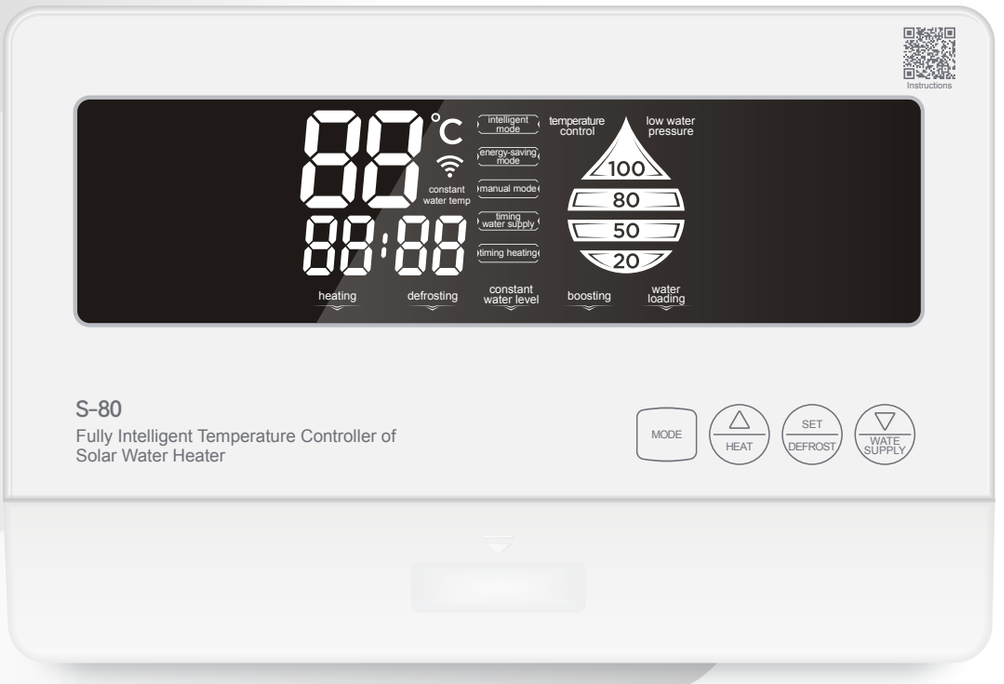
S-80

Temperature Controller
Operation Instruction Manual



• Welcome to choose this product. Users must carefully read it before installation and use.

Dear User:

Thank you for choosing S-80 series solar water heater intelligent controller. It is our great honor that you become one of our customers. You will surely appreciate the convenience given by the superiority of this product. Before you install and operate this product, please read this manual carefully to ensure the proper operation and give a full superior performance. This manual is a random accessory, please keep this manual properly after usage for future maintenance of this product. This controller is a main component of solar water heater. Adopting newest single-chip microcomputer to meet various usage requirement professionally. Perfect streamlined housing, wide area bright colorful display, innovative water level display method & physical buttons, all ensure you an easier operation experience. The water temperature and water level sensor is produced via using patented technology. The integrated structure has the characteristics of high temperature resistance, corrosion resistance, water impermeability, and effective prevention of scaling. It can run stably for a long time.

01 / MAIN TECHNICAL PARAMETERS

1.Power Supply: 100-240V 50Hz Power Consumption: ≤8W

2.Temperature Display Range:0~99℃

3.Temperature Measurement Precision: ±1℃

4.Temperature Controlling Precision: ±1℃

5.Water Level: 5 Levels Display

6.Residual Operating Current: ≤20mA 0.1S

Input:

1. Integrated sensor of water temperature and level

Output:

Power of Controllable Electric Tracing Band: ≤500W

Power of Controllable Heating Resistor: ≤2000W(220V)

Solenoid Valve: DC 12V, Power ≤3.6W

02/ THE MAIN FUNCTION

1. Power-on Self-test: At the beginning, the whole screen lights will be on for safety self-test and emits a "beep" prompt tone, which indicates that the machine is in normal status.
2. Beijing Time: Will show the actual Beijing Time on screen.
3. Water Temperature Indication: Will display the actual water temperature inside the solar water heater.
4. Water Level Indication: Will display the actual water level inside the solar water heater.
5. Water Temperature Preset: The preset heating temperature range is 30℃~ 80℃, the default is 50℃, and the step is 5℃.
6. Water Level Preset: The water level can be preset to 50, 80, 100%, the default is 100%.
7. Water Shortage Alarm: When the water level changes from high to low and water shortage occurs, the buzzer alarm will be started and the 25% water level flashes at the same time.
8. Water Filling in Case of Water Shortage: When the water level changes from high to low and water shortage occurs, water will be automatically filled to the water level preset manually after a delay of 30 minutes.
Also, if the water temperature is lower than 95℃ and the water level is lower than 50%, water tank will be automatically filled to the water level preset manually as soon as the machine is powered on.
9. Pipe Explosion Protection: When the power is on, if the water level is lower than 20% (lack of water) and the water temperature is higher than or equal to 95°C, water supply is prohibited to prevent pipe explosion.
10. Power-off Memory: In the event of a power failure, the controller will save all parameters set by the user before the power failure. When powered on, the controller will continue to operate according to the mode and function parameters set before the power failure.
11. Automatic Overflow Prevention: If overflow is caused by vacuum tube rupture or water level sensor failure, water supply will be automatically stopped when the overflow protection time is reached. If the water level is still insufficient after 60 minutes of water supply, it is considered that the vacuum tube is broken and water supply will be stopped. If the water level is 80% and the water level is not full after 30 minutes of water supply, water supply will be stopped.

12. Low Water Pressure Protection: When the water level is 25% or 50%, during the water supply process, due to low water pressure or water outage, the water level cannot rise by one level in 30 minutes. The controller will pause the water supply for 30 minutes and then start the water supply again. If the water level still cannot rise by one level after 2 times water supply, the water supply will stop, and the low water pressure will always be on. To avoid the following serious consequences when the water pressure is low or the water is on outage status:

1.) The solenoid valve and water pump are powered on for a long time, causing the water pump to idle and burn;

2.) Due to the rupture of the solar vacuum tube or other water leakage issues, water continues to flow, so water flows from the water tank and roof for a long time;

3.) Due to drying After the water supply is stopped, water suddenly comes in. Due to the stagnation, the temperature of the solar water tank is too high, when water inlets suddenly, will cause the vacuum tube explosion.

13. Compulsive Water Loading: When the water level sensor can not work properly, water will be filled compulsively by pressing “water loading” button. The controller will buzz every minute to warn the user to pay attention to the water overflow issue. Water loading will be stopped after 8 minutes

14. Temperature Control Water Supply: When the water tank is not full and the water temperature is higher than the temperature setting by the user (the factory setting is 65℃), water will be automatically added to a suitable water temperature which is 10℃ lower than the setting temperature. This function can prevent the unreasonable phenomenon of low water volume and high water temperature. Time with temperature control function: 9:00-17:00. If the temperature is set to --℃, the temperature control function will be canceled.

15. Water Replenishment Delay: When water is being used (water level drops), the temperature-controlled water supply will be delayed for 60 minutes to avoid starting the water replenishment when the user is using water.

16. Constant Temperature Heating: When the water temperature in the water tank is 5℃ lower than the constant temperature, it will start heating to the preset constant temperature immediately to ensure the water temperature in the water tank is constant. If the water level is lower than 50%, start the water supply immediately, then start the heating to avoid dry boiling. Therefore, the water level cannot be lower than 50% during heating. It is recommended to use double pipes for water inputting and outputting for making sure the continuous large amount of water usage by users. If the heating is turned off by a button, the constant temperature heating function will be suspended for 60 minutes.

17. Pipeline Defrosting: When the outdoor temperature is low in winter, you can press the defrost button to start the electric tracing band to prevent the water pipes from freezing and cracking. The defrost stop time can be set in the settings (the original factory setting is 15 minutes, if it is set to 00 minutes, the electric tracing band will be powered on for a long time and is in heat preservation status, the user needs to turn it off manually), the electric tracing band runs for a fixed 15 minutes, and stops at the set defrosting stop time, and so on. This function not only saves electric energy, but also prevents aging and fires caused by long-term energization of the electric tracing band. During the defrosting process, it can be turned off by pressing the button manually.

Water Supplying Pressurization: When the water supply pressure is low, you can choose to connect a booster pump to increase the water supply pressure. When the water is supplied, the instrument opens the solenoid valve and starts the booster pump to pressurize the water supply. When the water supply is completed, both are closed at the same time. (You could only choose either the pipe defrosting or water supplying pressurization.)

19. Overheat Protection: When the controller starts heating resistor, if the internal temperature is higher than 90°C, the electric heating function will be turned off, and it will restart when it is lower than 80°C.

20. Self-selected Mode: four modes are available: Manual, Timing, Intelligent, and Energy-saving.

Manual Mode: In this mode, the water supply (except temperature-controlled water supply and constant water level) and heating (except constant temperature heating) are not automatically started. The user can press the button to turn on and off the water supply and heating as needed. Users can enter the setting interface and adjust the preset parameters by pressing ▲ and ▼. When starting the manual water filling, if the actual water level is higher than or equal to the manual preset water level, the controller will fill the water until it is full to ensure the user's water filling needs. When starting heating resistor, if the water level is lower than 50%, it will automatically start filling water to 50% before heating. If the water level is lower than 50% while heating, the heating will be turned off immediately to protect the heating resistor. The original factory default water level settings are 100% and the water temperature is 50°C. Users can reset the parameters as needed. It is recommended that the user preset the heating temperature not to exceed 60°C.

Timing Mode: You can set three times for water filling and three times for heating. The original factory setting is to start the scheduled water supply at 9:00 for the first time to reach 100% water level, and start the heating to 55°C at 16:00 for the first time. The remaining 2 times of water supplying and the heating are in closed status. The above time and parameters are original factory default settings, users can reset the time and parameters as needed to fully meet user personalized needs. Key operations are valid in this mode.
Intelligent Mode: Start to supply water to 50% water level at 4:00, start heating to 50°C at 5:00 to make sure that users have enough water for washing after getting up. Start supplying water to 100% water level at 9:00 to meet users' water demand at noon, start supplying water to 80% water level at 16:00, and start heating to 55°C at 17:00 to ensure that 55°C and 100% water are available for users at night. The time and parameters of the intelligent mode can’t be modified. Key operations are valid in this mode.
Energy-saving Mode: The energy-saving mode includes the timing water supply in the timing mode, and the timing heating is cancelled.

03 / METHOD OF APPLICATION

This solar water heater intelligent controller is operated intelligently, so the user does not need to do any operation. If the user wants to change the operation mode, please press the mode to switch directly between the four modes (the selected mode indicator is always on, and the factory default is the intelligent mode). If the user wants to change the setting parameters in each mode, the following method can be used: Please press the setting button for more than three seconds, release the button after the buzzer prompts to enter the setting state, and press ▲ and ▼ to select the desired preset value. After the preset value is determined, press the setting button to enter the next option. The entire setting process is as follows:

In Manual Mode

1. Manual water level setting (factory 100%): When the water level indicator is always on and the water level value flashes, indicating that the manual water level value is currently being set. Press ▲ or ▼ to select the desired water level value, and press Set to enter the next option.
2. Manual heating temperature setting (factory 50℃): When heating is always on and the temperature value flashes, indicating that the manual heating temperature value is currently being set. Press ▲ or ▼ to select the desired temperature value and press Set to enter the next option.
3. Setting of Beijing time "hour" (factory default 12 hours): When the hour flashes, indicating that the hour value is currently being set. Press ▲, ▼ to select a suitable hour value, and press Set to enter the next option;
4. Setting of Beijing time "minute" (factory default 00 minutes): When the minute flashes, indicating that the minute value is currently being set. Press ▲, ▼ to select the appropriate minute value, and press Set to enter the next option;
5. Temperature control water supply setting (original factory 65℃): Setting range (55-95,--); "--" means off;
6. Setting of defrost stop time (15 minutes by default): When the defrost indicator is always on and the temperature value flashes, indicating that the defrost stop time is currently being set. Press ▲ or ▼ to select the desired time.

In Timing Mode

1. Setting of Beijing time (factory default 12 o'clock): When the hour flashes, indicating that the hour value is currently being set. Press ▲ or ▼ to select a suitable hour value, and press Set to enter the next option.
2. Setting of Beijing time "minute" (factory default 00 minutes): When the minute flashes, indicating that the minute value is currently being set. Press ▲ or ▼ to select the required minute value and press Set to enter the next option;
3. Temperature control water supply setting (original factory 65℃): Setting range (55-95,--); "--" means off.
4. Setting of defrosting stop time (15 minutes in the original factory): When the defrosting indicator is always on and the temperature value flashes, indicating that the defrosting stop time is in progress. Press ▲ or ▼ to select the desired time.
5. Setting the first time of timing water filling: When the timer is always on and the hour flashes, indicating that the first time of timing water filling hour value is currently being set. Press ▲ or ▼ to select the required time, and press Set to enter the next option;
6. Setting of the first timed water level: When the timed water level and setting time are always on, and the water level value flashes, indicating that the first timed water level is being set. Press ▲ or ▼ to select the desired water level value, and press Set to enter the next option.
7. Setting the second timing water filling time: The timing water filling indicator is always on and the hour flashes, indicating that the second timing water filling hour value is currently being set. Press ▲ or ▼ to select the required time, and press Set to enter the next option;
8. Setting of the second timed water level: The timed water level and setting time are always on, and the water level value flashes, indicating that the second timed water level is being set. Press ▲ or ▼ to select the desired water level value, and press Set to enter the next option.
9. Setting the third timing water filling time: The timing water filling indicator is always on and the hour flashes, indicating that the third time of timing water filling hour value is currently being set. Press ▲ or ▼ to select the required time, and press Set to enter the next option;
10. Setting of the third timed water level: Timed water level and setting time are always on, and the water level value flashes, indicating that the third timed water level is being set. Press ▲ or ▼ to select the desired water level value, and press Set to enter the next option;

11. Setting the first timing heating time: The timing heating indicator is always on and the hour indicator flashes, indicating that the first timing heating hour value is currently being set. Press ▲ or ▼ to select the required time and press Set to enter the next option.
12. Setting the first timing heating temperature: When timing heating, set time is always on, and the temperature value flashes, indicating that the first timing heating temperature value is currently being set. Press ▲, ▼ to select the desired temperature value, and press Set to enter the next option;
13. Setting the second timing heating time: The timing heating indicator is always on and the hour indicator flashes, indicating that the second timing heating hour value is currently being set. Press ▲ or ▼ to select the desired time and press Set to enter the next option.
14. Setting the second timing heating temperature: Timing heating, set time is always on, the temperature value flashes, indicating the current second timing heating temperature value is being set. Press ▲ or ▼ to select the desired temperature value and press Set to enter the next option.
15. Setting the third timing heating time: The timing heating indicator is always on and the hour indicator flashes,, indicating that the third timing heating hour value is being set. Press ▲ or ▼ to select the desired time and press Set to enter the next option.
16. Setting the third timing heating temperature: Timing heating, set time is always on, and the temperature value flashes, indicating that the third timing heating temperature value is currently being set. Press ▲, ▼ to select the desired temperature value, and press Set to enter the next option;

In Intelligent Mode

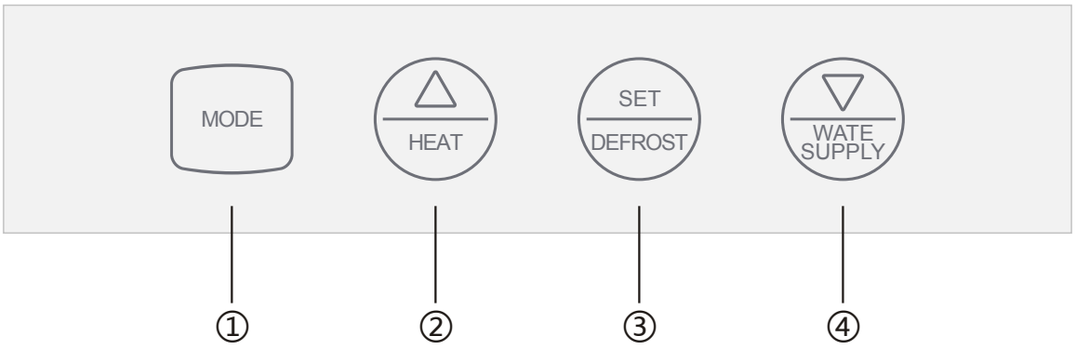
1. Setting of Beijing time "hour" (factory default 12 hours): The hour flashes, indicating that the hour value is currently being set. Press ▲, ▼ to select a suitable hour value, and press Set to enter the next option;
2. Setting of Beijing time "minute" (factory default 00 minutes): The minute flashes, indicating that the minute value is currently being set. Press ▲, ▼ to select the appropriate minute value, and press Set to enter the next option;
3. Temperature control water supply setting (original factory 65℃): Setting range (55-95,--); "--" means off;
4. Setting of defrost stop time (15 minutes in the original factory): The defrost indicator is always on and the temperature value flashes, indicating that the defrost stop time is currently being set. Press ▲ or ▼ to select the desired time.
If no key operation is performed for a long time during the setting process, the setting item will flash 10 times and then automatically exit the setting interface, and a buzzer will sound when exiting.

Parameter Range Setting

1. The first timing water filling time: 00~23, (original 9:00)
2. The first timing water level: 50, 80, 100% (original 100%)
3. The second timing water filling time: 00~23,--hour (original --:00)
4. The second timing water level: 50, 80, 100% (original 100%)
5. The third timing water filling time: 00~23, hour (original --:00)
6. The third timing water level: 50, 80, 100% (original 100%)
7. The first timing heating time: 00~23,--hour (original 16:00)
8. The first time timing heating temperature: 30℃~80℃ (original 55℃)
9. The second timing heating time: 00~23, hours (original --:00)
10. The second timing heating temperature: 30℃~80℃ (original 55℃)
11. The third timing heating time: 00~23, hours (original --:00)
12. The third timing heating temperature: 30℃~80℃ (original 55℃)
13. Manual water level: 50, 80, 100% (original 100%)
14. Manual heating temperature: 30℃~80℃ (original 50℃)
15. Beijing time "hour": 00~23 o'clock (original 12 o'clock)
16. Beijing time "minute": 00~59 minutes (original 00 minutes)
17. Temperature control water temperature: 50℃~80℃ (original 65℃)
18. Constant heating temperature: 30℃~80℃ (original 50℃)
19. Defrost time: 00,5~90 minutes (original 15 minutes)

Note: Press and hold the heating button for 3 seconds to turn on or off constant temperature heating.
Setting of the constant temperature heating temperature (off by the original factory): The constant temperature is always on and the temperature value flashes, indicating that the constant temperature heating temperature value is currently being set. Press ▲ and ▼ to select the desired temperature value.
Press and hold the water loading key for 3 seconds to set the constant water level function
Setting of constant water level (off in the original factory): The constant water level is always on and the water level flashes, indicating that the upper limit of the constant water level is currently being set. Press ▲ and ▼ to select the desired value.
Press and hold the mode key and the water loading key at the same time to reset the parameters, and the display will show "HF".

04/ KEY INTRODUCTION



Key	Short Press	Long Press	
①Mode	Intelligent/ Energy Saving/ Manual/ Timing Mode		
②Heating/▲	Switch Manual heating	Thermostatic Heating Setting, will start thermostatic heating after saving the setting	Increasing data when in setting status
③Defrosting / Set	Switch Manual defrosting	Pressing and hold this key to enter into setting mode	Pressing this key shortly to enter into next parameter
④Water Supplying / ▼	Switch Manual water supplying	Constant water level setting, will enter into constant water level mode after saving the setting	Decreasing data when in setting status

Combination Key.

Press and hold ①+④ key at same time to restore factory settings.

05/ INSTALLATION METHOD

CONTROLLER INSTALLATION

1. Install the bracket in a place that is not exposed to water but is easy to observe and use, and fix it firmly with screws.
2. Hang the controller on the bracket and open the front cover.
3. Connect the water temperature and water level sensor probe cable according to the wiring diagram and the colors indicated on it. It is universal for two-core and four-core sensors. It can be connected to both two-core sensors and four-core sensors.
4. Connect the cable wires of the heating resistor, solenoid valve, water pump or electric tracing band to the corresponding wiring probes according to wiring diagram.
The wires must be connected tightly and cannot be connected incorrectly, otherwise it will cause accidents such as electrical burns.
5. The connecting wires can be connected from the right lower lateral. After all the installation is completed, check that everything is correct, cover the junction box, and power on for self-test.

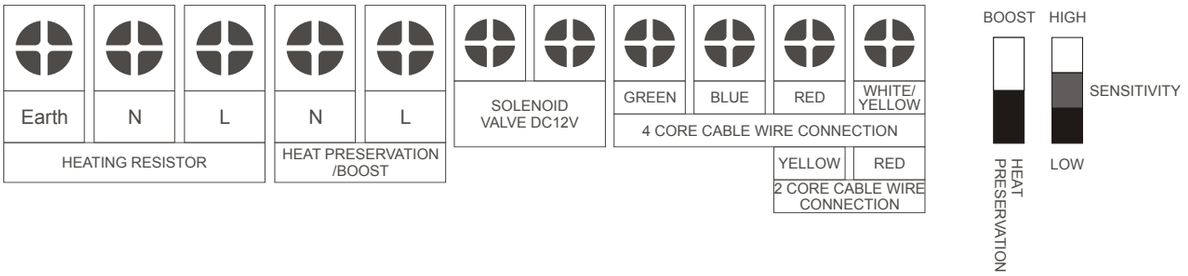
INSTALLATION OF WATER TEMPERATURE AND WATER LEVEL SENSOR

1. Screw the cable fastening accessories on the overflow pipe, insert the sensor through the overflow pipe, and pull the lead wire or the lifting rod gently to make it close to the inlet end, then extend the cable or lifting rod inward about 1 cm, and then use the pressing plate to fasten the cable (if you use silicone to fasten, please refer to the instructions on the sensor packaging bag).
2. Bring the cables indoors and fix the outdoor cables to avoid being pulled apart or scratched.
3. The sensor must not touch or be too close to the heating resistor.
4. Please make sure that the socket doesn’t get wet or soaked during installation. There is also a bottom-mounted sensor type, which is installed from the bottom of the water tank upwards. Tighten the installation nut to ensure that there is no water seepage (see the installation diagram).
5. It is recommended that all cables be protected with PVC protection tube and installed in a standardized manner to reduce faults.

SOLENOID VALVE INSTALLATION

1. Installation direction: The inlet or outlet end of the solenoid valve must be installed correctly. The end with the filter is the inlet end, and the arrow at the bottom shows the flow direction.
2. The two-core connecting wire is connected to the solenoid valve. The lead wire can be lengthened. A cable with a larger diameter should be used when wiring.
3. The solenoid valve equipped with the controller has its own circuit device, so check valve is not required.
4. When the filter screen is blocked by dirt, unscrew the three-way nut on the inlet end of the solenoid valve, take out the filter screen and clean it, then reinstall it and tighten the nut.

06 / WIRING DIAGRAM



07 / COMMON FAULTS AND SOLUTIONS

Fault Display	Reason	Solution
Temperature Sensor Fault	1. The sensor signal line is in poor contact 2. The sensor signal line is in incorrect connection, disconnected or damaged	Connect the sensor signal line correctly or change a new sensor
Showing Water Level 20% or 100%	1. The sensor signal line is in poor contact 2. The sensor signal line is in incorrect connection, disconnected or damaged	Connect the sensor signal line correctly or change a new sensor
Electric Leakage: Display 1d	The controller is leaking electric	Change new controller or restart the controller.
The low water pressure icon is on	1. The water pressure is low 2. Solenoid valve is damaged 3. Solenoid valve is blocked by dirt.	Install booster pump or clean the solenoid valve filter, check the solenoid valve connection and the solenoid valve terminal
No self-test at startup, no display, random display	1. Voltage is low 2. Controller is damaged	1. Restart the controller 2. Change a new controller

08/ PRECAUTIONS

1. Please keep the controller away from direct sunlight or rain to avoid damage to the controller.
2. Installation by professionals is required. Improper installation may cause the controller to become unavailable or be permanently damaged.
3. The water tank can not be lack of water for a long time to avoid excessive solar heat caused by empty exposure, and to protect the solar water heater and water temperature and level sensors.
4. To prevent long-term overflow caused by unexpected problems such as incorrect operation, abnormal power supply and control failure, the solenoid valve and solar water heaters must be installed in a place where water cannot leak into the room or spray out and cause accidents. If a return pipe is installed, a reliable drainage pipe must be connected.
5. The controller itself has lightning protection function, but for security consideration, please install reliable lightning protection device and pay attention to lightning protection. When lightning occurs, the power supply should be disconnected in time and the usage of solar water heater should be stopped. Please pay attention to personal safety.
6. The controller has multiple protections, and users do not need to unplug the power plug when using water.
7. Maintenance personnel must cut off the power supply before performing maintenance operations such as sensor replacement.
8. During installation and usage, if the time displayed on the controller is different from the standard time, please calibrate it in time.