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Operation Manual

R290 DC Inverter Heat Pump 50kW & 100kW

CONTENT

1 Foreword

- Please read this instruction carefully before installation and use.
- This instruction includes required messages for installation, adjustments, and maintenance.
- Heat pump products are produced to strict design standards to ensure safe, efficient, and reliable operation.
- We don`t responsible for damage to people or property caused by improper installation, adjustment, maintenance, or operations contrary to this instruction manual.

The DANGER sign indicates potential harm that could result in personal injury or death.

The WARNING sign indicates potential harm that could result in personal injury or death.

The CAUTION sign indicates dangers that can cause damages to unit, other devices, or air pollution.

The NOTE sign indicates important items to take note of. The NOTE indicates items that may affect the operation of the units.

- Apart from factory provided options, additional external wires are not allowed to be connected to the power or control wiring cabinets.
- Third party relays, switches, sensors, and controllers are not allowed to be installed in the power or control wiring cabinets.
- External wiring cannot cross over the power or control wiring cabinets.
- All the wiring work must follow our specifications and be installed by professionals.

Lethal high voltage DC and AC is present in the power wiring control cabinet. Make sure the power supply is off before opening the cabinet.

To avoid injury or damages to the units, please observe these notes:

- The supply power wiring must be selected according to the maximum overcurrent protection (MOCP) or maximum power.
- Power must be ground in accordance with the National Electrical Code.
- Confirm the fastening of power wiring prior to start-up
- Connect the supply wiring in accordance with the wiring diagram.
- Installation professionals are advised to wear protective gear, such as anti-static gloves during electrical operations, etc.
- Check the parts, integrity, and insulation of wiring, and repair if needed.

- This unit is intended to operate within the ranges specified.
- It is strictly prohibited to refit the unit or modify the parameters.

Water system installation

- Isolation valves and drains shall be installed at the inlet and outlet of the water pipes; strainers are recommended on the inlet piping.
- Gauges and thermometers are recommended to be installed on the inlet and outlet pipes to monitor the operation of the system and equipment.
- The temperature difference of water inlet and outlet are suitable between 4℃ and 6℃ when operating at full load.

The water quality should meet the requirement below：

Item	Unit	Standard Requirements	Item
pH value（25℃）	6.5 − 8.0	Chloridion（Cl（mg/L）	＜50
Electrical conductivity（25℃）(μs/cm)	＜250	Silver sulfate（SO42−）（mg/）	＜50
TFe（mg/L）	＜0.3	Total alkalinity	＜50
Total hardness（mg/L）	＜50	Silicon dioxide（SiO2）	＜30

Prior to start-up, the compressor should be powered on to preheat the system. Recommended preheat cycle is 8 hours prior to initial start-up.

Completing the recommended preheat improves the temperature of the compressor lubricating oil. Failing to properly preheat the system can result in poor operation or damage to the compressor.

CFC’s can destroy the ozone layer in the atmosphere and pollute the environment. Utilize recovery devices to recover refrigerant when servicing the system.

User Qualifications

Installation operations in A3 grade flammable and explosive R290 refrigerant circuit system heat pumps can only be carried out by authorized and qualified HVAC dealers and qualified installers. These HVAC dealers and installers must receive qualified training according to EN 378 Part 4 or IEC 60335-2-40, Section HH. Operators need to have industry-recognized job skills certificates.

Brazing/welding work in R290 refrigerant circuit system heat pumps can only be performed by personnel certified according to ISO 13585 and AD 2000, Data sheet HP 100R. Only qualified and certified HVAC dealers should perform brazing/welding work.the operation process must fall within the application scope of the application and be carried out in accordance with the prescribed procedures. According to the Pressure Vessels Directive (2014/68/EU), welding/brazing work on heat pump type pressure vessel connections requires certification of personnel and processes by a notified body.

If the operation of this system has the potential for power loss and has the potential to experience ambient temperatures below freezing [0°C], then the user should utilize one of three strategies: A) Order the unit with factory mounted heat trace, then provide field heat trace on external piping and an emergency power source for the heat trace, or B) Utilize glycol (anti-freeze) solution within all external hydronic piping. C) Drain the water from the system prior to any ambient temperature dropping below freezing [0°C].

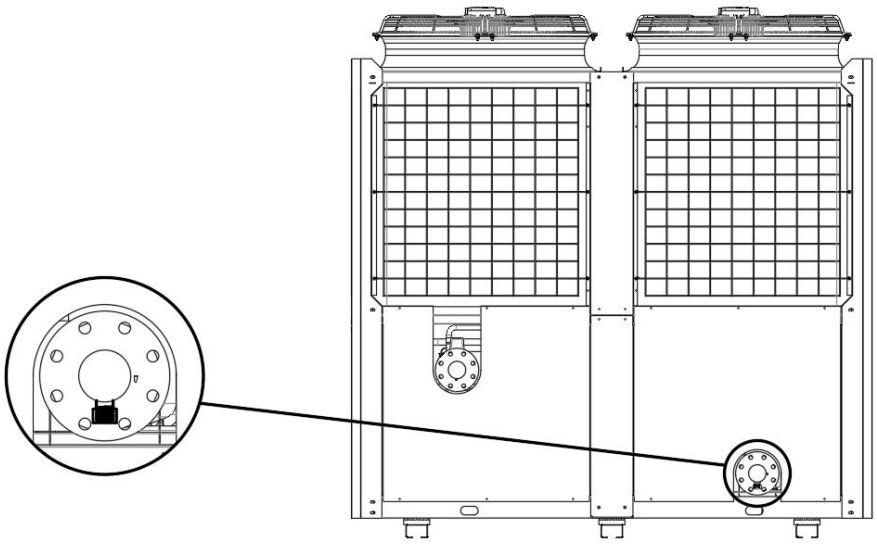
Ensure supply wiring is free of defects and properly protected.
It is prohibited to disconnect or short circuit any safety devices.
Ensure three-phase power is connected properly to avoid reverse rotation or phase loss. Operation with reverse phase will cause serious damage to the unit.
Power wiring must be protected by a rubber gasket, otherwise water could damage electrical components and result in risk of electric shock.

This appliance can used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

Please make sure that the unit and power connection have good earthing, otherwise may cause electrical shock.
The unit CANNOT be installed near the flammable gas. Once there is any leakage of the gas, fire can be occur.
The unit can only be repaired by the qualified personnel of an installer center or an authorized dealer.
Installation must be performed in accordance with the NEC/CEC by authorized person only
Single wall heat exchanger is not suitable for potable water connection.
The appliance shall be installed in accordance with national wiring regulations.
The appliance must be fitted with means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III conditions, and these means must be incorporated in the fixed wiring in accordance with the wiring rules.
An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.
When installing, all wiring holes on the chassis need to be installed with conduit for field wiring.

Operation guidelines for defrosting and drainage in winter

In winter, when the temperature is lower than 0℃, if the unit is powered off for any reason, then water must be drained from the unit to prevent damage to the hydronic components. Draining the system of water shall be carried out as follows:



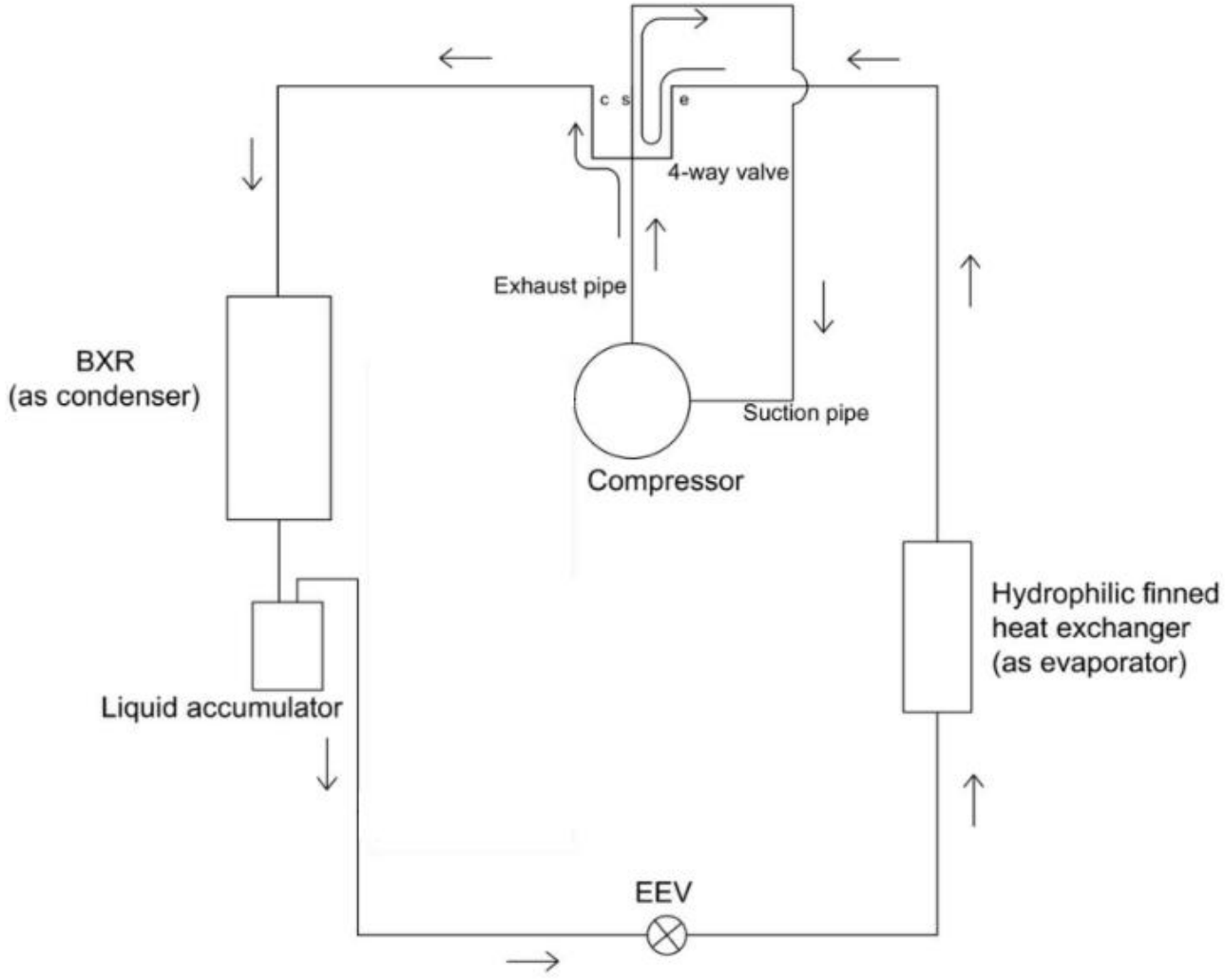
Operational guideline：

Isolate the inlet and outlet water connections external to the unit. Ensure the internal isolation valves on each heat exchanger are open. Installed a drain pipe and valve at the Inlet water connection. Keep the drain valve open until the next use. Open the vent valve to facilitate complete draining of water from the heat exchangers. Using compressed air or a wet/dry vacuum to assist water removal is recommended.

WARNING	When flushing the piping system prior to start-up, ensure this heat pump is bypassed to prevent pipe debris from entering the heat exchangers. Only after the piping has been cleaned, should the heat pump be pressure tested.

2 Working principle

This heat pump water heater gathers heat from the environment (refrigerant-to-air HXR), compresses refrigerant vapor to a higher temperature, then heats the working fluid (domestic water or glycol depending on the application) in the condenser section (refrigerant-to-water HXR). The condensed high pressure and warm fluid is rapidly expanded through the EEV to introduce cold liquid into the evaporator (ambient air side) to be boiled off and complete the circuit. A reversing valve is utilized during the defrost cycle.

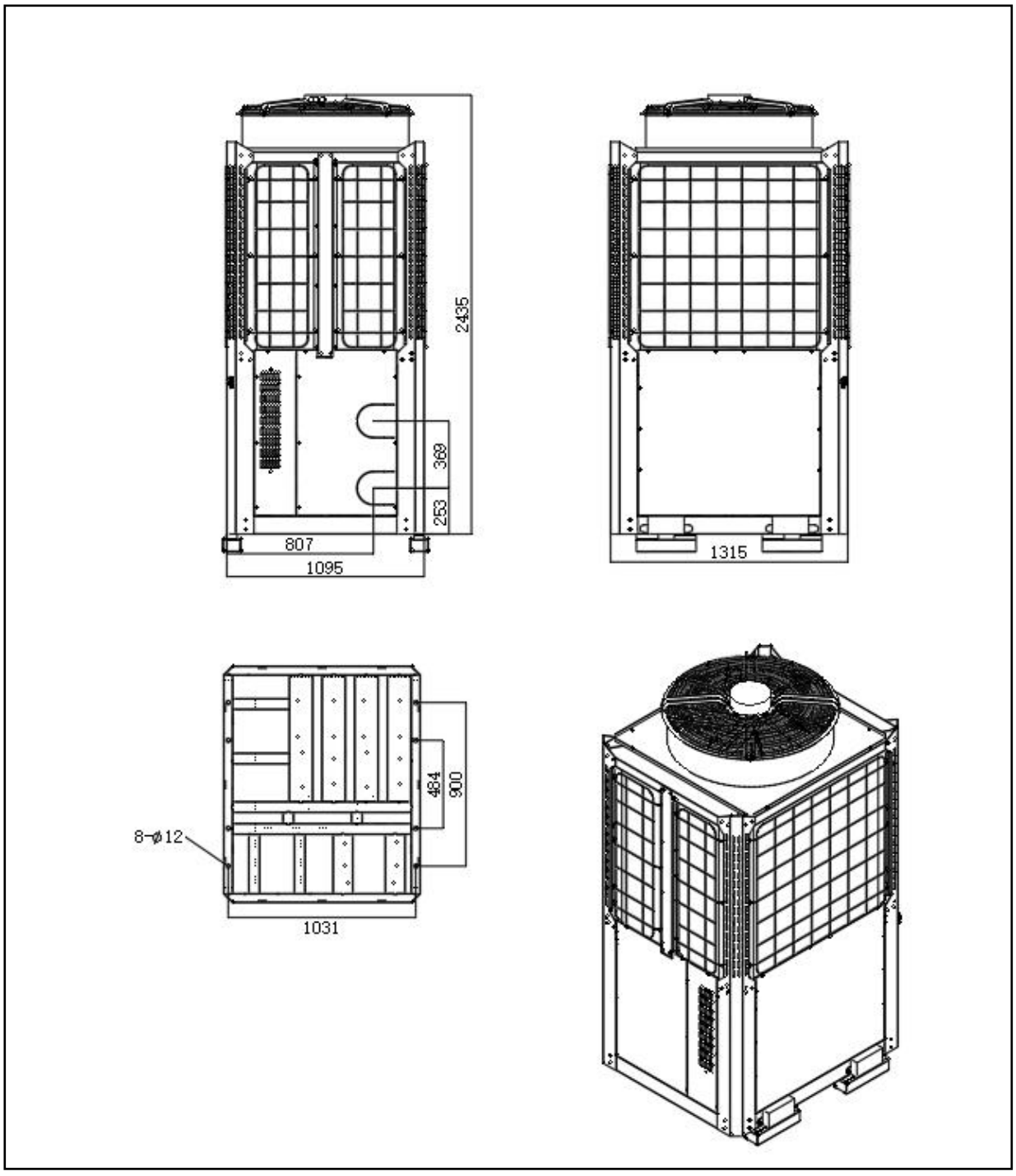


3 Product specification

3.1 Dimensions

500HCR5TINVM-USC

Unit: mm



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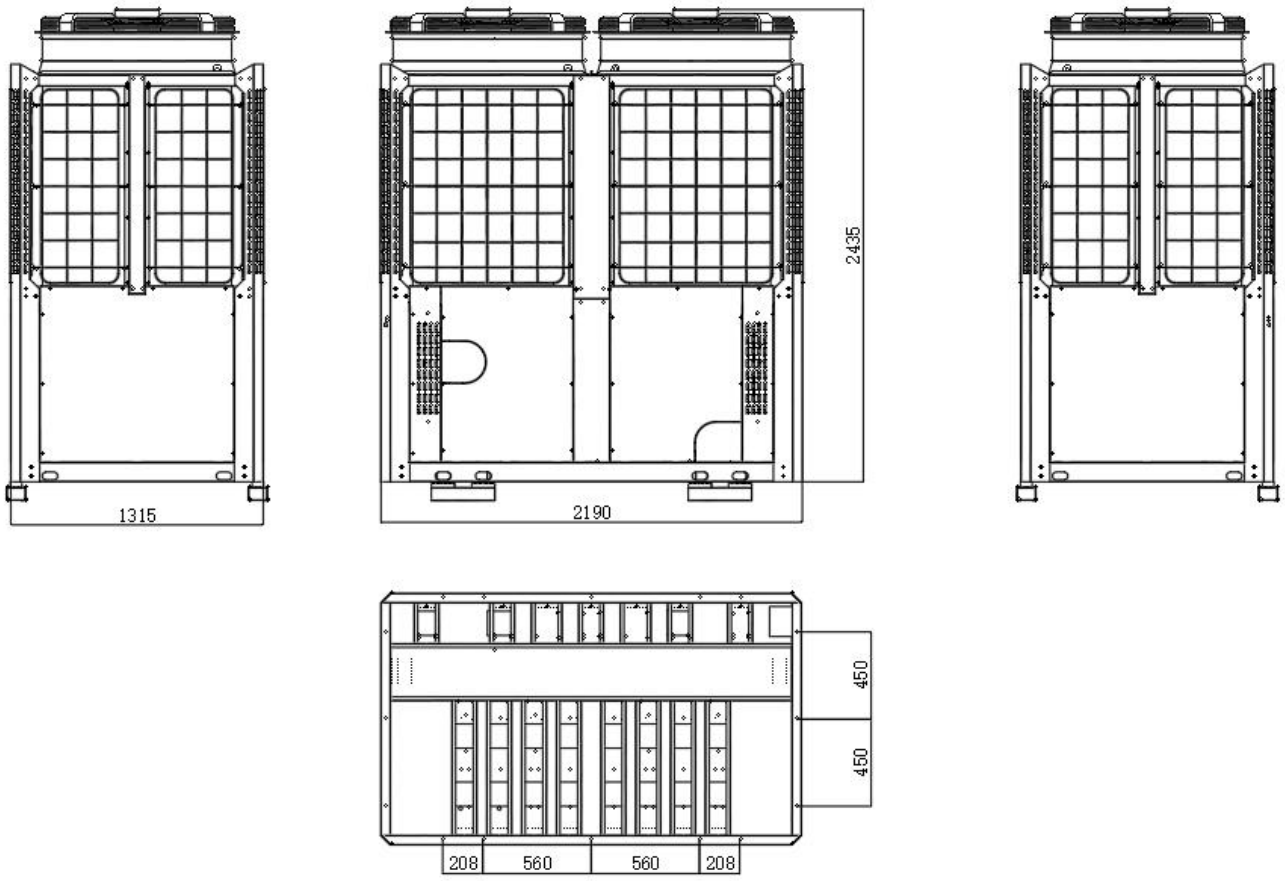
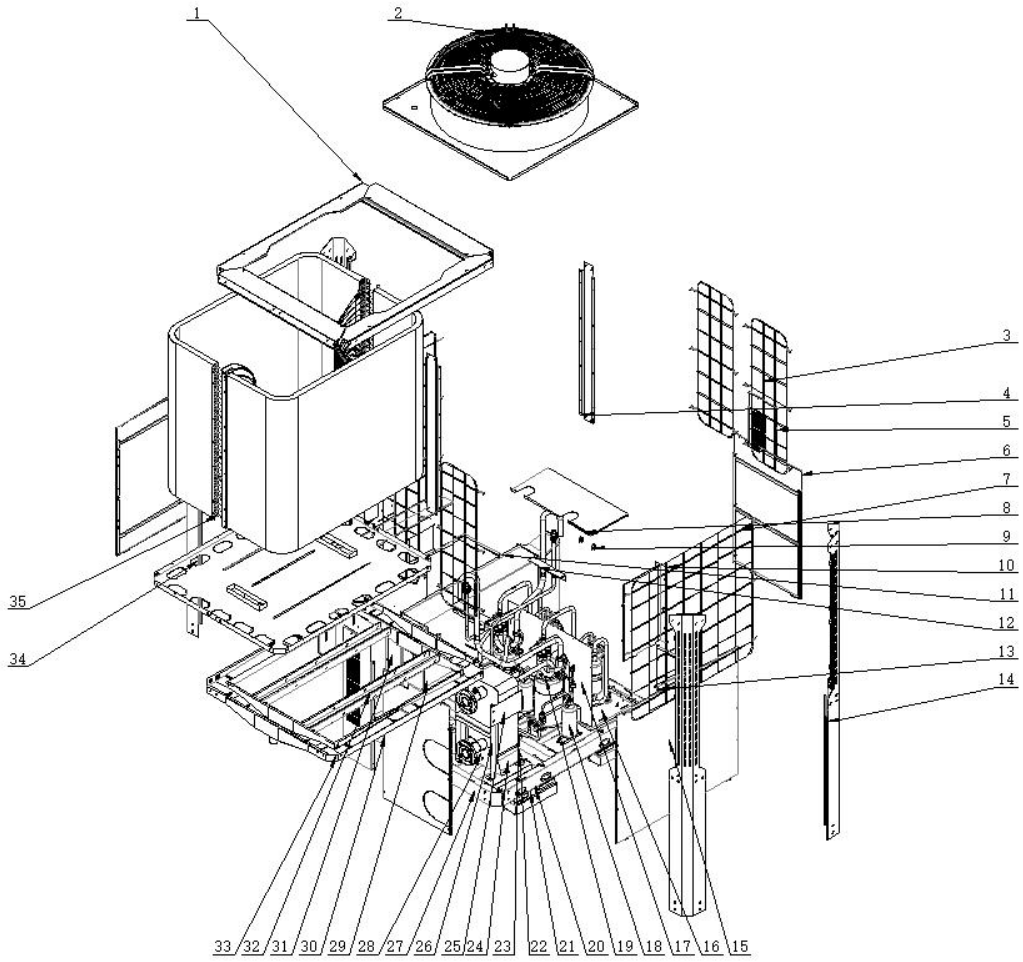
Unit: mm



3.2 Main parts of unit

500HCR5TINVM-USC



DESCRIPTION							
1	Top Cover	10	Hoardings	19	Gas-liquid Separator	28	Back Plate Replacement
2	Fan	11	Hoardings	20	Shock Absorber	29	Air Guide Cover
3	Side Net	12	Baffle	21	Bottom	30	Back Panel
4	Cover Plate	13	Hoardings	22	Fixed Plate Directly Below the plate changer	31	Air Guide Cover
5	Front Plate	14	Column	23	Mounting Bracket	32	Back Panel
6	Front Plate	15	Left Plate	24	Fixed Plate	33	Drainage Tray
7	Side Net	16	Fixed Plate	25	Fixed Plate	34	Columns Around
8	Hoardings	17	Hoardings	26	Left Support	35	Evaporator
9	Drainage Tray	18	Liquid Storage Tank	27	Chassis		

3.3 Technical parameter

Mode:	500HCR5TINVM-USC	1000HCR5TINVM-USC
[Space Heating] Ambient Temp. (DB/WB): 7°C/6°C, Water Temp. (Inlet/Outlet): 30°C/35°C.		
Heating Capacity (kW)	13.62~50.00	27.24~104.00
Power Input (kW)	2.34~11.68	4.68~24.53
Heating Current Input Range(A)	3.95~19.72	7.90~41.62
COP	5.82~4.28	5.82~4.24
[Space Heating] Ambient Temp. (DB/WB): 7°C/6°C, Water Temp. (Inlet/Outlet): 50°C/55°C.		
Heating Capacity (kW)	12.26~46.00	24.52~98.00
Power Input (kW)	2.99~15.43	5.98~33.11
Heating Current Input Range(A)	5.04~26.04	10.08~55.06
COP	4.10~2.98	4.10~2.86
[Space Cooling] Ambient Temp. (DB/WB): 35°C / -, Water Temp. (Inlet/Outlet): 12°C/7°C.		
Cooling Capacity (kW)	7.60~35.00	15.20~80.00
Power Input (kW)	1.76~12.36	3.52~28.37
Cooling Current Input Range(A)	2.97~20.86	5.94~47.87
EER	4.30~2.83	4.30~2.82
Max. Power Input (kW)	22.00	44.00
Max. Running Current (A)	37.20	74.70
Max. Outlet Water Temp. (°C)	75	
Operation Range (°C)	-25~43	
Power Supply	380-415V/3N~/ 50Hz	
Rated Water Flow (m^3/h)	8.6	17.9
Water Pressure Drop (kPa)	25	28
CO2 Equivalent (Ton)	0.0120	0.0240
ErP Level (35°C)	A+++	
ErP Level (55°C)	A+++	
Refrigerant Type	R290	
Refrigerant weight (KG)	2.0×2	2.0×4
Sound Pressure Level dB(A) at 1m	58	60
Sound power level dB(A) at 1m	75	77
Water Pipe Connection (inch)	DN50	DN65
Fan Quantity	1	2
Water Proof Class	IPX4	
Electricity Shock Proof	I	
Net Weight（kg）	490	958
Net Dimensions (L×W×H) (mm)	1095×1315×2435	2190×1315×2435
Shipping Dimensions (L×W×H) (mm)	1100×1350×2535	2200×1350×2535
Shipping Weight (kg)	510	978

Due to product upgrade and improvement of the above unit parameters may change, please refer to the fuselage nameplate parameters prevail

4 Installation

4.1 Product handling

- Confirm the unit has sufficient space for safely rigging it into place.
- Remove the protective packaging just prior to installation.
- During handling, the inclination of the unit shall not be more than 15° to prevent the unit from overturning.
- When rolling transportation is used, the same size rollers shall be placed under the base of the unit. Each roller must be a little longer than the outer frame of the base and suitable for the balance of the unit.
- When hoisting, the hoisting cable shall be rated for minimum of 3 times the weight of the unit. Check and ensure that the lifting hook is fastened to the unit, and the hoisting angle is greater than 60°. Add cloth or hard paper between the unit and the wire rope to prevent damage to the unit. Hoisting diagram is as follows:

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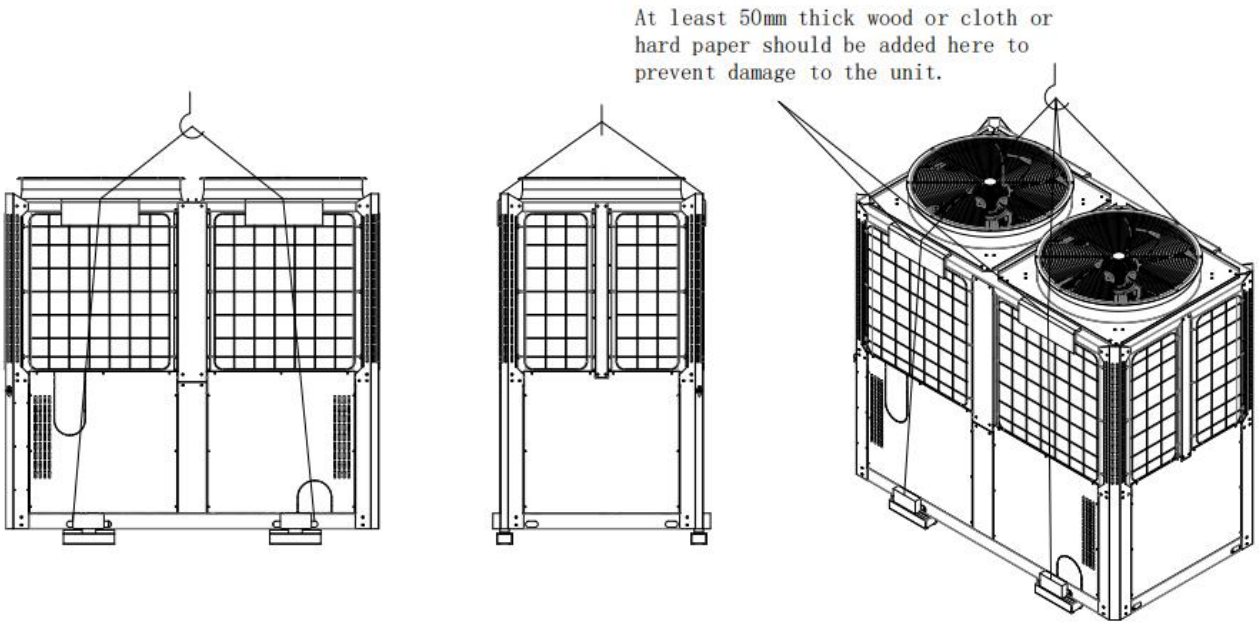

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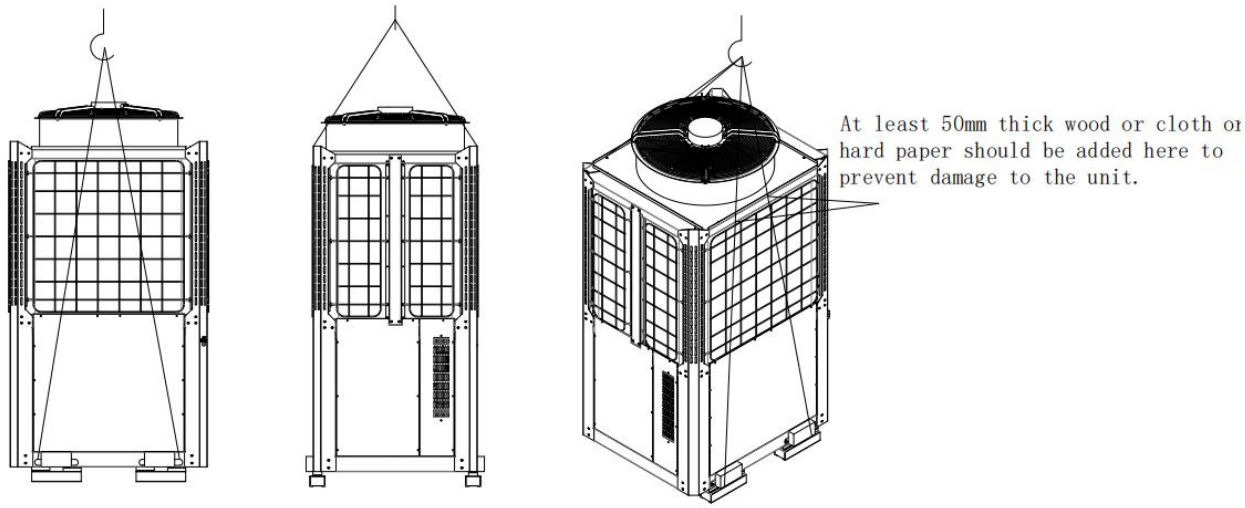
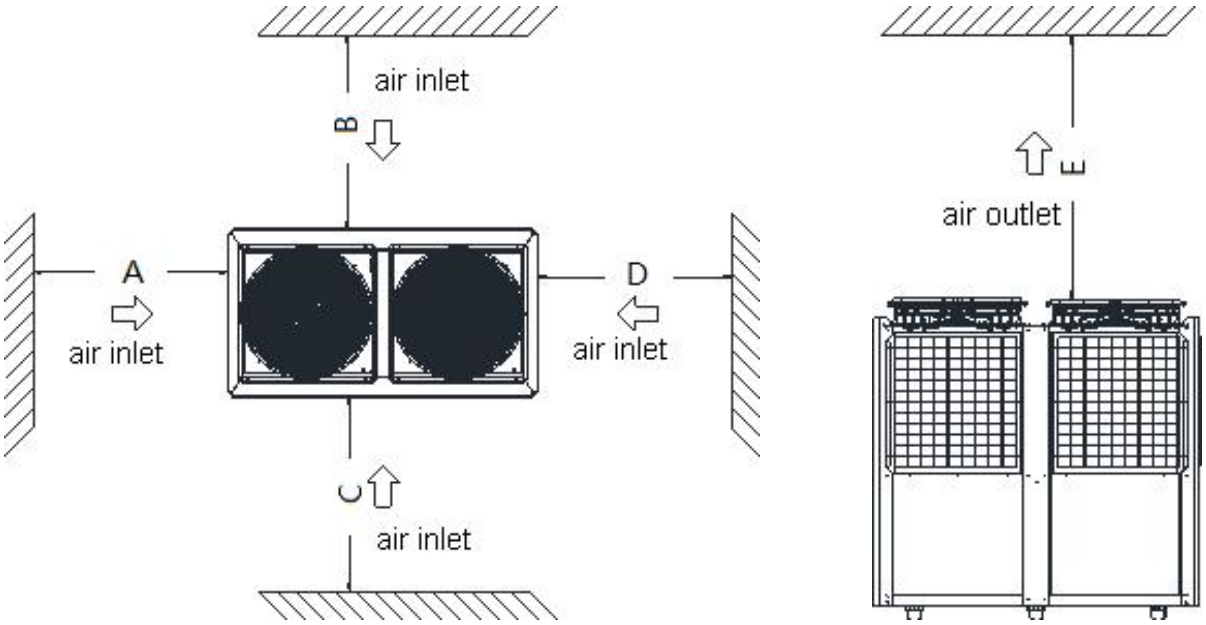


4.2 Installation site selection

- The unit shall be installed in a location with ample space to allow for sufficient air flow and maintenance of all components.
- If the unit is in a place accessible to unauthorized personnel, isolation safety measures should be taken, such as setting up protective fence, etc.
- Select locations where the sound from the unit and cool air leaving the coils will not affect the surrounding environment including nearby building occupants.
- The location shall facilitate the installation and maintenance of pipes and electrical connections.
- Ensure a sound foundation if mounted on grade and sufficient vibration isolation if roof mounted.
- Ensure sufficient drainage for rain and condensate discharge.
- Roof mounted units shall consider local codes regarding wind and seismic restraints, mounting heights above the snow line, and ensure properly grounding protection to mitigate damage from lighting strikes.

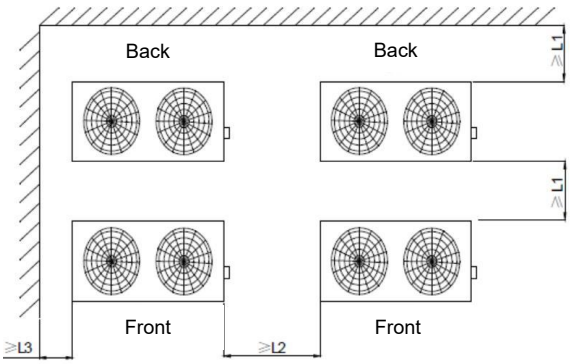
Recommended unit spacing：

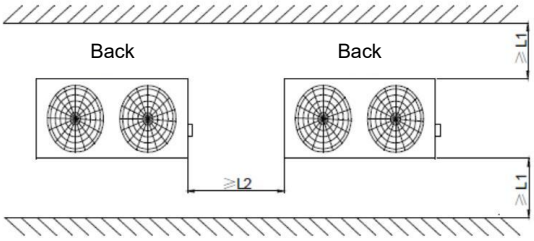


Air flow clearances:

Installation space（mm）				
A	B	C	D	E
≥ 2000mm	≥ 2000mm	≥ 2000mm	≥ 2000mm	≥ 3000mm

Recommended unit spacing：





Air flow clearances:

Installation space（mm）		
L1	L2	L3
≥ 2000mm	≥ 2000mm	≥ 2000mm

4.3 Installation foundation

- Supporting platforms must be able to bear the operating weight of the equipment and all associated piping, accessories, maintenance personal, and weather-related components such as snow, water, etc. The units should be installed level. For the operating weight, please refer to the table of performance and specification parameters.
- The units must be installed on a level surface (with an inclination level not to exceed 2-degrees). Vibration isolation pads are recommended. Units should be fixed to surface with bolts. Condensate should drain away from the unit.

5 Piping layout

5.1 Pipe size

Please refer to the performance specification for inlet and outlet pipe diameters.

5.2 Installation requirements

A means of isolating the unit from the main system flow is required for service. A bypass value is recommended to allow the system piping to be cleaned without introducing sediment into the heat pump heat exchangers.

Install a 40 mesh or finer filter near the inlet of the unit. Pressure gauge and temperature sensor on the inlet and outlet pipes are recommended to allow for ease of monitoring operation.

The water flow must be properly balanced to ensure the water flow does not exceed the maximum flow rate.

When operating at full load, the temperature difference between inlet and outlet should be between 4°C and 6°C.

External piping should be properly supported. The unit's pipe connections should not carry the weight of the piping.

All low points of the water system must be provided with drainage interfaces to facilitate the drainage of water in the water system. All high points must be provided with vent valves to facilitate the evacuation of air in the pipeline. Vent and drain ports should be left uninsulated for ease of maintenance.

	The pipe should be thoroughly flushed and free of debris prior to start-up. Care must be taken during installation to ensure no foreign debris enters the waterside or air-side heat exchangers.

5.3 Water quality requirements

A. Water quality considerations

If the unit is applied to a closed (HVAC) loop then scale build up is unlikely; and single wall heat exchangers are permissible. For units directly heating potable water, double wall heat exchangers are required, and the quality of the supply water and means of filtration and softening the water will affect the amount of potential scale and sediment build-up within the heat exchangers. Care should be taken to mitigate scale and sediment building up. Scale and sediment build up will derate performance and can ultimately cause system failure.

NOTE: Clean out ports are located on the supply and return headers of the unit. Annual backflushing of the heat exchanger assemblies with a potable water rated acid is recommended to dissolve any scale buildup and flush away any sediments that may accumulate.

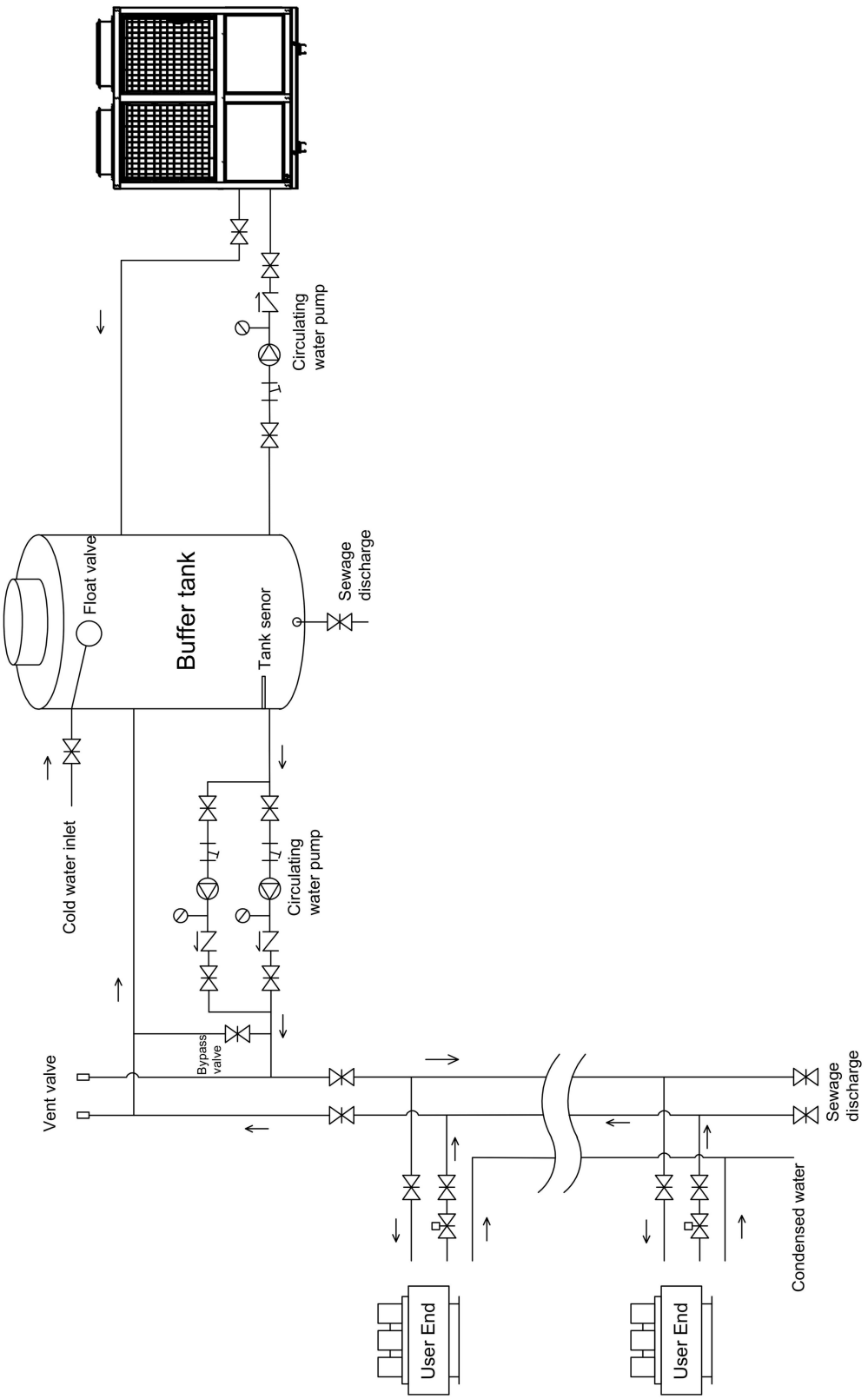
The water quality, such as pH value, conductivity, chloride ion concentration, sulfur ion concentration, etc. should be analyzed before use. Water must be filtered and softened with water softening equipment before entering the water heater's heat exchangers.

Applicable water quality standards of unit

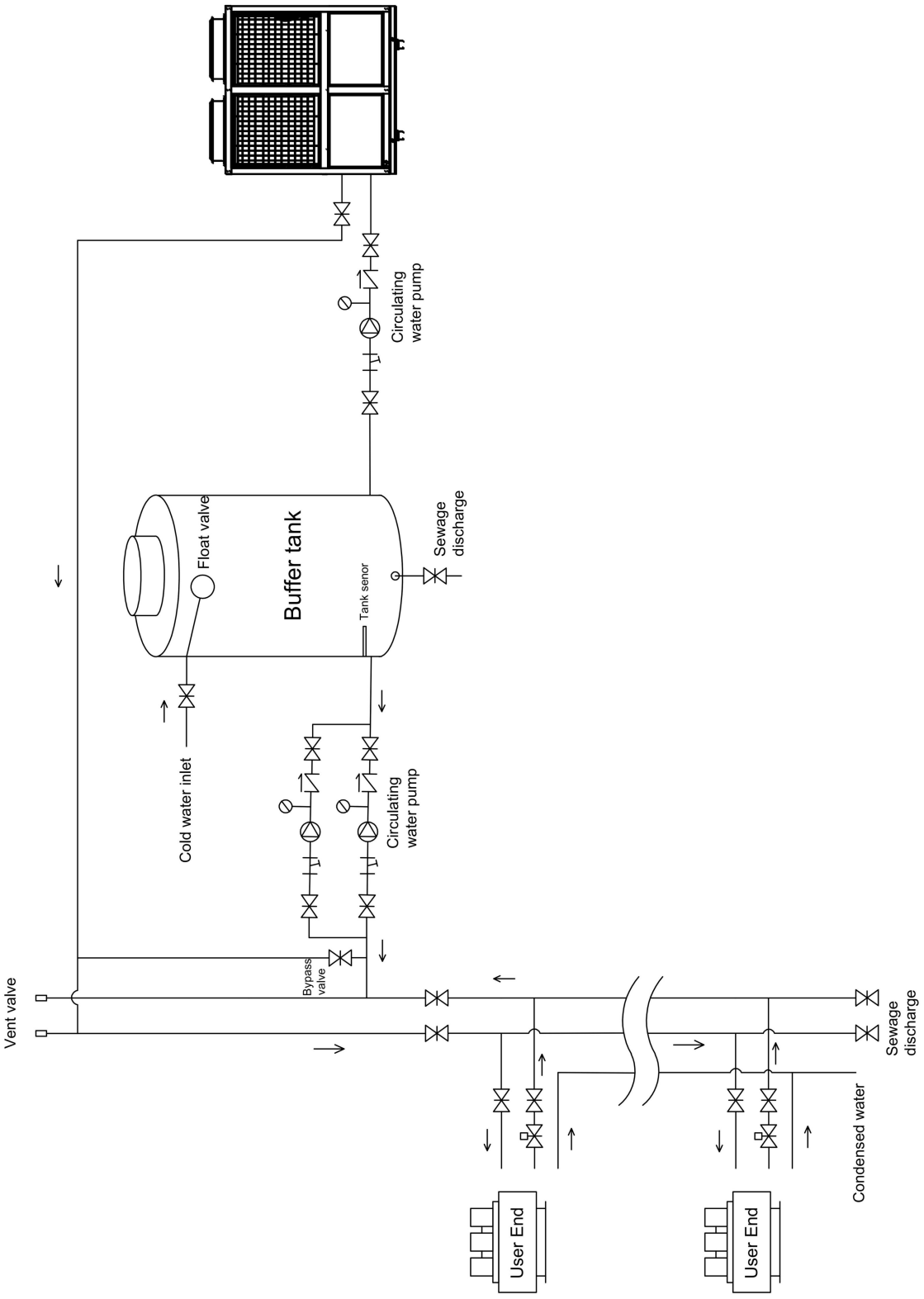
Item	Unit	Standard Requirements	Item
Ph value（25℃）	6.5－8.0	Chloridion（CL）(mg/L）	＜50
Conductivity（25℃）(μs/cm)	＜250	Silver sulfate（SO42－）(mg/L）	＜50
Total iron（mg/L）	＜0.3	Total alkalinity	＜50
Total hardness（mg/L）	＜50	Silicon dioxide（SiO2）	＜30

5.4 Water system piping

Solution 1



Solution 2


Circulating water pump
Float valve
Buffer tank
Tank senor
Sewage discharge
Cold water inlet
Circulating water pump
Bypass valve
Vent valve
Sewage discharge
Condensed water
User End
User End

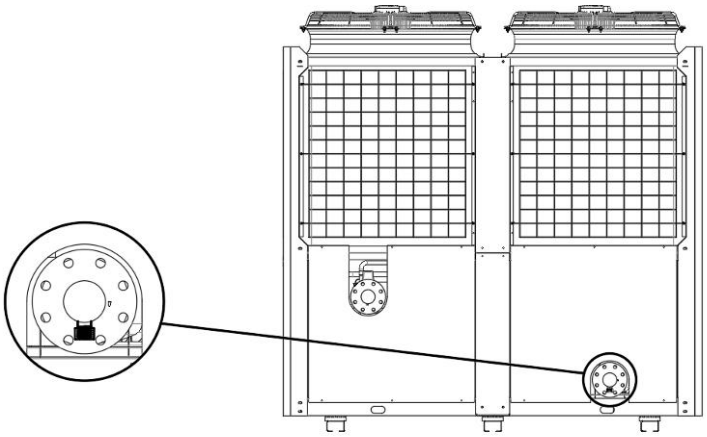
5.5 Winter freeze protection

The unit is equipped with a freeze protection program. If the unit has power and senses the water is below 4℃, it will turn on and operate the system until the water is at 16℃. To protect the hydronic components from freezing during a power outage, there are a few options.

Option 1: Order the unit with factory mounted heat-trace and connect the heat-trace circuit to the building emergency power supply.

Option 2: Utilize a glycol loop for the outdoor hydronic components; and a secondary double wall heat exchanger between the glycol loop and potable hot water located indoors.

Option 3: Drain the system during ambient conditions at or below 0℃. To properly drain the system, follow the steps noted below:



Operational guideline：

To drain the system, first isolate the supply and return piping to the unit, then ensure the internal isolation valves on each heat exchanger are open, next open the drain valve at the bottom of inlet water pipe (Client supplied) to drain the water from the system. Opening the air vent on the return piping will speed up the draining process.

	The pipe should be thoroughly flushed and free of debris prior to start-up. Care must be taken during installation to ensure no foreign debris enters the water-side or air-side heat exchangers.

6 Electrical wiring diagram

6.1 Notice

- The power supply voltage must conform to the rated voltage.
- Wiring must be carried out by a professional and wired in accordance with wiring diagram.
- Ensure the power supply wires are properly sized and protected from excessive current (please refer to the performance specification and parameters table for details).
- Units shall be grounded and wired per national wiring electrical code.
- The power and ground wires must be tightened by applying the right torque with the right tools.
- Only the electrical components specified by the company can be used, and the installation and technical services are required from the designated manufacturer or authorized dealer. If the wiring is not in accordance with the electrical installation specifications, it may lead to the failure of the controller or electric shock.
- According to the national technical standards for electrical equipment, set up leakage protection devices.
- After all the wiring is completed, the power can be connected only after careful inspection.
- Please read the labels on the electrical cabinet.
- The power supply wire for outdoor installation of the unit shall not be lower gauge than the neoprene armored flexible cord (line 57 in IEC 60245), and the wire diameter specification of the power supply wire shall be selected according to the rated maximum current of the nameplate, as shown in the table below：

Maximum current (A)	Area of wire (mm²)	Switch nominal specification(A)
≤16	≥2.5	25 A
≤25	≥4	32 A
≤32	≥6	40 A
≤41	≥6	50A
≤57	≥10	63 A
≤76	≥16	80 A
≤101	≥25	100 A
≤125	≥35	125 A
≤135	≥50	160A

- When the power supply is connected, it must be equipped with a full-pole disconnection device matching with the unit and at least 0.12 inches contact distance from the power supply and a leakage protection device.
- If the supply cord is damaged, it must be replaced by a professional in the designated manufacturer's maintenance department or similar department to avoid danger.
- The power supply shall be housed in a weather tight enclosure, 60 inches or more above the ground. It is forbidden to be installed in a moist, acidic, corrosive environment or exposed to direct sunlight.
- Always disconnect the power prior to opening the electric cabinet.

- Workers must wear anti-static gloves during electrical operation.

Do not insert hand or foreign matter into the outlet of the water heater.

It is forbidden to refit the unit and change the parameters of the unit without permission.

6.2 Wiring Diagram

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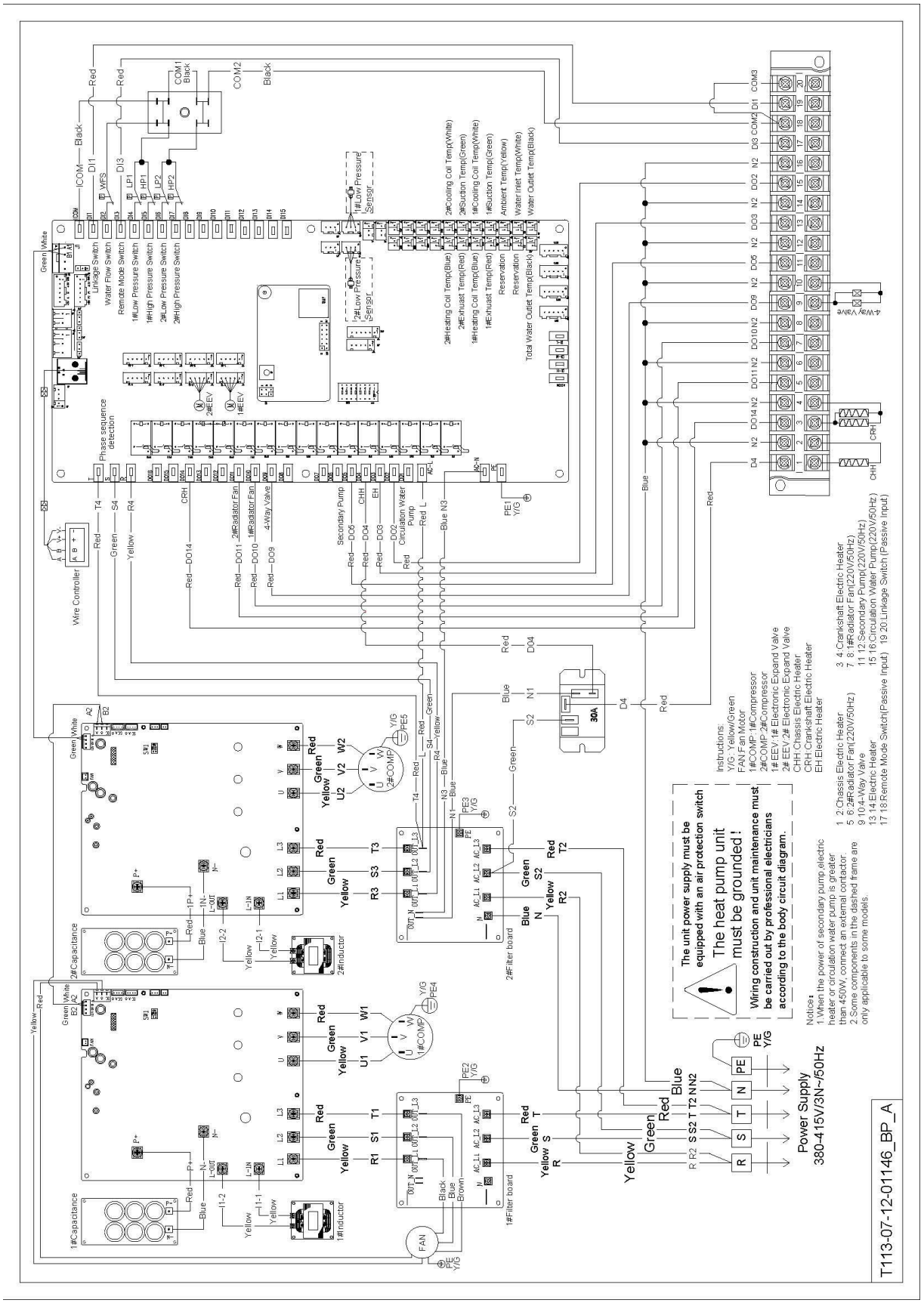

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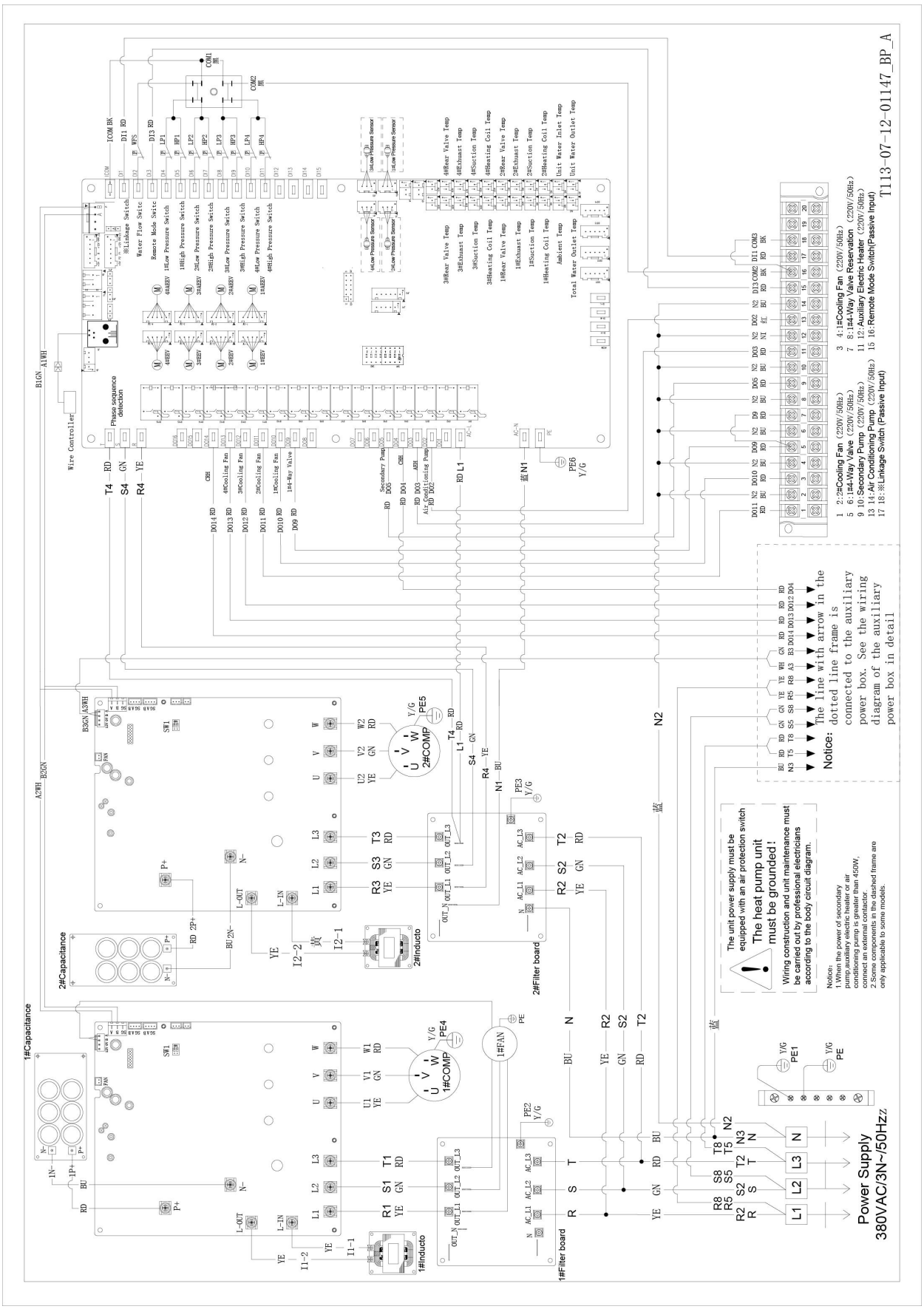
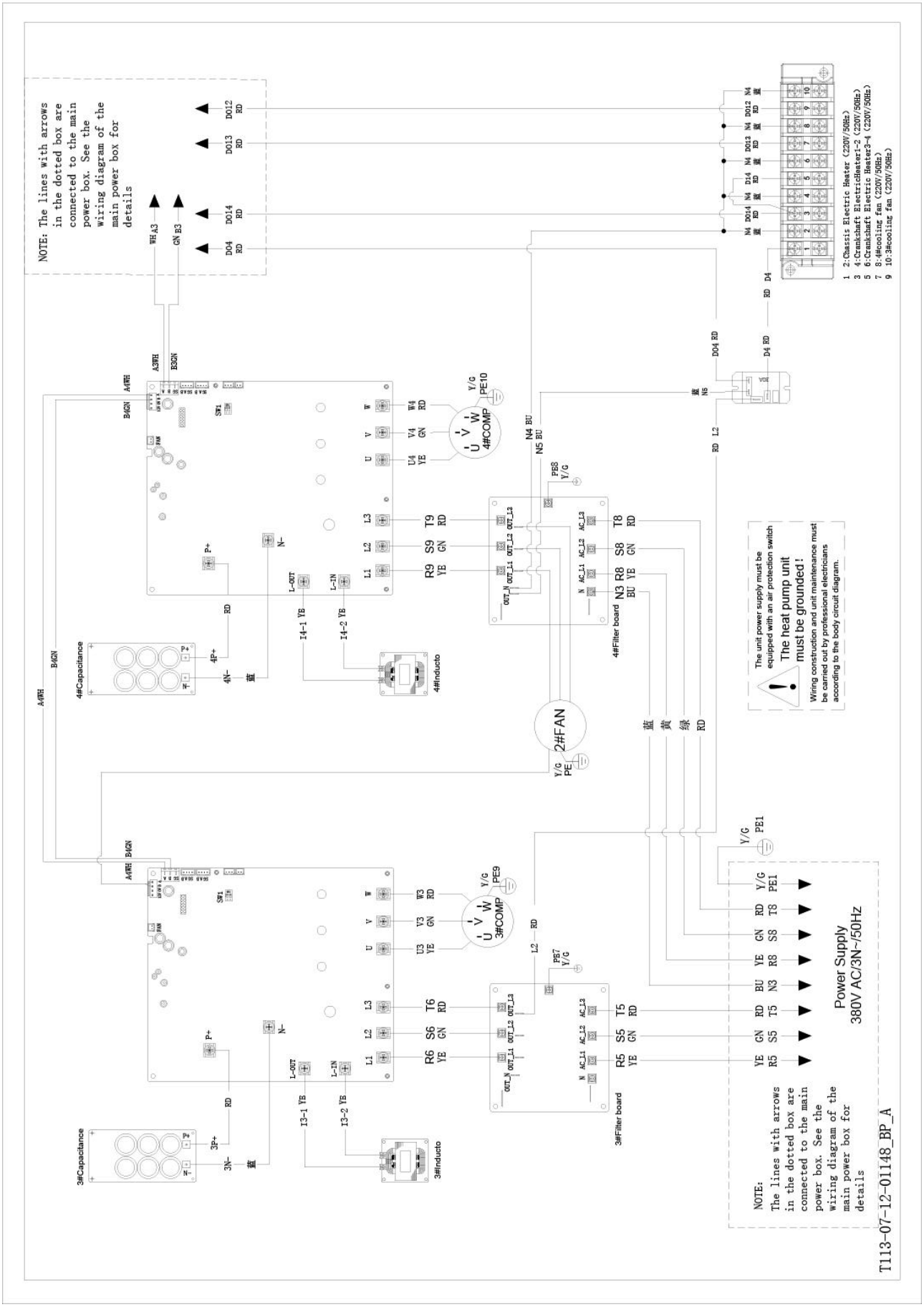
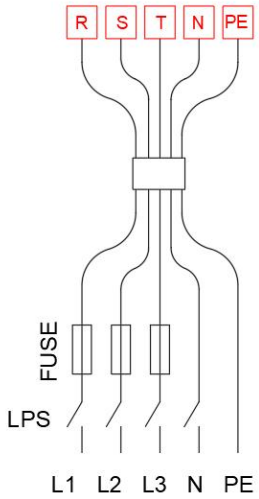



NOTE: The lines with arrows in the dotted box are connected to the main power box. See the wiring diagram of the main power box for details
WH A3
GN B3
DO4 RD
DO14 RD
DO13 RD
DO12 RD
1 2:Chassis Electric Heater (220V/50Hz)
3 4:Crankshaft ElectricHeater1-2 (220V/50Hz)
5 6:Crankshaft Electric Heater3-4 (220V/50Hz)
7 8:4#cooling fan (220V/50Hz)
9 10:3#cooling fan (220V/50Hz)
A4WH
B4GN
A3WH
B3GN
4#COMP
3#COMP
2#FAN
PE10
PE9
PE8
PE7
PE1
Y/G
4#Capacitance
3#Capacitance
4#Inducto
3#Inducto
4#Filter board
3#Filter board
L-OUT
L-IN
I4-1 YE
I4-2 YE
I3-1 YE
I3-2 YE
4P+
4N-
3P+
3N-
The unit power supply must be equipped with an air protection switch
The heat pump unit must be grounded!
Wiring construction and unit maintenance must be carried out by professional electricians according to the body circuit diagram.
NOTE:
The lines with arrows in the dotted box are connected to the main power box. See the wiring diagram of the main power box for details
Power Supply
380V AC/3N~/50Hz
T113-07-12-01148_BP_A

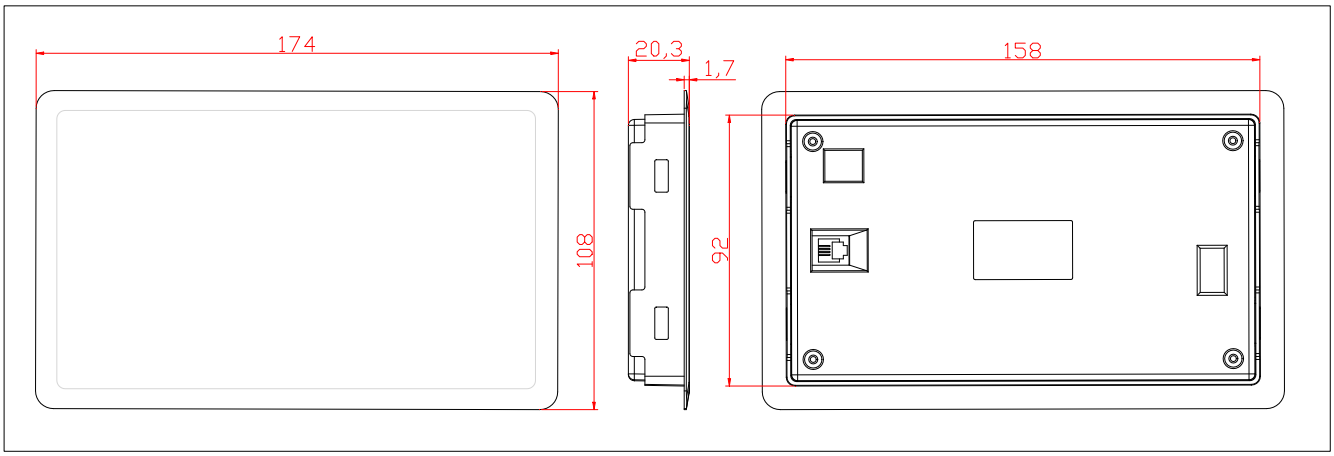
Power wiring

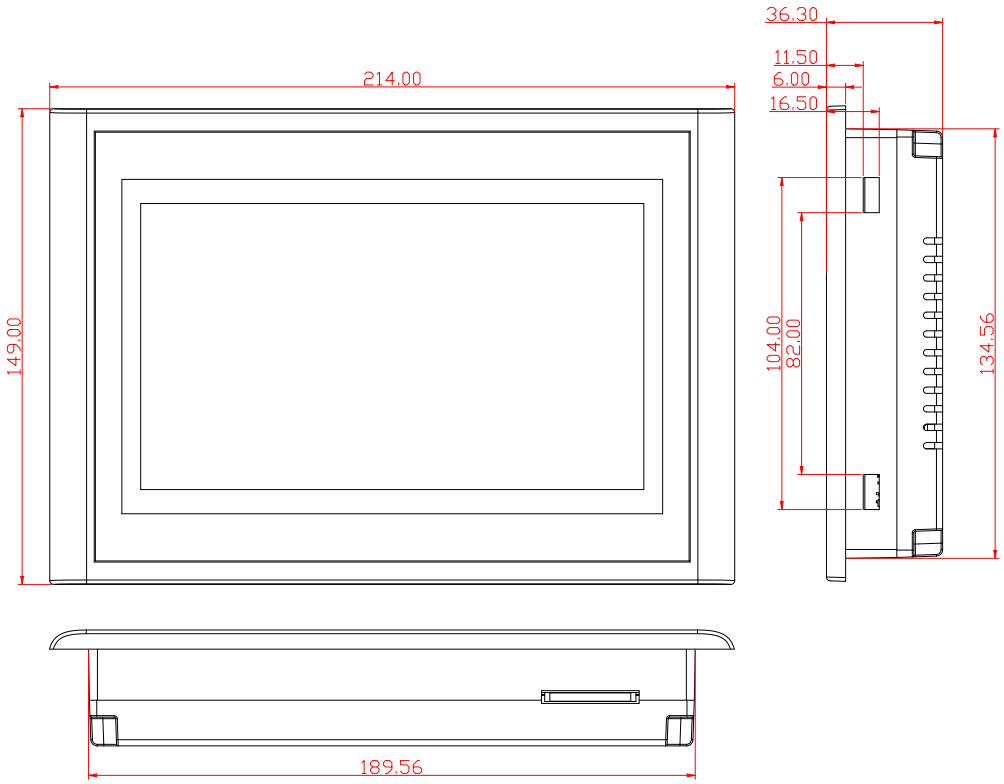


7 Remote control operation instruction

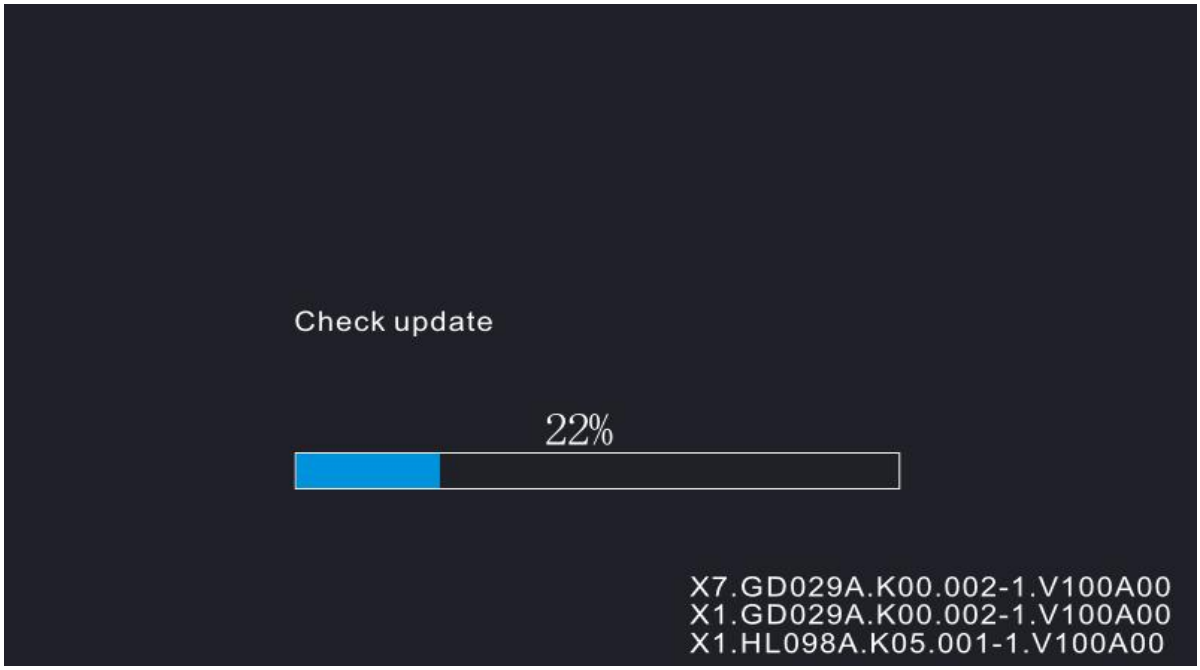
7.1 Controller panel

Unit:mm

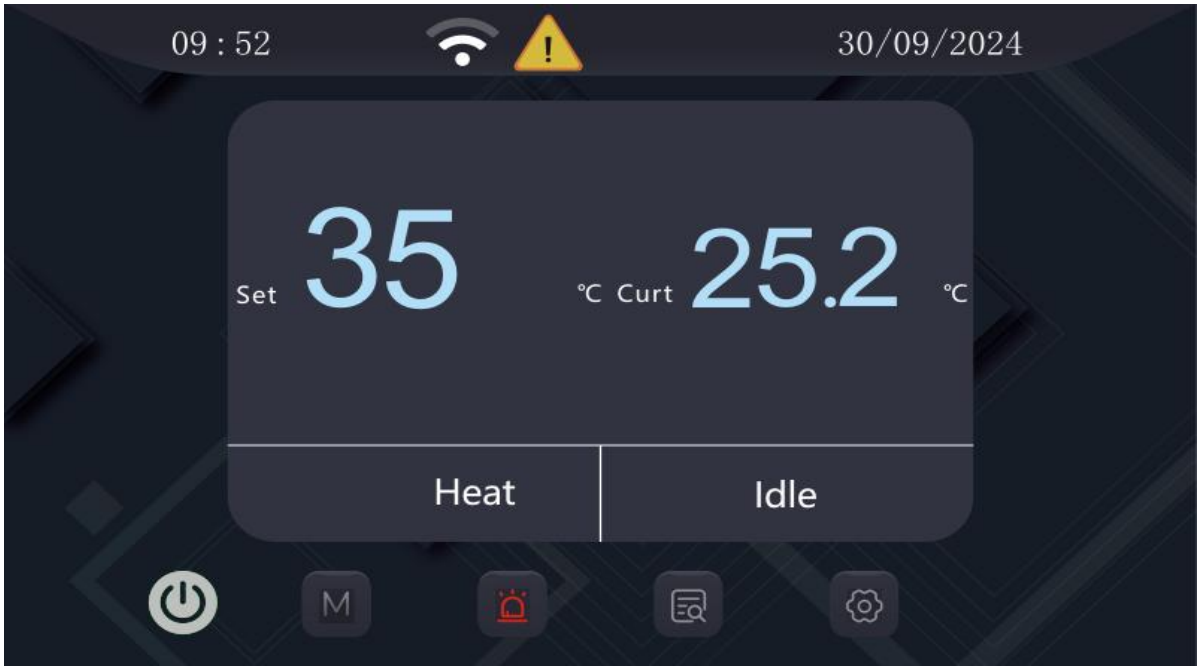




7.2 Interface overview



When powering on for the first time, after staying in the dynamic interface for 30 seconds, enter the following main interface according to the motherboard mode.

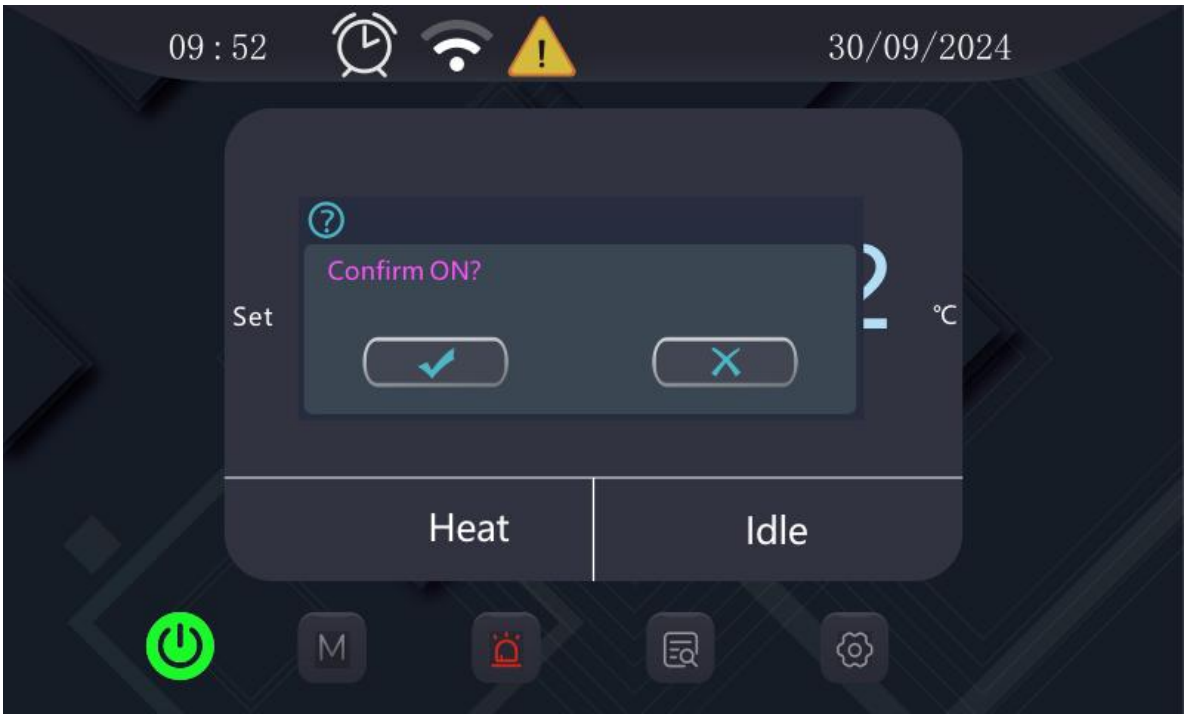


ON/OFF	Mode	Fault	Inquire	Setting

Icon	Meaning	Icon	Meaning
	Switch on and off		Timed validity
	Parameter setting		Network state
	Fault alarm		Defrost
	Mode switching		Home
	Data status query		

7.3 Switch on and off

At the main interface,Short press turn on and turn off.



7.4 Mode setting

At the main interface, short press M mode key to jump to the corresponding interface according to the current mode supported by the unit.

For example, when the unit supports cooling and heating modes, short press the M mode key to enter the mode setting: cooling, heating, automatic.

7.5 Temperature setting

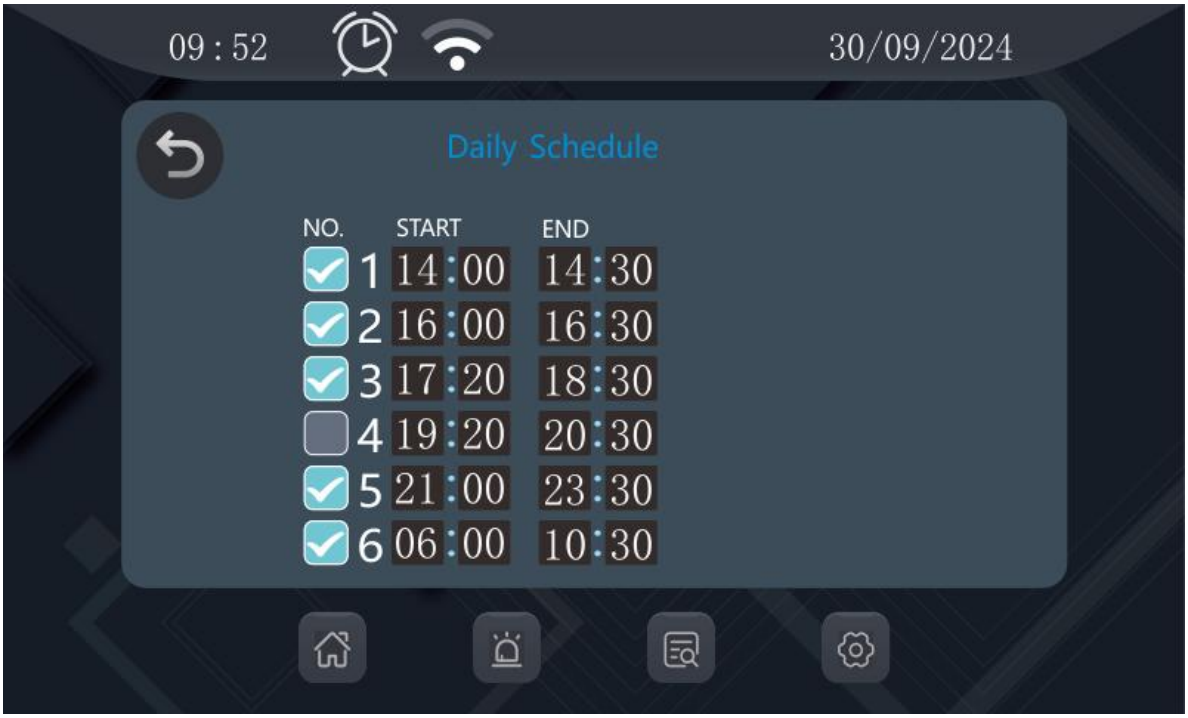
At the main interface,Click Set temperature, you can enter the target temperature you need to set, in different modes, the controller will display different set temperature range, as shown below

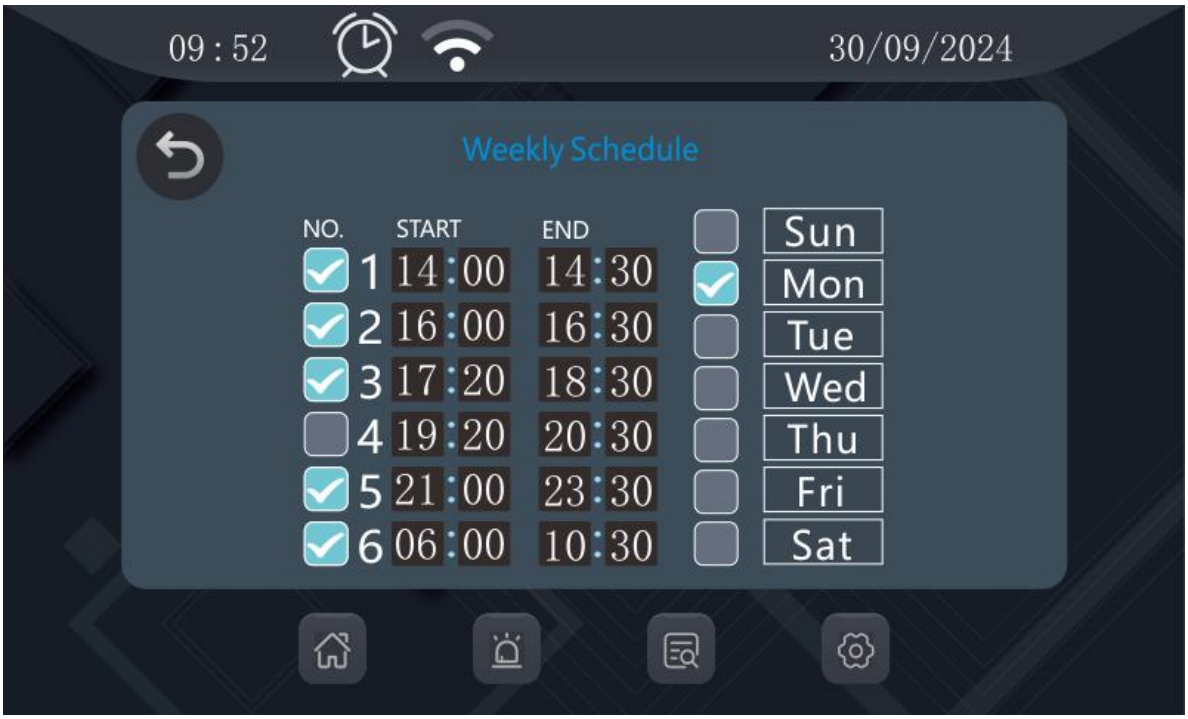
7.6 Time setting

At the main interface,short press enter the setting screen. short press **Time and date** to enter the time setting.As shown below.

7.7 Timing setting

At the main interface,short press enter the setting screen. short press **Timer** to enter the timing setting.As shown below.


09 : 52
30/09/2024
Daily Schedule
NO. START END
1 14 : 00 14 : 30
2 16 : 00 16 : 30
3 17 : 20 18 : 30
4 19 : 20 20 : 30
5 21 : 00 23 : 30
6 06 : 00 10 : 30


09 : 52
30/09/2024
Weekly Schedule
NO. START END
1 14 : 00 14 : 30
2 16 : 00 16 : 30
3 17 : 20 18 : 30
4 19 : 20 20 : 30
5 21 : 00 23 : 30
6 06 : 00 10 : 30
Sun
Mon
Tue
Wed
Thu
Fri
Sat

7.8 Language setting

At the main interface,short press enter the setting screen. short press **Display setting to** enter the language setting.You can find the language Settings and other Settings for the display.

7.9 User parameter setting

At the main interface,short press enter the setting screen. short press User parameters to enter the User parameters setting ,you can modify the user parameters according to your needs.

7.10 User parameter

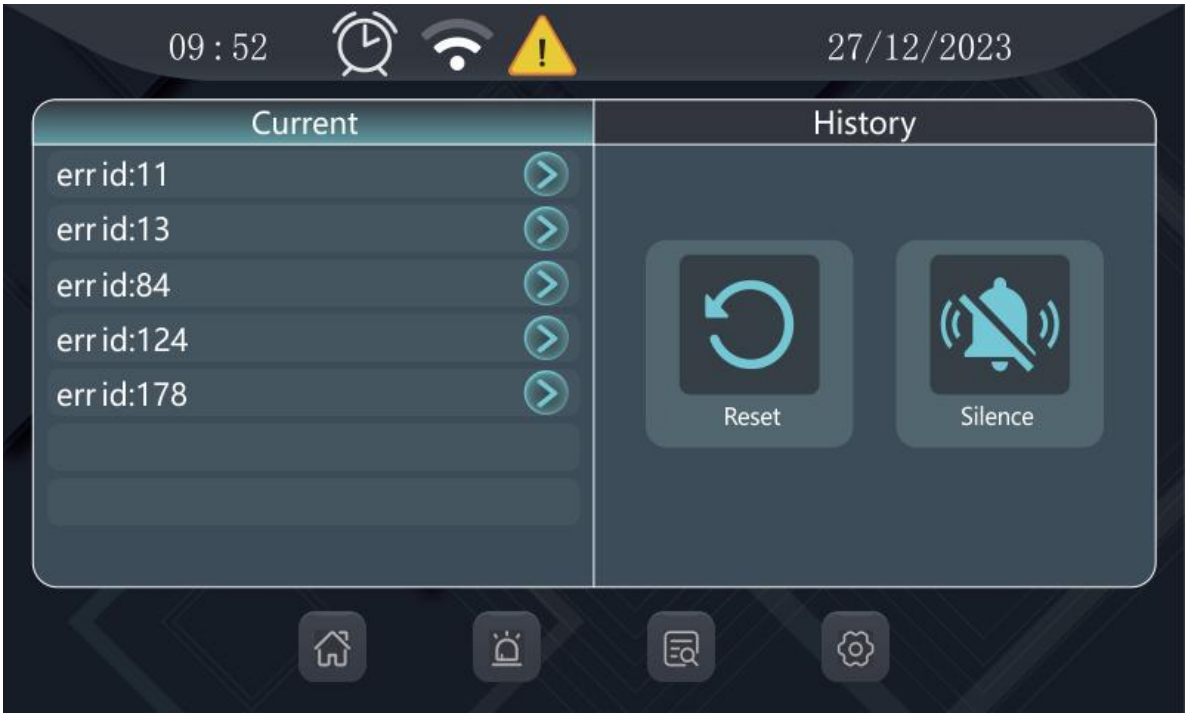
No.	Parameter name	Meaning	Unit	Range	Default	Reservation
1	Ctrl mode	Control mode	-	Heat mode Cool mode Auto mode	/	/
2	Cool point	Cooling setting temp.	°F	Min. to Max	12	Min:【Cool in min】or【Cool out min】 Max: 【Cool max】 Water heater unit is not available
3	Heat point	Heating setting temp.	°F	Min. to Max	50	Min: 【Heat min】 Max:【Heat in max】or【Heat out max】 Water heater unit is not available
4	Hot point	Water heater setting temp.	°F	30-60	50	Heating&Cooling unit is not available
5	Hot diff	Water heater temp. differential	°F	1-30	5	Heating&Cooling unit is not available
6	cool freeze	Cooling antifreeze	-	Disabled /Enable	Enable	Water heater unit is not available
7	Power On Set	Memory function	-	Remember Auto ON None	Remember	
8	Auto point	Setting temp. in auto. mode	°F	10-60	25	
9	Toge Switch	Linkage function	-	Disabled /Enable	Disabled	
10	AlarmSoundSet	Fault alarm sound	-	sound off sound on once 10sec cycle 10sec	sound off	cycle 10sec: It rings 10 seconds every 30 minutes.
11	Air load di.	Load differential	°F	0-20	5	
12	Air unload d	Unload differential	°F	0-10	2	
13	DispWaterLine	Water level state	-	Disabled /Enable	Enable	Available only for water heater unit, can be set displayed or not.

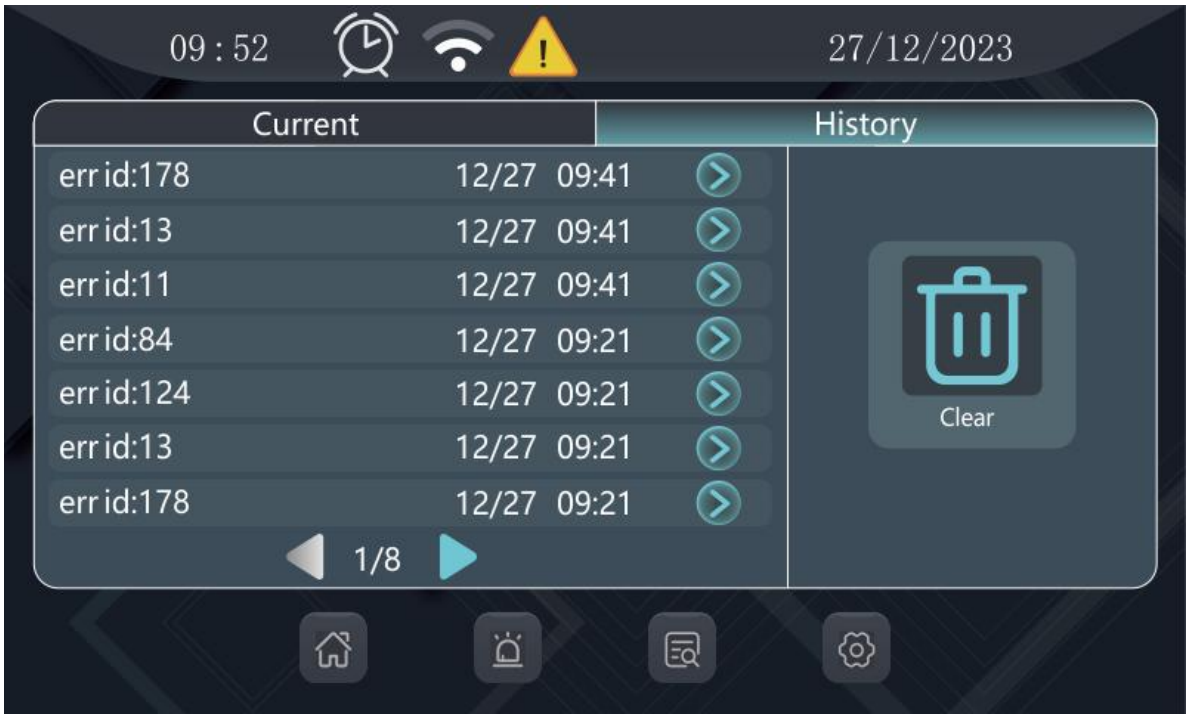
Cascade Units Setting

1	Unit number	1-16	1
2	00#Unit	Disabled/Enable	Enable
3	01#Unit	Disabled/Enable	Enable
4	02#Unit	Disabled/Enable	Enable
5	03#Unit	Disabled/Enable	Enable
6	04#Unit	Disabled/Enable	Enable
7	05#Unit	Disabled/Enable	Enable
8	06#Unit	Disabled/Enable	Enable
9	07#Unit	Disabled/Enable	Enable
10	08#Unit	Disabled/Enable	Enable
11	09#Unit	Disabled/Enable	Enable
12	10#Unit	Disabled/Enable	Enable
13	11#Unit	Disabled/Enable	Enable
14	12#Unit	Disabled/Enable	Enable
15	13#Unit	Disabled/Enable	Enable
16	14#Unit	Disabled/Enable	Enable
17	15#Unit	Disabled/Enable	Enable

7.11 Fault inquiry

When faults occur, the main interface will note the fault  . Short press  to see the list of fault codes, you can also view the history of the fault, which will show the specific time of the fault.





7.12 Status Inquiry

At the main interface,short press enter status query,You can click on **AI** and **DO** to understand the state and temperature point information of the heat pump.as shown below

Description:

【1】The up and down keys displayed on the page can be clicked to turn the page to see

【2】If the light on the DO page is displayed, there is output. If the light is off, there is no output

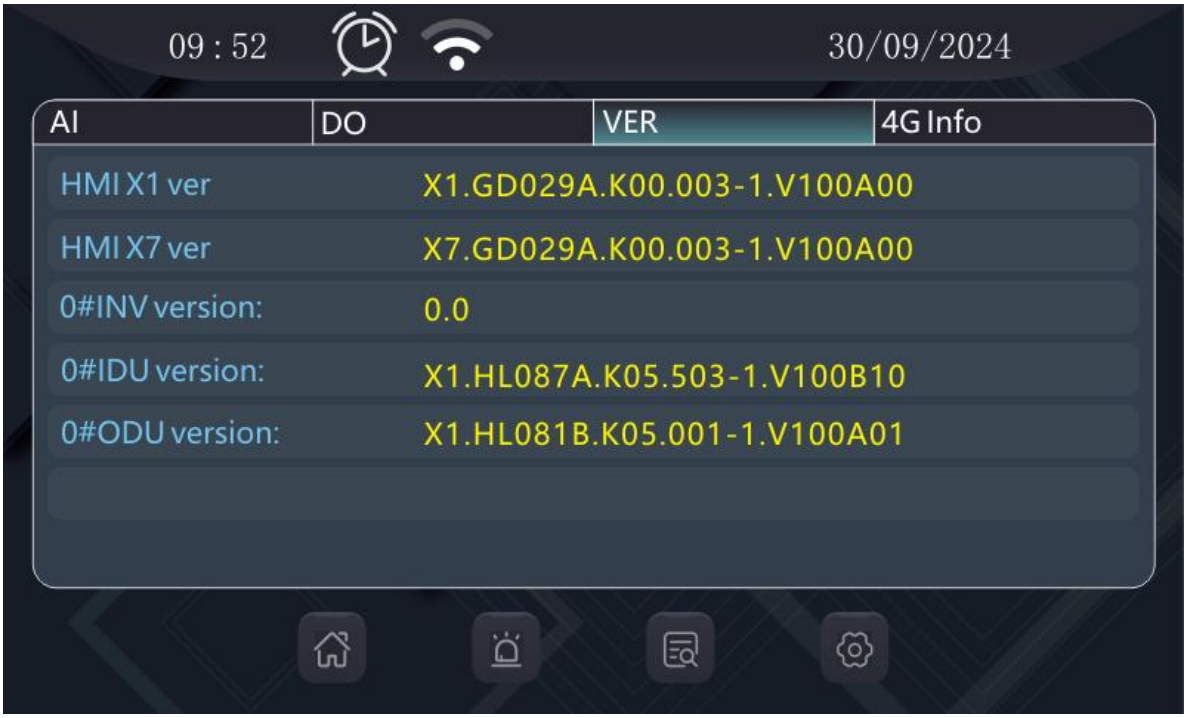
【3】Inquiry list

Module Parameter List		
Items	Meaning	Unit
Comp.	Compressor	
InE	EVI valve	
Bt Heat	Chassis heater	
fan	Fan	
four	4-way valve	
Crank	Crackshaft heater	
Low Out	Discharge water valve	
CompM.EEV OD% ST	Main EEV opening	ST
CompA.EEV OD% ST	Assistance EEV opening	ST
CompCurrent	Compressor current	A
CompSuction tmp	Suction temperature	°F
CompEvap. in	Temperature after EEV	°F
CompCoil tmp	Coil temperature	°F
CompExh. tmp	Exhaust temperature	°F
CompCur. superH	Current superheat	°F
CompObj. superH	Object superheat	°F
Out temp	Water outlet temperature	°F
In temp	Water inlet temperature	°F
environ tmp	Environment temperature	°F

System Parameter List		
Items	Means	Unit
CycPump	Circulating water pump	
Heater	Assistance electric heater	
Ambient temp.	Ambient temperature	°F
Sys. evap. out	Water outlet temperature	°F
Sys. evap. in	Water inlet temperature	°F

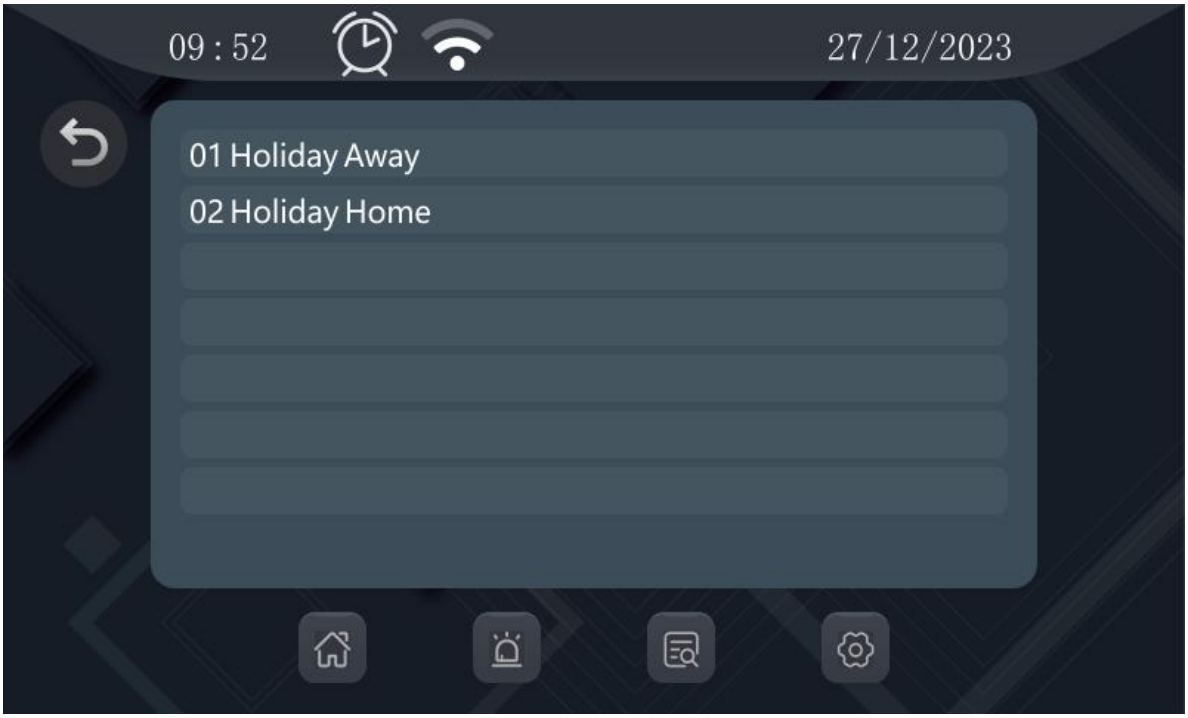
7.13 Version inquiry

After entering the Status inquiry interface, press **VER** to select Version inquiry.as shown below



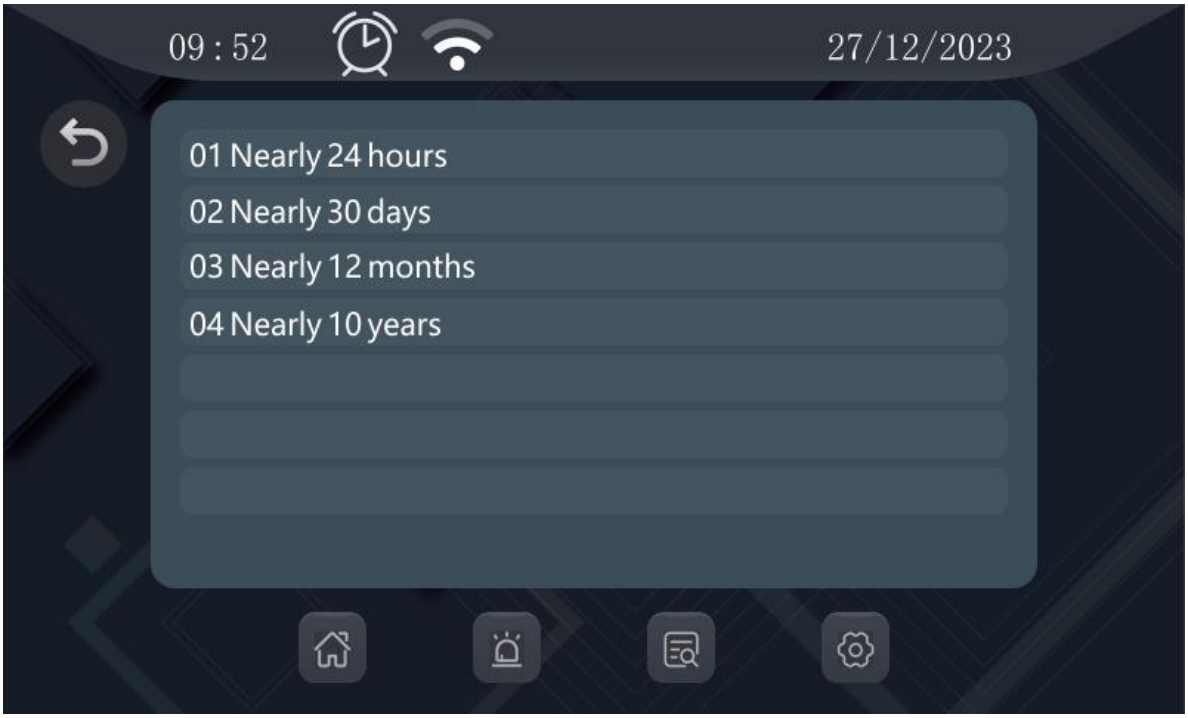
7.14 Holiday mode setting

At the main interface,short press enter the setting screen. short press **Hoil.Mode Set**, then you can choose your vacation mode to use or not to use, and then choose the features and times you need.



7.15 Electricity statistics

At the main interface,short press enter the setting screen. short press **ECM**, then you can see the recent electricity statistics for different time periods.as shown below.


09 : 52
27/12/2023
01 Nearly 24 hours
02 Nearly 30 days
03 Nearly 12 months
04 Nearly 10 years


09 : 52
27/12/2023
Nearly 24 hours
0.1kWh
27/12/2023 09
CQ
HQ
WQ
0
0
0
CP
HP
WP
0
0
0
EER(%)
COP(%)
W-COP(%)
0
0
0
1/24

8 Module control and linkage wiring

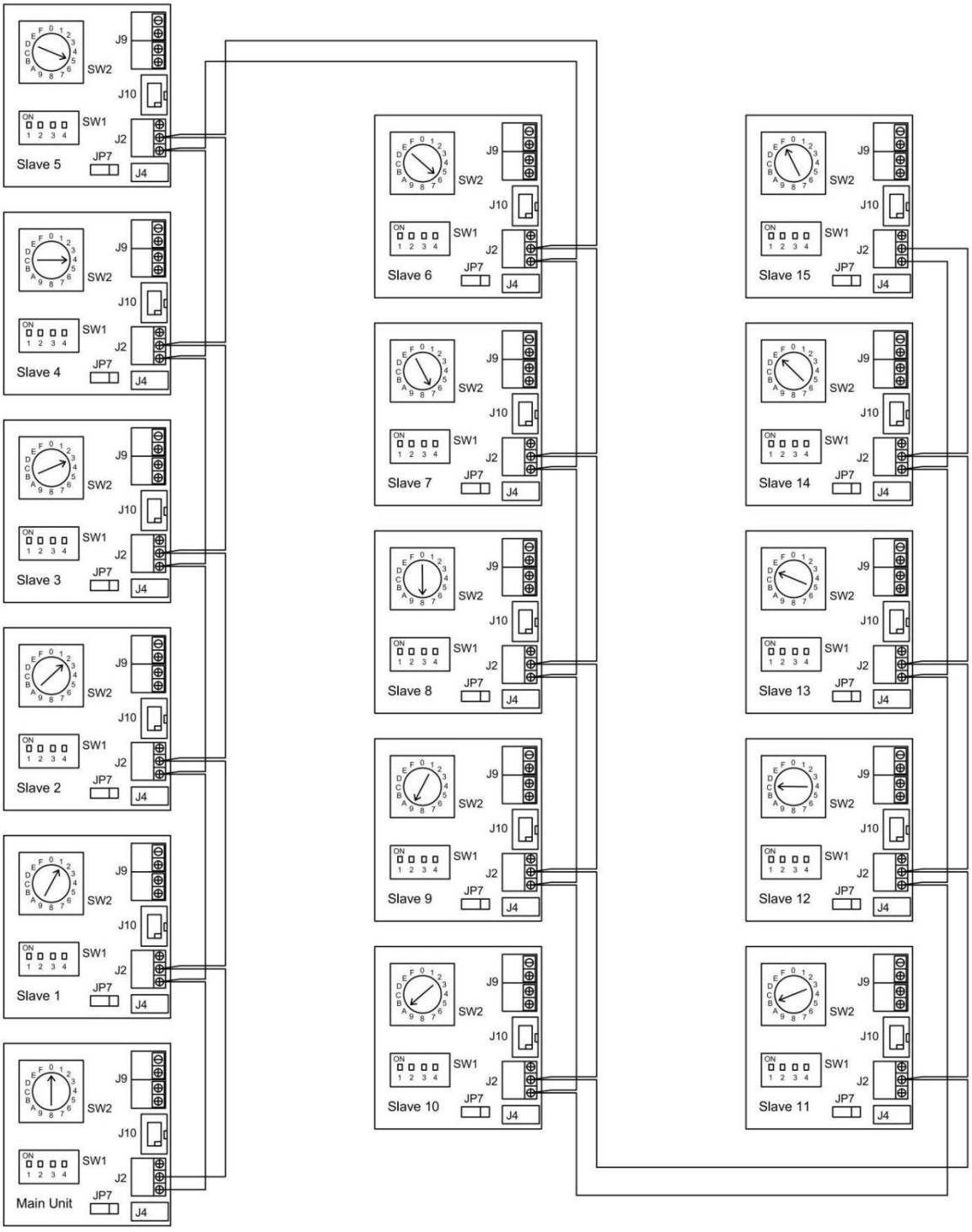
Parameter setting required for module control

A		Setting Range	Default	Unit	Type	Reservations
Module parameter settings						
1	Module quantities	1…16	1		2/N	The number of modules the unit can control (Total number of units, including host and slave),the corresponding address (SR1) is set to 0... F, 0# main module.

Wiring diagram of module control and dial code table of each module control dial code

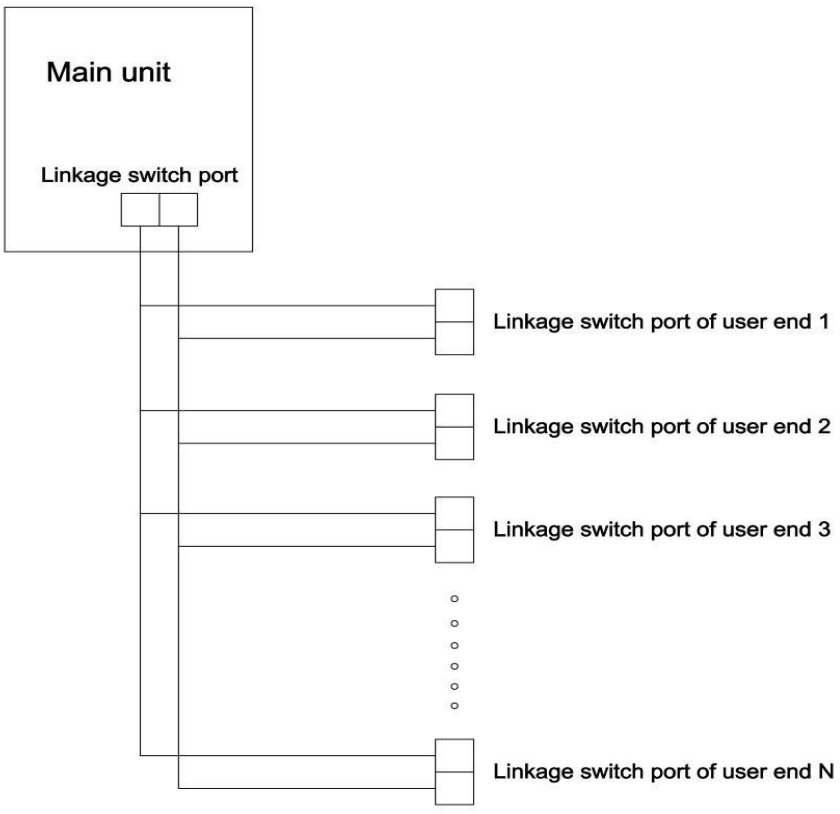
Module code	Main unit	Slave 1	Slave 2	Slave 3	Slave 4	Slave 5	Slave 6	Slave 7	Slave 8	Slave 9	Slave 10	Slave 11	Slave 12	Slave 13	Slave 14	Slave 15
Dial switch SW2	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

Schematic diagram of control wiring and code dialing of each module:



Linkage control wiring diagram and parameter setting requirements

- Linkage control is not used by default when the unit leaves the factory. If the user needs to use linkage control, turn【Toge Switch】into【Enab】.
- After the linkage control takes effect, when the linkage terminal of the unit is closed and the switch key command is "open," the unit can run. When the unit linkage terminal is disconnected, the unit will stop.
- When controlling the main module, the linkage switch only needs to be connected to the main module, not to the slave module.
- Terminal linkage switch signal can only be a passive signal, namely on and off signal. It cannot access active signal, such as voltage signal, otherwise it will damage the electric control board. The company shall not be responsible any main board damage due to improper operation of the terminal linkage switch.The connection mode is as shown below:



Linkage switch port of user end must be passive signal (communication signal). It is forbidden to connect to active signal (like voltage signal)，otherwise the PCB will be damaged.

9 Wi-Fi Settings

9.1 Software Installation

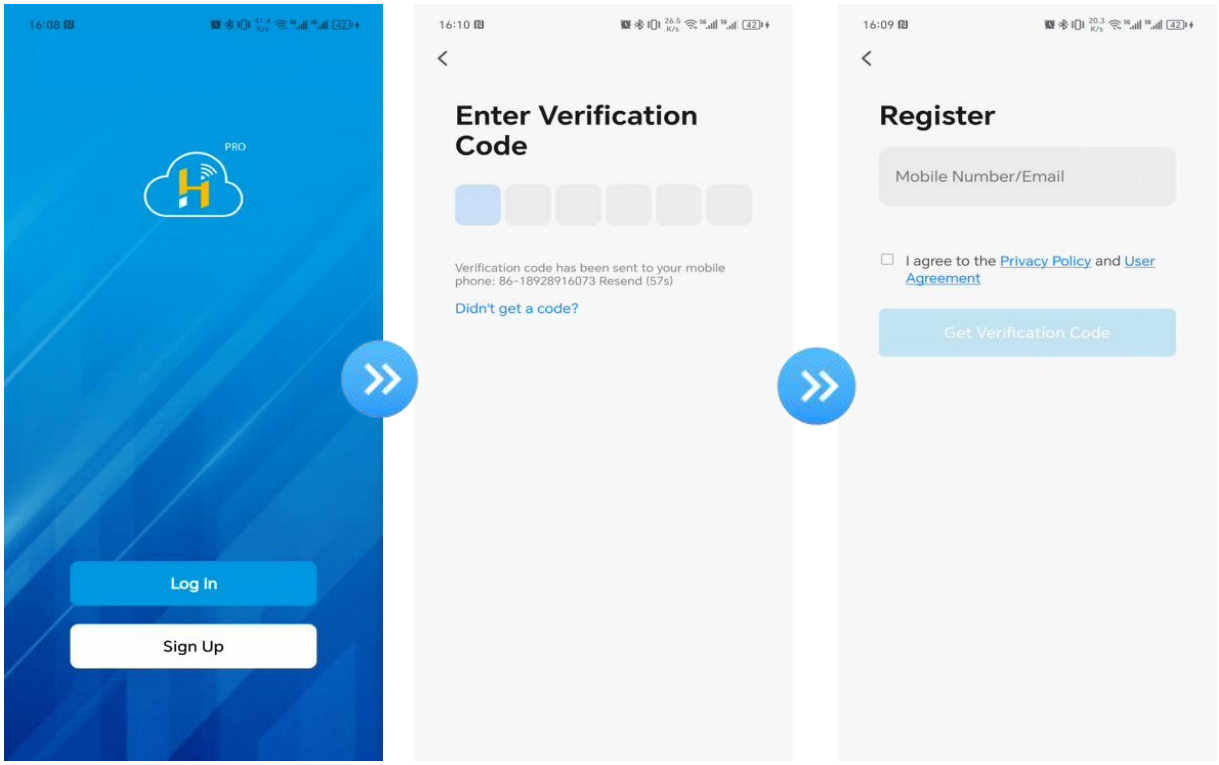
Scan the QR code below to install software

For IOS/Android Users

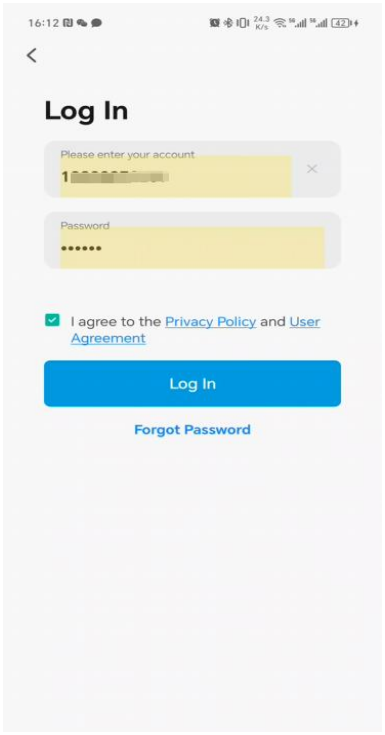
After installation,click “ ” on your desktop to start up HuilianSmart

9.2 Registration and login

Users don't have account can click "Sign Up" to create an account: Register Enter your phone number Get Verification Code Enter Verification Code Set Code;



After the registration is complete, fill in the login according to the registered mobile phone number and password



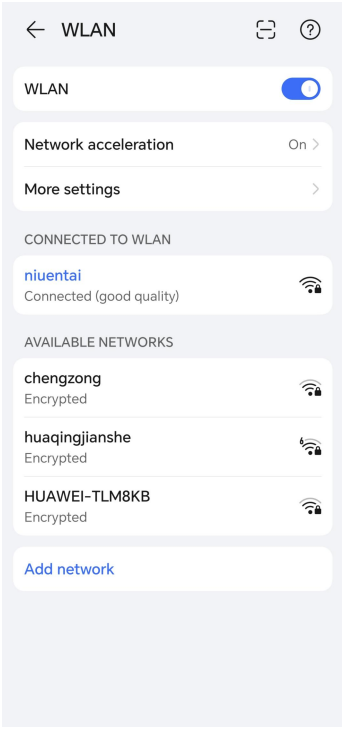
9.3 Heat pump equipment connection

Step 1:

When power is on press "  ",Enter the Wi-Fi Settings

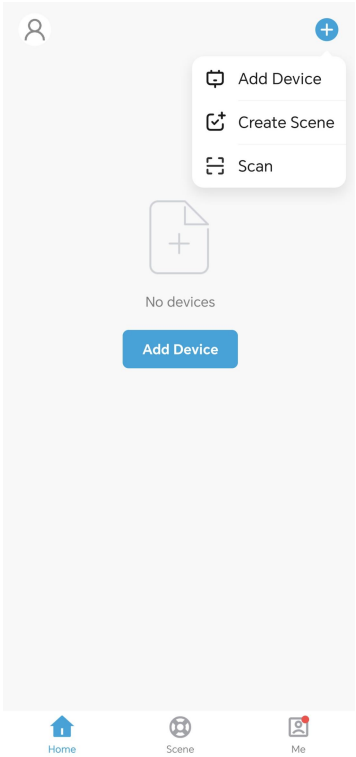
Step 2:

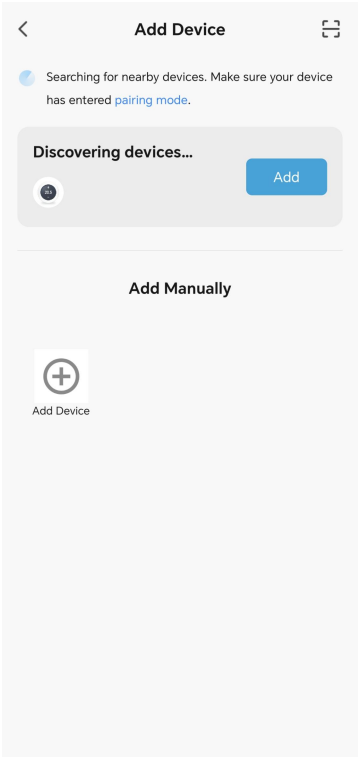
Turn on the phone's Wi-Fi function and connect to the Wi-Fi hot-spot. The Wi-Fi hot-spot must be able to connect to the Internet normally;

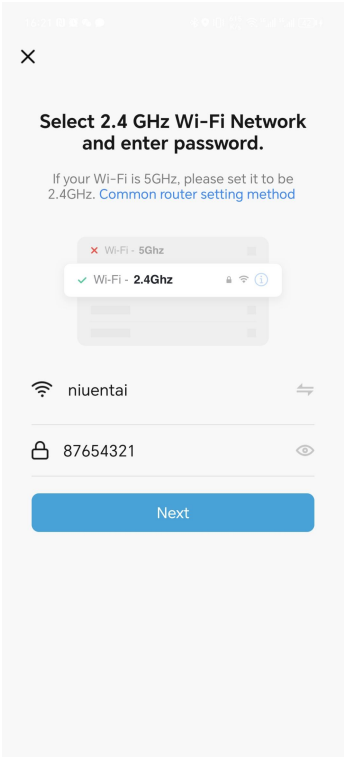


Step 3:

Open the "HuilianSmart" APP, log in into the main interface, click on the top right corner "+" or "add equipment" of the interface, Enter the Wi-Fi connection interface, enter the Wi-Fi password of the mobile phone (it must be the same as the Wi-Fi of the mobile phone), click "Next", and then directly enter the connected status of the device.

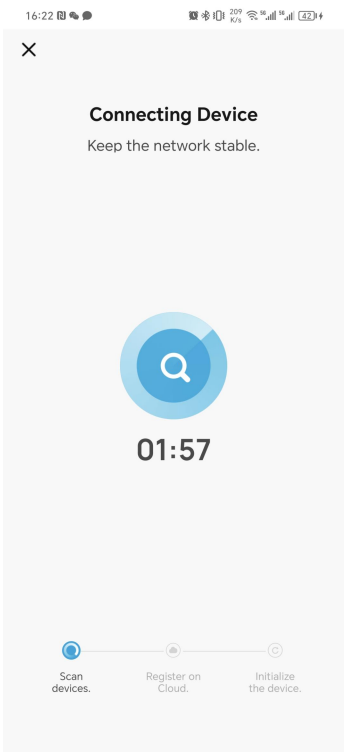


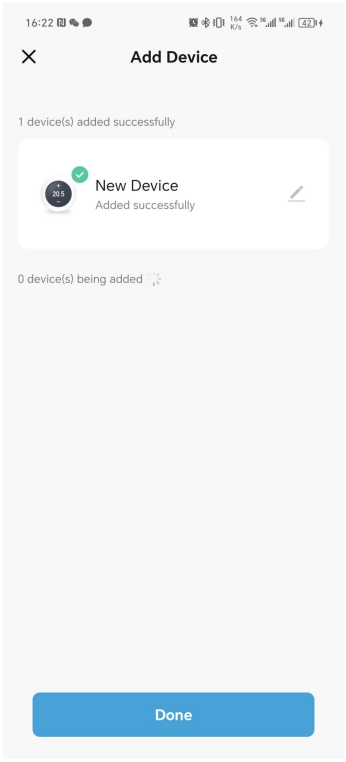




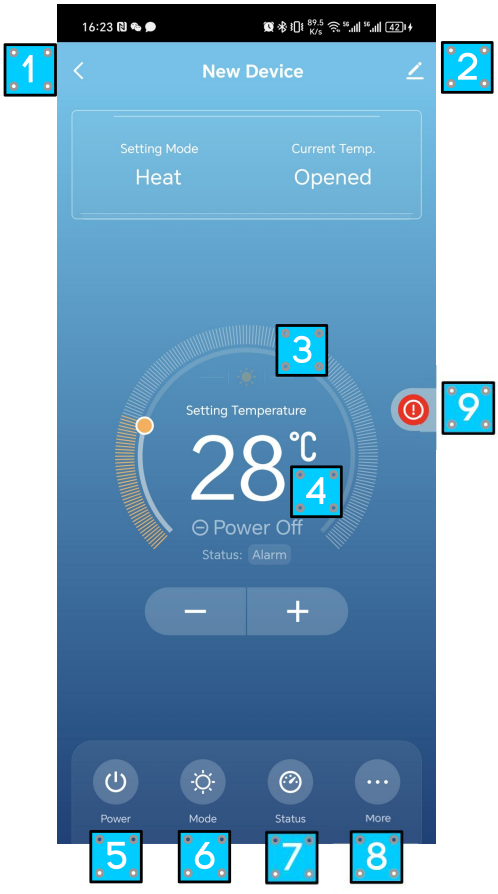
Step4 :

When “Scan devices”, “Register on Cloud”, “Initialize the device” are all completed, connect succeeds.





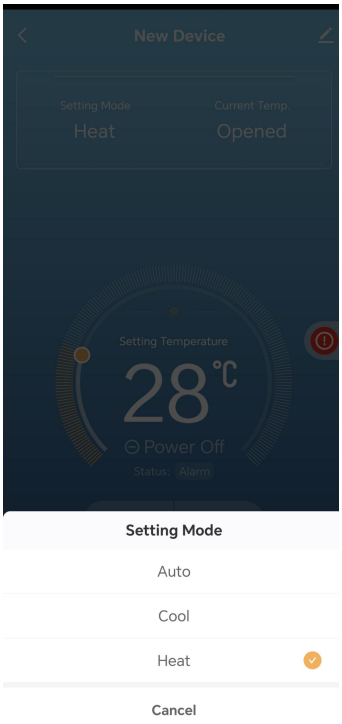
9.4 Software Functin Operation



① Back
② More: You can change device name, select device installation location, check networking status, add Shared users, create device cluster, view device information, and more.
③ Setting temp. adjustment: The circle slides counterclockwise to reduce the temp., but clockwise to increase the temp..
④ Target temp.
⑤ ON/OFF.
⑥ Mode switching: Click to select the mode to be switched.
⑦ Status query , click Query the running status parameters of the heat pump.
⑧ Advanced Settings,you can set the advanced parameters of the heat pump, APP language, timing, Settings of the heat pump, version query.
⑨ Fault warning, click to view the current heat pump fault alarm

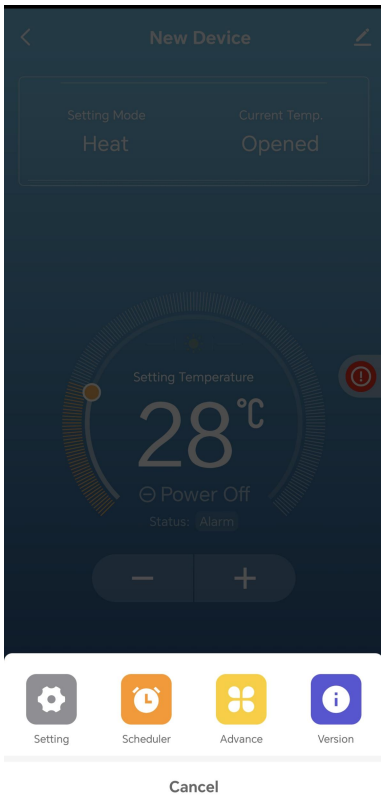
- **Mode settings**

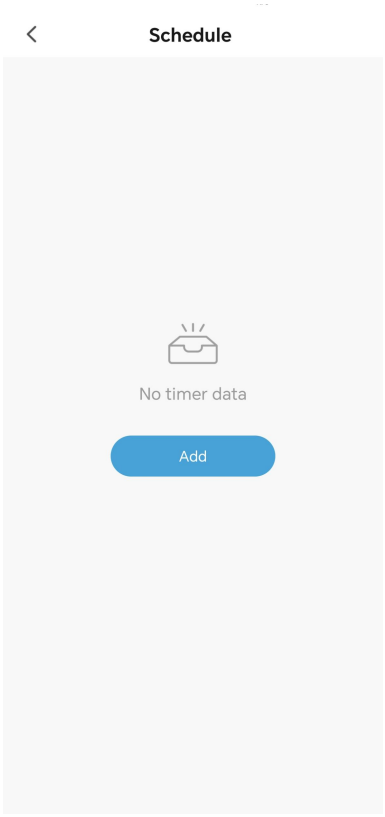
Click “MODE” on the main interface to switch modes,select what you need.



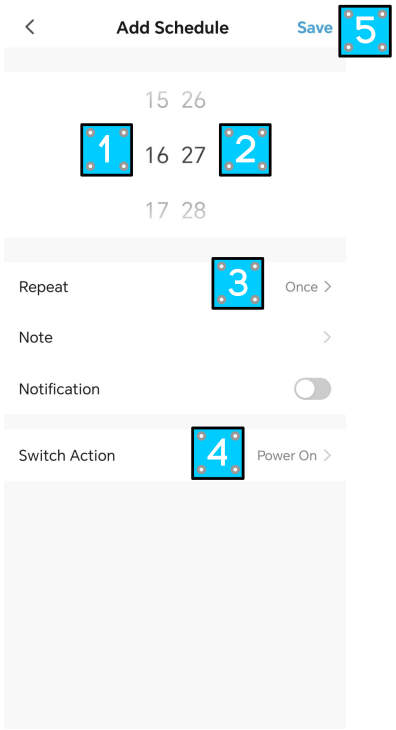
● **Timer setting**

Click “MOER” on the main interface to enter timer setting interface, as shown below, click to add timer.





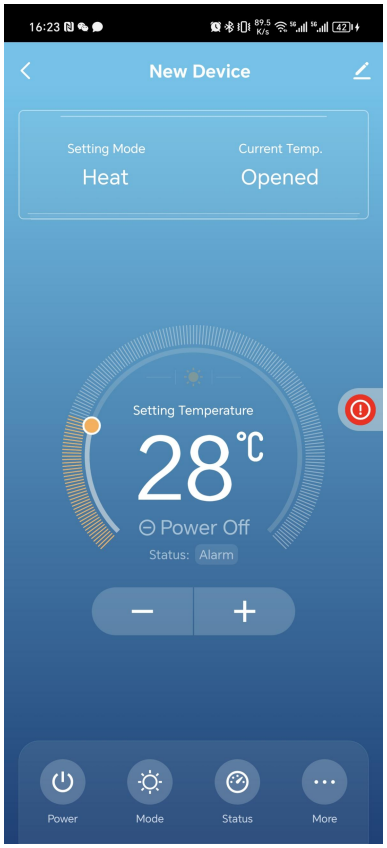
1. After entering timer setting, swipe up/down to set timer,set up repeat weeks and on/off,then click “save” to save your settings as follows.

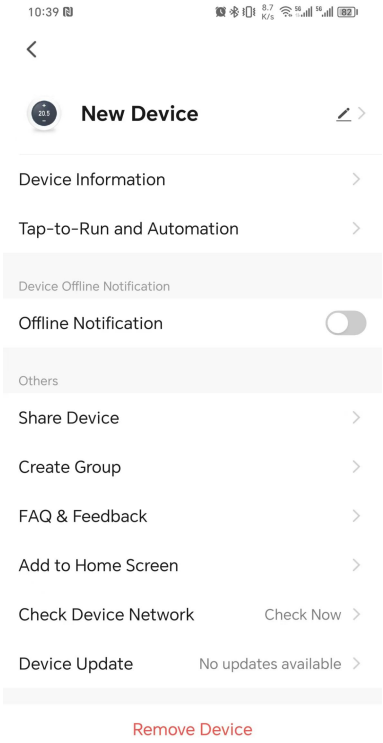


① Hours
② Minutes
③ Set the repetition
④ Set power ON/OFF
⑤ Save your modification

9.5 Device Removal

Click “  ” on the top right corner of the main interface to enter the device details interface, and click “device removal”





10 Trial Running And Maintenance

10.1 Trial Running

Note before trial running

- The water heat pump be bypassed while the pipes are being cleaned. Only after the pipes have been verified clean should the bypass line be closed, and the isolation valves to the water heaters opened. The static water pressure should be a minimum of 15-psig and the water flow should be balanced to match the rated flow of the unit.
- Power the unit 8-hours before the unit's initial start-up to preheat the compressor. Starting the unit too soon after initial power may cause damage to the compressor.
- Complete the software set-up prior to operating the system.
- Engage a factory trained technician to provide start-up services.
- Confirm items below before trial running, then fill the blanks with check mark "√".

Correct unit installation	□	Check voltage is within specifications	□
Correct piping & wiring	□	Air inlet and outlet free of obstructions	□
Drain valve functioning properly	□	Pressure relief valve functioning normally	□
Pipe insulation complete	□	Level foundation	□

Trial running

- Only after all wiring and piping work has been completed and checked can the power be connected, and the water filled.
- Vent the air in the system prior to start-up.
- Check the controller to ensure it is operational and error free. If there is a fault code, trouble shoot the cause of the fault, confirm that the unit can operate normally, and restart the unit.
- Operate the unit for at least 30-minutes to ensure proper operation.
- Avoid frequent cycling. 10 minutes is the proper time to restart the unit after it stops.
- Check for abnormal sound or vibration during operation; diagnosis any items that are out of spec.
- Keep power applied to the unit during normal operation.

If it is necessary to cut off the power supply because the unit has stopped running for a long time, remember to electrify the unit 8 hours before starting up again and preheat the compressor.

10.2 Fault Analysis And Elimination

- Reset mode: A = Automatic reset; M = Manual reset; A/M = limited automatic reset; Refer to the "Fault Reset Instructions."
- If there is no special explanation for the following switch quantity faults, they will alarm only after [general fault delay] shaking elimination.
- The following sensor faults will alarm after 4 seconds of quenching without special instructions.

Fault reset instructions

- Power on and reset
- After fault clearance, can only be reset after power-on again.
- Like EEPROM data fault.

- Limited automatic reset (A/M)
- After the fault clearance, 【Automatic reset time】 delays, during this time no longer appear the same fault, automatic reset.
- Within 【automatic reset allows】 set time, it can automatically reset for 2 times, alarm cumulative number > 2 times, need to manually reset.
- After manual reset, the alarm times can be accumulated again.
- Limited faults: check the fault table.
- Automatic reset (A)
- Alarm after the fault clearance, 【automatic reset timedelay】, this time no longer appear the same fault, automatic reset.
- Automatic reset without number;
- Fault self-recovery: check the fault table.
- Manual reset (M)
- Alarm after the fault clearance, only by manual reset controller;
- Type failure can also be manually reset.

10.3 Trouble shooting

Faults	Possible cause	Trouble shooting
Excessive exhaust pressure (Cooling)	There is air in the system or other non-condensable gas condenser fin dirty or debris blocked.	Remove the gas from the nozzle and vacuum the condenser fins again if necessary.
	Insufficient condensing air volume or failure of condensing fan suction pressure is too high.	Repair the condensing fan and resume operation. See "Excessive suction pressure."
	Overcharge of refrigerant.	Discharge excess refrigerant.
	Ambient temperature is too high.	Check ambient temperature.
Low exhaust pressure (Cooling)	Refrigerant leakage or filling is not enough.	Check for leakage or fill with sufficient refrigerant.
	Low suction pressure.	See "Low suction pressure."
Low suction pressure (Cooling)	Insufficient water flow.	Check the temperature difference between inlet and outlet water, adjust the water flow and check the installation.
	Water inlet temperature is low.	Check for leakage or fill with sufficient refrigerant.
	There is scale in evaporator due to refrigerant leakage or insufficient refrigerant filling.	Remove scale.
Excessive exhaust pressure (Heating)	Insufficient water flow.	Check the temperature difference between inlet and outlet water and adjust the water flow.
	There is air in the system or other non-condensable gas condenser fin dirty or debris blocked.	Remove the gas from the nozzle and vacuum the scale again if necessary.
	Water outlet temperature is too high.	Check the water temperature.
	Excessive suction pressure.	See "Excessive suction pressure."

Faults	Possible Cause	Trouble Shooting
Low exhaust pressure (Heating)	Water temperature is too low.	Check water temperature.
	Refrigerant leakage or insufficient refrigerant filling.	Check for leakage or fill with sufficient refrigerant.
	Low suction pressure.	See "Low suction pressure."
Excessive suction pressure (Heating)	Air side heat exchanger inlet temperature is high.	Check ambient temperature.
	Overcharge of refrigerant.	Discharge excess refrigerant.
Low suction pressure (Heating)	Refrigerant leakage or filling is not enough.	Check for leakage or fill with sufficient refrigerant.
	Insufficient air volume.	Check fan steering.
	Air short circuit.	Eliminate the cause of air short circuit.
	Insufficient defrost operation.	Failure of four-way valve or sensor, replace if necessary.
Compressor stopped due to anti-freezing protection (Cooling)	Insufficient water flow.	If water pump or water flow switch is failure, check if necessary, repair or replace.
	There is gas in the water loop.	Discharge gas.
	There is something wrong with the sensor.	If fault is confirmed, replace it.
The compressor stopped because of high pressure protection	Excessive exhaust pressure.	See "Excessive exhaust pressure."
	High pressure switch fault.	Check for faults, repair or replace.
The compressor stopped because the motor was overloaded	Excessive exhaust pressure or suction pressure.	See "Excessive exhaust pressure" and "Excessive suction pressure."
	High or low voltage, single phase or phase imbalance.	Check that the voltage is not more than or less than 20V of rated voltage.
	Short circuit of motor or terminal.	Check corresponding resistance of each terminal of the motor.
	Overload element fault.	Replace it.
Compressor stops due to built-in temperature sensor or exhaust temperature protection	Voltage is too high or too low.	Check that the voltage is not more than or less than 20V of rated voltage.
	Excessive exhaust pressure or low suction pressure.	See "Excessive exhaust pressure" and "Low suction pressure."
	Component fault.	Check the built-in temperature sensor when the motor is cooled.
The compressor stopped because of low pressure protection	The front (or back) filter of the EEV is blocked.	Replace filter.
	Low pressure switch fault.	If defective, replace it.
	Low suction pressure.	See "Low suction pressure."
Abnormal compressor noise	The liquid refrigerant flows into the compressor from the evaporator and produces liquid shock.	Adjust refrigerant charge.
	Compressor aging.	R eplace the compressor.

Faults	Possible Cause	Trouble Shooting
There is noise	The fastening screw on the panel is loose.	Tighten all parts.
Compressor does not start	The overcurrent relay will jump and the safety will burn out.	Replace the damaged components.
	The control circuit is not on.	Check the wiring of control system.
	High pressure protection or low pressure protection.	See front suction and exhaust pressure fault section.
	The contactor coil is burnt out.	Replace the damaged components.
	Power phase sequence connection error.	Reconnect and adjust any two connections in the three phases.
	Water system failure, water flow switch is out of line.	Check the water system.
	There is a fault signal on the wire controller.	Find out the fault type and take corresponding measures.
Excessive frost on the air heat exchanger	Failure of four-way valve or sensors.	Check operation and replace if necessary.
	Air short circuit.	Eliminate the cause of air short circuit.

10.4 Maintenance

Main parts maintenance

a. Pay attention to the suction and exhaust pressure of system during operating. Determine the reason for the abnormality.
b. Check whether the electrical wiring is loose, or if the contacts are oxidized, or if the wire insulation is damaged; replace and repair as necessary. Always pay attention to the working voltage, current and phase balance.
c. Inspect systems and replace failed components in a timely manner.

Descaling

All domestic hot water systems will experience scale build up over time. Scale build up can affect the heat transfer performance and lead to increased power consumption, excess exhaust pressure (or low suction pressure), and premature equipment failure. To avoid these concerns, these units are equipped with 1” NPT ports on the supply and return headers to allow quick and easy connection for preventative maintenance. To remove surface deposition of calcium oxide or other minerals from the heat exchangers it is recommended to use descaled agents using formic acid, citric acid, acetic acid and other organic acid cleaning.

NOTE:

Any cleaning solvent should comply with FDA G.R.A.S standards. Never use cleaning agents containing fluoride chlorate because the galvanized pipe on the water side is easily corrode, leading to leakage of refrigerant.

When descaling pay attention to the following aspects:

The waterside heat exchanger must be cleaned by professionals.

After using cleaning agents, properly flush the system with clean water.

Properly dispose of waste fluids and particles.

Cleaning agents and neutralizing agents can have corrosive effects on the eyes, skin, mucous

membranes of the nose, etc. Therefore, protective devices (such as goggles, protective gloves, protective masks, protective shoes, etc.) must be used in the cleaning process to prevent inhalation or contact with agents.

Preparations for unit restart after prolonged outage:

- *Thoroughly inspect and clean the unit.*
- *Clean the plumbing system.*
- *Inspect water pump, regulator and other equipment of water piping system.*
- *Tighten all wire connections.*
- *Power on for 8 hours before starting.*

Parts replacement

Replacing parts should use the parts provided by the manufacturer, do not replace with 3rd party parts.

Refrigerating system

The system is factory charged with refrigerant. If the refrigerant charge is found to be low, evacuate the charge and check for leaks.

(1) If repair welding is needed, the system must be drained of gas before welding.
Connect the vacuum tube to the low-pressure side refrigerant injection nozzle.
Vacuum the system line with vacuum pump, vacuum for more than 3 hours, confirm that the multi-meter indicating pressure in the specified range.

(2) Replenish the refrigerant.

1) After reaching the desired vacuum limit and holding it for 3-hours or more, the system can be charged with refrigerant. The appropriate refrigerant filling amount has been indicated on the nameplate and in the main technical parameters table.
2) The charging amount of refrigerant will be affected by the ambient temperature. If the required charging amount is not reached and cannot be recharged, the water can be circulated and the unit can be started for charging. If necessary, the low-voltage control switch can be temporarily short-circuited.
3) Slowly fill the system with refrigerant and check the suction and exhaust pressure.

Warning:

Do not inject oxygen, acetylene or other flammable or toxic gases into the refrigeration system during leak detection and air tightness test. Only high-pressure nitrogen or refrigerant can be used.

Disassemble compressor

If the compressor needs to be removed, please follow the following steps：

- *Turn off the unit power supply.*
- *Remove the compressor power connector.*
- *Remove compressor suction and exhaust pipe.*
- *Disconnect the compressor retaining bolt.*
- *Move the compressor.*

Auxiliary electric heater

Air-source heat pump capacity will derate when the ambient temperature drops. Be sure to reference the performance data when selecting equipment. For areas that experience temperatures below 5°F for extended times, the outlet temperature may drop below 140°F. Secondary electric heaters can be used to either boost temperature or supplement the load to counteract the derate in performance caused by low ambient conditions.

System antifreeze

Water should not be allowed to freeze in the heat exchanger because the expanding ice can seriously damage to the heat exchanger. Leaks caused by frozen water can result system failure. Warranty does not cover damage due to improper freeze protection. Special attention should be paid to the frost prevention.

The freeze protection flow controller and anti-freeze temperature sensor are critical safety devices and must remain wired in accordance to the wiring diagrams.

Care must be taken during maintenance to avoid freezing the HXR's when filling or discharging refrigerant in the syst