

AIR SOURCE WATER HEAT PUMP

Installation and Instruction Manual

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1. Preface

Welcome to air source water heat pump. Your decision to purchase heat pump will reward you for many years.

This is your assurance that you have purchased quality heat pump system available, one that is manufactured in a state-of-the-art facility and go with innovation.

Necessary reading

Carefully read these operating and installation instructions and keep them safe. Should the equipment change hands, pass these instructions to the subsequent owner. Pass them to the trained contractors for servicing purposes.

Qualified only

Positioning, installation and commissioning must be carried out by trained personnel working in accordance with these *operating and installation instructions*.

Protection

Where children or persons with limited physical, sensory or mental capabilities are to be allowed to control this equipment ensure that this will only happen under supervision or after appropriate instructions by a person responsible for their safety. Children should be supervised to ensure that they do not play with the equipment.

For information

The pictures and drawings in this manual is for your information only. The manufacture has the right to change or improve the product when it is needed, without prior notification to the users of this device.

Quality check at first receipt of this product

When the product is delivered to the users, please check whether there is any damage on the unit during transportation; If there is any please talk with the forwarder or the contractor.

If the heat pump unit just can be installed a while latter, please keep it free from damage, rust or abrasion by following methods.



- 1, all the access like the water connections must be sealed correctly;
- 2, the unit must be free from sunshine, and placed under 45°C;
- 3, the unit must be free from heavy dust to avoid dirty on the evaporator;
- 4, the unit must be placed free from chaos to avoid accident.
- 5, please check the unit during stock

2.Safety Precautions




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

The piping connection and wiring should be installed according to the local legal laws and regulations as well as the profession standard.

Mark Notes



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



Icon Notes




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

2. Safety Precautions

Warning




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





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

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

2.Safety Precautions

Attention

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

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

3.Overall information of the heat pump

1.Device description

The air source heat pump extracts heat from ambient air and transfer it to water. By circulating the water, the energy is used to warm the house efficiently. Through the usage of floor heating, the heat pump COP can be as high as 4.5.

In reverse, cooling is also available when it is needed.

Compared with oil boiler, gas boiler and electrical heater, heat pump is the best solution with high efficiency, safety and environment protect.

This air source heat pump use advanced heating tech-nology and intelligent control system, to produce hot water at maximum temperature of 65°C for all applications coupled with radiators, fan coils and floor heating.

In addition, the air heat pump can be used to provide hot water for sanitary use, like kitchen, shower, etc.

2.Features of the AIR HEAT PUMP

1, Save our planet---earth, by green technology

Heat pump transfer heat from air to the space for heating, so that there is no burning, no waste, no dirty gas, thus maintain good environment for human and save earth from waste.

2, Serve people by high efficiency and money saving

The heat pump is driven by electricity, and annually average efficiency can be higher than 4. By timer function, users can make use of the electric power at the low point of a day, thus save money for every family.

3, Good for life with safe running

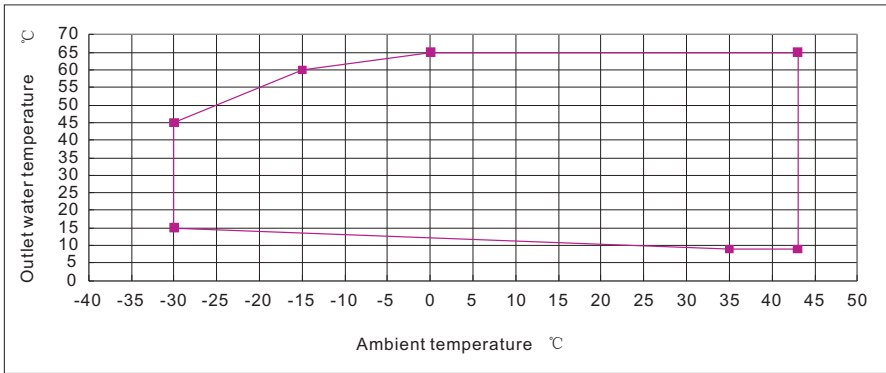
To use heat pump for heating can avoid electrical shot and burning, thus keep people free from explosion or poisoning.

4, Easy operation

Heat pump is controlled and protected by micro-computer based contro-ller, the desired water temperature is set according to real requirement.System protection program will guarantee the unit to be running at hard environment.

3. Overall information of the heat pump

3. Running Range



Power Supply:

Three phase 380V/3N/50Hz, min. voltage 342V, min. voltage 418V

Ambient temp range:

Cooling: 21~43°C

Heating: -30~43°C

Water temp range:

Heat pump controls water inlet temp to the range below:

Cooling water (in): 8°C~21°C;

Heating water (in): 9°C~55°C;

4. New Technology

4.1 EVI Strong Heating Technology

Compared with normal heat pump system, heat pump with EVI greatly improves the system running safety in low ambient temperature.

Meanwhile, COP is increased by 15% and heating capacity is increased by 20%.

4.2 Low Ambient Temperature Heating Technology

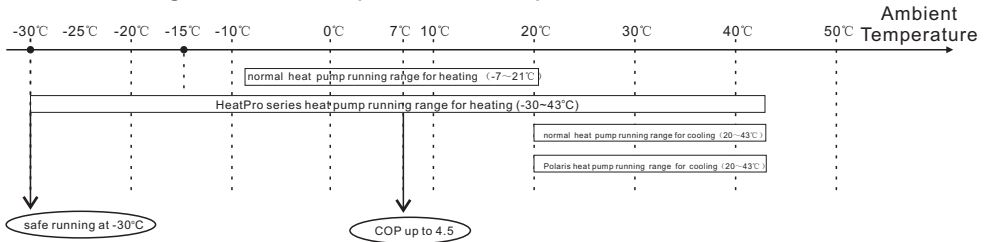
The heat pump can work efficiently and safely at -30°C ambient temperature.

4.3 High COP

The COP of heat pump can reach 4.5 at floor heating condition.

3. Overall information of the heat pump

4.4 Running Ambient Temperature Comparison



4.5 Functions

- Heating/Cooling
- Smart defrost
- Auto Protection
- Multiple Module Control
- Automatic Reset for Partial Failure
- Auto Alert
- Remote Control

4.6 Heat Pump Protection

- Water flow protection
- Compressor overload, discharge air temp protection
- Discharge air pressure over high protection
- Suction air pressure over low protection
- Water(out) temperature over high protection
- Water(out) temperature over low protection
- Suspend anti-freezing protection in winter
- Compressor frequent switching protection

3.Overall information of the heat pump

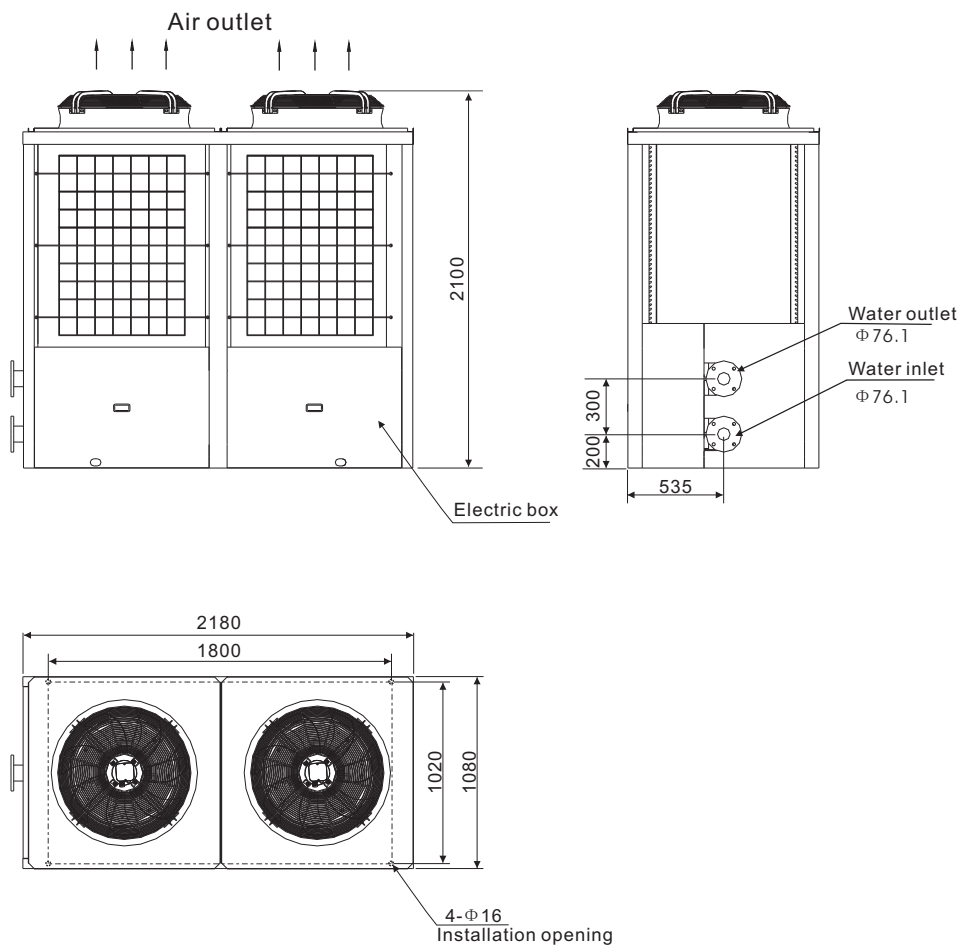
5.Specification data

Indoor Unit Model			
*Heating Capacity	kW		85
	kcal/h		290000
**Heating Capacity	kW		86
	kcal/h		294000
Cooling Capacity	kW		59
	kcal/h		201300
*Power Input for heating	kW		23.9
**Power Input for heating	kW		32.7
Power Input for Cooling	kW		21.9
Running Current(*heating/**heating/cooling)	A		49.2/60/48.7
Power Supply			380V/3N~/50Hz
Compressor Quantity			2
Compressor type			EVI Scroll
Fan Quantity			2
Fan Power Input	W		1100×2
Fan Rotate Speed	RPM		900
Noise	dB(A)		73
Water Connection	mm		76.1
Water flow rate	m ³ /h		15.5
Water pressure drop	kPa		50
Unit dimension (L/W/H)	mm	(Subject to drawings of the heat pump)	
Packing size (L/W/H)	mm	(Subject to data on the package)	
Net Weight	kg	(Subject to data on the nameplate)	
Gross weight	kg	(Subject to data on the package)	

- 1.*Heating: outdoor temperature DB/WB7°C/6°C , outlet water 45°C, inlet water (return) 40°C;
2.**Heating: outdoor temperature DB/WB7°C/6°C , outlet water 60°C, inlet water (return) 55°C;
3.Cooling: outdoor temperature DB/WB35°C/24°C , outlet water 7°C, inlet water (return)12°C;

3.Overall information of the heat pump

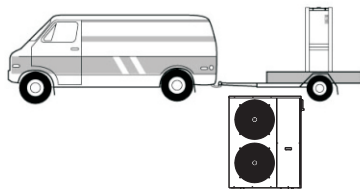
3. Overall information of the heat pump



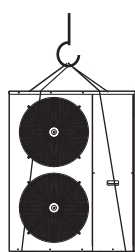
4. Installation

1 Transit

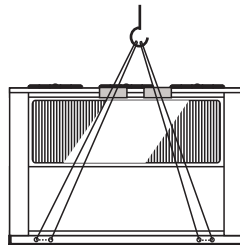
When the heat pump is transported please keep the unit stand up. The unit cannot be laid down, otherwise the inner parts of the device may be damaged.



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



Picture 1



Picture 2



WARNING

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

2 Installation occasions

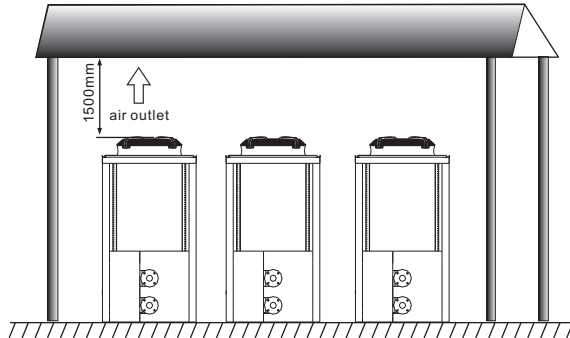
- The unit can be installed on any place outdoor which can carry heavy machine such as terrace, housetop, ground and so on.
- The location must have good ventilation.
- The place is free from heat radiation and other fire flame.
- A pall is needed in winter to protect the heat pump from snow.(See picture 2)
- There must be not obstacles near the air inlet and outlet of the heat pump.
- There must be water channel around the heat pump to drain the condensing water .
- A place which is free from strong air blowing.
- There must be enough space around the unit for maintenance.

3 Installation method

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

4. Installation

Picture 3: Snow shelter



Attention

Snow shelter is necessary if the heat pump has to work normally at cold area in winter.

4. Water loop connection

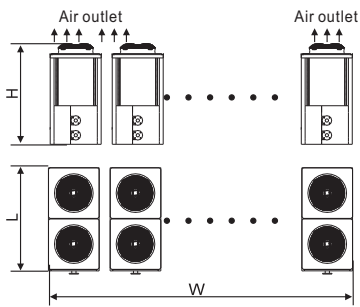
Please pay attention to below matters when the water pipe is connected:

- 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.
- The connection between the heat pump and the construction is better to be flexible type, to avoid vibration transfer. The support to the water pipe must be separate, but not rely on the heat pump unit
- 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.
- There must be drainage on the low points of the water system, and there is already drainage on the chassis of the heat pump. The water in the system must be drain out during winter if the heat pump is not running. And there must be air vent on the high point of the water system to drive air of the water. Drainage and air vent need not to be insulated, in order to maintain.

4.Installation

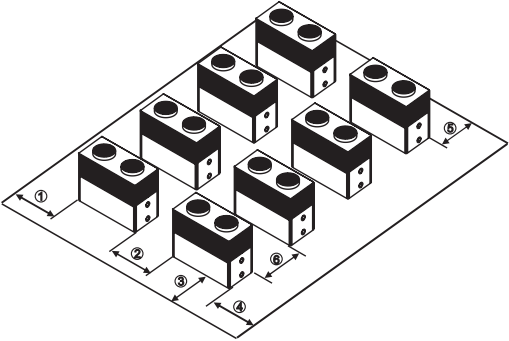
5.Location of the unit

The size of unit



Parallel model	L(mm)	W(mm)	H(mm)
two units	2180	3160	2100
three units	2180	5240	2100
four units	2180	7320	2100
five units	2180	9400	2100

The schematic diagram of installation



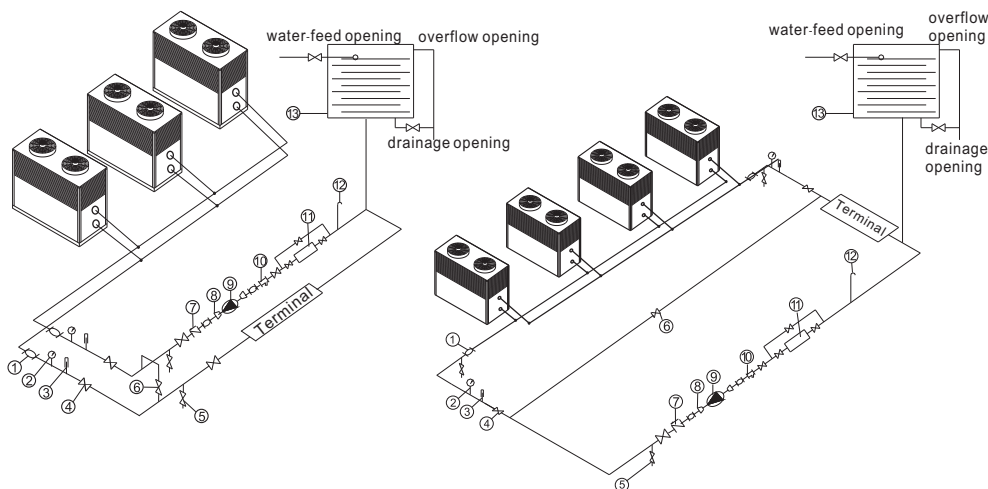
1	The place for maintenance more than 1500mm
2	The distance between two units more than 1500mm
3	The place for maintenance more than 1500mm
4	The place for maintenance more than 1500mm
5	The place for maintenance more than 1200mm

4.Installation

6 Water connection diagram

■ 3 units, different course connection

■ 4 units, same course connection



1	rubber connector	4	adjusting valve	7	one way valve	10	Y filter	13	expansion tank
2	gauge	5	drain valve	8	reducer union	11	electric scale-borer		
3	thermometer(0-100°C)	6	bypass valve	9	water pump	12	discharge valve		

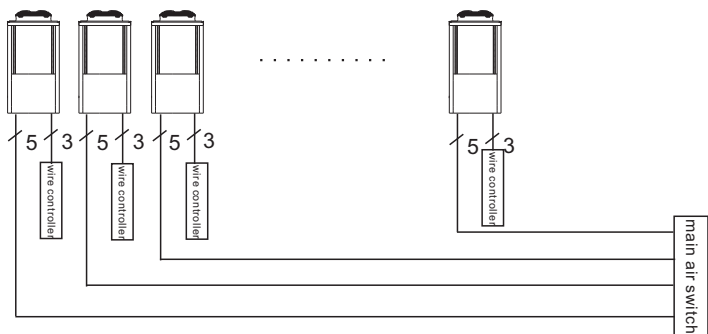
7.Power supply connection

- 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.

4.Installation

8.Cable and switch

- The unit should use independent power supply, Wiring required by Table 6.1, Power supply voltage must in line with rated voltage.
- Power supply circuit must be equipped with an All-pole disconnect device have at least 3mm contact opening distance.
- The wiring must be completed by professional technicians in accordance with circuit diagram.
- Power supply circuit must have earth wire, the earth wire of power should be connected with external earth wire safely. And the external earth wire must be in order.
- The creepage protection device must be settled in accordance with the relevant national technical standards for electronic equipment.
- The power wire and signal wire should be neatly arranged. High voltage wire and low voltage wire must be separated and free from any interference, and they must be free from any pipe and valves of the unit.
- When all the wiring is completed, the power can only be connected after a double check.



Power Specifications

Items Unit Model	Power Supply	Cable	MCB	Creepage Protector
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	380V/3N~50Hz	Section area	Earthing wire	100A	30mA Less Than 0.1 SET
		25*4mm ²	25mm ²		


4. Installation

9. Trial running

Inspection before trial running

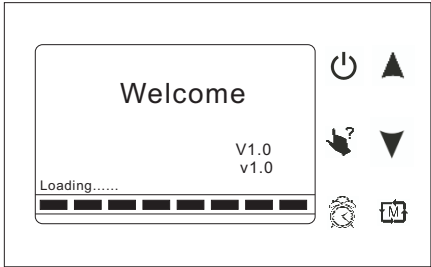
- Check the indoor unit, and make sure that the pipe connection is right and the relevant valves are open .
- Check the water loop, to ensure that the water inside of the expansion tank is enough, the water supply is good, the water loop is full of water and without any air. Also make sure there is good 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.

5.Controlling and Operation

1.Function of wire controller



Button	Name	Function
	ON/OFF	Press this button to start up/shut off the unit, cancel current operation or back to upper interface.
	HELP	Press this button to check button function or system state.
	MODE	Press this button to change the current mode, page up or confirm current operation.
	CLOCK	Press the button to set the clock, the timer on or timer off
	Up	Press this key to select the upward option or increase the parameter value.
	Down	Press this key to select the downward option or decrease the parameter value.

5. Controlling and Operation

2. Usage of wire controller

2.1 The way to use

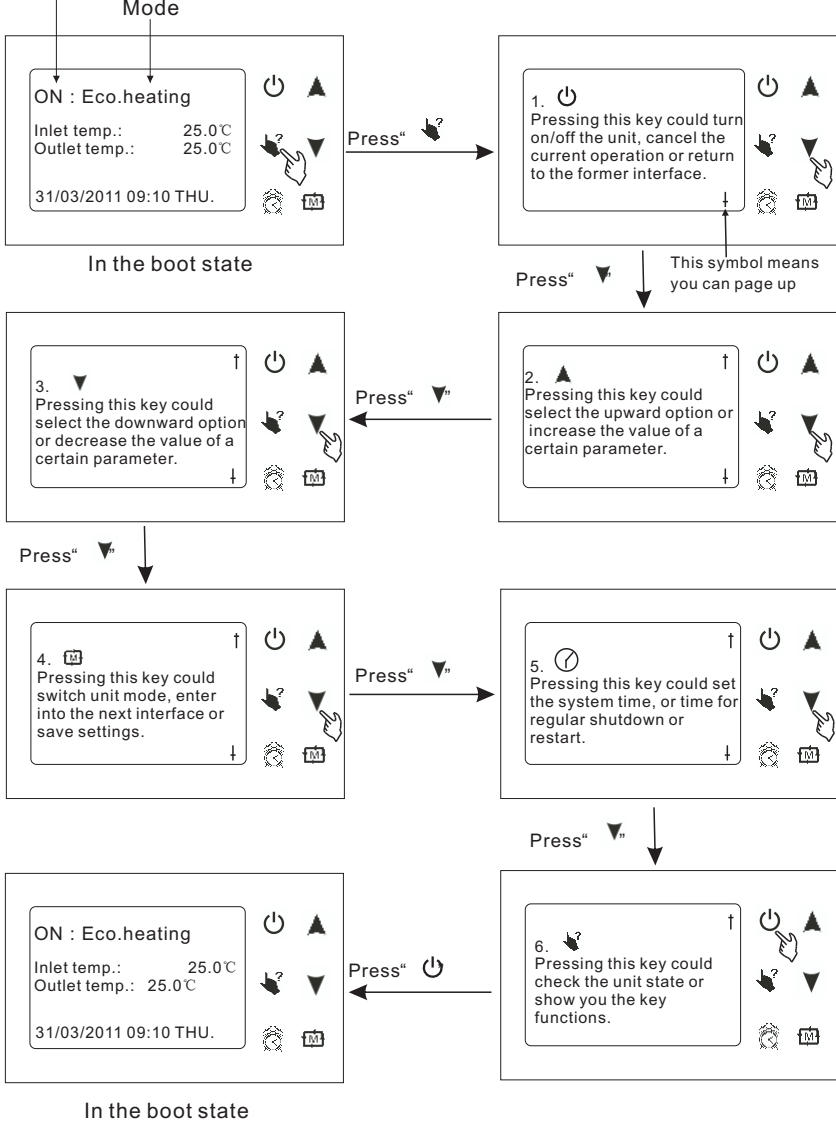
You can use “ ” at any interface, it will show relevant button function of current interface.

You can press “ ” to exit the "help" interface.


For example :

Press “ ” at main interface, system will show all button function; Press “ ” at clock interface, system will show “ ”, “ ”, “ ” and “ ” button function.

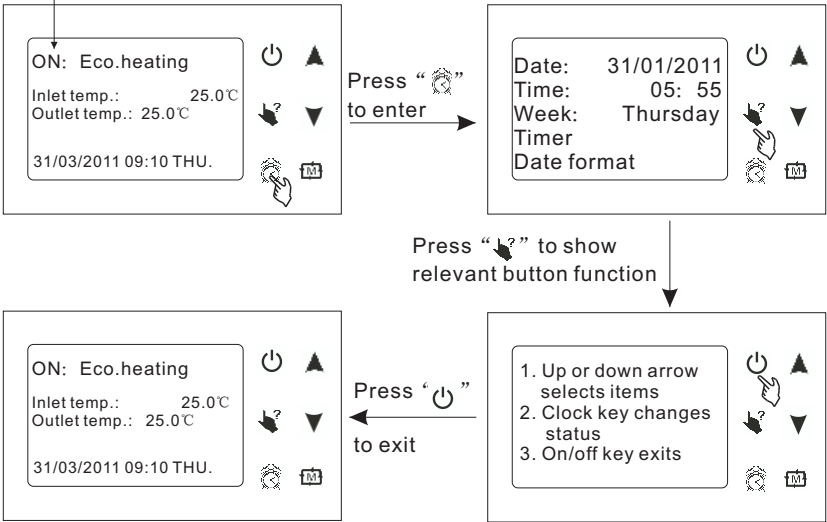
Both are OK when system show ON or OFF



5. Controlling and Operation

Press “” at clock interface, the screen shows as follow:

Both are OK when system shows ON or OFF

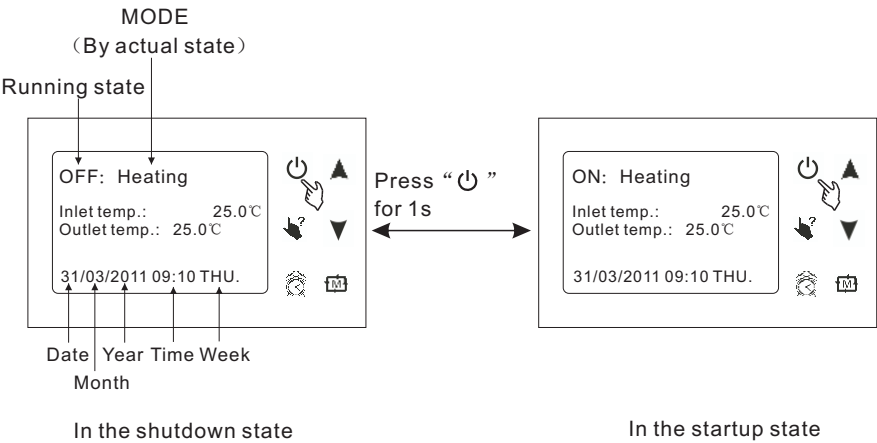


2.2 Starting up and shutting down

Press “” in the shutdown state for 1s to start up the system;


Press “” in the startup state for 1s to shut down the system.

For example:

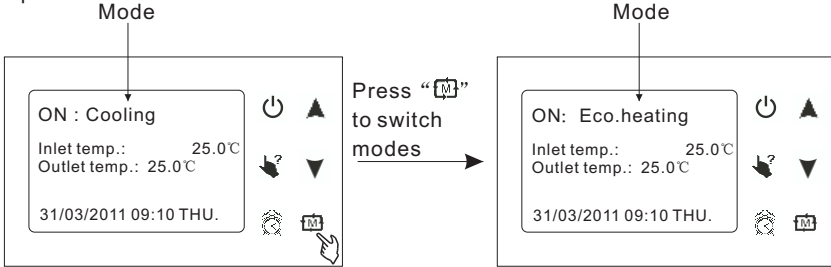


5. Controlling and Operation






2.3 The operation of mode switching

At main interface, you can switch modes of cooling, economic heating, heating, rapid heating by pressing “”. Or switch modes of cooling, economic heating and automatic. The different unit gets different mode types.

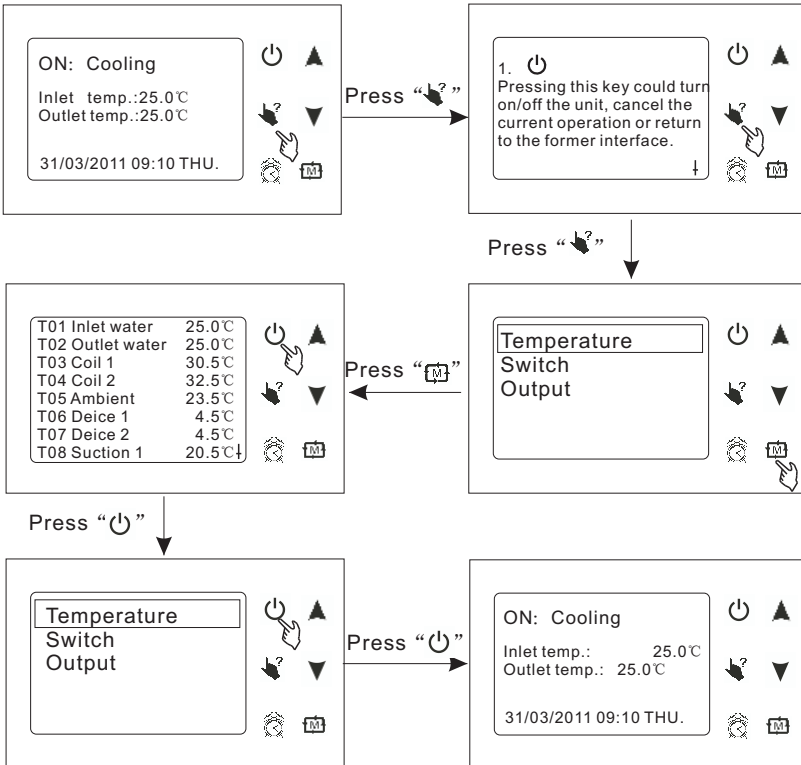
Attention: the operation of mode is invalid when the unit you buy is cooling only or heating only. For example:



2.4 The operation of system state checking

At any interface, you can enter system working state by pressing “” twice, press “” (pageup) or “” (pagedown) to select the needing parameter, press “” to enter, and press “” to exit.

For example:

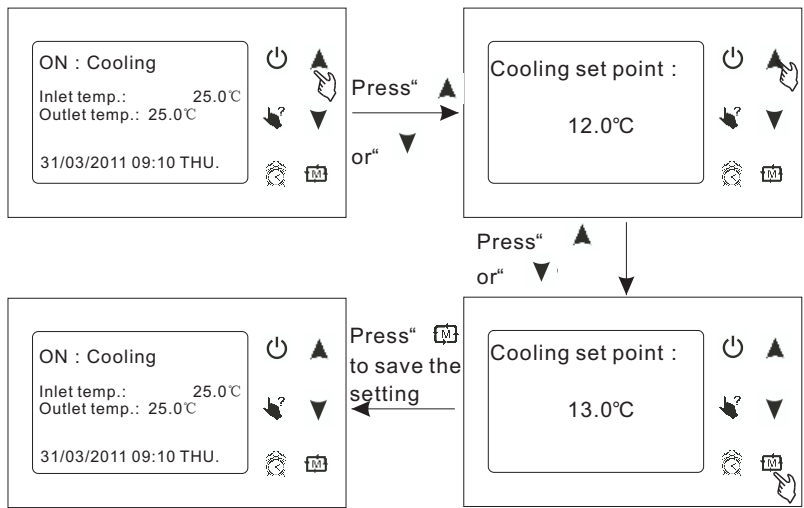


5. Controlling and Operation

2.5 The operation of parameter setting

At main interface, press “▲” or “▼” enter parameter setting interface, press “▲” (increasing) or “▼” (decreasing) can change parameter value, press “M” to save the setting and exit . Press “P” can not save the setting but exit. (You can refer to parameter table to set relevant temperature.)

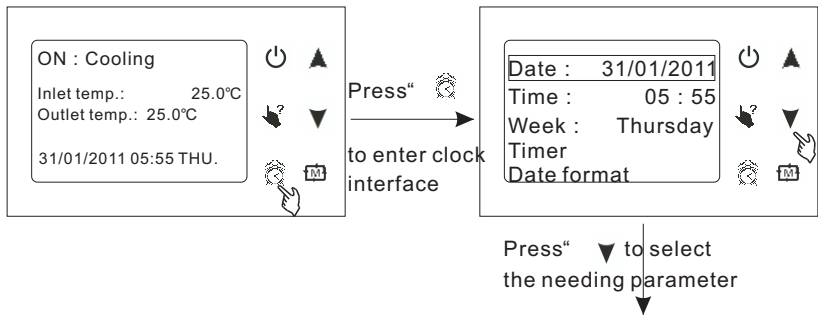
For example :



2.6 The operation of clock setting

At main interface, press “M” to enter clock setting interface, select the needing parameter and press “▲” or “▼” (Decreasing) can change parameter value, then press “M” to save, press “P” cancel the setting or back to the main interface. (“timer setting”refer to timer operation)

For example :



5. Controlling and Operation

Press "▼" to select
needing parameter

Date : 31/01/2011
Time : 05 : 55
Week : Thursday
Timer
Date format

Press "⌚"

Hour bit flashing

Date : 31/01/2011
Time : 05 : 55
Week : Thursday
Timer
Date format

Minute bit flashing

Date : 31/01/2011
Time : 06 : 55
Week : Thursday
Timer
Date format

Press "⌚"
to save the
hour value

Press "▲"
or "▼"

Hour bit flashing

Date : 31/01/2011
Time : 06 : 55
Week : Thursday
Timer
Date format

Press "▲"
or "▼"

Minute bit flashing

Date : 31/01/2011
Time : 06 : 41
Week : Thursday
Timer
Date format

Press "⌚"
to save the
minute value

Date : 31/01/2011
Time : 06 : 41
Week : Thursday
Timer
Date format

Press "⏻"
to exit

ON : Cooling
Inlet temp.: 25.0°C
Outlet temp.: 25.0°C
31/01/2011 06:41 THU.

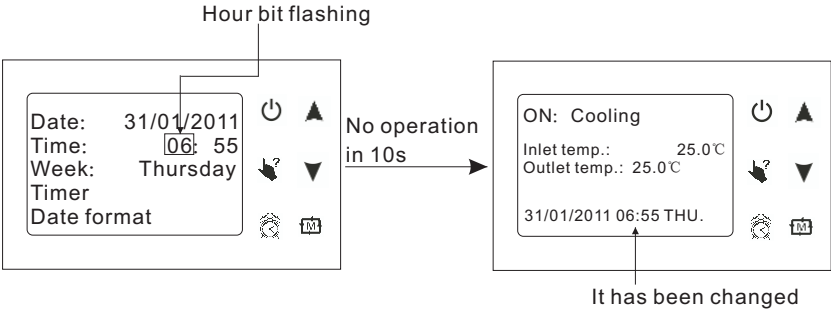
The time has been changed

Tips : The setting of date and week is the same with clock;

If there is no operation in 10s, system will remember parameter setting automatic and back to the main interface.,

As follow :

5. Controlling and Operation



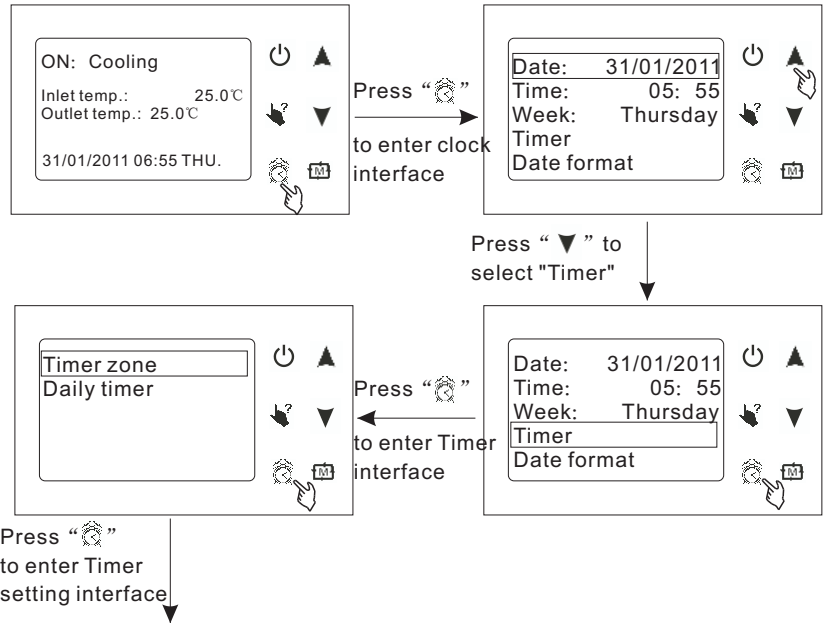
2.7 The operation of timer setting

You can set four timer on and timer off according to you needing.

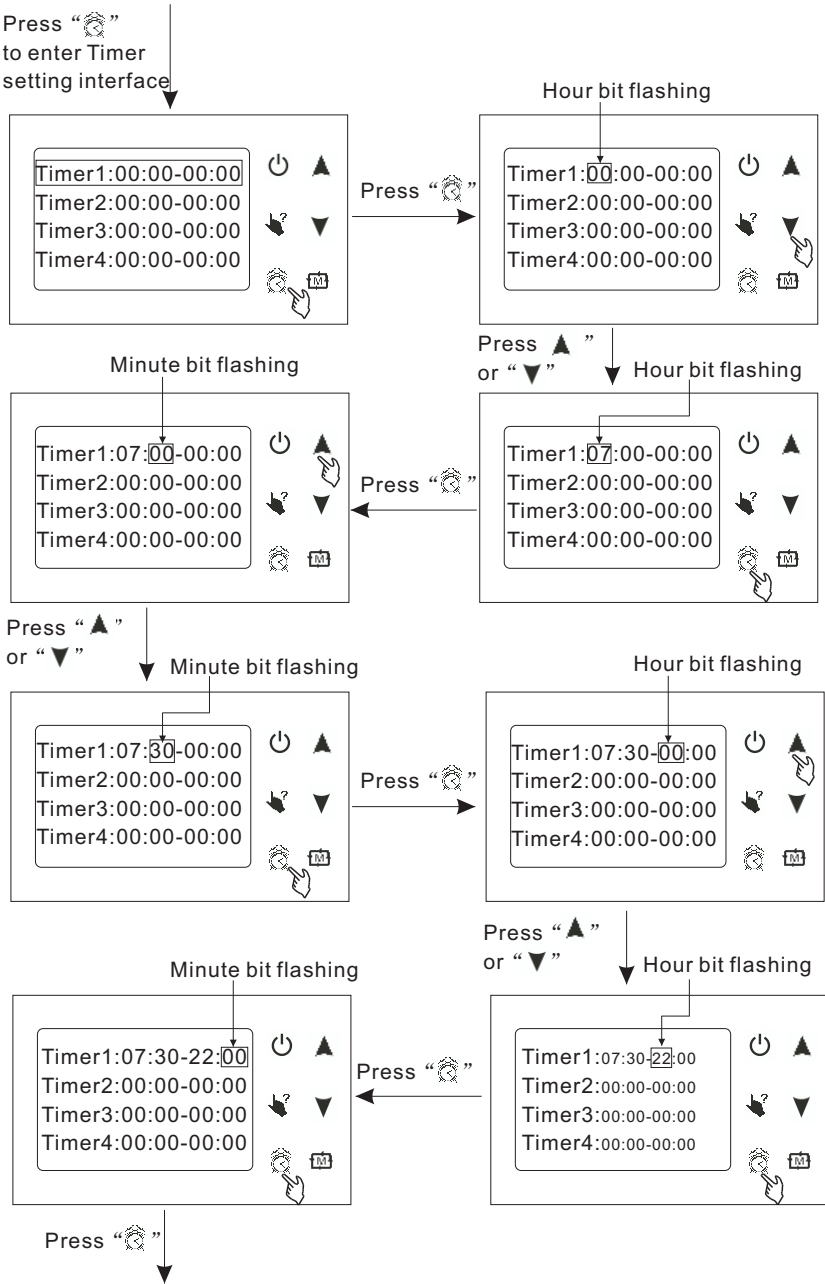
At main interface, press “🕒” to enter timer setting, press “▼” to select “Timer”, then press “🕒” to enter timer setting interface, (timer setting: you can set four timer on and timer off, and the time you set can from Monday to Sunday.), the operation is the same with clock setting.

For example:

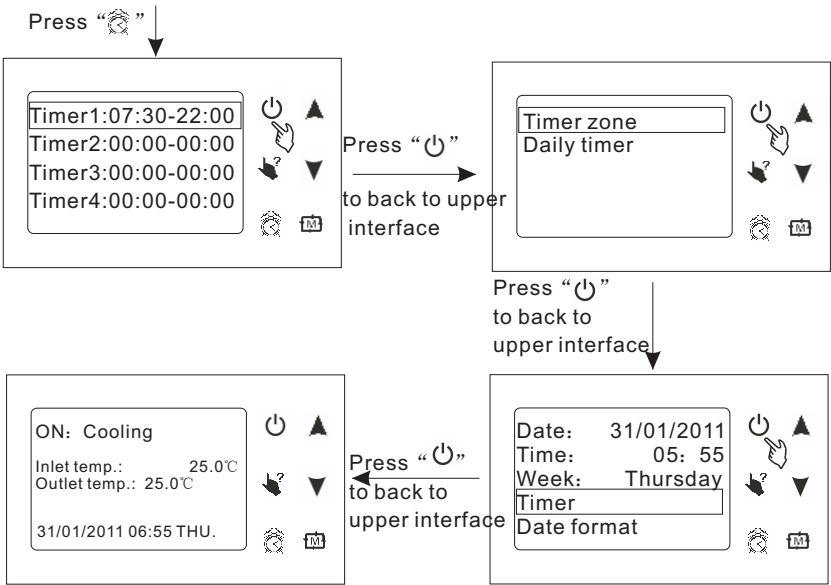
A. Timer setting



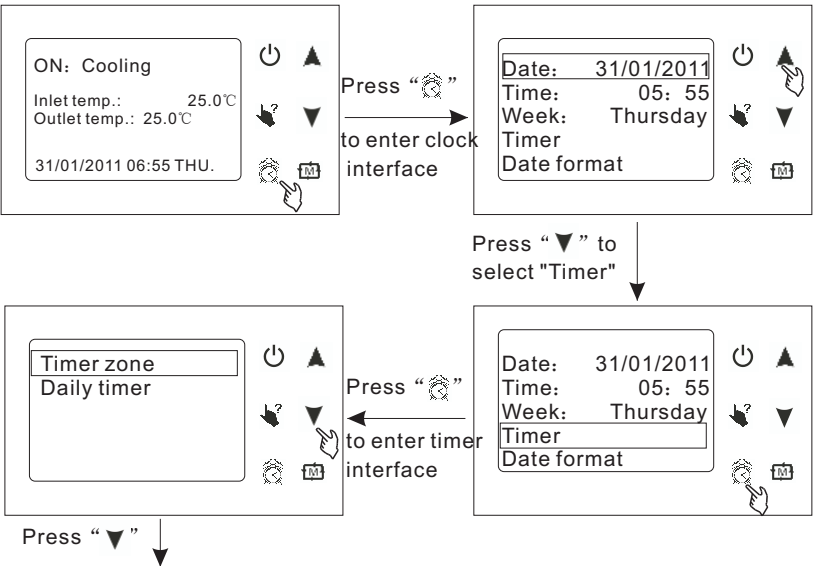
5. Controlling and Operation



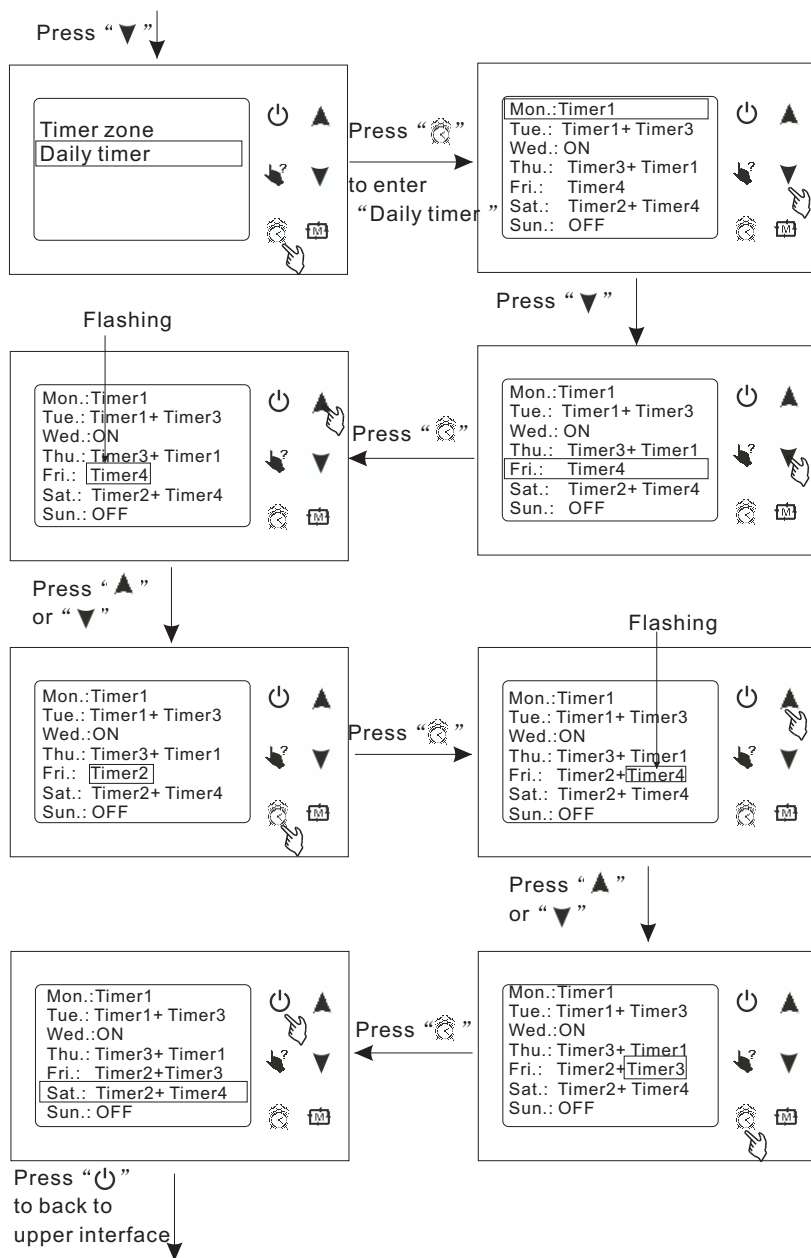
5. Controlling and Operation




B. The operation of daily timer

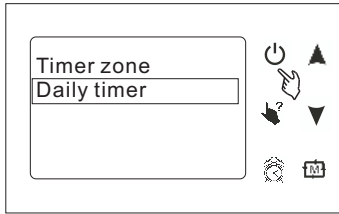


5. Controlling and Operation

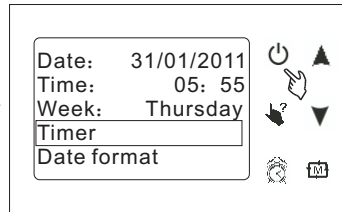



5. Controlling and Operation

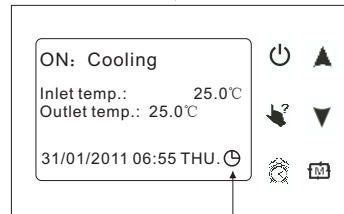
Press “”
to back to upper
interface




Press “”
to back to
upper
interface



Press “”
to back to upper
interface



If “” has been shown, it means
timer on/off has been set

Tips: The Timer operations of Monday, Tuesday, Wednesday, Thursday, Saturday, Sunday is the same with Friday.

Monday: OFF : means Monday Timer hasn't been set, and the running state is the same with Sunday at 24:00, for example, if system is running at 24:00 on Sunday, then it will be running the whole day on Monday, and vice versa;

Wednesday: ON : means system will be running the whole day on Wednesday

Thursday: OFF : means system will be off the whole day on Thursday;

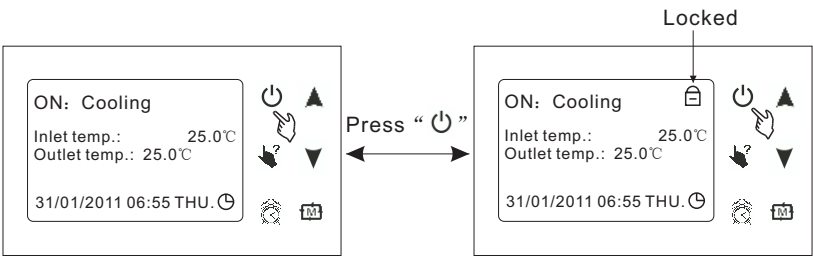
Saturday: Timer1+Timer2 : means the time to start up and to shut down is according to Timer1 and Timer2.

If there is no operation in 10s, system will memory the parameter setting automatically and back to main interface.

5. Controlling and Operation

2.8 Keyboard lock

To avoid mis-operations, please lock the controller after parameter setting.
At the main interface, pressing “⏻” for 5 seconds, the keyboard will be locked.
When the keyboard is locked, pressing “⏻” for 5 seconds, the keyboard will be unlocked.



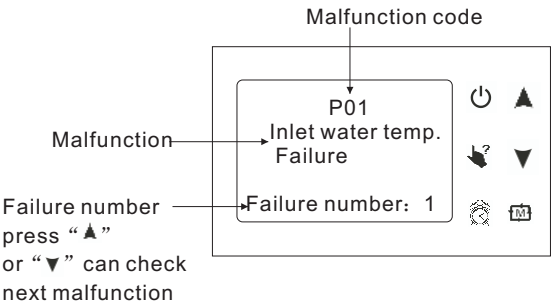
NOTES:

When the unit is in alarming state, the key lock can be removed automatically.

2.9 Malfunction display

There will be malfunction code showing on the controller screen when relative malfunction occurs.

You can refer to the malfunction table to find out the failure cause and solution.
For example:



3. Parameter table

Meaning	Default	Remarks
Set-point of cooling target temp.	12℃	Ajustable
Set-point of heating target temp.	45℃	Ajustable

6. Troubleshooting and extra information

1. Maintenance

- Check the water supply and air vent frequently, to avoid lack of water or air in the water loop. Clean the water filter in a certain period to keep good water quality. Lack of water and dirty water can damage the unit. The heat pump will start the water pump per 72 hours when it is not running, to avoid freezing.
 - Keep the unit in a place which is dry and clean, and has good ventilation. Clean the heat exchanger in 1 or 2 month and keep good heat exchange rate and save energy.
 - Check each part of the unit and the pressure of the system. Replace the failure part if there is any, and recharge the refrigerant if it is needed.
 - Check the power supply and the electrical system, make sure the electrical components are good, the wiring is well. If there is any part failed with wrong action or smell, please replace in time.
 - If the heat pump is not used for a long time, please drain out all the water in the unit and seal the unit to keep it good. Please drain the water from the lowest point of the heat exchanger to avoid freezing in winter. Water recharge and full inspection on the heat pump is needed before it is restarted.
 - Please drain out the water in the super heater of the heat pump unit in winter, when the super heater is not used, in case it is heat pump with super heater.
 - The water loop of the heat pump **MUST** be protected from freezing in winter time. Please pay attention to below suggestions. Nonobservance on below suggestion will invalid the warranty for the heat pump.
- (1) Please do not shut off the power supply to the heat pump in winter. When the air temperature is below 0 °C, if the inlet water temperature is above 2 °C and below 4 °C, the water pump will start for freezing protect, if the inlet water is lower than 2 °C, the heat pump will run for heating.
- (2) Use anti-freezing liquid (glycol water)
- 1) look for below table for the volume of the glycol water
 - 2) the glycol water can be added into the system from the expansion tank of the water loop.

Glycol percentage (%)	10	20	30	40	50
ambient temp. (°C)	-3	-8	-14	-22	-33
cooling/heating capacity fluctuation	0.991	0.982	0.972	0.961	0.946
power input fluctuation	0.996	0.992	0.986	0.976	0.966
water flow fluctuation	1.013	1.040	1.074	1.121	1.178
water drop fluctuation	1.070	1.129	1.181	1.263	1.308

Note: if the glycol water is too much, the water flow and water pump will be influenced and the heat exchange rate will be decreased. This table is for reference, please use anti-freezing water according to the real condition of the local climate.

6. Troubleshooting and extra information

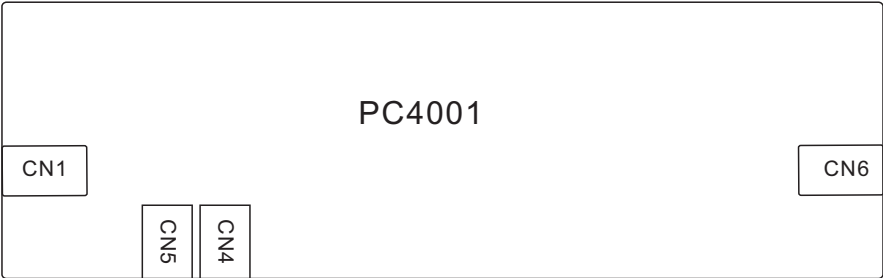
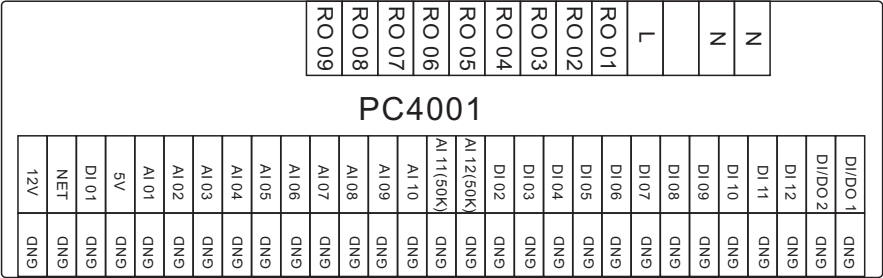
2. Malfunction table

You can refer to the malfunction table to find out the failure cause and solution.

malfunction	display	Indicator	Reason	resolution
Power on		Off		
Normal working		On		
Inlet temp. Sensor failure	P01	1 On 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Outlet temp. Sensor failure	P02	2 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Recovery temp. Sensor failure	P033	3 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Ambient temp. Sensor failure	P04	4 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Coil 1 temp. Sensor failure	P15	5 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Coil 2 temp. Sensor failure	P25	5 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Suction 1 temp. Sensor failure	P17	7 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Suction 1 temp. Sensor failure	P27	7 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Discharge 1 temp. Sensor failure	P181	8 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Discharge 2 temp. Sensor failure	P281	8 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Antifreezing 1 temp. Sensor failure	P19	9 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
Antifreezing 2 temp. Sensor failure	P29	9 on 1 off	The temp. Sensor is broken or short circuit	Check or change the temp. Sensor
High pressure1 protection	E11	11 on 1 off	The high-preesure switch is broken	Check the pressure switch and cold circuit
High pressure2 protection	E21	11 on 1 off	The high-preesure switch is broken	Check the pressure switch and cold circuit
Low pressure1 protection	E12	12 on 1 off	The low-preesure switch is broken	Check the pressure switch and cold circuit
Low pressure2 protection	E22	12 on 1 off	The low-preesure switch is broken	Check the pressure switch and cold circuit
Heat source side water flow failure	E031	13 on 1 off	No water/little water in water system	Check the pipe water flow and water pump
The use side water flow failure	E032	13 on 1 off	No water/little water in water system	Check the pipe water flow and water pump
water flow over-low failure	E035	13 on 1 off	No water/little water in water system	Check the pipe water flow and water pump
Elctrical-heat over heat failure	E04	14 on 1 off	Electrical-heat is over heat	Check or change electrical-heat
Compressor 1 overload failure	E101	21 on 1 off	Compressor is overload	Check the compressor functionality
Compressor 2 overload failure	E201	21 on 1 off	Compressor is overload	Check the compressor functionality
Water-inlet and outlet temp. difference	E06	16 on 1 off	Water flow is not enough and low differential pressure	Check the pipe water flow and whether water system is jammed or not
The system 1use side antifreezing protection	E171	17 on 1 off	Water flow is not enough	Check the pipe water flow and whether water system is jammed or not
The system 2 use side antifreezing protection	E271	17 on 1 off	Water flow is not enough	Check the pipe water flow and whether water system is jammed or not
The system 1heat source side antifreezing protection	E172	17 on 1 off	Water flow is not enough	Check the pipe water flow and whether water system is jammed or not
The system 2 heat source side antifreezing protection	E272	17 on 1 off	Water flow is not enough	Check the pipe water flow and whether water system is jammed or not
The primary anti-freezing protection	E19	19 on 1 off	The ambient temp. Is low	/
The secondary anti-freezing protection	E29	19 on 1 off	The ambient temp. Is low	/
Discharge Temp. Of system 1 is too high	P182	8 on 1 off	The compressor is overload	Check the compressor functionality
Discharge Temp. Of system 2 is too high	P282	8 on 1 off	The compressor is overload	Check the compressor functionality
System protection	E05	8 on 1 off	The protection system is failure	Check each protection point of the system
Defrosting		Flashing	/	/
Communication failure	E08	/	Communication failure between wire controller and main board	Check the wire connection between remote wire controller and main board

7.The main controller terminals

1. Connection of PCB illustration(the upper and the lower)



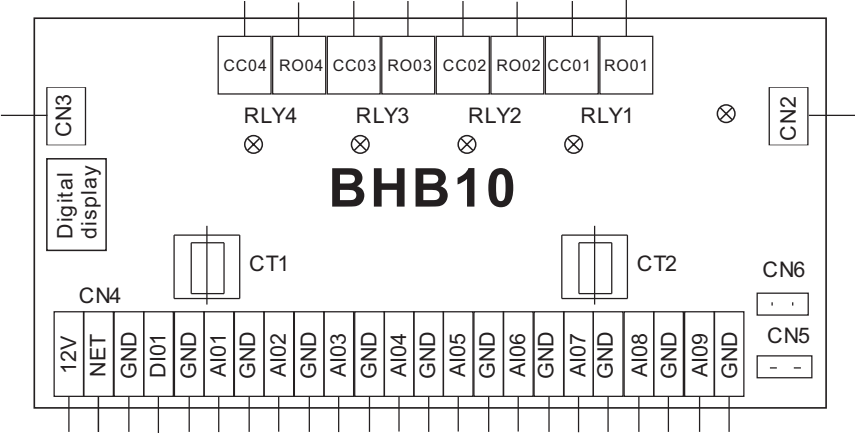
7.The main controller terminals

2.Connections explanation:

NO.	Symbol	Meaning	NO.	Symbol	Meaning
1	AC-L	Live line	21	DI 07	Water flow switch protection input
2	AC-N	Null line	22	DI 08	Electric heater overload protection input
3	RO 01	Compressor 1 output(220VAC)	23	DI 09	Compressor 1 overload protection input
4	RO 02	Compressor 2 output(220VAC)	24	DI 10	Compressor 2 overload protection input
5	RO 03	High speed of fan output(220VAC)	25	DI 11	System protection input
6	RO 04	Low speed of fan output(220VAC)	26	DI 12	Emergency switch input
7	RO 05	Water pump output(220VAC)	27	AI 01	Water input temperature input
8	RO 06	4-way valve output(220VAC)	28	AI 02	Water output temperature output
9	RO 07	Electric heater output(250VAC)	29	AI 03	System 1 fan coil temperature input
10	RO 08	Spray valve output(220VAC)	30	AI 04	System 2 fan coil temperature input
11	RO 09	Alarm system output(220VAC)	31	AI 05	Ambient temperature input
12	DI/DO 1	Mode indicator output	32	AI 06	System 1 antifreeze temperature input
13	DI/DO 2	Emergency switch output	33	AI 07	System 1 antifreeze temperature input
14	DI 01	Flow rate input	34	AI 08	System 1 suction temperature input
15	DI 02	System 1 high pressure protection input	35	AI 09	System 2 suction temperature input
16	DI 03	System 1 low pressure protection input	36	AI 10	No use
17	DI 04	System 2 high pressure protection input	37	AI 11(50K)	System 1 discharging temperature input
18	DI 05	System 2 low pressure protection input	38	AI 12(50K)	System 2 discharging temperature input
19	NET GND 12V	Connecting to the remote controller	39	CN1	System 2 electric expansion valve output
20	DI 06	Phase sequence protection	40	CN6	System 1 electric expansion valve output
			41	CN4	Burning program interface
			42	CN5	RS485 interface

7.The main controller terminals

3 Connection of PCB illustration



Connections explanation:

No.	Symbol	Meaning
1	RO01	System1 mangtic valve outlet (220-230VAC)
2	RO02	System2 mangtic valve outlet (220-230VAC)
3	RO03	System1 alert outlet (220-230VAC)
4	RO04	System2 alert outlet (220-230VAC)
5	CC01	System1 mangtic valve inlet (220-230VAC)
6	CC02	System2 mangtic valve inlet (220-230VAC)
7	CC03	System1 alert inlet (220-230VAC)
8	CC04	System2 alert inlet (220-230VAC)
9	NET GND 12V	Wire controller
10	DI01 GND	Mode/communication
11	AI01 GND	System 1 anti-freeze temp.(input)
12	AI02 GND	System 2 anti-freeze temp.(input)
13	AI03 GND	System 1 exhaust temp.(input)
14	AI04 GND	System 1 economizer outlet temp.failure(input)
15	AI05 GND	System 2 economizer inlet temp.failure(input)
16	AI06 GND	System 2 economizer outlet temp.failure(input)
17	AI07 GND	System 1 exhaust temp.(input)
18	AI08 GND	System 2 exhaust temp.(input)
19	AI09 GND	Ambient temp.(input)

7.The main controller terminals

4 BHB10 malfunction Table

2.1 The common failure cause and solution.

Malfunction	Digital display	Detector display	Canse	Solution
System 1 exhaust temp.failure	81	P181	The sensor is open or short circuit	Check or change the sensor
System 2 exhaust temp.failure	81	P281	The sensor is open or short circuit	Check or change the sensor
Ambient temp.sensor failure	4	P04	The sensor is open or short circuit	Check or change the sensor
System 1 anti-freeze temp.failure	9	E171	The sensor is open or short circuit	Check or change the sensor
System 2 anti-freeze temp.failure	9	E271	The sensor is open or short circuit	Check or change the sensor
System 1 economizer inlet temp.failure	01	P101	The sensor is open or short circuit	Check or change the sensor
System 2 economizer inlet temp.failure	01	P201	The sensor is open or short circuit	Check or change the sensor
System 1 economizer outlet temp.failure	02	P102	The sensor is open or short circuit	Check or change the sensor
System 2 economizer outlet temp.failure	02	P202	The sensor is open or short circuit	Check or change the sensor
System 1 anti-freeze protection	71	P19	Water flow volume not enough	Check the flow volume,water system is jammed or not
System 2 anti-freeze protection	71	P29	Water flow volume not enough	Check the flow volume,water system is jammed or not
Communication failure	\	E08	Communication failure between remote wire controller and main board	Check the wire connection between remote wire controller and main board
System 1 current protection	51	E151	Current through compressor too heavy	Check through the power supply for compressor or short circuit
System 2 current protection	51	E251	Current through compressor too heavy	Check through the power supply for compressor or short circuit
System 1 exhaust high temp.protection	82	P182	Compressor exhaust temp.too high	Check through the refrigerant system
System 2 exhaust high temp.protection	82	P282	Compressor exhaust temp.too high	Check through the refrigerant system

2.2 The indicator light display of failure cause.

Malfunction	Indicator light
System 1 failure	1 on 1 off
System 1 failure	2 on 1 off
Ambient failure	3 on 1 off

7.The main controller terminals

5 Common observation

Look over and clear the failure according to below information.

Failure	Possible causes for the failure	Solutions
Heat pump cannot be started	1 Wrong power supply 2 power supply cable loose 3 circuit breaker open	1 shut off the power and check power supply; 2 check power cable and make right connection 3 check for the cause and replace the fuse or circuit breaker
Water pump is running with high noise or without water	1 lack of water in the piping 2 much air in the water loop 3 water vavles closed 4 dirt and block on the water filter	1 check the water supply and charge water to the piping; 2 discharge the air in the water loop; 3 open the valves in water loop; 4 clean the water filter.
Heat pump capacity is low, compressor do not stop	1 lack of refrigerant; 2 bad insulation on water pipe; 3 low heat exchange rate on air side exchanger; 4 lack of water flow	1 check for the gas leakage and recharge the refrigerant; 2 make good insulation on water pipe; 3 clean the air side heat exchanger; 4 clean the water filter
High compressor exhaust	1 too much refrigerant 2 low heat exchange rate on air side exchanger	1 discharge the redundant gas 2 clean the air side heat exchanger
Low pressure problem of the system	1 lack of gas 2 block on filter or capillary 3 lack of water flow	1 check the gas leakage and recharge freon; 2 replace filter or capillary; 3 clean the water filter and discharge the air in water loop.
Compressor do not run	1 power supply failure 2 compressor contactor broken 3 power cable loose 4 protection on compressor 5 wrong setting on return water temp. 6 lack of water flow	1 check off the power supply; 2 replace compressor contactor; 3 tighten the power cable; 4 check the compressor exhaust temp. ; 5 reset the return water temp. ; 6 clean the water filter and discharge the air in water loop.
High noise of compressor	1 liquid refrigerant goes into compressor 2 compressor failure	1 bad evaporation, check the cause for bad evaporation and get rid of this; 2 use new compressor;
Fan do not run	1 failure on fan relay 2 fan motor broken	1 replace the fan relay; 2 replace fan motor.
The compressor runs but heat pump has not heating or cooling capacity	1 no gas in the heat pump; 2 heat exchanger broken; 3 compressor failure.	1 check system leakage and recharge refrigerant; 2 find out the cause and replace the heat exchanger; 3 replace compressor.
Low outlet water temperature	1 low water flow rate; 2 low setting for the desired water temp.;	1 clean the water filter and discharge the air in water loop. 2 reset the desired water temperature.
Low water flow protection	1 lack of water in the system; 2 failure on flow switch	1 clean the water filter and discharge the air in water loop. 2 replace the flow switch.

8. Appendix

1. Caution & Warning

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

8. Appendix

2. Cables specification

2.2 Three phase unit

Nameplate maximum current	Phase line	Earth line	MCB	Creepage protector	Signal line
No more than 10A	$3 \times 1.5\text{mm}^2$	1.5mm^2	20A	30mA less than 0.1 sec	$n \times 0.5\text{mm}^2$
10~16A	$3 \times 2.5\text{mm}^2$	2.5mm^2	32A	30mA less than 0.1 sec	
16~25A	$3 \times 4\text{mm}^2$	4mm^2	40A	30mA less than 0.1 sec	
25~32A	$3 \times 6\text{mm}^2$	6mm^2	40A	30mA less than 0.1 sec	
32~40A	$3 \times 10\text{mm}^2$	10mm^2	63A	30mA less than 0.1 sec	
40~63A	$3 \times 16\text{mm}^2$	16mm^2	80A	30mA less than 0.1 sec	
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	$3 \times 70\text{mm}^2$	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.

