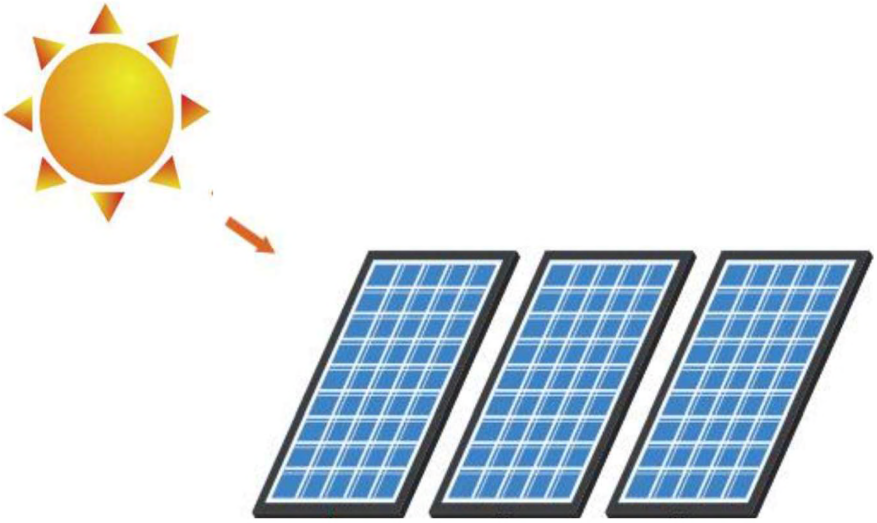
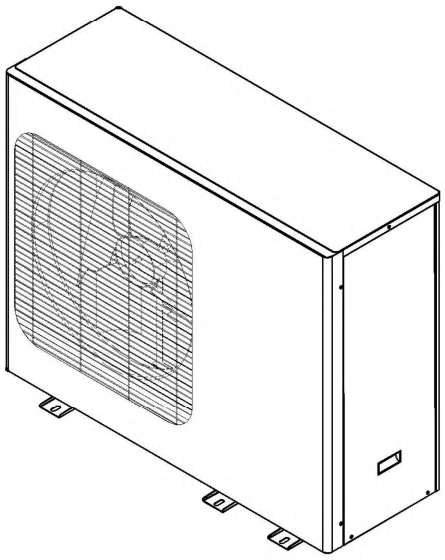
Installation & User's Manual

Solar Air-to-Water Heat Pump





- Installation work should be done by professionals.
- For your convenience, please read this manual carefully and follow the steps in the manual.
- Please keep the manual properly for easy reference

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1. Preface

- In order to provide our customers with quality, reliability and versatility. Please read this manual carefully before you open or maintain the unit. The manufacture of this product will not be held responsible if someone is injured or the unit is damaged, as a result of improper installation, debugging, or unnecessary maintenance. It is vital that the instructions within this manual are adhered to at all time. The unit must be installed by qualified personnel.
- The unit can only be repaired by qualified installer centre, personnel or an authorized dealer.
- Maintenance and operation must be carried out according to the recommended time and frequency, as stated in this manual.
- Use genuine standard spare parts only.
  Failure to comply with these recommendations will invalidate the warranty.
- Our heat pump has following characteristics:

  1) Self-sufficient in electricity
     Advanced photovoltaic direct drive technology is adopted to make the power consumption characteristics of the unit consistent with photovoltaic power generation characteristics, so as to ensure the preferential utilization of photovoltaic energy, which is supplemented by the grid Combined with dynamic load tracking MPPT technology to maximize the real-time utilization of photovoltaic energy.
  2) AC/DC hybrid technology
     Through the AC/DC hybrid control technology, the intelligent seamless switch of "pure commercial power, photovoltaic commercial power hybrid" is realized (switching time < 10ms). Even if the sunshine conditions or the power grid changes dramatically, the unit still runs stably.
  3) Full DC frequency conversion technology
     Through the efficient DC inverter compressor and DC fan, the full DC control system is used to achieve the best dynamic matching of motor speed, so that the unit runs in the most energy saving state.
  4) Intelligent WIFI control
     WIF function can real-time monitor the respective AC and DC power consumption and the working state of the unit.
  5) Wide voltage operation
     Grid AC: AC 220-240/1/50 AC 380-410/3/50,DC: 200~410V
     The unit can be started in the above wide voltage range and run stably, and low frequency start, small starting current, small impact on the power grid.
- WARNING
  Do not use means to accelerate the defrosting process or to clean, Other than those recommended by the manufacturer.
  The appliance shall be stored in a zoom without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.)
  Do not pierce or burn.
  Be aware that refrigerants may not contain an odour,



Appliance shall be installed, operated and stored in a room with a floor area larger than $30m^{2.}$
NOTE The manufacturer may provide other suitable examples or may provide additional information about the refrigerant odour.

- This appliance can be used by children aged from 8 years and above and person with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- 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.
- The appliance shall be installed in accordance with national wiring regulations.
- Do not operate your air conditioner in a wet room such as a bathroom or laundry room.
- Before obtaining access to terminals, all supply circuits must be disconnected.
- An all-pole disconnection device which has at least 3mm clearances in all poles, and have a leakage current that may exceed 10mA, the residual current device(RCD) having a rated residual operating current not exceeding 30mA, and disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
- Do not pierce or burn.
- Appliance shall be installed, operated and stored in a room with floor area larger than $30m^2$.
  Be aware that refrigerants may not contain an odour
  The installation of pipe-work shall be kept to a minimum 30 m^2.
  Spaces where refrigerant pipes shall be compliance with national gas regulations.
  Servicing shall be performed only as recommended by the manufacturer.
  The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation
  All working procedure that affects safety means shall only be carried by competent persons.
- 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.

2. Specifications

These devices are used for both heating and cooling applications as well as domestic hot water tanks. They can be combined with fan coil devices, floor heating applications, low-temperature efficient radiators, domestic hot water tanks and solar kits, which are supplied on site.

The device provides a wired controller.

Standare heaters (optional) increase heating capacity at fairly low outdoor temperatures. And provide backup services for heat pump failure or avoiding the freezing of outdoor water pipes.

Notes:

1.The maximum length between the unit and the controller is 50m.

2.Power lines and communication lines must be arranged separately and cannot be placed in the same pipe, which may cause electromagnetic interference. The power lines and communication lines shall not contact with the piping to prevent the high temperature pipes from damaging the line.

Communication lines must be shielded lines, including indoor or unit to outdoor unit POE lines indoor unit control HA and HB lines.

Relationship between capacity (load) and ambient temperature

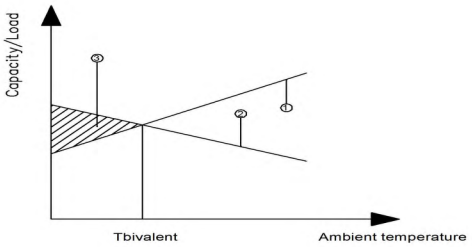


Figure 2-1

1. Heat pump capacity.

2. Required heating capacity (site dependent).

3.Additional heating capacity provided by backup heater.

Domestic hot water tank (field supply)

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

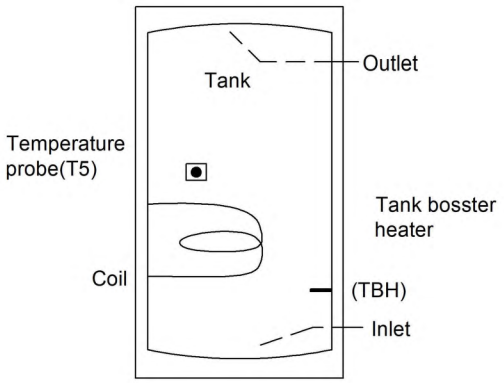


Figure 2-2

The booster heater should be installed below the temperature probe (T5).

Due to the different units and materials of the heat exchanger, the requirements for the storage tank vary.

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

In cooling mode, the range of water flow temperature (TW _ out) at different outdoor temperatures (A) is shown in Figure 2-3 below:

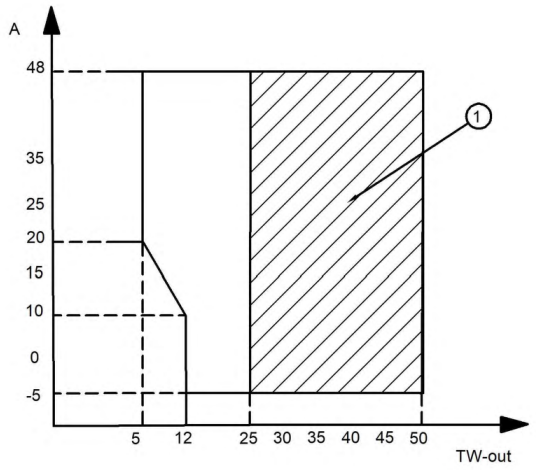


Figure 2-3

1.Operating range of the heat pump, possible limitations and protection.

The flow temperature (W) range for different outdoor temperatures under heating mode (A) is shown in Figure 2-4 below:

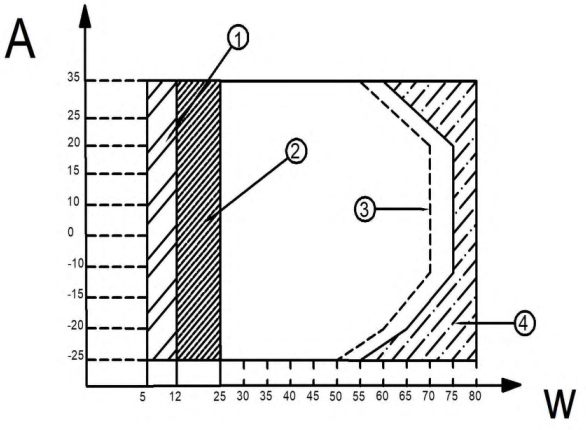


Figure 2-4

(1) If IBH/AHS settings are valid, only IBH /AHS is open; if IBH/AHS settings are invalid, only heat pump is open; limitations and protection may occur during heat pump operation.

(2) Operating range of the heat pump, possible limitations and protection。

(3) Maximum water inlet temperature line for heat pump operation.

(4) The heat pump is off and only IBH / AHS is on. (IBH can heat water temperature to 75 ℃ and AHS can heat water temperature to 80℃)

Flow temperature (W) at different outdoor temperatures (A) Figure 2-5 below:

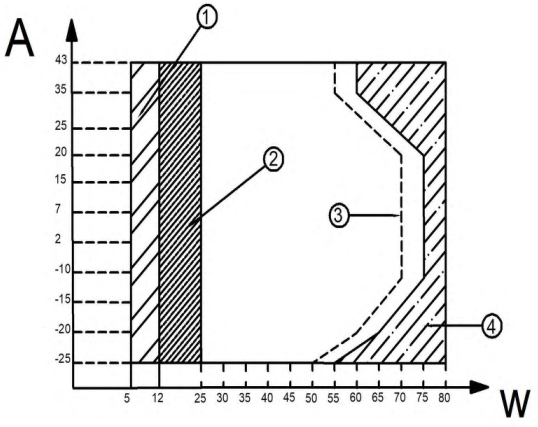


Figure 2-5

(1) If IBH/AHS settings are valid, only IBH /AHS is open; if IBH/AHS settings are invalid, only heat pump is open; limitations and protection may occur during heat pump operation.

(2) Operating range of the heat pump, possible limitations and protection。

(3) Maximum water inlet temperature line for heat pump operation.

(4) The heat pump is off and only IBH/ AHS is on. (IBH can heat water temperature to 75 ℃ and AHS can heat water temperature to 80℃)

3.Important information on the refrigerant

This product easily contains propane gas, which can not be released into the air.
Refrigerant type: R290.
R290.a high purity propane with zero ODP valve and no ozone depletion effect. The low GWP valve shows its environmental protection characteristics and provides great support for achieving carbon neutrality in the EU.
GWP=Global warming potential

Model	Factory charged refrigerant volume in the unit	
	Refrigerant/kg	Tonnes CO_2 equivalent
12kW	1.43	4.29
14kW	1.43	4.29
16kW	1.43	4.29

Notes:

Frequency of Refrigerant Leakage Checks.



For unit that contains fluorinated greenhouse gases in quantities of 5 tonnes of CO_2 equivalent or more,but ofless than 50 tonnes of CO_2 equivalent,at least every 12 months, or where a leakage detection system isinstalled, at least every 24 months.
For unit that contains fuorinated greenhouse gases in quantities of 500 tonnes of CO_2 equivalent or more,atleast every three months, or where a leakage detection system is installed,at least every six months.
When using R290, we should pay attention to its safety. Short exposure to low concentrations of R290 usually does not cause severe symptoms, but prolonged exposure or high concentrations may result to anesthetic state, loss of consciousness or even asphyxia. R290 is a flammable gas that may form an explosive mixture when mixing with air, thus posing a risk of combustion and explosion when encountering a heat source or open flame.
Only certified personnel can perform the installation, operation, and maintenance.

4. Installation illustration

4.1. Before installation

1. Before installation

Please confirm the model name and serial number.

2.Transport

Due to the large size and inconvenient weight handling, the transportation adopts the lifting form, please refer to the following figure 4-1.

(1) A layer of foam board should be placed on the upper position to protect the whole machine.
(2) The hook and the center of gravity of the unit shall be in the vertical direction to prevent improper inclination.

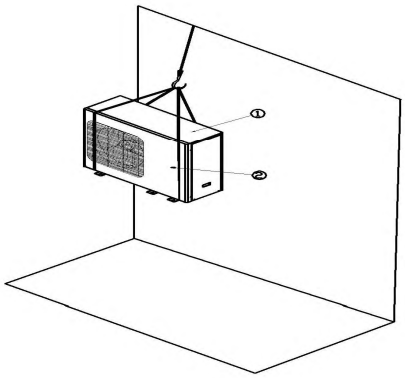


Figure 4-1

Notes:

(1) To avoid injury, do not touch the air inlet or aluminum finsof the unit.
(2) Do not use the unit own grip to avoid damage.
(3) The unit is top heavy! Prevent the unit from falling due toimproper inclination during handling.

4.2. Installation site

1.Select an installation site that meets the following conditions and meets the customer's approval.

Notes:

(1) Well-ventilated place.
(2) Places where the unit does not disturb neighbors.
(3) Safe place that can withstand the weight and vibration of the unit, and the unit can be installed at a uniform level.
(4) Where there is no possibility of flammable gas or product leakage.
(5) The device is not suitable in a potentially explosive environment.
(6) The service space can be fully guaranteed.
(7) The length of the pipes and lines of the unit is within the allowable range.
(8) Water leakage from the unit does not result in this location (e. g., drain blockage).
(9) Rain can be avoided wherever possible.

(10) Do not install the device where it is often used as a workspace. During construction (such as grinding, etc.), if a large amount of dust is produced there, the device must be covered.
(11) 11.Do not place any objects or equipment on the top of the device (roof).
(12) Do not climb, sit, or stand on the top of the unit.
(13) Take adequate preventive measures in accordance with relevant local laws and regulations.
(14) Do not install it near the sea or where there is corrosive gas.

2.Special attention should be paid to the following matters when installing units in places exposed to strong winds.

(1) Strong air of 5 m/sec or above blows through the air outlet of the unit, resulting in a short circuit (discharge air inhalation), which may have the following consequences:
(2) A decline in the operational capability.
(3) Frequent frost in heating operations.
(4) Operation interruption due to increased high pressure.
(5) When strong winds blow continuously at the front of the unit, the fan can start to rotate quickly until it breaks.

Under normal conditions, the installation of the unit is shown in the following figure 4-2:

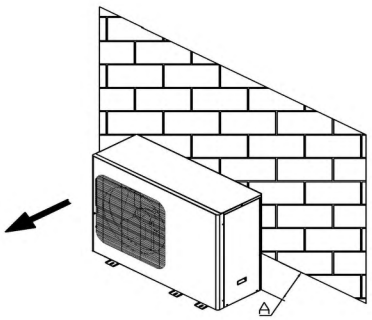


Figure 4-2

For strong wind and wind direction, unit installation (any possible) see Figure 4-3 below:
Turn the air outlet side to the building wall, fence, or screen.

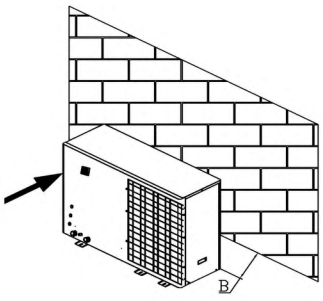


Figure 4-3

Make sure there is enough space to install the unit.
Set the exit side and the wind direction at a right Angle as shown in Figure 4-4 below.

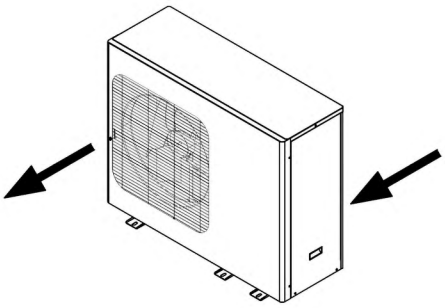


Figure 4-4

(1) Prepare a drain around the foundation to drain the wastewater around the unit.
(2) If the water is not easily discharged from the unit, please install the unit on the basis of the concrete block, etc.(The height of the foundation should be about 100 mm (3.93 inches).
(3) If you install the device on the frame, install a waterproof board (about 100 mm) at the bottom of the device to prevent water entry from the low

side.

(4) When installing units in places that frequent snow, pay special attention to raising the foundation as high as possible.

(5) If you install the equipment on the building frame, install a waterproof tray (field supply about 100mm) to avoid dripping.(See the figure 4-5 on the right)

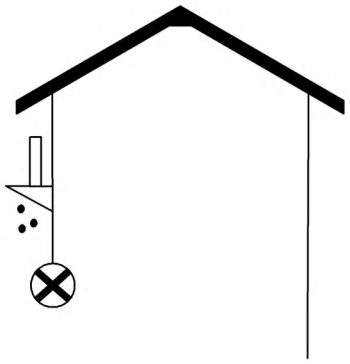


Figure 4-5

4.3.Selecting a location in cold climates

When operating this machine in cold weather, always follow the following instructions,the installation of the unit is shown in the following figure4-6.

(1) To prevent exposure to the wind, install its suction side into the wall.

(2) Do not install the unit, where the suction side may be directly exposed to the wind.

(3) To prevent contact with the wind, install a baffle on the exhaust side of the unit.

(4) In a snowy area, it is very important to choose a snow cover that will not affect the installation site of the unit. If transverse snowfall is possible, ensure that the heat exchanger coil is not affected by snow (a transverse ceiling should be constructed if necessary).

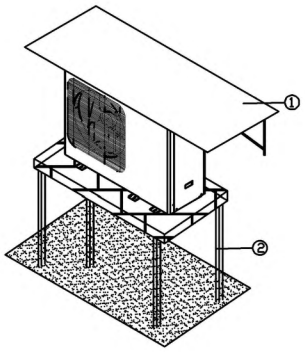


Figure 4-6

(1) 1.Construct a large canopy.

(2) 2.Construct a pedestal.

Install the unit high enough from the ground to prevent being buried by snow. The height of the base must be greater than the thickness of the largest snow in local history plus 10 cm or more)

4.4. Selecting a location in direct sunlight

Since the outdoor temperature is measured through the ambient temperature sensor of the unit, ensure that it is installed in the shade or under the canopy to avoid direct sunlight from solar heat and otherwise protect the unit.

4.5. Installation Precautions

4.5.1 Dimensions

Model:

12kW, 14kW, 16kW (See Figure 4-7 below for more details).

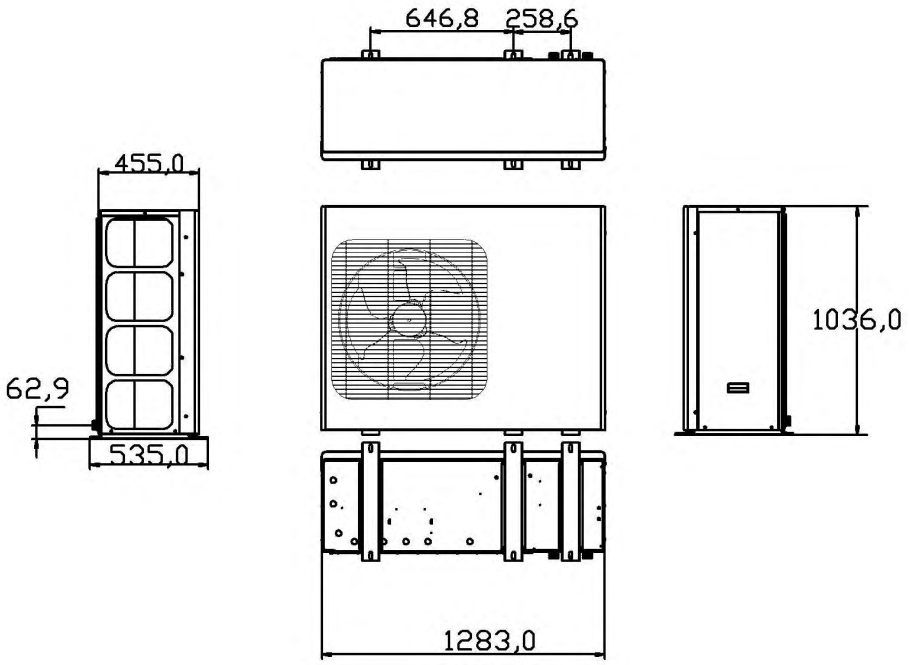


Figure 4-7

4.5.2 Installation requirements

Check the strength and level of the installation ground so that the unit will not cause any vibration or noise during operation.

In accordance with the foundation drawing in the fiqure, fix the unit securely by means of foundation bolts. (Prepare four setseach of ϕ 10 Expansion bolts, nuts and washers which are readily available in the market.)

Sin the anchor bolt until its length is 20 mm from the foundation surface.

See Figure 4-8 below for more details.

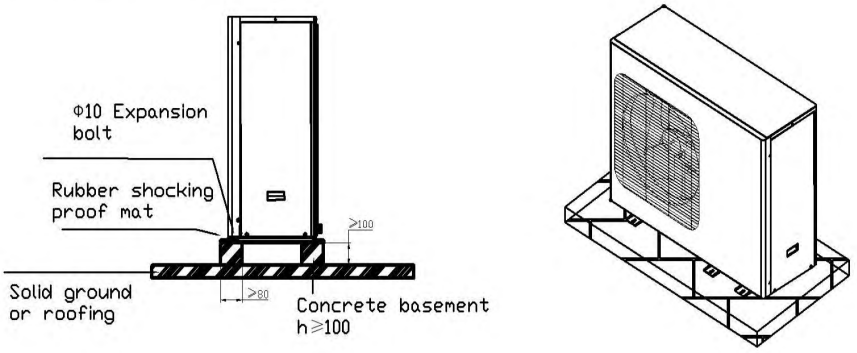


Figure 4-8

4.5.3 Drain hole position

The hole of the unit is shown in Figure 4-9 below.

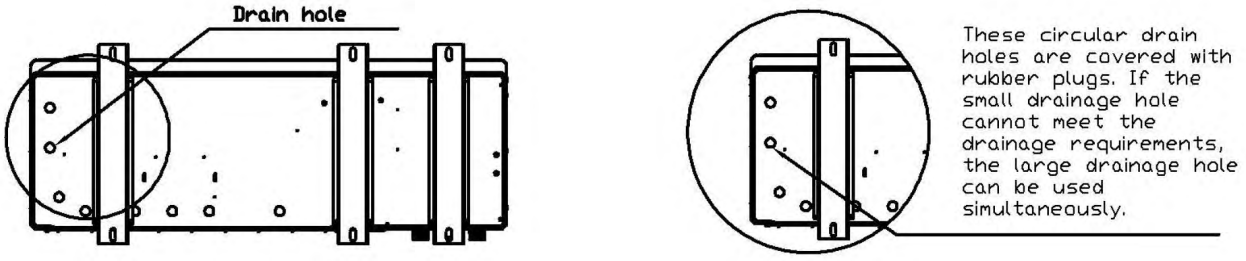


Figure 4-9

Note:

If in cold weather, even if the large drainage hole can not be discharged, you need to install an electric heating belt.

4.5.4 Servicing space requirements

1.In case of stacked installation (See Figure 4-10 below for details).

(1) If there is an obstacle in front of the air outlet side.
(2) If there is an obstacle in front of the air inlet side.

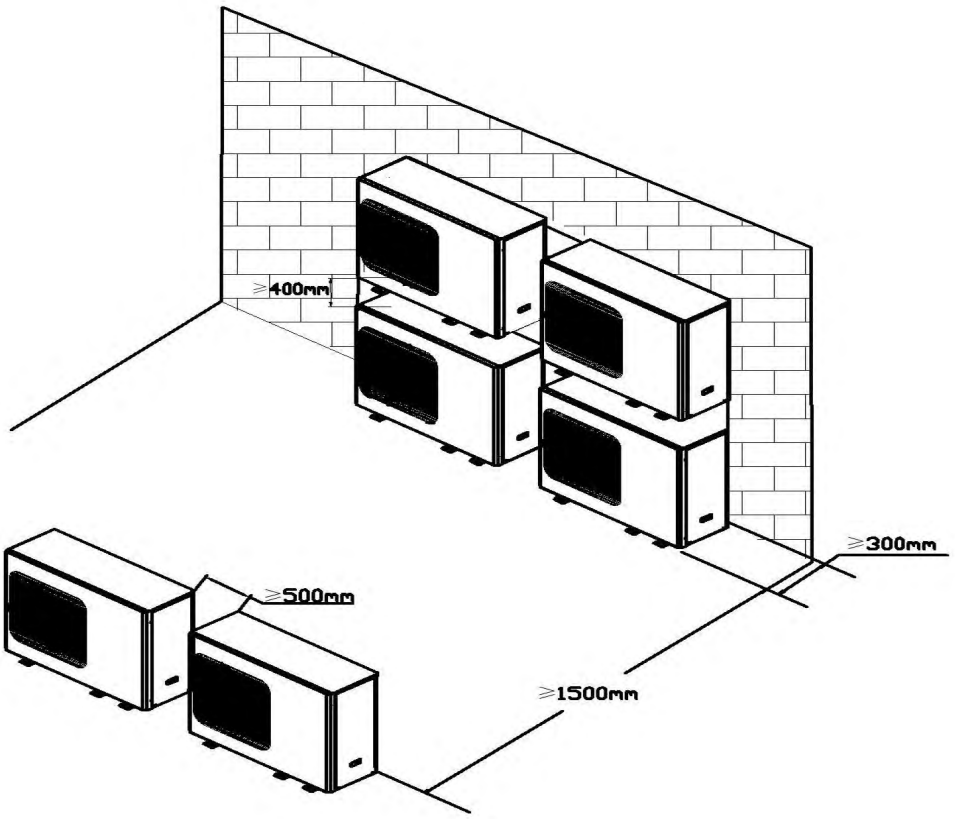


Figure 4-10

2.Multi-row installation for roof, etc.(See Figure 4-11 below for details).

In case of installing multiple units in lateral connection per row.

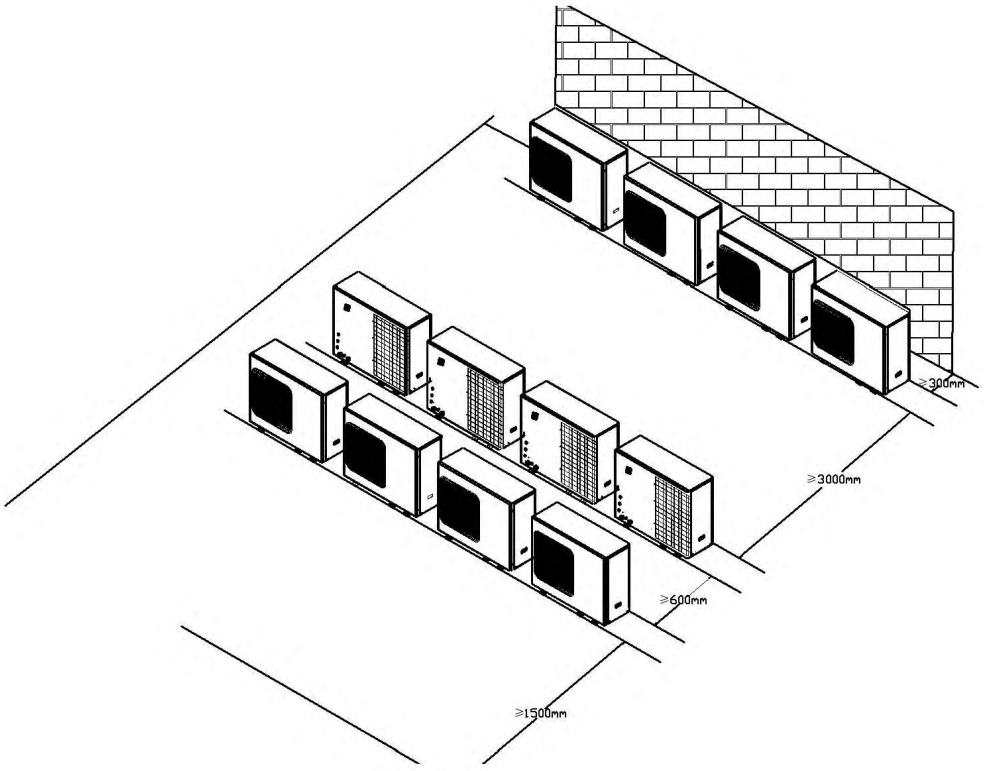


Figure 4-11

4.6. Installation of Solar Photovoltaic Modules

Installation of Solar Modules

Solar Modules must be installed in accordance with all applicable codes. Some of them are the local building codes, the Building Code of Australia, AS/NZS 4777 and AS /5033. They must be installed by a licenced, competent person.

Solar Array Maximum Voltage

The maximum Voltage Open Circuit (VOC) must be calculated to account for low temperature voltage rise. Failure to do may damage the equipment and void warranty.
For guidance see AS/NZS 5033 4.2 PV array maximum voltage.
The maximum Voltage Open Circuit for this equipment is 380 Vdc.
For example, if the lowest recorded temperature is 4 to 0 degrees C and the VOC of a module is 44.2 Vdc, one would multiply 44.2 by 1.1 equalling 48.62volts.
Dividing the maximum VOC input of 380 Vdc by 48.62 yields the maximum number of solar modules 7.81. Rounding down yields 7 modules max at that low temperature.

VOLTAGE CORRECTION FACTORS FOR CRYSTALLINE AND MULTI-CRYSTALLINE SILICON PV MODULES

Lowest expected operating temperature ℃	Correction factor
24 to 20	1.02
19 to 15	1.04
14 to 10	1.06
9 to 5	1.08
4 to 0	1.10
-1 to -5	1.12
-6 to -10	1.14
-11 to -15	1.16
-16 to -20	1.18
-21 to -25	1.20
-26 to -30	1.21
-31 to -35	1.23
-36 to -40	1.25

Solar Array Maximum Current

Paralleling of the solar array is not recommended as the maximum rated Array Short circuit current is 12 amps.

Galvanic Considerations Outdoor Unit

The outdoor unit is to be treated as a non-galvanically isolated regulator. The solar isolation

switches must be rated for the full array voltage and current. If connected to the AC supply, the outdoor unit must be connected to the 230-volt AC distribution board via a type A or B residual current and overcurrent device

Solar Module Installation

This manual contains information regarding the installation and safe handling of solar photovoltaic module(s). All instructions should be read and understood before attempting to install. If there are any questions, please contact our sales department for further explanation. The installer should conform to all safety precautions listed in this guide when installing the modules. Local codes and regulations must be followed.

This manual does not describe specific structures and installation procedures.

An approved solar technician must be consulted to determine the following:

- The specifications of the solar photovoltaic system
- Cable material
- Connecting components
- Bracket and support
- Supporting parts
- Switching and circuit protection



Solar modules are large and require careful handling. Only a qualified technician should install Solar Modules. Solar arrays are current limited sources. Use appropriate protection measures when working on them. They contain hazardous DC voltages.

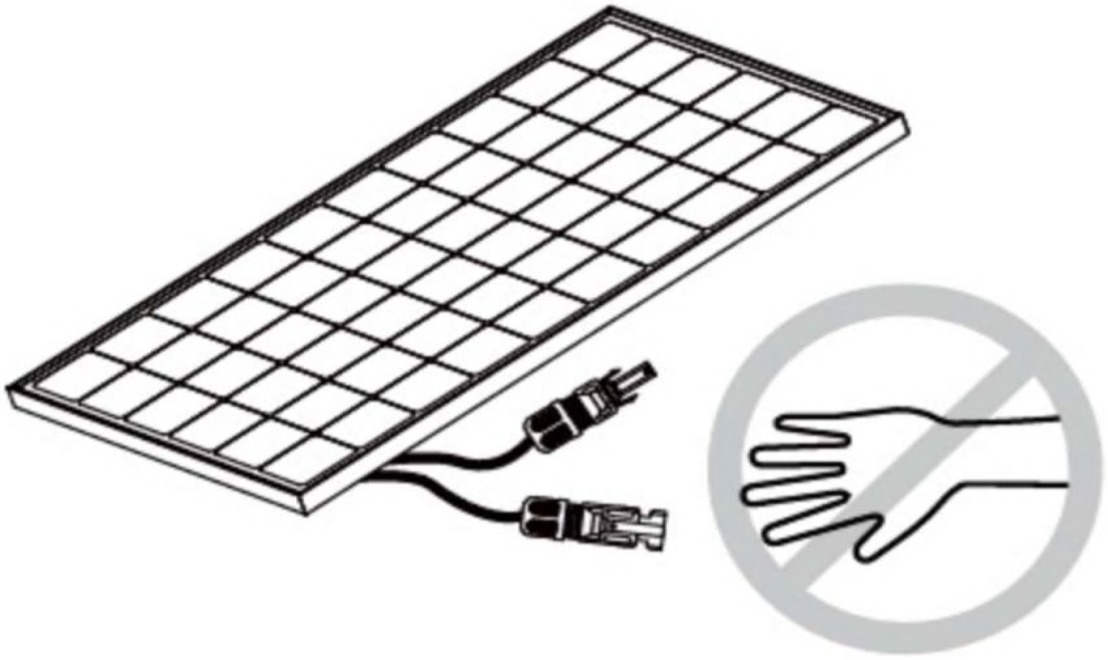
Installation of Solar Modules should be performed only by qualified persons, who are familiar with the mechanical and electrical requirements.

All electrical connections should be made with approved MC-4 type connectors, and from the same manufacturer. (AS/NZS 5033 clause 4.3.7 (k))

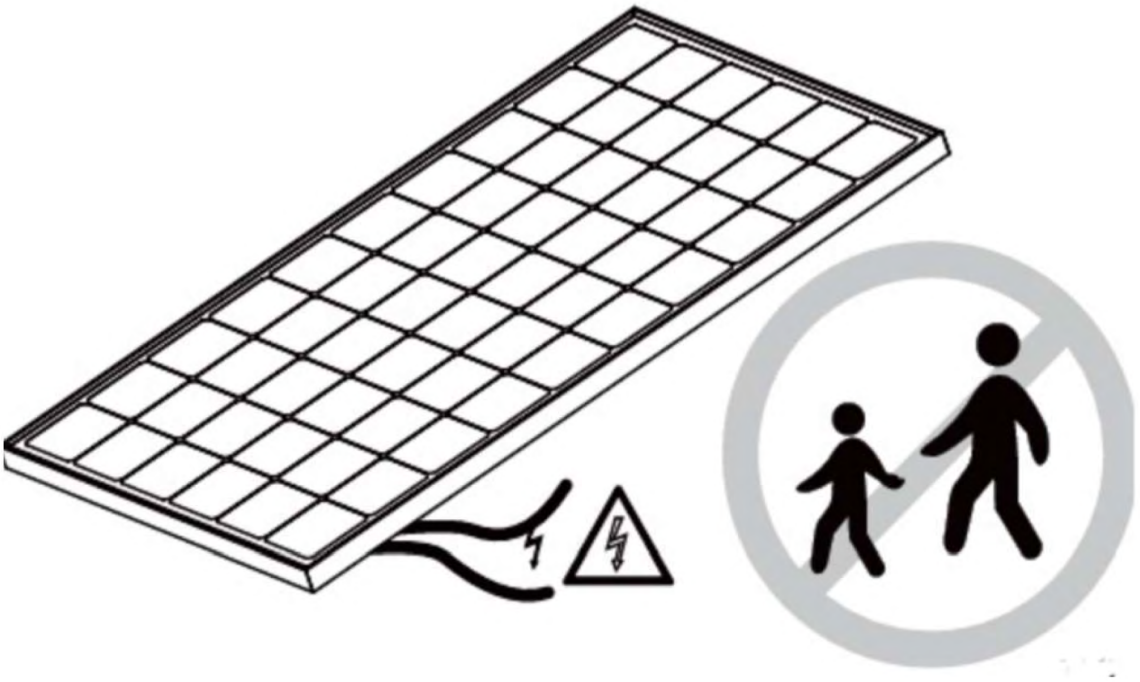
One individual solar module generates DC voltage greater than 30V when exposed to sunlight. Contact with a DC voltage of 30V or more is potentially hazardous. Do not touch the contacts of electrical terminals.



Do not touch the module contacts.

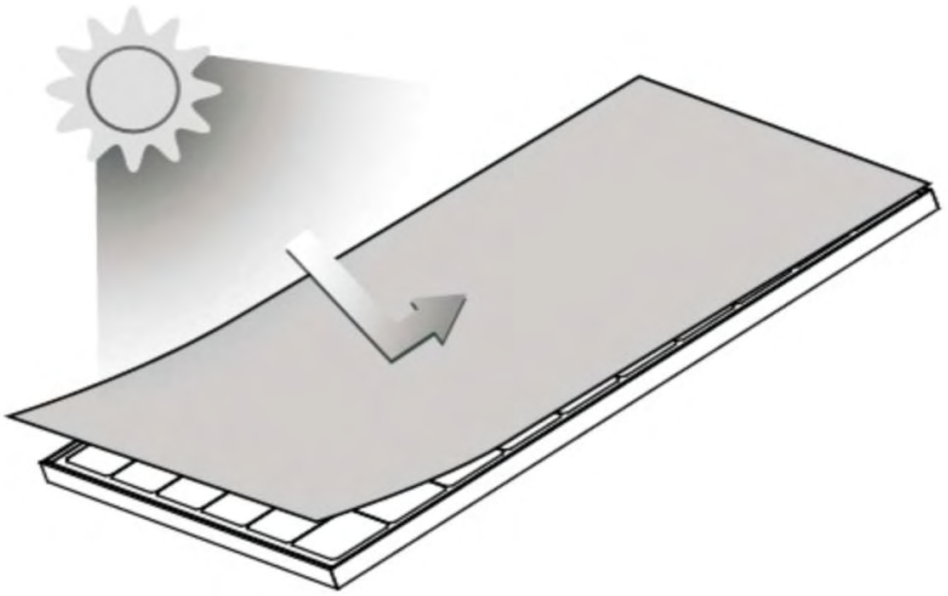


Keep children away from the system while transport and installing mechanical and electrical components.

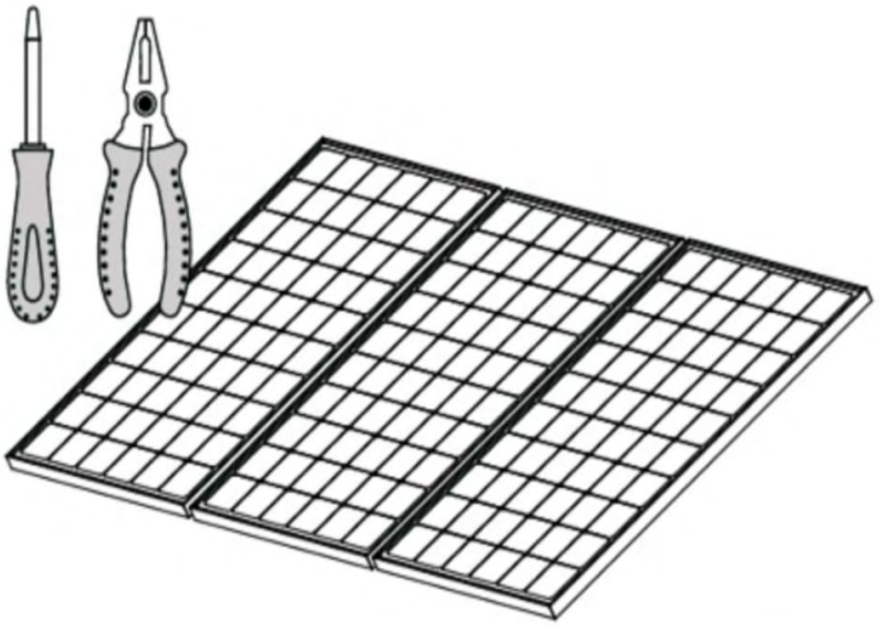


Completely cover the module with an opaque material during installation to keep electricity from being generated. Do not touch the ends of live wires. Do not wear metallic rings,

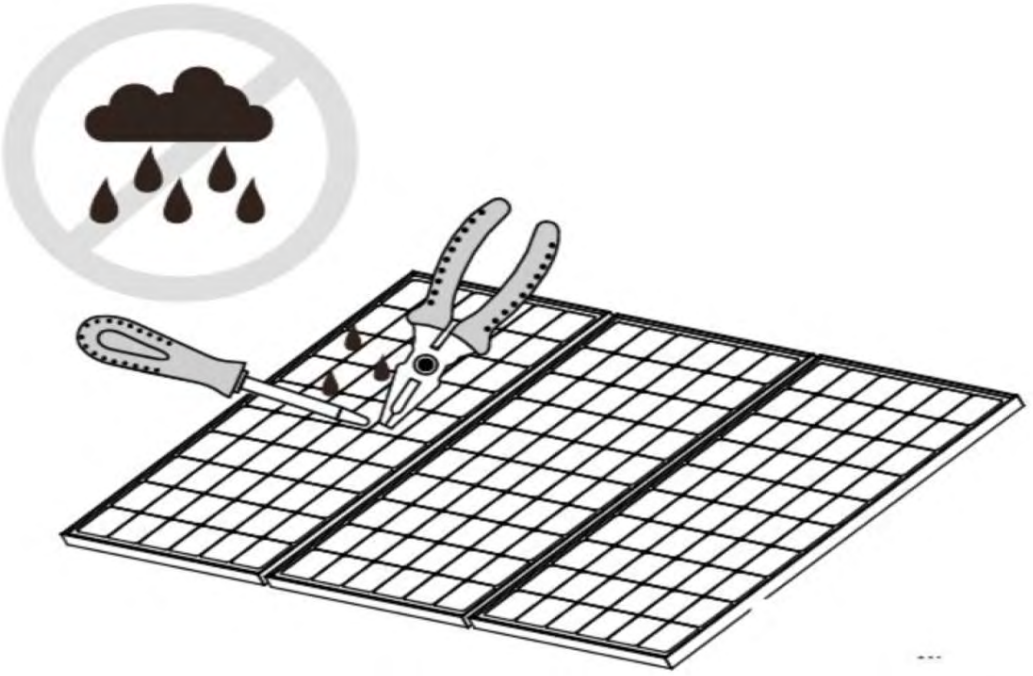
watchbands, ear, nose lip rings or other metallic devices while installing or troubleshooting photovoltaic systems.



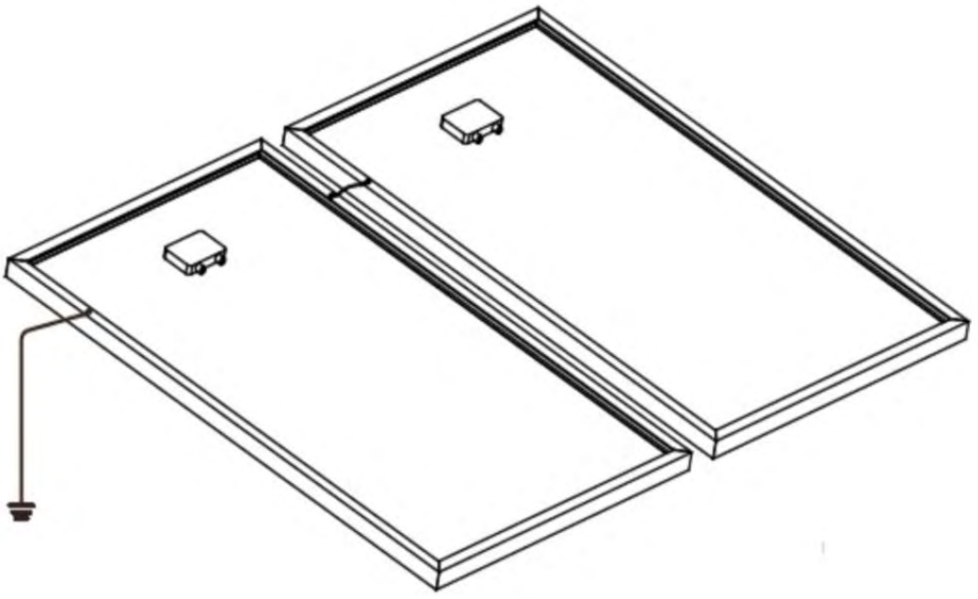
Use only insulated tools that are approved for electrical installations.



Do not work on solar modules in wet conditions.



The module frame must be properly earthed. Removal on any one module must not interrupt the earthing of the remaining modules.



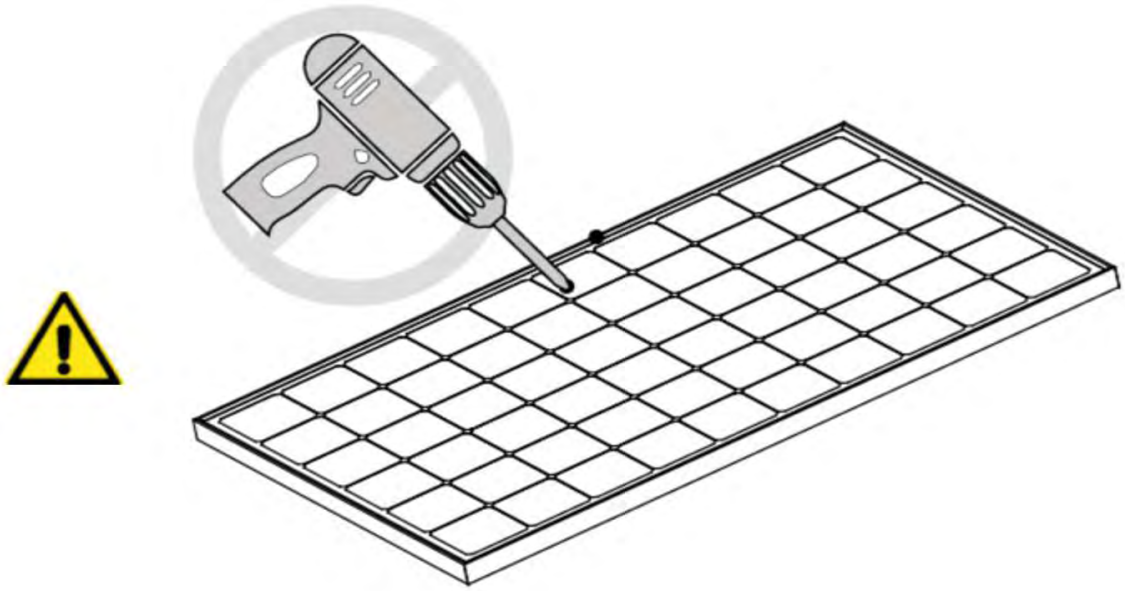
Solar Array Mechanical installation

Selecting an installation place:

- Select a suitable place for installation of the solar modules. The modules should not be shaded during the solar window part of the day.
- The module should be facing north in the southern latitudes for best power generation.
- An approved solar technician should be consulted to determine the best orientation of the solar panels.

Selecting the proper support frame:

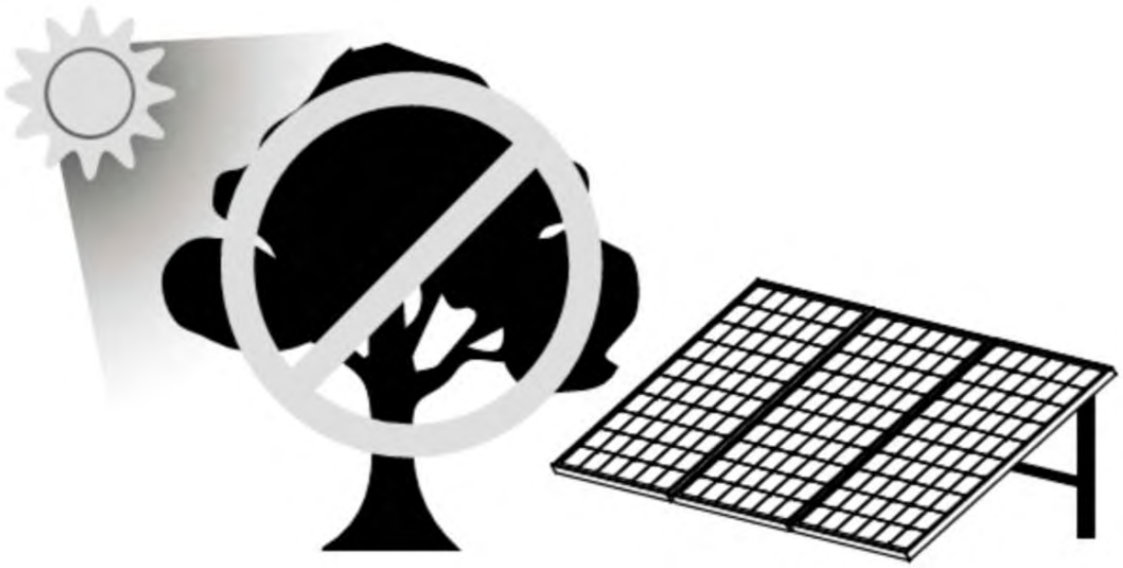
- Always observe the instructions and safety precautions included with the support frame to be used with the modules.
- Never attempt to drill holes in the glass surface of the module. It will void the warranty.
- Do not drill additional mounting holes in the frame of the module. It will void the warranty.



- Modules must be securely attached to the mounting structure using four mounting points for normal installation. If additional wind or snow loads are considered for the installation additional mounting points should also be used.
- The support frame must be made of durable, corrosion resistant and UV resistant material.
- The heat expansion and cold contraction of the support frame should have no effect on its usage and performance.

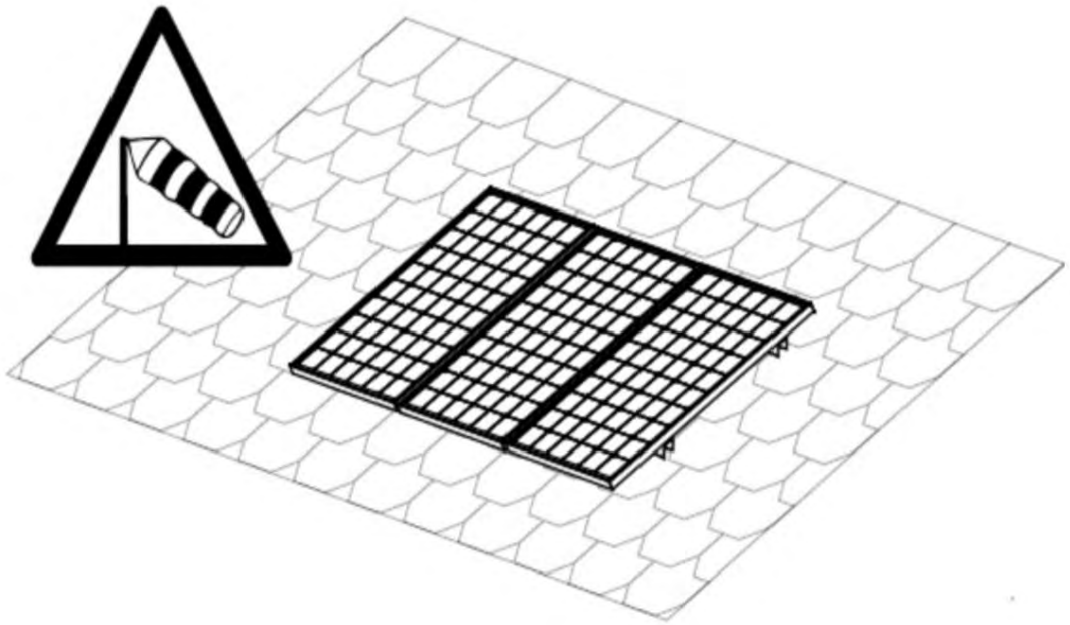
Ground mounting:

- Select the height of the mounting system to prevent the lowest edge of the module from being covered by snow in winter in areas the experience heavy snowfalls. In addition, assure the lowest portion of the module is placed high enough that it is not shaded by plants or trees and is free from the effects of sand and stone driven by wind.

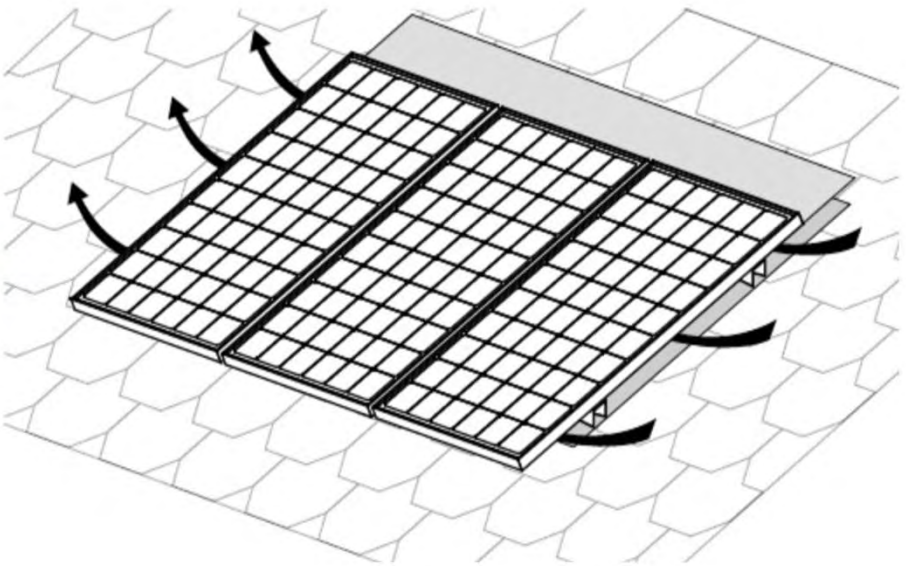


Roof Mounting:

- When installing the modules on a roof ensure that they are securely fastened and cannot fall because of wind or snow loads.
- When installing on a roof, ensure that the roof construction is suitable. In addition, any roof penetration required to mount the module must be properly sealed to prevent leaks.
- The roof installation of solar modules may affect the fireproofing of the house construction and it may be necessary to use an earth ground fault circuit breaker.

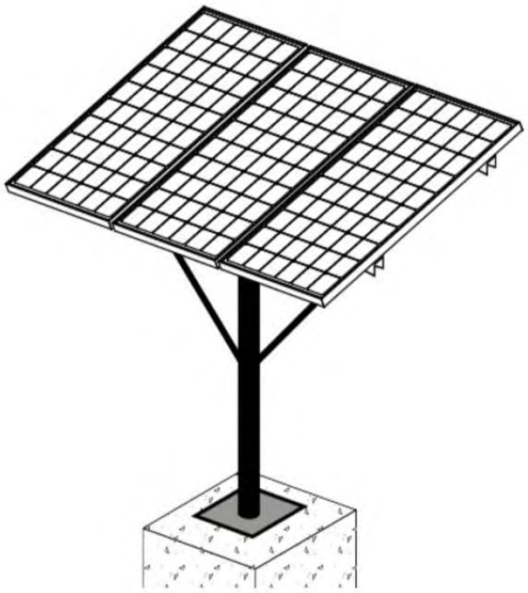


- Provide adequate ventilation under a module for cooling. 50 mm minimum between the module and the mounting surface.



Pole mounting:

- When installing the modules on a pole, choose a pole and module mounting structure that will withstand anticipated winds for the area. The pole must have a solid foundation.

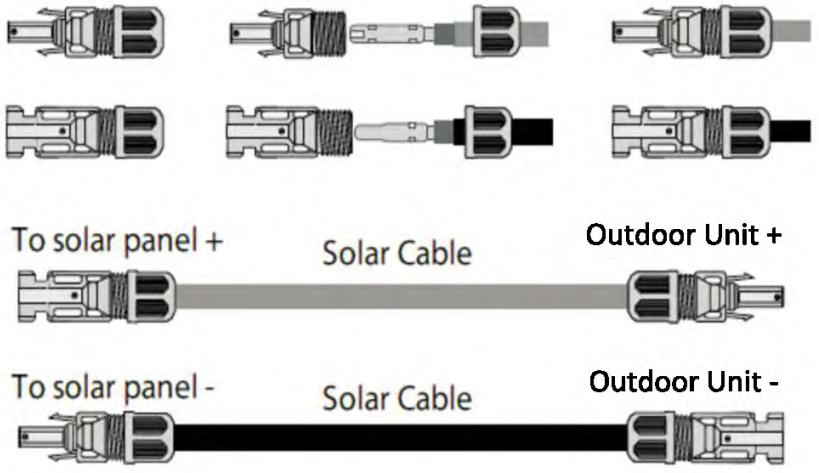


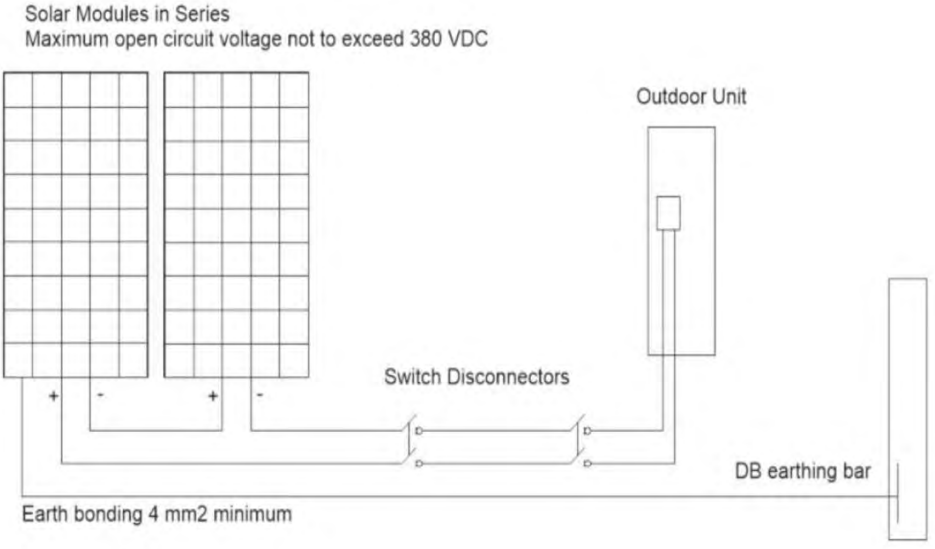
Solar Array Wiring

The array is formed of modules in series. The switch disconnector must be approved for disconnecting solar DC under load.
The MC-4 connectors must be approved and from the same manufacturer at each join.
Mismatching connectors can cause failure and possible fire.

General installation:

- Do not use modules of different configurations in the same system.
- The solar photovoltaic array consists of a maximum of 10 modules of 270 watts or 8 modules of 370 watts.
- The solar array total system voltage must not exceed 380 volts DC open circuit. If installed in an area that experiences temperatures lower than 20 degrees C the Voltage open circuit will rise and a calculation must be done by a qualified technician.
- Both sides of an MC 4 type connection must be of the same type and manufacturer.
- Multistrand solar wire, having a minimum cross section of 2.5 sq mm or larger must be used.
- Cable installation must comply with all local and national codes and regulations.
- A switch disconnector rated for DC must be used between the array and the outdoor unit. If not adjacent to the array a separate switch must be installed at the array.





Earth Fault Protection Solar DC

Roof mounted DC PV arrays located on dwellings must be provided with DC earth fault protection per US Electrical code NEC 2005 Article 690.5. Earth fault protection isolates the Neutral conductor. (in DC this is usually the negative wire) from earth when a ground fault occurs.

Solar Disclaimer

Because the use of this manual and conditions or methods of installation, operation, use and maintenance of the photovoltaic (PV) product are beyond our control, we do not take any responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with such installation, operation use or maintenance. Nor responsibility is assumed by us for any infringement of patents or other rights of third parties, which may result by using the PV product. No license is granted by modification or otherwise under any patent or patent rights.

The information in this manual is based on company knowledge and experience and is believed to be reliable, but such information including product specification (without limitations) and suggestions do not constitute a warranty, expressed or implied.

We reserve the right to change the manual, the PV product, the specifications, or product data sheets without prior notice.

5.Typical Applications

The application examples given below are provided only.

5.1 Application 1

As shown in Figure Figure 5-1 below.

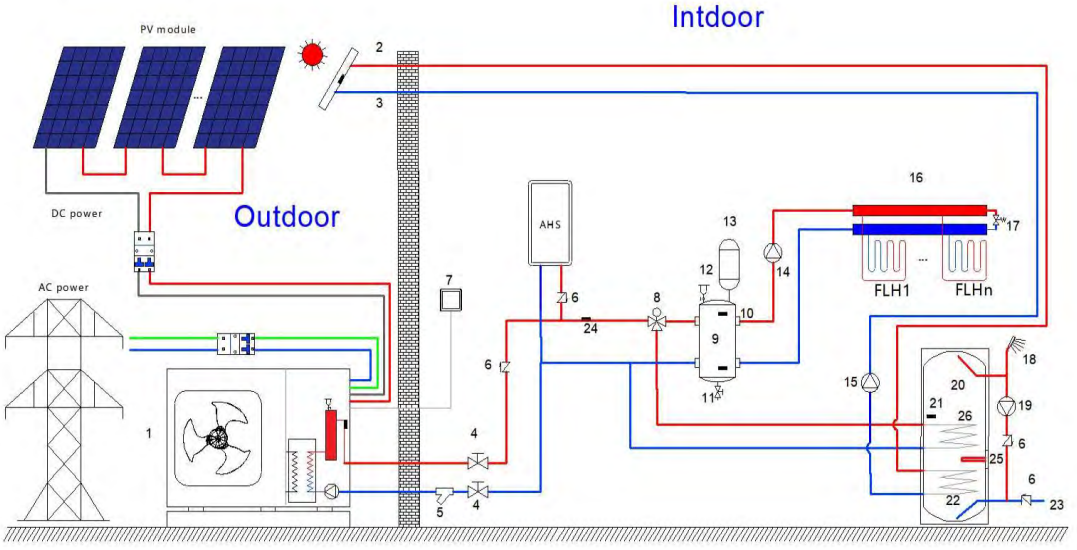


Figure 5-1

Code	Assembly unit	Code	Assembly unit
1	Main unit	15	P_s:Solar pump (Field supply)
2	Solar panel (Field supply)	16	Collector/distributor (Field supply)
3	Tsolar:Solar temperature sensor (Optional)	17	Bypass valve (Field supply)
4	Shut-off valve (Field supply)	18	Hot water tap (Field supply)
5	Filter (Accessory)	19	P_d:DHW pipe pump (Field supply)
6	Check valve (Field supply)	20	Domestic hot water tank (Field supply)
7	User interface	21	T5:Domestic water tank temperature sensor (Accessory)
8	S3V1:3-way valve (Field supply)	22	Coil 2, heat exchanger for Solar energy
9	Buffer tank (Field supply)	23	Tap water inlet pipe (Field supply)
10	Tbt:Buffer tank upper temperature sensor (Optional)	24	T1:Total water flow temperature sensor (Optional)
11	Drainage valve	25	TBH: Domestic hot water tank booster heater (Field supply)
12	Automatic air purge valve	26	Coil 1, heat exchanger for heat pump
13	Expansion vessel (Field supply)	FHL 1...n	Floor heating loop (Field supply)
14	P_o:Outside circulation pump (Field supply)	AHS	Auxiliary heat source (Field supply)

1. Space heating

Set the switch signal, operation mode, and temperature setting on the user interface. P_o continues running as long as the unit is open space heated, S3V1 remains closed.

2. Domestic water heating

Set the on / off signal and the target water tank water temperature (T5S) on the user interface. As long as the unit turns on the domestic hot water, P_o will stop running and S3V1 remains open.

3. AHS (auxiliary heat source) control

The AHS funtion is set on the user interface.(AHS funtion can be set valid or invalid in "OTHER HEATING SOURCE"of "FOR SERVICEMSN".)

When AHS is set to heating mode only, it can be opened by:

a.Turn on the AHS via BACKHEATER function on the user interface;

b.AHS will automatically open when the initial water temperature is too low or the target water temperature is too high.

P_o continues running and S3V1 remains closed as long as AHS is on.

(1) When AHS is set to be effective for heating mode and DHW mode. AHS control in heating mode is the same as in Part 2); in DHW mode, AHS is automatically enabled when the initial living water temperature T5 is too low or the target living water temperature is too high. P_o stops running, while SV1 remains open.

(2) When the AHS settings is valid, M1M2 can be set to valid on the user interface. In heating mode, if the MIM2 dry contact closes, the AHS will be turned on. This function is not valid in the DHW mode.

4. TBH (tank booster heater) control

The AHS function is set on the user interface.(AHS function can be set valid or invalid in "OTER HEATING SOURCE" of "FOR SERVICEMAN".)

(1) When TBH is set to valid, TBH can be enabled through the water tank heater function on the user interface; In DHW mode, when the initial living water temperature T5 is too low or the target living water temperature is too high, TBH is enabled automatically on.

(2) When TBH is set to valid, M1 M2 can be set to valid on the user interface. If the MIM 2 dry contact is closed, the TBH is turned on.

5.Solar energy control

The hydraulic module identifies the solar signal by judging the Tsolar or receiving the SL1 SL2 signal from the user interface. The identification method can be set by solar input at the user interface.

(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 SL1 SL2 control is set to be valid, Solar energy turns ON after receiving Solar kit signal from user interface, P_s starts running; Without solar kit signal. Solar energy turns OFF, P_s stops running.

Notes:

1.The maximum outlet water temperature can reach 80 degrees Celsius, please note the burns.

2.At extremely low ambient temperature, the domestic hot water is exclusively heated by TBH, which assures that heat pump can be used for space heating with full capacity.
3.Details on domestic hot water tank configuration for low outdoor temperatures (T4DHWMIN) can be found in "DHW MODE SETTING" of "FOR SERVICEMAN".

5.2 Application 2

5.2.1 Single-zone control is shown in Figure 5-2 below

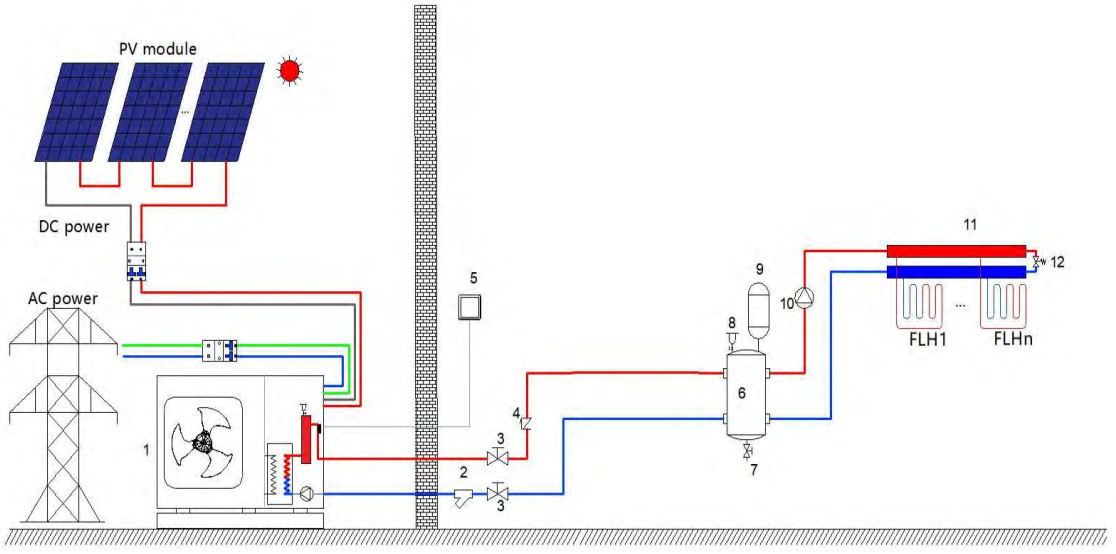


Figure 5-2

Code	Assembly unit	Code	Assembly unit
1	Main unit	8	Automatic air purge valve
2	Filter (Accessory)	9	Expansion vessel (Field supply)
3	Shut-off valve (Field supply)	10	P_o: Outside circulation pump(Field supply)
4	Check valve (Field supply)	11	Collector/distributor (Field supply)
5	User interface	12	Bypass valve (Field supply)
6	Buffer tank (Field supply)	FHL1...n	Floor heating loop (Field supply)
7	Drainage valve		

1.Space heating
One zone control: the unit ON/OFF is controlled by the room thermostat, operation mode and outlet water temperature are set on the user interface. System is ON when "HT" of the thermostat keep closing for 15s. When "HT"keepopeningfor15s,systemturms OFF.

2.The circulation pump operation
When the system is ON, which means "HT" of the thermostat close, P_o starts running: When the system is OFF.which means "HT" open, P_o stops running.

5.2.2 The mode setting control is shown in Figure 5-3 below

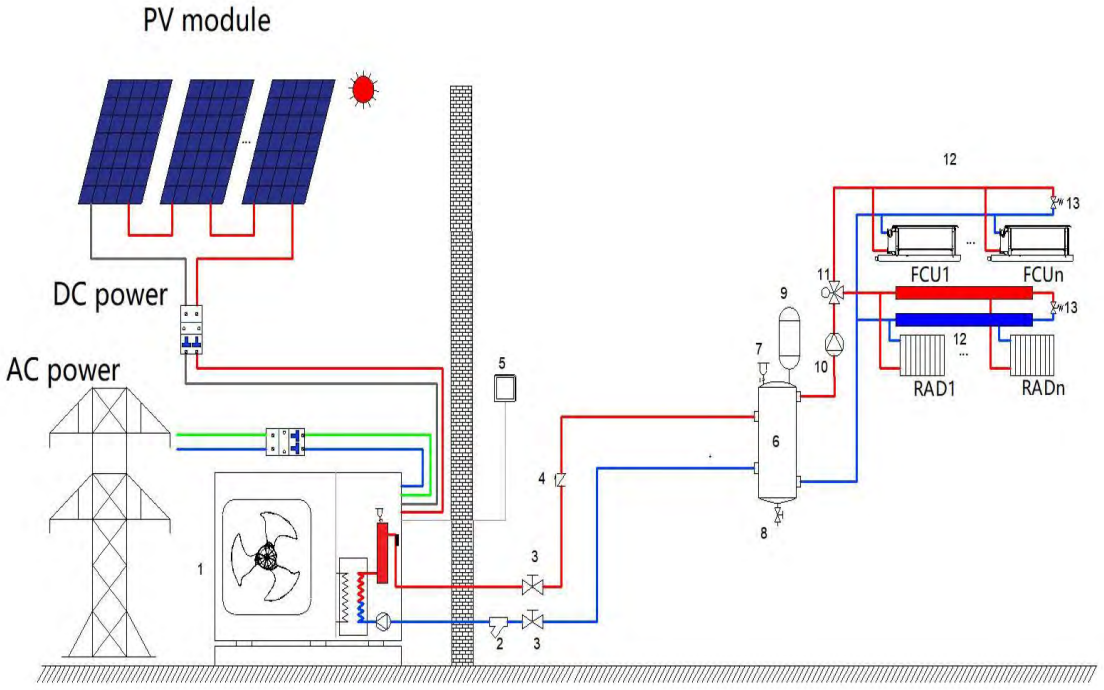


Figure 5-3

Code	Assembly unit	Code	Assembly unit
1	Main unit	9	Expansion vessel (Field supply)
2	Filter (Accessory)	10	P_o: Outside circulation pump(Field supply)
3	Shut-off valve (Field supply)	11	S3V2:3-way valve (Field supply)
4	Check valve (Field supply)	12	Collector/distributor (Field supply)
5	User interface	13	Bypass valve (Field supply)
6	Buffer tank (Field supply)	FCU1...n	Fan coil unit (Field supply)
7	Automatic air purge valve	RAD1...n	Floor heating loop (Field supply)
8	Drainage valve		

1.Space heating

Operation mode and ON/OFF of the unit are set via the room thermostat, water temperature is set on the user interface.

(1) When "CL" of the thermostat keep closing for 15s, the system will run according to the priority mode set on the user interface.

(2) When "CL" of the thermostat keep opening for 15s and "HT" close , the system will run according to the non-priority mode set on the user interface.

(3) When "HT" of the thermostat keep opening for 15s and "CL" open , the system will turn off.

(4) When "CL" of the thermostat keep opening for 15s and "HT" open , the system will turn off.

2.The circulation pump and valve operation

(1) When the system is in cooling mode, S3V2 keeps OFF, P_o starts running.

(2) When the system is in heating mode, S3V2 keeps ON, P_o starts running.

5.2.3 Dual-zone control is shown in Figure Figure 5-4 below

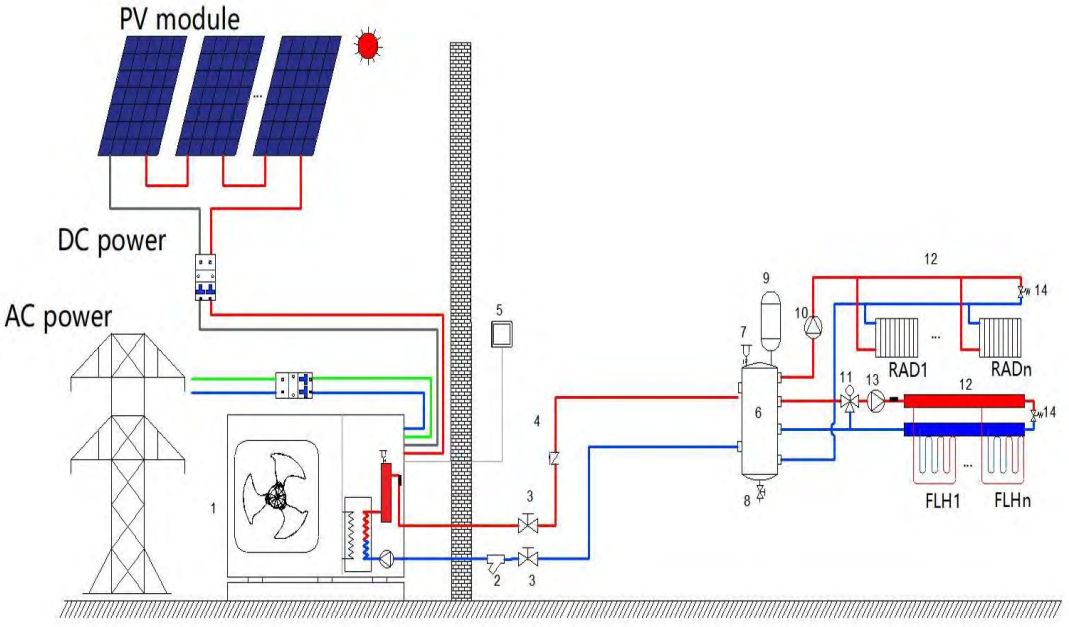


Figure 5-4

Code	Assembly unit	Code	Assembly unit
1	Main unit	9	Expansion vessel (Field supply)
2	Filter (Accessory)	10	P_o: Outside circulation pump(Field supply)
3	Shut-off valve (Field supply)	11	S3V3: Mixing valve (Field supply)
4	Check valve (Field supply)	12	Collector/distributor (Field supply)
5	User interface	13	P_c: zone 2 circulation pump (Field supply)
6	Buffer tank (Field supply)	14	Bypass valve (Field supply)
7	Automatic air purge valve	RAD 1...n	Radiator (Field supply)
8	Drainage valve	FLH 1...n	Floor heating loop (Field supply)

1. Space heating

Zone1 can operate in cooling mode or heating mode, while zone2 can only operate in heating mode;

Operation mode and water temperature are set on the user interface, the unit ON/OFF is controlled by the room thermostat. While installing the system, only"HT"terminals need to be connected for the thermostat in zone1,only"CL"terminals need to be connected for the the rmostat in zone2.

(1) When“HT”keeps closing for 15s, zone1 turns ON. When“HT”keeps opening for 15s, zone1 turns OFF.

(2) When“CL”keeps closing for 15s, zone2 turns ON. When “CL” keeps opening for 15s, zone2 turns OFF.

2. The circulation pump and valve operation

When region 1 is ON, P_o starts running: when region 1 is closed, P_o stops running;

When zone 2 is ON, S3V3 switches between ON and OFF according to the set TW2, P_C keeps ON;

When zone 2 is OFF,S3V3 is OFF,P_c stops running.

The floor heating circuit requires a lower water temperature in heating mode compared to the radiator or fan coil set. To reach these two set points, use a mixing station to adjust the water temperature according to the requirements of the floor circuit. The radiator is directly connected to the unit water circuit, and the floor circuit is located after the mixing station. The mixing station is controlled by this unit.

Note:

The drain valve must be installed at the lowest position of the piping system.

5.3 Cascade system is shown in Figure 5-5 below

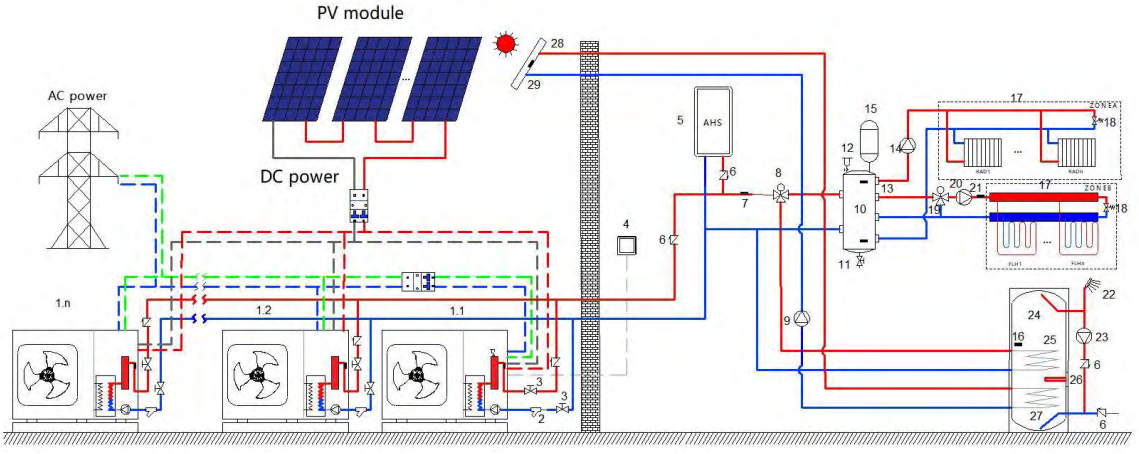


Figure 5-5

Code	Assembly unit	Code	Assembly unit
1.1...1.n	Main unit	18	Bypass valve(Field supply)
2	Filter (Accessory)	19	S3V3:Mixing valve (Field supply)
3	Shut-off valve (Field supply)	20	P_C:Zone2 circulation pump (Field supply)
4	User interface	21	TW2:Zone2 water flow temperature sensor (Optional)
5	AHS:Auxiliary heating source(Field supply)	22	Hot water tap(Field supply)
6	Check valve(Field supply)	23	P_D:DHW pipe pump (Field supply)
7	T1:Total water flow temperature sensor (Optional)	24	Domestichotwatertank(Field supply)
8	S3V1:3-way valve (Field supply)	25	Coin 1,heat exchanger for heat pump
9	P_s:Solar pump (Field supply)	26	TBH:Domestichotwater tank booster heater
10	Buffer tank (Field supply)	27	Coin2,heat exchanger for solar energy
11	Drainage valve	28	Tsolar:Solar temperature sensor (Optional)
12	Automatic air purge valve	29	Shut-off valve (Field supply)

13	Tbt:Buffer tank upper temperature sensor (Optional)	ZONEA	The space operates in cooling or heating mode
14	P_o:Outside circulation pump (Field supply)	ZONEB	The space only operates in Heating mode
15	Expansion vessel (Field supply)	RAD1...n	Fan coil unit(Field supply)
16	T5:Domestic water tank temperature sensor (Accessory)	FHL1...n	Floor heating loop(Field supply)
17	Collector/distributor (Field supply)		

1.Domestic water heating

Only masterunit can operate in DHW mode.T5S is set on the user interface. In DHW mode,S3V1 keeps.

2.Slave heating

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

In cooling mode, S3V3 and P_C keep OFF, P_O keeps ON;

In heating mode, when both ZONE 1 and ZONE 2 work, P_C and P_O keep ON, S3V3 switches between ON and OFF according to the set TW2;

In heating mode, when only ZONE 1 works, P_O keep ON, S3V3 and P_C keeps OFF;

In heating mode, when only ZONE 2 works, P_O keep OFF, P_C keeps ON, S3V3 switches between ON and OFF according to the set TW2.

3.AHS(Auxiliary heat source) Control

The AHS function is set on the user interface.(AHS function can be set valid or invalid in “OTHER HEATING SOURCE” of "FOR SERVICEMAN".);AHS is only controlled by master unit. When master unit operates in DHW mode , AHS can only be used for producng domestic hot water; when master unit operates in heating mode, AHS can be used for heating mode.

1)When AHS is set valid only in heating mode, it will be tumed on in following conditions:

a.Turn on BACK UP HEATER function on user interface;

b.Master unit operates in heating mode. When inlet water temperature is too low, or while ambient temperature is too low, the target leaving water temperature is too high, AHS will be turned on automatically.

2)When AHS is set valid in heating mode and DHW mode, it will be turned on in following conditions:

When master unit operates in heating mode, conditions of turning on AHS is same as 1); When master unit operates in DHW mode,if T5 is too low or when ambient temperature is too low,target T5 temperature is too high,AHS will be turnedonautomatically.

3)When AHS is valid,and the operation of AHS is controlled by M1M2.When M1M2 closes,AHS is turned on.

4.TBH(Tank boster heater) Control

The TBH function is set on the user interface. (TBH function can be set valid or invalid in “OTHER HEATING SOURCE” of "FOR SERVICEMAN".) TBH is only controlled by master unit. Please refer to

5.1 Application 1 for TBH control.

5.Solar energy Control

Solar energy is only controlled by master unit. Please refer to 5.1 Application 1 for solar energy control.

Notes:

1. Maximum 6 units can be cascaded the system. One of them is master unit, the others are slave units; Master unit and slave units are distinguished by whether connected to wired controller while powering on. The unit with wired controller is master unit, units without wired controller are slave units; Only master unit can operate in DHW mode. While installation,please check the cascade system diagram and determine the master unit; Before powering on, remove all wired controllers of salve units.
2. S3V1,S3V2,S3V3, P_O, P_C, P_S,T1,T5, TW2, Tbt,Tsolar, SL1 SL2,AHS,TBH interface are only connected to corresponding terminals on main board of master unit.
3. The address code of the slave unit needs to be set on the hydraulic module PCB board DIP-switch (See electrically controlled wiring diagram on the unit)
4. It is suggested to use the reversed return water system in order to avoid hydraulic imbalance between each unit in a cascade system.
5. In cascade system, Tbt sensor must be connected to master unit and set Tbt vaild on user interface otherwise all slave units will not work.
6. If outside circulation pump need to be connected in series in system when the head of internal water pump is not enough, outside circulation pump is suggested to be installed after the balance tank.
7. Please ensure that the maximum interval of power-on time of all units doesn't exceed 2 mins, which may cause the slaves to fail to communicate normally.
8. Maximum 6 units can be cascaded in one system, all slave unit address codes cannot be the same and caon not be 0#.
9. The outlet pipe of each unit must be installed with a check valve.

6.Unit profile

6.1. The inner panel is shown in Figure 6-1

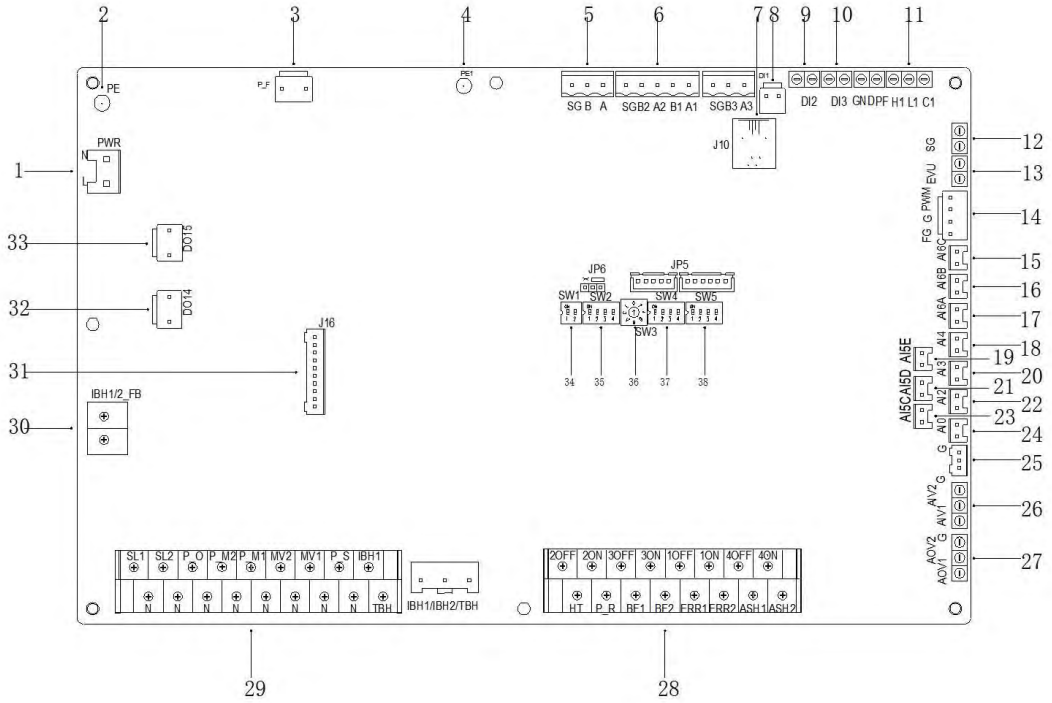


Figure 6-1

Code	Assembly unit	Assembly unit
1	PWR	Power input port from Main control board (PWR)
2	PE	Electrical grounding
3	P_F	Frequency variable pump power supply
4	PE1	Electrical grounding1
5	GS/B/A	Internal and external communication
6	SG/B2/A2/B1/A1	BMS and cascades
7	J10	Display screen
8	DI1	Water flow switch
9	DI2	Line controller switch
10	DI3	Thermostat C signal or hot water switch
11	H1/L1/C1	Spare
12	SG	SG
13	EVU	EVU
14	FG/G/PWM	Frequency frequency water pump control and feedback
15	AI6C	B1 Mixed water temperature
16	AI6B	Hot water tank temperature
17	AI6A	Total effluent temperature of the system

18	AI4	Solar temperature
19	AI5E	The plate changes the water temperature
20	AI3	Temperature of the upper buffer tank
21	AI5D	The plate is replaced with water temperature
22	AI2	Buffer the temperature of the lower tank
23	AI5C	Total effluent temperature
24	AI0	B2 mixed water temperature
25	5V/G	Effusion meter
26	AIV1/AIV2/G	Spare
27	AIV1/AIV2/G	Spare
28	J22	Active output
29	J23	Active output
30	IBH1/2_FB	Water tank electric heat feedback
31	J16	Extended board interface
32	DO14	Anti-freezing of the electric heating zone
33	DO15	Spare

6.2. Schematic diagram of the external machine board

6.2.1 The external main control board is shown in Figure 6-2 below

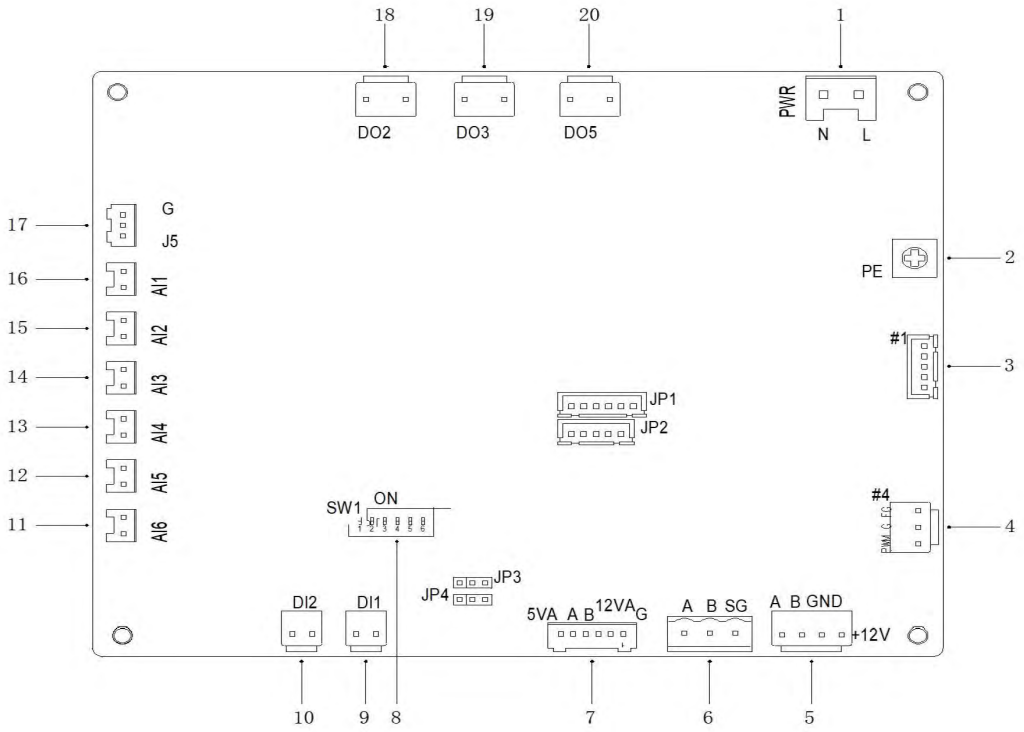


Figure 6-2

Code	Assembly unit	Assembly unit
1	PWR	Electric source
2	PE	Electrical grounding
3	#1	Main valve
4	#4	Variable frequency pump
5	A/B/GND/+12V	Power converter and DC12V input
6	A/B/SG	Communication
7	5VA/A/B/12VA/G	DC12V output
8	SW1	Dip switch SW1
9	DI1	Pressure machine high pressure
10	DI2	Pressure machine low pressure
11	AI6	Case temperature
12	AI5	Valve rear temperature
4	AI4	Delivery temperature
3	AI3	Suction temperature
15	AI2	Fin temperature
16	AI1	Ambient temperature
17	J5	The J5 pressure sensor
18	DO2	Four-way valve
19	DO3	Chassis electric heating
20	DO5	Electric heating of crankshaft 1

6.2.2 External machine drive board

As shown in Figure 6-3 below.

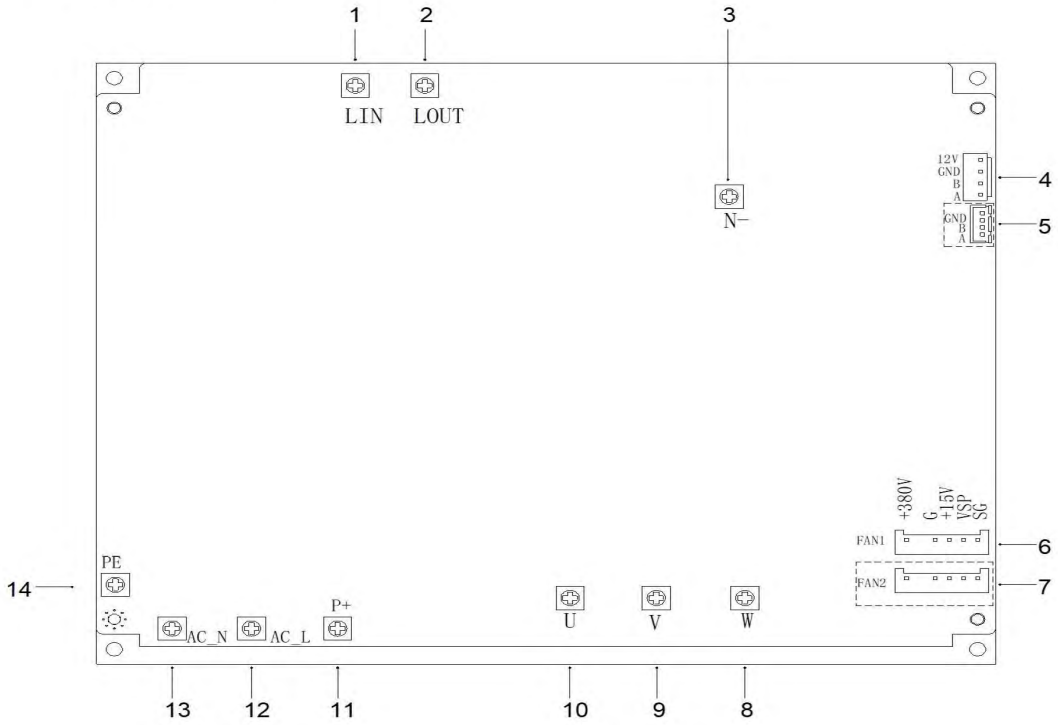


Figure 6-3

Code	Assembly unit	Assembly unit
1	PE	Electrical grounding
2	AC-N	Null line
3	AC-L	Battle line
4	P+	Generatrix +
5	U	Press U
6	V	Press V
7	W	press W
8	FAN1	Draught fan1
9	FANB2	Draught fan2
10	N-	Pv output-
11	P+	Pv output +
12	AC_L	source L
13	AC_N	source N
14	PE	Electrical grounding

6.2.3 The booster plate is shown in Figure 6-4 below.

Model	1-phase	1-phase	1-phase	3-phase
	4/6kW	8/10kW	12/14/16kW	12/14/16kW
Power supply DC PV String Input Data				
Power supply AC	AC 220-240/1/50			AC 380-415/3/50
Voc	DC 80-380V	DC 80-380V	DC 200-410V	DC 200-410V
Max. PV (DC) Input Current (A)	13	13+13	13+(13+13)	13+13
Max. PV ISC (A)	22	22+22	22+(22+22)	22+22
No.of MPPT Trackers	1	1	2	1
No.of Strings per MPPT Tracker	1	2	1+2	2

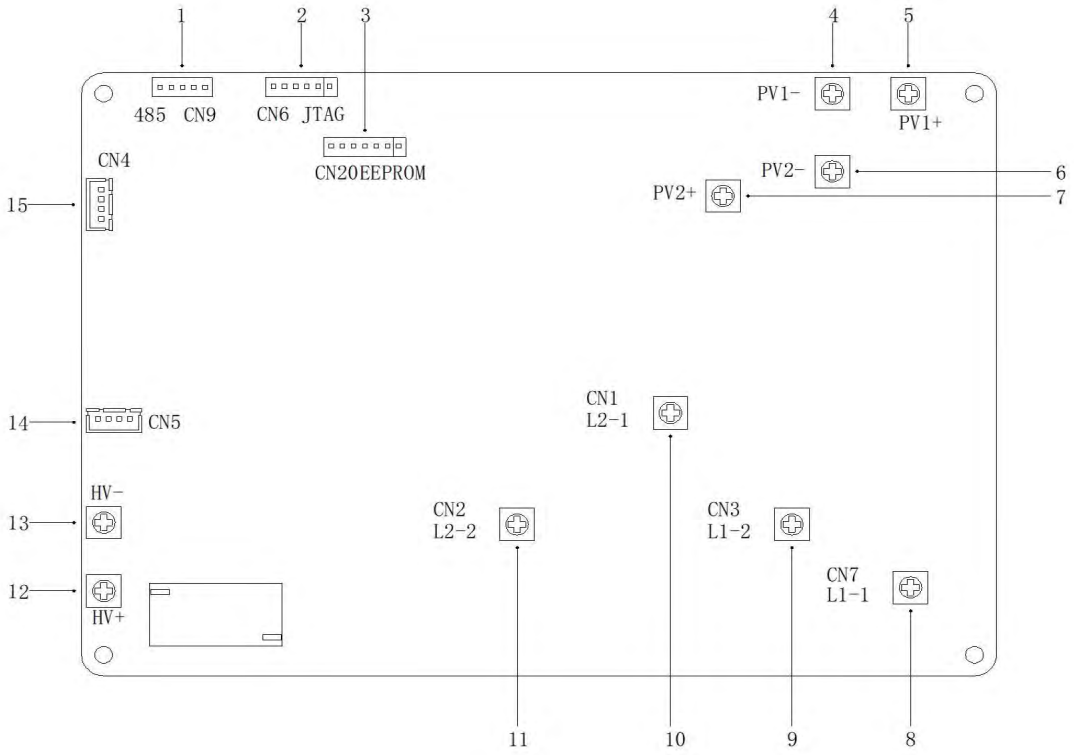


Figure 6-4

Code	Assembly unit	Assembly unit
1	CN9	External board communication
2	CN6	-
3	CN20	EE
4	PV1-	Photovoltaic into the line
5	PV1+	Photovoltaic into the line
6	PV2-	Photovoltaic into the line
7	PV2+	Photovoltaic into the line
8	CN7	Differential mode inductance
9	CN3	Differential mode inductance
10	CN1	Differential mode inductance
6	PV2-	Photovoltaic into the line
7	PV2+	Photovoltaic into the line
8	CN7	Differential mode inductance
9	CN3	Differential mode inductance
10	CN1	Differential mode inductance

6.3. Water piping

The length and distance of all pipelines have been considered.

Demand:

The maximum allowable the rmistor cable length is 20m. This is the maximum allowable distance between the domestic water tank and the unit (only for devices with domestic water tank). The the rmistor cable of the domestic hot water tank is 10m long. To optimize efficiency,

we recommend being as close to three-way valves and domestic hot water tanks as possible.

Notes:

1. If domestic hot water tank (supplied on site) during installation, refer to the Installation and Owner's Manual. If there is no ethylene glycol (antifreeze) in the system or a power failure or pump fault, drain the system(As shown in Figure 6-5 below).
2. Frozen water may be damaged from the system during freezing weather when the unit is not used.

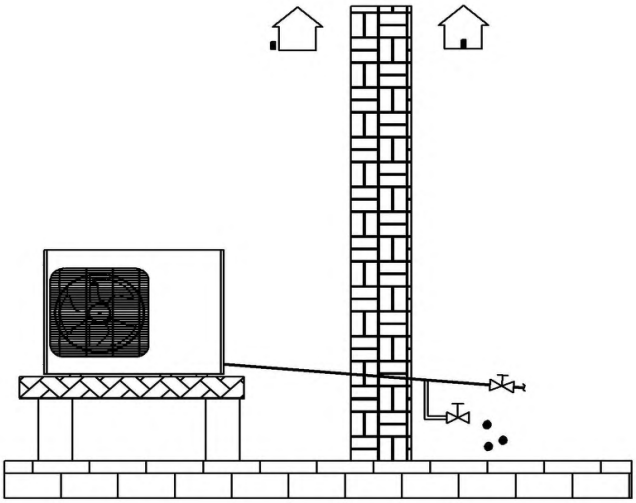


Figure 6-5

6.3.1 Check the water circuit

The installation is equipped with an entrance and outlet to a water supply road. The circuit must be provided by authorized technicians and must comply with local laws and regulations.
The device can only be used in a closed water system. Application in open-circuit circuits may cause excessive corrosion of water pipes.
See Figure Figure 6-6 below for more details

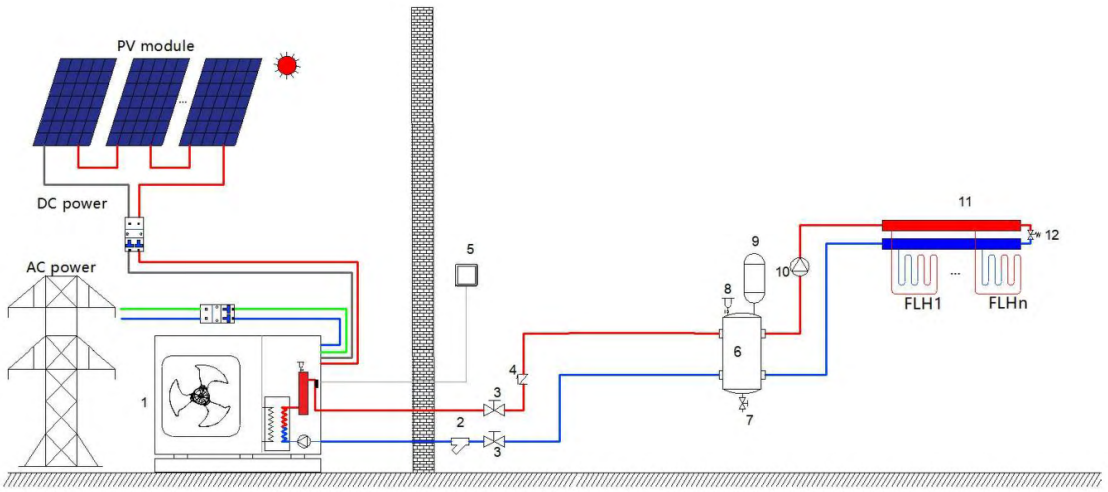


Figure 6-6

Code	Assembly unit	Code	Assembly unit
1	Main unit	8	Automatic air purge valve
2	Filter (Accessory)	9	Expansion vessel (Field supply)
3	Shut-off valve (Field supply)	10	P_o: Outside circulation pump(Field supply)
4	Check valve (Field supply)	11	Collector/distributor (Field supply)
5	User interface	12	Bypass valve(Field supply)
6	Buffer tank (Field supply)	FHL 1...n	Floor heating loop (Field supply)
7	Drainage valve		

Notes:

Before continuing to install the device, check the following conditions.

1. The maximum water pressure≤3 bar.
2. According to the safety device setting, the maximum water temperature is 70 C.
3. Always use materials compatible with the water used in the system and the materials used in the equipment.
4. Ensure that components installed in field piping can withstand water pressure and temperature.
5. Drainage taps must be set at all low points of the system to fully drain the circuit during maintenance.
6. Vvents must be provided at all high points of the system. The vents shall be located in a position where maintenance is easily smoothly. An automatic air purge valve is provided inside the unit. Check that the air purification valve is not tightened so as to automatically release the air in the water circuit.

6.3.2 Water volume and sizing expansion vessels

The device is equipped with a 5-liter expansion vessel with a maximum working pressure of 3bar. To ensure the normal operation of the unit, it may be necessary to adjust the prepressure pressure of the expansion vessel.

1. Check that the total water volume in the installation, excluding the internal water volume of the unit, is at least 40L.
2. Expansion vessel volume must fit the total water system volume.
3. To size the expansion for the heating and cooling circuit.

Note:

In most applications, this minimal amount of water will be satisfactory. Additional water may be required in critical processes or in rooms with high heat loads. When the circulation of each space heating loop is controlled by remotely controlled valves, it is important to maintain a minimum amount of water, even if all valves are closed.

6.3.3 Water circuit connection

The connection of inlet and outlet must be properly connected according to the label on the outdoor unit.

When connecting the pipeline, pay attention not to exert too much force, so as not to deform the unit pipeline. Deformation of the pipes can cause the unit failure

Problems can arise if air, moisture, or dust enters the waterways. Therefore, the following points should always be considered when connecting the waterways:

1. Use only clean pipes.Tube end facing down with the burr removed.
2. When passing through the wall tube, the pipe end should be covered to prevent dust and dirt from entering.
3. Use a good threaded sealant to seal the connection. The seal must be able to withstand the pressure and temperature of the system.
4. When using non-copper metal pipes, ensure that both materials are insulated from each other to prevent galvanic corrosion.
5. Copper is a soft material that uses suitable tools when connecting waterways. Improper use can damage the line.

Notes:

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:

1. 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...
2. When using a 3-way valve in the water circuit, Preferably choose a ball type 3-wayvalve fo guarantee full separation between the domestic hot water and floor heating water circuit.
3. When using a 3-way valve or 2-way valve in the water circuit.The recommend maximum change over time of the valve should be less than 60 seconds.

6.3.4 Water circuit anti-freeze and insulation protection

All intemal hydronic parts are insulated to reduce heat loss. insulation must also be added to the field piping.

In event of a power failure, the above features would not protect the unit from freezing.

The software contains special functions using the heat pump and backup heater (if optional and aviliable) to protect the entire system against freezing. When the temperature of the water flow in the system drops to a certain value, the unit will heat the water, either using the heat pump, the electric heating tap, or the backup heater.The anti-freeze function will turn off only when the temperature increases to a certain value.

Water may enter into the flow switch and cannot be drained out and may freeze when the temperature is low enough.The flow switch should be removed and dried, then can be installed in the unit.

The complete water circuit including all pipes and water pipes must be insulated to prevent condensation and reduce cold and hot capacity during cooling, and to prevent external water pipe freezing in winter. The insulation shall be at least B1 fire resistant grade and shall comply with all applicable laws and regulations. The sealing material must be at least 0.039 W / mK to prevent freezing on the external water piping.(As shown in Figure 6-7below).

If the outdoor ambient temperature is higher than 30℃ and the humidity is above RH 80%, the thickness of the sealing material shall be at least 20mm, to avoid condensation of the sealing surface.

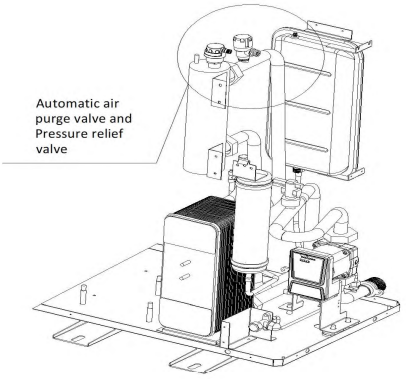
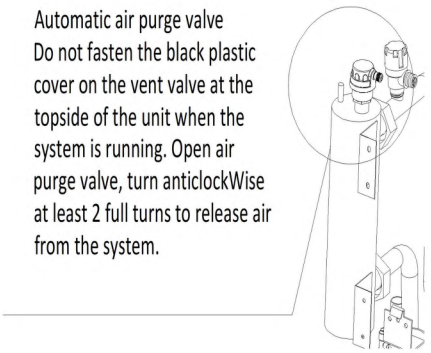


Figure 6-7

6.3.5 Filling water

1. Connect the water supply to the filling valve and open the valve.
2. Ensure the automatic air purification valve is opened.
3. Fill with water pressure of approximately 2.0 bar. Use an air purification valve to remove as much of the air from the circuit as possible. Air in the water circuit may cause a failure of the backup electric heater.



Notes:

During the system during the system. During the first running time of the system, the remaining air will be removed through the automatic air purification valve. Water may need to be added afterwards:

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.

6.4 Main components of the unit

As shown in Figure 6-8 below.

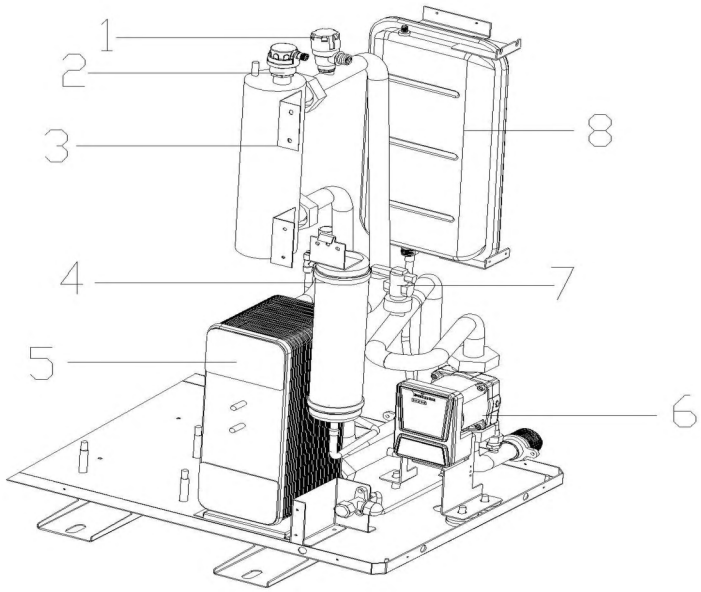


Figure 6-8

Code	Assembly unit	Explanination
1	Pressure relief valve	Prevents excessive water pressure by opening at 3 bar and discharging water from the water circuit.
2	Automatic air purge valve	Remaining air in the water circuit will be automatically removed from the water circuit.
3	Reservoir	Storage, gas-liquid separation, filtration, elimination, and refrigerant buffering.
4	Electrical heating	The main role of electric heating is to convert electrical energy into heat energy, which is used to heat objects or media
5	Plate heat exchanger	Transfer heat from the refrigerant to the water.
6	Pump	Circulates water in the water circuit.
7	Flow switch	Detects water flow rate to protect compressor and water pump in the event of insufficient water flow.
8	Expansion vessel	Balances water system pressure.

6.5 Field wiring

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.
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 (As shown in Figure 6-9 below).

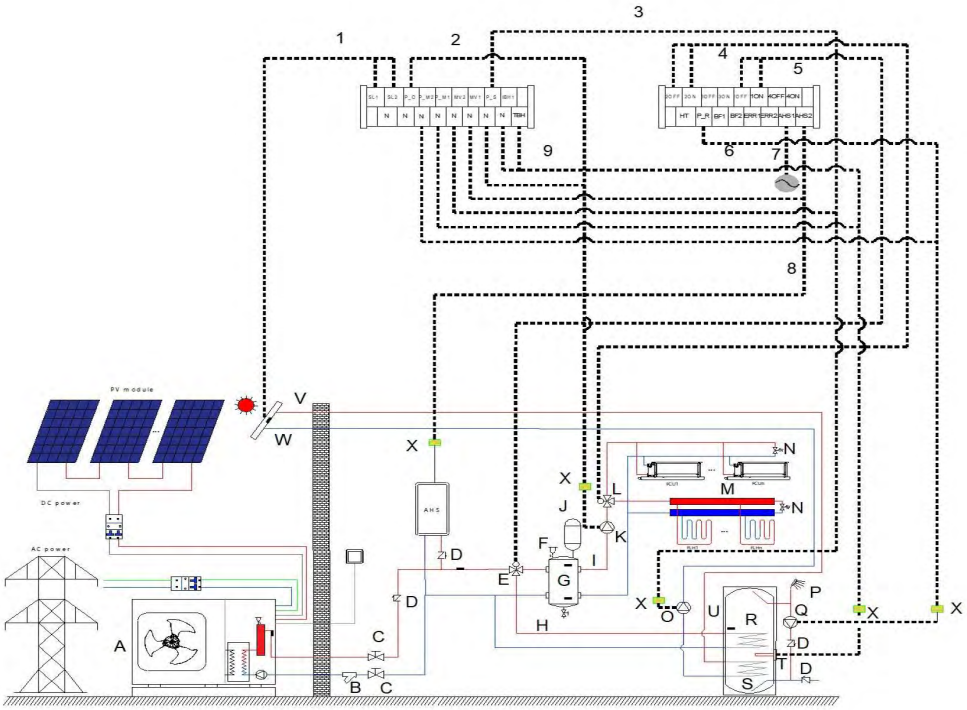


Figure 6-9

Components description:

Code	Assembly unit		Code	Assembly unit	
1	SL	Solar signal	6	P_R	Next back to the pump
2	P_O	External circulation pump	7	AHS1	Failure indication
3	P_S	Solar water pump	8	AHS2	External heat source
4	2OFF/2ON	Electromagnetic three-way valve 2	9	TBH	Water tank electric heat
5	1OFF/ION	Electromagnetic three-way valve 1			

Code	Assembly unit	Code	Assembly unit
A	Main unit	M	Collector/distributor (Field supply)
B	Filter (Accessory)	N	Bypass valve(Field supply)
C	Shut-off valve (Field supply)	O	P_s:Solar pump (Field supply)
D	Check valve (Field supply)	P	Hot water tap (Field supply)
E	S3V1:3-way valve (Field supply)	Q	P_d:DHW pipe pump (Field supply)
F	Automatic air purge valve	R	Coin 1,heat exchanger for heat pump
G	Buffer tank (Field supply)	S	Coin2,heat exchanger for solar energy
H	Drainage valve	T	TBH:Domestic hot water tank booster heater
I	Tbt:Buffer tank upper temperature sensor (Optional)	U	Domestic hot water tank(Field supply)
J	Expansion vessel (Field supply)	V	Tsolar:Solar temperature sensor (Optional)
K	P_o: Outside circulation pump(Field supply)	W	Shut-off valve (Field supply)
L	S3V2:3-way valve (Field supply)	X	Contactor

(a) Minimum cable section: AWG18(0.75mm²).
(b) If the load current is large and an AC contactor is required, supply your resmistor cable.

Note:
Use H 07 RN-F for all cables except sensitive and user interface cables.

The equipment must be grounded.
All high pressure external loads, if metal or ground ports, must be grounded.
All external load currents need to be less than 0.2A, and if a single load current is greater than 0.2A, the load must be controlled through an AC contactor.
"AHS1" "AHS2" wiring terminal ports only provide the switch signal.
Expansion valve E plus tropical, plate heat exchanger E plus tropical and flow switch E plus tropical share one control port.
Field wiring guidelines
Most of the field wiring on the unit shall be conducted on the junction box in the switch box. To access the terminal block, remove the handle metal plate.

Before removing the plate, turn off all power, including unit power and backup heater and domestic hot water tank.

Tie all cables.
The backup heater requires a dedicated power supply circuit.
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 handle sheet metal.
Install the wires and fix the cover firmly so that the cover may be fit in properly.

6.5.2 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.

Notes:
The ground fault circuit interrupter must be a high- speed type breaker of 30 mA (<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.

6.5.3 Safety device requirement

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. In case the MCA exceeds 63A, the wire diameters should be selected according to the national wiring regulation.
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 current circuit breakers and residual current operation breakers.

Table 6-1

Rated current of appliance: A	Nominal cross-sectional area (mm)	
	Flexible cords	Cable for fixed wiring
⩽3	0.5 and 0.75	1 and 2.5
>3 and ≤6	0.75 and 1	1 and 2.5
>6 and ≤10	1 and 1.5	1 and 2.5
>10 and ≤16	1.5 and 2.5	1.5 and 4
>16 and ≤25	2.5 and 4	2.5 and 6
>25 and ≤32	4 and 6	4 and 10
>32 and ≤50	6 and 10	6 and 16
>50 and ≤63	10 and 16	10 and 25

Table 6-2 1-phase 12-16kW standard and 3-phase 12-16kW 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)
12kW 1-PH	220-240	50	198	264	25	30	40	-	17.00	0.17	1.50
14kW 1-PH	220-240	50	198	264	26.5	30	40	-	17.00	0.17	1.50
16kW 1-PH	220-240	50	198	264	28	30	40	-	17.00	0.17	1.50
12kW 3-PH	380-415	50	342	456	9.5	14	16	-	16.00	0.17	0.70
14kW 3-PH	380-415	50	342	456	10.5	14	16	-	16.00	0.17	0.70
16kW 3-PH	380-415	50	342	456	11.5	14	16	-	16.00	0.17	0.70

Notes:
MCA : Minimum. 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)

6.5.4 Remove the switch box cover

1-phase:As shown in Figure 6-10 below.

Unit	12kW	14kW	16kW
Maximum over current protector (MOP) (A)	30	30	30
Wiring size(mm²)	6.0	6.0	6.0

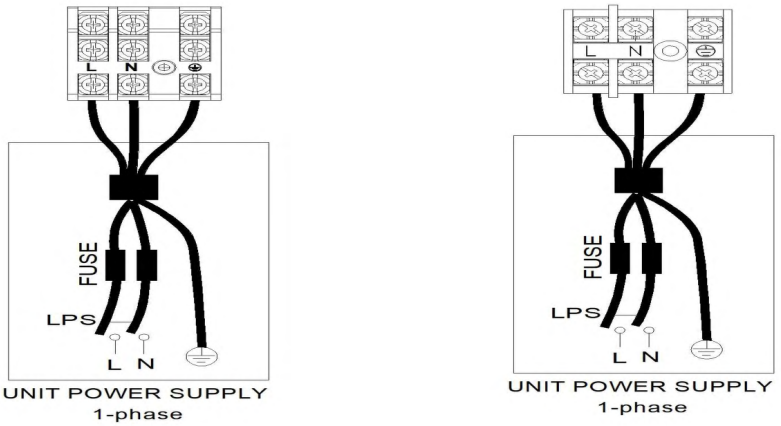


Figure 6-10

The ground fault circuit interrupter must be 1 high-speed type of 30mA(<0.1s). Please use 3-core shielded wire.
Stated values are maximum values (see electrical data for exact values).
Leakage protection switch must be installed to the power supply of the unit.(As shown in Figure 6-11 below).

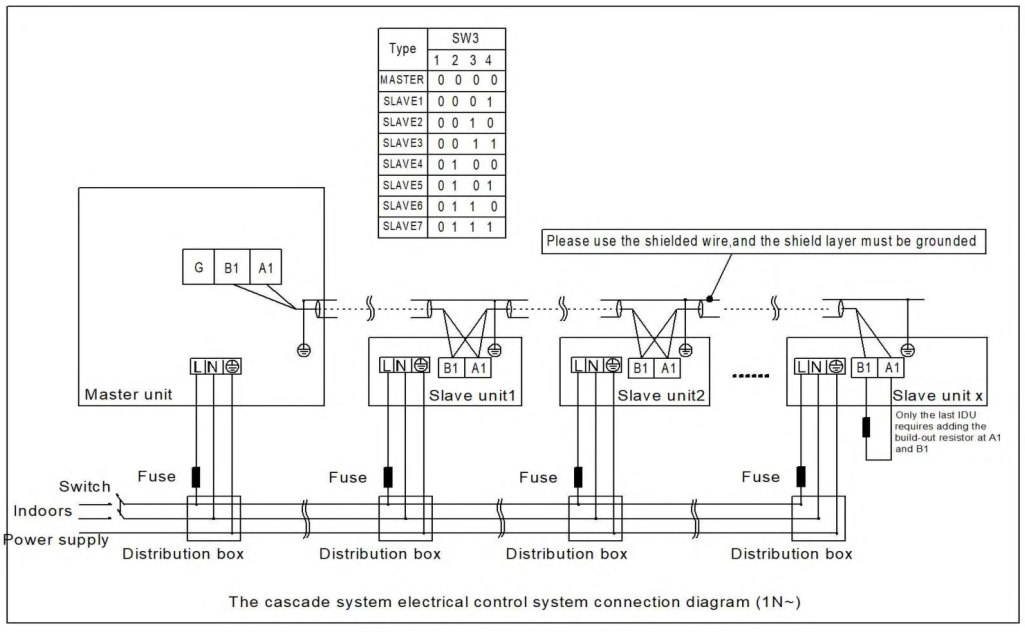
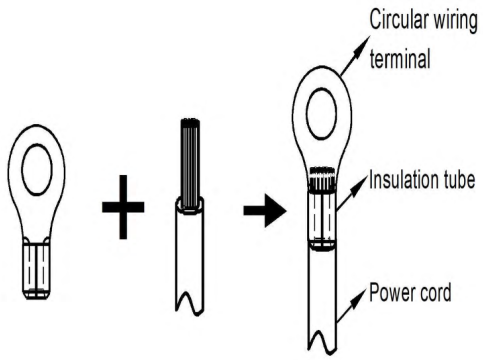


Figure 6-11

Notes:

1 The cascade function of the system only supports 6 machines at most.
2 In order to ensure the success of automatic addressing, all machines must be connected to the same power supply and powered on uniformly.
3 Only the Master unit can connect the controller, and you must put the SW9 to "on" of the master unit, the slave unit cannot connect the controller .
4 Please use the shielded wire, and the shield layer must be grounded.

When connecting to the power supply terminal, use the circular wiring terminal with the insulation casing (see Figure 6.12).
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 6.13)



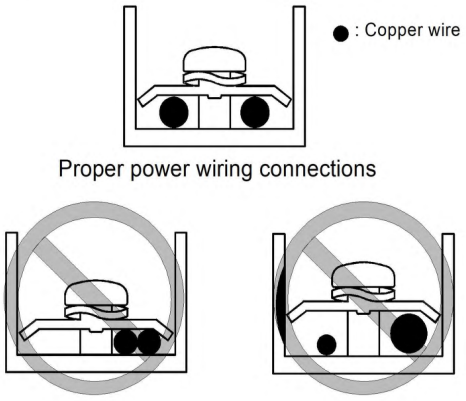


Figure 6-12 **Figure 6-13**

Power Cord Connection of cascade system (As shown in Figure 6-14 below).
Use a dedicated power supply for the indoor unit that is different from the power supply for the outdoor unit.
Use the same power supply, circuit breaker and leakage protective device for the indoor units connected to the same outdoor unit.

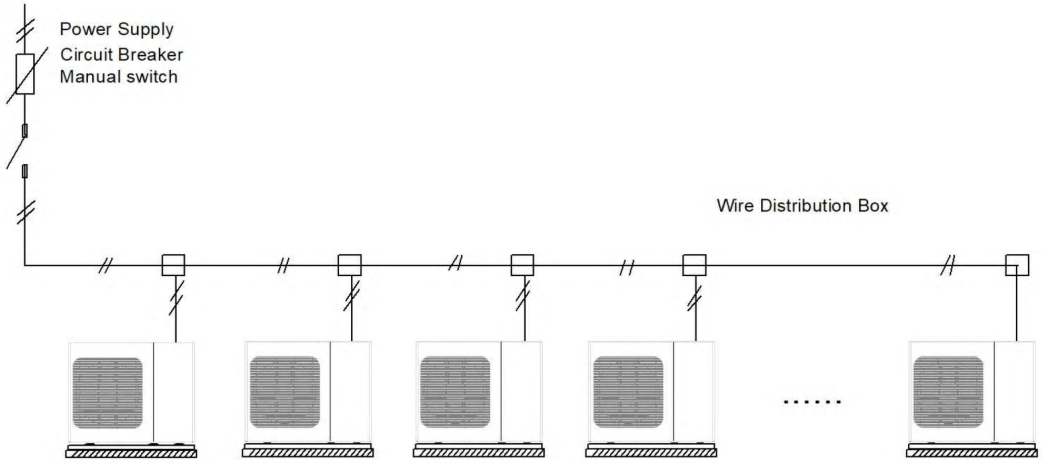


Figure 6-14

6.5.5 Connection for other components

unit 12-16kW (As shown in Figure 6-15 below).
The detailed ports are described below.
Port provide the control signal to the load.Two kind of control signal port:
Type 1 Dry connector without voltage.
Type 2 Port provide the signal with 220V voltage. If the current of load is <0.2A, load can connect to the port directly. If the current of load is >=0.2A, the AC contactor is required to connected for the load.

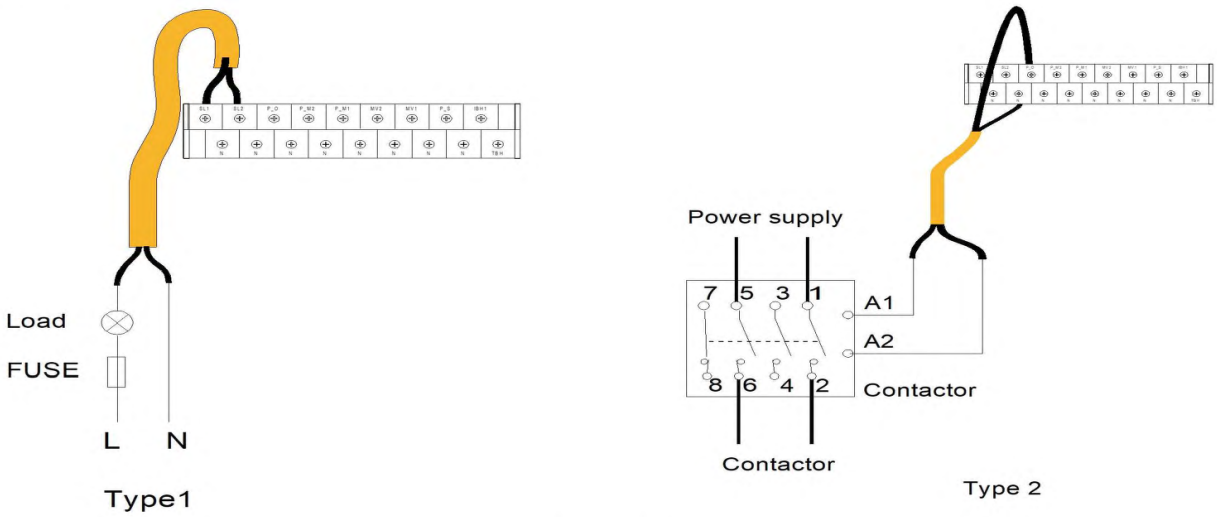
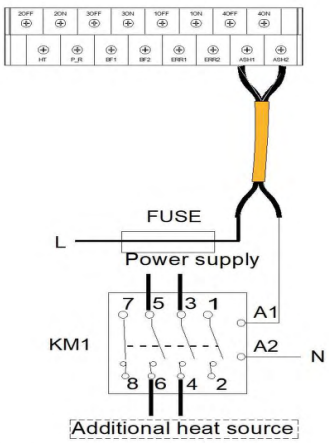


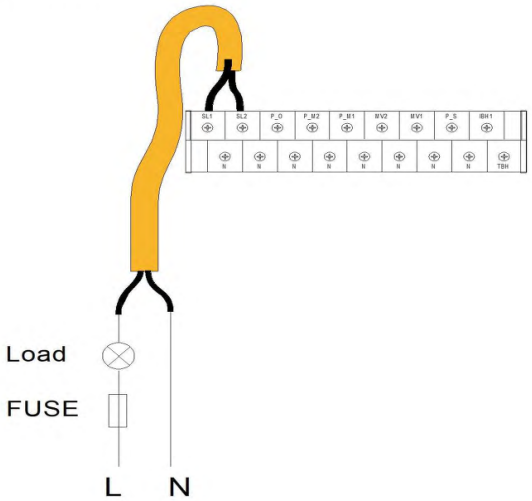
Figure 6-15

Control signal port of hydraulic module: The CN11contains terminals for 3-way valve, pump,booster heater , etc. The parts wiring is illustrated below:

1) For additional heat source control(AHS):



Voltage:220-240VAC
Maximum running current(A):0.2
Wiring size(mm²):0.75
Control port signal type:Type2

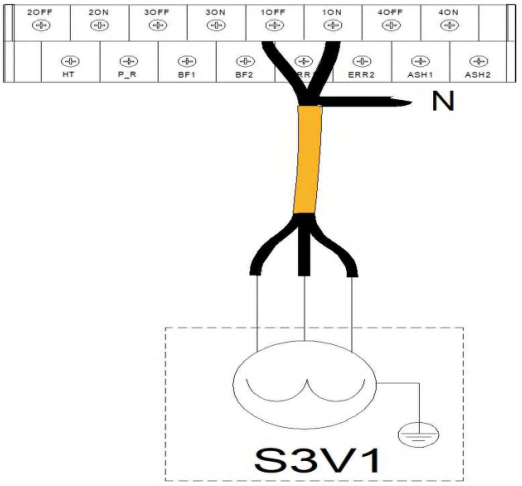


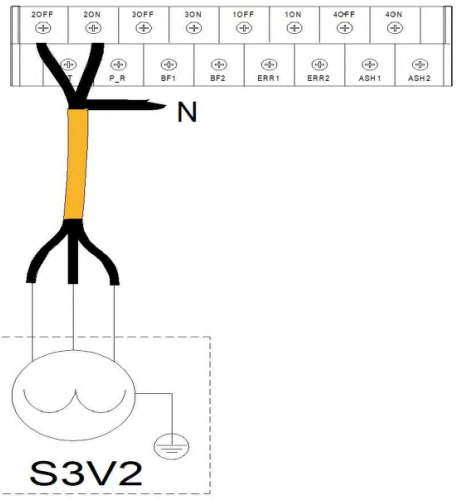
Voltage:220-240VAC
Maximum running current(A):0.2
Wiring size(mm²):0.75
Control port signal type:Type 1

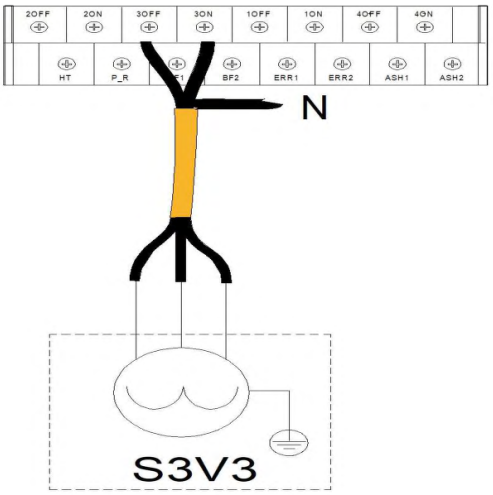
Note:
This part only applies to Basic. For Customized, cause there is an interval backup heater in the

unit, the hydraulic module should not be connected to any additional heat source.

2) For 3-way vale S3V1、S3V2、S3V3:

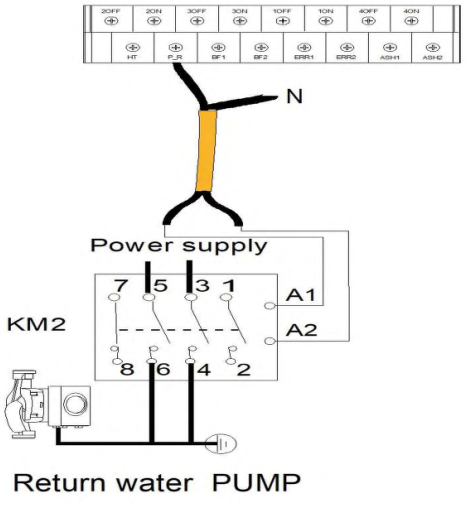




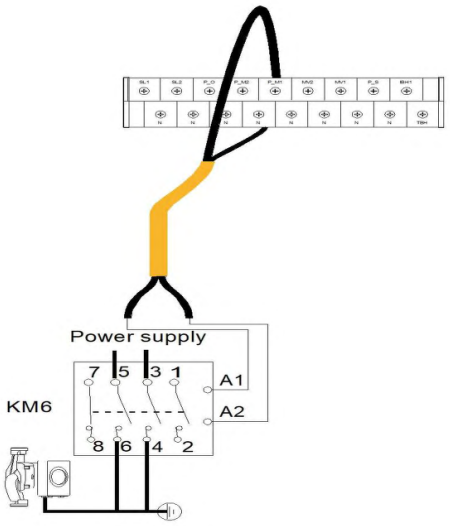


Voltage:220-240VAC
Maximum running current(A):0.2
Wiring size(mm²):0.75
Control port signal type:Type 2

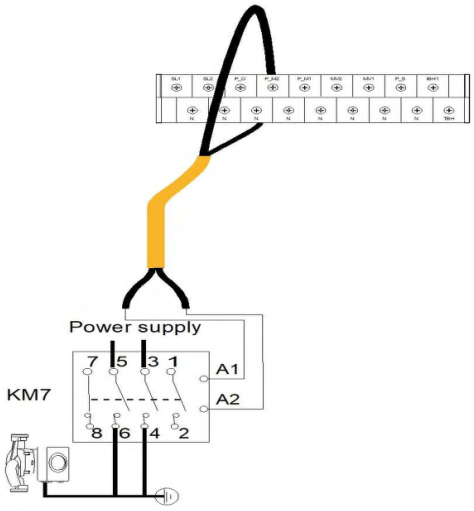
3) For outside pump



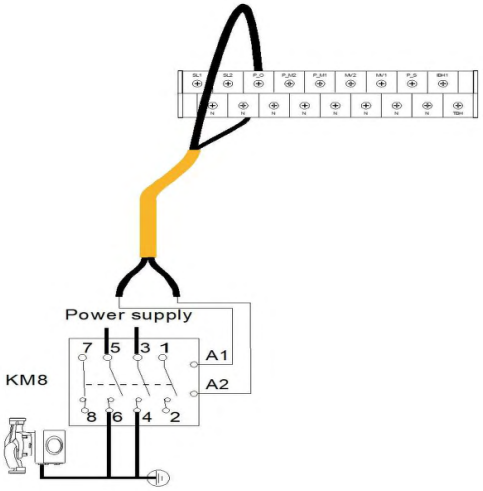
P_R



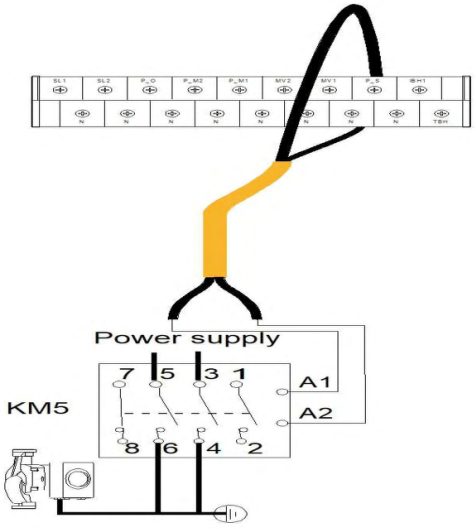
P_M1



P_M2

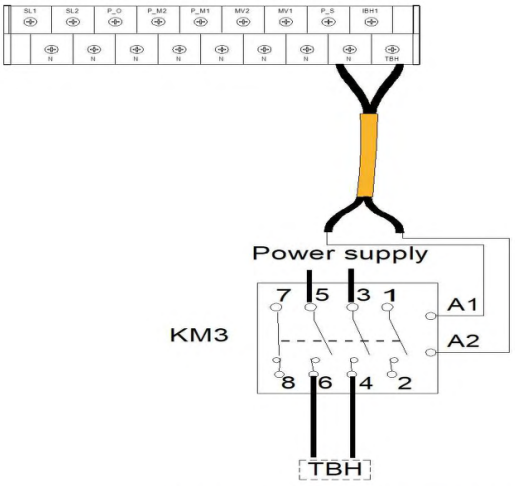


P_O

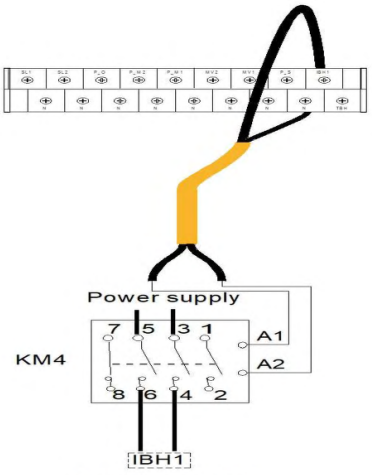


P_S

4) For tank booster heater(TBH):



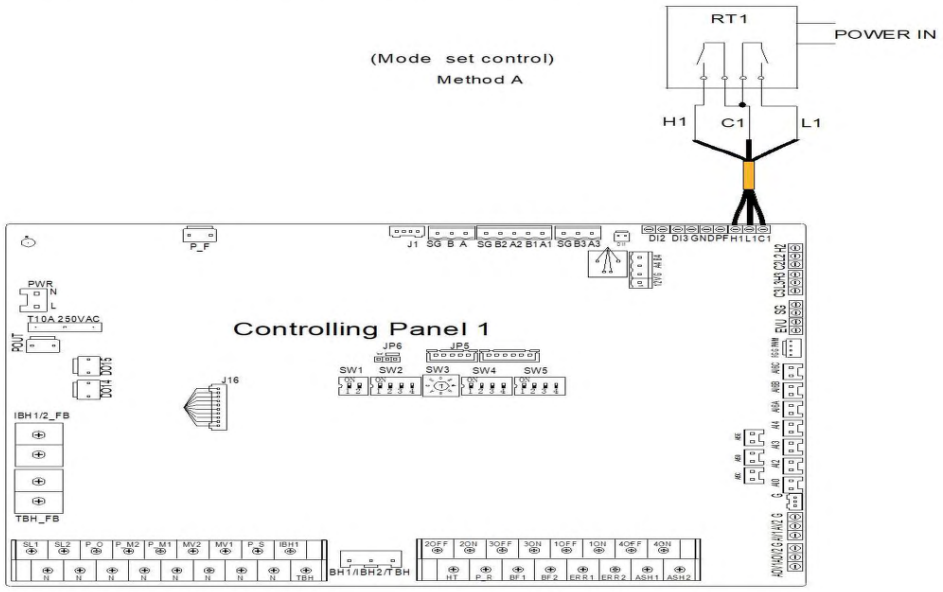
Electric heating for water tank

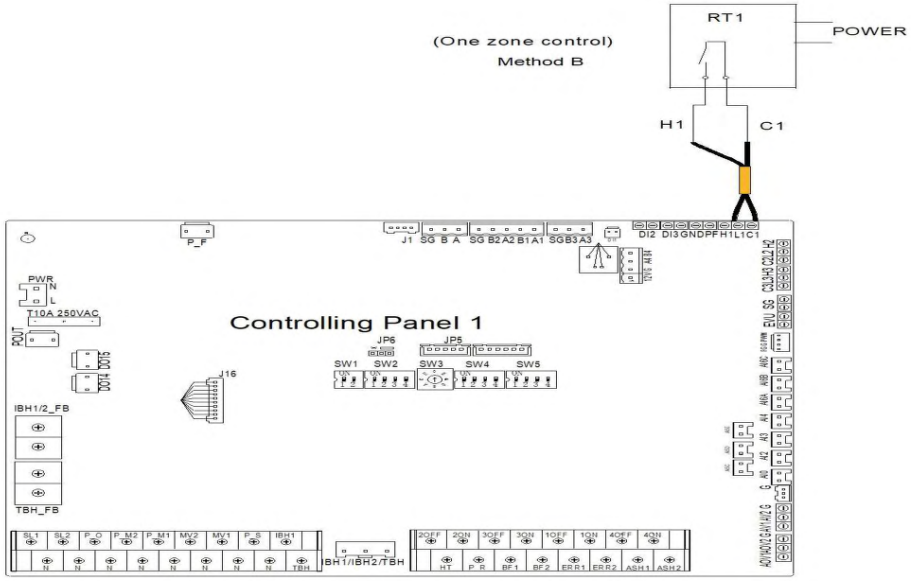


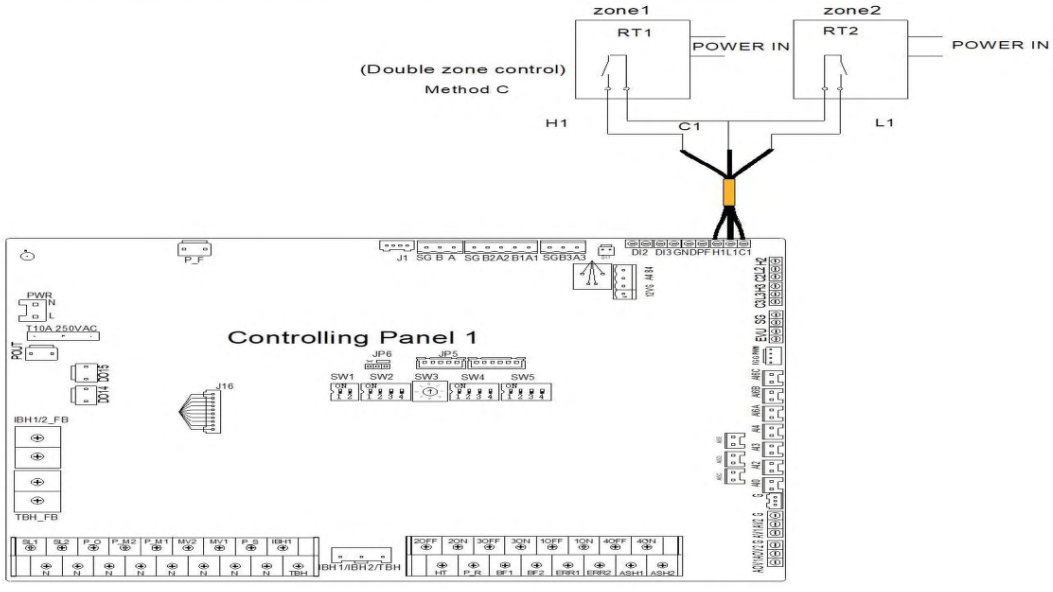
Electric heating

5) For room thermostat:

Room thermostat (Low voltage): "POWER IN" provide the voltage to the RT.







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

Method B (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 FOR SERVICEMAN set ROOM THERMOSTAT to MODE SET:

A.1 When "CL" of the thermostat keep closing for 15s, the system will run according to the priority mode set on the user interface.

A.2 When "CL" of the thermostat keep opening for 15s and "HT" close , the system will run according to the non-priority mode set on the user interface.

A.3 When "HT" of the thermostat keep opening for 15s and "CL" open , the system will turn off.

A.4 When "CL" of the thermostat keep opening for 15s and "HT" open , the system will turn off.

The port closing voltage is 12VDC, the port disconnection voltage is 0VDC.

Method B (One zone control)

RT provide the switch signal to unit. User interface FOR SERVICEMAN 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 (Double zone control)

Hydraulic Module is connected with two room thermostat, while user interface FOR SERVICEMAN set ROOM THERMOSTAT to DOUBLE ZONE:

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 turn on according to climate temp curve. When unit detect voltage is 0V between CL and COM, zone2 turn 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.

Notes:

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 .

When ROOM THERMOSTAT is not set to NON, the indoor temperature sensor Ta can't be set to valid.

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.

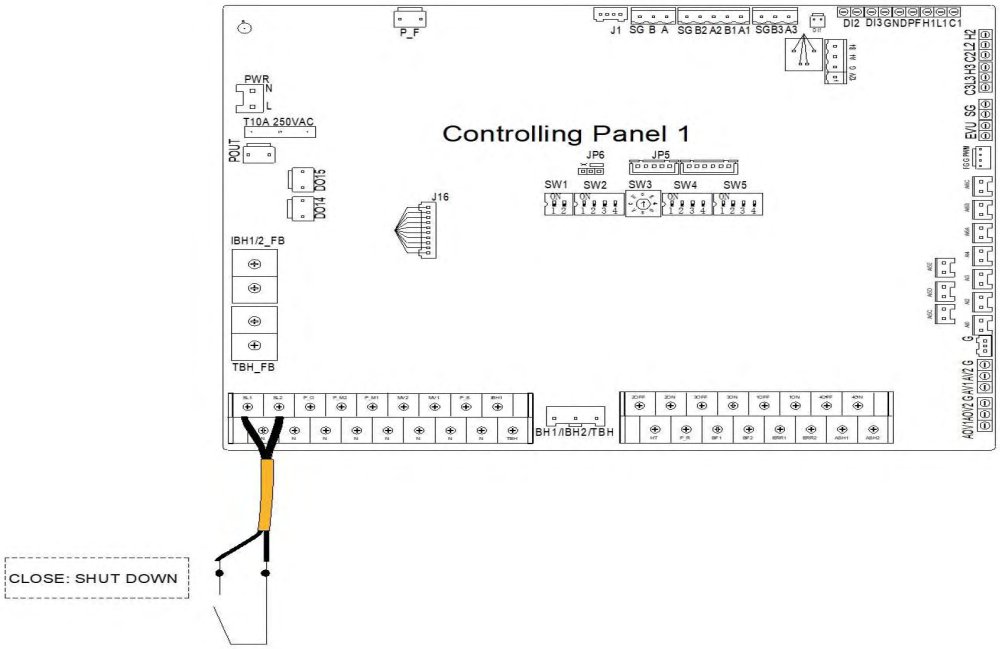
a) Procedure

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.

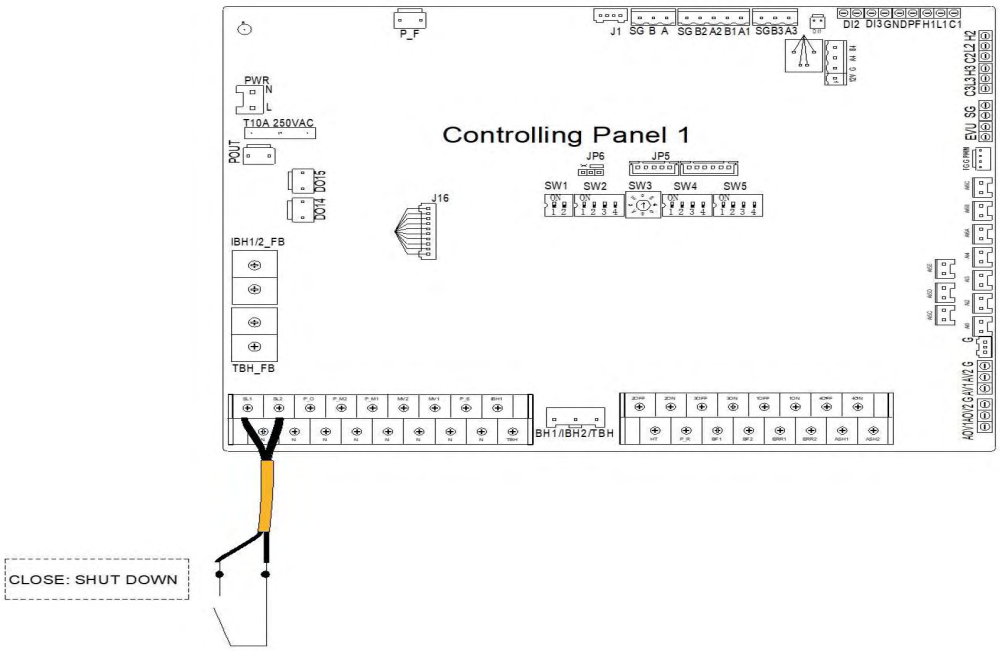
6) For solar energy input signal(low voltage):

For solar energy input signal:



7) For remote shut down:

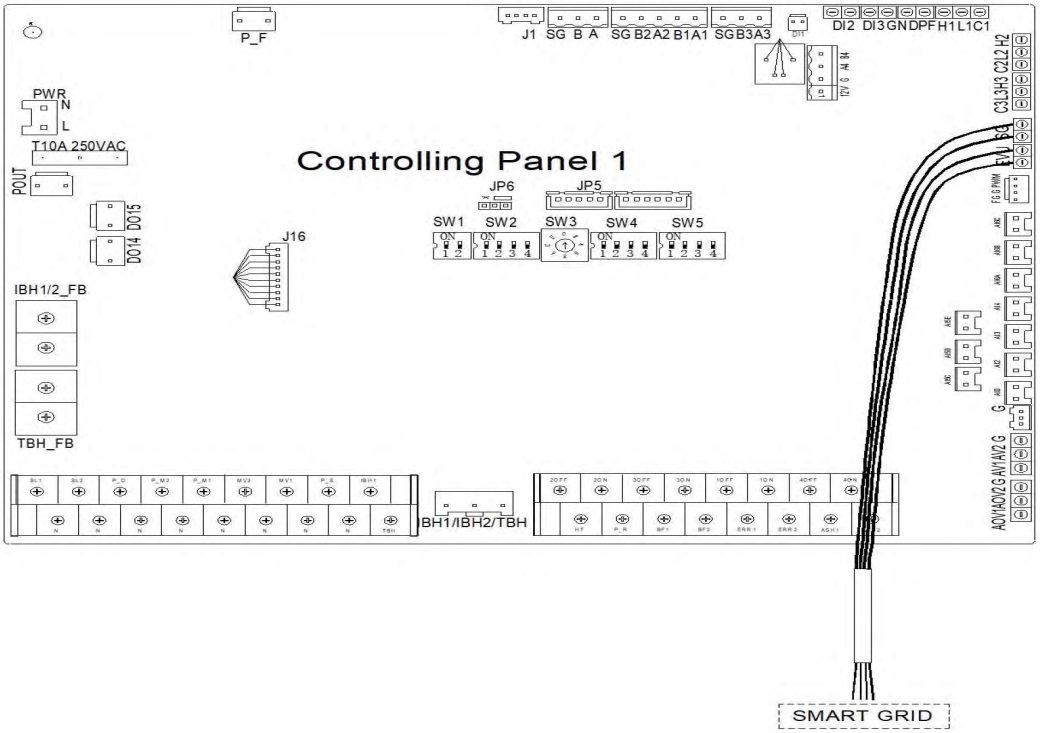
For solar energy input signal:



8) For smart grid:

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

as following:



a) SG=ON, EVU=ON.

If DHW mode is set available:

●The heat pump will operate in DHW mode firstly.

●TBH is set available, If T5<69 ,TBH will be turned on forcibly (The heat pump and TBH can operate at the same time.); if T5 ≥70 , TBH will be turned off.(DHW=Domestic Hot Water, T5S is the set water tank temperature.)

●TBH is set unavailable and IBH is set available for DHW mode, as long as T5<59 ,IBH will be turned on forcibly(The heat pump and TBH can operate at the same time.); if T5≥ 60 , IBH will be turned off.

b) SG=OFF, EVU=ON. If DHW mode is set available and DHW mode is set ON:

●The heat pump will operate in DHW mode firstly.

●If TBH is set available and DHW mode is set ON, If T5 T5S-2 the TBH will be turned on (The heat pump and IBH can operate at the same time.); if T5≥T5S+3 the TBH will be turned off.

●If TBH is set unavailable and IBH is set available for DHW mode ,If T5 T5S-dT5_ON, IBH will be turned on (The heat pump and IBH can operate at the same time.); if T5≥Min (T5S+3,60), the IBH will be turned off.

c) SG=OFF, EVU=OFF. The unit will operate normally.

d) SG=ON, EVU=OFF. Heat pump,IBH, TBH will be turned off immediately.

7. Initial Start-up of the Unit

The installer shall configure the unit to match the installation environment (outdoor climate, installed options, etc.). And the user's expertise.

Note:
It is important that all information in this chapter is arranged by the installer and the system is applicable.

7.1. Initial start-up at low outdoor ambient temperater

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

7.2. Pre-operation checks

Turn off the power supply before connecting.
After the installation of the unit, check the following before switching on the circuit breaker.
1.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, and unit and backup heater kit have been connected according to the instructions described in the chapter 6.5 "Field wiring", according to the wiring diagrams and to local laws and regulations.
2.Fuses, circuit breakers or protective devices Check that fuses or locally installed protective devices meet the specifications and types specified in the 15 Technical Specification. Ensure that no fuses or protection guards are bypassed.
3.Spare heater circuit breaker Do not forget to open the standby heater circuit breaker in the switch box (depending on the type of standby heater). Refer to the wiring diagram.
4.Boost heater circuit breaker Do not forget to turn on the booster heater circuit breaker (only for units installed with optional domestic hot water tanks).
5.The grounding wiring ensures that the ground wire is correctly connected, and the grounding terminal is tightened.6.Internal wiring Visually check the switch box for loose connections or damaged electrical components.
7.Install and check that the unit is correctly installed, to avoid abnormal noise and vibration when the unit is started.
8.Damaged equipment Check the inside of the unit for damaged components or squeezed pipes.
9.Refrigerant leak Check the inside of the unit for refrigerant leakage. If there is a refrigerant leak, call your local dealer.
10.Power voltage Check the supply voltage on the local power panel. This voltage must correspond to the voltage on the device identification label.
11.The air cleaning valve ensures the air sweeping valve is open (at least 2 laps).

12.Shut-off valves Make sure that the shut-off valves are fully open.

7.3.First installation

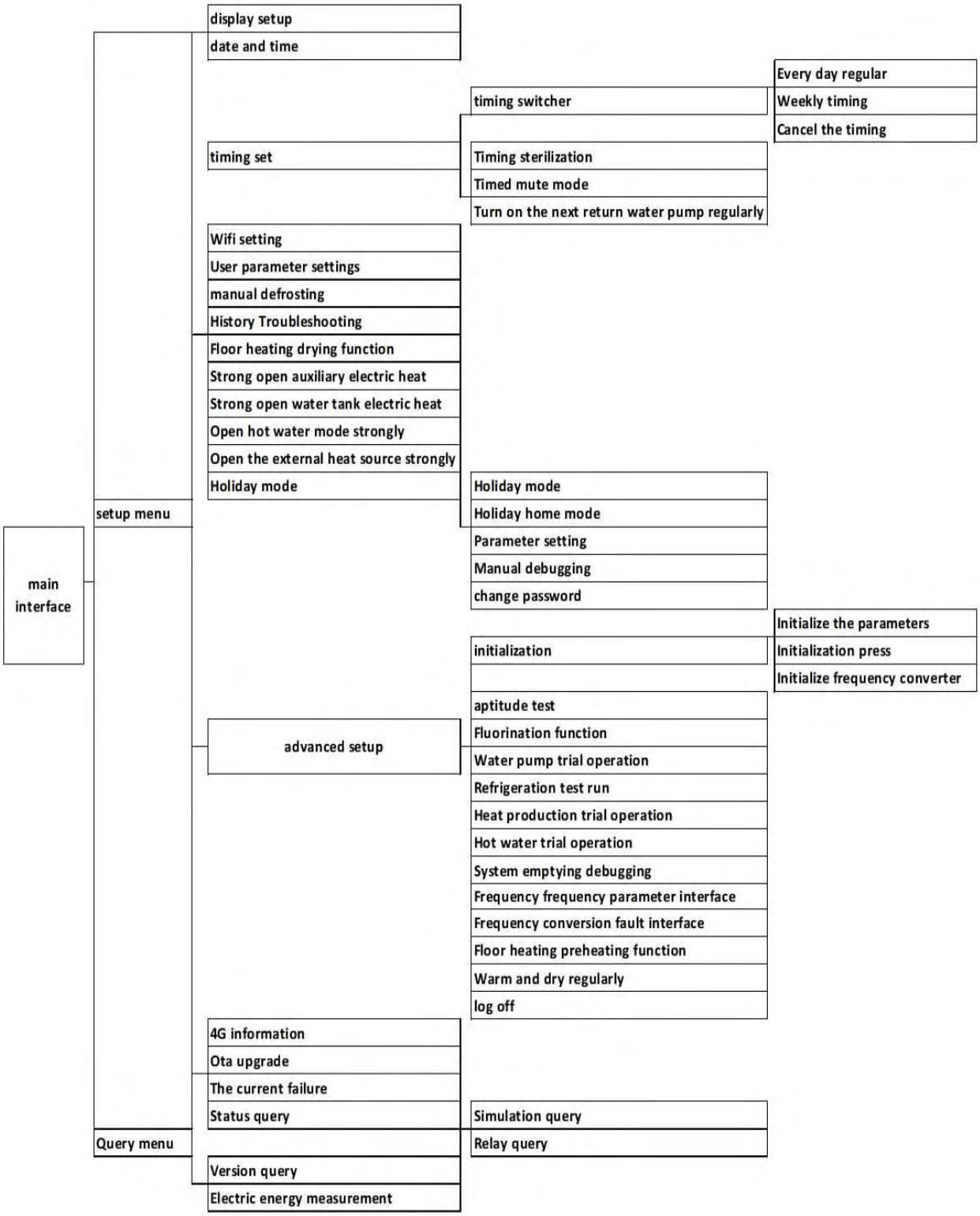
If nothing is displayed on the user interface, it is necessary to check for any of the following abnormalities before diagnosing possible error codes.
Disconnection or wiring error (between power supply and unit and between unit and user interface).
The fuse on the PCB may be broken.
If the user interface shows "Water is insufficient" , there is a possibility that there is air in the system, or the water level in the system is less than the required minimum.

7.4.Matters need attention

Safety precaution
Please read the safety precautions carefully before installing the unit.
Here are the important safety issues that must be followed.
Confirm that there is no abnormality after the test operation, and then give the manual to the user.
Do not install the unit in places with a lot of oil, steam and sulfide gas. Otherwise, the product may become deformed and fail.

8. Function Introduction

8.1. Functional profil



1. The controller has the function of "system maintenance" to limit the operation time of the unit. After the system maintenance time reaches the mandatory shutdown, the unit can not be started again before the system maintenance is removed. The antifreeze function is not affected during the system maintenance period. The System Maintenance function is disabled by default.
2."Unit Accumulated Operating Time" is counted in hours, and "System maintenance Time" is converted to "days" (Note: this is running time / 24 hours, not actual days)
3.The system maintenance setting interface can perform 3 operations as shown in the following table: (refer to the display manual for specific operation and interface description)

Order	project name	Set the scope	Windows default	Unit	Remarks
1	System maintenance set place	0～1365	0	day	Set to 0 table Disable the work ability
2	change password	/	/	/	/
3	Run time query	/	/	/	/
4	Run time zero	/	/	/	Initialize the Runtime
5	Initialization Settings	/	/	/	Initialize the System Maintenance Settings setting value
6	Use period class mould	Forced shutdown / Keep running		/	

8.2. Parameter setting

Order	Model	Range	Unit	R290_16k W_Single
1	control mode	[1] Refrigeration mode; [2] heating mode; [3] automatic mode	/	Heating mode
2	Refrigeration setting temperature	-15...35	℃	12
3	Setting temperature for heating	0...105	℃	45
4	Set temperature of hot water	0...100	℃	50
5	Refrigeration setting room temperature	16...30	℃	26
6	Set room temperature for heating	16...30	℃	20
7	Setting temperature for heating(B)	0...105	℃	35
8	Set room temperature for heating(B)	16...30	℃	26
9	Setting temperature for heating(B1)	0...105	℃	35

10	Setting temperature for heating(B2)	0...105	℃	35
11	Power mode	[0] Standard; [1]Powerful; [2]Energy saving; [3] Automatic	/	Powerful
12	Timed sterilization function	[0] Forbidden; [1]Use	/	Forbidden
13	Thermal death points	60...70	℃	65
14	Maximum cycle of sterilization	90...300	min	210
15	Debicide high temperature time	5...60	min	30
16	Heat away from home on holidays	20...25	℃	25
17	Hot water away from home on holidays	20...25	℃	25
18	Refrigeration curve in Zone A	[0] Forbidden; [1] low temperature curve 1; [2] low temperature curve 2; [3] low temperature curve 3;[4] Low temperature curve 4; [5] low temperature curve 5; [6] low temperature curve 6; [7] low temperature curve 7; [8] low temperature curve 8;[9] High temperature curve 1; [10] high temperature curve 2; [11] high temperature curve 3; [12] high temperature curve 4; [13] high temperature curve 5; [14] high temperature curve 6; [15] high temperature curve 7; [16] high temperature curve 8; [17] curve 9	/	Forbidden
19	Thermal curve in Zone A	[0] Forbidden; [1] low temperature curve 1; [2] low temperature curve 2; [3] low temperature curve 3; [4] low temperature curve 4; [5] low temperature curve 5; [6] low temperature curve 6;[7] Low temperature curve 7; [8] low temperature curve 8; [9] high temperature curve 1; [10] high temperature curve 2; [11] high temperature curve 3; [12] high temperature curve 4; [13] high temperature curve 5; [14] high temperature curve 6;[15] High temperature curve 7; [16] high temperature curve 8; [17] curve 9	/	Forbidden
20	Refrigeration curve in Zone B	[0] Forbidden; [1] low temperature curve 1; [2] low temperature curve 2; [3] low temperature curve 3; [4] low temperature curve 4; [5] low temperature curve 5; [6] low temperature curve 6;[7] Low temperature curve 7; [8] low temperature curve 8; [9] high temperature curve 1; [10] high temperature curve 2; [11]	/	Forbidden

		high temperature curve 3; [12] high temperature curve 4; [13] high temperature curve 5; [14] high temperature curve 6;[15] High temperature curve 7; [16] high temperature curve 8; [17] curve 9		
21	Thermal curve in Zone B	[0] Forbidden; [1] low temperature curve 1; [2] low temperature curve 2; [3] low temperature curve 3; [4] low temperature curve 4; [5] low temperature curve 5; [6] low temperature curve 6;[7] Low temperature curve 7; [8] low temperature curve 8; [9] high temperature curve 1; [10] high temperature curve 2; [11] high temperature curve 3; [12] high temperature curve 4; [13] high temperature curve 5; [14] high temperature curve 6;[15] High temperature curve 7; [16] high temperature curve 8; [17] curve 9	/	Forbidden
22	Curve 9 refrigeration ring temperature 1	-5...46	℃	35
23	Curve 9 refrigeration ring temperature 2	-5...46	℃	25
24	Curve 9 cooling outlet temperature 1	5...25	℃	10
25	Curve 9 cooling outlet temperature 2	5...25	℃	16
26	Curve 9 heating ring temperature 1	-25...35	℃	7
27	Curve 9 heating ring temperature 2	-25...35	℃	-5
28	Curve 9 heating out temperature 1	25...65	℃	28
29	Curve 9 heating out temperature 2	25...65	℃	35

9. Maintenance and troubleshooting

9.1.Maintenance and service

To ensure optimal availability of the unit, periodic inspections and inspections of the unit and field wiring are required.
This maintenance work needs to be done by your local technicians.

Notes:

1. You must turn off the power panel before manual maintenance or repair activities.
2. Do not contact Amy live parts for 10 minutes after the power is off.
3. Please note that some parts of the electrical assembly box are hot.
4. Forbid touch any conductive parts.
5. Do not flush the equipment. May cause an electric shock or a fire.
6. Forbid leave the unitun attended when serice panel is removed.

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

- Check the water pressure, if below 1 bar, charge the system and clean the filter.
- The operation pressure of the refrigerant system should only be serviced by a certified technician.
- Check the power supply and cable connection often. Should the unit begin to operate abnormally, switch it off and contact the qualified technician.
- Discharge all water in the water pump and water system, so that freezing of the water in the pump or water system does not occur. You should discharge the water at the bottom of water pump if the unit will not be used for an extended period of time. You should check the unit thoroughly and fill the system with water fully before using it for the first time after a prolonged period of no usage.

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

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

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

- Presence of fire extinguisher

  If any hot work is to be conducted on the refrigeration equipment or any associated parts appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

- 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 an 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.

- 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. Prolonged period of no usage.

- 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:

  1) The charge size is in accordance with the room size within which the refrigerant containing parts are installed.
  2) The ventilation machinery and outlets are operating adequately and are not obstructed.
  3) If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
  4) Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
  5) 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.

- 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:

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

- Repairs to sealed components
  1) During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
  2) Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way 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.
  3) Ensure that apparatus is mounted securely.
  4) 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.

- Pressure relief valve hose
  Check that the pressure relief valve hose is positioned to drain the water.

- 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.

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

- Leak detection methods
  The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.
  Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate

percentage of gas (25% maximum) is confirmed.
Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
If a leak is suspected, all naked flames shall be removed/ extinguished.
If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN)shall then be purged through the system both before and during the brazing process.

- Maintenance of photovoltaic panels
  1) Clean the glass surface of the component if it is dirty. Clean with a soft sponge dipped in water.
  2) Perform mechanical and electrical inspection every 6 months to ensure that the components are clean and connected reliably.
  3) If there is any doubt, please have qualified personnel check.
  4) Observe the maintenance instructions for all components used in the system, such as bracket, charging rectifier, inverter, battery, etc.
  5) If there is snow, use a brush with soft bristles to clean the surface of the component.

9.2.Troubleshooting

This section provides useful information for diagnosing and correcting certain failures that may occur in the equipment.
This troubleshooting and related corrective action may only be performed by your local technician.

9.2.1 preparatory work

Before starting the troubleshooting procedures, perform a thorough visual inspection of the equipment for obvious defects, such as loose connections or poor wiring.

When the safety device is activated, stop the device and identify the cause before reset. In no case shall the safety device be bridged or replaced to a valve other than the plant setting. If you cannot find the cause of the problem, please call your local dealer.

If the safety valve is not working properly and needs to be replaced, always reconnect the hose on the safety valve to avoid water flowing out of the unit!

Notes:
1.When checking the unit switch box, always ensure that the unit main switch is closed.
2.For questions about the optional domestic hot water solar kit, see its installation and troubleshooting in the owner's manual.

9.2.2 Error codes

A series of error codes and corresponding meaning can be found in the table below.

1.Internal and external system failure

Item	Error code	Malfunction or protection	Item	Error code	Malfunction or protection
1	1	Out-of-phase protection	12	12	Hot water tank temperature failure
2	2	EEPROM Data error and fault	13	13	B2 mixed water temperature fault
3	3	Standby fault	14	14	Total effluent temperature of the system is faulty
4	4	Standby fault	15	15	Standby fault
5	5	Standby fault	16	80	Temperature fault of upper buffer tank
6	6	System maintenance data is wrong	17	81	Lower buffer tank temperature failure
7	7	Lack of phase protection	18	82	Solar energy temperature failure
8	8	Standby fault	19	83	Line controller communication failure
9	9	Standby fault	20	84	Total outlet temperature of air conditioning failure
10	10	Water tank electric heat overload	21	85	Indoor temperature failure
11	11	B1 mixed water temperature fault			

1.Wrong phase fault
Reset mode :A/M
Testing conditions:
Dial-up code SW 2.1 is the ON.
Post-electric detection.
Alarm action:Stopping machine .
“Non-frequency reduction shutdown”
Do not enter anti-freezing .
Failure recovery:Check the three-phase electricity .

2.EEPROM Data fault
Reset mode:P
Testing conditions:Post-electric detection .
Alarm action:Alarm, can not boot.
Failure recovery:
Initialize all of the parameters .
If the fault still cannot be resolved after initialization, please contact us!

3.System maintenance data is wrong
Reset mode :P
Testing conditions:Post-electric detection .
Alarm action:Post-electric detection.
Failure recovery:
Initialize the system maintenance settings.
If the fault still cannot be resolved after initialization, please contact us!
Lack of phase failure
Reset mode:A/M.
Testing conditions:
Dial-up code SW 2.1 is for ON.
Post-electric detection.
Alarm action:
Stopping machine.
“Non-frequency reduction shutdown” .
Do not enter anti-freezing.
Failure recovery:Check the three-phase electricity.

Water tank electric heat overload.
Initial condition mode:M
Testing conditions:The electric thermal overload signal of the water tank is detected.
Alarm action:Only the alarm, no shutdown.
Failure recovery:Check whether the electric heating wiring of the water tank is normal.
Hot water tank temperature failure.
Reset mode:A.
Testing conditions:Post-electric detection.
Alarm action:Stopping machine.
Failure recovery:
Check that the probe is properly connected properly .
Check the temperature probe for normal B1 mixed water temperature fault.
Reset mode:A.
Testing conditions:Post-electric detection.
Alarm action:Only to the police.
Failure recovery:
Check that the probe is properly connected properly.
Check the temperature probe is normal.
Total effluent temperature of the system is faulty.
Reset mode:A.
Testing conditions:Post-electric detection.
Alarm action:Stop the external heat source, AHS.
Failure recovery:
Check that the probe is properly connected properly.
Check the temperature probe is normal.
B2Mixed water temperature failure .
Reset mode:A.
Testing conditions:Post-electric detection.
Alarm action:Only to the police.
Failure recovery:
Check that the probe is properly connected properly.
Check the temperature probe is normal.
Temperature fault of upper buffer tank.
Reset mode:A.

Testing conditions:
[Buffer water tank upper temperature probe]Set to "Use", [Buffer water tank lower temperature probe]Set to off,when the upper temperature TACt 1 fails.
[Buffer water tank upper temperature probe]
[Buffer water tank lower temperature probe]
Both are set to Use, when both temperature probes fail.
Alarm action:
Total effluent temperature probe.
Only to the police.
Only when the air-conditioning area is running.
Stopping machine
Failure recovery:
Check that the probe is properly connected properly.
Check the temperature probe is normal.
Lower buffer tank temperature failure.
Reset mode:A.
Testing conditions:[Buffer water tank lower temperature probe] Set to "Use",[Buffer water tank upper temperature probe]Set to disabled, when the lower temperature of the buffer tank fails [Buffer water tank upper temperature probe][Buffer water tank lower temperature probe] Are set to Use, when both temperature probes fail.
Alarm action:
When the hot water area is present.
Only to the police.
Only when the air-conditioning area is running.
Stopping machine.
Failure recovery:
Check that the probe is properly connected properly.
Check the temperature probe is normal.
Solar energy temperature failure.
Reset mode:A.
Testing conditions:Post-electric detection.
Alarm action:Stop the solar water pump.
Failure recovery:
Check that the probe is properly connected properly.
Check the temperature probe is normal.

Line controller communication failure.
Reset mode:M.
Testing conditions:
[Line controller communication detection]Let "Use" cannot communicate successfully with the wire controller.
Alarm action:Stopping machine.
Failure recovery:
Check and the wire controller for properly connected.
Check whether the control board is operating normally.
Total outlet temperature of air conditioning failure.
Reset mode:A.
Testing conditions:
[Total effluent temperature probe]Total total probe fault of the unit.
Alarm action:
When the hot water area is present.
Only to the police.
Only when the air-conditioning area is running.
Stopping machine.
Failure recovery:
Check whether the probe is connected normally. Check whether the temperature probe is normal.
Indoor temperature failure
Reset mode:A.
Testing conditions:Post-electric detection.
Alarm action:
When the hot water area is present.
Only to the police
Only when the air-conditioning area is running.
Stopping machine.
Failure recovery:
Check that the probe is properly connected properly.
Check the temperature probe is normal.

2.Internal and external machine mode failure code

Fault name	0 # Board	1# Board	2# Board	3# Board	4# Board	5# Board	6# Board	7# Board
Pressure machine low pressure	97	193	289	385	481	577	673	769
Pressure machine high pressure	98	194	290	386	482	578	674	770
Standby fault	99	195	291	387	483	579	675	771
Standby fault	100	196	292	388	484	580	676	772
Wing temperature failure	101	197	293	389	485	581	677	773
Exhaust temperature failure	102	198	294	390	486	582	678	774
Exhaust temperature is too high	103	199	295	391	487	583	679	775
J5 pressure transmission failure	104	200	296	392	488	584	680	776
J6 pressure transmission failure	105	201	297	393	489	585	681	777
Pressure transmission low pressure is too low	106	202	298	394	490	586	682	778
Pressure transfer high pressure is too high	107	203	299	395	491	587	683	779
Inhale temperature failure	108	204	300	396	492	588	684	780
Temperature failure after valve	109	205	301	397	493	589	685	781
The inspiratory temperature is too low	110	206	302	398	494	590	686	782
Emergency defrosting is frequent	111	207	303	399	495	591	687	783
The temperature difference between suction and exhaust is abnormal	112	208	304	400	496	592	688	784
Refrigeration evaporation is too low	113	209	305	401	497	593	689	785
Standby fault	114	210	306	402	498	594	690	786
The ring-temperature limiting press is	115	211	307	403	499	595	691	787

opened								
The temperature of the plate for return water is too low	116	212	308	404	500	596	692	788
The temperature of the plate for return water is too high	117	213	309	405	501	597	693	789
Fan 1 has an abnormal rotational speed	118	214	310	406	502	598	694	790
Abnormal rotational speed of the fan 2	119	215	311	407	503	599	695	791
Standby fault	120	216	312	408	504	600	696	792
Standby fault	121	217	313	409	505	601	697	793
Standby fault	122	218	314	410	506	602	698	794
Standby fault	123	219	315	411	507	603	699	795
Frequency frequency communication failure	124	220	316	412	508	604	700	796
Frequency conversion failure	125	221	317	413	509	605	701	797
Frequency conversion model setting	126	222	318	414	510	606	702	798
Economic inlet temperature failure	127	223	319	415	511	607	703	799
Economic outlet temperature failure	128	224	320	416	512	608	704	800
Cooling air side temperature failure	129	225	321	417	513	609	705	801
The oling liquid side temperature failure	130	226	322	418	514	610	706	802
The evaporation temperature is too high	131	227	323	419	515	611	707	803
Case temperature failure	132	228	324	420	516	612	708	804
Environmental temperature failure	161	257	353	449	545	641	737	833
Communication failure	162	258	354	450	546	642	738	834
EEPROM Wrong data	163	259	355	451	547	643	739	835
Auxiliary electric heat overload	164	260	356	452	548	644	740	836
Overload	165	261	357	453	549	645	741	837
The exchange water temperature of the plate is too low	166	262	358	454	550	646	742	838
The exchange water temperature of the plate is too high	167	263	359	455	551	647	743	839
Plate replacement water temperature fault	168	264	360	456	552	648	744	840
Water is insufficient	169	265	361	457	553	649	745	841
Lack of phase protection	170	266	362	458	554	650	746	842
Board return water temperature fault	171	267	363	459	555	651	747	843
Total outlet water temperature fault	172	268	364	460	556	652	748	844
Wrong phase protection	173	269	365	461	557	653	749	845
The temperature difference between the plate exchanges is too large	174	270	366	462	558	654	750	846
The temperature difference is abnormal	175	271	367	463	559	655	751	847
Frequency variable pump warning	176	272	368	464	560	656	752	848
The communication is abnormal	177	273	369	465	561	657	753	849
Internal and external machine communication failure	178	274	370	466	562	658	754	850
The protocol version is too low	179	275	371	467	563	659	755	851
Frequency variable pump failure	180	276	372	468	564	660	756	852

The model setting is abnormal	181	277	373	469	565	661	757	853
The R290 sensor failure	182	278	374	470	566	662	758	854
R290 leak	183	279	375	471	567	663	759	855
Flow sensor fault	184	280	376	472	568	664	760	856
Model setting failed	185	281	377	473	569	665	761	857

10. Final checks and test run

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

10.1.Final checks

Before opening the unit, read the following suggestions:
1. After the installation and parameter setting, cover all the sheet metal of the unit.
2. The unit should be maintained by professionals.

10.2.Run the operation instructions

TEST RUN is used to check correct operation of the valves, air purge, circulation pump operation, cooling, heating and domestic water heating.
Before using POINT CHECK, make sure that the water system and the tank are filled with water, and air is expelled, otherwise the pump or backup heater optional may be broken.

When circulation pump running is turned on, all running components will stop. 60 seconds later, the S3V1 will be off, the S3V2 will be on, 60 seconds later PUMPI will operate. 30s later, if the flow switch checked normal flow, PUMPI will operate for 3min, after the pump stops 60 seconds, the S3V1 will close and the S3V2 will be off. 60s later the both PUMPI and PUMPO will operate, 2 mins later, the flow switch will check the water flow. If the flow switch closes for 15s, PUMPI and PUMPO will operate until the next command is received.

During COOL MODE test running, the default target outlet water temperature is 7°C. The unit will operate until the water temperature drops to a certain value or the next command is received.
During HEAT MODE test running, the default target outlet water temperature is 35°C. The IBH (backup heater) will turn on after the compressor runs for 10 min. After the IBH runs for 3 minutes, the IBH will turn off, the heat pump will operate until the water temperature increase to a certain value or the next command is received.

During DHW MODE test running, the default target temperature of the domestic water is 55°C. The TBH(tank boost heater) will turn on after the compressor runs for 10min. The TBH will turn off 3 minutes later, the heat pump will operate until the water temperature increase to a certain value or the next command is received.

11. Technical Specifications

11.1. Specification

Model			1-phase/3-phase		
			12kW	14kW	16kW
Power supply AC	Power AC	V/Ph/H	AC 220-240/1/50AC 380-415/3/50		
Cooling （A35W18）	Capacity	kW	12.0	14.0	16.0
	EER		4.5	4.2	3.9
Cooling （A35W7）	Capacity	kW	11.5	12.7	14.0
	EER		3.05	2.90	2.75
Heating （A7W35)	Capacity	kW	12.0	14.0	15.0
	COP		4.8	4.5	4.4
Heating （A7W45)	Capacity	kW	12.0	14.0	15.0
	COP		3.7	3.5	3.35
Heating （A7W55)	Capacity	kW	12.0	14.0	15.0
	COP		3.1	3.0	2.85
ErP Sound power level					
Monobloc Unit（dB）			57	57	58
Net dimension W×D×H			1283×455×1036		
Packing dimension W×D×H			1360×545×1222		
Net weight (kg)			160/158		
Gross weight(kg)			174/172		
Operating ambient temp range					
Cooling（℃）			-5 ~ 48		
Heating（℃）			-25 ~ 35		
DHW(tank)（℃）			-25 ~ 43		
Setting water temp range					
Cooling（℃）			10 ~ 30（LWT 5 ~ 25)		
Heating（℃）			25 ~ 80		
DHW(tank)（℃）			25 ~ 75		
Water circuit					
Piping connections			G1-1/4"		
Safety valve set pressure			0.3		
Flow switch			0.6		
Expansion tank Volume			5		
Capacity of the back-up heater			3	3	9

12. Information Servicing

1.Checks to the area
Safety checks must be performed to ensure that the risk of fire is minimized. For the maintenance of the refrigeration system, the following precautions shall be followed before working on the system.

2.Work procedure
The Works shall be performed under controlled procedures to minimize the risk of combustible gases or vapors during the conduct of the works.

3.General work area
All maintenance and other personnel working in the local area should be informed of the nature of the work in progress. Working in a confined space should be avoided. The area around the work space should be separated. By controlling flammable materials, the conditions in the area are safe.

4.Refrigeration agent inspection
The area should be inspected with appropriate refrigerant detectors before and during work to ensure that technicians are aware of the potential flammable environment. Ensure that the leak detection equipment used is suitable for use with combustible refrigerant, i. e. no spark, adequately sealed or intrinsically safe.

5.Presence of fire extinguisher
For thermal work of refrigeration equipment or any related parts, suitable fire extinguishing equipment shall be provided. Place a dry powder fire extinguisher or a carbon dioxide fire extinguisher near 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 open or fully ventilated before entering the system or performing any hot work. Some degree of ventilation should continue during the completion of the work. Ventilation should safely disperse the released refrigerant, preferably discharged into the atmosphere.
8.Refrigeration equipment inspection
When replacing electrical parts they shall conform for that purpose and the correct specifications. Always follow the manufacturer's maintenance and service guidelines. If in doubt, consult the manufacturer's technical department for assistance. Use a flammable refrigerant.

1) The filling volume is consistent with the room size where the refrigerant containing the components is installed.
2) The ventilation machinery and the exits worked well and were not blocked.
3) If an indirect cooling circuit is used, the secondary tank should be checked for the presence of refrigerant and the marks on the equipment continue to be visible and clear.
4) Illegible marks and marks shall be corrected.
5) Refrigeration pipes or components are installed in locations that are unlikely to be exposed to any substances that may corrode refrigerant components unless they are made of materials that are inherently corrosion resistant or properly protected against corrosion.

9.Checks to electrical devices
Repair and maintenance of electrical components shall include initial safety inspection and component inspection procedures. If there is a fault that may endanger safety, no power must be connected to the circuit until the fault is satisfactorily handled. If the fault cannot be corrected immediately but must continue running, an appropriate temporary solution should be used. This shall be reported to the owner of the equipment to notify all parties.
1) That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
2) That there no live electrical components and wiring are exposed while charging, recovering or purging the system.

10.Repairs to sealed components
When repairing the sealing parts, remove all power supplies from the working equipment before removing the sealing cover, etc. If power is absolutely necessary to supply the equipment during maintenance, then a permanently operating form of leak detection should be installed at the most critical location to warn of potentially hazardous conditions.
Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not alteredIn such a way that the level of protection is afected. This shall include damage to cables, excessive number of connection sterminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
1) Ensure that the equipment is firmly installed
2) Ensure that the seal or sealing material is not degraded and no longer prevents access into the flammable environment. The replaced parts shall comply with the manufacturer's specifications.
3) The use of silicon sealant may inhibit the effeciveness of some types of leak detection equipment. instrinsically safe components do not have to be isolated prior to working on them.
4) The use of silicon sealant may inhibit the effeciveness of some types of leak detection equipment. instrinsically safe components do not have to be isolated prior to working on them.

11.Repair to intrinsically components
Do not apply any permanent inductance or capacitance load to the circuit, unless ensure that this does not exceed the allowable voltage and current of the equipment used. The intrinsically safe component is the only type that can work in a flammable environment. The test device shall be at the correct rating. Parts can only be replaced with the parts specified by the manufacturer. Other components may cause the refrigerant in the atmosphere to catch fire due to the leakage.

12.conductor arrangement

Check that the cables are not subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The inspection should also take into account the effects of aging or constant vibration from sources such as the compressor or fan.

13.Refrigeration agent detection

In no case should a potential ignition source be used when looking for or detecting a refrigerant leak. Halide torch (or any other detector using an open 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 refrigernat 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

Routine procedures shall be used when entering the reinforcement circuit for any other purpose. It is important to follow best practice, because notability is a consideration. The following procedures shall be followed:

1) Remove refrigerant;
2) Purge the circuit inert gas;
3) Evacuate;
4) Purge again with inert gas;
5) 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. The flushing should be done by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is reached, then discharged into the atmosphere and finally pulled into the vacuum. This process shall be repeated until there is no refrigerant in the system.

When the final OFN charge is used, the system should discharge to atmospheric pressure to put the work in place. This operation is absolutely important if the pipe is bradered. Ensure that the outlet of the vacuum pump is not closed to any ignition source and is well ventilated.

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 completing this procedure, the technician must be fully familiar with the equipment and all the disassembled equipment. It is recommended that all refrigerant must be recycled safely recovered. Oil and refrigerant samples shall be taken prior to the task.
Analysis is required before reuse the recovered refrigerant. Before this task begins, electricity must be supplied.
1) Familiar with the equipment and its operation.
2) Isolate system electrically.Make sure that cylinder is situated on the scales before recovery takes place.
3) Before trying this procedure, make sure of the following.
Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
All personal protetive 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.
4) Minimize the flow rate of the refrigerant system.
5) If a vacuum is not possible,make a manifold so that refrigerant can be removed from various parts of the system.
6) Make sure that cylinder is situated on the scales before recovery takes place.
7) Start the recovery machine and operate according to the manufacturer's instructions.
8) Do not overfill the cylinder.(Not more than 80%).
9) Do not exceed the maximum working pressure of the cylinder, even if it is temporary.
10) When the cylinder is filled correctly and the process is complete, ensure that the cylinder and equipment are quickly removed from the site and close all isolation valves on the equipment.
11) The recovered refrigerant shall not be injected into other refrigeration systems unless it has been cleaned and inspected.

18.Labelling
The equipment shall be labeled with commissioning and emptied refrigerant. The label shall be dated and signed. Ensure the equipment is labeled indicating that it 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 tranferring 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 retruning 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

Transportation of the equipment containing flammable refrigerant shall comply with the transportation regulations.

Marking of equipment using signs Compliance with local regulations.

The equipment using the flammable refrigerant shall comply with the national regulations.

Storage of equipment and appliances.

The storage of the equipment shall be conducted according to the manufacturer's instructions.

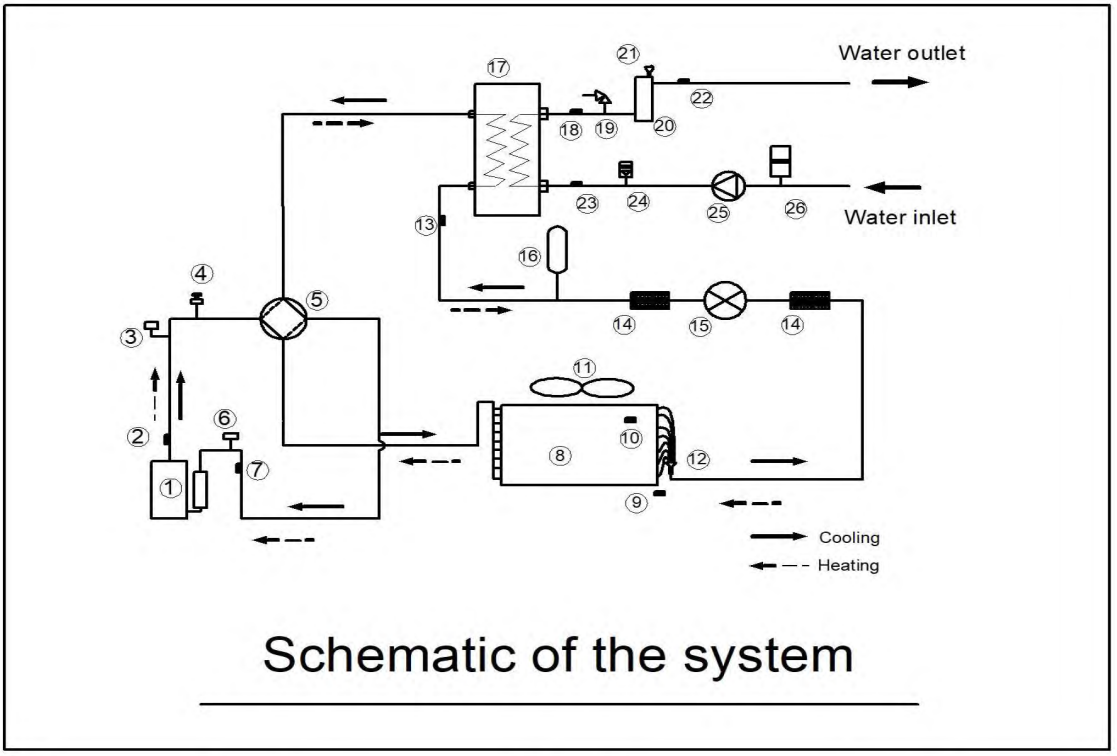
Store the packaged (unsold) equipment.

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

The maximum number of equipment allowed to be stored together will be determined by the local regulations.

ANNEX

ANNEX A:Refrigerant cycle

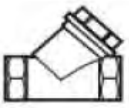


Schematic of the system

Item	Description	Item	Description
1	Compressor	14	Strainer
2	The exhaust gas temperature sensor	15	Electronic expansion valve
3	High pressure switch	16	Reservoir
4	Pressure sensor	17	Plate heat exchanger
5	4-way valve	18	Water temperature sensor
6	Low pressure switch	19	Safety valve
7	Suction temperature sensor	20	Electrical heating
8	Air side heat exchanger	21	Air evacuation valve
9	Fin temperature sensor	22	Total effluent temperature probe
10	Air temperature sensor	23	Inlet water temperature sensor
11	DC_FAN	24	Water flow switch
12	Shunt capillary module	25	Water pump
13	Temperature sensor behind valve	26	Expansion drum

ANNEX B:ACCESSORIES

Accessories supplied with the unit

Name	Shape	Quantity
Installation and owner's manual (this book)		1
Wire Controller Operation Instruction		1
Y-shape filter		1
Wired controller		1
Thermistor(12m) for Tbt 1(or Tw2 or Tsolar or T5)		2

Accessories avaliable from supplier

Name	Shape	Quantity
Thermistor for buffer tank temp. (Tbt2)		1
Thermistor for Zone 2 flow temp. (Tw2)		2
Thermistor for solar temp.(Tsolar)		1
Thermistor for hot water tank temp.(T5)		1

Thermistor for Tbt,Tw2,Tsolar and T5 can be shared. If necessary, you can purchase other thermistors and connection wiring from the supplier.



V1.0