



# **Intelligent controller**

## **Manual**

**Product type: Swimming pool heat pump controller**

**Product type: CCYC002**

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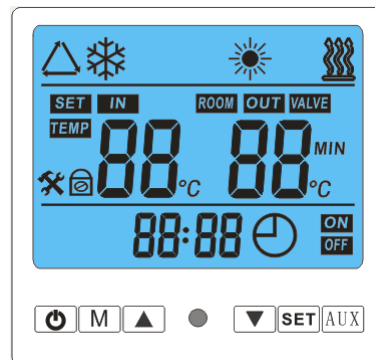
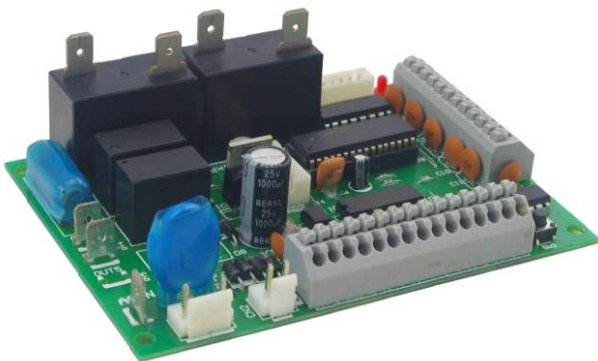
# Simple controller of swimming pool heat pump heater Manual

## 1. General description:

- 1.1. Three operation modes: automation, cooling and heating;
- 1.2 Single compressor system;
- 1.3 Controlled by a wire control panel
- 1.4 System operation parameters and set parameters can be displayed and changed.
- 1.5 With automatic protection and automatic failure alarm function;
- 1.6 System protection: 3 minute compressor protection; high/low pressure protection; sensor protection; water flow detection, etc.
- 1.7 Communication distance between the unit and the wire control is not shorter than 100M;
- 1.8 With strong anti-interference, stable and reliable performance.

### Note:

- 1.9 When a wire control panel is connected and ON/OFF switch closes. Unit's ON/OFF will be controlled by panel. While there is no wire control panel connected, Unit will be ON if ON/OFF switch is closed and unit will be OFF if ON/OFF switch is opened.
- 2.0 When a wire control panel is connected, Unit's operation modes according to the wire control setting. While there is no wire control panel connected, unit operation mode is controlled by the mode signal switch (closes for heating and opens for cooling).
- 2.1 Electric parameter:



Power supply: 220±10%(VAC), 50/60Hz

Senor type: NTC(5KΩ/25°C,B value 3470K)

Mounting size: 95×150×30mm

Mounting size: 86×86×16mm

Measuring range: -9°C~99°C

Controlling range: -9°C~99°C

Port output capacity: Compressor and water pump: 20A/250VAC Others: 5A/250VAC

## 2. Delay output control:

### 2.1 Water pump

- 2.1.1 When system requires to open, water pump starts 30 seconds in advance of the compressor and compressor starts after the water system has fully circulated.
- 2.1.2 When system requires to close, water pump closes 30 seconds later only after the compressor and fan are both closed.
- 2.1.3 During defrosting, water pump does not stop running.

**Note: For popular models ( parameter 9=0 ), water pump does not stop when constant temperature shutdown. For special models ( parameter 9=1 ), water pump stops 30 seconds later after compressor closes.**

**2.2 Compressor**

2.2.1 Safe time of compressor start →close and start →start (except for defrosting procedure while defrosting);

2.2.2 After the same compressor closes, wait 3 minutes to restart.

2.2.3 There must be a time span of 5 minutes between two starts for the same compressor.

**2.3 Four-way valve**

2.3.1 It is powered on in heating mode. When the unit is started, it opens 30 seconds ahead of compressor while the unit is shutdown it closes 2 minutes after the compressor closes. 4-way exchange valve dose not close when unit closes in heating and constant temperature state.

2.3.2 It delays 2 minutes for the 4-way exchange valve to stop when it changes from heating mode to refrigeration mode;

2.3.3 The compressor starts only after the 4-way exchange valve starts for 5 seconds when it changes from heating mode to refrigeration mode;

2.3.4 It delays 2 minutes for the 4-way exchange valve to stop when it changes from heating mode to shutdown.

**2.4 Fan**

2.4.1 When compressor starts, fan starts. When compressor closes , fan closes.

2.4.2 When defrosting, it is controlled according to the requirement of defrosting.

**2.5 Electric heating (only for electric heating model)**

2.5.1 Electric heating starts only after water pump opens for 10 seconds.

2.5.2 Electric heating restarts only after it closes for 10 seconds.

**3. Electronic expansion valve:**

3.1 Initial opening steps: 350P ( Adjust parameter C); Range of opening steps: 100P~500P; Shutdown steps: 350P (Adjust parameter C);

3.2 When electronic expansion valve selects automatic control (the parameters 6 to 1)

3.3 Compressor starts , EEV’S action is controlled by super heat temperature.

3.4 EEV opens 350 steps (parameter C) in defrosting states.

3.5 Super heat parameter (Heating mode is parameter “b”, cooling mode is parameter “d”).

3.6 When electronic expansion valve selects manual control (the parameters 6 to 0), the operation steps adjust by parameter C.

**4. Operation mode**

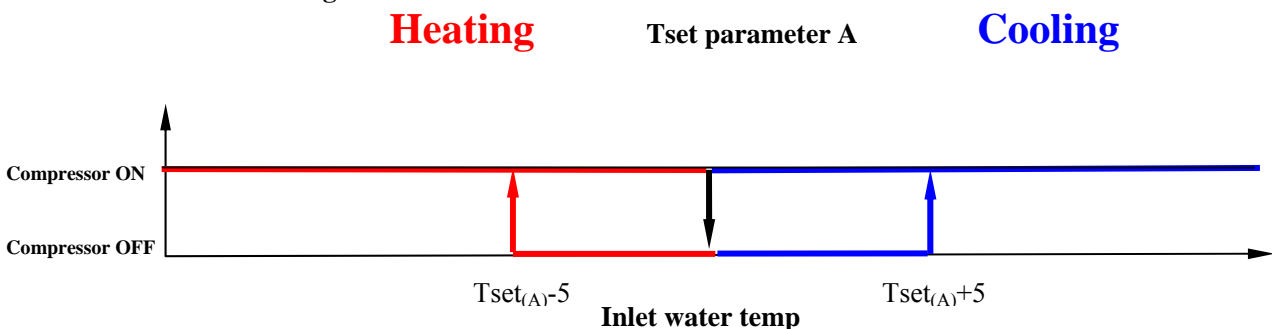
**4.1Automation mode**

4.1.1 Temp setting: Inlet water temp set value  $T_{set}$ , range 8-60°C ( parameter A), Initial set

4. temp is 40°C;

4.1.2: Operation control: System enters the cooling or heating mode according to the water inlet temp and maintain the water inlet temp in the range of set temp  $\pm 5^{\circ}C$ .

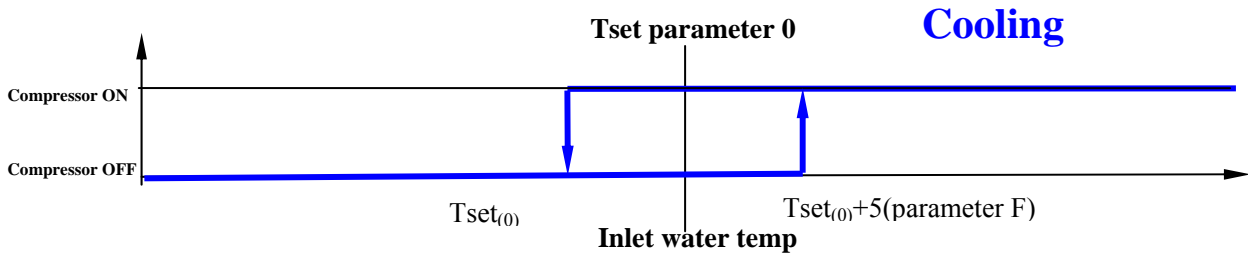
4.1.3Details in the following:



**4.2 Cooling Mode**

4.2.1 Temp setting: Inlet water temp set value T, range 8-28°C ( parameter 0), Initial set temp is 12°C;

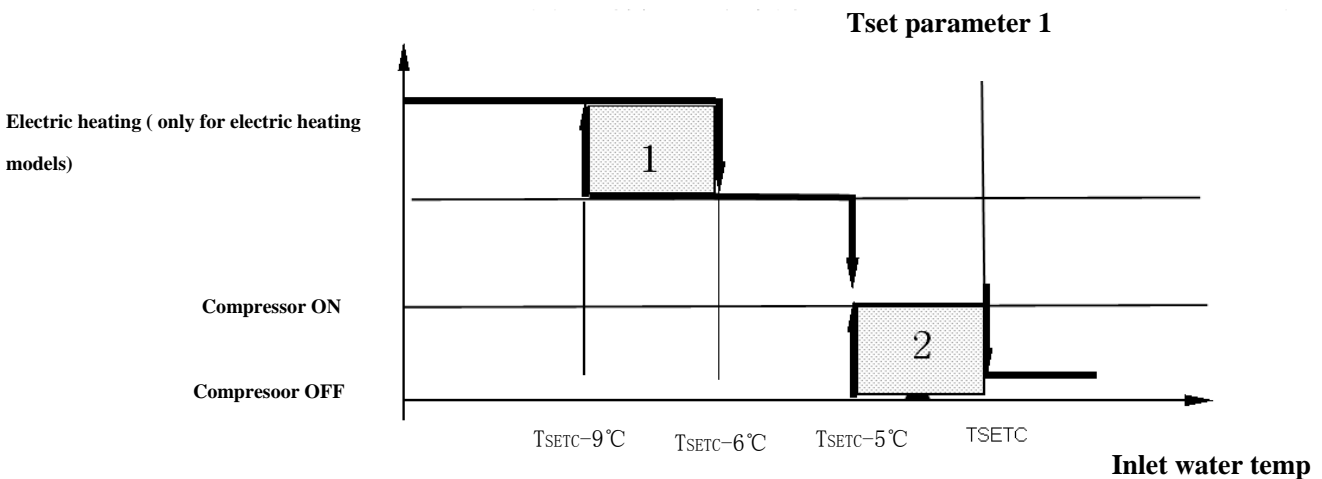
4.2.2 Operation control: 4-way valve is powered off, water pump opens, Whether compressor open or shutdown is decided by the value of Inlet water temp and T set (0)



**4.3 Heating Mode**

4.3.1 Temp setting: Inlet water temp set value T, range 15-60°C ( parameter 1), Initial set temp is 40°C;

4.3.2 Operation control: 4-way valve is powered on, water pump opens, Whether compressor open or shutdown is decided by the value of Inlet water temp and T set (1)



**4.3.3 Electric heating (only for electric heating model)**

4.3.1.1 When electric heating function starts

4.3.1.2 When unit opens, it operates on the curve 1 shown in the above chart;

4.3.1.3 When unit closes, it operates on the curve 2 shown in the bellow chart.

**5. Defrosting**

5.1 Condition to enter defrosting

5.1.1 After heating mode operates for 40 minutes parameter 02 ( 30-90minutes ), it enters defrosting when tested coil temp  $\leq -7^{\circ}\text{C}$ , (parameter 03);

5.1.2 When coil temp failure ( PP03) occurs, defrosting will be changed to timer defrosting with during of 6 minutes.

5.2 Condition to quit from defrosting

5.2.1 When coil temp  $> 13^{\circ}\text{C}$  parameter 04 (  $2^{\circ}\text{C} \sim 30^{\circ}\text{C}$ ), or defrosts for 8 minutes parameter 05 ( 1~12 minutes), it quits from defrosting.

5.3 Defrosting action

5.3.1 Following action begins when it meets defrosting condition:

5.3.2 Compressor and outdoor fan stop running and send defrosting direction signal to the remote control issuing defrosting signal;

5.3.3 The 4-way exchange valve will be powered off after 25 seconds;

5.3.4 Compressor starts after 30 seconds;

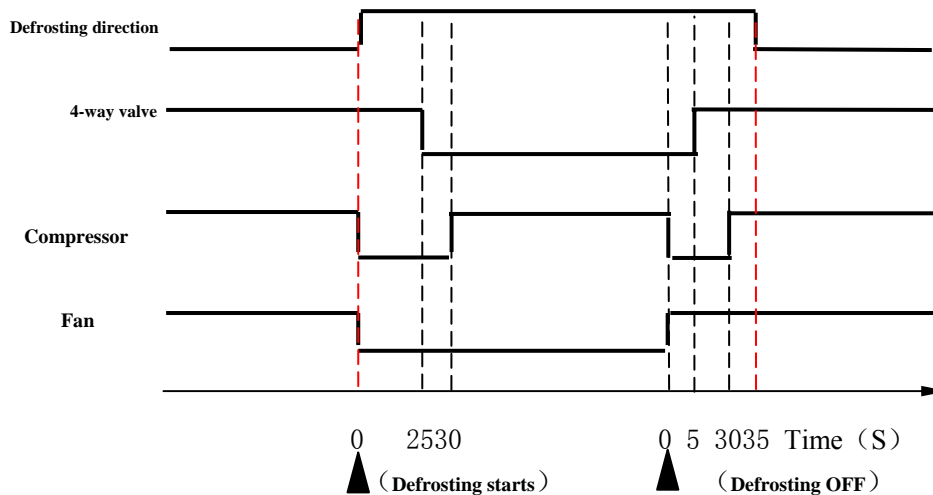
5.3.5 Water pump operates normally.

5.3.6 Following action begins when it meets defrosting quitting condition:

5.3.7 When system meets the defrosting quitting condition, it quits from defrosting.

Compressor stops running and outdoor fan begins to run. 4-way exchange valve will be powered off 5 seconds later.

5.3.8 Compressor starts and recovers to normal heating after fan runs for 30 seconds. The Heating continuous operation time is reset(parameter 02) and send defrosting closing signal to remote control and stops issuing defrosting signal.



5.4 Abnormal completion of defrosting

5.4.1 If unit closes during defrosting, it will keep defrosting until defrosting ends.

5.4.2 If low pressure protection is shielded during defrosting and it quits from defrosting to normal heating, low pressure switch is detected 5 minutes later.

## 6. System protection

### 6.1 Power off memory

6.1.1 When parameter 7 is set to 1, if it is powered on again after a sudden power off during normal operation, system will automatically recover to the status before power off.

6.1.2 When parameter 7 is set to 0, if it is powered on again after a sudden power off during normal operation, system is in the closing status.

### 6.2 Inlet water temp sensor failure

6.2.1 When inlet water temp sensor is detected to be short-circuited or disconnected at any time, it is determined to be a inlet water temp sensor failure then unit stops.

6.2.2 When it is detected that inlet water temp sensor recovers to normal, unit will recover to normal operation.

6.2.3 When failure occurs, failure code "PP 01" is displayed on the wiring panel.

### 6.3 Outlet water temp sensor failure

6.3.1 When outlet water temp sensor is detected to be short-circuited or disconnected at any time, it is determined to be a outlet water temp sensor failure then unit stops.

6.3.2 When it is detected that outlet water temp sensor recovers to normal, unit will recover to normal operation.

6.3.3 When failure occurs, failure code "PP 02" is displayed on the wiring panel.

### 6.4 Coil temp sensor failure

6.4.1 When coil temp sensor is detected to be short-circuited or disconnected at any time, it is determined to be a coil temp sensor failure and unit works normally. Defrosting control will be changed to timer defrosting and at the same time electronic expansion valve will be changed to manual control in heating mode.

6.4.2 When it is detected that coil temp sensor recovers to normal, defrosting will recover to sensor defrosting and electronic expansion valve will return to automatic operation (when it is set to automatic control)

6.4.3 When failure occurs, failure code “PP 03” is displayed on the wire control panel.

### **6.5 Suction temp sensor failure**

6.5.1 When suction temp sensor is detected to be short-circuited or disconnected at any time. it is determined to be a suction temp sensor failure and unit will work normally and electronic expansion valve will be changed to manual control.

6.5.2 When it is detected that suction temp sensor recovers to normal, electronic expansion valve will return to automatic operation (when it is set to automatic control)

6.5.3 When failure occurs, failure code “PP 04” is displayed on the wire control panel.

### **6.6 Outdoor temp sensor failure**

6.6.1 When outdoor temp sensor is detected to be short-circuited or disconnected at any time, it is determined to be a outdoor temp sensor failure then and unit works normally. Anti-freeze protection is decided by inlet water temp.

6.6.2 When it is detected that outdoor temp sensor recovers to normal, unit will recover to normal operation.

6.6.3 When failure occurs, failure code “PP 05” is displayed on the wiring panel.

### **6.7 Excessive temp difference between inlet water temp and outlet water temp**

6.7.1 It detects the temp of inlet water temp and outlet water temp after compressor starts. When it is detected that the difference between inlet water temp and outlet water temp exceeds 13℃, it will enters excessive difference protection between inlet water temp and outlet water temp. Unit will stop for protection. Water pump will not close. Failure code “PP 06” is displayed on the wire control.

6.7.2 When in excessive temp difference protection, unit will restart 3 minutes later ( when it does not reach the condition that it will not recover unless power off. )

6.7.3 If this protection occurs three times within 30 minutes, Unit will stop for protection. It will not recover unless power off. Failure code “EE 05” is displayed on the wiring panel.

### **6.8 Excessive cold protection**

6.8.1 This function becomes effective only in cooling mode.

6.8.2 After compressor operates for 5 minutes, when it is detected that outlet water temp $\leq 5^{\circ}\text{C}$ , it enters excessive cold protection. Compressor and fan stop running while water pump works as usual (when parameter 9=0)

6.8.3 When excessive cold protection occurs, if it is detected that Outlet water temp $\geq 7^{\circ}\text{C}$ , it will quit from excessive cold protection to normal operation.

6.8.4 When in excessive cold protection, failure code “PP 07” is displayed on the wiring panel.

### **6.9 Condenser temp sensor failure**

6.9.1 when it is detected that condenser temp sensor is short circuited or disconnected at any time, it is determined to be a condenser temp sensor failure. Unit works normally for protection. Electronic expansion valve will be changed to manual control in heating mode.

6.9.2 When it is detected that condenser temp sensor recovers to normal, unit will recover to normal operation.

6.9.3 When failure occurs, failure code “PP 08” is displayed on the wire control panel.

### **6.10 Anti-freeze protection in winter**

6.10.1 In off status, detects inlet water temp and ambient outdoor temp.

6.10.2 When outdoor temp  $\leq 0^{\circ}\text{C}$  and  $2^{\circ}\text{C} \leq \text{inlet water temp} \leq 4^{\circ}\text{C}$ , it enters to the one class anti-freeze status. Unit will automatically open to operate the water pump mode.

6.10.3 If ambient temp.  $\text{TW} \leq 0^{\circ}\text{C}$  and inlet water temp  $\leq 2^{\circ}\text{C}$ , it enters to the two class anti-freeze status. Unit will automatically open to operate the heating mode.

6.10.4 When inlet water temp  $\geq 15^{\circ}\text{C}$  or outdoor temp  $> 1^{\circ}\text{C}$ , it quits from anti-freeze protection.

6.10.5 If outdoor temp failure occurs, whether it enters anti-freeze protection is decided by inlet water temp. If inlet

water temp failure occurs, whether it enters anti-freeze protection is decided by outdoor temp. (Inlet water temp failure occurs, It enters the one class anti-freeze status only)

6.10.6 If both inlet water temp and outdoor temp failure occurs, anti-freeze protection will not be treated.

6.10.7 While in anti-freeze protection, failure code “PP 07” is displayed on the wiring panel.

**6.11 Water flow failure**

6.11.1 It begins to detect after water pump works for 30 seconds. If water flow switch disconnection is detected for continuous 2 seconds, it is determined to be a water flow failure. Compressor and fan stop while water pump dose not stop.

6.11.2 When water flow failure occurs, if water flow switch closing is detected, unit recovers to normal operation.

6.11.3 When failure occurs, failure code “EE 03” is displayed on the wiring panel.

**6.12 High pressure protection**

6.12.1 After compressor starts for 5 seconds, if system high pressure switch disconnection is detected for continuous 5 seconds, it is determined to be a system high pressure failure. Then unit stops.

6.12.2 When high pressure switch closing is detected, unit will quit from failure protection and recover to normal operation (without 3 times of system failure in 30 minutes).

6.12.3 If system failure occurs for continuous 3 times within 30 minutes, it will not recover unless power off.

6.12.4 When failure occurs, failure code “EE 01” is displayed on the wiring panel.

**6.13 Low pressure protection**

6.13.1 After compressor starts for 5 minutes, if system low pressure switch disconnection is detected for continuous 5 seconds, it is determined to be a system low pressure failure. Then unit stops.

6.13.2 When low pressure switch closing is detected, unit will quit from failure protection and recover to normal operation (without 3 times of system failure in 30 minutes).

6.13.3 If system failure occurs for continuous 3 times within 30 minutes, it will not recover unless power off.

6.13.4 When failure occurs, failure code “EE 02” is displayed on the wiring panel.

**6.14 Power phase protection**

6.14.1 If phase protection switch disconnection is detected for continuous 1 second at any time, it is determined to be a power phase-sequence failure and unit shutdowns for protection.

6.14.2 When failure occurs, it will not recover unless power off.

6.13.3 When failure occurs, failure code “EE 04” is displayed on the wire control panel.

**6.15 Communication failure**

6.15.1 Within 20 seconds when power on for the first time, if main board does not receive any communication signal from wiring panel, it is determined to be disconnected with remote control. System controls the operation just according to water flow switch signal

6.15.2 In normal states ,if wiring panel dose not receive any signal from main board in continuous 10 seconds, it is determined to be a communication failure and failure code “EE 08” is displayed.

**7. Table of system parameter, status and failure codes**

**7.1 System parameter**

Parameter	Meaning	Range	Default	Note
00	Set value of cooling inlet water temp	8-28℃	12℃	adjustable
01	Set value of heating inlet water temp	15-60℃	40℃	adjustable
02	Defrosting cycle	30-90Min	40Min	adjustable

03	Temp at which defrosting begins in heating	0--30℃	-7℃	adjustable
04	Temp at which defrosting quits in heating	2-30℃	13℃	adjustable
05	Time when defrosting quits in heating	1-12Min	8Min	adjustable
06	EEV control options	0(manual)/1(automatic)	1	adjustable
07	Power off memory	0-1	1 (Yes)	adjustable
08	Model options (cooling/C&H/C&H&elec.heating /H& elec.heating)	0-3	1 (C&H)	adjustable
09	Water pump operation mode	0-1	0	adjustable
A	Set value of inlet water temp in automatic mode	8-60℃	40℃	adjustable
B	Super heat in heating	-F(15℃)~F(15℃)	5℃	adjustable
C	Steps for EEV manually adjust	15~47	35	adjustable
D	Super heat in cooling mode	-F(15℃)~F(15℃)	5℃	adjustable
E	Heating limited setting	30~70℃	60℃	adjustable
F	Restart different temperature	1~20℃	5℃	adjustable


7.2 System Temperature

Status code	Meaning	Range	Note
IN	Inlet water temp	-9℃~99℃	measured value
OUT	Outlet water temp	-9℃~99℃	measured value
P1	Coil temp	-9℃~99℃	measured value
P2	Suction temp	-9℃~99℃	measured value
P3	Outdoor temp	-9℃~99℃	measured value
P4	Condenser temp	-9℃~99℃	measured value
P5	EEV steps	100P~500P	measured value

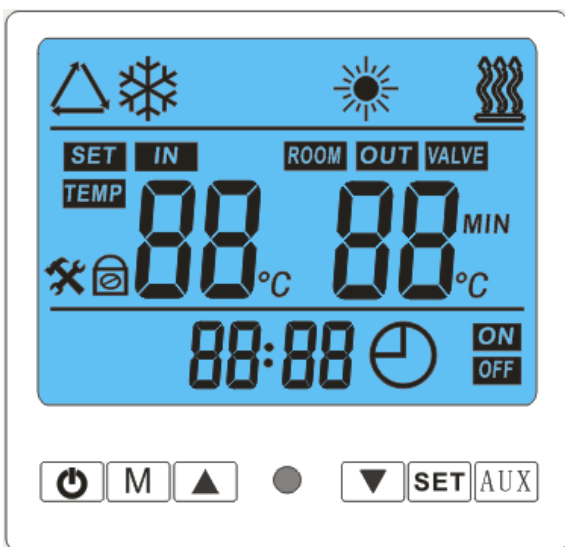
7.3 System failure code

Protection/Failure	Failure code	Indicator lamp for unit operation /failure
Standby		off
Normally operation		light
Inlet water temp sensor failure	PP01	
<b>Outlet water temp sensor failure</b>	PP02	
<b>Coil temp sensor failure</b>	PP03	
<b>Suction temp sensor failure</b>	PP04	
<b>Outdoor temp sensor failure</b>	PP05	
<b>Excessive temp difference</b>	PP06	
<b>Excessive cold protection</b>	PP07	



One class anti-freeze	PP07	
Two class anti-freeze	PP07	
<b>High pressure protection</b>	EE01	
<b>Low pressure protection</b>	EE02	
<b>Water flow failure</b>	EE03	
<b>Excessive temp difference</b>	EE05	
 Flashing	Defrosting direction	
<b>Communication failure</b>	EE08	

## Manual of wiring control panel



### 1. Definition of wiring panel keys

1.1 “” ON/OFF key

Press the key to open or close the unit in any condition

1.2 “M” Mode key

Press the key to change mode for AUTO , Cooling , heating 

1.3 “▲” & “▼” up and down key

Together with the key “SET”, it is used to inquire and set various parameters.

1.4 “SET” setting key

Along with the keys “▲” and “▼”, it is used for parameter inquiry and setting and clock setting.

1.5 “AUX” Electric heating key

When set to be a model with electric heating, this key can be used to open or close electric heating and timing setting.

### 2. Wiring panel operation

#### 2.1 Keys for locking and unlocking

2.1.1 In main interface, press and hold the key “▲” and “▼” at the same time for 3 seconds, after a buzzer sound “Beep”, the keys are locked.

2.1.2 In locking status, press and hold the key “▲” and “▼” at the same time for 3 seconds, after a buzzer sound “Beep”, the keys are unlocked.

#### 2.2 Temp display

2.2.1 In the “ON” or “OFF” state, press the key “▲” or “▼” to check all kinds of temp status. If you don’t press any key within five seconds, screen will return to main page and display water inlet/outlet temperature in the “ON” and

display the outdoor temp in the “OFF” state.

### 2.3 Parameter display and setting

2.3.1 In non parameter inquiry or setting interface, press the key “SET” to enter the parameter inquiry interface. In parameter inquiry interface, press the key “SET” each time to check the next parameter (circulated inquiry). 15 parameters in total can be checked from 00 F.

2.3.2 In parameter inquiry interface, parameter 00 and 01 can be set by pressing the key “▲” and “▼” directly in “ON or OFF” state.

2.3.3 Other parameter(02-F) must be set in “OFF” state. In parameter inquiry interface, press and hold the keys “▲” and “▼” at the same time for 3 seconds to enter setting interface for other parameters after a buzzer sound “Beep”. At this time, press the key “▲” or “▼” to set various parameters. Press the key “SET” to find out the value to be set.

2.3.4 In the interface of parameter inquiry or parameter setting, if there is no key operation in continuous 8 seconds, it will quit automatically from the parameter inquiry interface or parameter setting interface and return to main interface.

### 2.4 Clock setting

2.4.1 In main interface, keep pressing “SET” button with 3 seconds to enter the clock setting interface, the hour of clock will be flashing, press “▲” or “▼” button to modify the hour of clock.

2.4.2 When finished the hour of clock setting, press “SET” button, the minute of clock will be flashing, press “▲” or “▼” button to modify the minute of clock.;

2.4.3 When finished the minute of clock setting, press “SET” button will be saved the current clock and return to main interface.

2.4.4 In clock setting interface, if it has no any button operation in 10 seconds or press “⏪” button, then it will return to main interface and save the current clock.

### 2.5 Timing setting

2.5.1 In main interface, keep pressing “AUX” button with 3 seconds to enter the timing setting interface, the hour of clock and “ON” symbol will be flashing, press “▲” or “▼” button to modify the hour of clock.

2.5.2 When finished the hour of clock setting, press “AUX” button, the minute of clock will be flashing, press “▲” or “▼” button to modify the minute of clock.;

2.5.3 When finished the minute of clock setting, press “AUX” button to enter timing OFF interface, the hour of clock and “OFF” symbol will be flashing, press “▲” or “▼” button to modify the hour of clock.

2.5.4 When finished the hour of clock setting, press “AUX” button, the minute of clock will be flashing, press “▲” or “▼” button to modify the minute of clock.;

2.5.5 When finished the minute of clock setting, press “AUX” button will be saved the current timing clock and return to main interface.

2.5.5 In timing clock setting interface, press “⏪” button, then it will return to main interface and save the current timing clock.

2.5.6 In timing clock setting interface, press “SET” button, the timing clock will be cancel.