

SOLAR CONTROL LSP-SC1

MANUAL



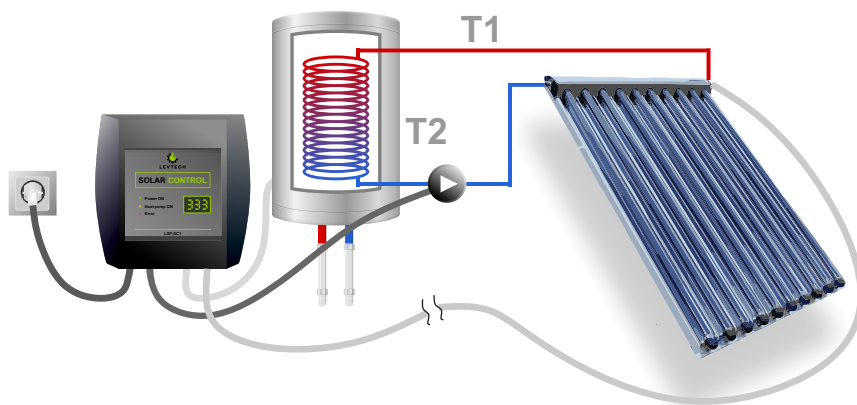
Brief description



The purpose of the LSP-SC1 controller is to control a simple solar thermal system, which consists of a solar collector, storage tank and a pump. Comparing the temperatures of the collector and of the storage tank, this device controls the pump and makes sure that the entire system is safe and highly efficient. It was designed for easy installation and usage.

Features

- anti-freezing function
- vacation mode
- sound alarm
- temperature displaying
- sensor fail alarm
- wall mountable case
- manual control
- pump saver function



Description of the controller



Potentiometer:
adjusts the delay
of the pump when
switching off
(0-20 Sec)

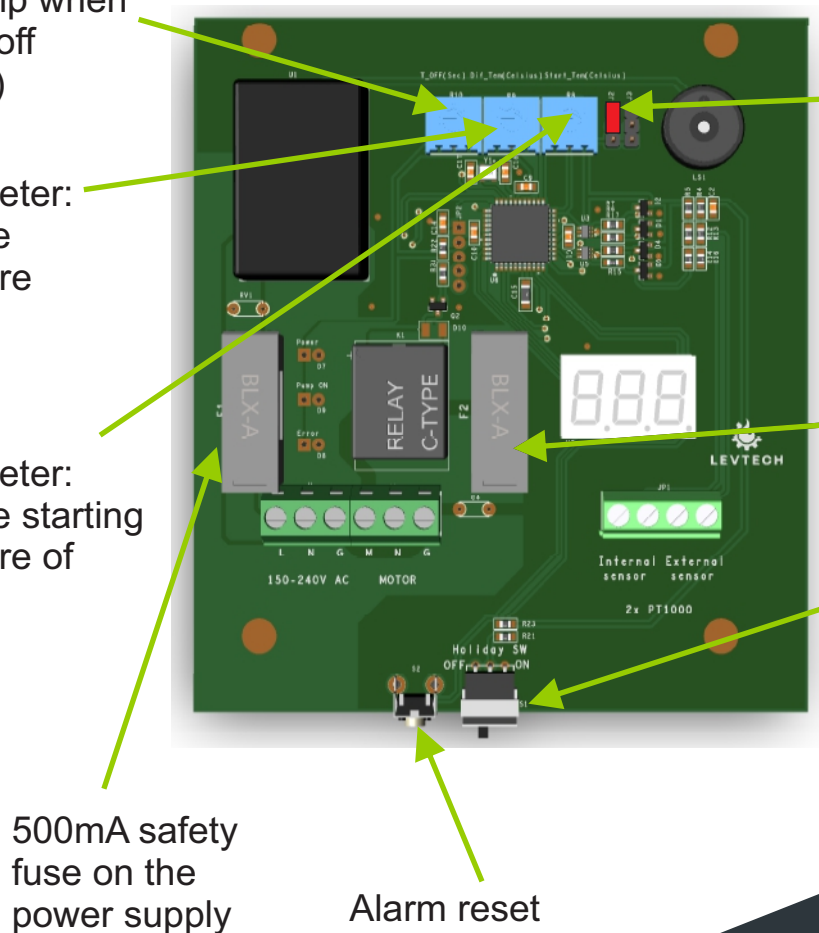
Potentiometer:
adjusts the
temperature
difference
(2-22 °C)

Potentiometer:
adjusts the starting
temperature of
controlling
(0-40 °C)

Jumper:
determines
whether the
system is filled
with antifreeze
liquid

5A safety fuse
for the pump

Holiday switch



500mA safety
fuse on the
power supply

Alarm reset
and pump test
button

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Description of the controller

The controller has no buttons and menu to avoid changing the settings by non-technicians/non-professional personnel. However, by removing the front cover, the technician/professional personnel can adjust the settings with the potentiometers and jumpers.

It has two inputs. Both are Pt1000 probe, one entering the solar systems, the other one entering the water tank. It has one output to switch the heat pump. The controller is supplied by the grid from 150V to 240V AC.

Potentiometers:

When changing the value on the potentiometers, the controller shows the value on its display in the corresponding unit. At its basic state, it shows the temperature measured in the solar thermal collector and water tank.

- The function of the T_OFF potentiometer is to set the delay time for the pump switch off. This starts from the moment when the temperature is equalized, in order to achieve that hot water flows through the storage tank heat exchanger without having it stuck in the pipe. It can be set from 0 to 20 sec.
- The Diff_Temp potentiometer sets the difference between the temperatures of the solar thermal collector and of the water tank. When this difference reaches the given value, then the controller switches the pump on. It can be set from 0 to 22 °C.
- The Start_Temp potentiometer sets the starting temperature for controlling the system. The temperature of the collector has to be higher then the given starting temperature in order to start the pump, even if the difference between the temperatures of the collector and of the water tank is high enough. It can be set from 0 to 40 °C.



Description of the controller

Jumper

During winter time, if the temperature drops below the given value, the collector turns the pump on to avoid water/antifreeze to get frozen in the system. The function of the jumper is to set whether the system is filled with antifreeze liquid or not.

In case the controller is set to antifreeze mode, during winter time when the temperature of the collector reaches -20°C , it will start the pump and will run it until the temperature of the collector reaches -15°C . When the antifreeze mode is off, the pump will start at 4°C and will switch off at 5°C to avoid the freezing of the water in the system.

Button

The main function of the button is to switch on the pump. Pressing the button will turn the pump on, releasing the button will switch it off. It can be actuated anytime regardless of the controller's function mode. It is used to test the pump. The other function is the alarm reset, which turns the alarm sound off.

Holiday switch

By switching the vacation mode on with the holiday switch at the bottom of the controller, it can be ensured that the system keeps the temperature of the tank on a certain level where the water cannot be overheated while not in use. This happens during the night, by the pump automatically switching on when the temperature in the water tank is higher than 40°C and the temperature in the collector is lower than 40°C . The pump is running until the temperature of the water tank cools down to 40°C .



Alarms

Broken sensor cable alarm

If any of the sensor cables are broken, the sound alarm and the pump will be turned on until the controller can measure the temperature again. The sound alarm can be stopped by pushing the button on the bottom of the controller. The alarm and the pump stops only in case the problem is solved.

The display shows the sensor which is broken.



EO– means that the water tank sensor is not connected.



ES-- means that the water tank sensor is short.



E--O means that the collector sensor is not connected.



E--S means that the collector sensor is short.

High temperature alarm

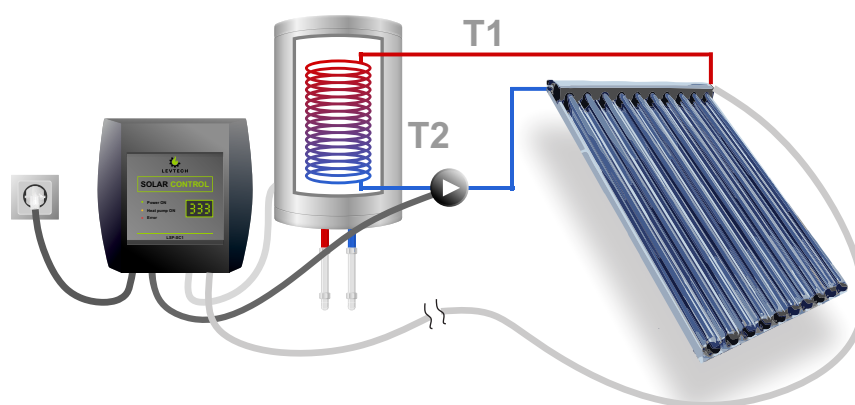
It will be triggered when the temperature in the collector reaches the 115 °C. The pump will be stopped to avoid damage in the pipe line caused by the hot water. The sound alarm can be switched off with the button and the pump can be controlled manually with this button. The alarm resets when the temperature in the collector cooled back to 105 °C.

Low temperature alarm

It will be triggered when the temperature in the collector reaches the -27 °C or -1 °C degrees depending on whether the system is set to antifreeze mode or not with the jumper. If this alarm is on, it means that the pump is not working and the controller couldn't warm up the system. The sound alarm can be switched off with the button. The alarm resets when the temperature in the collector cooled back to -15 or 5 °C.



Working Method



Normal mode

In normal working condition, the controller measures the temperature in the collector (T1) and in the water tank (T2). If the temperature in the collector minus the temperature in the water tank is higher than the preset value, then it turns on the pump and runs it until the temperature of the collector (T1) is lower than $T1 + \text{half of the preset value}$.

For example:

Preset value $(T1 - T2) = 10\text{ }^{\circ}\text{C}$

$T2 = 50\text{ }^{\circ}\text{C}$

$T1$ reaches the $60\text{ }^{\circ}\text{C}$ and the controller switches the pump on and runs it until $T1$ cools down to $55\text{ }^{\circ}\text{C}$ ($50 + (10/2)$).

Holiday mode

The system automatically cools down during night time to avoid damage caused by overheating the system.

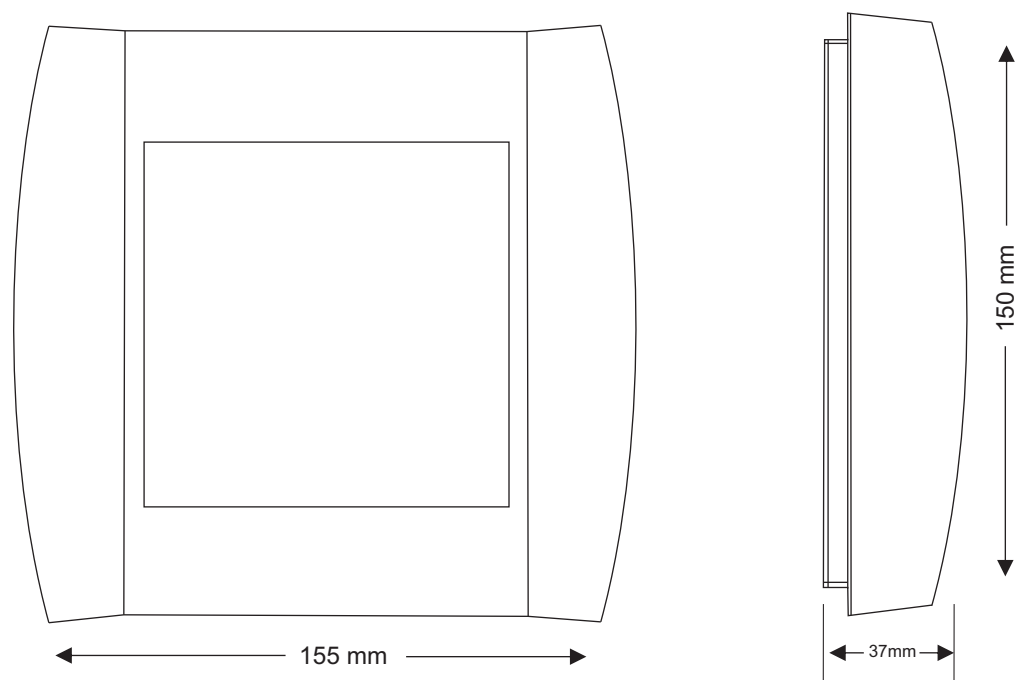
Winter mode

The controller doesn't let the system freeze by turning on the pump when the temperature is below a certain level.

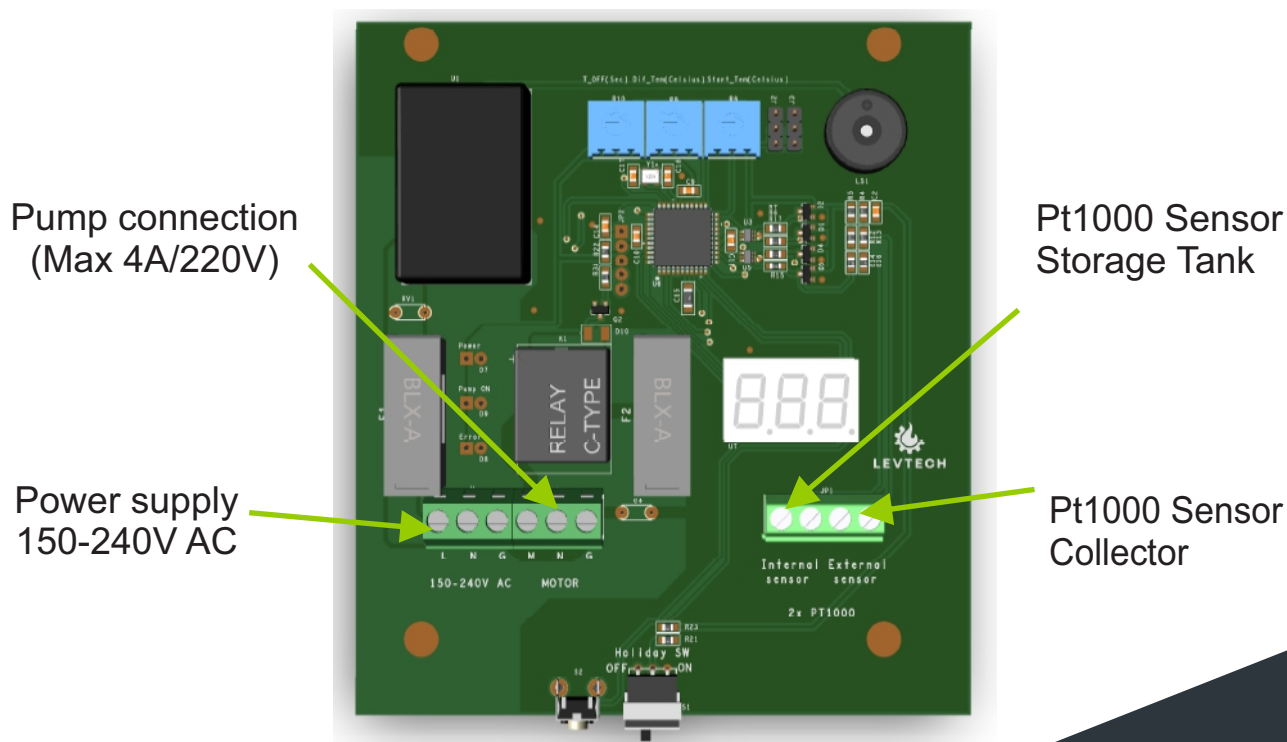
Pump saver function

There is a pump block avoiding algorithm built in the system, which is tracking whether the pump has been started in the past 8 days. If it hasn't been in use, then it starts the pump for one minute.

Dimensions



Connections



Specifications

Supply voltage	150V to 240V AC 50Hz
Current consumption of the controller	<200 mA
Ambient temperature for the controller	-20°C to 60°C
Dimensions (W x H x D)	155 x 150 x 37 mm
Weight	231g
Display	3digit 7 segment display
Maximum load of the pump	4A
Sensor inputs	Pt1000
Measuring range	-50°C to 180°C
Temperature control accuracy	+/- 0.5°C

Default settings

Antifreeze jumper	OFF (Without antifreeze)
Holiday switch	OFF
Holiday mode	Keeping temperature of the tank below 40 °C degrees
High temperature alarm	115 °C in collector
High temperature alarm automatic off	105 °C in collector
Antifreeze mode	Pump starts at -20 °C degrees Pump switches off at -15 °C degrees
None antifreeze mode	Pump starts at 4 °C degrees Pump switches off at 5 °C degrees
Pump delay potmeter	5 sec
Temperature difference potmeter	6 °C degrees
Controlling start temperature potmeter	30 °C degrees



Attention

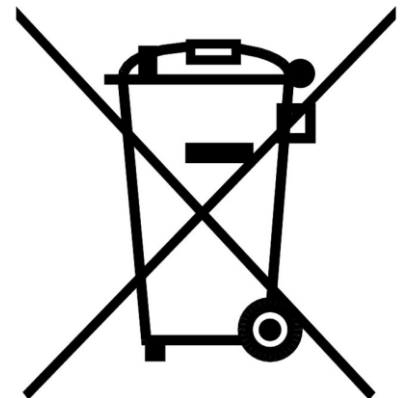
Before starting to work on the power source (cable connection, installation of equipment, etc.), make sure that the equipment is disconnected from the main source of energy. All connection links must be done by a qualified electrician. Before activating the controller, measure pump reset efficiency and inspect insulation of wires!

The device may be damaged if struck by lightning!

Make sure it is switched off during storms!



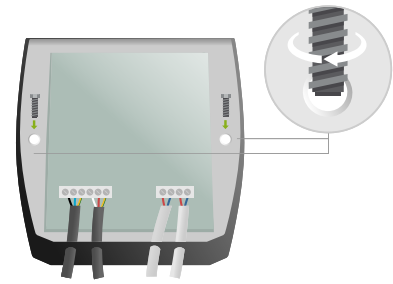
Electrical and electronic appliances often contain materials which, if handled or disposed of incorrectly, could be potentially hazardous to human health and to the environment. They are, however, essential for the correct functioning of your appliance. Therefore, please do not dispose of it with your household waste. Please dispose of it at your local community waste collection/recycling centre, and ensure that it presents no danger to children while being stored for disposal.



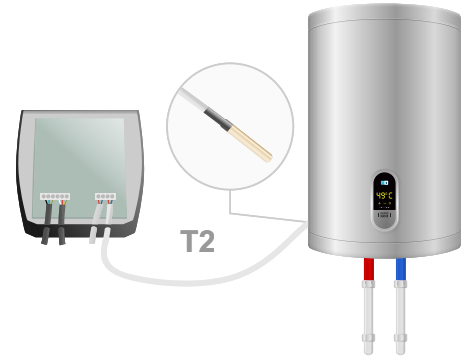
INSTALLATION INSTRUCTIONS

SOLAR CONTROL

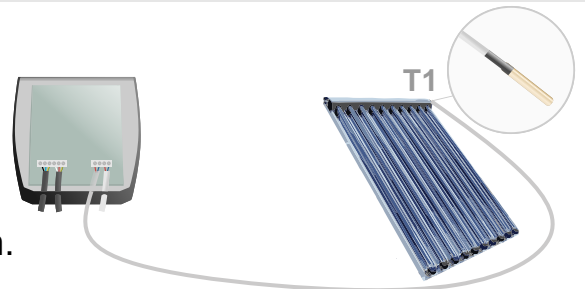
- 1 Remove the front cover of the controller and mount the enclosure on the wall with two screws. Try to find a place near to the water tank.



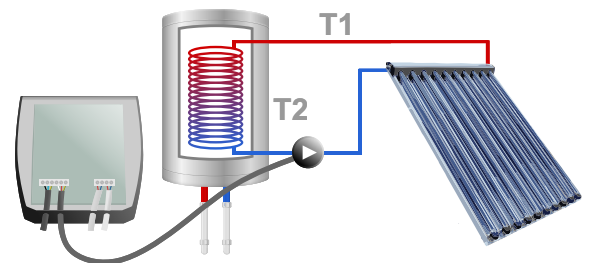
- 2 Put the water tank sensor inside the water tank temperature measuring hole.



- 3 Put the collector sensor into the collector temperature measuring hole. If necessary, the sensor wire can be extended to the desired length to reach the points to be measured, using a wire of similar cross-section.



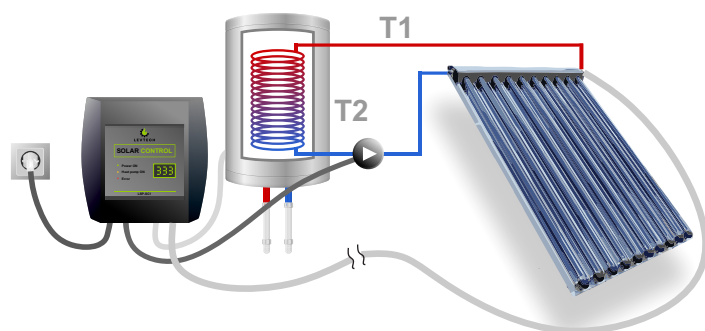
- 4 Connect the pump to the collector.



- 5 Connect the power source by plugging in the collector.



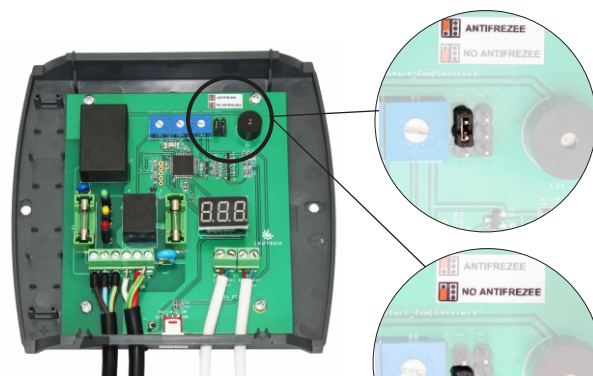
- 6 Done.



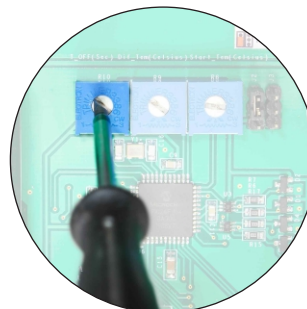
CONFIGURATION INSTRUCTIONS

SOLAR CONTROL

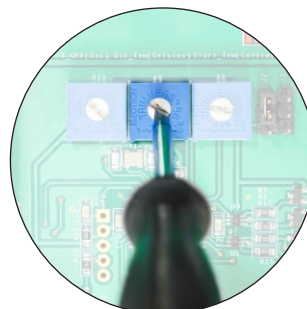
- 1 If the system is filled with antifreeze then put the jumper on the upper 2 pins. If there isn't antifreeze filled in the systems, then keep the default settings.



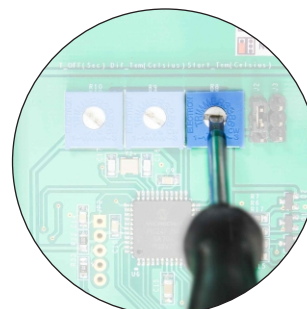
- 2 Using a screwdriver, set the delay time of the pump switch off by turning the potentiometer on the left.



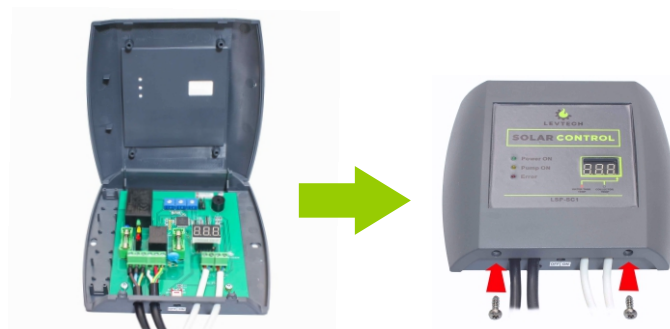
- 3 Using a screwdriver, set the temperature difference by turning the potentiometer in the middle.



- 4 Turn the potentiometer on the right with a screwdriver to set the minimum temperature collector.



- 5 Place back the front cover.



- 6 Test whether the pump is starting by pressing the button.

