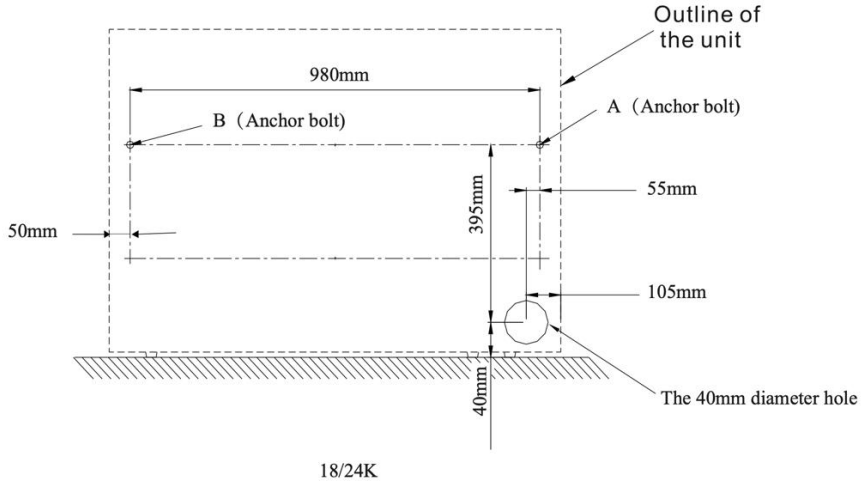
1. Select the piping and drainage directions. The piping and drain can be made in two directions as shown below(fig.1).When the direction is selected, please drill a 100mm(4")diameter hole on the wall, and the hole must be tilted downward towards the outdoor for smooth water flow. When the pipe is led out from the rear, make a hole in figure, at the position shown (fig.2).



(Fig.1)

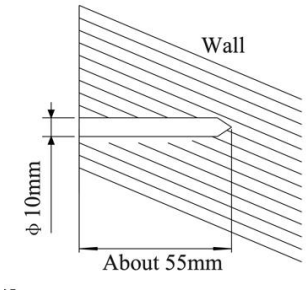
2. Drilling holes for anchor bolts and installing the anchor blots （m10)

According to the position of the hole, install two expansible anchor bolts (A and B) at the position shown in the figure.

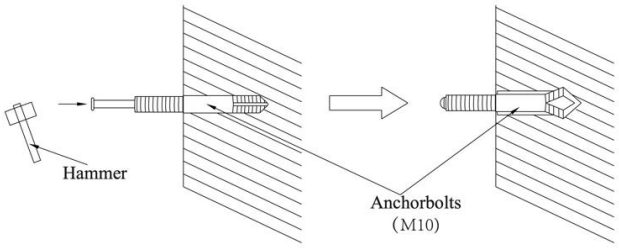


18/24K

With a concrete drill, drill two 10mm diameter holes at the position (A and B) on the wall.

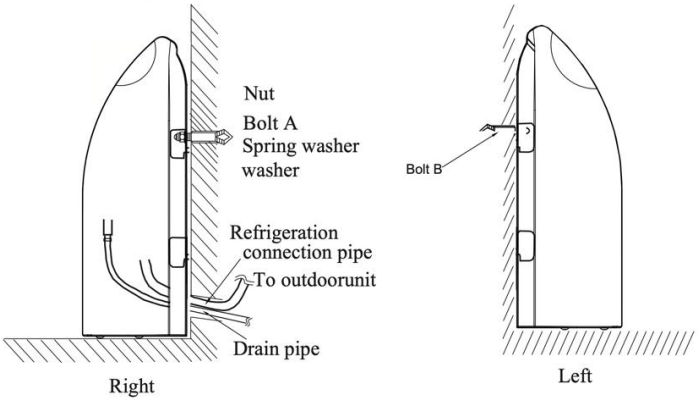


Insert the anchor bolts into the drilled holes, and drive the pins completely into the anchor bolts with a hammer.



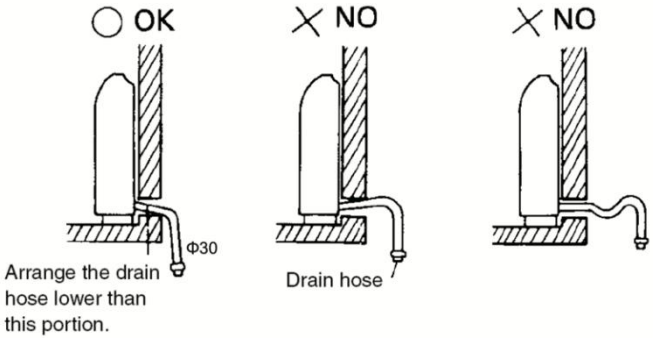
Install the unit to them witmuts, washers and spring washers.

NOTE: The installation angle should notexceed 15 degrees.



CAUTION

Be sure to arrange the drain hose so that it is leveled lower than the drain hose connecting port of the indoor unit.



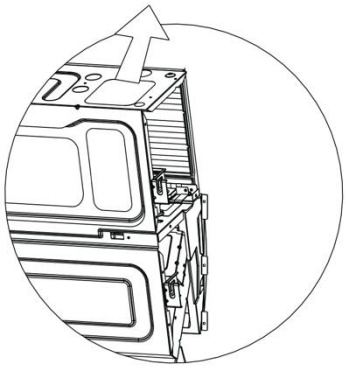
Under ceiling type

1. Select piping and drain directions.

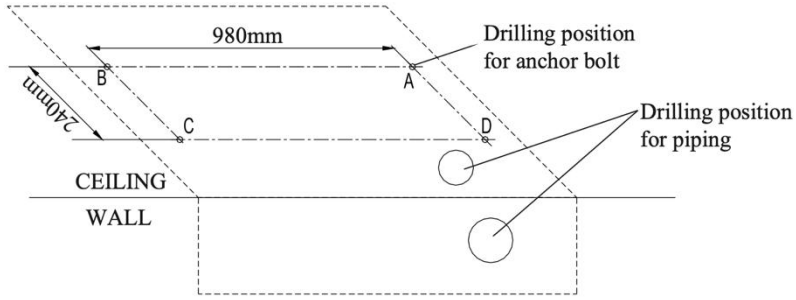
CAUTION: Install the drainage hose at the rear, it should not be installed on the top .

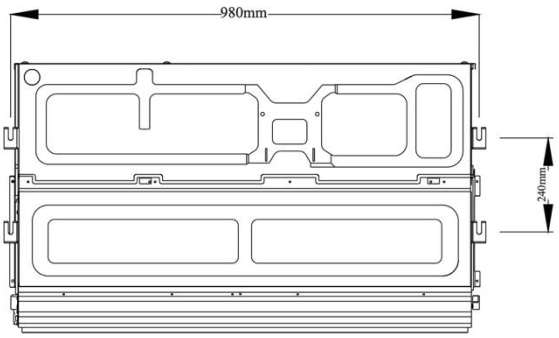
When the directions are selected, drill 80 mm (3-1/8") and 50 mm (2") or 150 mm (6") dia. hole on the wall so that the hole is tilted downward toward the outdoor for smooth water flow.

indo



2. Drilling holes for anchor bolts and installing the anchor blots (m10). Please drill four holes for anchor bolts at the position A, B, C and D.



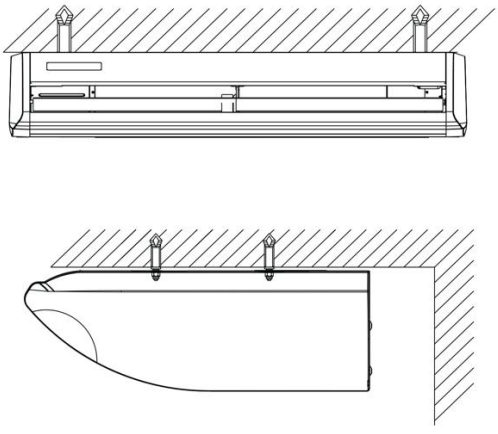


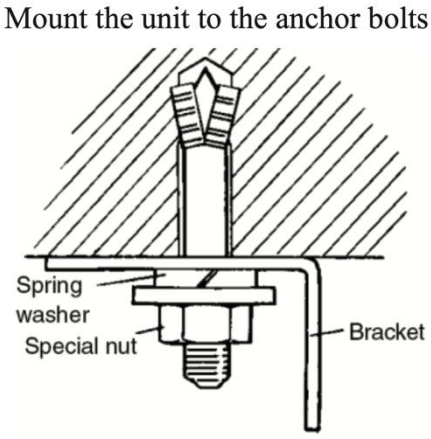
18/24K

3. Installing indoor unit

Now, securely tighten nuts to each bolt with washers and spring washers

NOTE: The installation angle should not exceed 10 degrees.

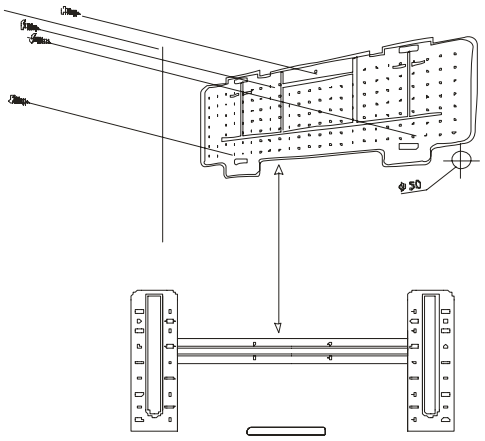




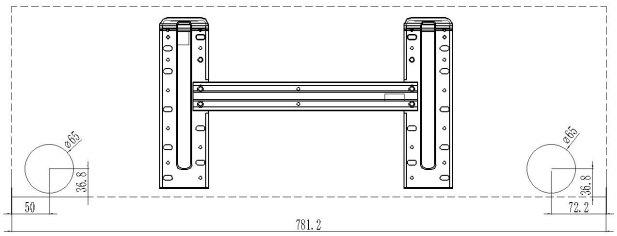
4. Mini Split

1. **Installation of the mounting plate.**

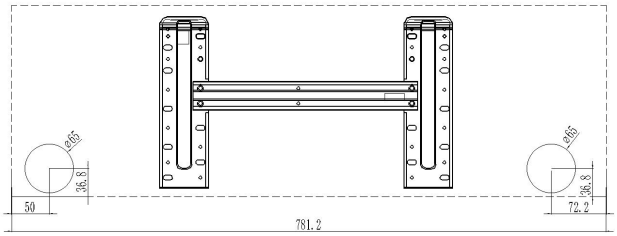
1) By using a level, put the mounting plate in a perfect square position vertically and horizontally.
2) Drill 32mm deep holes in the wall to fix the plate.
3) Insert the plastic anchors into the hole.
4) Fix the mounting plate by using the provided tapping screws.
5) Check that the mounting plate is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



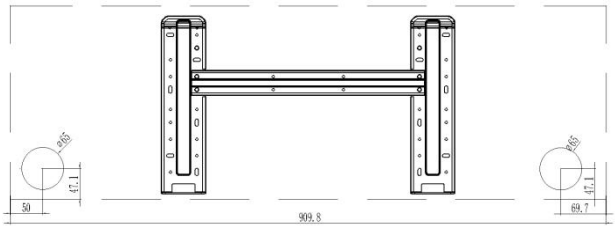
9K(770X)



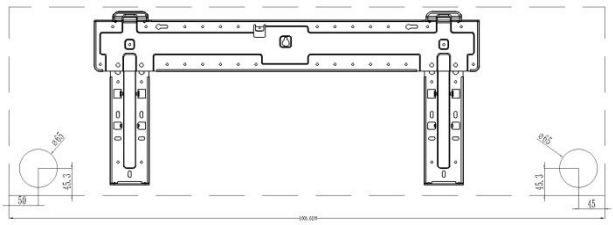
12K(770X)



18K(900X)



24K(1010X)

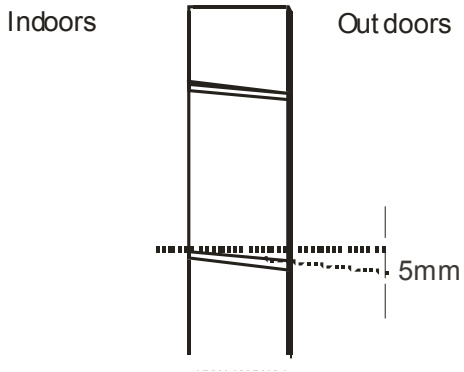


Note: The shape of the mounting plate may be different from the one above, but installation method is similar.

2. 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.

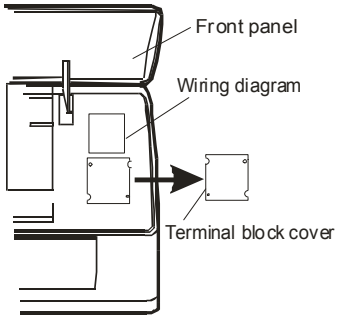


The hole must slope downwards towards the exterior.

Note: Keep the drain pipe down towards the direction of the wall hole, otherwise leakage may occur.

3. Electrical connections---Indoor unit

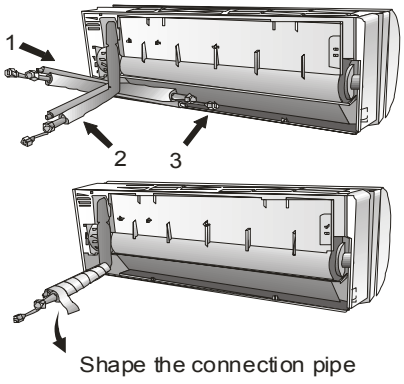
1).Lift the front panel.
2).Take off the cover as indicated in the picture (by removing a screw or by breaking the hooks).
3).For the electrical connections, see the circuit diagram on the right part of the unit under the front panel.
4).Connect the cable wires to the screw terminals by following the 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

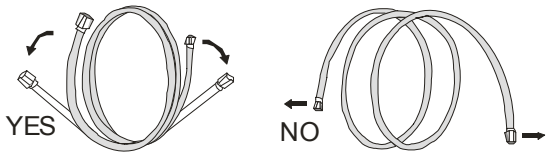
The piping can be run in the 3 directions indicated by numbers in the picture. When the piping is run in direction 1 or 3, cut a notch along the groove on the side of the indoor unit with a cutter.

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.



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.

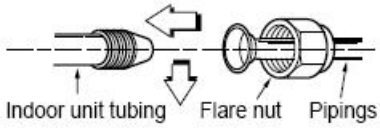


Extending the rolled pipe

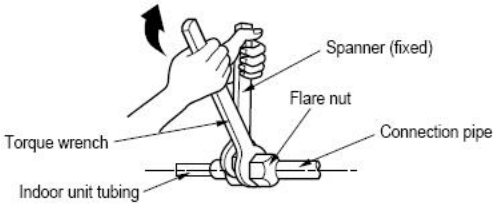
5. Connections to the indoor unit

1).Remove the indoor unit pipe cap (check that there is no debris inside).

2).Insert the fare nut and create a flange at the extreme end of the connection pipe.



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

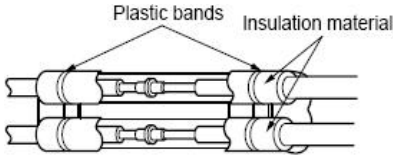


Capacity (Btu/h)	Pipe Size (Torque)	
	Gas	Liquid
7/9/12K	3/8" (4.2kg.m)	1/4" (1.8kg.m)
18K	1/2" (5.5kg.m)	1/4" (1.8kg.m)
24K	5/8" (6.6kg.m)	3/8" (4.2kg.m)

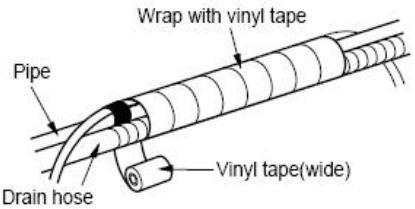
When extending the drain hose at the indoor unit, install the drain pipe.

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.

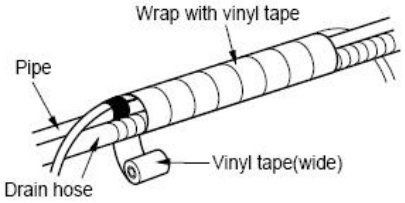


Wrap the area which accommodates the rear piping housing section with vinyl tape.



- 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.



6. Indoor unit condensed water drainage

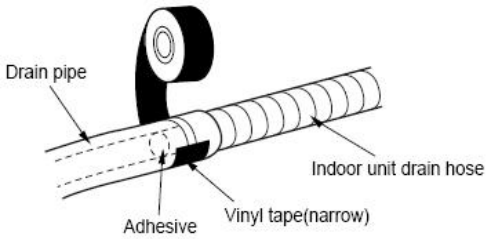
The indoor unit condensed water drainage is fundamental for the success of the installation.

1).Place the drain hose below the piping, taking care not to create siphons.

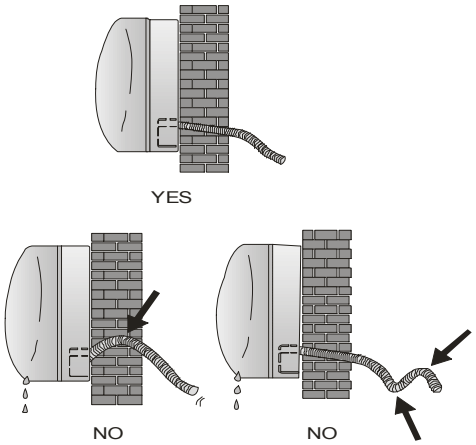
2).The drain hose must slant downwards to aid drainage.

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, 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.



5.4.2. Outdoor Unit Installation

- Step1: Select Installation Location

Select a site that allows for the following:

1.1 Do not install the outdoor unit near sources of heat,steam or flammable gas.

1.2 Do not install the unit near in to windy or dusty places.

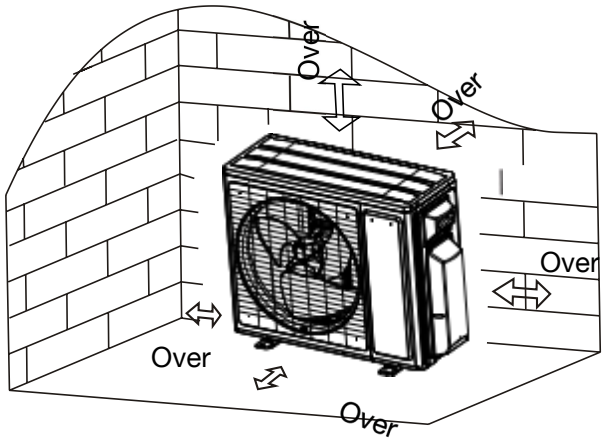
1.3 Do not install the unit where people often pass.Select a place where the air discharge and operating sound will not disturb the neighbors.

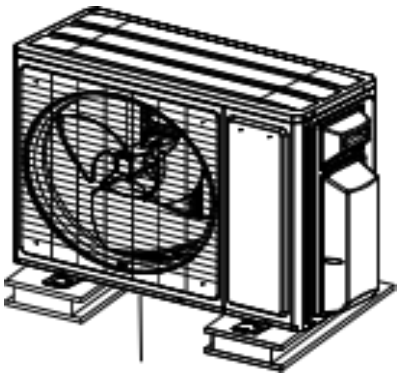
1.4 Avoid installing the unit where it will be exposed to direct sunlight(other wise use a protection, if necessary,that should not interfere with the air flow).

1.5 Reserve the spaces as shown in the picture for the air to circulate freely.

1.6 Install the outdoor unit in a safe and solid place.

1.7 If the outdoor unit is subject to vibration, place rubber blankets onto the feet of the unit.



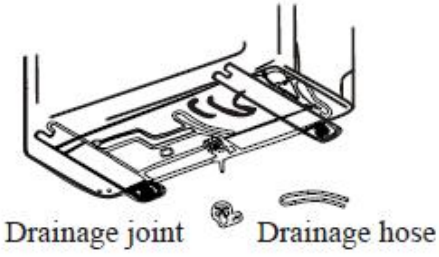


At least 3cm
above the floor

- Step2: Install Drainage Hose

2.1 This step only for heat pump models or RCACs.

2.2 Insert the drainage joint to the hole at the bottom of the outdoor unit.



2.3 Connect the drainage hose to the joint and make the connection well enough.

- Step3: Fix Outdoor Unit

3.1 According to the outdoor unit installation dimensions to mark the installation position for

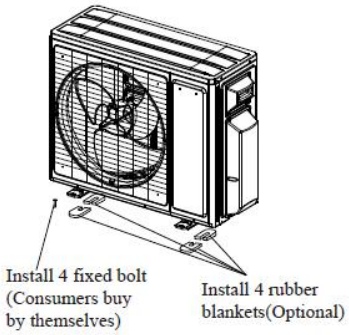
expansion bolts .

3.2 Drill holes and clean the concrete dust and place the bolts .

3.3 If applicable install 4 rubber blankets on the hole before place the outdoor unit(Option).This will reduce vibrations and noise.

3.4 Place the outdoor unit base on the bolts and pre-drilled holes.

3.5 Use wrench to fix the outdoor unit firmly with bolts.



- Note:

The outdoor unit can be fixed on a wall-mounting bracket. Follow the instruction of the wall-mounting bracket to fix the wall-mounting bracket on the wall, and then fasten the outdoor unit on it and keep it horizontal.

The wall-mounting bracket must be able to support at least 4 times of the weight of outdoor unit.

- Step4:Install Writing(The following are 2 zone system and 5 zone system,and other analogies)

4.1 Use a phillips screwdriver to unscrew wiring cover, grasp and press it down gently to take it down.

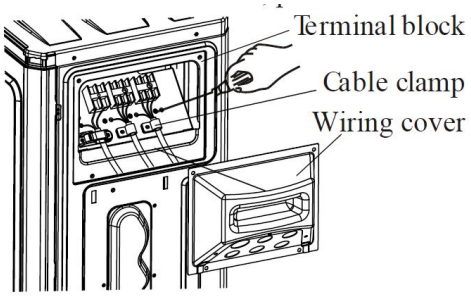
4.2 Unscrew the cable clamp and take it down.

4.3 According to the wiring diagram pasted inside the wiring cover, connect the connecting wires to the corresponding terminals, and ensure all connections are firmly and securely.

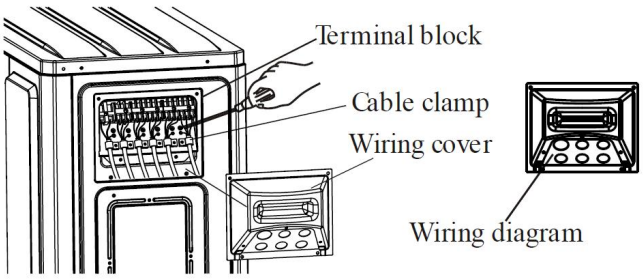
4.4 Reinstall the cable clamp and wiring cover.

⚠ When connecting the wires of indoor and outdoor units, the power should be cut off.

Note: Install the cable, please refer to fron t page "Cable Connection Between IDU To ODU".



2 zone system



5 zone system

- Step5:Connecting Refregerant Pipe

5.1 Unscrews the valve cover, grasp and press it down gently to take it down (if the valve cover is applicable).

5.2 Remove the protective caps from the end of valves.

5.3 Take off the plastic cover in the pipe ports and check whether there is any sundry on the port of the connecting pipe and make ensure the port is clean.

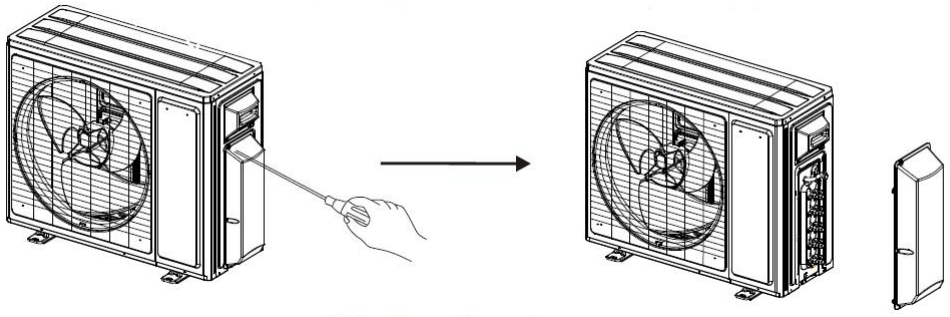
5.4 After aligning the center, rotate the flare nut of the connecting pipe to tighten the nut as tightly as possible by hand.

5.5 Use a spanner to hold the body of the valve and use a torque wrench to tighten the flare nut

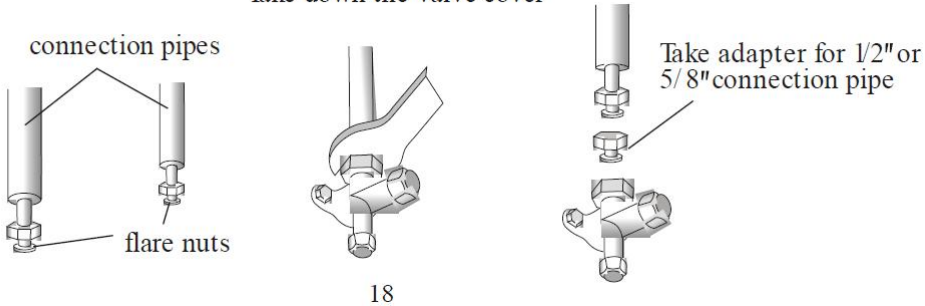
according to the torque values in the torque requirements table.

(Refer to the torque requirements table on section INSTALLATION PRECAUTIONS)

IMPORTANT：If need to connect to 1/2 " or 5/8 " connection pipe, please use the transitadapter, and find it in indoor carton box together with user manual bag.



Take down the valve cover



18

- Step6:Vacuum Pumping(2 zone system)

6.1 Use a spanner to take down the protective caps from the service port, low pressure valve and high pressure valve of the outdoor unit.

6.2 Connect the pressure hose of manifold gauge to the service port on the outdoor unit low pressure valve.

6.3 Connect the charge hose from the manifold gauge to the vacuum pump.

6.4 Open the low pressure valve of the manifold gauge and close the high pressure valve.

6.5 Turn on the vacuum pump to vacuum the system.

6.6 The vacuum time should not be less than 15 minutes, or make sure the compound gauge indicates -0.1 MPa (-76 cm/Hg)

6.7 Close the low pressure valve of the manifold gauge and turn off the vacuum.

6.8 Hold the pressure for 5 minutes, make sure that the rebound of compound gauge pointer does not exceed 0.005 MPa.

6.9 Open the low pressure valve counterclockwise for 1/4 turn with hexagonal wrench to let a little

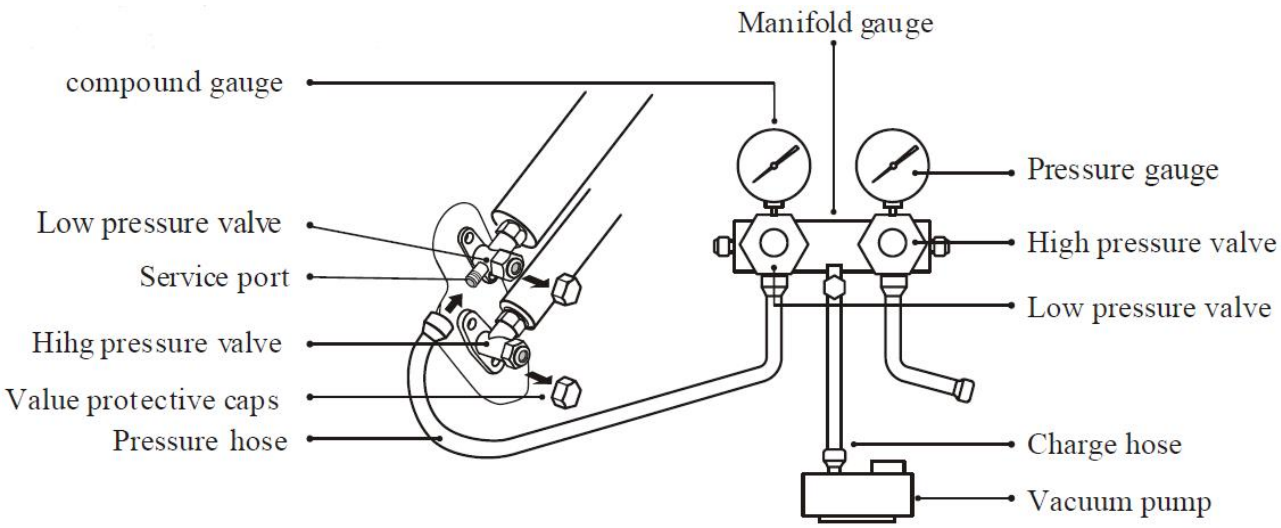
refrigerant fill in the system, and close the low pressure valve after 5 seconds and quickly remove the pressure hose.

6.10 Check all indoor and outdoor joints for leakage with soapy water or leak detector.

6.11 Fully open the low pressure valve and high pressure valve of the outdoor unit with hexagonal wrench.

6.12 Reinstall the protective caps of the service port, low pressure valve and high pressure valve of the outdoor unit.

6.13 Reinstall the valve cover.



⚠ After install line set and before open the valve switch, must vacuum at first.

- Step6:Vacuum Pumping(3\4\5 zone system)

6.1 Preparations and Precautions

Air and foreign matter in the refrigerant circuit can cause abnormal rises inpresure, which can damage the air conditioner, reduce its efficiency, and cause injury .Use a vacuum pump and manifold gauge to evacuate the refrigerant circuit, removing any non-condensable gas and moisture from the system. Evacuation should be performed upon initial installation.

Before performing evacuation

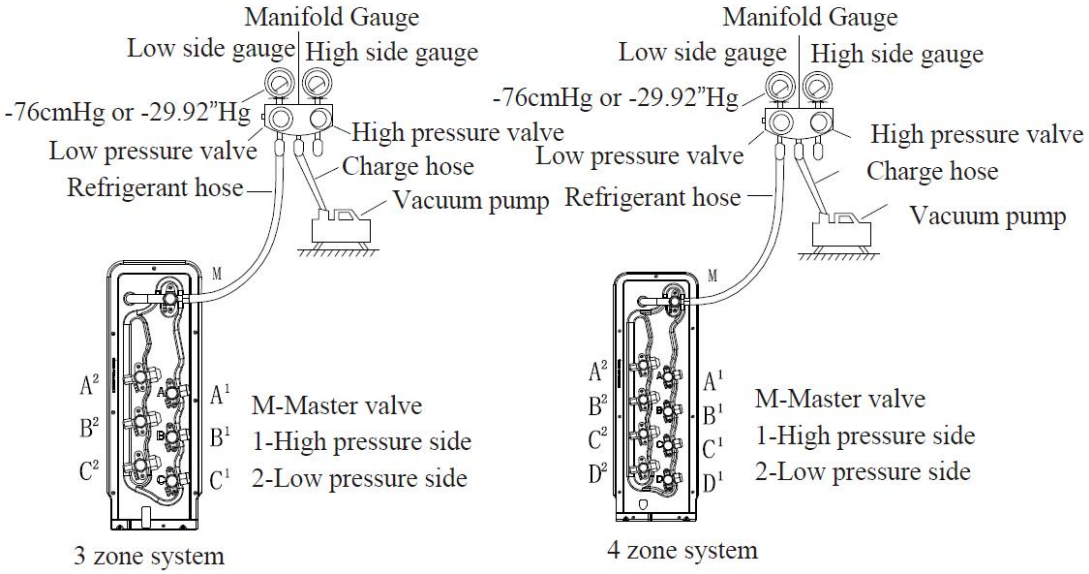
1) Check to make sure that both high-pressure and low-pressure pipes between the indoor and outdoor units are connected properly in accordance with the Refrigerant Piping Connection section of this manual.

2) Check to make sure allwiring is connected properly.

3) Perform nitroeen leak check on all refrieerant joints.

6.2 Evacuation Instructions

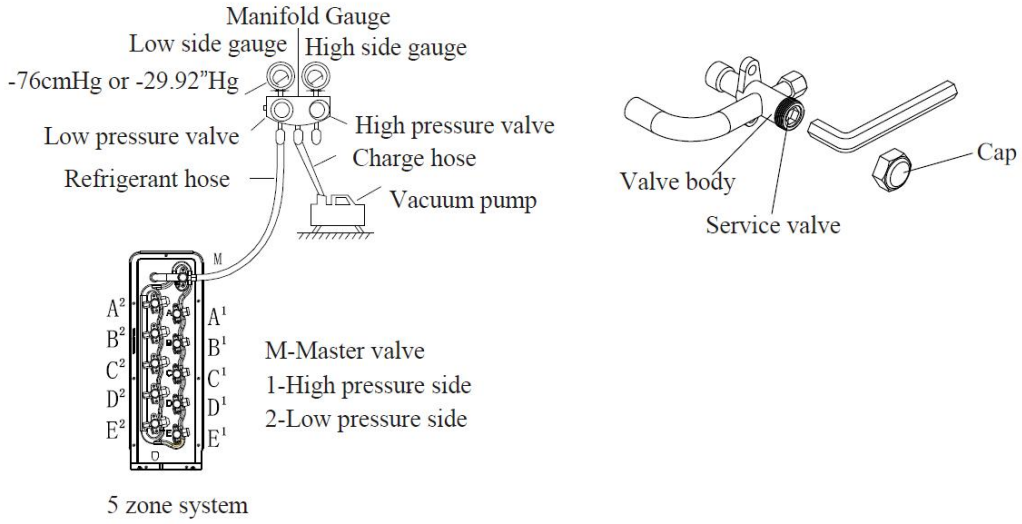
Before using the manifold gauge and vacuum pump, read their operation manuals to familiarize yourself with how to use them properly.



1. Connect the refrigeration hose from the low side manifold gauge to themaster service valve port on the outdoor unit.

2. Connect charge hose from the manifold gauge to the vacuum pump.

3. Open the low pressure side service valves (A2, B2, C2, etc.) if the lineset was connected. But be careful not to open the high pressure side service valves (A1, B1, C1, etc.)



4. Open the Low Pressure side valve on the manifold gauge.Keep the High Pressure side valve closed.

5. Turn on the vacuum pump to evacuate the system.

6. Run the vacuum until the Compound Meter reads-76cmHg/-29.92"Hg (-101 kPa). It is recommended to use a micron gauge; run the vacuum until the micron gauge reads 350 to 500 microns or less.

7. After the vacuum process has been achieved, close the Low Pressure side valve on the manifold gauge, and turn off the vacuum pump.

8. Wait for approximately 10 to 15 minutes, then check that there has been no change in system vacuum. It is recommended to use a micron gauge; check to make sure the system is still below 500 microns.

9. If there is a change in system vacuum, refer to Gas Leak Check section for information on how to check for leaks. If there is no change in system vacuum, remove the charge hose from the service port.

10. Using allen wrench, fully open the master valves (M1, M2) on the top and the high pressure side service valves (A1, B1, C1, etc.).

11. Tighten valve caps on all valves (master valves, high side and low side services valves) by hand. You may tighten it further using a torque wrench if needed.

NOTICE: Open valve stems gently, When opening service valve, turn the allen wrench until it hits against the stopper. Do not try to force the valve to open further.

5.4.3. Pipe Length and Additional Refrigerant

Inverter Models ODU Capacity(Btu/h)	2 Zone System	3 Zone System	4 Zone System	5 Zone System
Max. equivalent length for all indoor units	131ft/40m	197ft/60m	197ft/80m	295ft/90m
Max. length to farthest indoor unit	82ft/25m	98ft/30m	98ft/30m	98ft/30m
Max. height difference between indoor and outdoor unit	49ft/15m	49ft/15m	49ft/15m	49ft/15m
Max. height difference between indoor unit	33ft/10m	33ft/10m	33ft/10m	33ft/10m
Standard refrigerant pipe length (ft /m)	49ft/15m	74ft/22.5m	98ft/30m	123ft/37.5m
Additional refrigerant charge (Based on the IDU liquid line size)	1/4in 0.11oz/ft	1/4in 0.11oz/ft	1/4in 0.11oz/ft 3/8in 0.22oz/ft	1/4in 0.11oz/ft 3/8in 0.22oz/ft

5.4.4. Torque Parameters

Torque Parameters

Pipe Size	Newton meter[N x m]	Pound-force foot(Ibf-ft)	Kilogram-force meter(kgf-m)
1/4 " (Φ6.35)	15 - 20	11.1 - 14.8	1.5 - 2.0
3/8 " (Φ9.52)	31 - 35	22.9 - 25.8	3.2 - 3.6
1/2 " (Φ12)	45 - 50	33.2 - 36.9	4.6 - 5.1
5/8 " (Φ15.88)	60 - 65	44.3 - 48.0	6.1 - 6.6

5.4.5. Outdoor Side Drain Pipe

- 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.

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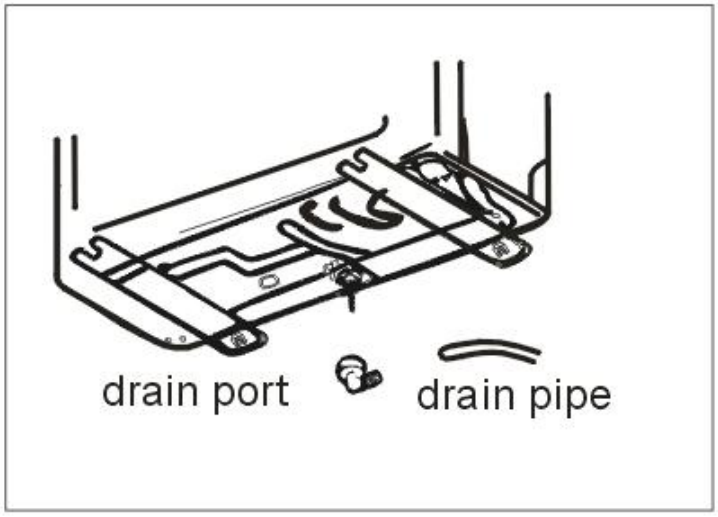


5.5. Electrical Installation

Cable Connection Between IDU To ODU

Note:Plug the connective cables to the corrersponding terminals,as shown.For example

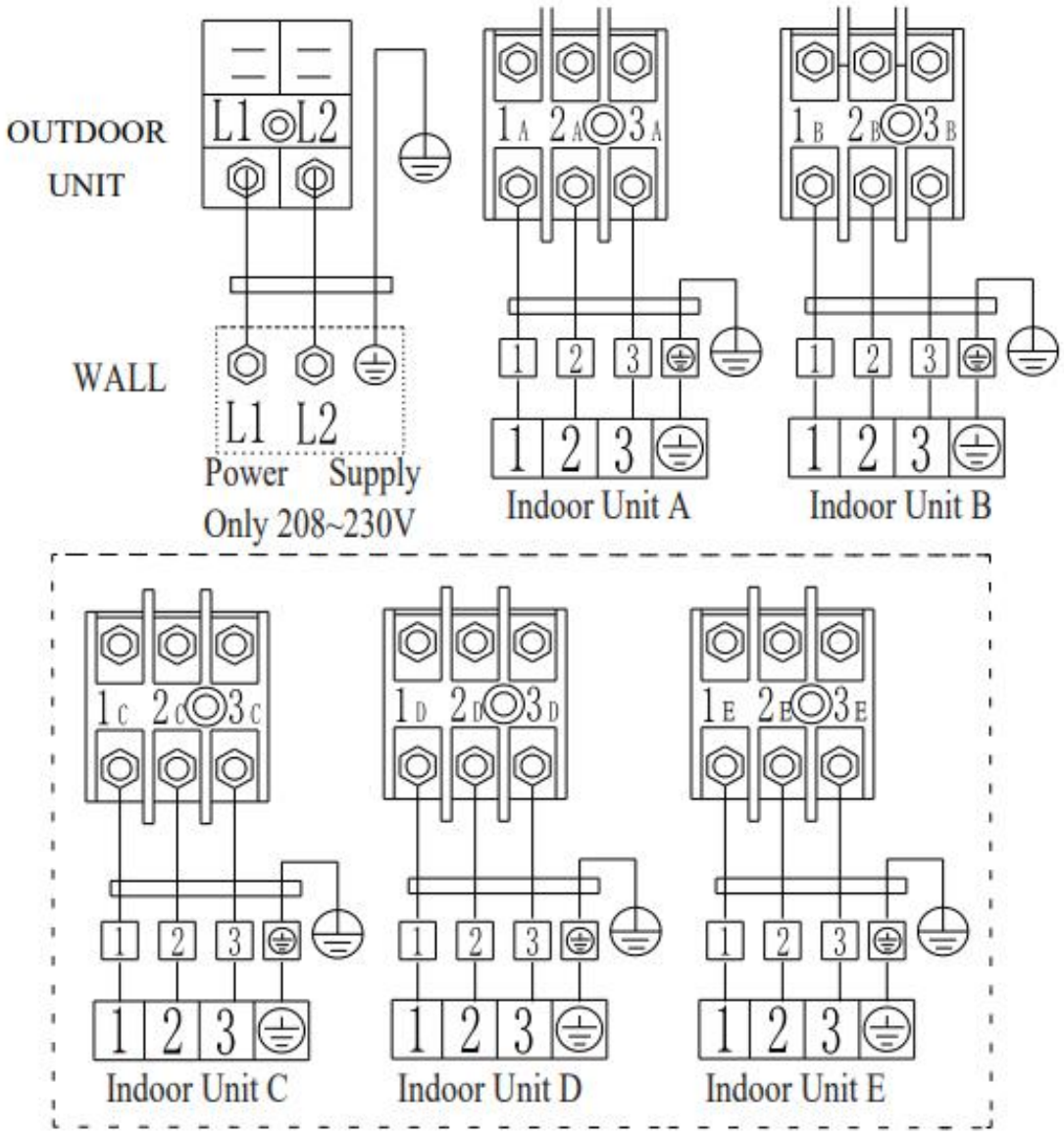
Terminal(A) of the ourdoor unit must connect with Terminal (A) on the indoor unit.

Note:

1)Connect to internal and external communication lines.

2)Connect the fire line.

3)Connect the zero line.



5.6. Test Running

Inspections Before Test Run

Do the following checks before test run.

Description	Inspection method
Electrical safety inspection	● Check whether the power supply voltage complier with specification. ● Check whether there is ant wrong or missing connection between the power lines,signal line and earth wires. ● Check whether the earth resistance and insulation resistance comply with requirements.
Installation safety inspection	● Confirm the direction and smoothness of drainage pipe. ● Confirm that the joint of refrigerant pipe is installed completely.

	● Confirm the safety of outdoor unit,mounting plate and indoor unit installation. ● Confirm that the valves are fully open. ● Confirm that there are no foreign objects or tools left inside the unit. ● Complete installation of indoor unit air inlet grille and panel.
Refigerant leakage detection	● The piping joint,the connector of the two valves of the outdoor unit,the valve spool,the welding port,etc.where leakage may occur. ● Foam detection method: Apply soapy water or foam evenly on the parts where leakage may occur, and observe whether bubbles appear or not,if not,it indicates that the leakage detection result if safe. ● Leak detector method: Use a professional leak detector and read the instruction of operation, detect at the position where leakage may occur. ● The duration of leak detection for each position should last for 3 minutes or more; If the test result shows that there ie leakage,the nut should be tightened and tested again until there ie no leakage; After the leak detection is completed,wrap the exposed pipe connector of indoor unit with thermal insulation material and wrap with insulation tape.

Test Running Instruction

1. Turn on the power supply.

2. Press the ON/OFF button on the remote controller to turn on the air conditioner .

3. Press the Mode button to switch the mode COOLING and HEATING.

In each mode set as below:

COOLING-Set the lowest temperature

HEATING-Set the highest temperature

4. Run about 8 minutes in each mode and check all functions are properly run and respond the remote controller. Functions check as recommended:

4.1 If the outlet air temperature responds to the cooling and heating modes

4.2 If the water drains properly from the drainage hose

4.3 If the Louver and deflectors(optional) rotae properly

5. Observe the test run state of the air conditioner at least 30 minutes.

6. After the successfully test run, return the normal setting and press ON/OFF button on the remote controller to turn off the unit.

7. Inform the user to read this manual carefully before use, and demonstrate to the user how to use the air conditioner, the necessary knowledge for service and maintenance, and the reminder for storage of accessories.

Note: If the ambient temperature exceeds the range mentioned in the section OPERATION INSTRUCTIONS, and it can not run COOLING or HEATING mode, lift the front panel and refer to the emergency button operation to run the COOLING and HEATING mode.

6.Troubleshooting

6.1 Error Code

Code	Reason	Remark
E0	IDU & ODU Communication failure	The IDU & ODU wiring connection correct?
E1	IDU Room Temperature sensor failure.（IDU RT failure）	IDU sensor and PCB.
E2	IDU Coil temperature sensor failure.（IDU IPT failure）	IDU sensor and PCB.
E3	ODU Coil temperature sensor failure. (OPT)	ODU coil sensor and ODU PCB
E4	AC Cooling system abnormal	Gas leakage? 2-way or 3-way valve blocked etc.
E5	IDU/ODU mismatched failure (specially performance test on the production line)	/
E6	IDU PG Fan motor / DC fan motor works abnormal（IDU failure）	Fan motor, fan blade and PCB.
E7	ODU Ambient Temperature sensor failure	ODU ambient sensor and ODU PCB.
E8	ODU Discharge Temperature sensor failure.	ODU discharge sensor and ODU PCB.
E9	IPM / Compressor driving control abnormal.	ODU PCB , compressor, etc.
EA	ODU Current Test circuit failure	ODU PCB broken?
Eb	The Communication abnormal of Main PCB and Display board（IDU failure）	Display board and main PCB.
EC	The Communication abnormal of system module and drive module (ODU failure)	ODU PCB broken
EE	ODU EEPROM failure.	1. ODU PCB broken? 2. Try to re-power on AC unit.
EF	ODU DC fan motor failure.	Fan motor, ODU PCB.
EH	ODU suction temperature sensor failure.	ODU suction sensor and PCB.
EU	Compressor phase current overcurrent protection	ODU/Compressor
En	ODU gas pipe temperature sensor failure.	ODU gas pipe sensor and PCB
Ey	ODU liquid pipe temperature sensor failure.	ODU liquid pipe senso and PCB
P0	IPM module protection.	ODU PCB
P1	Over / under voltage protection.	1. ODU PCB broken? 2. Power supply abnormal?
P2	Over current protection.	1. ODU PCB broken? 2. Power supply abnormal?
P4	ODU Discharge pipe Over temperature protection.	Please check the troubleshooting for detail.
P5	Sub-cooling protection on Cooling mode.	Please check the troubleshooting for detail.
P6	Overheating protection on Cooling mode.	Please check the troubleshooting for detail.
P7	Overheating protection on Heating mode.	Please check the troubleshooting for detail.
P8	Outdoor Over temperature/Under temperature protection.	Please check the troubleshooting for detail.
P9	Compressor driving protection (Load abnormal).	Please check the troubleshooting for detail.

PA	Communication failure for TOP flow unit/ Preset mode conflict. （IDU failure）	Please check the troubleshooting for detail.
F0	Infrared Customer feeling test sensor failure. （IDU failure）	Querying by press remote controller
F1	Electric Power test module failure. （IDU failure）	Querying by press remote controller
F2	Discharge temperature sensor failure PROTECTION.	Please check the troubleshooting for detail.
F3	ODU coil temperature failure PROTECTION..	Please check the troubleshooting for detail.
F4	Cooling system gas flow abnormal PROTECTION..	Please check the troubleshooting for detail.
F5	PFC PROTECTION	Please check the troubleshooting for detail.
F6	The Compressor lack of phase / Anti-phase PROTECTION.	Please check the troubleshooting for detail.
F7	IPM Module temperature PROTECTION	Please check the troubleshooting for detail.
F8	4-Way Value reversing abnormal..	Please check the troubleshooting for detail.
F9	The module temperature test circuit failure.	ODU PCB
FA	The compressor Phase-current test circuit failure.	ODU PCB
Fb	Limiting/Reducing frequency for Over load protection on Cooling/Heating mode.	Querying by press remote controller
FC	Limiting/Reducing frequency for High power consumption protection.	Querying by press remote controller
FE	Limiting/Reducing frequency for Module current protection (phase current of compressor).	Querying by press remote controller
FF	Limiting/Reducing frequency for Module temperature protection.	Querying by press remote controller
FH	Limiting/Reducing frequency for Compressor driving protection.	Querying by press remote controller
FP	Limiting/Reducing frequency for anti-condensation protection..	Querying by press remote controller
FU	Limiting/Reducing frequency for anti-frost protection.	Querying by press remote controller
Fj	Limiting/Reducing frequency for Discharge over temperature protection.	Querying by press remote controller
Fn	Limiting/Reducing frequency for ODU AC Current protection.	Querying by press remote controller
Fy	Gas leakage protection	Please check the troubleshooting for detail.
bf	TVOC sensor failure（IDU failure, optional）	Querying by press remote controller
bc	PM2.5 sensor failure（IDU failure, optional）	Querying by press remote controller
bj	Humidity sensor failure. （IDU failure）	Querying by press remote controller
H1	High pressure switch failure	1. high pressure switch damage 2. high pressure switch connection is loose 3. ODU main PCB damage
H2	Low pressure switch failure	1. Low pressure switch damage 2. Low pressure switch connection is loose 3. ODU main PCB damage

Note: Remote controller FAILURE CODE Querying function

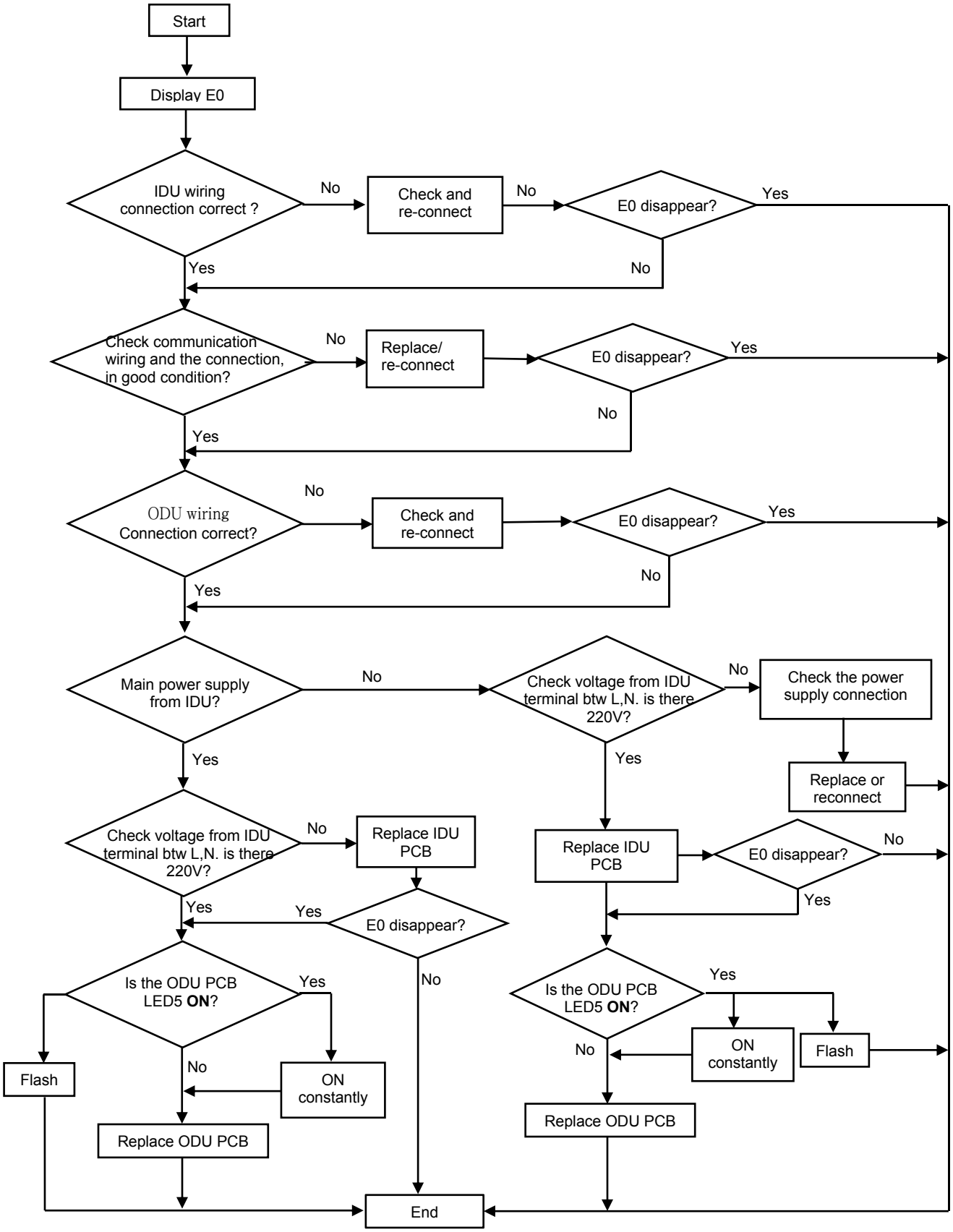
As shown in the failure codes, some of the codes (Fb~bj) need to press remote control for inspection.

While unit on operation, press the ECO button 8 times with 8 seconds, the buzzer BIBI 2 times, you can inspect the special failure code as Fb ~Fn, bj etc.

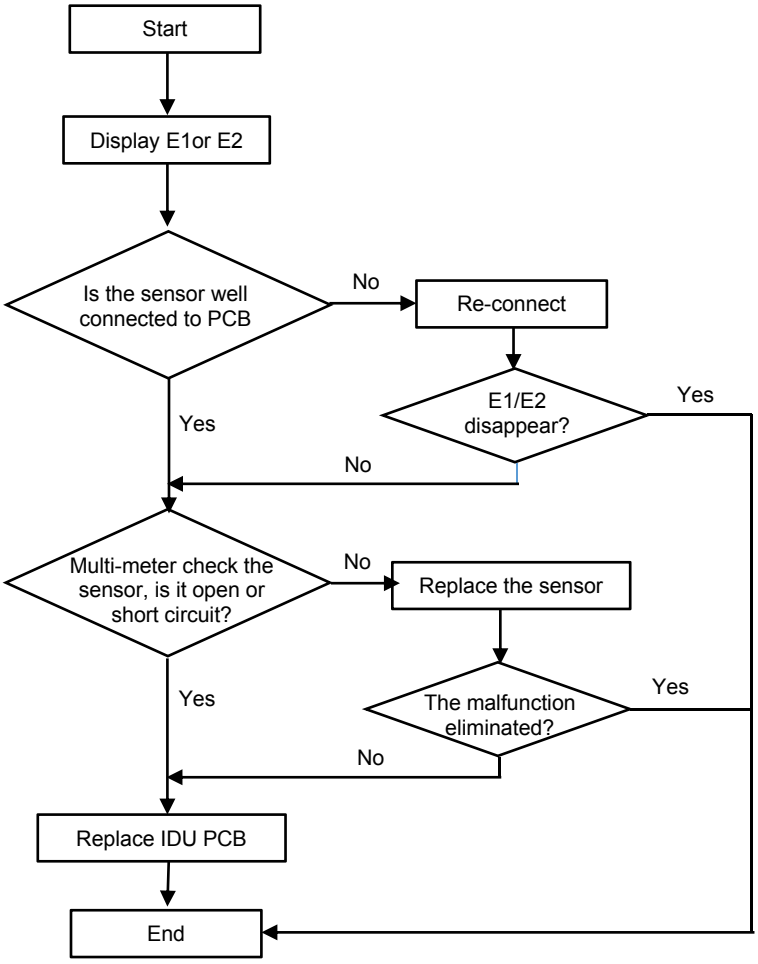
MALFUNCTION	POSSIBLE CAUSES
The appliance does not operate	Power failour/plug pulled out.
	Damaged indoor/outdoor unit fan motor.
	Faulty protective device or fuses.
	Faulty compressor thermomagnetic circuit breake
	Loose connections or plug pulled out.
	It sometimes stops operating to protect the appliance.
	Voltage higher or lower than the voltage range.
	Active TIMER-ON function.
	Damaged electronic control board
Strange odor	Dirty air filter.
Noise of running water	Back flow of liquid in the refrigerant circulation.
A fine mist comes from the air outlet	This occurs when the air in the room becomes very cold,for example in the “COOLING” or “DEHUMIDIFYING/DRY” modes
A strange noise can be heard	This noise is made by the expansion or contraction of the front pane l due to variations in temperature and does not indicate a problem.
Insufficient airflow, eitherhot or cold	Unsuitable temperature setting.
	Obstructed air conditioner intakes and outlets.
	Dirty air filter.
	Fan an speed set at minimum.
	Other sources of heat in the room.
	No refrigerant
The appliance does not respond to commands	Remote control is not close enough to indoor unit
	The batteries of remote control need to be replaced.
	Obstacles between remote control and signal receiver in indoor unit
The display is opp	Active DISPLAY function.
	Power failure.
Switch off the air conditioner immediately and cut off the power supply in the event of :	Strange noises during operation.
	Faulty electronic control board.
	Spraying water or objects inside the appliance.
	Overheated cables or plugs.
	Very strong smells coming from the appliance.

6.2 Troubleshooting

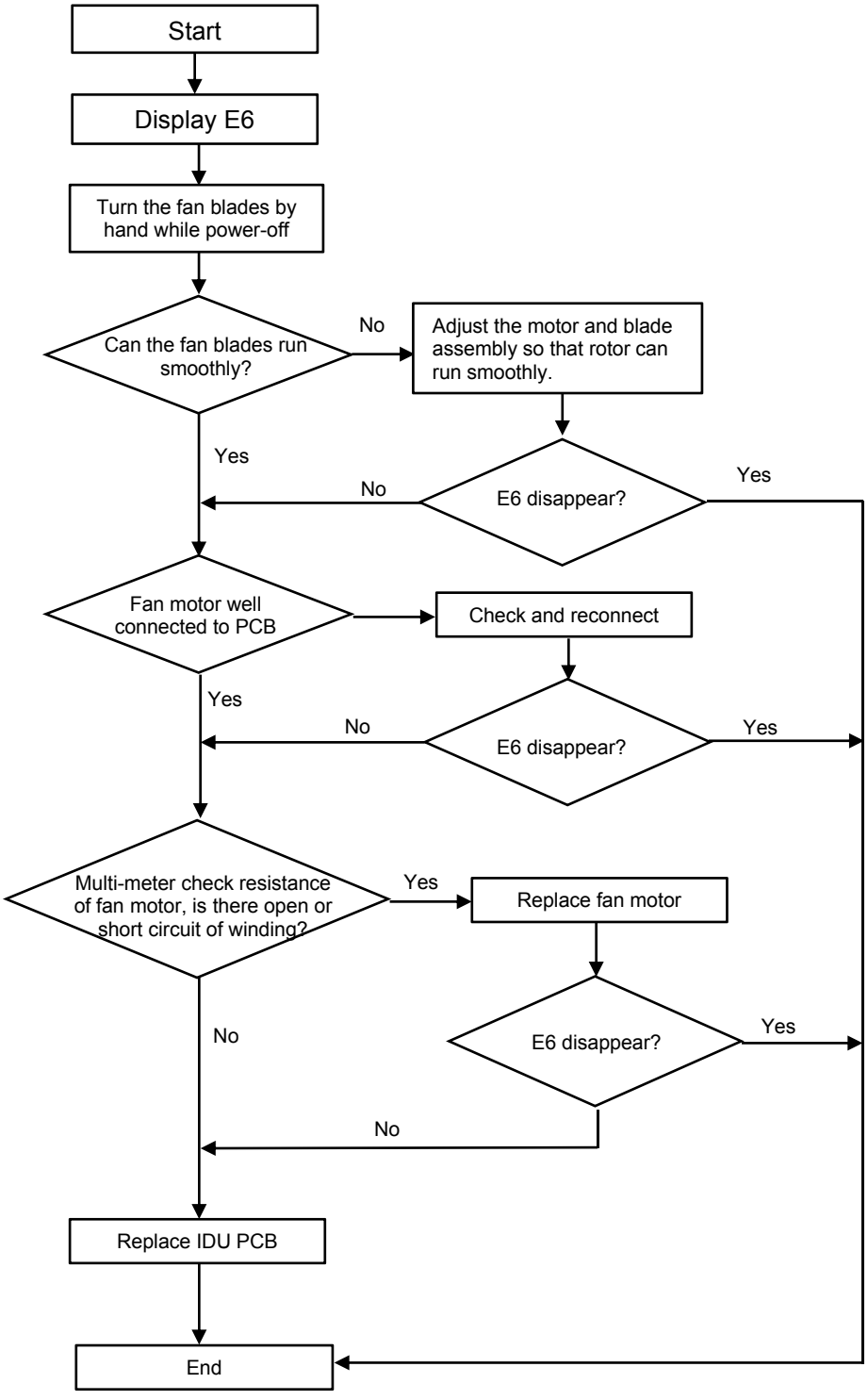
6.2.1 E0 ---IDU & ODU communication failure



6.2.2 E1, E2 ---IDU Room temperature sensor and/or coil temperature sensor failure.

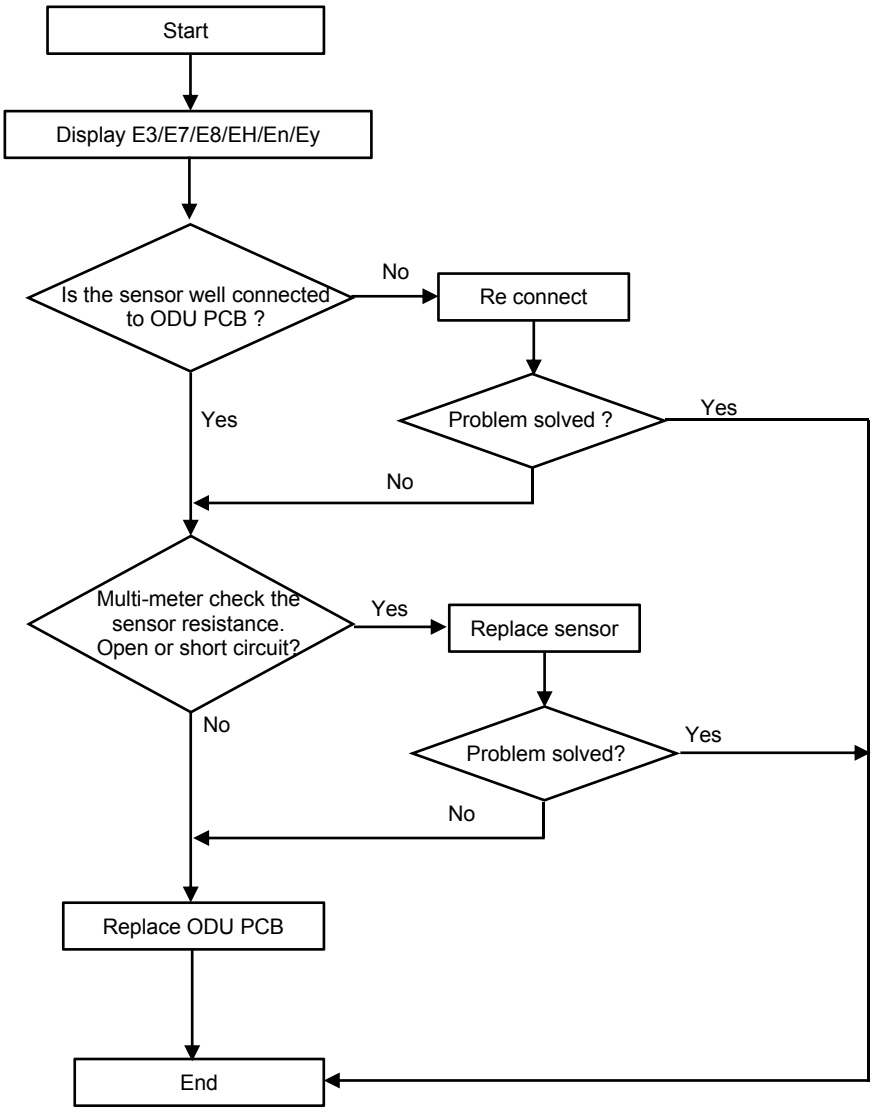


6.2.3 E6----IDU ventilation failure (PG and DC fan motor only)



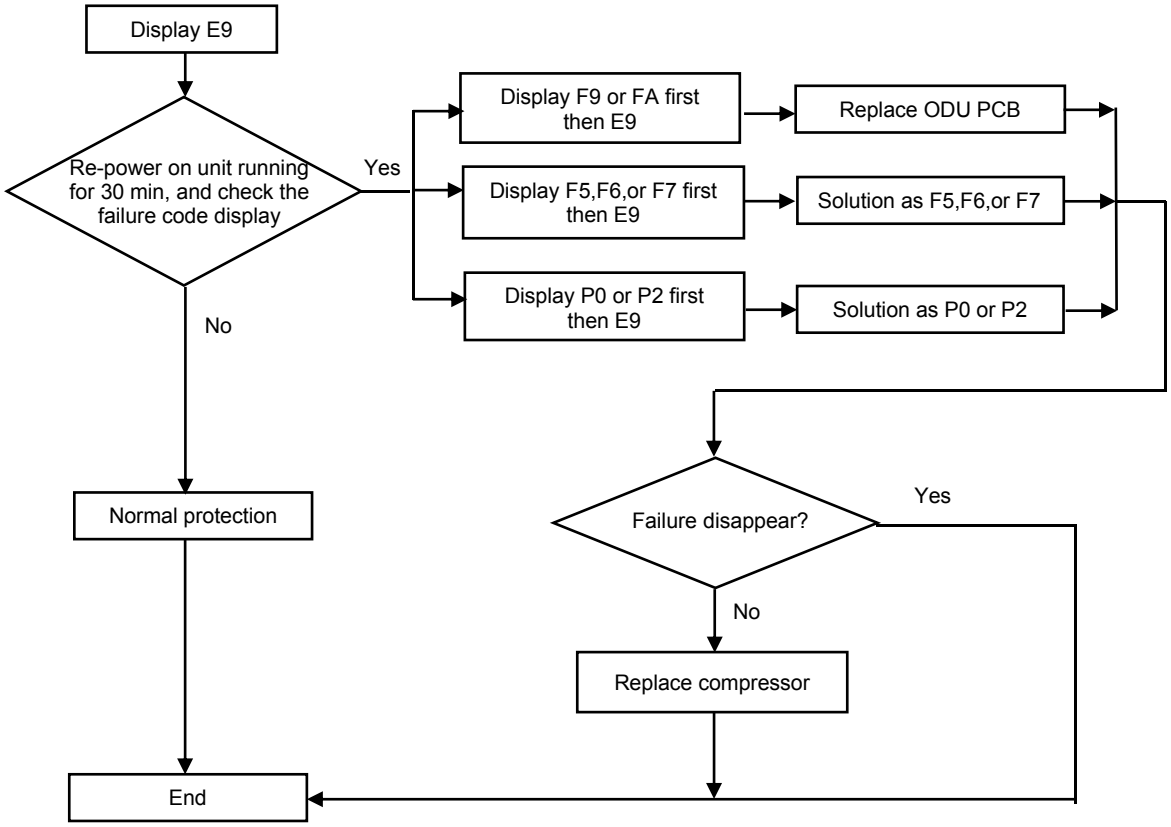
6.2.4 E3, E7, E8, EH, En or Ey----ODU Coil temperature sensor, Ambient temperature sensor , Discharge temperature sensor failure, Suction temperature sensor failure, Gas pipe temperature sensor failure or liquid pipe temperature sensor failure.

When any of the sensor resistance open or short circuit , unit will display failure code as E3/E7/E8/EH/En or Ey, IDU and ODU turns off. When the sensor resistance recovery, unit revert to be standby, customer can switch on the unit directly.



6.2.5 E9---ODU IPM /Compressor drive fault

If unit have 6 times stopping works for IPM protection (P0) continuously, it will display E9 error, and unit can't be recovered to operation, except press ON/OFF button.



6.2.6 EA--- ODU Current Test circuit failure

Cause: Outdoor current sampling circuit failure or driver parameter mismatch

Solution: Replace the ODU PCB.

6.2.7 Eb--- IDU communication abnormal of main board and operating board

Cause: 1. The communication wire damaged. 2. Outdoor main board damaged 3. Operating board damaged.

Solution: 1. Replace the communication wire. 2. Replace the outdoor main board. 3. Replace the operating board.

6.2.8 EC--- The Communication abnormal of system module and drive module

Cause: 1. The communication circuit of the outdoor unit PCB is damaged.2. Program mismatch between system module and driver module

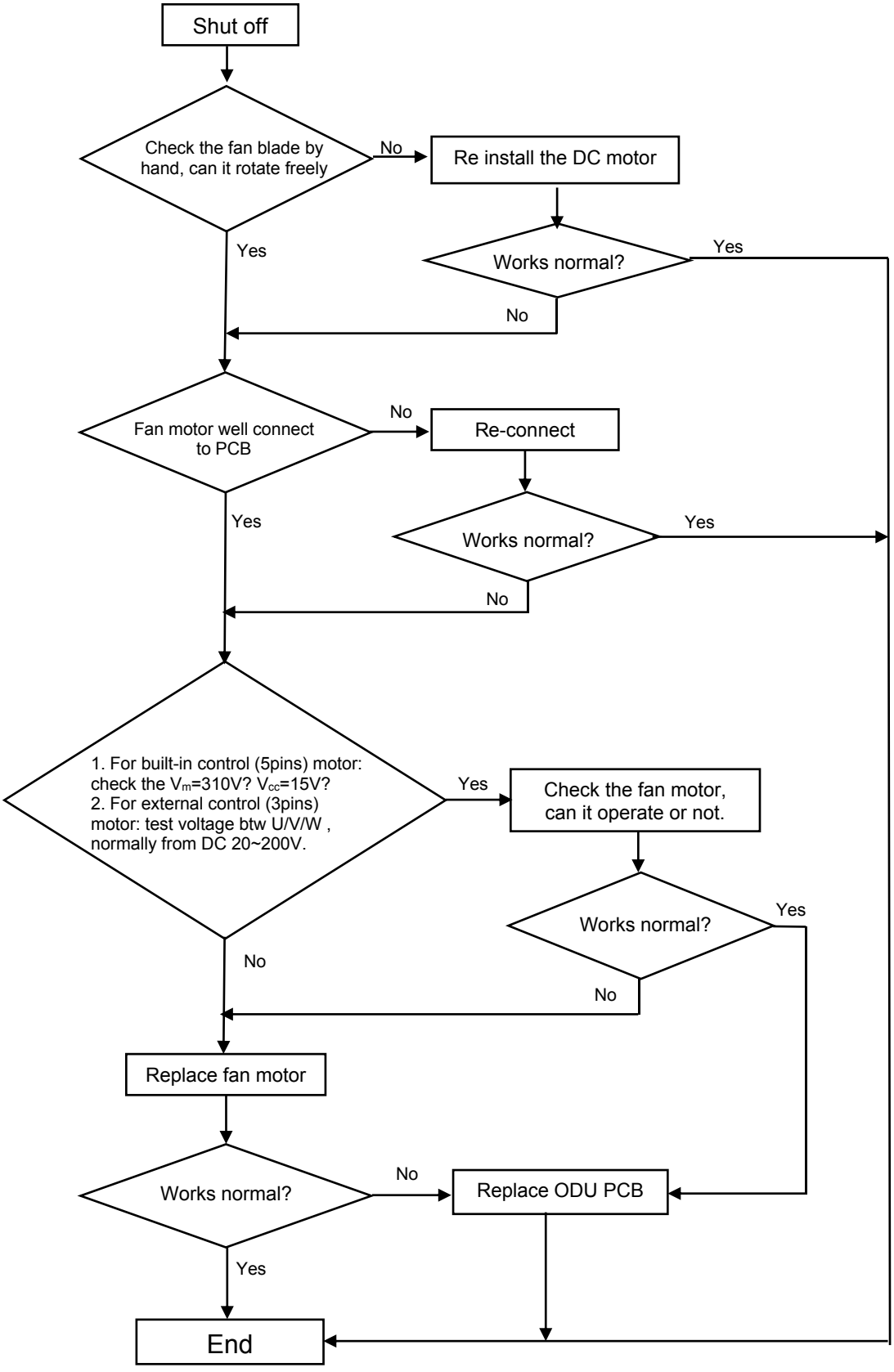
Solution: Replace the ODU PCB.

6.2.9 EE--- ODU EEPROM failure

Cause: The ODU mainboard damaged.

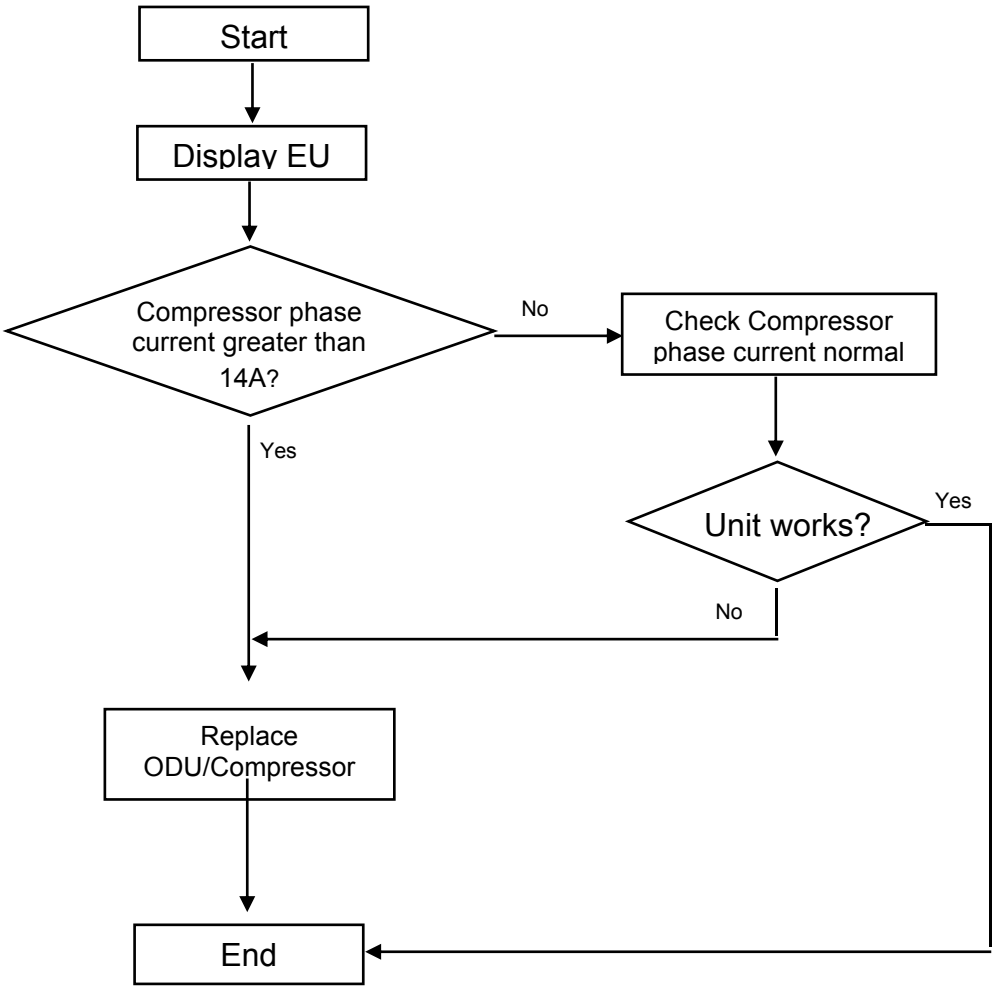
Solution: Replace the ODU PCB.

6.2.10 EF---ODU DC fan motor failure



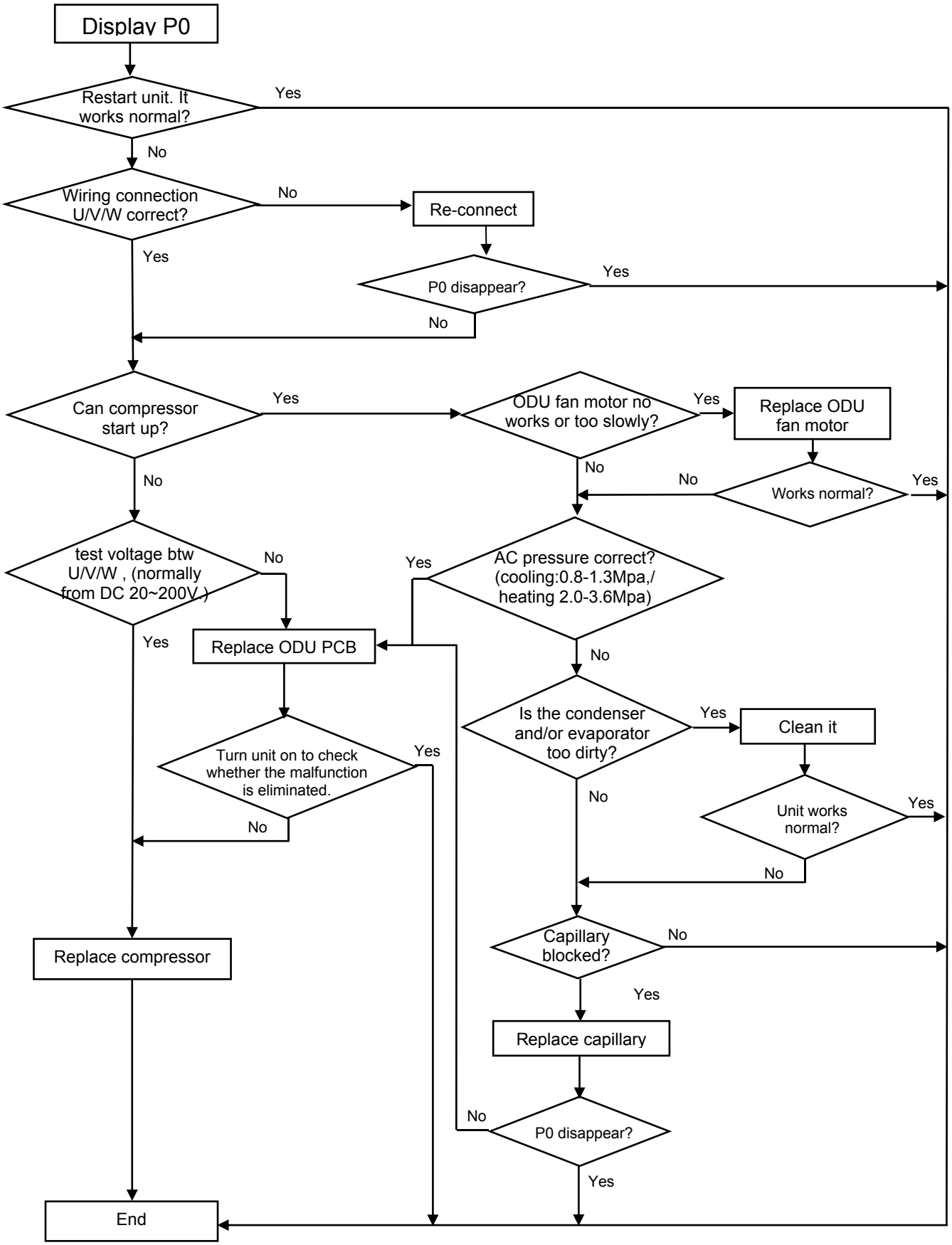
6.2.11 EU---Compressor phase current overcurrent protection

Compressor phase current protection is reported when phase current greater than 14A is detected for 3s consecutively.



6.2.12 P0---IPM protection

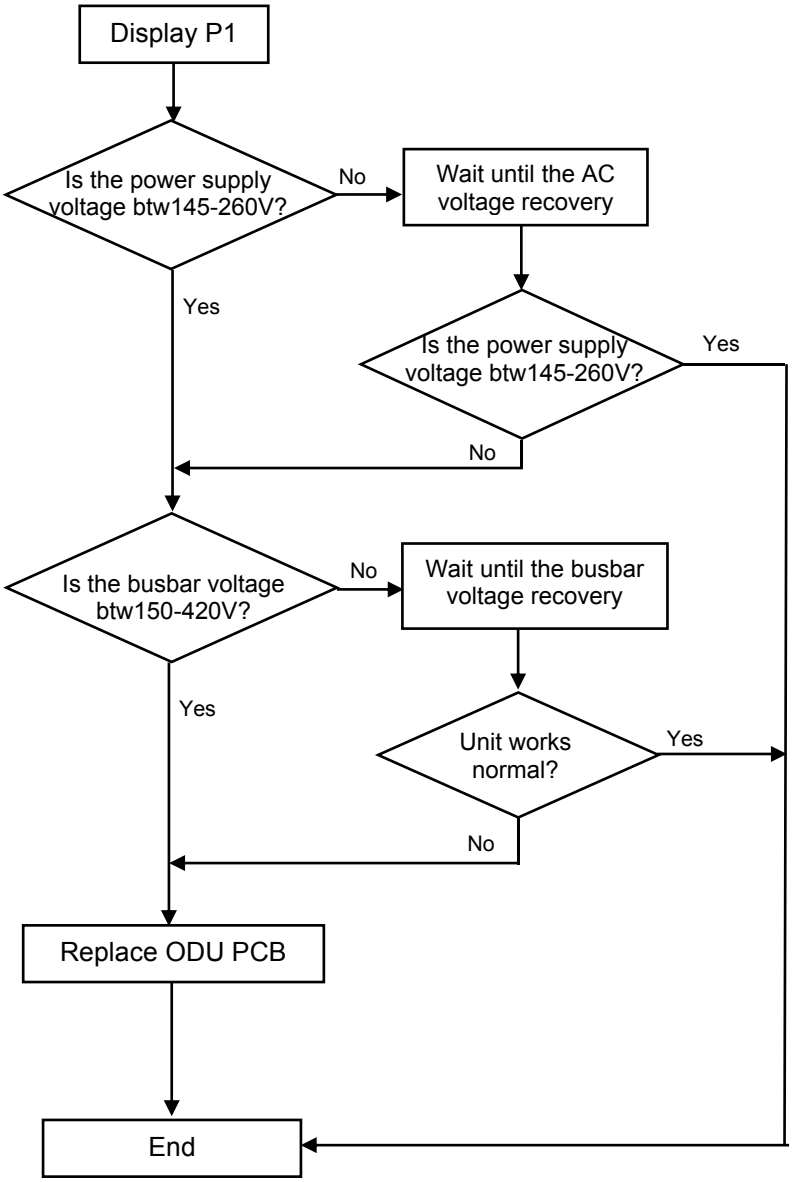
When overheat or overcurrent for IPM, AC unit will display P0protection.



6.2.13 P1--- Over / under voltage protection

1. Test voltage between L &N, When the power supply V > AC260V or V < AC150V, AC will display P1 protection, unit will recover back to previous status while V > AC155V.

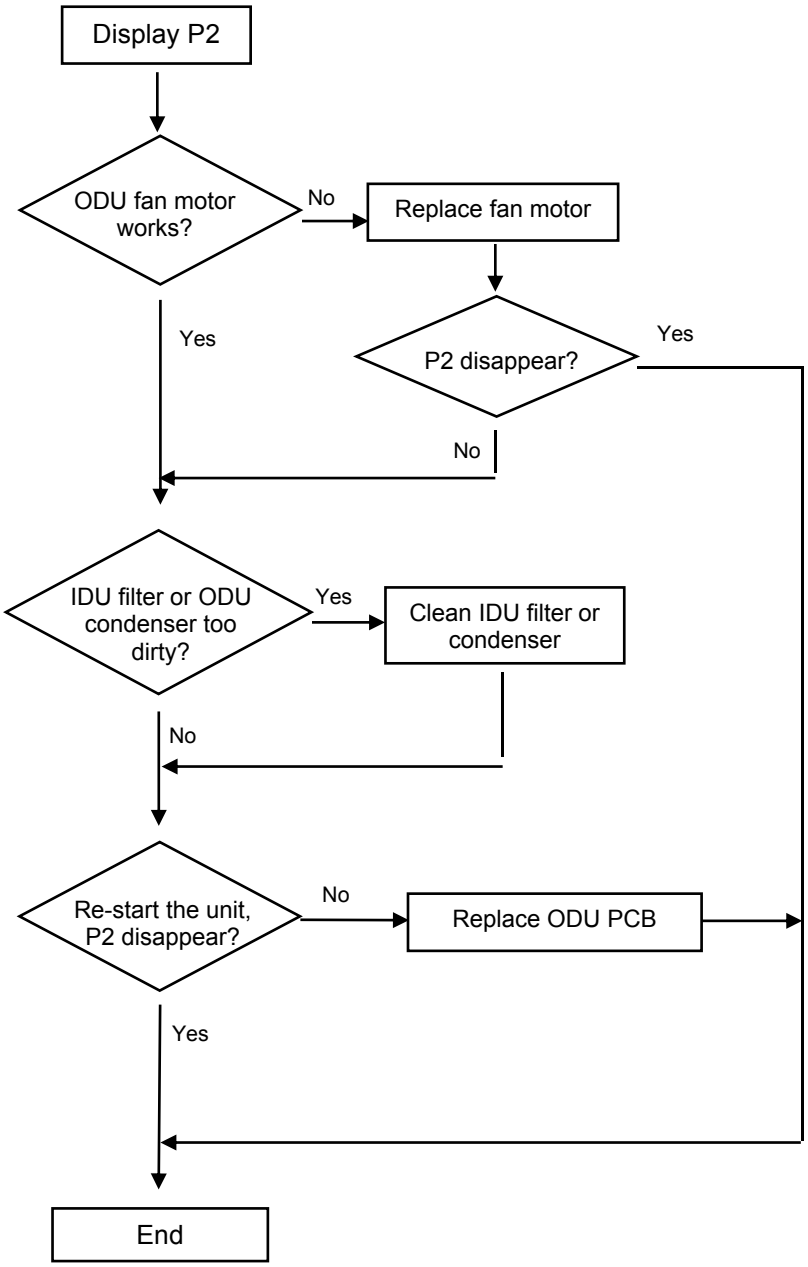
2. Test voltage on the big size electrolytic capacitor of ODU PCB, When DC busbar voltage V > DC420V or V < DC150V, unit will recover back to previous status while DC190V < V < DC410V



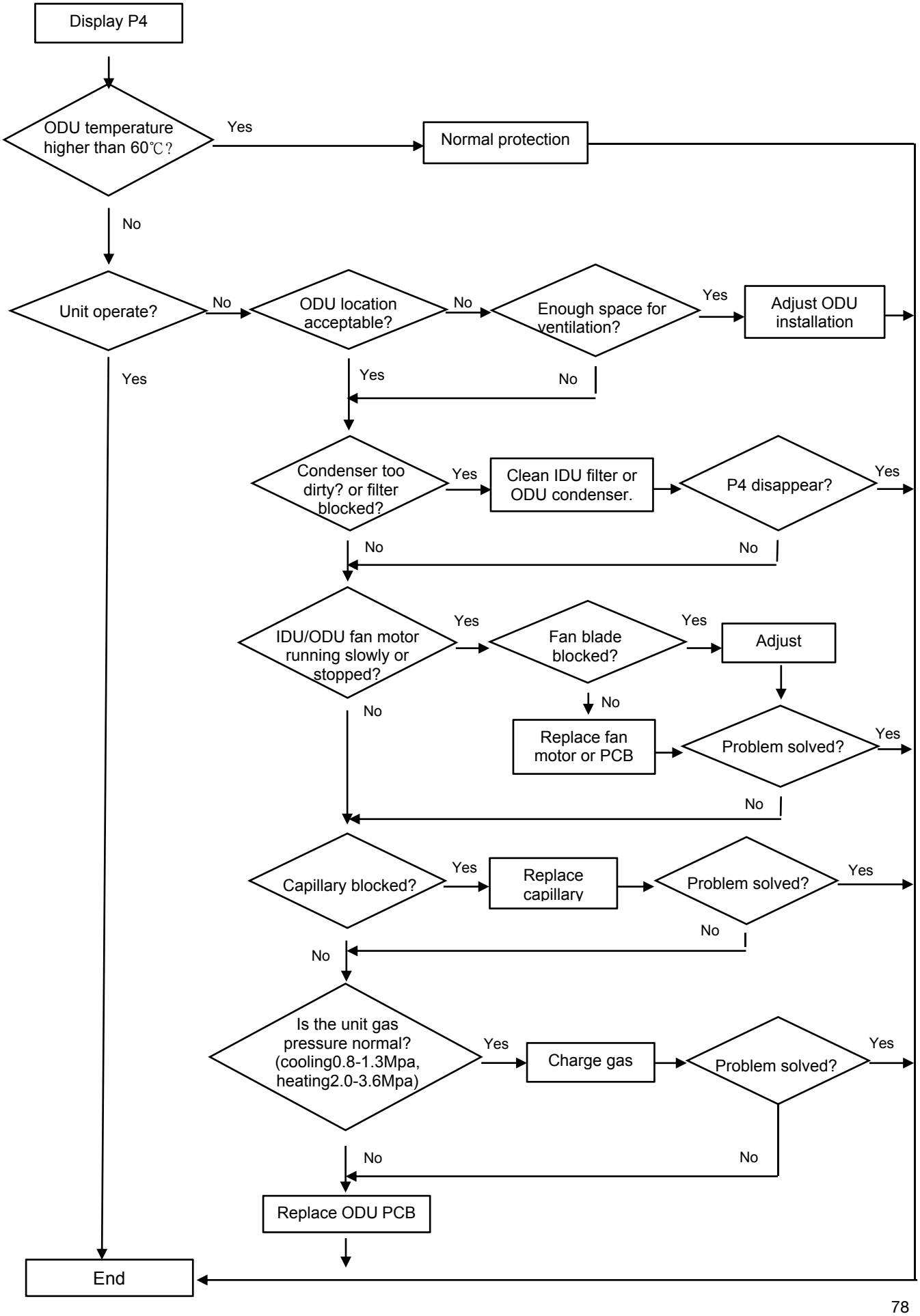
6.2.14 P2---Over Current protection

When the AC unit running current more than I_{max}, it will stop and display P2 protection.

Note: for different AC model, I_{max} has difference valve.

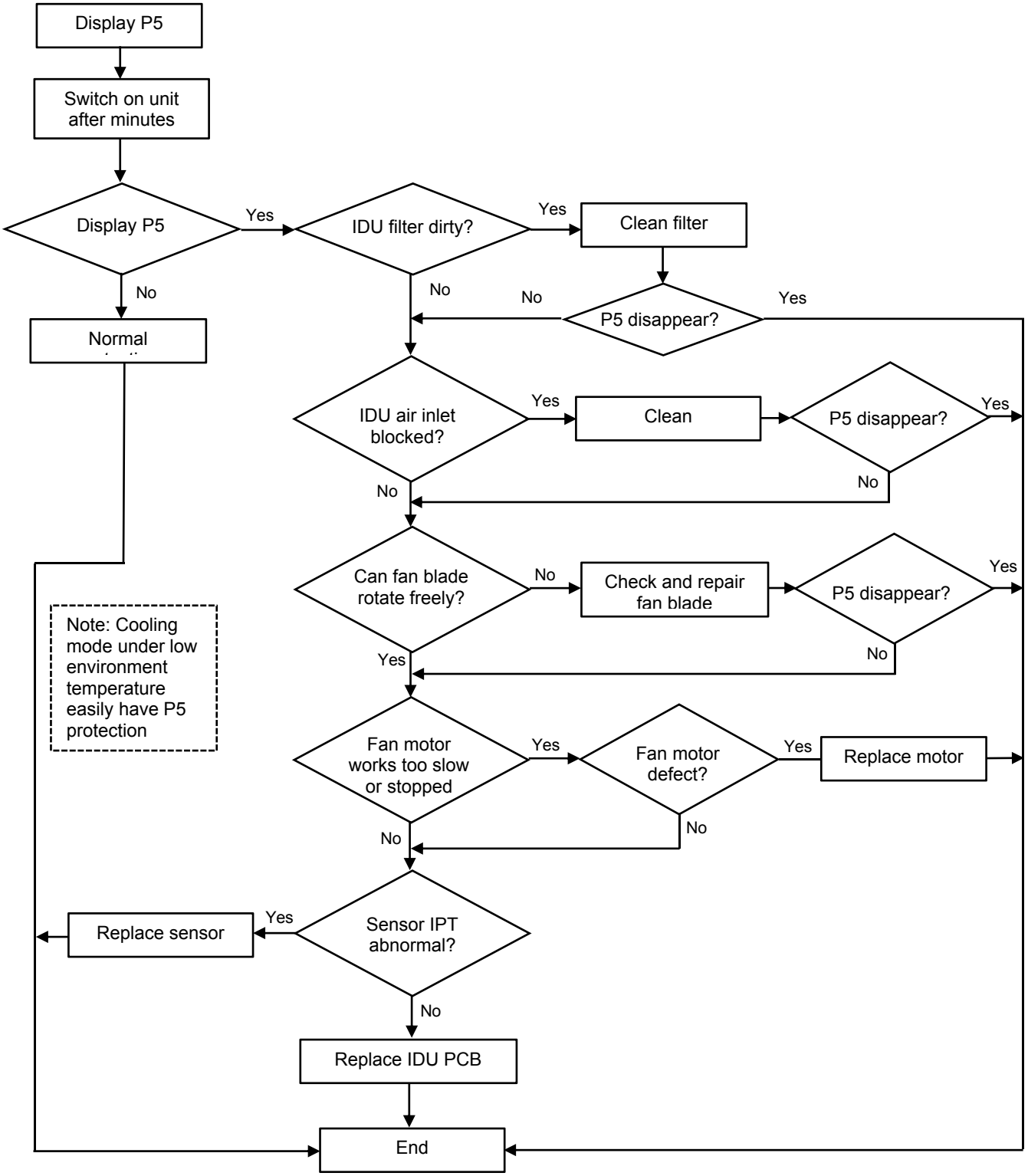


6.2.15 P4 ---ODU Discharge temperature overheating protection



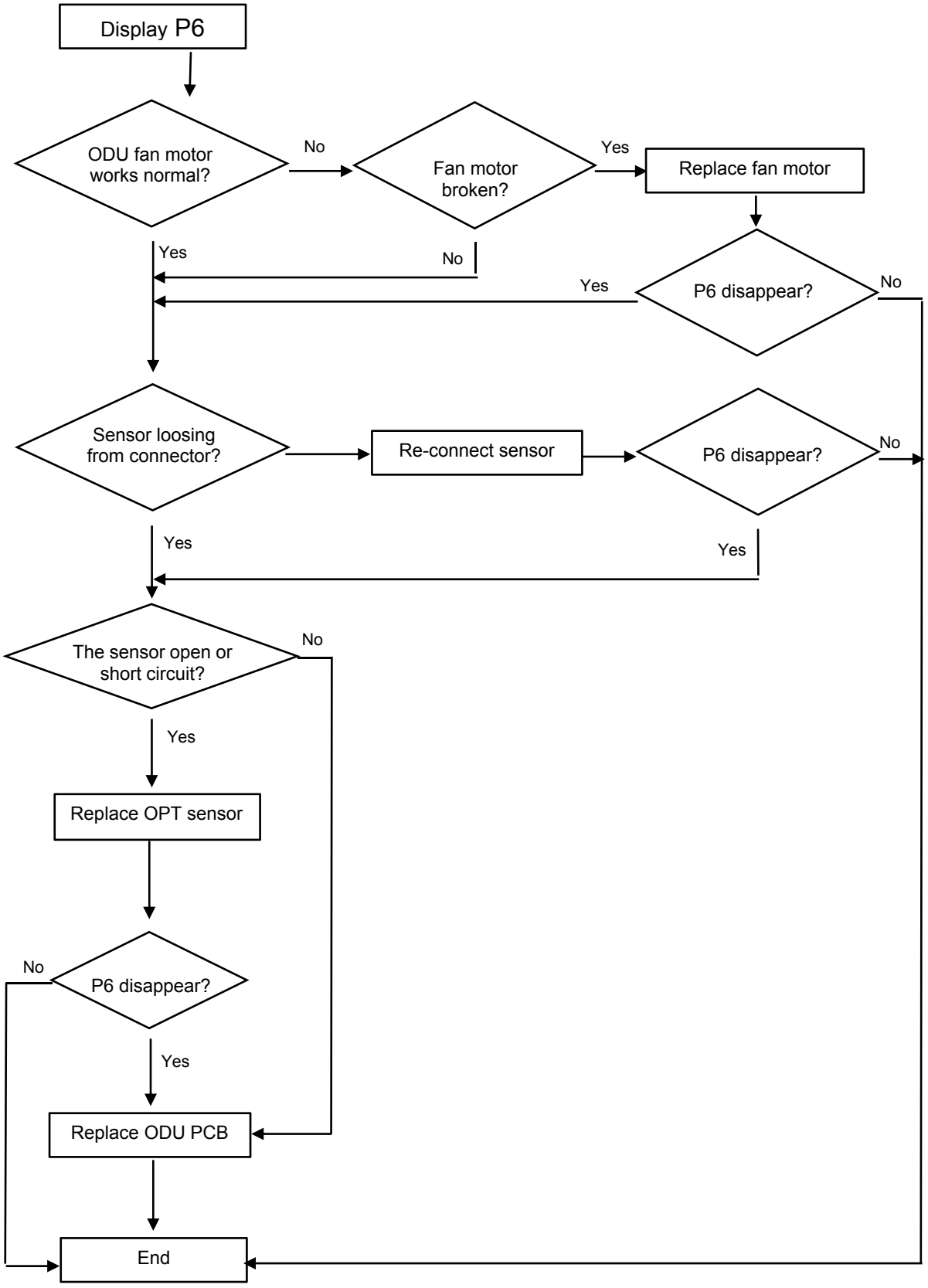
6.2.16 P5---Sub-cooling protection on Cooling/Dry mode

On Cooling or Dry mode, when IDU evaporator coil temperature **IPT** < **1**℃ continuously for 3 min after compressor start up for 6 min, CPU will switch off outdoor unit and show P5 failure code.



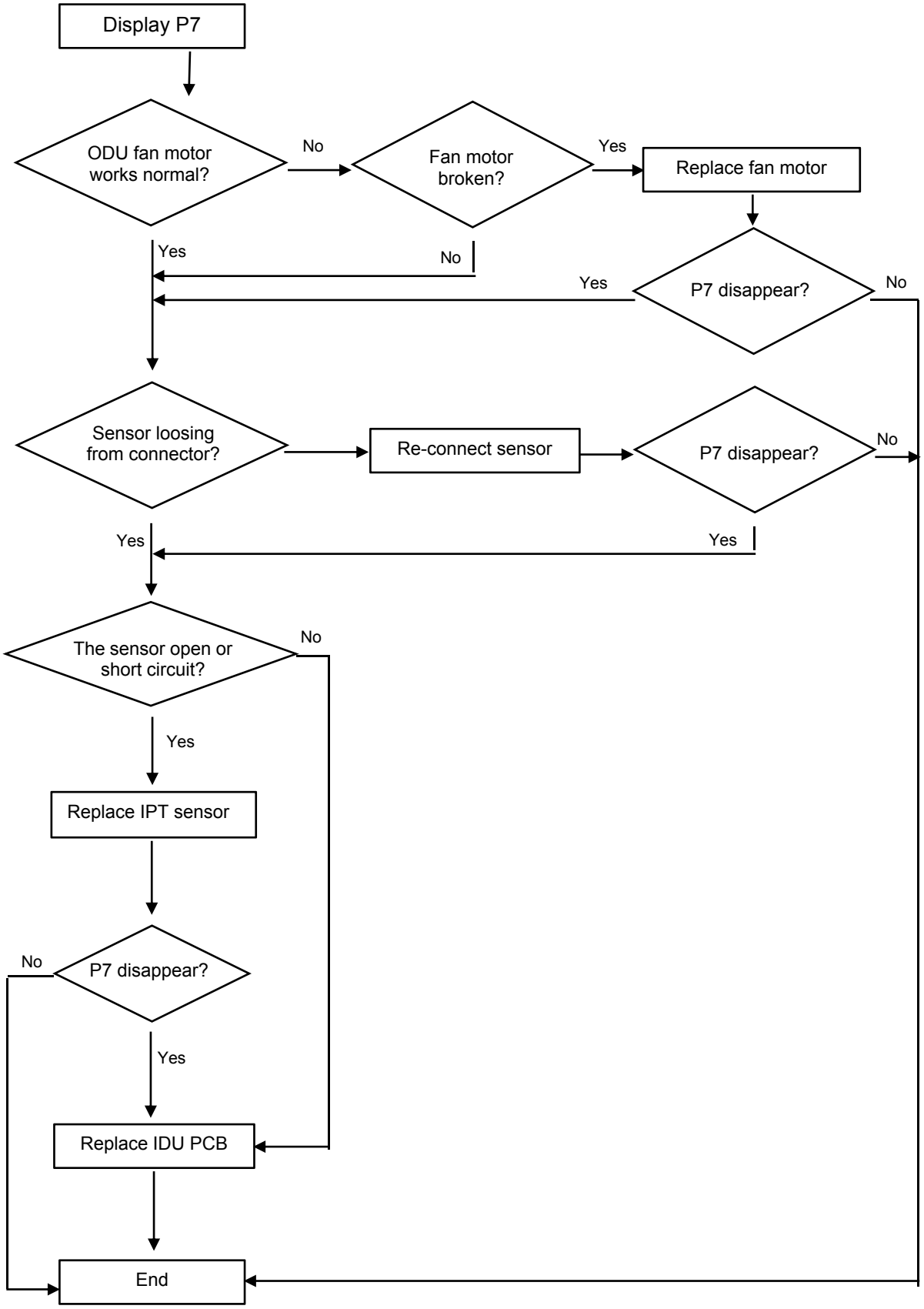
6.2.17 P6---Overheating protection on Cooling mode

On Cooling or Dry mode, when ODU condenser coil temperature OPT≥62℃ , MCU will switch off outdoor unit and show P6 failure code.



6.2.18 P7---Overheating protection on Cooling mode

On heating mode, when IDU evaporator coil temperature IPT≥62℃, ODU PCB will switch off outdoor unit and show P7 failure code.



6.2.19 P8---Outdoor Overtemperature/Under-temperature protection

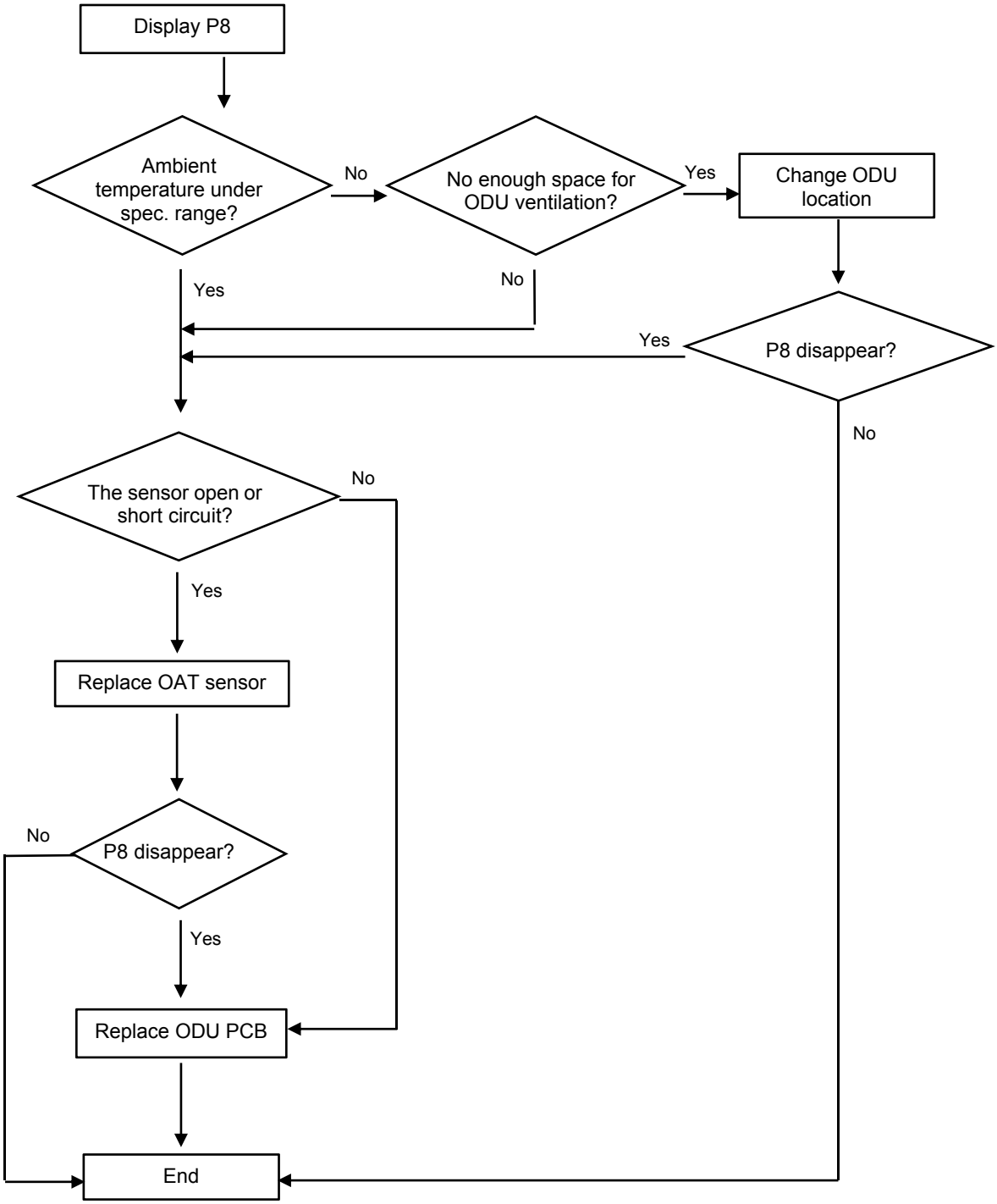
When environment temperature as below condition, the compressor will stop working, after 200s delay, the IDU will show P8 failure code.

(1). **On Cooling or Dry mode**: ODU ambient temperature: OAT < -20℃ or OAT > 63℃;

(2). **On Heating mode**:

a. OAT≥40℃ or

b. 30℃ < OAT≤40℃ and RT > 35℃



6.2.20 P9---The compressor driving protection (the compressor load abnormal)

When compressor start up or in the process of operation, if:

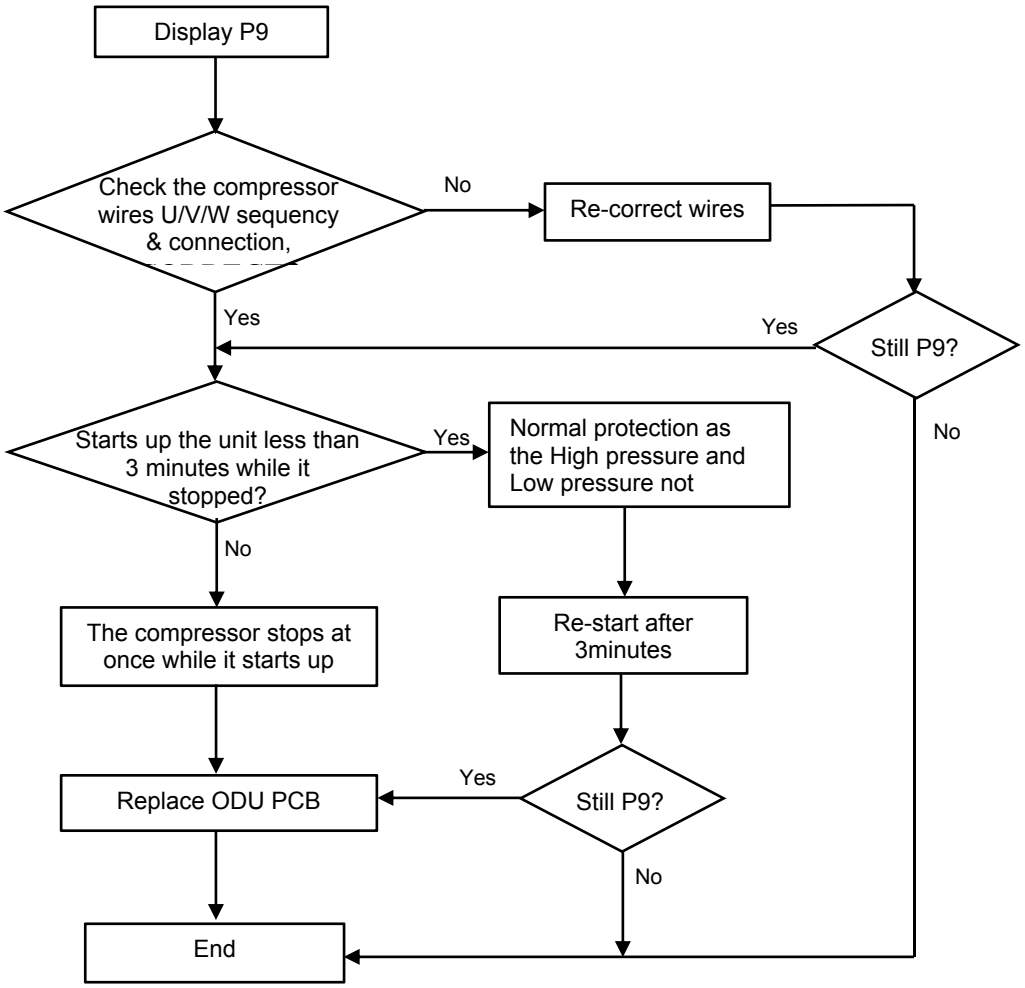
(1). MCU can't test the feedback signal from compressor, or

(2). Tested a abnormal signal from compressor, or

(3). The compressor startup abnormal.

The outdoor unit will shut off, and show P9 protection.

(The unit will re-startup 6 times continuously, if it still can't work normal, then show P9 code)



6.2.21 PA--- Communication failure for TOP flow unit/ Preset mode conflict

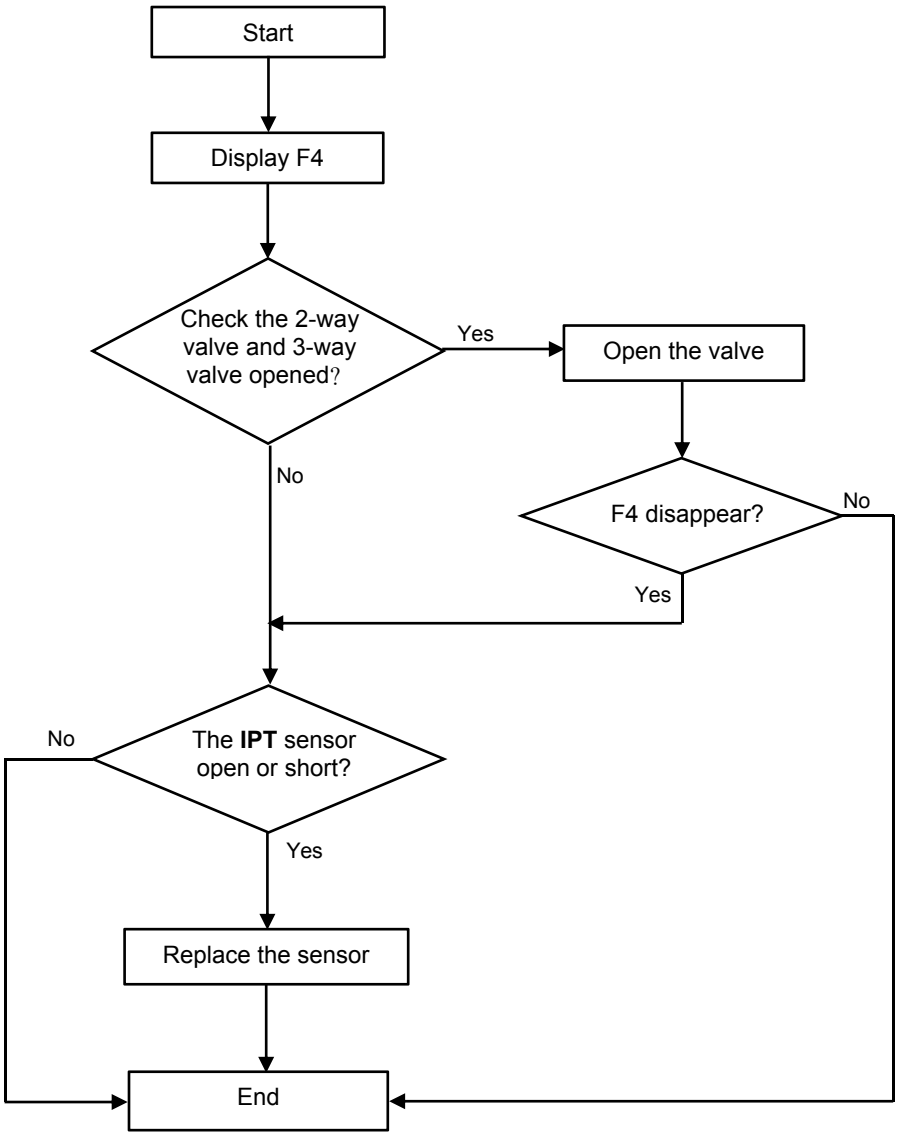
Cause: 1.If the first - turned - on indoor unit (with the highest priority) operates in cooling/dehumidification mode, other indoor units can only operate in cooling/dehumidification mode and air supply mode. Otherwise, the indoor unit operating in other modes will report a mode conflict fault, and it will not be allowed to start up, but this will not affect the indoor units that are already running.

2.If the first - turned - on indoor unit (with the highest priority) operates in heating mode, other indoor units can only operate in heating mode. Otherwise, the indoor unit operating in other modes will report a mode conflict fault, and it will not be allowed to start up, but this will not affect the indoor units that are already running.

Solution: Set all indoor units to the same mode.

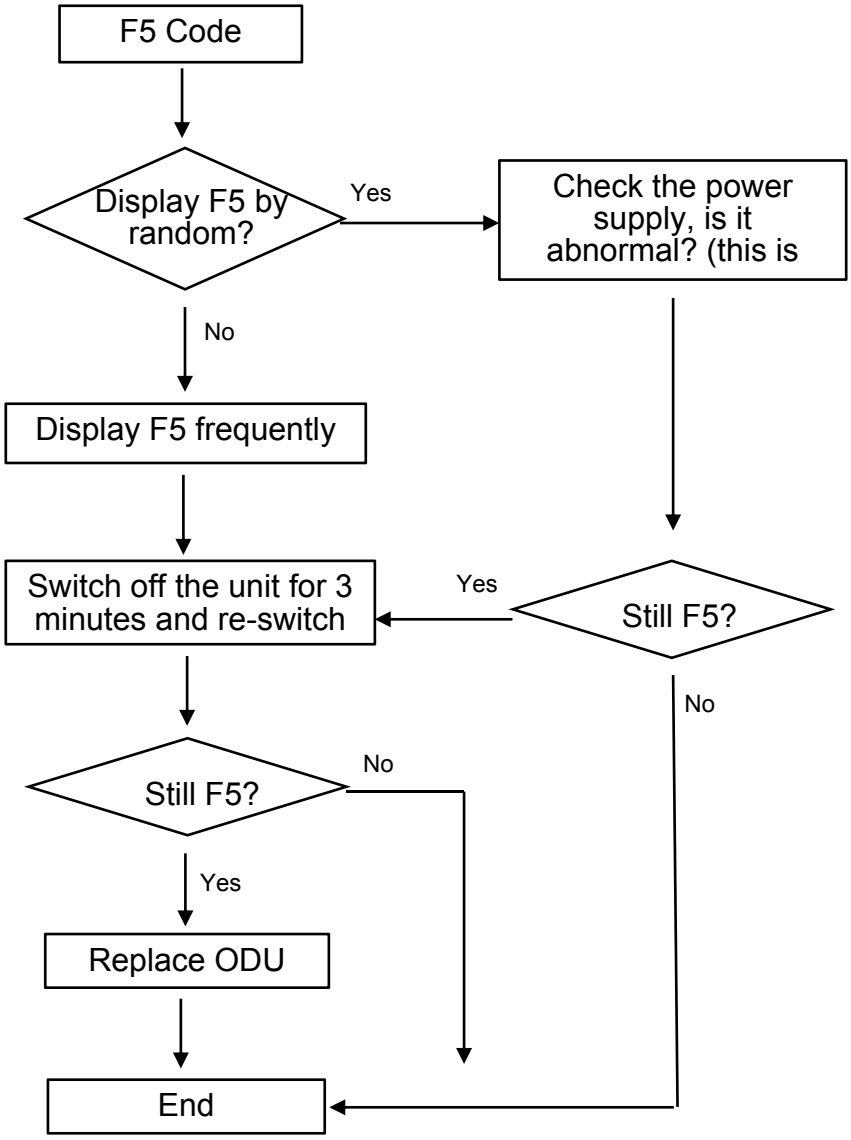
6.2.22 F4---Cooling system Gas flow abnormal protection

When compressor startup, unit will check the variation of IDU coil temperature. If there is mistake installer forgetting to open the 2-way or 3-way valve on ODU, the gas can't flow in the cooling system, it will show F4 protection.



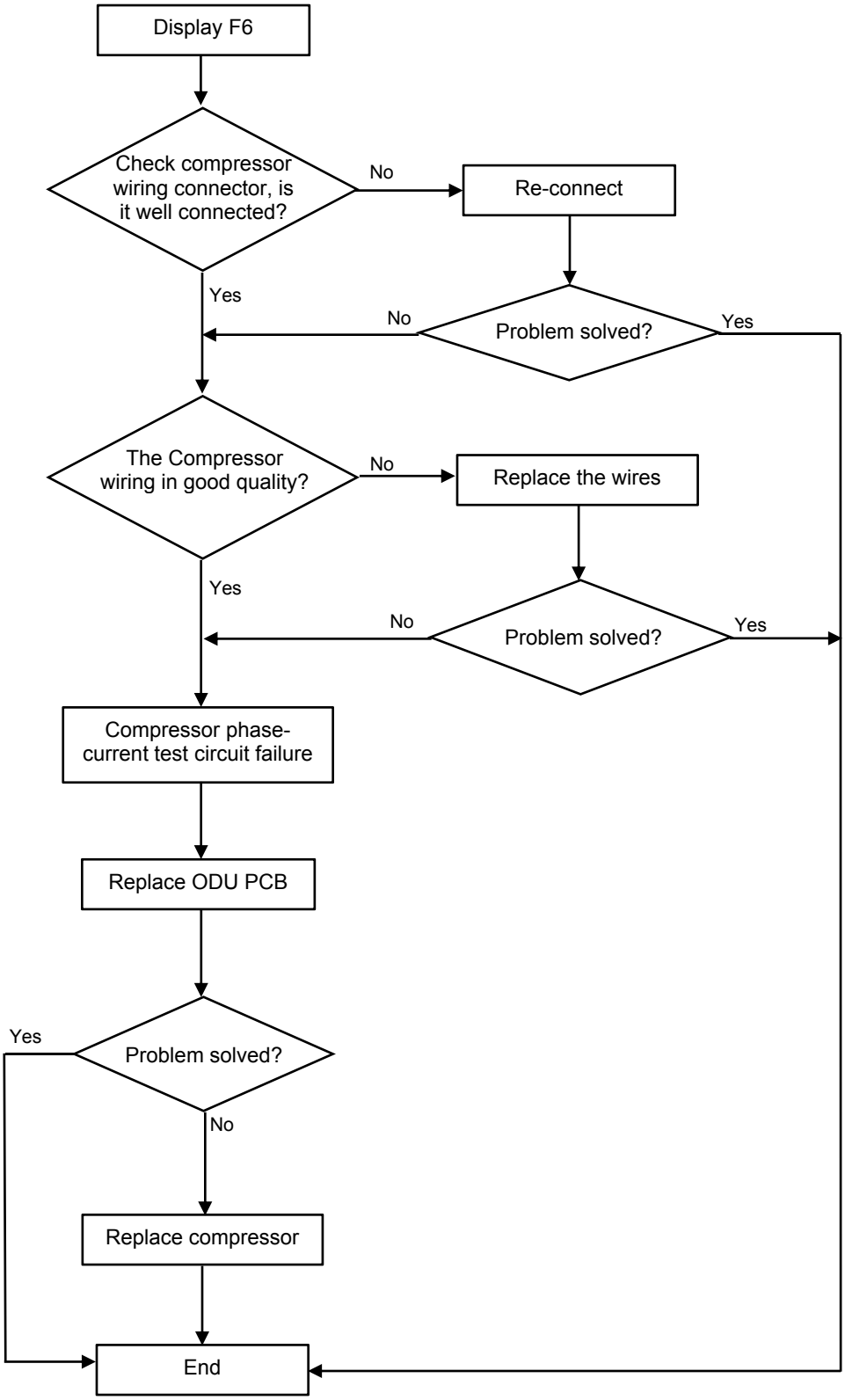
6.2.23 F5---PFC Protection

PFC Overcurrent protection



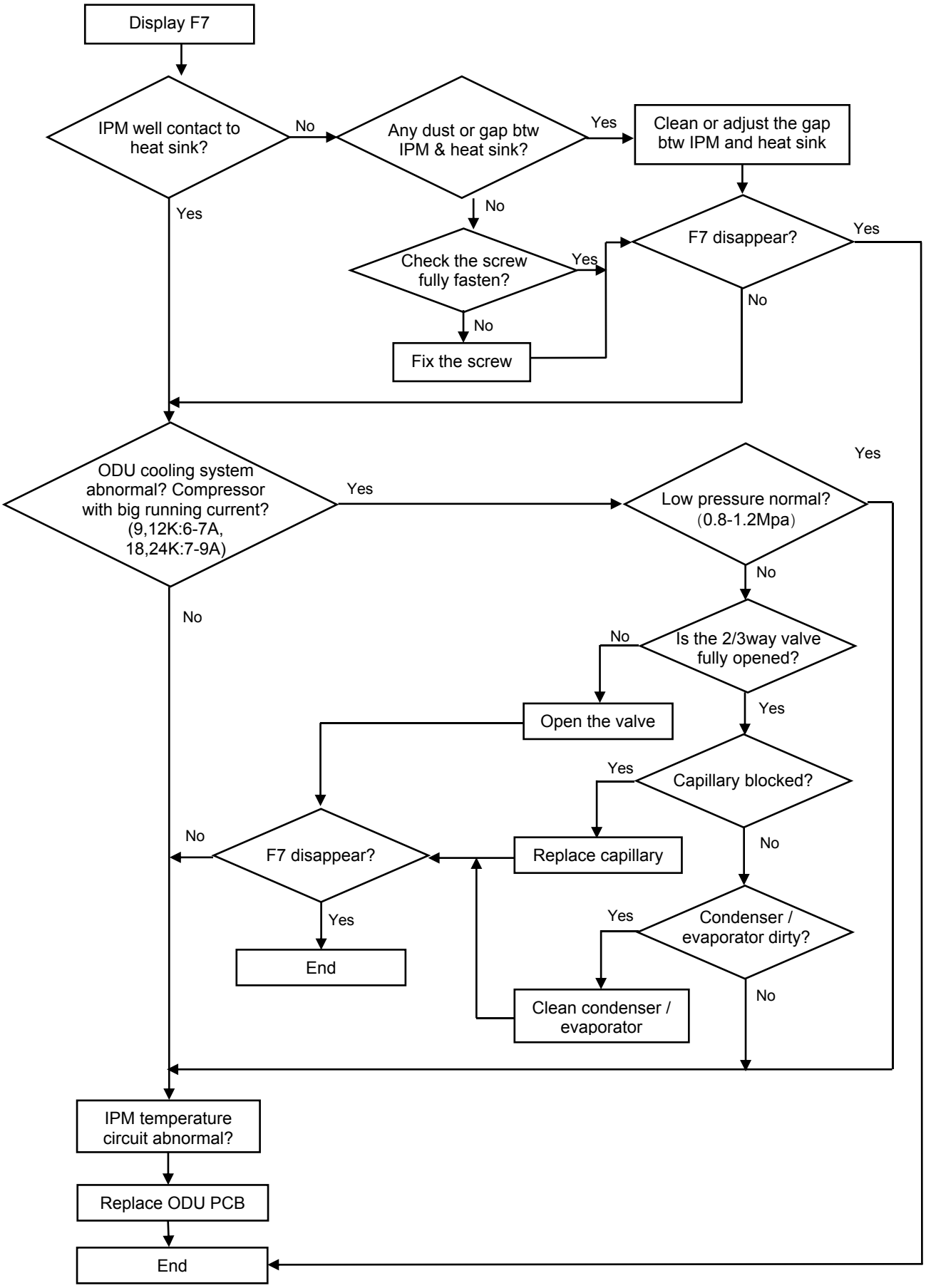
6.2.24 F6 The Compressor Lack of phase / Anti-phase protection.

If ODU PCB can't test one, or even three phase of compressor current, it will show F6 protection.



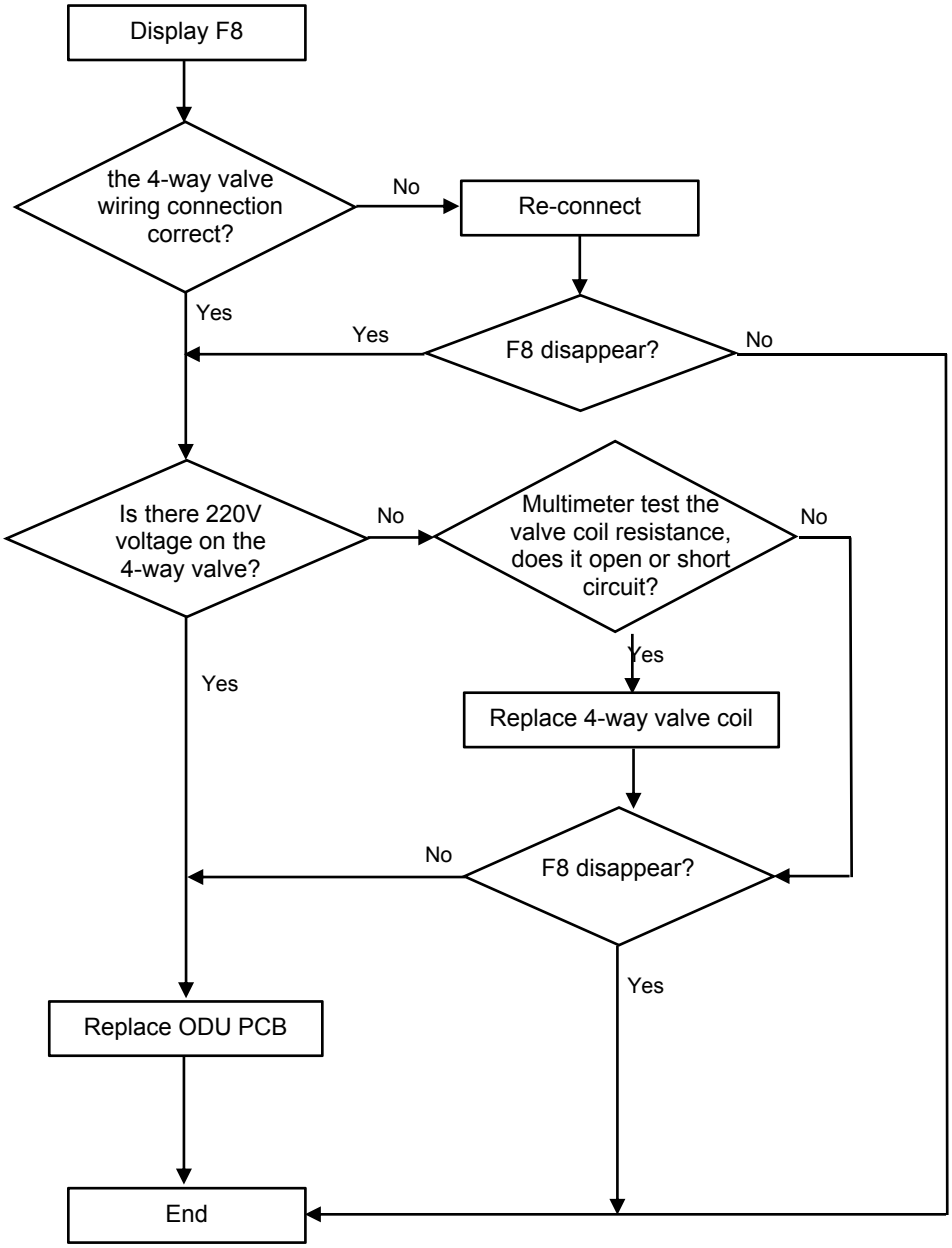
6.2.25 F7---Module temperature protection.

IPM overtemperature protection, when IPM temperature more than 95℃, it will show F7.



6.2.26 F8---4-Way Value Reversing abnormal

On heating mode, if IDU Coil temperature tested lower than Room temperature 5℃ or even more after compressor works for 8min, unit will show F8 code.



6.2.27 F9--- The module temperature test circuit failure

Reason: The IPM module temperature test circuit failure.

Solution: Replace the ODU PCB.

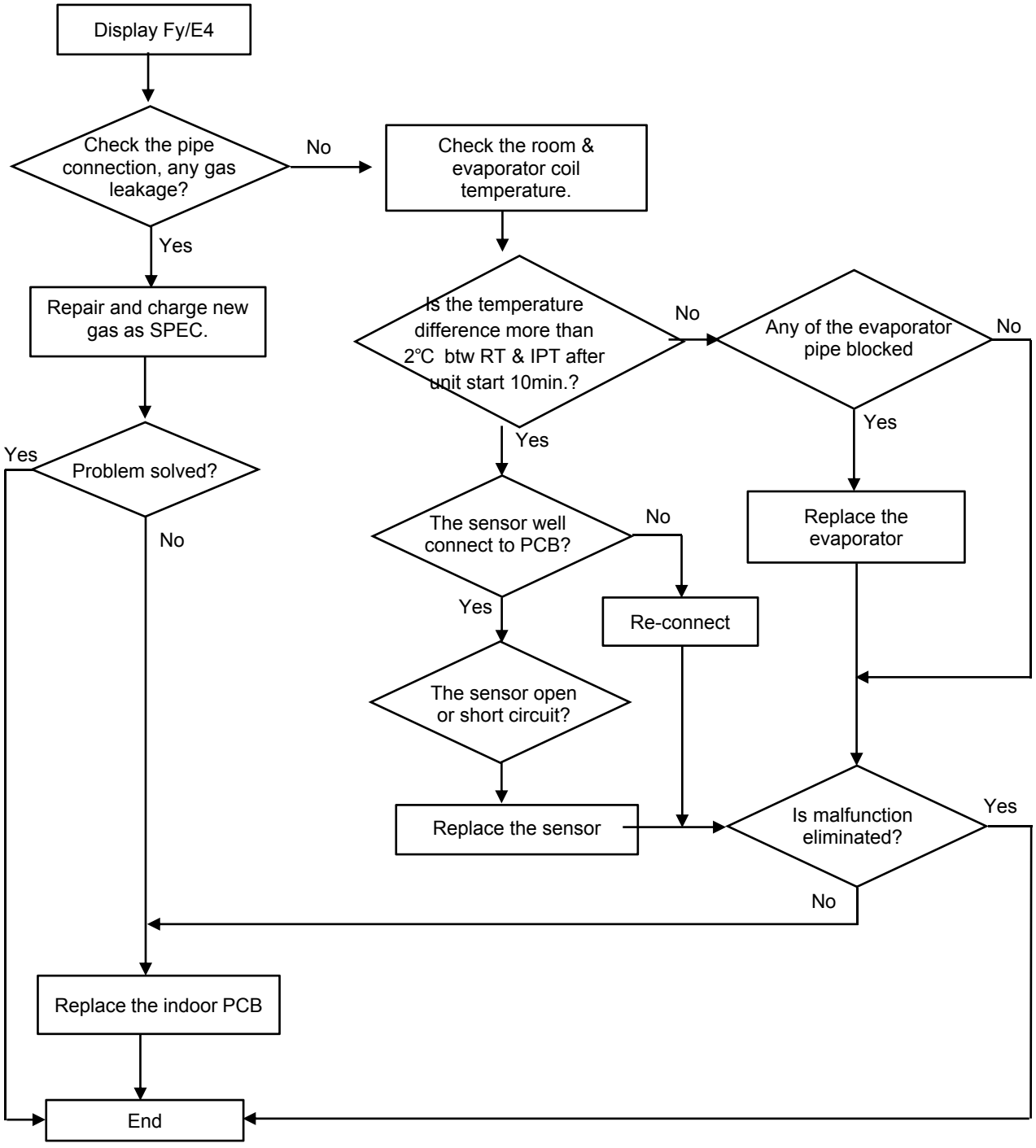
6.2.28 FA--- The compressor Phase-current test circuit failure

Reason: The compressor phase-current test circuit failure.

Solution: Replace the ODU PCB.

6.2.29 Fy or E4--- Gas leakage protection, AC Cooling system abnormal

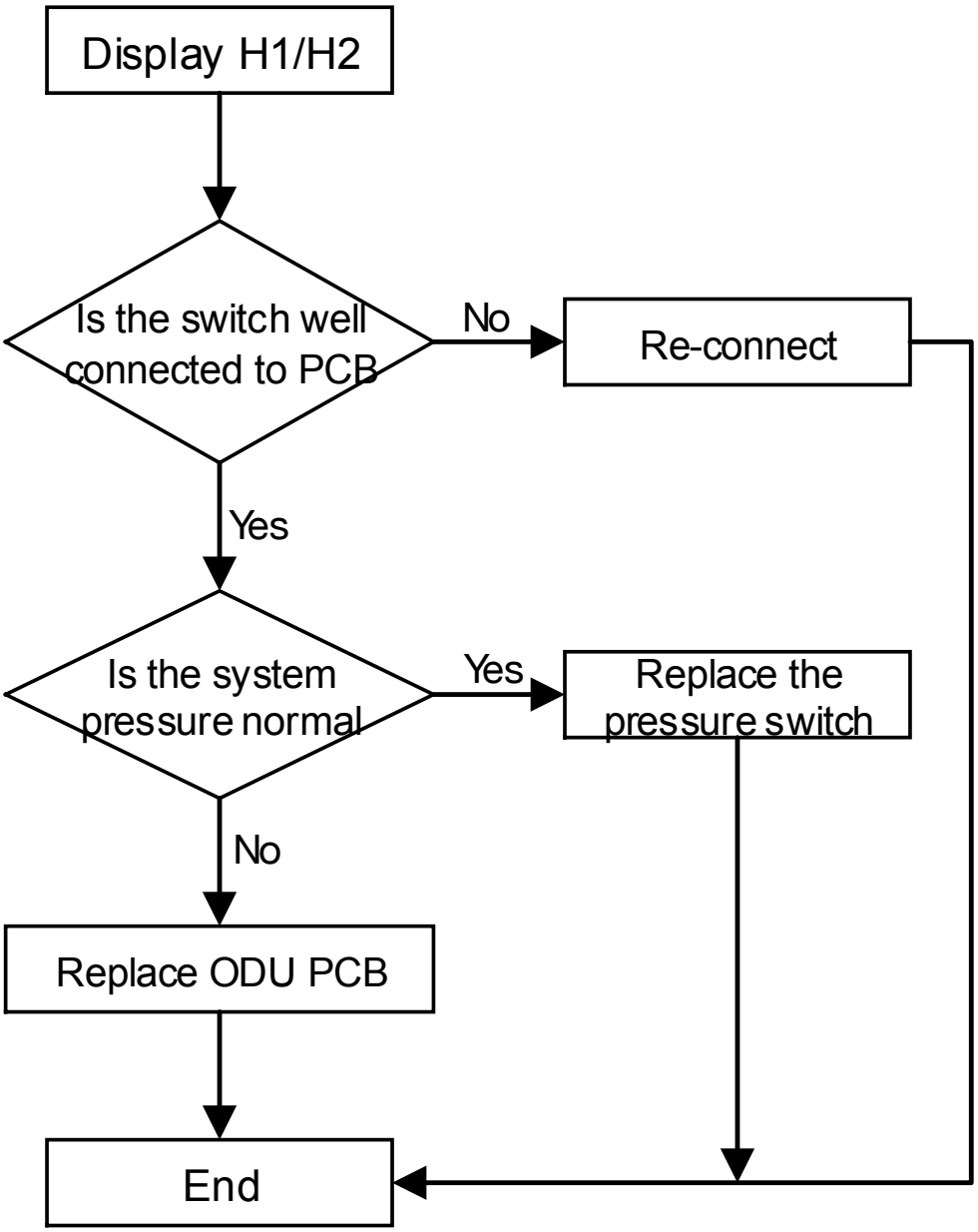
After compressor works in high frequency for 9 min, if the temperature on IDU evaporator & ODU condenser has only a little variation comparing previous, but, the compressor discharge temperature on high level, then the unit will show Fy or E4 failure code.



6.2.30 H1 or H2--- High pressure switch failure, Low pressure switch failure

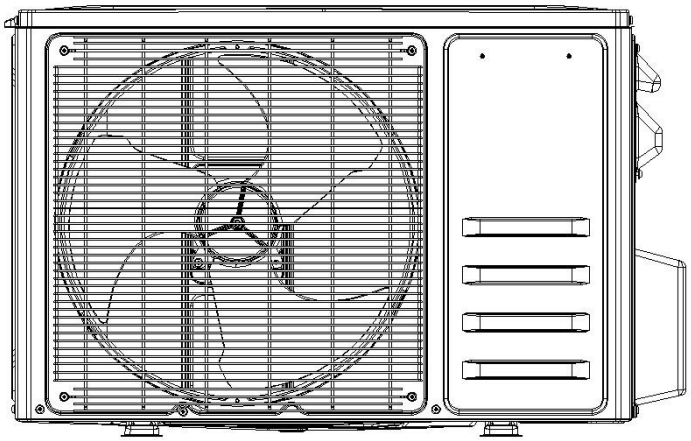
1.The high-pressure switch is installed at the discharge pipe of the system. When the pressure on the high-pressure side of the system exceeds the preset protection value, the protection mechanism is triggered, and the H1 fault code is displayed.

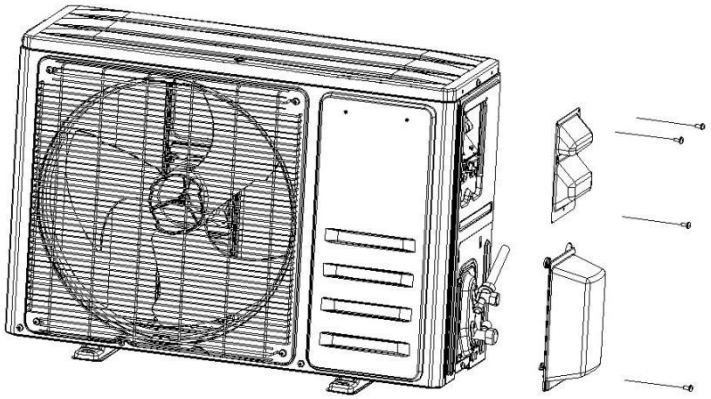
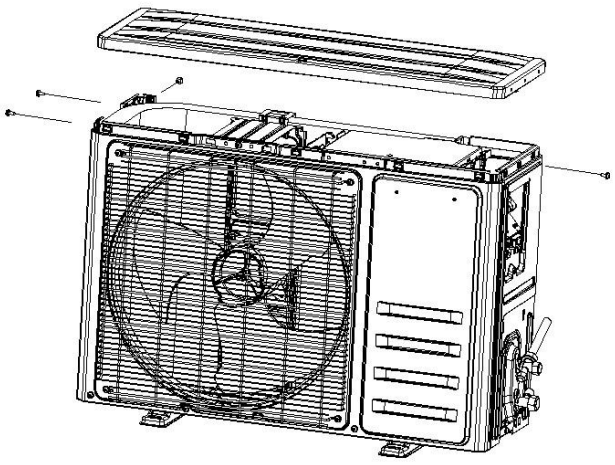
2.The low-pressure switch is installed at the suction pipe of the system. When the pressure on the low-pressure side of the system falls below the preset protection value, the protection mechanism is triggered, and the H2 fault code is displayed.

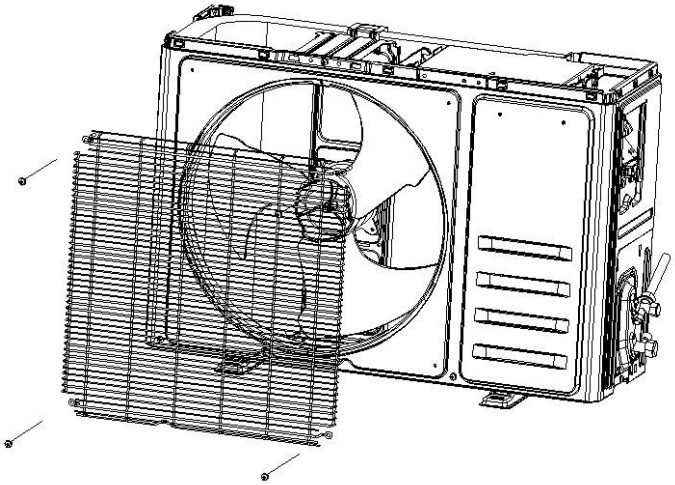
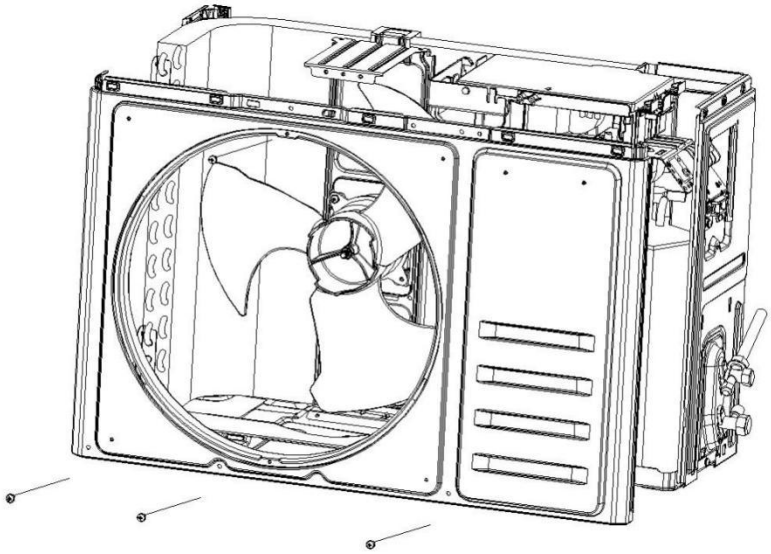
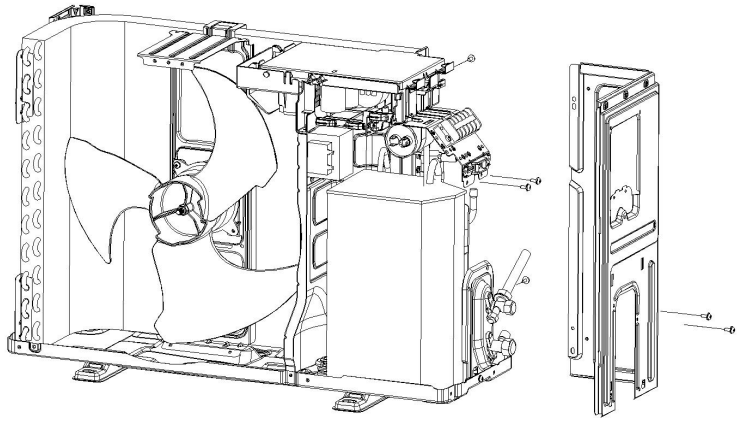


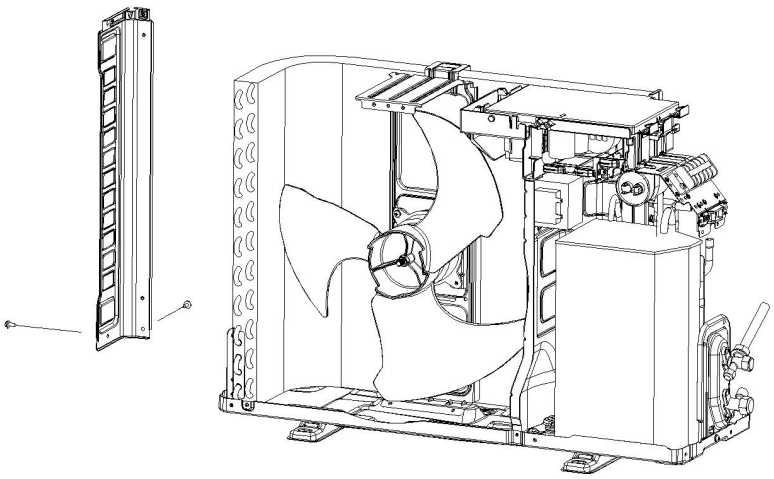
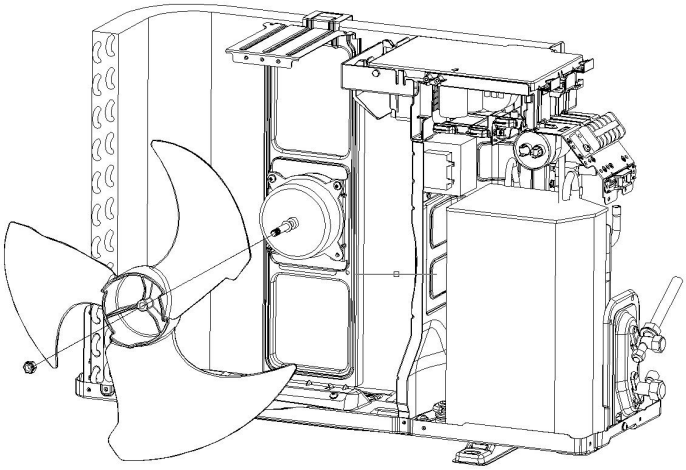
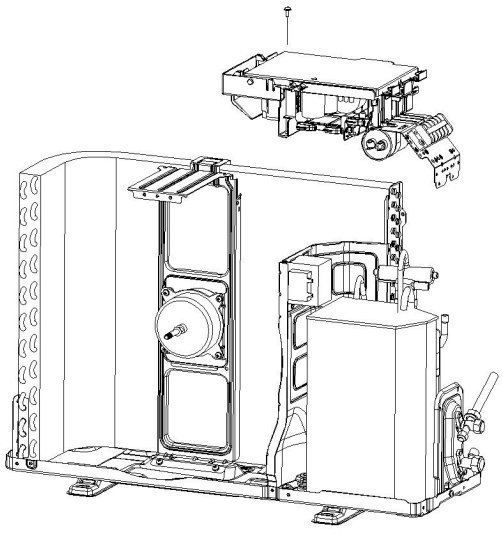
7.Unit Disassembly

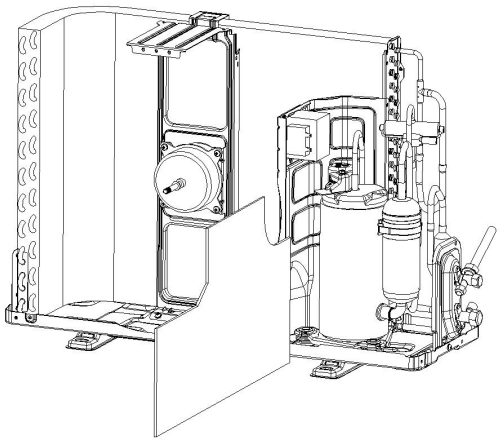
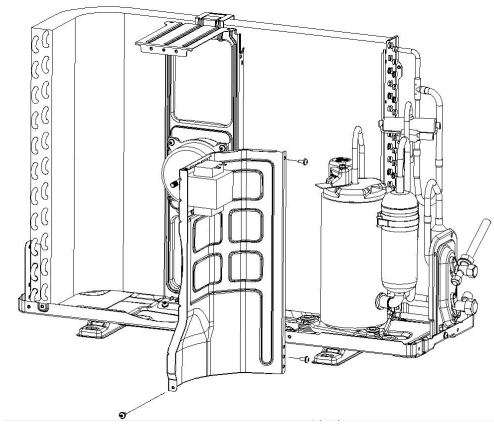
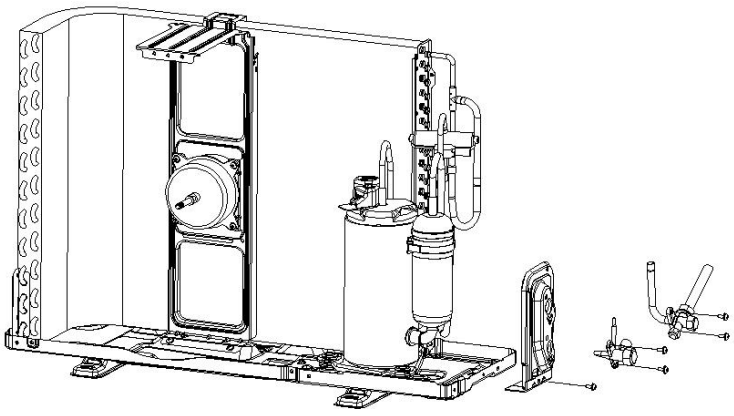
7.1.ODU Disassembly

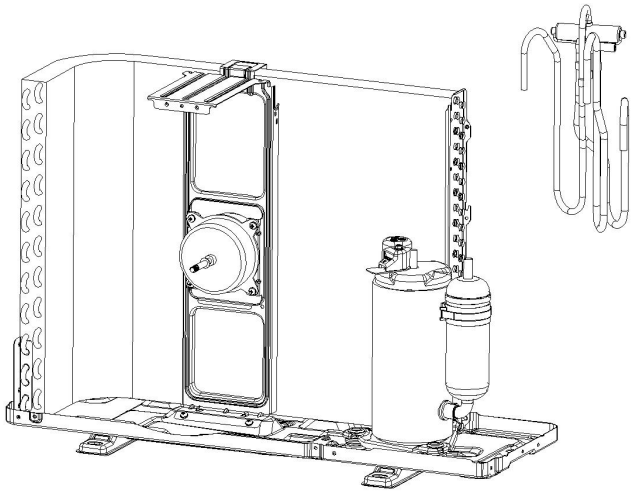
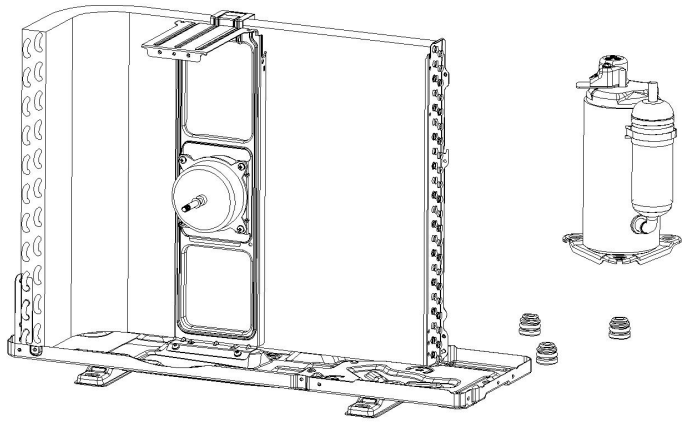
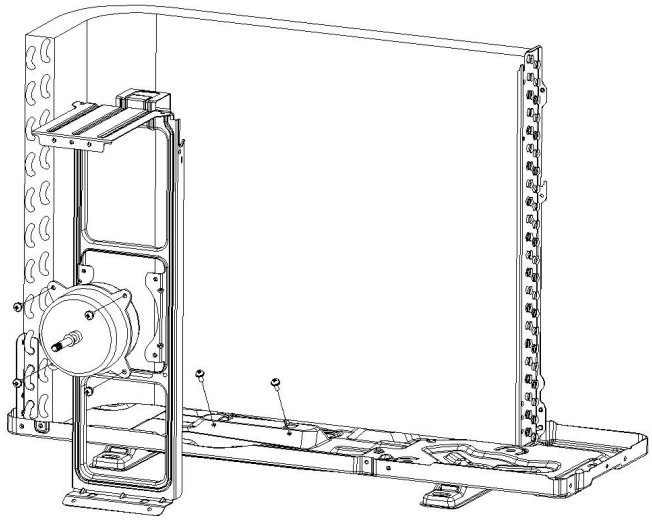
<table>
<tr><td colspan="2">Step</td><td>Reference picture</td></tr>
<tr><td colspan="2">Before disassembly</td><td>  </td></tr>
<tr><td colspan="3">step1：Remove the PCB Cover , valve Cover and top cover</td></tr>
<tr><td>A</td><td>1). Unfix one screw on the PCB cover, you can take the cover out from unit.

2). Unfix one screw on the valve cover, you can take it out easily.</td><td>  </td></tr>
<tr><td>B</td><td>Unfix screws btw the top cover with front panel, left and right plate, then you can take the top cover out.</td><td>  </td></tr>
</table>

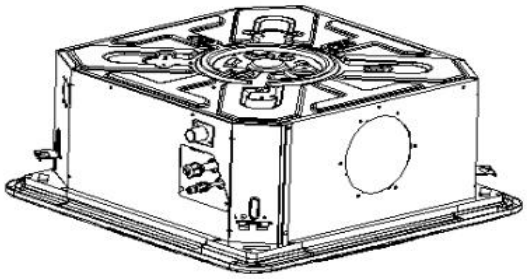
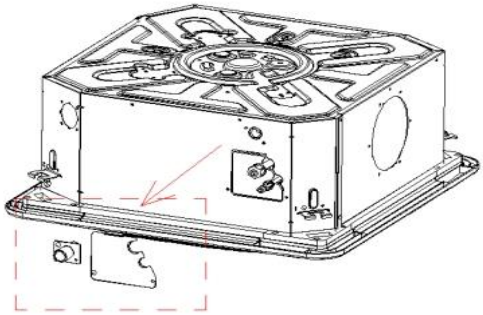
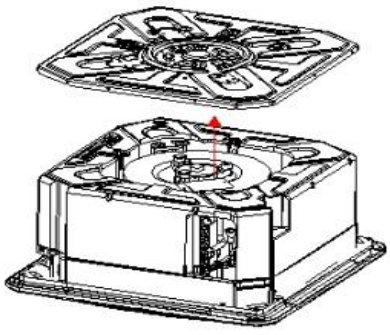
step2：Disassemble the Fan Guard and Front Panel		
A	Remove the screws assembling the grille to the front panel and remove the grille.	
B	Unfix screws on front panel with fan guard, ODU middle separate plate and base plate, uplift front panel you can take it out from unit	
step3：Disassemble the Left and Right plate.		
A	Unfix screws btw Right Plate and the Electric Box assembly, Valve Plate , Base Plate, then you can take the Right plate out.	

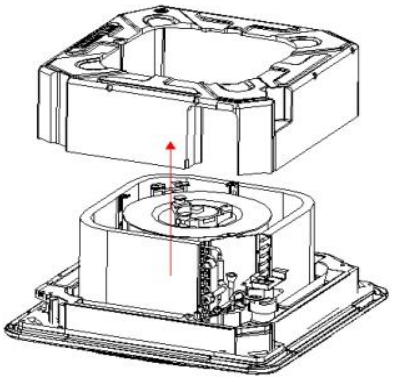
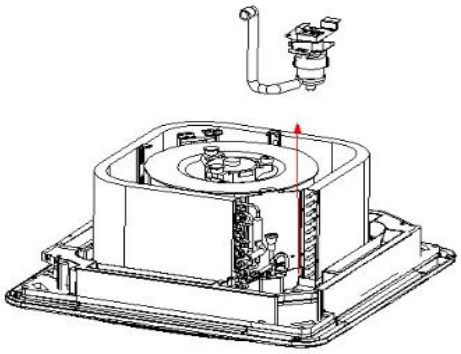
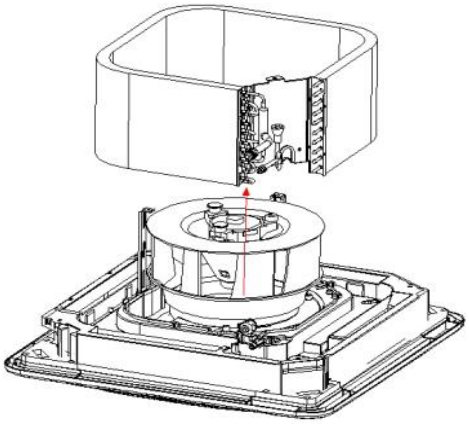
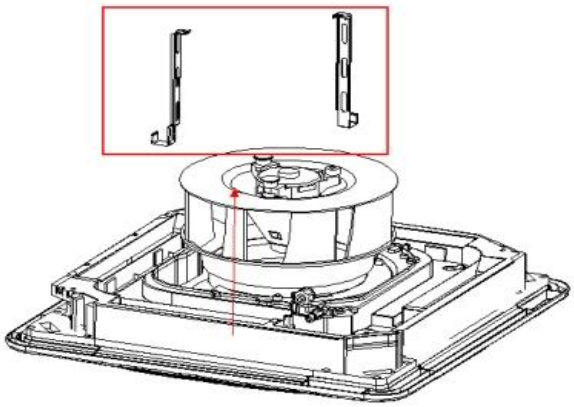
B	Unfix screws btw Left Plate, Base plate and Condenser plate, you can take the left plate out.	
step4：Disassemble the Axis Fan Blade		
A	Unscrew the fan blade nut, and take the blade out.	
step5：Disassemble the electric box		
	Unfix screw btw Electric Box and motor supporter etc. loosen the wiring clamp, then you can take the control box out.	

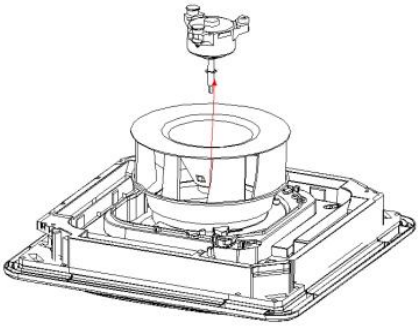
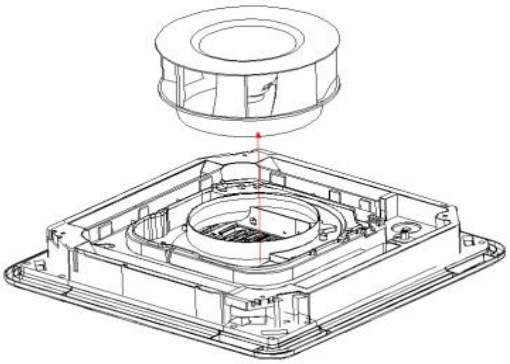
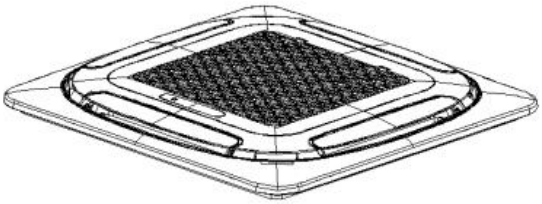
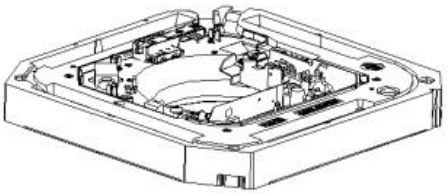
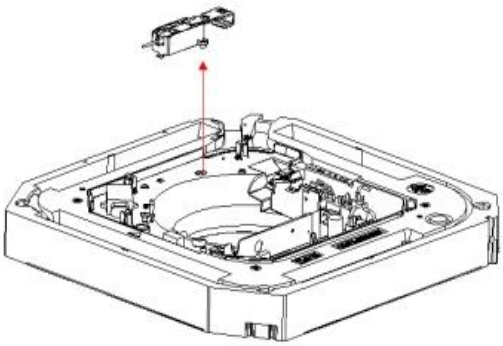
step6：take out the noise cotton		
A	Shown as picture to take the cotton out	
step7：Disassemble the separate plate		
	Unfix the screw btw separate plate and unit, and take it out	
step8：Disassemble the 2 and 3-way valve		
	Unfix screw btw Valve plate and base, you can take the 2-way and 3-way valve out 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.	

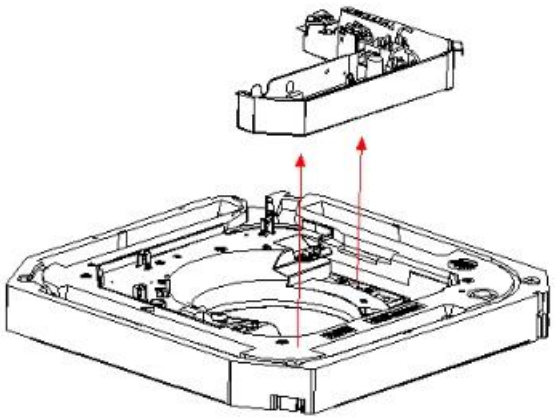
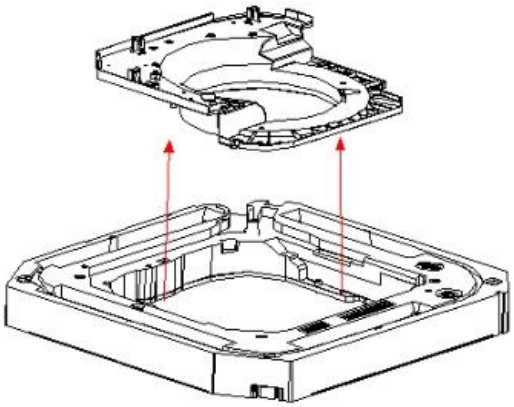
step9：Disassemble the 4-way valve assembly		
	Take the 4-way valve out from system by welding. Make sure no hurt to the compressor and nameplate, etc.	
step10：Disassemble the compressor.		
	Unscrew the nuts and take the compressor out.	
step11：Remove the fan motor and fan supporter.		
	Unfix screws btw fan motor with supporter, and supporter with base plate. Note: Pay attention to the motor wiring, it can't be taken out by force.	

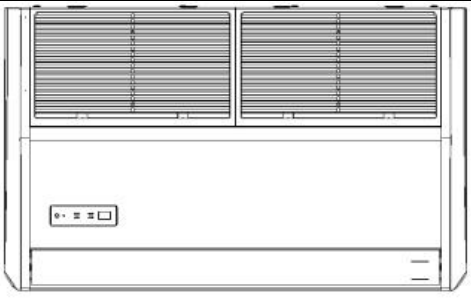
7.2. IDU Disassembly

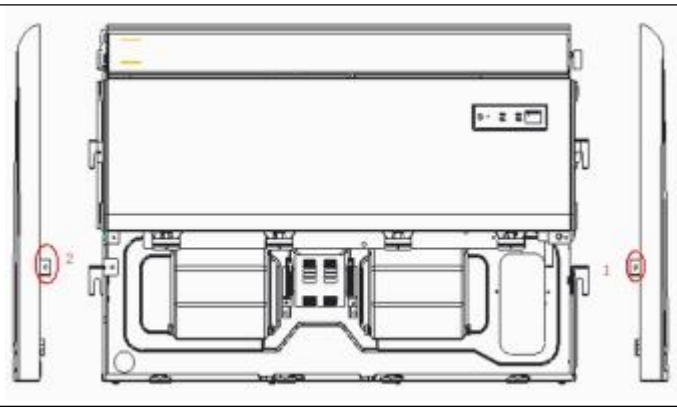
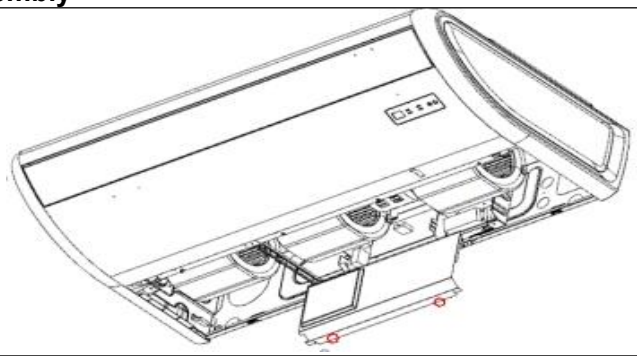
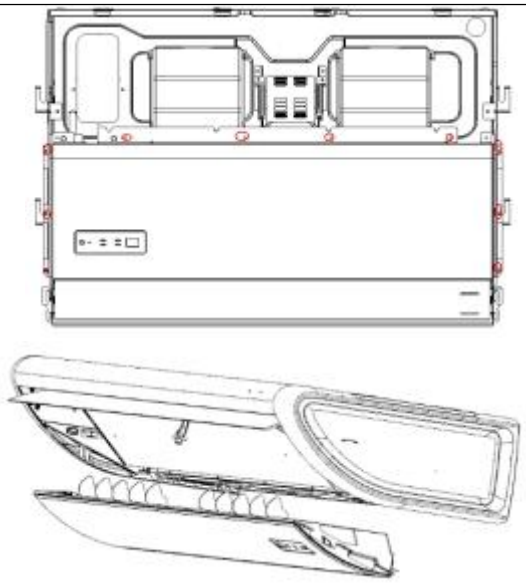
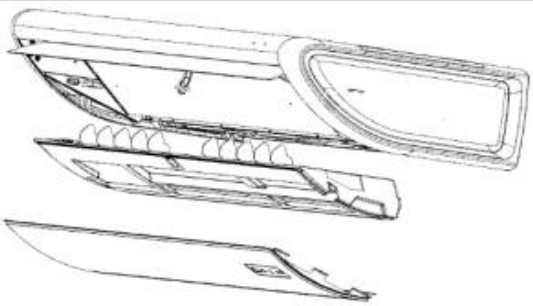
CASSETTE	
STEPS	**PICTURES**
1. Pre-disassembly state	
Pre disassembly	
2. Remove seal plate and drain spout	
A. Disassemble the seal plate **B. Remove the drain spout**	
3. Remove the front and rear fascia assembly	
A. Unfix screws and hooks of base plate, the front and rear panel assembly, and remove the front and rear fascia assembly from unit.	
4. Dismantal the base assembly	
The chassis components can be removed by removing the fixing screws between the base foam part, evaporator fix plate and base assembly.	

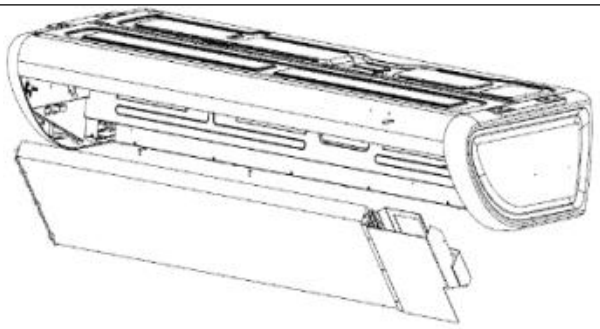
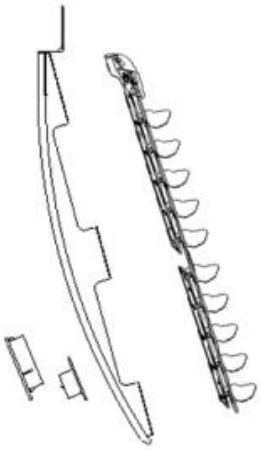
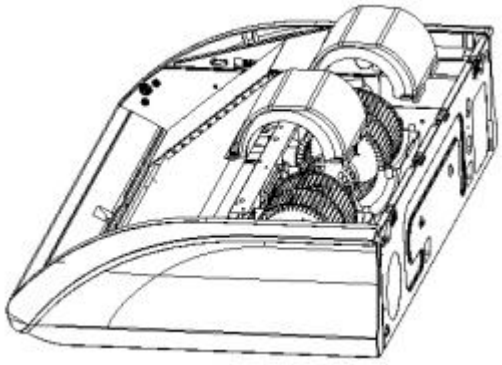
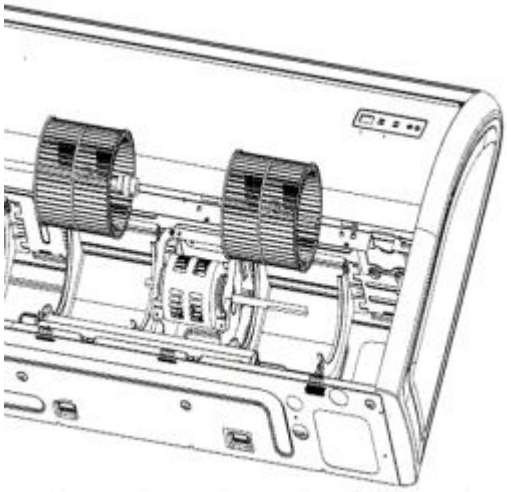
5. Remove the base foam assembly	
Remove the base foam assembly according to the direction shown as the red arrow.	
6. Disassemble the water pump assembly.	
According to the direction shown as arrow to take the water pump out.	
7. Dismantal the evaporator assembly	
Shown as arrow to take the evaporator out.	
8. Remove the evaporator fixing plates	
According to the direction shown as photo to remove the fixing plates.	

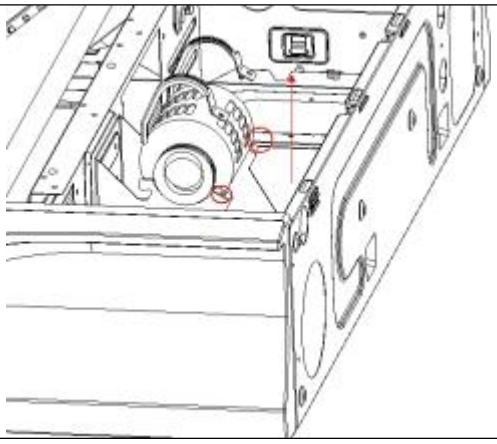
9. disassemble the DC motor	
Disassemble the DC motor as photo.	
10. Remove centrifugal fan	
Take the centrifugal fan out as photo.	
11. Remove the panel assembly	
Unfix screws btw panel & drainage assembly, take the panel assembly out.	 
12. Remove USB/WI-FI module.	
Unfix screw btw USB/WI-FI module and Air guide part. Take the module out.	

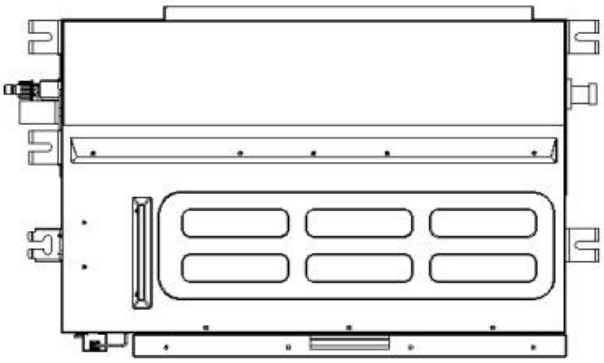
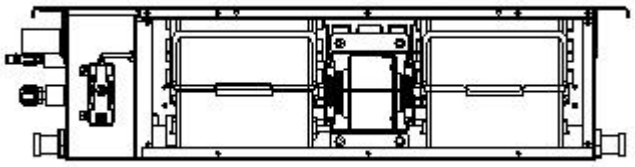
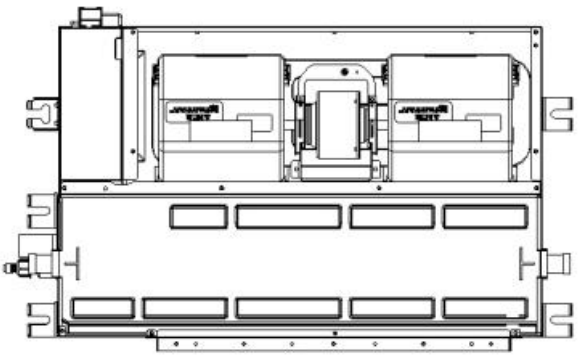
13. Remove the electric box assembly	
Unfix screws btw the electric control box , the water tray assembly and the air guide in the direction shown in the figure, and remove the electric control box assembly	
14. Disassemble the air guide parts	
Unfix screws btw the guide parts and water tray, and take the air guide parts out.	

CEILING FLOOR	
STEPS	**PICTURES**
1. Before disassemble	
The appearance of unit.	
2. Remove the front grille	
A. Remove screws by pushing the buckles in the direction of photo. **B. Open the grille and from the back snap hook to remove the grille.**	
3. dismantle the left and right side plate.	

Along wth the illustration unfix the screws, and remove the left and right side blocks from the snap hooks.	
4. Remove the electronic control box assembly	
Unscrew the screws shown as photo and remove the electronic control cover plate	
5. Remove the front panel assembly	
Unfix screws of the front panel screws as shown, and then take the panel assembly out.	
6. Remove the water tray.	
Take the water tray out shown as illustration	
7. Remove the evaporator assembly	

Take the evaporator out shown as illustration	
8. Remove the display panel and vane assembly	
Take the the display panel and vane assembly out as photo.	
9. Remove the volute parts	
Shown as illustration	
10. Disassemble the centrifugal fan	
Take the centrifugal fans out as illustration	
11. Dismantal the fan motor	

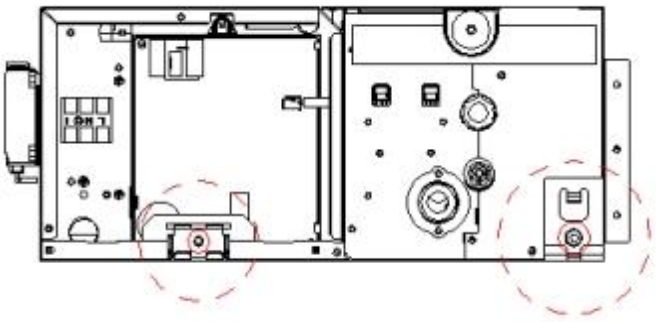
Take out the fan motor refering to the picture.	

DUCT	
STEPS	**PICTURES**
1. Before disassemble	
The appearance of unit.	
2. Dismantal the filter assembly	
A. Dismantal the filter assembly **B. Take the filter out.**	
3. Disassemble the base part, air return plate	
A. The base part can be removed by unfixing screws btw it with the left and right side panels, and the center partition. **B. Remove the screws btween the air return plate, the left side plate, and the electric control box, remove the air return plate.** **C. Remove the Wi-Fi fixing coverand take the USB connection cable out.**	
4. Dismantal the front panel assembly.	
Unfix screws of the front panel and take the assembly out.	

5. Remove the electrical box cover and hooks

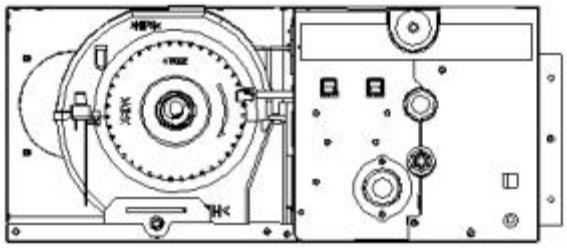
A. Unfix screws on the electrical box cover and take the cover out.

B. Unfix screws on the hooks and take the hooks out.



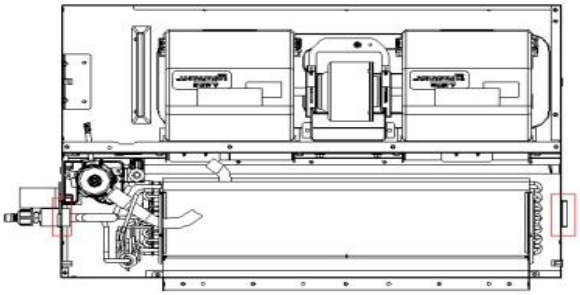
6. Remove the electric control box assembly

Unfix screws on the the electric control box, and take the electric control box out.



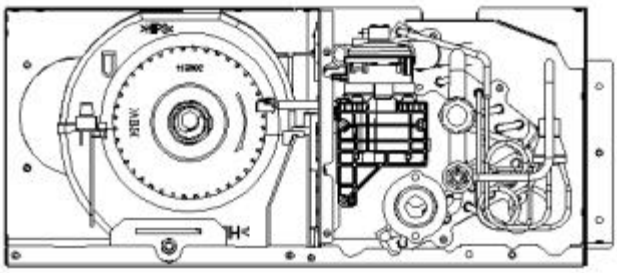
7. Remove the water tray assembly.

After removing the base plate, lift up the drain nozzles on both sides to take the water tray out.



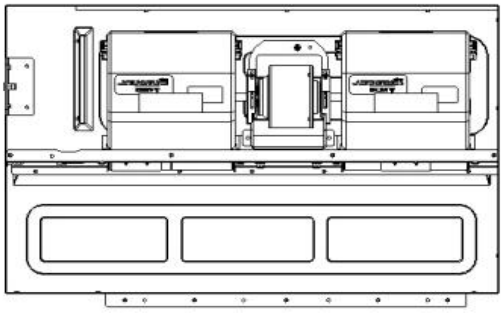
8. disassemble the right side plate, drainage mounting assembly

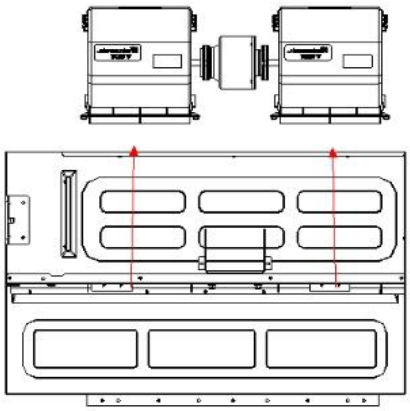
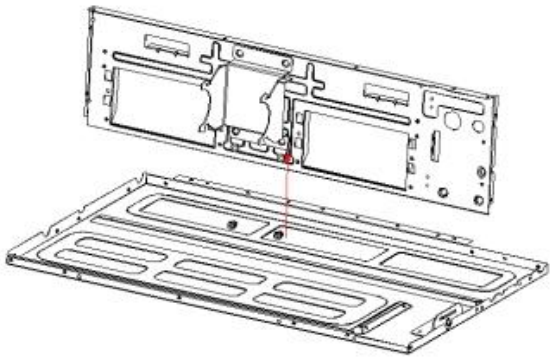
A. Unfix screws between the right side plate and the evaporator end plate, the top
plate, the drain mounting assembly, remove the right side plate.
B. Remove the drain nozzle on the drain mounting assembly, then take the assembly out.



9. Remove the water pump assembly, evaporator module and left side panel parts

A. Unfix screws btw the water pump assembly and center divider, take the water pump assembly out.
B. Unfix screws btw the evaporator module and left side panel assembly, take the left side panel out.
C. Unfix screws btw the left side panel part and top panel, the center partition, take the left side panel part out.



10. Remove centrifugal fan volute assembly and DC motor	
Remove the motor limit clasp, then take the volute assembly and DC motor out in the direction shown as illustration.	
11. Remove the center divider assembly	
Unfix screws btw the center divider assembly and top cover, take the center divider out.	

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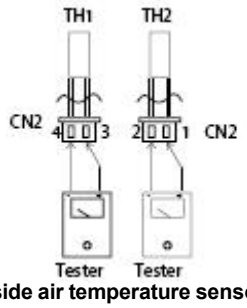
8.THERMISTOR TEMPERATURE CHARACTERISTICS

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

TEMP. (℃)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	TEMP. (℃)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	TEMP. (℃)	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				

Resistance at 25℃:wall split type 5 kΩ, cassette and duct 10kΩ.



TH1: indoor room temperature sensor and outside air temperature sensor

TH2: indoor exchange temperature sensor and outside exchange temperature sensor

TH4: Outdoor exchange temperature sensor and outside exchange temperature sensor

TH5: Outdoor ambient temperature sensor and outside exchange temperature sensor

Before measuring resistance, disconnect connectors as shown above.

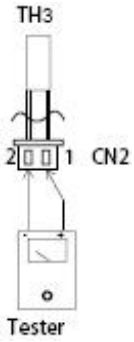
2. Outdoor unit discharge sensor temperature characteristics

TEMP. (℃)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	TEMP. (℃)	R min (k Ohm)	R(t) (k Ohm)	R max (k Ohm)	TEMP. (℃)	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℃:20 kΩ



TH3: Outdoor unit discharge pipe sensor

Before measuring resistance, disconnect connectors as shown above.