

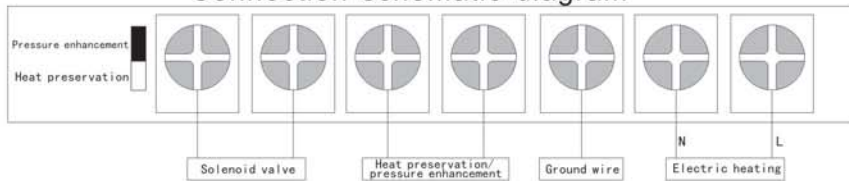
Common Faults and Troubleshooting

Symptom	Cause	Solution
Not self-test on power on; no display or anomalous display	Too short plug's pins or unsound connection	Plug off the power and check the voltage; reconnect the power
The water level—℃, 20% is displayed but the indicator for water level 100% lights and blinks	Unsound connection of the plug, received plugging, broken line or line damaged due to thunder stroke	Perform secure plugging according to the red color-code; or replace it with a new one; replace the principal machine
The beeper can't alarm	The beeper alarm is broken	Repair or exchange the beeper alarm

Installation of intelligent controller

1. Link the probe cable's socket of the water temperature & level sensor with the plug in accordance with the red color code; fasten the plugging and place the socket & plug in the groove to fix them.
2. Hang the controller on the bracket. Referring to the connection schematic diagram, connect the connecting lines of solenoid valve, to corresponding connecting posts. Guard against any wrong connections, for accidents like burnout in the electric device etc. can be resulted in.
3. The connecting lines shall be exposed through at the back. Restore the junction box's lid. After all installations are finished and checked, conduct a power on self-test.

Connection schematic diagram

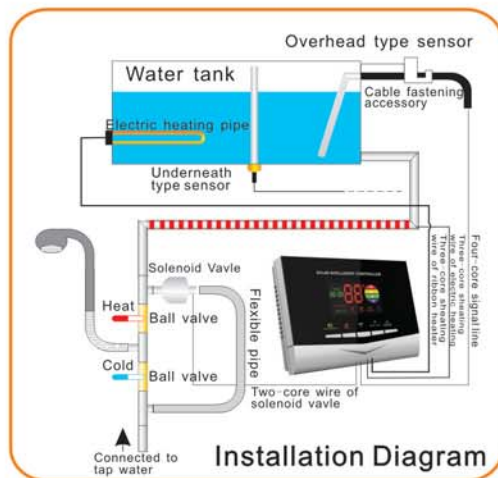


Installation of Solenoid Valve

1. With installing directions, pay close attention to the ensuring the water inlet and outlet terminal and the arrow at the bottom indicates the water flow direction.
2. The M-7 solenoid valve furnished in the fully intelligent controller has been equipped a check valve, so needn't install one way check valve.
3. The pipe linking with the water inlet terminal is preferred to be a flexible pipe or other pipes that can be removed with little difficulty, facilitating the cleaning of obstructions on the filter screen.

Installation of water temperature & level sensor

1. Firstly, screw the cable fastening accessory on the overflow pipe; next, insert the sensor via the overflow pipe; then pull the lead wire with slight force to make it attach to the inlet; lastly, extend the cable inward by 1 centimeter before tightening it with a clamping bar.
2. Match the socket of cable terminal with the sign of sensor's plug before plugging firmly. Fix the accessory with bandage and the pipe-protecting orifice facing downward.
3. During installation, the socket should never be showed or soaked. With installation of underneath sensor, it should be mounted at the water tank's bottom; screw up the fixing but to eliminating water seeping



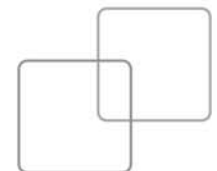
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SOLAR WATER HEATER CONTROLLER

Key Functions

- Timing heating
- Timing watering
- Manual watering
- Power on self-test
- Water level preset
- Full water alarming
- Water quality setting
- T-controlled watering
- Constant-Temp heating
- Dry-burning protection
- Water level indication
- Memory on power failure
- Water temperature preset
- Automatic pressurization
- Water loading in shortage
- Intelligent timing control
- Pipeline heat preservation
- Auto leakage protection
- Electric leakage protection
- Water temperature indication
- Watering shortage alarming
- Intelligent heating protection
- Watering under low water pressure
- Compulsory watering



Major Technical Indications

1. Power supply: 220VAC Power consumption: <5W
2. Accuracy of temperature measuring: $\pm 2^{\circ}\text{C}$
3. Range of temperature measuring: 0-99 $^{\circ}\text{C}$
4. Water level classification: Five classes
5. Power of controllable water pump or ribbon heater: <500W
6. Power of controllable electric heating: <1500W Optional: 3000W
7. Action current of electric leakage: $\leq 10\text{mA}/0.1\text{S}$
8. Parameter of solenoid valve: DC 12V, with pressure valve or non-pressure valve optionally equipped
- Operating pressure of pressure valve: 0.02Mpa-0.8Mpa, apply to direct supply water.
- Operating pressure of non-pressure valve: 0.0Mpa, apply to water-tank supply or low water-pressure supply

Key Functions

1. **Power on self-test:** A beep at start-up indicates the machine stays in a sound condition.
2. **Water level preset:** 50, 80, 100% water loading level can be preset.
3. **Timepiece:** Hour and minute can be displayed.
4. **Water temperature preset:** 30 $^{\circ}\text{C}$ ~80 $^{\circ}\text{C}$ Heating temperature range may be preset.
5. **Water level indication:** Water quantity inside the solar water heater is shown
6. **Water shortage alarming:** On water level declining and water shortage incurred. The beeper alarms for 8 times and the indicator of 20% water position flashes at the same time.
7. **Water loading in shortage:** On water level declining and water shortage incurred, water will be refilled automatically to reach the preset water level after 5 minutes delayed.
8. **Full water alarming:** When the water position reached 100% level, the beeper will alarm for 4 times and then watering is closed.
9. **T-controlled watering:** When the figure 8:00-17:00 is indicated, the water tank is not fully filled and the temperature goes above 70 $^{\circ}\text{C}$, water will be refilled automatically in order to reach appropriate temperature to 55 $^{\circ}\text{C}$, this function prevents the abnormal phenomenon characterized by low water quantity and high water temperature. When the water level declines, the temperature-control watering will be started after 2-hour delay. When at 17:00-18:00, temperature-control watering stops working.
10. **Manual watering:** When the water level is below the preset one, pressing the Watering key can perform the specified work manually and lift the water level to the preset level.
11. **Water temperature indication:** Water temperature actual inside the solar water heater is shown.
12. **Timing watering:** In case the customer can not secure stable water supply, he may according to his own habits or preferences, set water refill to one or two specific time points. After the setting becomes effective, the machine shall refill water daily as per the defined time
13. **Compulsory watering:** Should the water level sensor or the water temperature indicator suffer any fault, pressing the "Watering" key can accomplish compulsory water loading, with a buzz of every minute as notification. Pay attention to whether the water overflows. The water loading will be stopped automatically after 8 minutes.
14. **Watering under low water pressure:** During water loading, if there is excessively low water pressure or water supply stops, the controller will turn into the low water pressure mode automatically, the controller will try to start watering in every 30-minute interval; if the machine fails to lift the water level to a higher class within 30 minutes, it will restart watering after 30-minute delay. The procedure will be repeated as in a cycle, avoiding the serious outcomes caused later due to low water pressure or water supply failure.
15. **Memory on power failure:** All configured parameters will be saved automatically in case of power failure and no another setting will be required for the next use.
16. **Dry-burning protection:** when the water contains no water or the water level is below 50%, the electric heating will be closed automatically.
17. **Timing heating:** When in days without sun shining, user can set the water heater heating automatically for two separate time point according to user's need. the heater will heat water respectively to set temperature automatically at the set time.
18. **Constant-Temp heating:** When the water temperature of the water tank is lower than the constant temperature heating temperature 5 $^{\circ}\text{C}$, heating process will be started immediately to increase it to the constant temperature specified, ensuring the water temperature inside the tank is constant. When the water level is under 50%, the water loading will be started automatically and promptly prior to heating started as to avoid dry-burning. In sight of the fact that the water is preferred not to be below 50%, we recommend the customer install two pipes for watering and discharging water in order to have little impact on continuous water consumption in quantity.
19. **Intelligent heating protection:** The electronic heating can not be started when water position is below 50% (if user starts electronic heating at this time, watering will be opened automatically to add water till 50% of water position, after which water feeding is closed and then electronic heating is started). The electronic heater will be powered off automatically when the heating does not change water temperature for a long time of 2 hours.
20. **Water quality setting:** The sensor's sensitivity can be declined as a result of long service or other reasons and the water level may not be indicated accurately. Then the instrument sensitivity can be enhanced by setting function of water quality swapping.
21. **Auto leakage protection:** Watering will be stopped in case of overflow caused by ruptured vacuum tube or faulted water level sensor etc.
22. **Automatic pressurization:** When the water pressure of water supply is relatively low, the function of auto pressurizing pump may be restored to. During water loading, the controller opens the solenoid valve while starting up the water pump for pressurizing water supply; as the water loading is finished, the two functions will be turned off at the same time.
23. **Pipeline heat preservation:** In the winter when the outdoor temperature is relatively low, the ribbon heater can be started by pressuring Heat preservation key; at this time the figure of heat preservation will bright and the water pipe is protected against low temperature.
24. **Intelligent timing control:** It satisfies convenient usage in different circumstances for users by setting two timing points for two separate water feeding levels and target temperatures of water.

25. Electric leakage protection: Electric heating will be auto shut down to ensure a safe use when electric leakage is found during heating. The switch function between pressure enhancement and pipeline heat preservation can be shifted in the set state. When the function of pressure enhancement of watering is selected, the pipeline heat preservation function is then cancelled. The factory setting of this function is pipeline heat preservation.

Instructions on Usage

The functions of watering and heating are fully intelligent, so the user needn't operation. However, if the customer desires to change preset water level & temperature and make use of timing mode, the following steps may be carried out: press the Set to enter the setting mode.

1. **Setting water temperature & level:** After entering the setting mode, when heating indicator lights up and watering indicator and water level indicator flash, then, press the "Watering" key to set water level. User can set heating temperature by pressing the "Heating" button.
2. **Timepiece setting:** Press the "Set" key to access the timepiece setting. The hour section of the timepiece blinks, press the "Heat preservation" key to set the hour; press the "Intelligence" key to set the minute.
3. **Set the first timing watering:** Pressing the "Set" key once again enters the timing watering setting 1; at the same time, the clock shows flashing "03:00", the water level is read as flashing 100%, this means it will watering at 3 o'clock in the morning. When the time of watering needs to be changed, press "Heat preservation" button to set the hour, press "Intelligence" button to set the minute and the level of watering can be set by pressing "Watering" button.
4. **Set the first timing heating:** Pressing the "Set" key once again enters the timing heating setting 1; the Timing Heating 1 flashes and the timepiece displays "04:00". A light up heating indicator with a blink 55 $^{\circ}\text{C}$ in the temperature indicator suggests that the water heater will heat the water to 55 $^{\circ}\text{C}$ at 4 o'clock in the morning. When the time of watering needs to be changed, press "Heat preservation" button to set the hour, press "Intelligence" button to set the minute and press "Heating" button to set the temperature.
5. **Set the second watering:** Pressing the "Set" key once again enters the timing watering setting 2; at the same time, the clock shows flashing "09:30", the water level is read as flashing 100 $^{\circ}\text{C}$, this means it will watering at 9:30 in the morning. The user can set the time and water level by the reference of the first time operation for watering.
6. **Set the second timing heating:** Press "Set" button to enter the second heating settings, the indicator of "timing heating 2" will light up and clock shows flashing "16:00" at the same time. The temperature indicator reads blinking 65 $^{\circ}\text{C}$ and the heating indicator lights up, which shows that the heater will heat water to 65 $^{\circ}\text{C}$ at 4 o'clock in the afternoon. The user can set the second timing heating by the reference of the first timing heating.
7. **Set pipeline heat preservation:** Press "Set" button again to enter setting of pipeline heat preservation, indicator of pipeline heat preservation will light up and the number indicator shows a flashing preservation interval time "10", which can be changed by pressing "Intelligence" button.
8. **Water quality settings:** Press "Set" button again to enter setting of the water quality. The factory set is ordinary water (LL), which can be modified by pressing "Watering" button to purified and high-resistance water (HH).

SHORTCUT BUTTON SETTING MODE

1. Press "Intelligence" button for one time, the timing watering and timing heating will be both started (The prerequisite is that timing watering and timing heating are closed). Press "Intelligence" button again to close timing watering 1 and timing heating 1. And a further press on "Intelligence" button will close timing watering 2 and timing heating 2. The temperature indicator flashes at this time and user can set a constant temperature by pressing "Heating" key.
2. Press "Watering" button to open or close water loading function directly, and press this button again for 3 seconds to open or close functions of timing watering, a further pressing on this button for 3 seconds can set temperature controlled watering.
3. Press "Heating" button to open or close heating function directly, and press this button again for 3 seconds to open or close functions of timing heating.
4. Press "Heat preservation" button for 3 seconds to start or close constant temperature heating function.

SETTING FINISHED

Press "Set" button again to back to main interface. To cancel all settings, press "Intelligence" button for 3 seconds to reset the heater to factory settings, which include 100% water level, heating temperature 55 $^{\circ}\text{C}$, timing watering 1 is at 3 o'clock in the morning and timing watering 2 is at 9:30 in the morning, timing heating 1 and 2 are respectively set at 4 o'clock in the morning with the target temperature 55 $^{\circ}\text{C}$ and 4 o'clock in the afternoon with the target temperature 65 $^{\circ}\text{C}$, water quality is set as ordinary water and the interval time for pipeline warm preservation is set as 10 minutes. The controller has strong memory function, the user just need set one time, all the settings will be remembered, so needn't set again when power failure.

Precautions

1. Do not flush directly the controller with water. Check if all connecting lines have sound connection.
2. To protect the solar water heater and water temperature & level sensor, the water tank should not lack of water for a long time.
3. To prevent long overflow caused by accidental problems, such as error operation, anomalous power supply and malfunction etc., the solenoid valve and the solar water heater should be installed in a room without water leakage or in a place free of accidents due to sprays. With a return pipe and take qualified lightning protection measures against thunderstroke. While the power should be disconnected to stop the use of solar water heater for the safety of life.