

# SWIMMING POOL HEAT PUMP UNIT

## *Installation & Instruction Manual*



## Applicable Model

MHPB-38HL MHPB-53HL

MHPB-78HL MHPB-95HL

MHPA-95HL MHPA-125HL

MHPA-140HL MHPA-140HS

MHPA-170HL MHPA-170HS

MHPA-210HS MHPA-260HS



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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 maintenanc. It is vital that the instructions within this manual are adhere at all times. Only 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 ot swimming pool water.

### **Easy operation**

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

### **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		MHPB-38HL	MHPB-53HL	MHPB-78HL	MHPB-95HL
Heating Capacity	KW	3.8	5.3	7.8	9.5
	K BTU	13	18	26.5	32.5
Heating Input Power	KW	1.08	1.19	2.05	2.37
Heating Running Current	A	5	5.5	9.5	11
Cooling Capacity	KW	2.8	3.8	5.5	6.5
	K BTU	9.6	13	18.8	22.2
Cooling Input Power	KW	1.05	1.25	2.16	2.46
Cooling Running Current	A	4.9	5.8	10	11.4
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
Water Connection	mm	50	50	50	50
Water Flow Volume	m³/h	1.75	2.75	3	4.9
Water Pressure Drop( Max)	kpa	10	12	12	15
Unit Dimension	L / W / H mm	940 / 360 / 550	940 / 360 / 550	940 / 360 / 550	1010 / 370 / 615
Packing Size	L / W / H mm	1045 / 390 / 590	1045 / 390 / 590	1045 / 390 / 590	1120 / 395 / 655
Net / Gross Weight	kg	41 / 47	43 / 50	50 / 57	58 / 65

Model		MHPA-140HS	MHPA-170HS	MHPA-210HS	MHPA-260HS
Heating Capacity	KW	14	17	21	26
	K BTU	47.7	58	71.6	88.7
Heating Input Power	KW	3.36	3.7	4.53	5.94
Heating Running Current	A	6.12	6.6	8.03	9.6
Cooling Capacity	KW	9	10.46	11.6	12
	K BTU	30.7	35.7	39.5	40.9
Cooling Input Power	KW	3.42	4.25	5	6.55
Cooling Running Current	A	6.2	7.2	8.57	10.53
Power Supply	V/Ph/Hz	380V/3Ph/50Hz			
Compressor Type		Scroll			
Controller		Intelligent LCD Controller			
Codensor		PVC Titanium Heat Exchanger			
Noise	dB(A)	50	52	54	58
Water Connection	mm	50	50	50	50
Water Flow Volume	m³/h	6-8	7-9	9-12	10-13
Water Pressure Drop( Max)	kpa	15	15	16	16
Unit Dimension	L / W / H mm	660 / 660 / 860	660 / 660 / 955	660 / 660 / 955	660 / 660 / 955
Packing Size	L / W / H mm	750 / 700 / 890	750 / 700 / 1100	750 / 700 / 1100	750 / 700 / 1100
Net / Gross Weight	kg	92/ 98	100/106	100 / 106	106/ 112

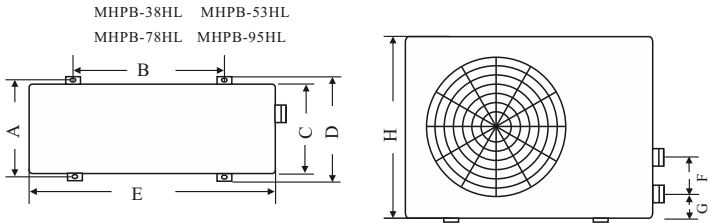
Above parameters is only for reference, exact details please as per nameplate.

Measurement conditions:

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

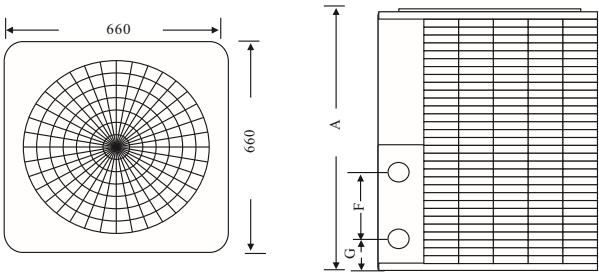
Cooling: Dry bulb 35° C, web bulb 24° C, inlet water temp. 27°

2.2 Dimension of swimming pool heat pump unit



Size (mm) \ Model	MHPB-38HL MHPB-53HL MHPB-78HL	MHPB-95HL
A	330	340
B	680	650
C	300	300
D	360	370
E	950	1010
F	200	270
G	110	110
H	600	670

MHPA-95HL MHPA-125HL  
MHPA-140HL MHPA-170HL  
MHPA-210HS MHPA-260HS



Model \ Size (mm)	MHPA-95HL MHPA-125HL MHPA-140HL MHPA-170HL	MHPA-210HS MHPA-260HS
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.

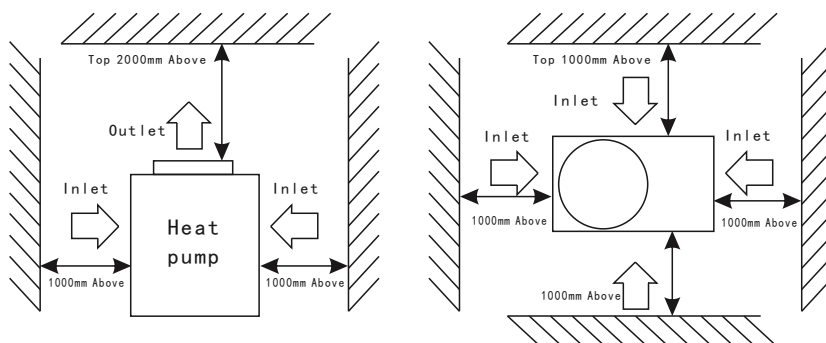
Attention:

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

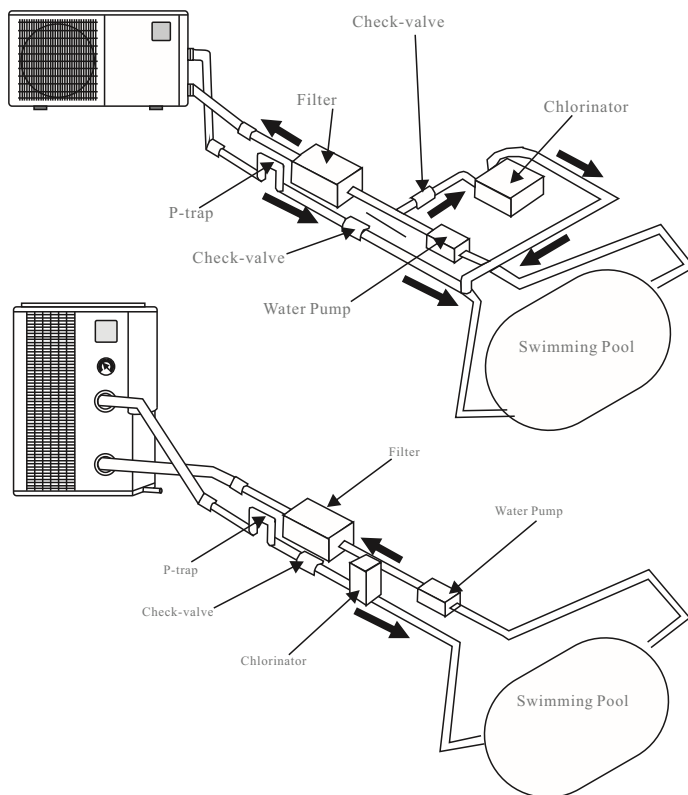
Install the heat pump as close to the swimming pool as possible to minimize the loss of heat through the piping. Put it on a solid base and place the rubber blocks under the heat pump to eliminate vibrations.

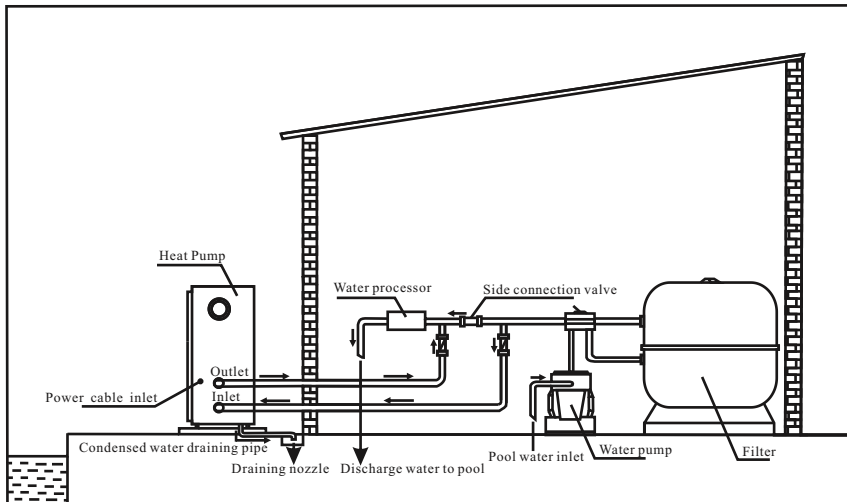
### 3.3 Distance from the pool

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.



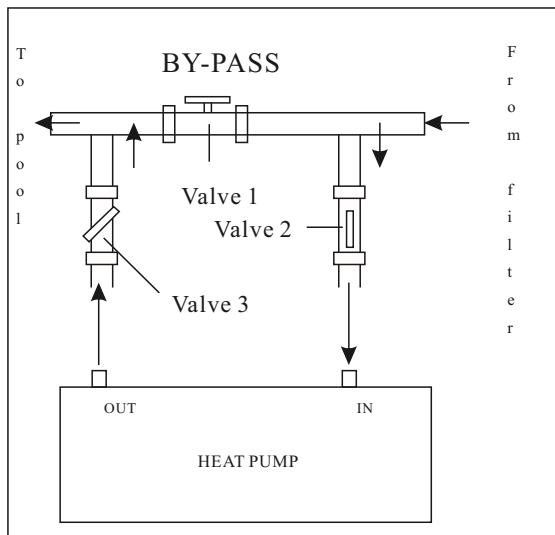


### 3.6 Connecting the by-pass

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

Completely open

Half way open



- 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 under high 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/l)	0.5	1.2
TAC(mg/l)	80	120
Salt(g/l)		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. Initialization status



2. Press " M " to choose the mode   
- Press "M"again      cooling 
- Press "M"again      heating 

#### 3. Standby status:






- Press "SET"once "00" "12℃" press   to adjust the water-in temp of cooling
- Press "SET"again "01" "40℃" press   to adjust the water-in temp of heating
- Press "SET"again "02" "40min" press  and  synchronously for 3s, get a sound "B"to set the parameter for defrosting cycle
- Press "SET"again "03" "7℃" press  and  synchronously for 3s, get a sound "B"to alter the initialization temp for defrosting
- Press "SET"again "04" "13℃" press  and  synchronously for 3s, get a sound "B"to alter the initialization temp for exit defrosting
- Press "SET"again "05" "8min" press  and  synchronously for 3s, get a sound "B"to alter the time for defrosting
- Press "SET"again "06" "1" press  and  synchronously for 3s, get a sound "B"to set the system quantity 1or2
- Press "SET"again "07" "1" press  and  synchronously for 3s, get a sound "B"to save the setting (memory function) "0"No,"1"YES
- Press "SET"again "08" "2" press  and  synchronously for 3s, the machine mode: 1.heat pump;2.heat pump and auxiliary heater;3.heating only
- Press "SET"again "09" "0" press  and  synchronously for 3s, working mode of water pump:0 ordinary 1 special
- Press "SET"again "10" "40℃" press  and  synchronously for 3s to set the return water temp under auto-mode

Further explanation of PCB connections (refer P9 on usermanual).

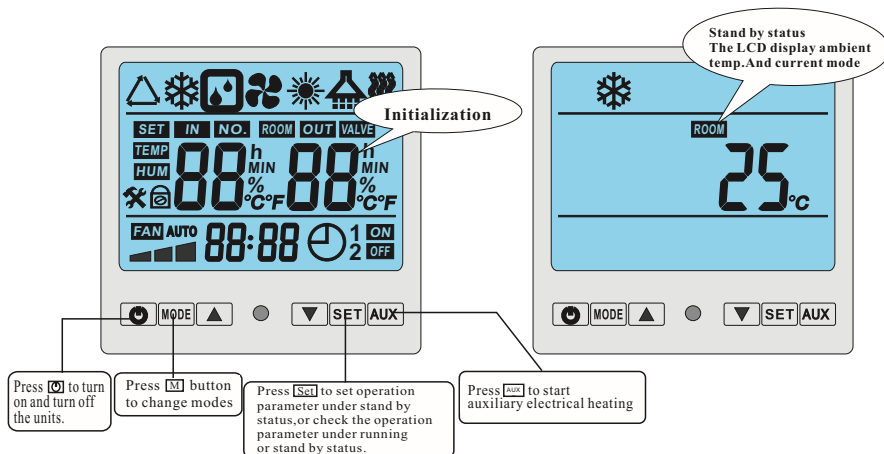
When FROST connecting with GND,the heat symbol  will flash ,defrost function will be disabled.

Disconnecting FROST and GND,then the heat symbol  won' t flash and the heat symbol  under auto-mode will disappear.

Display Lock:

Press  and  synchronously for 5s, symbol  comes out,it means all buttons on the display are locked,but it can be unlocked after pressing both  and  synchronously for 5s.

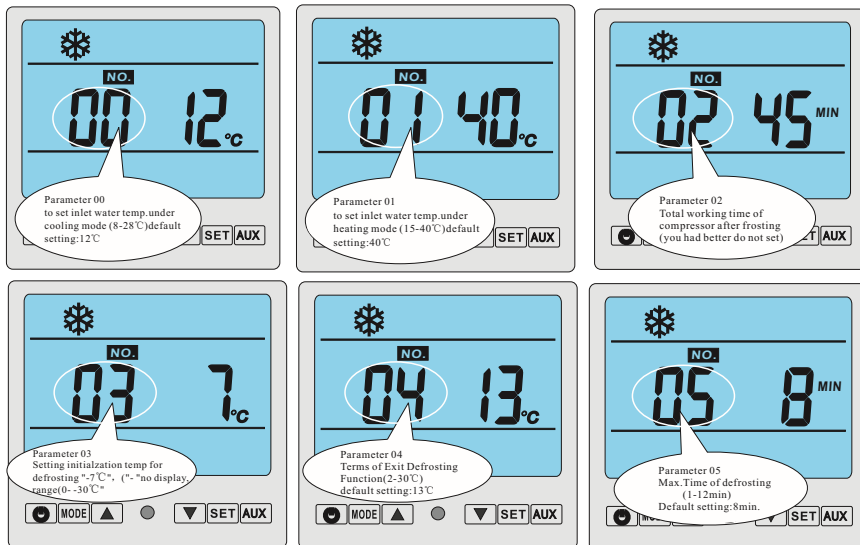
## 5.2 The functions of controller display

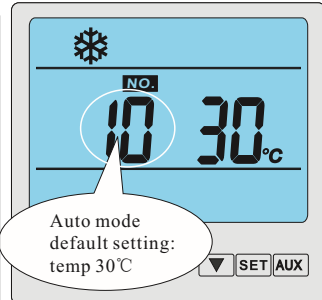
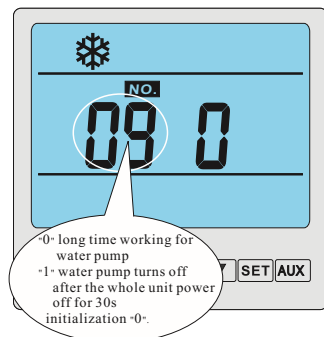
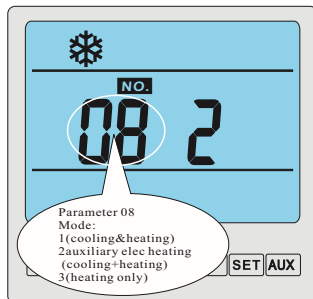
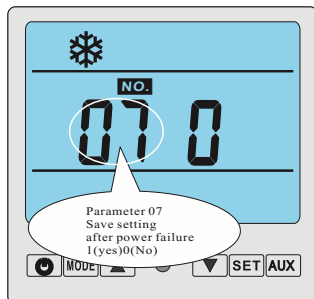
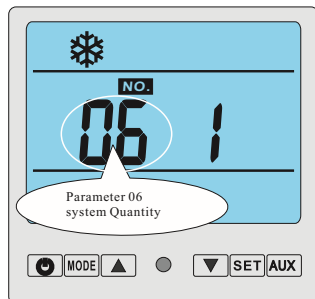


### Setting operation parameter

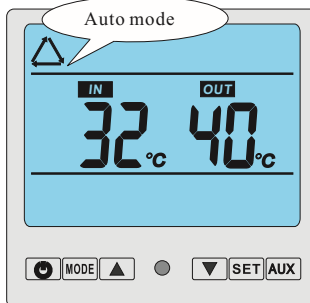
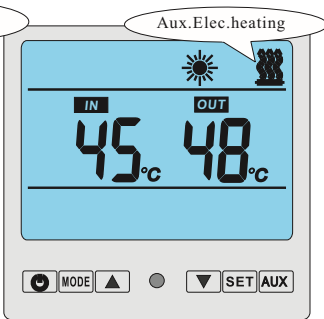
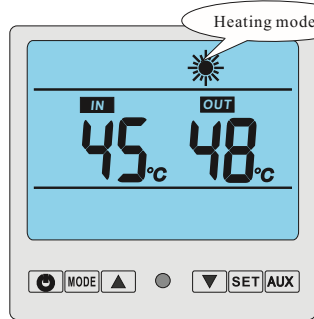
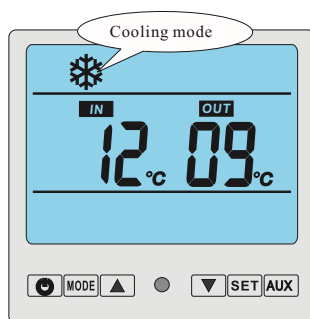
- ⊙ Under standby status, press "SET" button to enter Operation Parameter setting interface;
- ⊙ Press " SET " again to start setting (parameter from 00-10, see the Operation Parameter Table);
- ⊙ Under parameter setting, press  $\Delta$  or  $\nabla$  to set data;
- ⊙ Please note no motion on the display for 5s, the LCD will display water-in/water out temp. (under running) or ambient temp. (under standby status)
- ⊙ Under running status, you can press "SET" to check current parameter, but can change data of parameter!

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

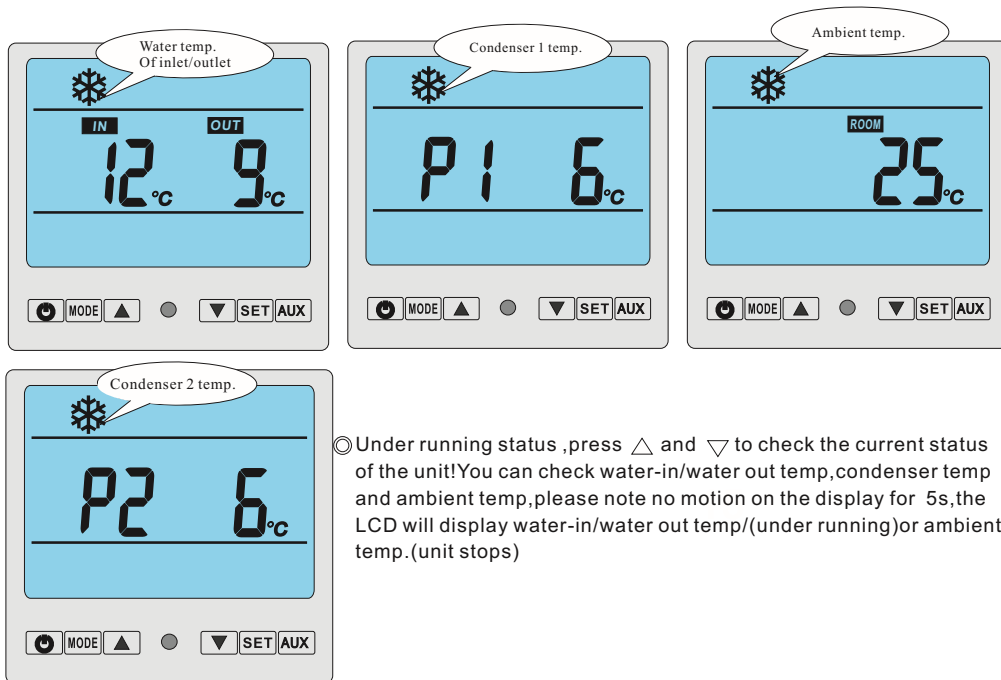




## To choose Mode



- ⊙ Press M to choose mode(mode can be changed under running)
- ⊙ Press △ 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****5.3 Operation data setting table:**

Digit	meaning	Range	Default	Adjust(yes/no)
00	Return water temp. Setting(cooling mode)	8-30°C	12°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	Terms of exit defrost under heating model	2-30°C	13°C	Adjusted by technicians
05	time of exit defrost under heating model	1-12MIN	8MIN	Adjusted by technicians
06	System quantity	1-2	2	Adjusted by technicians
07	Automatic restarting	0-1	0 (no record)	Adjusted by technicians
08	Model(cooling only/heat pump/auxiliary electrical heating/hot water)	1-3	3 (hot water)	Adjusted by technicians
09	Working mode of water pump	0-1	0	Adjusted by technicians
10	Auto mode(return water temp)	8-40°C	30°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.

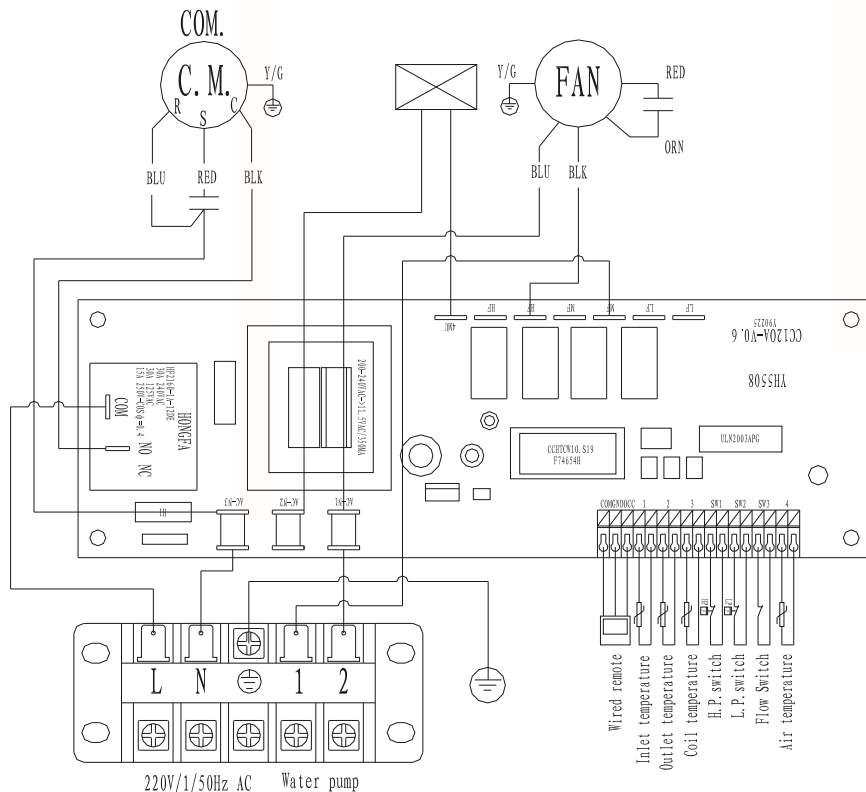
### 6.2 Trouble shooting guide

malfunction	Controller display	Reason	resolution
Water in temp. Sensor failure	PP 01	The sensor is open or short circuit	Check or change the sensor
Water out temp. Sensor failure	PP 02	The sensor is open or short circuit	Check or change the sensor
Coil1 sensor failure	PP 03	The sensor is open or short circuit	Check or change the sensor
Coil2 sensor failure (proprietary for A type)	PP 04	The sensor is open or short circuit	Check or change the sensor
ambient sensor failure	PP 05	The sensor is open or short circuit	Check or change the sensor
Temp. is too much different between water-in and water-out	PP 06	Water flow volume not enough, water pressure difference is too low	Check the water flow volume, or water system is jammed or not
Anti freezing under cooling mode	PP 07	Water flow volume is not enough	Check the water flow volume, or water system is jammed or not
The first time freezing protection in winter	PP 08	Too low	
The second time freezing protection in winter	PP 09	Too low	
Malfunction of system1	EE 01	The system1 protection was failure	Check each protection point of system1 remove the malfunction according to System Protection Board malfunction table)
Malfunction of system2(cut off under low voltage)	EE 02	The system2 protection was failure	Check each protection point of system2 remove the malfunction according to System Protection Board malfunction table)
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) Hi/Low pressure protection (for single phase unit)	EE 04	Wrong connections or lack of connection	Check connections of power cable
3times water-in and water-out temp. difference protection 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

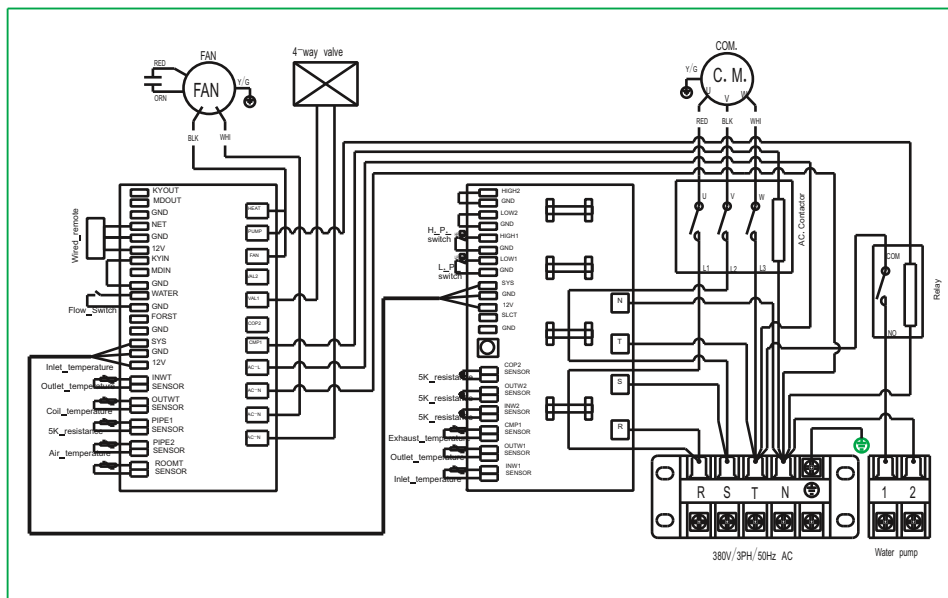


## 7. Detailed Specification

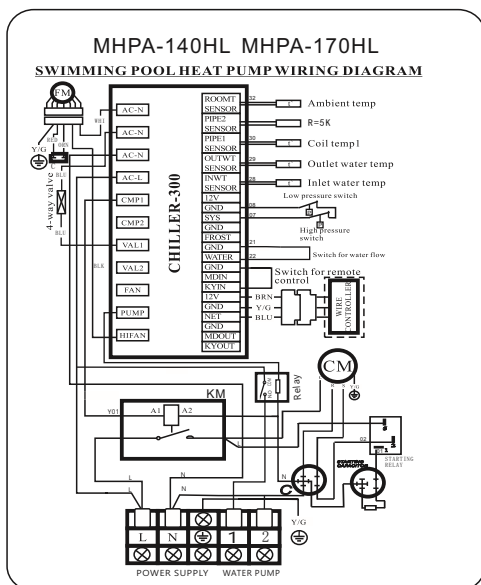
### 7.1 Wiring Diagram



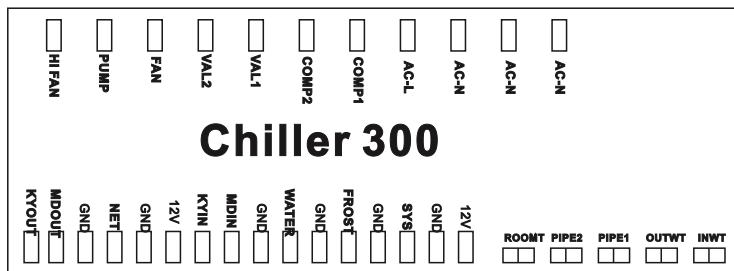
**MODEL:MHPB-38HL MHPB-53HL**  
**MHPB-78HL MHPB-95HL**



MHPA-140HS MHPA-170HS MHPA-210HS MHPA-260HS



## 7.2 Connection of PCB illustration



### Connections explanation:

No.	Symbol	Meaning
1	HI FAN	High speed for fan
2	PUMP	Water pump (220VAC)
3	FAN	Fan motor (220VAC)
4	VAL2	4way valve of system2 (220VAC) (no use)
5	VAL1	4way valve of system1 (220VAC)
6	COMP2	Compressor of system2 (220VAC) (no use)
7	COMP1	Compressor of system1 (220VAC)
8	AC-L	Live wire
9	AC-N	neutral wire
10	KYOUT GND	On/Off switch(output)(no use)
11	MDOUT GND	Mode output(no use)
12	NET GND 12V	Wire controller
13	KYIN	On/Off Switch(input)(no use)
14	MDIN	Model(input)(no use)
15	WATER GND	Flow switch (input)( normal close)
16	FROST GND	Defrost signal(no use)
17	SYS GND 12V	System protection(input)(normal close)
18	ROOMT	Ambient temp.(input)
19	PIPE2	Temp. Of fan coil2( input)(no use)
20	PIPE1	Temp. Of fan coil 1( input)(no use)
21	OUTWT	Water out temp.(input)
22	INTWT	Water in temp.(input)