

COMMERCIAL HEATING&COOLING HEAT PUMP USER MANUAL

Please read this manual carefully before using and keep it in a safe place.

Content

I. Foreword	1
II. Product specification	4
1. Dimensions	4
2. Technical parameter	5
III. Installation	6
1. Product handling	6
2. Installation site selection	6
3. Installation foundation	7
4. Hydronic piping layout	8
4.1. Pipe size	8
4.2. Water tank selection	8
4.3. Installation requirements	8
4.4. Water quality requirements	9
5. Water system piping for atmospheric (open) tank	10
6. Winter freeze protection	12
IV. Electrical wiring diagram	12
1. Notice	12
2. Wiring diagram	14
V. Control function	15
1. Controller panel	15
2. Interface overview	15
3. Interface introduction	17
3.1. Overview	17
3.2. Countdown interface	17
3.3. Main interface	18
3.4. Fault inquiry	18





3.5. Timing set.....	19
3.6. Status inquiry.....	20
3.7. Version inquiry.....	21
3.8. Historical fault inquiry.....	21
4. Password operation.....	22
4.1. Password input.....	22
4.2. Password change.....	23
5. Parameter setting.....	23
5.1. Parameter level.....	23
5.2. Parameter setting.....	24
6. Atmospheric Tank Control.....	27
7. Control instructions of the lower return pump.....	27
8. Module control and linkage wiring.....	28
VI. Trial running and maintenance.....	31
1. Trial running.....	31
2. Trouble shooting.....	32
2.1. Control protection function list.....	32
2.2. Fault analysis and elimination of electric control panel display.....	32
2.3. Trouble shooting.....	33
VII. Maintenance.....	35

1. Foreword


Please read this instruction carefully before installation and use. This instruction includes required messages for installation, adjustments, and maintenance.

NEW ENERGY heat pump products are produced to strict design standards to ensure safe, efficient, and reliable operation.

NEW ENERGY is not 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 **NEW ENERGY** 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.
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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 7°F (4°C) and 14°F (6°C) when operating at full load.
- The water quality should meet the requirement below:

pH value (25°C)	6.5 - 8.0	Chloride (Cl ⁻) (mg/L)	50
Electrical conductivity (25°C) (µs/cm)	~250	Silver sulfate (SO ₄ ²⁻) (mg/L)	50
TFe (mg/L)	~0.3	Total alkalinity	50
Total hardness (mg/L)	~50	Silicon dioxide (SiO ₂)	30



Compressor shipping brackets are mounted to the bottom of the compressors to prevent the vibration isolation mounts from damage during shipment. REMOVE the compressor shipping brackets prior to start-up.

Warning

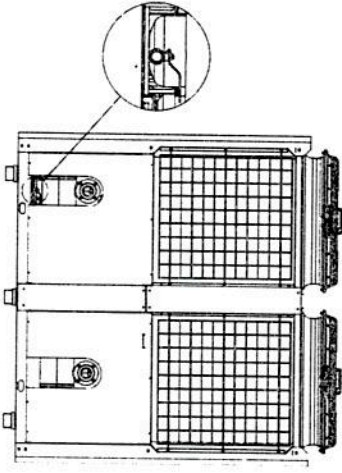
- Prior to start-up, the compressor should be powered on to preheat the system. Recommended preheat cycle is 8 hours prior to initial start-up. Completing the recommended preheat improves the temperature of the compressor lubricating oil. Failing to properly preheat the system can result in poor operation 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.
- If the operation of this system has the potential for power loss and has the potential to experience ambient temperatures below freezing (32°F (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 (32°F (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.


Operation guidelines for defrosting and drainage in winter

In winter, when the temperature is lower than 32°F (0°C), 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. Open the drain cap at the bottom of inlet water pipe to drain water. Keep the drain port 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.

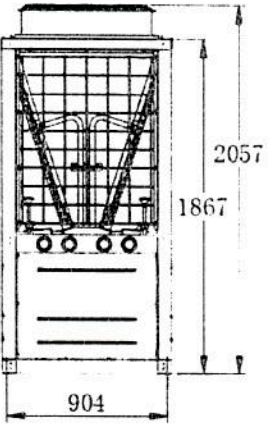
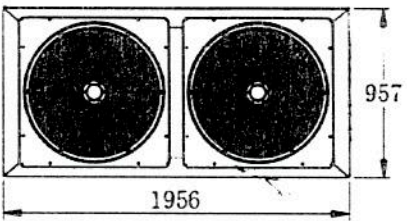
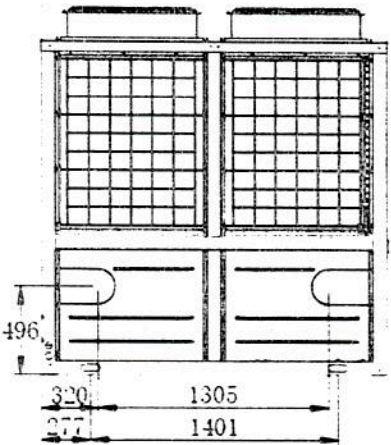
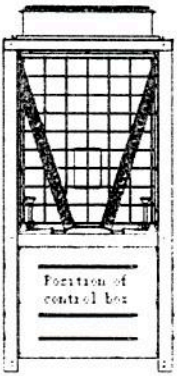


When flushing the piping system prior to start-up, ensure this heat pump is bypassed to prevent pipe debris from entering the heat exchangers. Only after the piping has been cleaned, should the heat pump be pressure tested.

II. Product specification

1. Dimensions

Unit:mm



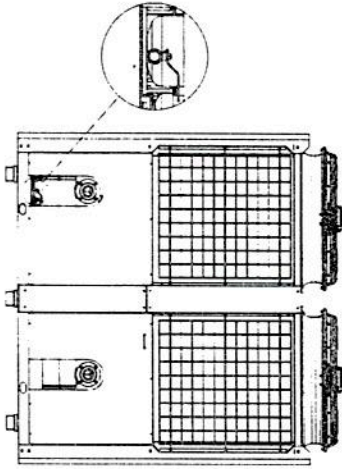
2. Technical parameter

Model:	TH-450HCR	TH-860HCR
Operation Range (°C)	-25~43	
Power Supply (V/Ph/Hz)	380-415V/3N~/50Hz	
Max Outlet Water Temp. (°C)	60	
DBWB: 7/6 °C, outlet water temperature 45°C		
Heating Capacity(kW)	45	86
Power Input(kW)	12.8	24.5
COP	3.52	3.51
DBWB:-12/-14 °C, outlet water temperature 41°C		
Heating Capacity(kW)	31	55
Power Input(kW)	11.92	22.36
COP	2.48	2.46
DBWB:35/24 °C, outlet water temperature 7°C		
Cooling Capacity (kW)	35	65
Power Input (kW)	12.2	23.8
EER	2.65	2.73
Max. Power Input (kW)	19	36
Max. Running Current (A)	34	65
Fan Quantity (/)	2	2
Fan Motor Input (W)	900	750
Water Flow Volume (m³/h)	6.1	11.2
Water Pressure Drop (kpa)	40	45
Suggested Water Temp Differential. (°C)	5	5
Water Connection (inch)	G1-1/2" (male)	2-1/2" (flange)
Noise dB(A)	568	569
Air Volume (m³/h)	15000	24000
Refrigerant Type/Quantity (kg)	R410A/7.6	R410A/14.0
Net weight (kg)	390	670
Net Dimensions(L/W/H) (mm)	1500×860×1430	1956×957×2057

III. Installation

1. Product handling

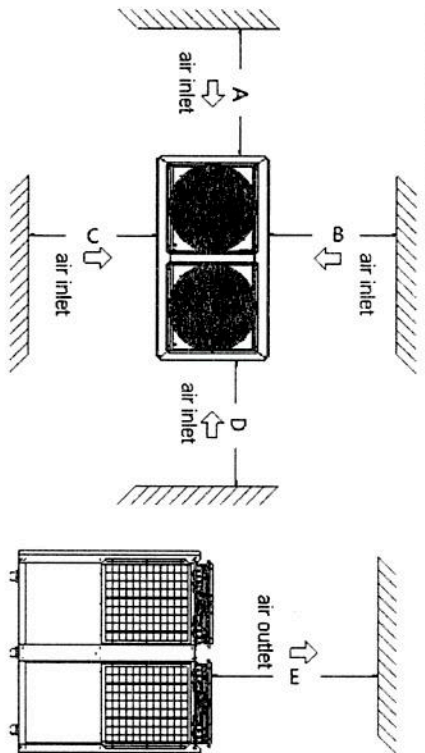
- Confirm the unit has sufficient space for safely rigging it into place.
- Remove the protective packaging just prior to installation.
- During handling, the inclination of the unit shall not be more than 15° to prevent the unit from overturning.
- When rolling transportation is used, the same size 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:



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 lightning strikes.

Recommended unit spacing:



Air flow clearances:

Installation space (mm)				
A	B	C	D	E
≥ 2000	≥ 2000	≥ 2000	≥ 2000	≥ 8000

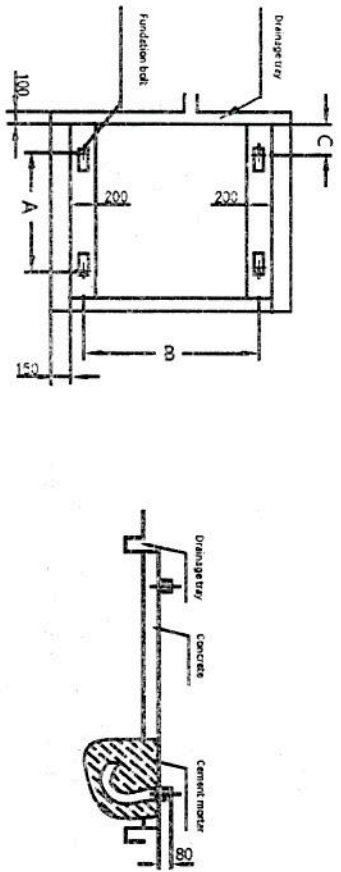
If the unit is installed indoors, a means of mitigating static pressure build-up must be implemented.



3. Installation foundation

- Supporting platforms must be able to bear the operating weight of the equipment and all associated piping, accessories, maintenance personnel, 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.

The installation base of concrete of the unit is as follows:



Unit: mm	A	B	C
	1600	937	2270

4. Hydronic piping layout

4.1. Pipe size

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

4.2. Water tank selection

Pressurized Tank Applications: A pressure relief valve should be installed on the water tank and selected to relieve pressure at no more than 10% less than the rated working pressure of the water heater and all other system components. If there is no pressure relief device installed on the water tank, the water system must be equipped with a pressure relief valve (PRV).

The PRV should be piped to a drain and open to atmosphere. To ensure proper operation of the PRV, it should be checked on a regular basis to ensure it is free of sediment or calcium carbonate deposits. The working pressure of the system should be set for a minimum of 30-psi.

Atmospheric Tank Applications: The unit is equipped with high, medium, and low water level, automatic water replenishment control function, which allows for integration with an open (atmospheric) tank. When the unit is applied to a pressurized tank, the output line of the high, medium, and low water level control will require a jumper to complete the circuit. This jumper should be factory installed.

4.3. Installation requirements

A means of isolating the unit from the main system flow is required for service. A bypass valve 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 7°F and 11°F (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.

	<p>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.</p>
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4.4. Water quality requirements

A. Frozen water quality control

When industrial water is used for chilled water, there is little scale, but when well water or river water is used, there will be more scale and sediment such as sand and soil, which will settle in the condenser and block the flow of water, resulting in the failure of the unit; if the water hardness is too high, it is easy to scale and corrode the equipment, so the water quality, such as pH value, conductivity, shall be analyzed before use. Chloride ion concentration, sulfur ion concentration, etc. Water must be filtered and softened with softened water equipment before entering the water.

B. Quality control of domestic hot water

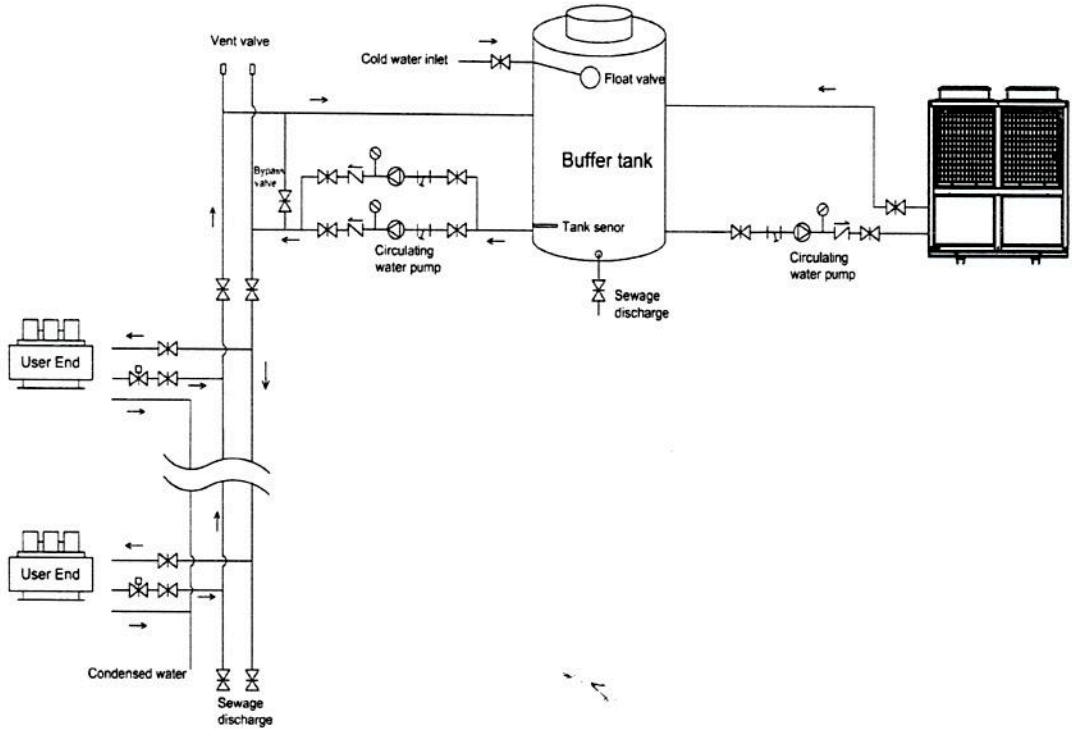
Domestic hot water is domestic water. Tap water or treated water is required. Lake water, river water and untreated groundwater are strictly prohibited.

C. Applicable water quality standards of unit

Ph value (25°C)	6.5 - 8.0	chloride ion (Cl) (mg/L)	<50
conductivity (25°C) (µs/cm)	<250	silver sulfate (SO4 ²⁻) (mg/L)	<50
total iron (mg/L)	<0.3	total alkalinity	<50
Total hardness (mg/L)	<50	silicon dioxide (SiO ₂)	<30

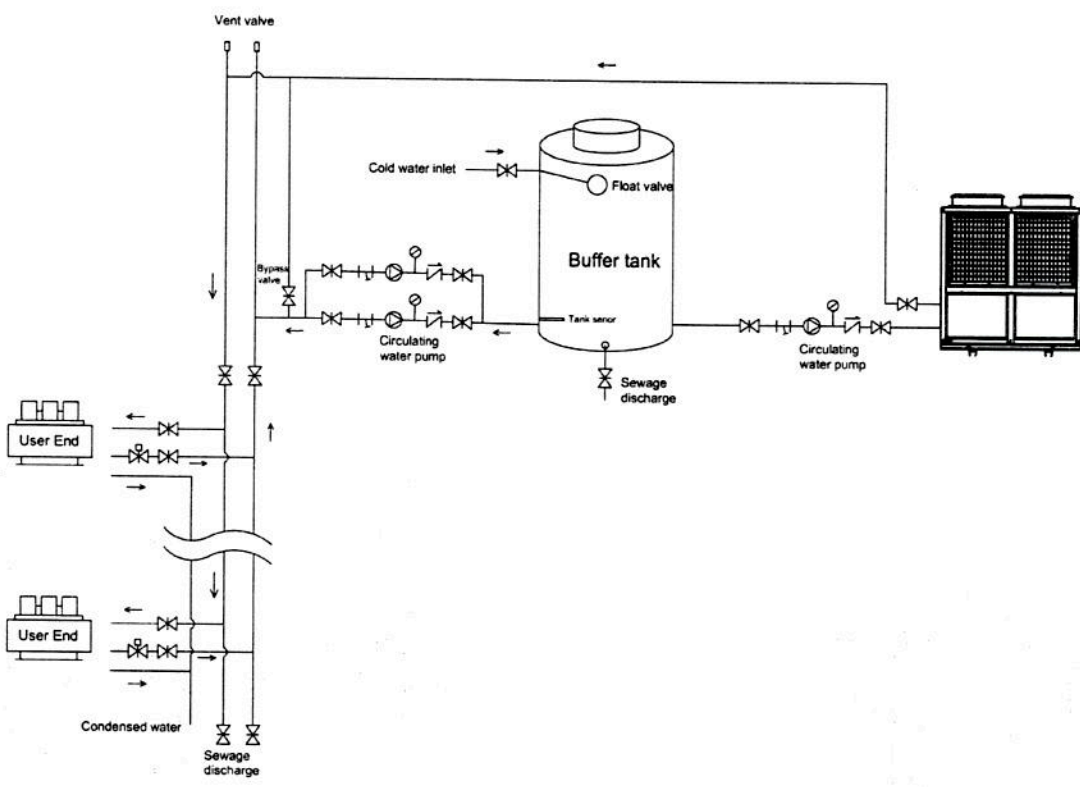
5. Water system piping for atmospheric (open) tank

Solution 1



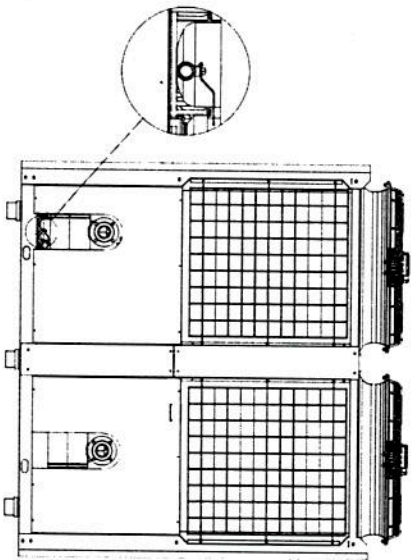
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Solution 2



6. Winter freeze protection

- **Guideline for defrosting and water draining in winter**
When it is below 0°C in winter, to prevent the internal pipe freezing crack, if the unit doesn't run for a long time, it is necessary to drain the water from the unit, detail operation is as follows:



Operation guideline:

Turn on the switch on the drain pipe at the bottom of the shell pipe in counterclockwise direction to drain water over. Keep the drain pipe (switch) open until the next use before closing. (To confirm that the water in the heat exchanger is drained over, please open the vent valve of the water system.)

Cleaning, pressurizing and leak detective of engineering water system need to disconnect the water way of the unit.



IV. Electrical wiring diagram

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 (mm ²)	Switch nominal specification (A)
≤16	22.5	25 A
≤25	24	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 (3mm) 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 (1.5m) 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.

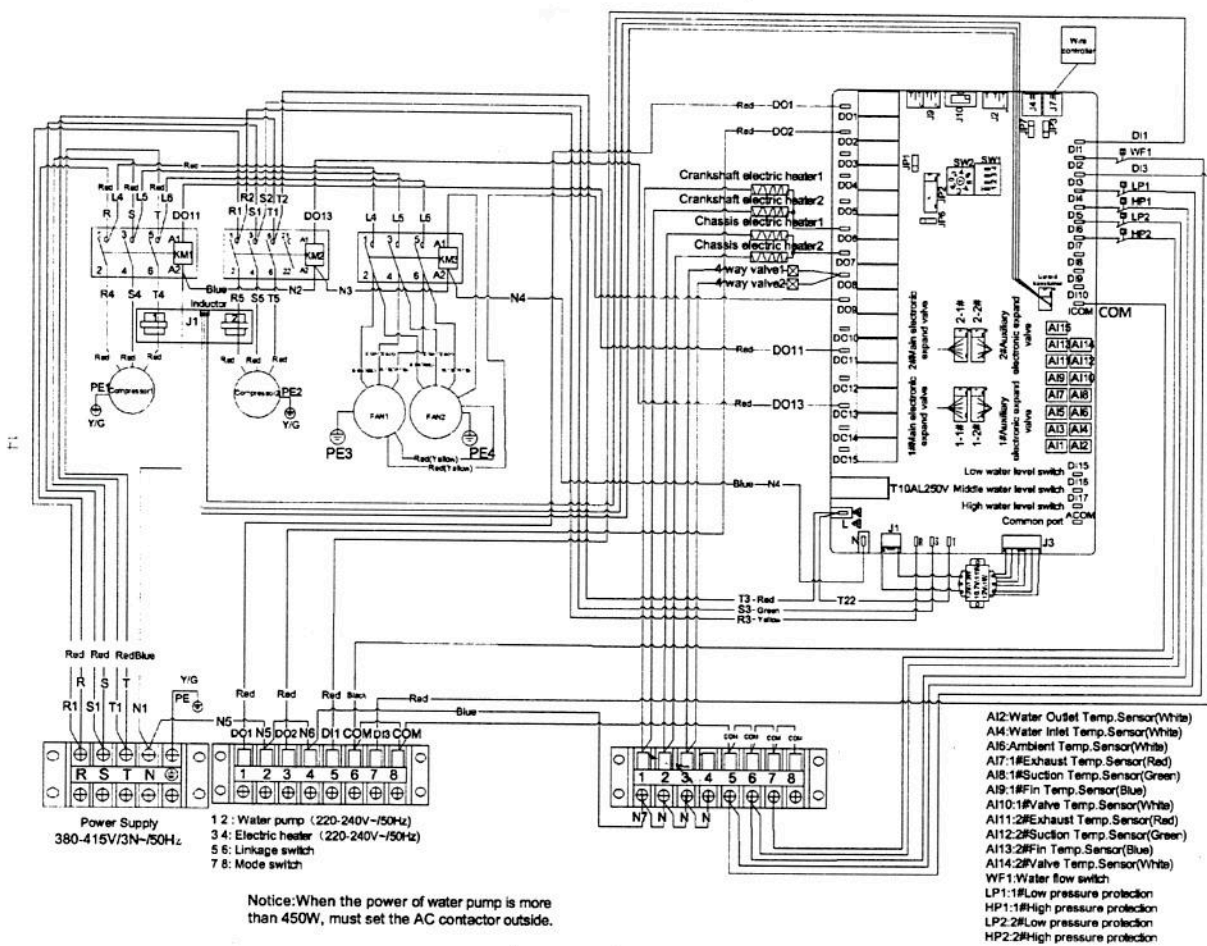


Do not insert hand or foreign matter into the outlet of the water heater.



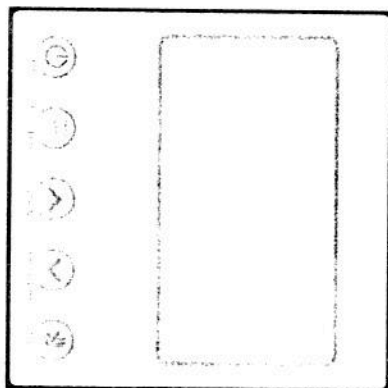
It is forbidden to refit the unit and change the parameters of the unit without permission.

2. Wiring diagram



V. Control function

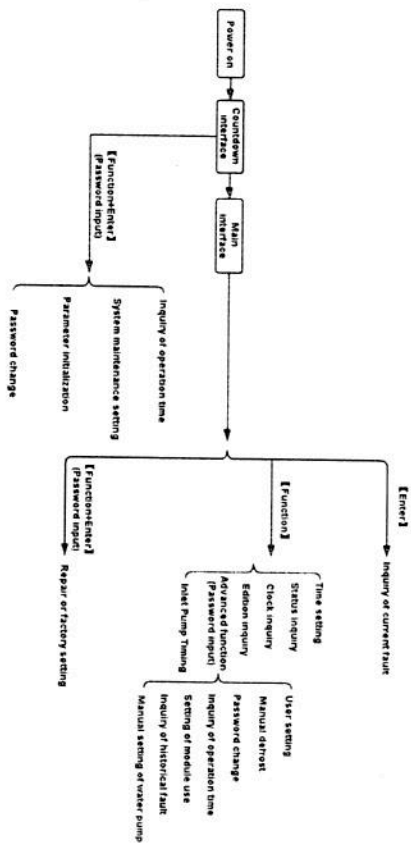
1. Controller panel



2. Interface overview

- Key switching

Five keys: ON/OFF, Function, Up, Down, Enter.



Note:

In the branch interface (except the countdown interface and the main interface), if the keypad is not utilized for 1-minute, then the system will automatically return to the main interface.

When "▲" is displayed on the right side of the interface, it means the user can press <Up/Add> to achieve a page turn.

When the right side of the interface displays "▼", it means the user can press <Down/Sub> to scroll down.

When the interface prompts "operation is currently prohibited, but operation is available XX-seconds later," it means there is another screen operating and it needs to wait. After XX-seconds, the interface can be operated.

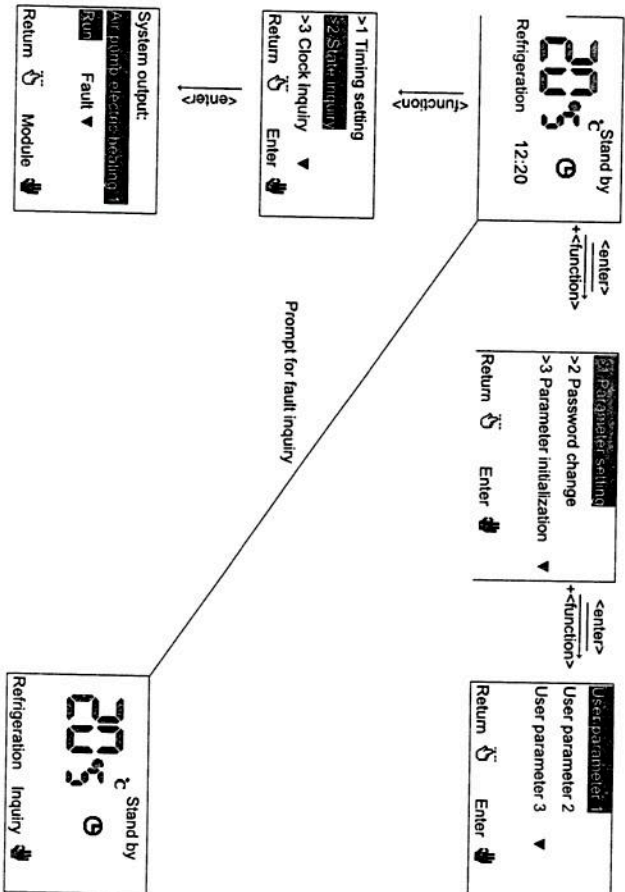
Icon	Meaning
°C	Indicates temperature.
▶	Indicates page up, parameter selection, or increasing value.
◀	Indicates page down, parameter selection, or decreasing value.
⊕	Indicates whether the unit uses timing function.
⊖	Indicates the icon of functional keys. It is only used for Menu, Cancellation, Return and Shift.
⊞	Indicates the icon of confirming keys. It is only used for Enter, Confirmation, Noise Reduction, Reset and Switching Module.
⊟	Indicates the icon of ON/OFF. It is only used for starting or shutting down the unit.

3. Interface introduction

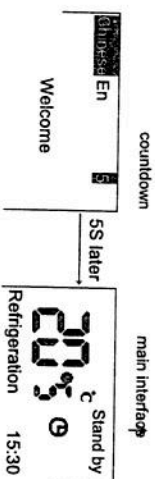
3.1. Overview

Interface submenus: a) Main Screen, b) Countdown, c) Status, d) Parameter Setting, e) Password, f) Fault History.

Interface switching

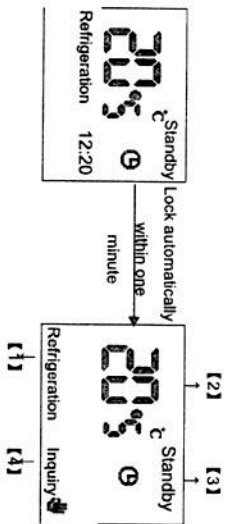


3.2. Countdown interface



Note: ① In the Countdown interface at starting up, press <up> or <down> to switch language directly.

3.3. Main interface

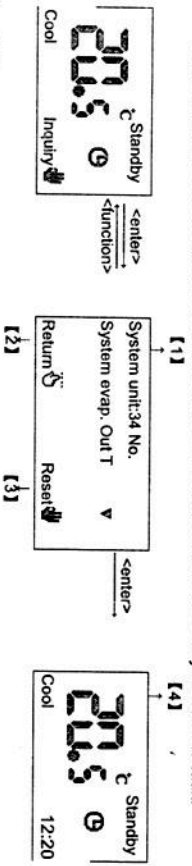


Description:

- [1] Current operation mode of the unit.
- [2] The current control temperature of the unit.
- [3] Indicates the status of the unit and the timing status of the unit.
- [4] Indicates fault inquiry of the unit.

3.4. Fault inquiry

When faults occur, the main interface will note the fault. Press the <Enter> key to view the fault.

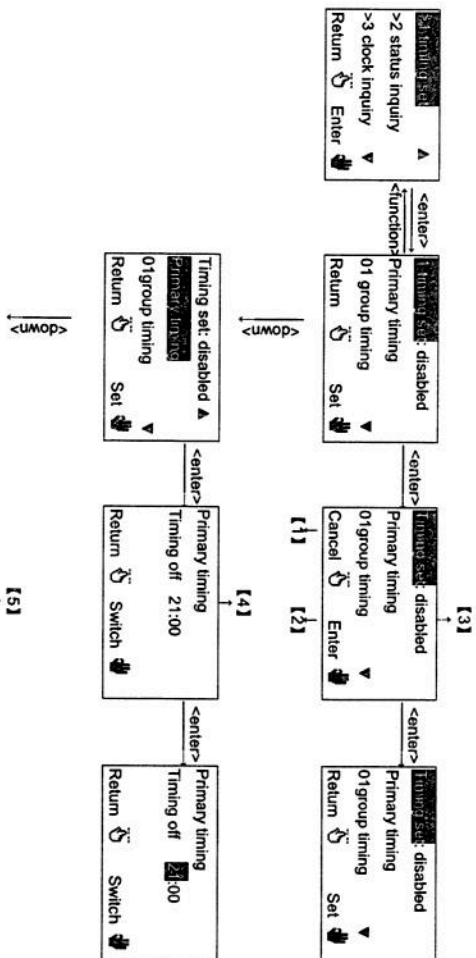


Description:

- [1] Indicates the fault code of the selected item and the corresponding information. Please refer to the instruction book of control panel for fault code descriptions. Press <Up> or <Down> key to switch display of fault module or fault number.
System unit: indicated whole system (main unit) faults
**No unit: indicated module faults
** No.: faults number.
00#-04#: circuit number
- [2] Indicates to press <Function> key to return to menu of previous level.
- [3] Indicates to press <Enter> key to reset fault. Display indicates to return to the main interface if there is no fault at present. If there is any fault, it continues to display the current fault.
- [4] Indicate there is no fault after pressing <Enter> key. Then it returns to the main interface.

3.5. Timing set

Press <Down> or <Up> to select timing set.



Description:

- [1] Press <Function> key to return to menu of previous level.
- [2] Press <Function> key to changed timing value.
- [3] Indicates the selection of the timing setting.
- [4] Indicates the selection of primary timing.
- [5] Indicates to select 01 group timing. Press <Up> or <Down> to switch among use of timing, primary timing and setting from 01 group to 10# group. After entering the selected timing item, press <Enter> key to change the set timing On/Off, Hour and Minute. Week (1, 2...7, when week is selected, the corresponding will flash). Press <Up> or <Down> key to change the selected value. Inverse display of week (1, 2...7) indicates that timing is effective on the day. As shown in the figure above, shutdown will be performed at 21:00 on Friday and Saturday.
Note: If the timing is set to 00:00, it indicates the function is not used.

3.6. Status Inquiry

After entering the status inquiry interface, press <Enter> key to switch module status inquiry.



Description:

- [1] Indicates to return to the interface of previous level by pressing <Function> key.
- [2] Press <Enter> key to switch among different module interfaces. In the interface, the status of all modules of the unit may be inquired. The module number is subject to the actual number of modules. The last item is the system module and indicates the system status.
- [3] Display the operation status of output equipment corresponding to modules.
Shadow display: indicates what the equipment is outputting at present. As shown in the figure above.
1# compressor of 00# module have output.
Normal display indicates no output such as 1# four-way valve.
- [4] Display the analog quantity signal of corresponding system module.
- [5] Display the analog quantity information of corresponding 00# module.

Inquiry list

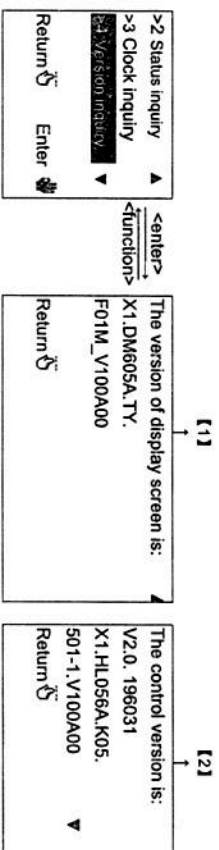
Items	Module parameter list	Meaning	Unit
Comp.		Compressor	
l#E		EVI valve	
Bl#Heat		Chassis heater	
fan		Fan	
four		4-way valve	
Crank		Crackshaft heater	
Low Out		Discharge water valve	
CompM.EEV OD% ST		Main EEV opening	ST
CompA.EEV OD% ST		Assistance EEV opening	ST
CompCurrent		Compressor current	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
CompObi. superH	Object superheat	°F
Out temp	Water outlet temperature	°F
In temp	Water inlet temperature	°F
environ tmp	Environment temperature	°F

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

3.7. Version Inquiry

After entering the Status Inquiry interface, press <Down> or <Up> to select Version inquiry.

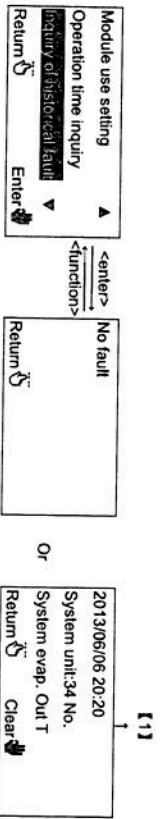


Description:

- [1] Indicates the version and function code corresponding to display screen. Press <Up> to continue the inquiry.
- [2] Indicates the version and function code corresponding to control. Press <Down> to continue the inquiry.
- [3] Indicates to press <Function> key to return to menu of previous level.

3.8. Historical Fault Inquiry

After entering the Advanced function, press <Down> or <Up> to select inquiry of historical fault.



Description:

【1】 Time of fault occurrence: Provides the time of fault occurrence.

Press <Enter> key to clear all historical faults.

【2】 Indicates the fault type displayed: Press <Module> to switch the display of module with fault:

System unit: indicated whole system (main unit) faults

**No unit (00-15): indicated module faults

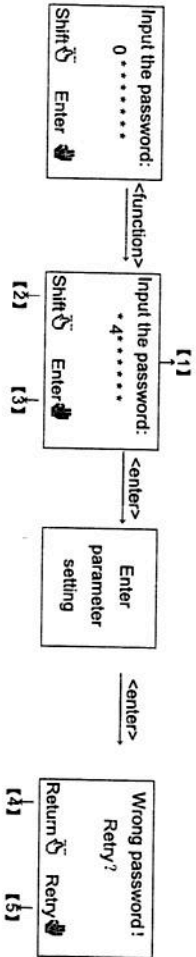
** No.: faults number.

00#-04#: circuit number

【3】 Indicates to return to the menu of previous level by pressing <Function> key.

4. Password operation

4.1. Password input



Description:

【1】 Reminds the users to input password including repair and manufacturer password.

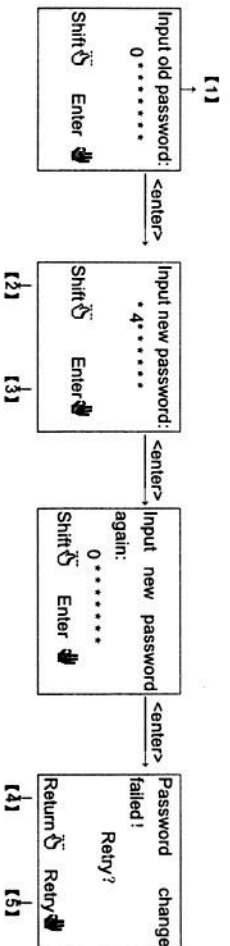
【2】 Press <Function> key to shift the input password at present. Press <Up> or <Down> to input the current password value.

【3】 Press <Enter> key to confirm the input password and enter parameter setting.

【4】 Indicates to return to the interface of previous level by pressing <Function> key.

【5】 Indicates to press <Enter> key to input password again.

4.2. Password change



Description:

【1】 Reminds the users to input the old password including repair and manufacturer passwords respectively. Different passwords may be changed at different levels.

【2】 Indicates to press <Function> key to shift the input password at present. Press up or down to input the current password value.

【3】 Press <Enter> key to confirm the input to change the password. If change is correct, successful change is prompted. Failure is prompted for wrong change.

Note: If the old password is input wrong, then it prompts wrong input of old password.

If the new password is input wrong, then it prompts wrong input of new password.

Press retry to input the password again.

5. Parameter setting

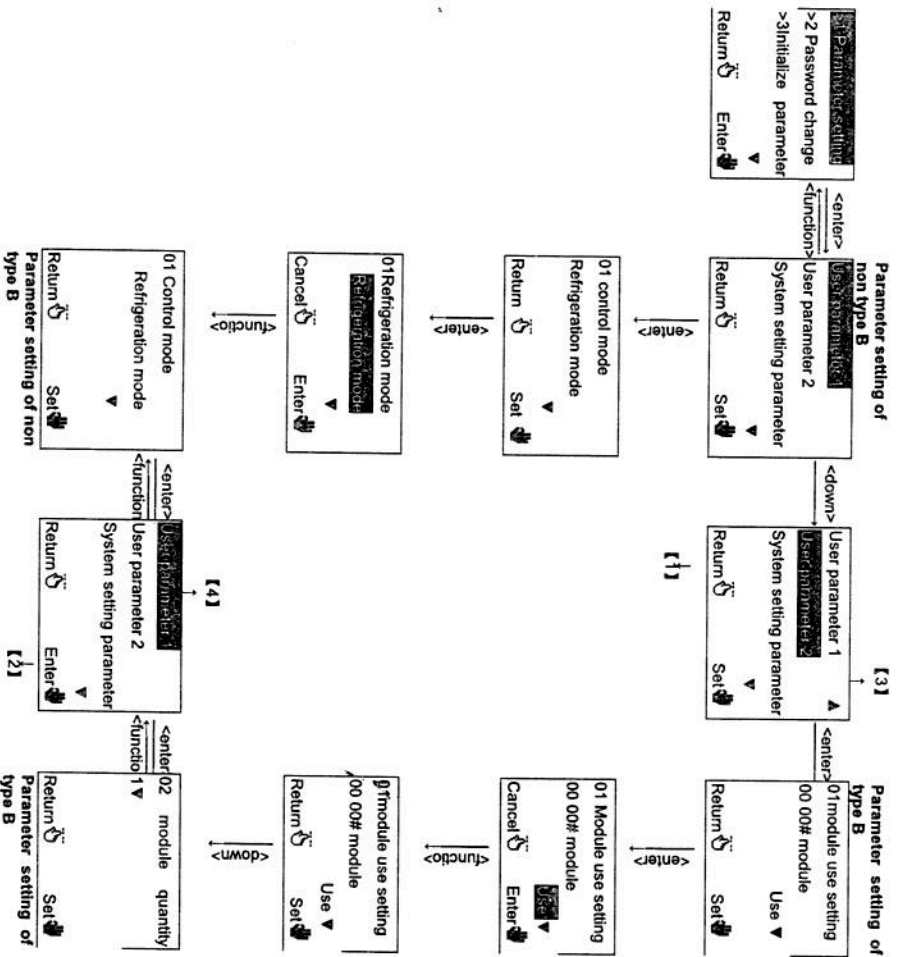
- Operation of the section is suitable for setting of all parameters.
- For parameter setting of Repair setting and Manufacturer setting, the parameters visible are different only due to password levels, but the setting method is the same.
- All settings have a corresponding password change.
- The initialization of parameter and initialization of operation time of compressor are only provided in Manufacturer parameter setting and are not set in other settings.

5.1. Parameter level

Please refer to password operation for input of password.

Function	Key	Effective interface for input of password.	Password
Advanced function	<Function>	Main interface	User password
Repair setting	<Enter + Function>		Repair password
Manufacturer setting	<Enter + Function>	Countdown interface	Manufacturer password
Maintenance setting	<Enter + Function>		Maintenance password

5.2. Parameter setting

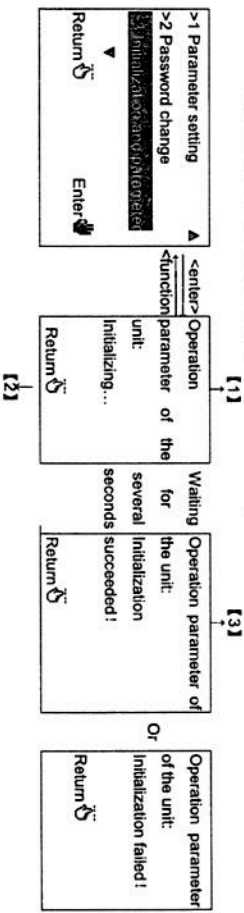


Description:

- [1]** Press <function> key to cancel the changed parameter value and return to the interface of previous level.
- [2]** Enter the parameter setting item and determine the content of changed parameter by pressing <enter> key.
- [3]** Indicates the name of parameter group. The major item "PL01 user parameter 1" is displayed by prompt here.
The "01 control mode" represents the character string that corresponds with the sub item. Press the <up> or <down> key to switch among sub-item of parameters in the parameter group circularly.

Press the <up> or <down> key to make change directly and press <enter> to save the value of current parameter. If the parameter value cannot be modified, it will not be able to enter.

- [4]** Indicates that the selected parameter is bit variable. It means that all sub-items of the parameter are operated according to bit.
If the parameter is variable, it will be divided into 16 sub-items for operation.
After entering manufacturer setting, press <down> or <up> to select the corresponding content for initialization.
Initialize parameter: the parameters are restored to default value.
Initialize compressor: the operation time of compressor and accumulate operation time of the unit is 0.
The initialization of parameter operation and compressor is the same. The initialization process is introduced with initialization of parameter. For example:



Description:

- [1]** Initializes the operation parameter of the unit, with the operation character of initialization is prompted.
- [2]** Indicates to return to the interface of previous level by pressing the <function> key.
- [3]** When the prompt of "initialization failed" appears. If it failed, initialization may be performed according to above operation until success is prompted.

! Attention:

If the unit is at the operation or alarm state, parameter cannot be initialized, or parameter initialization failed may be prompted.

After parameter initialization of the unit is successful, ensure to power on the unit again and use after confirmation that the parameters are in effect.

User parameter setting list 1

No.	Parameter name	Meaning	Unit	Range	Default	Reservation
1	Ctrl mode	Control mode	-	Heat mode Cool mode Auto mode Hold 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 dl.	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.

User parameter setting list 2

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

6. Atmospheric Tank Control

Water refill solution

- When high water level and medium water level are disconnected at the same time, test the water tank temperature.
 - When the hot water tank temperature \geq **[Hot point]** - **[spy start D]**, refill water.
 - When the hot water tank temperature \leq **[Hot point]** - **[spy start D]**, no need to refill water.
 - When the water is heated, the hot water tank temperature \geq **[Hot point]** - **[spy start D]**, refill water.
- When the high-water level, medium-water level and low-water level are disconnected at the same time, water replenishment is mandatory. When the water tank is refilled, and medium water level and low water level is closed at the same time, test the temperature of the water tank.
 - When the hot water tank temperature \geq **[Hot point]** - **[spy start D]**, refill water.
 - When the hot water tank temperature \leq **[Hot point]** - **[spy start D]**, no need to refill water.
- When the water is heated, the hot water tank temperature \geq **[Hot point]** - **[spy start D]**, refill water. Fill water until the high water level switch is closed.

Stop condition (any condition)

- When the water level sensor (switch) fails.
- High water level is closed, medium water level is disconnected.
- High water level is closed, low water level is disconnected.
- Medium water level is closed, low water level is disconnected.
- High/medium/low level are closed at the same time

7. Control instructions of the lower return pump

Starting conditions (All conditions needed)

- [Hot In tmp] \leq [pm start int]**.
 - Lower return pump timing working period (it is in the time of downPump start] and [downPump stop]
- The equality of the two means that the working period of the lower return pump is not limited by the use of time. That is, it does not need to meet this condition.)
- [HotW tmp] \geq [pm stop int]**.
 - Water flow switch has no fault.
 - Lower return water temperature sensor has no failure.

Stop conditions (Any conditions)

- Lower return water temperature sensor is failed.
- It is not in the timing operation period.

- [Sys:How in] ≥ [pm stop inT]
- [HoIW tmp] ≤ [pm stop inT]
- Lower return water flow switch failed.

8. Module control and linkage wiring

Parameter setting required for module control

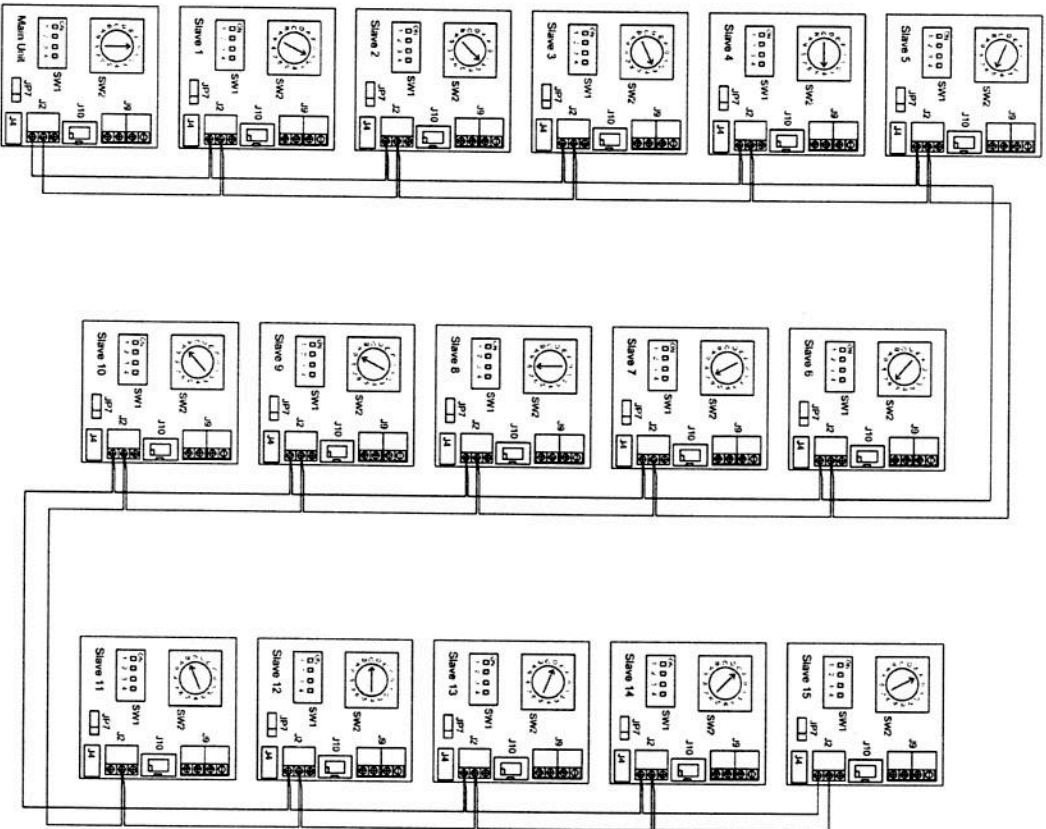
Under shutdown state, press "Function" and "Confirm" at the same time to enter password setting, enter password 123, enter the module parameter setting table, and press the information needed from the following table to set parameters.

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	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

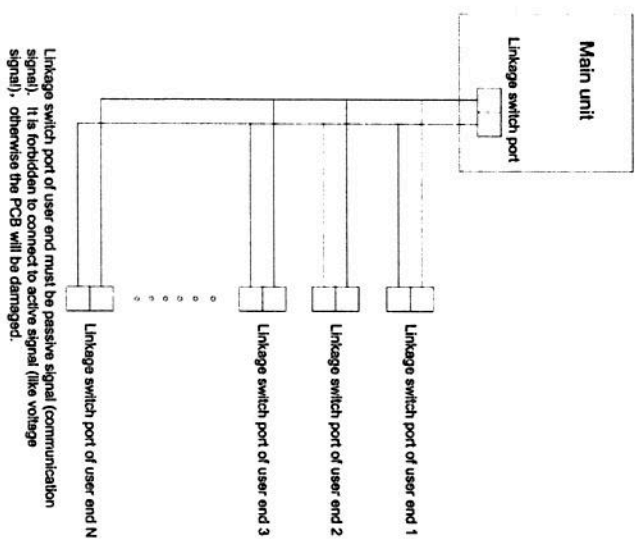
Schematic diagram of control wiring and code dialing of each module:



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 for 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.

VI. Trial running and maintenance


1. Trial running

Note before trial running

- The water heater should 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-psi-g 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 | <input type="checkbox"/> | Check voltage is within specifications | <input type="checkbox"/> |
| Correct piping & wiring | <input type="checkbox"/> | Air inlet and outlet free of obstructions | <input type="checkbox"/> |
| Drain valve functioning properly | <input type="checkbox"/> | Pressure relief valve functioning normally | <input type="checkbox"/> |
| Pipe insulation complete | <input type="checkbox"/> | Level foundation | <input type="checkbox"/> |

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 electricly the unit 8 hours before starting up again and preheat the compressor.

2. Trouble shooting

2.1. Control protection function list

- 1) Cut-out protection
- 2) Low water flow
- 3) Phase sequence protection
- 4) Low suction pressure protection
- 5) Compressor overcurrent protection
- 6) Compressor overload protection
- 7) Excessive exhaust pressure protection
- 8) Excessive exhaust temperature protection
- 9) Frost protection
- 10)

2.2. Fault analysis and elimination of electric control panel display

- **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

4 reset modes of faults:

- 1) Power on and reset
- 2) *After fault clearance, can only be reset after power-on again Like EEPROM data fault.*
- 3) Limited automatic reset (A/M)
- 4) *After the fault clearance, [Automatic reset time J] delays, during this time no longer appear the same fault, automatic reset.*
- 5) *Within [Automatic reset allows J] set time, it can automatically reset for 2 times, alarm cumulative number > 2 times, need to manually reset.*
- 6) *After manual reset, the alarm times can be accumulated again.*
- 7) *Limited faults: check the fault table.*
- 8) Automatic reset (A)
- 9) *Alarm after the fault clearance, [automatic reset timedeelay J], this time no longer appear the same fault, automatic reset*
- 10) Automatic reset without number:
- 11) Fault self-recovery: check the fault table.
- 12) Manual reset (M)
- 13) Alarm after the fault clearance, only by manual reset controller.
- 14) 1) 2) 3) Type failure can also be manually reset

2.3. 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."
Low exhaust pressure (Cooling)	Overcharge of refrigerant.	Discharge excess refrigerant.
	Ambient temperature is too high. Refrigerant leakage or filling is not enough.	Check ambient temperature. Check for leakage or fill with sufficient refrigerant.
Low suction pressure (Cooling)	Low suction pressure.	See "Low suction pressure."
	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.
Excessive exhaust pressure (Heating)	There is scale in evaporator due to refrigerant leakage or insufficient refrigerant filling.	Remove scale.
	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.
Low exhaust pressure (Heating)	Excessive suction pressure.	See "Excessive suction pressure."
	Water temperature is too low.	Check water temperature.
	Refrigerant leakage or insufficient refrigerant filling.	Check for leakage or fill with sufficient refrigerant.
Excessive suction pressure (Heating)	Low suction pressure.	See "Low suction pressure."
	Air side heat exchanger inlet temperature is high.	Check ambient temperature.
Low suction pressure (Heating)	Overcharge of refrigerant.	Discharge excess refrigerant.
	Refrigerant leakage or filling is not enough.	Check for leakage or fill with sufficient refrigerant.
	Insufficient air volume. Air short circuit.	Check fan steering. Eliminate the cause of air short circuit.
Low suction pressure (Heating)	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. There is something wrong with the sensor.	Discharge gas. 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.
	Voltage is too high or too low.	Check that the voltage is not more than or less than 20V of rated voltage.
Compressor stops due to built-in temperature sensor or exhaust temperature protection	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.
Abnormal compressor noise	Low suction pressure.	See "Low suction pressure."
	The liquid refrigerant flows into the compressor from the evaporator and produces liquid shock.	Adjust refrigerant charge.
	Compressor aging.	R replace the compressor.
There is noise	The fastening screw on the panel is loose.	Tighten all parts.
	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.
Compressor does not start	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.

Excessive frost on the air heat exchanger	There is a fault signal on the wire controller. Failure of four-way valve or sensors. Air short circuit.	Find out the fault type and take corresponding measures. Check operation and replace if necessary. Eliminate the cause of air short circuit.
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VII. Maintenance

● Main parts maintenance

Pay attention to the suction and exhaust pressure of system during operating. Find out the reason and trouble shooting in time if find abnormally.

Do not set the site of control and protect equipment around.

Check whether the electrical wiring is loose, there is no oxidation at the contact point, sundries and other causes of bad contact, if any, it should be handled promptly. Always pay attention to the working voltage, current and phase balance.

Timely check the reliability of electrical components and replace the failed and unreliable components.

● Descaling

After running for a long time, water side heat exchanger heat transfer surface deposition calcium oxide or other minerals, these substances on the heat transfer surface scale is large, can affect the heat transfer performance and lead to increased power consumption, exhaust pressure too high (or low suction pressure). Can be descaled using formic acid, citric acid, acetic acid and other organic acid cleaning. Never use cleaning agents containing fluoride chlorate because the galvanized pipe on the water side is easily corrode, leading to leakage of refrigerant. When cleaning descaling pay attention to the following aspects:

The waterside heat exchanger must be cleaned by professionals.

After using cleaning agents, clean water pipes and heat exchanger with water. The water treatment can prevent the system from being corroded or cleaned for scale adsorption.

In the case of the use of cleaning agents, the concentration of cleaning agents, cleaning time and temperature are adjusted according to the dirt deposition.

After pickling and cleaning, the waste liquid shall be neutralized. Contact the relevant company for waste of liquid treatment.

Cleaning agents and neutralizing agents 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.

● Power off in winter

In case of power off, water must be drained over.

In case of continuous power supply, water can't be drained over, units have freezing protection program that runs when units operate.

● The following preparations shall be made when the unit is restarted after any prolonged outage:

Thoroughly inspect and clean the unit.

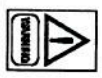
Clean the plumbing system.

Inspect water pump, regulator and other equipment of water piping system.

Tighten all wire connections.

Power on for 12 hours before starting.

- **Parts replacement**



Replacing parts should use the parts provided by the company, do not replace with any different parts.

- **Refrigerating system**

Check the values of suction and exhaust pressure to determine whether to inject refrigerant, and to detect leakage. If there is a leak or parts are replaced in the refrigeration cycle system, conduct air tightness test. Filling refrigerant should be treated differently in the following two cases.

A. The refrigerant is completely leaking. In this case, the system must be detected with high-pressure nitrogen. If repair welding is needed, the system must be drained of gas before welding.

Connect the vacuum tube to the low pressure side fluorine 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.

After reaching the required vacuum degree, the refrigerant bottle shall be used to fill the refrigerant into the refrigeration system. The appropriate refrigerant filling amount has been indicated on the nameplate and in the main technical parameters table.

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 chilled water can be circulated and the unit can be started for charging. If necessary, the low-voltage control switch can be temporarily short-circuited.

B. Replenish the refrigerant

Make the frozen water cycle, and start the unit. If necessary, the low voltage control switch short.

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**

When the environment temperature is lower than 0 °C, heating efficiency with the outdoor temperature falls. For the air-cooled heat pump units in the cold region heating operation stability, complement part of heat loss due to defrost, when a user area winter minimum temperature in the range of 0 to 10 °C, equipped with auxiliary electric heater may be considered. Consult relevant professionals to select auxiliary electric heater power.

- **System antifreeze**

If the water side heat exchanger runner freezes, it will be seriously damaged. That is, the heat exchanger will break and leak. The frost crack damage does not in the warranty scope. So, special attention should be paid to the frost prevention.

If the unit is placed in an environment where the outdoor temperature is less than 2 °C, the water in the water system should be drained.

During operation, if the frozen water target flow controller and anti-freeze temperature sensor fail during operation, the water pipe may freeze. So if the target flow controller must be connected according to the wiring schematic diagram.

During maintenance, it is possible to freeze and crack the water side heat exchanger when filling the unit with refrigerant or discharging the refrigerant for maintenance.