

R290 AIR TO WATER HEAT PUMP

Installation and Instruction Manual



waterware.co.nz

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In order to provide the customers with high quality, strong reliability and good versatility products, this heat pump is produced by strict design and manufacture standards. This manual includes all the necessary information about installation, debugging, discharging and maintenance. Please read this manual carefully before you open or maintain the unit.

The manufacture of this product will not be held responsible if someone is injured or the unit is damaged, as a result of improper installation, debugging, unnecessary maintenance which is not in line with this manual.

The unit must be installed by qualified personnel.

It is vital that the below instructions are adhered to at all times to keep the warranty.

—The unit can only be opened or repaired by a qualified installer or an authorized dealer.

—Maintenance and operation must be carried out according to the recommended time and frequency, as stated in this manual.

-Use genuine standard spare parts only.

Failure to comply with these recommendations will invalidate the warranty.

Inverter air source water heat pump is a kind of high efficiency, energy saving and environment friendly equipment, which is mainly used for house warming. It can work with any kinds of indoor unit such as fan coil, radiator, or floor heating pipe, by providing warm or hot water. One unit of monoblock heat pump can also work with several indoor units.

The air source water heat pump unit is designed to have heat recovery by using super heater which can provide hot water for sanitary purpose.

2. Safety Instructions

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

Mark Notes

| Mark | Meaning | | | | |
|------|---|--|--|--|--|
| | A wrong operation may lead to death or grievous injury on people. | | | | |
| | A wrong operation may lead to harm people or loss of material. | | | | |

Icon Notes

| lcon | Meaning |
|-----------|---|
| \otimes | Prohibition. What is prohibited will be nearby this icon. |
| 0 | Compulsory implement. The listed action needed to be taken. |
| | ATTENTION (include WARNING) Please pay attention to what is indicated. |

Warning

| Operation | Meaning | | | |
|---------------------|--|--|--|--|
| Prohibition | DO NOT put fingers into the fan and evaporator of the unit, otherwise harm may occur. | | | |
| Shut off the power. | When there is something wrong or strange smell, the power supply needs to be shut off to stop the un Continue running may cause short circuit or fire. | | | |

| Operation | Meaning | | | |
|---------------------|---|--|--|--|
| Prohibition | DO NOT put fingers into the fans and evaporator of the unit, otherwise harm may occur. | | | |
| Shut off the power. | When there is something wrong or strange smell, the power supply needs to be shut off to stop the unit. Continue running may cause short circuit or fire. | | | |

| Move and Repair | Meaning | | | | |
|--------------------|--|--|--|--|--|
| 0 | When the heat pump needs to be moved or installed again, please entrust dealer or qualified people to carry it out. Improper installation will | | | | |
| Entrust | lead to water leakage, electrical shock, injury or fire. | | | | |
| Entrust | It is prohibited to repair the unit by the user himself, otherwise electrical shock or fire may occur. | | | | |
| Prohibit | When the heat pump needs to be repaired, please entrust dealer or qualified people to carry it out. Improper movement or repair on the unit will lead to water leakage, electrical shock, injury or fire. | | | | |

| Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. |
|---|
| The appliance shall be stored in a room and installed in the environment without continuously operating or potential ignition sources (for example: open flames, an operating gas appliance or an operating electric heater or Electric Spark or hot objects |

ATTENTION

| Installation | Meaning |
|--------------------------|--|
| Installation Place | The unit CANNOT be installed near the flammable gas. Once there is any leakage of the gas, fire may occur. |
| 0 | Make sure that the basement of the heat pump is strong enough, to avoid any decline or fall down of the unit |
| Fix the unit. | |
| • | Make sure that there is circuit breaker for the unit, lack of circuit breaker may lead to electrical shock or fire. |
| Need circuit breaker. | |

| Operation | Meaning |
|----------------------------------|--|
| Check the installation basement. | Please check the installation basement regularly (once <u>a</u> month), to avoid any decline or damage too the basement, which may hurt people or damage the unit. |

| Switch off the power. | Please switch off the power when cleaning or maintaining | | | |
|-----------------------|--|--|--|--|
| Prohibition | It is prohibited to using copper or iron as fuse. The right fuse must be fixed by electrician for the heat pump. | | | |
| Prohibition | It is prohibited to spray the flammable gas to the heat pump, as it may cause fire. | | | |

3. Features

This series of heat pump unit owns following features:

3.1. Advanced Controlling

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

3.2. Nice Appearance

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

3.3. Flexible Installation

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

3.4. Quiet Running

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

3.5. Good Heat Exchange Rate

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

3.6. Large Working Range

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

1. Appearance and structure of the heat pump



Air outlet in horizontal ← direction

The longest distance of installing the remote controller is 200 meters.

Remote Controller (Manually)

Water outlet tube

2. The data of unit

*** REFRIGERANT: R290

| Model | | HPR6HT | HPR13HT | HPR20HT |
|----------------------------------|-------|-------------------------------|----------------|----------------|
| Heating Capacity | kW | 3.10~8.90 | 5.40~14.95 | 8.00~22.00 |
| Heating Power Input | kW | 0.65~2.10 | 1.05~3.85 | 1.60~6.90 |
| Cooling Capacity | kW | 1.20~5.72 | 3.60~10.50 | 4.20~15.00 |
| Cooling Power Input | kW | 0.65~2.40 | 1.12~4.47 | 1.80~7.30 |
| Hot Water Capacity | kW | 3.92~10.68 | 6.50~18.50 | 10.00~27.00 |
| Hot Water Power Input | KW | 0.78~2.47 | 1.27~4.65 | 1.90~7.10 |
| Max Power Input | KW | 3.0 | 5.30 | 7.5 |
| Max Current Input | А | 13.5 | 24.5 | 35.0 |
| Power Supply | | 220-240V~/50Hz | 220-240V~/50Hz | 220-240V~/50Hz |
| Compressor Quantity | | 1 | 1 | 1 |
| Compressor Model | | Rotary | Rotary | Rotary |
| Fan Quantity | | 1 | 1 | 2 |
| Fan Power Input | W | 150 | 170 | 75 |
| Fan Rotate Speed | RPM | 600 | 600 | 600 |
| Water Pump Input | W | 60 | 60 | 160 |
| Noise | dB(A) | 38~52 | 39~52 | 42~54 |
| Water Connection | inch | 1 | 1 | 1 |
| Water Flow Volume | m3/h | 1.0 | 1.7 | 2.9 |
| Internal Water Pressure Drop | kPa | 20 | 30 | 45 |
| Water Head | m | 5.0 | 5.5 | 6.9 |
| Unit Net Dimensions (L/W/H) | mm | See drawings of the heat pump | | |
| Unit Shipping Dimensions (L/W/H) | mm | see data on the package | | |
| Net Weight | kg | see data on the nameplate | | |
| Shipping Weight | kg | see data on the package | | |

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

BS EN 14511-1-2013 Air conditioner, whole liquid cooling machine, electric compressor. Part2: Test condition ; Part3:Test method ; Part4:related requirements. 3. Unit dimension

Models:HPR6HT





Models:HPR13HT

975 1287





Models:HPR20HT





Installation place

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

Installation method

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

Water loop connection

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

- Try to reduce the resistance to the water from the piping.
- The piping must be clear and free from dirty and blocks. Water leakage test must be carried out to ensure there is no water leaking. And then the insulation can be made.
- Attention that the pipe must be tested by pressure separately. DO NOT test it together with the heat pump.
- There must be expansion tank on the top point of the water loop, and the water level in the tank must be at least 0.5 meter higher than the top point of the water loop.
- The flow switch is installed inside of the heat pump, check to ensure that the wiring and action of the switch is normal and controlled by the controller.
- Try to avoid air stayed inside of the water pipe, and there must be air vent on the top point of the water loop.
- There must be thermometer and pressure meter at the water inlet and outlet, for easy inspection during running.

Power supply connection

- Open the front panel, and open the power supply access.
- The power supply must go through the wire access and be connected to the power supply terminals in the controlling box. Then connect the 3-signal wire plugs of the wire controller and main controller.
- If the outside water pump is needed, please insert the power supply wire into the wire access also and connect to the water pump terminals.
- If an additional auxiliary heater is need to be controlled by the heat pump controller, the relay (or power) of the aux-heater must be connected to the relevant output of the controller.

Location of the unit



The picture shows the location of horizontal air outlet unit.

| Attention | |
|---|--|
| Requirements A>500mm;B>1500mm; C>1000mm;D>500mm | |
| | |

The minimum ventilation distance in diagram 1.

9 Transit

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









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

10 Trial Running

Inspection before trial running

- Check the indoor unit, and make sure that the pipe connection is right and the relevant valves are open.
- Check the water loop, to ensure that the water inside of the expansion tank is enough, the water supply is good, the water loop is full of water and without any air. Also make sure there is good insulation for the water pipe.
- Check the electrical wiring. Make sure that the power voltage is normal, the screws are fastened, the wiring is made in line with the diagram, and the earthing is connected.
- Check the heat pump unit including all of the screws and parts of the heat pump to see if they are in good order. When power on, review the indicator on the controller to see if there is any failure indication. The gas gauge can be connected to the check valve to see the high pressure(or low pressure) of the system during trial running.

Trial running

- Start the heat pump by press " 🔟 " key on the controller. Check whether the water pump is running, if it runs normally there will be 0.2 MPa on the water pressure meter.
- When the water pump runs for 1 minutes, the compressor will start. Hear whether there is strange sound from the compressor. If abnormal sound occurs please stop the unit and check the compressor. If the compressor runs well please look for the pressure meter of the refrigerant.
- Then check whether the power input and running current is in line with the manual. If not please stop and check.
- Adjust the valves on the water loop, to make sure that the hot(cool) water supply to each door is good and meet the requirement of heating(or cooling).
- Review whether the outlet water temperature is stable.
- The parameters of the controller are set by the factory, it is not allowed to change then by user himself.



1. Main interface display and function



| Key number | Key name | Key function |
|------------|---------------------|---|
| 1 | On and off | Click this key to switch ON or OFF Red represents ON, while white represents OFF |
| 2 | Lock screen | You can perform various operations on the display when the lock is open, but you cannot operate the display when the lock is closed. After locking the screen, press the screen lock button and enter the password "22" to unlock the screen. |
| 3 | Mode key | Hot water mode, heating mode, cooling mode, hot water+heating mode or hot water+cooling mode can be selected by pressing this key. |
| 4 | Temperature setting | Click this key to set the target temperature |
| 5 | Timer setting | Click this key to set the timer. White represents not enabled, while green represents enabled |
| 6 | Setup key | Click this key to check the unit status, time, factory parameter, temperature curve, timer setting and Mute setting |

| lcon | Function |
|------|--|
| 7 | Fault icon: This icon will be displayed when the unit fails ,then the display will enter Failure record interface after tapping this icon |
| 8 | Defrosting icon: This icon will be displayed when the unit enters the defrosting function. |
| 9 | Electric heater icon: This icon will be displayed when the unit enters the electric heater mode. |
| 10 | Water flow icon: Display the current water flow (note: when H31=0, the icon is not displayed) |
| 1) | Mode&temp.&power timer icon: This icon will be displayed when enters this timer |
| 12 | Ambient temperature: Display the current ambient temperature. |
| 13 | SG Ready Icon: This icon will be displayed when enters SG Ready, SG Ready includes five modes: Solar Sleep Mode, Solar Low Mode, Solar Medium Mode, Solar High Mode, Normal Mode |
| (4) | Running mode icon: representing the unit is currently running in hot water mode. There are five modes, namely: heating, cooling, hot water, hot water + cooling, hot water + heating |
| 15 | DHW temperature: The unit is in DHW mode when this icon is shown, otherwise this icon is not shown. |
| 16 | Room temperature icon: Display the current room temperature. (note: when H25=2,it shows buffer tank temperature; when H25=0/3, the icon is not shown.) |

1.1 On and off

As the main interface shows

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



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

1.2 Mode switch



In the main interface, there are five modes can be selected after tapping the mode key.

- (1) Tapping hot water mode icon (1), then the display will change to this mode interface;
- (2) Tapping heating mode icon (2), then the display will enter this mode interface;

(3) Tapping cooling mode icon (3), then the display will switch to this mode interface;

(4) Tapping hot water+heating mode icon ④, then the display will go into hot water+heating mode interface;

(5) Tapping hot water+cooling mode icon (5), then the display will come to hot water+cooling mode interface.

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

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

1.3 Setting of target temperature



Take hot water + cooling mode for example:

Tapping (1), the wire controller back to main interface;

Tapping 2, the target temp. of hot water can be set by pop-up keyboard;

Tapping (3), the target temp. of cooling mode can be set by pop-up keyboard.

Note: When room temperature control, click the room temperature display in the main interface to enter the room target temperature setting interface.

1.4 Unlock screen

After locking screen, click " 10 rop up the following screen. Enter password "22" to unlock.



1.5 Timer setting



Click the timer setting key to enter the timer setting and the interface displays as follows:

| Y | | |
|---|--------------|----------------------------|
| | On/Off Timer | Warm Water Cir. Control |
| | | 2 |

1.5.1 Timer On/Off



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



Note: Click (1) to set the day of the week, click (2) to enable the Timing switch function, click (3) to select the time period to turn on the Timing switch.

1.5.2 Warm Water Cir. Control



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



Same operation as Timer on/off function. Click (1) to set the day of the week, click (2) to enable the Timing switch function, click (3) to select the time period to turn on the Timing switch.

1.6 Setup

Click the setup key to enter the setup and the interface display is shown as follows:



| Key number | Key name | Key function | |
|------------|----------------------|---|--|
| 1 | Operating mode | Click this key to view the current operating parameters of the unit. | |
| 2 | Electric heater | Click this key to turn on the unit Electric heater. When $R35 \neq 0$, the icon displays. | |
| 3 | Smart Grid | Click this key to enter Smart Grid | |
| (4) | Factory parameter | Click the key and enter the password to enter the factory parameter settings and status parameters interface. | |
| 5 | System time setting | Click this key to set the system time. | |
| 6 | Mute setting | Click this key to set the unit mute function mode. When H22=1, the icon displays. | |
| 0 | Curve key | Click this key to view the temperature curve. | |

1.6.1 State



In the setup interface, tapping operating mode button (1), then the interface displays as follows:

| State | | | |
|-------|--------------------|-----------|---|
| | | | |
| N | Unit State | ON | |
| Y | Present Mode | Hot Water | |
| | Inlet Water Temp. | 45.5℃ | |
| | Outlet Water Temp. | 45.5℃ | / |
| | DHW Temp. | 45.5℃ | |
| | Ambient Temp. | 10.5℃ | |
| | | | |

1.6.2 Electric Heater



In the setup interface, tapping Electric heating button 2, then the interface displays as follows:



1.6.4 Clock



In the setup interface, tapping system time setting button 5, then the interface displays as follows: (1)



| Key number | Key name | Key function | |
|------------|------------|---|--|
| 1 | Return key | Click this key to return to the setup interface. | |
| 2 | Up key | Click this key to increase the value. | |
| 3 | Down key | Click this key to decrease the value. | |
| 4 | Cannel key | Click this key to cancel the current settings and return to the settings page. | |
| 5 | Enter key | Click the key to determine the setting, and the system will be automatically calibrated if it is incorrect. | |

Note:

When the temperature unit is ${}^\circ\!\!\mathbb{C}$, the time format is displayed as "day-month-year hour:minute :second".

When the temperature unit is $\ensuremath{\mathbb{T}}$, the time format is displayed as "month-day-year hour:minute :second".

1.6.5 Silent Timer



In the setup interface, tapping Mute Timer button (6), then the interface displays as follows:



| Key number | Key name | Key function | |
|------------|--------------|--------------------------------------|--|
| 1 | Fast-silent | Click this key to enter fast-silent | |
| 2 | Silent timer | Click this key to enter silent timer | |

1.6.5.1 Fast-Silent

The fast-silent function is unsettable when the fan is off.

The fast-silent function is settable when the fan is on.



Reans the unit is in silent state, 🔯 means the unit is in normal state.

1.6.5.2 Silent Timer



In the silent mode interface, tapping Mute Timer button 2, then the interface displays as follows:



Note: Click 1 to set silent timer start hour, click 2 to set silent timer start minute, click 3 to set silent timer close hour, click 4 to set silent timer close minute, then click 5 and 6 to enable or disable the silent mode.

1.6.6 Curve



In the setup interface, tapping Curve button $\overline{\mathbb{O}}$, then the interface displays as follows:



This curve function records the water inlet temperature and water outlet temperature;
Temperature data is collected every five minutes and the 12 sets of temperature data are saved every hour. Timekeeping is made from the latest data saving, if the power is disrupted when the time is less than 1 hour (12 sets), the data during such period will not be saved.
Only curve for power-on status is recorded, and that for power-off will not be saved;
The value of the abscissa indicates the time from the point on the curve to the current time point. The leftmost point on the first page (0 on the abscissa) is the latest temperature record;
Temperature curve record is provided with power-down memory function.

1.7 Fault interface

Click the fault icon on the main interface and the interface displays as follows:



- 1:Fault code
- 2:Fault name
- $\textcircled{3:Occurrence time of the fault, Day and month hour: minute: second lf the current temperature is ``F', Month and day hour: minute: second temperature is ``F', month and day hour: minute: second hour: minute: second$
- ④:Click this key to clear all fault records, enter the date of the day into the OK screen.

| Confirm to Clear? Yes No | |
|-----------------------------|-----------------------------|
| | |
| | Confirm to Clear? Yes No |

2. Parameter list and breakdown table

2.1 Electronic control fault table

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

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

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

Frequency conversion board fault table:

| Protect/fault | Fault display | Reason | Elimination methods |
|--|------------------|---|--|
| IPM Overcurrent Fault | F00 | IPM Input current is large | Check and adjust the current measurement |
| Comp. Driver Fault | F01 | Lack of phase, step or drive hardware damage | Check the measuring voltage check frequency conversion board hardware |
| Pre-Charge Failure | F03 | The PFC circuit protection | Check the PFC switch tube short circuit or not |
| DC Power Bus Overvoltage Fault | F05 | DC bus voltage>Dc bus Overload-voltage protection value | Check the input voltage measurement |
| DC Power Bus Undervoltage | F06 | DC bus voltage <dc bus<br="">Underload-voltage protection value</dc> | Check the input voltage measurement |
| AC Power Undervoltage Fault | F07 | The input voltage is low, causing the input current is low | Check the input voltage measurement |
| AC Power Overcurrent Fault | F08 | The input voltage is too high, more than outage protection current RMS | Check the input voltage measurement |
| Input Power Voltage Sampling Fault | F09 | The input voltage sampling fault | Check and adjust the current measurement |
| DSP and PFC Communication Fault | F12 | DSP and PFC connect fault | Check the communication connection |
| DSP and Comp. Driver Communication Fault | F11 | DSP and Inverter board communication failure | Check the communication connection |
| Comp. Driver and PCB Communication Fault | F151 | DSP and Mainboard communication failure | Check the communication connection |
| IPM Overheat Fault | F13 | The IPM module is overheat | Check and adjust the current measurement |
| Comp. Overcurrent Fault | E051 | The compressor is overload | Check whether the system of the compressor running normally |
| Input Power Lacking Phase Fault | F15 | The input voltage lost phase | Check and measure the voltage adjustment |
| IPM Current Sampling Fault | F18 | IPM sampling electricity is fault | Check and adjust the current measurement |
| Comp. Driver Temp. Sensor Fault | F17 | The transducer is overheat | Check and adjust the current measurement |
| IGBT Power Device Overheat Alarm | F20 | The IGBT is overheat | Check and adjust the current measurement |
| Comp. Weak Magnetic Alarm | F16 | Compressor magnetic force is not enough | Check and adjust the current measurement |
| AC Input Current Frequency Decrease Alarm | F22 | Input current is too large | Check and adjust the current measurement |
| EEPROM Alarm | F23 | MCU error | Check whether the chip is damaged Replace the chip |
| Destroyed EEPROM & No Activated Fault | F24 | MCU error | Check whether the chip is damaged Replace the chip |
| Input Power Current Sampling Fault | F25 | The V15V is overload or undervoltage | Check the V15V input voltage in range 13.5V~16.5V or not |
| IGBT Overheat Fault | F26 | The IGBT is overheat | Check and adjust the current measurement |
| Comp. Current Frequency Decrease Alarm | F33 | The compressor current frequency reduction | Check and adjust the current measurement |
| AC Power Overvoltage Fault | F10 | Input voltage>Input Overload- -voltage protection value | Check whether the input voltage is higher than 265V |
| Compressor Lacking Phase Fault | F14 | The compressor lost phase | Check whether compressor cables are connected properly and reliably |
| EEPROM Fault | F29 | Failed to read the memory chip | Check the frequency conversion board |
| Overspeed Fault | F21 | The compressor is running abnormally | Check whether the compressor cable is nor- -mal and whether the compressor is blocked |

Operation and Use

| Protect/fault | Fault display | Reason | Elimination methods |
|--|------------------|--|---|
| Driver (Fan)Temp.Sensor Fault | F120 | The temp. sensor is broken or short circuit | Check or change the temp. sensor |
| Driver (Fan)IPM Overheat Fault | F106 | The fan IPM drive plate has poor heat dissipation | Check heat dissipation conditions |
| Driver (Fan) External Overcurrent Fault | F105 | The fan IPM hardware running current is too large | Check whether the fan is blocked |
| Driver (Fan) Power Lacking Phase Fault | F101 | The fan lost phase | Check whether fan cables are connected properly and reliably |
| Driver (Fan) Current Sampling Fault | F112 | Fan sampling electricity is fault | Check whether the fan drive plate is abnormal |
| Driver (Fan) Start Fault | F102 | The fan fails to start | Check whether the fan is blocked |
| Driver (Fan) Internal Overcurrent Fault | F113 | The fan software running current is too large | Check whether the fan is blocked |
| Driver (Fan) overspeed Fault | F109 | The fan speed is too high | Check whether the fan drive board is abnormal |

2.2 Parameter list

| Meaning | Default | Remarks |
|--|-------------|------------|
| Cooling target temperature set point | 12 ℃ | Adjustable |
| Heating the target temperature set point | 45 ℃ | Adjustable |
| Hot water target temperature set point | 55 ℃ | Adjustable |

3. Interface diagram

3.1 Wire control interface diagram and definition



| Sign | Meaning |
|------|--------------|
| V | 12V (power+) |
| А | 485A |
| В | 485B |
| G | GND(power-) |

Operation and Use

3.2 Controller interface diagram and definition



Main board of the input and output interface instructions below

| Number | Sign | Meaning |
|--------|-------------|--|
| 01 | AI/DI01 | Inlet Water Temp. |
| 02 | AI/DI02 | Outlet Water Temp. |
| 03 | AI/D103 | Coil Temp. |
| 04 | AI/DI04 | Ambient Temp. (AT) |
| 05 | AI/D105 | Suction Temp. |
| 06 | AI/D106 | Antifreeze Temp. |
| 07 | AI/D107 | Zone 1 room temp./Zone 1-P |
| 08 | AI/DI08 | DHW Tank Temp. |
| 09 | AI/DI09 | Room Temp. /Buffer Tank Temp. |
| 10 | AI/DI10 | EVI Inlet Temp. |
| 11 | AI/DI11 | EVI Outlet Temp. |
| 12 | AI/DI12 | High Pressure Switch |
| 13 | AI/DI13 | Low Pressure Switch |
| 14 | AI/DI14 | Flow Switch |
| 15 | AI/DI15 | Zone 2 Water Temp. after Mixing |
| 16 | AI/DI16 | Remote Switch/SG-1 |
| 17 | Al/17 (50k) | DHW Switch/Zone 2 room temp./Zone 2-P |
| 18 | AI/18 (50K) | Exhaust Temp. |
| 19 | 0~5V_IN1 | Transformer Current 1 |
| 20 | 0~5V_IN2 | Transformer Current 2 |
| 21 | 0~5V_IN3 | Transformer Current 3 |
| 22 | 0~5V_IN4 | Low Pressure |
| 23 | DIN_1 | Heating & Cooling Function Switch |
| 24 | DIN_2 | Heating / Cooling Mode Switch |
| 25 | PWM_IN1 | Water Flow Rate |
| 26 | PWM_IN2 | Reserved |
| 27 | PWM_OUT1 | Heating & Cooling Function Switch Output |
| 28 | PWM_OUT2 | Heating / Cooling Mode Switch Output |
| 29 | 0~10V OUT1 | Mixing valve output |
| 30 | 0~10V OUT2 | Reserved |
| 31 | +5V | 5V output |
| 32 | +12V | 12V output |
| 33 | CN1 | EEV Steps |
| 34 | CN2 | EVI EEV Steps |
| 35 | CN3 | Reserved |
| 36 | CN4 | Reserved |
| 37 | CN300 | Program port |
| 39 | IP5 1 | 5 inch color diaplay/DC fan speed regulation module/ |
| | | Frequency conversion board/Hydraulic module |
| 39 | JP5_2 | Centralized control communication port |
| 40 | JP5_3 | DTU/WIFI/Thermostat 1/Thermostat 2 |
| 41 | R001 | Compressor |

Operation and Use

| 42 | R002 | Zone 2 Mixing valve Open |
|----|-------|----------------------------|
| 43 | R003 | Zone 2 Mixing valve Closed |
| 44 | R004 | Main Circulation Pump |
| 45 | R005 | DHW Pump |
| 46 | R006 | 4-way valve |
| 47 | R007 | Electric Heater Stage 1 |
| 48 | R008 | Electric Heater Stage 2 |
| 49 | R009 | Hot water 3-way valve |
| 50 | RO10 | Crankcase Heater |
| 51 | R011 | Bottom Plate Heater |
| 52 | R012 | Cooling 3-Way Valve |
| 53 | R013 | DHW Electric Heater |
| 54 | R014 | Zone 1 pump |
| 55 | R015 | Zone 2 pump |
| 56 | JP9 | 12V input |
| 57 | CN7 | Reserved |
| 58 | P_FB2 | Reserved |
| 59 | P_FB1 | Reserved |
| 60 | P2_DO | Reserved |
| 61 | P1_DO | Reserved |

Note:

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

Appendix 1、Caution & Warning

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

Appendix 2, Cable specification

1. Single phase unit

| Nameplate maximum current | Phase line | Earth line | МСВ | Creepage protector | Signal line |
|---------------------------------|----------------------------|--------------------|------|------------------------|----------------------|
| No more | 2×1 5mm2 | 1 5mm2 | 204 | 20mA loss than 0.1 and | |
| than 10A | 2/(1.011111 | 1.511111- | 20A | SomA less man 0.1 sec | |
| 10~16A | $2 \times 2.5 \text{mm}^2$ | 2.5mm ² | 32A | 30mA less than 0.1 sec | |
| 16~25A | 2×4mm ² | 4mm ² | 40A | 30mA less than 0.1 sec | |
| 25~32A | 2×6mm ² | 6mm ² | 40A | 30mA less than 0.1 sec | |
| 32~40A | $2 \times 10 \text{mm}^2$ | 10mm ² | 63A | 30mA less than 0.1 sec | |
| 40~63A | $2 \times 16 \text{mm}^2$ | 16mm ² | 80A | 30mA less than 0.1 sec | n×0.5mm ² |
| 63~75A | $2 \times 25 \text{mm}^2$ | 25mm ² | 100A | 30mA less than 0.1 sec | |
| 75~101A | $2 \times 25 \text{mm}^2$ | 25mm ² | 125A | 30mA less than 0.1 sec | |
| 101~123A | $2 \times 35 \text{mm}^2$ | 35mm ² | 160A | 30mA less than 0.1 sec | |
| 123~148A | $2 \times 50 \text{mm}^2$ | 50mm ² | 225A | 30mA less than 0.1 sec | |
| 148~186A | 2×70mm ² | 70mm ² | 250A | 30mA less than 0.1 sec | |
| 186~224A | $2 \times 95 \text{mm}^2$ | 95mm ² | 280A | 30mA less than 0.1 sec | |

2. Three phase unit

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

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

Appendix 3 Water quality requirements

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

Attention: +: Good corrosion resistance under normal conditions 0: There may be corrosion problems

-: Not recommended

| | | Plate material | | Brazing material | | | | |
|--|-----------------------------------|----------------|------------------|------------------|------------------|--------------------|------------------|------------------|
| Moisture | Concen- tration | Time limit | AISI 304 | AISI 316 | 254 SMO | Cuprum | Nickel | SS |
| Alkalinity (HCO₃ ⁻) | <70 70-300 >300 | 24h | + + + | + + + | + + + | 0 + 0/+ | +++++ | + + + |
| Sulfate (So₄²·) | <70 70-300 >300 | unlimited | + + + | + + + | + + + | + 0/- - | + + + | + + + |
| HCO ₃ ⁻ /SO ₄ ²⁻ | >1.0 <1.0 | unlimited | + + | + + | + + | + 0/- | + + | + + |
| Electrical conductivity | <10 10-500 >500 | unlimited | + + + | + + + | + + + | 0 + 0 | + + + | + + + |
| рН | <6.0 6.0-7.5 7.5-9 >9 | 24h | 0 + + + | 0 + + + | 0 + + + | 0 0 + 0 | +++++++ | 0 + + + |
| Ammonium (NH₄⁺) | <2 2-20 >20 | 24h | + + + | + + + | + + + | + 0 - | + + + | + + + |
| Chloride (Cl ⁻) | <10 100-200 200-300 >300 | unlimited | + 0 - - | + + + - | + + + + | + + + 0/+ | + + + + | +++++ |

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