INSTALLATION & OWNER'S MANUAL

Aquantia Bibloc Outdoor Unit

KHP-BI 4 DVN
KHP-BI 6 DVN
KHP-BI 8 DVN
KHP-BI 12 DVN
KHP-BI 14 DVN
KHP-BI 16 DVN
KHP-BI 12 DTN
KHP-BI 14 DTN
KHP-BI 16 DTN

Thank you very much for purchasing our product.
Before using your unit, please read this manual carefully and keep it for future reference.

CONTENTS PAGE

1 PRECAUTIONS

1) Ensure that all Local, National and International regulations are satisfied.
2) Read this "PRECAUTIONS FOR SAFETY" carefully before Installation.
3) The precautions described below include the important items regarding safety. Observe them without fail.
4) After the installation work, perform a trial operation to check for any problem.
5) Follow the Owner's Manual to explain how to use and maintain the unit to the customer.
6) Turn off the main power supply switch (or breaker) before the unit maintenance.
7) Ask the customer to keep the Installation Manual together with the Owner's Manual.

CAUTION

New Refrigerant Heat Pump Installation

THIS HEAT PUMP ADOPTS THE NEW HFC REFRIGERANT (R410A)WHICH DOES NOT DESTROY OZONE LAYER.

- The characteristics of R410A refrigerant are; easy to absorb water, oxidizing membrane or oil, and its pressure is approx.1.6 times higher than that of refrigerant R22. Accompanied with the new refrigerant, refrigerating oil has also been changed Therefore, during installation work, be sure that water, dust, former refrigerant, or refrigerating oil does not enter the refrigerating cycle.
- To prevent charging an incorrect refrigerant and refrigerating oil, the sizes of connecting sections of charging port of the main unit and installation tools are charged from those for the conventional refrigerant.
- Accordingly the exclusive tools are required for the new refrigerant (R410A):
  For connecting pipes, use new and clean piping designed for R410A,and please be care so that water or dust does not enter. Moreover, do not use the existing piping because there are problems with pressure-resistance force and impurity in it.

CAUTION

To Disconnect the Appliance from Main Power Supply.

This appliance must be connected to the main power supply by means of a switch with a contact separation of at least 3 mm. The installation fuse must be used for the power supply line of this heater pump.

CAUTION

- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- Children should be supervised to ensure that they do not play with the appliance.
- Ask an authorized dealer or qualified installation professional to install/maintain the heat pump. Inappropriate installation may result in water leakage, electric shock or fire.
- Turn off the main power supply switch or breaker before attempting any electrical work. Make sure all power switches are off. Failure to do so may cause electric shock.
- Connect the connecting cable correctly. If the connecting cable is connected in a wrong way, electric parts may be damaged.
- When moving the heat pump for the installation into another place, be very careful not to enter any gaseous matter other than the specified refrigerant into the refrigeration cycle. If air or any other has is mixed in refrigerant, the gas pressure in the refrigeration cycle becomes abnormally high and it may resultingly causes pipe burst and injuries on persons.

- **Do not modify this unit by removing any of the safety guards or by by-passing any of the safety interlock switches. Exposure of unit to water or other moisture before installation may cause a short-circuit of electrical parts. Do not store it in a wet basement or expose to rain or water.**
- **After unpacking the unit, examine it carefully if there are possible damage. Do not install in a place that might increase the vibration of the unit.**
- **Please pay attention to avoid the components while connect to the connecting pipes.**
- **To prevent the refrigerant piping from oxidizing inside when welding, it is necessary to charge nitrogen, or oxide will chock the circulation system. To avoid personal injury (with sharp edges), be careful when handling parts.**
- **Perform installation work properly according to the Installation Manual. Inappropriate installation may result in water leakage, electric shock or fire.When the heat pump is installed in a small room, provide appropriate measures to ensure that the concentration of refrigerant leakage occur in the room does not exceed the critical level.**
- **Install the heat pump securely in a location where the base can sustain the weight adequately. Perform the specified installation work to guard against an earthquake. If the heat pump is not installed appropriately, accidents may occur due to the falling unit.**
- **If refrigerant gas has leaked during the installation work, ventilate the room immediately. If the leaked refrigerant gas comes in contact with fire, noxious gas may generate.**
- **After the installation work, confirm that refrigerant gas doer not leak.If refeigerant gas leaks into the room and flows near a fire source, such as a cooking range, noxious gas might generate.**
- **Electrical work must be performed by a qualified electrician in accordance with the Installation Manual. Make sure the heater pump uses an exclusive power supply. An insufficient power supply capacity or inappropriate installation may cause fire.**
- **Use the specified cables for wiring connect the terminals securely fix. To prevent external forces applied to the terminals from affecting the terminals. Be sure to provide grounding. Do not connect ground wires to gas pipes, water pipes, lightning rods or ground wires for telephone cables.**
- **Conform to the regulations of the local electric company when wiring the power supply.Inappropriate grounding may cause electric shock.**
- **Do not install the heat pump in a location subject to a risk of exposure to a combustible gas. If a combustible gas leaks, and stays around the unit, a fire may occur.**
- **If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.**
- **If an appliance is intender to be permanently connected to the water mains and not connected by hose-set, this shall be stated.**

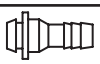
Operation ambient temperature range	
Heating mode	-20 ~ +35°C
Cooling mode	-5 ~ +46°C
Domestic hot water mode	-20 ~ +43°C

Required tools for installation work:

1	Screw driver	17	Gauge manifold (Charge hose: R410A special requirement)
2	Hole core drill(65mm)		
3	Spanner		
4	Pipe cutter	18	Vacuum pump (Charge hose: R410A special requirement)
5	Knife		
6	Reamer		
7	Gas leak detector	19	Torque wrench 1/4(17mm) 16N•m (1.6kgf•m) 3/8(22mm) 42N•m (4.2kgf•m) 1/2(26mm) 55N•m (5.5kgf•m) 5/8(15.9mm) 120N•m (12.0kgf•m)
8	Tape measure		
9	Thermometer		
10	Mega-tester		
11	Electro circuit tester		
12	Hexagonal wrench	20	Copper pipe gauge adjusting projection marginmargin
13	Flare tool		
14	Pipe bender		
15	Bubble level	21	Vacuum pump adapter
16	Metal saw		

2 ACCESSORY AND REFRIGERANT

Please check whether the following fittings are of full scopes.
If there are some spare fittings , please restore them carefully.

	Name	Shape	Quantity
Installation fittings	1. Outdoor unit installation & owner's manual (This book)		1
	2. Drainage pipe connector		1
	3. Magnet ring (Only for 1 Phase 10~16kW)		1
	4. Product technical manual		1
	5. Energy label		1

3 BEFORE INSTALLATION

Before installation
Be sure to confirm the model name and the serial no. of the unit.

Handling
Due to relatively large dimensions and high weight, the handling of the unit is only to be done by means of lifting tools with slings. These slings can be fitted into specially for this purpose foreseen sleeves at the base frame.

CAUTION

- To avoid injury, do not touch the air inlet or aluminium fins of the unit.
- Do not use the grips in the fan grills to avoid damage.
- Unit is top heavy!
  Prevent the unit from falling due to inclination during handling.

4 IMPORTANT INFORMATION REGARDING THE REFRIGERANT USED

This product contains fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent gases into the atmosphere.
Refrigerant type: R410A
GWP(1) value: 1975
(1) GWP = global warming potential
The refrigerant quantity is indicated on the unit name plate

5 SELECTING INSTALLATION SITE

WARNING

- Make sure to provide for adequate measures in order to prevent that the unit be used as a shelter by small animals.
- Small animals making contact with electrical parts can cause malfunctions, smoke or fire. Please instruct the customer to keep the area around the unit clean.

1 Select an installation site where the following conditions are satisfied and that meets with your customer's approval.
- Places which are well-ventilated.
- Places where the unit does not bother next-door neighbours.
- Safe places which can withstand the unit's weight and vibration and where the unit can be installed level.
- Places where there is no possibility of flammable gas or product leak.
- The equipment is not intended for use in a potentially explosive atmosphere.
- Places where servicing space can be well ensured.
- Places where the units' piping and wiring lengths come within the allowable ranges.
- Places where water leaking from the unit cannot cause damage to the location (e.g. in case of a blocked drain pipe).
- Places where the rain can be avoided as much as possible.
- Do not install the unit in places often used as workplace. In case of construction works (e.g. grinding works) where a lot of dust is created, the unit must be covered.
- Do not place any objects or equipment on top of the unit (top plate)
- Do not climb, sit or stand on top of the unit.
- Be sure that sufficient precautions are taken, in accordance with relevant local laws and regulations, in case of refrigerant leakage.

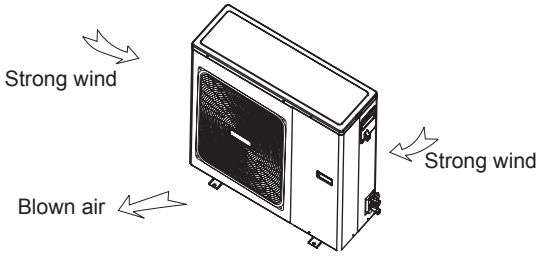
2 When installing the unit in a place exposed to strong wind, pay special attention to the following.
Strong winds of 5 m/sec or more blowing against the unit's air outlet causes short circuit (suction of discharge air), and this may have the following consequences:
- Deterioration of the operational capacity.
- Frequent frost acceleration in heating operation.
- Disruption of operation due to rise of high pressure.
- When a strong wind blows continuously on the face of the unit, the fan can start rotating very fast until it breaks.

Refer to the figures for installation of this unit in a place where the wind direction can be foreseen.

- Turn the air outlet side toward the building's wall, fence or screen.

Make sure there is enough room to do the installation

- Turn the air outlet side toward the building's wall, fence or screen.



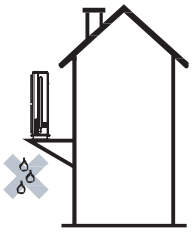
3 Prepare a water drainage channel around the foundation, to drain waste water from around the unit.

4 If the water drainage of the unit is not easy, please build up the unit on a foundation of concrete blocks, etc. (the height of the foundation should be about 100 mm.

5 If you install the unit on a frame, please install a waterproof plate about 100 mm. of the underside of the unit in order to prevent the invasion of water from the lower direction.

6 When installing the unit in a place frequently exposed to snow, pay special attention to elevate the foundation as high as possible.

7 If you install the unit on a building frame, please install a waterproof plate (field supply) (about 100 mm.) of the underside of the unit) in order to avoid the drainwater dripping.
(See figure).



6 OUTDOOR UNIT INSTALLATION

6.1 Installation place

Please keep away from the following place, or malfunction of the machine may be caused:

1) There is combustible gas leakage.
2) There is much oil (including engine oil) ingredient.
3) There is salty air surrounding(near the coast)
4) There is caustic gas (the sulfide, for example) existing in the air (near a hotspring)
5) A place the heat air expelled out from the outdoor unit can reach your neighbor's window.
6) A place where the drain water does not make any problem.
7) A place that the noise interferes your neighbors every day life.
8) A place that is not exposed to a strong wind.
9) A place that is too weak to bear the weight of the unit .
10) A place that does not block a passage.
11) Uneven place.
12) Insufficient ventilation place.
    Near a private power station or high Frequency equipment. Install indoor unit, outdoor unit, power cord and connecting wire at least 1m away from TV set or radio to prevent noise or picture interference.

CAUTION

- When an outdoor unit is installed in a place that is always exposed to a strong wind like a coast or on a high storey of a building, secure a normal fan operation by using a duct or a wind shield.
- When the outdoor unit is installed in an elevated position, be sure to 4secure its feet.
- Keep indoor unit, outdoor unit, power supply wiring and transmission wiring at least 1 meter away from televisions and radios. This is to prevent image interference and noise in those electrical appliances. (Noise may be generated depending on the conditions under which the electric wave is generated, even if 1 meter is kept.)
- The insulation of the metal parts of the building and the heater pump should comply with the regulation of National Electric Standard.

6.2 Installation space (unit: mm)

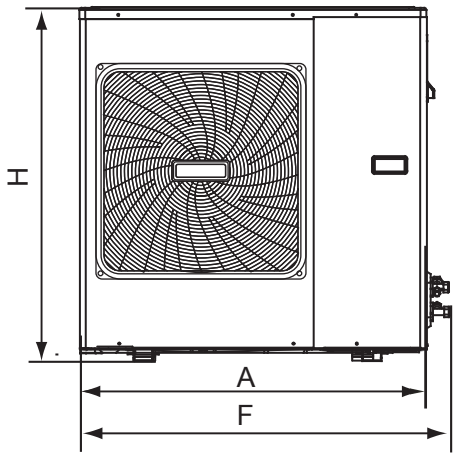


Fig. 6-1

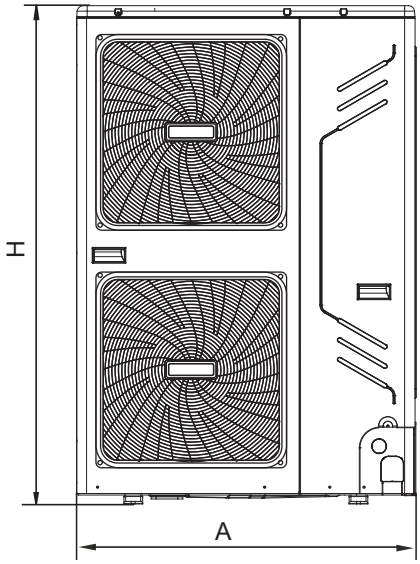


Fig. 6-2

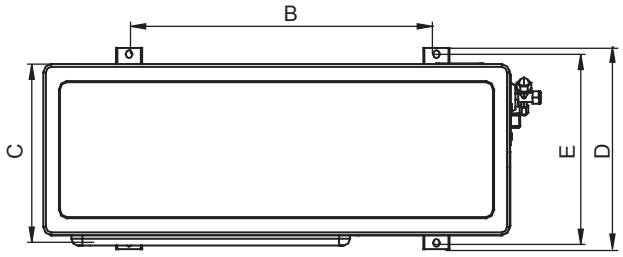


Fig. 6-3

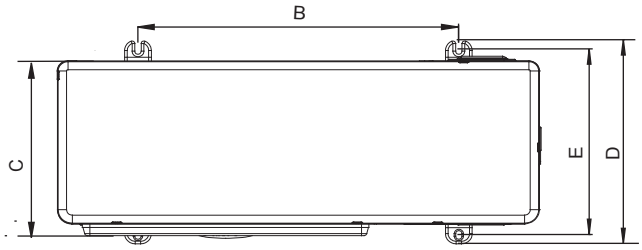


Fig. 6-4

MODEL	A	B	C	D	E	F	H	Fig.No.
4~6kW	895	590	350	355	333	960	860	Fig.6-1/ Fig.6-3
8kW	990	625	390	395	360	1050	965	Fig.6-1/ Fig.6-3
10~16kW	900	600	348	400	360	/	1327	Fig.6-2/ Fig.6-4

1) Single unit installation

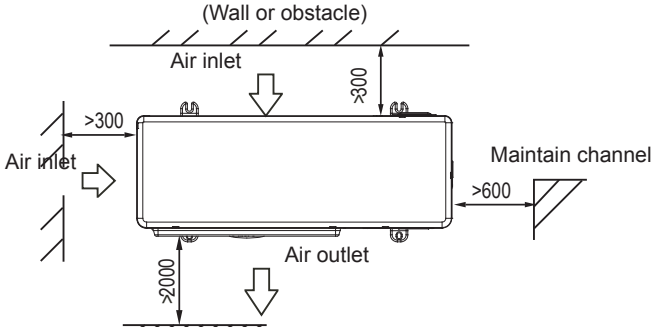


Fig. 6-5

2) Parallel connect the two units or above

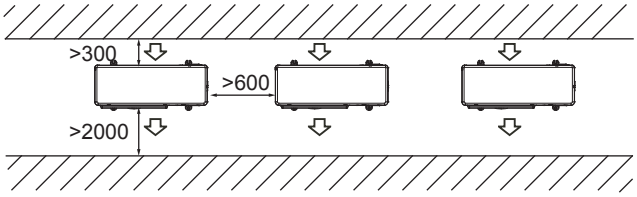


Fig. 6-6

3) Parallel connect the front with rear sides

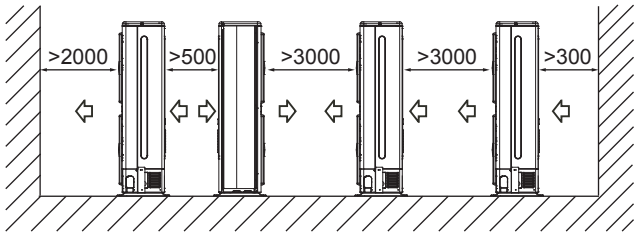


Fig. 6-7

6.3 Moving and installation

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.

1) Do not touch the fan with hands or other objects.

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

3) Make concrete foundation accoding to the sepecif-ications of the outdoor units. (refer to Fig.6-8)

4) Fasten the feet of this unit with bolts firmly to prevent it from collapsing in case of earthquake or strong wind. Refer to Fig.6-8

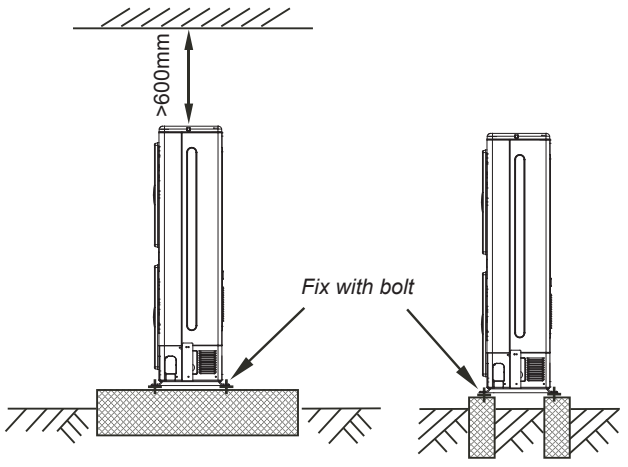


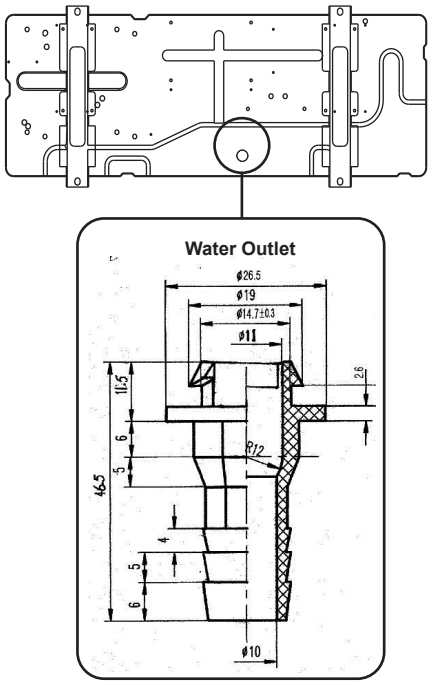
Fig. 6-8

NOTE

All the pictures in this manual are for explanation purpose only. They may be slightly different from the heat pump you purchased (depend on model). The actual shape shall prevail.

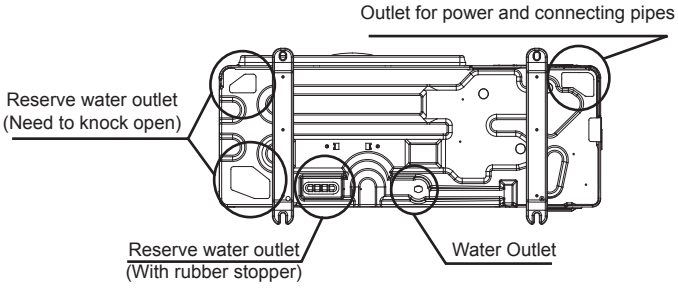
6.4 Water Outlet

Four condensed water outlets on the chassis for selection display as the follow figure:



4~8kW

Fig. 6-9



10~16kW

Fig. 6-10

CAUTION

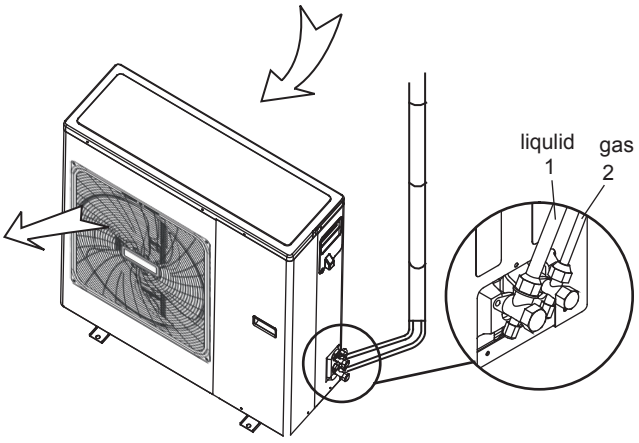
While installing the outdoor unit, pay attention to the installation place and the drainage pattern;

- For 4~8kW model units, there is only one water outlet on the bottom pan. If it's installed at low ambient temperature zone (such as the ambient temperature is lower than -7°C for a long period), some heating devices should be install at the bottom pan to prevent the drainage channel and water outlet from freezing, or order a special unit for low temperature zone.
- For 10~16kW model units, if it's installed at the low ambient temperature zone, the frozen condensed water will block up the water outlet, please pull out the rubber stopper of the reserve water outlet. If that still fails to satisfy for the water draining, please knock open the other two water outlets, and keep the water can drain in time. Pay attention to the knock the reserve water outlet from outside to inside, and it will be beyond repair after knocking open, please pay attention to the installation place, lest cause the inconvenience. Please do the moth proofing for the knocked out hole, to avoid the pest processing into and destroy the components.

7 INSTALL THE CONNECTING PIPE

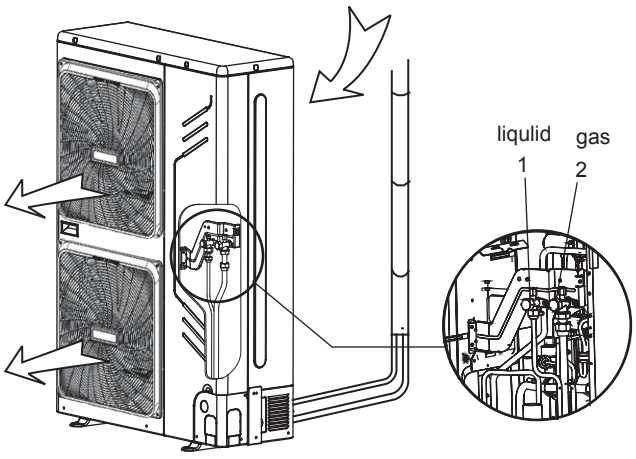
Check whether the differance in height between the indoor unit and outdoor unit, the length of refrigerant pipe, and the number of the bends meet the following requirements:

7.1 Refrigerant piping



4~8kW

Fig.7-1



10~16kW

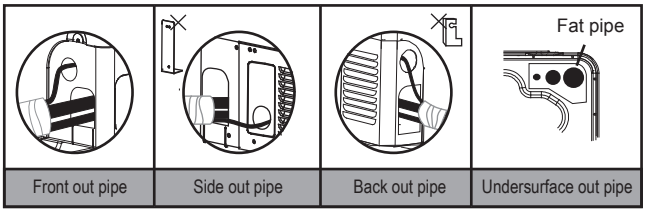
Fig.7-2

CAUTION

- Please pay attention to avoid the components where it is connecting to the connecting pipes.
- To prevent the refrigerant piping from oxidizing inside when welding, it is necessary to charge nitrogen, or oxide will chock the circulation system.

1) The indoor and outdoor connecting pipe interface and powercable outlet.

   Can select various piping and wiring patterns such as out from the front, the back, the side and undersurface etc. (The follow display the locations of several piping and wiring knock-off interfaces)



CAUTION

- Side out pipe: please remove the L-shape metal plate, otherwise can not wiring.
- Back out pipe:
  Undersurface outlet pipe: the knock out should from inside to outside, and then piping and wiring through this.Pay attention to the piping, the fat connecting pipe should out from the largest hole, otherwise the pipes will be rubbed. Please do the moth proofing for the knocked out hole, to avoid the pest processing into and destroy the components. Please wipe off the piping support rubber blanket beside the inner outlet pipe cover of the machine while back side getting out pipes.

7.2 Leakage Detection

Use soap water or leakage detector to check every joint whether leak or not (Refer to Fig.7-3).Note:
A is low pressure side stop valve
B is high pressure side stop valve
C and D is connecting pipes interface of indoor and outdoor uni

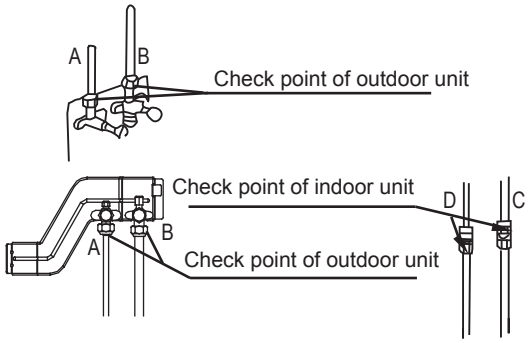


Fig.7-3

7.3 Heat Insulation

Do the heat insulation to the pipes of gas side and liquid side separately. The temperature of the pipes of gas side and liquid side when cooling, for avoiding condensation please do the heat insulation fully.

1) The gas side pipe should use closed cell foamed insulation material, which the fire-retardant is B1 grade and the heat resistance over 120°C.
2) When the external diameter of copper pipe≤Φ12.7mm, the thickness of the insulating layer at least more than 15mm;
   When the external diameter of copper pipe≥Φ15.9mm, the thickness of the insulating layer at least more than 20mm.
3) Please use attached heat-insulating materials do the heat insulation without clearance for the connecting parts of the indoor unit pipes.

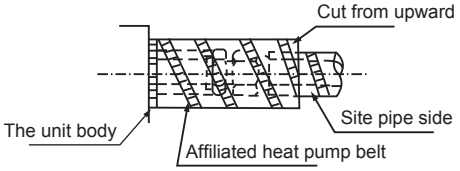


Fig.7-4

7.4 Connecting method

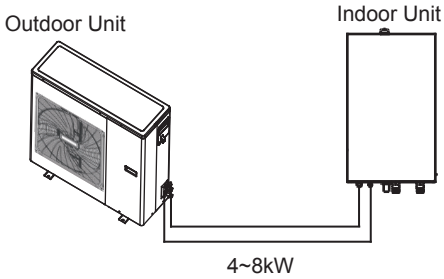


Fig.7-5

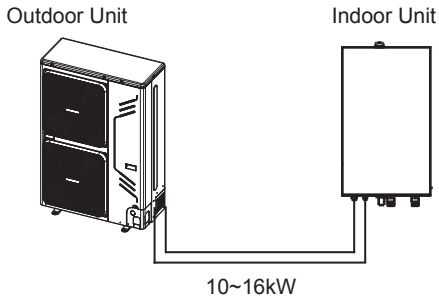


Fig.7-6

1) Size of pipes of Gas side and Liquid side

MODEL	Refrigerant	Gas side/Liquid side
4~16kW	4~16kW	Φ15.9/Φ9.5

2) Connection method

	Gas side	Liquid side
4~16kW Outdoor unit	Flaring	Flaring
Indoor unit	Flaring	Flaring

Models	4~6kW	8kW	10~16kW
Max. piping length	20m	30m	50m
Max. differance in height when outdoor unit is upside	10m	20m	30m
Max. differance in height when outdoor unit is downside	8m	15m	25m

7.5 Remove Dirt or Water in the Pipes

1) Make sure there is no any dirt or water before connectiong the piping to the outdoor units.

2) Wash the pipes with high pressure nitrogen, never use refrigerant of outdoor unit.

7.6 Airtight Test

Charge pressured nitrogen after connecting indoor/outdoor unit pipes to do airtight test.

CAUTION

- Pressured nitrogen [4.3MPa (44kg/cm^2) for R410A] should be used in the airtight test.
- Tighten high pressure/low pressure valves before applying pressured nitrogen.
- Apply pressure from air vent mouth on the hight pressure/low pressure valves.
- The high pressure/low pressure valves are closed when applying pressured nitrogen.
- The airtight test should never use any oxygen, flammable gas or poisonous gas.

7.7 Air Purge with Vacuum Pump

1) Using vacuum pump to do the vacuum,never using refrigerant to expel the air.
2) Vacuuming should be done from both liquid side and gas side simultaneously.
3) Please select power source for indoor unit and outdoor unit respectively.
4) The power supply has specified branch circuit with leakage protector and manual switch.
5) Outdoor unit and indoor unit conncet with required power supply which is 220-240V~ 50Hz or 380-415V 3N~ 50Hz.
6) Use 3-core screened wire as indoor and outdoor control wire.
7) The installation should comply with relevant national electric standard.
8) Power wiring should be engaged by specialized electrician.

7.8 Refrigerant Amount to be Added

Calculate the added refrigerant according to the diameter and the length of the liquid side pipe of the outdoor unit/indoor unit connection. If the length of the liquid side pipe is less than 10 meters it is no need to add more refrigerant, so than calculating the added refrigerant the length of the liquid side pipe must subtract 10 meters.

Liquid side piping diameter	Refrigerant to be added permeter piping
Φ9.5	0.054kg

8 ELECTRICAL WIRING

CAUTION

- Please select power source for indoor unit and outdoor unit respectively.
- The power supply has specified branch circuit with leakage protector and manual switch.
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- Use 3-core screened wire as indoor and outdoor control wire.
- The installation should comply with relevant national electric standard.
- Power wiring should be engaged by specialized electrician.

8.1 Outdoor Unit Wiring

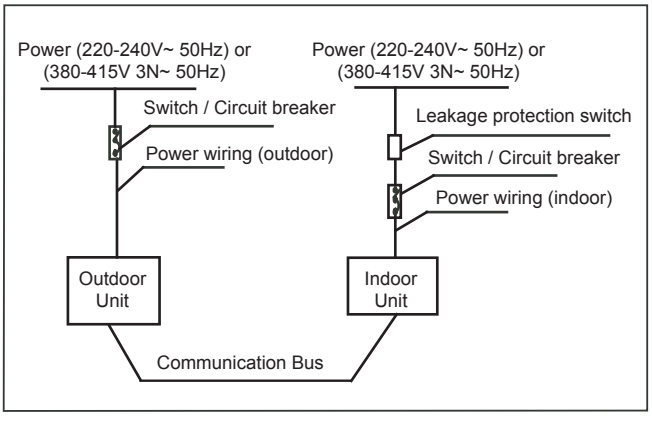
1) The Specification of Power

Capicity (kW)		4~8	10~16	12~16
Outdoor Unit Power	Phase	1 Phase		3 Phase
	Voltage and Frequency	220-240V 50Hz		380-415V 50Hz
	Power Wiring (mm^2)	3X2.5	3X4.0	5X2.5
Circuit Breaker (A)		32	40	3
Indoor/Outdoor unit Signal wire (mm^2) (Weak electric signal)		3-core shielded wire 3X0.75		
Flexible cord must meet 60245IEC(H05RN-F) standards.				

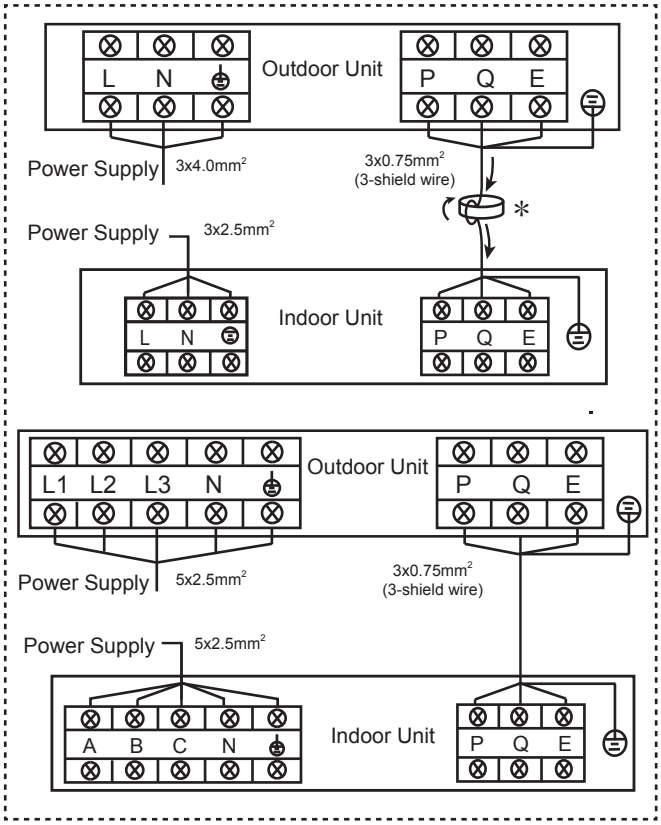
CAUTION

CEquipment complying with IEC 61000-3-12.

- A disconnection device having an air gap contact separation in all active conductors should be incorporated in the fixed wiring according to the National Wiring Regulation.



4~16kW



CAUTION

- The reserved function is indicated in broken line table, users can select it when necessary.

* To prevent interference with communication, increase a magnetic ring inside and outside communication line (around 1 lap).

2) Indoor/Outdoor Unit Signal Wire
Wrong connection may cause malfunction.
3) Wiring Connection
Seal the wiring connection with the insulation material, or the condensing dew will be caused.

8.2 Indoor Unit Wiring

1) Power Supply

Capicity(kW)		4~16
Indoor Unit Power	Phase	1-Phase or 3 Phase
	Voltage and Frequency	220-240V 50Hz 380-415V 50Hz
	Power Wiring (mm^2)	3X2.5(1phase) or 5X2.5(3 phase)
Circuit Breaker (A)		32
Indoor Unit /Outdoor Unit Signal Wire (mm^2) (Weak electric signal)		3-core shielded wire 3X0.75

CAUTION

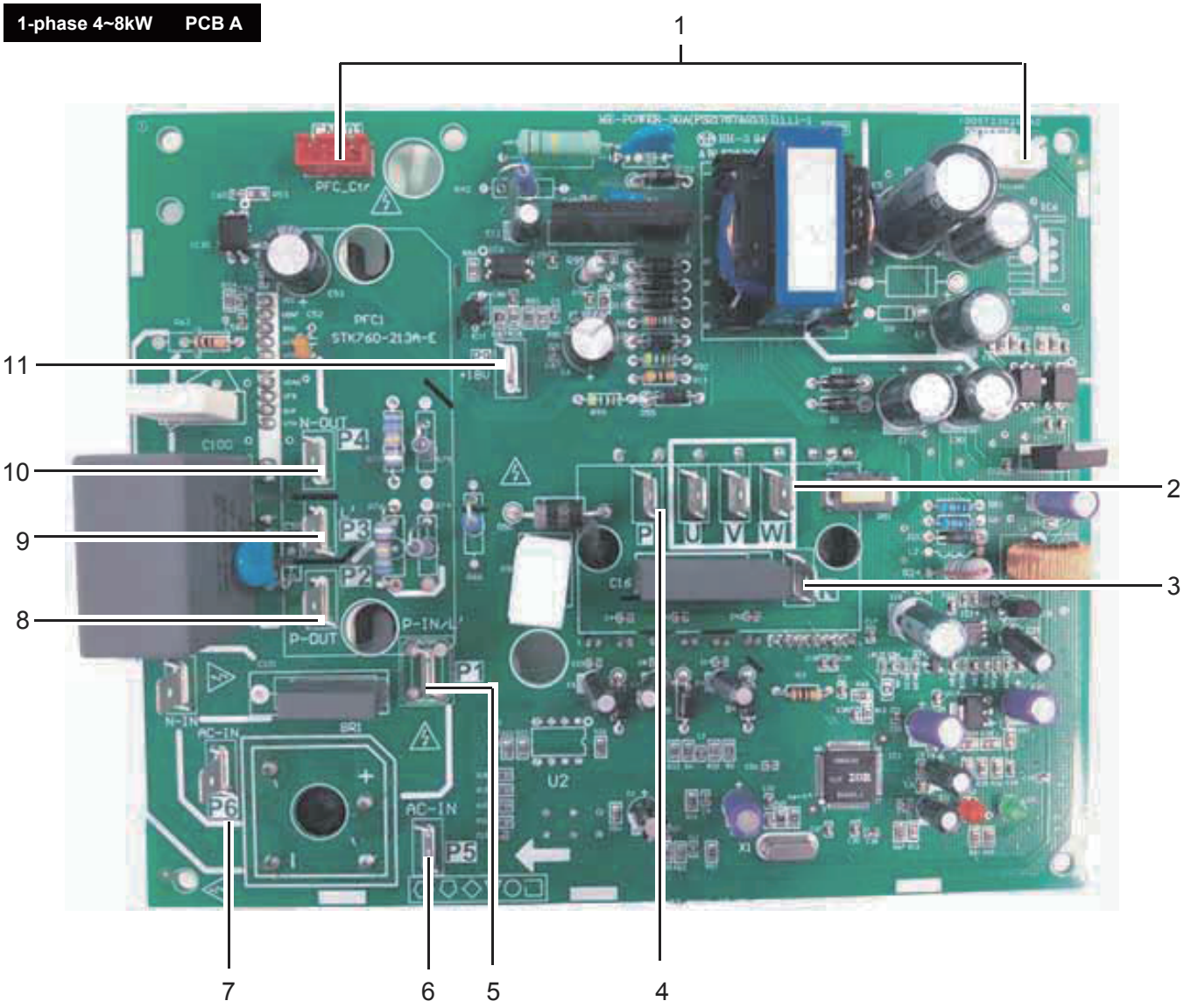
- When power cord is parallel with signal wire, please put them into separate wire distribution pipes, and leave a proper distance.
- (Reference distance: It is 300mm when current capacity of power cord is less than 10A, or 500mm when 50A).

8.3 Switch box main components

The image shown here is indicative only. If there is inconsistency between the image and the actual product, the actual product shall govern.

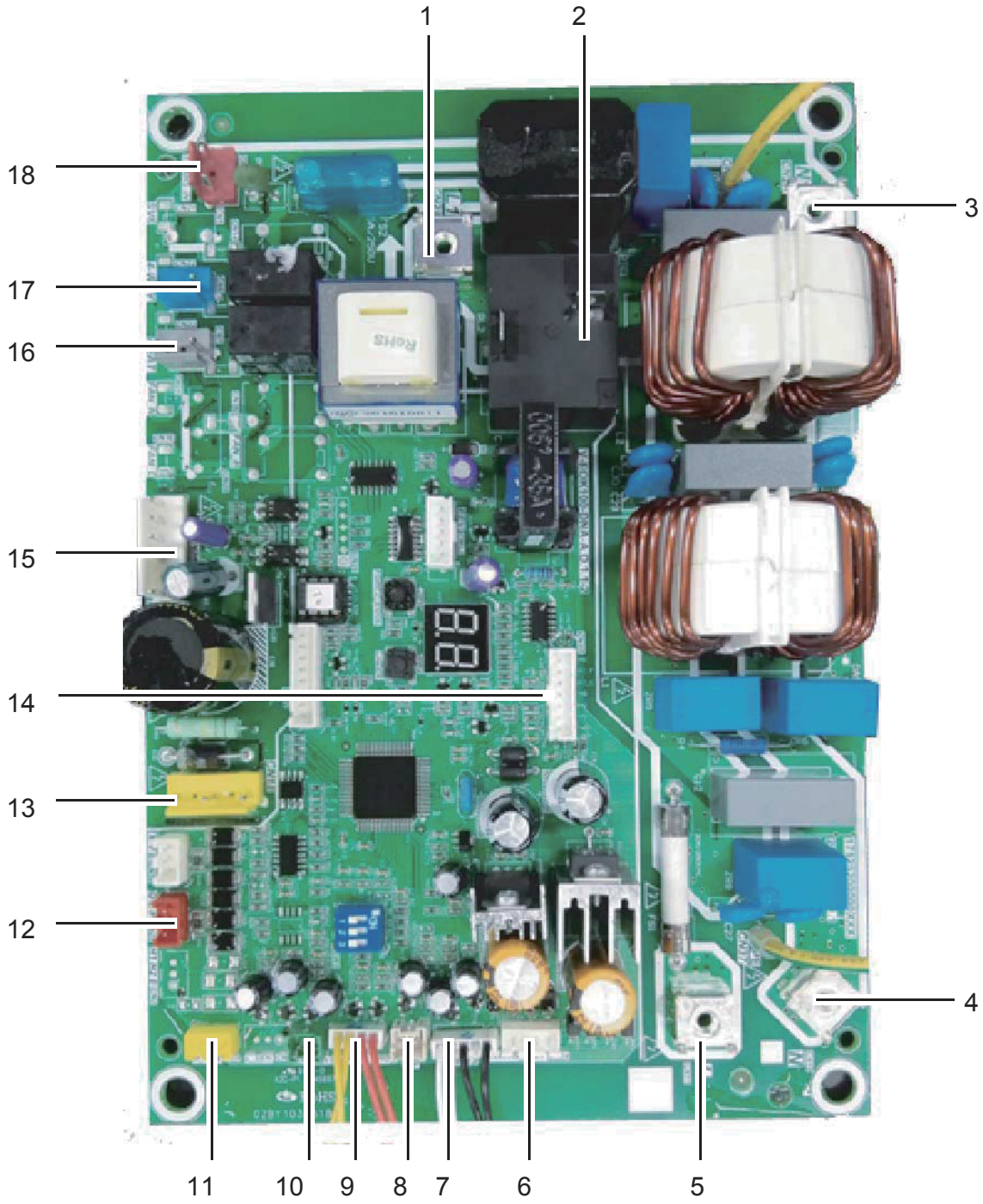
8.3.1 Switch box main components (1-phase 4\6\8kW)

1-phase 4~8kW PCB A



1 To main board (CN101,CN105)
2 Compressor connection port U V W (U,V,W)
3 Input port N for IPM module(N)
4 Input port P for IPM module(P)
5 Input port for PFC inductance P1(P1)
6 Input port for bridge Rectifiers(P5)
7 Input port for Bridge Rectifiers(P6)
8 Output port P of PFC(P2)
9 Input port for PFC inductance 3(P3)
10 Output port N of PFC(P4)
11 +18V(P9)

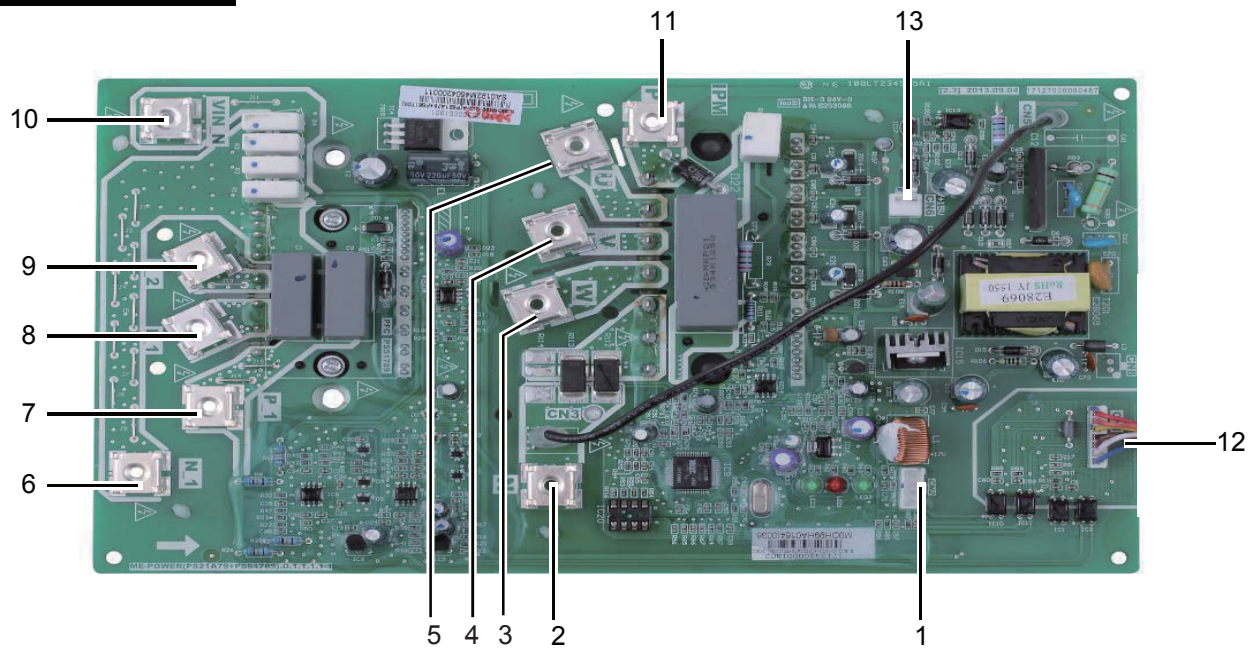
1-phase 4~8kW PCB B



1	Rectifier bridge input port L	10	Th temperature sensor port
2	Hydraulic compartment input port2	11	Pressure sensor port
3	Rectifier bridge input port N	12	Wire controller port
4	Power supply N	13	P/N/+18V port
5	Power supply L	14	To IPDU/PFC
6	Transformer output port	15	DC fan port
7	BLACK: T3 temperature sensor port WHITE:T4 temperature sensor port	16	Compression electromechanical heating belt
8	TP temperature sensor port	17	4-way valve port
9	YELLOW: High pressure switch RED: Low pressure switch	18	Transformer input port

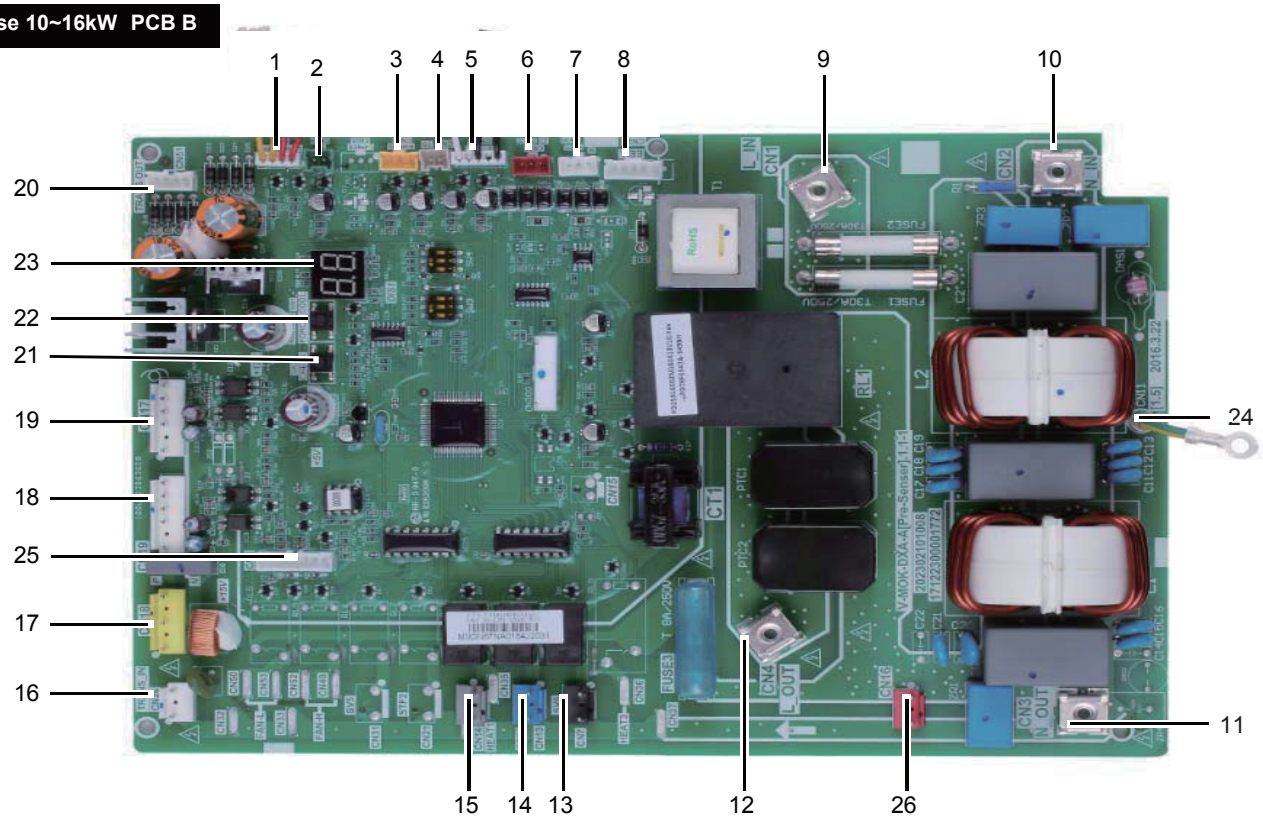
8.3.2 Switch box main components (1-phase, 10/12/14/16kW)

1-phase 10~16kW PCB A



1 Reserved(CN2)
2 Input Port N For Ipm Module(N)
3 Power Supply Of W Phase For Compressor(W)
4 Power Supply Of V Phase For Compressor(V)
5 Power Supply Of U Phase For Compressor(U)
6 Output Port N Of Pfc Module(N_1)
7 Output Port P Of Pfc Module(P_1)
8 Input Port For Pfc Inductance L_1(L_1)
9 Input Port For Pfc Inductance L_2(L_2)
10 Input Port N For Pfc Module(VIN-N)
11 Input Port P Foripm Modele(P)
12 Communicate Port Between Pcb A And Pcb B(CN1)
13 +15V(CN6)

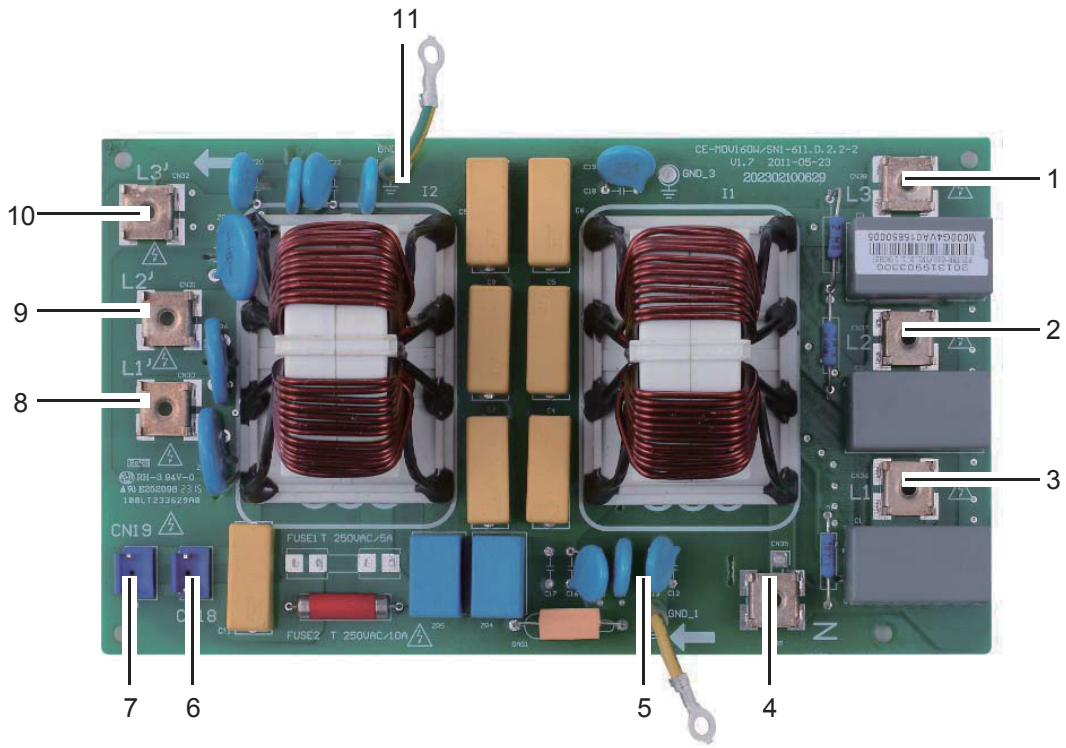
1-phase 10~16kW PCB B



1 Port For Pressure Switch(CN12)
2 Port For Suction Temperature Sensor(CN24)
3 Port For Pressure Sensor(CN28)
4 Port For Discharge Temperature Sensor(CN8)
5 Port For Ambient Temperature And Condenser Outlet Temperature Sensor(CN9)
6 Port For Communication Between Outdoor Unit And Bydro-box(CN10)
7 Reserved(CN30)
8 Port For Electrical Expansion Value(CN22)
9 Input Port For Live Wire(CN1)
10 Input Port For Neutral Wire(CN2)
11 Output Port For Neutral Wire(CN3)
12 Ourput Port For Live Wire(CN4)
13 Reserved(CN7)
14 Port For 4-way Value(CN13)
15 Port For Eletric Heating Tape(CN14)
16 Input Port For Transformer(CN26)
17 Power Supply Port For Fan(CN18)
18 Port For Down Fan(CN19)
19 Port For Up Fan(CN17)
20 Output Port For Transformer(CN51)
21 Check Button(SW2)
22 Refrigerant Recovery Button
23 Digital Displays(DIS1)
24 Ground Wire(CN11)
25 Comunication Port For PCBA(CN6)
26 Power supply port for hydro-box control board(CN16)

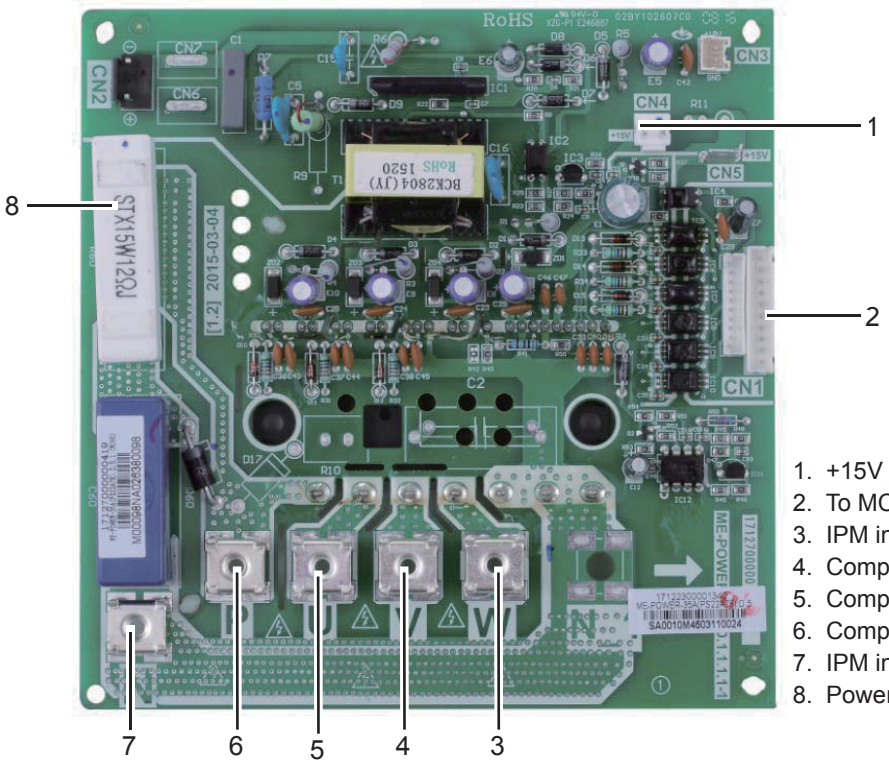
8.3.2 Switch box main components (1-phase, 10/12/14/16kW)

3-phase 12~16kW PCB A



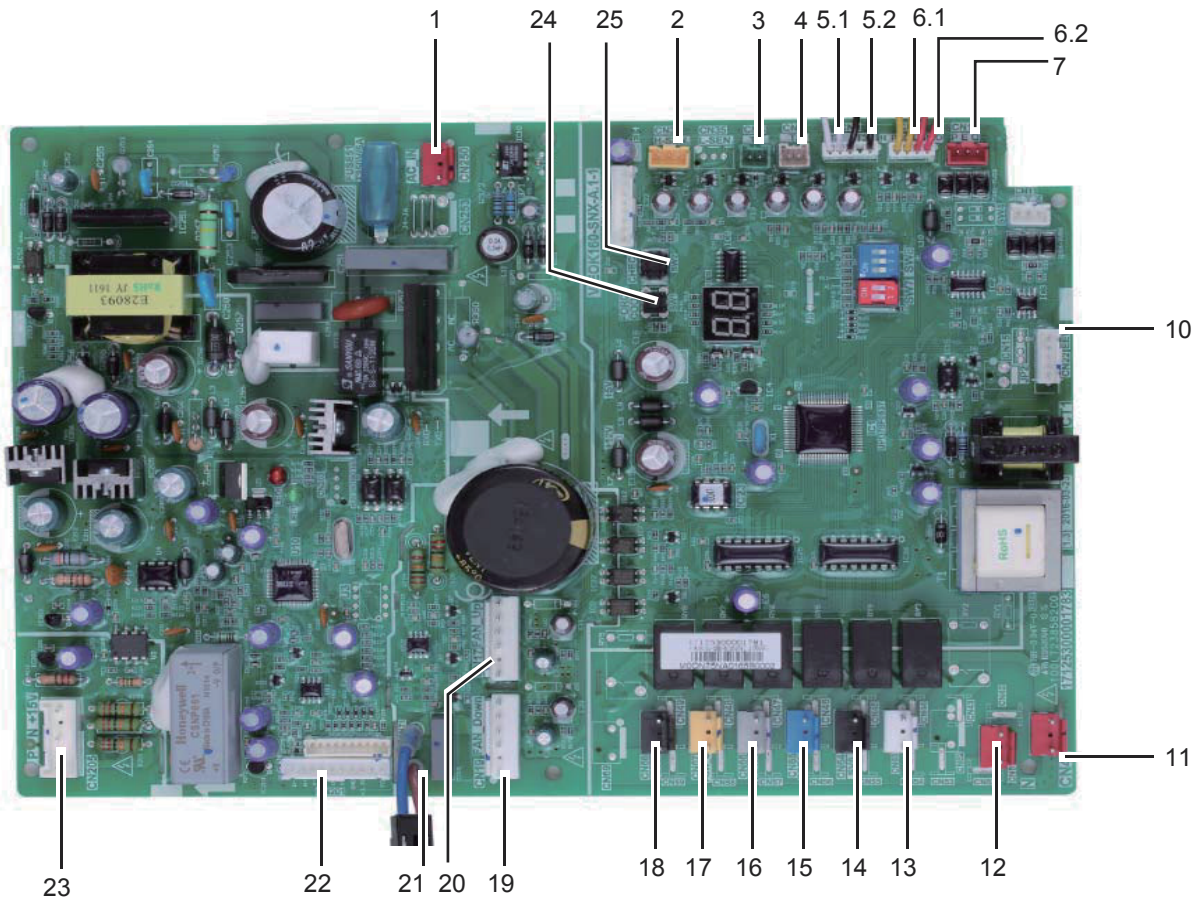
1 Power supply L3(L3)
2 Power supply L2(L2)
3 Power supply L1(L1)
4 Power supply N(N)
5 Ground wire(GND_1)
6 Power supply for load(CN18)
7 Power supply for main control board(CN19)
8 Power filtering L1(L1')
9 Power filtering L2(L2')
10 Power filtering L3(L3')
11 Ground wire(GND_2)

3-phase 12~16kW PCB B



1. +15V port(CN4)
2. To MCU(CN1)
3. IPM input N
4. Compressor connection port W
5. Compressor connection port V
6. Compressor connection port U
7. IPM input P
8. Power for switching power supply(CN2)

3-phase 12~16kW PCB C



1 Power supply for the main PCB(CN250)
2 Port for pressure sensor(CN36)
3 Port for sunction temperature sensor(CN4)
4 Port for discharge temperature sensor(CN8)
5.1 Port for outdoor temperature sensor(CN9)
5.2 Port for condenser outlet temperature sensor(CN9)
6.1 Port for high pressure switch(CN6)
6.2 Port for low pressure switch(CN6)
10 Port for electrical expansion value(CN22)
11 Port for power supply(CN41)
12 Power supply for hydro-box control board(CN6)
13 PFC control port(CN63)
14 Reserved(CN64)
15 Port for 4-way value(CN65)
16 Port for eletric heating tape(CN66)
17 PTC control(CN67)
18 Reserved(CN68)
19 Port for down fan(CN19)
20 Port for up fan(CN17)
21 Power supply port for module(CN70\71)
22 Communication port for IPDU(CN201)
23 Port for voltage check(CN205)
24 Refrigerant recovery button(SW1)
25 Check button(SW2)

9 TEST RUNNING

Operate according to "key points for test running" on the electric control box cover.

CAUTION

- Test running can not start until the outdoor unit has been connected to the power for 12 hours.
- Test running can not start until all the valves are affirmed open.
- Never make the forced running .(Or the protector sits back, danger will occur.)

10 PRECAUTIONS ON REFRIGERANT LEAKAGE

This heat pump adopts inncouous and nonflammable refrigerant. The locating room of the HP should big engough that any refrigerant leakage is unable to reach critical thickness.So certain esssential action can be taken on time.

1) Critical thickness------the Max. thickness of Freon without any harm to person.
2) Refrigerant critical thickness: 0.44[kg/m^3] for R410A.
   - Confirm the critical thickness through follow steps, and take necessary actions.
   - Calculate the sum of the charge volume (A[kg]) Total Refrigerant volume of 10HP=factory refrigerant volume + superaddition.
   - Calculate the indoor cubage (B[m^3]) (as the minimum cubage.
   - Calculate the refrigerant thickness.Counter measure against over high thickness

$$\frac{A[kg]}{B[m^3]} \leqslant \text{critical thickness}$$

3) Install mechanical ventilator to reduce the refrigerant thickness under critical level. (ventilate regularly).
4) Install leak alarm facility related to mechanical ventilator if you can not regularly ventilate.

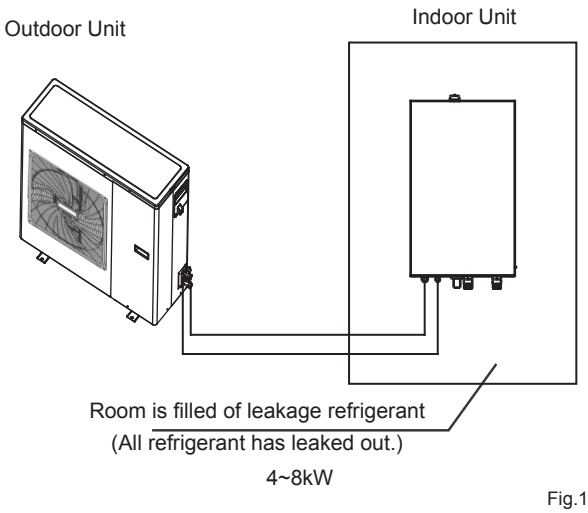


Fig.10-1

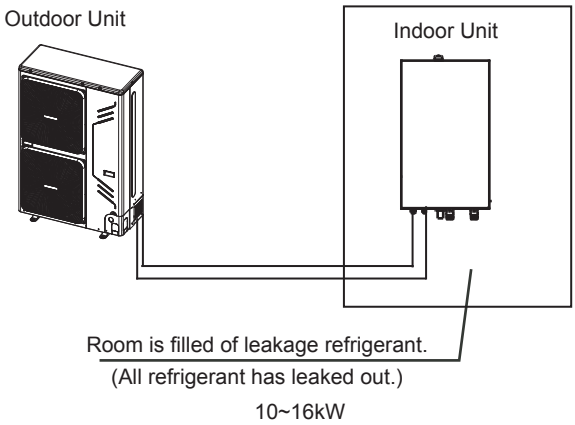


Fig.10-2

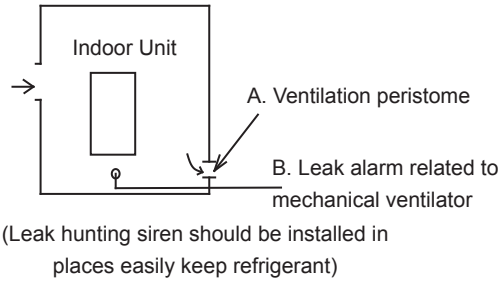


Fig.10-3

NOTE

Please press “constraint cool” button to carry out refrigerant recycling process. Keep the low pressure above 0.2MPa, other wise compressor may be burnt out.

11 TURN OVER TO CUSTOMERG

The owner's manual of indoor unit and owner's manual of outdoor unit must be turned over to the customer. Explain the contents in the owner’s manual to the customers in details.

WARNING

- **Ask your dealer for installation of the heat pump.**
  Incomplete installation performed by yourself may result in a water leakage, electric shock, and fire.
- **Ask your dealer for improvement, repair, and maintenance.**
  Incomplete improvement, repair, and maintenance may result in a water leakage, electric shock, and fire.
- **In order to avoid electric shock, fire or injury, or if you detect any abnormality such as smell of fire, turn off the power supply and call your dealer for instructions.**
- **Never let the indoor unit or the remote controller get wet.**
  It may cause an electric shock or a fire.
- **Never press the button of the remote controller with a hard, pointed object.**
  The remote controller may be damaged.
- **Never replace a fuse with that of wrong rated current or other wires when a fuse blows out.**
  Use of wire or copper wire may cause the unit to break down or cause a fire.
- **It is not good for your health to expose your body to the air flow for a long time.**
- **Do not insert fingers, rods or other objects into the air inlet or outlet.**
  When the fan is rotating at high speed, it will cause injury.
- **Never use a flammable spray such as hair spray, lacqueror paint near the unit.**
  It may cause a fire.
- **Never touch the air outlet or the horizontal blades while the swing flap is in operation.**
  Fingers may become caught or the unit may break down.
- **Never put any objects into the air inlet or outlet.**
  Objects touching the fan at high speed can be dangerous.
- **Never inspect or service the unit by yourself.**
  Ask a qualified service person to perform this work.
- **Do not dispose this product as unsorted municipal waste. Collection of such waste separately for special treatment is necessary.**
  Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.
  Contact you local government for information regarding the connection systems available.
- **If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundeater and get into the food chain, damaging your health and well-being.**
- **To prevent refrigerant leak, contact your dealer.**
  When the system is installed and runs in a small room, it is required to keep the concentration of the refrigerant, if by any chance coming out, below the limit. Otherwise, oxygen in the room may be affected, resulting in a serious accident.
- **The refrigerant in the heat pump is safe and normally does not leak.**

If the refrigerant leaks in the room, contact with a fire of a burner, a heater or a cooker may result in a harmful gas.

- **Turn off any combustible heating devices, ventilate the room, and contact the dealer where you purchased the unit.**
  Do not use the heat pump until a service person confirms that the portion where the refrigerant leaks is repaired.

CAUTION

- **Do not use the heat pump for other purposes.**
  In order to avoid any quality deterioration, do not use the unit for cooling precision instruments, food, plants, animals or works of art.
- **Before cleaning, be sure to stop the operation, turn the breaker off or pull out the supply cord.**
  Otherwise, an electric shock and injury may result.
- **In order to avoid electric shock or fire, make sure that an earth leak detector is installed.**
- **Be sure the heat pump is grounded.**
  In order to avoid electric shock, make sure that the unit is grounded and that the earth wire is not connected to gas or water pipe, lightning conductor or telephone earth wire.
- **In order to avoid injury, do not remove the fan guard of the outdoor unit.**
- **Do not operate the heat pump with a wet hand.**
  An electric shock may happen.
- **Do not touch the heat exchanger fins.**
  These fins are sharp and could result in cutting injuries.
- **Do not place items which might be damaged by moisture under the indoor unit.**
  Condensation may form if the humidity is above 80%, the drain outlet is blocked or the filter is polluted.
- **After a long use, check the unit stand and fitting for damage.**
  If damaged, the unit may fall and result in injury.
- **To avoid oxygen deficiency, ventilate the room sufficiently if equipment with burner is used together with the heat pump.**
- **Arrange the drain hose to ensure smooth drainage.**
  Incomplete drainage may cause wetting of the building, furniture etc.
- **Never touch the internal parts of the controller.**
  Do not remove the front panel. Some parts inside are dangerous to touch, and a machine trouble may happen.
- **Never do the maintenances work by yourself.**
  Please contact your local dealer to do the maintenances work.
- **Never expose little children, plants or animals directly to the air flow.**
  Adverse influence to little children, animals and plants may result.
- **Do not allow a child to mount on the outdoor unit or avoid placing any object on it.**
  Falling or tumbling may result in injury.
- **Do not operate the heat pump when using a room fumigation - type insecticide.**
  Failure to observe could cause the chemicals to become deposited in the unit, which could endanger the health of those who are hypersensitive to chemicals.
- **Do not place appliances which produce open fire in places exposed to the air flow from the unit or under the indoor unit.**
  It may cause incomplete combuston or deformation of the unit due to the heat.
- **Do not install the heat pump at any place where flammable gas may leak out.**
  If the gas leaks out and stays around the heat pump, a fire may break out.
- **The appliance is not intended for use by young children or infirm persons without supervision.**
- **Young children should be supervised to ensure that they do not play with the appliance.**
- **The outdoor unit window-shades should be periodic cleaning in case of being jammed.**
  This window-shapes is heat dissipation outlet of components, if being jammed will cause the components shorten their service life spans because of overheated for a long time.
- **The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.**

12 OPERATION AND PERFORMANCE

12.1 Protection Equipment

This Protection Equipment will enable the Heat Pump to stop when the Heat Pump is to be directed running compulsively.

When the Protection Equipment is activated, the Operation Indicator still lights while the Heat Pump is not running. But the Check Indicatior Lights.

The protection equipment may be activated in following conditions:

- **Cooling Operation**
  - The air inlet or air outlet of outdoor unit is blocked.
  - Strong wind is Continuously blowing to the air outlet of the outdoor unit.
- **Heating Operation**
  - Too much rubbish adhere to the filter in the indoor unit
  - The air outlet of indoor unit is choked

● Mishandling in operation:
If mishandling happens because of lighting or mobile wireless, please shut off the manual power switch, and turn on again, thenpush the ON/OFF button.

NOTE

When the protection equipment starts, please shut down the manual power switch, and restart operation after problem issolved.

12.2 About power cut

- If power is cut during operation, stop all the operation immediately
- Power comes again. The lamp on the display panel of indoor unit flashes. And then unit will auto-restart.

12.3 Heating capacity

- The heating operation is a heat-pump process that heat will be absorbed from outdoor air and released to indoor water. Once the outdoor temperature is decreased, heating capacity decreased corredpindingly.
- Other heating equipment is suggested to be used together when outdoor temperature is too low.
- In some extreme cold upland that buy another inddoor unit equipped electrical heater will obtain better performance. (Refer to indoor unit owner's manual for details)

NOTE

1. The motor in Indoor Unit will continue running for 20~30 seconds for to remove residual heat when the Indoor Unit recoeiving OFFcommand during heating operation.
2. If the heat pump malfunction occurs because of disturb, pleasereconnect the heat pump to power, then turn on it again.

12.4 Compressor protection feature

- A protection feature prevents the heat pump from being activated for approximately several minuites when it restarts immediately after operation.

12.5 Cooling and heating operation

- The the indoor unit in the same system can not run cooling and heating at the same time.
- If the Heat Pump Administrator has set running mode, then the heat pump can not run on modes other than the presetted. Standby or No Priority will be displayed in the Control Panel.

12.6 Features of heating operation

- Water will not become hot immediately at the beginning of the heating operation, 3~5 minutes ago (depends on the indoor and outdoor temperature), until the indoor heat exchanger become hot, then becomes hot.
- During operation, the fan motor in the outdoor unit may stop running under high temperature.

12.7 Defrost in the heating operation

- During heating operation, outdoor unit sometimes will frost. To increase efficiency, the unit will start defrosting automatically (about 1~10 minutes), and then water will be drained out fromoutdoor unit.
- During defrosting, the fan motors in the outdoor unit will stop running.

13 MALFUNCTION CODE OF OUTDOOR UNIT

13.1 Error codes

When a safety device is activated, an error code will be displayed on the user interface.

A list of all errors and corrective actions can be found in the table below.

Reset the safety by turning the unit OFF and back ON.

In case this procedure for resetting the safety is not successful, contact your local dealer.

Code	Discription	Corrective action
E1	Power fault	Connect the power supply cables innormal phase. Change any two ofthe three power supply cables (L1, L2, L3) to correct phase
H0	Communication fault between hydro-box and outdoor unit	Check the wiring between userinterface and unit, or contact yourlocal dealer
H1	Communication fault between oudoor unit and IR341	Contact your local dealer.
E5	Outdoor unit exchanger temperature sensor (T3) fault	Contact your local dealer.
E6	Outdoor unit ambient temperature sensor (T4) fault	Contact your local dealer.
E9	Compressor suction line temperature sensor (Th) fault	Contact your local dealer.
EA	compressor discharge line temperature sensor (Tp) fault	Contact your local dealer.
H8	Pressure sensor fault	Contact your local dealer.
HF	Outdoor unit EEPROM fault	Contact your local dealer.
H4	Three times P6 protects	Contact your local dealer.
H6	DC fan motor fault	Contact your local dealer.
H7	DC cmopressor voltage protect fault	Check that the power supply isbetween 172VAC and 265VAC.

Code	Discription	Corrective action
HE	Heat mode fan is running in A region for 10 minutes	Check that the unit is operating within its operating range, contact your local dealer
HH	Twice H6 in 10 minutes	Restart the unit, if the error occurs again, contact your local dealer
HL	PFC module fault	Check that the unit is operating within its operating range, contact your local dealer
HP	3 times low pressure protect in 1 hour in cooling mode	Check that the unit is operating within its operating range, contact your local dealer
P0	Heat pump system low pressure protect	Check that the unit is operating within its operating range, contact your local dealer
P1	Heat pump system high pressure protect	Check that the unit is operating within its operating range, contact your local dealer
P3	DC compressor current protect	Check that the unit is operating within its operating range, contact your local dealer
P4	Compressor discharge temperature too high protect	Check that the unit is operating within its operating range. Clean the outdoor coil. If the coil is clean, contact your local dealer
P6	Transducer module protect	Contact your local dealer.
P9	DC fan motor protect	Contact your local dealer.
PC	Other protection (Which can not be display on the user interface)	Contact your local dealer.
Pd	Outdoor unit exchanger temperature (T3) too high protect	Contact your local dealer.
L0	Inverter module error	Contact your local dealer.
L1	Inverter module low voltage protection	Contact your local dealer.
L2	Inverter module high voltage protection	Contact your local dealer.
L4	MEC error	Contact your local dealer.
L5	Compressor 0 speed protection	Contact your local dealer.
L7	Power phase error	Contact your local dealer.
L8	Compressor frequency change is larger than 15Hz between this moment and last moment	Contact your local dealer.
L9	The difference between target frequency and compressor operationg frequency is larger than 15Hz.	Contact your local dealer.
F1	Inverter module voltage was too low	Contact your local dealer.
dF	Defrosting(Not malfunction)	It is normal function and not error.
d0	Oil returning(Not malfunction)	It is normal function and not error.
FC	Force cooling(Not malfunction)	It is normal function and not error.

14 FOLLOWING SYMPTOMS ARE NOT HEAT PUMP TROUBLES

Symptom 1: The system does not operate

- The heat pump does not start immediately after the ON/OFF button on the romote controller is pressed.
  If the operation lamp lights, the system is in normal condition.
  To prevent overloading of the compressor motor, the heat pump starts a few minutes after it is turned ON.

Symptom 2: Change into the Pump mode during heating mode

- When the outlet water temperature drops to the set temperature, the compressor goes off and the indoor unit changes to pump mode; when the temperature rises up, the compressor starts again. It is same in the heating mode.

Symptom 3: White mist comes out of outdoor unit

- When the system is changed over to heating operation after defrost operation Moisture generated by defrost becomes steam and is exhausted.

Symptom 4: Noise of heat pump

- A continuous low hissing sound is heard when the system is in operation.
  This is the sound of refrigerant gas flowing through both indoor and outdoor units.
- A hissing sound which is heard at the start or immediately after stopping operation or defrost operation.
  This is the noise of refrigerant caused by flow stop or flow change.
- When the tone of operating noise changes.
  This noise is caused by the change of frequency.

Symptom 5: Dust comes out of the unit

- When the unit is used for the first time in a long time.
  This is because dust has gotten into the unit.

Symptom 6: The units can give off odours

- The unit can absorb the smell of rooms, furniture, cigarettes, etc., and then emit it again.

Symptom 7: The outdoor unit fan does not spin.

- During operation. The speed of the fan is controlled in order to optimize product operation.

15 TROUBLE SHOOTING

If one of the following malfunctions occur, stop operation, shut off the power, and contact with your dealer.

- The operation lamp is flashing rapidly (twice every second) This lamp is still flashing rapidly after turn off the power and turn on again.
- Remote controller receives malfunction or the button does not work well.
- A safety device such as a fuse, a breaker frequently actuates.
- Obstacles and water enter the unit.
- Water leaks from indoor unit.
- Other malfunctions.

If the system does not properly operate except the above mentioned cases or the above mentioned malfunctions is evident, investigate the system according to the following procedures.

Symptoms	Causes	Solution
Unit does not start	• Power failure. • Power switch is off. • Fuse of power switch may have burned. • Batteries of remote controller exhausted or other problem of controller.	• Wait for the comeback of power. • Switch on the power. • ReplLocation: • Replace the batterises or check the controller.
Water flowing normally but completely can't cooling	• Temperature is not set correctly. • Be in 3 minutes protection of compressor.	• Set the temperature properly. • Wait.
Units start or stop frequently	• Refrigerant is too little or too much. • Air or no concreting gas in the refrigerating circuit. • Compressor is malfunction. • Voltage is too high or too low. • System circuit is blocked.	• Check leakage, and rightly recharge refrigerant. • Vacuum and recharge refrigerant. • Maintenance or change compressor. • Install manostat. • Find reasons and solution.
Low cooling effect	• Outdoor unit and indoor unit heat exchanger is dirty. • The water filter is dirty. • Inlet/outlet of indoor/outdoor units is blocked. • Sunlight directly shine. • Too much heat resource. • Outdoor temp. is too high. • Leakage of refrigerant or lack of refrigerant.	• Clean the heat exchanger. • Clean the water filter. • Eliminate all dirties and make air smooth. • Make curtains in order to shelter from sunshine. • Reduce heat source. • AC cooling capacity reduces (normal). • Check leakage and rightly recharge refrigerant.
Low heating effect	• Outdoor temperature is lower than 7°C • Leakage of refrigerant or lack of refrigerant.	• Use heating device. • Check leakage and rightly recharge refrigerant.

16 TECHNICAL SPECIFICATIONS

Model (Capacity mark)	KHP-BI 4 DVN KHP-BI 6 DVN	KHP-BI 8 DVN	KHP-BI 12 DVN KHP-BI 14 DVN KHP-BI 16 DVN	KHP-BI 12 DTN KHP-BI 14 DTN KHP-BI 16 DTN
Power supply	220-240V~ 50Hz			380-415V3N~50Hz
Rated power input	2.7kW	3.2kW	6.0kW	6.0kW
Rated current	10.5A	14.0A	27.0A	9.0A
Norminal capacity	Refer to the technical data			
Dimensions (W×H×D) [mm]	960*860*380	1075*965*395	900*1327*400	
Packing (W×H×D)[mm]	1040*1000*430	1120*1100*435	1030×1456×435	
Fan motor	DC motor / Horizontal			
Compressor	DC inverter dual rotary			
Heat exchanger	Fin-coil			
Refrigerant				
Type	R410A			
Quantity	2.5kg	2.8kg	3.9kg	4.2kg
Weight				
Net weight	60kg	76kg	99kg	115kg
Gross weight	72kg	88kg	112kg	126kg
Connections				
Gas side	φ15.9			
Liquid side	φ9.52			
Drain connection	DN15			
Max. piping length	20m	30m	50m	50m
Max. differance in height when outdoor unit is upside	10m	20m	30m	30m
Max. differance in height when outdoor unit is downside	8m	15m	25m	25m
Operation ambient temperature range				
Heating mode	-20~+35°C			
Cooling mode	-5~+46°C			
Domestic hot water mode	-20~+43°C			

17 IMPORTANT INFORMATION FOR THE USED REFRIGERANT

This product has the fluorinated gas which is listed in kyoto protocol it is forbidden to release to air.
Refrigerant type: R410A; Volume of GWP: 2088;
GWP=Global Warming Potential

Model	Factory charge	
	Refrigerant/kg	tonnes CO_2 equivalent
KHP-BI 4 DVN	2.50	5.22
KHP-BI 6 DVN	2.50	5.22
KHP-BI 8 DVN	2.80	5.85
KHP-BI 12 DVN	3.90	8.14
KHP-BI 14 DVN	3.90	8.14
KHP-BI 16 DVN	3.90	8.14
KHP-BI 12 DTN	4.20	8.77
KHP-BI 14 DTN	4.20	8.77
KHP-BI 16 DTN	4.20	8.77

Attention:

1) For equipment that contains fluorinated greenhouse gases in quantities of 5 tonnes of CO2 equivalent or more,but of less than 50 tonnes of CO2 equipment,at least every 12 monthes, or where a leakage detection system is installed, at least every 24 monthes.

2) For equipment that contains fluorinated greenhouse gases in quantities of 50 tonnes of CO2 equivalent or more,but of less than 500 tonnes of CO2 equipment,at least every six monthes, or where a leakage detection system is installed, at least every 12 monthes.

3) For equipment that contains fluorinated greenhouse gases in quantities of 500 tonnes of CO2 equivalent or more,at least every three monthes, or where a leakage detection system is installed, at least every six monthes.

4) Non-hermetically sealed equipment charged with fluorinated greenhouse gases shall only be sold to the end user where evidence is provide that the installation is to be carried out by an undertaking certified person.

5) Only certificated person is allowed to do installation, operation and maintenance.

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