

# **SWIMMING POOL HEAT PUMP UNIT**

## **Installation & Instruction Manual**



# CONTENTS

1. Preface .....	1
2. Specifications .....	2
2.1 Performance Data of Swimming Pool Heat Pump Unit .....	2
2.2 Dimensions for Swimming Pool Heat Pump Unit .....	3
3. Installation and Connection .....	4
3.1 Installation of System .....	4
3.2 Swimming Pool Heat Pumps Location .....	5
3.3 How Close to Your Pool? .....	5
3.4 Swimming Pool Heat Pumps Plumbing .....	6
3.5 Swimming Pool Heat Pumps Electrical Wiring .....	7
3.6 Initial Start-up of the Unit .....	7
4. Usage and Operation .....	8
4.1 The operation manual of the wire controller .....	8
4.2 The operation of the wire controller .....	9
4.3 Parameters Table .....	11
5. Maintenance and Inspection .....	12
5.1 Ordinary Malfunctions And Solution .....	12
5.2 Common observation .....	13
6. Appendix .....	14
6.1 Caution & Warning .....	14
6.2 Cable specification .....	15
6.3 Explosive view of the unit .....	16

# 1. PREFACE

---

In order to provide our customers with quality, reliability and versatility, this product has been made to strict production 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 manufacturer of this product will not be held responsible if someone is injured or the unit is damaged, as a result of improper installation, debugging, or unnecessary maintenance. It is vital that the instructions within this manual are adhered to at all times. The unit must be installed by qualified personnel.

- The unit can only be repaired by qualified installer center personnel or an authorised dealer.
- Maintenance and operation must be carried out according to the recommended time and frequency, as stated in this manual.
- Use genuine standard spare parts only. Failure to comply with these recommendations will invalidate the warranty.
- SWIMMING POOL HEAT PUMP Unit heats the spa water and keeps the temperature constant.

This type of pump has the following characteristics:

## 1. Durable

Withstand prolonged exposure to corrosives such as chlorine. The heat exchanger is made of PVC & titanium tube which can .

## 2. Installation flexibility

The unit can be installed outside or inside of the Spa.

## 3. Quiet operation

The unit comprises an efficient rotary/ scroll compressor and a low-noise fan motor, which guarantees its quiet operation.

## 4. Advanced controlling

The unit includes micro-computer controlling, allowing all operation parameters to be set. Operation status can be displayed on the wire controller.

## 2.SPECIFICATION

---

### 2.1 Performance data of Swimming Pool Heat Pump Unit

REFRIGERANT :R410A

Unit	Model	PWT-HP-57
Heating Capacity	kW	50.2
	BTU/h	170680
Heating Power Input	kW	10.3
Running Current	A	18.6
Power Supply		380V/3N~/50Hz
Compressor Quantity		2
Compressor		Scroll
Fan Quantity		2
Fan Power Input	W	150×2
Fan Rotate Speed	RPM	750
Fan Direction		Vertical
Noise	dB(A)	61
Water Connection	mm	60.3
Water Flow Volume	m <sup>3</sup> /h	21
Water Pressure Drop(max)	kPa	18.8
Unit Net Dimensions(L/W/H)	mm	See the drawing of the units
Unit Shipping Dimensions(L/W/H)	mm	See package label
Net Weight	kg	See nameplate
Shipping Weight	kg	See package label

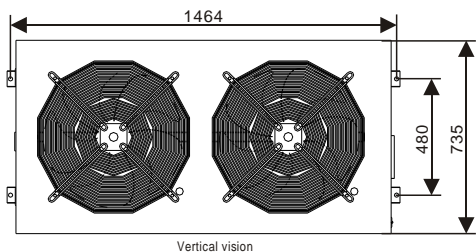
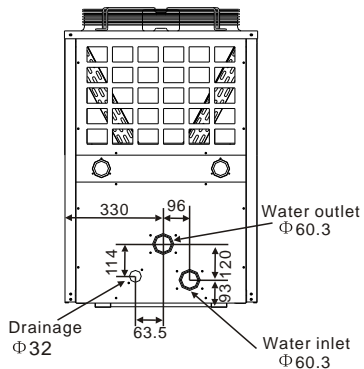
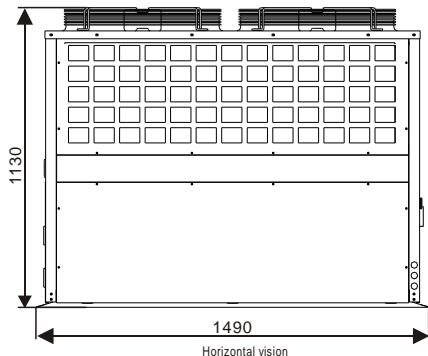
Heating: Outdoor air temp:24°C/19°C, Inlet water temp:26°C

## 2.SPECIFICATION

### 2.2 The dimensions for Swimming Pool Heat Pump Unit

Models: PWT-HP-57

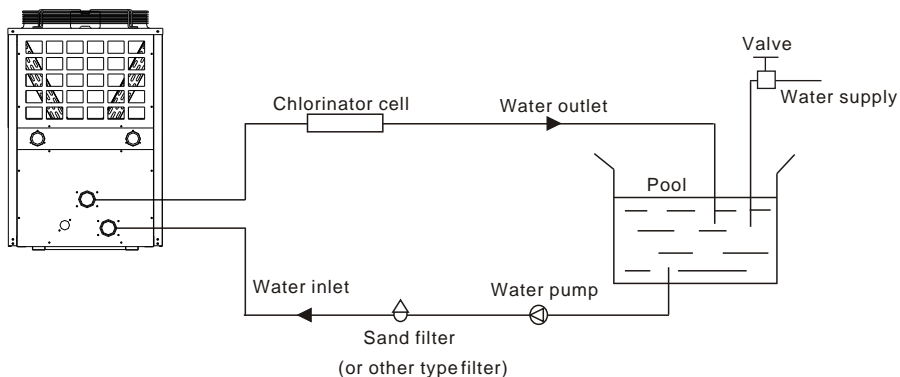
Unit: mm



# 3.INSTALLATION AND CONNECTION

---

## 3.1 Installation illustration



### Installation items:

The factory only provides the main unit and the water unit; the other items in the illustration are necessary spare parts for the water system, that provided by users or the installer.

### Attention:

Please follow these steps when using for the first time

- 1.Open valve and charge water.
- 2.Make sure that the pump and the water-in pipe have been filled with water.
- 3.Close the valve and start the unit.

# 3. INSTALLATION AND CONNECTION

---

## 3.2 Heat Pumps Location

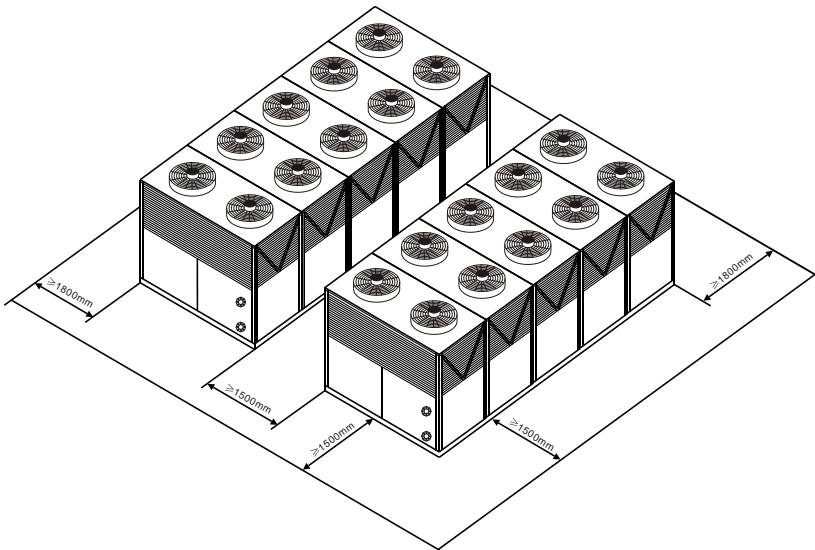
The unit will perform well in any outdoor location provided that the following three factors are present.

- 1. Fresh Air - 2. Electricity - 3. Pool filter piping

The unit may be installed virtually anywhere outdoors. For indoor pools please consult the supplier. Unlike a gas heater, it has no draft or pilot light problem in a windy area.

DO NOT place the unit in an enclosed area with a limited air volume, where the units discharge air will be re-circulated.

DO NOT place the unit to shrubs which can block air inlet. These locations deny the unit of a continuous source of fresh air which reduces its efficiency and may prevent adequate heat delivery.



## 3.3 How Close To Your Pool?

Normally, the pool heat pump is installed within 7.5 metres of the pool. The longer the distance from the pool, the greater the heat loss from the piping. For the most part, the piping is buried. Therefore, the heat loss is minimal for runs of up to 15 meters (15 meters to and from the pump = 30 meters total), unless the ground is wet or the water table is high. A very rough estimate of heat loss per 30 meters is 0.6 kW-hour, (2000 BTU) for every 5 °C difference in temperature between the pool water and the ground surrounding the pipe, which translates to about 3% to 5% increase in run time.



# 3. INSTALLATION AND CONNECTION

---

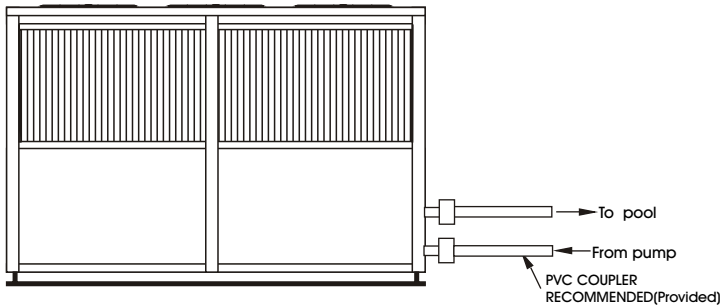
## 3.4 Heat Pumps Plumbing

The Swimming Pool Heat Pumps exclusive rated flow titanium heat exchanger requires no special plumbing arrangements except bypass (please set the flow rate according to the nameplate). The water pressure drop is less than 10kPa at max. Flow rate. Since there is no residual heat or flame Temperatures, The unit does not need copper heat sink piping. PVC pipe can be run straight into the unit.

Location: Connect the unit in the pool pump discharge (return) line downstream of all filter and pool pumps, and upstream of any chlorinators, ozonators or chemical pumps.

Standard model have slip glue fittings which accept 40mm NB PVC pipe for connection to the pool or spa filtration piping. By using a 50 NB to 40NB you can plumb 50NB PVC piping straight into the unit.

Give serious consideration to adding a quick coupler fitting at the unit inlet and outlet to allow easy draining of unit for winterizing and to provide easier access should servicing be required.



Condensation: Since the Heat pump cools down the air about 4 -5°C, water may condense on the fins of the horseshoe shaped evaporator. If the relative humidity is very high, this could be as much as several litres an hour. The water will run down the fins into the basepan and drain out through the barbed plastic condensation drain fitting on the side of the basepan. This fitting is designed to accept 3/4" clear vinyl tubing which can be pushed on by hand and run to a suitable drain. It is easy to mistake the condensation for a water leak inside the unit.

NB: A quick way to verify that the water is condensation is to shut off the unit and keep the pool pump running. If the water stops running out of the basepan, it is condensation. AN EVEN QUICKER WAY IS to TEST THE DRAIN WATER FOR CHLORINE - if there is no chlorine present, then it's condensation.

## 3. INSTALLATION AND CONNECTION

---

### 3.5 Heat Pumps Electrical Wiring

NOTE: Although the unit heat exchanger is electrically isolated from the rest of the unit, it simply prevents the flow of electricity to or from the pool water. Grounding the unit is still required to protect you against short circuits inside the unit. Bonding is also required.

The unit has a separate molded-in junction box with a standard electrical conduit nipple already in place. Just remove the screws and the front panel, feed your supply lines in through the conduit nipple and wire-nut the electric supply wires to the three connections already in the junction box (four connections if three phase). To complete electrical hookup, connect Heat Pump by electrical conduit, UF cable or other suitable means as specified (as permitted by local electrical authorities) to a dedicated AC power supply branch circuit equipped with the proper circuit breaker, disconnect or time delay fuse protection.

Disconnect - A disconnect means (circuit breaker, fused or un-fused switch) should be located within sight of and readily accessible from the unit. This is common practice on commercial and residential air conditioners and heat pumps. It prevents remotely-energizing unattended equipment and permits turning off power at the unit while the unit is being serviced.

### 3.6 Initial startup of the Unit

NOTE - In order for the unit to heat the pool or spa, the filter pump must be running to circulate water through the heat exchanger.

Start up Procedure - After installation is completed, you should follow these steps:

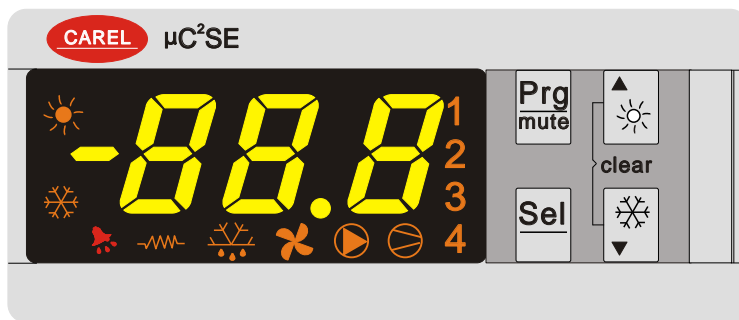
1. Turn on your filter pump. Check for water leaks and verify flow to and from the pool.
2. Turn on the electrical power supply to the unit, then press the key ON/OFF of wire controller, It should start in several seconds.
3. After running a few minutes make sure the air leaving the top(side) of the unit is cooler (Between 5-10 °C)
4. With the unit operating turn the filter pump off. The unit should also turn off automatically,
5. Allow the unit and pool pump to run 24 hours per day until desired pool water temperature is reached. When the water-in temperature reach setting, The unit just shuts off. The unit will now automatically restart (as long as your pool pump is running) when the pool temperature drops more than 2°C below set temperature.

Water Flow Switch - the unit is equipped with a flow switch that turns it on when the pool pump is running and shuts it off when the pump shuts off. This switch is the same type used in all gas pool heaters and is factory adjusted for normal pool installations. If the pool water level is more than a few feet above or below the thermostat knob of the unit, your dealer may need to adjust it at initial startup.

Time Delay - The unit is equipped with a 3 minute built-in solid state restart delay included to protect control circuit components and to eliminate restart cycling and contactor chatter. This time delay will automatically restart the unit approximately 3 minutes after each control circuit interruption. Even a brief power interruption will activate the solid state 3 minute restart delay and prevent the unit from starting until the 5 minute countdown is completed.

## 4. USAGE AND OPERATION

### 4.1 The operation manual of the wire controller



#### 4.1.1 About buttons

Button	Meaning
	Pressing this button could returning back to the previous interface.
	Function1: continually pressing this button could enter into the set interface. Function2: pressing this button could enter into the next interface.
	Function1: continually pressing this button could start the heating mode. Function2: pressing this button could turn up and increase the value.
	Function1: continually pressing this button could start the cooling mode. Function2: pressing this button could turn down and increase the value.

#### 4.1.2 About icons



Ico	Meaning	Ico	Meaning
1; 2	Compressor1 and 2 start up		Defrosting
3; 4	Compressor3 and 4 start up		Electrical heater start up
	At least one compressor starts up		Warning
	Water pump starts up		Cooling mode
	Condensate fan starts up		Heating mode

# 4. USAGE AND OPERATION


## 4.2. The operation of the wire controller

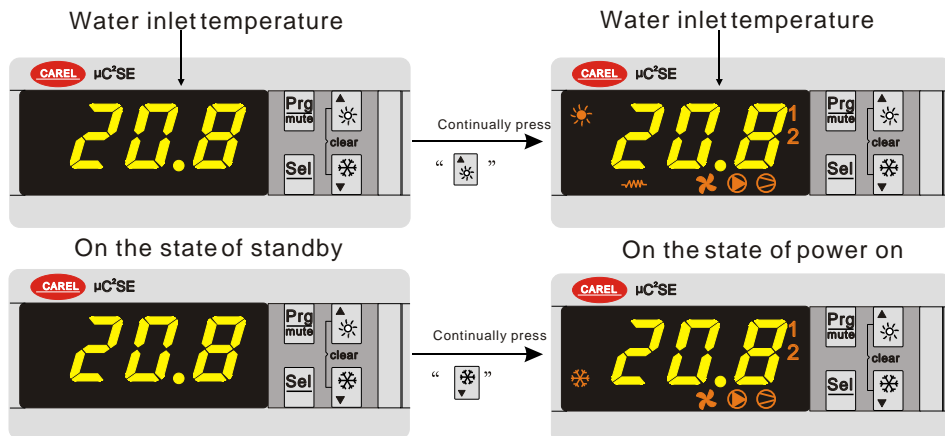
### 4.2.1 Turnon/off

On the state of power off, pressing(for 5s) “” or “” could start the unit. The screen displays the mode and water inlet temperature;







On the state of power on, pressing(for 5s) “” or “” could turn off the unit. For the corresponding modes please refer to the corresponding buttons. The screen shows the water inlet temperature.

Press “” the system will be heating;

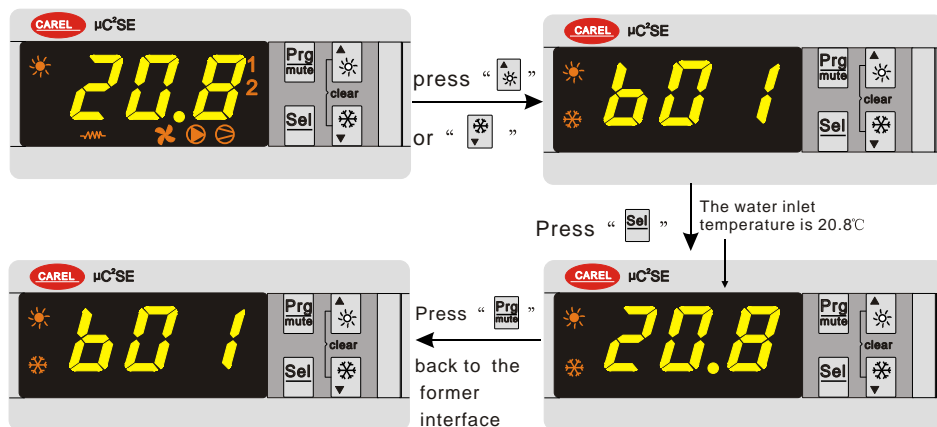
Press “” the system will be cooling.



### 4.2.2 Check the parameters

On the state of power on or power off, the measured temperature of B01-B04 could be checked. Press “” or “” to enter into the temperature interface. Press “” (Up) or “” (Down) to find the needed temperature, then press “” to check it. Press “” to return back to the previous interface.

B01: Inlet water temp.; B02: Outlet water temp.; B03: Coil temp.; B04: Ambient temp.



# 4.Usage and Operation

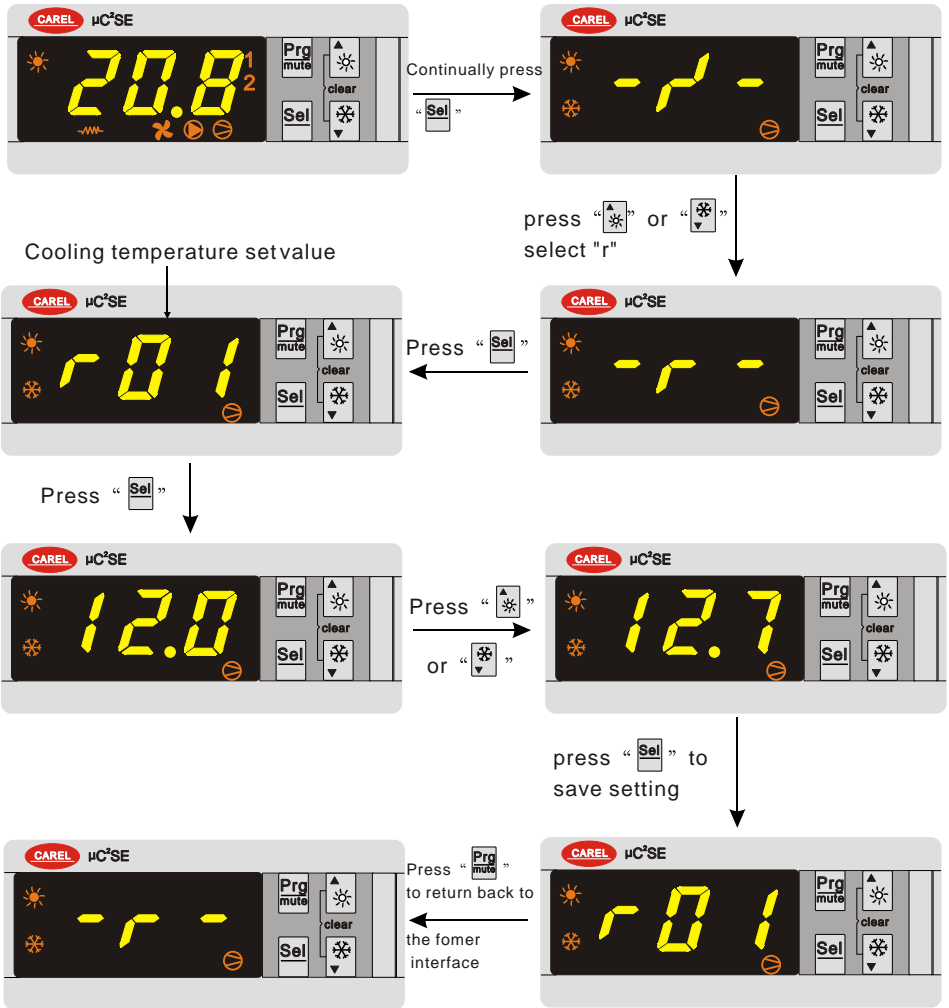
## 4.2.3 Temperature setting

On the state of power on or power off, you could set the heating or cooling temperature.

Press “Sel” and hold for 5s to enter into the parameter setting interface. Press “▲” (Up) or “▼” (Down) to choose the needed setting. Press “Sel” to confirm. Press “Sel” again to enter into the corresponding parameter setting interface. Pressing “▲” or “▼” could increase or decrease the value of the parameters. Press “Sel” conserve settings. Back the previous interface press “Prg mute”.

The setting of parameters will effect the performance and efficiency of the unit. Do not make any change of them when it is not necessary. r01/r02/r03/r04 are permitted to set by the users. For the default values please refer to “Parameters Table”.

The permitted setting are shown as below (take r01 for example):



## 4. Usage and Operation

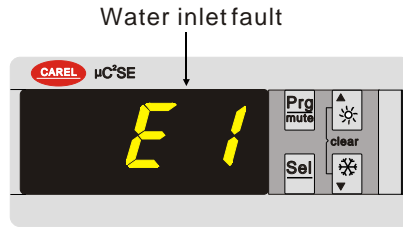
---

### 4.2.4 Malfunction

When there is something wrong with the unit, the wire controller will display the error code according to the fault reason.

For the detailed meanings of the error codes please refer to the Fault Table.

For example:



### 4.3 Parameters Table

Code	Meaning	Default value	Unit
R01	Cooling temperature	28	℃
R02	Cooling temperature difference	1	℃
R03	Heating temperature	28	℃
R04	Heating temperature difference	1	℃

## 5.Maintenance and Inspection

---

### 5.1 Ordinary Malfunctions And Solution

You could check and maintain the unit according to the faults display.

malfunction	display	Reason	resolution
Normal working			
Water inlet temp. Sensor failure	E1	The sensor is open or short circuit	Check or change the sensor
Water outlet temp. Sensor failure	E2	The sensor is open or short circuit	Check or change the sensor
Evaporator sensor failure	E3	The sensor is open or short circuit	Check or change the sensor
Ambient sensor failure	E4	The sensor is open or short circuit	Check or change the sensor
Anti freezing under cooling mode	A1	Water flow rate is not enough	Check the water flow volume, or water system is jammed or not
Flow switch failure	FL	No water/little water in water system.	Check the water flow volume, water pump is failure or not
High pressure protect	HP1	High pressure switch action	Check through each pressure switch and return circuit
Low pressure protect	LP1	Low pressure switch action	Check through each pressure switch and return circuit
Exhaust temperature/ or current protect	tC1	Exhaust temperature or current is too high	Check through exhaust temp. switch and current

# 5. Maintenance and Inspection

## 5.2 Common observation

Look over and clear the failure according to below information.

Failure	Possible causes for the failure	Solutions
Heat pump cannot be started	<ol style="list-style-type: none"> <li>1 Wrong power supply</li> <li>2 power supply cable loose</li> <li>3 circuit breaker open</li> </ol>	<ol style="list-style-type: none"> <li>1 shut off the power and check power supply;</li> <li>2 check power cable and make right connection</li> <li>3 check for the cause and replace the fuse or circuit breaker</li> </ol>
Water pump is running with high noise or without water	<ol style="list-style-type: none"> <li>1 lack of water in the piping</li> <li>2 much air in the water loop</li> <li>3 water valves closed</li> <li>4 dirt and block on the water filter</li> </ol>	<ol style="list-style-type: none"> <li>1 check the water supply and charge water to the piping;</li> <li>2 discharge the air in the water loop;</li> <li>3 open the valves in water loop;</li> <li>4 clean the water filter.</li> </ol>
Heat pump capacity is low, compressor do not stop	<ol style="list-style-type: none"> <li>1 lack of refrigerant;</li> <li>2 bad insulation on water pipe;</li> <li>3 low heat exchange rate on air side exchanger;</li> <li>4 lack of water flow</li> </ol>	<ol style="list-style-type: none"> <li>1 check for the gas leakage and recharge the refrigerant;</li> <li>2 make good insulation on water pipe;</li> <li>3 clean the air side heat exchanger;</li> <li>4 clean the water filter</li> </ol>
High compressor exhaust	<ol style="list-style-type: none"> <li>1 too much refrigerant</li> <li>2 low heat exchange rate on air side exchanger</li> </ol>	<ol style="list-style-type: none"> <li>1 discharge the redundant gas</li> <li>2 clean the air side heat exchanger</li> </ol>
Low pressure problem of the system	<ol style="list-style-type: none"> <li>1 lack of gas</li> <li>2 block on filter or capillary</li> <li>3 lack of water flow</li> </ol>	<ol style="list-style-type: none"> <li>1 check the gas leakage and recharge freon;</li> <li>2 replace filter or capillary;</li> <li>3 clean the water filter and discharge the air in water loop.</li> </ol>
Compressor do not run	<ol style="list-style-type: none"> <li>1 power supply failure</li> <li>2 compressor contactor broken</li> <li>3 power cable loose</li> <li>4 protection on compressor</li> <li>5 wrong setting on return water temp.</li> <li>6 lack of water flow</li> </ol>	<ol style="list-style-type: none"> <li>1 check off the power supply;</li> <li>2 replace compressor contactor;</li> <li>3 tighten the power cable;</li> <li>4 check the compressor exhaust temp.;</li> <li>5 reset the return water temp.;</li> <li>6 clean the water filter and discharge the air in water loop.</li> </ol>
High noise of compressor	<ol style="list-style-type: none"> <li>1 liquid refrigerant goes into compressor</li> <li>2 compressor failure</li> </ol>	<ol style="list-style-type: none"> <li>1 bad evaporation, check the cause for bad evaporation and get rid of this;</li> <li>2 use new compressor;</li> </ol>
Fan do not run	<ol style="list-style-type: none"> <li>1 failure on fan relay</li> <li>2 fan motor broken</li> </ol>	<ol style="list-style-type: none"> <li>1 replace the fan relay;</li> <li>2 replace fan motor.</li> </ol>
The compressor runs but heat pump has not heating or cooling capacity	<ol style="list-style-type: none"> <li>1 no gas in the heat pump;</li> <li>2 heat exchanger broken;</li> <li>3 compressor failure.</li> </ol>	<ol style="list-style-type: none"> <li>1 check system leakage and recharge refrigerant;</li> <li>2 find out the cause and replace the heat exchanger;</li> <li>3 replace compressor.</li> </ol>
Low outlet water temperature	<ol style="list-style-type: none"> <li>1 low water flow rate;</li> <li>2 low setting for the desired water temp.;</li> </ol>	<ol style="list-style-type: none"> <li>1 clean the water filter and discharge the air in water loop.</li> <li>2 reset the desired water temperature.</li> </ol>
Low water flow protection	<ol style="list-style-type: none"> <li>1 lack of water in the system;</li> <li>2 failure on flow switch</li> </ol>	<ol style="list-style-type: none"> <li>1 clean the water filter and discharge the air in water loop.</li> <li>2 replace the flow switch.</li> </ol>



## 6. APPENDIX

---

### 6.1 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-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.
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 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°C.
13. Caution: Single wall heat exchanger, not suitable for potable water connection.

## 6. APPENDIX

### 6.2 Cable specification

#### 1. Single phase unit

Nameplate maximum current	Phase line	Earth line	MCB	Creepage protector	Signal line
No more than 10A	2×1.5mm <sup>2</sup>	1.5mm <sup>2</sup>	20A	30mA less than 0.1 sec	n×0.5mm <sup>2</sup>
10~16A	2×2.5mm <sup>2</sup>	2.5mm <sup>2</sup>	32A	30mA less than 0.1 sec	
16~25A	2×4mm <sup>2</sup>	4mm <sup>2</sup>	40A	30mA less than 0.1 sec	
25~32A	2×6mm <sup>2</sup>	6mm <sup>2</sup>	40A	30mA less than 0.1 sec	
32~40A	2×10mm <sup>2</sup>	10mm <sup>2</sup>	63A	30mA less than 0.1 sec	
40~63A	2×16mm <sup>2</sup>	16mm <sup>2</sup>	80A	30mA less than 0.1 sec	
63~75A	2×25mm <sup>2</sup>	25mm <sup>2</sup>	100A	30mA less than 0.1 sec	
75~101A	2×25mm <sup>2</sup>	25mm <sup>2</sup>	125A	30mA less than 0.1 sec	
101~123A	2×35mm <sup>2</sup>	35mm <sup>2</sup>	160A	30mA less than 0.1 sec	
123~148A	2×50mm <sup>2</sup>	50mm <sup>2</sup>	225A	30mA less than 0.1 sec	
148~186A	2×70mm <sup>2</sup>	70mm <sup>2</sup>	250A	30mA less than 0.1 sec	
186~224A	2×95mm <sup>2</sup>	95mm <sup>2</sup>	280A	30mA less than 0.1 sec	

#### 2. Three phase unit

Nameplate maximum current	Phase line	Earth line	MCB	Creepage protector	Signal line
No more than 10A	3×1.5mm <sup>2</sup>	1.5mm <sup>2</sup>	20A	30mA less than 0.1 sec	n×0.5mm <sup>2</sup>
10~16A	3×2.5mm <sup>2</sup>	2.5mm <sup>2</sup>	32A	30mA less than 0.1 sec	
16~25A	3×4mm <sup>2</sup>	4mm <sup>2</sup>	40A	30mA less than 0.1 sec	
25~32A	3×6mm <sup>2</sup>	6mm <sup>2</sup>	40A	30mA less than 0.1 sec	
32~40A	3×10mm <sup>2</sup>	10mm <sup>2</sup>	63A	30mA less than 0.1 sec	
40~63A	3×16mm <sup>2</sup>	16mm <sup>2</sup>	80A	30mA less than 0.1 sec	
63~75A	3×25mm <sup>2</sup>	25mm <sup>2</sup>	100A	30mA less than 0.1 sec	
75~101A	3×25mm <sup>2</sup>	25mm <sup>2</sup>	125A	30mA less than 0.1 sec	
101~123A	3×35mm <sup>2</sup>	35mm <sup>2</sup>	160A	30mA less than 0.1 sec	
123~148A	3×50mm <sup>2</sup>	50mm <sup>2</sup>	225A	30mA less than 0.1 sec	
148~186A	3×70mm <sup>2</sup>	70mm <sup>2</sup>	250A	30mA less than 0.1 sec	
186~224A	3×95mm <sup>2</sup>	95mm <sup>2</sup>	280A	30mA less than 0.1 sec	

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





CODE:20181112-0002