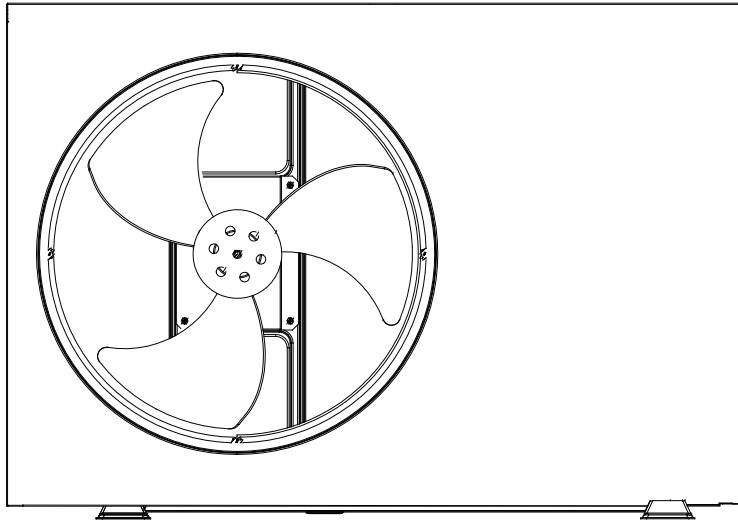


# HYUNDAI

DC INVERTER AIR SOURCE HEAT PUMP

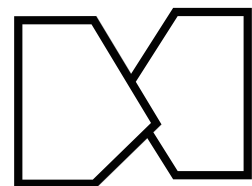
MONOBLOC INVERTER SERIES

## Instructions manual



HY/R290-70B/EN7BP  
HY/R290-100B/EN7BP  
HY/R290-120B/EN7BP  
HY/R290-160B/EN7BP  
HY/R290-100B/EN7BP-3  
HY/R290-120B/EN7BP-3  
HY/R290-160B/EN7BP-3

Licensed by Hyundai Corporation Holdings, Korea



GENUINE PRODUCT OF  
HYUNDAI CORPORATION

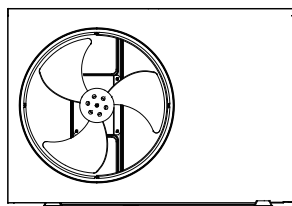


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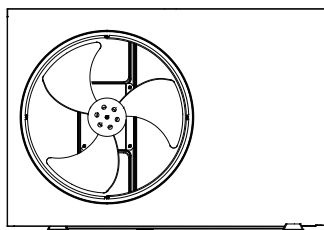
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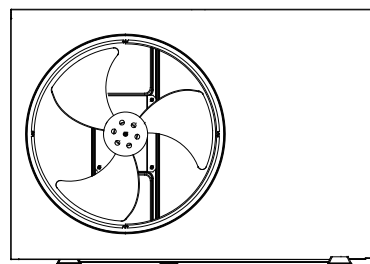
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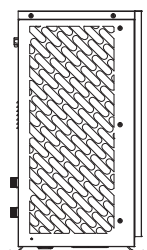
7 kW



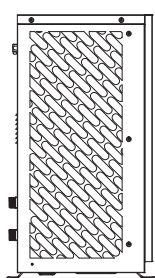
10 kW



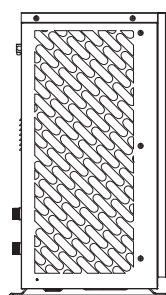
12/14/16 kW



7 kW

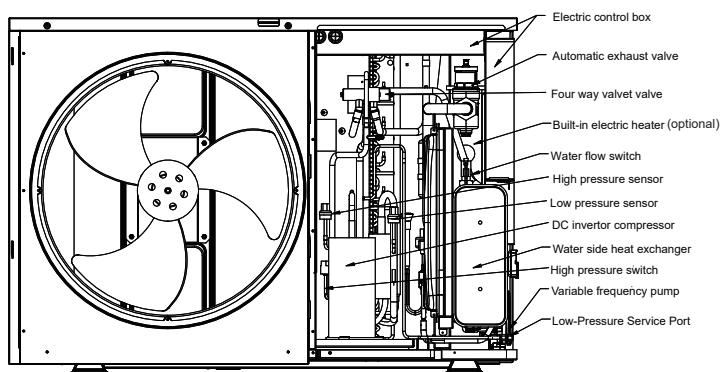


10 kW



12/14/16 kW

Internal layout: 7kW(1-phase) for example



#### NOTE

The picture and function described in this manual contain the backup heater components. Pictures in this manual are for reference only, please refer to the actual product.



# 1 SAFETY PRECAUTIONS

The precautions listed here are divided into the following types. They are quite important, so be sure to follow them carefully.  
Meanings of DANGER, WARNING, CAUTION and NOTE symbols.

## INFORMATION

- Read these instructions carefully before installation. Keep this manual in a handy for future reference.
- Improper installation of equipment or accessories can result in electric shock, short circuit, leakage, fire, or other damage to the equipment. It is important to use only accessories that are made by the supplier and are specifically designed for the equipment. It is also important to have the installation done by a qualified professional.
- All the activities described in this manual must be carried out by a licensed technician. Be sure to wear adequate personal protection equipment such as gloves and safety glasses while installing the unit or carrying out maintenance activities.
- Contact your dealer for any further assistance.



Caution: Risk of fire/  
flammable materials

## WARNING

Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.

## DANGER

Indicates an imminently hazardous situation that if not avoided, will result in death or serious injury.

## WARNING

Indicates a potentially hazardous situation that if not avoided, could result in death or serious injury.






## CAUTION

Indicates a potentially hazardous situation that if not avoided, may result in minor or moderate injury.  
It is also used to alert against unsafe practices.

## NOTE

Indicates situations that could only result in accidental equipment or property damage.

Explanation of symbols displayed on the monobloc

	WARNING	This symbol shows that this appliance contains a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	CAUTION	This symbol shows that the operation manual should be read carefully.
	CAUTION	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	CAUTION	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
	CAUTION	This symbol shows that information is available such as the operating manual or installation manual.

### DANGER


- Before touching electric terminal parts, turn off the power switch.
- When service panels are removed, live parts can be easily touched by accident.
- Never leave the unit unattended during installation or servicing when the service panel is removed.
- Do not touch water pipes during and immediately after operation as the pipes may be hot and could burn your hands. To avoid injury, give the piping time to return to normal temperature or be sure to wear protective gloves.
- Do not touch any switch with wet fingers. Touching a switch with wet fingers can cause electrical shock.
- Before touching electrical parts, turn off all applicable power to the unit.

### WARNING

- Tear apart and throw away plastic packaging bags to prevent children from playing with them. Children who play with plastic bags risk suffocation and death.
- Safely dispose of packing materials such as nails and other metal or wood parts that could cause injuries.
- Request your dealer or qualified personnel to perform installation work in accordance with this manual. Improper installation may result in water leakage, electric shocks, or fire.
- Be sure to use only specified accessories and parts for installation work. Failure to use specified parts may result in water leakage, electric shocks, fire, or the unit falling from its mount.
- Install the unit on a foundation that can withstand its weight. Insufficient physical strength may cause the equipment to fall and possible injury.
- Perform specified installation work with full consideration of strong wind, hurricanes, or earthquakes. Improper installation work may result in accidents due to equipment falling.
- Ensure that all electrical work is carried out by qualified personnel according to the local laws and regulations and this manual using a separate circuit. Insufficient capacity of the power supply circuit or improper electrical construction may lead to electric shocks or fire.
- Be sure to install a ground fault circuit interrupter according to local laws and regulations. Failure to install a ground fault circuit interrupter may cause electric shocks and fire.
- Make sure all wiring is secure. Use the specified wires and ensure that terminal connections or wires are protected from water and other adverse external forces. Incomplete connection or affixing may cause a fire.
- When wiring the power supply, form the wires so that the front panel can be securely fastened. If the front panel is not in place there could be overheating of the terminals, electric shocks or fire.
- After completing the installation work, check for refrigerant leakage.
- Never directly touch any leaking refrigerant as it could cause severe frostbite. Do not touch the refrigerant pipes during and immediately after operation as the refrigerant pipes may be hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor and other refrigerant cycle parts. Burns or frostbite are possible if you touch the refrigerant pipes. To avoid injury, give the pipes time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.
- Do not touch the internal parts (pump, backup heater, etc.) during and immediately after operation. Touching the internal parts can cause burns. To avoid injury, give the internal parts time to return to normal temperature or, if you must touch them, be sure to wear protective gloves.
- Do not pierce or burn.
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

### CAUTION

- Ensure that the unit is properly grounded during installation.
- Grounding resistance should be according to local laws and regulations.
- Do not connect the ground wire to gas or water pipes, lightning conductors or telephone ground wires.
- Incomplete grounding may cause electric shocks.
  - Gas pipes: Fire or an explosion might occur if the gas leaks.
  - Water pipes: Hard vinyl tubes are not effective grounds.
  - Lightning conductors or telephone ground wires: Electrical threshold may rise abnormally if struck by a lightning bolt.
- Install the power wire at least 1 meter (3 feet) away from televisions or radios to prevent interference or noise. (Depending on the radio waves, a distance of 1 meter (3 feet) may not be sufficient to eliminate the noise.)
- Do not wash the unit. This may cause electric shocks or fire. The appliance must be installed in accordance with national wiring regulations. 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.

- Do not install the unit in the following places:
  - Where there is mist of mineral oil, oil spray or vapors. Plastic parts may deteriorate, and cause them to come loose or water to leak.
  - Where corrosive gases (such as sulfurous acid gas) are produced. Where corrosion of copper pipes or soldered parts may cause refrigerant to leak.
  - Where there is machinery which emits electromagnetic waves. Electromagnetic waves can disturb the control system and cause equipment malfunction.
  - Where flammable gases may leak, where carbon fiber or ignitable dust is suspended in the air or where volatile flammables such as paint thinner or gasoline are handled. These types of gases might cause a fire.
  - Where the air contains high levels of salt such as near the ocean.
  - Where voltage fluctuates a lot, such as in factories.
  - In vehicles or vessels.
  - Where acidic or alkaline vapors are present.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- This appliance can be used by children 8 years old and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they are supervised or given instruction on using the unit in a safe manner and understand the hazards involved. Children should not play with the unit. Cleaning and user maintenance should not be done by children without supervision.
- Children should be supervised to ensure that they do not play with the appliance.
- If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person.
- DISPOSAL: 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 municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substance can leak into the groundwater and get into the food chain, damaging your health and well-being.
- The wiring must be performed by professional technicians in accordance with national wiring regulation and this circuit diagram. An all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device (RCD) with the rating not exceeding 30mA shall be incorporated in the fixed wiring according to the national rule.
- Confirm the safety of the installation area ( walls, floors, etc. ) without hidden dangers such as water, electricity, and gas. Before wiring/pipes.
- Before installation, check whether the user's power supply meets the electrical installation requirements of unit ( including reliable grounding , leakage , and wire diameter electrical load, etc. ). If the electrical installation requirements of the product are not met, the installation of the product is prohibited until the product is rectified.
- When installing multiple air conditioners in a centralized manner, please confirm the load balance of the three-phase power supply, and multiple units are prevented from being assembled into the same phase of the three-phase power supply.
- Product installation should be fixed firmly. Take reinforcement measures, when necessary.
- Be aware that refrigerants may not contain an odor.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry-recognised assessment specification.
- Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
-  This marking indicates that this product should not be disposed with the other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmentally safe recycling.
- The A-weighted emission sound pressure level at workstations, where this exceeds 70 dB(A). If the A-weighted sound pressure level is below 70 dB, no value needs to be given, but the instructions shall state that the A-weighted sound pressure level is below 70 dB.

The R290 series units contain R290 refrigerant gas. The density of this gas is greater than that of air, so in the event of leakage it tends to disperse and stratify, accumulating in niches, depressions in the ground or underground regions. It is mandatory to comply with the danger and safety zones given in this manual, when installing the units. These zones have been designed in accordance with EN 60079-10-1, estimating an appropriate refrigerant loss in order to guarantee the safety of the units in the installation area.

A danger zone is defined as a area around the machine in which, in the event of a leakage of refrigerant gas, a flammable atmosphere is formed for a short time, within which it is necessary to implement all the precautions described in the manual. in the absence of specific standards or regulations, when using the unit in an industrial or working environment, it is advisable to carry out the classification of places with explosion hazards considering the ATEX Directive 1999/92 (Directive 89/391). There must NOT be any sources of ignition in the danger zones, including:

- flammable gases and sprays, self-igniting powders;
- electrical equipment that is not suitable for use in potentially explosive areas (zone 2 according to Directive 89/391);
- naked flames, heated surfaces (maximum surfaces temperature of 360°C and processing by heat; smoking is prohibited, even for electronic cigarettes;
- sparks, electrostatic charges, direct and indirect lightning effects, eddy currents and cathodic protection;
- ignition sources due to remote processes (ionising and non-ionising radiation);
- permanent electrical sources (switches, lamps, etc.) or other possible triggers;

In addition, danger zone must NOT:

- include potentially dangerous areas or elements such as wells, manholes, openings to the sewage system and other openings to underground places and premises (e.g. garages), river drains, power lines, flammable deposits, electrical installations, etc.;
- include doors, windows or glass panes, to prevent the possible return of the gas inside the building;
- extend towards neighbouring residential properties, parking areas, public access sites, roads or railways.

A safety zone extending beyond the danger zone must be identified. Within the safety zone, in the event of a refrigerant leak, the concentration of the gas in the air is typically below the critical levels for the formation of flammable or hazardous atmospheres. Compliance with the following provisions remains mandatory:

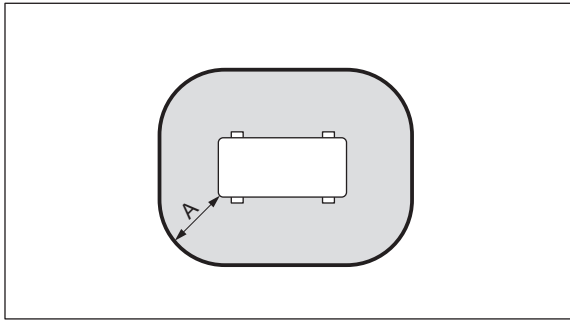
- prevent accumulation and stagnation in underground spaces, drains, manholes, cellars. etc.;
- do not place building vents inside or near the safety zone;
- do not use naked flames and other direct heat sources.

In any case, comply with national and local regulations for the installation of machinery (as applicable) in order to prevent the formation of fire hazards and to prevent gases from seeping underground into openings to the ground or floors below. No structural modifications may be made in the danger and safety zones that would alter their extent or change the behaviour of the air-coolant mixture.

It is also strictly forbidden to tamper with, alter, remove or compromise, even partially, the functionality of the devices, guards and prescriptions provided for the safety of property and persons.

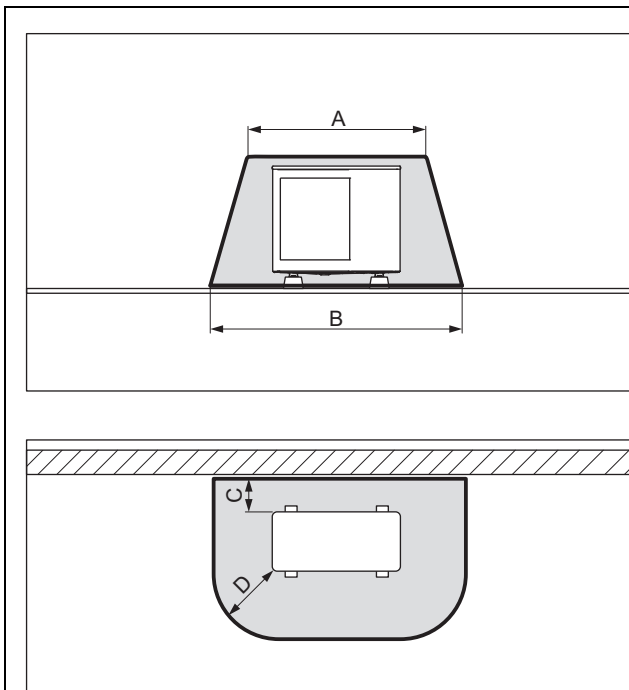
In this manual, different types of outdoor installation are considered, as indicated in the following paragraphs.

### 1. Protective zone for ground installation on the premises



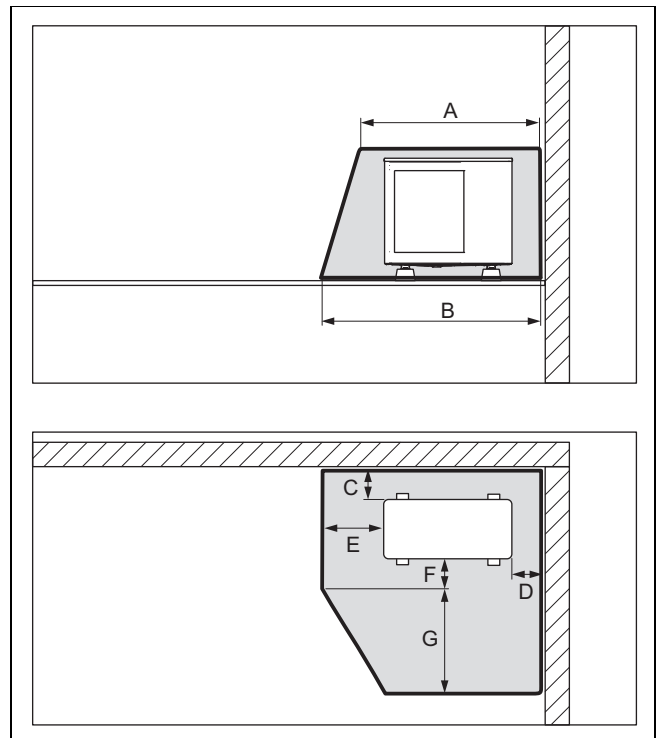
A 1000 mm

### 2. Protective zone for ground installation in front of a building wall



A 2100 mm  
B 3100 mm  
C 200 mm/250 mm  
D 1000 mm

### 3. Protective zone for ground installation in a building corner



A 2100 mm  
B 2600 mm  
C 200 mm/250 mm  
D 500 mm  
E 1000 mm  
F 500 mm  
G 1800 mm

### NOTE

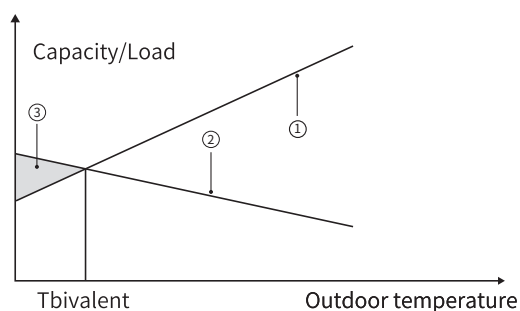
- About hydrocarbon refrigerant
  - This heat pump unit contains hydrocarbon refrigerant. For specific information on the type of gas and the amount, please refer to the relevant label on the unit itself. Compliance with national gas regulations shall be observed.
  - Installation, service, maintenance and repair of this unit must be performed by a certified technician.
  - Product uninstallation and recycling must be performed by a certified technician.
  - If the system has a leak-detection system installed, it must be checked for leaks at least every 12 months. When the unit is checked for leaks, proper record-keeping of all checks is strongly recommended.

## 2 GENERAL INTRODUCTION

- This appliance's functionality can be expanded through the addition of components and accessories.
- The intended use assumes that a fixed installation, in conjunction with permissible and system-specific components, has been properly conducted.
- Use of the appliance for commercial or industrial purposes other than for space heating/cooling or domestic hot water (DHW) heating is considered inappropriate.
- Improper use or operation of the appliance, such as unauthorized opening by the system user, is strictly prohibited. Such actions will result in a waiver of liability.
- Misuse also includes altering the components of the heating system away from their intended function.
- These units are used for both heating and cooling applications and domestic hot water tanks. They can be combined with fan coil units, under-floor heating, low temperature high efficiency radiators, domestic hot water tanks and solar water heater kit, which are all field supplied.
- A wired controller is supplied with the unit.
- If you choose the built-in backup heater unit, the backup heater can increase the heating capacity during cold outdoor temperature. The backup heater also serves as a backup in case of malfunctioning and for frozen protection of the outside water piping during winter time.

### Note:

This appliance is designed exclusively for domestic or semi-domestic purposes. This means that even users without prior instruction should be able to operate the appliance safely.

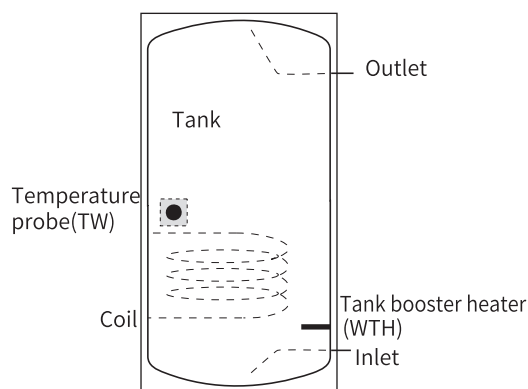


- ① Heat pump capacity.
- ② Required heating capacity (site dependent).
- ③ Additional heating capacity provided by backup heater.

### Domestic hot water tank (field supply)

A domestic hot water tank (with or without booster heater) can be connected to the unit.

The requirement of the tank is different for different unit and material of heat exchanger.



The booster heater should be installed below the temperature probe (TW).

The heat exchanger (coil) should be installed below the temperature probe.

The pipe length between the outdoor unit and tank should be less than 5 meters.

Model		7~10 kW	12~16 kW
Volume of tank/L	Recommended	150~300	200~500
Heat exchange area/m <sup>2</sup> (Stainless steel coil)	Minimum	1.8	2.4
Heat exchange area/m <sup>2</sup> (Enamel coil)	Minimum	2.0	2.5

### Room thermostat (field supplied)

Room thermostat can be connected to the unit (room thermostat should be kept away from heating source when selecting the installation place).

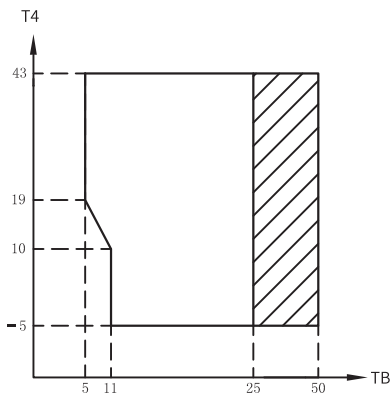
Solar water heater kit for domestic hot water tank (field supplied)

### Operation range

Outlet water (Heating mode)		25 ~ 75°C
Outlet water (Cooling mode)		7 ~ 25°C
Domestic hot water		20 ~ 70°C
Ambient temperature		-25 ~ 43°C
Water pressure		0.1~0.3MPa
Water flow	7 kW	10~35 L/min
	10 kW	10~35 L/min
	12 kW	10~50 L/min
	14 kW	10~50 L/min
	16 kW	10~50 L/min

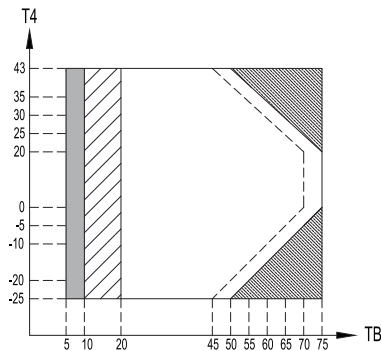
The unit has anti-freezing protection that uses the heat pump or backup heater to keep the water system safe from freezing in all conditions. (Refer to 9.4 "Water piping").

In cooling mode, the water flow temperature (TB) range in different outdoor temperature (T4) is listed below:



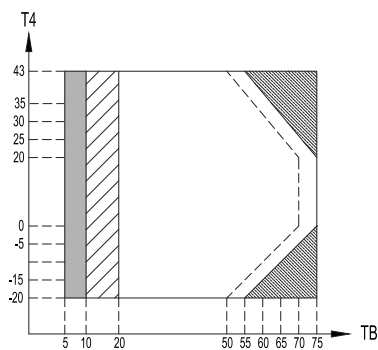
Operation range by heat pump with possible limitation and protection.

In heating mode, the water flow temperature (TB) range in different outdoor temperature (T4) is listed below:



If IPH/AHS setting is valid, only IPH/AHS turns on;  
 If IPH/AHS setting is invalid, only heat pump turns on, limitation and protection may occur during heat pump operation.  
 Operation range by heat pump with possible limitation and protection.  
 Heat pump turns off, only IPH/AHS turns on.  
 Maximum inlet water temperature line for heat pump operation.

In DHW mode, the water flowing temperature (TB) range in different outdoor temperature (T4) is listed below:



If IPH/AHS setting is valid, only IPH/AHS turns on;  
 If IPH/AHS setting is invalid, only heat pump turns on, limitation and protection may occur during heat pump operation.  
 Operation range by heat pump with possible limitation and protection.  
 Heat pump turns off, only IPH/AHS turns on.  
 Maximum inlet water temperature line for heat pump operation.

## 3 ACCESSORIES

### 3.1 Accessories supplied with the unit

Installation Fittings		
Name	Shape	Quantity
Installation and owner's manual		1
Wired controller manual		1
Product fiche		1
Y-shape filter		1
Wired controller		1
20 m extension cord		1
Water outlet connection pipe assembly		2
Energy label		1
Shockproof		4
DHW sensor(8 m)		1

### 3.2 Accessories available from supplier

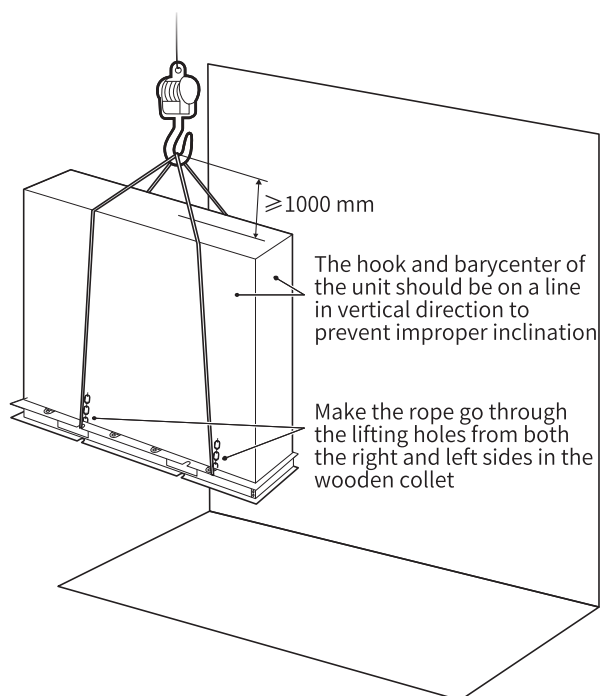
Thermistor for balance tank (TE1)		1
Thermistor for Zone 2 flow temp. (TZ2)		1
Thermistor for solar temp. (Tsolar)		1

## 4 BEFORE INSTALLATION

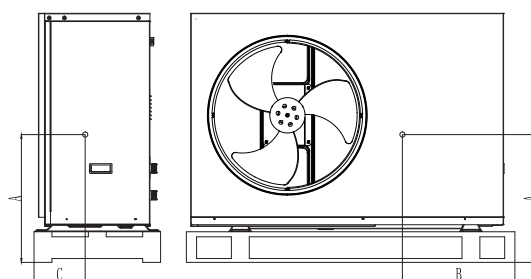
- **Before installation**  
Be sure to confirm the model name and the serial number of the unit.
- **Handling**  
Due to relatively large dimensions and heavy weight, the unit should only be handled using lifting tools with slings. The slings can be fitted into foreseen sleeves at the base frame that are made specifically for this purpose.

## ⚠ CAUTION

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

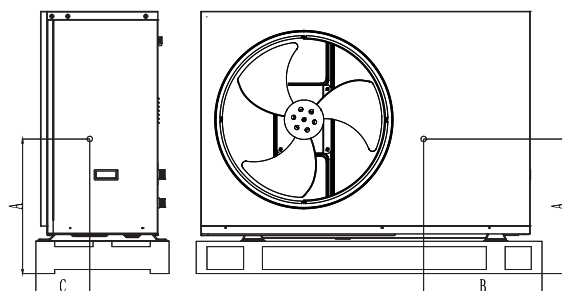


Model	A	B	C
1 phase 7KW	450	400	190
1 phase 10KW	500	440	200
3 phase 10KW	500	440	200
1 phase 12/14/16KW	600	500	380
3 phase 12/14/16KW	600	500	380

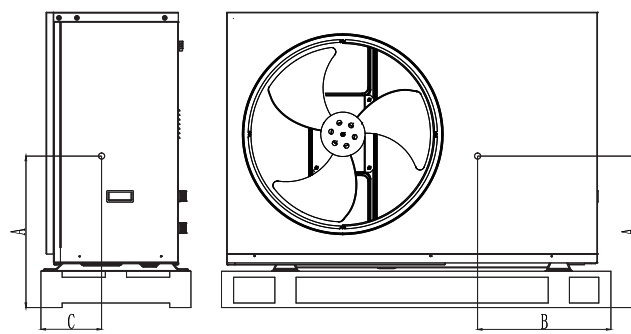


7KW (unit:mm)

The position of barycenter for different units can be seen in the picture below.



10KW (unit:mm)



12/14/16KW (unit:mm)

## 5 IMPORTANT INFORMATION FOR THE REFRIGERANT

This product has the fluorinated gas, which is forbidden to release to air.

Refrigerant type : R290 ;GWP Value:3.

GWP=Global Warming Potential

Model	Factory charged refrigerant volume in the unit	
	Refrigerant/kg	Tonnes CO <sub>2</sub> equivalent
7 kW (1 Phase)	0.60	0.002t
10KW(1 Phase)	0.83	0.002t
12KW(1 Phase)	1.13	0.003t
14KW(1 Phase)	1.45	0.004t
16KW(1 Phase)	1.45	0.004t
10KW(3 Phase)	0.83	0.002t
12KW(3 Phase)	1.13	0.003t
14KW(3 Phase)	1.45	0.004t
16KW(3 Phase)	1.45	0.004t



### CAUTION

- Frequency of Refrigerant Leakage Checks
  - For unit that contains fluorinated greenhouse gases in quantities of 5 tonnes of CO<sub>2</sub> equivalent or more, but of less than 50 tonnes of CO<sub>2</sub> equivalent, at least every 12 months, or where a leakage detection system is installed, at least every 24 months.
  - For unit that contains fluorinated greenhouse gases in quantities of 50 tonnes of CO<sub>2</sub> equivalent or more, but of less than 500 tonnes of CO<sub>2</sub> equivalent, at least every six months, or where a leakage detection system is installed, at least every 12 months.
  - For unit that contains fluorinated greenhouse gases in quantities of 500 tonnes of CO<sub>2</sub> equivalent or more, at least every three months, or where a leakage detection system is installed, at least every six months.
  - This heat pump unit is a hermetically sealed equipment that contains R290 gas.
  - Only certificated person is allowed to do installation, operation and maintenance.

## 6 INSTALLATION SITE

### WARNING

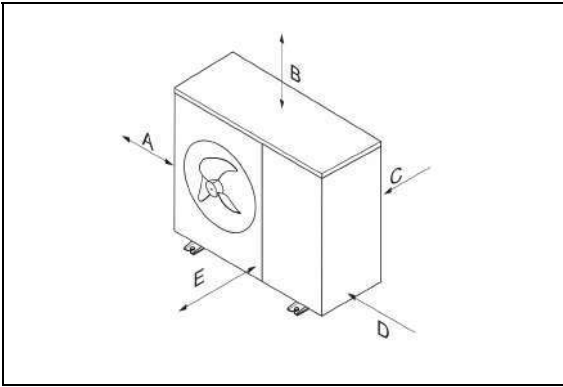
- There is flammable refrigerant in the unit and it should be installed in a well-ventilated site. Be sure to adopt adequate measures to prevent the unit from being used as a shelter by small animals.
  - Small animals making contact with electrical parts can cause malfunction, smoke or fire. Please instruct the customer to keep the area around the unit clean.
- 
- Select an installation site where the following conditions are satisfied and one that meets with your customer's approval.
    - Places that are well-ventilated.
    - Places where the unit does not disturb neighbors.
    - Safe places which can bear the unit's weight and vibration and where the unit can be installed at an even 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 rain can be avoided as much as possible.
    - Do not install the unit in places often used as a work space. In case of construction work (e.g. grinding etc.) where a lot of dust is created, the unit must be covered.
    - Do not place any object 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 case of refrigerant leakage according to relevant local laws and regulations.
    - Don't install the unit near the sea or where there is corrosion gas.
  - 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 a 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 front of the unit, the fan can start rotating very fast until it breaks.

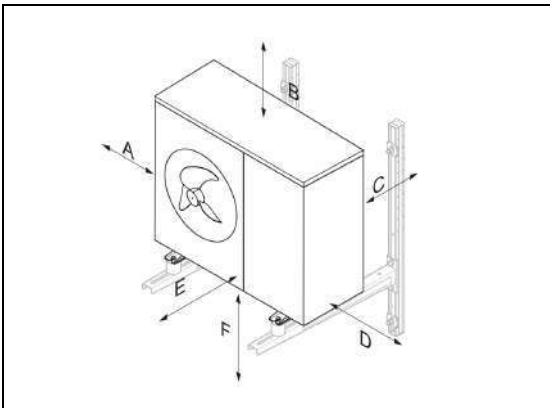
In normal condition, refer to the figures below for installation of the unit:

**Validity:** Floor installation OR Flat roof installation



Minimum clearance	Heating mode	Heating and cooling mode
A	100 mm	100 mm
B	1000 mm	1000 mm
C	200 mm	250 mm
D	500 mm	500 mm
E	600 mm	600 mm

**Validity:** Wall-mounting



Minimum clearance	Heating mode	Heating and cooling mode
A	100 mm	100 mm
B	1000 mm	1000 mm
C	200 mm	250 mm
D	500 mm	500 mm
E	600 mm	600 mm
F	300 mm	300 mm

- Make sure there is enough room to do the installation.  
Set the outlet side at a right angle to the direction of the wind.
- Prepare a water drainage channel around the foundation, to drain waste water from around the unit.
- If water does not easily drain from the unit, mount the unit on a foundation of concrete blocks, etc. (the height of the foundation should be about 100 mm).
- If the unit is mounted on a frame, install a waterproof plate (approx. 100 mm) on the bottom of the unit to prevent water from entering from the low side.
- When installing the unit in a place frequently exposed to snow, pay special attention to elevate the foundation as high as possible.

- If you install the unit on a building frame, please install a waterproof tray (field supply) (about 100mm, on the underside of the unit) in order to avoid drain water dripping. (See the picture in the right).



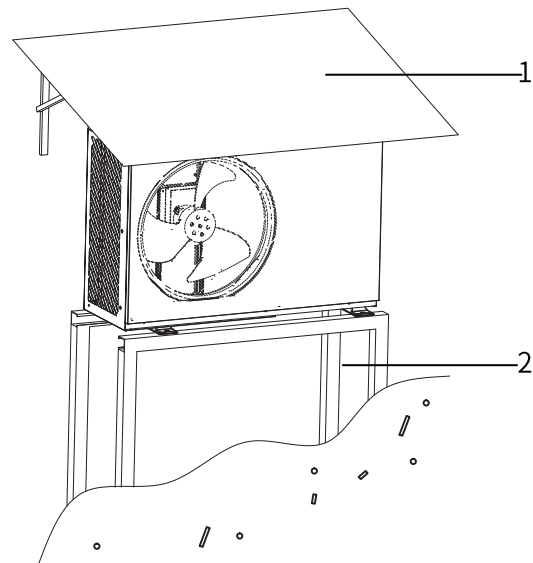
## 6.1 Selecting a location in cold climates

Refer to "Handling" in section "4 Before installation"

### NOTE

When operating the unit in cold climates, be sure to follow the instructions described below.

- To prevent exposure to wind, install the unit with its suction side facing the wall.
- Never install the unit at a site where the suction side may be exposed directly to wind.
- To prevent exposure to wind, install a baffle plate on the air discharge side of the unit.
- In heavy snowfall areas, it is very important to select an installation site where the snow will not affect the unit. If lateral snowfall is possible, make sure that the heat exchanger coil is not affected by the snow (if necessary construct a lateral canopy).



① Construct a large canopy.

② Construct a pedestal.

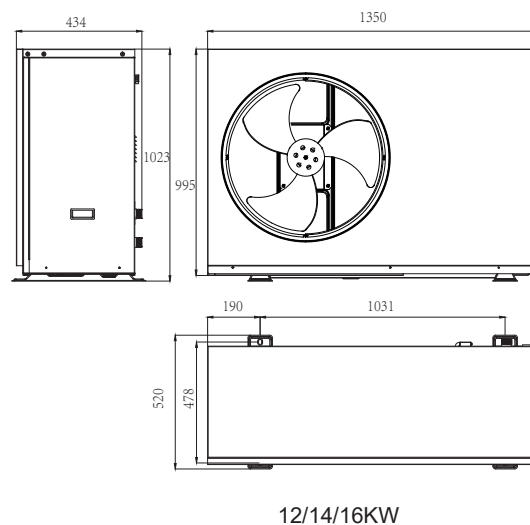
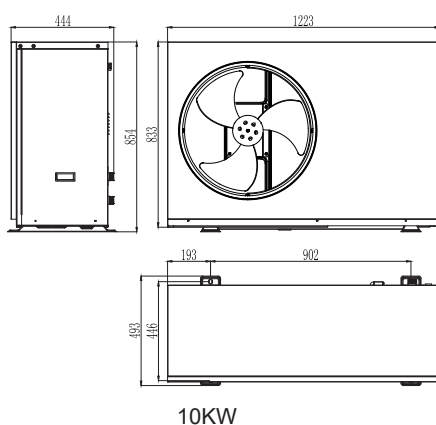
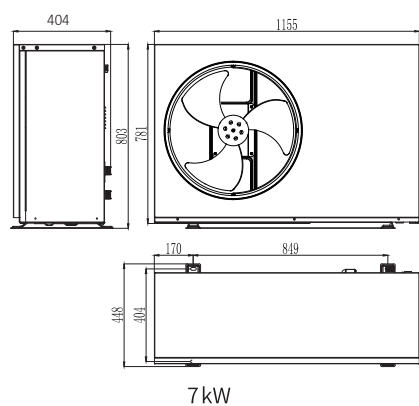
Install the unit high enough off the ground to prevent it from being buried in snow.

## 6.2 Selecting a location in hot climates

As the outdoor temperature is measured via the outdoor unit air thermistor, make sure to install the outdoor unit in the shade or a canopy should be constructed to avoid direct sunlight, so that it is not influenced by the sun's heat, otherwise protection may be possible to the unit.

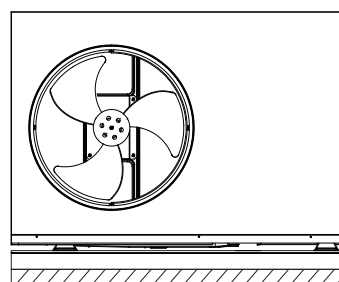
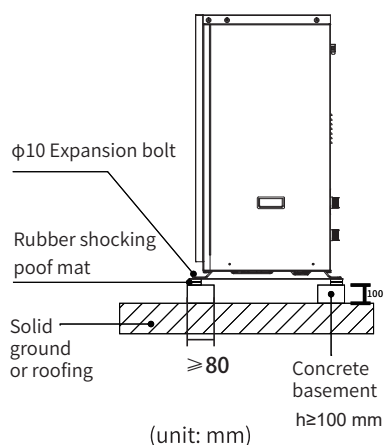
## 7 INSTALLATION PRECAUTIONS

### 7.1 Dimensions

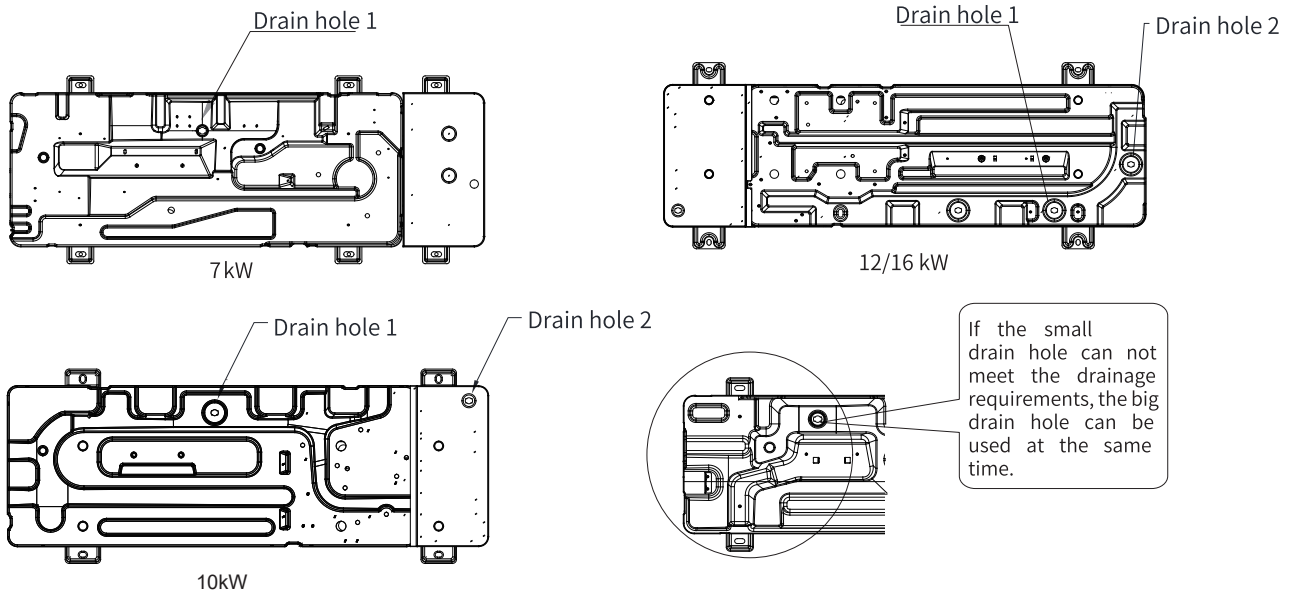


### 7.2 Installation requirements

- Check the strength and level of the installation ground so that the unit may not cause any vibrations or noise during its operation.
- In accordance with the foundation drawing in the figure, fix the unit securely by means of foundation bolts. (Prepare four sets of  $\Phi 10$  Expansion bolts, nuts and washers which are readily available in the market.)
- Screw in the foundation bolts until their length is 20 mm from the foundation surface.



## 7.3 Drain hole position



### NOTE

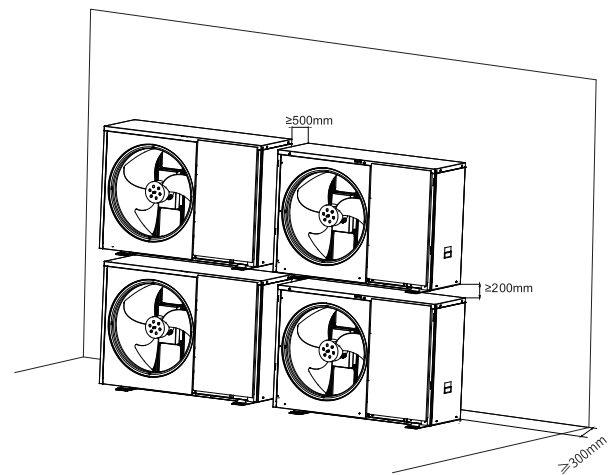
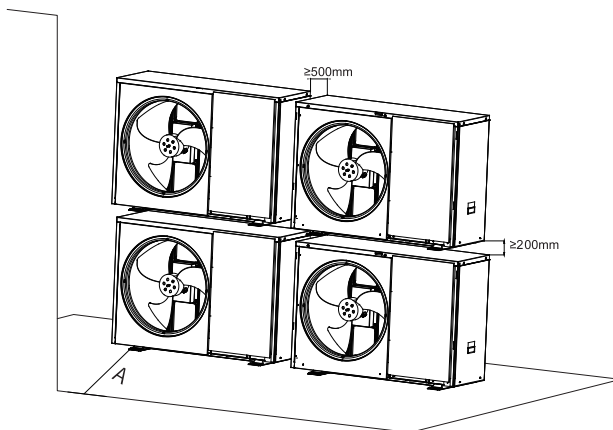
It's necessary to install an electrical heating belt if water can't drain out in cold weather even the big drain hole has opened.

## 7.4 Servicing space requirements

### 7.4.1 In case of stacked installation

1) In case obstacles exist in front of the outlet side.

2) In case obstacles exist in front of the air inlet.



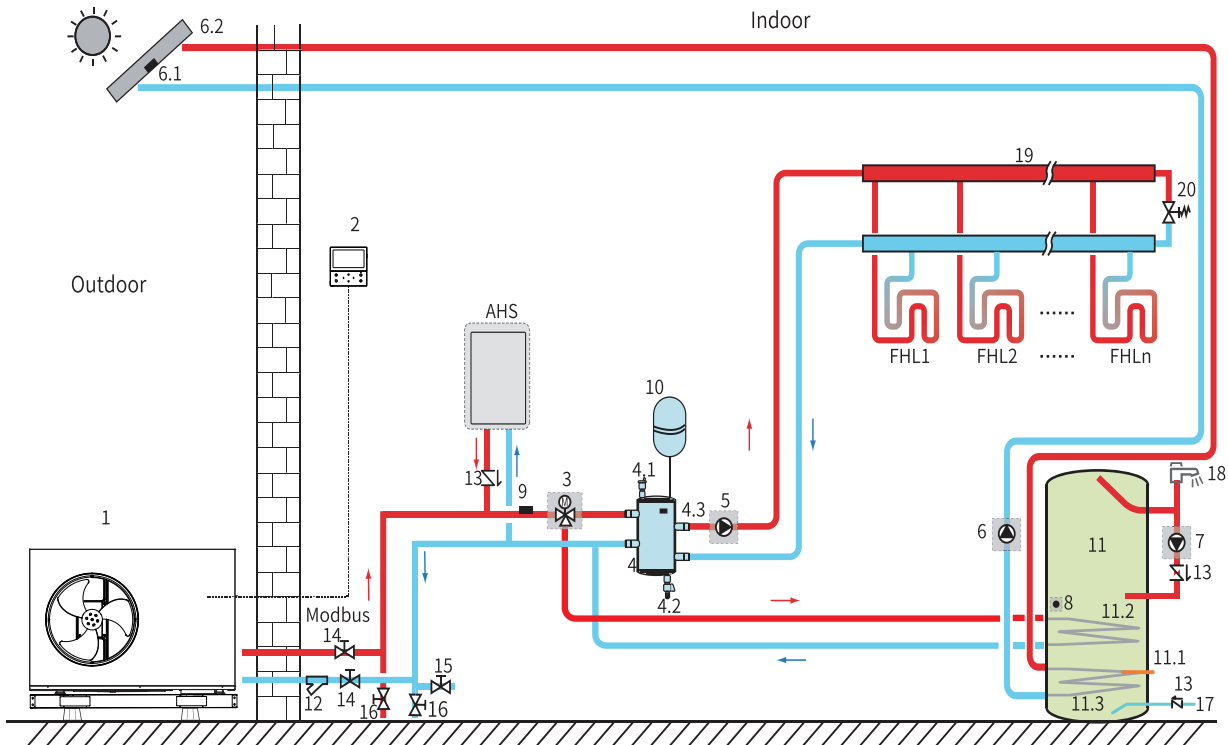
Unit	A(mm)
7kW	≥ 1000
10-16kW	≥ 1500



## 8 TYPICAL APPLICATIONS

The application examples given below are for illustration only.

### 8.1 Application 1



Code	Assembly unit	Code	Assembly unit
1	Main unit	11	Domestic hot water tank (Field supply)
2	User interface	11.1	WTH: Domestic hot water tank booster heater (Field supply)
3	SV1:3-way valve (Field supply)	11.2	Coil 1, heat exchanger for heat pump
4	Balance tank (Field supply)	11.3	Coil 2, heat exchanger for Solar water kit
4.1	Automatic air purge valve	12	Filter (Accessory)
4.2	Drainage valve	13	Check valve (Field supply)
4.3	TE1: Balance tank upper temperature sensor (optional for cascade)	14	Shut-off valve (Field supply)
5	P_o: Outside circulation pump(Field supply)	15	Filling valve (Field supply)
6	P_s: Solar pump (Field supply)	16	Drainage valve (Field supply)
6.1	Tsolar: Solar water heater kit sensor(optional)	17	Tap water inlet pipe (Field supply))
6.2	Solar water heater kit (Field supply)	18	Hot water tap (Field supply)
7	P_d: DHW pipe pump(Field supply)	19	Collector/distributor (Field supply)
8	TW: Domestic water tank temperature sensor (Accessory)	20	Bypass valve (Field supply)
9	TC:Total water flow temperature sensor (Optional)	FHL	Under-floor heating loop (Field supply)
10	Expansion vessel (Field supply)	1...n	
		AHS	Auxiliary heat source (Field supply)

- **Space heating**

The ON/OFF signal and operation mode and temperature setting are set on the user interface. P\_o keeps running as long as the unit is ON for space heating, SV1 keeps OFF.

- **Domestic water heating**

The ON/OFF signal and target tank water temperature (TW) are set on the user interface. P\_o stops running as long as the unit is ON for domestic water heating, SV1 keeps ON.

- **AHS (auxiliary heat source) control**

The AHS function is set on the wired controller (See "wired controller manual")

1) When the AHS is set to be valid only for heating mode, AHS can be turned on in the following ways:

a. Turn on the AHS via BACKUPHEATER function on the user interface.

b. AHS will be turned on automatically if initial water temperature is too low or target water temperature is too high at low ambient temperature.

P\_o keeps running as long as the AHS is ON, SV1 keeps OFF.

2) When the AHS is set to be valid for heating mode and DHW mode. In heating mode, AHS control is same as part 1). In DHW mode, AHS will be turned on automatically when the initial domestic water temperature TW is too low or the target domestic water temperature is too high at low ambient temperature. P\_o stops running, SV1 keeps ON.

- **WTH (Domestic hot water tank booster heater) control**

The WTH function is set on the user interface. (See "wired controller manual" )

1) When the WTH is set to be valid, WTH can be turned on via BACKUP HEATER function on the user interface; In DHW mode, WTH will be turned on automatically when the initial domestic water temperature TW is too low or the target domestic water temperature is too high at low ambient temperature.

- **Solar energy control (solar water heater kit)**

Hydraulic module recognizes solar energy signal by judging Tsolar or receiving SL1SL2 signal from user interface. The recognition method can be set via SOLAR INPUT on the user interface. Please refer to 9.7.6/1). For solar energy input signal for wiring.

1) When Tsolar is set to be valid, Solar energy turns ON when Tsolar is high enough, P\_s starts running; Solar energy turns OFF when Tsolar is low, P\_s stops running.

2) When SL1SL2 control is set to be valid, Solar energy turns ON after receiving Solar water heater kit signal from user interface, P\_s starts running; Without Solar water heater kit signal. Solar energy turns OFF, P\_s stops running.

### **CAUTION**

The highest outlet water temperature may reach 75°C, please be ware of burn.

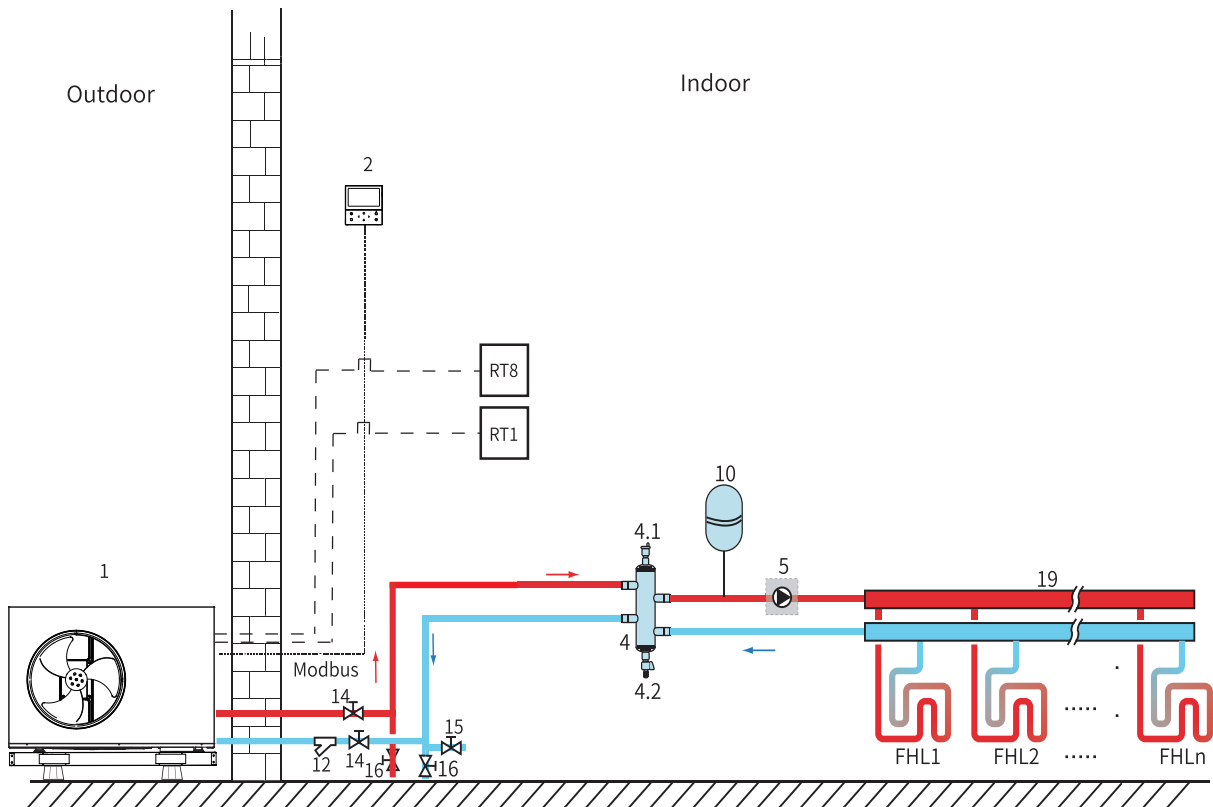
### **NOTE**

Make sure to fit the (SV1) 3-way valve correctly. For more details, please refer to 9.7.6 Connection for other components. At extremely low ambient temperature, the domestic hot water is exclusively heated by WTH, which assures that heat pump can be used for space heating with full capacity.

## 8.2 Application 2

ROOM THERMOSTAT Control for Space heating or cooling need to be set on the user interface. It can be set in three ways: MODE SET/ONE ZONE/TWO ZONE. The monobloc can be connected to a high voltage room thermostat and a low voltage room thermostat. Please refer to 9.7.6/5) "For room thermostat" for wiring. (see 10.5.7 "ROOM THERMOSTAT" for setting)

### 8.2.1 One zone control



Code	Assembly unit	Code	Assembly unit
1	Main unit	14	Shut-off valve (Field supply)
2	User interface	15	Filling valve (Field supply)
4	Balance tank(Field supply)	16	Drainage valve (Field supply)
4.1	Automatic air purge valve	19	Collector/distributor (Field supply)
4.2	Drainage valve	RT 1	Low voltage room thermostat(Field supply)
5	P_o:Outside circulation pump(Field supply)	RT8	High voltage room thermostat (Field supply)
10	Expansion vessel (Field supply)	FHL 1...n	Under-floor heating loop (Field supply)
12	Filter (Accessory)		

- Space heating/Cooling

One zone control: the unit ON/OFF is controlled by the room thermostat, cooling or heating mode and outlet water temperature are set on the user interface. System is ON when any "HL" of all the thermostats closes. When all "HL" open, system turns OFF.

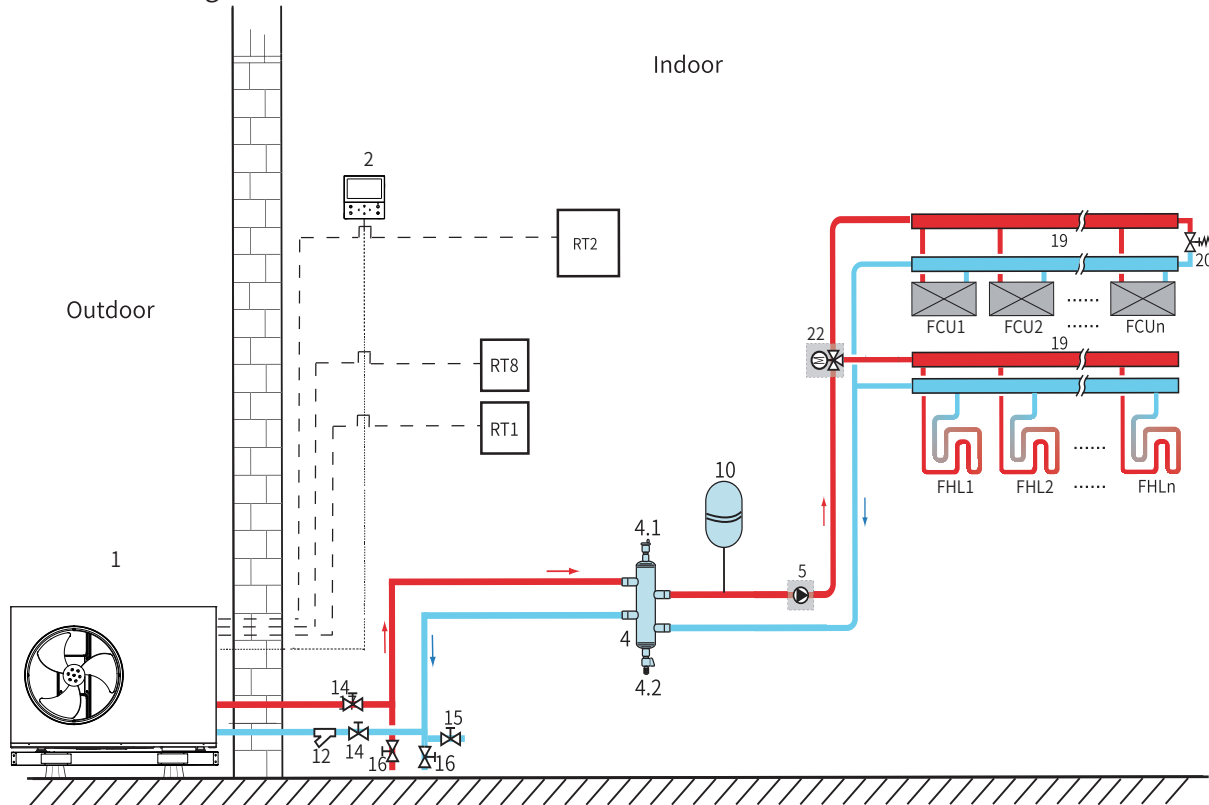
Note:When you set cooling mode to cool the floor loop with the user interface supplied with the unit, the desired temperature cannot be set less than 18°C to prevent water condensation on the floor.

- The circulation pumps operation

When the system is ON, which means any "HL" of all the thermostats closes, P\_o starts running; When the system is OFF, which means all "HL" opens, P\_o stops running.



## 8.2.2 Mode setting control



Code	Assembly unit	Code	Assembly unit
1	Main unit	16	Drainage valve (Field supply)
2	User interface	19	Collector/distributor
4	Balance tank(Field supply)	20	Bypass valve (Field supply)
4.1	Automatic air purge valve	22	SV2: 3-way valve( Field supply)
4.2	Drainage valve	RT 1/2	Low voltage room thermostat
5	P_o: Outside circulation pump(Field supply)	RT8	High voltage room thermostat
10	Expansion vessel (Field supply)	FHL 1...n	Under-floor heating loop(Field supply)
12	Filter (Accessory)	FCU 1...n	Fan coil unit (Field supply)
14	Shut-off valve(Field supply)		
15	Filling valve (Field supply)		

- Space heating /cooling

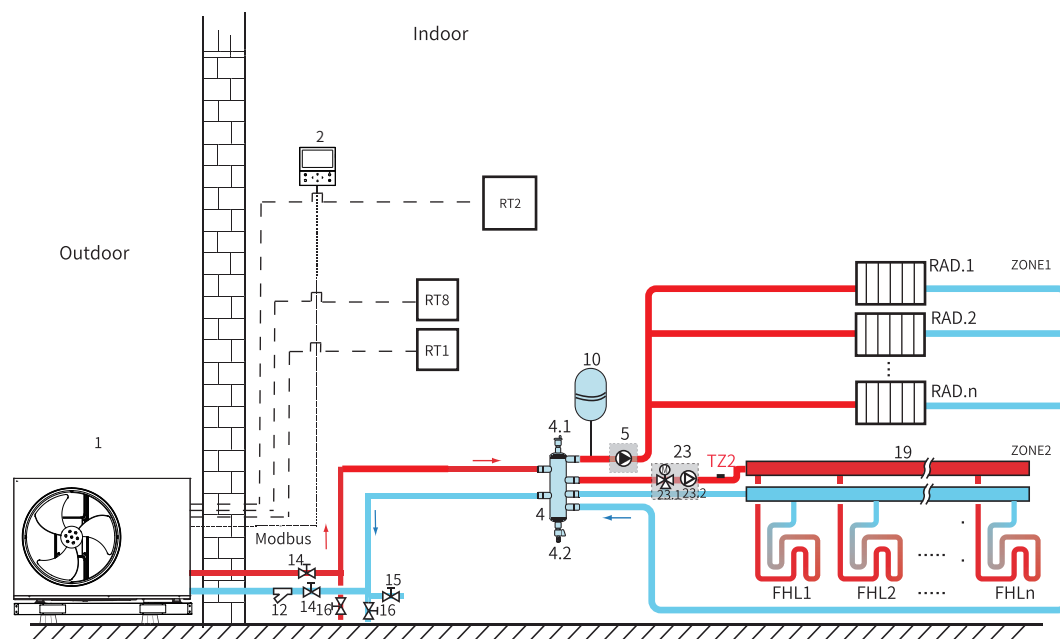
Cooling or heating mode is set via the room thermostat, water temperature is set on the user interface.

- 1) When any "CL" of all the thermostats close, system will be set at cooling mode with FCU.
- 2) When any "HL" of all the thermostats close and all "CL" open, system will be set at heating mode with FLH.

- The circulation pumps operation

- 1)When the system is in cooling mode, which means any "CL" of a ll the thermostats closes, SV2 keeps ON, P\_o starts running.
- 2)When the system is in heating mode, which means one or more " HL" close and all "CL" open, SV2 keeps OFF, P\_o starts running.

### 8.2.3 Double zone control



Code	Assembly unit	Code	Assembly unit
1	Main unit	19	Collector/distributor (Field supply)
2	User interface	21	Thermostat transfer board (Field supply)
4	Balance tank (Field supply)	23	Mixing station (Field supply)
4.1	Automatic air purge valve	23.1	SV3: Mixing valve (Field supply)
4.2	Drainage valve	23.2	P_c: zone 2 circulation pump (Field supply)
5	P_o: zone 1 circulation pump (Field supply) RT 1/2		Low voltage room thermostat (Field supply)
10	Expansion vessel (Field supply)	RT8	High voltage room thermostat (Field supply)
12	Filter (Accessory)	TZ2	Zone 2 water flow temperature sensor (Field supply)
14	Shut-off valve (Field supply)	FHL 1...n	Under-floor heating loop (Field supply)
15	Filling valve (Field supply)	RAD. 1...n	Radiator (Field supply)
16	Drainage valve (Field supply)		

#### • Space heating/Cooling

Zone1 can operate in cooling mode or heating mode, while zone2 can only operate in heating mode; While installation, for all thermostats in zone1, only “H、 L” terminals need to be connected. For all thermostats in zone2, only “C、 L” terminals need to be connected.

1) The ON/OFF of zone1 is controlled by the room thermostats in zone1. When any “HL” of all thermostats in zone1 closes, zone1 turns ON. When all “HL” turn OFF, zone1 turns OFF; Target temperature and operation mode are set on the user interface.

2) In heating mode, the ON/OFF of zone2 is controlled by the room thermostats in zone2. When any “CL” of all thermostats in zone2 closes, zone2 turns ON. When all “CL” open, zone2 turns OFF. Target temperature is set on the user interface; Zone 2 can only operate in heating mode. When cooling mode is set on the user interface, zone2 keeps in OFF status.

note: Floor cooling is available to zone 2 when zone 2 is controlled by a wired controller instead of a room thermostat. When you set cooling mode to cool the floor loop with the user interface supplied with the unit, the desired temperature cannot be set less than 18°C to prevent water condensation on the floor.

#### • The circulation pump operation

When zone 1 is ON, P\_o starts running; When zone 1 is OFF, P\_o stops running;

When zone 2 is ON, SV3 switches between ON and OFF according to the set TZ 2 , P\_c keeps ON;

is OFF, SV3 is OFF, P\_c stops running.

The floor heating loops require a lower water temperature in heating mode compared to radiators or fan coil unit. To achieve these two set points, a mixing station is used to adapt the water temperature according to requirements of the floor heating loops. The radiators are directly connected to the unit water circuit and the floor heating loops are after the mixing station. The mixing station is controlled either by the unit, or by the field.

#### ⚠ CAUTION

1) Make sure to connect the SV2/SV3 terminals in the controller PCB correctly. Please refer to 9.7.6 /2) for 3-way valve SV1,SV2,SV3.

2) Thermostat wires to the correct terminals and to configure the ROOM THERMOSTAT in the wired controller correctly . Wiring of the room thermostat should follow method A/B/C as described in 9.7.6 "Connection for other components /5) For room thermostat".

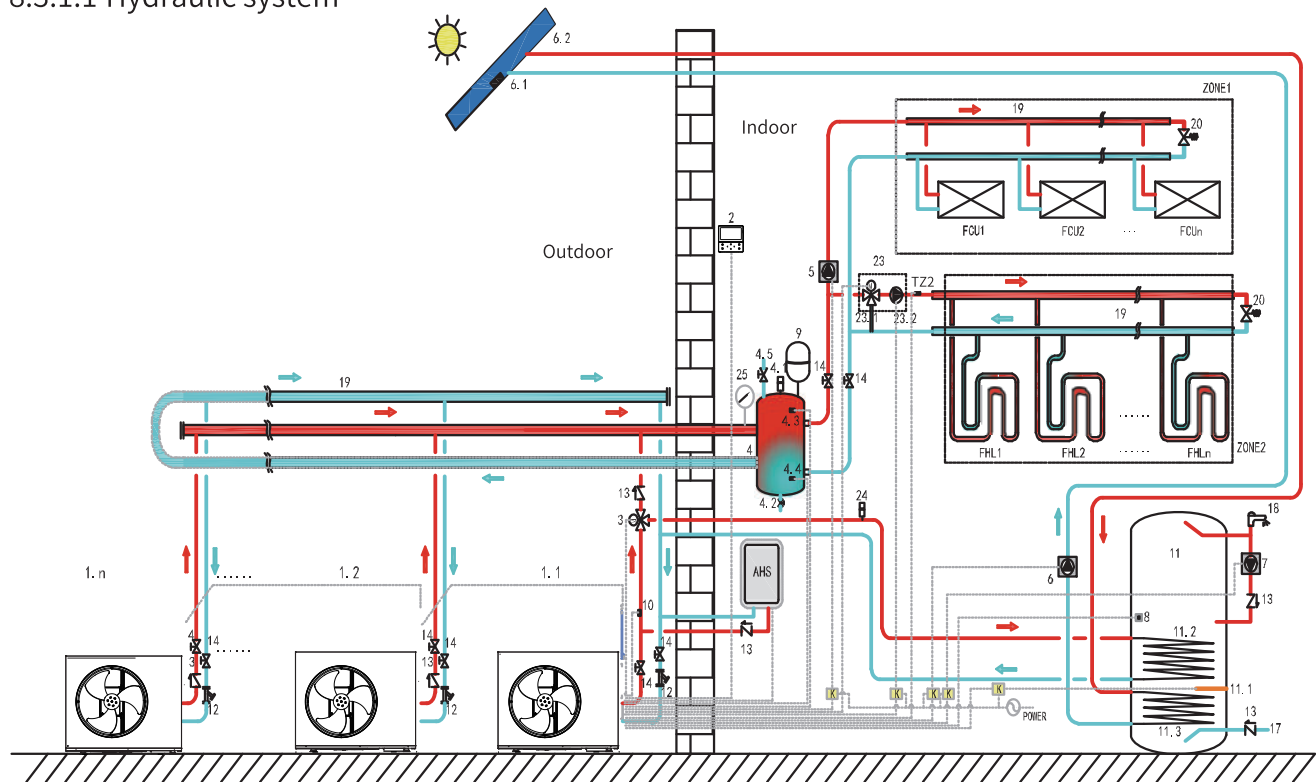
## NOTE

- 1) Zone 2 can only operate in heating mode. When cooling mode is set on user interface and zone 1 is OFF, "CL" in zone 2 closes, system still keeps "OFF". While installation, the wiring of thermostats for zone 1 and zone 2 must be correct.
- 2) Drainage valve (2) must be installed at the lowest position of the piping system.

### 8.3. Application 3

#### 8.3.1 Cascade application

##### 8.3.1.1 Hydraulic system



Cascade hydraulic system

Legend			
1.1	Master unit	11.3	Coil 2: heat exchanger for solar water heater kit
1.2...n	Slave unit	12	Filter(Accessory)
2	User interface	13	Check valve(Field supply)
3	SV1: 3-way valve(Field supply)	14	Shut- off valve(Field supply)
4	Balance tank ( Field supply)	17	Tap water inlet pipe(Field supply)
4.1	Automatic bleed valve	18	Hot water tap(Field supply)
4.2	Drainage valve	19	Collector/Distributor(Field supply)
4.3	TE1: Balance tank upper temperature sensor for CASCADE application	20	Bypass valve(Field supply)
4.4	TE2: Balance tank lower temperature sensor(reserved)	23	Mixing station(Field supply)
4.5	Filling valve	23.1	SV3: Mixing valve(Field supply)
5	P_O: Outside circulation pump (Field supply)	23.2	P_C: Zone B circulation pump(Field supply)
6	P_S: Solar pump(Field supply)	24	Automatic bleed valve( Field supply)
6.1	Tsolar: Solar temperature sensor(Optional)	25	Watermanometer(Field supply)
6.2	solar collector (Field supply)	TZ2	Zone B water flow temperature sensor(Optional)
7	P_D: DHW pipe pump(Field supply)	RAD1...n	Radiator(Field supply)
8	TW:Domestic water tank temperature sensor(Accessory)	FHL 1...n	Floor heating loop(Field supply)
9	Expansion vessel(Field supply)	K	Contactore(Field supply)
10	TC: Total water flow temperature sensor(optional)	ZONE 1	The space cooling or heating mode
11	Domestic water tank(Field supply)	ZONE 2	The space heating mode
11.1	WTH: Domestic water tank heater	AHS	Auxiliary heat source(Field supply)
11.2	Coil 1: heat exchanger for heat pump		

## NOTE

- The example is just for application illustration, please confirm the exact installation method according to the installation manual.
- At most 8 units can be controlled in group.
- The group control system can control and view the operation of the entire system only by connecting the master to the wire controller.
- If the DHW function is required, the water tank can only be connected to the master unit water circuit through a 3-way valve, and controlled by the master unit.
- If AHS is needed, it can only be connected to the master waterway and controlled by the master unit.
- The TE1 temperature sensor must be installed in the parallel system (otherwise unit cannot be started).
- If the balance tank is too large, TE2 needs to be added in order to improve the control accuracy.
- TE2 is set in the lower part of the balance tank.
- The water inlet and outlet pipe joints of each unit of the parallel system should be connected with soft connections and one-way valves must be installed at the water outlet pipe.

### • Space heating /cooling

All slave units can operate in space heating mode. The operation mode and setting temperature are set on the user interface(2). Due to changes of the outdoor temperature and there required load indoors, multiple outdoor units may operate at different times.

In cooling mode with FCU,SV3(23.1)andP C(23.2) keep **OFF** ,P 0(5) keeps **ON**;

In heating mode , when both ZONE 1 and ZONE 2 work,P\_C(23.2) and P\_0(5) keep **ON** , SV3(23.1) switches between **ON** and**OFF** according to the set TZ2.

In heating mode , when only ZONE 1 work,P\_0(5) keep **ON**, SV3(23.1) and P\_C(23.2) keep **OFF** . in heating mode , when only ZONE2 work,P\_0(5) keep**OFF**,P\_C(23.2) keep**ON** and SV3(23.1) switches between **ON**and**OFF**, according to the set TZ2.

Note:When you set cooling mode to cool the floor loop with the user interface supplied with the unit, the desired temperature cannot be set less than 18°C to prevent water condensation on the floor.

### • Domestic water heating

Only the master unit 1.1Y can operate in DHW mode. The Desired hot water temperature is set on the user interface(2).In DHW mode,SV1(3) keeps **ON**.When the master unit operated in DHW mode,The slave units can operate in space cooling/heating mode.

### • AHS control

AHS is only controlled by the master unit. When the master unit operates in DHW mode,AHS can only be used for producing domestic hot water; when the master unit operates in heating mode,AHS can only be used for heating mode.

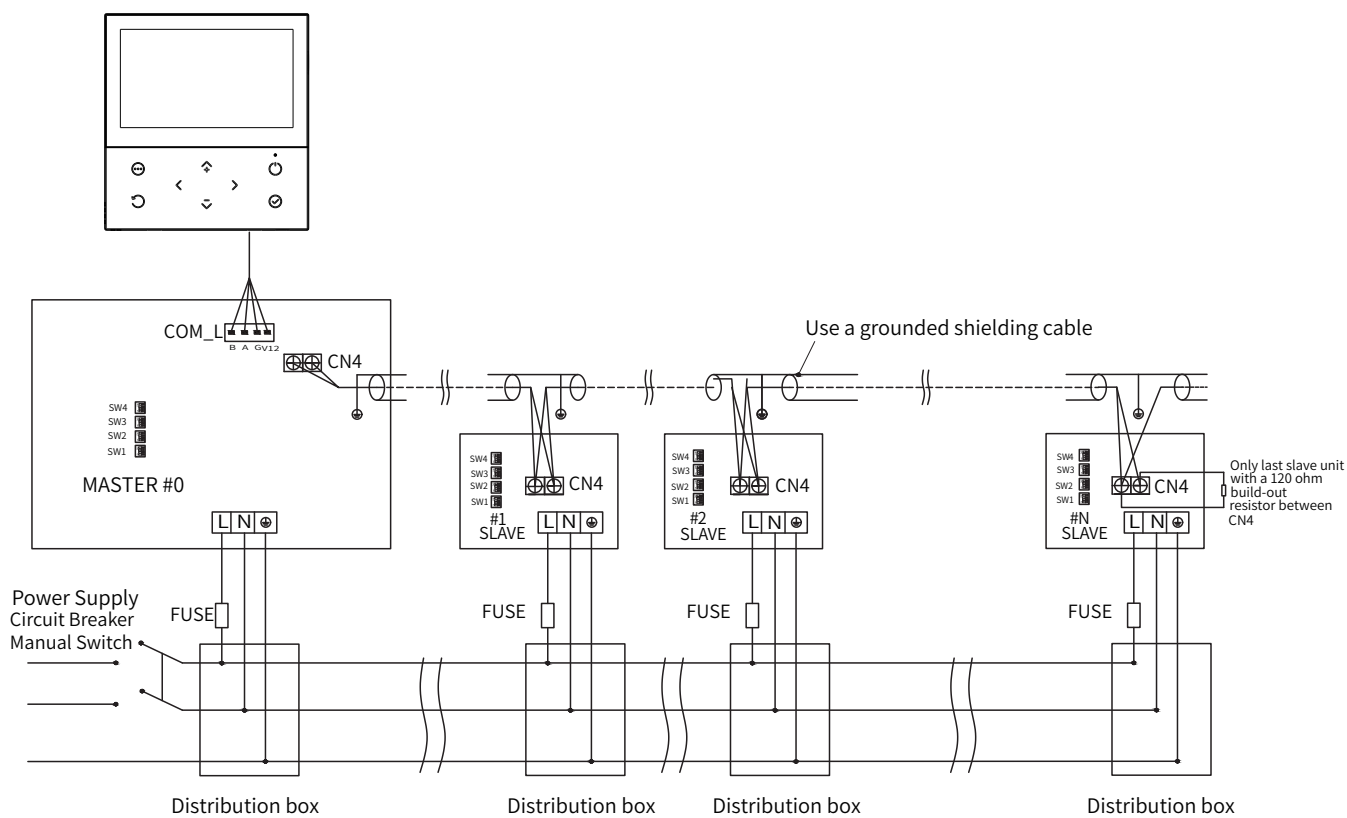
### • WTH control

WTH is only controlled by master unit.

### • Solar energy control

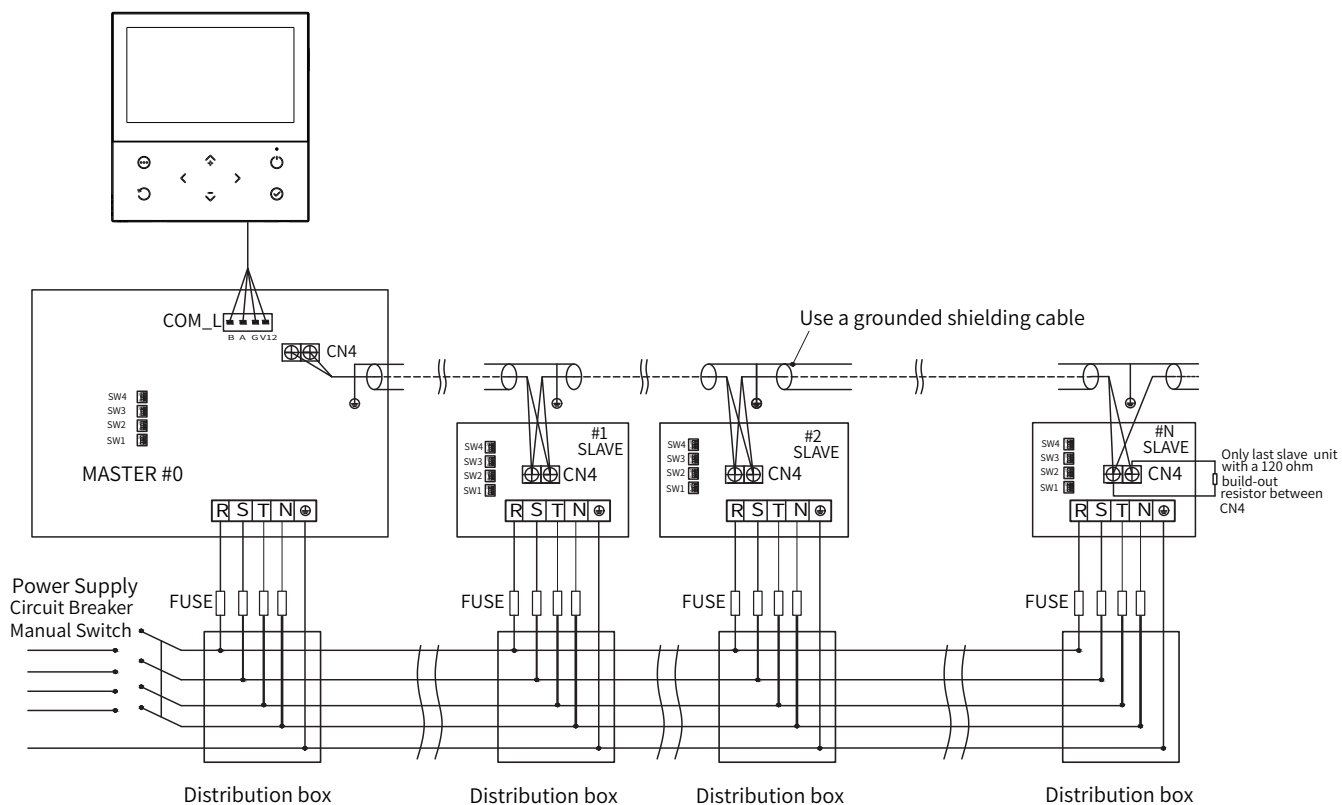
Solar water heater kit is only controlled by Master unit.

8.3.2 Wiring



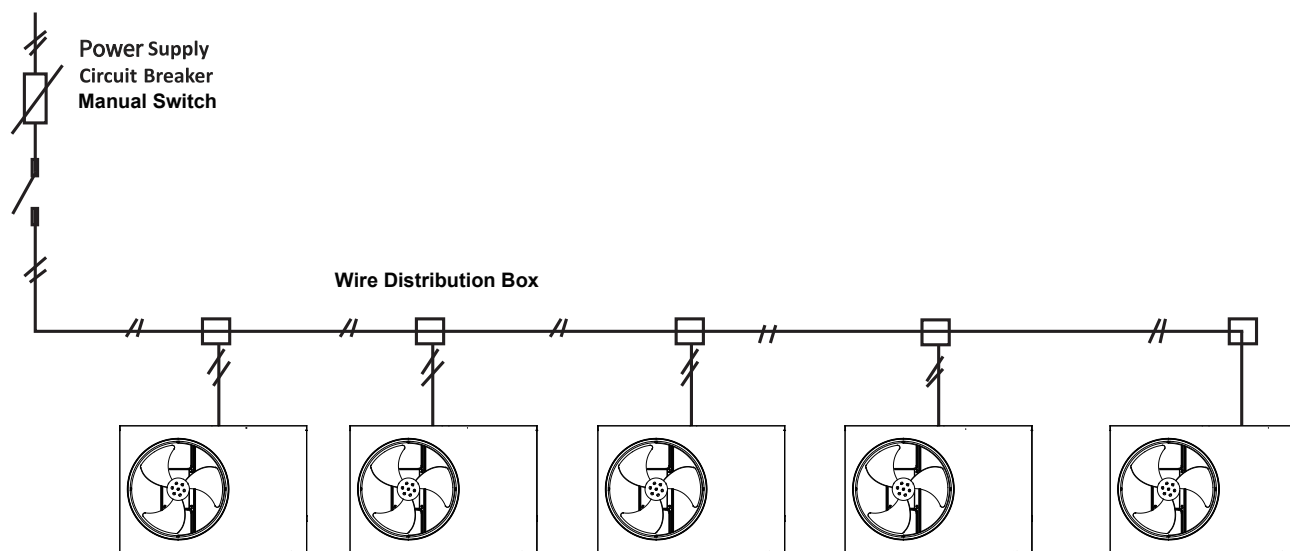
Cascade system wiring diagram for single phase 4~16kW models

Dip Switch			
SW4	1	SINGLE	OFF
		CASCADE	ON
	2/3/4	MASTER#0	OFF/OFF/OFF
		SLAVE #1	OFF/OFF/ON
		SLAVE #2	OFF/ON/OFF
		SLAVE #3	OFF/ON/ON
		SLAVE #4	ON/OFF/OFF
		SLAVE #5	ON/OFF/ON
		SLAVE #6	ON/ON/OFF
		SLAVE #7	ON/ON/ON



Cascade system wiring diagram for three phase 12~16 kW models

### 8.3.3 Power supply

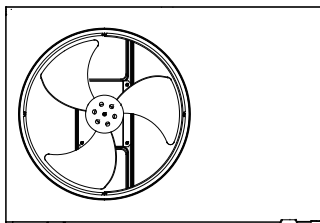


#### 8.4 Balance tank volume requirement

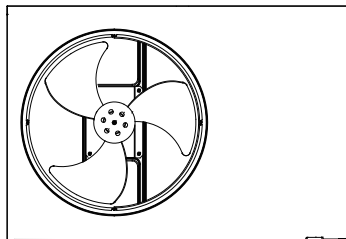
NO.	model	Balance tank (L)
1	7kW	≥ 35
2	10kW	≥ 45
3	12kW	≥ 60
4	14-16kW	≥ 80

## 9 OVERVIEW OF THE UNIT

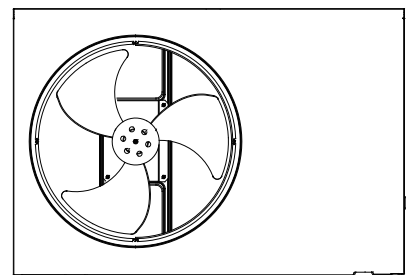
### 9.1 Disassembling the unit



7kW



10kW



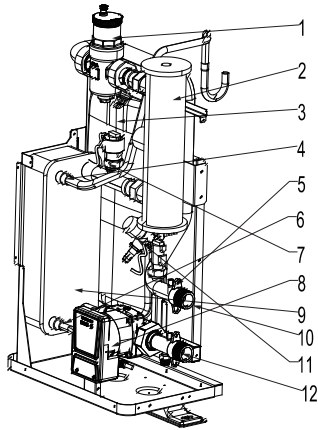
12/14/16kW

#### WARNING

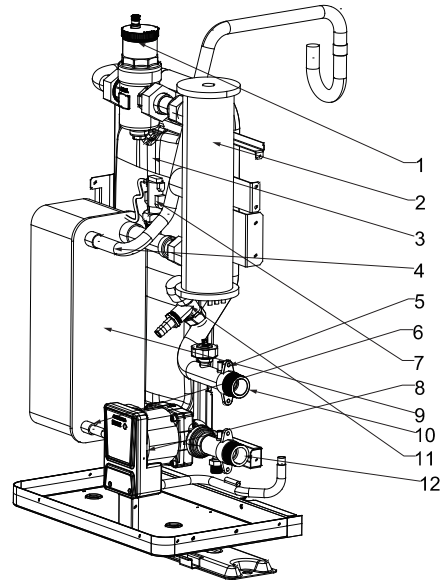
- Switch off all power — i.e. unit power supply and backup heater and domestic hot water tank power supply (if applicable) — before removing door.
- Parts inside the unit may be hot.

## 9.2 Main components

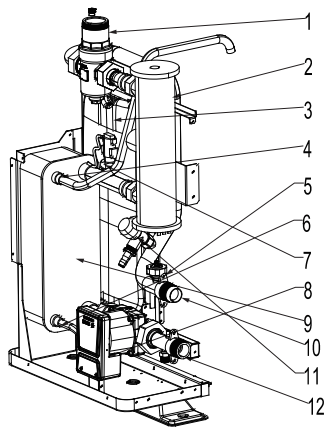
### 9.2.1 Hydraulic module



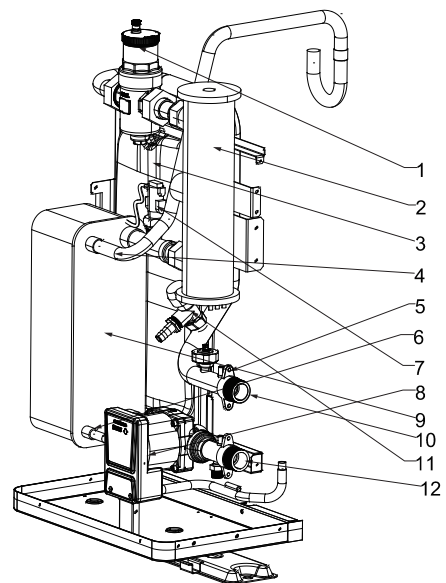
7 kW with backup heater



12~16 kW with backup heater



10 kW with backup heater



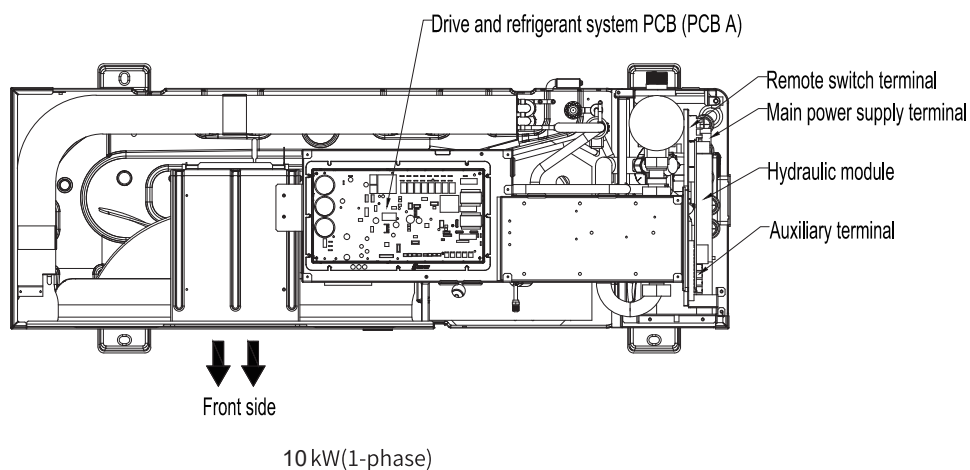
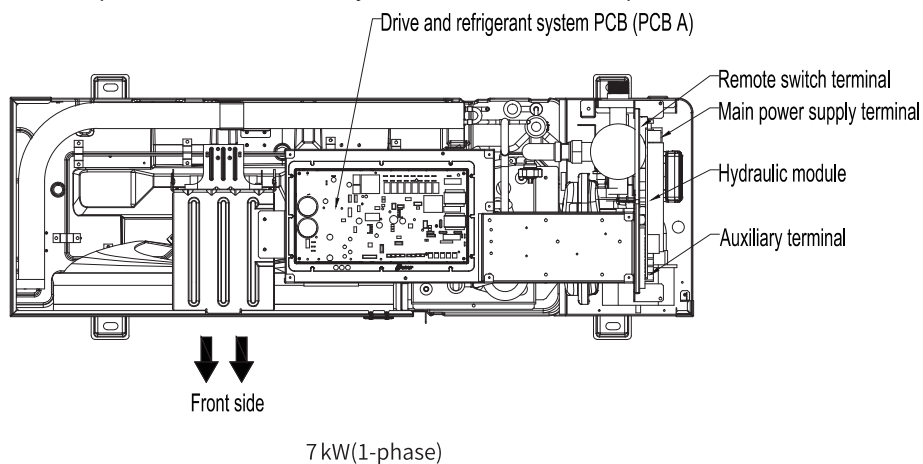
12~16 kW (3-Phase) with backup heater

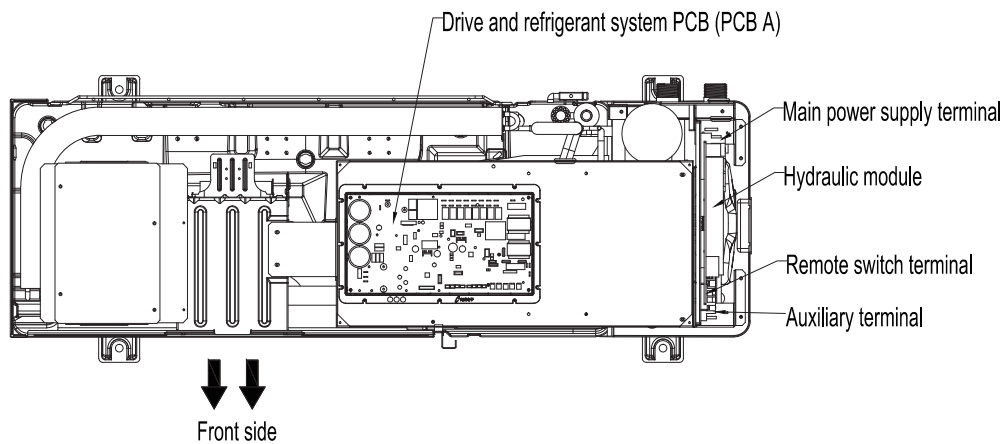


Code	Assembly unit	Explanation
1	Automatic air purge valve (optional)	Remaining air in the water circuit will be automatically removed from the water circuit.
2	Backup heater (optional)	Provides additional heating capacity when the heating capacity of the heat pump is insufficient due to very low outdoor temperature. Also protects the external water pipes from freezing.
3	Expansion vessel	Balances water system pressure.
4	Refrigerant gas pipe	/
5	Temperature sensor	Three temperature sensors determine the water and refrigerant temperature at various points in the water circuit.
6	Refrigerant liquid pipe	/
7	Flow switch	Detects water flow rate to protect compressor and water pump in the event of insufficient water flow.
8	Pump	Circulates water in the water circuit.
9	Plate heat exchanger	Transfer heat from the refrigerant to the water.
10	Water outlet pipe	/
11	Pressure relief valve	Prevent excessive water pressure by opening at 3 bar and discharging water from the water circuit.
12	Water inlet pipe	/

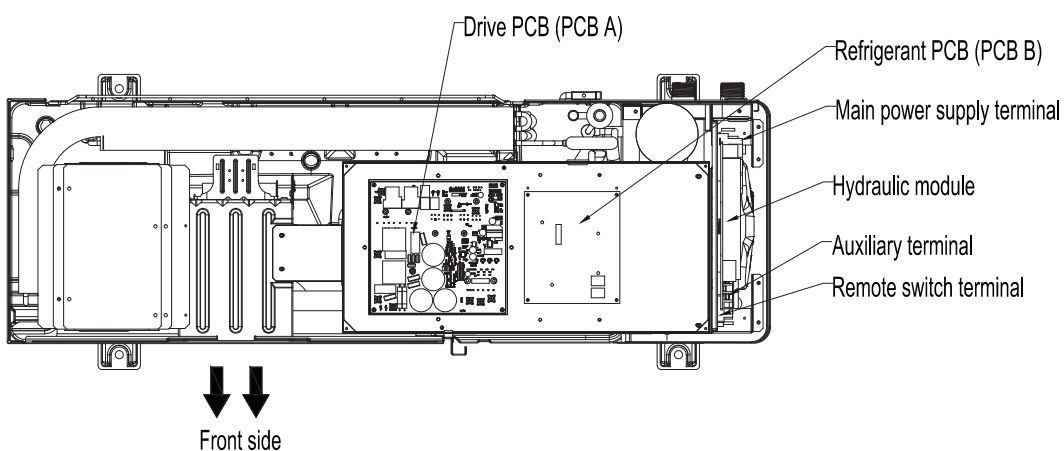
### 9.3 Electronic control box

Note: The picture is for reference only. Please refer to the actual product.

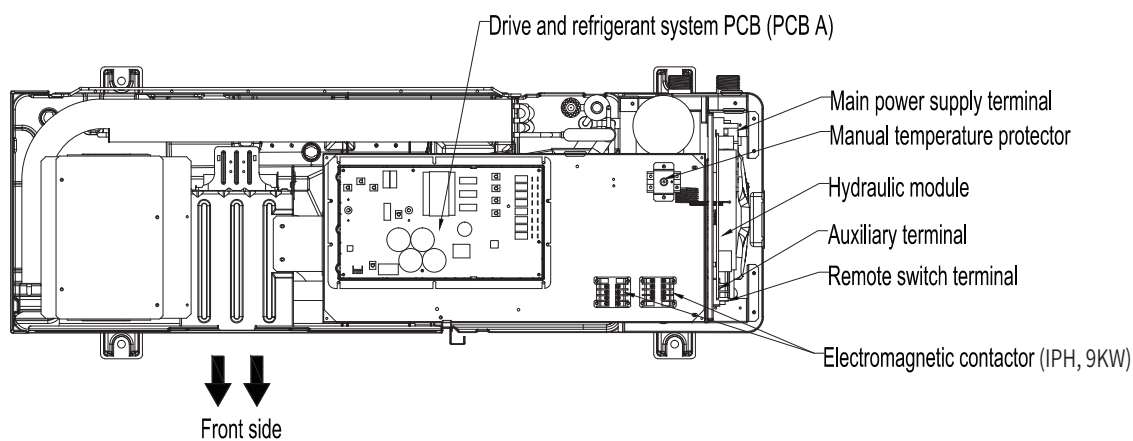




12 kW(1-phase)



14--16 kW(1-phase)

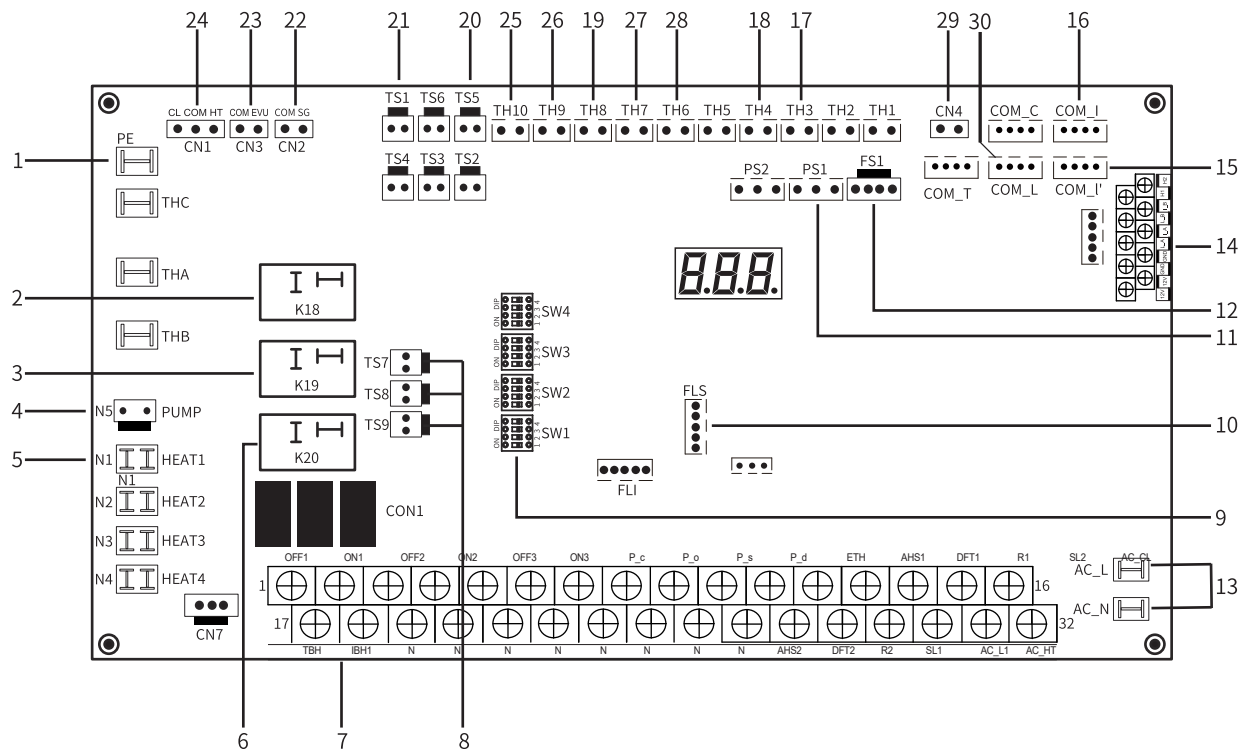


12-16 kW(3-phase)

## PCB specification

Model/Number	7/10kW	12 kW	16 kW	10/12/14/16kW(3-Phase)
Refrigerant system module	1	1	1	1
Inverter module			1	
DC Fan drive board				
Hydraulicmodule PCB	1	1	1	1
Total	2	2	3	2

### 9.3.1 Main control board of hydraulic module

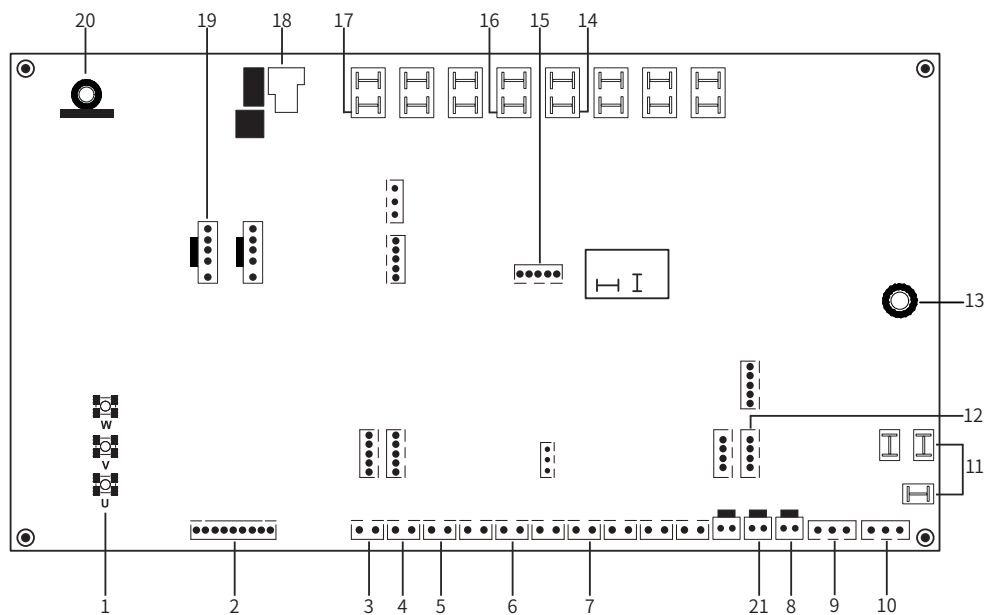


Items	Port label	function
1	PE	Port for ground
2	K18	Relay, for 3kW IPH
3	K19	Relay for domestic water tank heater( 3 kW)
4	Pump	Power supply of internal pump
5	HEAT 1	Plate heat exchange anti-freezing heater
6	K20	Relay, for 3-phase 6kW IPH
7	CON1	Terminals(Reserved)
8	TS7/TS9	High temperature protection switch for IPH
	TS8	High temperature protection switch for WTH
9	SW1/2/3/4	Dip switch
10	FLS	Program update
11	PS1	Water pressure sensor
12	FS1	Internal pump speed feedback
13	AC	Power supply
14	U19	Communication ports
15	COM_I'	Refrigerant Leak Sensor
16	COM_I	Communication port

Items	Port label	function
17	TH3	Inlet water temperature sensor
18	TH4	Outlet water temperature sensor
19	TH8	Domestic water tank temperature sensor
20	TS5	Remote on/off switch
21	TS1	Water flow switch
22	SG	Smart Grid
23	EVU	Commercial power
24	CN1	Low voltage thermostat
25	Tso	Solar temperature
26	TZ2	Zone 2 temperature
27	TE2	Reserved
28	TE1	Buffer temp. sensor for CASCADE
29	CN4	Communication port
30	COM_L	Wired controller

### 9.3.2 1-phase for 7-16 kW units

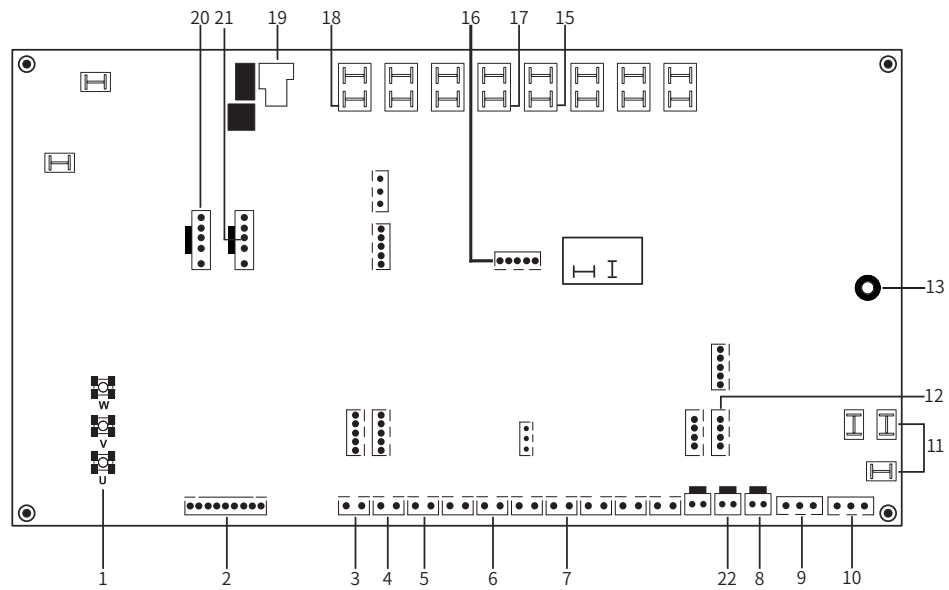
#### 1) PCB A, 7 kW, Drive and refrigerant system PCB



Items	Port label	function	Items	Port label	function
1	U/V/W	Compressor output	12	COM4	Communication with hydraulic module PCB
2	JTAG	Drive program update	13	PE1	Port for ground
3	TH1	Coil temperature sensor	14	OUT4	4-way valve
4	TH2	Outdoor ambient temperature sensor	15	FLS	PCB Program update
5	TH3	Refrigerant liquid temperature sensor	16	OUT5	Chassis heater
6	TH5	Discharge temperature sensor	17	OUT8	Crankcase heater
7	TH7	Suction temperature sensor	18	K9	Relay for PFC
8	TS3	Reserved	19	FAN1	DC Fan
9	TS4	HPS: High pressure sensor	20	L1	Common mode inductance
10	TS5	LPS: Low pressure sensor	21	TS2	High pressure switch
11	AC	Power supply			

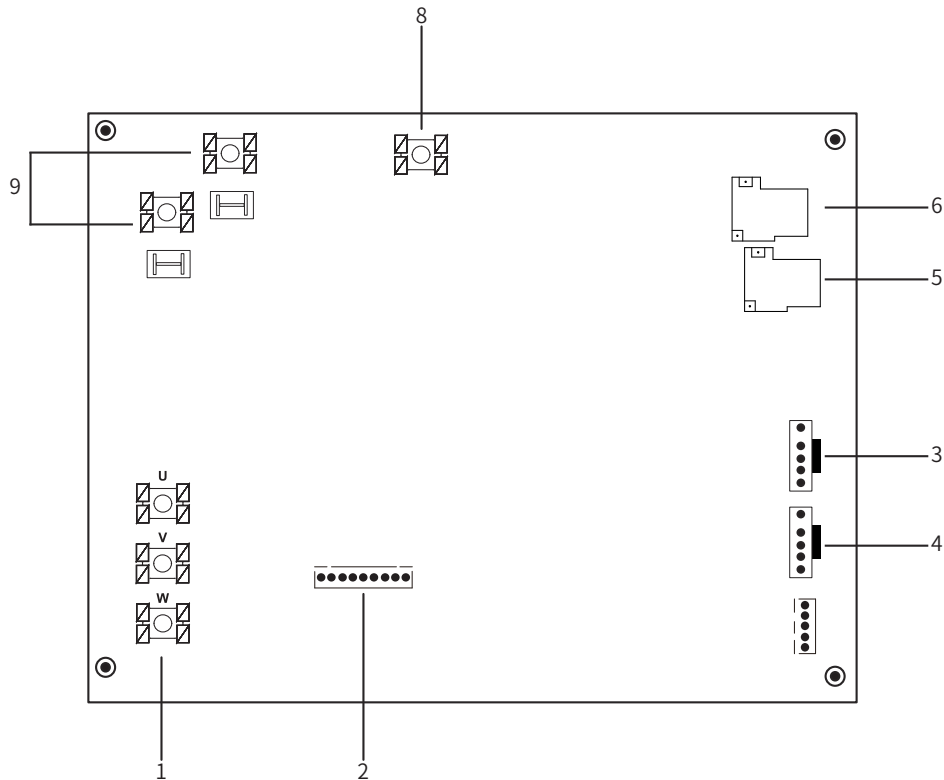
## 2) PCB A, 7/10/12 kW, Drive and refrigerant system PCB

Notification: 7 -10 -12 kw models has different PCB A but same connect ports



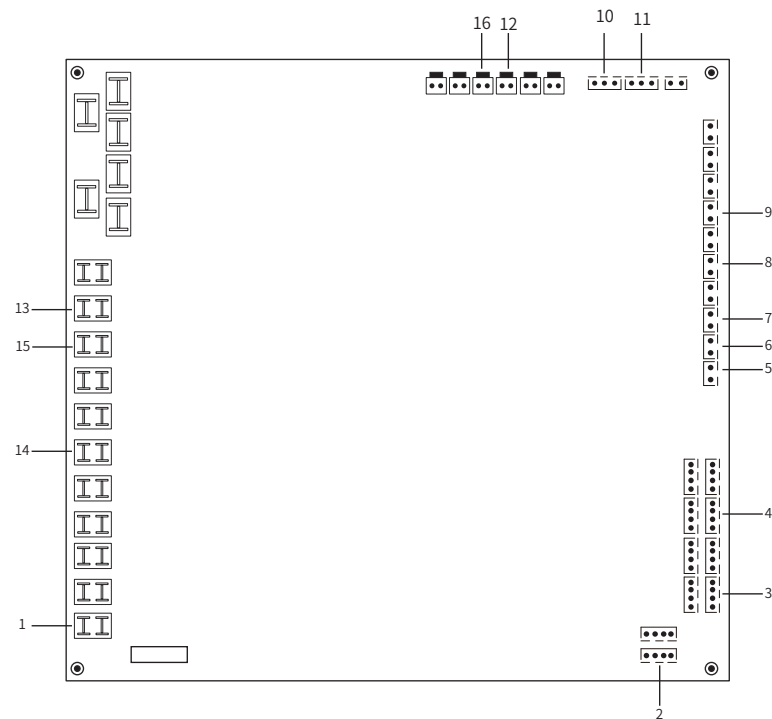
Items	Port label	function
1	U/V/W	Compressor output
2	JTAG	Drive program update
3	TH1	Coil temperature sensor
4	TH2	Outdoor ambient temperature sensor
5	TH3	Refrigerant liquid temperature sensor
6	TH5	Discharge temperature sensor
7	TH7	Suction temperature sensor
8	TS3	Reserved
9	TS4	HPS:High pressure sensor
10	TS5	LPS: Low pressure sensor
11	AC	Power supply
12	COM4	Communication with hydraulic module PCB
13	PE1	Port for ground
14	/	Filter components
15	OUT4	4- way valve
16	FLS	PCB Program update
17	OUT 5	Chassis heater
18	OUT 8	Crankcase heater
19	K9	Relay for PFC
20	FAN1	DC fan1
21	FAN2	DC fan2
22	TS2	High pressure switch

### 3) PCB A, 14-16 kW, Drive PCB



Items	Port label	function
1	U/V/W	Compressor output
2	JTAG	Drive program update
3	FAN1	DC fan 1
4	FAN2	DC fan 2
5	K2	Relay for PFC
6	K1	Relay for PFC
7	/	Filter components
8	PE	Port for ground
9	AC	Power supply
10	/	Drive components

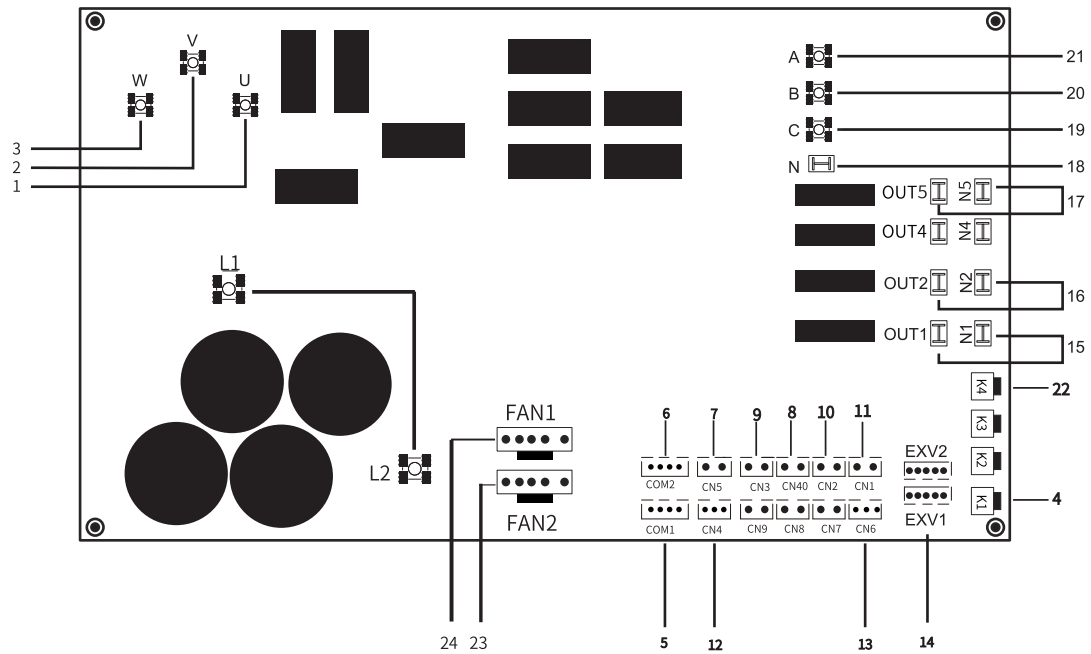
#### 4) PCB B, 14-16 kW, Refrigerant system PCB



Items	Port label	Function
1	AC (L/N)	Powers supply
2	EXV1	Electric expansive valve
3	COM_L/I	Communication with hydraulic module PCB
4	COM_D	Communication with inverter module PCB
5	TH1	T3: Coil temperature sensor
6	TH2	T4: Outdoor ambient temperature sensor
7	TH3	T5: liquid temperature sensor
8	TH5	TP: Discharge temperature sensor
9	TH7	TH: Suction temperature sensor
10	TS7	HPS: High pressure sensor
11	TS8	LPS: Low pressure sensor
12	TS4	Reserved
13	Output 4	Four- way valve
14	Output 8	Crankcase heater
15	Output 5	Chassis heater
16	TS3	High pressure switch

### 9.3.3 3-phase for 10-16kW units

PCB A, 3-phase for 10-16 kW, Drive and refrigerant system PCB



Items	Port label	Function	Items	Port label	Function
1	U	Compressor connection port	12	CN4	Low pressure sensor
2	V		13	CN6	High pressure sensor
3	W		14	EXV1	Electronic expansion valve
4	K1	Reserved	15	OUT1,N1	Four way valve
5	COM1	Communication between PCB A and Main control board of hydraulic module	16	OUT2,N2	Chassis heater
6	COM2	Reserved	17	OUT5,N5	Compressor Crankcase heater
7	CN5	Suction temperature	18	N	Power supply
8	CN40	EEV Liquid temperature	19	C	
9	CN3	Discharge temperature	20	B	
10	CN2	Ambient temperature	21	A	
11	CN1	Coil temperature	22	K4	High pressure switch
			23	FAN 2	DC FAN2
			24	FAN 1	DC FAN1



## 9.4 Water piping

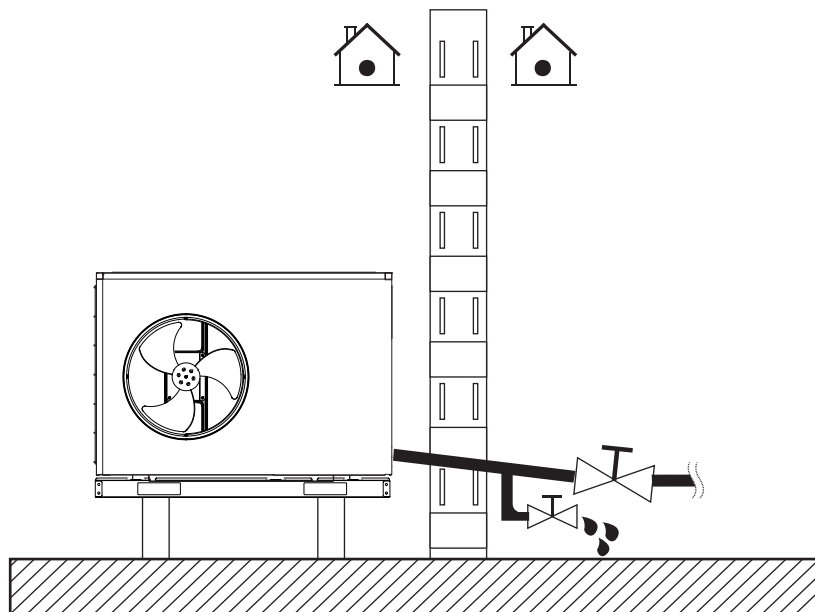
All piping lengths and distances have been taken into consideration.

### Requirements

The maximum length for the thermistor cable is 20 meters. This applies specifically to installations that include a domestic hot water tank, where the cable distance between the tank and the unit should not exceed 20 meters. The thermistor cable that comes with the domestic hot water tank is 8 meters. To ensure optimal efficiency, we recommend installing the 3-way valve and the domestic hot water tank as close as possible to the unit.

### NOTE

If your installation includes a domestic hot water tank (field supply), please refer to the Installation and Owner's Manual for the tank.



### NOTE

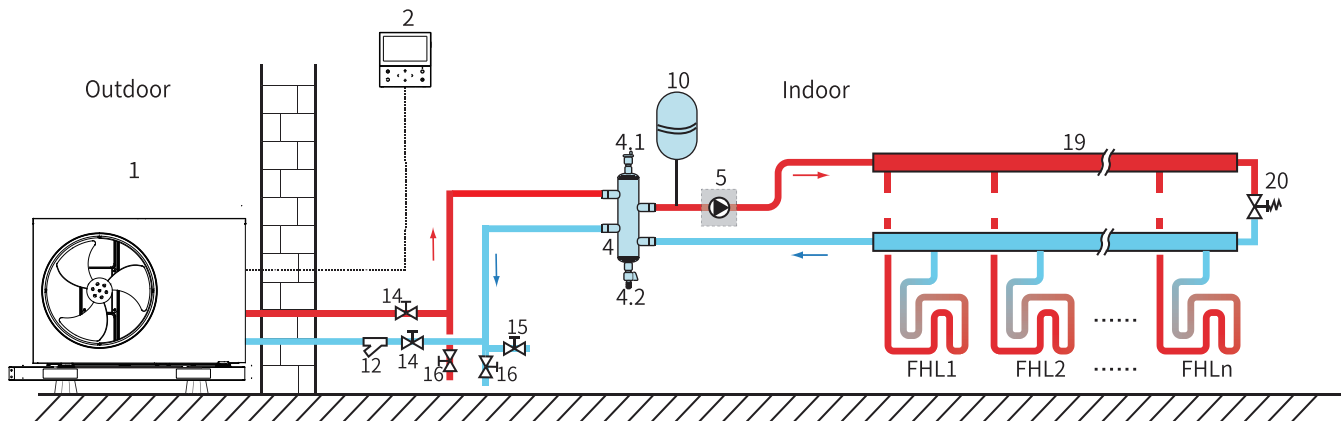
If water is not removed from the system in freezing weather when unit is not in use, the frozen water may damage the water circle parts. Mechanical anti-freeze valves are recommended.

### 9.4.1 Check the water circuit

The unit comes equipped with a water inlet and water outlet for connection to a water circuit. It is important that this circuit is installed by a licensed technician and complies with local laws and regulations.

It should be noted that the unit is designed to be used in a closed water system only. Any attempt to use the unit in an open water circuit can lead to excessive corrosion of the water piping.

Example :



Code	Assembly unit	Code	Assembly unit
1	Main unit	12	Filter (Accessory)
2	User interface(accessory)	14	Shut-off valve (Field supply)
4	Balance tank (Field supply)	15	Filling valve (Field supply)
4.1	Automatic air purge valve	16	Drainage valve (Field supply)
4.2	Drainage valve	19	Collector/distributor (Field supply)
5	P_o: Outside circulation pump(Field supply)	20	Bypass valve (Field supply)
10	Expansion vessel(Field supply)	FHL 1...n	Under-floor heating (Field supply)

Before continuing installation of the unit, check the following:

- The maximum water pressure should not exceed 3 bar.
- The maximum water temperature should not exceed 75°C as per the safety device setting.
- Always ensure that the materials used in the system are compatible with the water being used and the materials used in the unit.
- Additionally, it is essential to ensure that all components installed in the field piping can withstand the water pressure and temperature.
- To allow for proper maintenance, it is important to install drain taps at all low points of the system, allowing for complete drainage of the circuit.
- Similarly, air vents should be provided at all high points of the system, ensuring they are easily accessible for service. An automatic air purge valve is provided inside the unit, so make sure not to tighten this valve to allow for the automatic release of air or refrigerant in the water circuit.

## 9.4.2 Water volume and sizing expansion vessels

The units are equipped with an expansion vessel of 6L that has a default pre-pressure of 1 bar. To assure proper operation of the unit, the pre-pressure of the expansion vessel might need to be adjusted.

1) Check that the total water volume in the installation, excluding the internal water volume of the unit, the recommendation is 17L/kW. The minimum water volume required for reliable operation is 5L/kW.

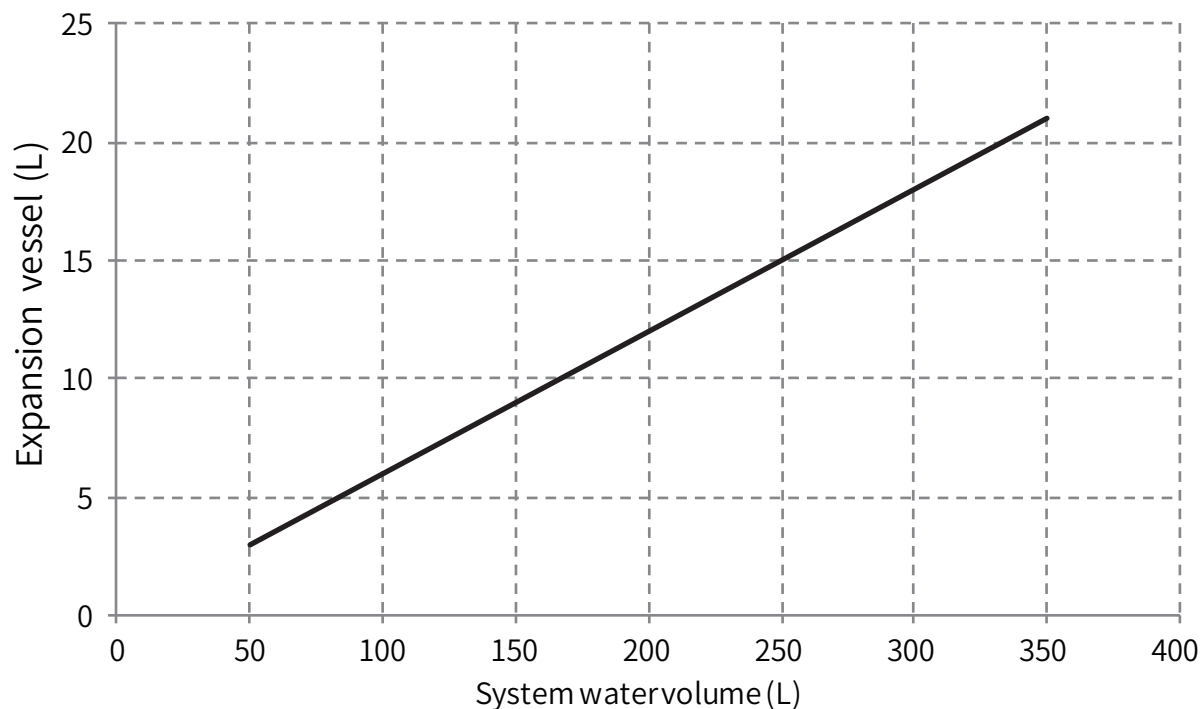
### NOTE

- In most applications this minimum water volume will be satisfactory.
- In critical processes or in rooms with a high heat load though, extra water might be required.
- When circulation in each space heating loop is controlled by remote control valve, it is important that this minimum water volume is kept even if all the valves are closed.

2) Expansion vessel volume must fit the total water system volume.

3) To size the expansion for the heating and cooling circuit.

The expansion vessel volume can follow the figure below:



### 9.4.3 Water circuit connection

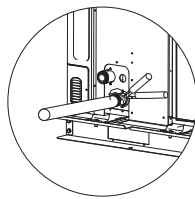
Water connections must be made correctly in accordance with labels on the outdoor unit, with respect to the water inlet and water outlet.

#### CAUTION

Be careful not to deform the unit's piping by using excessive force when connecting the piping. Deforming the piping can cause the unit to malfunction.

If air, moisture, or dust gets in the water circuit, problems may occur. Therefore, always take the following into account when connecting the water circuit:

- Use only clean pipes.
- Hold the pipe end downwards when removing burrs.
- Cover the pipe end when inserting it through a wall to prevent dust and dirt from entering.
- Use a good thread sealant to seal the connections. The sealant must be able to withstand the pressures and temperatures of the system.
- When using non-copper metallic piping, be sure to insulate the two different materials from each other to prevent galvanic corrosion.
- Copper is a soft material, so use appropriate tools for connecting the water circuit. Inappropriate tools will cause damage to the pipes.



#### NOTE

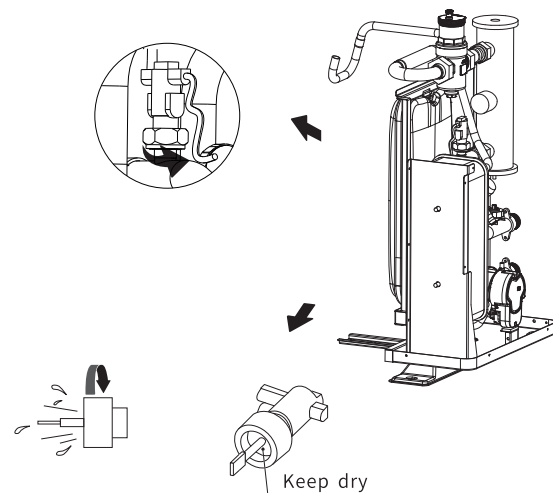
The unit is only to be used in a closed water system. Application in an open water circuit can lead to excessive corrosion of the water piping:

- Never use Zn-coated parts in the water circuit. Excessive corrosion of these parts may occur as copper piping is used in the unit's internal water circuit.
- When using a 3-way valve in the water circuit. Preferably choose a ball type 3-way valve to guarantee full separation between the domestic hot water and space heating water circuit.
- When using a 3-way valve or a 2-way valve in the water circuit. The recommended maximum changeover time of the valve should be less than 60 seconds.

### 9.4.4 Water circuit anti-freeze protection

To reduce heat loss, all internal hydraulic parts are insulated. It is also essential to add insulation to the field piping.

The software includes special functions that use the heat pump and backup heater (if available) to protect the entire system against freezing. If the water flow temperature in the system drops below a specific point, the unit will heat the water using either the heat pump or backup heater. The freeze protection function will only turn off when the temperature increases to a certain value.



#### NOTE

Counterclockwise rotation, remove the flow switch.  
Drying the flow switch completely.

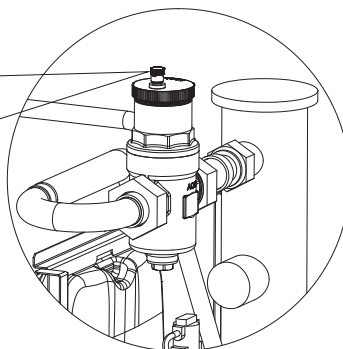
### CAUTION

If the unit is not going to be used for an extended period, ensure that the unit remains powered on at all times. If you need to cut off the power, ensure that the water in the system pipe is drained clean to avoid any damage caused by freezing to the unit and pipeline system. Also the power of the unit needs to be cut off after water in the system is drained off.

## 9.5 Filling water

- Connect the water supply to the filling valve and open the valve.
- Make sure the automatic air purge valve is open (at least 2 turns).
- Fill with water pressure of approximately 2.0 bar. Remove air in the circuit as much as possible using the air purge valves. Air in the water circuit could lead to malfunction of the backup electric heater.

This valve is opened from factory, when doing the installation in jobsite, this valve will automatically discharge the air in the water system during the pump operation.



### NOTE

During filling, it might not be possible to remove all air in the system. Remaining air will be removed through the automatic air purge valves during the first operating hours of the system. Topping up the water afterwards might be required.

- The water pressure will vary depending on the water temperature (higher pressure at higher water temperature). However, at all times water pressure should remain above 0.3 bar to avoid air entering the circuit.
- The unit might drain-off too much water through the pressure relief valve.
- Water quality should be complied with EN 98/83 EC Directives.
- Detailed water quality condition can be found in EN 98/83 EC Directives.

## 9.6 Water piping insulation

It is essential to insulate the complete water circuit, including all piping and water piping, to prevent condensation during cooling operations. Insulation will also reduce the heating and cooling capacity and prevent freezing of the outside water piping during winter. The insulation material should have a B1 fire resistance rating and comply with all applicable legislation. Thickness of the insulation material should be at least 13 mm with a thermal conductivity of 0.039 W/mK to prevent freezing on the outside water piping.

In cases where the outdoor ambient temperature is higher than 30°C and the humidity is higher than RH 80%, it is recommended to increase the thickness of the insulation material to at least 20 mm to avoid condensation on the surface of the seal. This will ensure optimal performance and prevent any damage that may occur from condensation.

## 9.7 Field wiring

### WARNING

A main switch or other means of disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with relevant local laws and regulations. Switch off the power supply before making any connections. Use only copper wires. Never squeeze bundled cables and make sure they do not come in contact with the piping and sharp edges. Make sure no external pressure is applied to the terminal connections. All field wiring and components must be installed by a licensed electrician and must comply with relevant local laws and regulations.

The field wiring must be carried out in accordance with the wiring diagram supplied with the unit and the instructions given below.

Be sure to use a dedicated power supply. Never use a power supply shared by another appliance.

Be sure to establish a ground. Do not ground the unit to a utility pipe, surge protector, or telephone ground. Incomplete grounding may cause electrical shock.

Be sure to install a ground fault circuit interrupter (30 mA). Failure to do so may cause electrical shock.

Be sure to install the required fuses or circuit breakers.

### 9.7.1 Precautions on electrical wiring work

- Fix cables so that cables do not make contact with the pipes (especially on the high pressure side).
- Secure the electrical wiring with cable ties as shown in figure so that it does not come in contact with the piping, particularly on the high-pressure side.
- Make sure no external pressure is applied to the terminal connectors.
- When installing the ground fault circuit interrupter make sure that it is compatible with the inverter (resistant to high frequency electrical noise) to avoid unnecessary opening of the ground fault circuit interrupter.

### NOTE

The ground fault circuit interrupter must be a high- speed type breaker of 30 m A (<0.1 s).

- This unit is equipped with an inverter. Installing a phase advancing capacitor not only will reduce the power factor improvement effect, but also may cause abnormal heating of the capacitor due to high-frequency waves. Never install a phase advancing capacitor as it could lead to an accident.

### 9.7.2 Wiring overview

The illustration below gives an overview of the required field wiring between several parts of the installation.

## NOTE

Please use H07RN-F for the power wire, all the cable are connect to high voltage except for thermistor cable and cable for user interface.

- Equipment must be grounded.
- All high-voltage external load, if it is metal or a grounded port, must be grounded.
- It is important to note that all load current should be less than 0.2 A, if the single load current is greater than 0.2A, the load must be controlled through AC contactor.
- AHS1" "AHS2", "A1" "A2", wiring terminal ports provide only the switch signal. Please refer to image of 9.7.6 to get the ports position in the unit.

Figure 3-4.2.1: Wiring hole for 7 kW models

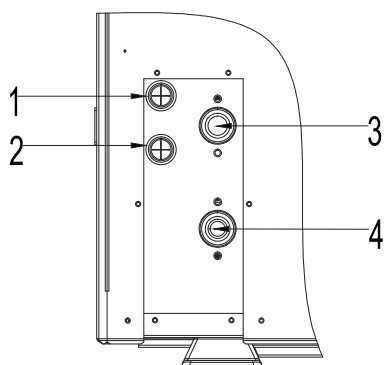


Figure 3-4.2.2: Wiring hole for 10 kW models

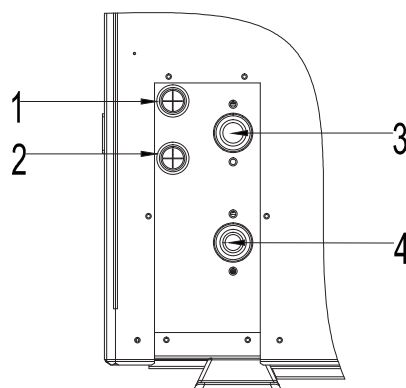
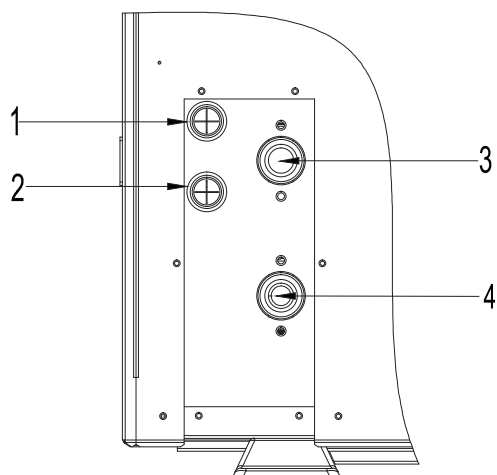


Figure 3-4.2.3: Wiring hole for 12-16kW models



Items	Assembly unit
1	Power cable
2	Low voltage cable
3	Water outlet
4	Water inlet

#### Field wiring guidelines

- Most field wiring on the unit is to be made on the terminal block inside the switch box. To gain access to the terminal block, remove the switch box service panel (door).

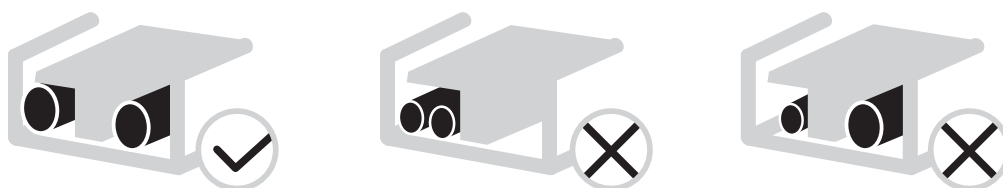
#### WARNING

Switch off all power including the unit power supply and backup heater and domestic hot water tank power supply (if applicable) before removing the switch box service panel.

- Fix all cables using cable ties.
- A dedicated power circuit is required for the backup heater.
- Installations equipped with a domestic hot water tank (field supply) require a dedicated power circuit for the booster heater. Please refer to the domestic hot water tank Installation & Owner's Manual. Secure the wiring in the order shown below.
- Lay out the electrical wiring so that the front cover does not rise up when doing wiring work and attach the front cover securely.
- Follow the electric wiring diagram for electrical wiring works (the electric wiring diagrams are located on the rear side of door).
- Install the wires and fix the cover firmly so that the cover may be fit in properly.

#### 9.7.3 Precautions on wiring of power supply

- Use a round crimp-style terminal for connection to the power supply terminal board. In case it cannot be used due to unavoidable reasons, be sure to observe the following instructions.
- Do not connect different gauge wires to the same power supply terminal. (Loose connections may cause overheating.)
- When connecting wires of the same gauge, connect them according to the figure below.



- Use the correct screwdriver to tighten the terminal screws. Small screwdrivers can damage the screw head and prevent appropriate tightening.
- Over-tightening the terminal screws can damage the screws.
- Attach a ground fault circuit interrupter and fuse to the power supply line.
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside force cannot affect the terminals.

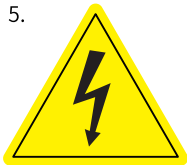
#### 9.7.4 Safety device requirment

1. Select the wire diameters (minimum valve) individually for each unit based on the table 9-1 and table 9-2, where the rated current in table 9-1 means MCA in table 9-2.
2. Maximum allowable voltage range variation between phases is 2%.
3. Select circuit breaker that having a contact separation in all poles not less than 3 mm providing full disconnection, where MFA is used to select the fuse, MCA for wiring size, TOCA for the circuit breaker.
4. Details of type and rating of fuses.

Model	Fuse type	Rating	Model	Fuse type	Rating
7kW	T30AH250V	30a 250V	10-12 kW 3-Ph	T10AH250V	10a 250V
10kW	T30AH250V	30a 250V		T30AH250V	30a 250V
12kW	T30AH250V	30a 250V			
14-16kW	T30AH250V	30a 250V	14-16 kW 3-Ph	T10AH250V	10a 250V
	T25AH250V	25a 250V		T30AH250V	30a 250V
	T6.3AL250V	6.3a 250V			



5.



The required power cable material should be at least 60245 IEC 57.

### Electrical data

(Rated input power/ rated current is for reference only, subject to the nameplate of the machine)

Model	Heat pump Unit		Total Max. current	Wires
	Input	Current		
7kW	3600W	17.2A	30.8A	3 x 6mm <sup>2</sup>
10kW	4700W	22.1A	35.7A	3 x 6mm <sup>2</sup>
12kW	6700W	28.5A	42.1A	3 x 10mm <sup>2</sup>
14-16kW	7600W	33.8A	47.4A	3 x 10mm <sup>2</sup>
10kW 3-PH	4700W	7.4A	21.0A	3 x 10mm <sup>2</sup>
12kW 3-PH	6300W	9.5A	23.1A	5 x 6mm <sup>2</sup>
14kW 3-PH	7500W	11.5A	25.1A	5 x 6mm <sup>2</sup>
16kW 3-PH	7500W	11.5A	25.1A	5 x 6mm <sup>2</sup>

Table 9-1

1-phase 7-16 kW standard and 3-phase 12-16 kW standard

System	Outdoor Unit				Power Current			Compressor		OFM	
	Voltage (V)	Hz	Min. (V)	Max. (V)	MCA (A)	TOCA (A)	MFA (A)	MSC (A)	RLA (A)	KW	FLA (A)
7kW	220-240	50	198	264	18	21	25	-	16.5	0.17	1.50
10kW	220-240	50	198	264	23	27	30	-	21.5	0.17	1.50
12kW	220-240	50	198	264	29	34	40	-	27.5	0.17	1.50
14-16kW	220-240	50	198	264	34	40	45	-	32.5	0.17	1.50
10kW 3-PH	380-415	50	342	456	8	14	16	-	7.2	0.17	1.50
12kW 3-PH	380-415	50	342	456	10	14	16	-	9.2	0.17	1.50
14kW 3-PH	380-415	50	342	456	12	14	16	-	11.2	0.17	1.50
16kW 3-PH	380-415	50	342	456	12	14	16	-	11.2	0.17	1.50

1-phase 7-16 kW standard with backup heater 3 kW (option)

System	Outdoor Unit				Power Current			Compressor		OFM	
	Voltage (V)	Hz	Min. (V)	Max. (V)	MCA (A)	TOCA (A)	MFA (A)	MSC (A)	RLA (A)	KW	FLA (A)
7kW	220-240	50	198	264	31	34	38	-	16.5	0.17	1.50
10kW	220-240	50	198	264	36	40	43	-	21.5	0.17	1.50
12kW	220-240	50	198	264	42	48	53	-	27.5	0.17	1.50
14 - 16kW	220-240	50	198	264	47	53	58	-	32.5	0.17	1.50

3-phase 12-16kW standard with backup heater 9 kW (option)

System	Outdoor Unit				Power Current			Compressor		OFM	
	Voltage (V)	Hz	Min. (V)	Max. (V)	MCA (A)	TOCA (A)	MFA (A)	MSC (A)	RLA (A)	KW	FLA (A)
10kW	380-415	50	342	456	21	27	29	-	7.2	0.17	1.50
12kW	380-415	50	342	456	23	27	29	-	9.2	0.17	1.50
14 - 16kW	380-415	50	342	456	25	27	29	-	11.2	0.17	1.50

### NOTE

MCA : Min. Circuit Amps. (A)

TOCA : Total Over-current Amps. (A)

MFA : Max. Fuse Amps. (A)

MSC : Max. Starting Amps. (A)

RLA : In nominal cooling or heating test condition, the input Amps of compressor where MAX. Hz can operate Rated Load Amps. (A)

KW : Rated Motor Output

FLA : Full Load Amps. (A)

The diagrams illustrate the power supply connections for the unit. The first diagram shows a 1-phase connection with L, N, and ground terminals. The second diagram shows a 1-phase connection with L, N, and ground terminals, and a separate ground terminal. The third diagram shows a 3-phase connection with R, S, T, and N terminals.

The ground fault circuit interrupter must be 1 high-speed type of 30mA(<0.1s). Please use 3-core shielded wire. The default of backup heater is optional (for single phase units default e-heater is 3kw and for three phases units e-heater is 9kw).

If circular wiring terminal with the insulation casing cannot be used, please make sure that :

- Do not connect two power cords with different diameters to the same power supply terminal (may cause overheating of wires due to loose wiring) (See Figure 9.2).

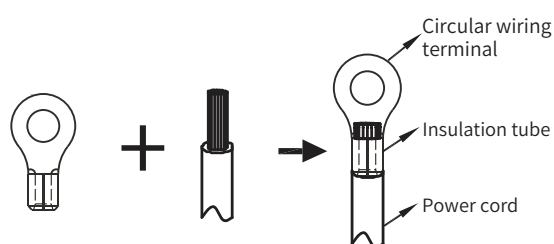


Figure 9.1

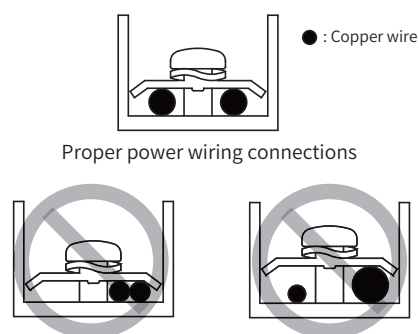
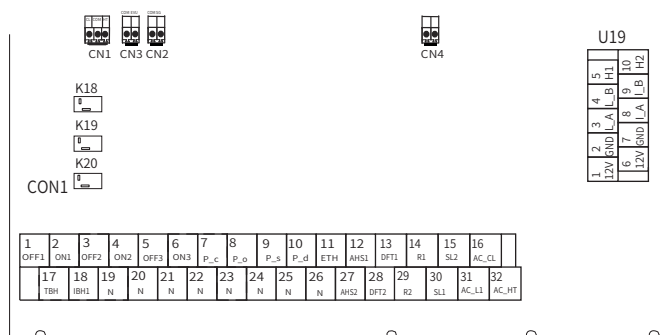


Figure 9.2

unit 4-16 kW



	Code	Print	Connect to
CON1	①	1 OFF1	SV1( 3-way valve)
		2 ON1	
		19 N	
	②	3 OFF2	SV2( 3-way valve)
		4 ON2	
		20 N	
	③	5 OFF3	SV3( 3-way valve)
		6 ON3	
		21 N	
	④	7 P_c	Pumpc(zone2 pump)
		22 N	
	⑤	8 P_o	Outside circulation pump /zone 1 pump
		23 N	
	⑥	9 P_s	Solar water heater pump
		24 N	
	⑦	10 P_d	DHW pipe pump
		25 N	
	⑧	11 ETH	Reserved
		26 N	
	⑨	12 AHS1	Additional heat source
		27 AHS2	
	⑩	13 DFT1	Reserved
		28 DFT2	
	⑪	14 R1	Reserved
		29 R2	
	⑫	15 SL2	PV panel input signal
		30 SL1	
	⑬	16 AC_CL	Room thermostat input (high voltage)
		31 AC_L1	
		AC HT	

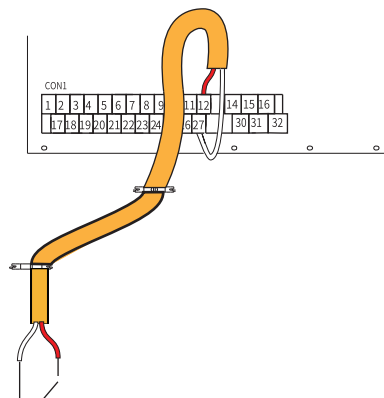
	Code	Print	Connect to
CN 1	①	CL	Room thermostat input (Low voltage)
	②	COM	
	③	HT	
CN 2	①	COM	SG
	②	SG	
CN 3	①	COM	EVU
	②	EVU	
CN 4	Communication terminal		Each module by sequence for CASCADE

	Code	Print	Connect to
U19	①	1 12V	Wired controler
		2 GND	
		3 L_A	
		4 L_B	
	②	6 12V	To outdoor unit
		7 GND	
		8 I_A	
		9 I_B	
	③	5 H1	RS485 port for modbus H1-B,H2-A
		10 H2	

Port provides the control signal to the load. Two kind of control signal ports:

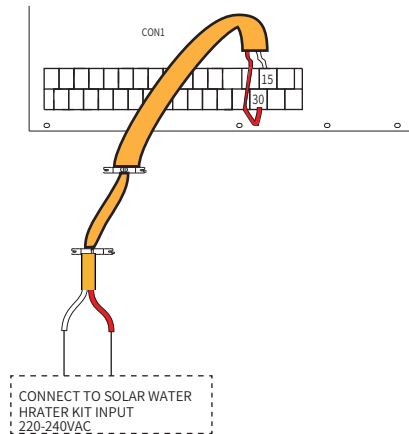
Type 1: Dry contact without voltage.

Type 2: Port provides the signal with 220V voltage. If the current of load is <0.2 A, load can connect to the port directly. If the current of load is ≥0.2 A, an AC contactor is required to be connected for the load.



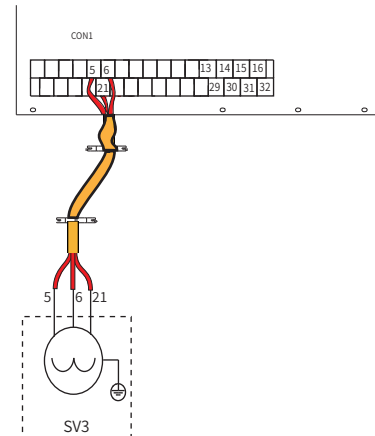
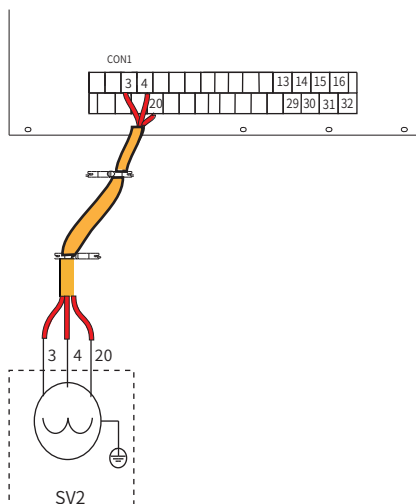
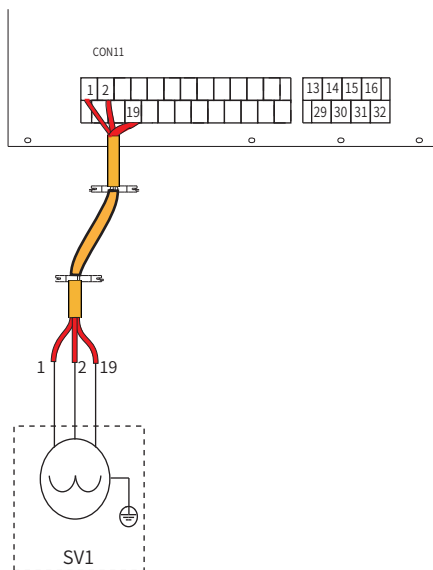
Type 1 For additional heat source control

1) For solar energy input signal:



Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm <sup>2</sup> )	0.75

2) For 3-way valve SV1, SV2 and SV3:

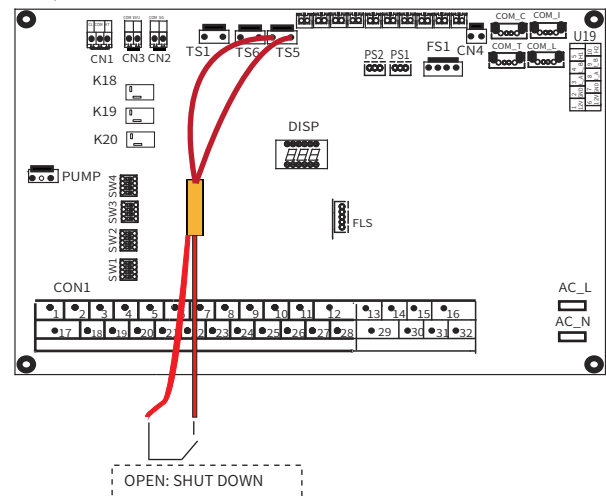


Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm <sup>2</sup> )	0.75
Control port signal type	Type 2

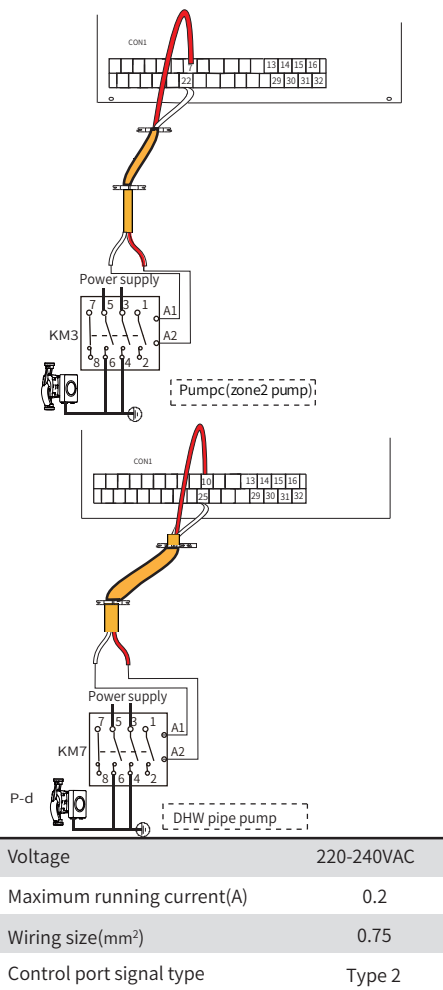
a) Procedure

- Connect the cable to the appropriate terminals as shown in the picture.
- Fix the cable reliably.

3) For remote shut down:



#### 4) For Pumpc and DHW pipe pump:



- a) Procedure
- Connect the cable to the appropriate terminals as shown in the picture. Fix the cable reliably.

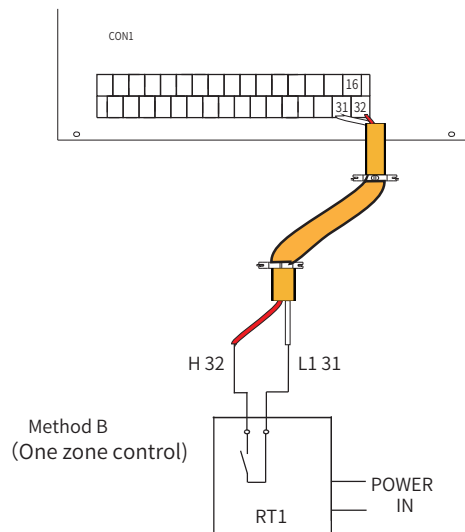
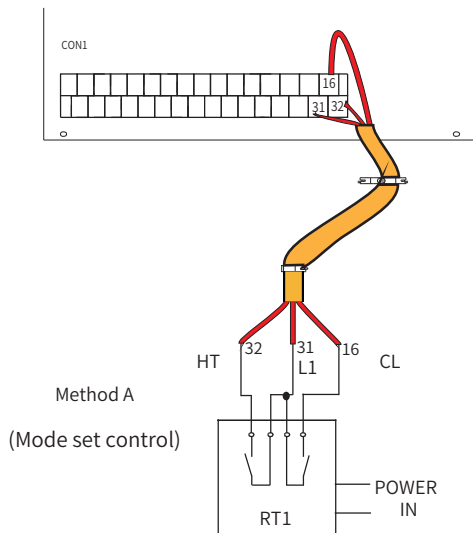
#### 5) For room thermostat:

Room thermostat type 1(High voltage): "POWER IN" provides the working voltage to the RT, don't provide the voltage to the RT connector directly. Port "31 L1" provides the 220V voltage to the RT connector. Port "31 L1" is connected from the unit main power supply port L of 1-phase power supply. Room thermostat type 2(Low voltage) : "POWER IN" provides the working voltage to the RT.

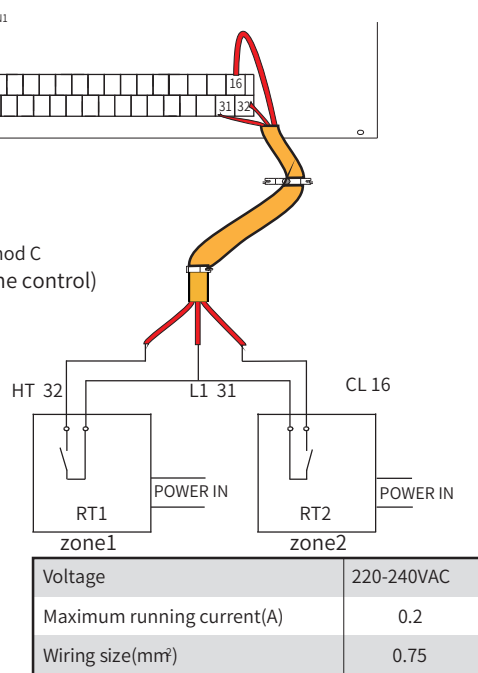
#### NOTE

There are two optional connect method depend on the room thermostat type.

Room thermostat type 1 (High voltage):



#### Method C (Two zone control)



There are three methods for connecting the thermostat cable (as described in the picture above) and it depends on the application.

#### • Method A (Mode set control)

RT can control heating and cooling individually, like the controller for 4-pipe FCU. When the hydraulic module is connected with the external temperature controller, user interface set ROOM THERMOSTAT to MODE SET

A.1 When unit detect voltage is 230VAC between CL and L1, the unit operates in the cooling mode.

A.2 When unit detect voltage is 230VAC between HT and L1, the unit operates in the heating mode.

A.3 When unit detect voltage is 0VAC for both side(CL-L1, HT-L1) the unit stop working for space heating or cooling.

A.4 When unit detect voltage is 230VAC for both side(CL-L1, HT-L1) the unit working in cooling mode.

#### • Method B (One zone control)

RT provide the switch signal to unit. User interface set ROOM THERMOSTAT to ONE ZONE

B.1 When unit detect voltage is 230VAC between H and L1, unit turns on.

B.2 When unit detect voltage is 0VAC between H and L1, unit turns off.

## Method C (Two zone control)

Hydronic Module is connected with two room thermostats, while user interface set ROOM THERMOSTAT to TWO ZONES

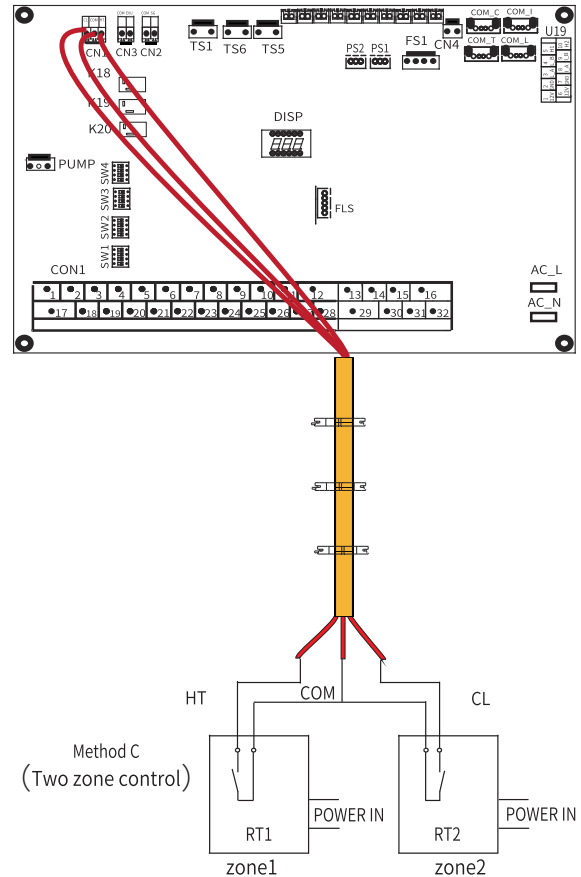
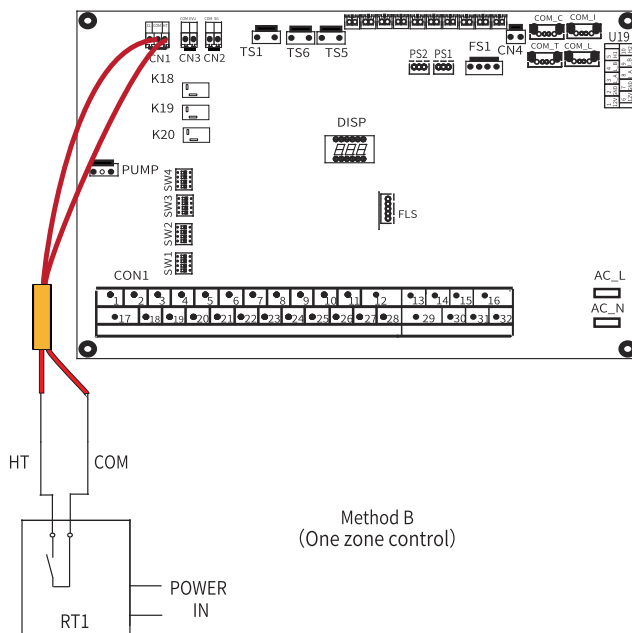
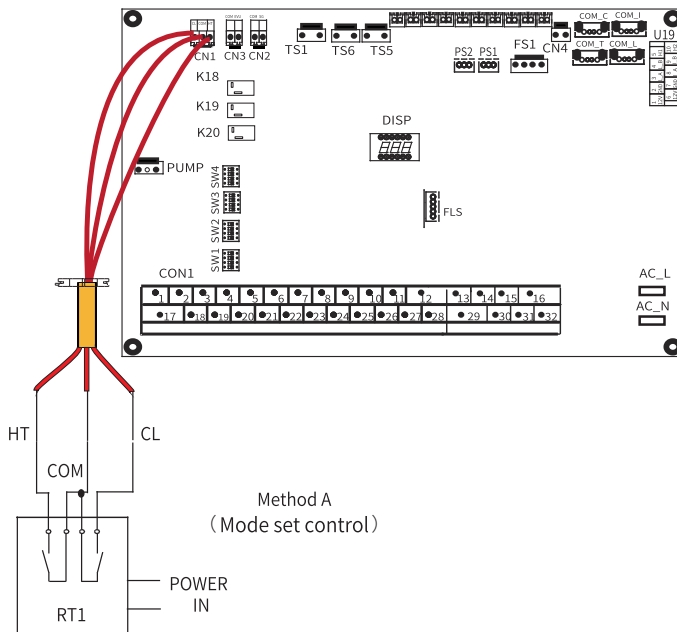
C.1 When unit detect voltage is 230VAC between H and L1, zone1 turns on. When unit detect voltage is 0VAC between H and L1, zone1 turns off.

C.2 When unit detect voltage is 230VAC between C and L1, zone2 turns on. When unit detect voltage is 0VAC between C and L1, zone2 turns off.

C.3 When H-L1 and C-L1 are detected as 0VAC, unit turns off.

C.4 when H-L1 and C-L1 are detected as 230VAC, both zone1 and zone2 turn on.

Room thermostat type2 (Low voltage):



There are three methods for connecting the thermostat cable (as described in the picture above) and it depends on the application.

### • Method A (Mode set control)

RT can control heating and cooling individually, like the controller for 4-pipe FCU. When the hydraulic module is connected with the external temperature controller, user interface set ROOM THERMOSTAT to MODE SET:

A.1 When unit detect voltage is 12VDC between CL and COM, the unit operates in the cooling mode.

A.2 When unit detect voltage is 12VDC between HT and COM, the unit operates in the heating mode.

A.3 When unit detect voltage is 0VDC for both side (CL-COM, HT-COM) the unit stop working for space heating or cooling.

A.4 When unit detect voltage is 12VDC for both side (CL-COM, HT-COM) the unit working in cooling mode.

### • Method B (One zone control)

RT provide the switch signal to unit. User interface set ROOM THERMOSTAT to ONE ZONE:

B.1 When unit detect voltage is 12VDC between HT and COM, unit turns on.

B.2 When unit detect voltage is 0VDC between HT and COM, unit turns off.

### • Method C (Two zone control)

Hydraulic Module is connected with two room thermostats, while user interface set ROOM THERMOSTAT to TWO ZONES:

C.1 When unit detect voltage is 12VDC between HT and COM, zone1 turn on. When unit detect voltage is 0VDC between HT and COM, zone1 turn off.

C.2 When unit detect voltage is 12VDC between CL and COM, zone2 turns on . When unit detect voltage is 0V between CL and COM, zone2 turns off.

C.3 When HT-COM and CL-COM are detected as 0VDC, unit turn off.

C.4 when HT-COM and CL-COM are detected as 12VDC, both zone1 and zone2 turn on.

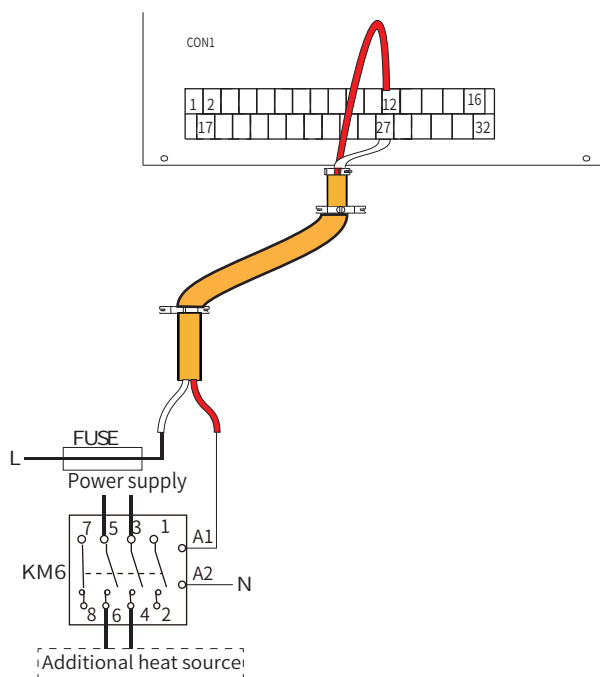
#### NOTE

The wiring of the thermostat should correspond to the settings of the user interface.

Power supply of machine and room thermostat must be connected to the same Neutral Line .

Zone 2 can only operate in heating mode, When cooling mode is set on user interface and zone1 is OFF, “CL” in zone2 closes, system still keeps 'OFF'. While installation, the wiring of thermostats for zone1 and zone2 must be correct.

#### 6) For additional heat source control:



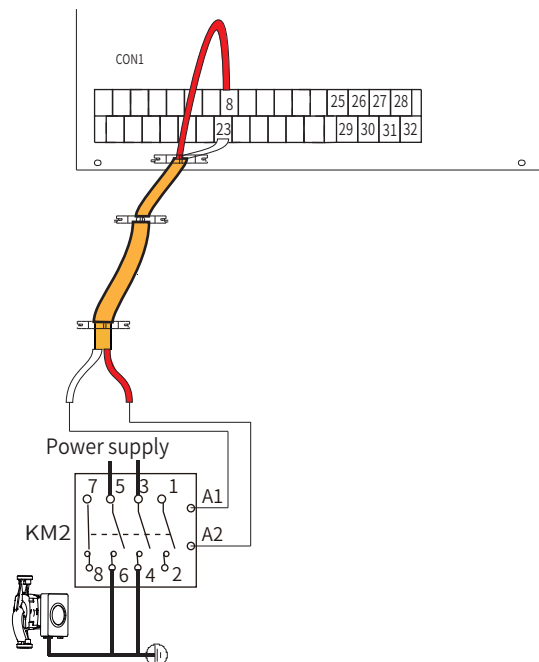
Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm <sup>2</sup> )	0.75
Control port signal type	Type 2

#### WARNING

This part only applies to the unit without an interval backup heater. If there is an interval backup heater in the unit, the hydronic Module should not be connected to any additional heat source.

Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm <sup>2</sup> )	0.75
Control port signal type	Type 1

#### 7) For external circulation pump P\_o:



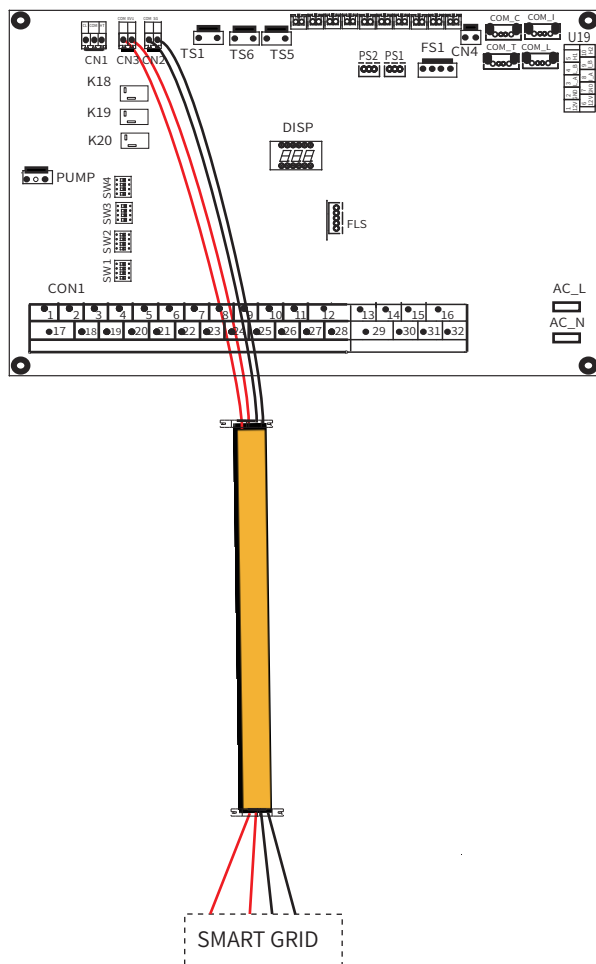
Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm <sup>2</sup> )	0.75
Control port signal type	Type 2

#### a) Procedure

- Connect the cable to the appropriate terminals as shown in the picture.
- Fix the cable with cable ties to the cable tie mountings to ensure stress relief.

## 8) For smart grid:

The unit has smart grid function, there are two ports on PCB to connect SG Ready signal and EVU signal as following:



1. When EVU signal is on, the unit operate as below:

DHW mode turn on, the setting temperature will be changed to 70°C automatically, and the WTH operate as below:  $TW < 69^{\circ}\text{C}$ , the WTH is on,  $TW \geq 70^{\circ}\text{C}$ , the WTH is off. The unit operate in cooling/heating mode as the normal logic.

2. When EVU signal is off, and SG signal is on, the unit operate normally.

3. When EVU signal is off, SG signal is off, the DHW mode is off, and the WTH is invalid, disinfect function is invalid. The max running time for cooling/heating is "SG RUNNIN TIME", then unit will be off.



## 10 START-UP AND CONFIGURATION

The unit should be configured by the installer to match the installation environment (outdoor climate, installed options, etc.) and user expertise.

### CAUTION

It is important that all information in this chapter is read sequentially by the installer and that the system is configured as applicable.

### 10.1 DIP switch settings overview

#### 10.1.1 Function setting

DIP switch SW1, SW2, SW3 and SW4 are located on the main control hydronic module board (see "9.3.1 main control board of hydronic module").

### WARNING

Switch off the power supply before making any changes to the DIP switch settings.

Refer to electrically controlled wiring diagram

### 10.2 Initial start-up at low outdoor ambient temperature

During initial start-up and when water temperature is low, it is important that the water is heated gradually. Failure to do so may result in concrete floors cracking due to rapid temperature change. Please contact the responsible cast concrete building contractor for further details.

### 10.3 Pre-operation checks

Checks before initial start-up.

### DANGER

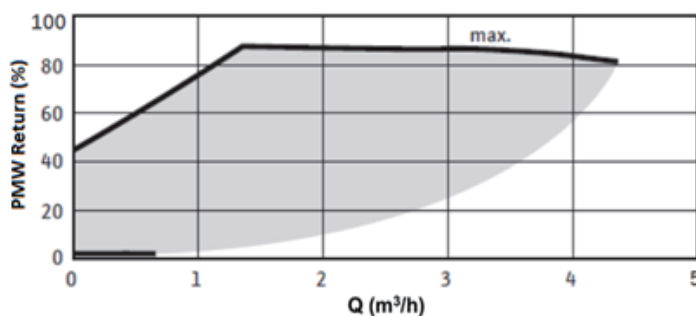
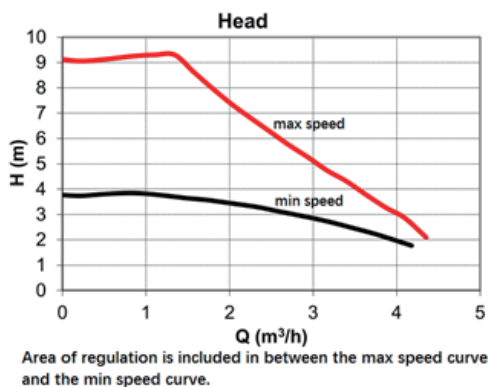
Switch off the power supply before making any connections.

After the installation of the unit, check the following before switching on the circuit breaker:

- Field wiring: Make sure that the field wiring between the local supply panel and unit and valves (when applicable), unit and room thermostat (when applicable), unit and domestic hot water tank. Unit and backup heater kit have been connected according to the instructions described in the chapter 9.7 "Field wiring", according to the wiring diagrams and to local laws and regulations.
- Fuses, circuit breakers, or protection devices: Check that the fuses or the locally installed protection devices are of the size and type specified in 14 "Technical specifications". Make sure that no fuses or protection devices have been bypassed.
- Booster heater circuit breaker: Do not forget to turn on the booster heater circuit breaker (applies only to units with optional domestic hot water tank installed).
- Ground wiring: Make sure that the ground wires have been connected properly and that the ground terminals are tightened.
- Internal wiring: Visually check the switch box for loose connections or damaged electrical components.
- Mounting: Check that the unit is properly mounted, to avoid abnormal noises and vibrations when starting up the unit.
- Damaged equipment: Check the inside of the unit for damaged components or squeezed pipes.
- Refrigerant leak: Check the inside of the unit for refrigerant leakage. If there is a refrigerant leak, call your local dealer.
- Power supply voltage: Check the power supply voltage on the local supply panel. The voltage must correspond to the voltage on the identification label of the unit.
- Air purge valve: Make sure the air purge valve is open (at least 2 turns).
- Shut-off valves: Make sure that the shut-off valves are fully open.

## 10.4 The circulation pump

The relationships between the head and the water flow rated, the PMW Return and the water flow rated are shown in the graph below.



### ⚠ CAUTION

If the valves are at the incorrect position, the circulation pump will be damaged.

### ⚠ DANGER

If it's necessary to check the running status of the pump when unit power on, please do not touch the internal electronic control box components to avoid electric shock.

### Failure diagnosis at first installation

- If nothing is displayed on the user interface, it is necessary to check for any of the following abnormalities before diagnosing possible error codes.
    - Wire Disconnection or wiring error (between the unit and user interface).
    - The fuse on the PCB may be broken.
  - If the user interface shows "P01" as an error code, there is a possibility that there is air in the system, or the water level in the system is less than the required minimum.
  - If the error code E01 is displayed on the user interface, check the wiring between the user interface and unit.
- More error code and failure causes can be found in 13.4 "Error codes".

## 10.5 Field settings

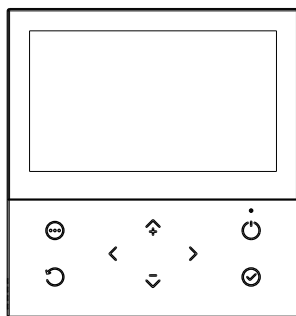
The unit should be configured to match the installation environment (outdoor climate, installed options, etc.) and user demand. A number of field settings are available. These settings are accessible and programmable through Going to "ⓘ" > Installer Level > System parameter" in user interface.

### Procedure

To change one or more field settings, proceed as follows.

### 💡 NOTE

Temperature values displayed on the wired controller (user interface) are in °C.



Keys	Function
	<ul style="list-style-type: none"> <li>Go to the menu structure(on the home page)</li> </ul>
	<ul style="list-style-type: none"> <li>Navigate the cursor on the display</li> </ul>
	<ul style="list-style-type: none"> <li>Navigate in the menu structure</li> </ul>
	<ul style="list-style-type: none"> <li>Adjust settings</li> </ul>
	<ul style="list-style-type: none"> <li>Turn on/off the space heating/cooling operation or DHW mode</li> </ul>
	<ul style="list-style-type: none"> <li>Turn on/or off functions in the menu structure</li> </ul>
	<ul style="list-style-type: none"> <li>Come back to the up level</li> </ul>
	<ul style="list-style-type: none"> <li>Go to the next step when programming a schedule in the menu structure; and confirm a selection to enter in the submenu of the menu structure.</li> </ul>

## About System parameter

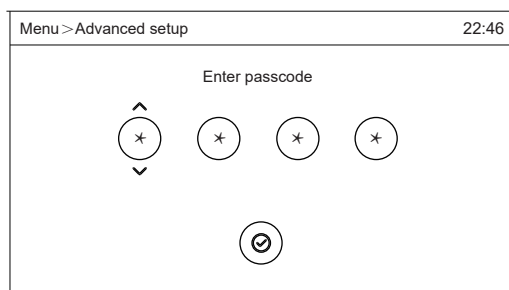
"System parameter" is designed for the installer to set the parameters.

- Setting the composition of equipment.

- Setting the parameters.

How to go to System parameter.

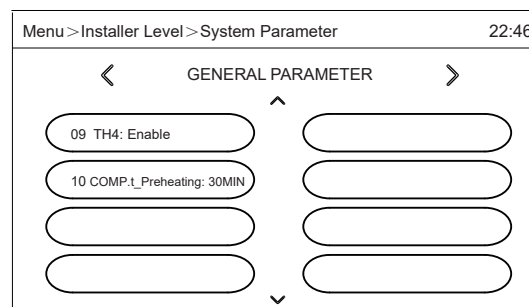
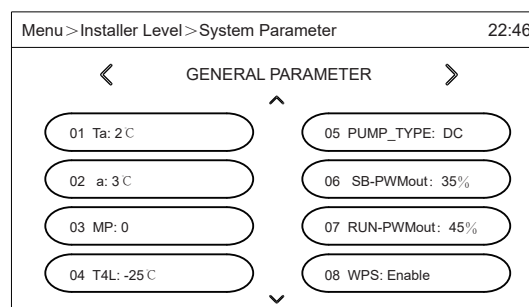
Go to > Installer Level>System parameter.



Press or to navigate and press or to adjust the numerical value, and then press confirm button. The password is 1212.


## 10.5.1 GENERAL PARAMETER

Go to > Installer Level > System parameter > GENERAL PARAMETER. The following pages will be displayed:



### 10.5.2 DHW MODE SET

DHW = domestic hot water

Go to  > Installer Level > System Parameter > DHW MODE SET. The following pages will be displayed.

Menu > Installer Level > System Parameter 22:46

< DHW MODE SET >

01 Tb: 5 C

02 Tx: 65 C

03 Teh: 4 C

04 Td: 30MIN

05 TANK HEATER: Enable

06 P\_d\_DHW: Disable

07 P\_d\_DIS: Enable


08 P\_d\_TIME KEEP: Enable

Menu > Installer Level > System Parameter 22:46

< DHW MODE SET >

09 t\_P\_d\_ON: 5MIN

### 10.5.3 HEAT MODE SET

Go to  > Installer Level > System Parameter > HEAT MODE SET. The following pages will be displayed.

Menu > Installer Level > System Parameter 22:46

< HEATING MODE SET >

01 ZONE1 HEAT-TYPE: 1

02 ZONE2 HEAT-TYPE: 2

03 HIGH TEMP HEAT: Disable

04 HD: Enable

05 I-BUF. HEATER: Disable

06 T4h: 24 C

07 T4g: -10 C

08 H-PUMP: 3

Menu > Installer Level > System Parameter 22:46

< HEATING MODE SET >

09 t\_T4\_FRESH\_H: 30MIN


10 T4\_ha1: -5 C

11 T4\_ha2: 7 C

12 SPTCh\_set1: 35 C

13 SPTCh\_set2: 28 C

### 10.5.4 COOL MODE SET

Go to  > Installer Level > System Parameter > COOLING MODE SET. The following pages will be displayed.

Menu > Installer Level > System Parameter 22:46

< COOLING MODE SET >

01 ZONE1 COOL-TYPE: 0

02 ZONE2 COOL-TYPE: 0

03 C-Pump: 0

04 t\_T4\_FRESH\_C: 30MIN


05 T4\_ca1: 25 C

06 T4\_ca2: 35 C

07 SPTcc\_set1: 16 C

08 SPTcc\_set2: 10 C

### 10.5.5 AUTO MODE SET

Go to  > Installer Level > System Parameter > AUTO MODE SET. The following pages will be displayed.

Menu > Installer Level > System Parameter 22:46

< AUTO MODE SET >

01 AUTO HEAT MAX T4: 17 C

02 AUTO COOL MIN T4: 25 C

### 10.5.6 TEMP. TYPE SET

#### About TEMP. TYPE SET

The TEMP. TYPE SETTING is used for selecting whether the water flow temperature or room temperature is used to control the ON/OFF of the heat pump.

When ROOM TEMP. is enabled, the target water flow temperature will be calculated from climate-related curves.

Go to **☰** > Installer Level > System Parameter > TEMP TYPE SET. The following pages will be displayed.

Menu > Installer Level > System Parameter 22:46

TEMP TYPE SET

01 ZONE TYPE: 0

02 SINGLE ZONE OPERATION : 0

03 DUAL ZONE OPERATION : 0

10.5.7 ROOM THERMOSTAT SET

The ROOM THERMOSTAT SET is used to set whether the room thermostat is available.

How to set the ROOM THERMOSTAT SET.

Go to **☰** > Installer Level > System Parameter > ROOM THERMOSTAT SET. The following pages will be displayed.

Menu > Installer Level > System Parameter 22:46

ROOM THERMOSTAT SET

01 ROOM THERMOSTAT: 0

02 SINGLE ZONE RT SET : 0

03 DUAL ZONE RT SET : 0

NOTE

ROOM THERMOSTAT =0 (NON), no room thermostat.

ROOM THERMOSTAT =1 (MODE SET), the wiring of room thermostat should follow method A.

ROOM THERMOSTAT =2 (ONE ZONE), the wiring of room thermostat should follow method B.

ROOM THERMOSTAT =3 (TWO ZONES), the wiring of room thermostat should follow method C (refer to 9.7.6 "Connection for other components/- For room thermostat")

10.5.8 HMI ROOM SENSOR CONTROL SET

HMI ROOM SENSOR CONTROL SET is set the difference between real room temperature and desired room temperature. If the unit attained the difference, it will shut down.

How to set the HMI ROOM SENSOR CONTROL SET

Go to **☰** > Installer Level > System Parameter > HMI ROOM SENSOR CONTROL SET. The following pages will be displayed.

Menu > Installer Level > System Parameter 22:46

HMI ROOM SENSOR CONTROL SET

01 dTro: 1.0 C

10.5.9 BUFFER TANK SET

BUFFER TANK SET is to enable the temperature sensor TE1 installed on buffer tank in cascade application.

How to set the BUFFER TANK SET .

Go to **☰** > Installer Level > System Parameter > BUFFER TANK SET. The following pages will be displayed

Menu > Installer Level > System Parameter 22:46

BUFFER TANK SET

01 TE1: Disable

10.5.10 MIXING VALVE SET

MIXING VALVE SET is to set the parameters which adjust the opening of three-valve SV3 installed on Zone 2

How to set the MIXING VALVE SET.

Go to **☰** > Installer Level > System Parameter > MIXING VALVE SET. The following pages will be displayed

Menu > Installer Level > System Parameter 22:46

MIXING VALVE SET

01 TZ2: Disable

05 dT\_SV3\_OFF: 0 C

02 t\_SV3\_ON: 5MIN

03 t\_SV3\_OFF: 2MIN

04 dT\_SV3\_ON: 5 C

### 10.5.11 OTHER HEATING SOURCE SET

The OTHER HEATING SOURCE SET is used to set the parameters of the backup heater, additional heating sources and solar energy kit.

How to enter the TEMP. TYPE SETTING.

Go to **☰** > Installer Level > System Parmeter > OTHER HEAT SOURCE SET. The following pages will be displayed

### 10.5.12 SPECIAL FUNCTION SET

SPECIAL FUNCTION SET is to set some functions that are seldom used in comparison with normal functions.

How to enter the SPECIAL FUNCTION SET.

Go to **☰** > Installer Level > System Parmeter > SPECIAL FUNCTION SET. The following pages will be displayed

### 10.5.13 WEATHER TEMPERATURE CURVE SET

The function is to set the desired weather compensation temperature curve.

How to enter the WEATHER TEMPERATURE CURVE SET

Go to **☰** > Installer Level > System Parmeter > WEATHER TEMPERATURE CURVE SET The following pages will be displayed

A-C: Zone1 Cooling B-C: Zone 2 Cooling  
A-H: Zone1 Heating B-H: Zone2 Heating

### 10.5.14 CONNECTIONS

The function is used to enable or disable other heat source(IPH/WTH/AHS/Solar thermal) and Smart Grid.

Go to **☰** > Installer Level > Connections

The following pages will be displayed

### 10.5.15 AUTO RESTART

This function is used to select whether or not to reapply the user interface settings from before the power failure when power is restored to the unit.

Go to **☰** > Installer Level > AUTO RESTART.

The following pages will be displayed

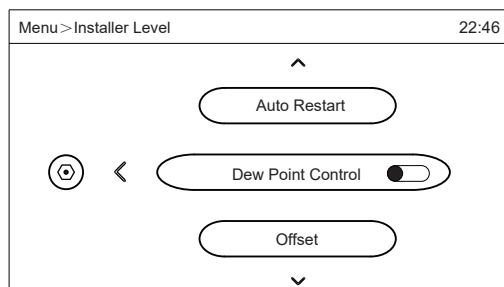
Press cancel button to abort, confirm button to enable "Auto Restart"

## 10.5.16 Dew Point Control

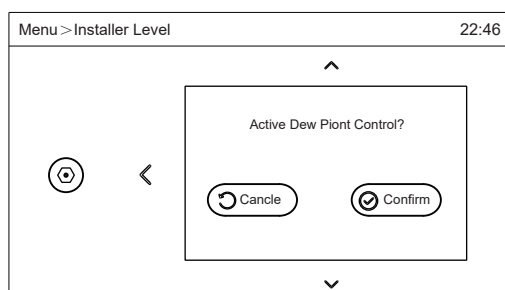
This function is only for cooling by means of floor-type terminal equipment to prevent condensation.

Go to > Installer Level > Dew Point Control.

The following page will be displayed:



Press Up or Down button to select "Dew Point Control", and then press Confirm button, the following page will be displayed:



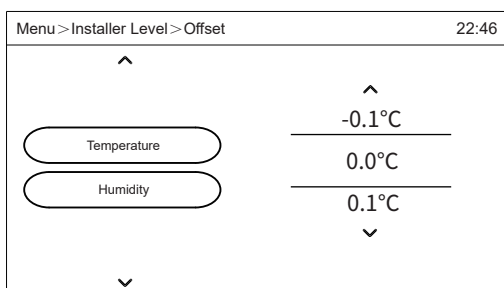
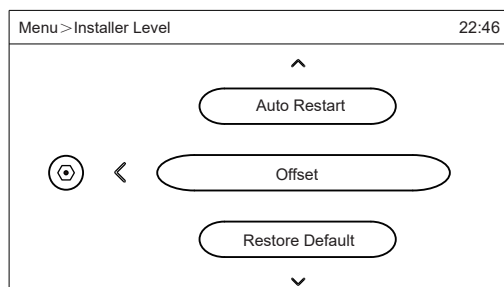
Press Cancel button to disable dew point control. Press Confirm button to enable the function. After enabling "Dew Point Control", home page and "user control>Zone 1, Zone 2,DHW" page will display the dew point "DP: XX °C" which is the desired leaving water temperature.

## 10.5.17 Offset

The function is used to correct room temperature and humidity.

Go to > Installer Level > Offset

The following pages will be displayed



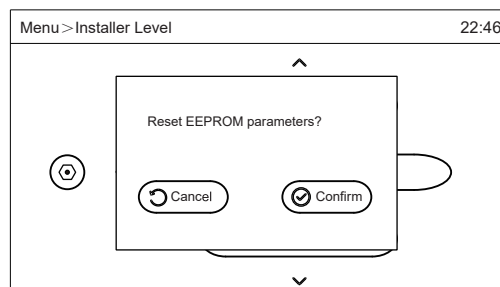
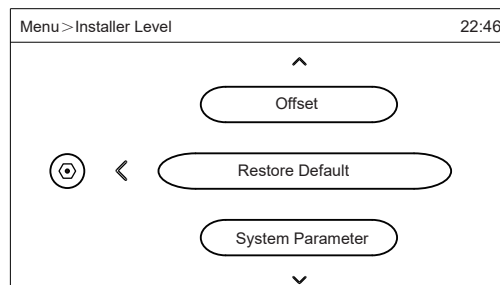
## 10.5.18 RESTORE DEFAULT

Restore Default is used to restore all the parameters set in the user interface to the factory setting.

How to enter the Restore Default.

Go to > Installer Level> Restore Default

The following pages will be displayed.

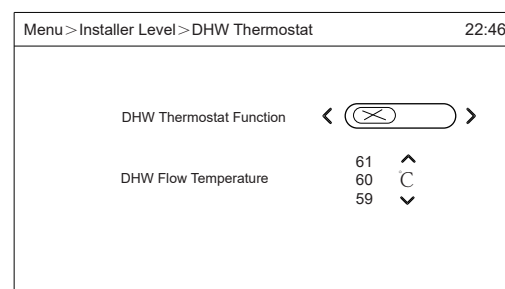


Press cancel button to abort,confirm button to reset all EEPROM parameters to the values to be set in the factory

## 10.5.19 DHW Thermostat

The function is only for HP using a customized hot water thermostat  
Go to > Installer Level > DHW Thermostat, and then press ""

the following page will be displayed



1st item "DHW Thermostat Function": means disabling the function; means enabling the function.

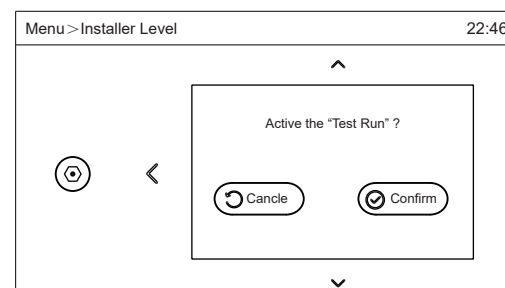
Press left or right button to select or , the default is .

2nd item "DHW Flow Temperature" is to set the desired HP leaving water temperature, the range is 25 °C-75 °C, the default is 60 °C.

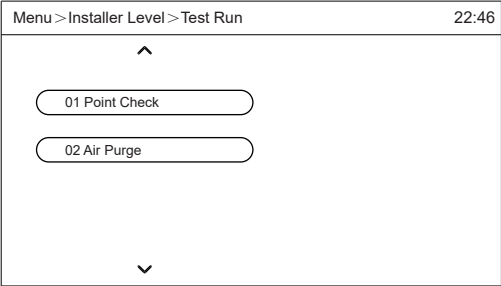
## 10.5.20 Test Run

The function is used to check correct operation of the valves, circulation pump, and to take an air purging of the water system.

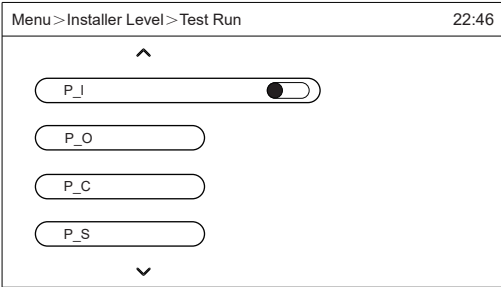
Go to > Installer Level > Test Run, and then press "", The following page will be displayed



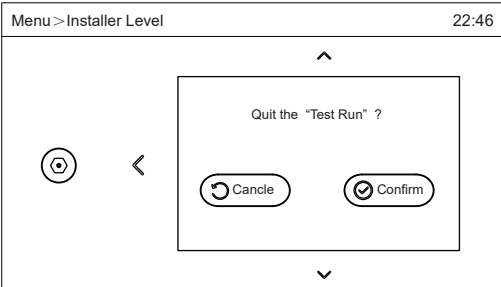
Press “⊙” to go to the function “Test Run”, the following page will be displayed.



Press up and down buttons to select 1st item“01 Point Check”and then press “⊙” the following page will be displayed.



Press up and down buttons to select the pumps or valves and then press “⊙” to switch on or off choiced parts.  
2nd item “ Air Purge”is to drive air out of the water system.  
If you want to exit“ Test Run”, you must press“⊙”continuously until the screen displays the following page, and press“⊙”to exit the function.

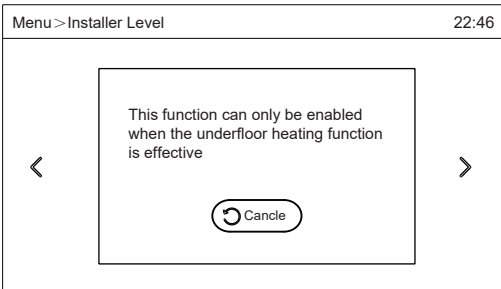


For cascade application, you must firly select the module to be tested, and then repeat previous operations.

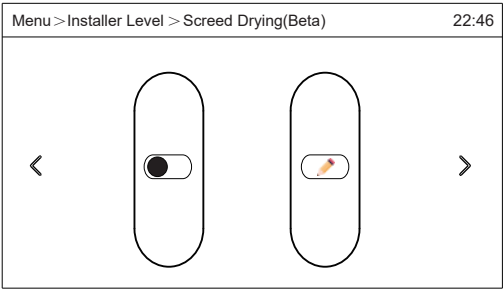
### 10.5.21 Screed Drying(Beta)

This function is to remove large amounts of water stored inside the floor to avoid warping or rupturing during floor heating operation.  
Go to ☺ > Installer Level > Screed Drying(Beta) .

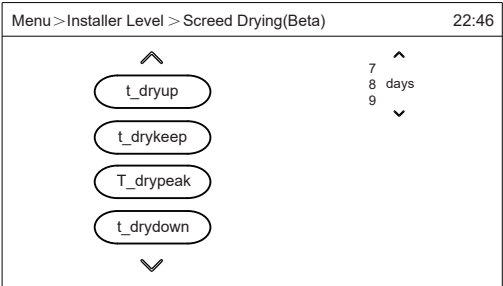
Before going into the function you must set the terminal device type to be FLH, or else a reminder page will appear :



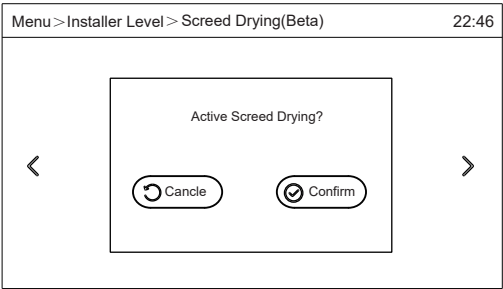
If the device type is FLH, the following page will be displayed:



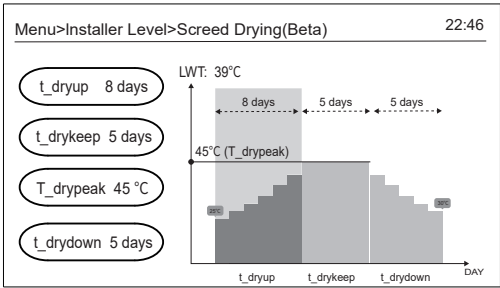
The right icon with a pen is to set desired time and temperature:



The left icon is to disable or enable Screed Drying:



Press Cancel button to disable the function. Press Confirm button to enable it and the following page will appear:




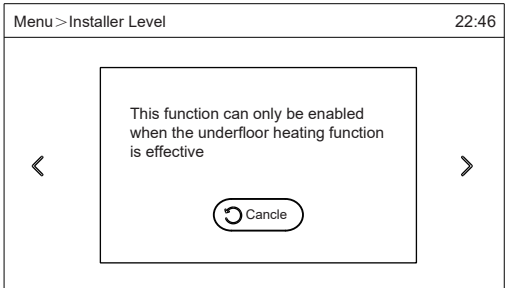
The page gives desired time and desired temperature during floor drying up and the current status.

### 10.5.22 Floor Preheating(Beta)

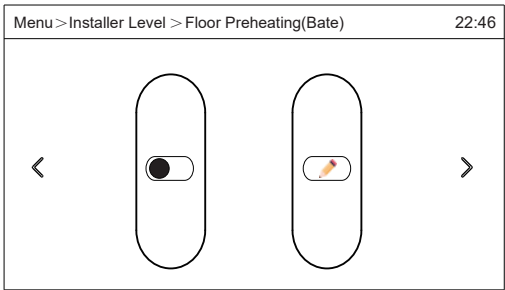
This function is to remove large air stored inside the floor which can cause malfunctions during heating pump operation.



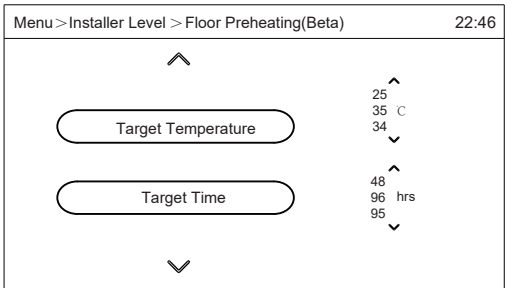
Go to  > Installer Level > Floor Preheating(Beta) .  
Before going into the function you must set the terminal device type to be FLH, or else a reminder page will appear:



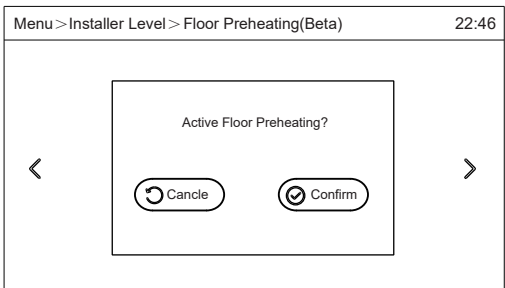
If the device type is FLH, the following page will be displayed:



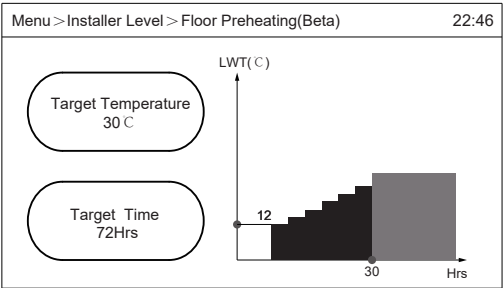
The right icon with a pen is to set desired time and temperature:



The left icon is to disable or enable Floor Preheating:



Press Cancel button to disable the function. Press Confirm button to enable it and the following page will appear:



The page gives desired time and desired temperature during floor preheating and the current status.

The parameters related to this chapter are shown in the table below.

Order number	Code	State	Default	Minimum	Maximum	Setting interval	Unit
1.1	Ta	Temperature difference between target LWT and real LWT for startup heat pump	2	1	5	1	°C
1.2	a	DeltaT between the target LWT and real LWT for restarting	3	1	10	1	°C
1.3	Mp	Select priority mode	0	0	2	1	/
1.4	T4L	Minimum ambient temp. of compressor operation for heating and hot water	-25	-40	-21	1	°C
1.5	PUMP_TYPE	Internal DC pump type	DC	DC	AC	1	/
1.6	SB-PWMout	Standby DC pump output	35	10	100	1	%
1.7	RUN-PWMout	Minimum DC pump operation output	40	30	100	1	%
1.8	WPS	Enable or disable water pressure detect, 1=Enable, 0=Disable	1	0	1	1	/
1.9	TH4	Enable or disable chassis heater, 1=Enable, 0=Disable	1	0	1	1	/
2.1	Tb	Temperature difference between target hot water and real tank water for startup heat pump	5	2	15	1	°C
2.2	Tx	Target disinfect temperature	65	55	75	1	°C
2.3	Teh	Ambient temperature of tank heater startup	4	-10	40	1	°C
2.4	Td	Disinfect running time	30	20	120	1	MIN
2.5	TANK HEATER	Enable or disable tank heater, NON=Disable, YES=Enable	YES	NON	YES	/	/
2.6	P_d_DHW	Enable or disable tank pump control, NON=Disable, YES=Enable	NON	NON	YES	/	/
2.7	P_d_DIS	Enable or disable tank pump in disinfect mode, NON=Disable, YES=Enable	YES	NON	YES	/	/
2.8	P_d_TIME KEEP	Enable or disable tank pump operation timing, NON=Disable, YES=Enable	YES	NON	YES	/	/
2.9	t_P_d_on	Tank pump ON time	5	5	120	1	MIN
3.1	ZONE A HEAT-TYPE	Zone A heating terminal device type, 0=FCU, 1=RAD, 2=FLH	RAD	FCU	FLH	1	/
3.2	ZONE B HEAT-TYPE	Zone B heating terminal device type, 0=FCU, 1=RAD, 2=FLH	FLH	FCU	FLH	1	/
3.3	HIGH TEMP HEAT OFF	Enable or disable high temperature shutdown, 0=Disable, 1=Enable	0	0	1	1	/
3.4	HD	0= Disable IPH, 1=Enable IPH	1	0	1	1	/
3.5	T4h	Maximum shutdown T4 temperature	24	10	30	1	°C
3.6	T4g	Ambient temperature of Enabling IPH or AHS	-10	-20	20	1	°C
3.7	H-PUMP	DC pump standby speed for heating	3	0	3	1	/
3.8	t_T4_FRESH_H	Refresh time of climate curve for heating	30	30	360	10	MIN
3.9	T4_ha1	Auto climate curve ambient temp. 1 for heating	-5	-25	35	1	°C
3.10	T4_ha2	Auto climate curve ambient temp. 2 for heating	7	-25	35	1	°C
3.11	SPTch_set1	Auto climate curve target temp. 1 for heating	35	25	60	1	°C
3.12	SPTch_set2	Auto climate curve target temp. 2 for heating	28	25	60	1	°C
4.1	ZONE A COOL TYPE	Zone A cooling terminal device type, 0=FCU, 1=RAD, 2=FLH	FCU	FCU	FLH	1	/
4.2	ZONE B COOL TYPE	Zone B cooling terminal device type, 0=FCU, 1=RAD, 2=FLH	FCU	FCU	FLH	1	/
4.3	C-Pump	DC pump standby speed for cooling	3	0	3	1	/
4.4	t_T4_FRESH_C	Refresh time of climate curve for cooling	30	30	360	10	MIN
4.5	T4_ca1	Auto climate curve ambient temp. 1 for cooling	25	-5	46	1	°C
4.6	T4_ca2	Auto climate curve ambient temp. 2 for cooling	35	-5	46	1	°C
4.7	SPTcc_set1	Auto climate curve target temp. 1 for cooling	16	5	25	1	°C
4.8	SPTcc_set2	Auto climate curve target temp. 2 for cooling	10	5	25	1	°C
5.1	AUTO HEAT MAX T4	Maximum ambient temp. of auto-heating mode	17	10	17	1	°C
5.2	AUTO COOL MIN T4	Minimum ambient temp. of auto-cooling mode	25	20	29	1	°C
6.1	ZONE TYPE	Two zones, 0 = single zone, 2 = dual zone	1	1	2	1	/
6.2	SINGLE ZONE OPERATION	Single zone target temperature type	0	0	3	1	/
6.3	DUAL ZONE OPERATION	Dual zone target temperature type (2 and 6 for reserved)	0	0	7	1	/

Order number	Code	State	Default	Minimum	Maximum	Setting interval	Unit
7.1	ROOM THERMOSTAT	Room thermostat type, 0=NON=without room thermostat, 1=MODE SET,2=ONE ZONE,3=TWO ZONES	0	0	3	1	/
7.2	SINGLE ZONE RT SET	Target temperature type on ROOM THERMOSTAT = MODE SET or ONE ZONE	0	0	1	1	/
7.3	DUAL ZONE RT SET	Target temperature type on ROOM THERMOSTAT = TWO	0	0	3	1	/
8.1	dTro	dTro is the bias of room temperature to start and stop the heat pump, when dTro is set 1 and room target is 20degreeC, which means to reach 20degreeC to be standby and less than 19degreesC to restart.	1	0.5	3	0.5	°C
9.1	TE1	Enable or disable TE1, NON=Disable, YES=Enable	NON	NON	YES	/	/
10.1	TZ2	Enable or disable TZ2, NON=Disable, YES=Enable	NON	NON	YES	/	/
10.2	t_SV3_ON	SV3 on time	5	0	0	1	MIN
10.3	t_SV3_OFF	SV3 off time	2	0	120	1	MIN
10.4	dT_SV3_ON	Temperature difference for SV3 ON	5	0	10	1	°C
10.5	dT_SV3_OFF	Temperature difference for SV3 OFF	0	-10	0	1	°C
11.1	dTso	Temperature difference for startup solar pump	10	2	20	1	°C
11.2	tso	Solar pump running time	30	0	90	1	MIN
11.3	Solar_Type	Solar type, 0=NON,1=Solar temp. sensor, 2=SL1SL2	0	0	2	1	/
11.4	AHS_Type	0=AHSDisable,1=AHS with only heating, 2=AHS both heating and DHW	0	0	2	1	/
12.1	t_SG_Block	Smart Grid block time	2	0	24	1	Hr
12.2	IP	Address code	251	1	255	1	/
12.3	Energy Information	Enable: to display ; Disable: not to display	Enable	Enable	Disable	/	/

The function description in the table below.

Previous No.	parameter	value	function
1.3	Mp	0	hot water priority
		1	space heating/cooling priority
		2	Preempty
1.4	T4L		if ambient temperature less than T4L,do not turn on heat pump, but can turn on backup heater or AHS
1.5	PUMP_TYPE		AC means internal water pump is alternating current DC means internal water pump is PWM
1.6	SB-PWMout		means PWM pump running speed when heat pump is standby mode in which the compressor shuts down because of getting a target temperature
1.7	RUN-PWMout		PWM pump must not operate below this speed when PWM pump is in speed adjustment
12.2	IP		heat pump address code in group controller
9.1	TE1		to activate temperature sensor mounted on top of buffer tank in cascade mode, but the function is for reserved
10.1	TZ2		to activate Zone 2 inlet temperature sensor function to get a low zone 2 target water temperature

Previous No.	parameter	value	function
2.3	Teh		if ambient temerature is higher than Teh, heat pump can't turn on hot water tank heater automatically unless manully turn on tank heater
3.3	HIGH TEMP HEAT OFF		enable or disable the function: don't turn on heat pump if ambient temperature is higher than T4h in heating mode
3.5	T4h		
3.7	H-PUMP	0-State 1; 1-State 2; 2-State 3; 3-State 4	When the unit switches off in cooling or heating mode, the running state of DC pump can be set by the wire controller: State 1: the cycle is to be on 1 minute at the minimum output (30%) first, and then off 3 minutes State 2: the cycle is to be on 1 minute at the minimum output (30%) first, and then off 10 minutes State 3: the cycle is to be on 2 minutes at the minimum output(30%) first, and then off 15 minutes State 4(default state): to keep running at the minimum output (30%).
3.8	t_T4_FRESH_H		the controller refresh the ambient temperature by the time interval (set by t_T4_FRESH_H) when use weather temperatue curve function in heating mode
4.3	C-Pump		to refer to the 3.7 H-PUMP
4.4	t_T4_FRESH_C		the controller refresh the ambient temperature by the time interval (set by t_T4_FRESH_C) when use weather temperatue curve function in cooling mode
6.2	SINGLE ZONE OPERATION	0=set water temp.(manually adjustment) 1=set water temp.(weather curve temp.) 2=for reserved 3=set room temp.(real weather curve temp.)	use it to set target temperature type when 6.1 ZONE TYPE=ONE(only one zone)

Previous No.	parameter	value	function
6.3	DUAL ZONE OPERATION	1)=0: Zone 1 and Zone 2 are both water temp.(manually adjustment) 2)=1:Zone 1 is water temp.(manually adjustment); Zone 2 is water temp.(weather curve temp.) 3)=2: for reserved 4)=3: Zone 1 is water temp.(manually adjustment);Zone 2 is room temp.(real weather curve temp.) 5)=4: Zone 1 is water temp.(real weather curve temp.); Zone 2 is water temp.(manually adjustment) 6)=5: Zone 1 and Zone 2 are both weather curve temp. 7)=6: for reserved 8)=7: Zone 1 is weather curve temp. Zone 2 is room temp.(real weather curve temp.).	use it to set target temperature type when 6.1 ZONE TYPE=TWO(two zones)

## 11 Commisioning AND FINAL CHECKS

The installer is obliged to verify correct operation of unit after installation.

### 11.1 Final checks

Before switching on the unit, read following recommendations:

- When the complete installation and all necessary settings have been carried out, close all front panels of the unit and refit the unit cover.
- The service panel of the switch box may only be opened by a licensed electrician for maintenance purposes.

#### NOTE

That during the first running period of the unit, required power input may be higher than stated on the nameplate of the unit. This phenomenon originates from the compressor that needs elapse of a 50 hours run in period before reaching smooth operation and stable power consumption.

## 12 MAINTENANCE AND SERVICE

In order to ensure optimal availability of the unit, a number of checks and inspections on the unit and the field wiring have to be carried out at regular intervals.

This maintenance needs to be carried out by your local technician.

#### DANGER

##### ELECTRIC SHOCK

- Before carrying out any maintenance or repair activities, switch off the power supply on the supply panel.
- Do not touch any live for at least 10 minutes after the power supply is turned off.
- Note that the crank heater of the compressor may operate even in standby mode.
- Some sections of the electric component box may be hot.
- Avoid touching any conductive parts.
- Avoid touching any conductive parts.

Do not rinse the unit as it may cause electric shock or fire.

Do not leave the unit unattended when the service panel is removed.

The following checks must be performed at least once a year by qualified person.

- Water pressure  
Check the water pressure, if it is below 1 bar, fill water to the system.
- Water filter  
Clean the water filter.
- Water pressure relief valve  
Check for correct operation of the pressure relief valve by turning the black knob on the valve counter-clockwise:  
-If you do not hear a clacking sound, contact your local dealer.  
-In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.
- Pressure relief valve hose  
Check that the pressure relief valve hose is positioned appropriately to drain the water.
- Backup heater vessel insulation cover  
Check that the backup heater insulation cover is fastened tightly around the backup heater vessel.
- Domestic hot water tank pressure relief valve (field supply) Applies only to installations with a domestic hot water tank. Check for correct operation of the pressure relief valve on the domestic hot water tank.

- Domestic hot water tank booster heater  
Applies only to installations with a domestic hot water tank. It is advisable to remove lime buildup on the booster heater to extend its life span, especially in regions with hard water. To do so, drain the domestic hot water tank, remove the booster heater from the domestic hot water tank and immerse in a bucket (or similar) with lime-removing product for 24 hours.
- Unit switch box  
-Carry out a thorough visual inspection of the switch box and look for obvious defects such as loose connections or defective wiring.  
-Check for correct operation of contactors with an ohm meter. All contacts of these contactors must be in open position.
- Use of glycol (Refer to 9.4.4 "Water circuit anti-freeze protection") Document the glycol concentration and the pH-value in the system at least once a year.  
-A PH-valve below 8.0 indicates that a significant portion of the inhibitor has been depleted and that more inhibitor needs to be added.
- -When the PH-valve is below 7.0 then oxidation of the glycol occurred, the system should be drained and flushed thoroughly before severe damage occurs.

Make sure that the disposal of the glycol solution is done in accordance with relevant local laws and regulations.

## 13 TROUBLE SHOOTING

This section provides useful information for diagnosing and correcting certain troubles which may occur in the unit.

This troubleshooting and related corrective actions may only be carried out by your local technician.

### 13.1 General guidelines

Before starting the troubleshooting procedure, carry out a thorough visual inspection of the unit and look for obvious defects such as loose connections or defective wiring.

#### WARNING

When carrying out an inspection on the switch box of the unit, always make sure that the main switch of the unit is switched off.

When a safety device was activated, stop the unit and find out why the safety device was activated before resetting it. Under no circumstances can safety devices be bridged or changed to a valve other than the factory setting. If the cause of the problem cannot be found, call your local dealer.

If the pressure relief valve is not working correctly and is to be replaced, always reconnect the flexible hose attached to the pressure relief valve to avoid water dripping out of the unit!

#### NOTE

For problems related to the optional solar water heater kit for domestic water heating, refer to the troubleshooting in the Installation and owner's manual for that kit.

## 13.2 General symptoms

Symptom 1: The unit is turned on but the unit is not heating or cooling as expected

POSSIBLE CAUSES	CORRECTIVE ACTION
The water flow is too low.	<ul style="list-style-type: none"> <li>• Verify that all shut-off valves of the water circuit are in the correct position.</li> <li>• Check if the water filter is plugged.</li> <li>• Ensure that there is no air in the water system.</li> <li>• Check the water pressure, which should be greater than 1 bar (for cold water).</li> <li>• Ensure that the expansion vessel is not damaged.</li> <li>• Verify that the resistance in the water circuit is not too high for the pump to handle.</li> </ul>
The water volume in the installation is too low.	Make sure that the water volume in the installation is above the minimum required value (refer to "9.4.2 Water volume and sizing expansion vessels").

Symptom 2: Pump is making noise (cavitation)

POSSIBLE CAUSES	CORRECTIVE ACTION
There is air in the system.	Purge air.
Water pressure at pump inlet is too low.	<ul style="list-style-type: none"> <li>• Check the water pressure. The water pressure must be &gt; 1 bar (water is cold).</li> <li>• Check that the expansion vessel is not broken.</li> <li>• Check that the setting of the pre- pressure of the expansion vessel is correct (refer to "9.4.2 Water volume and sizing expansion vessels").</li> </ul>

Symptom 3: The water pressure relief valve opens

POSSIBLE CAUSES	CORRECTIVE ACTION
The expansion vessel is broken.	Replace the expansion vessel.
The filling water pressure in the installation is higher than 0.3MPa.	Make sure that the filling water pressure in the installation is about 0.10~0.20MPa (refer to "9.4.2 Water volume and sizing expansion vessels").

Symptom 4: The water pressure relief valve leaks

POSSIBLE CAUSES	CORRECTIVE ACTION
Dirt is blocking the water pressure relief valve outlet.	<p>Check for correct operation of the pressure relief valve by turning the red knob on the valve counter clockWise:</p> <ul style="list-style-type: none"> <li>· If you do not hear a clacking sound, contact your local dealer.</li> <li>· In case the water keeps running out of the unit, close both the water inlet and outlet shut-off valves first and then contact your local dealer.</li> </ul>





## 13.4 Error codes

When the protection is activated, an error code(which doesn't include external failure) will be displayed on the user interface.

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

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

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

Fault number	Fault name	Failure analysis	Diagnosis method	Solution
P01	Water flow protection	<ol style="list-style-type: none"> <li>1. Lack of water in water system.</li> <li>2. Water flow switch is fault.</li> <li>3. Water system is blocked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the valve of water replenishing is off.</li> <li>2. Check whether the water flows witch is damage.</li> <li>3. Check whether the Y shape filter is blocked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Open the valve.</li> <li>2. Change the water flows witch.</li> <li>3. Clean or change the filternet.</li> </ol>
P02	High pressure protection	<ol style="list-style-type: none"> <li>1. Water flow is over low.</li> <li>2. High pressure switch is fault.</li> <li>3. Refrigerant system is blocked.</li> <li>4. EXV is locked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether there is water shortage or insufficient pump flow;</li> <li>2. Check whether the high pressure switch is damage.</li> <li>3. Check whether the refrigerant system is blocked.</li> <li>4. Check whether there is EXV reset sound when the unit is standby, and power on or off.</li> </ol>	<ol style="list-style-type: none"> <li>1. Refill water or Add an additional water pump.</li> <li>2. Change high pressure switch.</li> <li>3. Change the filter of refrigerant system.</li> <li>4. Change the EXV.</li> </ol>
P03	Low pressure protection	<ol style="list-style-type: none"> <li>1. Lack of refrigerant.</li> <li>2. Refrigerant system is blocked</li> <li>3. The unit is not running in regulations operating condition.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the refrigerant system is leakage.</li> <li>2. Check whether the filter in refrigerant system is blocked.</li> <li>3. Check whether the outdoor ambient and the inlet water temperature is normal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the leakage point.</li> <li>2. Change the filter of refrigerant system.</li> <li>3. If the ambient temperature and water temperature is too high or low, the unit will stop.</li> </ol>
P04	Condenser temperature over-heat protection	<ol style="list-style-type: none"> <li>1. Airflow of outdoor fan is insufficient.</li> <li>2. Condenser is too dirty.</li> <li>3. The temperature sensor (T3) is fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether there is any obstacle which is preventing the airflow.</li> <li>2. Check whether the condenser is too dirty.</li> <li>3. Check whether the condenser pipe temperature sensor(T3) is normal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean the vents</li> <li>2. Clean the condenser.</li> <li>3. Replace the temperature sensor.</li> </ol>
P05	Discharge temperature protection	<ol style="list-style-type: none"> <li>1. Lack of refrigerant.</li> <li>2. Discharge temperature sensor is fault.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the refrigerant system is leakage.</li> <li>2. Check whether the discharge temperature sensor is normal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the leakage point.</li> <li>2. Replace the temperature sensor</li> </ol>
P06	Anti-freezing protection of leaving water	<ol style="list-style-type: none"> <li>1. Water flow is too low.</li> <li>2. Heat-exchanger is blocked.</li> <li>3. Y shape filter in water system is blocked.</li> <li>4. Load is too low.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether there is some air in water circuit system.</li> <li>2. Check whether the heat-exchanger is blocked.</li> <li>3. Check whether the Y shape filter is blocked.</li> <li>4. Check whether the water circuit system is reasonable.</li> </ol>	<ol style="list-style-type: none"> <li>1. If there is a problem with the drain valve, replace it with a new one;</li> <li>2. Blow the plate heat exchanger with water or high-pressure gas in the opposite direction for cleaning;</li> <li>3. Clean the filter;</li> <li>4. The water circulation system must have a shunt.</li> </ol>
P07	Anti-freezing protection of condenser pipe	<ol style="list-style-type: none"> <li>1. Lack of refrigerant.</li> <li>2. Water circuit system is blocked.</li> <li>3. Refrigerant system is blocked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for leaks in the system;</li> <li>2. Check whether Y shape filter is blocked.</li> <li>3. Check whether filter in refrigerant system is blocked.</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the leakage point.</li> <li>2. Clean the filter.</li> <li>3. Replace the filter</li> </ol>

Fault number	Fault name	Failure analysis	Diagnosis method	Solution
P08	Middle pressure protection	Middle pressure switch off	Check whether the middle pressure switch is open circuit, when turn off the unit	Replace the middle pressure switch
P10	Low pressure sensor protection	1. Lack of refrigerant 2. The refrigeration system is blocked 3. Exceeding the scope of system work	1. Check whether the system is leaking 2. Check if the filter net is blocked 3. Check whether the ambient temperature or water temperature exceeds the limit	1. Repair the leak and refill the refrigerant 2. Replace the filter 3. Exceed the system working limit, can't run
P11	DC fan 1 failure	1. The fan is faulty or stuck 2. The main control board is faulty	1. Check whether the fan is stuck, or replace with a new fan 2. Replace the main control board	1. Check if the fan is stuck, or replace with a new fan 2. Replace the main control board
P12	DC fan 2 failure			
P13	4-way valve fault	1. Entering/leaving water temperature sensors are reversely inserted 2. 4-way valve is fault 3. PCB is fault	1. Check whether the entering and leaving temperature sensors are reversely inserted 2. Check whether action of 4-way valve is normal 3. Check whether the sample temperature of motherboard is accurate	1. Correct the wrong place 2. Try to switch repeatedly to see if it works, if not, replace it 3. If it is wrong, replace it
P14	Refrigerant leakage fault	1. Leaks in refrigeration system. 2. Refrigerant leakage sensor failure. 3. PCB failure.	1. Check whether there is leakage in refrigeration system. 2. Check whether refrigerant leakage sensor is normal. 3. Check whether PCB is faulty.	1. Fix leakage in refrigeration system. 2. Replace refrigerant leakage sensor. 3. Replace PCB.
P21	DC pump is abnormal	1. The water pump is faulty or stuck 2. The system lacks water and is blocked 3. Main control board failure	1. Check whether the water pump is blocked, or replace with a new water pump 2. Check whether the system is short of water, whether it is blocked, and whether the valve is closed 3. Replace the main control board	1. Check if the water pump is blocked, or replace with a new water pump; 2. Refill water or clean or replace the filter net and open the valve 3. Replace the main control board
P25	Outlet pressure sensor failure	1. The sensor connection line is open or short-circuited 2. Sensor failure 3. The main control board is faulty	1. Use a multimeter to check whether the sensor and connection are abnormal 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal 3. Replace the main control board and confirm whether it is normal	1. Repair the connecting wire and plug or replace the sensor 2. Replace the motherboard
E01	Communication error of controller	1. The communication cable is disconnected 2. The wire controller is faulty 3. The main control board is faulty	1. Check whether the communication cable is open or the plug is in poor contact 2. Confirm whether the wire controller is normal on a normal machine 3. Use a normal wire controller to confirm whether it is normal on the faulty machine	1. Replace the communication cable or repair 2. Replace the line controller 3. Replace the main control board

Fault number	Fault name	Failure analysis	Diagnosis method	Solution
E02	TP exhaust temperature sensor failure	<ol style="list-style-type: none"> <li>1. The sensor connection line is open or short -circuited</li> <li>2. Sensor failure</li> <li>3. The main control board is faulty</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a multimeter to check whether the sensor and connection are abnormal</li> <li>2. Replace the faulty sensor with a normal sensor to confirm whether it is normal</li> <li>3. Replace the main control board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the connecting wire and plug or replace the sensor</li> <li>2. Replace the mother-board</li> </ol>
E03	T3 coil temperature sensor failure	<ol style="list-style-type: none"> <li>1. The sensor connection line is open or short -circuited</li> <li>2. Sensor failure</li> <li>3. Main control board failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a multimeter to check whether the sensor and connection are abnormal</li> <li>2. Replace the faulty sensor with a normal sensor to confirm whether it is normal</li> <li>3. Replace the main control board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the connecting wire and plug or replace the sensor</li> <li>2. Replace the mother-board</li> </ol>
E04	T4 Ambient temperature sensor failure	<ol style="list-style-type: none"> <li>1. The sensor connection line is open or short -circuited</li> <li>2. Sensor failure</li> <li>3. Main control board failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a multimeter to check whether the sensor and connection are abnormal</li> <li>2. Replace the faulty sensor with a normal sensor to confirm whether it is normal</li> <li>3. Replace the main control board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the connecting wire and plug or replace the sensor</li> <li>2. Replace the mother-board</li> </ol>
E05	T5 liquid pipe temperature sensor failure	<ol style="list-style-type: none"> <li>1. The sensor connection line is open or short -circuited</li> <li>2. Sensor failure</li> <li>3. Main control board failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a multimeter to check whether the sensor and connection are abnormal</li> <li>2. Replace the faulty sensor with a normal sensor to confirm whether it is normal</li> <li>3. Replace the main control board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the connecting wire and plug or replace the sensor</li> <li>2. Replace the mother-board</li> </ol>
E06	TH return air temperature sensor failure	<ol style="list-style-type: none"> <li>1. The sensor connection line is open or short -circuited</li> <li>2. Sensor failure</li> <li>3. Main control board failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a multimeter to check whether the sensor and connection are abnormal</li> <li>2. Replace the faulty sensor with a normal sensor to confirm whether it is normal</li> <li>3. Replace the main control board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the connecting wire and plug or replace the sensor</li> <li>2. Replace the mother-board</li> </ol>
E07	TW water tank temperature sensor failure	<ol style="list-style-type: none"> <li>1. The sensor connection line is open or short -circuited</li> <li>2. Sensor failure</li> <li>3. Main control board failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a multimeter to check whether the sensor and connection are abnormal</li> <li>2. Replace the faulty sensor with a normal sensor to confirm whether it is normal</li> <li>3. Replace the main control board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the connecting wire and plug or replace the sensor</li> <li>2. Replace the mother-board</li> </ol>

Fault number	Fault name	Failure analysis	Diagnosis method	Solution
E08	TA Inlet water temperature sensor failure	<ol style="list-style-type: none"> <li>1. The sensor connection line is open or short -circuited</li> <li>2. Sensor failure</li> <li>3. Main control board failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a multimeter to check whether the sensor and connection are abnormal</li> <li>2. Replace the faulty sensor with a normal sensor to confirm whether it is normal</li> <li>3. Replace the main control board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the connecting wire and plug or replace the sensor</li> <li>2. Replace the mother-board</li> </ol>
E09	TB outlet water temperature sensor failure	<ol style="list-style-type: none"> <li>1. The sensor connection line is open or short -circuited</li> <li>2. Sensor failure</li> <li>3. Main control board failure</li> </ol>	<ol style="list-style-type: none"> <li>1. Use a multimeter to check whether the sensor and connection are abnormal</li> <li>2. Replace the faulty sensor with a normal sensor to confirm whether it is normal</li> <li>3. Replace the main control board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the connecting wire and plug or replace the sensor</li> <li>2. Replace the mother-board</li> </ol>
E10	Communication failure between main control board and drive board	<ol style="list-style-type: none"> <li>1. The communication cable is disconnected</li> <li>2. The main control board is faulty</li> <li>3. The drive module is faulty</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the communication cable is open or the plug is in poor contact</li> <li>2. Replace the main control board and confirm whether it is normal</li> <li>3. Replace the drive board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace or repair the communication cable</li> <li>2. Replace the main control board</li> <li>3. Replace the drive module</li> </ol>
E13	Discharge pressure sensor fault	<ol style="list-style-type: none"> <li>1. The sensor connection line is open or short -circuited</li> <li>2. Sensor failure</li> <li>3. The main control board is faulty</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the sensor and connection are abnormal</li> <li>2. Replace the faulty sensor with a normal sensor to confirm whether it is normal</li> <li>3. Replace the main control board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the connecting wire and plug or replace the sensor</li> <li>2. Replace the mother-board</li> </ol>
E14	Low pressure sensor LPS failure	<ol style="list-style-type: none"> <li>1. The sensor connection line is open or short -circuited</li> <li>2. Sensor failure</li> <li>3. The main control board is faulty</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the sensor and connection are abnormal</li> <li>2. Replace the faulty sensor with a normal sensor to confirm whether it is normal</li> <li>3. Replace the main control board and confirm whether it is normal</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair the connecting wire and plug or replace the sensor</li> <li>2. Replace the mother-board</li> </ol>
E15	DC bus voltage is too low	<p>Wiring error or IPM module failure Check whether the wiring is wrong, reconnect the cable or replace the IPM module</p>		
E16	DC bus voltage is too high			
E17	AC current protection (input current)			
E18	IPM module is abnormal			
E19	PFC abnormal			

Fault number	Fault name	Failure analysis	Diagnosis method	Solution
E20	Compressor failed to start			
E21	Compressor phase loss			
E22	IPM Module reset			
E23	Compressor over-current			
E24	PFC module temperature is too high			
E25	Current detection circuit failure			
E26	Out of step			
E27	PFC module temperature sensor is abnormal			
E28	communication fail			
E29	IPM module temperature is too high			
E30	IPM module temperature sensor failure			
E31	Reserved			
E32	Reserved			
E33	Reserved			
E34	AC input voltage is abnormal			

Wiring error or IPM module failure  
Check whether the wiring is wrong,  
reconnect the cable or replace the IPM module

Fault number	Fault name	Failure analysis	Diagnosis method	Solution
E35	Drive EEPROM error	Wiring error or IPM module failure Check whether the wiring is wrong, reconnect the cable or replace the IPM module		
E36	Power off reset			
E37	Reserved			
E38	Reserved			
E49	TC error the final water temperature sensor			
E50	Solar temperature sensor Tso error			
E51	The built-in temperature sensor Tro of the wire controller is faulty			
E52	Zone 2 temperature sensor TZ2 error			
E53	Up temperature sensor TE1 of buffer tank error			
E54	Down temperature sensor TE2 of buffer tank error			
E56	Outlet water pressure sensor PS1error	The gas sensor wire is loose and tighten the wire, or replace the sensor.		
E57	GAS SENSOR OFFLINE			
E58	GAS SENSOR FAULT	For CASCADE application, there are communication errors between master module and salve modules, please check whether the wiring is correct		
E59	MODULE OFFLINE			
E60	Bi-block boards Communication failure	For Bi-Block application, there are communication error between outer module and indoor module, please check whether the wiring is correct or loose		
E61	I-buf. temperature sensor TE3 fault	1. The sensor connection line is open or short -circuited 2. Sensor failure 3. Main control board failure	1. Use a multimeter to check whether the sensor and connection are abnormal 2. Replace the faulty sensor with a normal sensor to confirm whether it is normal 3. Replace the main control board and confirm whether it is normal	1. Repair the connecting wire and plug or replace the sensor 2. Replace the mother-board

## 14 TECHNICAL SPECIFICATIONS

### 14.1 General

Model	1 phase				
	7 kW	10kW	12 kW	14 kW	16 kW
Nominal capacity	Refer to the Technical Data				
Connections					
water inlet/outlet	33 mm				
Water drain	Hose nipple				
Expansion vessel					
volume	6 L				
Maximum working pressure (MWP)	3 bar				
Pump					
Type	Water cooled				
No. of speed	Variable speed				
Pressure relief valve water circuit	3 bar				
Operation range - water side					
heating	25~75°C				
cooling	5~25°C				
Operation range - air side					
heating	-25 to 43°C				
cooling	-5 to 43°C				
domestic hot water by heat pump	-25 to 43°C				

### 14.2 Electrical specifications

Model		1-phase 7 - 16 kW
Standard unit	Power Supply	220-240 V~ 50 Hz
	Nominal Running Current	See "9.7.4 Safety device requirement"
Backup heater	Power Supply	See "9.7.4 Safety device requirement"
	Nominal Running Current	

### 14.3 General(3-Phase)

Model	3 phase			
	10 kW	12 kW	14 kW	16 kW
Nominal capacity	Refer to the Technical Data			
Connections				
water inlet/outlet	33mm			
Water drain	Hose nipple			
Expansion vessel				
volume	6 L			
Maximum working pressure (MWP)	3 bar			
Pump				
Type	Water cooled			
No. of speed	Variable speed			
Pressure relief valve water circuit	3 bar			
Operation range - water side				
heating	25~75 °C			
cooling	5~25 °C			
Operation range - air side				
heating	-25 to 43°C			
cooling	-5 to 43°C			
domestic hot water by heat pump	-25 to 43°C			

### 14.4 Electrical specifications(3-Phase)

Model		3-phase 10 - 16 kW
Standard unit	Power Supply	380-415 V~ 50 Hz
	Nominal Running Current	See “9.7.4 Safety device requirement”
Backup heater	Power Supply	See “9.7.4 Safety device requirement”
	Nominal Running Current	



## 15 INFORMATION SERVICING

### 1) Checks to the area

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

### 2) Work procedure

Works shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

### 3) General work area

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

### 4) Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. no sparking, adequately sealed or intrinsically safe.

### 5) Presence of fire extinguisher

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

### 6) No ignition sources

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

### 7) Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

### 8) Checks to the refrigeration equipment

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

- The charge size is in accordance with the room size within which the refrigerant containing parts are installed.
- The ventilation machinery and outlets are operating adequately and are not obstructed.
- If an indirect refrigerating circuit is being used, the secondary circuits shall be checked for the presence of refrigerant; marking to the equipment continues to be visible and legible.
- Marking and signs that are illegible shall be corrected.
- Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

### 9) Checks to electrical devices

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

Initial safety checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- That there are no live electrical components and wiring are exposed while charging, recovering or purging the system.
- That there is continuity of earth bonding.

#### 10) Repairs to sealed components

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

b) Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

- Ensure that apparatus is mounted securely.
- Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

#### NOTE

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

#### 11) Repair to intrinsically safe components

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

#### 12) Cabling

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

#### 13) Detection of flammable refrigerants

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

#### 14) Leak detection methods

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

#### 15) Removal and evacuation

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

- Remove refrigerant
- Purge the circuit with inert gas
- Evacuate
- Purge again with inert gas
- Open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be flushed with OFN to render the unit safe. This process may need to be repeated several times.

Compressed air or oxygen shall not be used for this task.

Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system.

When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet for the vacuum pump is not closed to any ignition sources and there is ventilation available.

#### 16) Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed:

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system.
- Prior to recharging the system it shall be pressure tested with OFN. The system shall be leak tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

#### 17) Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken.

In case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

a) Become familiar with the equipment and its operation.

b) Isolate system electrically

c) Before attempting the procedure ensure that:

- Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
- All personal protective equipment is available and being used correctly.
- The recovery process is supervised at all times by a competent person.
- Recovery equipment and cylinders conform to the appropriate standards.

d) Pump down refrigerant system, if possible.

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

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

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

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

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

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

k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

#### 18) Labelling

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

#### 19) Recovery

When removing refrigerant from a system, either for service or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct numbers of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.

Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order.

Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to retraining the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

#### 20) Transportation, marking and storage for units

Transport of equipment containing flammable refrigerants Compliance with the transport regulations.

Marking of equipment using signs Compliance with local regulations.

Disposal of equipment using flammable refrigerants Compliance with national regulations.

Storage of equipment/appliances.

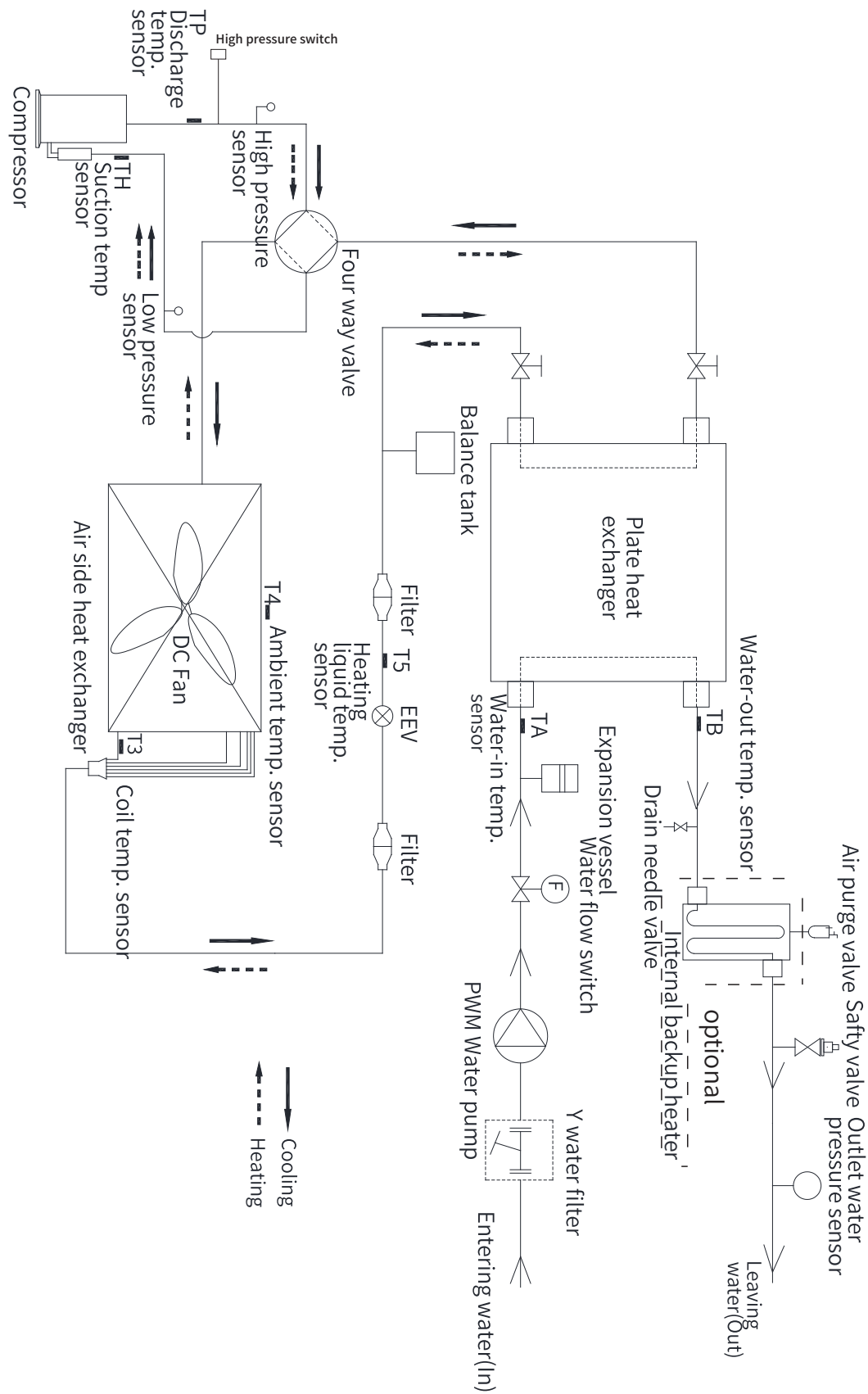
The storage of equipment should be in accordance with the manufacturer's instructions.

Storage of packed (unsold) equipment.

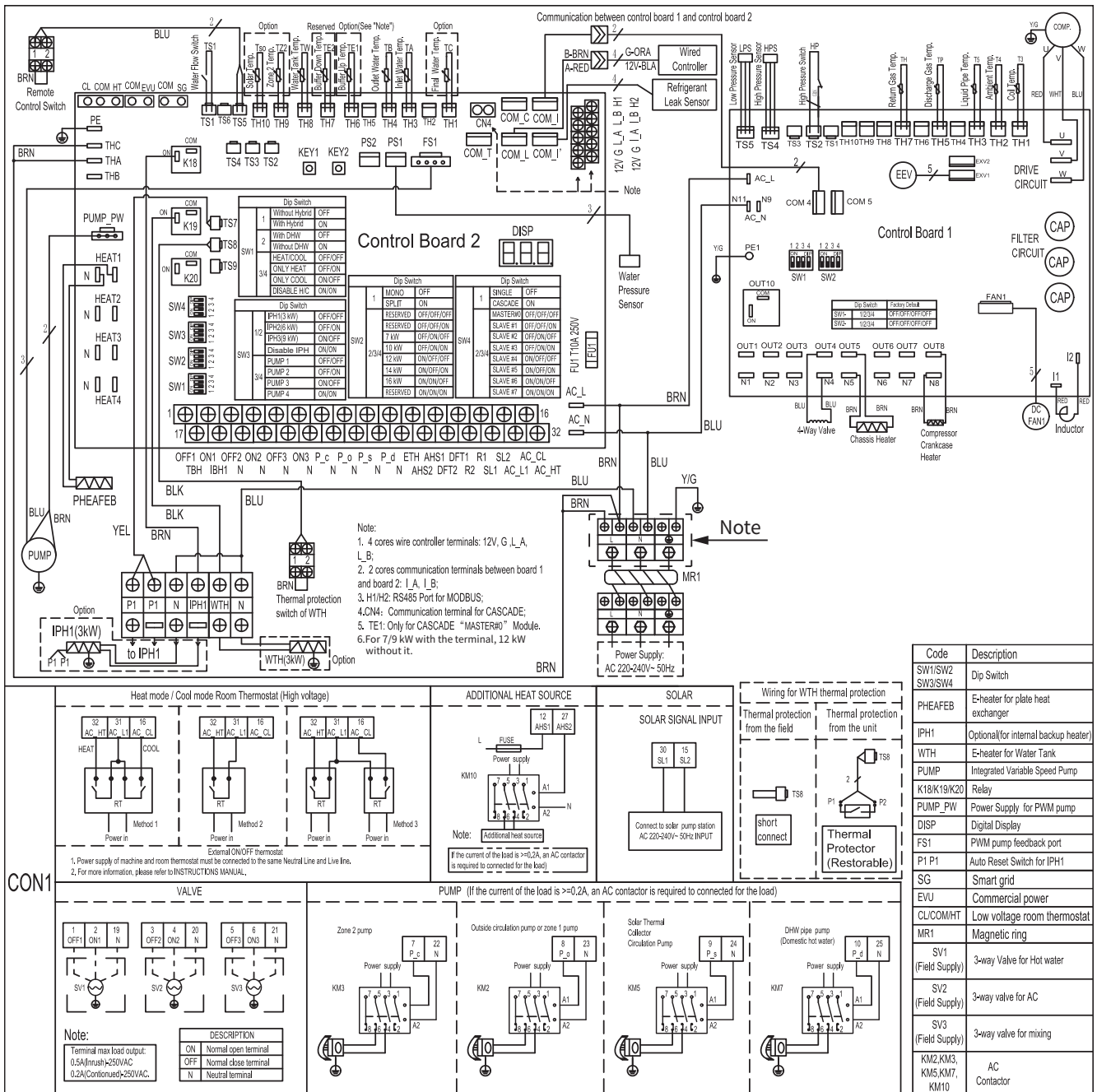
Storage package protection should be constructed such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.

The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

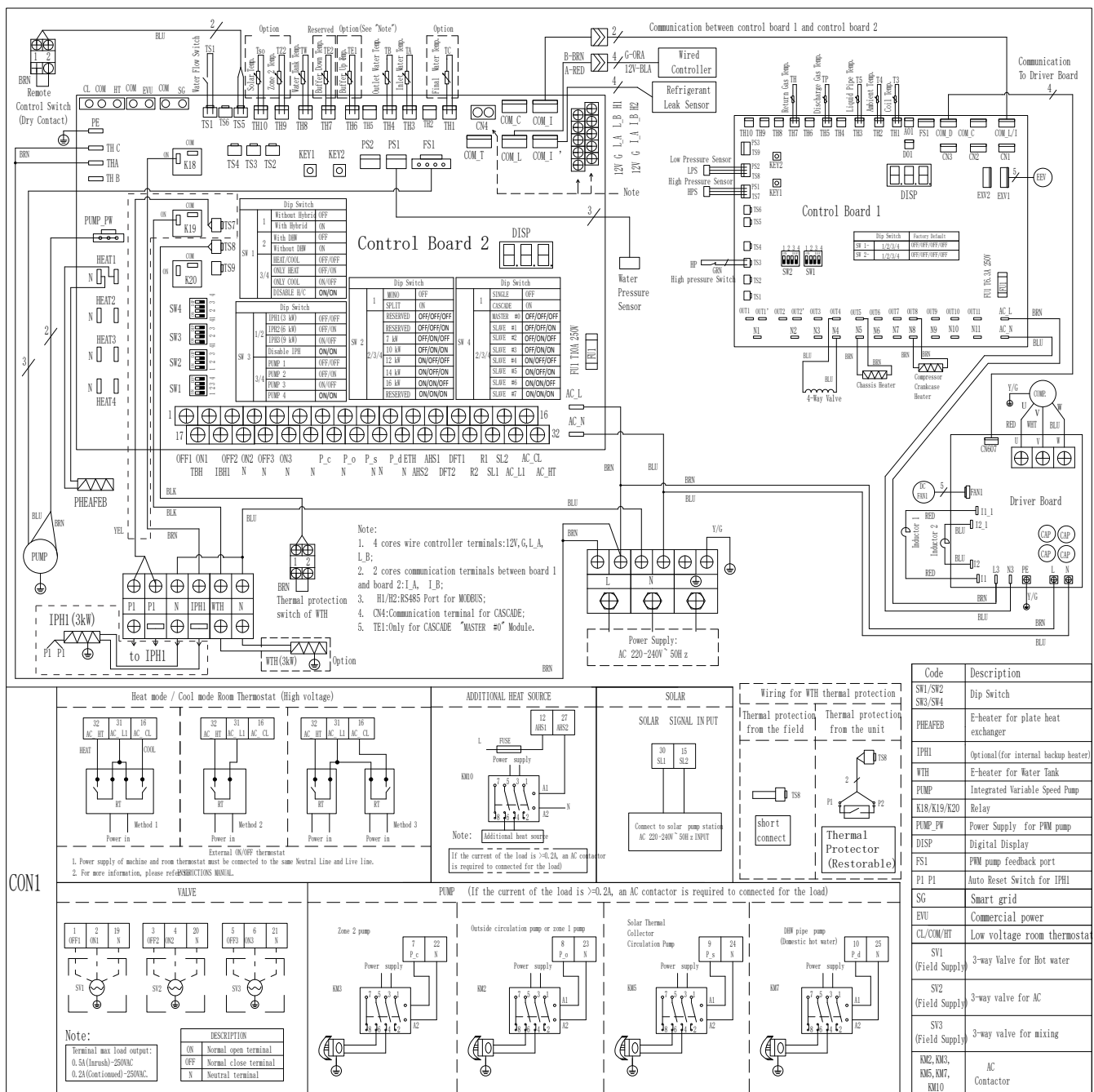
ANNEX A: Refrigerant cycle



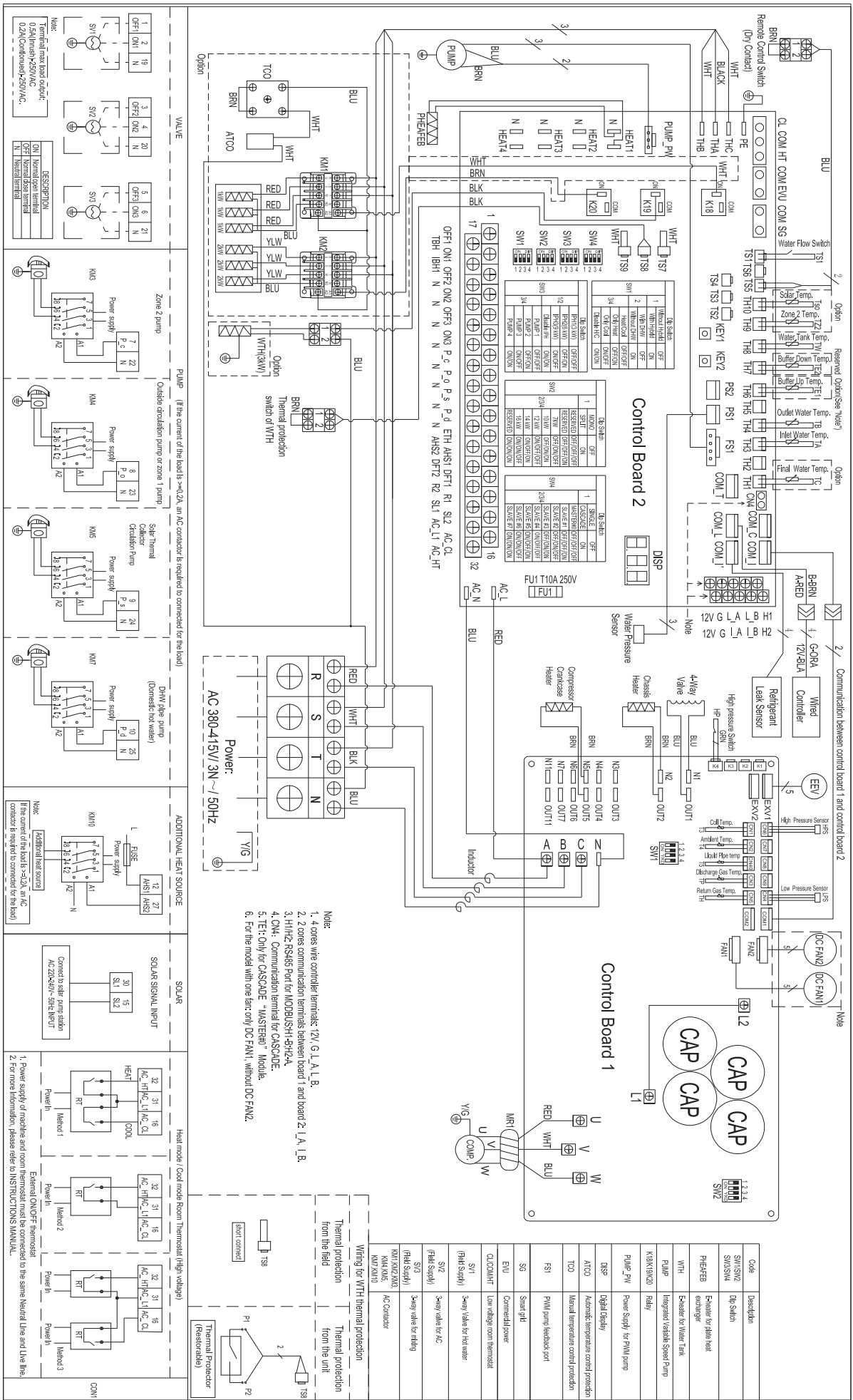
# Electrical wiring diagram of the unit (7~12 kW)



# Electrical wiring diagram of the unit (14~16 kW)



## Electrical wiring diagram of the unit (3-phase 10~16 kW)





# Modbus protocol point list

RS-485 ModbusRTU :251 Mother board address: 251 Baud rate: 9600bps Data bits: 8 bits Parity bit: None Parity Stop bit: 2 stop bit CRC-16 Checkout: Modbus Modbus format 3X:4X Data in area 3X can be read only, data in 4X can be read and written Function codes supported: 0X03, 0X04, 0X06, 0X10			
Address of register	Data type	Data content	Description
3X0000	U16	Total number of addresses	Since 3X0000 (including 3X0000)
3X0001	U16	third party thermostat controller type	0: without third party thermostat 1: with third party thermostat(single zone control: on/off and mode change) 2: with third party thermostat(single zone control: on/off) 3: with third party thermostat(two zones control: on/off)
3X0002	U16	without third party thermostat single zone or two zones control	0: 1: 0: single zone, 1: two zones
3X0003	U16	without third party thermostat for single zone control	0: the setting water temperature works as the target temperature to turn on/off the unit 1: the climate curves settig water temperature works as the target temperature to turn on/off the unit 2 reserved: the setting water temperature works as the target temperature and room setting temperature is used to turn on/off the unit3: the climate curves setting water temperature works as the target temperature and room setting temperature works to turn on/off the unit
3X0004	U16	without third party thermostat for two zones control	0: both zone 1/2: the manual setting water temperature works as the target temperature to turn on/off the unit 1: zone 1: the manual setting water temperature works as the target temperature to turn on/off the unit, zone 2: climate curves setting water temperature works as the target temperature to turn on/off the unit 2 reserved: zone 1: the manual setting water temperature works as the target temperature to turn on/off the unit, zone 2: the manual setting water temperature works as the target temperature and room setting temperature is used to turn on/off the unit 3: zone 1: the manual setting water temperature works as the target temperature to turn on/off the unit, zone 2: the climate curves setting water temperature works as the target temperature and room setting temperature is used to turn on/off the unit 4: zone 1: the climate curves setting water temperature works as the target temperature to turn on/off the unit, zone 2: the manual setting water temperature works as the target temperature to turn on/off the unit 5: both zone 1/2: the climate curves setting water temperature works as the target temperature to turn on/off the unit 6: zone 1: the climate curves setting water temperature works as the target temperature to turn on/off the unit, zone 2: the manual setting water temperature works as the target temperature and the setting room temperature is used to turn on/off the unit 7: zone 1: the climate curves setting water temperature works as the target temperature to turn on/off the unit, zone 2: the climate curces setting water temperature works as the target temperature and the setting room temperature used to turn on/off the unit
3X0005	U16	with thermostat single zone control	0: 0: the manual setting water temperature works as the target temperature to turn on/off the unit 1: 1: the climate curves setting water temperature works as the target temperature to turn on/off the unit
3X0006	U16	with thermostat two zones control	0: both zone 1/2: the setting water temperature works as the target temperature to turn on/off the unit 1: zone 1: the manual setting water temperature works as the target temperature to turn on/off the unit, zone 2: climate curves setting water temperature works as the target temperature to turn on/off the unit 2: zone 1: climate curves setting water temperature works as the target temperature to turn on/off the unit, zone 2: the manual setting water temperature works as the target temperature to turn on/off the unit 3: both zone 1/2: the climate curves setting water temperature works as the target temperature to turn on/off the unit
3X0007	U16		0:R32 R32 Series 1:R290 R290 Series
3X0008	U16	unit type	Bit[15 -:1]: Bit[0:-(1)
3X0009	U16	Effective mode	Bit[15 -:3]: Reserved Bit[2:-(1) DHW mode effective or not(1 means effective) Bit[1:-(1) Heating mode effective or not(1 means effective) Bit[0:-(1) Cooling mode effective or not(1 means effective)
3X0010	S16	Zone 1 cooling mode temperature setting upper limit	For example: 123 means 123 degree celsius
3X0011	S16	Zone 1 cooling mode temperature setting lower limit	
3X0012	S16	Zone 1 heating mode temperature setting upper limit	
3X0013	S16	Zone 1 heating mode temperature setting lower limit	
3X0014	S16	Zone 1 DHW mode temperature setting upper limit	
3X0015	S16	Zone 1 DHW mode temperature setting lower limit	
3X0016	S16	Zone 1 auto mode cooling temperature setting upper limit	
3X0017	S16	Zone 1 auto mode cooling temperature setting lower limit	
3X0018	S16	Zone 1 auto mode heating temperature setting upper limit	
3X0019	S16	Zone 1 auto mode heating temperature setting lower limit	
3X0020	S16	Zone 2 cooling mode temperature setting upper limit	
3X0021	S16	Zone 2 cooling mode temperature setting lower limit	
3X0022	S16	Zone 2 heating mode temperature setting upper limit	
3X0023	S16	Zone 2 heating mode temperature setting lower limit	
3X0024	U16	Reverved	
3X0025	U16	Reverved	
3X0026	S16	2 Zone 2 auto mode cooling temperature setting upper limit	For example: 123 means 123 degree celsius
3X0027	S16	2 Zone 2 auto mode cooling temperature setting lower limit	
3X0028	S16	2 Zone 2 auto mode heating temperature setting upper limit	
3X0029	S16	2 Zone 2 auto mode heating temperature setting lower limit	
3X0030	S16	Room temperature setting upper limit	For example: 123 means 12.3 degree celsius
3X0031	S16	Room temperature setting lower limit	
3X0032	U16	Reverved	
3X0033	U16	Reverved	
3X0034	U16	zone 1 terminal type for cooling	0: FCU, 1: Radiator, 2: Floor heating circuit
3X0035	U16	zone 1 terminal type for heating	
3X0036	U16	zone 2 terminal type for cooling	
3X0037	U16	zone 2 terminal type for heating	
3X0038	U16	System status B15~B12: Reserved B11: Ambient temp. too low, compressor can not be started B10~B8: Reserved B7~B5: Reserved B4: Disinfection mode is running B3: Reserved B2: Anti-freezing mode is running B1: Defrosting mode is running B0: Oil return mode is running	0: off, 1: on
3X0039	U16	Request external heating source(only for hybrid solution) B15~B4: Reserved B3: Reserved B2: Reserved B1: Request external heating source during defrosting mode B0: Request external heating source during anti-freezing mode	0: off, 1: on



3X0040	S16	Room temperature Tidr	For example: 123 means 12.3 degree celsius
3X0041	S16	Total leaving water temperature TC(after auxiliary gas boiler heaters)	
3X0042	S16	Inlet water temperature TA	
3X0043	S16	Leaving water temperature TB	
3X0044	S16	Buffer tank upper part temperature TE1	
3X0045	S16	Buffer tank lower part temperature TE2(reserved)	
3X0046	S16	DHW water tank temperature TW	
3X0047	S16	Zone 2 mixing station inlet water temperature TZ2	
3X0048	S16	Solar water heating temperature Tso	
3X0049	S16	Outdoor unit coil temperature T3	
3X0050	S16	Ambient temperature T4	
3X0051	S16	Outlet temperature of the EXV valve T5	
3X0052	S16	Discharge temperature TP	
3X0053	S16	Suction temperature TH	
3X0054	S16	Reserved	
3X0055	S16	Reserved	
3X0056	S16	Target outlet setting temperature TOut	
3X0057	U16	Reserved	
3X0058	U16	Reserved	
3X0059	U16	Reserved	
3X0060	U16	Inlet water pressure(reserved)	For example: 123 means 12.3Bar
3X0061	U16	Outlet water pressure	
3X0062	U16	PWM Percentage of output PWM of DC water pump	For example: 123 means 123%
3X0063	U16	PWM Percentage of feedback PWM of DC water pump	
3X0064	U16	Actual water flow of the DC pump	For example: 123 means 12.3m3/h
3X0065	U16	Reserved	
3X0066	S16	Zone 1 climate curve cooling set temperature	For example: 123 means 123 degree celsius
3X0067	S16	1 Zone 1 climate curve heating set temperature	
3X0068	S16	2 Zone 2 climate curve cooling set temperature	
3X0069	S16	2 Zone 2 climate curve heating set temperature	
3X0070	U16	EEV Main EEV open degree	For example: 123 means 123 steps
3X0071	U16	EEV Auxiliary EEV open degree Reserved	
3X0072	U16	1 Speed of No.1 DC fan	For example: 123 means 123 Revolutions per minute
3X0073	U16	2 Reserved	
3X0074	U16	AC input voltage	For example: 123 means 123V
3X0075	U16	AC input current	For example: 123 means 12.3A
3X0076	U16	DC bus voltage	For example: 123 means 123V
3X0077	U16	Compressor current	For example: 123 means 12.3A
3X0078	U16	Compressor target frequency	For example: 123 means 123Hz
3X0079	U16	Compressor actual frequency	
3X0080	U16	Main water pump on/off status(unit internal circulation water pump)	0: off, 1: on
3X0081	U16	Four way valve on/off status	
3X0082	U16	Reserved	
3X0083	U16	Reserved	
3X0084	U16	Reserved	
3X0085	U16	Reserved	
3X0086	U16	High pressure	For example: 123 means 123kpa
3X0087	U16	Low pressure	
3X0088	U16	Reserved	
3X0089	U16	Reserved	
3X0090	U16	E01~E16	E01~E96 bit by bit operation 3X0090 bit0 1E01 For example, if the bit0 of 3X0090 is 1, E01 is the error code 3X0091 bit1 1E18 For example, if the bit1 of 3X0091 is 1, E18 is the error code
3X0091	U16	E17~E32	
3X0092	U16	E33~E48	
3X0093	U16	E49~E64	
3X0094	U16	E65~E80	
3X0095	U16	E81~E96	P01~P96 bit by bit operation 3X0096 bit0 1P01 For example, if the bit0 of 3X0096 is 1, P01 is the error code 3X0097 bit1 1P18 For example, if the bit0 of 3X0097 is 1, P18 is the error code
3X0096	U16	P01~P16	
3X0097	U16	P17~P32	
3X0098	U16	P33~P48	
3X0099	U16	P49~P64	
3X0100	U16	P65~P80	
3X0101	U16	P81~P96	
3X0101	U16	Current target operation mode	B15~B12: Auto target mode 0X01: Cooling mode 0X02: Heating mode B11~B8: DHW target mode 0X00: Standby mode 0X08: DHW mode B7~B4: Two zones control: zone 2 air conditioner target mode 0X00: Standby mode 0X01: Cooling mode 0X02: Heating mode B3~B0: Two zones control: zone 1 air conditioner target mode One zone control: air conditioner target mode 0X00: Standby mode 0X01: Cooling mode 0X02: Heating mode

3X0103	U16	Actual operation mode	B15~B9: Reserved B11~B8: DHW operation mode 0X00: Standby 0X08: DHW mode B7~B4: Two zones control: zone 2 air conditioner operation mode 0X00: Standby 0X01: Cooling 0X02: Heating B3~B0: Two zones control: zone 1 air conditioner operation mode One zone control: air conditioner operation mode 0X00: Standby 0X01: Cooling 0X02: Heating
3X0104	U16	Reserved	
3X0105	U16	Reserved	
3X0106	U16	Reserved	
3X0107	U16	Reserved	
3X0108	U16	Reserved	
3X0109	U16	Reserved	
4X2100	U16	Air condition modes	1: Cooling mode 2: Heating mode 4: Auto mode
4X2101	U16	Air condition modes	0: All off 1: Zone 1 on, zone 2 off 2: Zone 1 off, zone 2 on 3: All on
4X2102	U16	DHW mode on/off	0: DHW off 1: DHW on
4X2103	U16	A Additional function A Bit[15~8]: Reserved Bit[7]: Reserved Bit[6]: Disinfection mode Bit[5~4]: Silent mode 0: Silent mode off 1: Silent mode level one 2: Silent mode level two(only for R290 heat pumps) Bit[3]: forced electrical heater Bit[2]: Reserved Bit[1]: Reserved Bit[0]: Reserved	0: off 1: on
4X2104	U16	B() Additional function A(Reserved)	0: off 1: on
4X2105	S16	DHW mode water temperature setting	For example: 123 means 123 degree celsius
4X2106	S16	zone 1 cooling mode temperature setting	
4X2107	S16	zone 1 heating mode temperature setting	
4X2108	S16	zone 1 auto mode cooling temperature setting	
4X2109	S16	zone 1 auto mode heating temperature setting	
4X2110	S16	zone 2 cooling mode temperature setting	
4X2111	S16	zone 2 heating mode temperature setting	
4X2112	S16	zone 2 auto mode cooling temperature setting	
4X2113	S16	zone 2 auto mode heating temperature setting	
4X2114	S16	Room temperature setting	

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