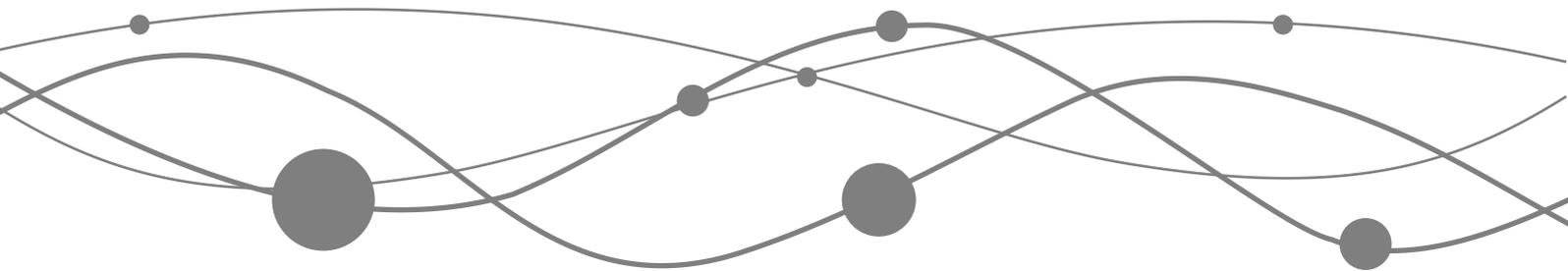




Thermopod

Controller Operation Manual

Hunan Harnitek Technology Co., Ltd.



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1 Introduction

The Thermopod is designed to provide automatic constant hot water heating preset to 53°C. If the cylinder temperature drops 5°C, the Thermopod will switch on and run until the target temperature of 53°C is reached, then it will return to Standby mode.

Advanced Settings - The Thermopod has 2 Run Time settings, so you can program 2 periods during which the unit does or does not run during the 24-HR day.

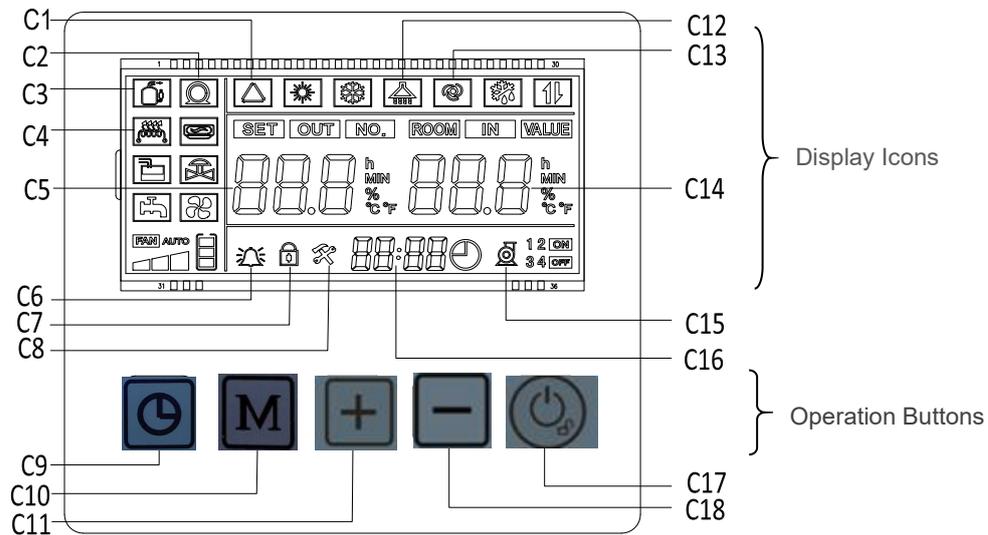
For energy saving, the Thermopod has 3 running periods during which you can choose 3 target temperatures during the 24-HR day. These can be used with or without the Run Time settings.

If an Immersion Heater is wired into the unit, it will be automatically called on to work with the Thermopod unit, to achieve the Disinfection target temperature once a week. The immersion unit is also called upon along with the Thermopod for either Single Boost or for if the Daily Boost is set-up.

The immersion will be called on as a heating back-up, if anything affect the functionality of the Thermopod unit.

Thermopod units should always be installed with a secondary heating source. This can be the existing heating source, or an immersion as a back-up.

2 Thermopod Controller Digital Display



C1	Energy Saving Mode	C12	Heating Water
C2	Water Pump	C13	Disinfection
C3	Compressor	C14	Water Outlet Temperature
C4	Electric Heating	C15	Timing Water Supply
C5	Cylinder Temperature	C16	Time Display
C6	Warning	C17	ON/OFF
C7	Lock	C18	Down
C8	Maintain		
C9	Timer		
C10	Function		
C11	Up		

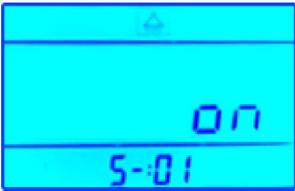
3 Tables of Parameter and Status

3.1 Unit parameter table

Press  for 3 seconds into the setting mode – User parameters

Parameter	Definition	Setting range	Default	Comments
L2	Compressor start to return difference setting temperature	2°C~18°C	5°C	
L3	Cylinder Target temperature	35°C ~ 60°C	53°C	Default 53°C, not over 60°C
L5	Automatic electric heating setting temperature	30°C~60°C	45°C	
L6	Duration of High temperature disinfection	0 Min -180 Min	60 Min	
L7	Timer of disinfection (Hourly)	00:00-23:00	14	14 = 14:00
L8	Timer of disinfection (Minutely)	0-59 Min	0	
L9	Time of start using water intensively	00:00-23:00	18	18 = 18:00
L10	Time of stop using water intensively	00:00-23:00	23	23 = 23:00
L11	Enter the start time of energy-saving period 1	00:00-23:00	8	8 = 08:00
L12	Enter the start time of energy-saving period 2	00:00-23:00	18	18 = 18:00
L13	Enter the start time of energy-saving period 3	00:00-23:00	23	23 = 23:00
L14	Target heating temperature of energy-saving period 1	0 ~ 60°C	53°C	
L15	Target heating temperature of energy-saving period 2	0 ~ 60°C	50°C	
L16	Target heating temperature of energy-saving period 3	0 ~ 60°C	45°C	
L17	Target temperature of compressor and electrical heater (Immersion) during disinfection	60-63°C	60°C	

3.2 Unit status table

Press the M button () , it will show: 

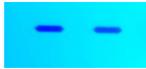
Press “+” or “-”button ( & ) to choose machine. Then press M button () to check current machine's parameters.



Means current machine is No. 1 machine;



Means current machine is on-line;



Means current machine is off-line; when it's off-line, no parameters will be shown.



If any machine failure during online status, it will shows ,  means No. 1 Machine occurs breakdown. The rest can be done in the same manner.

Unit Status Code	Definition	Display Range	Display Value	Comments
A0	Cylinder Temperature	-31°C~99°C (Parameter F3=0)		
A1	Coil Temperature	-31°C~99°C	Measured Value	
A2	Suction Temperature	-31°C~99°C	Measured Value	
A3	Exhaust Temperature	0°C~125°C	Measured Value	
A4	Ambient Temperature	-31°C~99°C	Measured Value	
A5	Water Outlet Temperature	-31°C~99°C (Parameter F3=0)	Measured Value	Only when water pump is connected
A9	Step Number of electronics expansion valve	10~50	Measured Value	Step=display value*10
E1	Error Code	Error Code (05 29)	Error Code No.	Latest Record
E2	Error Code	Error Code (05 29)	Error Code No.	Second Record
E3	Error Code	Error Code (05 29)	Error Code No.	Third Record
E4	Error Code	Error Code (05 29)	Error Code No.	Fourth Record
E5	Error Code	Error Code (05 29)	Error Code No.	Fifth Record
E6	Error Code	Error Code (05 29)	Error Code No.	Last Old Record

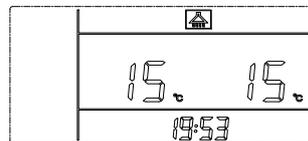
4 General Operation

Mode

- When device starts up with  on the top of the screen, it enters Heating mode.

Home Screen

This is always the home screen in operation.



Lock and Unlock Screen

- When the device is locked, see lock icon  on the screen diagram, press and hold  for 5 seconds. The control is unlocked after a 'beep' sound and the icon disappears.

The control will be automatically locked if there is no command for 60 seconds.

5 Controller Operation Buttons



On/Off switch Button

This is used to set:

- Unlock the screen
- Turn ON/OFF the system
- Boost function
- User parameter checking and setting
- Energy saving setting



Function Button

This is used to set:

- Checking mode
- Clearing error history
- Checking run time setting
- User parameter checking and setting
- Energy saving setting

Remark: different time length of holding  triggers different function.



Timer Button

This is used to set:

- Real time clock
- Run time setting
- Boost function



Up & Down Button

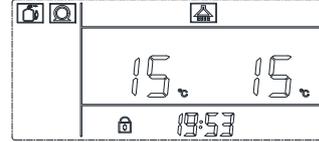
This is used to set:

- Real time clock
- Run time setting
- User parameter checking and setting
- Energy saving setting

6 Using the Control Panel

Lock and Unlock Screen

- The system will be automatically locked after 60 seconds if there is no command input, with  showing on the left screen diagram.
- When the device is locked, press and **hold**  for 5 seconds, the control is unlocked after a 'beep' sound and lock icon  disappears from the display.

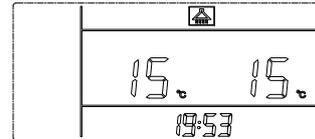


ALWAYS UNLOCK THE SCREEN FIRST BEFORE THE FOLLOWING OPERATIONS

Real-Time Setting

Steps:

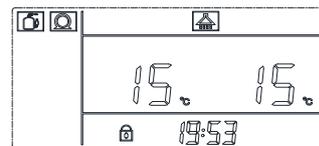
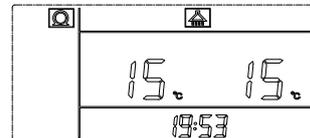
- In home page, press  and hold it for 10 seconds until the time shown on the screen is flashing;
- Press , the hour digit hh will flash, and then adjust the time hh by   ;
- After setting hh, press , the minute digit mm will flash, and then adjust the time mm by   ;
- Press  to confirm the adjustment and return to home screen.



Switching ON the Thermopod System

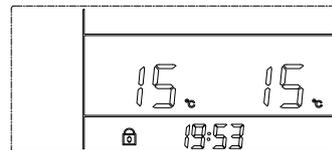
Steps:

- Press the button  and hold it for 1 second, then the heating water  signal appears. If the target temperature is not achieved the system will switch on.
- 1 second after the heating water signal shows, the water pump  signal appears. After 90 seconds, the compressor will automatically operate and  will appear on the upper left.



Switch Off the System

If you want to switch off the system, press  button and hold it for 1 second. The compressor and immersion will switch off in 5 seconds. The water pump will follow in 30 seconds. The whole system will switch off after three icons    disappear.



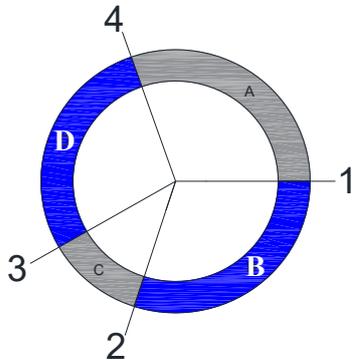
Run-time Setting

In automatic mode, the system will always switch on if the target temperature drops 5°C. By setting one or two Run-time setting periods you can decide when the system does or does not run. This can be useful if you need to ensure silence at any period, or wish to make use of cheaper electricity times.

Example of Run-time Setting

All figures and settings are able to change, based on the user's preference.

In the example below, the user sets two Run-time heating, one is from 06:00 to 13:00, and the other is from 16:00 to 23:00.



No.	Time (is able to change)
1	0600
2	1300
3	1600
4	2300

Events to happen

Item	Description
A	Heating Mode OFF (Standby)
B	First Period Heating Mode ON
C	Heating Mode OFF (Standby)
D	Second Period Heating Mode ON

Setting Steps:

First time period setting:

- From the Home Screen, press , then '1 ON' will appear on the screen and the time will flash;
- Press  to select the hours (hh will flash) and use  and  to select the correct hour for start '1';
- Press  to change the minutes, and again use arrows to change the value;
- Press  to select the hours (hh will flash), and use  and  to select the correct hour for end "1",

Second time period setting (if required):

- Press  and move to '2 ON' to set the start time for the second setting;
- Press  to select the hours (hh will flash) and use  and  to select the correct hour for start '2';
- Press  to change the minutes, and again use arrows to change the value;
- Press  to select the hours (hh will flash) and use  and  to select the correct hour for end "2",
- Press  and '1 2 and ON/OFF' will show on the display to show that Time settings 1 and 2 are active.

Notice: If you require ONLY 1 time period to be set, you should do the following,

When you finish setting the "1 off time", immediately press  to exit and save. The "1 ON/OFF" will show on the screen which means that the first time period ONLY is activated.

Checking Run-time Setting and Turning ON or OFF

Steps:

- Press  and then press  to show each Time setting ON/OFF;
- If you want to delete the automatic run-time setting, press  to delete the hour digits and the minute digits;
- If “1 2 and ON/OFF” does not show bottom right, it means all settings have been cancelled.

7 Boost Function

Boost Function

This is the function to rapidly boost the temperature back to the pre-set target temperature (L3)

Prerequisites: unlock the screen and the system is running with  on the top of the screen.

- The Boost target temperature is pre-set to Default at 53°C, and can be adjusted (see User Parameter checking and setting) up.
- To start (or stop once started) the Boost Function, hold both  and  buttons for 3 seconds, once activated both the Thermopod and the immersion will be called on with  on the screen until the target temperature is met. Then the unit will return to stand-by.
- If you want to switch off this function, repeat the steps “starting the system”

Daily Boost Function

The DAILY BOOST period will run every day to boost the temperature quickly until it reaches target temperature (L5). If that temperature is already achieved, the system will remain in Stand-By. Both the Thermopod unit and Immersion will run during this period.

- The Daily Boost Function is preset (Default Time: 18:00~23:00, parameter: L9, L10).
- This run period will then be in place each day.
- Check “User Parameter checking and setting” to amend these times.
- The unit will run until the water temperature reaches the **Default of 45°C (adjustable, parameter L5)**.
- Within the set time period (L9~L10), the Daily Boost will not activate if the water temperature is already reached - cylinder temperature \geq L5 (45) °C.
- To **DE-ACTIVATE** this function reset L9~L10 from the default setting of 18:00~23:00; to 00:00~00:00. The function will not activate.

8 User Parameter checking and setting

Check all the user parameters and make changes if required. (Refer to Unit parameter table L2-L17).

Steps:

- **ENTER:** Hold  for 3 seconds to enter “user parameter checking interface”, then press  and  to scroll the parameters that you want to change.
- **SELECT PARAMETER:** Press  to enter the parameter setting which you want. Press  again, and this will allow you to change the data which will be flashing.
- **CHANGE PARAMETERS:** Press  or  to alter the current user parameter values, and press  again to return to the user parameter checking interface;
- **SAVE & EXIT SETUP:** When in parameter setting interface, if there are no commands input for 30 seconds, the display screen will automatically exit the interface and return to the home page; Pressing  could also turn the display screen to home page.

Restoring default parameter setting

All the default settings of user parameters and factory parameters can be quickly restored and any parameters that have been changed can be simply returned to default.

- Hold  and  to restore default parameter setting, the parameter is restored after a 'beep' sound.

Troubleshooting by using memory function

- The system can memorize the last 6 errors that have occurred, and display them on the screen even if the system blacks out.
- Checking mode: In checking mode, press  or  to find E1~E6. The listings of E1~E6 are the Error code histories.

Clearing error history

- Scroll down to the error section (E1...E6)
- While on an Error page (E1...E6), hold  and  for 5 seconds to clear the error history.

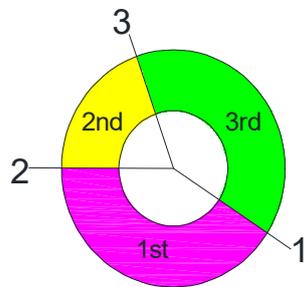
9 Energy Saving Setting

This advanced feature allows you to divide 24hrs into 3 sections. When Energy saving is activated, you can set different Thermopod Target temperatures during these 3 periods. And these temperatures will be the target temperatures in the running of both the Automatic, and Run Time settings.

Logic of Energy Saving Setting

The numbers below are the pre-set default values. All values can be altered if you prefer different times or temperatures.

In the example below, the user sets three energy saving temperatures that are 50°C (from 23:00 to 08:00), 45°C (from 08:00 – 18:00), and 53°C (from 16:00 to 23:00).



No.	Time (Subject to change)
1	L11 0800
2	L12 1800
3	L13 2300

Events to happen

Item	Time	Description
1 st	0800 – 1800	Period 1, L14, Setting 53°C
2 nd	1800 – 2300	Period 2, L15, Setting 50°C
3 rd	2300 – 0800	Period 3, L16, Setting 45°C

Energy Saving - Time Period Setting

This is a 24 hour set up, so that each value for L11, 12 and 13 is both a start and finish time.

- Time on L11-L12, (the target water temperature is L14 default 53°C)
- Time on L12-L13, (the target water temperature is L15 default 50°C)
- Time on L13-L11, (the target water temperature is L16 default 45°C)

Steps:

- Press  and hold for 3 seconds until the screen shows the L2 value
- Press  until you reach L11 (Zone 1 start/finish time)
- Press  and the Hour value will flash, and use  or  to select the hour

- Press  to enter this new time
- Press  to move to L12 and repeat the setting process
- Repeat to change L13 to a new value and press  to enter these settings and exit.

Energy saving - Temperature Settings

The setting of L14, L15 and L16 provide the start and finish times for 3 time zones during 24 Hrs.

- *Time on L11-L12, (the target water temperature is L14 default 53°C)*
- *Time on L12-L13, (the target water temperature is L15 default 50°C)*
- *Time on L13-L11, (the target water temperature is L16 default 45°C)*

Setting Steps:

- Press  +  TOGETHER for at least 3 seconds until the symbol  is shown on the display.
- Press and hold  until it shows L2
- Use  to scroll up to L14.
- Press  to move to the temperature of L14 and use  and  to change the value.
- Press  to save and move back to "L14", then press  to move to "L15".
- Follow the same procedure to change the L15 and L16 values.
- Amend all the temperatures you wish, then press  to go back to the home screen.

Energy Saving – Switching ON/OFF

When turned on (as below), these will be your target temperatures in your time zones in both Automatic running and Run Time setting running.

Switching ON - Steps:

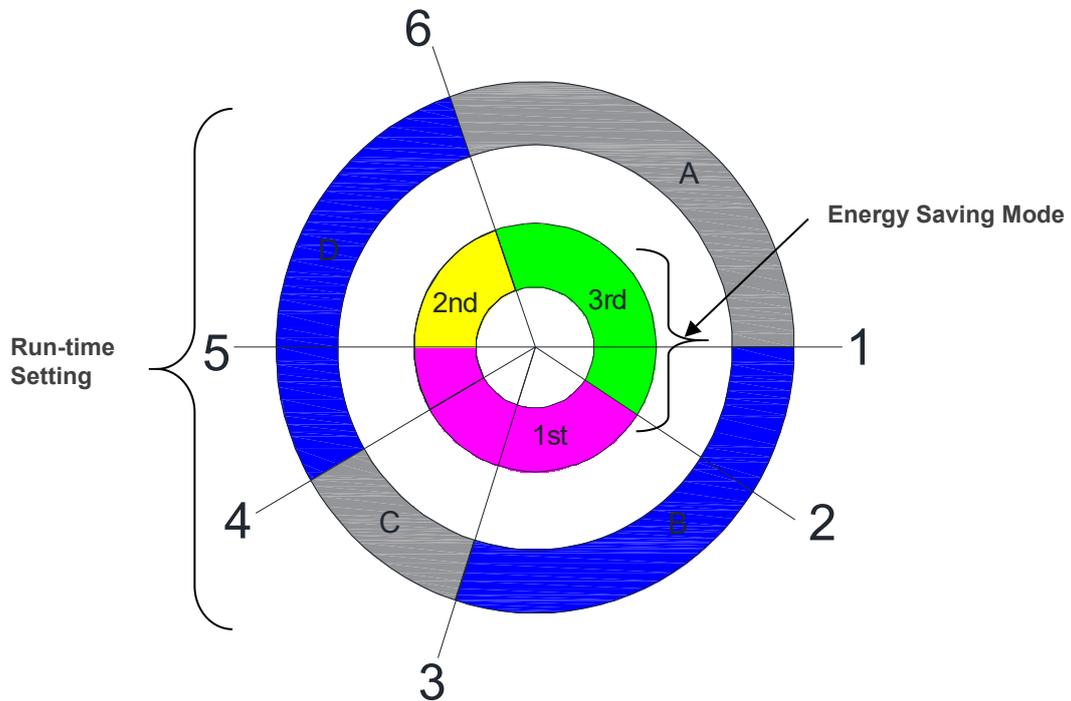
- Press  +  TOGETHER for at least 3 seconds until the symbol  is shown on the display.
- If the  is shown, then the Energy saving mode is activated.

Switching OFF - Steps:

- Press  +  TOGETHER for at least 3 seconds until the symbol  is no longer on the display.
- When  is not showing on the screen, then the Energy saving mode is NOT activated, and the unit is in automatic mode.

Overall Logic between Energy Saving Mode and Run-time Setting

In the following, it is explained the logic of functions between Energy Saving Mode and Run-time setting. The setting is totally variable based on the user's habit and need. Therefore, the figure below is only an example to show how both of them work perfectly together.



No.	Time (subject to change)
1	0600
2	0800
3	1300
4	1600
5	1800
6	2300
7	0000

Events to happen

Item	Description
1st	Period 1, L14, Setting 53°C
2nd	Period 2, L15, Setting 50°C
3rd	Period 3, L16, Setting 45°C
A	Heating Mode OFF
B	First Period Heating Mode ON
C	Heating Mode OFF
D	Second Period Heating Mode ON

Period	From xx to xx	Description
1 - 2	0600 – 0800	Continue to work until A0 is 45°C
2 – 3	0800 – 1300	Continue to work until A0 is 53°C
3 – 4	1300 – 1600	Heating standby mode
4 – 5	1600 – 1800	Continue to work until A0 is 53°C
5 – 6	1800 – 2300	Continue to work until A0 is 50°C
6 - 1	2300 - 0700	Heating standby mode

Remarks:

The control logic is that run-time setting always goes first before energy saving mode.

10 Operation Modes

Heating Mode

The Thermopod will switch on automatically when it detects a drop in the Cylinder temperature. This is determined by the **temperature difference between the real-time temperature and the target temperature (L2, default 5°C)**

- Heating is activated **when the Real-time Cylinder temperature \leq Target temperature (L3) – Compressor activating temperature difference (L2)**
- Heating stops **when the Real-time Cylinder temperature \geq Target temperature (L3) – Compressor activating temperature difference (L2)**

Water Disinfection Mode (Legionella Prevention)

Automatic Disinfection

This function automatically activates every week (switching on according to the pre-set time L7). The day of the week is according to the DAY when the unit is last powered on from the mains – that becomes the designated day. If you wish to change this to Friday before 14:00, completely power off the unit on Friday and then re-power the unit. **Please note that the cut-off for changing the DAY setting is 14:00, so any time after this will set to the following day.** Once the water temperature has reached preset value (60°C) and stays at this temperature for 60mins (in case the water temp is dropped during this period), the system will return to stand-by mode.

After switching the unit on, the disinfection begins at 14:00 (default setting: the starting time in the day can be changed manually as parameter L7 and L8, and disinfects every 7 days).

- When the disinfection mode is activated, the heating mode symbol  displays.
- When parameter L6=0 is reached, this mode is nullified.
- Water temperature \leq Parameter L17 - 2°C, the electrical heating and the compressor is ON; Water temperature \geq Parameter L17, the electrical heating and the compressor is OFF.

Exiting Water Disinfection Mode

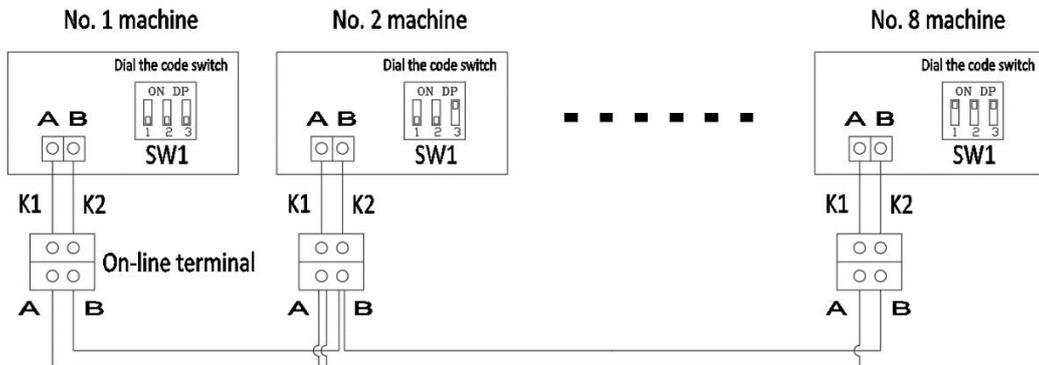
- Once the water temperature has reached the pre-set value of 60°C, it stays at 60°C for 60 minutes. The device then exits disinfection mode and resets the timer.

NOTE: The time will be paused if the temperature drops below target during this period, and then restart when temperature is returned.

- If the immersion is called on for more than 3 hours it will be switched off to protect it.
- **Please set the disinfection function for a time period of minimal hot water usage.**
- Duration of the High temperature disinfection (L6) is accumulated to the total time for 1 hr, and kept to achieve 60°C.
- If running the energy saving mode, the target set temperature \geq parameter L17 means 60 OR 61°C, disinfection is already complete, and there is no need to start the disinfection process.
- If the system is running at the time when the disinfection is due to start, the target temperature will simply be increased to 60°C and the disinfection mode will override to complete the process, leaving the cylinder fully heated.
- If the compressor detects a fault and stops operating, the electric heating (Immersion) still needs to perform the disinfection command (when the fault is the water temperature sensor), this will prevent you from opening the electric heating (Immersion).
- The water pump is always running during the disinfection operation.

11. Machines On-line Operational Instruction

11.1 On-line Wiring Diagram



- 1) At most, 8 units on-line;
- 2) As shown in figure above, starting from No. 1 machine, connect terminal A & B of each machine; ATTENTION: Terminal A & B cannot be reversed;
- 3) No. 1 machine will be the master unit, the rest machines will be slave machine. When the units are in on-line mode, only No. 1 machine can be connected to display device, others cannot; and for Cylinder T sensors, only No. 1 machine's needs to be put into the Cylinder, because others will not display;
- 4) Users need to prepare connection cables according to onsite condition. 0.5mm²Double Core Double Colour Soft Copper cables are recommended.



11.2 Online Dialling Code

As shown in below picture: Every machine has its own unique code, before the power is on, please dial the code of each machine to its own designated spots.

Heat pump Unit Number	Dial the code switch	Heat pump Unit Number	Dial the code switch
NO.1 machine		NO.5 machine	
NO.2 machine		NO.6 machine	
NO.3 machine		NO.7 machine	
NO.4 machine		NO.8 machine	



12 Troubleshooting

Certain sensor outputs can be accessed from the display to help evaluate performance issues and support trouble shooting.

The following table lists the error code warnings that protect the Thermopod block.

Suggested Actions

- Contact the installer to check for a common fix.
- Search for a Trouble Shooting Solution to find known solutions

Error Code Table

Error Code	Name of Error Code
05	High pressure protection
09	Communication error
12	Exhaust superheat
15	Cylinder temperature probe error
16	Coil temperature probe error
18	Exhaust temperature probe error
21	Ambient temperature probe error
27	Water outlet temperature probe error
29	Suction temperature probe error

Troubleshooting Guide

Problems	Causes	Solutions
Communication error (error code 09)	1. White communication line is disconnected	1. Restore the line connection 2. Replace a new one
Screen does not show any information.	1. Lack of Power	1. Check the power supply, make sure the power switch is on.
	2. Fuse damage in main control	2. Replace fuse
High pressure protection switch is disconnect (error code 05)	1. Air in the hydraulic circuit	1. Check the functioning of the water pump and bleed the pump. Bleed the air through into air vent
	2. Water filter blockage	2. Check, clear or replace water filter
	3. Temperature probe in the cylinder is disconnected or loose	3. Restore the temperature probe connection
	4. Excess refrigerant	4. Check refrigerant pressure by manometers and adjust back to the normal level
	5. Fluorine filter system blockage	5. Check or replace fluorine filter
	6. Main control board damage	6. Replace main control board
	7. Pressure switch damage	7. Check or replace pressure switch
	8. Condenser fouling	8. Clear or replace condenser
	9. Expansion valve damage	9. Check or replace expansion valve

Exhaust superheat (>125°C) (error code 12)	1. Refrigerant gas leak	1. Check for leaks in the refrigeration circuit
	2. Lack of refrigerant	2. Vacuum the closed system and re-fill refrigerant charge
	3. Temperature probe in the cylinder is disconnected or loose	3. Restore the temperature probe connection
Temperature probe malfunction (error code 15, 16, 18, 21, 27, 29)	1. Temperature probe disconnected	1. Check the temperature probe line connection
	2. Temperature probe line shortcut	2. Replace a new one
Water is still cold when the compressor is working	1. Pipe-work between Thermopod and solar collector panel is not insulated properly	1. Check the proper insulation of the hydraulic circuit, pipe-work and cylinder
	2. Refrigerant gas leakage	2. Repair leakage and refill refrigerant gas
	3. Lower set temperature	3. Check the temperature set point on screen
	4. Compressor damage	4. Replace compressor

Remark: Every time after checking and fixing, please switch on the machine and monitor its operation for 20 minutes before leaving.

HARNiTEK