



Making your home Green & Smart

Heating / Cooling +DHW Heat Pump



R290

ECOER SmartGreenOne Series

For outdoor installation only



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1. Preface

In order to provide the customers with high quality, strong reliability and good versatstandardsility product, this heat pump is produced by strict design and manufacture. 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.




2. Safety Precaution

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.



2.1 Mark Notes



Mark	Meaning
 WARNING	A wrong operation may lead to death or heavy injury on people.
 ATTENTION	A wrong operation may lead to harm on people or loss of material.




2.2 Icon notes

Icon	Meaning
	Prohibition. What is prohibited will be nearby this icon
	Compulsory implement. The listed action need to be taken.
	ATTENTION (include WARNING) Please pay attention to what is indicated.

2.3 Warning

Installation	Meaning
 Professional installer is required.	The heat pump must be installed by qualified personals, to avoid improper installation which can lead to water leakage, electrical shock or fire.
 Earthing is required	Please make sure that the unit and power connection have good earthing, otherwise may cause electrical shock.

Operation	Meaning
 PROHIBITION	DO NOT put fingers or others into the fans and evaporator of the unit, otherwise harm may be occurred.
 Shut off the power	When there is something wrong or strange smell, the power supply need to be shut off to stop the unit. Continue to run may cause electrical short or fire.




Move and repair	Meaning
 Entrust	When the heat pump need to be moved or installed again,please entrust dealer or qualified person to carry it out. Improper installation will lead to water leakage, electrical shock, injury or fire.
 Entrust	It is prohibited to repair the unit by the user himself, otherwise electrical shock or fire may be occur.
 Prohibit	When the heat pump need to be repaired, please entrust dealer or qualified person to carry it out. Improper movement or repair on the unit will lead to water leakage, electrical shock, injury or fire.







Do not use means to accelerate the defrosting process or to clean,Other than those recimmeded 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)

2.4 ATTENTION

Installation	Meaning
 Installation Place	The unit CANNOT be installed near the flammable gas. Once there is any leakage of the gas, fire can be occur.
 Fix the unit	Make sure that the basement of the heat pump is strong enough, to avoid any decline or fall down of the unit
 Need circuit breaker	Make sure that there is circuit breaker for the unit, lack of circuit breaker can lead to electrical shock or fire.

Operation	Meaning
 Check the Installation basement	Please check the installation basement in a period (one month), to avoid any decline or damage on the basement, which may hurt people or damage the unit
 Switch off the power	Please switch off the power for clean or maintenance.
 Prohibition	It is prohibited to use copper or iron as fuse. The right fuse must be fixed by electrician for the heat pump.
 Prohibition	It is prohibited to spray the flammable gas to the heat pump, as it may cause fire.

3. Specification

3.1 Features

This series of heat pump unit owns following features:

3.1.1 Advanced Controlling

The PC micro-computer 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.

3.1.2 Nice Appearance

The heat pump is designed with beautiful looking. The monoblock one has the water pump included which is very easy for installation.

3.1.3. Flexible Installation

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

3.1.4 Quiet Running

The heat pump unit use a special designed heat exchanger to enhance whole efficiency.

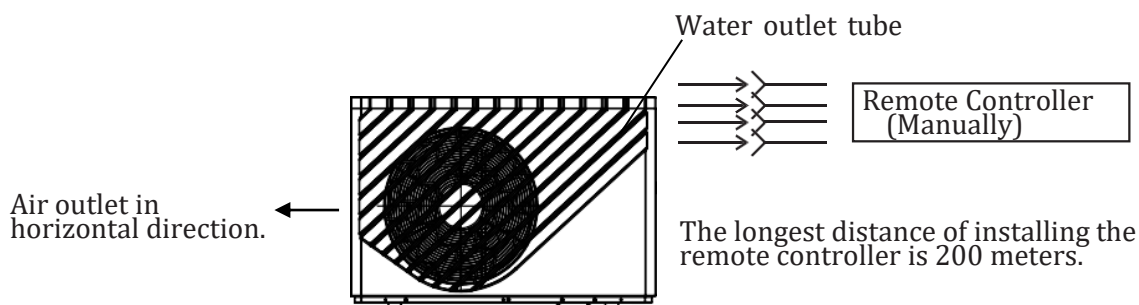
3.1.5 Good Heat Exchange Rate

The heat pump unit use a special designed heat exchanger to enhance whole efficiency.

3.1.6 Large Working Range

This series of heat pump is designed to work under different working conditions as low as -15 degrees for heating.

3.2 Appearance and structure of the heat pump



3.3 The data of unit

*** REFRIGERANT : R290

Model		ESBM-020GPP	ESBM-040GPP	ESBM-060GPP	ESCM-060GPP
Heating Capacity	kW	3.10~8.90	5.40~14.95	8.00~22.00	8.00~22.00
Heating Power Input	kW	0.65~2.10	1.05~3.85	1.60~6.90	1.60~6.90
Cooling Capacity	kW	1.20~5.72	3.60~10.50	4.20~15.00	4.20~15.00
Cooling Power Input	kW	0.65~2.40	1.12~4.47	1.80~7.30	1.80~7.30
Hot Water Capacity	kW	3.92~10.68	6.50~18.50	10.00~27.00	10.00~27.00
Hot Water Power Input	KW	0.78~2.47	1.27~4.65	1.90~7.10	1.90~7.10
Max Power Input	KW	3.0	5.30	7.5	8.3
Max Current Input	A	13.5	24.5	35.0	15.0
Power Supply	/	220-240V~/50Hz	220-240V~/50Hz	220-240V~/50Hz	380~415V/3N~/50Hz
Compressor Quantity	/	1	1	1	1
Compressor Model	/	Rotary	Rotary	Rotary	Rotary
Fan Quantity	/	1	1	2	2
Fan Power Input	W	150	170	75	75
Fan Rotate Speed	RPM	600	600	600	600
Water Pump Input	W	60	60	160	160
Noise	dB(A)	38~52	39~52	42~54	42~54
Water Connection	inch	1	1	1	1
Water Flow Volume	m ³ /h	1.0	1.7	2.9	2.9
Water Pressure Drop(max)	kPa	40	20	65	65
Circulation Pump Head	m	7.5	7.5	12.5	12.5
Unit Net Dimensions L/W/H	mm	See drawings of the heat pump			
Unit Shipping Dimensions L/W/H	mm	see data on the package			
Net Weight	kg	see data on the nameplate			
Shipping Weight	kg	see data on the package			

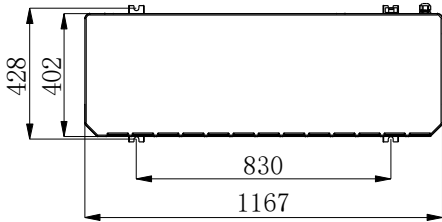
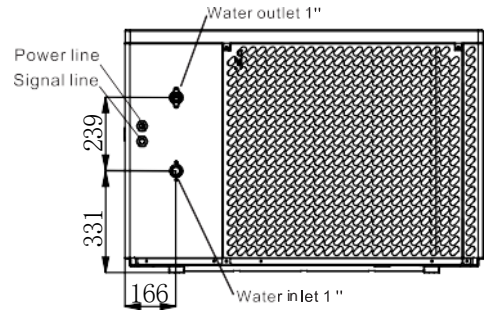
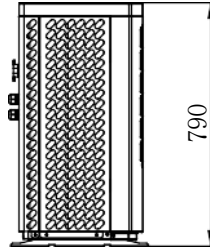
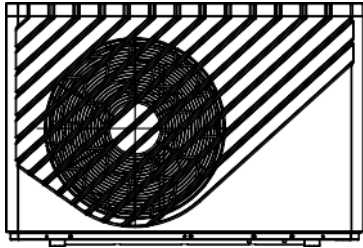
Cooling working condition:(DB/WB)35°C/24°C, (Outlet/Inlet)7°C/12°C. Heating working condition :(DB/WB)7°C/6°C, (Outlet/Inlet)35°C/30°C. Hot Water working condition:(DB/WB): 20°C/15°C,water tank temperature circulation form 15°C to 55°C

BS EN 14511-1-2013 Air conditioner, whole liquid cooling machine, electric compressor.

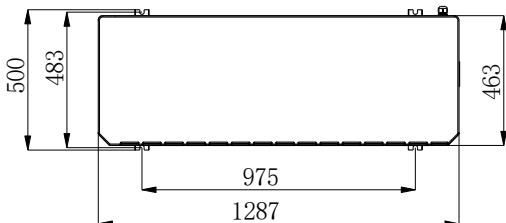
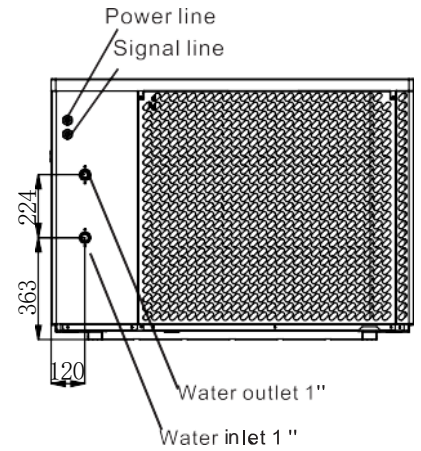
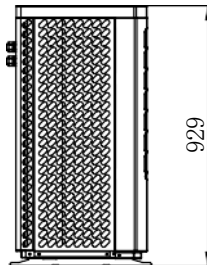
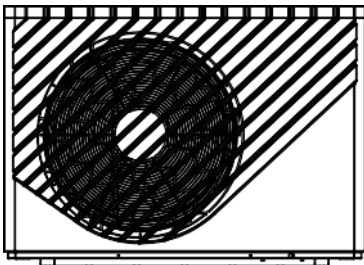
Part2: Test condition ; Part3:Test method; Part4:related requirements.

3.4 Unit dimension

Models: ESBM-020GPP

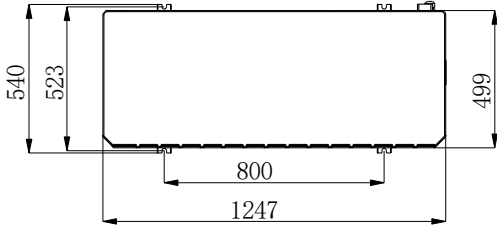
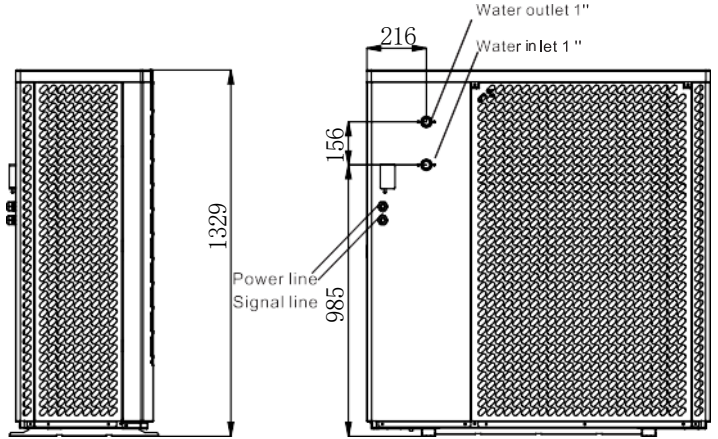
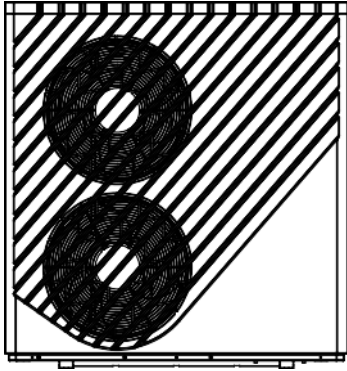


Models: ESBM-040GPP



Models: ESBM-060GPP

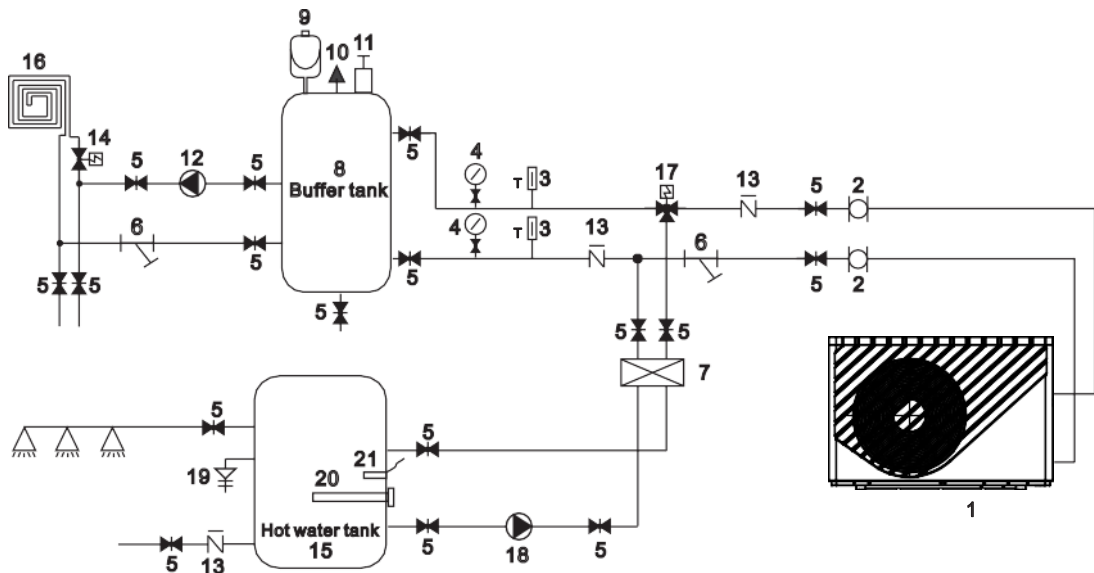
ESCM-060GPP



4. Installation

4.1 Application of heat pump

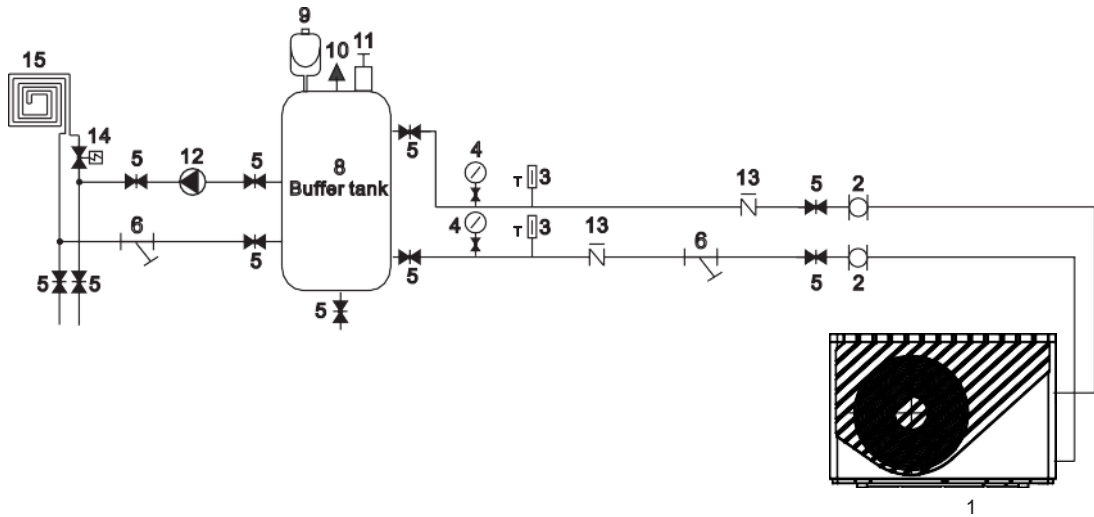
4.1.1 House Heating/Cooling + Domestic Hot Water



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		
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	Hoter water pump		

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

4.1.2 House Heating/Cooling (including 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		

4.2 Choose a right heat pump unit

4.2.1 Based on the local climate condition, construction features and insulation level, calculate the required cooling(heating) capacity per square meter.

4.2.2 Conclude the total capacity which will be needed by the construction.

4.2.3 According to the total capacity needed, choose the right model by consulting the heat.

4.2.4 Pump features as below:

4.2.4.1 Cooling only unit: chilled water outlet temp. at 5-15°C, maximum ambient temp. at 43°C.

4.2.4.2 Heating and Cooling unit: for cooling chilled water outlet temp. at 5-15°C, maximum ambient temp. at 43°C. For heating, warm water outlet temp. at 9-75°C, minimum ambient temp. at -25°C.

4.2.4.3 Unit application Inverter air source water heat pump is used for house, office, hotel, and so forth, which need heating or cooling separately, with each area needed to be controlled.

4.3 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.

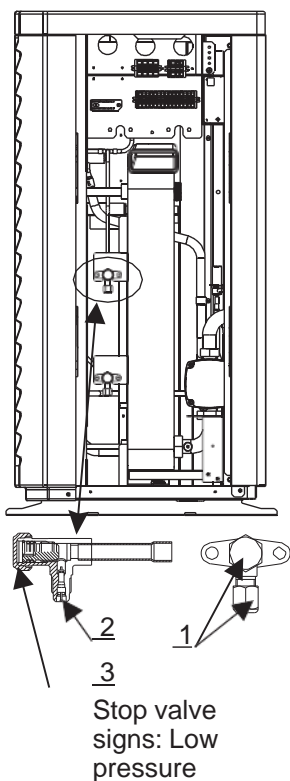
4.4 Installation Place

- 4.4.1 The unit can be installed on any place outdoor which can carry heavy machine such as terrace, housetop, ground and so on.
- 4.4.2 The location must have good ventilation.
- 4.4.3 The place is free from heat radiation and other fire flame.
- 4.4.4 A pall is needed in winter to protect the heat pump from snow.
- 4.4.5 There must be not obstacles near the air inlet and outlet of the heat pump. A place which is free from strong air blowing.
- 4.4.6 There must be water channel around the heat pump to drain the condensing water. There must be enough space around the unit for maintenance.
- 4.4.7 A place which is far away operating or potential ignition sources (for example: open flames, an operating gas appliance or an operating electric heater or Electric Spark or hot object)

4.5. Refrigerant charge

The heat pump is not infused with the refrigerant 290 and full of high-pressure nitrogen or keep it in a vacuum instead, please follow these steps to infusing refrigerant R290.

4.5.1 Preparations



- 4.5.1.1 Please in a well-ventilated environment while charge refrigerant.
- 4.5.1.2 Keep away from open flames or potential sources of fire.
- 4.5.1.3 Disconnect the power supply of the heat pump.
- 4.5.1.4 Carefully check the nameplate of the heat pump and charge strictly according to the labeled amount.
- 4.5.2 Check the pressure of nitrogen gas inside the system. The heat pump has charged about 30 Bar pressure nitrogen gas inside the system, please check whether there is still high-pressure nitrogen before charging refrigerant, otherwise check the leakage point. (Use spanner remove the seal nut 1 and 3, use 5mm inner hexagon spanner open the valve 2. If it can Blowing out the high-pressure gas then the heat pump is not leaking.)
- 4.5.3 Use 5mm inner hexagon spanner open the valve 2 and release all the nitrogen gas inside the system.
- 4.5.4 Vacuumize the heat pump. Connect the vacuum pump with the valve 2, keep vacuum pump running until the absolute pressure below 30Pa or operating time more than one hour.
- 4.5.5 Charge refrigerant. Keep the refrigerant in liquid state when charging and strictly according to the labeled amount.
- 4.5.6 Finish the charging, close the valve 2 and screw the seal nut 1 and 3.

4.6 Water loop connection

Please pay attention to below matters when the water pipe is connected:

4.6.1 Try to reduce the resistance to the water from the piping.

4.6.2 The piping must be clear and free from dirty and blocks. Water leakage test must be carried out to ensure there is no water leaking. And then the insulation can be made.

4.6.3 Attention that the pipe must be tested by pressure separately. DO NOT test it together with the heat pump.

4.6.4 There must be expansion tank on the top point of the water loop, and the water level in the tank must be at least 0.5 meter higher than the top point of the water loop.

4.6.5 The flow switch is installed inside of the heat pump, check to ensure that the wiring and action of the switch is normal and controlled by the controller.

4.6.6 Try to avoid air stayed inside of the water pipe, and there must be air vent on the top point of the water loop.

4.6.7 There must be thermometer and pressure meter at the water inlet and outlet, for easy inspection during running.

4.7 Power supply connection

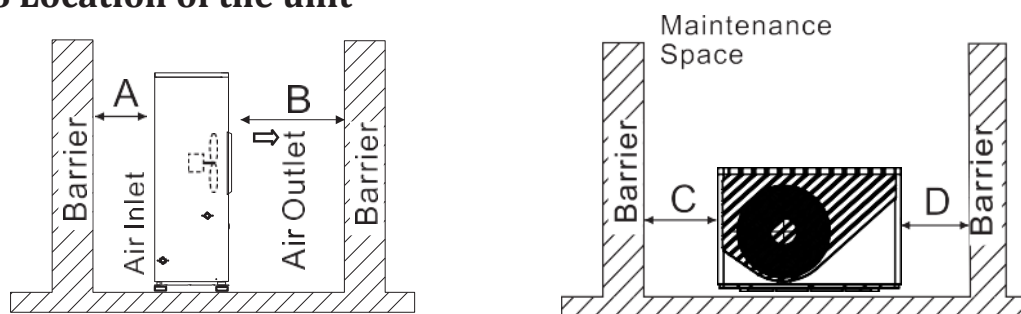
4.7.1 Open the front panel, and open the power supply access.

4.7.2 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.

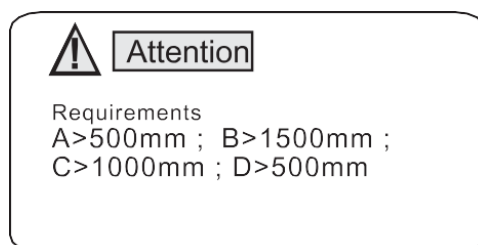
4.7.3 If the outside water pump is needed, please insert the power supply wire into the wire access also and connect to the water pump terminals.

4.7.4 If an additional auxiliary heater is need to be controlled by the heat pump controller, the relay (or power) of the aux-heater must be connected to the relevant output of the controller.

4.8 Location of the unit



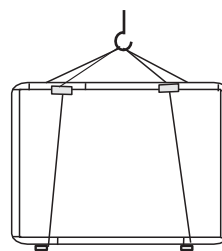
The picture shows the location of horizontal air outlet unit



The minimum ventilation distance in diagram 1.

4.9 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 !

4.10 Trial Running

4.10.1 Inspection before trial running


4.10.1.1 Check the indoor unit, and make sure that the pipe connection is right and the relevant valves are open .

4.10.1.2 Check the water loop, to ensure that the water inside of the expansion tank is enough, the water supply is good, the water loop is full of water and without any air. Also make sure there is good insulation for the water pipe.

4.10.1.3 Check the electrical wiring. Make sure that the power voltage is normal, the screws are fastened, the wiring is made in line with the diagram, and the earthing is connected.

4.10.1.4 Check the heat pump unit including all of the screws and parts of the heat pump to see if they are in good order. When power on, review the indicator on the controller to see if there is any failure indication. The gas gauge can be connected to the check valve to see the high pressure(or low pressure) of the system during trial running.

4.10.2 Trial running

4.10.2.1 Start the heat pump by press "  " key on the controller. Check whether the water pump is running, if it runs normally there will be 0.2 MPa on the water pressure meter.

4.10.2.2 When the water pump runs for 1 minutes, the compressor will start. Hear whether there is strange sound from the compressor. If abnormal sound occurs please stop the unit and check the compressor. If the compressor runs well please look for the pressure meter of the refrigerant.

4.10.2.3 Then check whether the power input and running current is in line with the manual. If not please stop and check.

4.10.2.4 Adjust the valves on the water loop, to make sure that the hot(cool) water supply to each door is good and meet the requirement of heating(or cooling).

4.10.2.5 Review whether the outlet water temperature is stable.

4.10.2.6 The parameters of the controller are set by the factory, it is not allowed to change then by user himself.

5. Operation and Use

5.1 Main Interface Display and Function

(1) Power on Interface



(2) Starting up Interface



Key function

Key number	Key name	Key Function
①	Lock screen	Click this key to lock the screen. White represents not enabled, while blue represents enabled
④	On and off	Click this key to switch ON or OFF Blue represents ON, while white represents OFF
⑤	Temperature setting	Click this key to set the target temperature
⑮	Mode key	Hot water mode, heating mode, cooling mode, hot water+ heating mode or hot water+ cooling mode can be selected by pressing this key

Note:

- ② is home icon. This icon is shown by sliding the main interface.
- ③ is tank water temperature. The machine is in hot water mode when this icon is shown; Otherwise this icon is not shown.
- ⑥ is outlet water temperature or room temperature. If H25=0, the outlet water temperature will be shown. If H25=1, the room temperature will be shown.

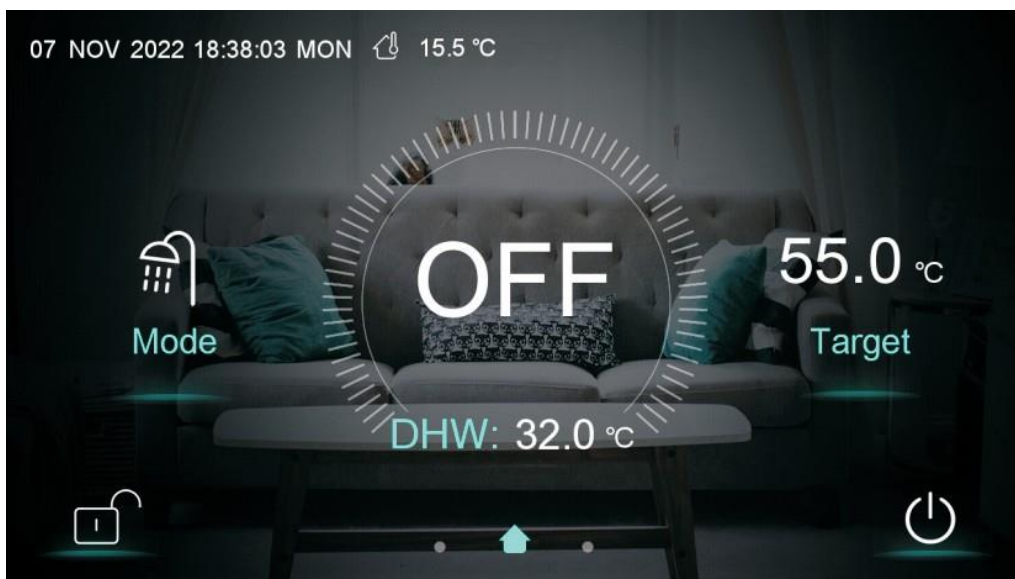
H25	English
0	Outlet
1	Room
2	Buffer Tank
3	Inlet

- ⑦ is Target Temperature of No.1 Unit.
- ⑧ is fault icon. This icon will flash when there is an error shown up, then the display will enter failure record interface after tapping this icon;
- ⑨ is defrosting icon. It will display in the defrosting process of the unit.
- ⑩ is timing mute icon which displays only when activated.
- ⑪ is timing switch which displays only when activated.
- ⑫ is ambient temperature.
- ⑬ is system time.
- ⑭ is current mode, it displays a dynamic icon when the unit startup and operating status.

5.1.1 ON/OFF

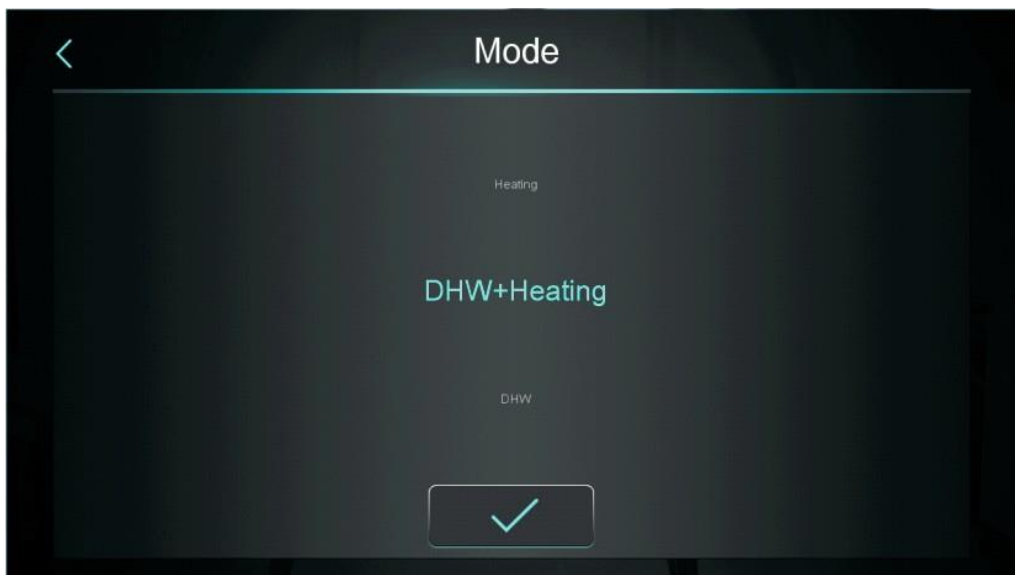
As the main interface shows

(1) In shutting down interface (on/off key is in white status),
press on/off key can start up the machine.



(2) In starting up interface (on/off key is in blue status),
press on/off key can shut down the machine.

5.1.2 Mode switch



There are five modes can be selected after sliding the mode icon.

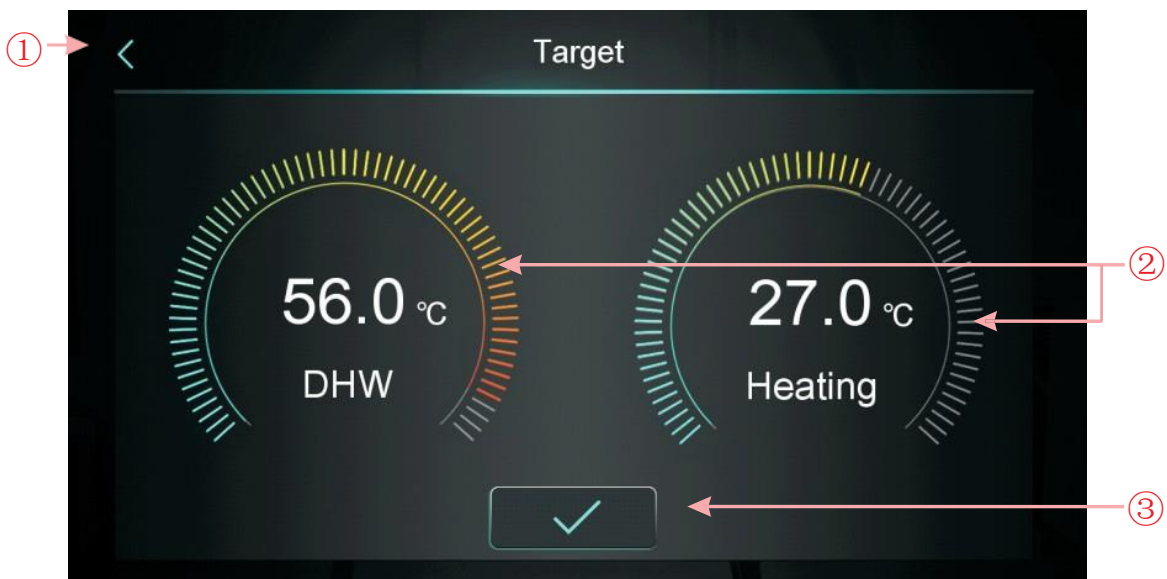
- (1) selecting hot water mode icon, then the display will change to this mode interface;
- (2) selecting heating mode icon, then the display will enter this mode interface;
- (3) selecting cooling mode icon, then the display will switch to this mode interface;
- (4) selecting hot water+ heating mode icon, then the display will go into hot water+ heating mode interface;
- (5) selecting hot water+ cooling mode icon, then the display will come to hot water+ cooling mode interface;

Note: a) If the machine model you purchased has no cooling function, the key of cooling mode will not be displayed.

b) If the machine model you purchased has no hot water function, the key of hot water mode function will not be displayed.

c) If the machine model you purchased has only DHW function ,the mode interface only displays DHW icon.

5.1.3 Setting of target temperature



Take DHW + heating mode for example:

Tapping ① , the wire controller back to main interface;

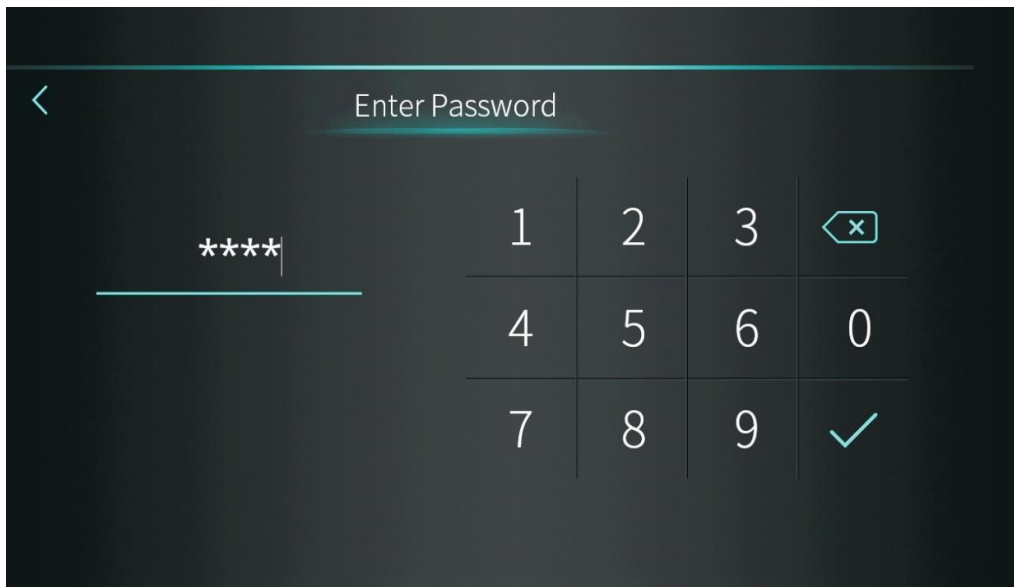
Sliding ② , the target temperature can be adjusted in the clockwise or counter clock-wise direction;

Tapping ③ , the target temperature can be saved.

Note: When room temperature control, click the room temperature display in the main interface to enter the room target temperature setting page, and slide the adjustment to set the room target temperature.

5.1.4 Unlock screen

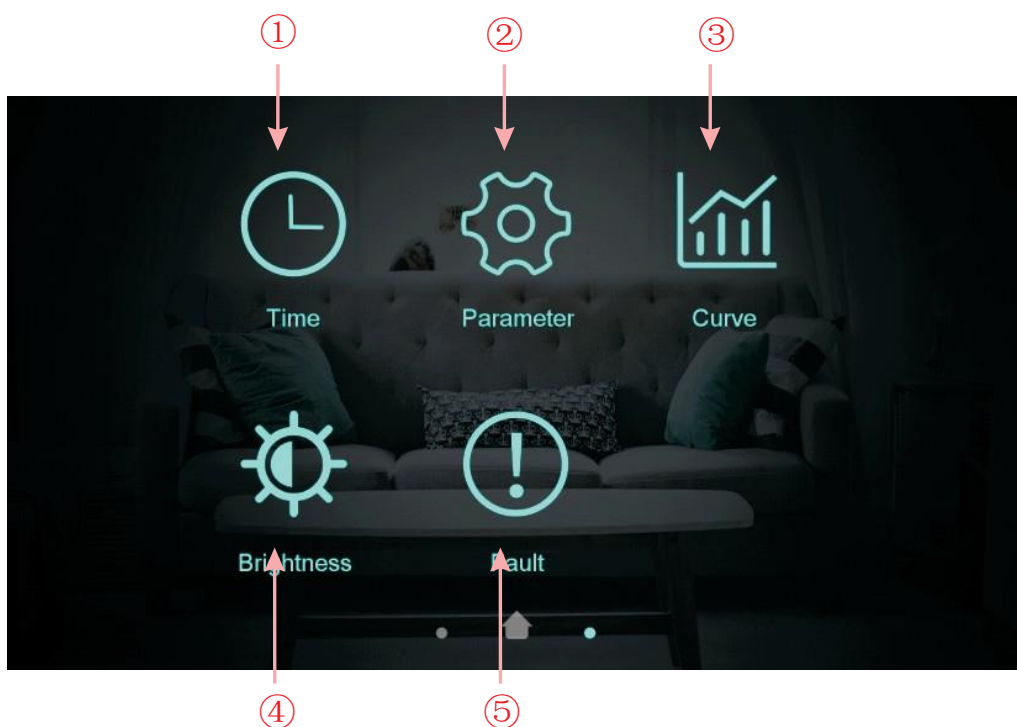
Click the lock screen key again while the screen has been locked, pop-up keyboard is shown as following:



Note: Input the password of 22 or 022, click the enter key and the screen will be unlocked.

5.2 Setting interface display and function

Swipe from right to left on the main interface to enter the function setting interface, and swipe from left to right on the function setting interface to return to the main interface. The function setting interface is shown in the figure below.

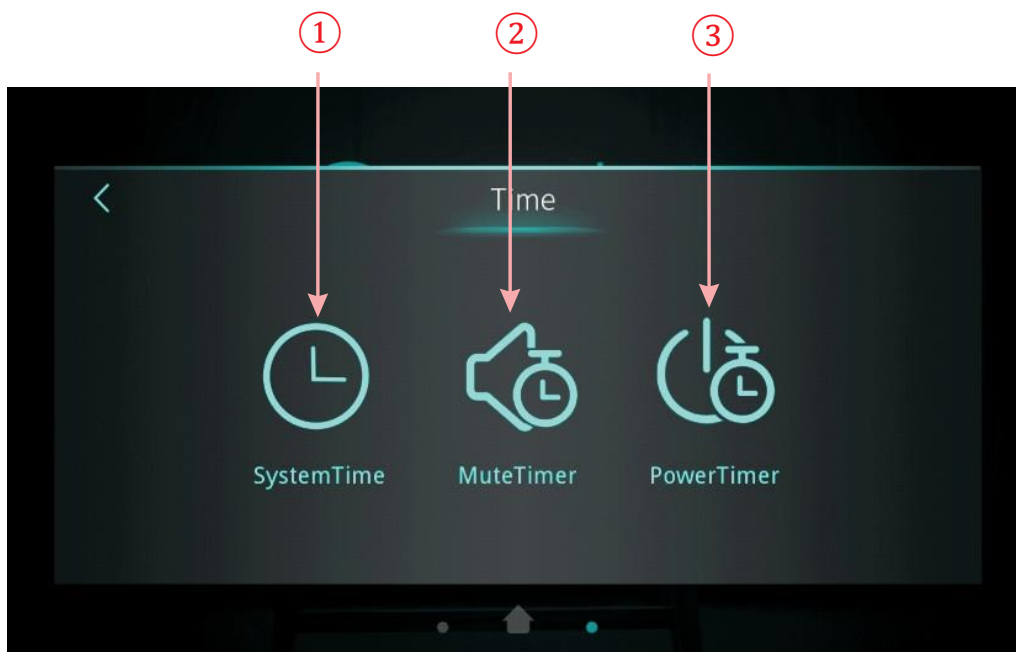


Key number	Key name	Key function
①	Time setting	Click this key to set the time function.
②	Factory parameter	Click the key and enter the password to enter the factory parameter settings and status parameters interface.
③	Curve key	Click this key to view the temperature curve.
④	Adjust brightness	Click this button to adjust screen brightness
⑤	Fault	Click to view fault history

5.2.2 Time setting

In the setup interface:

(1) Tapping the button ①, then the interface display is shown as follows:



5.2.2.1 System time setting

In the time setting interface, click ① interface displays as follows:

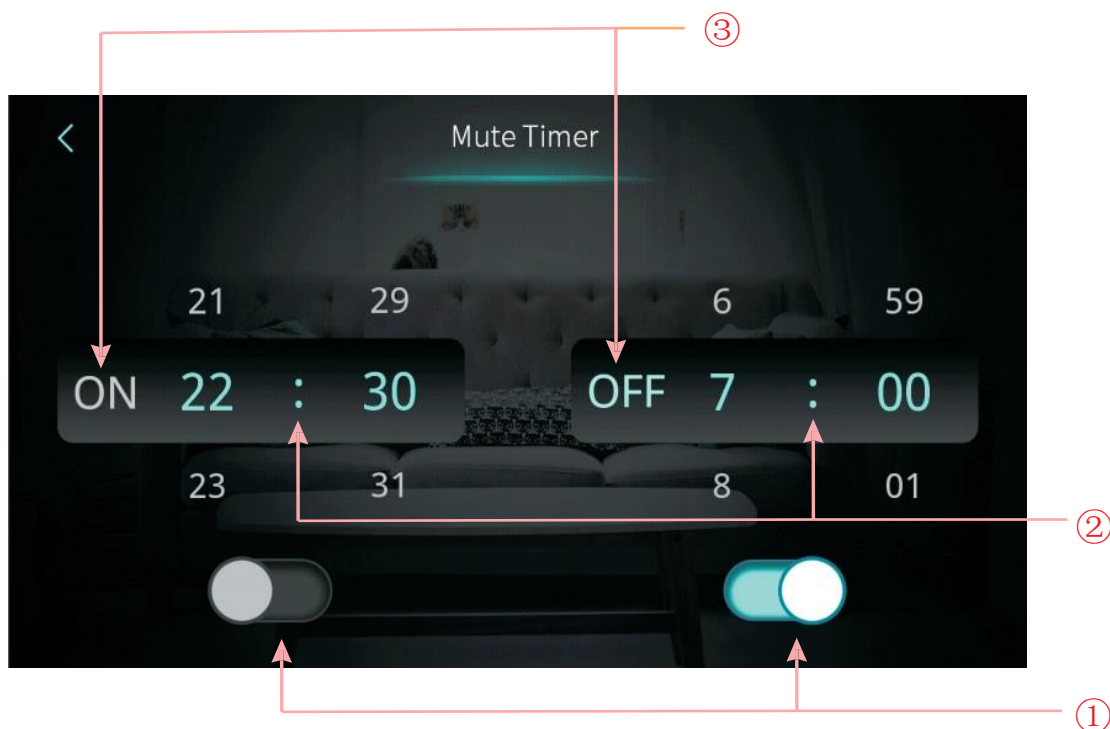


When entering the page of system time setting, the system time will be initialized to the time at the moment when the system time setting button is pressed, and you can adjust the time by sliding up and down.

Note: When the temperature unit is °F, the time format is displayed as: month-day-year hour: minute: second.

5.2.2.2 Mute Timer setting

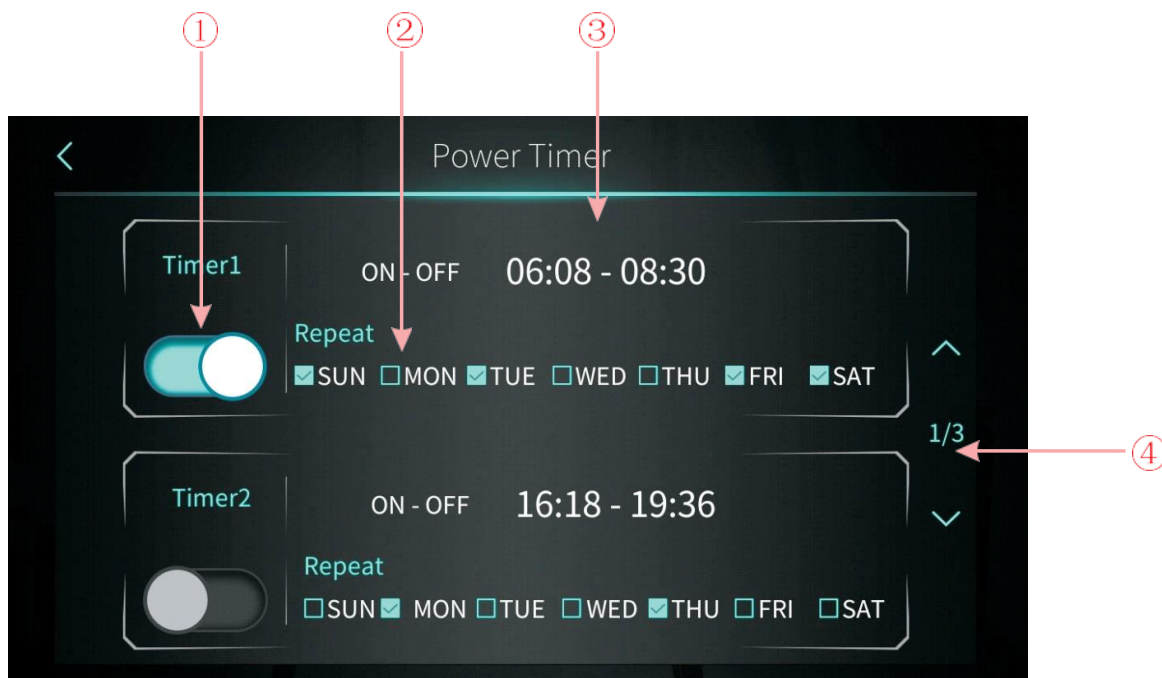
In the time setting interface, click ② interface displays as follows:



NO.	Name	Key color	Button function
①	Whether enable the mute timer on function	Enable: Blue Disable: Gray	Click this key to enable or disable the mute timer on function
	Whether enable the mute timer off function	Enable: Blue Disable: Gray	Click this key to enable or disable the mute timer off function
②	The mute timer on setting point		select from 0:00-23:59
	The mute timer off setting point		select from 0:00-23:59
③	The status of mute timer on	Enable: Blue Disable: Gray	The status of mute timer on is shown
	The status of mute timer off	Enable: Blue Disable: Gray	The status of mute timer on is shown

5.2.2.3 Power Timer setting

In the time setting interface, click ③ interface displays as follows:

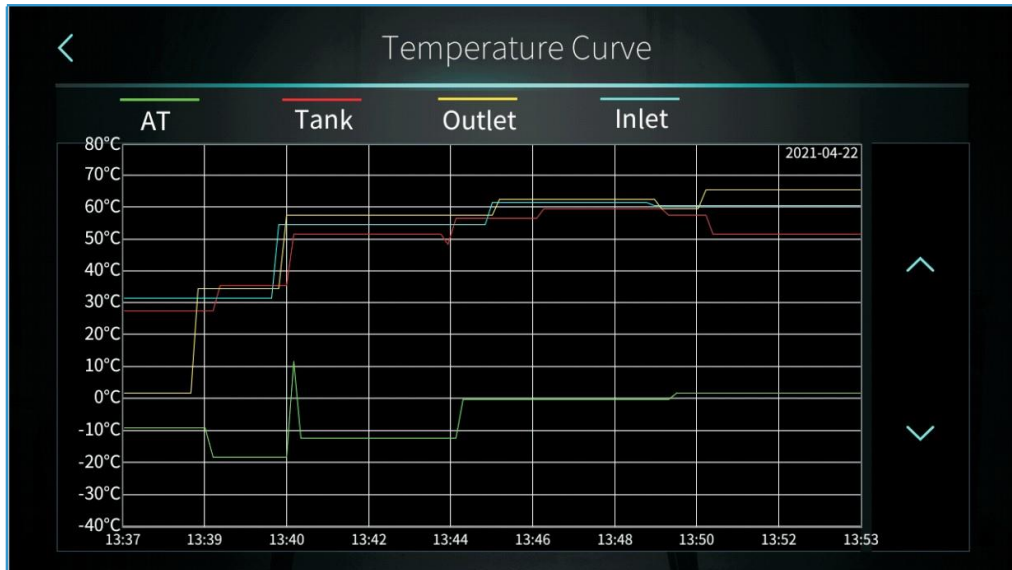


NO.	Name	Button function
①	Timing switch function on	Clicking the button, when the font color is blue, the timing switch is on
②	Week setting	Set the day of the week to activate the timing switch
③	Time period setting	Set the time to turn on and the time to turn off
④	Turn page	A total of 6 timing switch time periods can be set, which can be selected by turning the page

5.2.3 Temperature Curve

In the setup interface:

Tapping operating mode button ④, then the interface display is shown as follows:



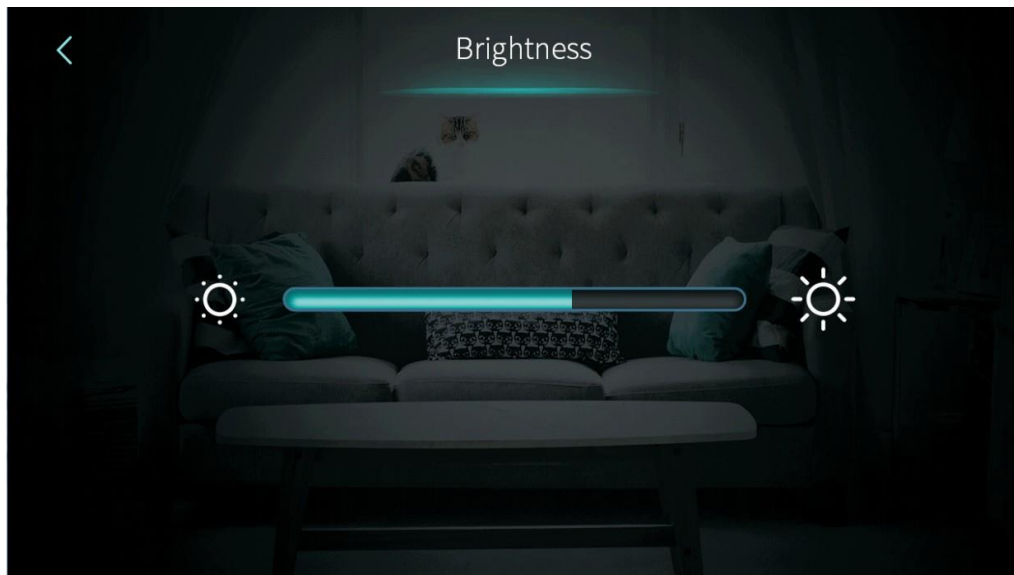
Note:

- 1) This curve function records the water inlet temperature water outlet temperature tank water temperature and ambient temperature;
- 2) Temperature data is collected and saved every five minutes. Timekeeping is made from the latest data saving, if the power is disrupted when the time is less than five minutes, the data during such period will not be saved;
- 3) Only curve for power-on status is recorded, and that for power-off will not be saved;
- 4) 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 temperature record;
- 5) Temperature curve record is provided with power-down memory function.

5.2.4 Color Display Calibration

In the setting interface:

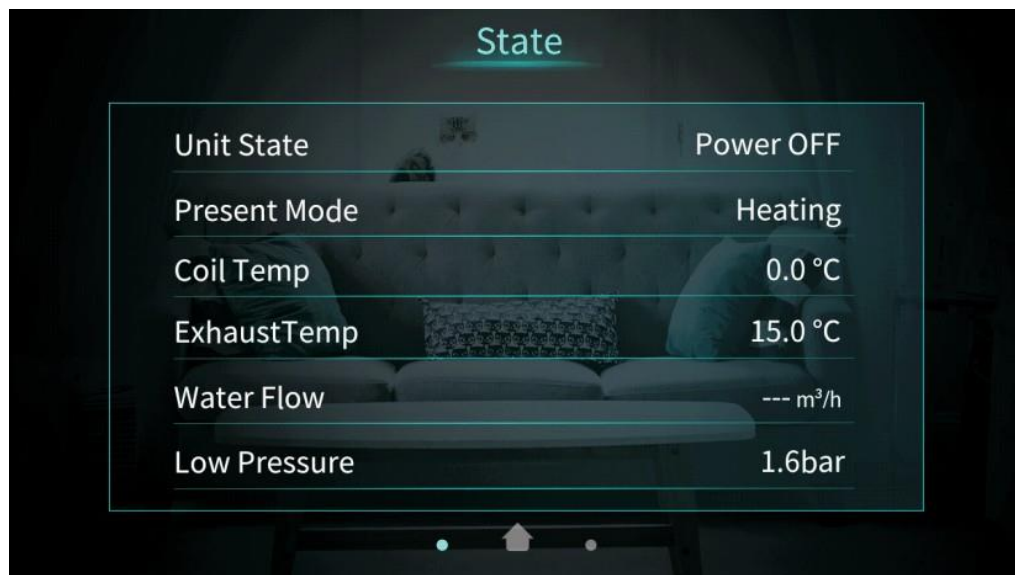
Tapping operating mode button ⑤, then the interface display is shown as follows:



Note:

- 1) The middle display bar can be dragged or clicked to adjust the brightness of the screen, with power-down memory.
- 2) Press the back key to return to the previous level and save the brightness setting value.
- 3) The screen has the function of automatic on and off, if there is no operation for 30s, the screen will enter the half-time screen state.
- 4) If there is no operation for another 5 minutes (a consecutive 5 minutes), the screen will enter the screen state.

5.3 Status interface display



5.4 Fault interface display and function

Click the fault icon on the main interface and the interface display is as follows:



Note: ①: Fault code

②: Fault name

③: Occurrence time of the fault: Day and month hour:minute:second

Note: If the current temperature is °F, occurrence time of the fault:

Month and day hour: minute: second

④: Click this key to clear all fault records

5.5 Failure List & Troubleshootin

5.5.1 Failure Handling

Issue	Possible cause	Related components	Solution
Unit tripped when powered on	Short circuit	Terminals Relays Contactors cables	Check all the components' connection Check relays and contactors whether are broken Disconnect the electronic components one by one and powered on to find the problem
Display cannot get power	Cables has disconnected The power input cable is mis- connected	Display cable Power input cable	Check the display cable Check the power cable Check the 3-phase power cable whether connected in right phase sequence
cannot start up the unit	The unit have error Cables has disconnected	Display Cables	Check the display whether shown error Check the cable Reconnect the power cable and check if it works
Display cannot work	The display has been locked The display is broken	Dis play	Check the display whether shown locked icon Check the cable Reconnect the power cable and check if it works
Heating effect is not good	The compressor running low frequency The fan is not running or speed is too low Leakage problem	Compressor Fan Refrigerant system	Check the compressor frequency Check the fan speed Check the exhaust temperature and low pressure
Shut off while didn't reach the target temperature	Temperature limit (according to ambient temperature)	Control logic	Check the parameters
The evaporator has too much frost and cannot defrosting cleanly	Fan blade or motor issue EEV step is not suitable Refrigerant amount issue Parameter issue	Parameters Fan EEV Refrigerant system	Check the defrosting parameters Check the compressor frequency Check the fan speed Check the exhaust temperature and low pressure
Abnorm al noise	Screws issue Fan blade or motor issue Compressor issue Components have collision	Screws Fan Compressor Other components (tubes, cables)	Check the screws Check the fan blade and motor Check the compressor Check other components

5.5.2 Parameter list and breakdown table

5.5.2.1 Electronic control fault table

Can be judged according to the remote controller failure code and troubleshooting.

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

Protect/fault	Fault display	Reason	Elimination methods
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 mainboard	Check the wire connection between remote wire controller and main board
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 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 2.The wire connection between DC-fan motor module and fan motor is in bad contact	1.Change a new fan motor 2.Check the wire connection and make sure they are in good contact
Fan Motor2 Fault	F032	1.Motor is in locked-rotor state 2.The wire connection between DC-fan motor module and fan motor is in bad contact	1.Change a new fan motor 2.Check the wire connection and make sure they are in good contact

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
DSP and PFC Communication Fault	F12	DSP and PFC connect fault	Check the communication connection
DSP and Comp. Driver Communication Fault	F11	DSP and Inverter board communication failure	Check the communication connection
Comp. Driver and PCB Communication Fault	F151	DSP and Mainboard communication failure	Check the communication connection
IPM Overheat Fault	F13	The IPM module is overheat	Check and adjust the current measurement
Comp. Overcurrent Fault	E051	The compressor is overload	Check whether the system of the compressor running normally
Input Power Lacking Phase Fault	F15	The input voltage lost phase	Check and measure the voltage adjustment
IPM Current Sampling Fault	F18	IPM sampling electricity is fault	Check and adjust the current measurement
Comp. Driver Temp. Sensor Fault	F17	The transducer is overheat	Check and adjust the current measurement
IGBT Power Device Overheat Alarm	F20	The IGBT is overheat	Check and adjust the current measurement
Comp. Weak Magnetic Alarm	F16	Compressor magnetic force is not enough	Check and adjust the current measurement
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

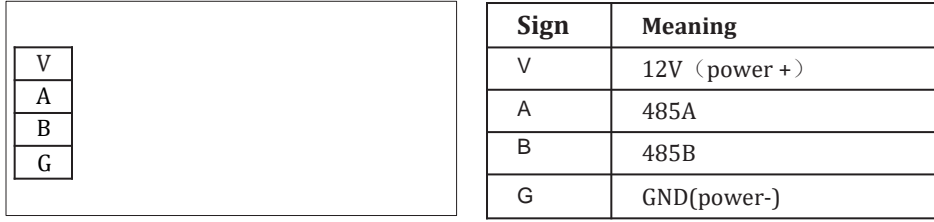
Protect/fault	Fault display	Reason	Elimination methods
Input Power Current Sampling Fault	F25	The V15V is overload or undervoltage	Check the V15V input voltage in range 13.5V~16.5V or not
IGBT Overheat Fault	F26	The IGBT is overheat	Check and adjust the current measurement
Comp. Current Frequency Decrease Alarm	F33	The compressor current frequency reduction	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
Compressor Lacking Phase Fault	F14	The compressor lost phase	Check whether compressor cables are connected properly and reliably
EEPROM Fault	F29	Failed to read the memory chip	Check the frequency conversion board
Overspeed Fault	F21	The compressor is running abnormally	Check whether the compressor cable is normal and whether the compressor is blocked
Driver (Fan)Temp.Sensor Fault	F120	The temp. sensor is broken or short circuit	Check or change the temp. sensor
Driver (Fan)IPM Overheat Fault	F106	The fan IPM drive plate has poor heat dissipation	Check heat dissipation conditions
Driver (Fan) External Overcurrent Fault	F105	The fan IPM hardware running current is too large	Check whether the fan is blocked
Driver (Fan) Power Lacking Phase Fault	F101	The fan lost phase	Check whether fan cables are connected properly and reliably
Driver (Fan) Current Sampling Fault	F112	Fan sampling electricity is fault	Check whether the fan drive plate is abnormal
Driver (Fan) Start Fault	F102	The fan fails to start	Check whether the fan is blocked
Driver (Fan) Internal Overcurrent Fault	F113	The fan software running current is too large	Check whether the fan is blocked
Driver (Fan) overspeed Fault	F109	The fan speed is too high	Check whether the fan drive board is abnormal

5.5.3 Parameter list

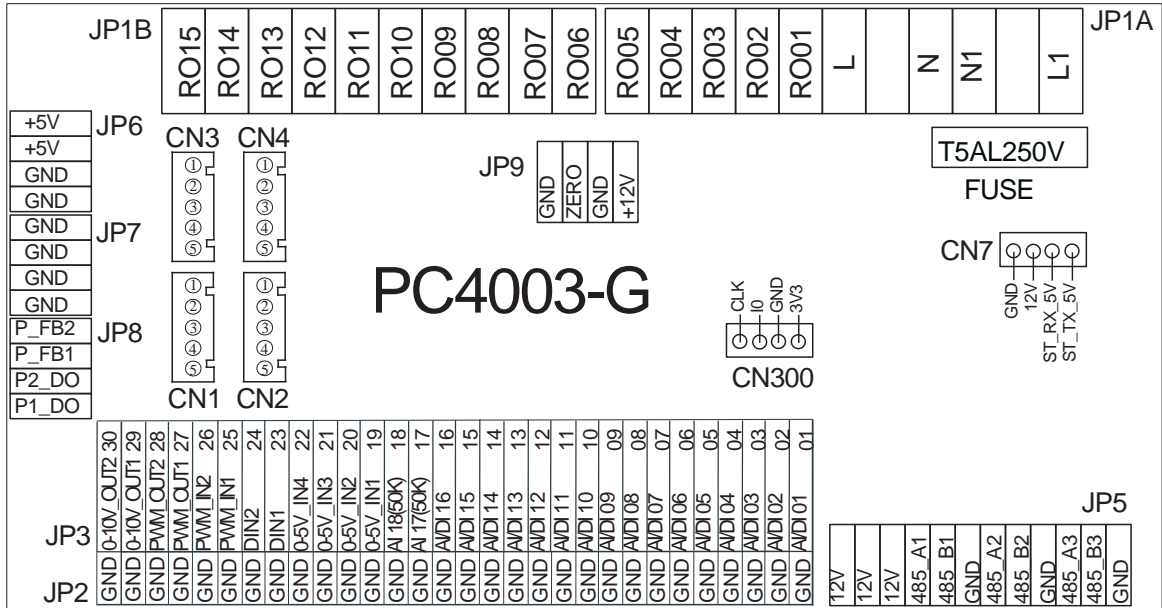
Meaning	Default	Remarks
Cooling target temperature set point	12℃	Adjustable
Heating the target temperature set point	40℃	Adjustable
Hot water target temperature set point	55℃	Adjustable

5.6 Interface diagram

5.6.1 Wire control interface diagram and definition



5.6.2 Controller interface diagram and definition



Main board of the input and output interface instructions below

Number	Sign	Meaning
01	AI/DI01	Inlet Water Temp.
02	AI/DI02	Outlet Water Temp.
03	AI/DI03	Coil Temp.
04	AI/DI04	Ambient Temp. (AT)
05	AI/DI05	Suction Temp.
06	AI/DI06	Antifreeze Temp.
07	AI/DI07	Distributor Tube Temp.
08	AI/DI08	DHW Tank Temp.
09	AI/DI09	Room Temp./Buffer Tank Temp.(10K)
10	AI/DI10	EVI Inlet Temp.
11	AI/DI11	EVI Outlet Temp.
12	AI/DI12	High Pressure Switch
13	AI/DI13	Low Pressure Switch
14	AI/DI14)	Flow Switch
15	AI/DI15)	Electric Heater Overheat Fault
16	AI/DI16	Remote Switch
17	AI/17 50k	DHW Switch
18	AI/18 50K	Exhaust Temp.
19	0~5V_IN1	Compressor current detection of 1
20	0~5V_IN2	Compressor current detection of 2
21	0~5V_IN3	Compressor current detection of 3
22	0~5V_IN4	Low Pressure Sensor
23	DIN_1	Heating & Cooling Function Switch
24	DIN_2	Heating / Cooling Mode Switch
25	PWM_IN1	Water Flow Rate
26	PWM_IN2	Reserved
27	PWM_OUT1	Heating & Cooling Function Switch Output
28	PWM_OUT2	Heating / Cooling Mode Switch Output
29	0~10V OUT1	Reserved
30	0~10V OUT2	Reserved
31	+5V	5V output
32	+12V	12V output
33	CN1	EEV Steps
34	CN2	EVI EEV Steps
35	CN3	Reserved

36	CN4	Reserved
37	CN300	Program port
38	JP5_1	5 inch color display/DC fan speed regulation module/ Frequency conversion board/Hydraulic module
39	JP5_2	Centralized control communication port
40	JP5_3	DTU/WIFI
41	R001	Compressor
42	R002	Fan high speed
43	R003	Fan low speed
44	R004	Main Circulation Pump
45	R005	DHW Pump
46	R006	4-way valve
47	R007	Electric Heater Stage 1
48	R008	Electric Heater Stage 2
49	R009	Hot water 3-way valve
50	R010	Crankcase Heater
51	R011	Bottom Plate Heater
52	R012	Alarm
53	R013	DHW Electric Heater
54	R014	Reserved
55	R015	Reserved
56	JP9	12V output
57	CN7	12V input
58	P_FB2	Reserved
59	P_FB1	Reserved
60	P2_DO	Reserved
61	P1_DO	Reserved

Note:

JP5_1 represents +12V, 485_A1, 485_B1, GND on the JP5 terminal;
 JP5_2 represents +12V, 485_A2, 485_B2, GND on the JP5 terminal;
 JP5_3 represents +12V, 485_A3, 485_B3, GND on the JP5 terminal.

6. Maintenance

6.1 Precautions for Daily Use

Before starting up the unit for the first time or after a long-time shutdown, the following preparations must be made:

- (1) Thoroughly inspect and clean up the unit.
- (2) Clean the waterway system.
- (3) Check water pump, regulating valve and other waterway equipment.
- (4) Tighten all wire connections.

Do not change the system parameters before consulting the engineer.

Ensure the water refill and exhaust device in the waterway is well, otherwise the performance and reliability of the unit will become worse.

Ensure the waterways are clean and avoid dirt and blockage.

Timely check the electricity, water and replace the faulty parts.

Please use the parts provided or recommended by the company, do not use the unqualified parts.

Refrigerant supplement:

Each unit has been equipped with sufficient refrigerant when leaving the factory. Do not charge or change the refrigerant.

If you need to replenish the refrigerant due to leakage, please contact the engineers or dealers.

6.2 Periodic Maintenance (every 6 months)

Preparation	Before maintenance, please ensure that the unit stop running and cut off the power supply.
Inspection and cleaning of fin heat exchanger	In order to ensure that heat exchangers remain in optimum condition for heat exchange, their surfaces must be clean.
Inspection and cleaning of plate heat exchanger	Every 6 months or when the capacity of the unit drops by more than 10%, check the water-side heat exchanger for scale and clean the heat exchanger.
Check the electrical wiring	Check if the contact point is loose, oxidized, or blocked by sundries, etc., which causes poor contact of the electronic wiring.

6.3 Inspection and Maintenance

6.3.1 Preparing for inspection and maintenance Danger!

Risk of death caused by fire or explosion if there is a refrigerant leakage!

Only carry out the work if you are competent and have knowledge about the special features and risks of R290 refrigerant.

The product contains combustible refrigerant R290. In the event of a leak, escaping refrigerant may mix with air to form a flammable atmosphere.

There is a risk of fire and explosion. Ensure that space is sufficiently aerated around the product.

Observe the basic safety rules before carrying out inspection and maintenance work or installing spare parts.

Disconnect the product from the power supply but ensure that the product is still earthed.

6.3.2 Cleaning the product

Do not clean the product with a high-pressure cleaner or a direct jet of water. Clean the product using a sponge and hot water with a cleaning agent.

Do not use abrasive cleaners. Do not use solvents. Do not use any cleaning agents that contain chlorine or ammonia.

6.3.3 Checking the evaporator, fan, and condensate discharge

Check whether there is dirt between the fins or whether depositions have adhered to the fins.

Clean the fins using a soft brush, avoid fins from being bent.

Check whether dirt has been accumulated on the condensate tray or in the condensate discharge pipe.

Check whether the water can drain freely.

7. Appendix

7.1 Caution & Warning

7.1.1 The unit can only be repaired by qualified installer centre personnel or an authorised dealer. for Europe market

7.1.2 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.

7.1.3 Please make sure that the unit and power connection have good earthing, otherwise may cause electrical shock.

7.1.4 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.

7.1.5 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.

7.1.6 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.

7.1.7 The unit CANNOT be installed near the flammable gas. Once there is any leakage of the gas , fire can be occur.

7.1.8 Make sure that there is circuit breaker for the unit, lack of circuit breaker can lead to electrical shock or fire.

7.1.9 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.

7.1.10 The unit can only be repaired by the qualified personnel of an installer center or an authorized dealer. for North America market

7.1.11 Installation must be performed in accordance with the NEC/CEC by authorized person only. for North America market

7.1.12 USE SUPPLY WIRES SUITABLE FOR 75 .

7.1.13 Caution: Single wall heat exchanger, not suitable for potable water connection.

7.2 Cable specification

7.2.1 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	

7.2.2 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.

7.3 Electric Wiring

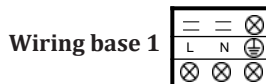
7.3.1 Power supply for unit

Single phase unit

Model: ESBM-020GPP

ESBM-040GPP

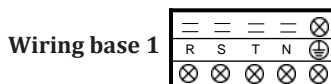
ESBM-060GPP



Print	Connect to
L	TO POWER SUPPLY 230V/~ /50Hz
N	
⊕	
⊕	

Three phase unit

Model: ESCM-060GPP



Print	Connect to
R	TO POWER SUPPLY 380-415V/3N~/50HZ
S	
T	
N	
⊕	

7.3.2 Other electrical wiring



Port 1/2, function: Remote control function Unit On/Off
 When Remote On/Off switch is closed,unit will turn on;
 When Remote On/Off switch is opened,unit will turn off;

Port 3/4、5/6、7/8, function: Remote control function Unit On/Off
 When the factory parameter H07=0, the port setting is invalid, and the remote controller mode is operated.
 When H07=1, the remote controller mode is invalid, and the remote controller mode is operated according to the table mode.

Mode	3/4	5/6	7/8
Heat	close	open	close
Cool	open	open	close
DHW	/	close	open
DHW+Heat	close	close	close
DHW+Cool	open	close	close

Print	Connect to	Description
Wiring base 2	1 Remote On/Off	Close (factory) Please refer to the above description.
	3 Remote Heat/Cool	Open (factory) Please refer to the above description.
	5 DHW On/Off	Close (factory) Please refer to the above description.
	7 Heat/Cool On/Off	Close (factory) Please refer to the above description.
	9 TT	Short circuit resistance(factory) Factory short circuit resistance, replace with Tank temperature sensor when necessary.
	11 BT	Short circuit resistance(factory) The factory short circuit resistance shall be replaced with the buffer tank temperature sensor when necessary.
	13 485a+	Not connected(factory) Reserved function for 485 communication.
	14 485B-	

Wiring base 3

⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
15	16	17	18	19	20	21	22	23	24	25	26		
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗

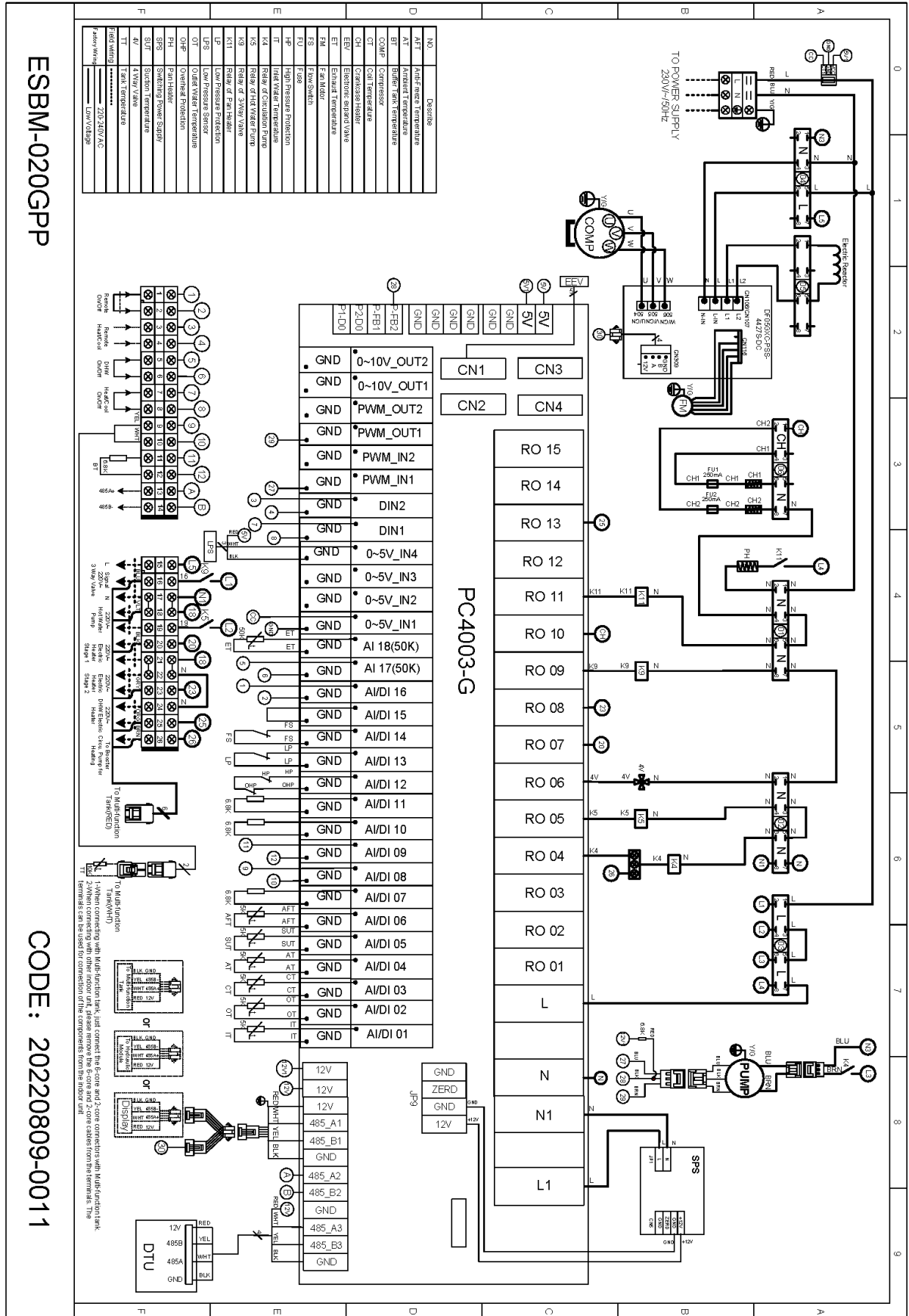
Print		Connect to	Description
Wiring base 3	15	Signal	3 Way Valve
	16	220V~	
	17	3 Way Valve	
	18	220V~	Hot Water Pump
	19	Hot Water Pump	
	20	220V~	AC contactor
	21	Electric Heater Stage 1	
	22	220V~	AC contactor
	23	Electric Heater Stage 2	
	24	220V~	AC contactor
25	DHW Electric Heater		
26	To Booster Circu. Pump for Heating	Not connected(factory)	The reserved function is used to control the three-way valve of the multi-function water tank.



Interface	Connect to	Description
Plug-in port	4-Core signal cable to display	For connection of display

7.4 Wiring Diagram

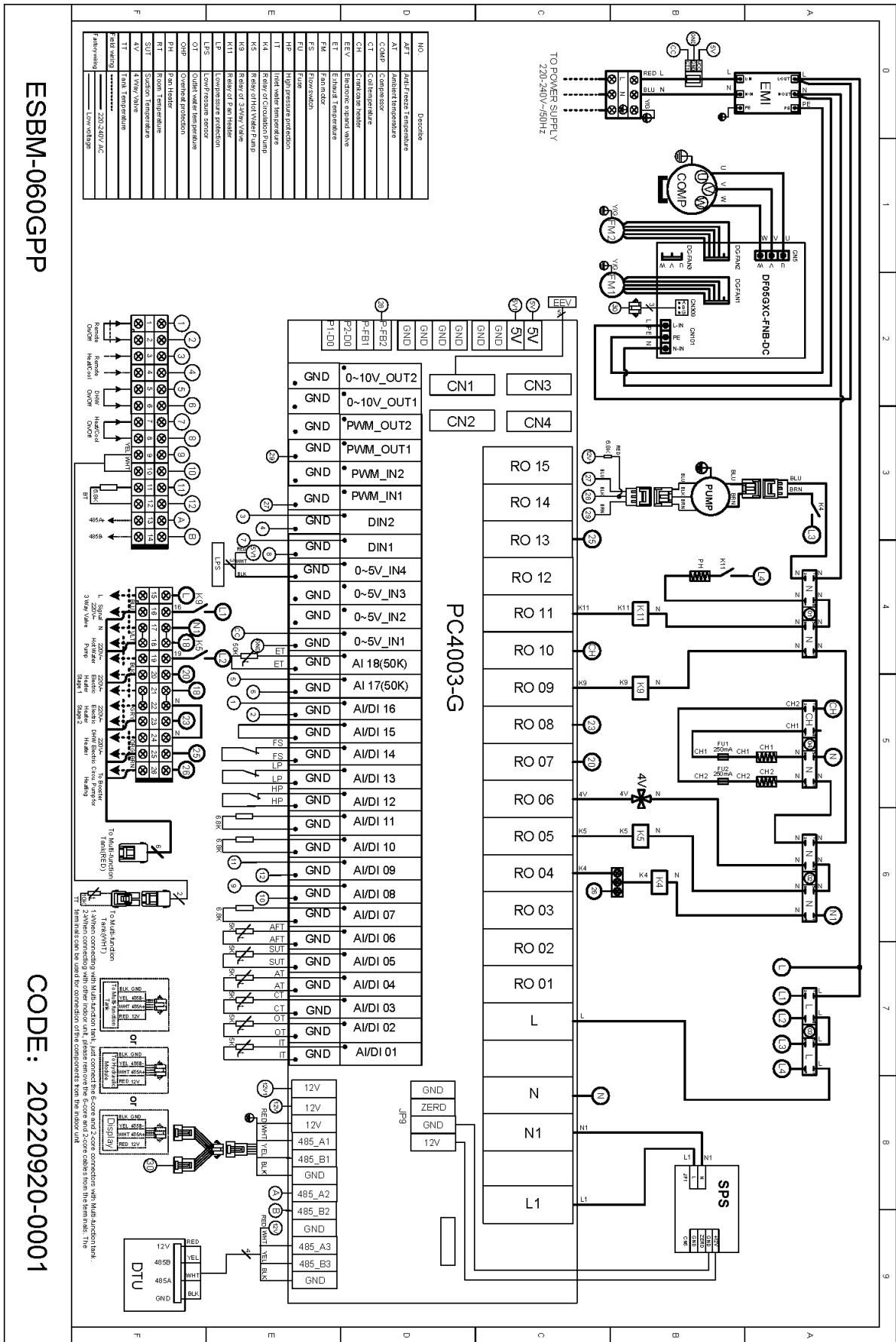
7.4.1 Model: ESBM-020GPP



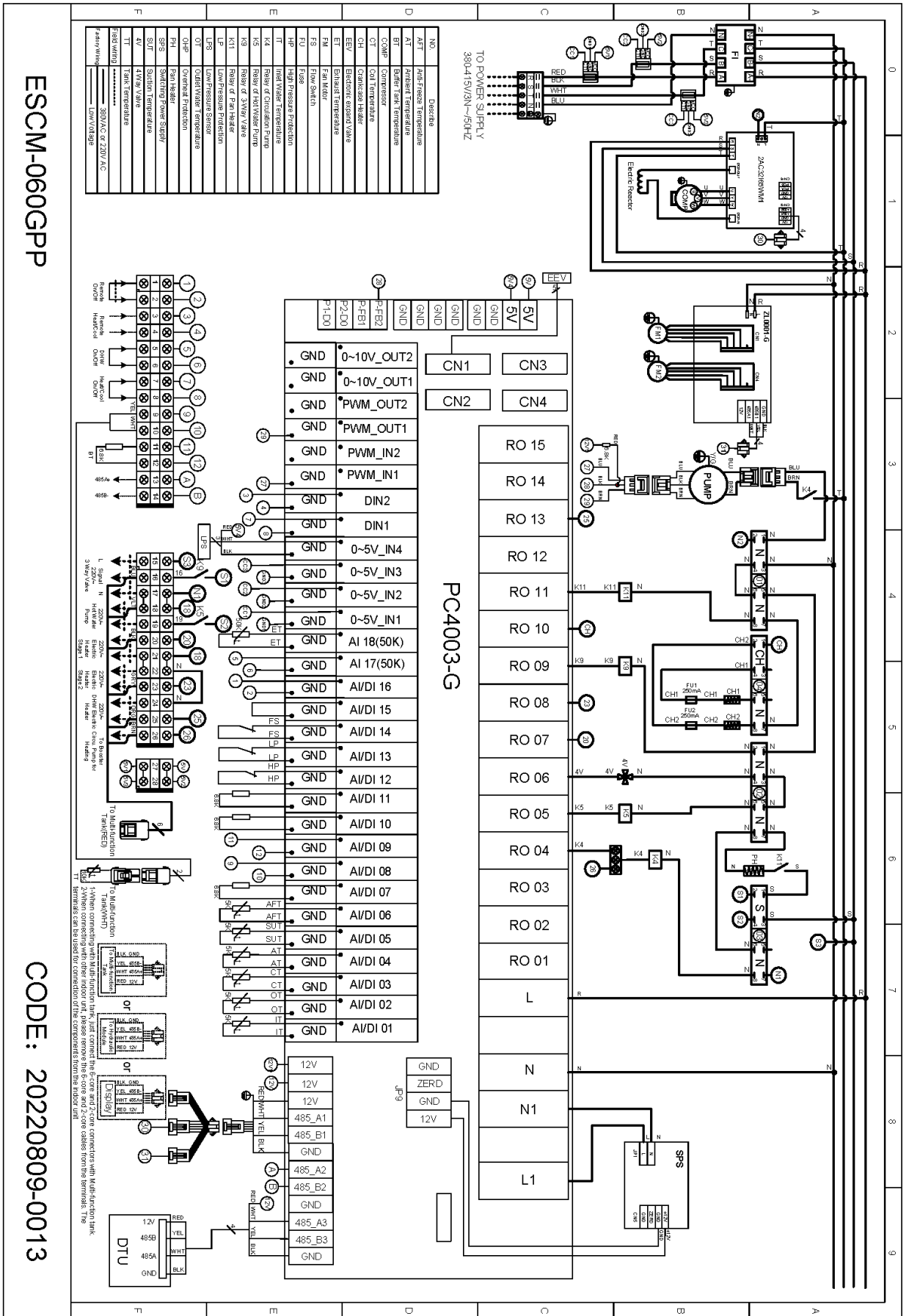
ESBM-020GPP

CODE: 20220809-0011

7.4.3 Model: ESBM-060GPP



7.4.4 Model: ESCM-060GPP



ESCM-060GPP

CODE: 20220809-0013

7.5 Electric heating wiring instructions

When you need to install electric heating, please follow the instructions below;

The following two electric heating installation modes can be selected:

1) DHW electric heating, which can only be installed in the DHW tank, can only work when the hot water mode is running and the opening conditions are met; When installing this electric heating, connect with the AC contactor through the port 24/25 of the wiring base to control the DHW electric heating;

2) Two-stage electric heating, which can be installed in one of the three positions of the main water circuit, DHW tank and buffer tank. When installing this electric heating, it is connected with the AC contactor through ports 20/21 and 22/23 of the wiring base to control the operation of the two-stage electric heater;

According to the different installation positions, set the corresponding values in the factory parameter settings of the display to enable the electric heating function;

R35 :Electric Heater Parameter

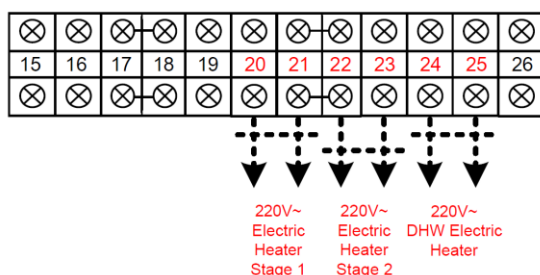
R35=0,disable the electric heater function:

R35=1,two stage electric heater in main water circuit;

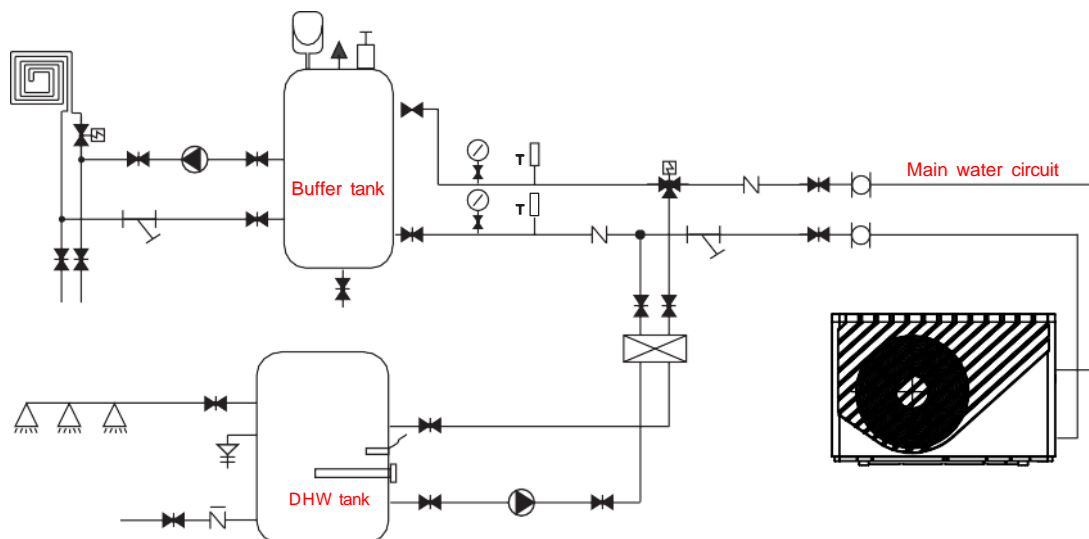
R35=2,two stage electric heater in DHW tank;

R35=3,two stage electric heater in buiffer tank ;

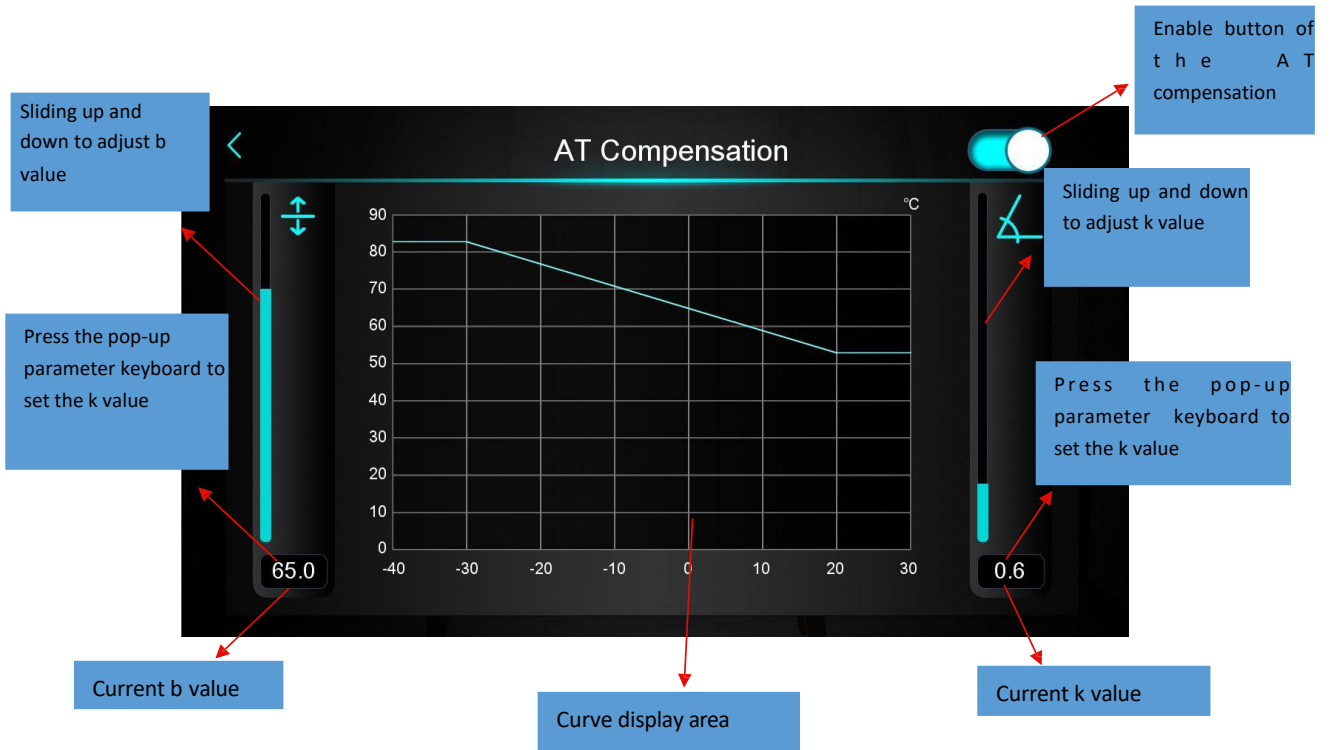
Electric heating control wiring port



Optional installation position of electric heating



7.6 Weather compensation settings



1. Range of k value(0~3.5);
2. Range of b value(0~90),when the Fahrenheit Celsius unit is switched, it shall follow the switch;
3. When you see the keyboard to enter the values of k & b, you can synchronize the data with the mainboard on the current interface.

7.7 Water quality requirements

7.7.1 Corrosi 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

Moisture	Concentration	Time limit	Plate material			Brazing material		
			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		+	+	+	-	+	+
$\text{HCO}_3^- / \text{SO}_4^{2-}$	>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/+	+	-

Note: _____

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