

## SWIMMING POOL HEAT PUMP UNIT

### *Installation & Instruction Manual*



#### Applicable Model:

HP3.8B

HP5.6B

HP7.8B

HP9.5B

HP12.5B

HP14B

HP17B

HP21B

HP26B

HP9.5A

HP12.5A

HP14A

HP17A

HP21A

HP26A

# SWIMMING POOL HEAT PUMP UNIT

## *Installation & Instruction Manual*

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# 1. Preface

\* In order to provide our customers with quality, reliability and versatility, this product has been made to strict producing standards. This manual includes all 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. Only a qualified person could install the unit.

\* A qualified installer, centre, personnel or an authorized dealer, can only repair the unit.

\* 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 void warranty.

\* The swimming pool heat pump unit heats the swimming pool water and keeps the temperature constant.

## **Our heat pump has following characteristics:**

### **Durable**

The heating exchanger is made of PVC & Titanium tube, which can withstand prolonged exposure to swimming pool water.

### **Easy operation**

The unit is very easy to operate: switch it on and set the desired pool water temperature.

### **Quiet operation**

The unit comprises an efficient rotary compressor and a low-noise fan motor, which guarantees its quiet operation. The unit can heat your swimming pool water when the air temperature is 10°C or higher.

### **Low cost**

The operational cost is very low due to its high performance

## 2. Specifications

### 2.1 Parameter of Swimming Pool Heat Pump Unit

Model		HP3.8B	HP5.6B	HP7.8B	HP9.5B	HP12.5B	HP14B1
Heating Capacity	KW	3.8	5.6	7.8	9.5	12.5	14
	K BTU	13	18	26.5	32.5	42.5	48
Heating Input Power	KW	0.8	1	1.6	1.9	2.5	2.8
Heating Running Current	A	3.6	5	7.5	8.8	11.7	13.3
Cooling Capacity	KW	2.3	3.2	4.8	5.9	7.7	8.6
	K BTU	7.8	11	16.5	20	26.5	29.5
Cooling Input Power	KW	0.75	1	1.5	1.9	2.6	2.9
Cooling Running Current	A	3.4	4.7	7.1	8.7	12.5	13.8
Power Supply	V/Ph/Hz	220V/1Ph/50Hz					
Compressor Type		Rotary					
Controller		Intelligent LCD Controller					
Codensor		PVC Titanium Heat Exchanger					
Noise	dB(A)	48	48	48	48	50	50
Water Connection	mm	50	50	50	50	50	50
Water Flow Volume	m <sup>3</sup> /h	2-4	3-5	3-5	4-7	4-7	5-8
Water Pressure Drop( Max)	kpa	10	12	12	15	15	15
Unit Dimension	L / W / H mm	940 / 365 / 550	940 / 365 / 550	940 / 365 / 550	1010 / 374 / 610	1100/440/700	1100/440/700
Packing Size	L / W / H mm	1045 / 390 / 590	1045 / 390 / 590	1045 / 390 / 590	1120 / 395 / 655	1260/500/730	1260/500/730
Net / Gross Weight	kg	37 / 40	53/ 56	54/ 57	63 /67	70/78	80/88
Model		HP14A	HP17A	HP21A	HP26A	HP50A	HP90A
Heating Capacity	KW	14	17	21	26	50	90
	K BTU	48	60	73	89	170	306
Heating Input Power	KW	2.88	3.5	4.25	5.2	10.3	17.5
Heating Running Current	A	5.8	6.5	7.9	9.3	16.4	31.2
Cooling Capacity	KW	8.6	10.3	13.5	14	36	58
	K BTU	29.3	35	46	48	123	200
Cooling Input Power	KW	2.98	3.6	4.65	6.2	12.1	18.8
Cooling Running Current	A	6	6.8	8.3	11	19.3	33.5
Power Supply	V/Ph/Hz	380V/3Ph/50Hz					
Compressor Type		Scroll					
Controller		Intelligent LCD Controller					
Codensor		PVC Titanium Heat Exchanger					
Noise	dB(A)	52	54	58	58	61	62
Water Connection	mm	50	50	50	50	63	75
Water Flow Volume	m <sup>3</sup> /h	6-9	7-10	8-11	8-14	8-15	35-55
Water Pressure Drop( Max)	kpa	15	16	16	16	18	28
Unit Dimension	L / W / H mm	660 / 660 / 850	660 / 660 / 950	660 / 660 / 950	660/660/950	1448/730/1260	2150/760/1330
Packing Size	L / W / H mm	750 / 700 / 860	750 / 700 / 960	750 / 700 / 960	750/700/960	1630/810/1380	2275/900/1500
Net / Gross Weight	kg	98 /115	106 / 120	106 / 120	106/120	260/290	510/570

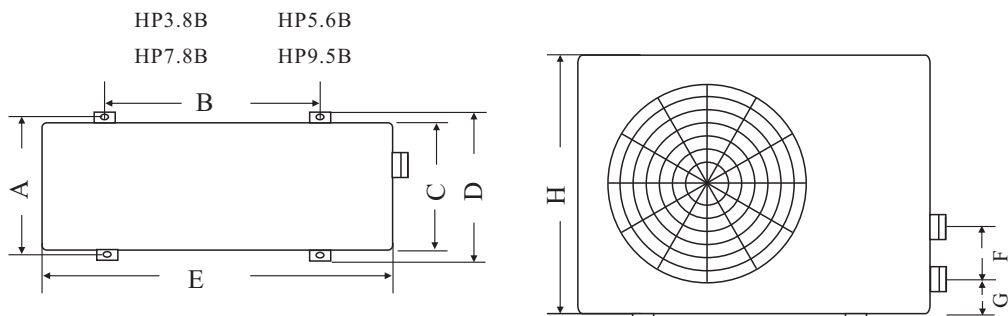
Above parameters is only for reference, exact details please as per nameplate.

Measurement conditions:

Heating: Dry bulb 24° C, web bulb 19° C, inlet water temp. 27° C

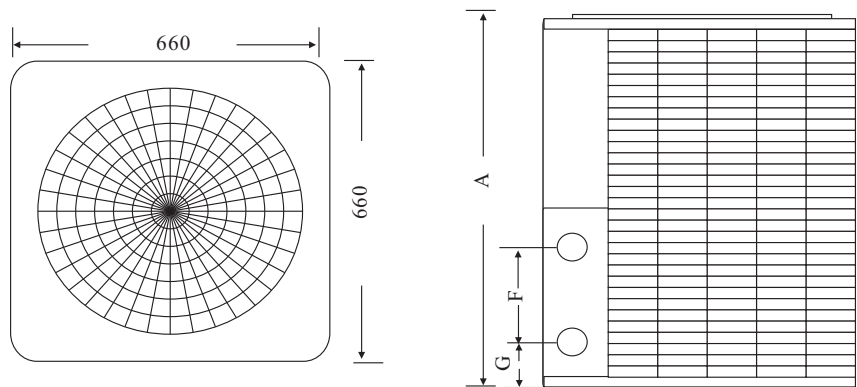
Cooling: Dry bulb 35° C, web bulb 24° C, inlet water temp. 27° C

## 2.2 Dimension of swimming pool heat pump unit



Model \ Size (mm)	HP3.8B HP5.6B HP7.8B	HP9.5B
A	330	340
B	680	650
C	300	300
D	360	370
E	950	1010
F	200	270
G	110	110
H	600	670

HP9.5A    HP12.5A  
 HP14A    HP17A  
 HP21A    HP26A



Model \ Size (mm)	HP9.5A HP12.5A HP14A	HP17A HP21A HP26A
A	855	955
G	110	110
F	350	450

### 3.Installation

The factory only provides the heat pump unit; the other items including an eventual bypass, in the illustration are necessary parts for the water system, provided by users or the installers.

Attention:

Please follow these steps when installing the heat pump:

1. All feeding of chemicals to the pool water has to be done downstream of the heat pump.
2. Install a bypass when the flow of the pool pump is more than 20% above the rated flow of the heat exchanger of the heat pump.
3. Install the heat pump above the level of the pool water.
4. Install the heat pump on a solid foundation and use the damping rubbers to eliminate vibrations and noise.
5. Always keep the unit straight up. If the unit has been tilted or put on his side, allow 24h before starting the unit.

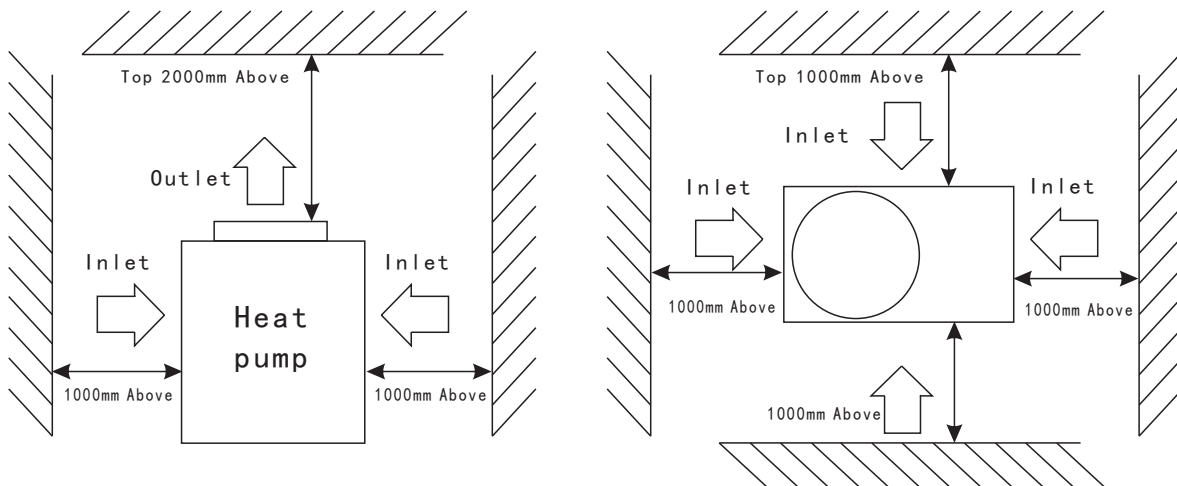
#### 3.1 Heat pump location

The unit may be installed virtually anywhere outdoors. For indoor pools please consult your suppliers.

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

DO NOT put the unit next to shrubs, which can block the air inlet, Such locations deny a continuous source of fresh air, which reduce its efficiency and may prevent adequate heat delivery.

The picture below give the minimum required distances from each side of the heat pump.



#### 3.2 How to close to the pool

Install the heat pump as close to the swimming pool as possible to minimize the loss of heat through the piping. Put it on a solid base and place the rubber blocks under the heat pump to eliminate vibrations.

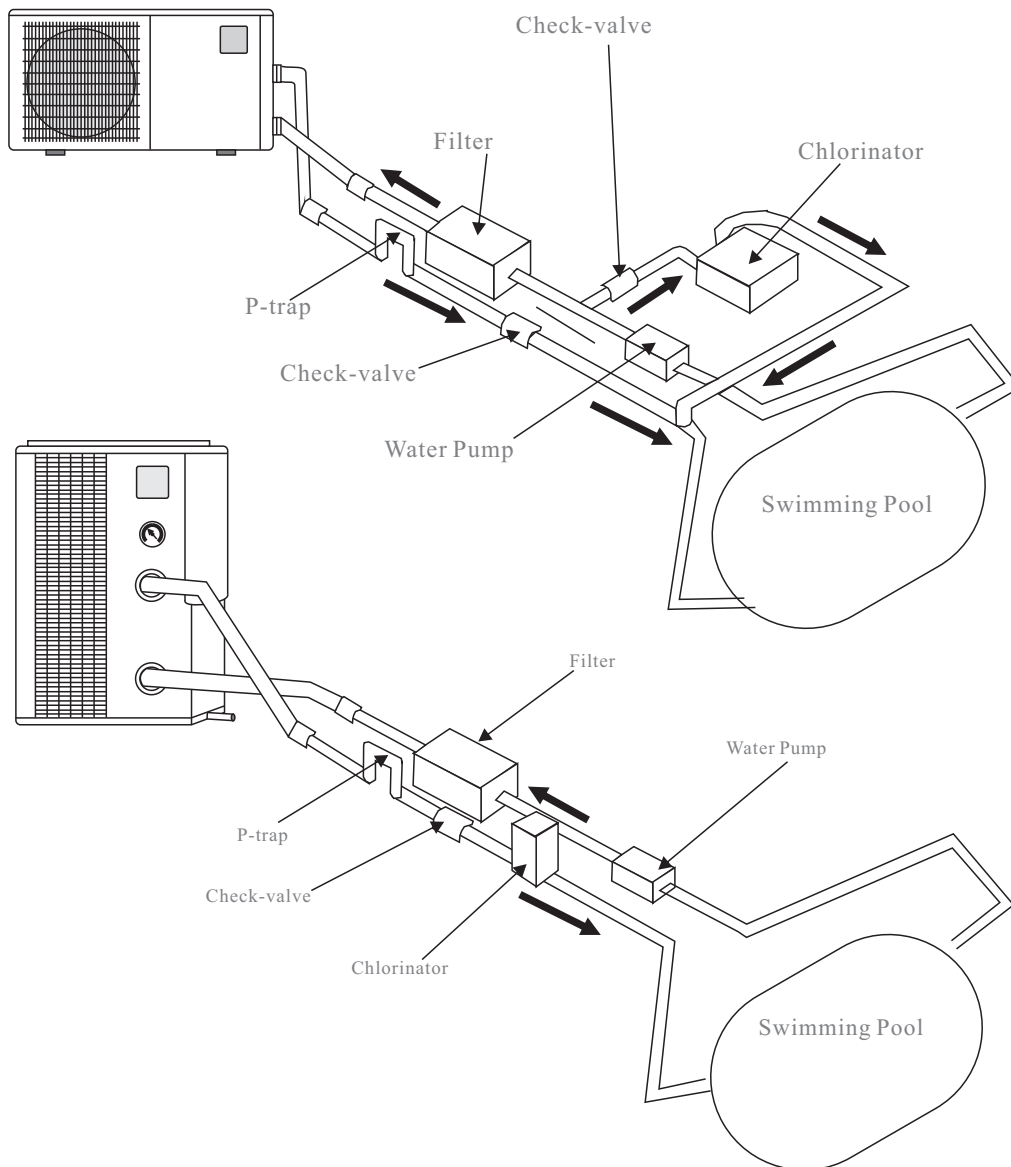
### 3.3 Distance from the pool

Normally, the pool heat pump is installed within a 7.5 meter radius of the pool. The greater the distance from the pool, the greater the heat loss from the piping. Since the piping is buried for the most part, heat loss is minimal for distances of up to 30 meters (15 meters to and from the pump= 30 meters total), unless the soil is wet or the water level is high. Heat loss per 30 meters could roughly be estimated at 0.6kw-hour (2000 BTU) for every 5 °C temperature difference between the pool water and the soil surrounding the pipe, which translates to an operation time increase of 3-5%.

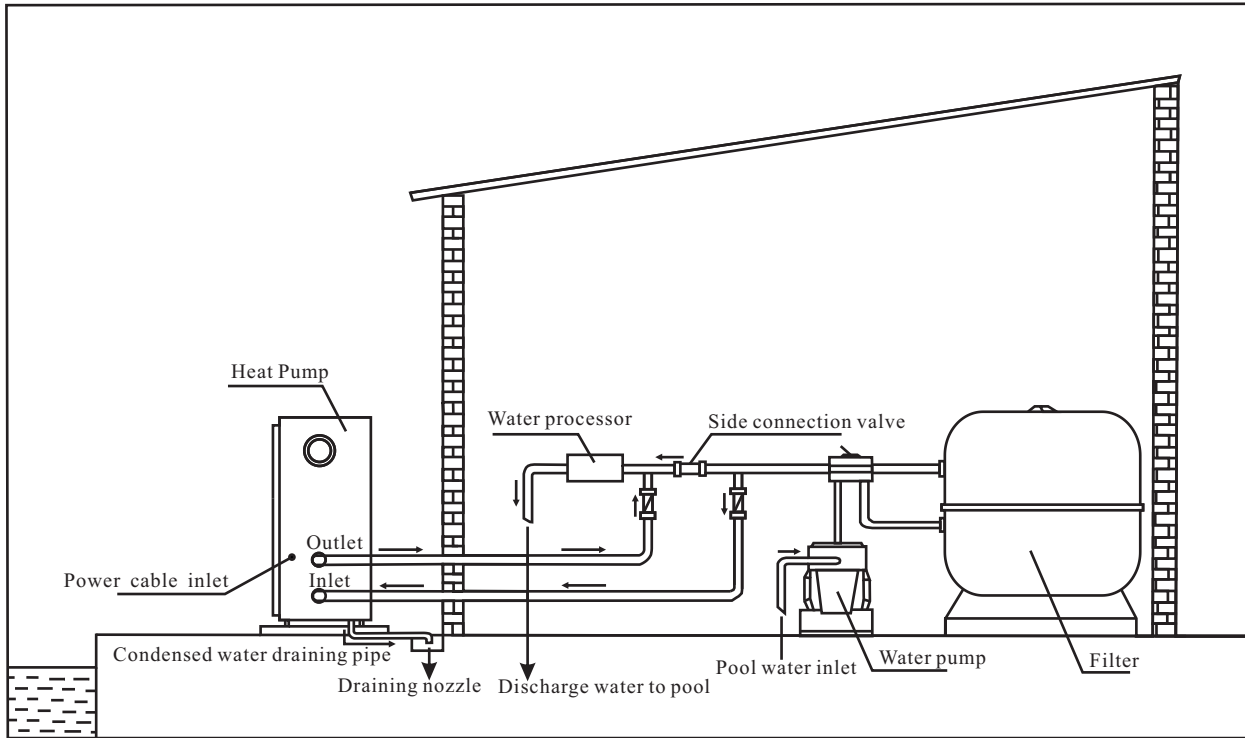
### 3.4 Installation of the check-valve

**Attention-** When using automatic chlorine and PH dosage systems, it is of uttermost importance to protect the heat pump from high concentrations of these chemicals that could corrode the heat exchanger.

Therefore, such systems should add the chemicals in the conduits located **DOWNSTREAM** of the heat pump and it is recommended to install a check-valve in order to prevent backflow when there is no water circulation. Damage to the heat pump caused by disregarding any of these recommendations will invalidate the warranty.



### 3.5 Pool system set up



### 3.6 Connecting the by-pass

**VALVE1-**

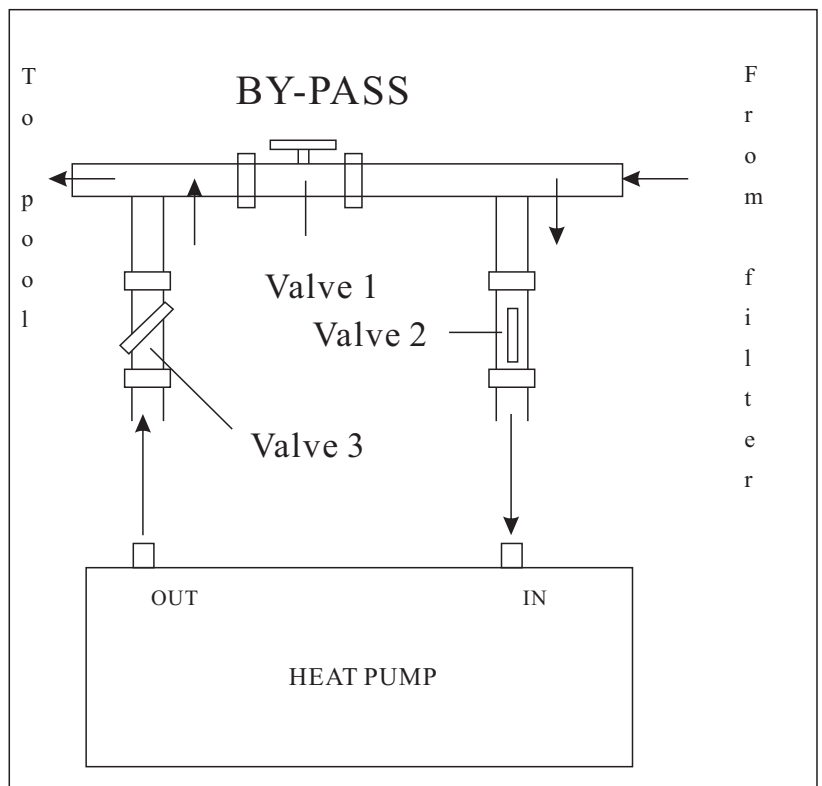
Slightly closed( water pressure increased with just 100 to 200gr)

**VALVE2-**

Completely open

**VALVE3-**

Half way open



**Setting the valve of the by-pass:**

- Set all 3 valves entirely open
- Slightly close valve 1 ( see also 3.6)
- Close valve 3 about half way to adjust the refrigerant pressure



### 3.7 Electrical wiring

Note:-Verify the local power supply and the operating voltage of the heat pump. It is recommended to use a separate circuit breaker(slow type-D curve)for the heat pump together with the proper wiring characteristics (see table below). The current to the heat pump should only be applied when the filter pump is running. For example a relay controlled by the filter pump could be used to activate the current to the heat pump. Further connect the electrical supply to the junction box inside the unit. All PRO heat pumps require single-phase connection.

**Grounding** the heat pump is required to protect you against electrical shock caused by an eventual short circuit inside the unit.

The heat pump is not equipped with a flow switch or any other kind of water flow detection. Therefore, the heat pump has to be wired electrically together with the filter pump to ensure water flow while the heat pump is running.

### 3.8 Initial start-up

**Start up procedure- after the installation is completed, you should follow these steps:**

1. Turn on the filter pump, check for leaks and verify flow to and from the pool.
2. Turn on the electrical power supply to the unit, then press the ON/ OFF key on the electronic control panel. The unit should start when the time delay period has lapsed .
3. When the unit has been running for a couple of minutes, check if the air leaving the unit is cooler.
4. Check the performance of the flow switch as follows: with the unit running, turn the filter pump off. The unit should also switch off automatically. If not, the flow switch must be readjusted.
5. All the unit and filter pump to run 24 hours a day until the desired pool water temperature is reached. When the set temperature is reached, the unit switches itself off. The unit will now automatically restart (as long as your filter pump is running) when the temperature of the pool water experiences a drop of more than 1°C below set temperature.

Depending on the starting temperature of the pool water and the air temperature, it can take several days for the water to reach the desired temperature. Covering the pool can drastically reduced this period.

**Water flow switch**—the unit is equipped with a flow switch that is switched on when enough water has flowed through the unit and that is switched off when the water flow becomes too low. (e. g. when the filter pump is switched off) .

**Time delay**—the unit is equipped with a built-in 3-minute start delay included to protect electrical components and contacts. After this time delay, the unit will automatically be restarted. Even a brief interruption of the power supply will activate the start delay and prevent the unit from starting immediately. Additional interruptions of the power supply during the delay period will have no effect on the 3-minute countdown.

### 3.9 Condensation

When the swimming pool water is being heated by the heat pump, the incoming air is cooled down quite a bit, which can cause condensation on the fins of the evaporator. Condensed volumes can attain several litres per hour underhigh atmospheric humidity. Sometimes, this is wrongfully interpreted as a water leak.

## 4. Guidelines

### 4.1 Water chemistry

Special attention should be paid to the chemical balance of the pool water. The pool water values should always stay within the following limits:

	Min	Max
pH	7.0	7.4
Free chlorine(mg/1)	0.5	1.2
TAC(mg/1)	80	120
Salt(g/1)		3

**Important: failure to comply with these limits will invalidate the warranty.**

**Note: exceeding one or several limits can damage the heat pump beyond repair. Always install water treatment equipment past the heat pump's water outlet, especially if the chemicals are automatically added to the water.**

**A check-valve should also be installed between the outlet of the heat pump and this equipment in order to prevent products from flowing back into the heat pump if the filter pump stops.**

### 4.2 Winterizing

**Important: failure to winterizing could damage the heat pump and will void warranty**

The heat pump, filter pump, filter and conduits must be protected in areas where the temperature can drop below the freezing point, Evacuate all water from the heat pump as follows:

1. Turn off the electrical power supply to the heat pump
2. Close the water supply to the heat pump: completely close valves 2 and 3 of the by-pass
3. Disconnect the water inlet and outlet coupler fittings of the heat pump and let the water drain out of the unit

### 4.3 Spring startup

If your heat pump has been winterized, perform the following steps when starting the system in the spring:

1. Inspect the system for any debris or structural problems.
2. Connect the water inlet and outlet unions firmly.
3. Turn on the filter pump to supply water to the heat pump. Adjust the by-pass to allow water flow through the heat pump.
4. Turn on the electrical power to the heat pump at the main breaker panel.

## 4.4 Owner inspection

The heat pumps are designed and constructed to provide long performance life when installed and operated properly under normal conditions. Periodic inspection are important to keep your heat pump running safe and efficiently all the years.

The following basic guidelines are suggested for your inspection:

1. Make sure the front of the unit is accessible for future service.
2. Keep the surrounding areas of the heat pump clear of all debris.
3. Keep all plants and shrubs trimmed and away from the heat pump.
4. Keep lawn sprinkler heads from spraying on the heat pump to prevent corrosion and damage.
5. If the unit is installed under a very sharp roof pitch or under a roof without a gutter, a gutter or diverter should be fitted to prevent excessive water from pouring down onto the unit.
6. Do not use the heat pump if any parts has been under water. Immediately call a qualified professional technician to inspect the heat pump and replace any part of the control system, which has be submerged.

The heat pump will produce condensation(water) while in operation. The heat pump base is designed to allow the condensation to exit through the bottom drain port. The condensation will increase as the outdoor air humidity level increase. Check the following at regular intervals to ensure proper condensate drainage:

1. Visually inspect and clear the bottom drain port of any debris that could clog the port.
2. Keep the air intake area and discharge area clear of debris so the airflow through the heat pump is not restricted. The cooler discharge air should not accumulate and be drawn into the side air intake coils.

During normal operation, the heat pump produces ten to twenty liters of condensate per hour. If condensate drainage is above this range during operation or if water continues to drain from the base when the heat pump is not in operation for more than an hour, a leak in the internal plumbing may have occurred. Call a qualified heat pump technician to investigate the problem.

**NOTE:** A quick way to verify that the water running through the drain is condensation water is to shut off the unit and keep the pool pump running. If the water stops running out of the base pan, it is condensation water.

**AN EVEN QUICKER WAY TEST THE DRAIN WATER FOR CHLORINE--if there is no chlorine present, then it's condensation.**

## 5. LCD Controller Display

### 5.1 Setting step

1. Under running status, press  $\triangle \nabla$  to adjust the temperature.

2. Press "M" to choose the mode  $\triangle \rightarrow \text{snowflake} \rightarrow \text{sun}$

Press "M" again      cooling  $\text{snowflake}$

Press "M" again      heating  $\text{sun}$

3. Standby status:

Press "M" 5 seconds, get a sound "B", LCD display will show "0" "27". Press "SET" to enter cooling temp. setting, press  $\triangle \nabla$  to alter cooling temp. Press "SET" again to confirm.

Press "M" again "1" "27" Press "SET" to enter heating temp. setting, press  $\triangle \nabla$  to alter heating temp.

Press "SET" again to confirm.

Press "M" again "2" "40" Press "SET" to enter defrosting time setting, press  $\triangle \nabla$  to alter defrosting time.

Press "SET" again to confirm.

Press "M" again "3" "-7" Press "SET" to enter defrosting temp. setting, press  $\triangle \nabla$  to alter defrosting temp.

Press "SET" again to confirm.

Press "M" again "4" "13" Press "SET" to enter exit defrosting temp. setting, press  $\triangle \nabla$  to alter exit defrosting temp.

Press "SET" again to confirm.

Press "M" again "5" "8" Press "SET" to enter exit defrosting time setting, press  $\triangle \nabla$  to alter exit defrosting time. Press "SET" again to confirm.

Press "M" again "6" "1" Press "SET" to enter system quantity setting, press  $\triangle \nabla$  to alter system quantity.

Press "SET" again to confirm.

Press "M" again "7" "1" Press "SET" to enter Automatic setting, press  $\triangle \nabla$  to alter. Press "SET" again to confirm.

Press "M" again "8" "1" Press "SET" to enter Mode setting, press  $\triangle \nabla$  to alter. Press "SET" again to confirm.

Press "M" again "9" "0" Press "SET" to enter water pump setting, press  $\triangle \nabla$  to alter. Press "SET" again to confirm.

Press "M" again "A" "40" Press "SET" to enter return water temp. setting, press  $\triangle \nabla$  to alter. Press "SET" again to confirm.

Press "M" again "b" "5" Press "SET" to enter Overheat protection (heating mode) setting, press  $\triangle \nabla$  to alter.

Press "SET" again to confirm.

Press "M" again "C" "35" Press "SET" to enter Electronic expansion valve setting, press  $\triangle \nabla$  to alter.

Press "SET" again to confirm.

Press "M" again "D" "5" Press "SET" to enter Overheat protection (cooling mode) setting, press  $\triangle \nabla$  to alter.

Press "SET" again to confirm.

Press "M" again "E" "40" Press "SET" to enter Max. temp. setting, press  $\triangle \nabla$  to alter. Press "SET" again to confirm.

Press "M" again "F" "2" Press "SET" to enter Split temp. setting, press  $\triangle \nabla$  to alter. Press "SET" again to confirm.

Press "M" again "G" "-10" Press "SET" to enter Ambient temp. protection setting, press  $\triangle \nabla$  to alter.

Press "SET" again to confirm.

Further explanation of PCB connections (refer P14 on user manual).

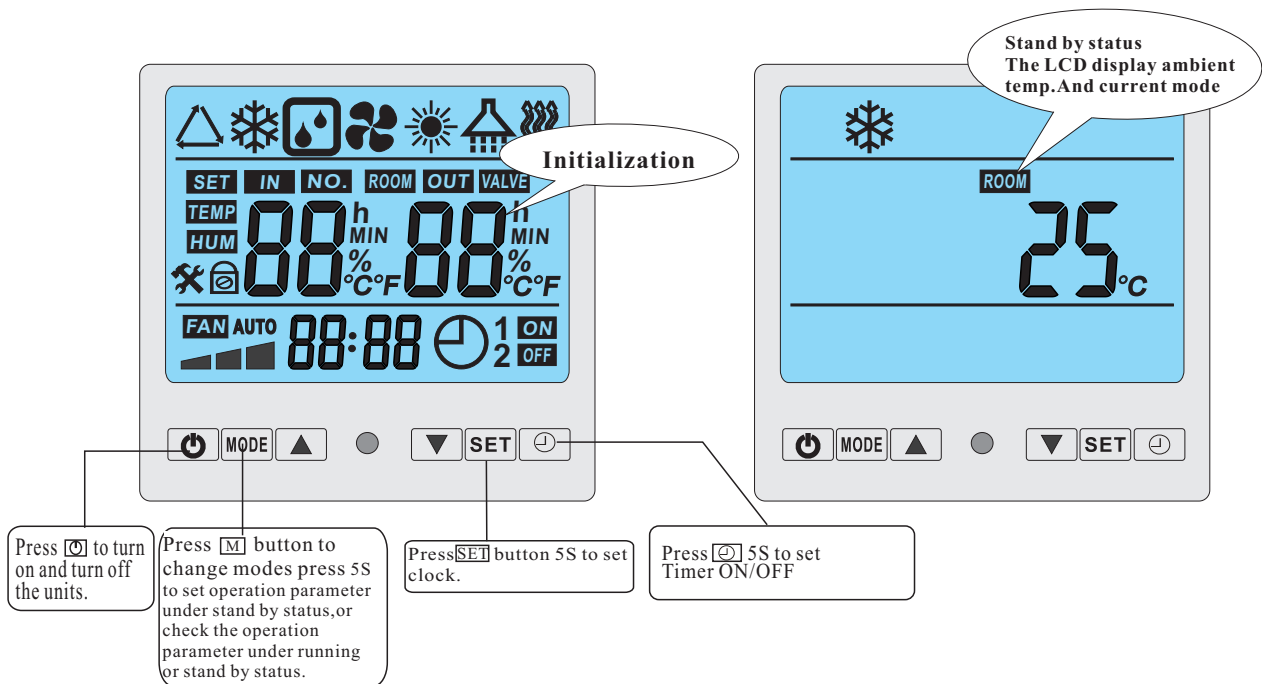
#### 4. Clock setting

Under running or standby status, Press "SET" for 5 seconds, get a sound "B", press  $\triangle \nabla$  to alter hour, press "SET" again to alter minute. Press "SET" again to confirm.

#### 5. Timer setting

Under running or standby status, Press " $\oplus$ " for 5 seconds, get a sound "B", press  $\triangle \nabla$  to alter hour of timer ON, Press " $\oplus$ " again to alter minute of timer ON. Press " $\ominus$ " again to alter timer OFF.

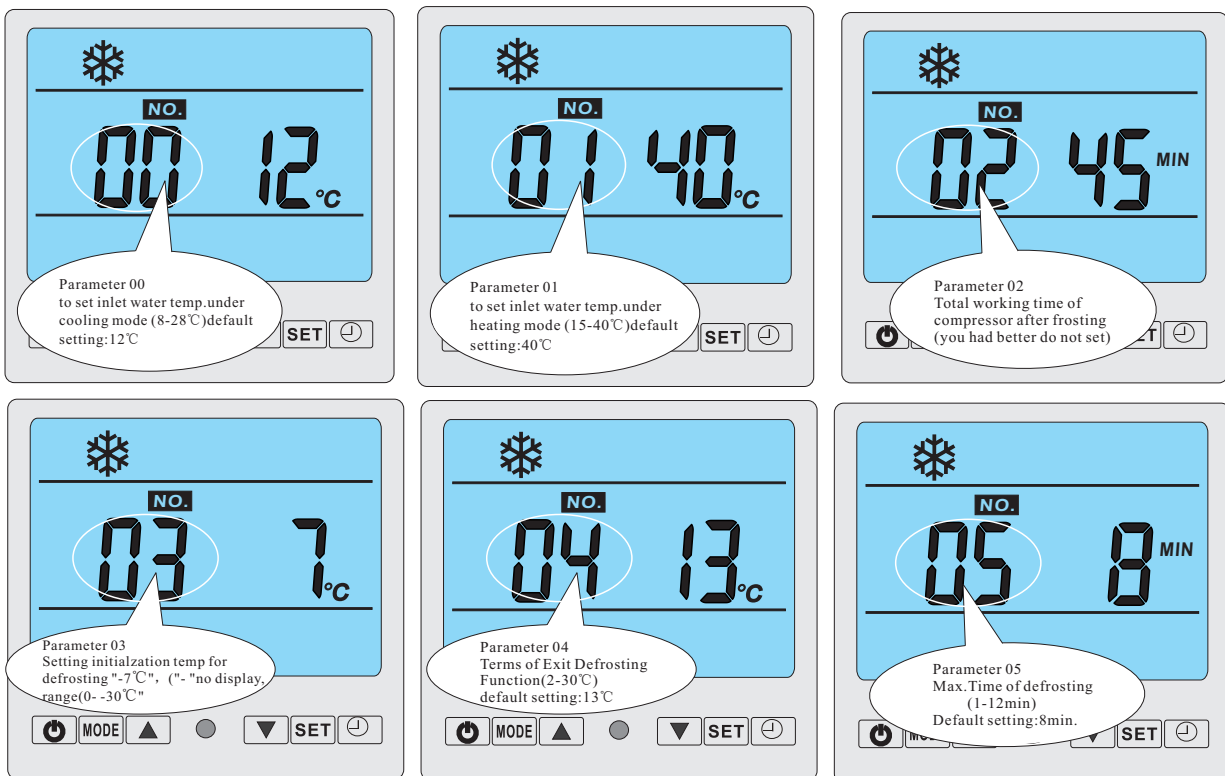
## 5.2 The functions of controller display

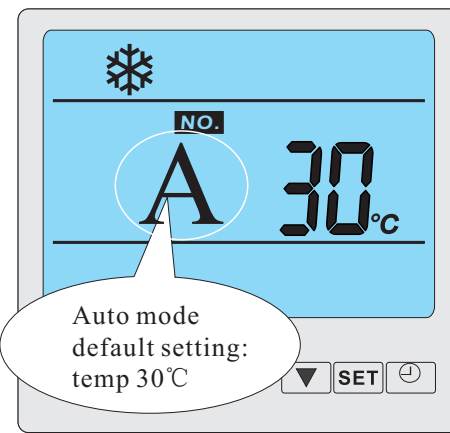
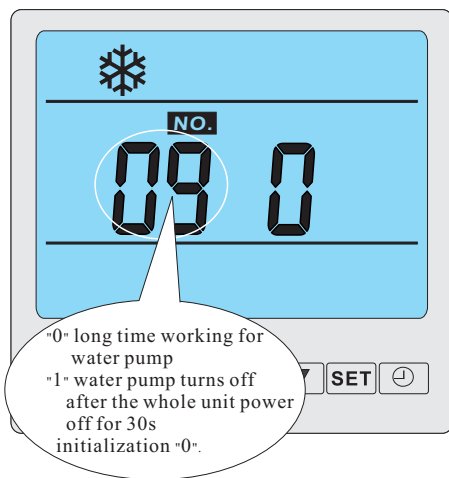
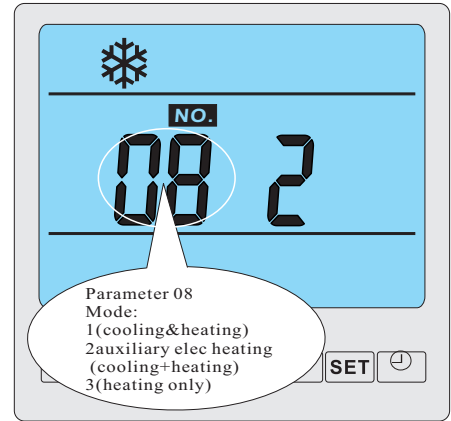
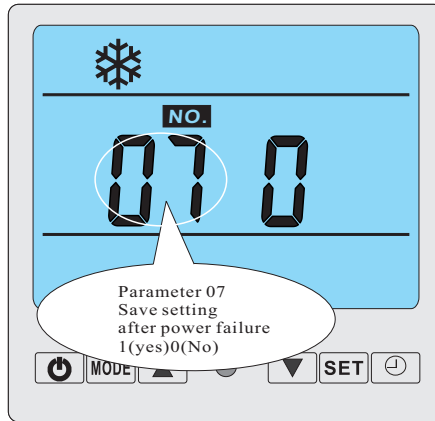
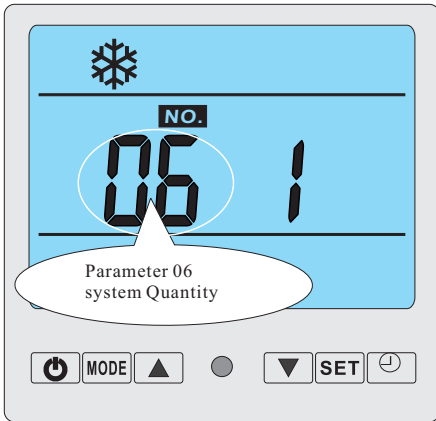


### Setting operation parameter

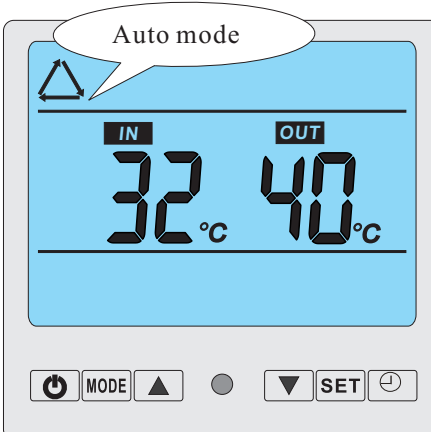
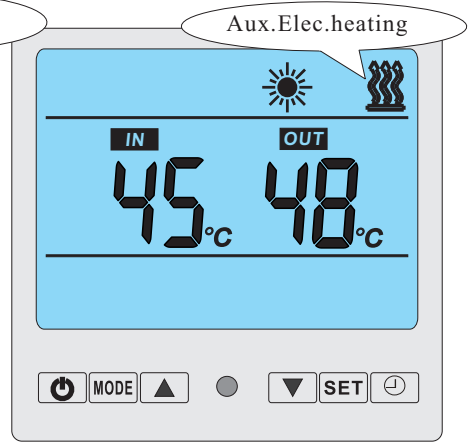
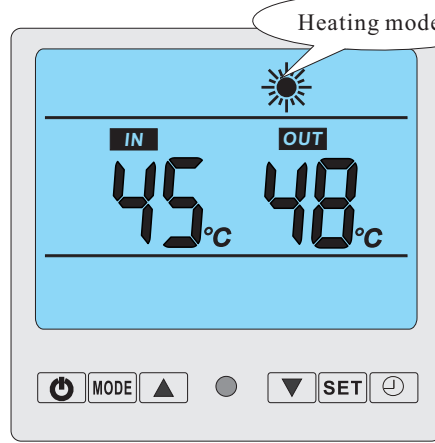
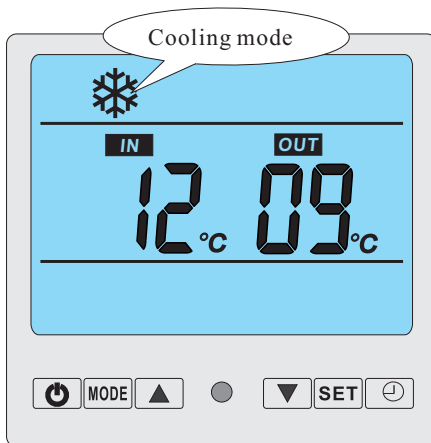
- ⊙ Under standby status, press "M" button 5s to enter Operation Parameter setting interface;
- ⊙ Press " M " again to start setting (parameter from 00-D, see the Operation Parameter Table);
- ⊙ Under parameter setting, press  $\Delta$  or  $\nabla$  to set data;
- ⊙ Please note no motion on the display for 10s, the LCD will display water-in/water out temp. (under running) or ambient temp. (under standby status)
- ⊙ Under running status, you can press "M" 5s to check current parameter, but can not change data of parameter!

Remarks: Standby status means the unit is connected with electricity but not running.





**To choose Mode**



- ⊙ Press M to choose mode(mode can be changed under running)
- ⊙ Press Δ and ∇ to power on unit.  
Under running,the LCD displays the water-in temp.And water-out temp.And current mode.
- ⊙ Aux.Elec.Heating just for unit with this function.

### How to know the current status



© Under running status ,press “M” 5 seconds to check the current status of the unit! You can check water-in/water out temp,condenser temp and ambient temp,please note no motion on the display for 10s,the LCD will display water-in/water out temp/(under running)or ambient temp.(unit stops)

### 5.3 Operation data setting table:

Digit	meaning	Range	Default	Adjust(yes/no)
00	Return water temp. Setting(cooling mode)	8-28°C	27°C	yes
01	Return water temp. Setting(heating mode)	15-40°C	27°C	yes
02	Total working time of compressor after frosting	30-90MIN	40MIN	Adjusted by technicians
03	Setting initialization temp for defrosting	-30°C--0°C	-7°C	Adjusted by technicians
04	Temp. of exit defrost under heating model	2-30°C	13°C	Adjusted by technicians
05	Max. time of defrost under heating mode	1-12MIN	8MIN	Adjusted by technicians
06	Electronic expansion valve mode	0(Manul)/1(AUTO)	1	Adjusted by technicians
07	Automatic restarting after power off	0-1	1(record)	Adjusted by technicians
08	Mode (cooling only/heat pump/ auxiliary electrical heating /hot water)	0-3	1(heat pump)	Adjusted by technicians
09	Water pump keep running or stop after compressor stop for 30s	0(keep running) /1(stop)	0	Adjusted by technicians
A	Auto mode(return water temp )	8-60°C	40°C	Adjusted by technicians
B	Setting of EEV.(heating mode)	-F(-15°C)~F(-15°C)	5°C	Adjusted by technicians
C	Electronic expansion valve manual steps	10~50	35	Adjusted by technicians
D	Setting of EEV.(cooling mode)	-F(-15°C)~F(-15°C)	5°C	Adjusted by technicians
E	Maximum temperature setting	30-70°C	40°C	Adjusted by technicians
F	DeltaT setting	1-20°C	2°C	Adjusted by technicians
G	Ambient temp. protection(Min.)	-15°C-15°C	-10°C	Adjusted by technicians



## 6. Maintenance and Inspection

### 6.1 Maintenance

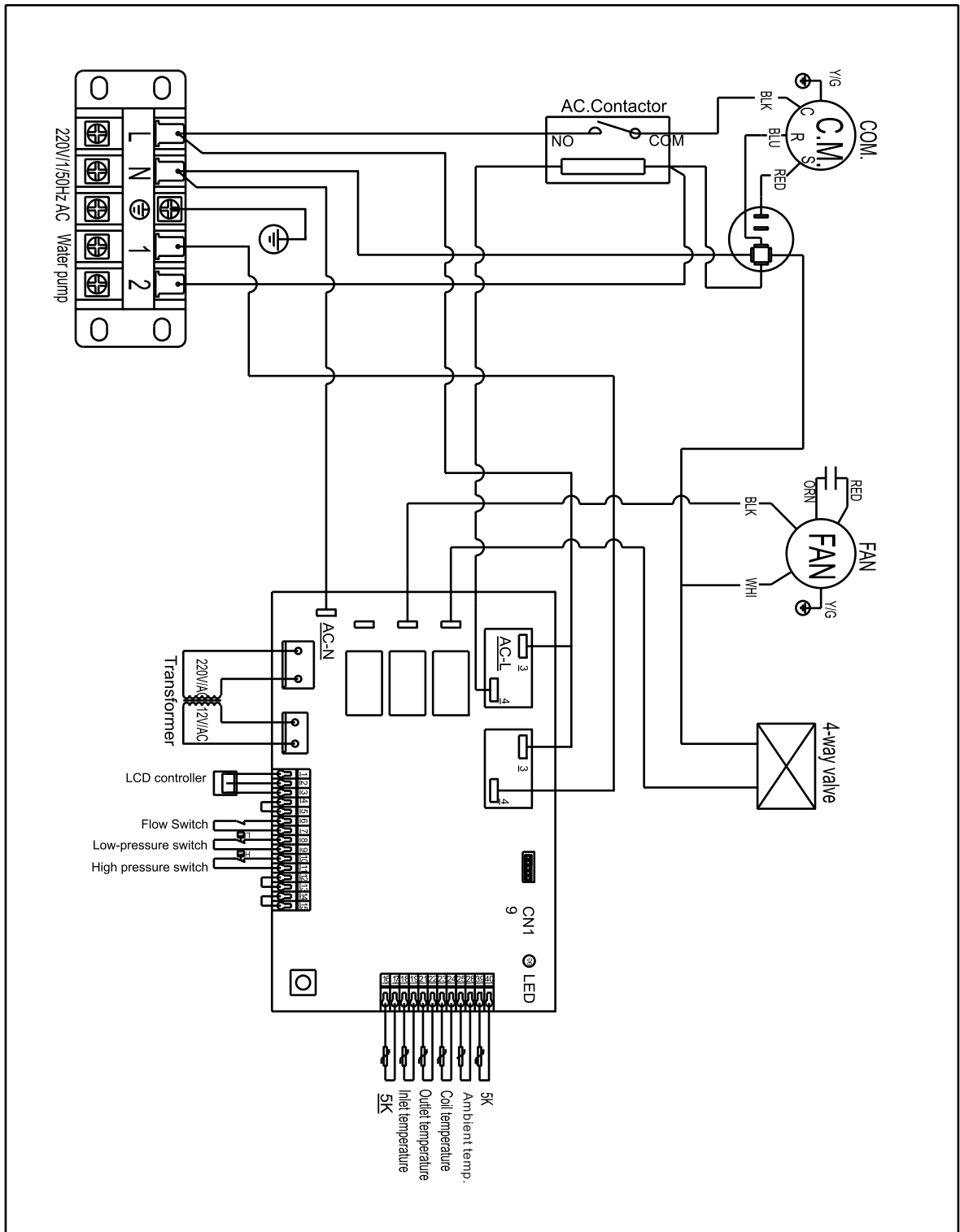
- To check the water supply device and the releaser often. You should avoid the condition of no water or air enter into system, or that will influence unit's performance and reliability. You should clear the water filter regularly to avoid unit's damage by filter's jam.
- There should be dry, sanitary and ventilation around the units. To clean the side heating exchanger regularly for keeping good heating exchanging and saving energy.
- To check the operation of every process in the unit, the operation pressure of the refrigerant system. You should maintain or change it in time.
- To check the power supply and cable connection often, there is abnormal action or bad smell about the electrical component. If there is, please maintain or change it in time.
- Please discharge all water in the water pump and water system lest freeze the water pump or water system. You should discharge the water at the bottom of water pump if the units will stop for long time. And you should check the units thoroughly and fill the system with water fully before power on the units again.

### 6.2 Trouble shooting guide

malfunction	Controller display	Reason	resolution
Water in temp. Sensor failure	PP 01	The sensor is open or short circuit	Check or replace a new sensor
Water out temp. Sensor failure	PP 02	The sensor is open or short circuit	Check or replace a new sensor
Coil1 sensor failure(Heating mode)	PP 03	The sensor is open or short circuit	Check or replace a new sensor
Gas return sensor failure	PP 04	The sensor is open or short circuit	Check or replace the sensor
Ambient sensor failure	PP 05	The sensor is open or short circuit	Check or replace the sensor
Temp. is too much different between water-in and water-out	PP 06	Water volume isn't enough	Increase water volume
Anti freezing under cooling mode	PP 07	Ambient temp.too low	
The first time freezing protection in winter	PP 07	Ambient temp. too low	
The second time freezing protection in winter	PP 07	Ambient temp. too low	
Coil sensor failure (Cooling mode)	PP 08	The sensor is open or short circuit	Check or change the sensor
High pressure protection	EE 01	Refrigerant system pressure is high	Check pressure gauge,increase the water volume
Low pressure protection	E E02	Refrigerant system pressure is low	Check pressure gauge,refeed refrigerant
Flow switch failure	EE 03	No water/little water in water system.	Check the water flow volume, water pump is failure or not
Power supply connections wrong(for 3phase unit)	EE 04	Wrong phase or lack of phase power connection	Check connections of power cable
3times display PP06 (Temp. is too much different between water-in&out)in 30minutes	EE 05	Water flow volume not enough, water pressure difference is too low	Check the water flow volume, or water system is jammed or not
Defrosting	Defrost code display		
Communication failure	EE 08	Wire controller and The PCB connection failure	Check the wire connection

## 7. Wiring diagram

Model: HP3.8B    HP5.6B    HP7.8B    HP9.5B



Model:HP14A      HP17A      HP21A

