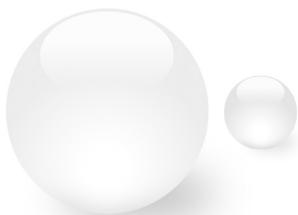


Technology makes the life perfection!

Solar System Controller SR601

Operation Instruction



⚠ Please read this instruction carefully before using the controller

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1. Safety information

1.1 Installation and commissioning

- When laying cables, please ensure that no damage occurs to any of the constructional fire safety measures presented in the building.
- The controller must not be installed in rooms where easily inflammable gas mixtures are present or may occur.
- The permissible environmental conditions must not be exceeded at the site of installation.
- Before connecting the device, make sure that the energy supply matches the specifications of controller showed on the type plate.
- All devices connected to the controller must conform to the technical specifications of the controller.
- All operations on an open regulator are only to be conducted cleared from the power supply. All safety regulations for working on the power supply are valid. Connecting and /or all operations that require opening the regulator (e.g. changing the fuse) are only to be conducted by specialists.

1.2 About this manual

This manual describes the installation, function and operation of a solar thermal controller.

When installing the remaining components e.g. the solar collectors, pump assemblies and the storage unit, be sure to observe the appropriate installation instructions provided by each manufacturer.

Installation, electrical connection, commissioning and maintenance of the device may only be performed by trained professional personnel. The professional personnel must be familiar with this manual and follow the instructions contained herein.

1.3 Liability waiver

The manufacturer cannot monitor the compliance with these instructions or the circumstances and methods used for installation, operation, utilization and maintenance of this controller. Improper installation can cause damages to material and persons. This is the reason why we do not take over responsibility and liability for losses, damages or cost that might arise due to improper installation, operation or wrong utilization and maintenance or that occurs in some connection with the aforementioned. Moreover we do not take over liability for patent infringements or infringements – occurring in connection with the use of this controller- on third parties rights. The manufacturer preserves the right to put changes to product, technical data or installation and operation instructions without prior notice. As soon as it becomes evident that safe operation is no longer possible (e.g visible damage). Please immediate take the device out of operation.

Note: ensure that the device cannot be accidentally placed into operation.

1.4 Description of symbols

Safety instruction:



Safety instructions in the text are marked with a warning triangle. They indicate measures, which can lead to injury of persons or safety risks.

Operation steps: small triangle “▶” is used to indicate operation step.

Note: Contains important information on operation or function.

2. Installation

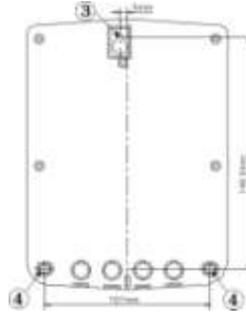
2.1 Installing the controller

Note: the controller must only be installed in an area having an adequate level of protection.

- ▶ Take out the screw ① from the bottom case of controller
- ▶ Remove the up cover ②, and the connection terminals are showed.

Operation manual of solar water controller SR601

► Firstly fix the screw ③ on wall, and then hang the controller on it. Last, through other two holes ④ fix the controller (note: don't drill holes on the case of controller).



2.2 Electrical connections



Remove the device from the mains supply before opening the case! All guidelines and regulations of the local electricity supplier must be observed!

2.2.1 Preparation before connections

Power can only be switched on when the housing of controller is closed, an installer must make sure that the IP protection class of the controller is not damaged during installation.

► Depending on the type of installation, the cables may enter the device through the rear of the case ⑤ or the lower side of the case ⑥.

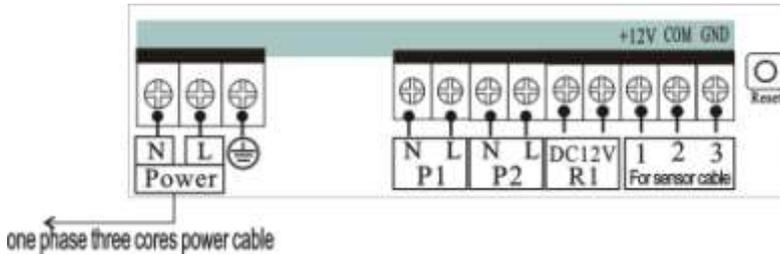
► **Cable come from the rear** ⑤: remove the plastic flaps from the rear side of the case using an appropriate tool.

► **Cable come from the below** ⑥: cut the left and right plastic flaps using an appropriate tool (e.g. knife) and break them out of the case.



2.2.2 Terminal connection

- According to following layout to connect wires.
- Wire with two colors is ground wire.



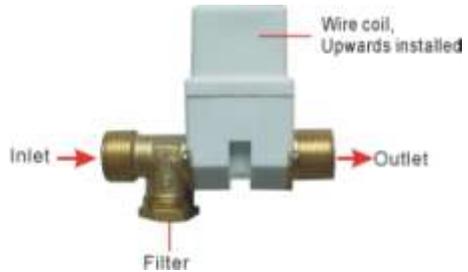
<p>Power Connection</p> <ol style="list-style-type: none"> Please note the type of power supply required from the type plate on the case of the device The protective conductor must be connected also. 	<p>Outputs: P1, P2, R1</p> <ol style="list-style-type: none"> Output P1: Electromagnetic relay, for electrical heater , max switching current 5A. Output P2: Electromagnetic relay, for pressure increasing pump, max. switching current: 5A Output R1: for electromagnetic vale , outlet voltage: DC12V 	<p>Inputs:</p> <ol style="list-style-type: none"> ports for sensor of water temperature and water level <p>Port1: connect red wire Port2: connect white wire Port3: connect black wire</p>
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“ **Reset** ”: This button is on the terminal connection panel, when system program is out of working, press “Reset” to recover the program of system to the factory settings.

2.3 Installing electromagnetic valve

- Before installing electromagnetic valve, please clean up and wash pipe.
- If water is provided by water tower, please select electromagnetic valve, which caters the water pressure of water tower. So to avoid the low flow rate or even no water flows from electromagnetic valve.
- Check whether the output voltage of controller caters to the label voltage of electromagnetic valve; check whether the filter net is completed, whether the body of electromagnetic valve is completed. Outlet and inlet of electromagnetic valve should be right installed, the side with filter net is input, and water flow direction should be same as the arrow which marked on the body of electromagnetic valve.
- Electromagnetic should be installed in the place where is easy to maintain and does not bring other lose, please take measures for anti-freezing, anti-sunburn and therefore to avoid aging of body of valve and to prolong the lifetime of valve. Please pay attention to install the wire coil upwards.
- It is forbidden to use wrench to work on the wire coil and on plastic part. The inlet and outlet pipe of electromagnetic valve should be keep at a same level, and ensure not to mount valve compulsively when both connection parts are not at a same level, and therefore to avoid damaged of valve. It should be noted that installed valve doesn't bear the torsional strength which caused by wrong mounted pipe.
- Two-cores wire should be connected with electromagnetic valve, when wire need to be prolonged, please select 1.5mm^2 cable.
- The pipe, which is connected with valve, should be easy to dismount or use flexible pipe, it should be easy to clean the filter.
- Switch-on power and check valve after installation.

Note: electromagnetic valve has check-valve function, it is not necessary to install one way valve any more.

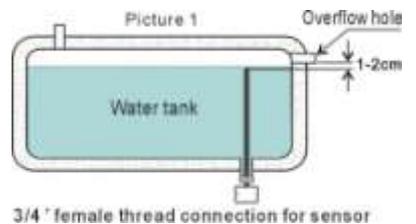


2.4 Faults checking of electromagnetic valve

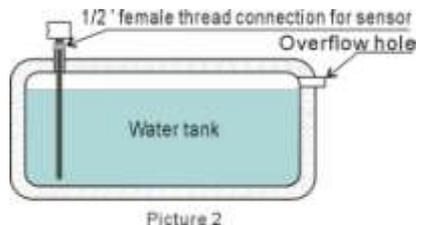
Reasons of fault	Checking measures	Error rectification
Wire connection is not good	Check wire connection	Re-connect wires
Whether wire coil of electromagnetic valve has power	Measure the resistance with Ohmmeter	Change wire coil or change valve if necessary
Operation voltage is unstable	Measure voltage	Change input power resource
Water pressure is less than 0.012Mpa	Open the tap and estimating	Installing a pressure increase pump or change a new valve with lower water pressure
Filter is stopped	Check optically	Regular wash filter
Water pressure is high than 0.8Mpa	Open the tap and estimating	Installing a pressure reduction pump or change a new valve with high operational voltage (about 10% more)

2.5 Installation of sensor

- Insert the bottom installed sensor into tank from bottom hole, fasten sensor. See picture 1



Insert the top installed sensor into tank from top hole, fasten sensor. See picture 2

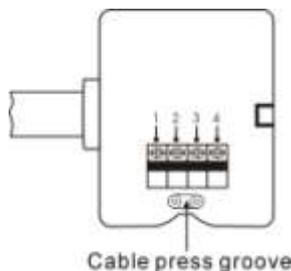


Note:

1. Sensor is suitable for tank, which diameter of inner tank is $\geq 350\text{mm}$
2. Sensor is installed inside tank, it works under high temperature, high humidity and scale conditions and thereof to be damaged easily, so sensor is damageable part, its quality guarantee is valid within 12 months from the purchasing date.

2.6 Diagram of cable connection for water temperature and water level sensor

- Port 1 connected with red wire (+12V)
- Port 2 connected with white wire (COM)
- Port 3 connected with black wire (GND)
- Port3 and port4 connected with overflow Probe(not necessary to distinguish the positive and negative)
- Connection cable should be leaded into building; the outside exposed part should be fixed properly to avoid damage of cable.



2.7 Anti-overflow probe installation instructions

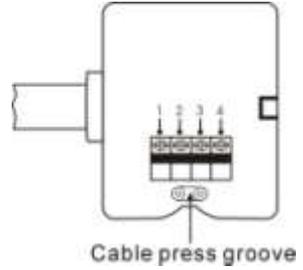
In order to avoid Bring about overflowing water due to water level sensor from checking abnormally when solar tank is loading water , install a overflow probe at the overflow hole and ensure that water in solar tank can not overflow, to avoid bringing about unnecessary lose and to get double insurance.

- screw the overflow probe into tank through the overflow port, which positioned on the side of tank, note the direction of probe, flat side upwards.



- Connected cable of overflow probe with port3 and port4 (not

necessary to distinguish positive and negative),
Then close the back cover.



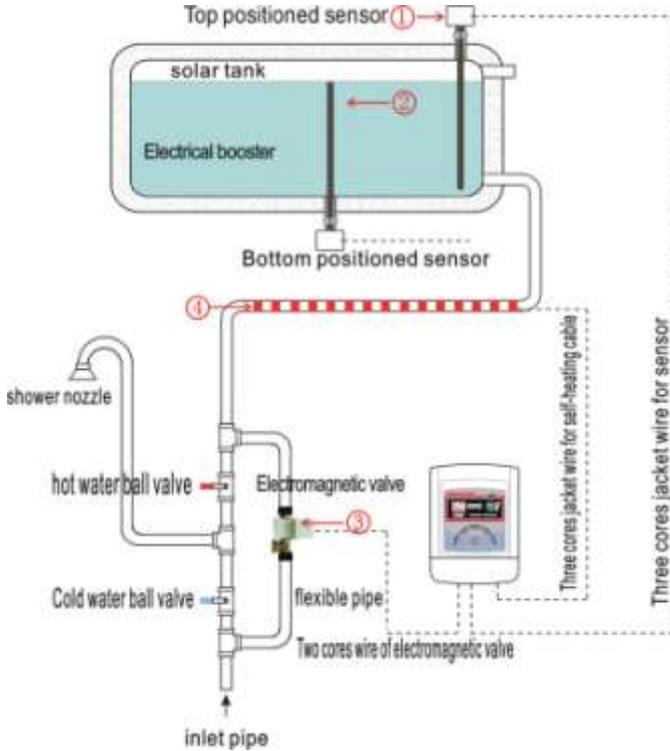
Note:

- water temperature and water level sensor must not be contacted with electrical heater or near to it, therefore to avoid temperature measuring error. Wire connection of bottom positioned sensor is same like side positioned sensor.
- Sensor cable carries low voltage, and to avoid inductive effects, must not be laid close to 230 volt or 400 volt cables (minimum separation of 100mm)
- If external inductive effects are existed, e.g. from heavy current cables, overhead train cables, transformer substations, radio and television devices, amateur radio stations, microwave devices etc, then the cables to the sensors must be adequately shielded.

3.Introduction of solar system

3.1 System diagram

Description: this system is water and collector integrated solar water system, it is easy for mounting, and efficiency is high.



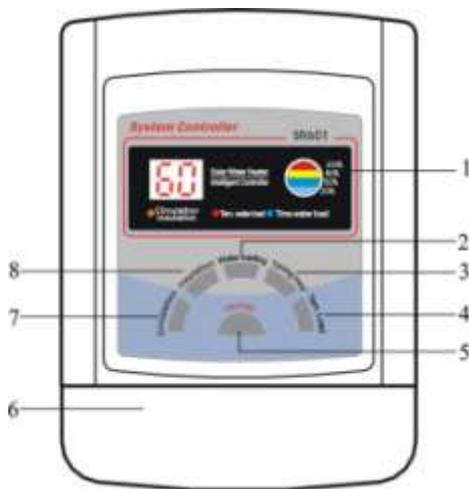
- ① Top installed water temperature and water level sensor
- ② Bottom installed water temperature and water level sensor
- ③ Electromagnetic valve
- ④ Electrical self-heating cable

Note:Customer only ask one kind of sensors for order.

4.Button of controller and display illustration

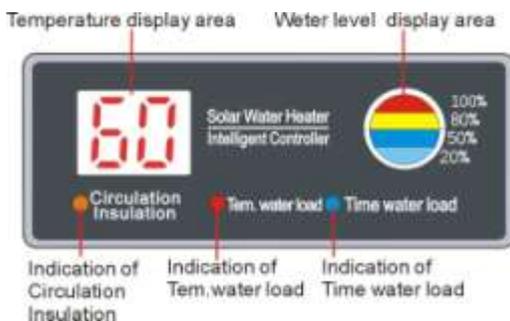
4.1 Adjusting button

Controller is adjusted by 9 buttons, which are showed on below display screen.



Nr.	Description	Nr.	Description
1	Display window	5	“On/ Off” button
2	Water loading button	6	Cover of cable terminal
3	Time controlled water loading button	7	Circulation button for circuit pump
4	Temperature controlled water loading	8	Insulation button to set self-heating wire

4.2 Screen display illustration



4.3 Code illustration

Code	Code explanation
E0	Connection cable between controller and sensor fault
E4	Collector pipe high temperature protection
E6	Temperature sensor fault
E7	Water level sensor fault

5. Main functions

- 1) Indicating water temperature: actual water temperature of solar water heater can be displayed on screen.
- 2) Indicating the position of water level: the position of water level inside water tank can be displayed.
- 3) Water level preset: possible to preset three water level of 50%, 80% and 100% of full tank volume.
- 4) Loading water when lack of water in tank: when water level goes down and tank appears the status of lack of water, controller starts to load water

automatically to the preset position after 30 minutes.

5)Temperature controlled water loading: if water in tank is not loaded fully, and when water temperature in tank is higher than the presetting loading temperature, which is adjustable from 35°C to 95°C(default value is 60°C), water loading starts automatically, when water temperature drops 5°C below the preset temperature, then water loading stops. But in the case that man is using water (at this time water level drops), then water loading is postponed for 60 minutes automatically. Design like this in order to avoid big fluctuating of temperature when man is using water. This function is active only at the time from 8:00 to 17:00.

6)Manual controlled loading water: it is possible to load water and to trigger electrical booster manually.

7)Low-pressure protection: during the water loading process, if water pressure is too low or loading stops (here, loading stop means, within 60 minutes, water level can't rise a grade), then controller entries to low-pressure protection mode automatically, low pressure symbol displays, . Controller exits this function 30 minutes later automatically.

8)Pipe circulation: it is possible to set operation time of pipe circulation pump for getting hot water immediately and increasing water pressure when man opens the tap.

9)Outdoor pipe insulation in winter: when ambient temperature in winter is lower than normal temperature, press“ insulation” button to trigger electrical self-heating cable to heat the outdoor pipe, through this function can avoid break of pipe caused by freezing. This function should be triggered when you need. Default work mode is self-heating cable works for 10 minutes, and then stops for 30 minutes, same process repeats.

10) Increasing pressure during water loading: in the case that the pressure of water supply net is lower, it is possible to increase water pressure by using a pump, (this pump and electrical valve are triggered at the same time). When water is full loaded in tank, pump and electrical valve stop also at same time.

11) High temperature protection of collector pipe: in the case that there is no water inside tank, when temperature of tank rises over 100°C , water loading is prohibited automatically, water loading button is impossible to work, and at this time error code "E4" displays. Only when the temperature drops to 80°C , it becomes possible to load water. This function is designed to avoid break of glass pipe caused by thermal stress, which happens when cold water flows suddenly into hot glass pipe.

6. Functions operation

6.1 "On/Off" button

- After power is switched-on, as default set controller is open, and controller displays water temperature and water level, all functional buttons are ready for setting operational parameters. After controller is open, press on/off button, then controller entries into close mode, after two 2 hours controller recovers to work again.

- Automatically water loading under Auto mode:

When water temperature is over 60°C and water level is at 20% position or at 50% or 80% position, 10 minutes later it starts to load water, but in the case when man is using water (water level is changing) it starts to load water 60 minutes later. When water temperature is lower than 55°C or when water level raises up to 100% position, then it stops to load water. When water level drops due to using water, tank appears the status of lack

of water, and then it starts to load water to desired position after 30 minutes.

6.2 “Water load” button

Press “Water load” button, symbol of water loading displays on screen, water level area blinks, press this button continuously to set desired water level (adjustable range 50% - 100%). During water is loading, press this button to stop water loading.

6.3 “Timing load” button

- “Timing load” button is used to set the time for triggering the water loading. Press “Timing load” button continuously to set the desired time for triggering water loading, (adjustable time range 1-23 hours). For example: if now is 8 o'clock AM, but you want to load water at 4 o'clock PM, then press this button until 08 disappears on screen, that means controller will start to load water 8 hours later automatically. After setting an indicating light blinks, 3 seconds later controller confirms the setting, and the Indicating light of this function is on. After the setting, you can press this button to check how long time is left to the preset water loading time. Press this button again to cancel this function.
- System has memory function, in the condition that power of controller isn't switched-off, your setting will be remember, it is not necessary to set every day.
- During the water loading process, press “Timing load” button again, it can stop the water loading immediately.

6.4 Tem. Load button

This button is used to set the temperature for triggering water loading. Press tem. Load button continuously to adjust the desired temperature for triggering water loading, adjustable range is 35°C 95°C, default value is 60°C, 3 seconds later controller confirms the setting. The indicating light of temperature controlled water loading is on. When the water temperature is higher than the preset temperature of tank, water loading is started, when the water temperature drops 5°C below the preset temperature, water loading is stopped. Press this button again to cancel this mode.

6.5 Circulation button

Press circulation button continuously to adjust the operation time for circulation pump, adjustable time range is 1-30 minutes, and default value is 3 minutes. After 3 seconds controller confirms the setting, and indicating light of insulation/ circulation is on, press this button again to switch off circulation pump during the operation of circulation pump.

6.6 Insulation button

Press insulation button, indicating light of insulation/ circulation is on; press this button again to switch off power of self-heating cable.

7. Technical data

- Appearance of controller: see product itself
(dimension: 170mm x128mm x40mm)
- Power supply: A230V±10%
- Power consumption: < 3W
- Accuracy of temperature measuring: ± 2°C
- Range of tank temperature measuring: 0 ~99 °C
- Range of temperature display: 0~ 99 °C
- Ambient temperature : -10°C ~ 50°C.
- Water proof grade: IP41.
- Socket : choice by customer

8. Delivery scope

Controller-----	1 piece
Customer manual-----	1 piece
Water level and temperature sensor-----	1 piece
Overflow probe-----	1 piece
Plastic expansion screw-----	3 pieces
Screw-----	3 pieces

9. Liability range of manufacturer

Controller can be returned back, repaired free, and exchanged within one year when the faulty reasons of controller are not intended (besides electromagnetic valve for one year). Repair service for whole lifetime is guaranteed.