ComfortStar®

PLATINUM LIGHT/HIGH-HEAT COMMERCIAL SERVICE MANUAL

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Table of Contents

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Intertek

R-410A

WARNING

- Installation MUST conform with local building codes or, in the absence of local codes, with the National Electrical Code NFPA70/ANSI C1-1993 or current edition and Canadian Electrical Code Part1 CSA C.22.1.

- The information contained in the manual is intended for use by a qualified service technician familiar with safety procedures and equipped with the proper tools and test instruments

- Installation or repairs made by unqualified persons can result in hazards to you and others.

- Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, property damage, personal injury and/or death.

- This service is only for service engineer to use.

CONTENTS

1. Precaution

1.1 Safety Precaution

■ **To prevent injury to the user or other people and property damage, the following instructions must be followed.**

■ **Incorrect operation due to ignoring instruction will cause harm or damage.**

■ **Before service the unit, be sure to read this service manual at first.**

1.2 Warning

➢ **Installation**

■ **Do not use a defective or underrated circuit breaker. Use this appliance on a dedicated circuit.**

There is risk of fire or electric shock.

■ **For electrical work, contact the dealer, seller, a qualified electrician, or an authorized service center.**

Do not disassemble or repair the product, there is risk of fire or electric shock.

■ **Always ground the product.**

There is risk of fire or electric shock.

■ **Install the panel and the cover of control box securely.**

There is risk of fire of electric shock.

■ **Always install a dedicated circuit and breaker.**

Improper wiring or installation may cause electric shock.

■ **Use the correctly rated breaker of fuse.**

There is risk of fire or electric shock.

■ **Do not modify or extend the power cable.**

There is risk of fire or electric shock.

■ **Do not install, remove, or reinstall the unit by yourself (customer).**

There is risk of fire, electric shock, explosion, or injury.

■ **Be caution when unpacking and installing the product.**

Sharp edges could cause injury, be especially careful of the case edges and the fins on the condenser and evaporator.

■ **For installation, always contact the dealer or an authorized service center.**

■ **Do not install the product on a defective installation stand.**

■ **Be sure the installation area does not deteriorate with age.**

If the base collapses, the air conditioner could fall with it, causing property damage, product failure, and personal injury.

■ **Do not let the air conditioner run for a long time when the humidity is very high and a door or a window is left open.**

■ **Take care to ensure that power cable could not be pulled out or damaged during operation.**

There is risk of fire or electric shock.

■ **Do not place anything on the power cable.**

There is risk of fire or electric shock.

■ **Do not plug or unplug the power supply plug during operation.**

There is risk of fire or electric shock.

■ **Do not touch (operation) the product with wet hands.**

■ **Do not place a heater or other appliance near the power cable.**

There is risk of fire and electric shock.

■ **Do not allow water to run into electrical parts.**

It may cause fire, failure of the product, or electric shock.

■ **Do not store or use flammable gas or combustible near the product.**

There is risk of fire or failure of product.

■ **Do not use the product in a tightly closed space for a long time.**

Oxygen deficiency could occur.

■ **When flammable gas leaks, turn off the gas and open a window for ventilation before turn the product on.**

■ **If strange sounds or smoke comes from product, turn the breaker off or disconnect the power supply cable.**

There is risk of electric shock or fire.

■ **Stop operation and close the window in storm or hurricane. If possible, remove the product from the window before the hurricane arrives.**

There is risk of property damage, failure of product, or electric shock.

■ **Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)**

There is risk of physical injury, electric shock, or product failure.

■ **When the product is soaked, contact an authorized service center.**

There is risk of fire or electric shock.

■ **Be caution that water could not enter the product.**

There is risk of fire, electric shock, or product damage.

■ **Ventilate the product from time to time when operating it together with a stove etc.**

There is risk of fire or electric shock.

■ **Turn the main power off when cleaning or maintaining the product.**

There is risk of electric shock.

■ **When the product is not be used for a long time, disconnect the power supply plug or turn off the breaker.**

There is risk of product damage or failure, or unintended operation.

■ **Take care to ensure that nobody could step on or fall onto the outdoor unit.**

This could result in personal injury and product damage.

➢ CAUTION

■ **Always check for gas (refrigerant) leakage after installation or repair of product.**

Low refrigerant levels may cause failure of product.

■ **Install the drain hose to ensure that water is drained away properly.**

A bad connection may cause water leakage.

■ **Keep level even when installing the product.**

It can avoid vibration of water leakage.

■ **Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.**

It may cause a problem for your neighbors.

■ **Use two or more people to lift and transport the product.**

■ **Do not install the product where it will be exposed to sea wind (salt spray) directly.**

It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

➢ Operational

■ **Do not expose the skin directly to cool air for long time. (Do not sit in the draft).**

■ **Do not use the product for special purposes, such as preserving foods, works of art etc. It is a consumer air conditioner, not a precision refrigerant system.**

There is risk of damage or loss of property.

■ **Do not block the inlet or outlet of air flow.**

■ **Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.**

There is risk of fire, electric shock, or damage to the plastic parts of the product.

■ **Do not touch the metal parts of the product when removing the air filter. They are very sharp.**

■ **Do not step on or put anything on the product. (outdoor units)**

■ **Always insert the filter securely. Clean the filter every two weeks or more often if necessary.**

A dirty filter reduces the efficiency of the air conditioner and could cause product malfunction or damage.

■ **Do not insert hands or other objects through air inlet or outlet while the product is operated.**

■ **Do not drink the water drained from the product.**

■ **Use a firm stool or ladder when cleaning or maintaining the product.**

Be careful and avoid personal injury.

■ **Replace the all batteries in the remote control with new ones of the same type. Do not mix old and new batteries or different types of batteries.**

There is risk of fire or explosion.

■ **Do not recharge or disassemble the batteries. Do not dispose of batteries in a fire.**

They may burn of explode.

■ **If the liquid from the batteries gets onto your skin or clothes, wash it well with clean water. Do not use the remote of the batteries have leaked.**
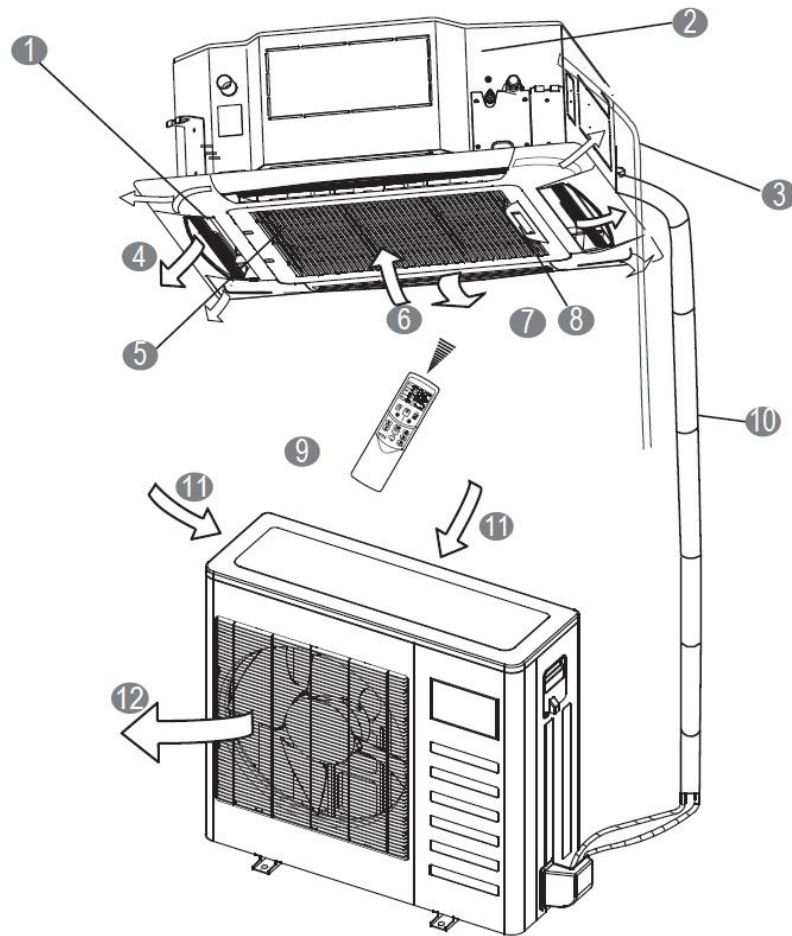
2. Part Names and Features

2.1 Model Names of Indoor/Outdoor units

IDU model
CPA-09
CPA-12
CPA-18
CPA-24
CPA-36DU
CPA-48DU
FPA-18
FPA-24
FPA-36DU
FPA-48DU
TPA-09
TPA-12
TPA-18
TPA-24
TPA-36DU
TPA-48DU

| ODU model |
|:---:|
| CPP009CD(O) |
| CPP012CD(O) |
| CPP018CD(O) |
| CPP024CD(O) |
| CPP036CD(O)-DU |
| CPP048CD(O)-DU |

2.2 Part names of Indoor/Outdoor units

Cassette Unit

|			
①	Air flow louver(at air outlet)	⑦	Air-in grill
②	Drain pump(drain water from indoor unit)	⑧	Display panel
③	Drain pipe	⑨	Remote controller
④	Air outlet	⑩	Refrigerant pipe
⑤	Air filter(inside air-in grill)	⑪	Air inlet
⑥	Air inlet	⑫	Air outlet

Duct Units
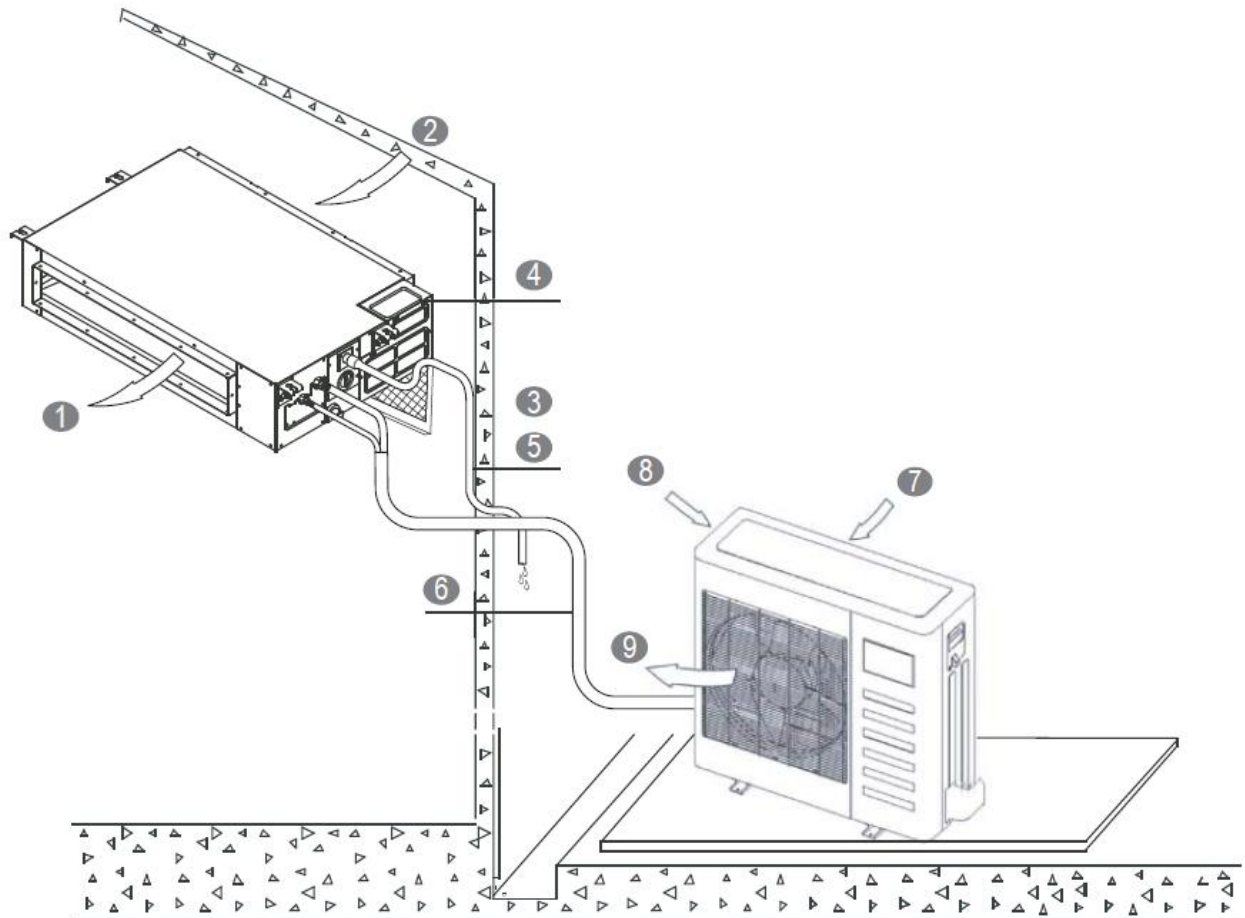
INDOOR UNIT

1. Air outlet
2. Air inlet
3. Air filter(on some models)
4. Electric control cabinet
5. Drain pipe

OUTDOOR UNIT

6. Connecting pipe
7. Air inlet
8. Air inlet(side and rear)
9. Air outlet

Ceiling-floor Units
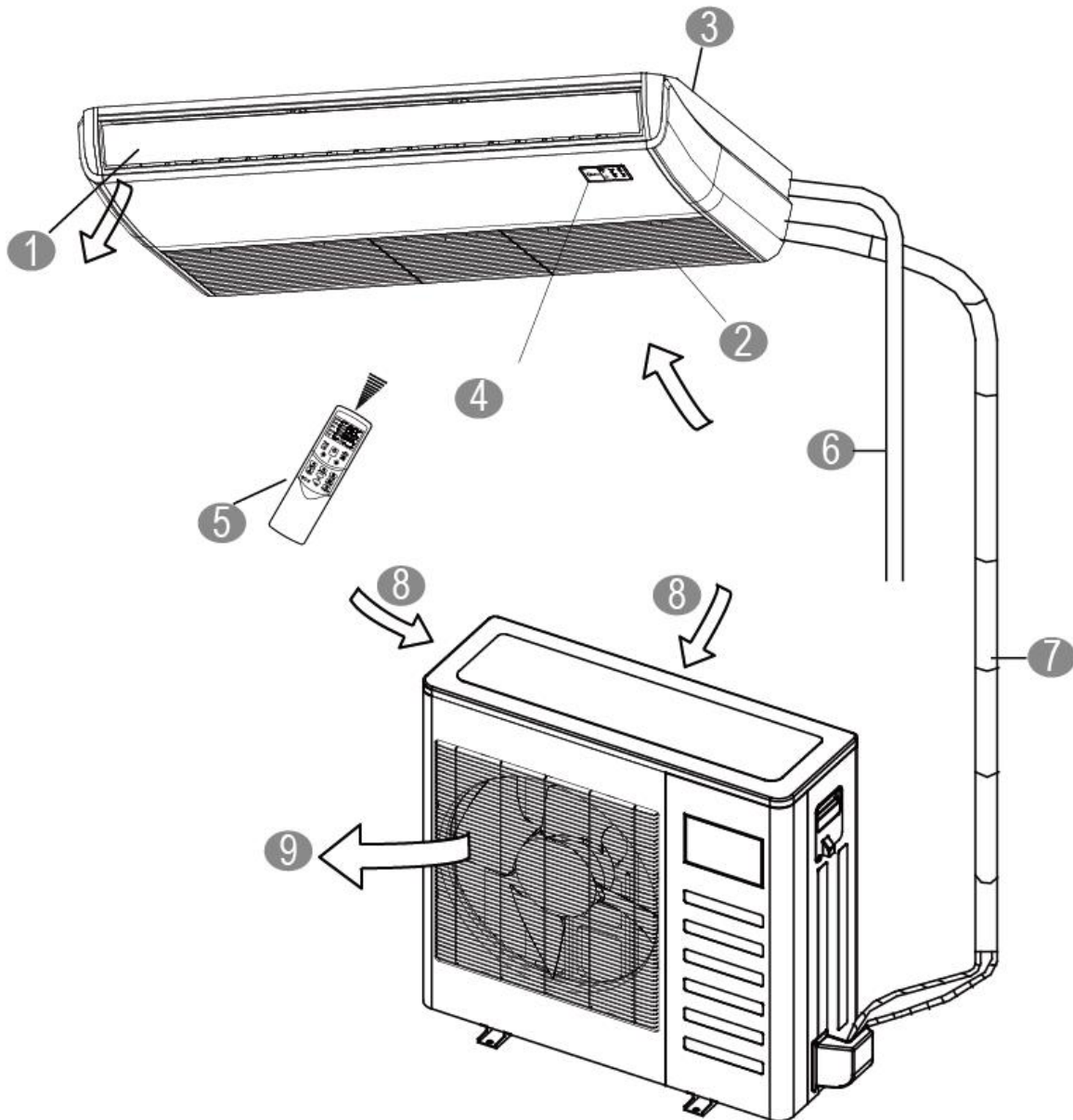
INDOOR UNIT

1. Air flow louver (at air outlet)
2. Air inlet (with air filter in it)
3. Installation part
4. Display panel
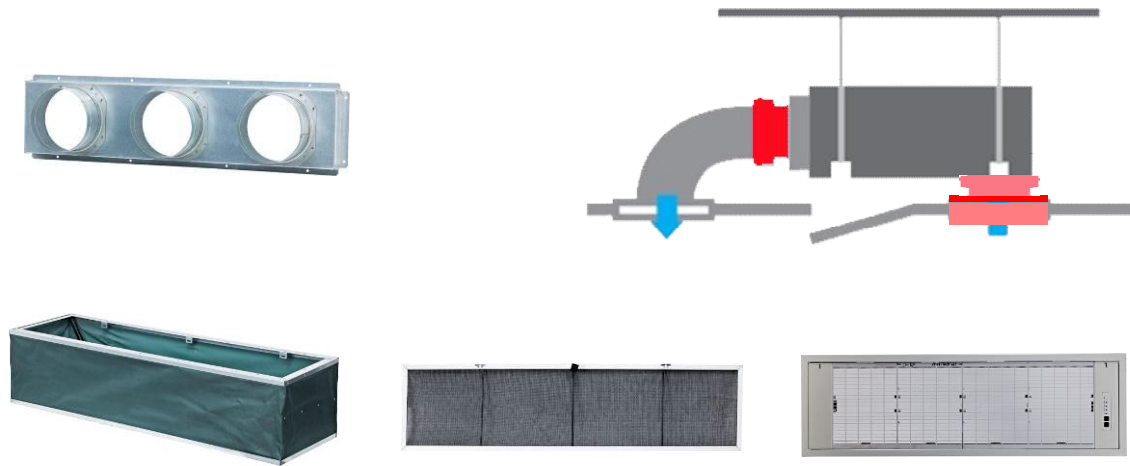5. Remote controller
6. Drain pipe

OUTDOOR UNIT

7. Connecting pipe
8. Air inlet
9. Air outlet

2.3 Features

2.3.1 Duct Units

2.3.1.1 Installation accessories: (Optional)

➢ Front Board, Canvas Air Passage, Filter, Panel, for easy installation

Panel

2.3.1.2 Easy Installation: Two air inlet styles (Bottom side or Rear side)

➢ Air inlet from rear is standard for all capacity; air inlet from bottom is optional.

➢ The size of air inlet frame from rear and bottom is same, it's very easy to move the cover from bottom to rear side, or from rear to the bottom, in order to matching the installation condition.
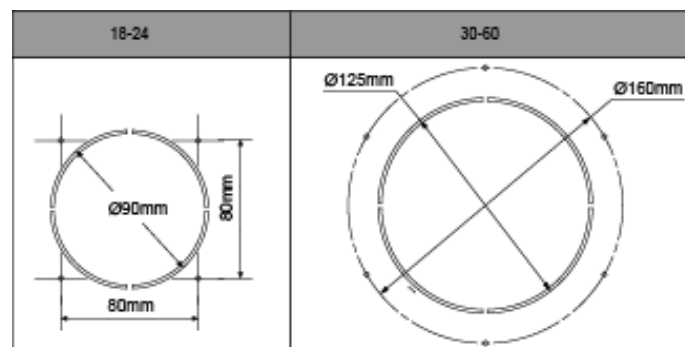

Air intake from rear (Standard)   Air intake from bottom (Optional)

2.3.1.3 Fresh air intake function

➢ Install one duct from the reserved fresh-air intake to outdoor.
Continually inhale the fresh air to improve the quality of the indoor air, fulfills air quality more healthy and comfortable.

2.3.1.4 Easy maintenance

➢ Clean the filter (Optional, standard product without filter)

It is easy to draw out the filter from the indoor unit for cleaning, even the filter is installed in rear side or bottom side.
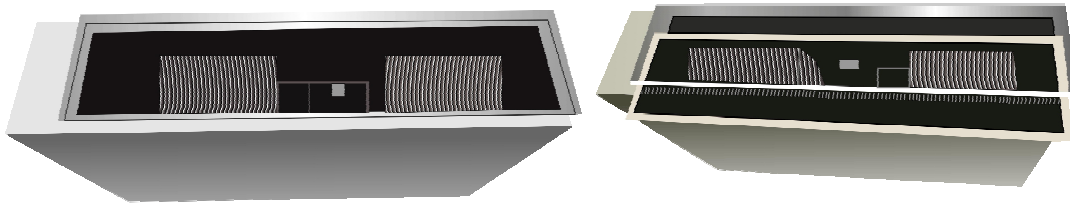

➢ Replace the motor or centrifugal fan

Remove the ventilated panel firstly. Remove a half of blower housing and take out the motor with centrifugal fan. Directly remove two bolts, and then replace the motor or centrifugal fan easily.

Motor

Blower Housing

Ventilated Panel
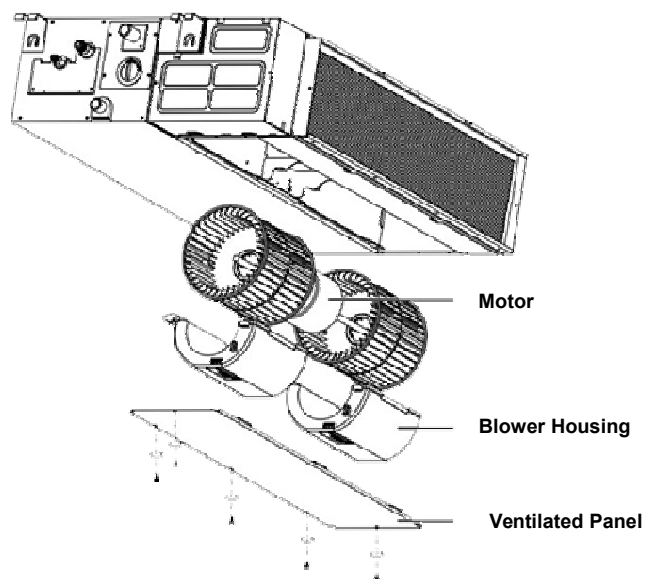
2.3.1.5 Reserved remote on-off and central control ports

➢ Reserved remote on-off ports and central control ports, can connect the cable of an on-off controller or a central controller to realize remote on-off control function or group control function.
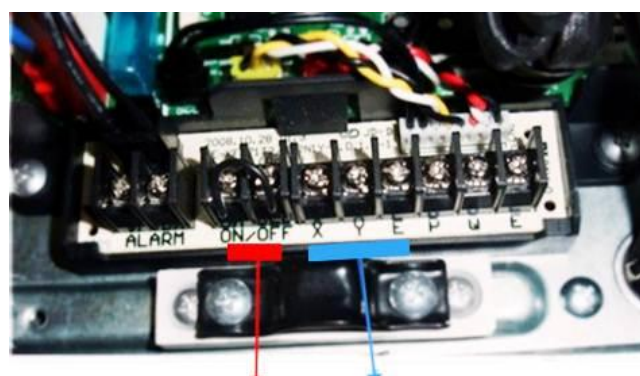
Remote on-off ports   Central control ports

2.3.1.6 Built-in drain pump (Optional):

➢ Built-in drain pump can lift the water to 750mm upmost. It's convenient to install drainage piping under most space condition.
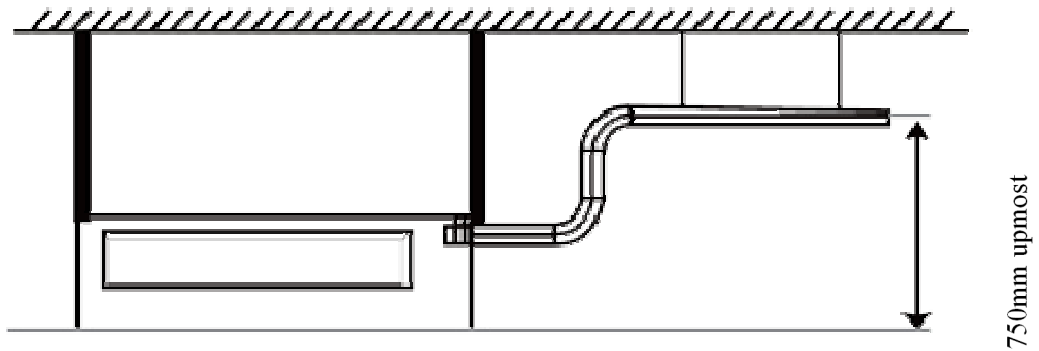
2.3.1.7 Built-in display board

➢ The standard indoor unit can be controlled by wired controller.

➢ There is a display board with a receiver in the E-box. Move out the display, and fix it in other place, even in the distance of 10m. The unit will realized remoter control.

➢ The wired controller and the display board can display the error code or production code when the chips detect some failure.

Wired Controller (Standard)
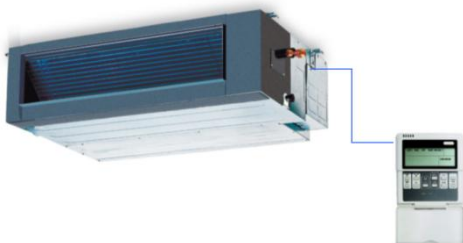
Remote Controller (Optional)

Display
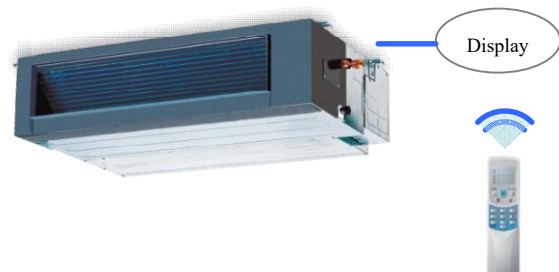
2.3.2 Cassette Unit

2.3.2.1 *Lower Noise*

➢ Optimize air channel system design to ensure the maximum quietness and comfort.

➢ Noise max down 6dB.

Old   **New**
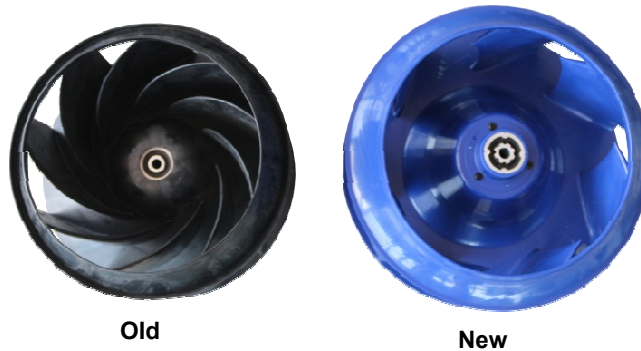
2.3.2.2 *Turbo mode (Optional)*

➢ Turbo function can boost cooling or heating speed in a short period, and makes the room cool down or heat up rapidly.

Common vs. Turbo

Cold   Hot

Turbo Mode (After 30 min)
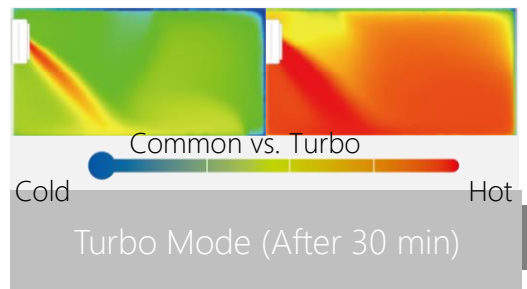
2.3.2.3 *Fire-proof controller box*

➢ Electrical control box adopts new design, which can meet higher fire safety requirements.

New   **Old**
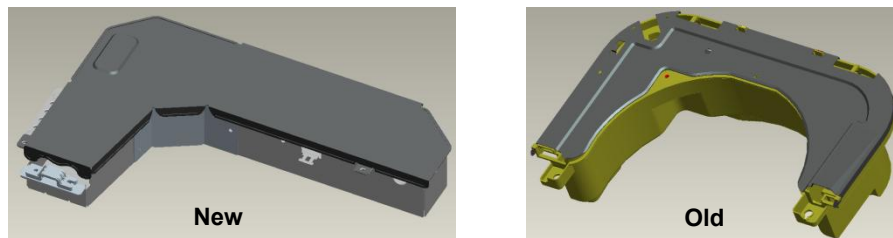
2.3.2.4 *Fresh Air*

➢ Fresh air intake function bring you fresh and comfortable air feeling.

2.3.2.5 *Wired controller (Optional)*

➢ Compared with infrared remote controller, wired controller can be fixed on the wall and avoid mislaying. It's mainly used for commercial zone and makes air conditioner control more convenient.

2.3.2.6 *Build-in Drain Pump*

➢ The drain pump can lift the condensing water up to 750mm upmost.

➢ It's convenient to install drainage piping under most space condition.
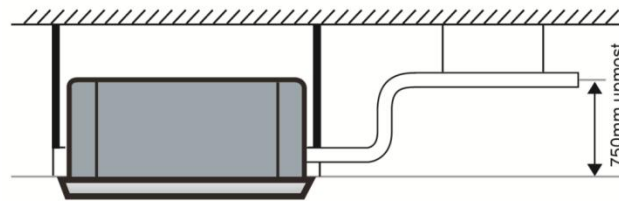
2.3.2.7 *Terminals for alarm lamp and long-distance on-off controller connection are standard*

➢ Reserve terminals for the connection of alarm lamp and long-distance on-off controller, more human control.

2.3.1 Ceiling-floor Units

2.3.1.1 Two-way installation

➢ The rounded design of the ceiling and floor type air conditioner allows either ceiling or floor-level installation. Ceiling installation saves room space, while floor installation helps prevent the loss of warm air.

2.3.1.2 Brief design

➢ Brief design that is suitable for any interior will not only give you cooling and heating performance but also upgrade your lifestyle.

2.3.1.3 3D airflow

Vertical air flow and horizontal airflow can be adjusted by remote controller, the cooperation of the two airflow ways help to spread air comfortably throughout even a large room. With these functions, the whole room can be evenly air-conditioned for both floor-level and ceiling installation.

2.3.1.4 Optional drainage pipe connection

➢ Both right side and left side drainage holes are available to avoid the space limitation for drainage pipe installation. Make you more convenient during installation.

C Panel (LED display)   D Panel

2.3.1.5 Convenience operating and easy maintenance

➢ Remote controller as standard, wired controller for optional.
➢ The filter without screw fixed, can be took out easily.

2.3.1.6 Easy installation, save working time

➢ The pipes can be connected from bottom, back and right side, makes the installation more easily.
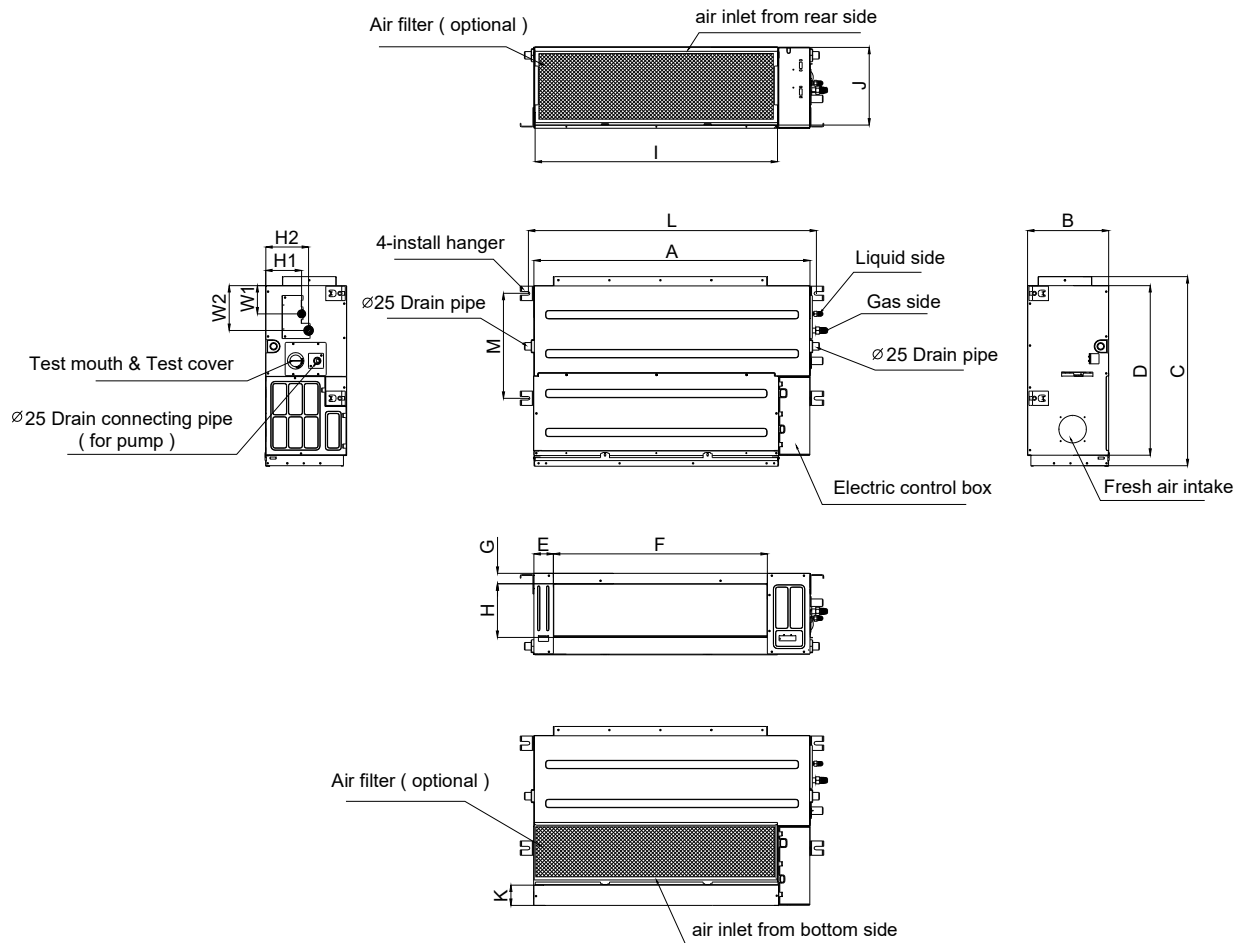➢ The wiring works can be finished before installation.
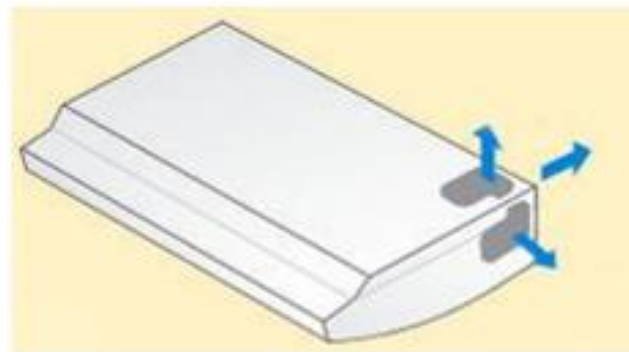
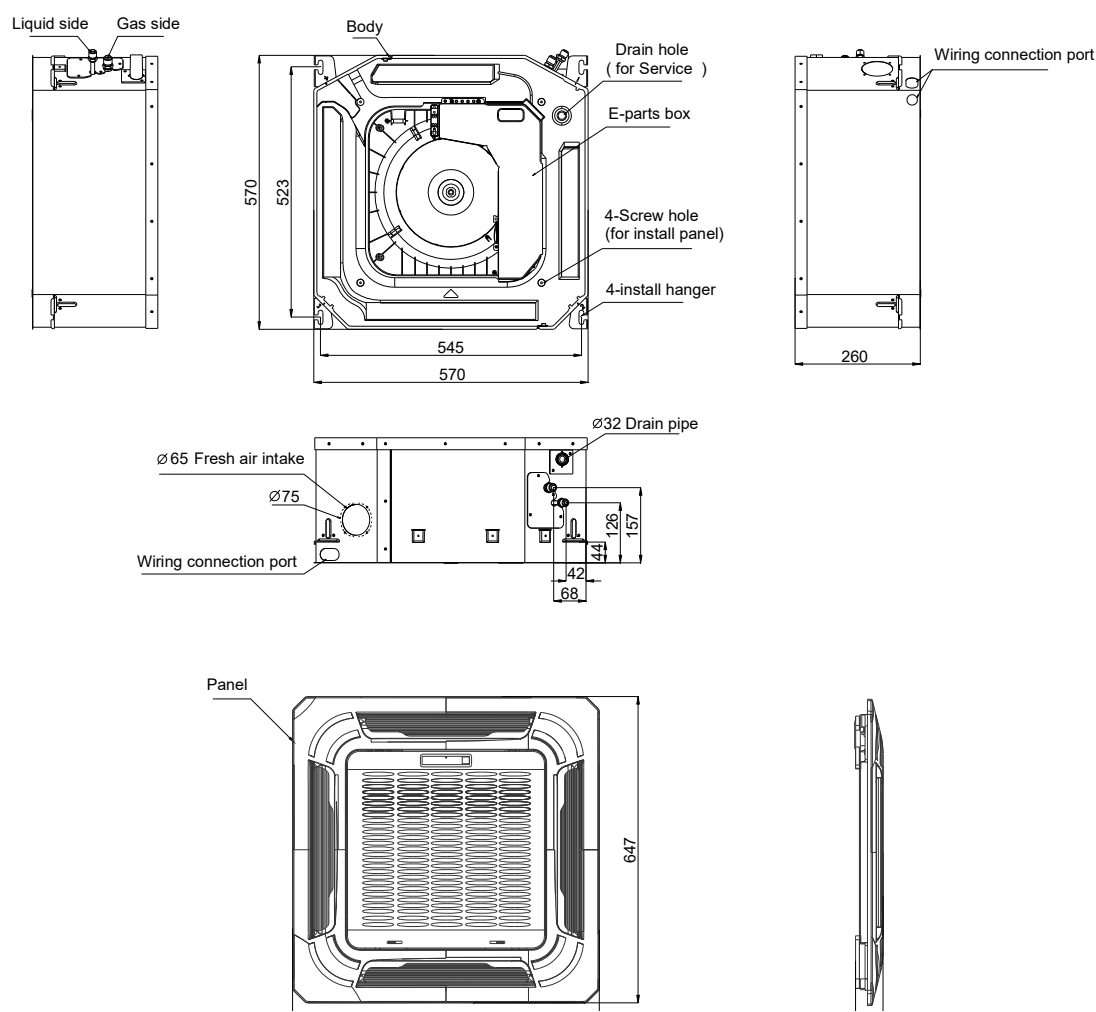## 2.3.1.7 Outside water pump for optional when ceiling installation.

3. Dimension

3.1 Indoor Unit

Duct Units

Capacity (KBtu)		Outline dimension(mm)				Air outlet opening size				Air return opening size			Size of install hanger		Size of refrigerant pipe			
		A	B	C	D	E	F	G	H	I	J	K	L	M	H1	H2	W1	W2
9	mm	700	210	635	570	65	493	35	119	595	200	80	740	350	120	143	95	150
	in	27.56	8.27	25	22.44	2.56	19.41	1.38	4.69	23.43	7.87	3.15	29.13	13.78	4.72	5.63	3.74	5.91
12	mm	700	210	635	570	65	493	35	119	595	200	80	740	350	120	143	95	150
	in	27.56	8.27	25	22.44	2.56	19.41	1.38	4.69	23.43	7.87	3.15	29.13	13.78	4.72	5.63	3.74	5.91
18	mm	920	210	635	570	65	713	35	119	815	200	80	960	350	120	143	95	150
	in	36.22	8.27	25.00	22.44	2.56	28.07	1.38	4.69	32.09	7.87	3.15	37.80	13.78	4.72	5.63	3.74	5.91
24	mm	920	210	635	570	65	713	35	119	815	200	80	960	350	120	143	95	150
	in	36.22	8.27	25.00	22.44	2.56	28.07	1.38	4.69	32.09	7.87	3.15	37.80	13.78	4.72	5.63	3.74	5.91
36	mm	1140	270	775	710	65	933	35	179	1035	260	45	1240	500	120	143	95	150
	in	44.88	10.63	30.51	27.95	2.56	36.73	1.38	7.05	40.75	10.24	1.77	48.82	19.69	4.72	5.63	3.74	5.91
48	mm	1200	300	865	800	80	968	40	204	1094	288	45	1240	500	175	198	155	210
	in	47.24	11.81	34.06	31.50	3.15	38.11	1.57	8.03	43.07	11.34	1.77	48.82	19.69	6.89	7.80	6.10	8.27

Cassette Units(9K, 12K, 18K)

Liquid side   Gas side   Body   Drain hole
                                                                         (for Service)

                                                                         E-parts box

570
523

                                                                         4-Screw hole
                                                                         (for install panel)

                                                                         4-install hanger

                          545
                          570

                                              ∅32 Drain pipe

∅65 Fresh air intake

∅75

                                                            126   157
                                                       44

Wiring connection port
                                                       42
                                                       68

Wiring connection port

260

Panel

647

Cassette Units (24K, 36K, 48K)

16

Capacity (Btu/h)		A	B	C	D
24K	mm	160	75	205	50
	inch	6.30	2.95	8.07	1.97
36K	mm	160	95	245	60
	inch	6.30	3.74	9.65	2.36
48K	mm	160	95	287	60
	inch	6.30	3.74	11.30	2.36

Ceiling-floor Units (18K-48K)
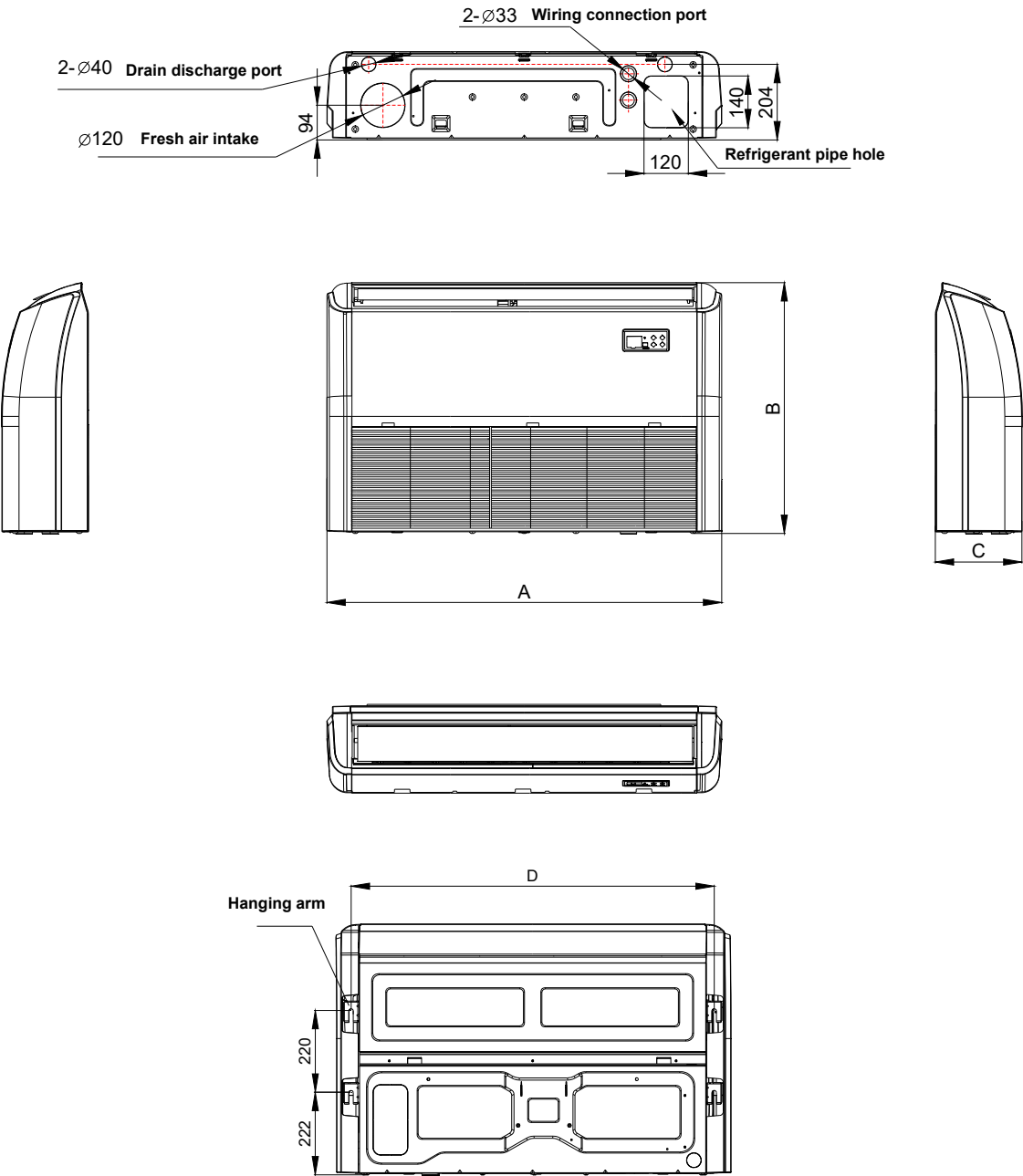
Capacity (Btu/h)		A	B	C	D
18K / 24K	mm	1068	675	235	983
	inch	42.05	26.57	9.25	38.70
36K	mm	1285	675	235	1200
	inch	50.59	26.57	9.25	47.24
48K	mm	1650	675	235	1565
	inch	64.96	26.57	9.25	61.61

3.2 Outdoor Unit
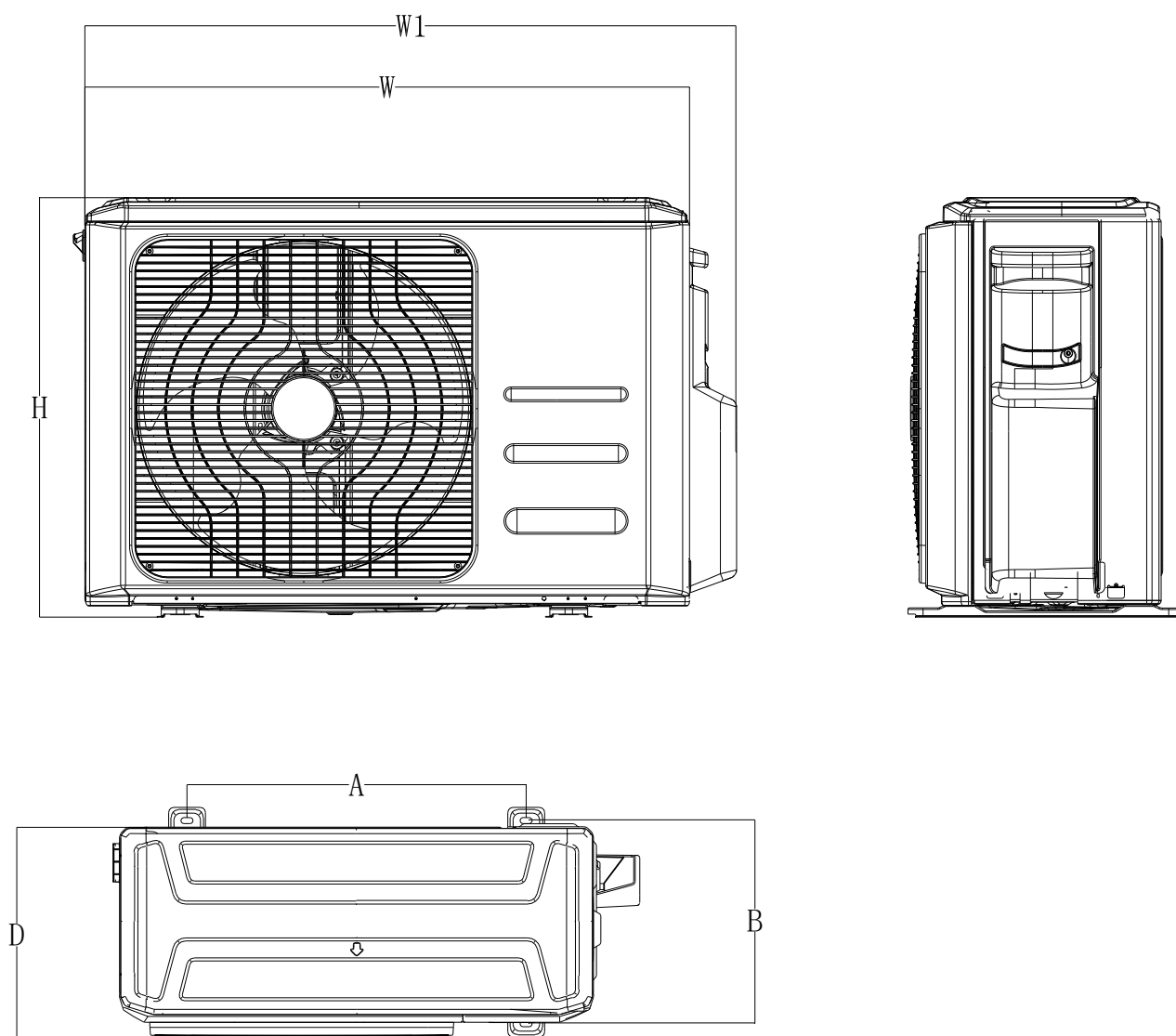
**Note:** The above drawing is only for reference. The appearance of your units may be different.

Model		W	D	H	W1	A	B
CPP009CD(O)	mm	770	300	555	840	487	298
	inch	30.3	11.8	21.9	33.1	19.2	11.7
CPP012CD(O)	mm	800	333	554	870	514	340
	inch	31.5	13.1	21.8	34.3	20.2	13.4
CPP018CD(O)	mm	845	363	702	914	540	350
	inch	33.3	14.3	27.6	36.0	21.3	13.8
CPP024CD(O) **CPP036CD(O)-DU**	mm	946	410	810	1030	673	403
	inch	37.2	16.1	31.9	40.6	26.5	15.9
CPP048CD(O)-DU	mm	952	415	1333	1045	634	404
	inch	37.5	16.3	52.5	41.1	25.0	15.9

4. Service Space

4.1 Indoor Unit

Duct Units

Ensure enough space required for installation and maintenance.

200mm(7.87in) or more   300mm(11.81in) or more

600mmx600mm/23.62inx23.62in
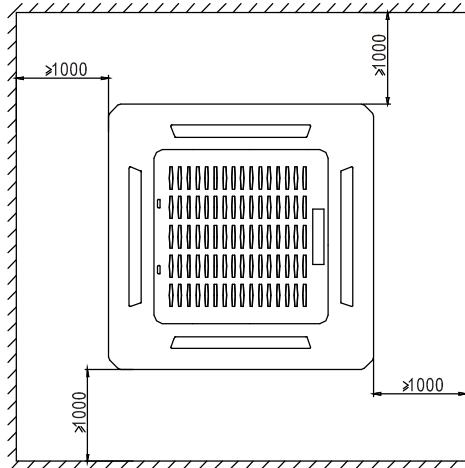
Check orifice
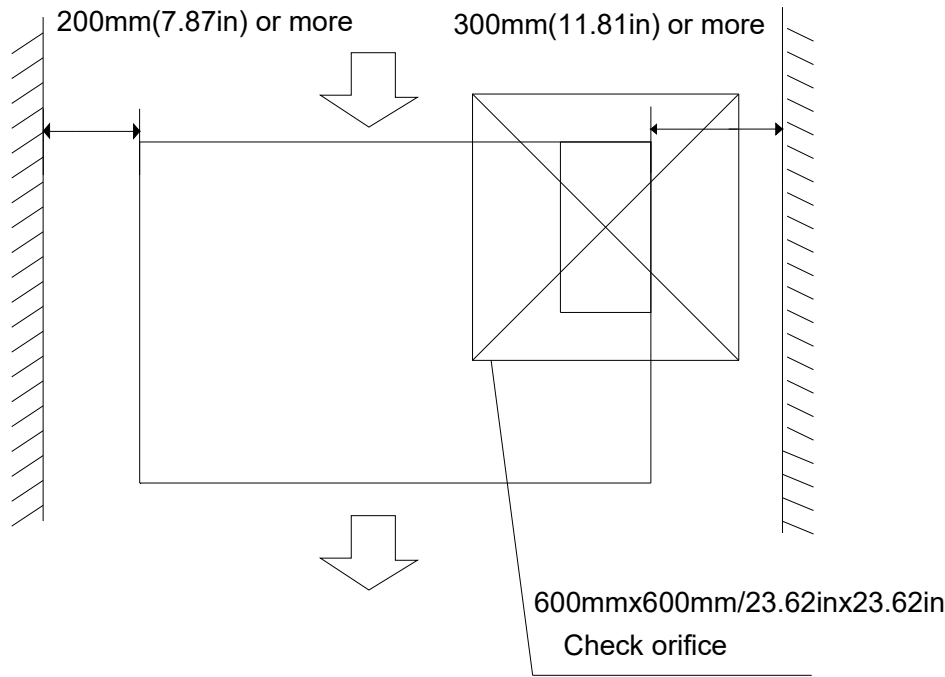
All the indoor units reserve the hole to connect the fresh air pipe. The hole size as following

Duct joint for new air duct

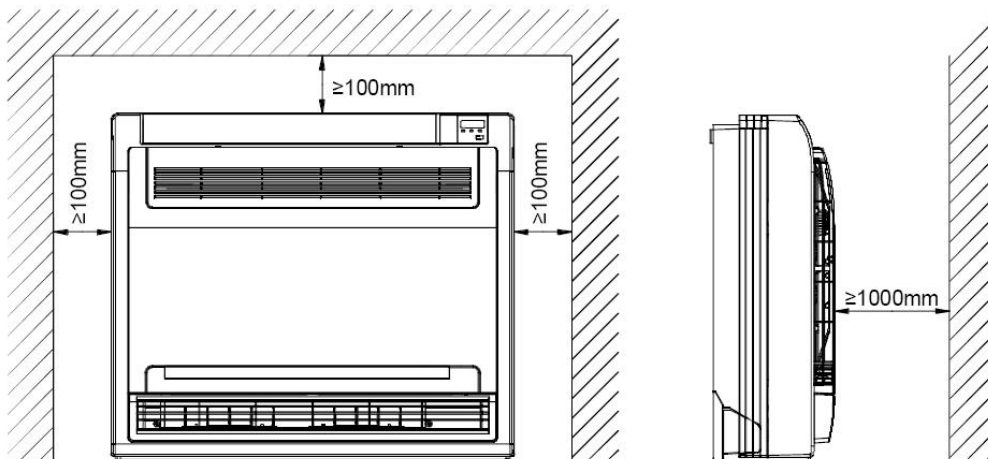| MODLE	
12-24	30-60

Ø90mm 80mm 80mm

Ø125mm Ø160mm
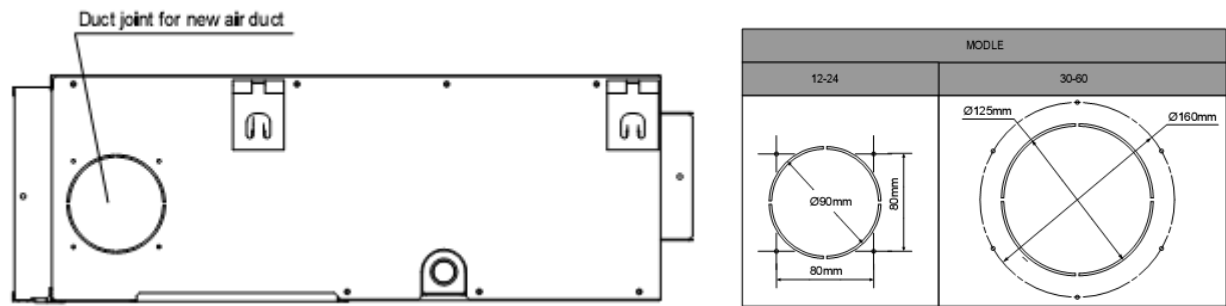
Cassette Units
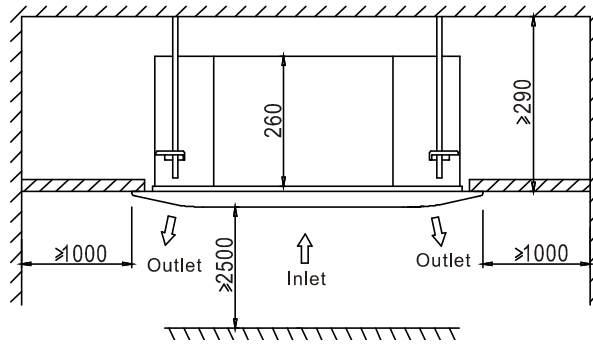
Unit: mm

Console Unit

Ceiling-floor Units

4.2 Outdoor Unit

(Wall or obstacle)

Air inlet

More than 30cm(11.81in)

More than 30cm
(11.81in)

Air inlet

Maintain channel
More than 60cm
(23.62in)

Air outlet

More than 200cm(78.74in)

More than 60cm
(23.62in)
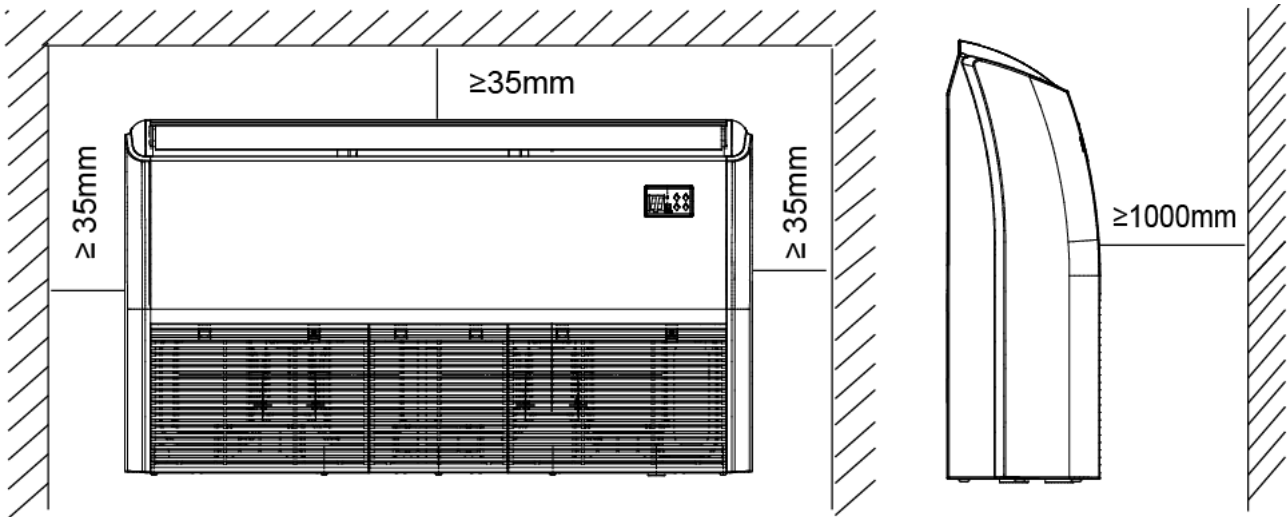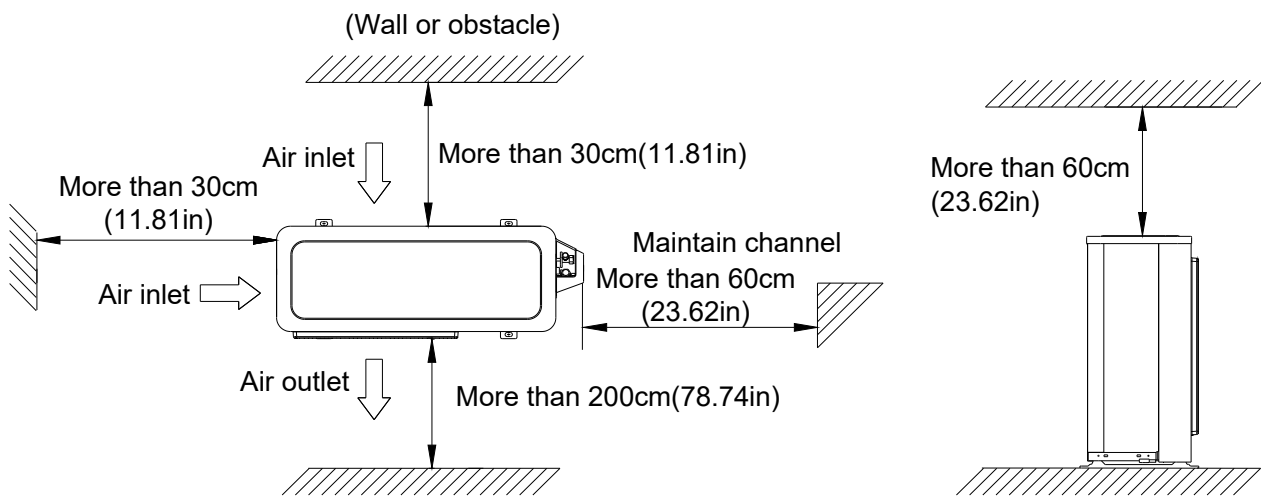
5. Refrigerant Cycle Diagram

6. Wiring Diagram

6.1 Indoor Unit

TPA-09, TPA-12, TPA-18,

CPA-09, CPA-12, CPA-18,CPA-24

FPA-24

WIRING DIAGRAM (INDOOR UNIT)
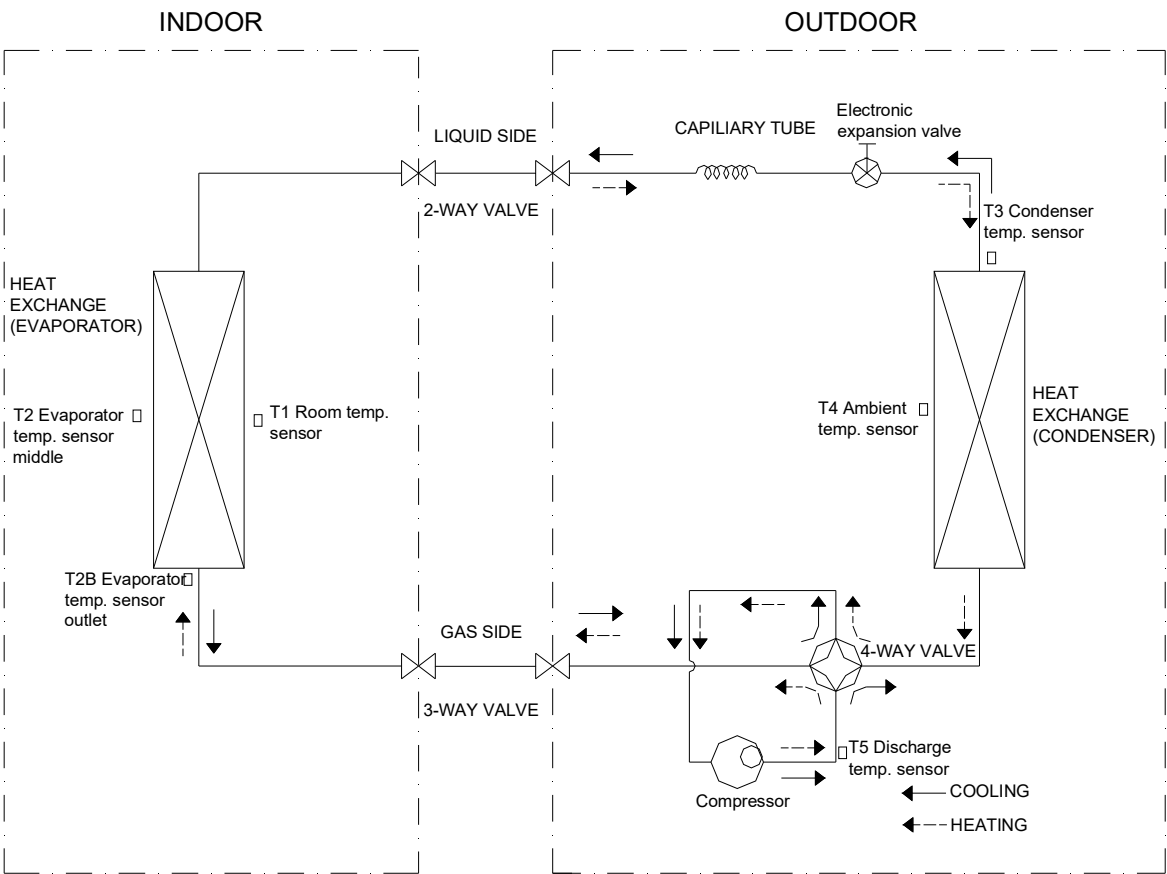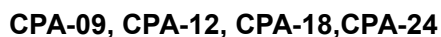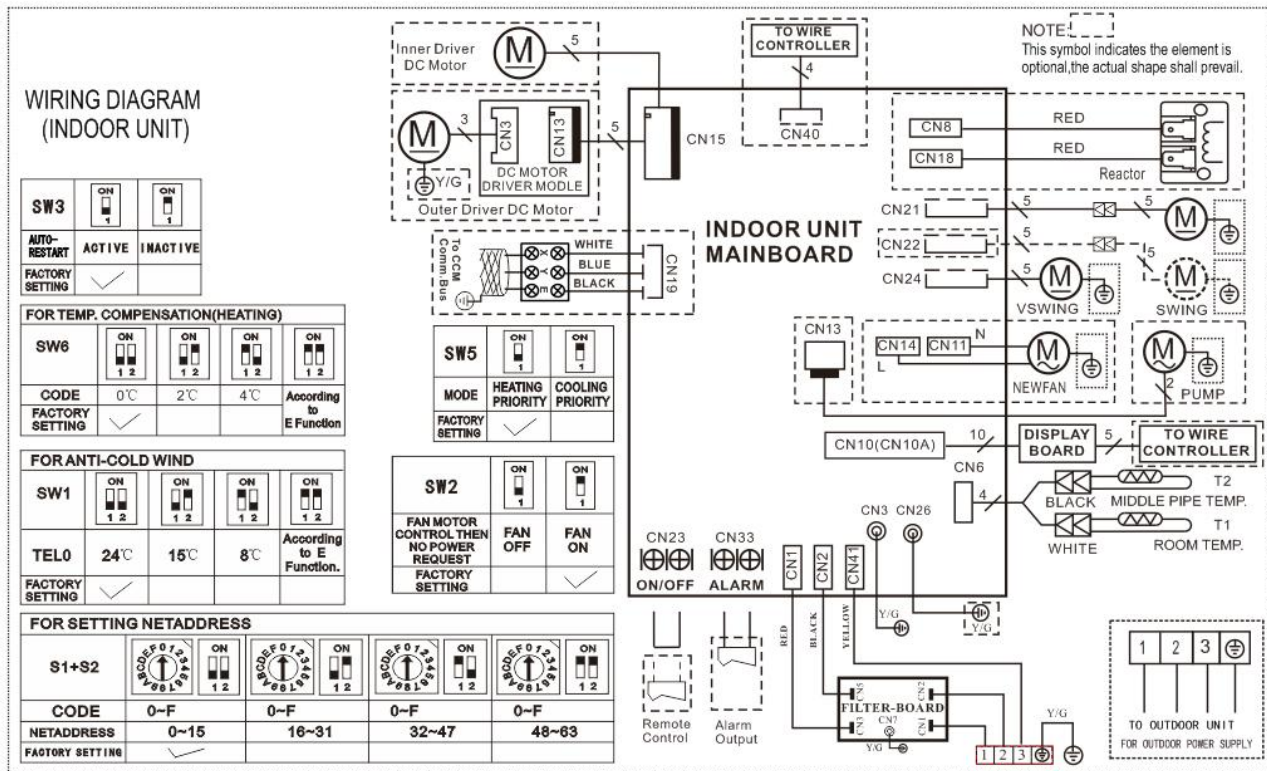
TPA-36DU, TPA-48DU

CPA-36DU, CPA-48DU

INDOOR UNIT MAINBOARD

Outer Driver DC Motor

Y/G | M | 3
CN3
DC MOTOR DRIVER MODLE
CN13 | 5
FAN2

Inner Driver DC Motor | M | 5 | CN16
FAN1
Inner Driver DC Motor | M | 5 | CN15

CN13 | 5
DC MOTOR DRIVER MODLE
CN3
Y/G | M | 3
Outer Driver DC Motor

CN40 | 4 | TO WIRE CONTROLLER

CN9 (S2) (S1)
E Y X Q E P

CN23 ON/OFF
CN33 ALARM

To CCM Comm.Bus
To outdoor Comm.Bus
Remote Control
Alarm Output

CN26 | CN3
Y/G | Y/G

CN1 | CN2
RED | BLACK
L(L1) | N(L2) | Y/G

L(L1) N(L2) — TO OUTDOOR UNIT FOR OUTDOOR POWER SUPPLY
L(L1) N(L2) — POWER

CN8 — RED
CN18 — RED
Reactor

N CN11
L CN14
NEWFAN

CN13 | 2 | M | PUMP

CN10(CN10A) | 10 | DISPLAY BOARD | 5 | TO WIRE CONTROLLER

CN6 | 4
BLACK | MIDDLE PIPE TEMP. T2
WHITE | ROOM TEMP. T1
CN7
T2B OUTER PIPE TEMP.

CN5 — WATER LEVEL SWITCH

FUNCTION SETTING INDICATION

FOR SETTING POWER

ENC1							
CODE	4	5	7	8	9	A	B
POWER	≤53	54~71	72~90	91~105	106~140	141~160	≥161
FACTORY SETTING	ACCORDING TO RELATED MODEL.						

FOR SETTING NETADDRESS

S1+S2				
CODE	0~F	0~F	0~F	0~F
NETADDRESS	0~15	16~31	32~47	48~63
FACTORY SETTING	✓			

FOR SETTING STATIC PRESSURE

ENC2							STATIC PRESSURE RANGE(Pa)
MODEL (K Btu/h)	CODE	0	1	2	3	4	
	MODEL≤12	0(Pa)	10(Pa)	20(Pa)	30(Pa)	40(Pa)	0-45(Pa)
	12<MODEL≤24	10(Pa)	25(Pa)	40(Pa)	55(Pa)	70(Pa)	0-100(Pa)
	24<MODEL≤60	20(Pa)	35(Pa)	50(Pa)	65(Pa)	80(Pa)	0-100(Pa)
FACTORY SETTING	✓						

FOR ANTI-COLD WIND

SW1	ON 1 2	ON 1 2	ON 1 2	ON 1 2
TEL0	24℃	15℃	Fan motor do not stop.	According to the E Function.
FACTORY SETTING	✓			

FOR SETTING FAN MOTOR CONTROL THEN NO POWER REQUEST

SW2	ON 1	ON 1
MODE	FAN OFF	FAN ON
FACTORY SETTING		✓

FOR SETTING AUTO-RESTART

SW3	ON 1	ON 1
AUTO-RESTART	ACTIVE	INACTIVE
FACTORY SETTING	✓	

FOR TEMP. COMPENSATION

SW6	ON 1 2	ON 1 2	ON 1 2	ON 1 2
DUCT TYPE	6℃	2℃	4℃	According to E Function.
FACTORY SETTING	✓			
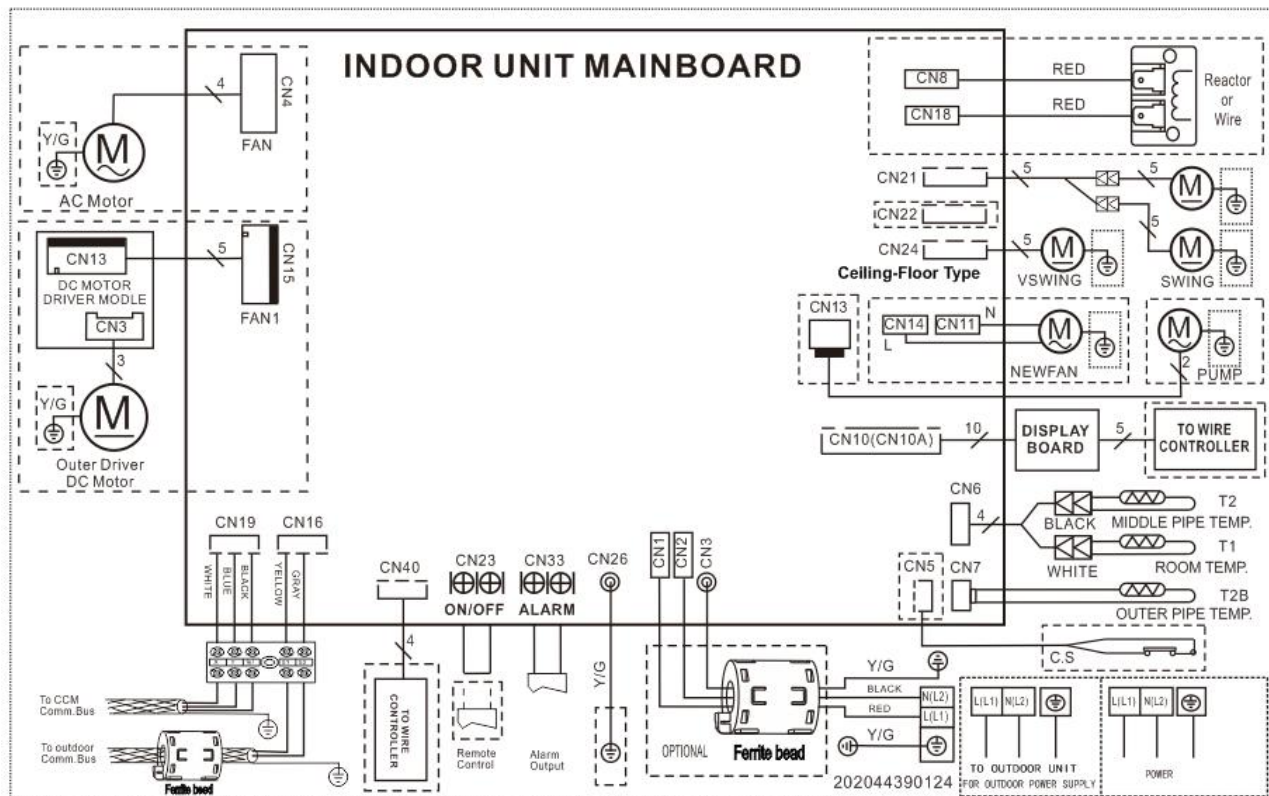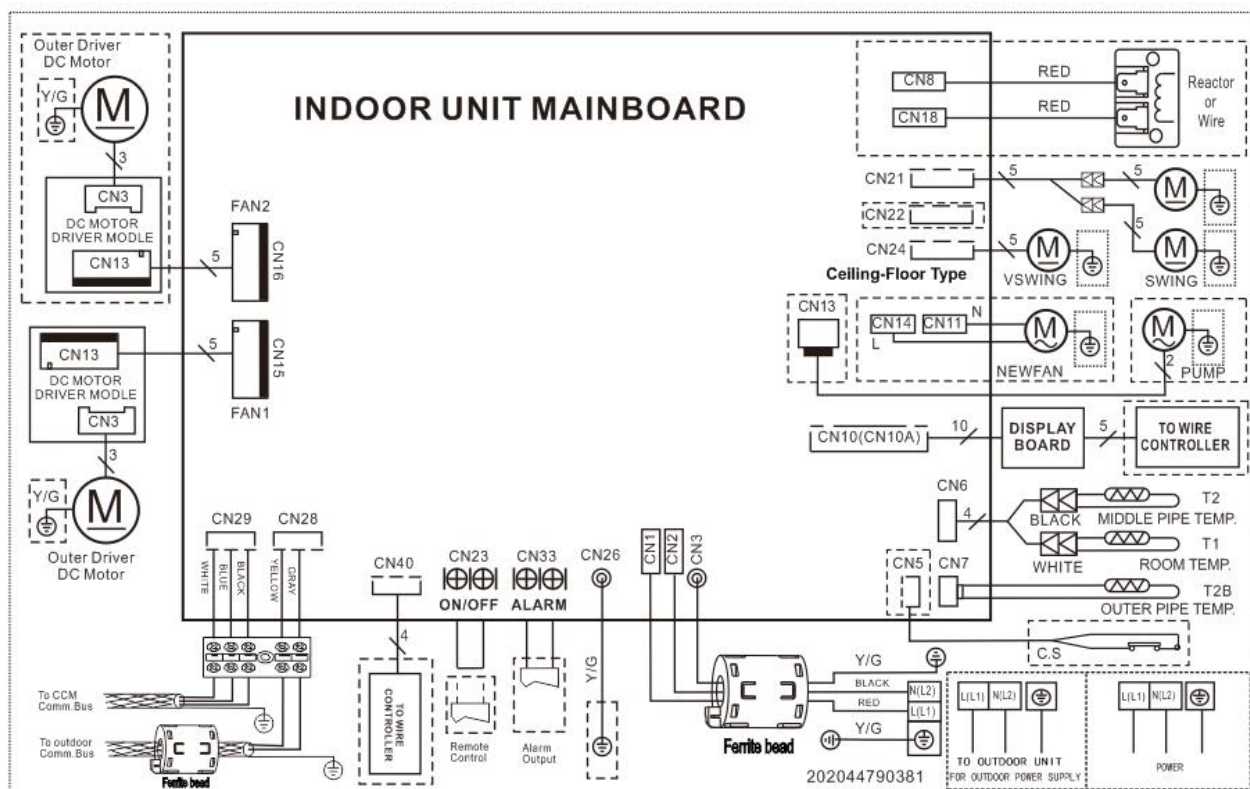
FPA-36DU

FPA-48DU

FPA-36DU，FPA-48DU

For Setting NETaddress

S1+S2							
Code	0~F	00	0~F	01	0~F	10	0~F	11
NETaddress	0~15		16~31		32~47		48~63	
Factory Setting								

FOR SETTING POWER

ENC1							
CODE	4	5	7	8	9	A	B
POWER	≤53	54~71	72~90	91~105	106~140	141~160	≥161
FACTORY SETTING	ACCORDING TO RELATED MODEL.						

For temp. compensation

SW6	ON 1 2	ON 1 2	ON 1 2	ON 1 2
CEILING AND FLOOR TYPE	0℃	2℃	4℃	According to E Function.
For Setting CEILING TYPE or FLOOR TYPE	FLOOR TYPE	CEILING TYPE		
Factory Setting	✓			

For Setting Fan Quantity (optional)

SW4	ON 1	ON 1
Mode	Single Fan	Double Fan
Factory Setting		✓

FOR ANTI-COLD WIND

SW1	ON 1 2	ON 1 2	ON 1 2	ON 1 2
TEL0	24℃	15℃	Fan motor do not stop.	According to the E Function.
FACTORY SETTING	✓			

FOR SETTING AUTO-RESTART

SW3	ON 1	ON 1
AUTO-RESTART	ACTIVE	INACTIVE
FACTORY SETTING	✓	

For Setting Fan Motor Control then No Power Request

SW2	ON 1	ON 1
Mode	Fan OFF	Fan ON
Factory Setting		✓

FUNCTION SETTING INDICATION
202044690388

6.2 Outdoor Unit

CPP018CD(O) ，CPP024CD(O)

16022000019211
OUTDOOR WIRING DIAGRAM

CPP009CD(O)，CPP012CD(O)

16022000019673

CPP036CD(O)-DU

CODE	PART NAME
COMP	COMPRESSOR
CAP1	FAN MOTOR CAPACITOR
EEV	ELECTRIC EXPANSIVE VALVE
FM1	OUTDOOR DC FAN
FAN1	OUTDOOR AC FAN
HEAT	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L	PFC INDUCTOR
L-PRO	LOW PRESSURE SWITCH
SV	4-WAY VALVE
TP	EXHAUST TEMPERATURE SENSOR
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
TH	HEATSINK TEMPERATURE SENSOR

16022700000800

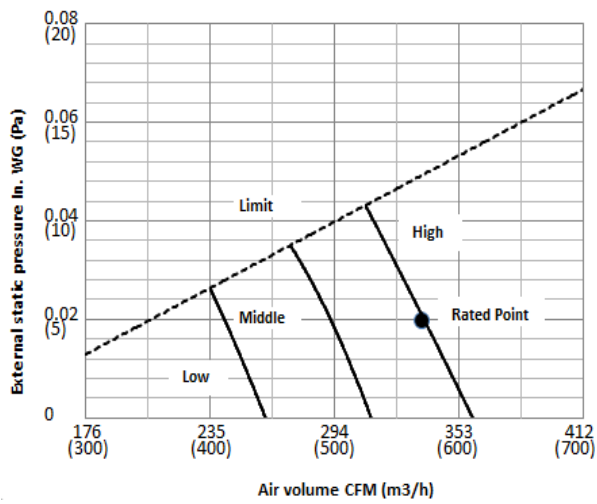## CPP048CD(O)-DU

WIRING DIAGRAM (OUTDOOR UNIT)
16022500003306

CODE	PART NAME
COMP	COMPRESSOR
CAP1,CAP2	FAN MOTOR CAPACITOR
CT1	AC CURRENT DETECTOR
D	DIODE MODULE
EEV	ELECTRIC EXPANSIVE VALVE
FM1,FM2	OUTDOOR DC FAN
FAN1,FAN2	OUTDOOR AC FAN
HEAT	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L	PFC INDUCTOR
L-PRO	LOW PRESSURE SWITCH
KM	AC CONTACTOR
SV	4-WAY VALVE
TP	EXHAUST TEMPERATURE SENSOR
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
TH	HEATSINK TEMPERATURE SENSOR

MAIN BOARD

IPM & PFC BOARD

COMP

Applicable to the units adopting DC motor only

DC MOTOR DRIVER BOARD

DCFAN2 DCFAN1

Applicable to the units adopting AC motor only

4-WAY

ACFAN2

ACFAN1

ELECTRONIC EXPANSIVE VALVE A

MAIN POWER SUPPLY

TO INDOOR UNIT

OPTIONAL

HEAT_D
HEAT_Y

TO INDOOR COMM. BUS

NOTE: Please use 2-core shielded wire.

YELLOW L YELLOW

RED D BLACK

BLACK RED

32

7. Fan Curves

ENC2							Static Pressure Range In. WG (Pa)
	Model	0	1	2	3	4	
Model (K Btu/h)	Model≤12	0.02 (5)	0.04 (10)	0.08 (20)	0.12 (30)	0.16 (40)	0-0.18 (0-45)
	Model=18	0.04 (10)	0.10 (25)	0.14 (35)	0.18 (45)	0.22 (55)	0-0.28 (0-70)
	18<Model≤24	0.04 (10)	0.10 (25)	0.16 (40)	0.22 (55)	0.28 (70)	0-0.40 (0-100)
	24<Model≤60	0.08 (20)	0.14 (35)	0.20 (50)	0.26 (65)	0.32 (80)	0-0.40 (0-100)
Factory Setting		√					

CPA-09,

Code 0

Code 1
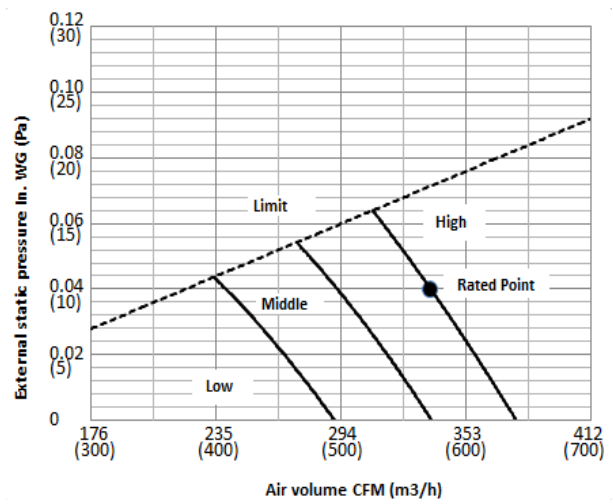
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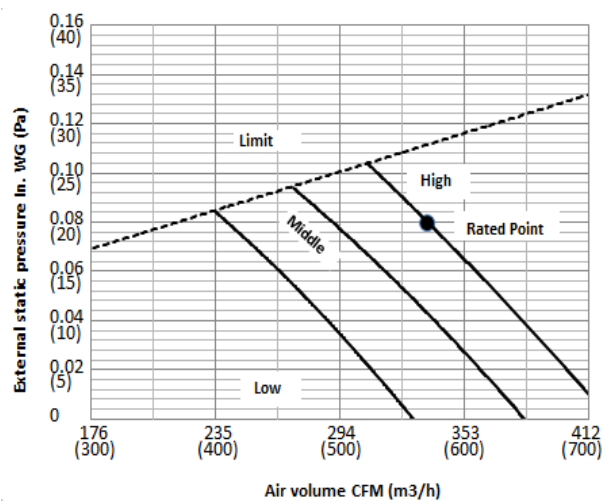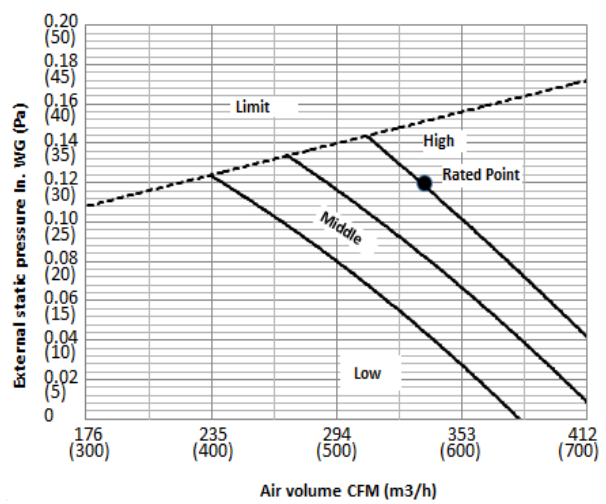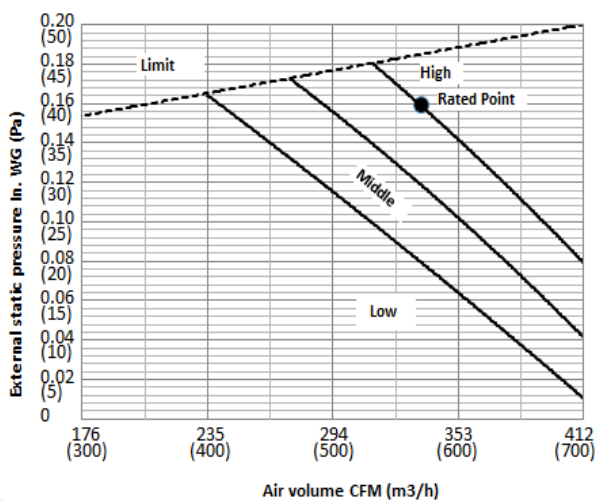
Code 3

Code 4

CPA-12

Code 0

Code 1

Code 2

Code 3

Code 4
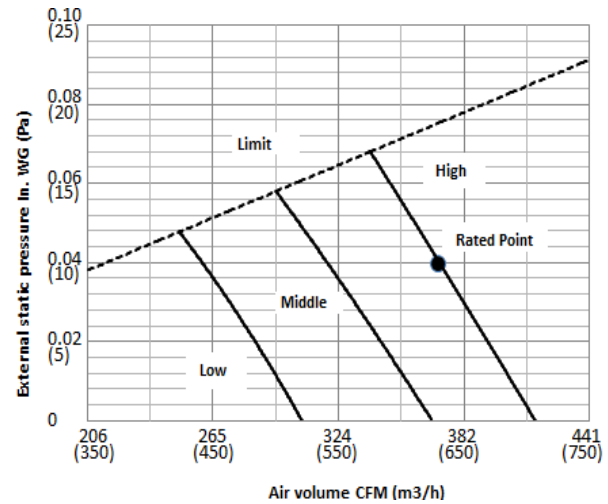

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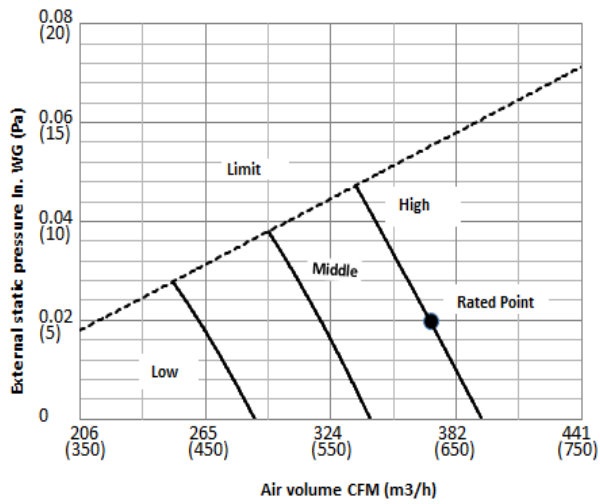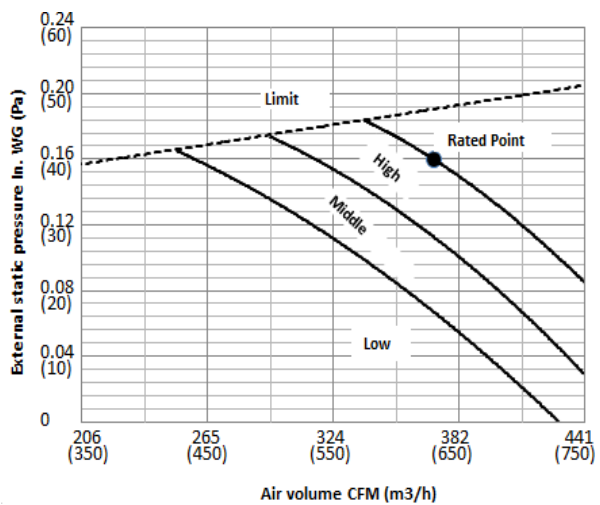
CPA-18
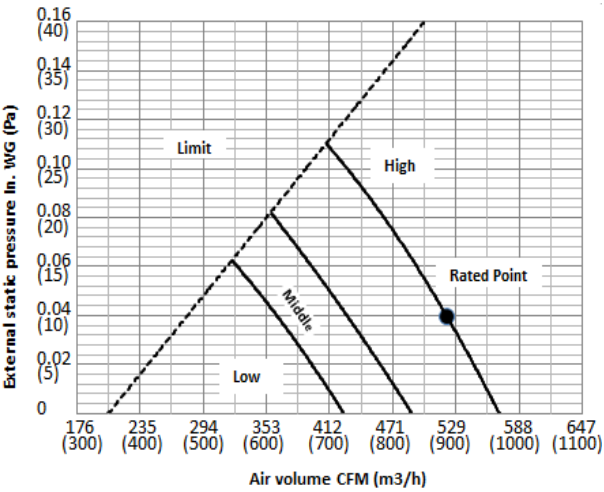
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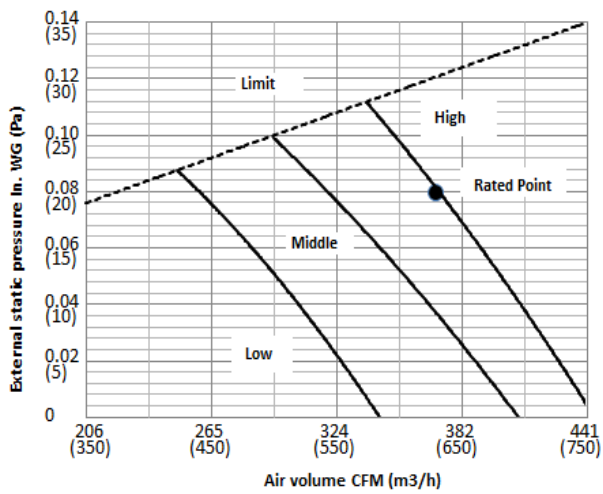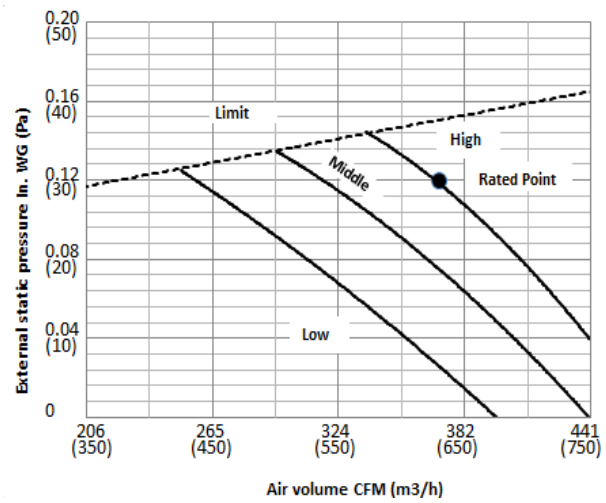
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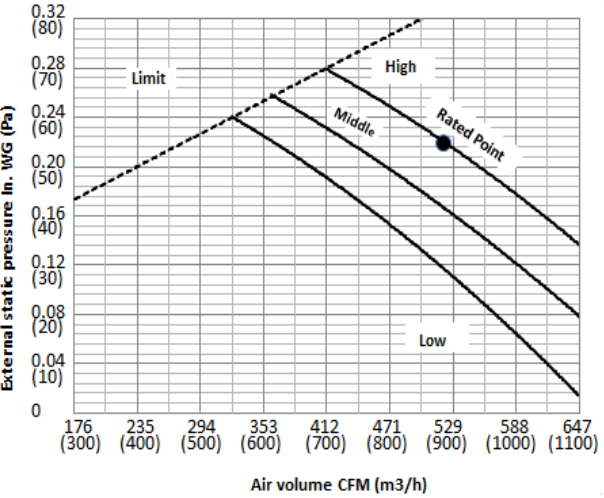
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Code 4

CPA-24

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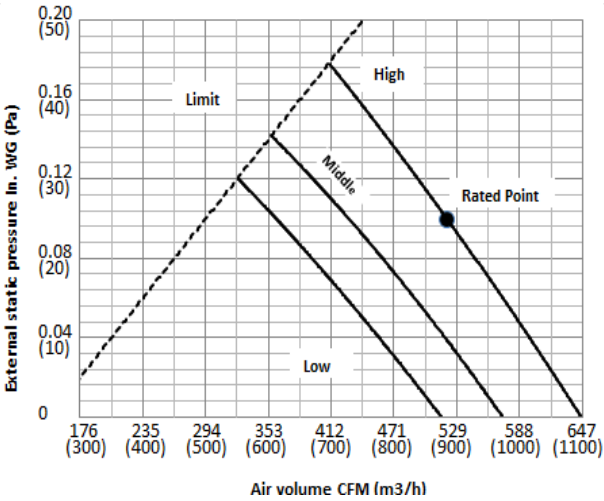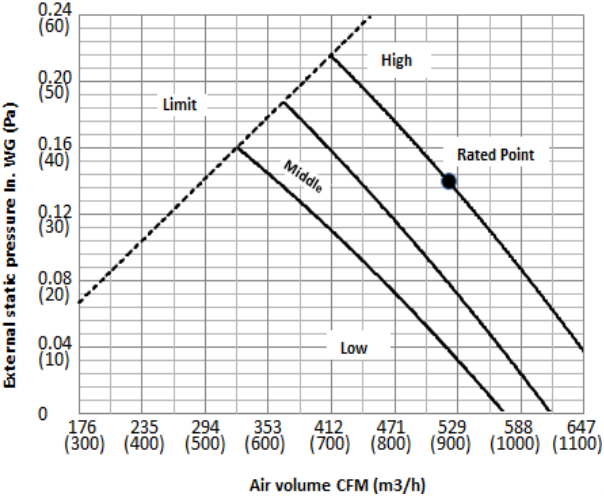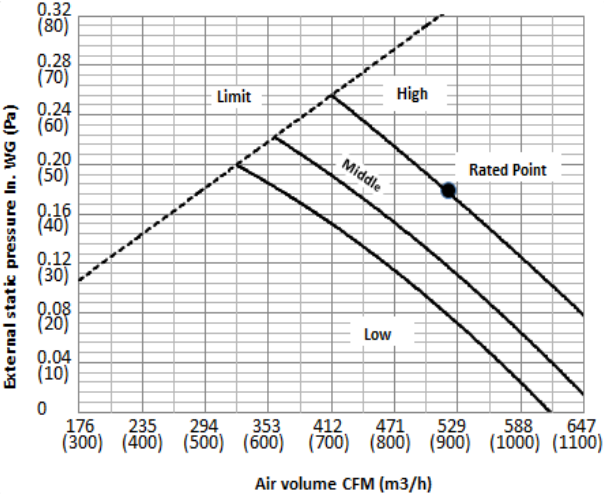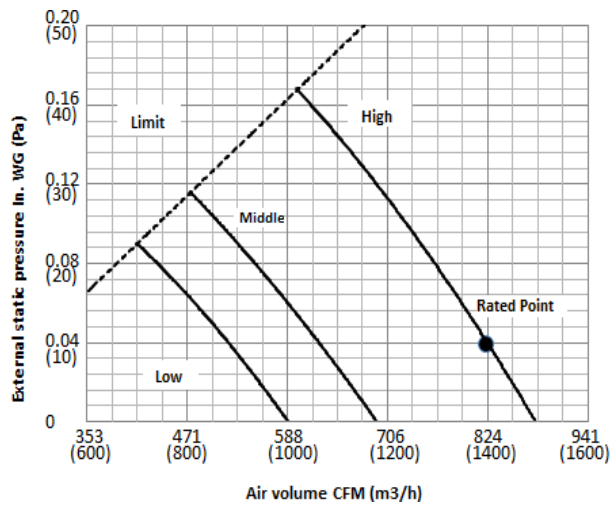

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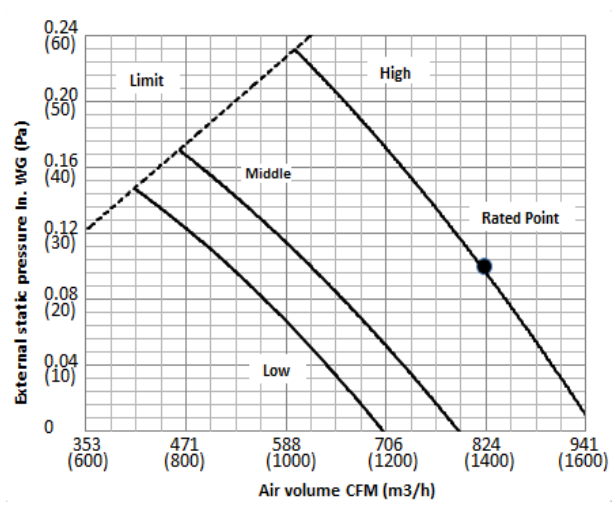
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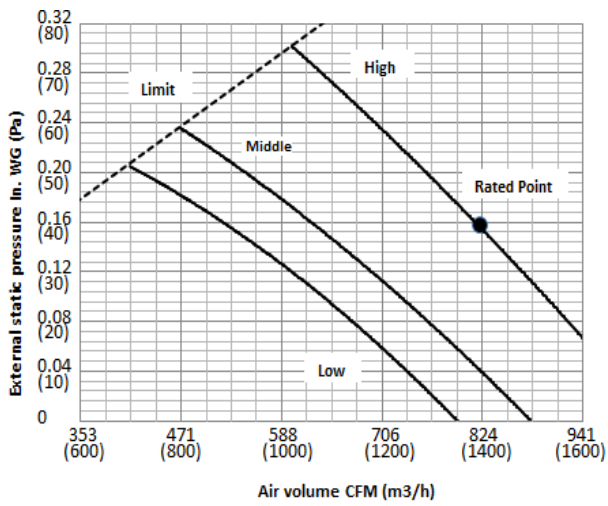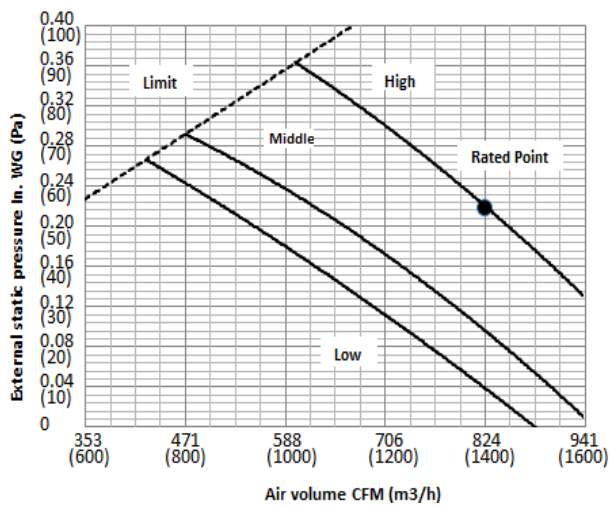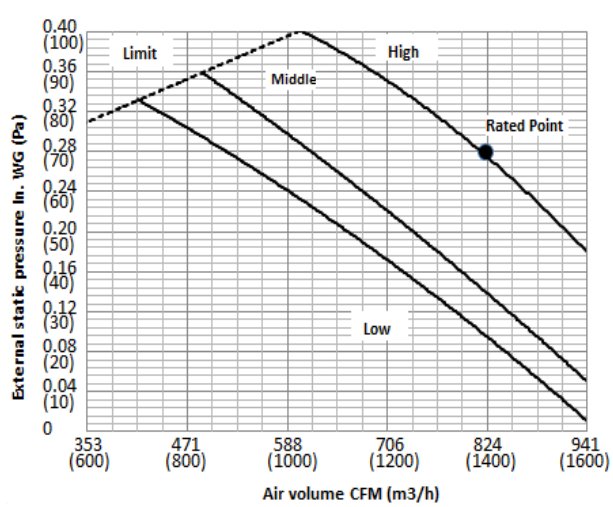
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Code 4

CPA-36DU

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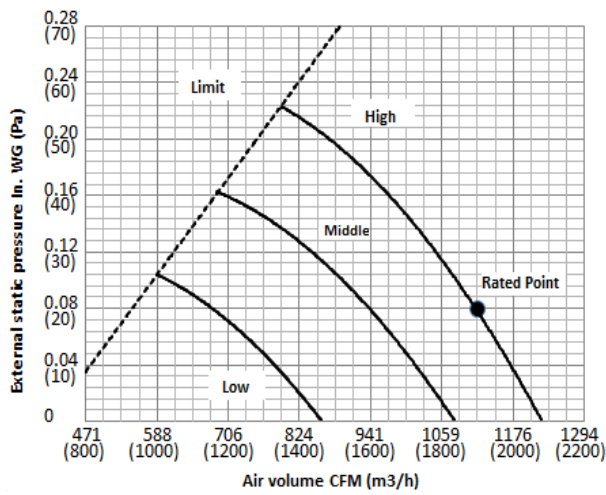
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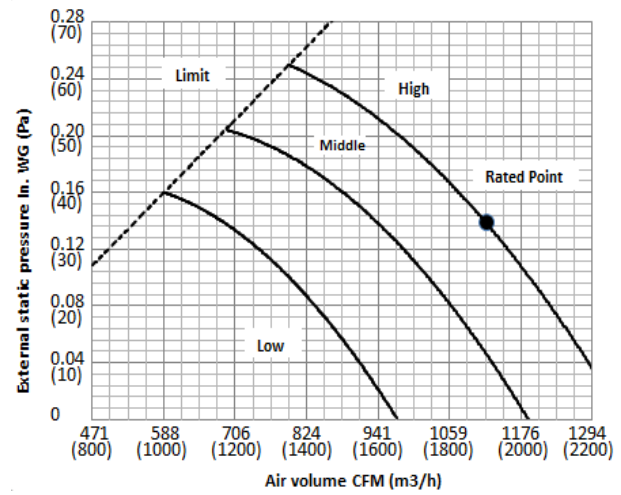
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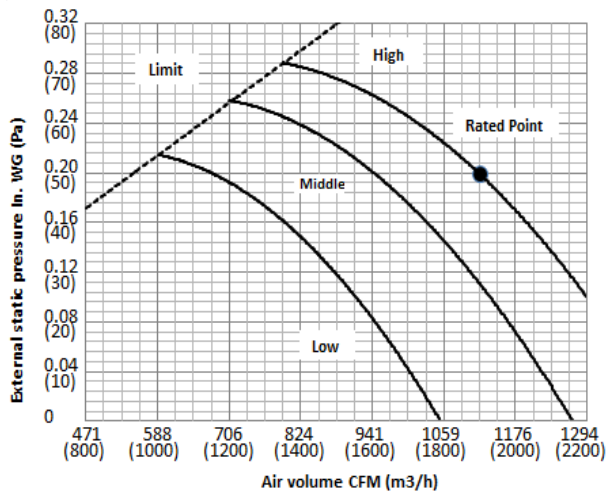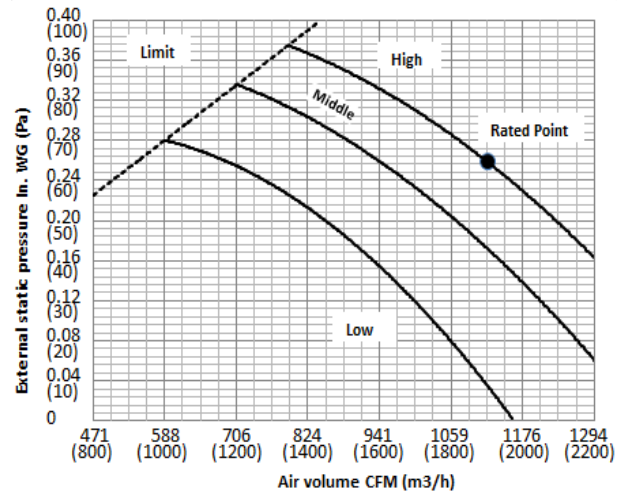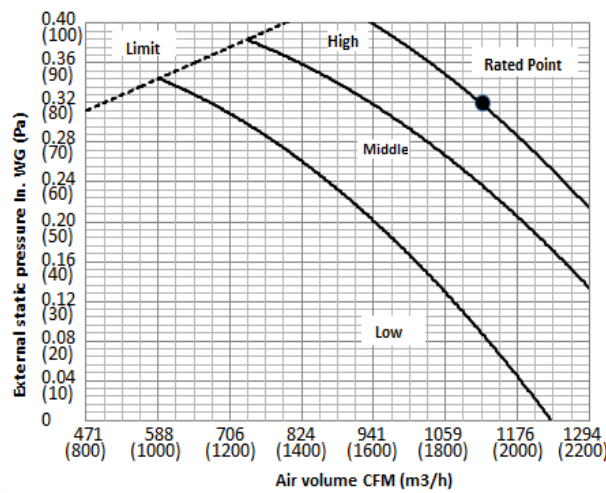
Code 3

Code 4

CPA-48DU

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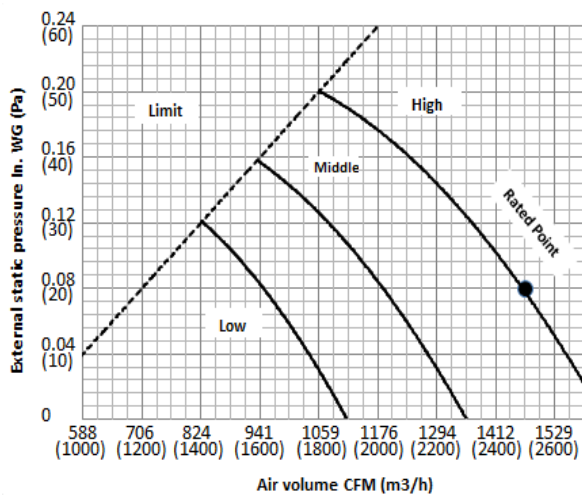
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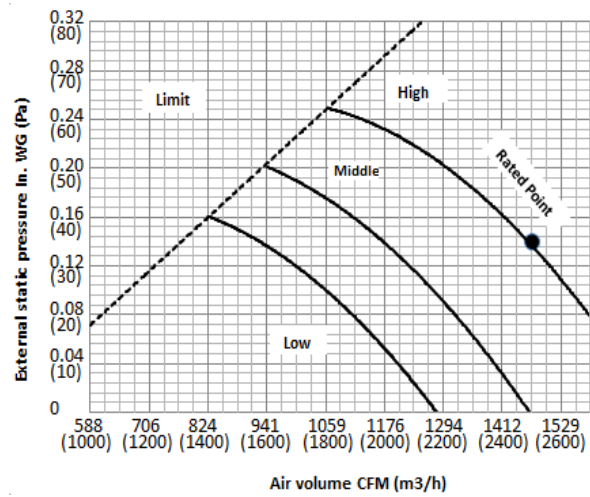
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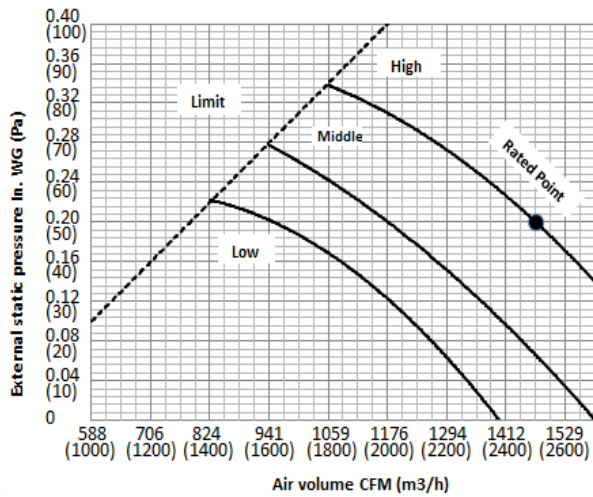
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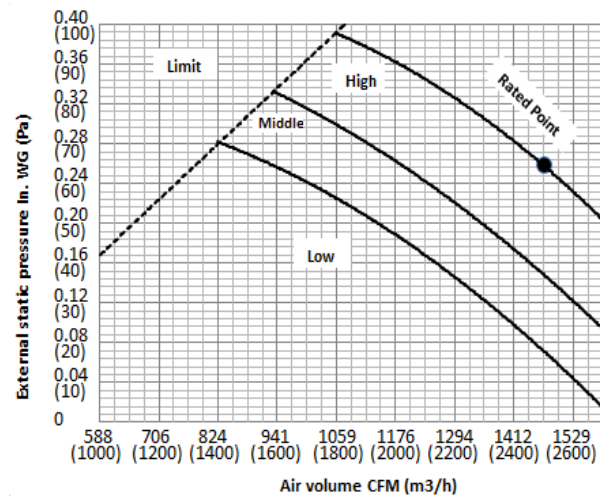
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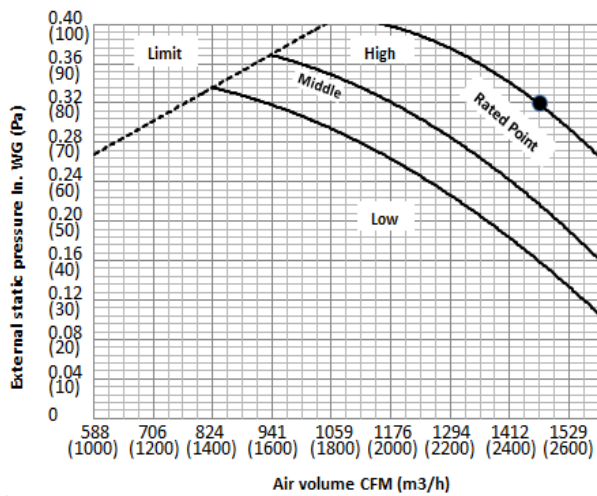
8 Electric Characteristics

Model	Indoor Unit			
	Hz	Voltage	Min.	Max.
TPA-09	60	208-230V	187V	253V
CPA-09	60	208-230V	187V	253V
TPA-12	60	208-230V	187V	253V
CPA-12	60	208-230V	187V	253V
FPA-24	60	208-230V	187V	253V
TPA-18	60	208-230V	187V	253V
CPA-18	60	208-230V	187V	253V
FPA-18	60	208-230V	187V	253V
CPA-24	60	208-230V	187V	253V
FPA-24	60	208-230V	187V	253V
TPA-36DU	60	208-230V	187V	253V
CPA-36DU	60	208-230V	187V	253V
FPA-36DU	60	208-230V	187V	253V
TPA-48DU	60	208-230V	187V	253V
CPA-48DU	60	208-230V	187V	253V
FPA-48DU	60	208-230V	187V	253V

9 Sound Level

9.1 Indoor unit

Concealed Duct Type

Discharge

Suction

Duct

Duct

1.4m

Microphone
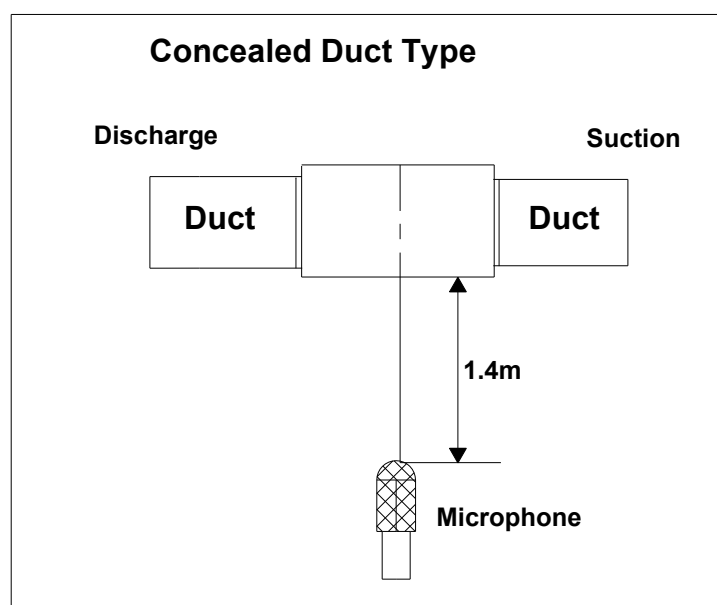
Model	Noise level dB(A)		
	H	M	L
CPA-09	37	34	31
CPA-12	39	36	32
CPA-18	35	33	31
CPA-24	50	47	45
CPA-36DU	53	49	45
CPA-48DU	44	47	41
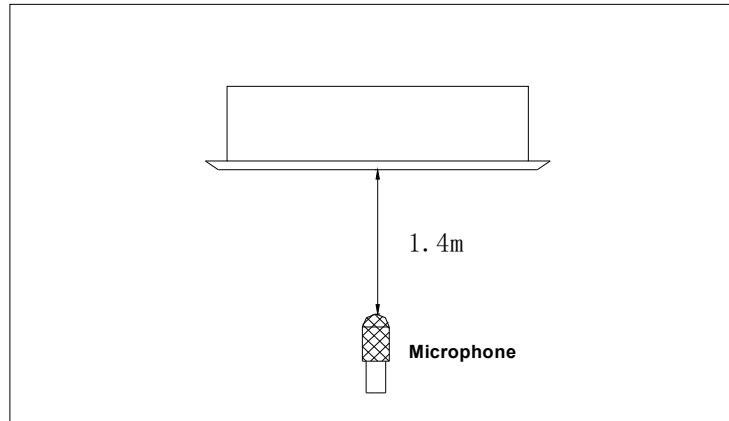
Model	Noise level dB(A)		
	H	M	L
TPA-09	41	39	37
TPA-12	41	38	35
TPA-18	46	43	41
TPA-36DU	52	47	44
TPA-48DU	53	49	45
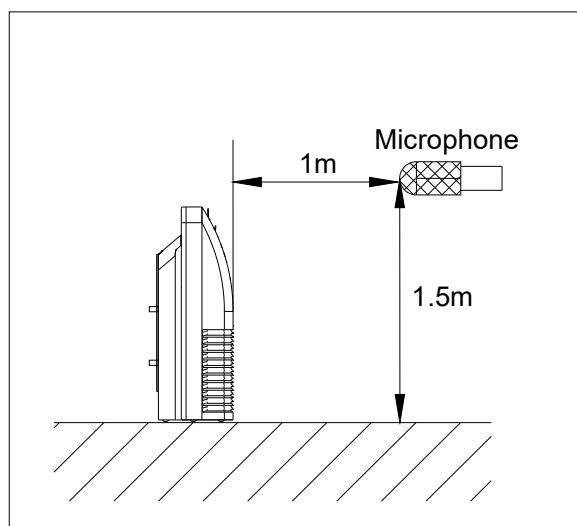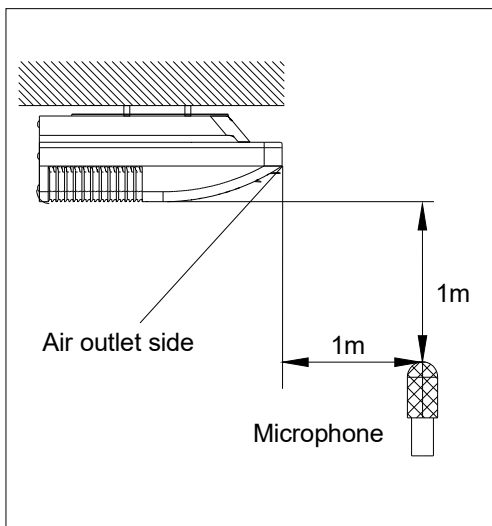
Model	Noise level dB(A)		
	H	M	L
FPA-18	47	44	38
FPA-24	53	49	45
FPA-36DU	55	48	41
FPA-48DU	57	54	52

9.2 Outdoor unit

Outdoor Unit
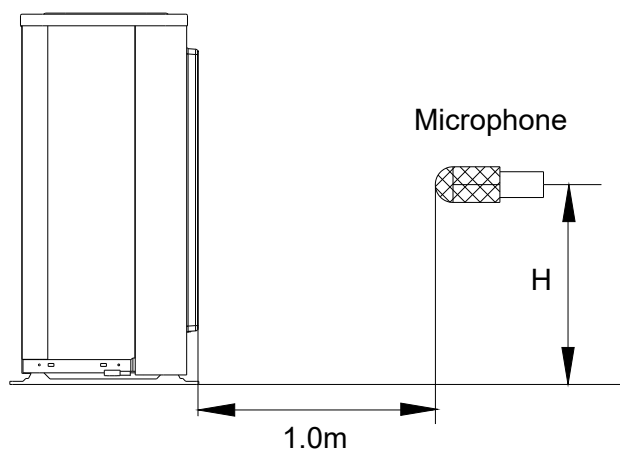
Note: H= 0.5 × height of outdoor unit
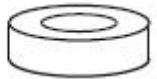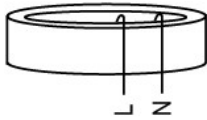
Model	Noise Level dB(A)
CPP009CD(O)	56
CPP012CD(O)	57
CPP018CD(O)	59
CPP024CD(O)	61
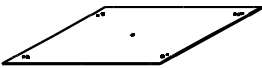
CPP036CD(O)-DU	65
CPP048CD(O)-DU	63
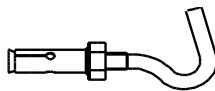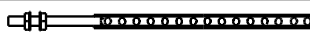
10 Accessories

Duct Units

	Name	Shape	Quantity
Tubing & Fittings	Soundproof / insulation sheath		2
	Binding tape		1
	Seal sponge		1
Drainpipe Fittings (for cooling & heating)	Drain joint		1
	Seal ring		1
Wired controller & Its Frame	Wired controller		1
Others	Owner׳s manual		1
	Installation manual		1
EMS & It's fitting	Magnetic ring (twist the electric wires L and N around it to five circles)		1

Cassette Units
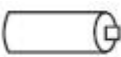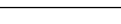
	Name	Shape	Quantity
Installation Fittings	Installation paper board		1
Tubing & Fittings	Soundproof / insulation sheath		1
Drainpipe Fittings	Out-let pipe sheath		1
	Out-let pipe clasp		1
	Drain joint		1
	Seal ring		1
Remote controller & Its Frame(The product you have might not be	Remote controller & Its Frame		1

provided the following accessories)	Remote controller holder		1
	Mounting screw(ST2.9×10-C-H)		2
	Remote controller manual		1
	Alkaline dry batteries (AM4)		2
Others	Owner's manual		1
	Installation manual		1
Installation accessory (The product you have might not be provided the following accessories	Expansible hook		4
	Installation hook		4
	Orifice		1

Console Units

	Name	Shape	Quantity
Installation fittings	Hook		2
Remote controller & Its Frame	Remote controller		1
	Frame		1
	Mounting screw(ST2.9×10-C-H)		2
	Alkaline dry batteries (AM4)		2
Others	Installation manual	/	1
	Owner's manual	/	1

Ceiling-floor Units

	Name	Shape	Quantity
Remote controller & Its holder	1. Remote controller		1
	2. Remote controller holder		1
	3. Mounting screw (ST2.9×10-C-H)		2
	4. Alkaline dry batteries (AM4)		2
Others	5. Owner's manual	——	1
	6. Installation manual	——	1
	7. Remote controller manual	——	1

45

11 The Specification of Power

Type		9K-18K	24K
Power	Phase	1-phase	1-phase
	Frequency and Voltage	208-230V, 60Hz	208-230V, 60Hz
Circuit Breaker/ Fuse (A)		25/20	40/30
Indoor Unit Power Wiring (mm^2)		————	————
Indoor/Outdoor Connecting Wiring	Ground Wiring	2.5	2.0
	Outdoor Unit Power Wiring	3×2.5	3×2.0
	Strong Electric Signal	4×1.0	4×1.5
	Weak Electric Signal	————	————

Model		36K	48K
Power	Phase	1-phase	1-phase
	Frequency and Voltage	208-230V, 60Hz	208-230V, 60Hz
Circuit Breaker/ Fuse (A)		60/40	70/55
Indoor Unit Power Wiring (mm2)		————	————
Indoor/Outdoor Connecting Wiring	Ground Wiring	4.0	4.0
	Outdoor Unit Power Wiring	3×4.0	3×4.0
	Strong Electric Signal	3×1.5	3×1.5
	Weak Electric Signal	3×0.5	3×0.5

12 Field Wiring

36K, 48K

OUTDOOR UNIT

INDOOR UNIT

2-core shielded cable(24AWG)

Use 3-core cable(14AWG) for the models which with auxiliary electric heater(PTC); Use 3-core cable(16AWG) for the others.

Power supply:
18K: 3-core cable(14AWG)
19K-36K: 3-core cable(12AWG)
37K-60K: 3-core cable(10AWG)
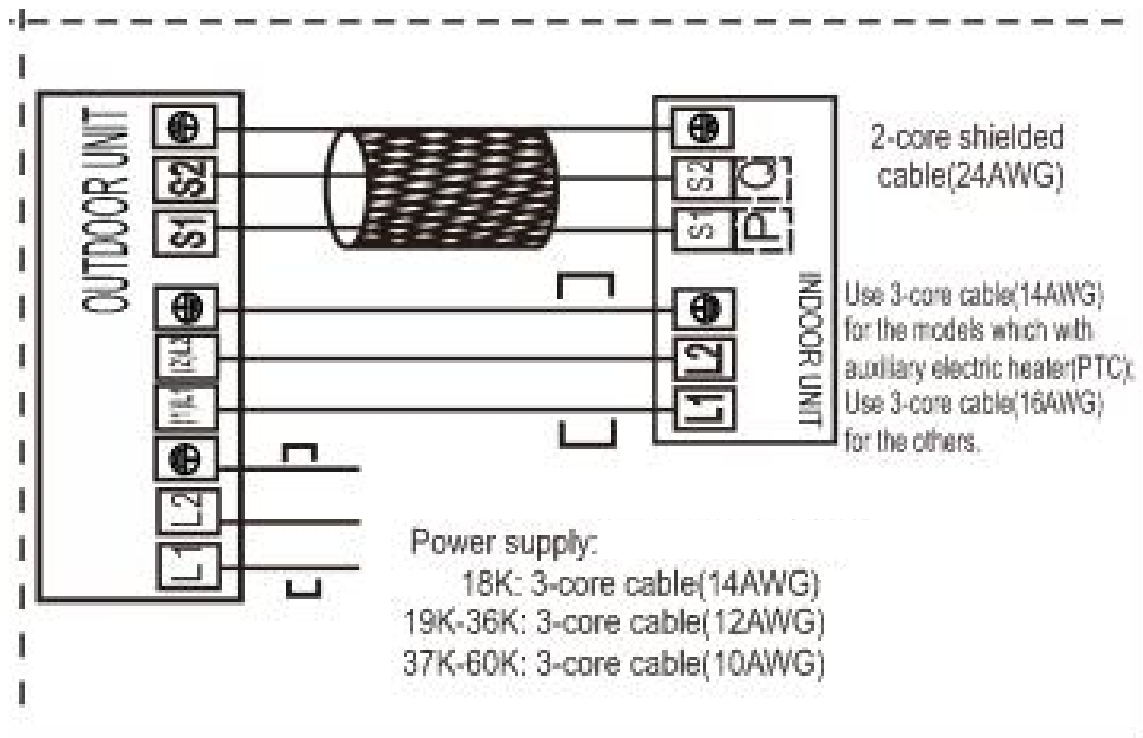
12 Installation Details

12.1 Location selection

12.1.1 Indoor unit location selection
- The place shall easily support the indoor unit's weight.
- The place can ensure the indoor unit installation and inspection.
- The place can ensure the indoor unit horizontally installed.
- The place shall allow easy water drainage.
- The place shall easily connect with the outdoor unit.
- The place where air circulation in the room should be good.
- There should not be any heat source or steam near the unit.
- There should not be any oil gas near the unit
- There should not be any corrosive gas near the unit
- There should not be any salty air neat the unit
- There should not be strong electromagnetic wave near the unit
- There should not be inflammable materials or gas near the unit
- There should not be strong voltage vibration.

12.1.2 Outdoor unit location selection
- The place shall easily support the outdoor unit's weight.
- Locate the outdoor unit as close to indoor unit as possible
- The piping length and height drop cannot exceed the allowable value.
- The place where the noise, vibration and outlet air do not disturb the neighbors.
- There is enough room for installation and maintenance.
- The air outlet and the air inlet are not impeded, and not face the strong wind.
- It is easy to install the connecting pipes and cables.
- There is no danger of fire due to leakage of inflammable gas.
- It should be a dry and well ventilation place
- The support should be flat and horizontal
- Do not install the outdoor unit in a dirty or severely polluted place, so as to avoid

blockage of the heat exchanger in the outdoor unit.
- If is built over the unit to prevent direct sunlight, rain exposure, direct strong wend, snow and other scraps accumulation, make sure that heat radiation from the condenser is not restricted.
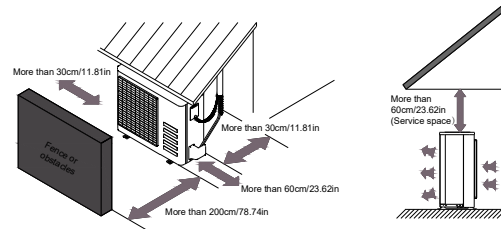
12.2 Indoor unit installation

12.2.1 A5 duct indoor unit installation
12.2.1.1 Service space for indoor unit
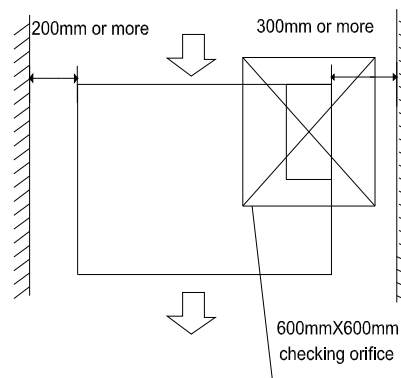
12.2.1.2 Bolt pitch
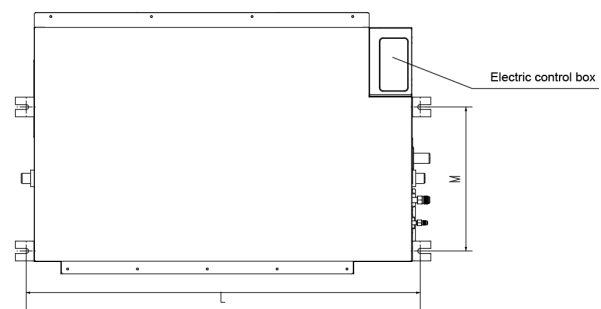
Capacity(KBtu)	Size of outline dimension mounted plug	
	L	M
12	740	350

12.2.1.3 Install the pendant bolt
Select the position of installation hooks according to the hook holes positions showed in upper picture.

Drill four holes of Ø12mm, 45~50mm deep at the selected positions on the ceiling. Then embed the expansible hooks (fittings).

12.2.1.4 Install the main body

Make the 4 suspender through the 4 hanger of the main body to suspend it. Adjust the hexangular nuts on the four installation hooks evenly, to ensure the balance of the body. Use a leveling instrument to make sure the levelness of the main body is within ±1°.

Screw nut
Shockproof cushion
Washer
Hanging screw bolt
Overhang part
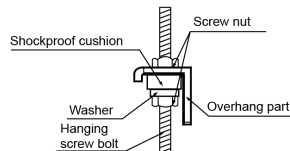
12.2.1.5 Install the air filter

Insert the air filter through the filter slot and fix it with 2 screws.
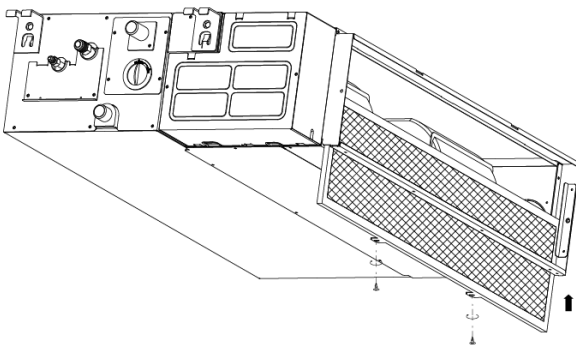
12.2.1.6 Install the air duct

Please design the air duct as below recommended picture

Canvas tie-in   Canvas tie-in
Isolation booth
Air outlet
Isolation booth
checking orifice
Air inlet
Air dust filter
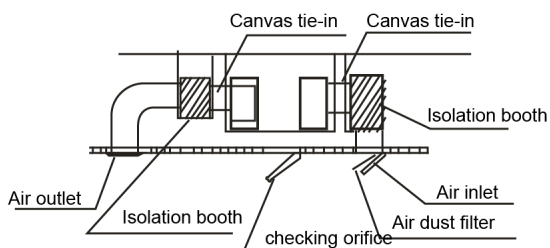
12.2.1.7 Change the air inlet direction

① Take off ventilation panel and flange, cut off the staples at side rail.

Air return flange
Dentilation panel
Side rail
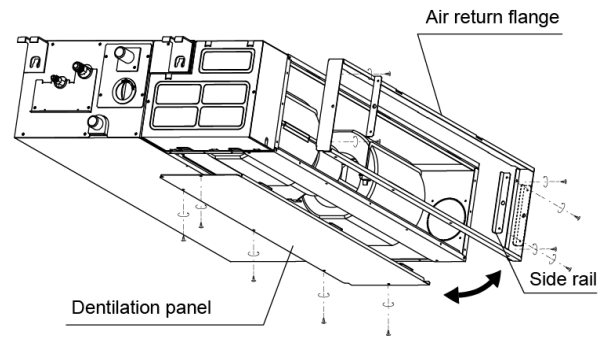
② Stick the attached seal sponge as per the indicating place in the following fig, and then change the mounting positions of air return panel and air return flange .

Seal sponge
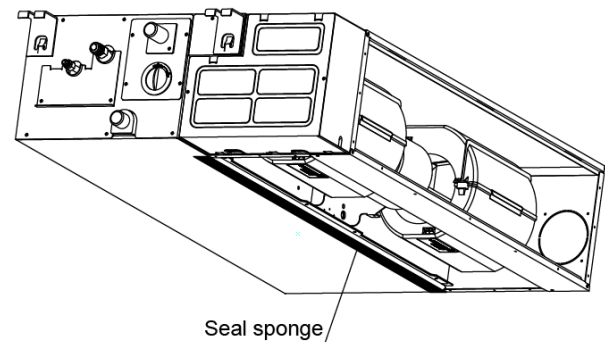
③ When install the filter mesh, please plug it into flange inclined from air return opening, and then push up.
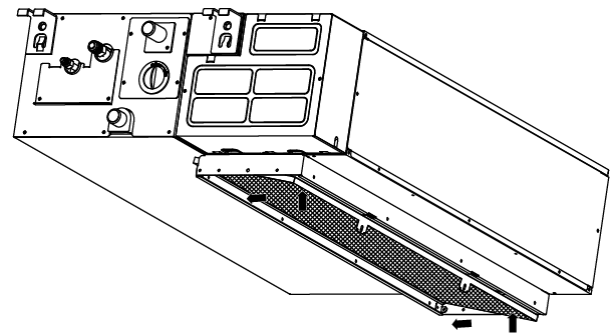
④ The installation has finish, upon filter mesh which fixing blocks have been insert to the flange positional holes.
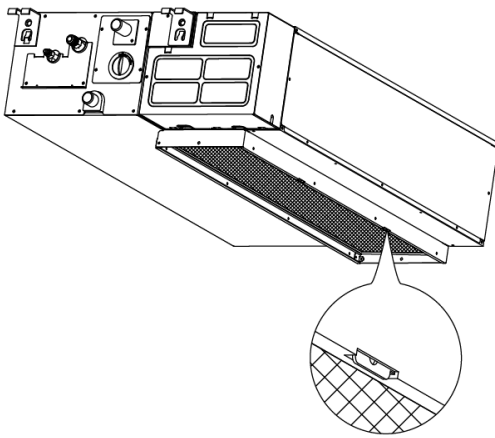
12.2.2 Cassette indoor unit installation
12.2.2.1 Service space for indoor unit
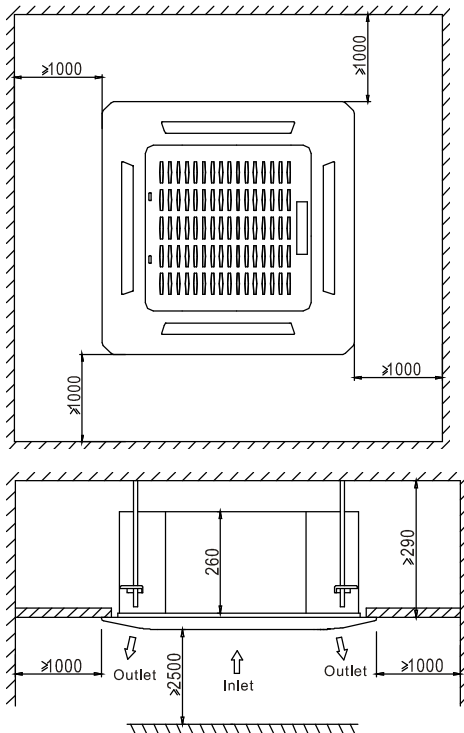
12.2.2.2 Bolt pitch
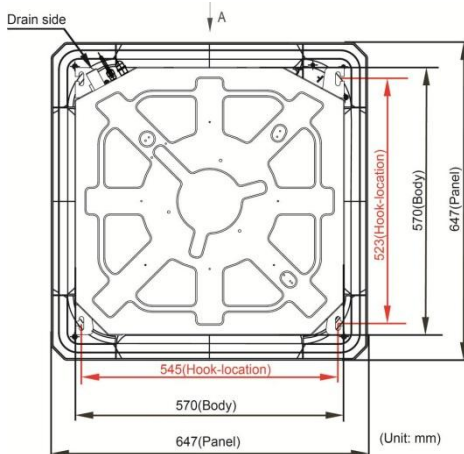
12.2.2.3 Install the pendant bolt

Select the position of installation hooks according to the hook holes positions showed in upper picture.

Drill four holes of Ø12mm, 45~50mm deep at the selected positions on the ceiling. Then embed the expansible hooks (fittings).

Face the concave side of the installation hooks toward the expansible hooks. Determine the length of the installation hooks from the height of ceiling, then cut off the unnecessary part.

If the ceiling is extremely high, please determine the length of the installation hook depending on the real situation.

12.2.2.4 Install the main body

Make the 4 suspender through the 4 hanger of the main body to suspend it. Adjust the hexangular nuts on the four installation hooks evenly, to ensure the balance of the body. Use a leveling instrument to make sure the levelness of the main body is within ±1°.
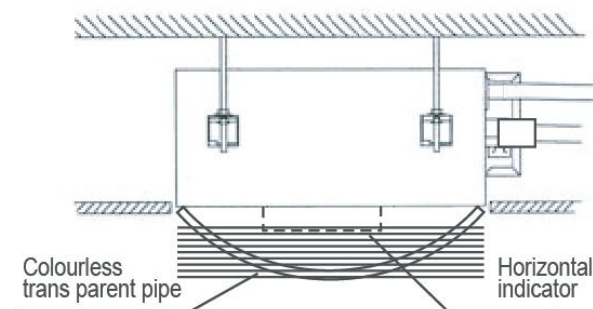
Adjust the position to ensure the gaps between the body and the four sides of ceiling are even.

The body's lower part should sink into the ceiling for 10~12 mm. In general, L is half of the screw length of the installation hook.
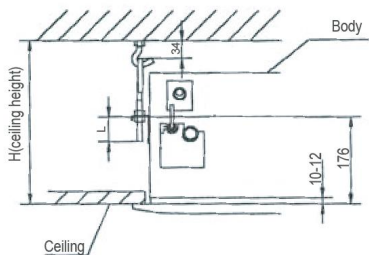
Locate the air conditioner firmly by wrenching the nuts after having adjusted the body's position well.

12.2.2.5 Install the panel
Remove the grille
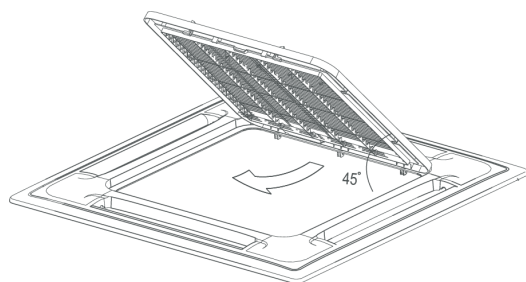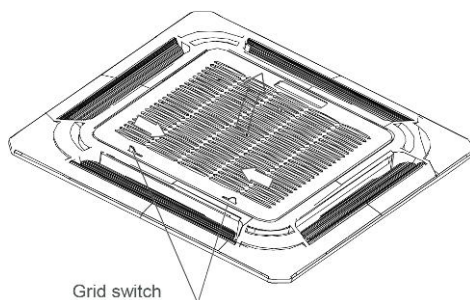
Hang the panel to the hooks on the mainbody.
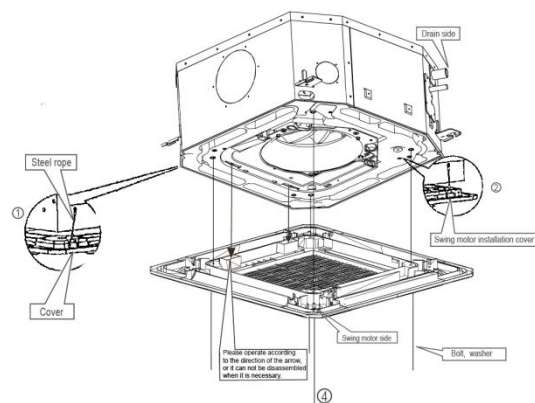
Tighten the screws under the panel hooks till the panel closely stick on the ceiling to avoid condensate water.
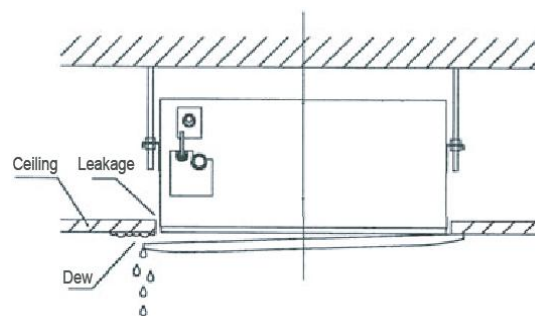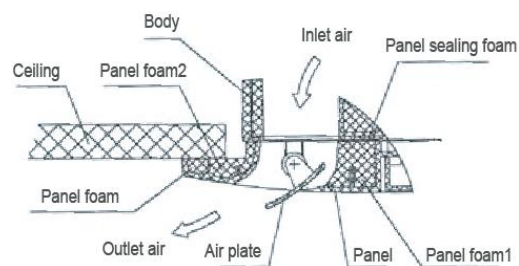
Hang the air-in grill to the panel, then connect the lead terminator of the swing motor and that of the control box with corresponding terminators on the body respectively.

Note: The panel shall be installed after the wiring connected.

12.2.3 Console indoor unit installation
14.2.1.1 Service space for indoor unit
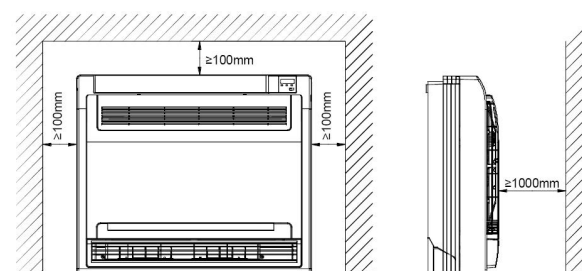
12.2.3.2 Install the main body

● Fix the hook with tapping screw onto the wall
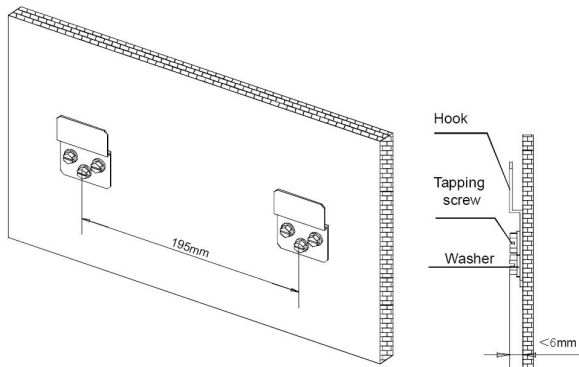
● Hang the indoor unit on the hook.

(The bottom of body can touch with floor or suspended, but the body must install vertically.)
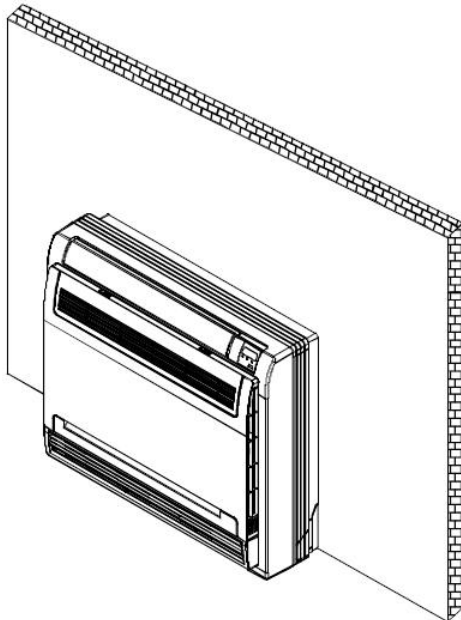
14.2.1 Ceiling-floor unit installation
14.2.1.1 Service space for indoor unit
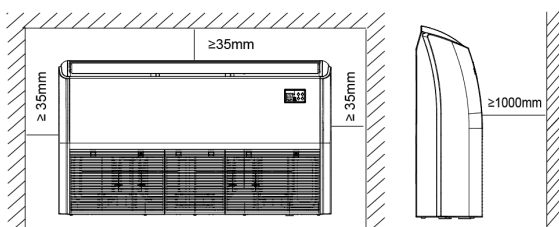
12.2.1.2 Bolt pitch
① Ceiling installation
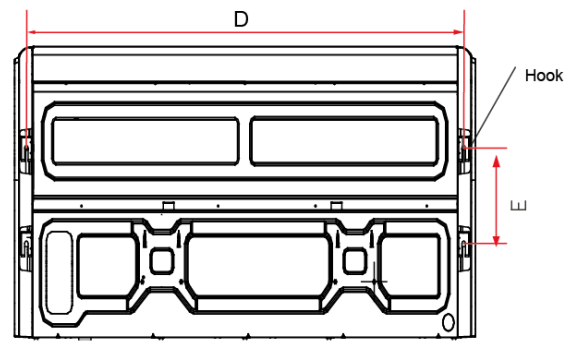
Capacity (Btu/h)	D	E
24K	983	220
36K	1200	220
48K	1565	220

② Wall-mounted installation
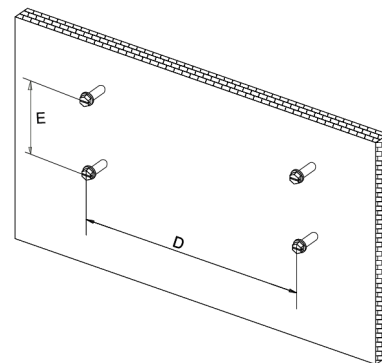
3.4.1 Install the pendant bolt
① Ceiling installation

Select the position of installation hooks according to the hook holes positions showed in upper picture. Drill four holes of Ø12mm, 45~50mm deep at the selected positions on the ceiling. Then embed the expansible hooks (fittings).

② Wall-mounted installation

Install the tapping screws onto the wall.(Refer to picture below)
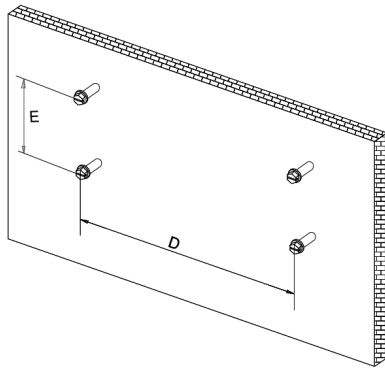
14.2.1.3 Install the main body

① Ceiling installation (The only installation method for the unit with drain pump)

Remove the side board and the grille.
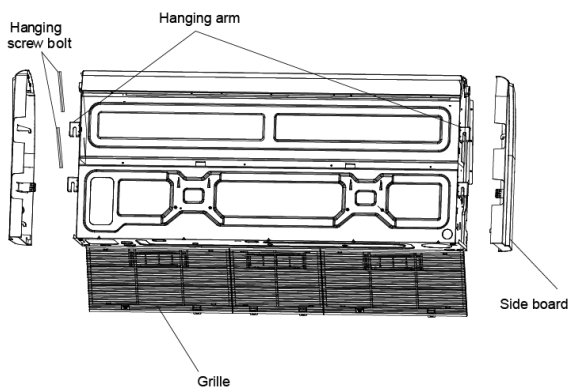
Locate the hanging arm on the hanging screw bolt.

Prepare the mounting bolts on the unit.
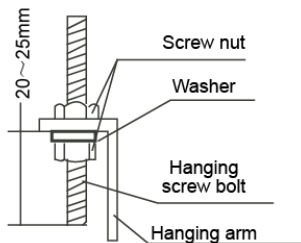
Put the side panels and grilles back.
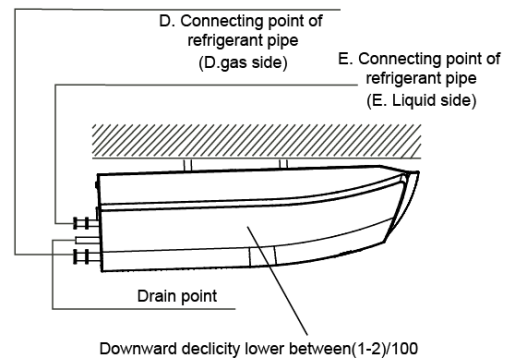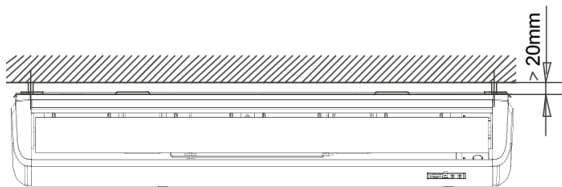
② Wall-mounted installation

Hang the indoor unit by insert the tapping screws into the hanging arms on the main unit. (The bottom of body can touch with floor or suspended, but the body must install vertically.)
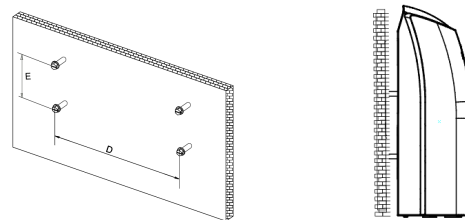
12.3 Outdoor unit installation

12.3.1 Service space for outdoor unit

12.3.2 Bolt pitch

53
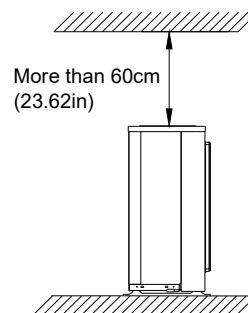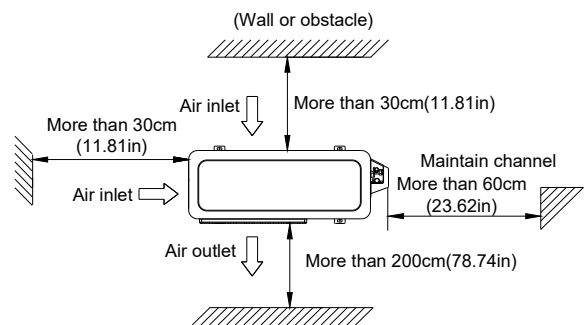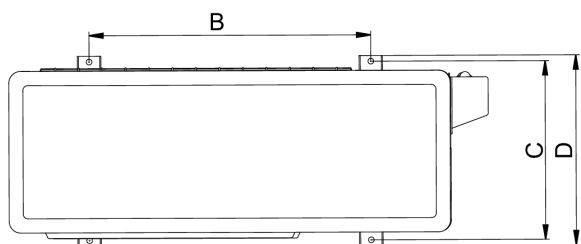
Model	B		C		D	
	mm	inch	mm	inch	mm	inch
9K	549	21.61	325	12.80	350	13.78
12K	549	21.61	325	12.80	350	13.78
18K	560	22.05	335	13.19	360	14.17
24K	640	25.20	405	15.94	448	17.64
36K	640	25.20	405	15.94	448	17.64
48K	634	24.96	404	15.91	448	17.64

14.3.3 Install the Unit

Since the gravity center of the unit is not at its physical center, so please be careful when lifting it with a sling.

Never hold the inlet of the outdoor unit to prevent it from deforming.

Do not touch the fan with hands or other objects.

Do not lean it more than 45, and do not lay it sidelong.

Make concrete foundation according to the specifications of the outdoor units.

Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind.
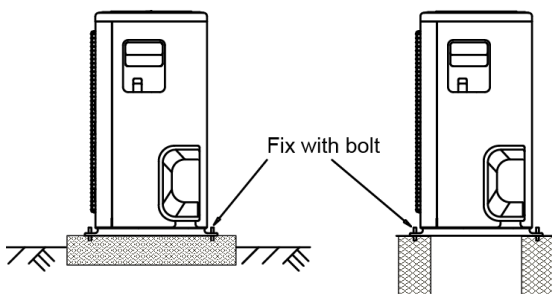
12.4 Refrigerant pipe installation

12.4.1 Maximum pipe length and height drop

Considering the allowable pipe length and height drop to decide the installation position. Make sure the distance and height drop

between indoor and outdoor unit not exceeded the date in the following table.

Model	Max. Length		Max. Elevation	
	m	Ft.	m	Ft.
9,000Btu/h	25	82.2	10	32.9
12,000Btu/h	25	82.2	10	32.9
18,000Btu/h	30	98.7	20	65.8
24,000Btu/h	50	164.5	25	82.2
36,000Btu/h	65	213.8	30	98.7
48,000Btu/h	65	213.8	30	98.7

12.4.2 The procedure of connecting pipes

1. Choose the pipe size according to the specification table.
2. Confirm the cross way of the pipes.
3. Measure the necessary pipe length.
4. Cut the selected pipe with pipe cutter
➤ Make the section flat and smooth.
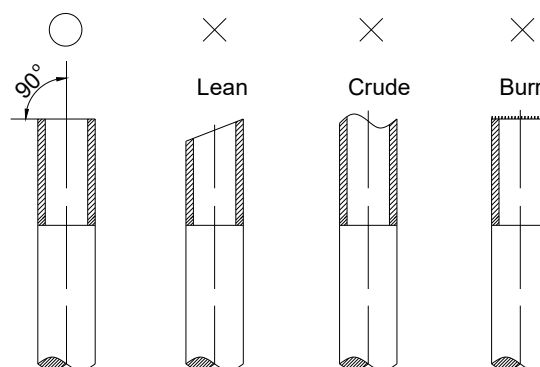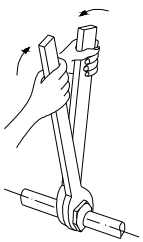
5. Insulate the copper pipe
➤ Before test operation, the joint parts should not be heat insulated.
6. Flare the pipe
➤ Insert a flare nut into the pipe before flaring the pipe
➤ According to the following table to flare the pipe

Pipe diameter	Flare dimension A (mm)		Flare shape
	Min	Max	
1/4" (6.35)	8.3	8.7	
3/8" (9.52)	12.0	12.4	

1/2" (12.7)	15.4	15.8	
5/8" (15.9)	18.6	19.1	
3/4" (19)	22.9	23.3	

➤ After flared the pipe, the opening part must be seal by end cover or adhesive tape to avoid duct or exogenous impurity come into the pipe.

7. Drill holes if the pipes need to pass the wall.
8. According to the field condition to bend the pipes so that it can pass the wall smoothly.
9. Bind and wrap the wire together with the insulated pipe if necessary.
10. Set the wall conduit
11. Set the supporter for the pipe.
12. Locate the pipe and fix it by supporter

➤ For horizontal refrigerant pipe, the distance between supporters should not be exceed 1m.

➤ For vertical refrigerant pipe, the distance between supporters should not be exceed 1.5m.

13. Connect the pipe to indoor unit and outdoor unit by using two spanners.

➤ Be sure to use two spanners and proper torque to fasten the nut, too large torque will damage the flare, and too small torque may cause leakage. Refer the following table for different pipe connection.

➤

Pipe Diameter	Torque		Sketch map
	(kgf.cm)	(N.cm)	
1/4" (6.35)	144~176	1420~1720	
3/8" (9.52)	333~407	3270~3990	
1/2" (12.7)	504~616	4950~6030	
5/8" (15.9)	630~770	6180~7540	
3/4" (19)	990~1210	9270~11860	

12.4.3 Installation for the first time

Air and moisture in the refrigerant system have undesirable effects as below:

● Pressure in the system rises.
● Operating current rises.
● Cooling or heating efficiency drops.

● Moisture in the refrigerant circuit may freeze and block capillary tubing.
● Water may lead to corrosion of parts in the refrigerant system.

Therefore, the indoor units and the pipes between indoor and outdoor units must be leak tested and evacuated to remove gas and moisture from the system.

Gas leak check (Soap water method):

Apply soap water or a liquid neutral detergent on the indoor unit connections or outdoor unit connections by a soft brush to check for leakage of the connecting points of the piping. If bubbles come out, the pipes have leakage.

1. Air purging with vacuum pump
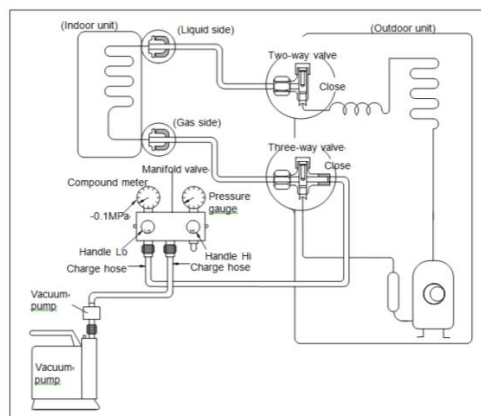
1) Completely tighten the flare nuts of the indoor and outdoor units, confirm that both the 2-way and 3-way valves are set to the closed position.
2) Connect the charge hose with the push pin of handle lo to the 3-way valves gas service port..
3) Connect the charge hose of handle hi connection to the vacuum pump.
4) Fully open the handle Lo of the manifold valve.
5) Operate the vacuum pump to evacuate.
6) Make evacuation for 30 minutes and check whether the compound meter indicates -0.1Mpa (14.5Psi). If the meter does not indicate -0.1Mpa (14.5Psi) after pumping 30 minutes, it should be pumped 20 minutes more. If the pressure can't achieve -0.1Mpa (14.5Psi) after pumping 50 minutes, please check if there are some leakage points. Fully close the handle Lo valve of the manifold valve and stop the operation of the

vacuum pump. Confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

7) Turn the flare nut of the 3-way valves about 45° counterclockwise for 6 or 7seconds after the gas coming out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure. Then remove the charge hose from the 3 way valve.

8) Fully open the 2 way valve and 3 way valve and securely tighten the cap of the 3 way valve.

2. Air purging by refrigerant
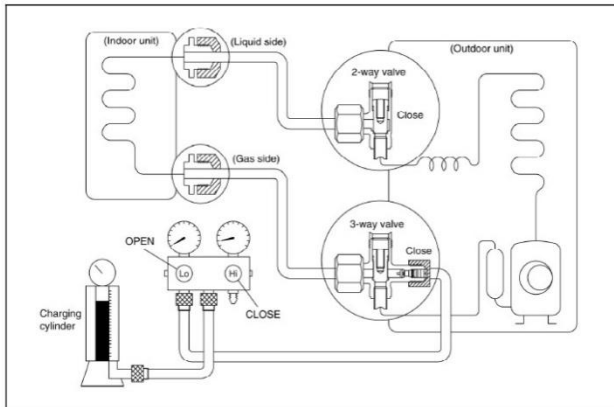
Procedure:

1). Confirm that both the 2-way and 3-way valves are set to the closed position.

2). Connect the charge set and a charging cylinder to the service port of the 3-way valve.

3). Air purging.

Open the valves on the charging cylinder and the charge set. Purge the air by loosening the flare nut on the 2-way valve approximately 45' for 3 seconds then closing it for 1 minute; repeat 3 times.

After purging the air, use a torque wrench to tighten the flare nut on the 2-way valve.

4). Check the gas leakage.

Check the flare connections for gas leakage.

5). Discharge the refrigerant.

Close the valve on the charging cylinder and discharge the refrigerant by loosening the flare nut on the 2-way valve approximately 45' until the gauge indicates 0.3Mpa (43.5Psi) to 0.5 Mpa (72.5Psi).

6). Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position.

Be sure to use a hexagonal wrench to operate the valve stems.

7). Mount the valve stems nuts and the service port cap.

Be sure to use a torque wrench to tighten the service port cap to a torque 18N·m.

Be sure to check the gas leakage.

12.4.4 Adding the refrigerant after running the system for many years
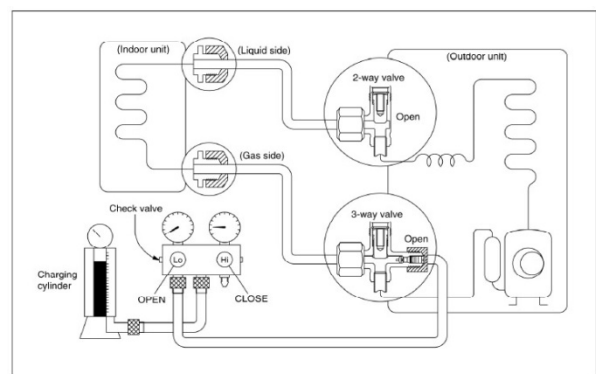
Procedure

1). Connect the charge hose to the 3-way service port, open the 2-way valve and the 3-way valve.

Connect the charge hose to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.

2). Purge the air from the charge hose.

Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

3) Put the charging cylinder onto the electronic scale and record the weight.

4) Operate the air conditioner at the cooling mode.

5) Open the valves (Low side) on the charge set and charge the system with liquid refrigerant.

6).When the electronic scale displays the proper weight (refer to the gauge and the pressure of the low side), disconnect the charge hose from the 3-way valve's service port

immediately and turn off the air conditioner before disconnecting the hose.

7). Mount the valve stem caps and the service port

Use torque wrench to tighten the service port cap to a torque of 18N.m.

Be sure to check for gas leakage.

12.4.5 Re-installation while the indoor unit need to be repaired

1. Collecting the refrigerant into the outdoor unit
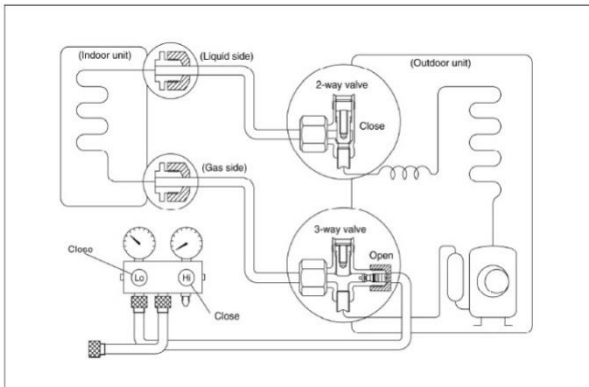
Procedure

1). Confirm that both the 2-way and 3-way valves are set to the opened position

Remove the valve stem caps and confirm that the valve stems are in the opened position.

Be sure to use a hexagonal wrench to operate the valve stems.

2). Connect the charge hose with the push pin of handle lo to the 3-way valves gas service port.

3). Air purging of the charge hose.

Open the handle Lo valve of the manifold valve slightly to purge air from the charge hose for 5 seconds and then close it quickly.

4). Set the 2-way valve to the close position.

5). Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1Mpa (14.5Psi).

6). Set the 3-way valve to the closed position immediately

Do this quickly so that the gauge ends up indicating 0.3Mpa (43.5Psi) to 0.5 Mpa (72.5Psi).

Disconnect the charge set, and tighten the 2-way and 3-way valve's stem nuts.

Use a torque wrench to tighten the 3-way valves service port cap to a torque of 18N.m.

Be sure to check for gas leakage.

2. Air purging by the refrigerant
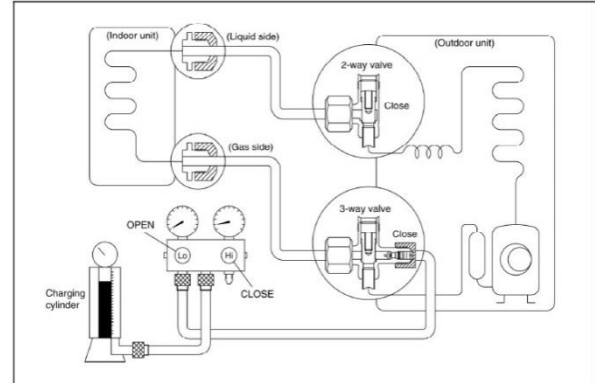
Procedure:

1). Confirm that both the 2-way and 3-way valves are set to the closed position.

2). Connect the charge set and a charging cylinder to the service port of the 3-way valve

Leave the valve on the charging cylinder closed.

3). Air purging.

Open the valves on the charging cylinder and the charge set. Purge the air by loosening the flare nut on the 2-way valve approximately 45' for 3 seconds then closing it for 1 minute; repeat 3 times.

After purging the air, use a torque wrench to tighten the flare nut on the 2-way valve.

4). Check the gas leakage

Check the flare connections for gas leakage.

5). Discharge the refrigerant.

Close the valve on the charging cylinder and discharge the refrigerant by loosening the flare nut on the 2-way valve approximately 45' until the gauge indicates 0.3Mpa (43.5Psi) to 0.5 Mpa (72.5Psi).

6). Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position

Be sure to use a hexagonal wrench to operate the valve stems.

7). Mount the valve stems nuts and the service port cap

Be sure to use a torque wrench to tighten the service port cap to a torque 18N.m.
Be sure to check the gas leakage.

12.4.6 Re-installation while the outdoor unit need to be repaired
1. Evacuation for the whole system
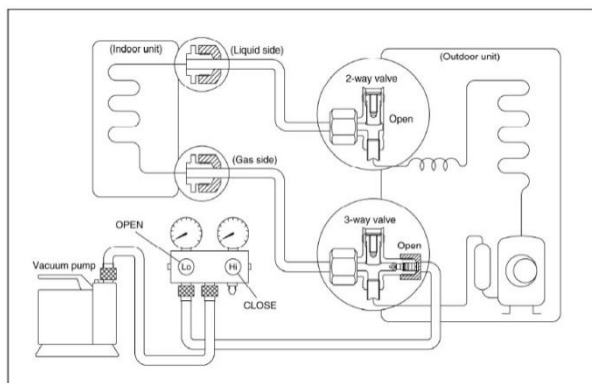
Procedure:

1). Confirm that both the 2-way and 3-way valves are set to the opened position.

2). Connect the vacuum pump to 3-way valve's service port.

3). Evacuation for approximately one hour. Confirm that the compound meter indicates -0.1Mpa (14.5Psi).

4). Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

5). Disconnect the charge hose from the vacuum pump.

2. Refrigerant charging
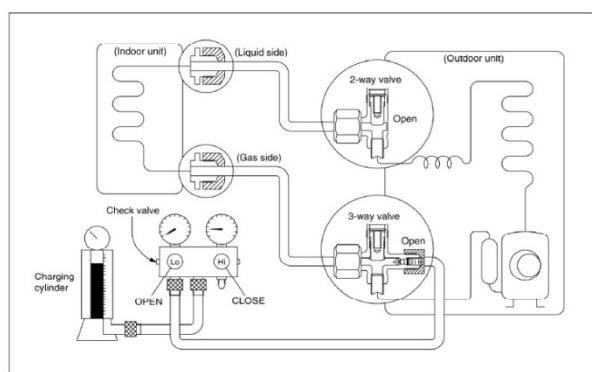
Procedure:

1). Connect the charge hose to the charging cylinder, open the 2-way valve and the 3-way valve

Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.

2). Purge the air from the charge hose

Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

3) Put the charging cylinder onto the electronic scale and record the weight.

4). Open the valves (Low side) on the charge set and charge the system with liquid refrigerant

If the system cannot be charge with the specified amount of refrigerant, or can be charged with a little at a time (approximately 150g each time) , operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure.

5).When the electronic scale displays the proper weight, disconnect the charge hose from the 3-way valve's service port immediately

If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.

6). Mounted the valve stem caps and the service port. Use torque wrench to tighten the service port cap to a torque of 18N.m. Be sure to check for gas leakage.

12.5   Drainage pipe installation

Install the drainage pipe as shown below and take measures against condensation. Improperly installation could lead to leakage and eventually wet furniture and belongings.

12.5.1 Installation principle
➢   Ensure at least 1/100 slope of the drainage pipe
➢   Adopt suitable pipe diameter
➢   Adopt nearby condensate water discharge

12.5.2 Key points of drainage water pipe installation

1. Considering the pipeline route and elevation

➢ Before installing condensate water pipeline, determine its route and elevation to avoid intersection with other pipelines and ensure slope is straight.

2. Drainage pipe selection

➢ The drainage pipe diameter shall not small than the drain hose of indoor unit

➢ According to the water flowrate and drainage pipe slope to choose the suitable pipe, the water flowrate is decided by the capacity of indoor unit.

Relationship between water flowrate and capacity of indoor unit

Capacity (x1000Btu)	Water flowrate (l/h)
12	2.4
18	4
24	6
30	7
36	8
42	10
48	12
60	14

According to the above table to calculate the total water flowrate for the confluence pipe selection.

For horizontal drainage pipe (The following table is for reference)

PVC pipe	Reference value of inner diameter of pipe (mm)	Allowable maximum water flowrate (l/h)		Remark
		Slope 1/50	Slope 1/100	
PVC25	20	39	27	For branch pipe
PVC32	25	70	50	
PVC40	31	125	88	Could be used for confluence pipe
PVC50	40	247	175	
PVC63	51	473	334	

Attention: Adopt PVC40 or bigger pipe to be the main pipe.

For Vertical drainage pipe (The following table is for reference)

PVC	Reference	Allowable	Remark
pipe	value of inner diameter of pipe (mm)	maximum water flowrate (l/h)	
PVC25	20	220	For branch pipe
PVC32	25	410	
PVC40	31	730	Could be used for confluence pipe
PVC50	40	1440	
PVC63	51	2760	
PVC75	67	5710	
PVC90	77	8280	

Attention: Adopt PVC40 or bigger pipe to be the main pipe.

3. Individual design of drainage pipe system

➢ The drainage pipe of air conditioner shall be installed separately with other sewage pipe, rainwater pipe and drainage pipe in building.

➢ The drainage pipe of the indoor unit with water pump should be apart from the one without water pump.

4. Supporter gap of drainage pipe

➢ In general, the supporter gap of the drainage pipe horizontal pipe and vertical pipe is respectively 1m~1.5m (3.28~4.92ft) and 1.5m~2.0m(4.95~6.56ft).

➢ Each vertical pipe shall be equipped with not less than two hangers.

➢ Overlarge hanger gap for horizontal pipe shall create bending, thus leading to air block.
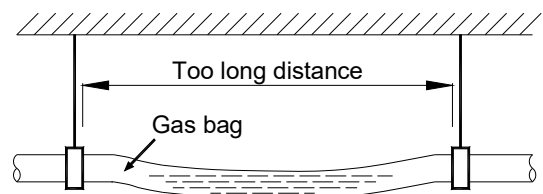
5. The horizontal pipe layout should avoid converse flow or bad flow
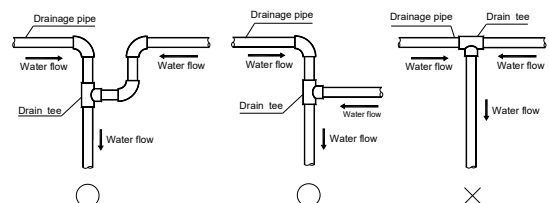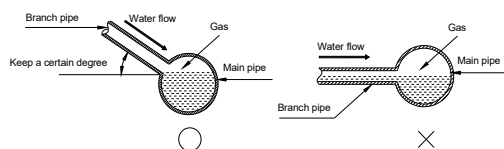
- The correct installation will not cause converse water flow and the slope of the branch pipes can be adjusted freely
- The false installation will cause converse water flow and the slope of the branch pipe cannot be adjusted.

6. Water storage pipe setting

- If the indoor unit has high extra static pressure and without water pump to elevate the condensate water, such as high extra static pressure duct unit , the water storage pipe should be set to avoid converse flow or blow water phenomena.
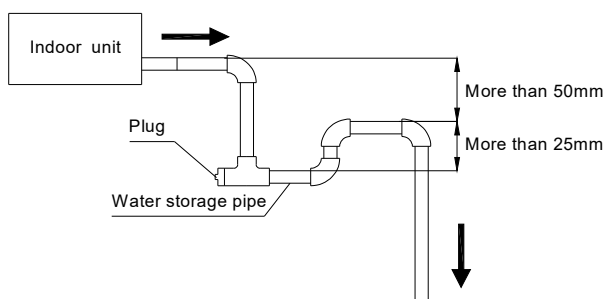
7. Lifting pipe setting of indoor unit with water pump

- The length of lifting pipe should not exceed the pump head of indoor unit water pump.
- The drainage pipe should be set down inclined after the lifting pipe immediately to avoid wrong operation of water level switch.
- Refer the following picture for installation reference.
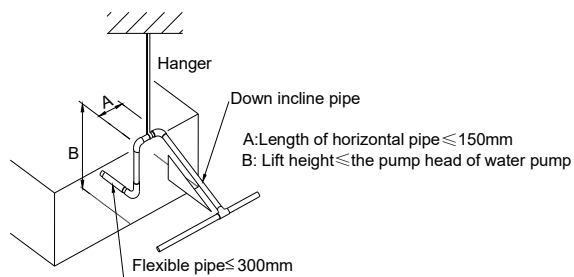
8. Blowhole setting

- For the concentrated drainage pipe system, there should design a blowhole at the highest point of main pipe to ensure the condensate water discharge smoothly.

- The air outlet shall face down to prevent dirt entering pipe.
- Each indoor unit of the system should be installed it.
- The installation should be considering the convenience for future cleaning.
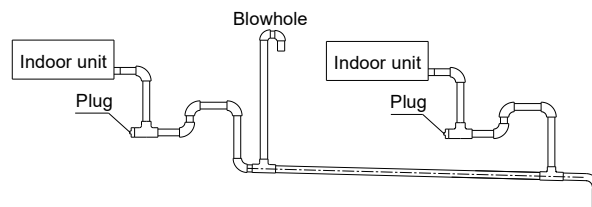
9. The end of drainage pipe shall not contact with ground directly.

12.5.3 Drainage test
12.5.3.1. Water leakage test

After finishing the construction of drainage pipe system, fill the pipe with water and keep it for 24 hours to check whether there is leakage at joint section.

12.5.3.2. Water discharge test

1. Natural drainage mode(the indoor unit with outdoor drainage pump)

   Infuse above 600ml water through water test hole slowly into the water collector, observe whether the water can discharge through the transparent hard pipe at drainage outlet.
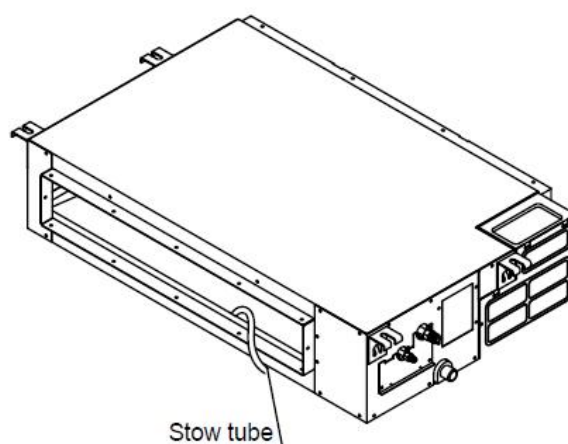
2. Pump drainage mode

2.1 Disconnect the plug of water level switch, remove the cover of water test hole and slowly infuse about 2000ml water through the water

test hole, be sure that the water will not touch the motor of drainage pump.

Test cap
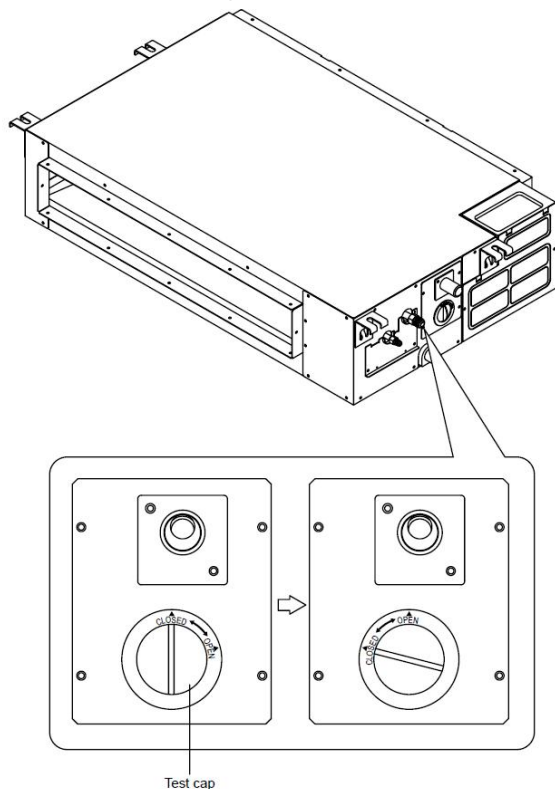
2.2 Power on and let the air conditioner operate for cooling. Check operation status of drainage pump, and then connect the plug of water level switch, check the operation sound of water pump and observe whether the water can discharge through the transparent hard pipe at drainage outlet. (In light of the length of drainage pipe, water shall be discharged about 1 minute delayed)

2.3 Stop the operation of air conditioner, power off the power supply and put the cover of water test hole back to the original place.

a. After stopped the air conditioner 3 minutes, check whether there is anything abnormal. If drainage pipes have not been distributed properly, over back-flow water shall cause the flashing of alarm indicator at remote-controlled receiving board and

even water shall run over the water collector.

b. Continuously infusing water until water level alarmed, check whether the drainage pump could discharge water at once. If water level does not decline under warning water level 3 minutes later, it shall cause shutdown of unit. When this situation happens, the normal startup only can be recovered by turning down power supply and eliminating accumulated water.

Note: Drain plug at the main water-containing plate is used for eliminating accumulated water in water-containing plate when maintaining air conditioner fault. During normal operation, the plug shall be filled in to prevent leakage.

12.5.4   Insulation work of drainage pipe
Refer the introduction to the insulation engineering parts.

12.6   Vacuum Drying and Leakage Checking

12.6.1   Purpose of vacuum drying
➤ Eliminating moisture in system to prevent the phenomena of ice-blockage and copper oxidation.

Ice-blockage shall cause abnormal operation of system, while copper oxide shall damage compressor.

➤ Eliminating the non-condensable gas (air) in system to prevent the components oxidizing, pressure fluctuation and bad heat exchange during the operation of system.

12.6.2   Selection of vacuum pump
➤ The ultimate vacuum degree of vacuum pump shall be -756mmHg or above.

➤ Precision of vacuum pump shall reach 0.02mmHg or above.

12.6.3 Operation procedure for vacuum drying

Due to different construction environment, two kinds of vacuum drying ways could be chosen, namely ordinary vacuum drying and special vacuum drying.

1 Ordinary vacuum drying

➢ When conduct first vacuum drying, connect pressure gauge to the infusing mouth of gas pipe and liquid pipe, and keep vacuum pump running for 1hour (vacuum degree of vacuum pump shall be reached -755mmHg).

➢ If the vacuum degree of vacuum pump could not reach -755mmHg after 1 hour of drying, it indicates that there is moisture or leakage in pipeline system and need to go on with drying for half an hour.

➢ If the vacuum degree of vacuum pump still could not reach -755mmHg after 1.5 hours of drying, check whether there is leakage source.

➢ Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

2 Special vacuum drying

The special vacuum drying method shall be adopted when:

➢ Finding moisture during flushing refrigerant pipe.

➢ Conducting construction on rainy day, because rain water might penetrated into pipeline.

➢ Construction period is long, and rain water might penetrated into pipeline.

➢ Rain water might penetrate into pipeline during construction.

Procedures of special vacuum drying are as follows:

➢ Vacuum drying for 1 hour.

➢ Vacuum damage, filling nitrogen to reach 0.5Kgf/cm2 .

Because nitrogen is dry gas, vacuum damage could achieve the effect of vacuum drying, but this method could not achieve drying thoroughly when there is too much moisture. Therefore, special attention shall be drawn to prevent the entering of water and the formation of condensate water.

➢ Vacuum drying again for half an hour.

If the pressure reaches -755mmHg,start to pressure leakage test. If it cannot reach the value, repeat vacuum damage and vacuum drying again for 1 hour.

➢ Leakage test: After the vacuum degree reaches -755mmHg, stop vacuum drying and keep the pressure for 1 hour. If the indicator of vacuum gauge does not go up, it is qualified. If going up, it indicates that there is moisture or leak source.

12.7 Additional refrigerant charge

➢ After the vacuum drying process is carried out, the additional refrigerant charge process needs to be performed.

➢ The outdoor unit is factory charged with refrigerant. The additional refrigerant charge volume is decided by the diameter and length of the liquid pipe between indoor and outdoor unit. Refer the following formula to calculate the charge volume.

Diameter of liquid pipe (mm)	Φ6.35	Φ9.52
Formula	V=15g/m×(L-7.5)	V=30g/m×(L-7.5)

V: Additional refrigerant charge volume (g).

L: The length of the liquid pipe (m).

Note:
➢ Refrigerant may only be charged after performed the vacuum drying process.
➢ Always use gloves and glasses to protect your hands and eyes during the charge work.
➢ Use electronic scale or fluid infusion apparatus to weight refrigerant to be recharged. Be sure to avoid extra refrigerant charged, it may cause liquid hammer of the compressor or protections.
➢ Use supplementing flexible pipe to connect refrigerant cylinder, pressure gauge and outdoor unit. And The refrigerant should be charged in liquid state. Before recharging, The air in the flexible pipe and manifold gauge should be exhausted.
➢ After finished refrigerant recharge process, check whether there is refrigerant leakage at the connection joint part. (Using gas leakage detector or soap water to detect).

12.8 Engineering of insulation

12.8.1 Insulation of refrigerant pipe

1 Operational procedure of refrigerant pipe insulation

Cut the suitable pipe → insulation (except joint section) → flare the pipe → piping layout and connection→ vacuum drying → insulate the joint parts

2 Purpose of refrigerant pipe insulation
➢ During operation, temperature of gas pipe and liquid pipe shall be over-heating or over-cooling extremely. Therefore, it is necessary to carry out insulation; otherwise it shall debase the performance of unit and burn compressor.
➢ Gas pipe temperature is very low during cooling. If insulation is not enough, it shall form dew and cause leakage.
➢ Temperature of gas pipe is very high (generally 50-100 ℃) during heating.

Insulation work must be carried out to prevent hurt by carelessness touching.

3 Insulation material selection for refrigerant pipe
➢ The burning performance should over 120℃
➢ According to the local law to choose insulation materials
➢ The thickness of insulation layer shall be above 10mm.If in hot or wet environment place, the layer of insulation should be thicker accordingly.

4 Installation highlights of insulation construction
➢ Gas pipe and liquid pipe shall be insulated separately, if the gas pipe and liquid pipe were insulated together; it will decrease the performance of air conditioner.
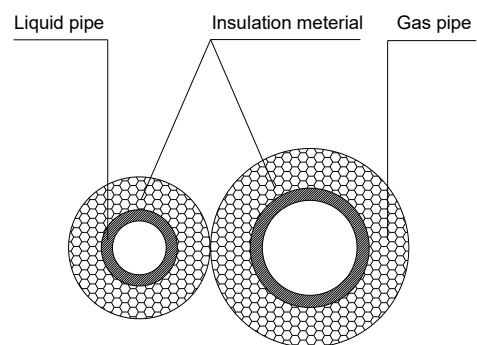
➢ The insulation material at the joint pipe shall be 5~10cm longer than the gap of the insulation material.
➢ The insulation material at the joint pipe shall be inserted into the gap of the insulation material.
➢ The insulation material at the joint pipe shall be banded to the gap pipe and liquid pipe tightly.
➢ The linking part should be use glue to paste together
➢ Be sure not bind the insulation material over-tight, it may extrude out the air in the material to cause bad insulation and cause easy aging of the material.

12.8.2 Insulation of drainage pipe
1 Operational procedure of refrigerant pipe insulation

Select the suitable pipe → insulation (except joint section) → piping layout and connection→ drainage test→ insulate the joint parts

2   Purpose of drainage pipe insulation

The temperature of condensate drainage water is very low. If insulation is not enough, it shall form dew and cause leakage to damage the house decoration.

3   Insulation material selection for drainage pipe

➤ The insulation material should be flame retardant material, the flame retardancy of the material should be selected according to the local law.

➤ Thickness of insulation layer is usually above 10mm.

➤ Use specific glue to paste the seam of insulation material, and then bind with adhesive tape. The width of tape shall not be less than 5cm. Make sure it is firm and avoid dew.

4   Installation and highlights of insulation construction

➤ The single pipe should be insulated before connecting to another pipe, the joint part should be insulated after the drainage test.

➤ There should be no insulation gap between the insulation material.

12.9   Engineering of electrical wiring

1   Highlights of electrical wiring installation

➤ All field wiring construction should be finished by qualified electrician.

➤ Air conditioning equipment should be grounded according to the local electrical regulations.

➤ Current leakage protection switch should be installed.

➤ Do not connect the power wire to the terminal of signal wire.

➤ When power wire is parallel with signal wire, put wires to their own wire tube and remain at least 300mm gap.

➤ According to table in indoor part named "the specification of the power" to choose the wiring, make sure the selected wiring not small than the date showing in the table.

➤ Select different colors for different wire according to relevant regulations.

➤ Do not use metal wire tube at the place with acid or alkali corrosion, adopt plastic wire tube to replace it.

➤ There must be not wire connect joint in the wire tube If joint is a must, set a connection box at the place.

➤ The wiring with different voltage should not be in one wire tube.

➤ Ensure that the color of the wires of outdoor and the terminal No. are same as those of indoor unit respectively.

12.10 Test operation

1   The test operation must be carried out after the entire installation has been completed.

2   Please confirm the following points before the test operation.

➤ The indoor unit and outdoor unit are installed properly.

➤ Tubing and wiring are correctly completed.

➤ The refrigerant pipe system is leakage-checked.

➤ The drainage is unimpeded.

➤ The ground wiring is connected correctly.

➤ The length of the tubing and the added stow capacity of the refrigerant have been recorded.

➤ The power voltage fits the rated voltage of the air conditioner.

➤ There is no obstacle at the outlet and inlet of the outdoor and indoor units.

➤ The gas-side and liquid-side stop values are both opened.

➤ The air conditioner is pre-heated by turning on the power.

3   Test operation

Set the air conditioner under the mode of "COOLING" by remote controller, and check the following points.

Indoor unit

➤ Whether the switch on the remote controller works well.

- ➢ Whether the buttons on the remote controller works well.
- ➢ Whether the air flow louver moves normally.
- ➢ Whether the room temperature is adjusted well.
- ➢ Whether the indicator lights normally.
- ➢ Whether the temporary buttons works well.
- ➢ Whether the drainage is normal.
- ➢ Whether there is vibration or abnormal noise during operation.

Outdoor unit
- ➢ Whether there is vibration or abnormal noise during operation.
- ➢ Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
- ➢ Whether any of the refrigerant is leaked.

13. Operation Characteristics

Temperature / Mode	Cooling operation	Heating operation	Drying operation
Room temperature	17℃～32℃(62℉～90℉)	0℃～30℃ (32℉～86℉)	10℃～32℃ (50℉～90℉)
Outdoor temperature (Entry level)	0℃～50℃ (32℉～122℉) (-15℃～50℃(5℉～122℉) ：For the models with low temperature cooling system)	-15℃～30℃ (5℉～86℉)	0℃～50℃ (32℉～122℉)
Outdoor temperature (E-Star level)	-25℃～50℃(-13℉～122℉)	-25℃～30℃ (-13℉～86℉)	

CAUTION:

1. If the air conditioner is used beyond the above conditions, certain safety protection features may come into operation and cause the unit to operate abnormally.

2. The room relative humidity should be less than 80%. If the air conditioner operates beyond this figure, the surface of the air conditioner may attract condensation. Please set the vertical air flow louver to its maximum angle (vertically to the floor), and set HIGH fan mode.

3. The optimum performance will be achieved during this operating temperature zone.

14. Electronic Function

14.1 Abbreviation

T1: Indoor room temperature

T2: Coil temperature of indoor heat exchanger middle.

T2B: Coil temperature of indoor heat exchanger outlet.

T3: Coil temperature of condenser

T4: Outdoor ambient temperature

T5: Compressor discharge temperature

Td: Target temperature

14.2 Display function

14.2.1 Icon explanation on indoor display board (A5 Duct)
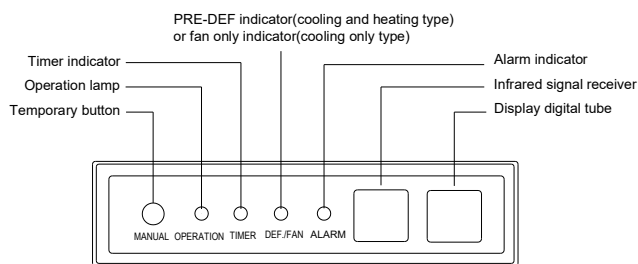
14.2.2 Icon explanation on indoor display board (Compact cassette).
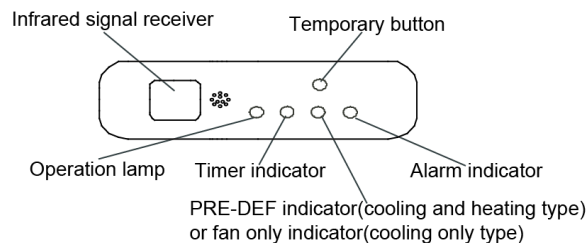
14.2.3 Icon explanation on indoor display board (slim Cassette).
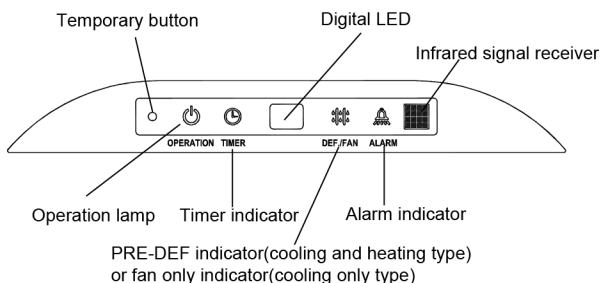
14.2.3 Icon explanation on indoor display board (Console).
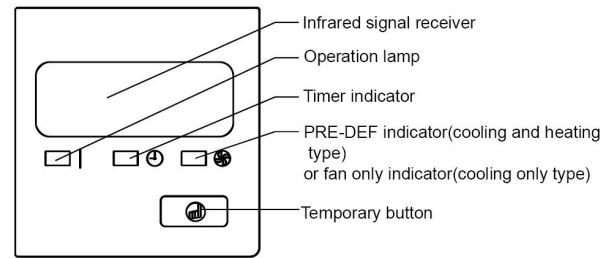
14.2.1 Icon explanation on indoor display board (Ceiling Floor)
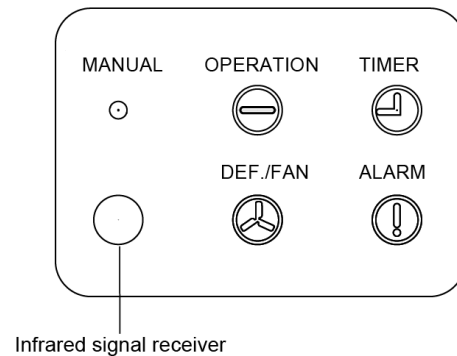
14.3 Main Protection

14.3.1 Three minutes delay at restart for compressor

1 minute delay for the 1st time stand-up and 3 minutes delay for others.

14.3.2 Temperature protection of compressor top

The unit will stop working when the compressor top temp. protector cut off, and will restart after the compressor top temp. protector restart.

14.3.3 Temperature protection of compressor discharge

When the compressor discharge temp. is getting higher, the running frequency will be limited as below rules:

---Compressor discharge temp. $T5>115 \ ℃$ (239°F) for 5s, compressor stops and restarts up till $T5<90℃(194°F)$

---$110<T5<115 \ ℃$ (239°F), decrease the frequency to the lower level every 2 minutes.

---$105(221°F)<T5<110℃(230°F)$, keep running at the current frequency.

----$T5<105℃(221°F)$, no limit for frequency.

14.3.4 Fan speed is out of control

When indoor fan speed keeps too low (lower than 300RPM) for 50s, the indoor fan will shut off and restart 30s later, if protection happened

3 times when fan motor restarts continuously, the unit will stop and the LED will display the failure.

When outdoor fan speed keeps too low (lower than 100RPM) or too high (higher than 1500RPM) for 60s, the unit will stop and the LED will display the failure. Malfunction is cleared 30s later.

14.3.5 Inverter module protection

The Inverter module has a protection function about current, voltage and temperature. If these protections happen, the corresponding code will display on indoor unit and the unit will stop working.

14.3.6 Indoor fan delayed open function

When the unit starts up, the louver will be active immediately and the indoor fan will open 10s later.

If the unit runs in heating mode, the indoor fan will be also controlled by anti-cold wind function.

14.3.7 Compressor preheating functions

Preheating permitting condition:

If $T4 < 3°C(37.4°F)$ and the machine connects to power supply newly within 5 seconds or if $T4 < 3°C(37.4°F)$ and compressor has stopped for over 3 hours, the compressor heating cable will work.

Preheating mode:

A weak current flow through the coil of compressor from the wiring terminal of the compressor, then the compressor is heated without operation.

Preheating release condition:

If $T4≥5°C (41°F)$ or the compressor starts running, the preheating function will stop.

14.3.9 Condenser high temperature T3 protection

---$55°C(131°F)<T3<60°C(140°F)$, the compressor frequency will decrease to the lower level until to F1 and then runs at F1.If $T3<54°C(129.2°F)$, the compressor will keep running at the current frequency.

---$T3<52°C(125.6°F)$, the compressor will not limit the frequency and resume to the former frequency.

---$T3>60°C(140°F)$ for 5 seconds, the compressor will stop until $T3<52°C(125.6°F)$.

14.3.10 Evaporator low temperature T2 protection

---$T2<0°C(32°F)$, the compressor will stop and restart when $T2≧5°C(41°F)$.

---$0°C(32°F)≦T2<4°C(39.2°F)$, the compressor frequency will be limited and decreased to the lower level

---$4°C(39.2°F)≤T2≤7°C(44.6°F)$, the compressor will keep the current frequency.

---$T2>7°C(44.6°F)$, the compressor frequency will not be limited.

14.4 Operation Modes and Functions

14.4.1 Fan mode

(1) Outdoor fan and compressor stop.

(2) Temperature setting function is disabled, and no setting temperature is displayed.

(3) Indoor fan can be set to high/med/low/auto.

(4) The louver operates same as in cooling mode.

(5) Auto fan:
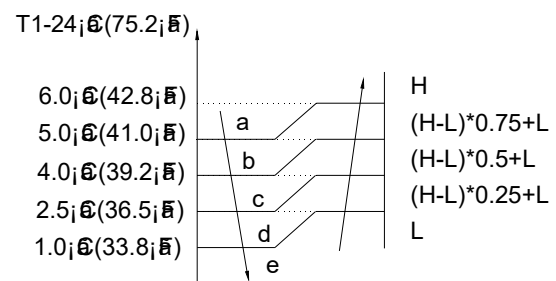
14.

4.2 Cooling Mode

14.4.2.1 Outdoor fan running rules
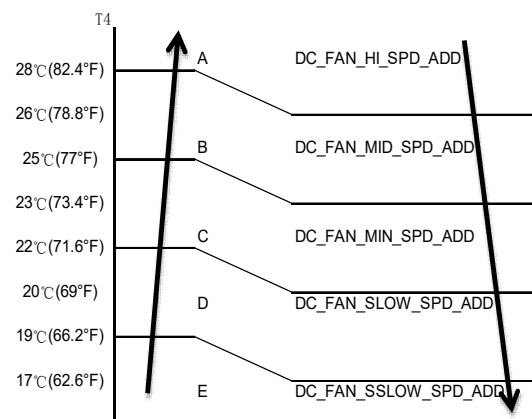
14.4.2.2 Indoor fan running rules

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In cooling mode, indoor fan runs all the time and the speed can be selected as high, medium, low and auto.

The indoor fan is controlled as below:

Setting fan speed	T1-Td ℃ (°F)		Actual fan speed
H	4.5(40.1) 3.0(37.4) 1.5(34.7)	A B C	H+（H+=H+G) H（=H） H−（H−=H−G)
M	4.5(40.1) 3.0(37.4) 1.5(34.7)	D E F	M+（M+=M+Z) M（M=M) M−（M−=M−Z)
L	4.5(40.1) 3.0(37.4) 1.5(34.7)	G H I	L+（L+=L+D) L（L=L) L−（L−=L−D)

Auto fan in cooling mode acts as follow:

T1-Td

6.0℃(42.8℉)	a	H
5.0℃(41.0℉)	b	(H-L)*0.75+L
4.0℃(39.2℉)	c	(H-L)*0.5+L
2.5℃(36.5℉)	d	(H-L)*0.25+L
1.0℃(33.8℉)	e	L
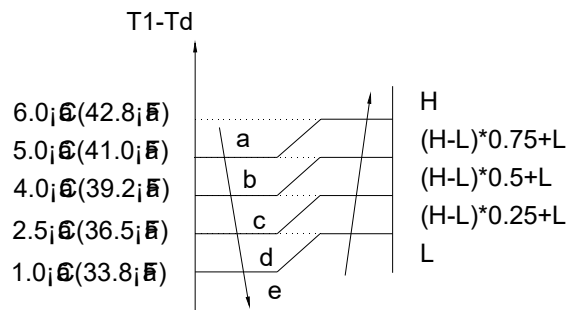
14.4.3 Heating Mode
14.4.3.1 Outdoor fan running rules

T4

21℃(69.8°F)	E	DC_FAN_SSLOW_SPD_ADD
19℃(66.2°F)	D	DC_FAN_SLOW_SPD_ADD
18℃(64.4°F)		
16℃(60.8°F)	C	DC_FAN_MIN_SPD_ADD
15℃(59°F)		
13℃(55.4°F)	B	DC_FAN_MID_SPD_ADD
12℃(53.6°F)		
10℃(50°F)	A	DC_FAN_HI_SPD_ADD
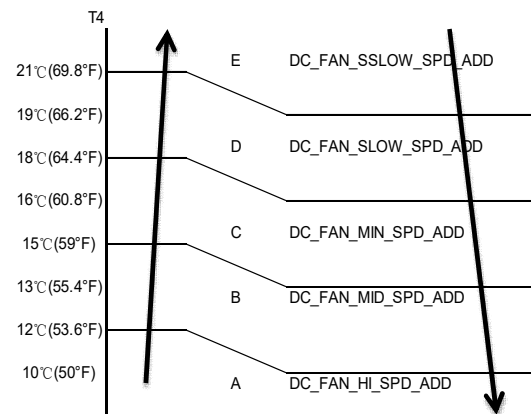
14.4.3.2 Indoor fan running rules

When the compressor is on, the indoor fan can be set to high/med/low/auto. And the anti-cold wind function has the priority.

The indoor fan is controlled as below:

Setting fan speed	T1-Td+1.5 ℃(34.7°F)		Actual fan speed
H	-1.5(29.3°F) -3.0(26.6°F) -4.5(23.9°F)		H-（H-=H-G) H（=H） H+(H+=H+G)
M	-1.5(29.3°F) -3.0(26.6°F) -4.5(23.9°F)		M-(M-=M-Z) M(M=M) M+(M+=M+Z)
L	-1.5(29.3°F) -3.0(26.6°F) -4.5(23.9°F)		L-(L-=L-D) L(L=L) L+(L+=L+D)

Auto fan action in heating mode:

T1-Td+1.5℃(34.7℉)

0.0℃(32℉)		L
-1℃(30.2℉)		(H+-L)*0.2+L
-2℃(28.4℉)		(H+-L)*0.4+L
-3℃(26.6℉)		(H+-L)*0.6+L
-4℃(24.8℉)		(H+-L)*0.8+L
-5℃(23.0℉)		
-6℃(21.2℉)		H+
-6.5℃(20.3℉)		
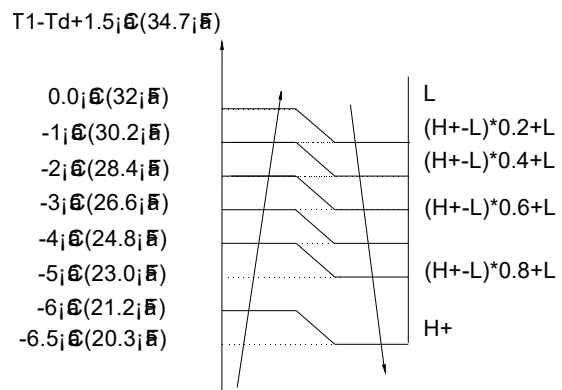
14.

4.3.3 Defrosting mode

If any one of the following items is satisfied, AC will enter the defrosting mode.

After the compressor starts up and keeps running, mark the minimum value of T3 from the 10th minutes to 15th minutes as T30.

1)If the compressor cumulate running time is up to 29 minutes and T3< TCDI1, T3 ＋ T30SUBT3ONE≦T30.

2)If the compressor cumulate running time is up to 35 minutes and T3< TCDI2, T3 ＋ T30SUBT3TWO≦T30.

3)If the compressor cumulate running time is up to 29 minutes and T3< TCDI3 for 3 minutes.

4)If the compressor cumulate running time is up to 120 minutes and T3<-15℃(5°F).

Condition of ending defrosting:

If any one of the following items is satisfied, the defrosting will finish and the machine will turn to normal heating mode.

----T3 rises to be higher than TCDE1.

----T3 keeps to be higher than TCDE2 for 80 seconds.

----The machine has run for 10 minutes in defrosting mode.

Defrosting action：
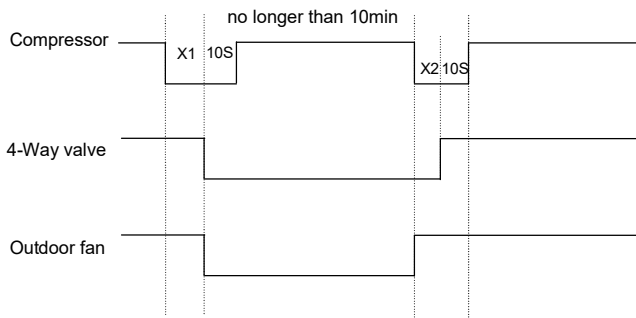
14.4.3.5 Evaporator coil temperature protection
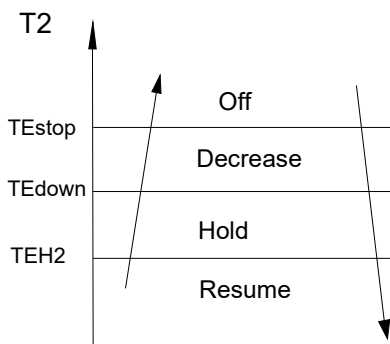
Off: Compressor stops.

Decrease: Decrease the running frequency to the lower level.

Hold: Keep the current frequency.

Resume: No limitation for frequency.

14.4.4 Auto-mode

This mode can be chosen with remote controller and the setting temperature can be changed between 17~30℃(62.6~86°F).

In auto mode, the machine will choose cooling, heating or fan-only mode according to ΔT ($\Delta T = T_1 - T_s$).

$\Delta T = T_1 - T_s$	Running mode
$\Delta T \geq 1℃(33.8°F)$	Cooling
$-1℃(30.2°F) < \Delta T < 1℃(33.8°F)$	Fan-only
$\Delta T \leq -1℃(30.2°F)$	Heating

Indoor fan will run at auto fan of the relevant mode.

The louver operates same as in relevant mode.

If the machine switches mode between heating and cooling, the compressor will keep stopping for 15 minutes and then choose mode according to $T_1 - T_s$.

If the setting temperature is modified, the machine will choose running function again.

14.4.5 Drying mode

Drying mode works the same as cooling mode in low speed.

All protections are active and the same as that in cooling mode.

14.4.6 Timer function

14.4.6.1 Timing range is 24 hours.

14.4.6.2 Timer on. The machine will turn on automatically when reaching the setting time.

14.4.6.3 Timer off. The machine will turn off automatically when reaching the setting time.

14.4.6.4 Timer on/off. The machine will turn on automatically when reaching the setting "on" time, and then turn off automatically when reaching the setting "off" time.

14.4.6.5 Timer off/on. The machine will turn off automatically when reaching the setting "off" time, and then turn on automatically when reaching the setting "on" time.

14.4.6.6 The timer function will not change the AC current operation mode. Suppose AC is off now, it will not start up firstly after setting the "timer off" function. And when reaching the setting time, the timer LED will be off and the AC running mode has not been changed.

14.4.6.7 The setting time is relative time.

14.4.7 Sleep function mode

14.4.7.1 The sleep function is available in cooling, heating or auto mode.

14.4.7.2. Operation process in sleep mode is as follow:

When cooling, the setting temperature rises 1℃ (33.8°F) (be lower than 30℃(86°F)) every one hour, 2 hours later the setting temperature stops rising and the indoor fan is fixed at low speed.

When heating, the setting temperature decreases 1℃ (33.8°F) (be higher than 17℃ (62.6°F)) every one hour, 2 hours later the

70

setting temperature stops rising and indoor fan is fixed at low speed. (Anti-cold wind function has the priority).

14.4.7.3 Operation time in sleep mode is 7 hours. After 7 hours the AC quits this mode and turns off

14.4.7.4 Timer setting is available.

14.4.8 Auto-Restart function

The indoor unit is equipped with auto-restart function, which is carried out through an auto-restart module. In case of a sudden power failure, the module memorizes the setting conditions before the power failure. The unit will resume the previous operation setting (not including sleep function) automatically after 3 minutes when power returns.

14.4.9 Follow me

1)   If the indoor PCB receives the signal which results from pressing the FOLLOW ME button on remote controller or wired remote controller, the buzzer will emit a sound and this indicates the follow me function is initiated. But when the indoor PCB receives signal which sent from remote controller every 3 minutes, the buzzer will not respond. When the unit is running with follow me function, the PCB will control the unit according to the temperature from follow me signal, and the temperature collection function of room temperature sensor will be shielded.

2)   When the follow me function is available, the PCB will control the unit according to the room temperature from the remote controller and the setting temperature.

3)   The PCB will take action to the mode change information from remote controller signal, but it will not affected by the setting temperature.

4)   When the unit is running with follow me function, if the PCB doesn't receive any signal from remote controller for 7 minutes or pressing FOLLOW ME button again, the follow me function will be turned off automatically, and the

temperature will control the unit according to the room temperature detected from its own room temperature sensor and setting temperature.

14.4.10 8℃ Heating(optional)

In heating operation, the preset temperature of the air conditioner can be as lower as 8 ℃ (46.4°F), which keeps the room temperature steady at 8℃(46.4°F) and prevents household things freezing when the house is unoccupied for a long time in severe cold weather.

1.3.11 Drain pump control

Adopt the water-level switch to control the action of drain pump.

Main action under different condition :(every 5 seconds the system will check the water level one time)

1. When the A/C operates with cooling (including auto cooling), dehumidifying, and forced cooling mode, the pump will start running immediately and continuously, till stop cooling.

2. Once the water level increase and up to the control point, LED will alarm and the drain pump open and continue checking the water level. If the water level fall down and LED disalarmed (drain pump delay close 1 minute) and operate with the last mode. Otherwise the entire system stop operating (including the pump) and LED remain alarming after 3 minutes,

Point check function

Press the LED DISPLAY or LED or MUTE button of the remote controller three times, and then press the AIR DIRECTION or SWING button three times in ten seconds, the buzzer will keep ring for two seconds. The air conditioner will enter into the information enquiry status. You can press the LED DISPLAY or AIR DIRECTION button to check the next or front item's information.

When the AC enter the "information enquiry" status, it will display the code name in 2 seconds, the details are as follows.

Enquiry information	Displaying code	Meaning
T1	T1	T1 temp.
T2	T2	T2 temp.
T3	T3	T3 temp.
T4	T4	T4 temp.
T2B	Tb	T2B temp.
TP	TP	TP temp.
TH	TH	TH temp.
Targeted Frequency	FT	Targeted Frequency
Actual Frequency	Fr	Actual Frequency
Indoor fan speed	IF	Indoor fan speed
Outdoor fan speed	OF	Outdoor fan speed
EXV opening angle	LA	EXV opening angle
Compressor continuous running time	CT	Compressor continuous running time
Causes of compressor stop.	ST	Causes of compressor stop.
Reserve	A0	
Reserve	A1	
Reserve	b0	
Reserve	b1	
Reserve	b2	
Reserve	b3	
Reserve	b4	
Reserve	b5	
Reserve	b6	
Reserve	dL	
Reserve	Ac	
Reserve	Uo	
Reserve	Td	

When the AC enter into the information enquiry status, it will display the code value in the next 25s, the details are as follows.

Enquiry information	Display value	Meaning	Remark
T1,T2,T3,T4, T2B,TP,TH, Targeted Frequency, Actual Frequency	-1F,-1E,-1d,-1c,-1b,-1A	-25,-24,-23,-22,-21,-20	1. All the displaying temperature is actual value.
	-19—99	-19—99	2. All the temperature is ° C no matter what kind of remote controller is used.
	A0,A1,···A9	100,101,···109	3. T1,T2,T3,T4,T2B display range:-25~70, TP display range:-20~130.
	b0,b1,···b9	110,111,···119	
	c0,c1,···c9	120,121,···129	4. Frequency display range: 0~159HZ.
	d0,d1,···d9	130,131,···139	5. If the actual value exceeds the range, it will display the maximum value or minimum value.
	E0,E1,···E9	140,141,···149	
	F0,F1,···F9	150,151,···159	
Indoor fan speed /Outdoor fan speed	0	OFF	
	1,2,3,4	Low speed, Medium speed, High speed, Turbo	For some big capacity motors.
	14-FF	Actual fan speed=Display value turns to decimal value and then multiply 10. The unit is RPM.	For some small capacity motors, display value is from 14-FF(hexadecimal), the corresponding fan speed range is from 200-2550RPM.
EXV opening angle	0-FF	Actual EXV opening value=Display value turns to decimal value and then multiply 2.	
Compressor continuous running time	0-FF	0-255 minutes	If the actual value exceeds the range, it will display the maximum value or minimum value.
Causes of compressor stop.	0-99	For the detailed meaning, please consult with engineer	Decimal display
Reserve	0-FF		

15. Troubleshooting

Safety

Electricity power is still kept in capacitors even the power supply is shut off. Do not forget to discharge the electricity power in capacitor.

Electrolytic Capacitors

(HIGH VOLTAGE! CAUTION!)
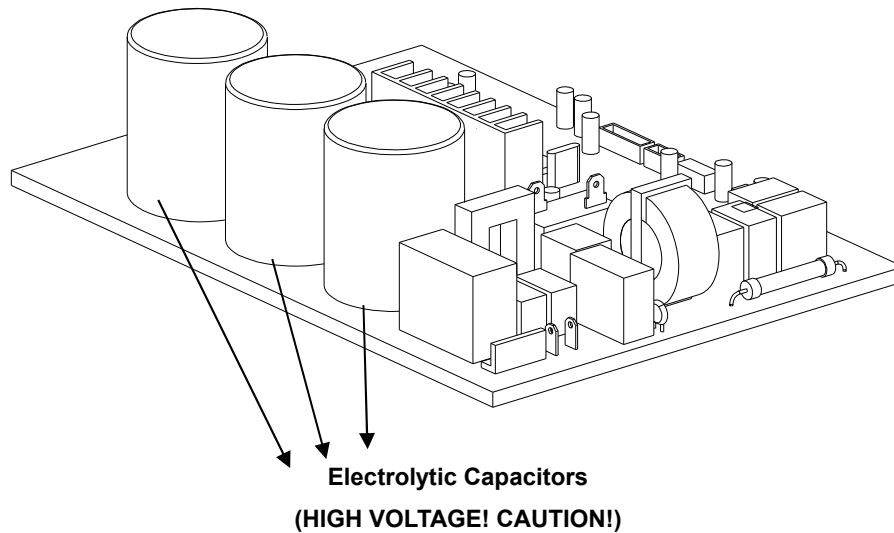
For other models, please connect discharge resistance (approx.100Ω 40W) or soldering iron (plug) between +, - terminals of the electrolytic capacitor on the contrary side of the outdoor PCB.

Discharging position
(Discharging period
10 seconds or more)

Plug of
soldering
iron
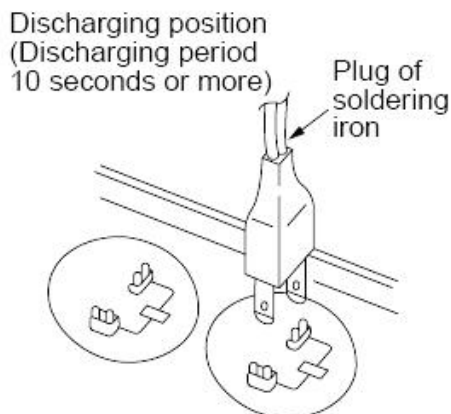
Note: The picture above is only for reference. The plug of your side may be different.

16.1 Indoor Unit Error Display

Operation lamp	Timer lamp	Display	LED STATUS
☆ 1 time	X	E0	Indoor unit EEPROM error
☆ 2 times	X	E1	Communication malfunction between indoor and outdoor units.
☆ 4 times	X	E3	Indoor fan speed has been out of control
☆ 5 times	X	E4	Indoor room temperature sensor T1 open circuit or short circuit
☆ 6 times	X	E5	Evaporator coil temperature sensor T2 open circuit or short circuit
☆ 7 times	X	EC	Refrigerant leakage detection
☆ 8 times	X	EE	Water-level alarm malfunction
☆ 1 time	O	F0	Current overload protection
☆ 2 times	O	F1	Open circuit or short circuit of outdoor ambient temperature sensor T4
☆ 3 times	O	F2	Open circuit or short circuit of condenser coil temperature sensor T3
☆ 4 times	O	F3	Open circuit or short circuit of Compressor discharge temperature sensor T5
☆ 5 times	O	F4	Outdoor unit EEPROM error
☆ 6 times	O	F5	Outdoor fan speed has been out of control
☆ 7 times	O	F6	T2B sensor error
☆ 8 times	O	F7	Lifting-panel communication error
☆ 9 times	O	F8	Lifting-panel malfunction
☆ 10 times	O	F9	Lifting-panel is not closed
☆ 1 times	☆	P0	IPM malfunction
☆ 2 times	☆	P1	Over voltage or over low voltage protection
☆ 3 times	☆	P2	High temperature protection of compressor top
☆ 4 times	☆	P3	Outdoor low temperature protection
☆ 5 times	☆	P4	Inverter compressor drive error
☆ 6 times	☆	P5	Mode conflict
☆ 7 times	☆	P6	Compressor low-pressure protection
☆ 8 times	☆	P7	Outdoor IGBT temperature sensor error

O（light）　　　　X（off）　　　☆（flash）

16.2 Outdoor unit error display
For 9K-24K outdoor unit:

No.	Problems	LED2 (Green)	LED1 (Red)	IU display
1	standby for normal	O	X	
2	Operation normally	X	O	
3	Compressor drive board EEPROM error	O	☆	E5
4	IPM malfunction or IGBT over-strong current protection	☆	X	P0
5	Over voltage or too low voltage protection	O	O	P1
6	Inverter compressor drive error	X	☆	P4
7	Inverter compressor drive error	☆	O	P4
8	Communication malfunction between main control board and driver board	☆	☆	P4

For 36K-48K Outdoor Unit

No	Problems	Error Code
1	Communication malfunction between indoor and outdoor units.	E1
2	Protection of over-current	F0
3	Open circuit or short circuit of outdoor ambient temperature sensor T4	F1
4	Open circuit or short circuit of condenser coil temperature sensor T3	F2
5	Open circuit or short circuit of Compressor discharge temperature sensor T5	F3
6	Outdoor unit EEPROM error	F4
7	Outdoor fan speed has been out of control	F5
8	IPM malfunction	P0
9	Over voltage or over low voltage protection	P1
10	High temperature protection of compressor top	P2
11	Outdoor low temperature protection	P3
12	Inverter compressor drive error	P4
13	High temperature protection of indoor coil in heating	J0
14	Outdoor temperature protection of outdoor coil in cooling	J1
15	Discharge temperature protection	J2
16	Protection of active PFC module	J3
17	Communication error between control board and IPM board	J4
18	Hi-pressure switch protection	J5
19	Low-pressure switch protection	J6
20	Outdoor IGBT temperature sensor error	P7
21	AC voltage protection	J8

Outdoor check function

N	Display	Remark
00	Normal display	Display running frequency, running state or malfunction code
01	Indoor unit capacity demand code	Actual data*HP*10 If capacity demand code is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "5.0",it means the capacity demand is 15. the digital display tube show "60",it means the capacity demand is 6.0)
02	Amendatory capacity demand code	
03	The frequency after the capacity requirement transfer	
04	The frequency after the frequency limit	
05	The frequency of sending to 341 chip	
06	Indoor unit evaporator outlet temp.(heating T2，cooling T2B)	If the temp. is lower than 0 degree, the digital display tube will show "0".If the temp. is higher than 70 degree, the digital display tube will show "70".

07	Condenser pipe temp.(T3)	If the temp. is lower than -9 degree, the digital display tube will show "-9".If the temp. is higher than 70 degree, the digital display tube will show "70". If the indoor unit is not connected, the digital display tube will show: "——"
08	Outdoor ambient temp.(T4)	
09	Compressor discharge temp.(T5)	The display value is between 13~129 degree. If the temp. is lower than 13 degree, the digital display tube will show "13".If the temp. is higher than 99 degree, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "0.5",it means the compressor discharge temp. is 105 degree. the digital display tube show "1.6",it means the compressor discharge temp. is 116 degree)
10	AD value of current	The display value is hex number.
11	AD value of voltage	
12	Indoor unit running mode code	Off:0, Fan only 1,Cooling:2, Heating:3
13	Outdoor unit running mode code	Off:0, Fan only 1,Cooling:2, Heating:3, Forced cooling:4
14	EXV open angle	Actual data/4. If the value is higher than 99, the digital display tube will show single digit and tens digit. For example, the digital display tube show "2.0",it means the EXV open angle is 120×4=480p.)

15	Frequency limit symbol	Bit7	Frequency limit caused by IGBT radiator	The display value is hex number. For example, the digital display tube show 2A, then Bit5=1, Bit3=1, Bit1=1. It means frequency limit caused by T4, T3 and current.
		Bit6	Frequency limit caused by PFC	
		Bit5	Frequency limit caused by T4.	
		Bit4	Frequency limit caused by T2.	
		Bit3	Frequency limit caused by T3.	
		Bit2	Frequency limit caused by T5.	
		Bit1	Frequency limit caused by current	
		Bit0	Frequency limit caused by voltage	

16	DC fan motor speed	
17	IGBT radiator temp.	The display value is between 30~120 degree. If the temp. is lower than 30 degree, the digital display tube will show "30".If the temp. is higher than 99 degree, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "0.5",it means the IGBT radiator temp. is 105 degree. the digital display tube show "1.6",it means the IGBT radiator temp. is 116 degree)
18	Indoor unit number	The indoor unit can communicate with outdoor unit well. General:1, Twins:2
19	Evaporator pipe temp. T2 of 1# indoor unit	If the temp. is lower than 0 degree, the digital display tube will show "0".If the temp. is higher than 70 degree, the digital
20	Evaporator pipe temp. T2 of 2# indoor unit	

21	Evaporator pipe temp. T2 of 3# indoor unit	display tube will show "70". If the indoor unit is not connected, the digital display tube will show: "——"
22	1# Indoor unit capacity demand code	Actual data*HP*10 If capacity demand code is higher than 99, the digital display tube will show single digit and tens digit. (For example, the digital display tube show "5.0",it means the capacity demand is 15. the digital display tube show "60",it means the capacity demand is 6.0). If the indoor unit is not connected, the digital display tube will show: "——"
23	2# Indoor unit capacity demand code	
24	3# Indoor unit capacity demand code	
25	Room temp. T1 of 1# indoor unit	If the temp. is lower than 0 degree, the digital display tube will show "0".If the temp. is higher than 70 degree, the digital display tube will show "70". If the indoor unit is not connected, the digital display tube will show: "——"
26	Room temp. T1 of 2# indoor unit	
27	Average room temp. T1	
28	Reason of stop	
29	Evaporator pipe temp. T2B of 1# indoor unit	If the temp. is lower than 0 degree, the digital display tube will show "0".If the temp. is higher than 70 degree, the digital display tube will show "70". If the indoor unit is not connected, the digital display tube will show: "——"
30	Evaporator pipe temp. T2B of 2# indoor unit	

16.3 Diagnosis and Solution
16.3.1 EEPROM error diagnosis and solution (E0/F4)

Error Code	E0/F4
Malfunction decision conditions	Indoor or outdoor PCB main chip does not receive feedback from EEPROM chip.
Supposed causes	● Installation mistake ● PCB faulty

Trouble shooting:

Power off, then restart the unit 2 minutes later.

Yes

Replace the indoor/outdoor main PCB.

EEPROM: An electrically erasable programmable read-only memory whose contents can be erased and reprogrammed using a pulsed voltage.

Indoor PCB
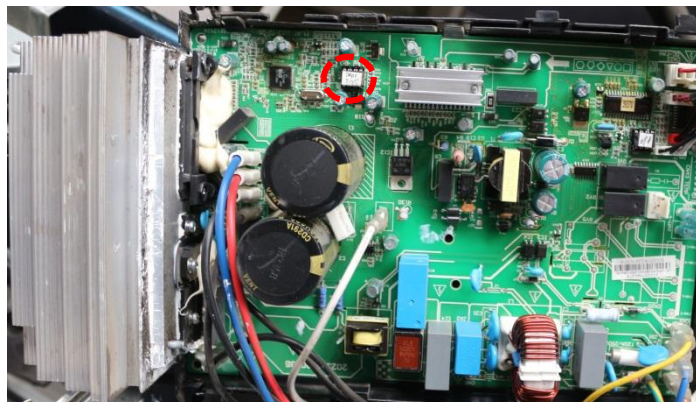
Outdoor PCB

Note: The two photos above are only for reference, it's may be not same totally with the ones on your side.

16.3.2 Communication malfunction between indoor and outdoor units diagnosis and solution (E1)

Error Code	E1
Malfunction decision conditions	Indoor unit does not receive the feedback from outdoor unit during 110 seconds and this condition happens four times continuously.
Supposed causes	● Wiring mistake ● Indoor or outdoor PCB faulty

Trouble shooting:

```
Power off, then restart the unit 2 minutes later
                    │ Yes
                    ▼
Measure Vs, is it positive fluctuation?          No
(Vs is the voltage between 3 and 2 of ──────────────┐
outdoor unit. Red pan-3, Black pan-2)               │
         │ Yes                                       ▼
         ▼                             Check the indoor wiring connection
Check the outdoor wiring connection                  │ Yes
         │ Yes                                        ▼
         ▼                             Replace the indoor main PCB.
Replace the reactor ◄─No─ Check whether reactor      Power on. Is the error
                          is normal?                 extinguished?
                               │ Yes                  │ No
                               ▼                       ▼
                    Replace the outdoor main PCB.  Replace the outdoor main PCB.
                    Power on. Is the error
                    extinguished?
                               │ No
                               ▼
                    Replace the indoor main PCB.
```

Remark:
Use a multimeter to test the DC voltage between 2 port and 3 port of outdoor unit. The red pin of multimeter connects with 2 port while the black pin is for 3 port.

When AC is normal running, the voltage will move alternately between -50V to 50V.

If the outdoor unit has malfunction, the voltage will move alternately with positive value.

While if the indoor unit has malfunction, the voltage will be a certain value.
Remark,
The old   label is L1,L2,S, L1,L2
The new label is   1, 2, 3, L1,L2
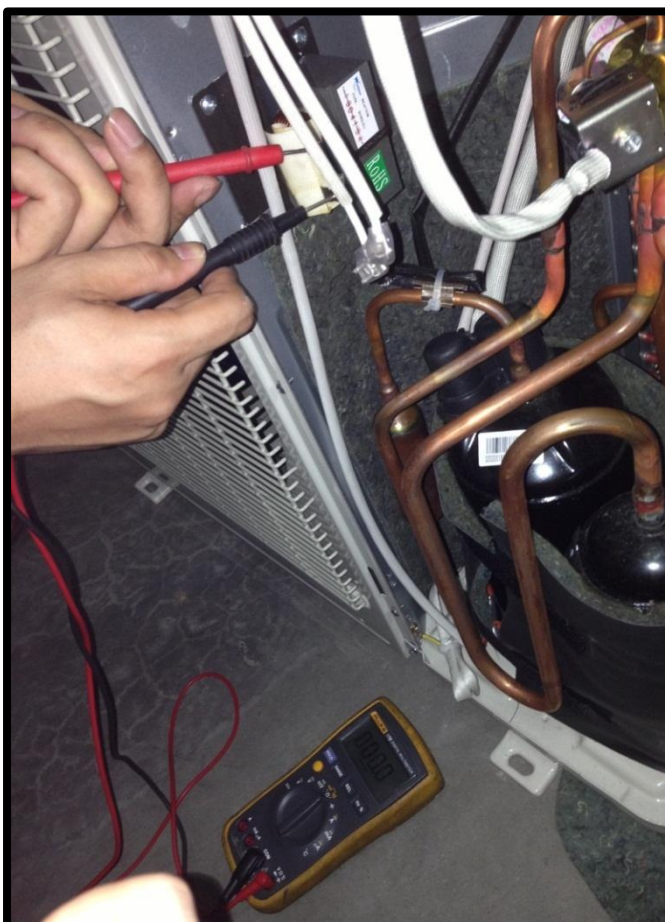
Remark:
Use a multimeter to test the resistance of the reactor which does not connect with capacitor.
The normal value should be around zero ohm. Otherwise, the reactor must have malfunction and need to be replaced.

16.3.3 Fan speed has been out of control diagnosis and solution (E3)

Error Code	E3
Malfunction decision conditions	When indoor fan speed keeps too low (300RPM) for certain time, the unit will stop and the LED will display the failure.
Supposed causes	● Wiring mistake ● Fan ass'y faulty ● Fan motor faulty ● PCB faulty

Trouble shooting:

```
   ┌─────────────────────┐
   │ Power off, then      │──No──►  ┌──────────────────────────┐
   │ restart the unit 2   │         │ The unit operates        │
   │ minutes later        │         │ normally.                │
   └─────────────────────┘         └──────────────────────────┘
            │
           Yes
            │
   ┌─────────────────────┐
   │ Shut off the power   │──No──►  ┌──────────────────────────┐
   │ supply, Rotate the   │         │ Find out the cause and   │
   │ fan by hand.         │         │ have it solved           │
   └─────────────────────┘         └──────────────────────────┘
            │
           Yes
            │
   ┌─────────────────────┐
   │ Check the wiring of  │──No──►  ┌──────────────────────────┐
   │ fan motor            │         │ Correct the connections. │
   └─────────────────────┘         └──────────────────────────┘
            │
           Yes
            │
   ┌─────────────────────┐
   │ Measure the voltage  │──No──►  ┌──────────────────────────┐
   │ for the fan motor    │         │ Replace the main PCB     │
   │ from the main PCB    │         └──────────────────────────┘
   └─────────────────────┘                    ▲
            │                                  │
           Yes                                 │
            │                                  │
   ┌─────────────────────┐                     │
   │ Replace the fan      │────────No──────────┘
   │ motor                │
   └─────────────────────┘
```
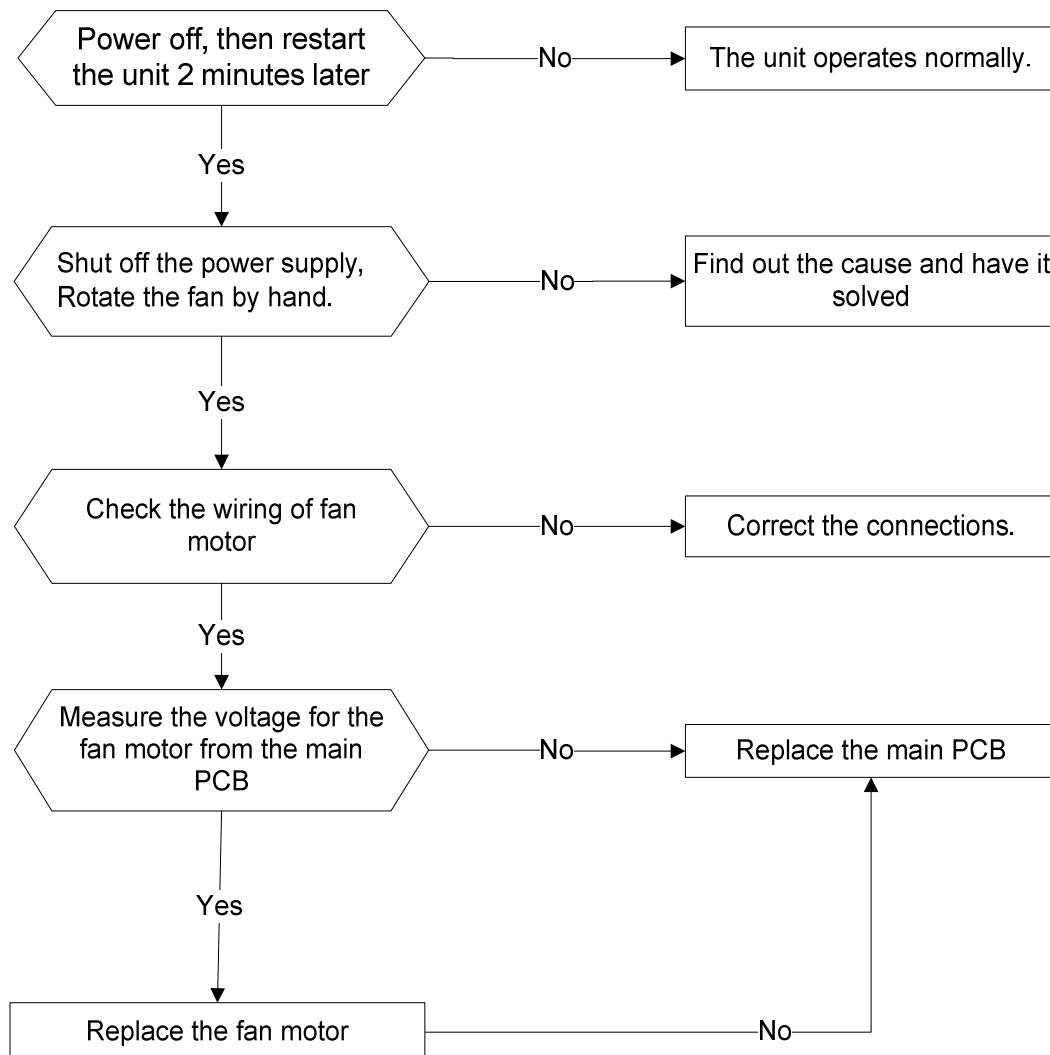
Index 1:

1. Indoor DC fan motor(control chip is inside fan motor)

Power on and when the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 in fan motor connector. If the value of the voltage is not in the range showing in below table, the PCB must have problems and need to be replaced.
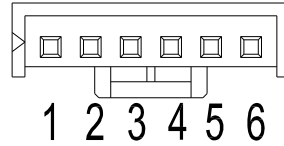
DC motor voltage input and output

NO.	Color	Signal	Voltage
1	Red	Vs/Vm	200~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	13.5~16.5V
5	Yellow	Vsp	0~6.5V
6	Blue	FG	13.5~16.5V

16.3.4 Open circuit or short circuit of temperature sensor diagnosis and solution (E4/E5/F1/F2/F3)

Error Code	E4/E5/F1/F2/F3
Malfunction decision conditions	If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED will display the failure.
Supposed causes	● Wiring mistake ● Sensor faulty

Trouble shooting:

```
   ┌─────────────────────┐
   │ Check the connection │ ──No──▶ ┌──────────────────────┐
   │ between temperature  │         │ Correct the connection│
   │   sensor and PCB.    │         └──────────────────────┘
   └─────────────────────┘
            │
           Yes
            │
            ▼
   ┌─────────────────────┐
   │ Measure the resistance value │ ──No──▶ ┌──────────────────┐
   │      of the sensor  │                  │ Repalce the sensor│
   └─────────────────────┘                  └──────────────────┘
            │
           Yes
            │
            ▼
   ┌─────────────────────────┐
   │ Replace indoor or outdoor main │
   │           PCB           │
   └─────────────────────────┘
```


85
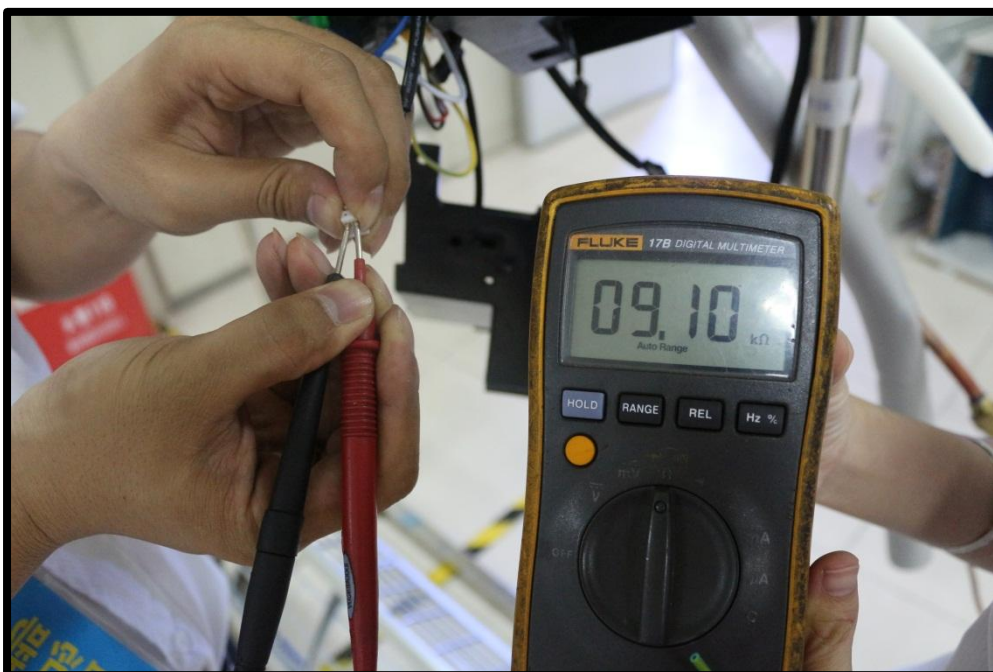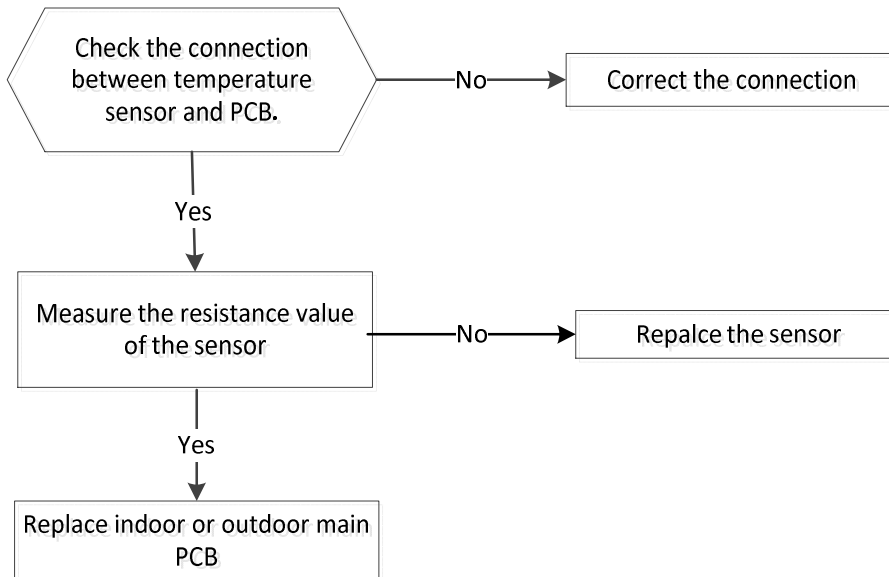
16.3.5 Refrigerant Leakage Detection diagnosis and solution (EC)

Error Code	**EC**
Malfunction decision conditions	**Define the evaporator coil temp.T2 of the compressor just starts running as Tcool.** **In the beginning 5 minutes after the compressor starts up, if T2 ＜Tcool－2℃ does not keep continuous 4 seconds and this situation happens 3 times, the display area will show "EC" and AC will turn off.**
Supposed causes	● **T2 sensor faulty** ● **Indoor PCB faulty** ● **System problems, such as leakage or blocking.**

Trouble shooting:

```
┌─────────────────────────┐
│ Power off, then restart the │
│   unit 2 minutes later.  │
└─────────────────────────┘
            │
           Yes
            │
     ┌──────────────────────┐
    ／ Check cool air blowing out ＼ ──Yes──→ ┌──────────────────┐
    ＼ from indoor air outlet   ／           │ Check if T2 sensor │
     └──────────────────────┘               └──────────────────┘
            │                                         │
            No                                       Yes
            │                                         │
     ┌──────────────────────┐                 ┌──────────────────┐
    ／ Check leakage of system ＼              │ Replace indoor PCB. │
    ＼                        ／               └──────────────────┘
     └──────────────────────┘
            │          └─Yes─┐
            No               │
            │      ┌────────────────────────┐
            │      │ Repair the leakage and  │
            │      │ recharge the refrigerant. │
            │      └────────────────────────┘
     ┌──────────────────────────┐
     │ check blockIng of system and │
     │    clear the blocking      │
     └──────────────────────────┘
```
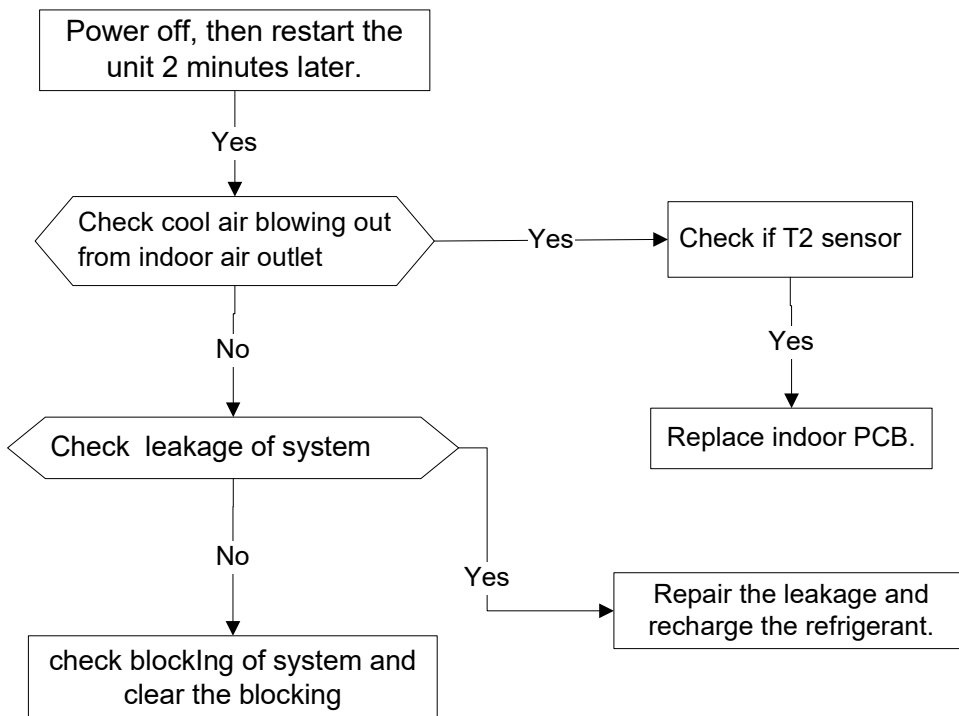
16.3.6 Water-level alarm malfunction diagnosis and solution

Error Code	EE
Malfunction decision conditions	If the sampling voltage is not 5V, the LED will display the failure.
Supposed causes	● Wiring mistake ● Water-level switch faulty ● Water pump faulty ● Indoor PCB faulty

```
┌─────────────────────────────────┐
│ Power off, then restart the unit │
│ 3 minutes later. Is it still     │
│ displaying the error code?       │
└─────────────────────────────────┘
              │
             Yes
              ▼
      ╱───────────────╲
     ╱ If the water-    ╲        ┌──────────────────────────┐
    ◁ level switch is    ▷──No──▶│ Insert the water-level   │
     ╲ inserted well?   ╱        │ switch well              │
      ╲───────────────╱          └──────────────────────────┘
              │
             Yes
              ▼
      ╱───────────────╲
     ╱ If the water-    ╲        ┌──────────────────────────┐
    ◁ level switch is    ▷──Yes─▶│ Replace the water-level  │
     ╲ broken?          ╱        │ switch                   │
      ╲───────────────╱          └──────────────────────────┘
              │
              No
              ▼
┌──────────────────────────┐
│ Replace the water pump,  │
│ If malfunction is still  │
│ not solved               │
└──────────────────────────┘
              │
             Yes
              ▼
┌──────────────────────────┐
│ Replace the indoor main  │
│ PCB                      │
└──────────────────────────┘
```
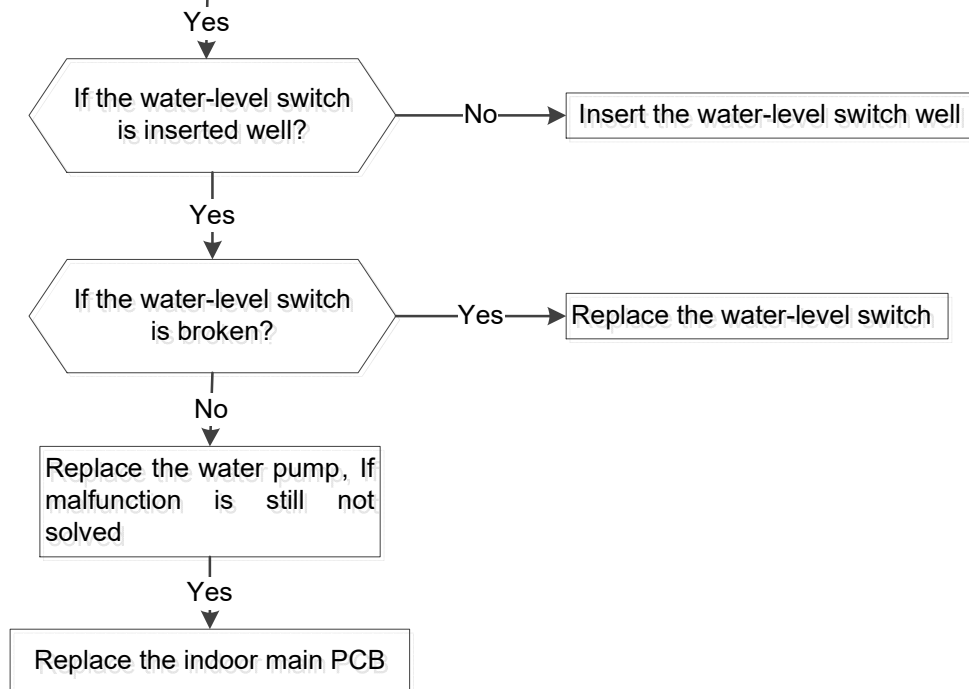
16.3.7 IPM malfunction or IGBT over-strong current protection diagnosis and solution (P0)

Error Code	**P0**
Malfunction decision conditions	**When the voltage signal that IPM send to compressor drive chip is abnormal, the display LED will show "P0" and AC will turn off.**
Supposed causes	**Wiring mistake; IPM malfunction; Outdoor fan ass'y faulty Compressor malfunction; Outdoor PCB faulty**

Trouble shooting:

Check the wiring between main PCB and compressor —Yes→ Correct the connection or replace the wires and connectors.

No ↓

Check the IPM —No→ Replace the IPM board or replace the main PCB

Yes ↓

Check the outdoor fan and the outdoor unit ventilation —No→ Please refer to the solution of 【Fan Speed Has Been Out Of Control】 malfunction

Yes ↓

Check the compressor resistance values —No→ Replace the compressor.

Yes ↓

Replace the outdoor main PCB
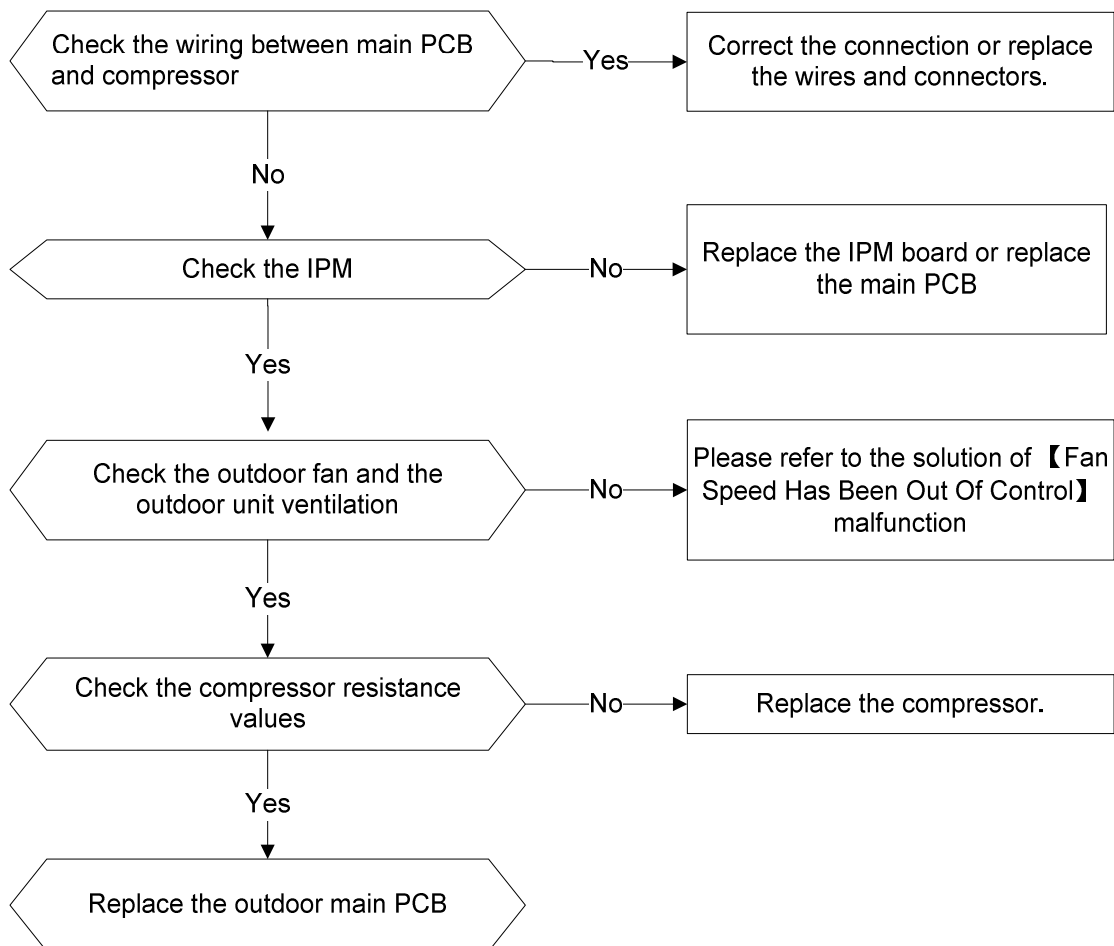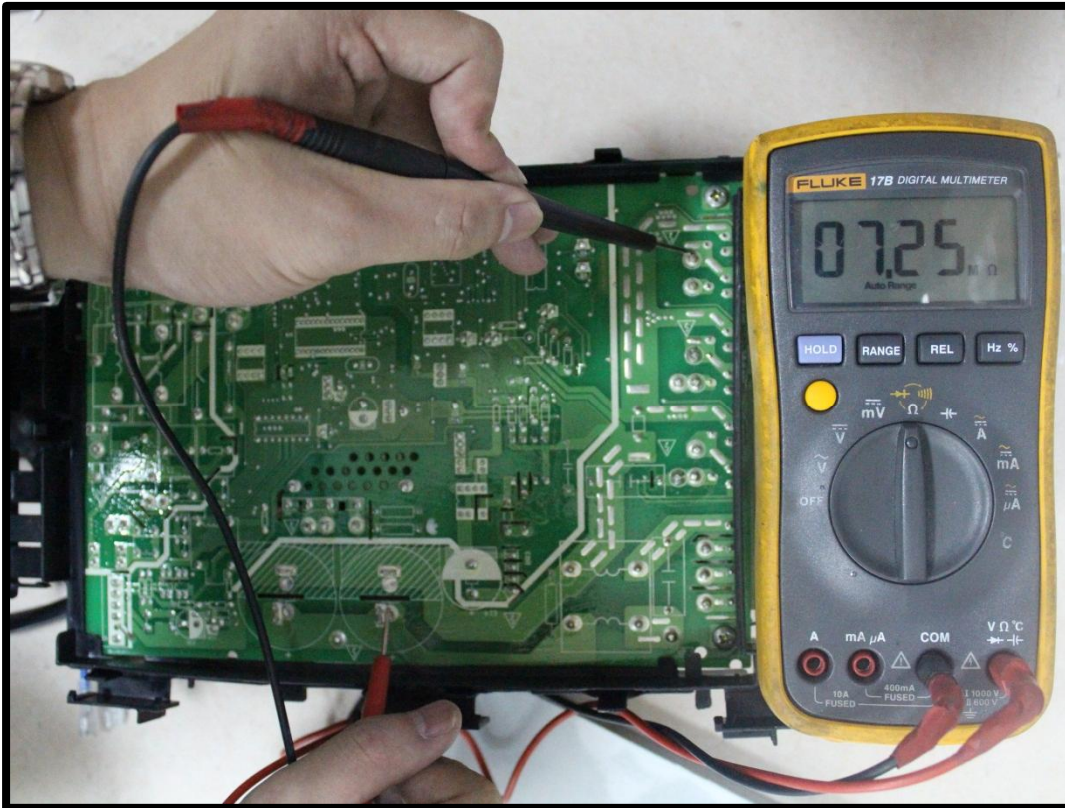
P-U
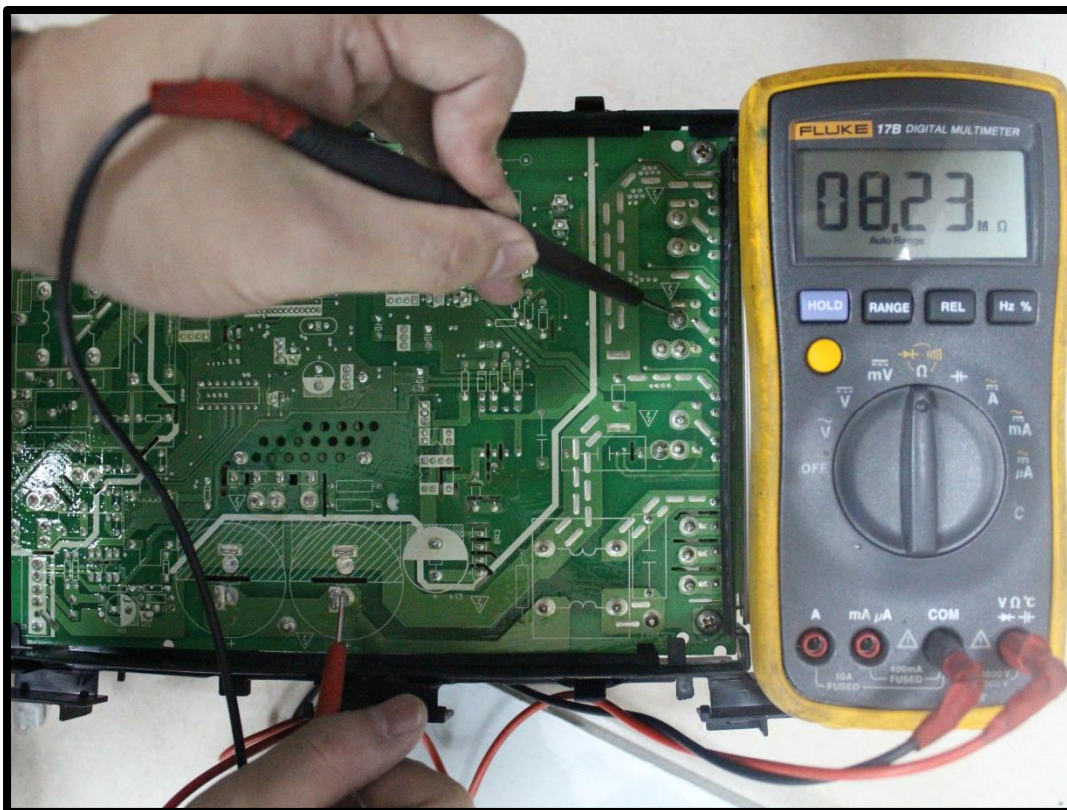
P-V
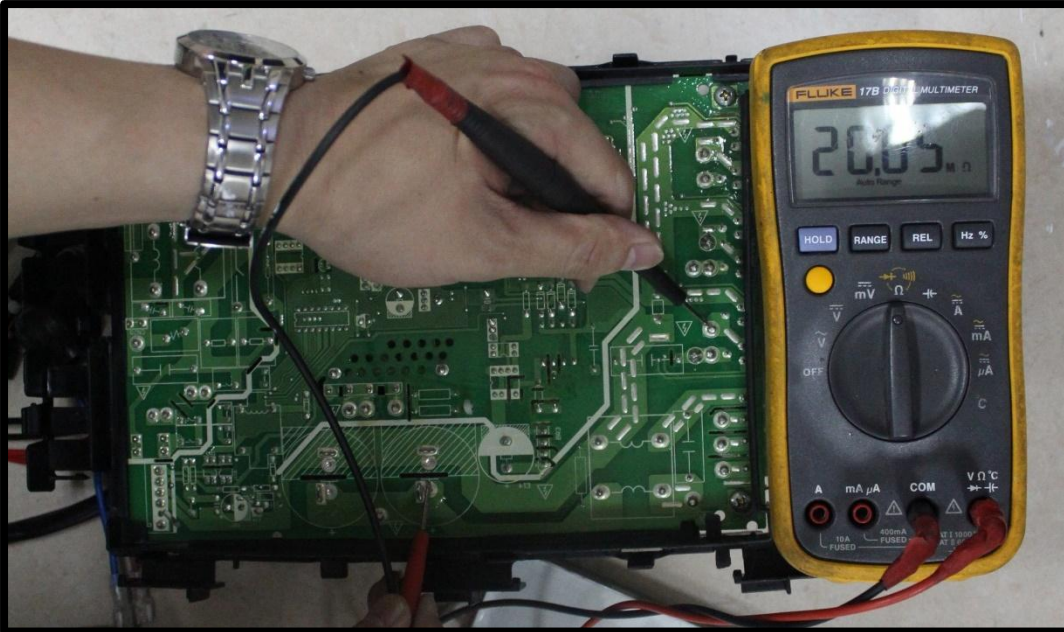
P-W
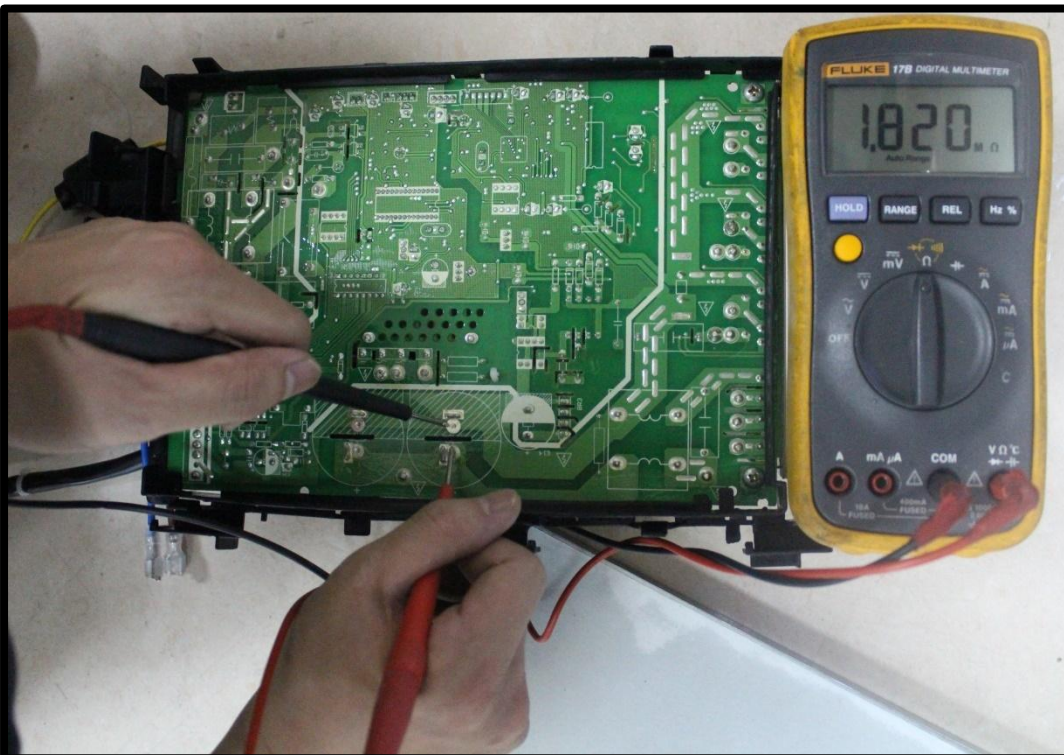
P-N

16.3.8 Over voltage or too low voltage protection diagnosis and solution (P1)

Error Code	P1
Malfunction decision conditions	An abnormal voltage rise or drop is detected by checking the specified voltage detection circuit.
Supposed causes	- Power supply problems. - System leakage or block - PCB faulty

Trouble shooting:

```
Check the power supply ──No──► Stop the unit
         │
        Yes
         │
         ▼
Check the connections and ──No──► Correct the connections or
wires                              replace the wires.
         │
        Yes
         │
         ▼
Check the voltage between P ──No──► Replace the IPM board
and N
         │
        Yes
         │
         ▼
Check the reactor ──No──► Replace outdoor main PCB
         │
        Yes
         │
         ▼
Replace the reactor
```
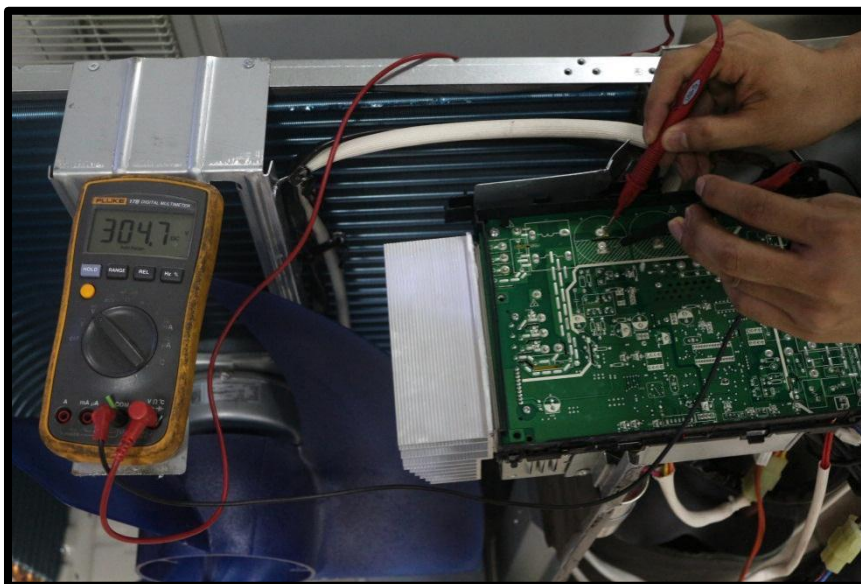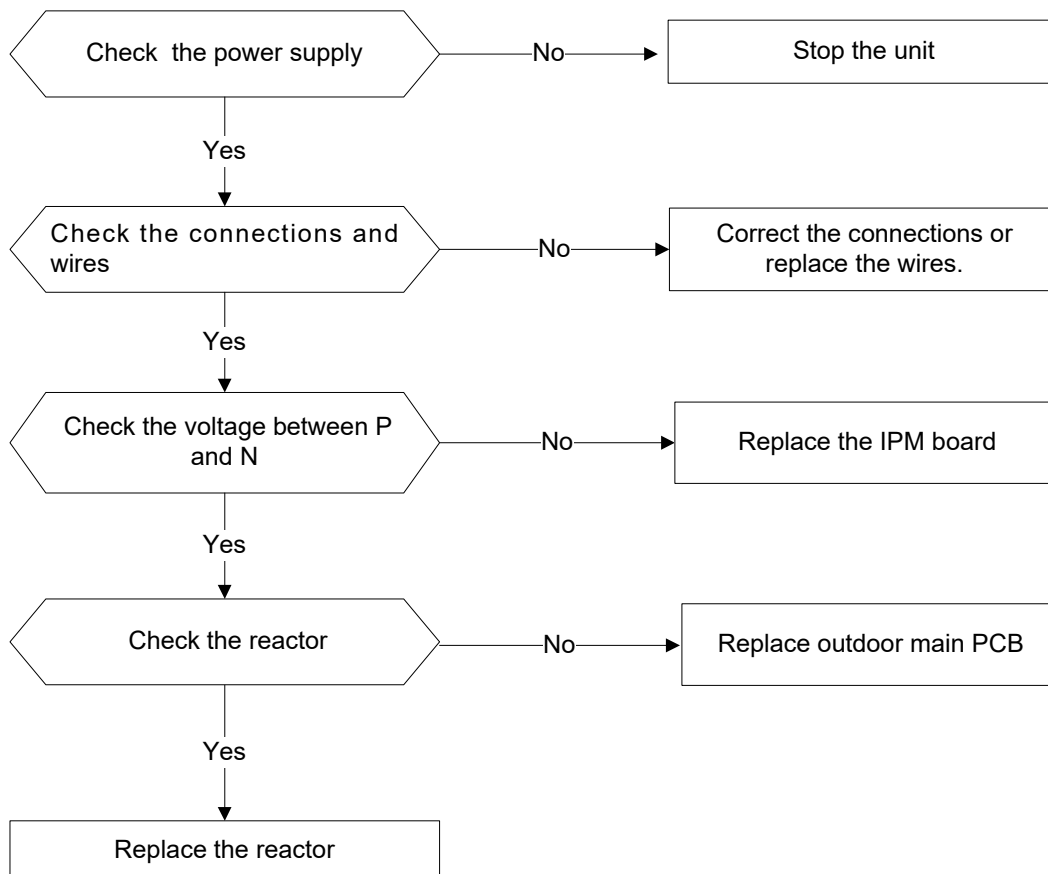

Remark:
Measure the DC voltage between P and N port. The normal value should be around 310V.

16.3.9 High temperature protection of compressor top diagnosis and solution (P2)

Error Code	P2
Malfunction decision conditions	If the sampling voltage is not 5V, the LED will display the failure.
Supposed causes	● Power supply problems. ● System leakage or block ● PCB faulty

Trouble shooting:

```
┌────────────────────────┐              ┌──────────────────────────────┐
│ Check the air flow      │── Yes ──────▶│ Clear up the air inlet and   │
│ system of indoor and    │              │ outlet or the heat exchanger │
│ outdoor units           │              │ of indoor and outdoor units. │
└────────────────────────┘              └──────────────────────────────┘
           │ No
           ▼
┌────────────────────────┐
│ Power off, then restart │
│ the unit 10 minutes     │
│ later                   │
└────────────────────────┘
           │ Yes
           ▼
┌────────────────────────┐         ┌─────────────────┐        ┌──────────────────────┐
│ Check if the temperature│── No ──▶│ Check the overload│── No ─▶│ Correct the connection.│
│ of compressor          │         │ protector        │        └──────────────────────┘
└────────────────────────┘         └─────────────────┘
           │ Yes                            │ Yes
           ▼                                ▼
┌────────────────────────┐         ┌─────────────────────┐       ┌──────────────────┐
│ Check refrigerant system│         │ Measure the resistance│── No ─▶│ Replace the OLP. │
└────────────────────────┘         │ between the two ports │       └──────────────────┘
           │                       │ of the OLP. Is it zero?│
           │                       └─────────────────────┘
           │                                │ Yes
           │                                ▼
           └──────── Yes ──────────▶┌──────────────────────────────┐
                                    │ Replace the outdoor control PCB.│
                                    └──────────────────────────────┘
```

16.3.10 Inverter compressor drive error diagnosis and solution(P4)

Error Code	**P4**
Malfunction decision conditions	**An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection and so on.**
Supposed causes	**Wiring mistake; IPM malfunction; Outdoor fan ass'y faulty Compressor malfunction; Outdoor PCB faulty**

Trouble shooting:

```
Check the wiring between main PCB        ──Yes──▶   Correct the connection or replace
and compressor                                      the wires and connectors.
        │
        No
        │
        ▼
Check the IPM                            ──No───▶   Replace the IPM board or replace
        │                                           the main PCB
        Yes
        │
        ▼
Check the outdoor fan and the           ──No───▶   Please refer to the solution of 【Fan
outdoor unit ventilation                            Speed Has Been Out Of Control】
        │                                           malfunction
        Yes
        │
        ▼
Check the compressor resistance         ──No───▶   Replace the compressor.
values
        │
        Yes
        │
        ▼
Replace the outdoor main PCB
```
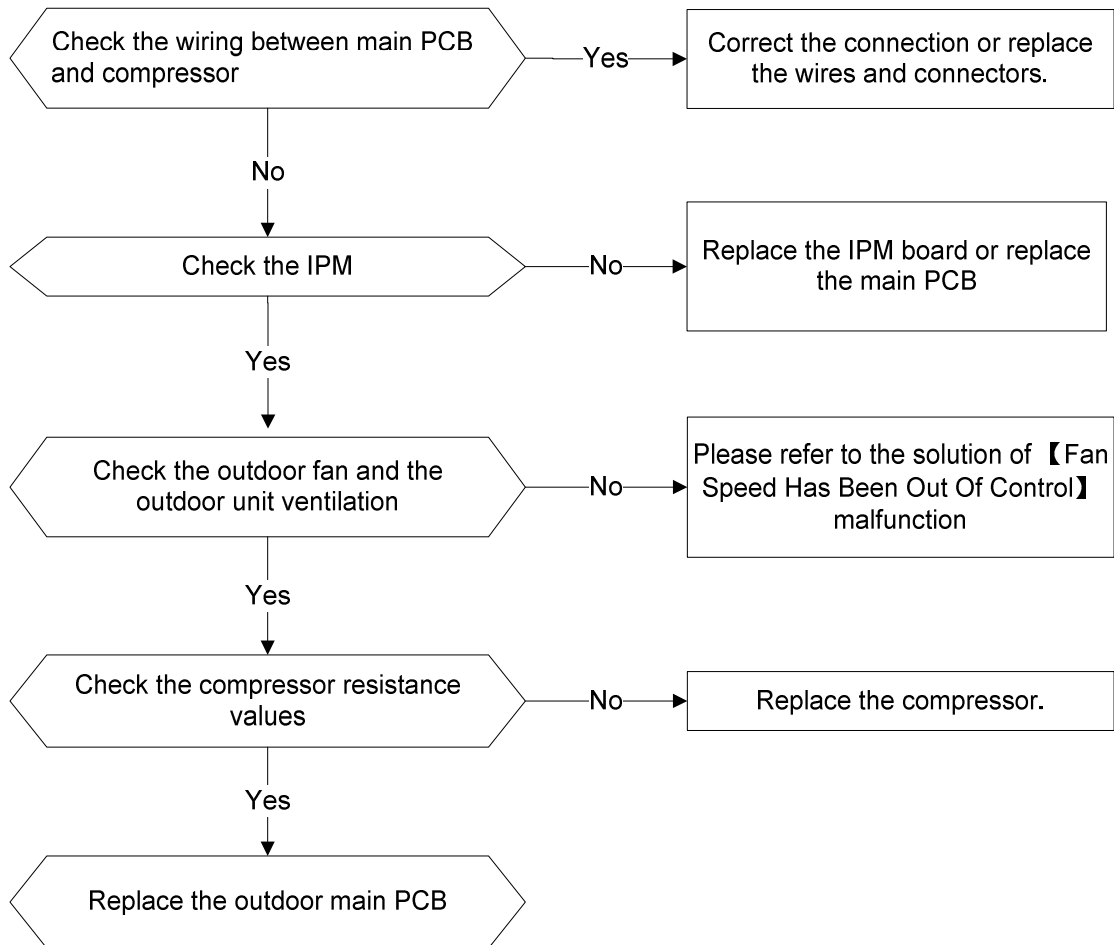
16.4 Main parts check

1. Temperature sensor checking

Disconnect the temperature sensor from PCB, measure the resistance value with a tester.
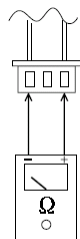
Tester

Temperature Sensors.

Room temp.(T1) sensor,

Indoor coil temp.(T2) sensor,

Outdoor coil temp.(T3) sensor,

Outdoor ambient temp.(T4) sensor,

Compressor discharge temp.(T5) sensor.

Measure the resistance value of each winding by using the multi-meter.

Appendix 1 Temperature Sensor Resistance Value Table for T1,T2,T3,T4 (℃--K)

℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm
-20	-4	115.266	20	68	12.6431	60	140	2.35774	100	212	0.62973
-19	-2	108.146	21	70	12.0561	61	142	2.27249	101	214	0.61148
-18	0	101.517	22	72	11.5	62	144	2.19073	102	216	0.59386
-17	1	96.3423	23	73	10.9731	63	145	2.11241	103	217	0.57683
-16	3	89.5865	24	75	10.4736	64	147	2.03732	104	219	0.56038
-15	5	84.219	25	77	10	65	149	1.96532	105	221	0.54448
-14	7	79.311	26	79	9.55074	66	151	1.89627	106	223	0.52912
-13	9	74.536	27	81	9.12445	67	153	1.83003	107	225	0.51426
-12	10	70.1698	28	82	8.71983	68	154	1.76647	108	226	0.49989
-11	12	66.0898	29	84	8.33566	69	156	1.70547	109	228	0.486
-10	14	62.2756	30	86	7.97078	70	158	1.64691	110	230	0.47256
-9	16	58.7079	31	88	7.62411	71	160	1.59068	111	232	0.45957
-8	18	56.3694	32	90	7.29464	72	162	1.53668	112	234	0.44699
-7	19	52.2438	33	91	6.98142	73	163	1.48481	113	235	0.43482
-6	21	49.3161	34	93	6.68355	74	165	1.43498	114	237	0.42304
-5	23	46.5725	35	95	6.40021	75	167	1.38703	115	239	0.41164
-4	25	44	36	97	6.13059	76	169	1.34105	116	241	0.4006
-3	27	41.5878	37	99	5.87359	77	171	1.29078	117	243	0.38991
-2	28	39.8239	38	100	5.62961	78	172	1.25423	118	244	0.37956
-1	30	37.1988	39	102	5.39689	79	174	1.2133	119	246	0.36954
0	32	35.2024	40	104	5.17519	80	176	1.17393	120	248	0.35982
1	34	33.3269	41	106	4.96392	81	178	1.13604	121	250	0.35042
2	36	31.5635	42	108	4.76253	82	180	1.09958	122	252	0.3413
3	37	29.9058	43	109	4.5705	83	181	1.06448	123	253	0.33246
4	39	28.3459	44	111	4.38736	84	183	1.03069	124	255	0.3239
5	41	26.8778	45	113	4.21263	85	185	0.99815	125	257	0.31559
6	43	25.4954	46	115	4.04589	86	187	0.96681	126	259	0.30754
7	45	24.1932	47	117	3.88673	87	189	0.93662	127	261	0.29974
8	46	22.5662	48	118	3.73476	88	190	0.90753	128	262	0.29216
9	48	21.8094	49	120	3.58962	89	192	0.8795	129	264	0.28482
10	50	20.7184	50	122	3.45097	90	194	0.85248	130	266	0.2777
11	52	19.6891	51	124	3.31847	91	196	0.82643	131	268	0.27078
12	54	18.7177	52	126	3.19183	92	198	0.80132	132	270	0.26408
13	55	17.8005	53	127	3.07075	93	199	0.77709	133	271	0.25757
14	57	16.9341	54	129	2.95896	94	201	0.75373	134	273	0.25125
15	59	16.1156	55	131	2.84421	95	203	0.73119	135	275	0.24512
16	61	15.3418	56	133	2.73823	96	205	0.70944	136	277	0.23916
17	63	14.6181	57	135	2.63682	97	207	0.68844	137	279	0.23338
18	64	13.918	58	136	2.53973	98	208	0.66818	138	280	0.22776
19	66	13.2631	59	138	2.44677	99	210	0.64862	139	282	0.22231

Appendix 2 Temperature Sensor Resistance Value Table for T5 (℃--K)

℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm
-20	-4	542.7	20	68	68.66	60	140	13.59	100	212	3.702
-19	-2	511.9	21	70	65.62	61	142	13.11	101	214	3.595
-18	0	483	22	72	62.73	62	144	12.65	102	216	3.492
-17	1	455.9	23	73	59.98	63	145	12.21	103	217	3.392
-16	3	430.5	24	75	57.37	64	147	11.79	104	219	3.296
-15	5	406.7	25	77	54.89	65	149	11.38	105	221	3.203
-14	7	384.3	26	79	52.53	66	151	10.99	106	223	3.113
-13	9	363.3	27	81	50.28	67	153	10.61	107	225	3.025
-12	10	343.6	28	82	48.14	68	154	10.25	108	226	2.941
-11	12	325.1	29	84	46.11	69	156	9.902	109	228	2.86
-10	14	307.7	30	86	44.17	70	158	9.569	110	230	2.781
-9	16	291.3	31	88	42.33	71	160	9.248	111	232	2.704
-8	18	275.9	32	90	40.57	72	162	8.94	112	234	2.63
-7	19	261.4	33	91	38.89	73	163	8.643	113	235	2.559
-6	21	247.8	34	93	37.3	74	165	8.358	114	237	2.489
-5	23	234.9	35	95	35.78	75	167	8.084	115	239	2.422
-4	25	222.8	36	97	34.32	76	169	7.82	116	241	2.357
-3	27	211.4	37	99	32.94	77	171	7.566	117	243	2.294
-2	28	200.7	38	100	31.62	78	172	7.321	118	244	2.233
-1	30	190.5	39	102	30.36	79	174	7.086	119	246	2.174
0	32	180.9	40	104	29.15	80	176	6.859	120	248	2.117
1	34	171.9	41	106	28	81	178	6.641	121	250	2.061
2	36	163.3	42	108	26.9	82	180	6.43	122	252	2.007
3	37	155.2	43	109	25.86	83	181	6.228	123	253	1.955
4	39	147.6	44	111	24.85	84	183	6.033	124	255	1.905
5	41	140.4	45	113	23.89	85	185	5.844	125	257	1.856
6	43	133.5	46	115	22.89	86	187	5.663	126	259	1.808
7	45	127.1	47	117	22.1	87	189	5.488	127	261	1.762
8	46	121	48	118	21.26	88	190	5.32	128	262	1.717
9	48	115.2	49	120	20.46	89	192	5.157	129	264	1.674
10	50	109.8	50	122	19.69	90	194	5	130	266	1.632
11	52	104.6	51	124	18.96	91	196	4.849			
12	54	99.69	52	126	18.26	92	198	4.703			
13	55	95.05	53	127	17.58	93	199	4.562			
14	57	90.66	54	129	16.94	94	201	4.426			
15	59	86.49	55	131	16.32	95	203	4.294			
16	61	82.54	56	133	15.73	96	205	4.167			
17	63	78.79	57	135	15.16	97	207	4.045			
18	64	75.24	58	136	14.62	98	208	3.927			
19	66	71.86	59	138	14.09	99	210	3.812			

Appendix 3:

℃	10	11	12	13	14	15	16	17	18	19	20	21	22
℉	48	50	52	54	56	58	60	62	64	66	68	70	72
℃	23	24	25	26	27	28	29	30	31	32	33	34	35
℉	74	76	78	80	82	84	86	88	90	92	94	96	98

2. Compressor checking

Measure the resistance value of each winding by using the tester.
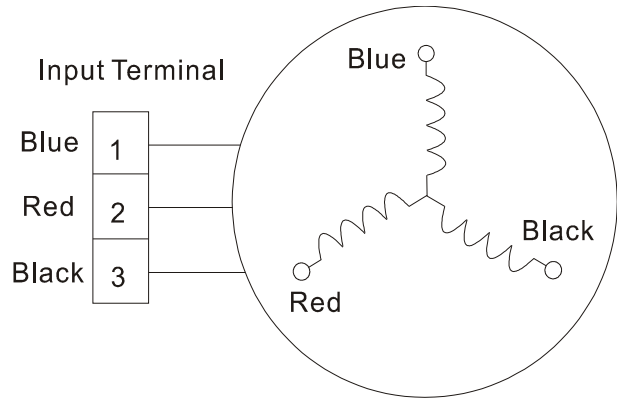
Resistance @ 68°F (20°C)

9H47YOMI	12H47YOMI	12H47ZOMI	18H47ZOMI	24H46ZOMI	30H48ZOMI	36H46ZOMI
ASN98D22UFZ	ASN98D22UFZ	ASN98D22UFZ	ASM135D23UFZ	ATF235D22UMT	ATF250D22UMT	ATF250D22UMT

Position	Resistance Value						
	ASN98D22UFZ	ASM135D23UFZ	ATF235D22UMT	ATF250D22UMT	ATF310D43UMT	ATQ420D1UMU	
Blue - Red	1.57 Ω	1.75 Ω	0.75 Ω	0.75 Ω	0.65 Ω	0.38 Ω	
Blue - Black							
Red - Blue							

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3. IPM continuity check

Turn off the power, let the large capacity electrolytic capacitors discharge completely, and dismount the IPM. Use a digital tester to measure the resistance between P and UVWN; UVW and N.

Digital tester		Normal resistance value	Digital tester		Normal resistance value
(+)Red	(-)Black		(+)Red	(-)Black	
P	N	∞ (Several MΩ)	U	N	∞ (Several MΩ)
	U		V		
	V		W		
	W		(+)Red		

4: Pressure on Service Port
Cooling chart:

COOLING MODE

℉ (℃)	Indoor Temp.	Outdoor temp.				
		75 （23.89）	85 （29.44）	95 （35）	105 （40.56）	115 （46.11）
BAR	70	8.2	7.8	8.1	8.6	10.1
BAR	75	8.6	8.3	8.7	9.1	10.7
BAR	80	9.3	8.9	9.1	9.6	11.2

PSI	70	119	113	117	125	147
PSI	75	124	120	126	132	155
PSI	80	135	129	132	140	162

MPA	70	0.82	0.78	0.81	0.86	1.01
MPA	75	0.86	0.83	0.87	0.91	1.07
MPA	80	0.93	0.89	0.91	0.96	1.12

Heating Chart:

℉ (℃)	Indoor Temp.	HEATING MODE				
		Outdoor temp.				
		57 (13.89)	47 (8.33)	37 (2.78)	27 (-2.78)	17 (-8.33)
BAR	55	30.3	28.5	25.3	22.8	20.8
BAR	65	32.5	30.0	26.6	25.4	23.3
BAR	75	33.8	31.5	27.8	26.3	24.9
PSI	55	439	413	367	330	302
PSI	65	471	435	386	368	339
PSI	75	489	457	403	381	362
MPA	55	3.03	2.85	2.53	2.28	2.08
MPA	65	3.25	3.00	2.66	2.54	2.33
MPA	75	3.38	3.15	2.78	2.63	2.49