# AIR-TO-WATER HEAT PUMP
# ECOPOWER

**Installation & Owner`s manual**

Air-to-water heat pump

Models:

CH-HP06UIMPZK-P

CH-HP12UIMPZK-P

CH-HP12UIMPZM-P

CH-HP17UIMPZM-P

Thank you for choosing Cooper&Hunter air-to-water heat pump, please read this installation & owner`s manual carefully before operation and retain it for future reference.

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# Preface

- In order to provide the customers with high quality, strong reliability and good versatility product, this heat pump is produced by strict design and manufacture standards.
  This manual includes all the necessary information about installation, debugging, discharging and maintenance. 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, unnecessary maintenance which is not in line with this manual.
  The unit must be installed by qualified personnel.
- It is vital that the below instructions are adhered to at all times to keep the warranty.
  —The unit can only be opened or repaired by qualified installer or an authorised 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.
- Inverter air source water heat pump is a kind of high efficiency, energy saving and environment friendly equipment, which is mainly used for house warming. It can work with any kind of indoor unit such fan coil, radiator, or floor heating pipe, by provide warm or hot water. One unit of monobloc heat pump can also work with several indoor units.
  The air source water heat pump unit is designed to have heat recovery by using super heater which can provide hot water for sanitary purpose.

This series of heat pump unit owns following features:

1 Advanced controlling
The PC microcomputer based controller is available for the users to review or set the running parameters of the heat pump. Centralized controlling system can control several units by PC.

2 Nice appearance
The heat pump is designed with beautiful looking. The monobloc one has the water pump included which is very easy for installation.

3 Flexible installation
The unit has smart structure with compact body, just simple outdoor installation is needed.

4 Quiet running
High quality and efficient compressor, fan and water pump is used to ensure the low noise level with insulation.

5 Good heat exchange rate
The heat pump unit use special designed heat exchanger to enhance whole efficiency.

6 Large working range
This series of heat pump is designed to work under different working conditions as low as -30 degrees for heating.

To prevent the users and others from the harm of this unit, and avoid damage on the unit or other property, and use the heat pump properly, please read this manual carefully and understand the following information correctly.

## Mark Notes

| Mark | Meaning |
|---|---|
|  WARNING | Incorrect operation may result in severe injury or death. |
|  ATTENTION | Incorrect operation can cause harm to individuals or property damage. |

## Icon notes

| Icon | Meaning |
|---|---|
|  | Actions that are prohibited are indicated by this icon. |
|  | Actions that must be taken are listed here. |
|  | **ATTENTION** (include **WARNING**)<br>Please heed the indicated warnings. |

## Warning

| Installation | Meaning |
|---|---|
| Professional installer is required. | The heat pump must be installed by qualified personnel to prevent improper installation, which could lead to water leakage, electrical shock, or fire. |
| Earthing is required | Ensure that the unit and power connections are properly grounded to prevent the risk of electrical shock. |

| Operation | Meaning |
|---|---|
| PROHIBITION | DO NOT insert fingers or other objects into the unit's fans or evaporator, as this could result in injury. |
| Power Shut-Off | In case of malfunction or a strange smell, immediately shut off the power supply to stop the unit. Continuing to operate it may cause an electrical short or fire. |

| Move and repair | Meaning |
|---|---|
| Entrust | If the heat pump needs to be moved or reinstalled, please entrust the task to a dealer or qualified person. Improper installation can lead to water leakage, electrical shock, injury, or fire. |
| Entrust | Users are not allowed to repair the unit themselves, as it may result in electrical shock or fire. |
| Prohibit | If the heat pump requires repairs, please entrust the task to a dealer or qualified person. Improper handling or repairs can lead to water leakage, electrical shock, injury,or fire. |




Do not use means to accelerate the defrosting process or to clean,Other than those recimmended by the manufacturer.



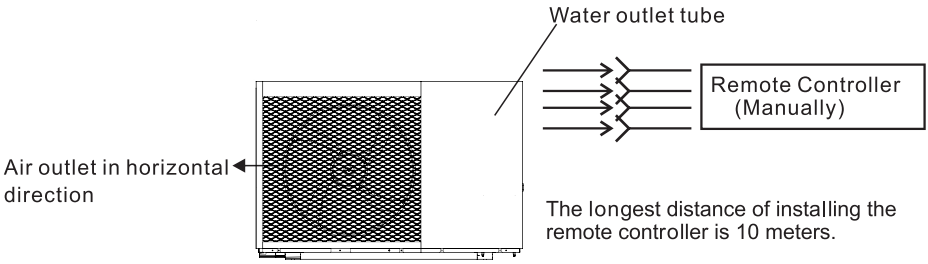
The appliance shall be stored in a room and install In the environment without continuously operating or potential ignition sources (for example:open flames, an operating gas appliance or an operating electric heater or Electric Spark or hot object )

## ATTENTION

| Installation | Meaning |
|---|---|
|  Prohibition of Flammable Gas Proximity | The unit can not be installed near any sources of flammable gas. In the event of a gas leakage, a fire may occur. |
|  Stable Foundation Required | Ensure that the foundation of the heat pump is strong enough to prevent any tilting or falling of the unit. |
|  Mandatory Installation of Circuit Breaker | A circuit breaker must be installed for the unit. The absence of a circuit breaker can lead to electrical shock or fire. |

| Operation | Meaning |
|---|---|
|  Regular Inspection of Installation Foundation | The installation foundation should be inspected periodically (at least once a month) to prevent any deterioration or damage that might cause injury or damage to the unit. |
|  Power Disconnection During Maintenance | Please switch off the power when cleaning or performing maintenance on the unit. |
|  Prohibition | The use of copper or iron as a fuse is prohibited. The correct fuse must be installed by a qualified electrician for the heat pump. |
|  Prohibition | Spraying flammable gas onto the heat pump is prohibited as it may cause a fire. |

## 1. Appearance and structure of the heat pump




## 2. The data of unit

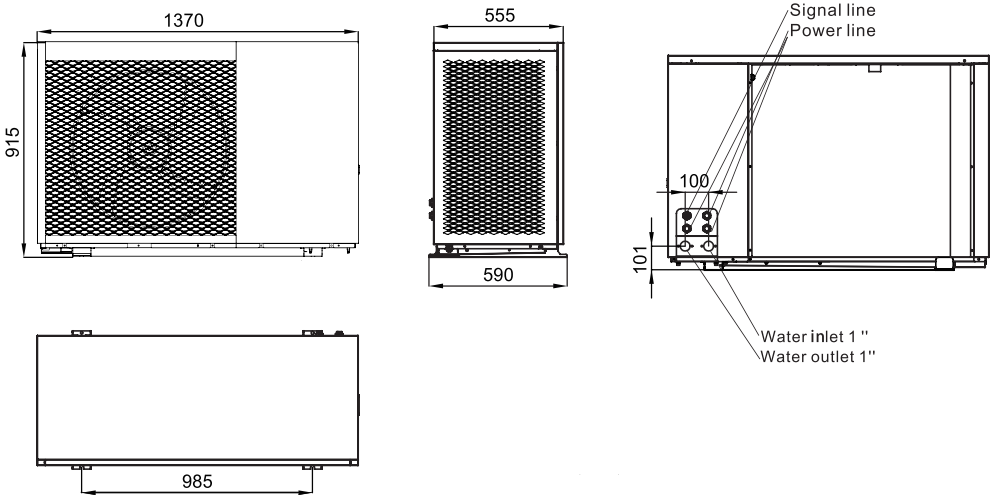
*** REFRIGERANT : R290

| Model | / | CH-HP06UIMPZK-P | CH-HP12UIMPZK-P | CH-HP12UIMPZM-P | CH-HP17UIMPZM-P |
|---|---|---|---|---|---|
| Nominal Heating Capacity (A) | kW | 6 | 12 | 12 | 17 |
| Max Heating Capacity (A) | kW | 6.00/*10.69 | 12.00/*17.71 | 12.00/*17.71 | 17.00/*24.06 |
| Max Heating Power Input (A) | kW | 1.23/*2.49 | 2.60/*4.55 | 2.60/*4.65 | 3.72/*6.30 |
| Nominal Capacity (B) | kW | 6 | 12 | 12 | 17 |
| Max Heating Capacity (B) | kW | 6.00/*9.97 | 12.00/*16.87 | 12.00/*16.87 | 17.00/*22.69 |
| Max Heating Power Input (B) | kW | 1.89/*3.37 | 3.82/*6.02 | 3.82/*6.05 | 5.43/*8.08 |
| Nominal Cooling Capacity (C) | kW | 6 | 12 | 12 | 17 |
| Cooling Capacity Range (C) | kW | 2.05-10.77 | 4.63-17.99 | 4.63-17.99 | 6.00-23.00 |
| Cooling Power Input Range (C) | kW | 0.53-2.51 | 0.91-5.38 | 0.91-5.38 | 1.30-7.30 |
| Nominal Cooling Capacity (D) | kW | 6 | 12 | 12 | 17 |
| Cooling Capacity Range (D) | kW | 1.12-7.58 | 3.44-14.14 | 3.44-14.14 | 4.00-18.00 |
| Cooling Power Input Range (D) | kW | 0.57-2.43 | 1.01-5.14 | 1.01-5.14 | 1.70-7.20 |
| Max. Power Input | kW | 3.60 | 7.40 | 7.40 | 9.71 |
| Max. Current Input | A | 15.50 | 32.00 | 11.30 | 15.00 |
| Power Supply | / | 220-240V~/50Hz | 220-240V~/50Hz | 380-415V/3N~/50Hz | 380-415/3N~/50Hz |
| Refrigerant Type | / | R290 | | | |
| Refrigerant Volume | kg | 0.7 | 1.0 | 1.0 | 1.3 |
| Compressor type | / | Rotary | | | |
| Compressor Quantity | / | 1 | | | |
| Fan Motor Type | / | DC motor | | | |
| Fan Quantity | / | 1 | 1 | 1 | 2 |
| Sound Pressure (1m) | dB | 39 | 41 | 42 | 44 |
| Sound Power Level (EN12102) | dB | 48 | 51 | 51 | 52 |
| Water Connection | inch | 1 | | | |
| Rated Water Flow | $m^3/h$ | 1.03 | 2.06 | 2.06 | 2.92 |
| Water Pressure Drop | kPa | 13 | 23 | 23 | 40 |
| Max. Water Head | m | 5.5 | 5.5 | 5.5 | 6.4 |
| Operating Ambient Temperature | °C | -30~45 | | | |
| Unit Net Dimensions (L/W/H) | mm | 1370×590×915mm | 1370×590×915mm | 1370×590×915mm | 1370×590×1335mm |
| Unit Shipping Dimensions (L/W/H) | mm | 1490×610×1050mm | 1490×610×1470mm | 1490×610×1050mm | 1490×610×1470mm |
| Net Weight | kg | 145 | 158 | 162 | 212 |
| Shipping Weight | kg | 168 | 183 | 187 | 245 |

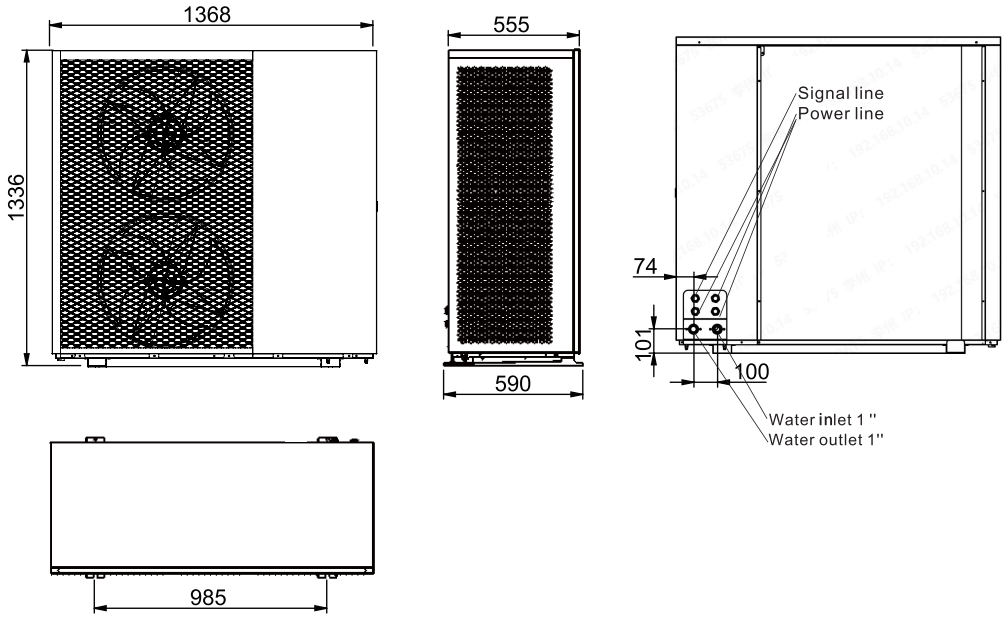
Heating working condition (A): (DB/WB)7°C/6°C. Outlet water temp.35°C.
Heating working condition (B): (DB/WB)7°C/6°C. Outlet water temp.55°C.
Cooling working condition (C): (DB/WB)35°C/24°C, Outlet water temp.18°C.
Cooling working condition (D): (DB/WB)35°C/24°C, Outlet water temp.7°C.
BS EN14511-1-2013 Air conditioner, whole liquid cooling machine, electric compressor.
Part2: Test condition; Part3: Test method; Part4: Related requirements.
The above heating data is available in two modes: Standard/*Boost.

## 3. Unit dimension

Models:CH-HP06UIMPZK-P/CH-HP12UIMPZK-P/CH-HP12UIMPZM-P




Models:CH-HP17UIMPZM-P



## Unit features

1. Plate heat exchanger

Utilize the plate heat exchanger, characterized by its compact size and high efficiency.

2.Environmentally Friendly Refrigerant

Employ the new generation of environmentally friendly refrigerant R290, which poses no harm to the ozone layer.

3. Heating in Frigid Environment.

The optimally designed unit can maintain normal heating functionality even when the ambient temperature drops to -30°C.

4. Refrigerant Charging

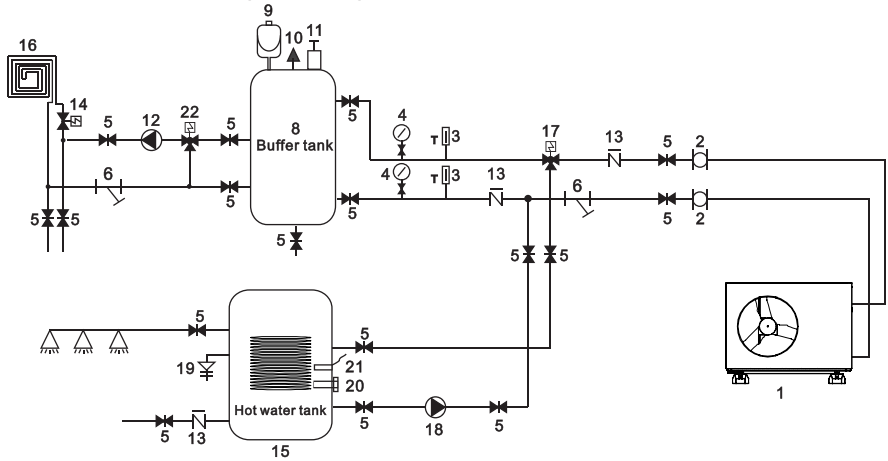
If the machine is not equipped with refrigerant and is charged with nitrogen, then the recharging of the refrigerant needs to be carried out according to the instructions on page 9.

5. Installation Environment

The refrigerant R290 is flammable and explosive. It is prohibited to install the unit in environments with operating or potential ignition sources, including open flames, operating gas appliances, electric heaters, electric sparks, or hot objects.

# 1 Application of heat pump

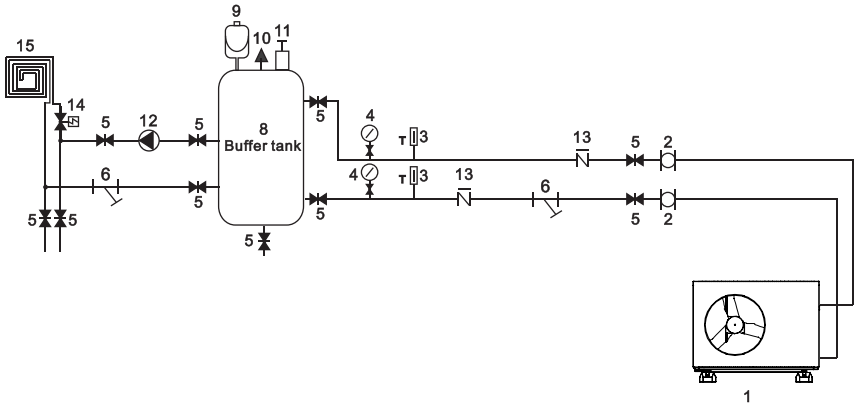
## 1.1 House Heating/Cooling + Domestic Hot Water




| | | | | | |
|---|---|---|---|---|---|
| 1 | Heat pump | 10 | Relief valve | 19 | PT valve |
| 2 | Flexible pipe | 11 | Air vent valve | 20 | Electrical heater |
| 3 | Thermometer | 12 | Water pump for floor heating | 21 | Hot water sensor |
| 4 | Manometer | 13 | Check valve | 22 | Mixing valve |
| 5 | Shut-off valve | 14 | Floor heating valve | | |
| 6 | Y type water filter | 15 | Hot water tank | | |
| 7 | Plate heat exchanger | 16 | Floor heating pipe/fan coil unit | | |
| 8 | Buffer tank | 17 | Hot water valve | | |
| 9 | Expansion tank | 18 | Hot water pump | | |

Remark:Item 17, 18, 20, 21 can be connected with heat pump.

## 1.2 House Heating/Cooling（includes Buffer tank）




| | | | | | |
|---|---|---|---|---|---|
| 1 | Heat pump | 7 | Plate heat exchanger | 13 | Check valve |
| 2 | Flexible pipe | 8 | Buffer tank | 14 | Floor heating valve |
| 3 | Thermometer | 9 | Expansion tank | 15 | Floor heating pipe/fan coil unit |
| 4 | Manometer | 10 | Relief valve | | |
| 5 | Shut-off valve | 11 | Air vent valve | | |
| 6 | Y type water filter | 12 | Water pump for floor heating | | |

# 2 Choose a right heat pump unit

1. Based on the local climate conditions, construction characteristics, and insulation level, calculate the required cooling/heating capacity per square meter.
2. Determine the total capacity required for the building.
3. Select an appropriate heat pump model according to the total capacity requirement. Typically, the heat pump's capacity should be 1.05 times or greater than the calculated heating requirement to ensure optimal energy-saving performance during operation.

Heat pump features are as follows:

- Cooling Mode

The heat pump operates within an ambient temperature range of 10~45 °C. It is recommended to set the target outlet water temperature between 7~25 °C.

- Heating Mode

The heat pump operates within an ambient temperature range of -30~45 °C. It is recommended to set the target outlet water temperature between 15~80 °C. Please note that higher water temperatures result in lower energy efficiency. The maximum allowable target outlet water temperature is 80 °C.

- Unit Application

This inverter air-source water heat pump is suitable for spaces such as houses, offices, and hotels that require independent heating or cooling, with the capability for zoned temperature control.

# 3 Installation method

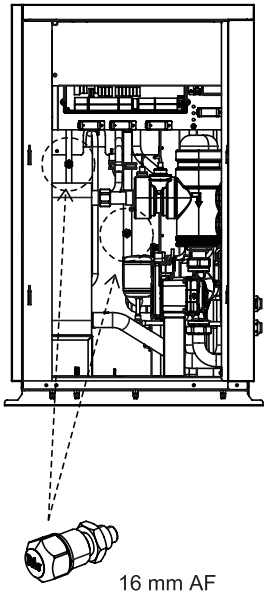
The heat pump can be installed onto the concrete basement by expansion screws, or onto a steel frame with rubber feet which can be placed on the ground or housetop. Make sure that the unit is placed horizontally.

## 4 Installation place

- The unit can be installed on any place outdoor which can carry heavy machine such as terrace, housetop, ground and so on.
- The location must have good ventilation.
- The area should be free from heat radiation and open flames.
- A cover is needed in winter to protect the heat pump from snow.
- There must be not obstacles near the air inlet and outlet of the heat pump.
- Choose a location that is free from strong winds.
- A water channel is necessary around the heat pump to drain the condensation water.
- There must be sufficient space around the unit for maintenance
- The location should be far from operating or potential ignition sources, such as open flames, operating gas appliances, electric heaters, electric sparks, or hot objects.

## 5 Refrigerant charge

If the machine is not equipped with refrigerant and is charged with nitrogen, then the recharging of the refrigerant needs to be carried out according to the steps below.




5.1 Preparations

5.1.1 Please ensure a well-ventilated environment while charging the refrigerant.

5.1.2 Avoid open flames or potential sources of fire.

5.1.3 Disconnect the power supply to the heat pump.

5.1.4 Carefully check the heat pump's nameplate and charge according to the specified amount labeled.

5.2 Nitrogen Gas Pressure Check

Check the pressure of the nitrogen gas inside the system. The heat pump is pre-charged with about 30 Bar of nitrogen gas. Before charging the refrigerant, ensure there is still high-pressure nitrogen present; otherwise, identify and check for leakage points. (Use a spanner to remove seal nuts. If high-pressure gas is expelled, the heat pump is not leaking.)

5.3 Nitrogen Gas Release

Use a 16mm inner hexagon spanner to open valve and release all the nitrogen gas inside the system.

5.4 Vacuuming the System

Connect a vacuum pump to valve and run it until the absolute pressure falls below 30Pa or it has been operating for more than one hour.

5.5 Refrigerant Charging

Ensure the refrigerant is in a liquid state when charging and adhere strictly to the labeled amount.

5.6 Sealing the System

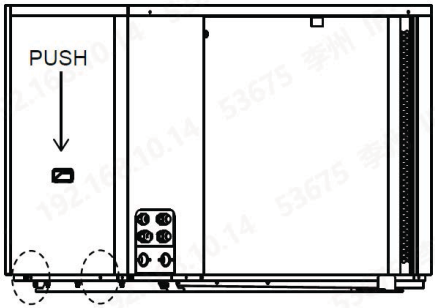
After charging is complete, tighten seal nuts.

# 6 Panel Removal

6.1 Service Panel

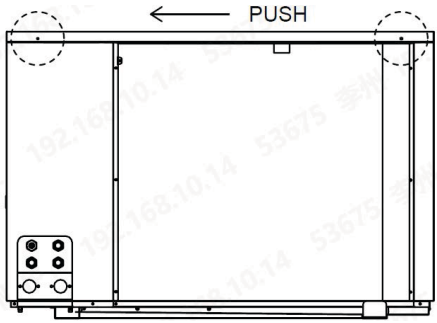
1. Remove 2*screws at the locations shown in the left-side figure.
2. Pull the service panel down to remove it.

Note: There is no need to remove the top cover before disassembling the service panel.




6.2 Top Cover

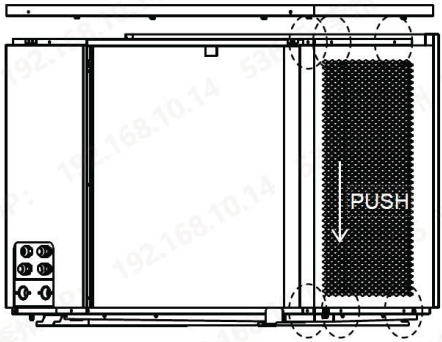
1. Remove 2*screws at the locations shown in the left-side figure.
2. Lift the top cover off toward the service panel.




6.3 Left Protective

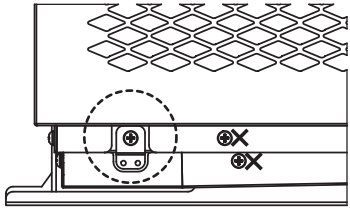
Note: The top cover must be removed prior to this operation.

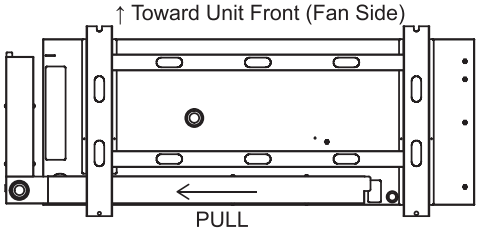
1. Remove 6*screws at the locations shown in the left-side figure.
2. Pull the left protective down to remove it.




6.4 Condensate Pan Removal

1. Remove 1*screw at the location shown in the left-side figure.
2.Pull the pan assembly straight out.





## 7 Water loop connection

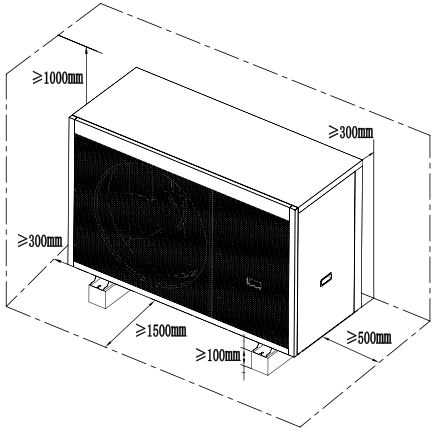
Please pay attention to the matters below when connecting the water pipe :

- Try to minimize the resistance to water flow within the piping.
- The piping must be clean and free from dirt and obstructions. A water leakage test must be conducted to ensure there are no leaks before proceeding with the insulation.
- Note that the pipe must undergo pressure testing separately. DO NOT test it concurrently with the heat pump.
- An expansion tank must be installed at the highest point of the water loop, and the water level in the tank should be at least 0.5 meters higher than the highest point of the water loop.
- The flow meter is installed inside the heat pump; ensure the wiring and functionality of the switch are normal and controlled by the controller.
- Try to prevent air from remaining inside the water pipe; there must be an air vent at the highest point of the water loop.
- A thermometer and pressure meter must be installed at the water inlet and outlet to facilitate easy inspection during operation.

## 8 Power supply connection

- Open the side panel, and open the power supply access.
- The power supply must go through the wire access and be connected to the power supply terminals in the controlling box. Then connect the 3-signal wire plugs of the wire controller and main controller.
- If an external water pump is required, please also insert its power supply cable through the wire access point and connect it to the water pump terminals.
- If an additional auxiliary heater needs to be controlled by the heat pump controller, the relay (or power supply) of the auxiliary heater must be connected to the relevant output on the controller.

## 9 Single Installation Requirements




Following distances around the outdoor unit must be respected under any condition for normal operation. The distances are only for operation not to be seen as safety zone.

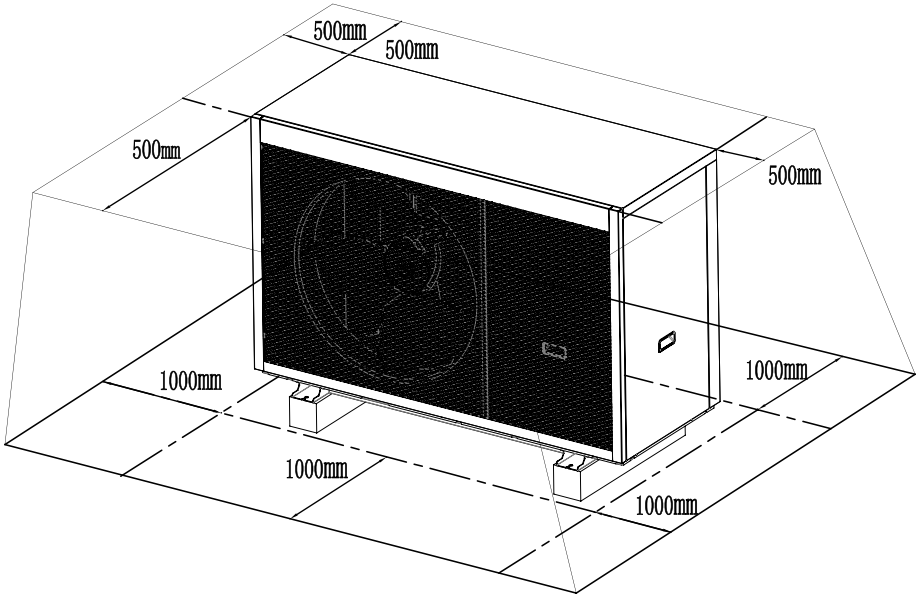
## 10 Danger zone

An area around the unit where, in the event of a refrigerant leak, a flammable environment could develop within a short period. All safety precautions described in the manual must be observed within this area.

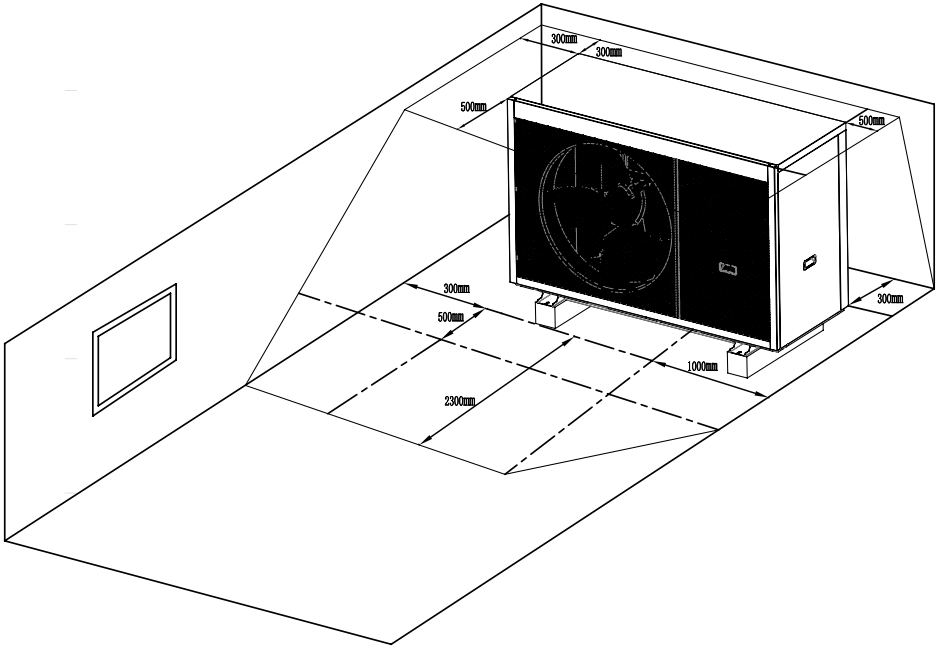
- There must be no building openings. (windows, doors, roof windows, etc.
- There must be no external and outlet air openings. (e.g. intakes of central ventilation system
- There should be no building boundaries, adjacent buildings, passageways, or roads
- Drainage system inlets, pump shafts, downspouts, and bath lakes should not be present
- Other grooves, bottoms and shafts must not be presen
- There should be no Roof avalanches
- Ignition sources (such as electrical switches or lamps) must not be used
- No parts should have a surface temperature higher than 360 °C
- Open flames are strongly prohibited

Above special safety precautions must be taken within the areas marked below.

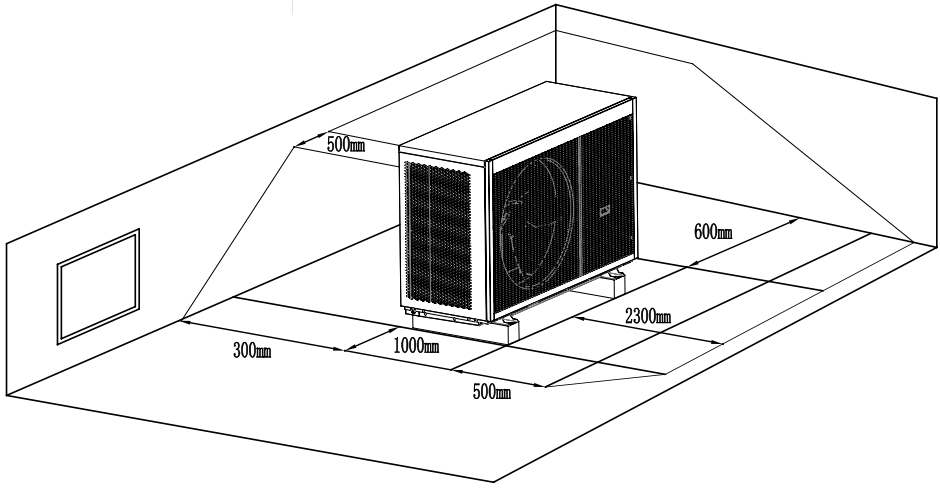
10.1 Ground installation no obstacle



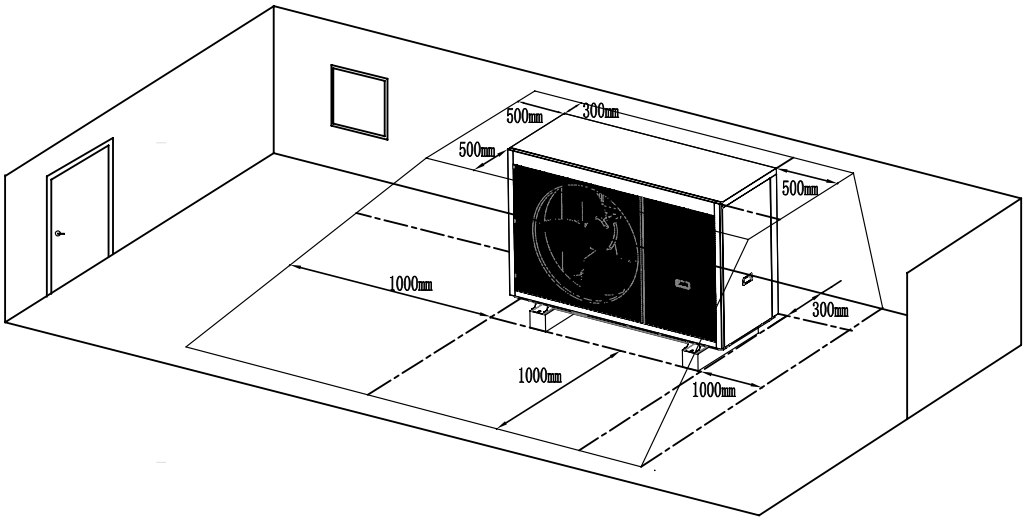
10.2 When installed at the left corner of a building



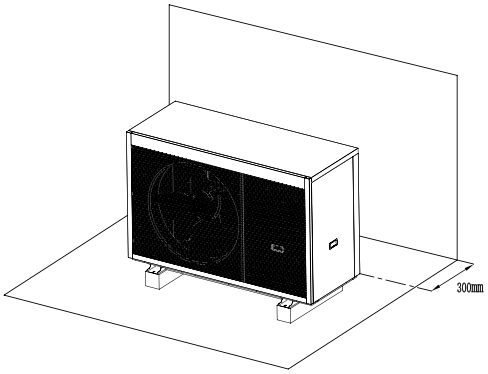

10.3 When installed at the right corner of a building



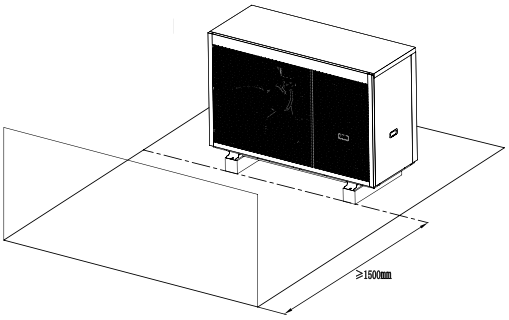
10.4 When installed on the ground on the front of the building wall




10.5 Wall on suction side




10.6 When the air outlet is towards the wall

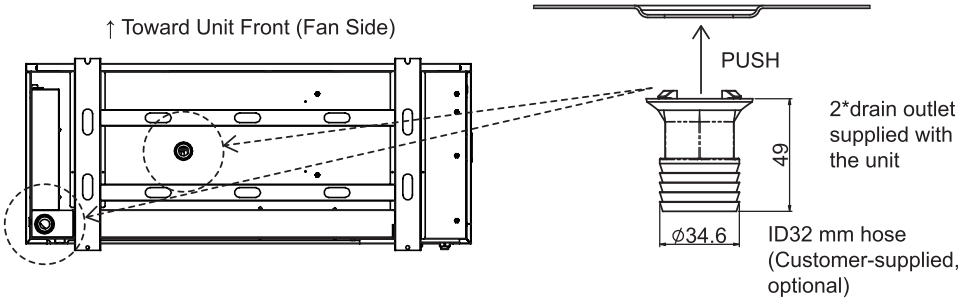


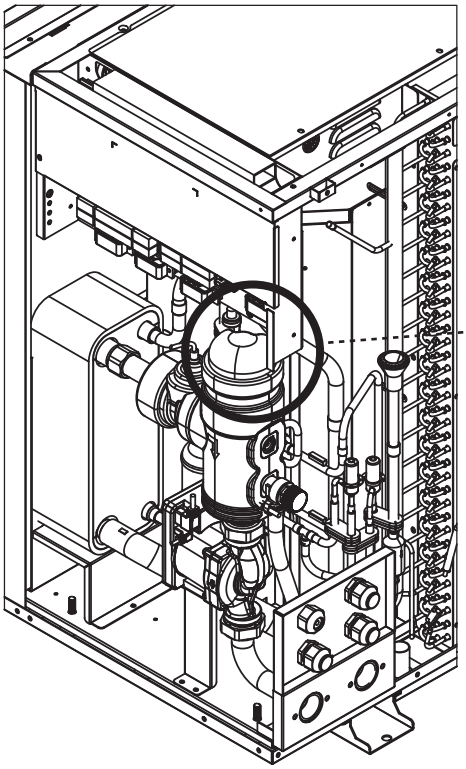
# 11 Pre-Startup Preparation

11.1 Drain Outlet

1. Install the unit onto the mounting base.
2. Insert the drain outlet (2*drain outlet supplied with the unit) into the drain outlet on the basepan and push up until it clicks into place.

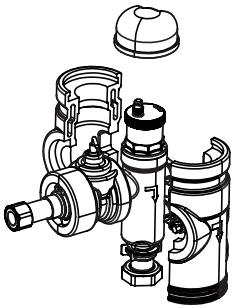
Note: It's recommended to connect a water pipe with an ID32 mm to the Drain.



11.2 Pressure Relief Valve

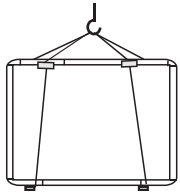
1. Disassemble the Front Rear and Top-side EPP Covers.
2. Loosen the Exhaust Nut on the top of the Pressure Relief Valve to facilitate exhaust.



11.3 Relief Valve Outlet
1. The drain pipe shall be routed to the drain hole of the chassis assembly.

## 12 Transit

When the unit need to be hung up during installation, a 8 meters cable is needed, and there must be soft material between the cable and the unit to prevent damage to the heat pump cabinet. (See picture 1)



Picture 1

WARNING

DO NOT touch the heat exchanger of the heat pump with fingers or other objects!

## 13 Trial Running

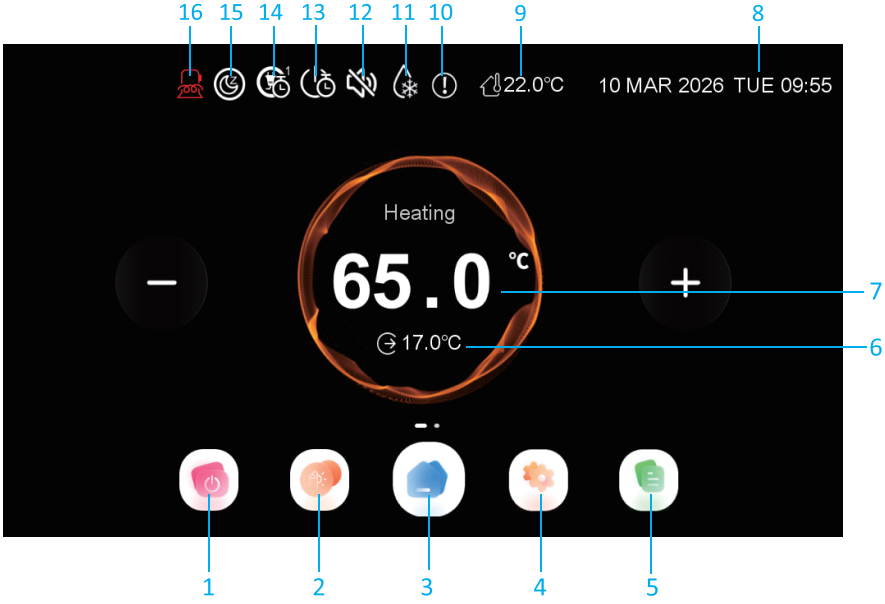
Inspection before trial running

- Check the indoor unit and verify that the pipe connection is correct and the relevant valves are open.
- Inspect the water loop to ensure that the expansion tank contains sufficient water, the water supply is adequate, and the loop is filled with water without any air present. Additionally, ensure good insulation is applied to the water pipe.
- Examine the electrical wiring. Confirm that the power voltage is normal, the screws are tightened, the wiring aligns with the diagram, and the grounding is connected properly.
- Review the heat pump unit, including all screws and components, to ascertain they are in good condition. Upon powering on, observe the indicators on the controller for any failure signs. Connect the gas gauge to the check valve to monitor the system's high (or low) pressure during the trial run.

### Trial running

- Activate the heat pump by pressing the "____" key on the controller. Check the water pump's operation; if functioning normally, the water pressure meter will indicate 0.2 MPa.
- After the water pump has run for 1 minute, the compressor will initiate. Listen for any unusual sounds emanating from the compressor. In case of abnormal noises, cease operation and inspect the compressor. If the compressor is running smoothly, proceed to check the refrigerant pressure meter.
- Subsequently, confirm that the power input and running current conform to the specifications detailed in the manual. If discrepancies are noted, halt the operation and investigate the issue.
- Adjust the valves in the water loop to guarantee the hot (or cold) water supply to each unit meets the heating (or cooling) requirements.
- Assess the stability of the outlet water temperature.
- The controller's parameters are preset by the manufacturer; unauthorized alterations by the user are prohibited.

## 1. Main interface display and function



| | Name | Description of operation |
|---|---|---|
| 1 | On/off | Power ON/OFF button, color indicates ON and gray indicates OFF |
| 2 | Mode | Click to choose the mode: DHW, heating, cooling, cooling+DHW, heating+DHW |
| 3 | Main | Click to back to the main interface |
| 4 | Setting | Click to enter the function setting interface |
| 5 | User interface | Click to enter the user setting interface |
| 6 | Current temp | Display according to H25, and the tank temp is displayed when the hot water mode is selected |
| 7 | Target temp | Display the current mode target temp,adjustable |
| 8 | System time | Display the current real-time time |
| 9 | AT | Display the ambient temp |
| 10 | Fault icon | Display when the unit fails,click to enter the real-time fault interface |
| 11 | Defrosting icon | Display when the unit is defrosting |
| 12 | Mute icon | Display when the unit is mute |
| 13 | Power timer | Display when the power on/off timer is enabled |
| 14 | Schedule icon | Display when the schedule timer is enabled |
| 15 | SG Ready icon | Display SG current mode icon |
| 16 | Preheat icon | Click to enter the preheat function interface |

Remark:
1. The target temp. cannot be set when the device is shut down.
2. If the device enter the AT Compensation and Schedule, the target temp. cannot be set and the corresponding text prompts are displayed.

# Operation and Use

## 1.1 Mode switch

Click on the icon to switch to the corresponding selection mode, after setting automatically return to the main interface.

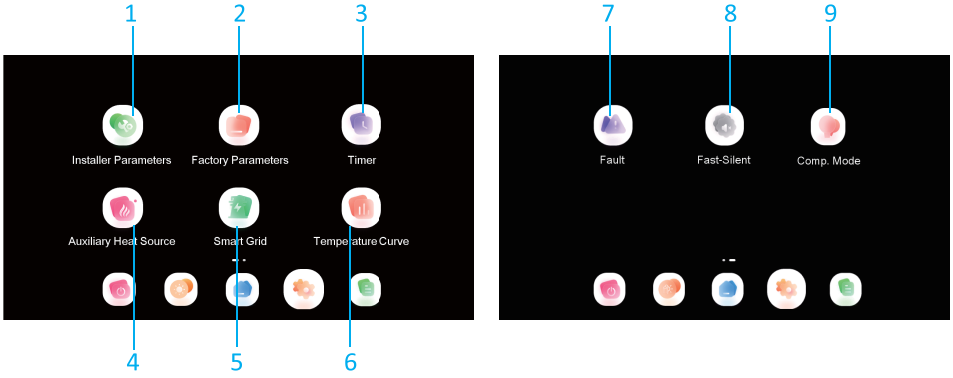



The mode setting screen is displayed according to the H05 and H28 parameters, with up to 5 modes selectable.

- H05=0&H28=0, only heating is displayed;
- H05=1& H28=0, heating and cooling is displayed;
- H05=0&H28=1, heating and DHW, heating + DHW is displayed;
- H05=1&H25=1, 5 modes are displayed;
- H28=2, only DHW is displayed.

## 2. Function setting

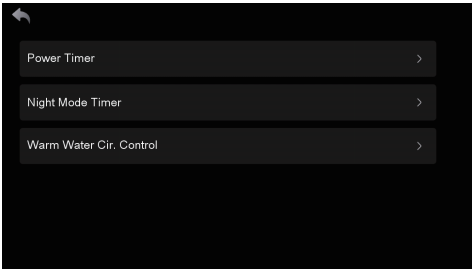
Click the button in the main interface to enter the setting interface.




| No. | Name | Description of operation |
|---|---|---|
| 1 | Installer Parameters | The interface is for installers |
| 2 | Factory Parameters | Click the key and enter the password to enter the factory parameter settings and status parameters |
| 3 | Timer | Click to enter the timer setting ineterface |
| 4 | Auxiliary Heat Source | Click to enter the auxiliary heat function interface |
| 5 | Smart Grid | Click to enter the SG function interface |
| 6 | Temperature Curve | Click to the temp. curve interface |
| 7 | Fault | Click to view the fault interface |
| 8 | Fast-Silent | Click to mute |
| 9 | Comp. Mode | Click to set the comp. frequency mode |

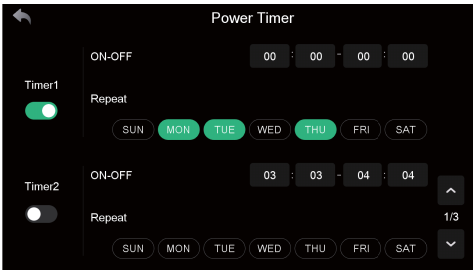
## 2.1 Timer function

Click the button in the setting interface to enter the timer function interface.



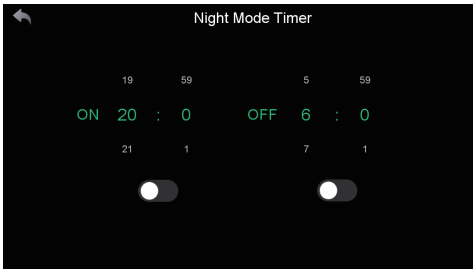

### 2.1.1 Power Timer function

This is the power on/off timer for the device. Up to 6 different timers are supported to adjust the operation of the device to your needs. Each timer allows you to select the number of days of the week that it will run.




Remark:
The time is set in 24-hour format and supports hour and minute settings across days.

### 2.1.2 Night Mode Timer function

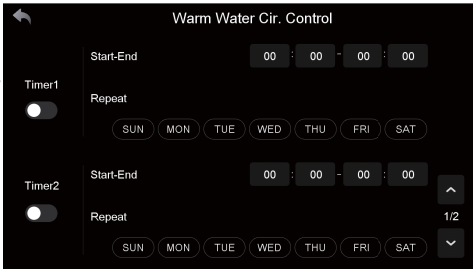



The night mode feature minimizes noise levels by limiting compressor and fan speeds.
Select the mode start time on the left side of the screen. Select the mode end time on the right side of the screen, which resumes normal operation.

Don't forget to activate the timer by pressing the switch on the button of the screen.

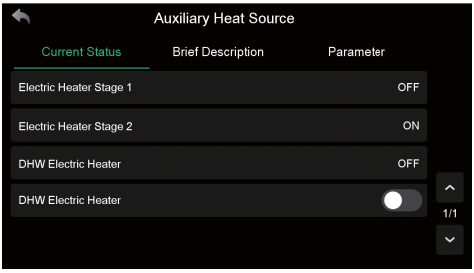
## 2.1.3 Warm Water Cir. Control function

Up to 3 different timers are supported to adjust the operation of the device to your needs. Each timer allows you to select the number of days of the week that it will run.




## 2.2 Auxiliary Heat function

Click the button in the setting interface to enter the auxiliary heat function interface.

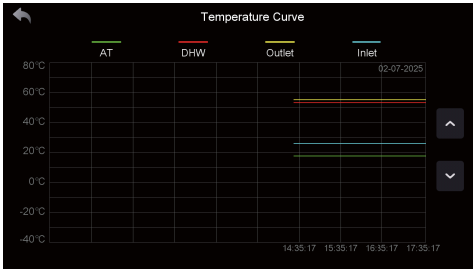



- Current Status: Displays three electric heating on/off states, and manual electric heating control parameters;
- Brief Description: Display the current AT. temp. and description of the conditions which the auxiliary heat source is turned on;
- To use the electric heater function, press the "Parameters" key, enter the code password and set the relevant parameters.

## 2.3 Temp. Curve

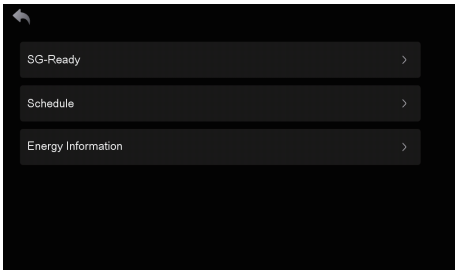
Click the button in the setting interface to enter the curve recording interface.

• This curve function records the water inlet temp, outlet temp, DHW temp and AT temp
• Temp data is collected and saved every 5 munites and save up to 30 days of data
• Only curve for power-on status is recorded, and that for power-off will not be saved
• Temp curve record is provided with power-down memory function
• The value of the abscissa indicates the time from the point on the curve to the current time point.The rightmost point on the first page is the latest temp record. Page up and down to view historical data



## 2.4 Smart Grid function

Click the button in the setting interface to enter the SG function, schedule, energy information interface.

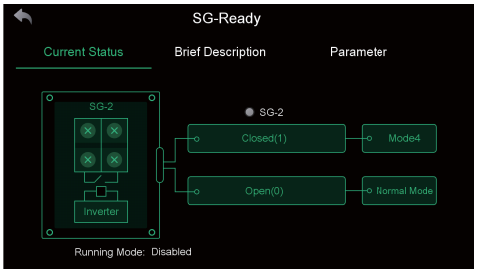



### 2.4.1 SG-Ready function interface 1.0

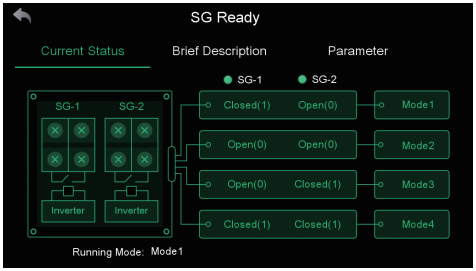
Through one or two contacts, the device receives information on available energy (from the PV system or the electricity supplier) and selects one of the 5 modes based on this information:

- Mode 1: Hibernation, where the heat pump is forced into standby. Standard mode is entered when continuous SG02 is in demand;
- Mode 2: Low energy mode with a maximum operating power of SG03 (when energy is insufficient or too expensive);
- Mode 3: Energy saving mode with maximum operating power SG04;
- Mode 4: Temperature Increasing Cooling/Heat Storage Mode. The heat pump target temp is raised according to SG05/SG06/SG07 and the electric heating is switched on according to SG08. (When energy consumption is low, the appliance can select a higher temp target to speed up heating and provide more domestic hot water);
- Normal Mode: Unit operates normally without power limitations and electric heater.

- To use the SG Ready function, press the “Parameters” key, enter the password and select the number of contacts to be used (1/2) in the SG01 parameter.
- The 1st contact (SG-1) is defined as Remote On/Off; the 2nd contact (SG-2) is defined as Remote Heating/Cooling Switch.



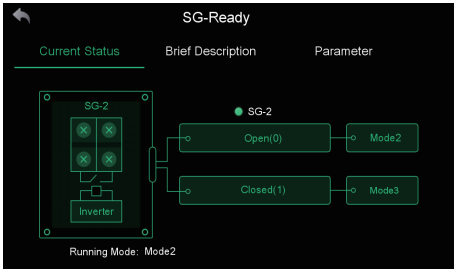

SG01=1



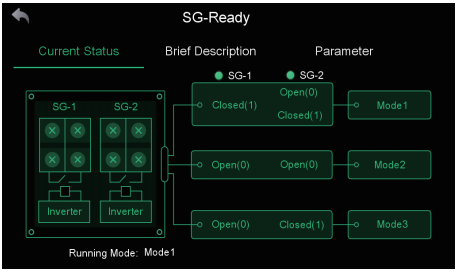

SG01=2

## 2.4.2 SG-Ready function interface 1.1

- Mode 1： Power Limit Mode, Electric heating disabled. Heat Pump max power = SG03 kW; Heat Pump stops when SG03 = 0;
- Mode 2: Normal mode, without power limitation, allow electric heater.;
- Mode 3： Solar high Mode — Cool storage/heat storage mode. The heat pump target temperature is increased according to SG05/SG06/SG07, electric heater is turned on without delay according to SG08.

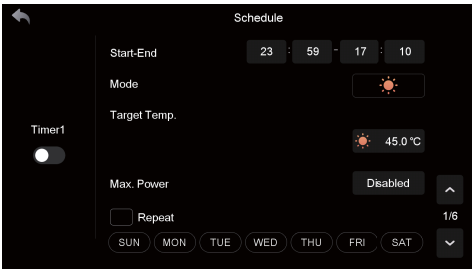



SG01=5




SG01=6

## 2.4.3 Schedule function




Support up to 6 different timers are supported to adjust the operation of the device to your needs. You can set the following:

- Start and end time
- Run mode
- Target temp
- Maximum power consumption
- Number of days the timer will run

## 2.5 Fault interface

Click the button in the setting interface to enter the fault interface, If the fault recovers, it is no longer displayed.

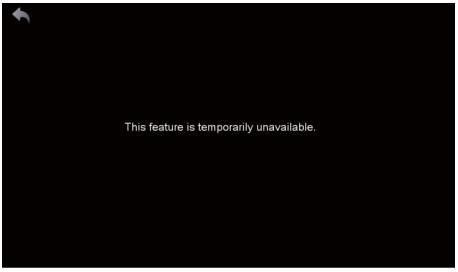
Detailed information on the faults and their solutions can be found in the fault table at the end of the manual.



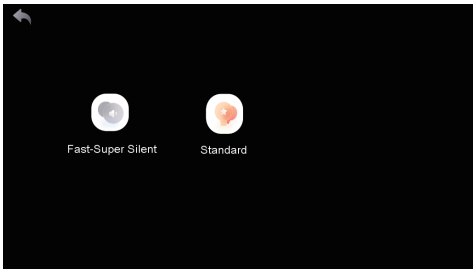
## 2.6 Comp. mode setting

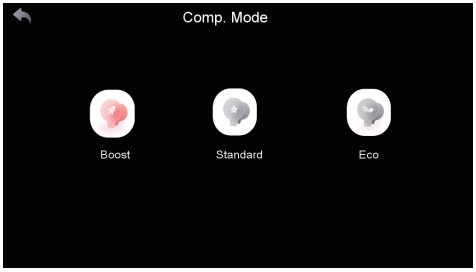
Click the button in the setting interface to enter the comp. mode interface.

If your unit does not support Comp. Mode, the following will be displayed:




If supported, the following options are available:




**Fast-Super Silent:** One-touch activation. The heat pump lowers compressor frequency and fan speed for ultra-quiet operation, with reduced output. Automatically exits after 8 hours.

**Standard:** Compressor Frequency Mode

**Boost** – Maximum output, higher noise level. For demanding conditions.

**Standard** – Default mode, balanced performance and noise. For everyday use.

**ECO** – Energy-saving priority, lower output but quieter and more efficient. For light demand, quiet, and energy-conscious scenarios.

## 2.7 Unit state function

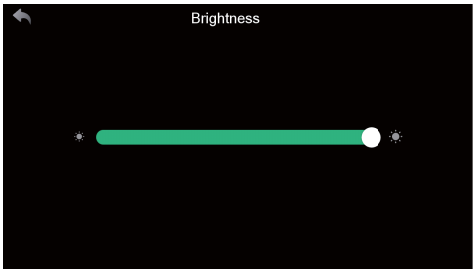
Click the button in the main interface to enter customer function configuration menu.



| Name | Description of operation |
|---|---|
| System Time | Click to set the system time |
| Language | Click to change the language |
| Brightness | Click to adjust screen brightness |
| About | Display information about the device software |
| State | Turn the page to view all status parameters. Parameters are grouped by label according to the first letter of their code |

### 2.7.1 Brightness

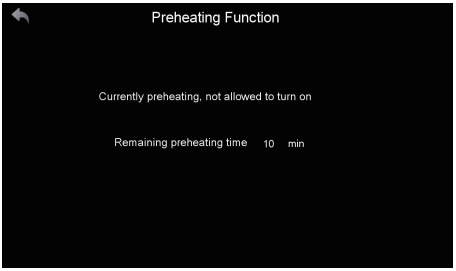
Click the  button in the project interface to enter the interface.




- Initialized brightness of 100, when the user set up after the set value to save, the next time the power or off the screen light according to the set brightness display.
- The screen will be darkened after 30s without operation, and then turn off the screen after 5min, and then light up after turning off the screen to return to the main interface.

## 2.8 Preheat Function

- After a long power outage, the system checks whether compressor preheating is needed before the first start.
- If the oil temperature is too low, the compressor will be locked and preheating will begin.
- The remaining preheat time will be shown on the screen. Once preheating is complete, the compressor can start normally.



## 3. Error Code Instruction

| Protect/fault | Fault display | Reason | Elimination methods |
|---|---|---|---|
| Inlet Water Temp. Sensor Fault | P01 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Outlet Water Temp. Sensor Fault | P02 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| DHW Tank Sensor Fault | P03 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| AT Sensor Fault | P04 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Suction Temp. Sensor Fault | P17 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Heating Returning Water Temp. Sensor Fault | P013 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| DHW Returning Water Temp. Sensor Fault | P018 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Heating Leaving Water Temp. Sensor Fault | P023 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| DHW Leaving Water Temp. Sensor Fault | P028 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Room Temp. Sensor Fault | P42 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| EVI Inlet Sensor Fault | P101 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| EVI Outlet Sensor Fault | P102 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Distributor Tube Temp. Sensor Fault | P152 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Coil Temp. Sensor Fault | P153 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Exhaust Temp. Sensor Fault | P181 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Overhigh Exhaust Temp. | P182 | The compressor is overload | Check whether the system of the compressor running normally |
| Anti-freezing Temp. Sensor Fault | P191 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Mix Tube Outlet Water Temp. Sensor Fault | P02a | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Buffer Tank Temp. Sensor Fault | P03a | The sensor is broken or short circuit | Check or change the temp. sensor |
| Pressure Sensor Fault | PP11 | The pressure sensor is broken or short circuit | Check or change the pressure sensor or pressure |
| High Pressure Sensor Fault | PP12 | The pressure sensor is broken or short circuit | Check or change the pressure sensor or pressure |
| Low AT Protection | TP | The ambient temp. is low | Check the ambient temp value |
| No Cooling at Low AT Protection | TC | The temp. sensor is incorrectly--detected or the temp.sensor is lower--than the set value A30 | Check or change the temp. sensor |
| Electric Heater Overheat Fault | E04 | The electric-heater protection switch is broken | Check whether the electric heater runs at the temperature above 150 ℃ for a long time |
| Excess Temp. Diff. Between Inlet & outlet | E06 | Water flow is not enough and low differential pressure | Check the pipe water flow and whether water system is jammed or not |
| Communication Fault | E08 | Communication failure between wire controller and main board | Check the wire connection between remote wire controller and main board |

| Protect/fault | Fault display | Reason | Elimination methods |
|---|---|---|---|
| Primary Anti-freezing Fault | E19 | The ambient temp. is low | Check the ambient temp value |
| Secondary Anti-freezing Fault | E29 | The ambient temp. is low | Check the ambient temp value |
| Insufficient Defrosting Water Flow Alarm | E030 | The unit flow rate is less than the minimum flow value of the unit. | Check or change waterway systems to provide unit flow |
| Flow Switch Fault | E032 | No water/little water in water system | Check the pipe water flow and water pump |
| Overhigh Outlet Water Temp. | E065 | No water/little water in water system | Check the pipe water flow and water pump |
| Low Outlet Water Temp. Temp. Fault | E071 | No water/little water in water system | Check the pipe water flow and water pump |
| Fan Motor 1 and PCB Communication Fault | E081 | Speed control module and main board communication fail | Check the communication connection |
| Fan Motor 2 and PCB Communication Fault | E082 | Speed control module and main board communication fail | Check the communication connection |
| Display and PCB Communication Fault | E084 | The wire controller software is not match the mainboard software | Check the wire control software number and the mainboard software number |
| Communication Fault with Hydraulic Module | E08c | Hydraulic Module and mainboard communication fail | Check the communication connection |
| HP Fault | E11 | The high-pressure switch is broken | Check the pressure switch and cold circuit |
| LP Fault | E12 | The low-pressure switch is broken | Check the pressure switch and cold circuit |
| Anti-freezing Fault | E171 | Use side water system temp. is low | 1. Check the water temp. or change the temp. sensor<br>2. Check the pipe water flow and whether water system is jammed or not |
| Fan Motor1 Fault | F031 | 1. Motor is in locked-rotor state<br>2. The wire connection between DC-fan motor module and fan motor is in bad contact | 1. Change a new fan motor<br>2. Check the wire connection and make sure they are in good contact |
| Fan Motor2 Fault | F032 | 1. Motor is in locked-rotor state<br>2. The wire connection between DC-fan motor module and fan motor is in bad contact | 1. Change a new fan motor<br>2. Check the wire connection and make sure they are in good contact |
| Zone 1 Room Temp. Sensor Fault | P105 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Zone 2 Room Temp. Sensor Fault | P106 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Zone 2 Mixing Temp. Sensor Fault | P107 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Abnormal Adjustment of Mixing Valve | E122 | 1. Mixing Valve is incorrectly connected;<br>2. Mixing Valve is damaged; | 1. Plug and unplug terminals;<br>1. Replace the Mixing Valve; |
| Zone 1 Thermostat Communication Fault | E08g | 1. Thermostat not connected<br>2. Thermostat failure<br>3. Wrong parameter setting | 1. Check the wiring connection between the thermostat and the unit<br>2. Replace the thermostat<br>3. Check the parameters |
| Zone 2 Thermostat Communication Fault | E08h | 1. Thermostat not connected<br>2. Thermostat failure<br>3. Wrong parameter setting | 1. Check the wiring connection between the thermostat and the unit<br>2. Replace the thermostat<br>3. Check the parameters |
| Low Water Flow Protection | E035 | Water flow is too low | Increased water flow |

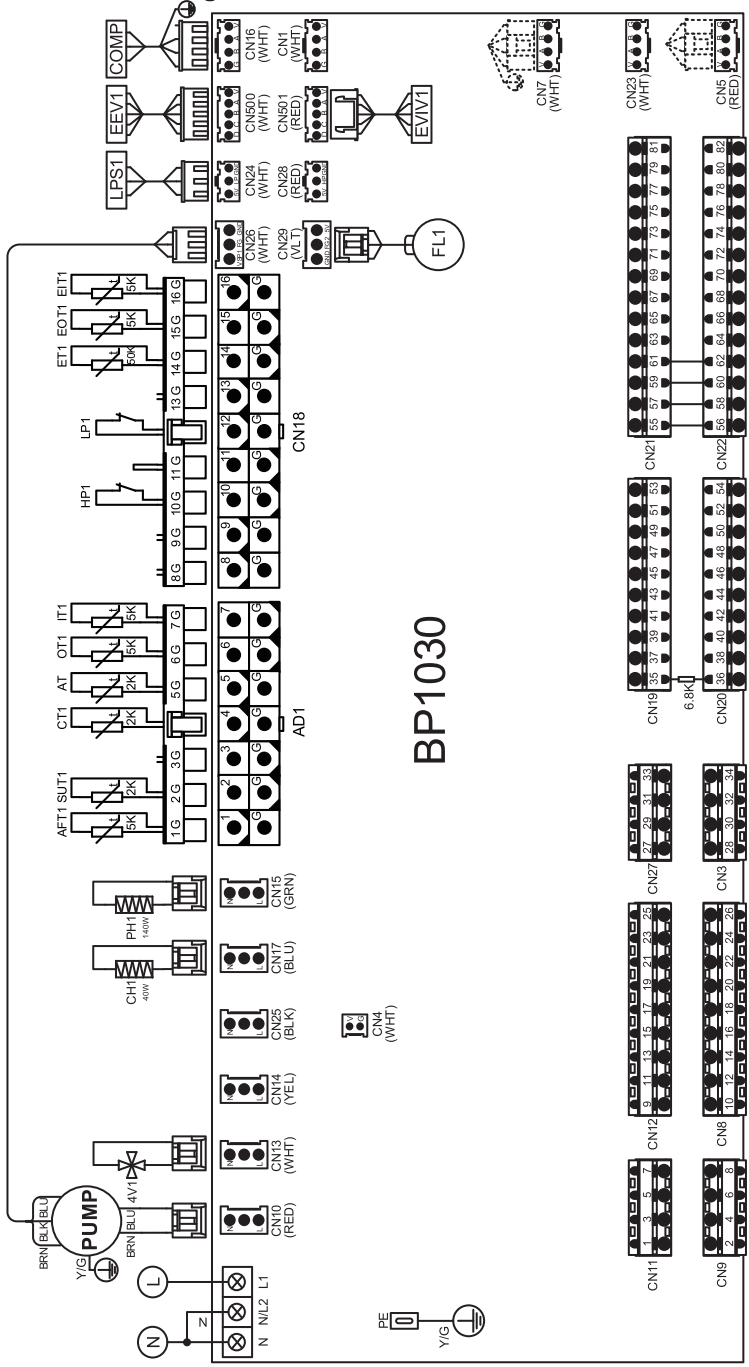
| Protect/fault | Fault display | Reason | Elimination methods |
|---|---|---|---|
| DHW Electric Heater Overheat Fault | E042 | Overload protection switch disconnected when the electric heating of the hot water tank was activated | Check the wiring of the electric heating overload switch in the hot water tank for proper connection and the condition of the overload switch |
| Overhigh Outlet Water Temp. after Electric Heater | E07a | High temperature detected at the water outlet of the electric heating during activation | 1. Verify if the water outlet temperature of the electric heating exceeds 70°C; 2. Check the wiring of the temperature sensor at the outlet of the electric heating for proper connection |
| Communication Fault with Indoor Unit | E08i | No successful communication detected with the indoor unit for 70 continuous seconds when the indoor unit control is enabled | 1. If no indoor unit is present, modify parameters to disable indoor unit control;<br>2. If there is an indoor unit, inspect the communication wiring between the indoor unit and the heat pump for proper connection |
| Communication Fault with Consumption Module | E08j | No successful communication detected with the consumption module for a continuous period of time when the consumption module control is enabled | 1. If no consumption module is present, modify parameters to disable consumption module control;<br>2. If there is a consumption module, inspect the communication wiring between the consumption module and the heat pump for proper connection |
| Water Pressure Sensor Fault(for IDU) | E034 | Short circuit or open circuit detected by the indoor unit's water pressure sensor | 1. Inspect the integrity of the indoor unit's water pressure sensor; 2. Check if the voltage at the water pressure sensor port is within the range of 0.5 to 4.5 volts |
| Temp. & Humidity Sensor Fault | T5T | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| External Ambient Temp. Sensor Fault | T5Z | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Cooling not allowed due to big temp. diff. between indoor& outdoor temp. | T5S | When dew point control is enabled, outdoor temperature < indoor temperature - DP3, heat pump temporarily disables cooling mode | 1. Wait for the indoor temperature to drop, or the outdoor temperature to rise, and the fault will be recovered automatically;<br>2. Set parameter DP3 to adjust the alarm value for the indoor/outdoor temperature difference;<br>3. Disable the dew point control function (set DP1=0) |

Frequency conversion board fault table:

| Protect/fault | Fault display | Reason | Elimination methods |
|---|---|---|---|
| IPM Overcurrent Fault | F00 | IPM Input current is large | Check and adjust the current measurement |
| Comp. Driver Fault | F01 | Lack of phase, step or drive hardware damage | Check the measuring voltage check frequency conversion board hardware |
| Pre-Charge Failure | F03 | The PFC circuit protection | Check the PFC switch tube short circuit or not |
| DC Power Bus Overvoltage Fault | F05 | DC bus voltage>Dc bus Overload-voltage protection value | Check the input voltage measurement |
| DC Power Bus Undervoltage | F06 | DC bus voltage<Dc bus Underload-voltage protection value | Check the input voltage measurement |
| AC Power Undervoltage Fault | F07 | The input voltage is low, causing the input current is low | Check the input voltage measurement |
| AC Power Overcurrent Fault | F08 | The input voltage is too high, more than outage protection current RMS | Check the input voltage measurement |
| Input Power Voltage Sampling Fault | F09 | The input voltage sampling fault | Check and adjust the current measurement |
| AC Power Overvoltage Fault | F10 | Input voltage>Input Overload--voltage protection value | Check whether the input voltage is higher than 265V |
| DSP and Comp. Driver Communication Fault | F11 | DSP and Inverter board communication failure | Check the communication connection |
| DSP and PFC Communication Fault | F12 | DSP and PFC connect fault | Check the communication connection |
| IPM Overheat Fault | F13 | The IPM module is overheat | Check and adjust the current measurement |
| Compressor Lacking Phase Fault | F14 | The compressor lost phase | Check whether compressor cables are connected properly and reliably |
| Input Power Lacking Phase Fault | F15 | The input voltage lost phase | Check and measure the voltage adjustment |
| Comp. Weak Magnetic Alarm | F16 | Compressor magnetic force is not enough | Check and adjust the current measurement |
| Comp. Driver Temp. Sensor Fault | F17 | The transducer is overheat | Check and adjust the current measurement |
| IPM Current Sampling Fault | F18 | IPM sampling electricity is fault | Check and adjust the current measurement |
| IGBT Power Device Overheat Alarm | F20 | The IGBT is overheat | Check and adjust the current measurement |
| Overspeed Fault | F21 | The compressor is running abnormally | Check whether the compressor cable is nor--mal and whether the compressor is blocked |
| AC Input Current Frequency Decrease Alarm | F22 | Input current is too large | Check and adjust the current measurement |
| EEPROM Alarm | F23 | MCU error | Check whether the chip is damaged Replace the chip |
| Destroyed EEPROM & No Activated Fault | F24 | MCU error | Check whether the chip is damaged Replace the chip |
| Input Power Current Sampling Fault | F25 | The V15V is overload or undervoltage | Check the V15V input voltage in range 13.5V~16.5V or not |
| IGBT Overheat Fault | F26 | The IGBT is overheat | Check and adjust the current measurement |
| EEPROM Fault | F29 | Failed to read the memory chip | Check the frequency conversion board |
| Comp. Current Frequency Decrease Alarm | F33 | The compressor current frequency reduction | Check and adjust the current measurement |
| Compressor Type Code Fault | F060 | Incorrect selection of compressor model code | Contact the supplier to obtain the correct model code |
| Driver (Fan) Power Lacking Phase Fault | F101 | The fan lost phase | Check whether fan cables are connected properly and reliably |

| Protect/fault | Fault display | Reason | Elimination methods |
|---|---|---|---|
| Driver (Fan) Start Fault | F102 | The fan fails to start | Check whether the fan is blocked |
| Driver (Fan) External Overcurrent Fault | F105 | The fan IPM hardware running current is too large | Check whether the fan is blocked |
| Driver (Fan)IPM Overheat Fault | F106 | The fan IPM drive plate has poor heat dissipation | Check heat dissipation conditions |
| Driver (Fan) overspeed Fault | F109 | The fan speed is too high | Check whether the fan drive board is abnormal |
| Driver (Fan) Current Sampling Fault | F112 | Fan sampling electricity is fault | Check whether the fan drive plate is abnormal |
| Driver (Fan) Internal Overcurrent Fault | F113 | The fan soft ware running current is too large | Check whether the fan is blocked |
| Driver (Fan)Temp. Sensor Fault | F120 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Comp. Driver and PCB Communication Fault | F151 | DSP and Mainboard communication failure | Check the communication connection |
| Comp. Overcurrent Fault | E051 | The compressor is overload | Check whether the system of the compressor running normally |

## 4. Controller interface diagram and definition



| NO. | | | Function |
|---|---|---|---|
| CN 11 / CN 9 | 1 | L | Circulation Pump |
| | 2 | N | |
| | 3 | L | Hot Water Pump |
| | 4 | N | |
| | 5 | L | Water Pump For Zone 1 Radiator |
| | 6 | N | |
| | 7 | L | Water Pump For Zone 2 Floor Heating |
| | 8 | N | |
| CN 12 / CN 8 | 9 | L | Pan Heater |
| | 10 | N | |
| | 11 | L | Electric Heater Stage 1 |
| | 12 | N | |
| | 13 | L | Electric Heater Stage 2 |
| | 14 | N | |
| | 15 | L | DHW Electric Heater |
| | 16 | N | |
| | 17 | Signal | 3 Way Valve For DHW |
| | 18 | N | |
| | 19 | L | |
| | 20 | N | |
| | 21 | L | 3 Way Valves For Cooling |
| | 22 | N | |
| | 23 | Signal | |
| | 24 | N | |
| | 25 | L | Remote Alarm |
| | 26 | N | |
| CN 27 / CN 3 | 27 | Open | / |
| | 28 | N | |
| | 29 | Close | |
| | 30 | N | |
| | 31 | Open | Mixing Valve For Zone 2 |
| | 32 | N | |
| | 33 | Close | |
| | 34 | N | |
| CN 19 / CN 20 | 35 | AI | Tank Temperature |
| | 36 | GND | |
| | 37 | AI | Buffer Tank Temperature |
| | 38 | GND | |
| | 39 | AI | Zone 1 Room Temperature / Passive Switch Signal For Zone 1 Thermostat |
| | 40 | GND | |
| | 41 | AI | Zone 2 Room Temperature / Passive Switch Signal For Zone 2 Thermostat |
| | 42 | GND | |
| | 43 | AI | The Outlet Water Temp. After Mixing For Zone 2 |
| | 44 | GND | |
| | 45 | T | Sensor Of Relative Humidity |
| | 46 | 5V | |
| | 47 | H | |
| | 48 | GND | |
| | 49 | 0-10 V | / |
| | 50 | GND | |
| | 51 | AI | / |
| | 52 | GND | |
| | 53 | AI | External Ambient Temperature |
| | 54 | GND | |

| NO. | | | Function |
|---|---|---|---|
| CN 21 / CN 22 | 55 | DI | Electric Overheat Protection |
| | 56 | GND | |
| | 57 | DI | Remote On/Off |
| | 58 | GND | |
| | 59 | DI | Heat/Cool On/Off |
| | 60 | GND | |
| | 61 | DI | DHW On/Off |
| | 62 | GND | |
| | 63 | DI | Remote Heat/Cool |
| | 64 | GND | |
| | 65 | DI | SG-1 |
| | 66 | GND | |
| | 67 | DI | SG-2 |
| | 68 | GND | |
| | 69 | 0-10 V | 0-10V Output |
| | 70 | GND | |
| | 71 | A 2 | Centralized Controller |
| | 72 | 12 V | |
| | 73 | B 2 | |
| | 74 | GND | |
| | 75 | A 3 | Thermostat |
| | 76 | 12 V | |
| | 77 | B 3 | |
| | 78 | GND | |
| | 79 | A 1 | / |
| | 80 | 12 V | |
| | 81 | B 1 | |
| | 82 | GND | |

| NO. | | Multiplexed Ports | Option | Parameter Setting |
|---|---|---|---|---|
| CN 19 / CN 20 | 39 / 40 | RT1  | Zone 1 Room Temp. | Z01=1/3 |
| | |  | Passive Switch Signal For Zone 1 Thermostat | Z01=7/9 |
| | 41 / 42 | RT2  | Zone 2 Room Temp. | Z01=2/3 |
| | |  | Passive Switch Signal For Zone 2 Thermostat | Z01=8/9 |

| NO. | | Function | |
|---|---|---|---|
| | CN10 | PUMP | PUMP |
| | CN13 | 4V | 4 Way Valve |
| | CN14 | / | Reserved |
| | CN25 | / | Reserved |
| | CN17 | CH | Crankcase Heater |
| | CN15 | PH | Pan Heater |
| AD1 | G1 | AFT | Anti-Freeze Temperature |
| | G2 | SUT | Suction Temperature |
| | G3 | / | Reserved |
| | G4 | CT | Coil Temperature |
| | G5 | AT | Ambient Temperature |
| | G6 | OT | Outlet Water Temperature |
| | G7 | IT | Inlet Water Temperature |
| CN18 | G8 | / | Reserved |
| | G9 | / | Reserved |
| | G10 | HP | High Pressure Protection |
| | G11 | / | Reserved |
| | G12 | LP | Low Pressure Protection |
| | G13 | / | Reserved |
| | G14 | EIT | EVI Inlet Gas Temperature |
| | G15 | EOT | EVI Outlet Gas Temperature |
| | G16 | ET | Exhaust Temperature |
| | CN26 | PUMP | PUMP Feedback |
| | CN24 | LPS | Low Pressure Sensor |
| | CN500 | EEV | Electronic Expansion Valve |
| | CN16 | COMP | Compressor |
| | CN29 | FL | Flow meter |
| | CN28 | / | Reserved |
| | CN501 | EVIV | Electronic Expansion Valve For EVI |
| | CN1 | / | Reserved |
| | CN7 | Display | Display |
| | CN23 | / | Reserved |
| | CN5 | DTU/WIFI | DTU/WIFI |

# 6. MAINTENANCE AND INSPECTION

- Check the water supply device and the release often. You should avoid the condition of no water or air entering into system, as this will influence unit's performance and reliability. You should clear the pool/spa filter regularly to avoid damage to the unit as a result of the dirty of clogged filter.
- The area around the unit should be dry, clean and well ventilated. Clean the side heating exchanger regularly to maintain good heat exchange as conserve energy .
- 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.
- Checks to the area
  Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.
- Work procedure
  Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.
- Work procedure
  Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.
- 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.
- 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 CO2 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 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.

- 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 area

  Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system. 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:
  The charge size is in accordance with the room size within which the refrigerant containing parts are installed;
  The ventilation machinery and outlets are operating adequately and are not obstructed;
  If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
  Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
  Refrigeration pipe or components are installed in a position where they are 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:
  . That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
  . That there no live electrical components and wiring are exposed while charging, recovering or purging the system;
  . 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.

  Ensure that apparatus is mounted securely.

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

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

- Repair to intrinsically safe components

  Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

  Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

  Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

- 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. A 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.

# 6. MAINTENANCE AND INSPECTION

## Removal and evacuation

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

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

The refrigerant charge shall be recovered into the correct recovery cylinders. The system shall be "flushed" with OFN to render the unit safe. This process may need to be repeated several times. Compressed air or oxygen shall not be used for this task.

Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.

Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available. working on them.

## Labelling

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

## Recovery

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

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is 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 returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

# 6. MAINTENANCE AND INSPECTION

- Decommissioning

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

a) Become familiar with the equipment and its operation.
b) Isolate system electrically.
c) Before attempting the procedure ensure that:
. Mechanical handling equipment is available, if required, for handling refrigerant cylinders;
. All personal protective equipment is available and being used correctly;
. The recovery process is supervised at all times by a competent person;
. Recovery equipment and cylinders conform to the appropriate standards.
d) Pump down refrigerant system, if possible.
e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
f) Make sure that cylinder is situated on the scales before recovery takes place.
g) Start the recovery machine and operate in accordance with manufacturer's instructions.
h) Do not overfill cylinders. (No more than 80 % volume liquid charge).
i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

- 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 minimise 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.

- The safety wire model is 5*20_10A/250VAC,And must meet the explosion-proof requirements

## Appendix 1、Caution & Warning

1. The unit can only be repaired by qualified installer centre personnel or an authorised dealer.（for Europe market）
2. This appliance is not intended for use by persons (including children) with reduced physical sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.（for Europe market）
   Children should be supervised to ensure that they do not play with the appliance.
3. Please make sure that the unit and power connection have good earthing, otherwise may cause electrical shock.
4. If the supply cord is damaged, it must be replaced by the manufacturer or our service agent or similarly qualified person in order to avoid a hazard.
5. Directive 2002/96/EC (WEEE):
   The symbol depicting a crossed-out waste bin that is underneath the appliance indicates that this product, at the end of its useful life, must be handled separately from domestic waste, must be taken to a recycling centre for electric and electronic devices or handed back to the dealer when purchasing an equivalent appliance.
6. Directive 2002/95/EC (RoHs): This product is compliant with directive 2002/95/EC (RoHs) concerning restrictions for the use of harmful substances in electric and electronic devices.
7. The unit CANNOT be installed near the flammable gas. Once there is any leakage of the gas , fire can be occur.
8. Make sure that there is circuit breaker for the unit, lack of circuit breaker can lead to electrical shock or fire.
9. The heat pump located inside the unit is equipped with an over-load protection system. It does not allow for the unit to start for at least 3 minutes from a previous stoppage.
10. The unit can only be repaired by the qualified personnel of an installer center or an authorized dealer.（for North America market）
11. Installation must be performed in accordance with the NEC/CEC by authorized person only.（for North America market）
12. USE SUPPLY WIRES SUITABLE FOR 75℃.
13. Caution: Single wall heat exchanger, not suitable for potable water connection.

## Appendix 2、Cable specification

1. Single phase unit

| Nameplate maximum current | Phase line | Earth line | MCB | Creepage protector | Signal line |
|---|---|---|---|---|---|
| No more than 10A | 2×1.5mm$^2$ | 1.5mm$^2$ | 20A | 30mA less than 0.1 sec | n×0.5mm$^2$ |
| 10~16A | 2×2.5mm$^2$ | 2.5mm$^2$ | 32A | 30mA less than 0.1 sec | |
| 16~25A | 2×4mm$^2$ | 4mm$^2$ | 40A | 30mA less than 0.1 sec | |
| 25~32A | 2×6mm$^2$ | 6mm$^2$ | 40A | 30mA less than 0.1 sec | |
| 32~40A | 2×10mm$^2$ | 10mm$^2$ | 63A | 30mA less than 0.1 sec | |
| 40~63A | 2×16mm$^2$ | 16mm$^2$ | 80A | 30mA less than 0.1 sec | |
| 63~75A | 2×25mm$^2$ | 25mm$^2$ | 100A | 30mA less than 0.1 sec | |
| 75~101A | 2×25mm$^2$ | 25mm$^2$ | 125A | 30mA less than 0.1 sec | |
| 101~123A | 2×35mm$^2$ | 35mm$^2$ | 160A | 30mA less than 0.1 sec | |
| 123~148A | 2×50mm$^2$ | 50mm$^2$ | 225A | 30mA less than 0.1 sec | |
| 148~186A | 2×70mm$^2$ | 70mm$^2$ | 250A | 30mA less than 0.1 sec | |
| 186~224A | 2×95mm$^2$ | 95mm$^2$ | 280A | 30mA less than 0.1 sec | |

2. Three phase unit

| Nameplate maximum current | Phase line | Earth line | MCB | Creepage protector | Signal line |
|---|---|---|---|---|---|
| No more than 10A | 3×1.5mm$^2$ | 1.5mm$^2$ | 20A | 30mA less than 0.1 sec | n×0.5mm$^2$ |
| 10~16A | 3×2.5mm$^2$ | 2.5mm$^2$ | 32A | 30mA less than 0.1 sec | |
| 16~25A | 3×4mm$^2$ | 4mm$^2$ | 40A | 30mA less than 0.1 sec | |
| 25~32A | 3×6mm$^2$ | 6mm$^2$ | 40A | 30mA less than 0.1 sec | |
| 32~40A | 3×10mm$^2$ | 10mm$^2$ | 63A | 30mA less than 0.1 sec | |
| 40~63A | 3×16mm$^2$ | 16mm$^2$ | 80A | 30mA less than 0.1 sec | |
| 63~75A | 3×25mm$^2$ | 25mm$^2$ | 100A | 30mA less than 0.1 sec | |
| 75~101A | 3×25mm$^2$ | 25mm$^2$ | 125A | 30mA less than 0.1 sec | |
| 101~123A | 3×35mm$^2$ | 35mm$^2$ | 160A | 30mA less than 0.1 sec | |
| 123~148A | 3×50mm$^2$ | 50mm$^2$ | 225A | 30mA less than 0.1 sec | |
| 148~186A | 3×70mm$^2$ | 70mm$^2$ | 250A | 30mA less than 0.1 sec | |
| 186~224A | 3×95mm$^2$ | 95mm$^2$ | 280A | 30mA less than 0.1 sec | |

When the unit will be installed at outdoor, please use the cable which can against UV.

## Appendix 3、Water quality requirements

1. Corrosion resistance of stainless steel and brazed materials in tap water at room temperature

Attention：+：Good corrosion resistance under normal conditions
0：There may be corrosion problems
-：Not recommended

| | | | Plate material | | | Brazing material | | |
|---|---|---|---|---|---|---|---|---|
| Moisture | Concen-tration | Time limit | AISI 304 | AISI 316 | 254 SMO | Cuprum | Nickel | SS |
| Alkalinity ($HCO_3^-$) | <70 | 24h | + | + | + | 0 | + | + |
| | 70-300 | | + | + | + | + | + | + |
| | >300 | | + | + | + | 0/+ | + | + |
| Sulfate ($So_4^{2-}$) | <70 | unlimited | + | + | + | + | + | + |
| | 70-300 | | + | + | + | 0/- | + | + |
| | >300 | | + | + | + | - | + | + |
| $HCO_3^-/SO_4^{2-}$ | >1.0 | unlimited | + | + | + | + | + | + |
| | <1.0 | | + | + | + | 0/- | + | + |
| Electrical conductivity | <10 | unlimited | + | + | + | 0 | + | + |
| | 10-500 | | + | + | + | + | + | + |
| | >500 | | + | + | + | 0 | + | + |
| pH | <6.0 | 24h | 0 | 0 | 0 | 0 | + | 0 |
| | 6.0-7.5 | | + | + | + | 0 | + | + |
| | 7.5-9 | | + | + | + | + | + | + |
| | >9 | | + | + | + | 0 | + | + |
| Ammonium ($NH_4^+$) | <2 | 24h | + | + | + | + | + | + |
| | 2-20 | | + | + | + | 0 | + | + |
| | >20 | | + | + | + | - | + | + |
| Chloride ($Cl^-$) | <10 | unlimited | + | + | + | + | + | + |
| | 100-200 | | 0 | + | + | + | + | + |
| | 200-300 | | - | + | + | + | + | + |
| | >300 | | - | - | + | 0/+ | + | - |

## Appendix 4 Accessories List

| No. | Item Description | Qty. |
|---|---|---|
| 1 | Rubber Foot | ×4 |
| 2 | Thermistor | ×2 |
| 3 | Carton | ×3 |
| 4 | PE Foam (EPE) | ×1 |
| 5 | Packing Belt | ×4 |
| 6 | Accessory Bag | ×1 |
| 7 | 4-core Connection Cable | ×1 |
| 8 | PE Foam (EPE) | ×1 |
| 9 | Drain Nozzle | ×2 |
| 10 | PE Foam (EPE) | ×1 |
| 11 | DTU | ×1 |
| 12 | Connection line (with DTU) | ×1 |

Note:



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