



**LEVTECH**

**User manual**



# SOLAR CONTROL

## LSP-SC2



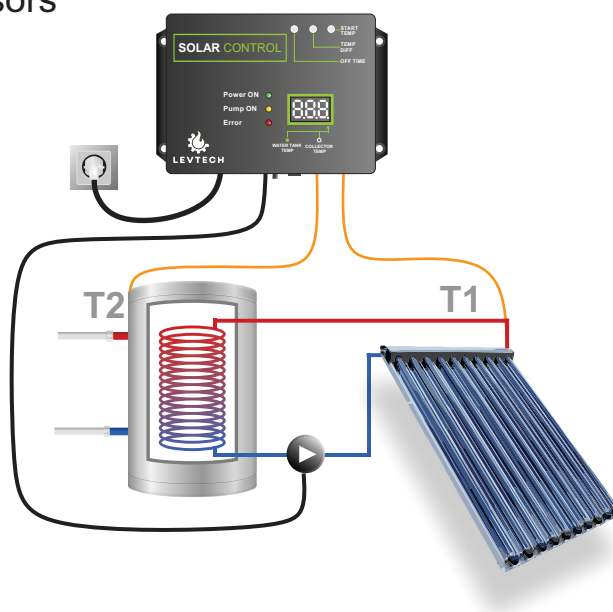
## Short description



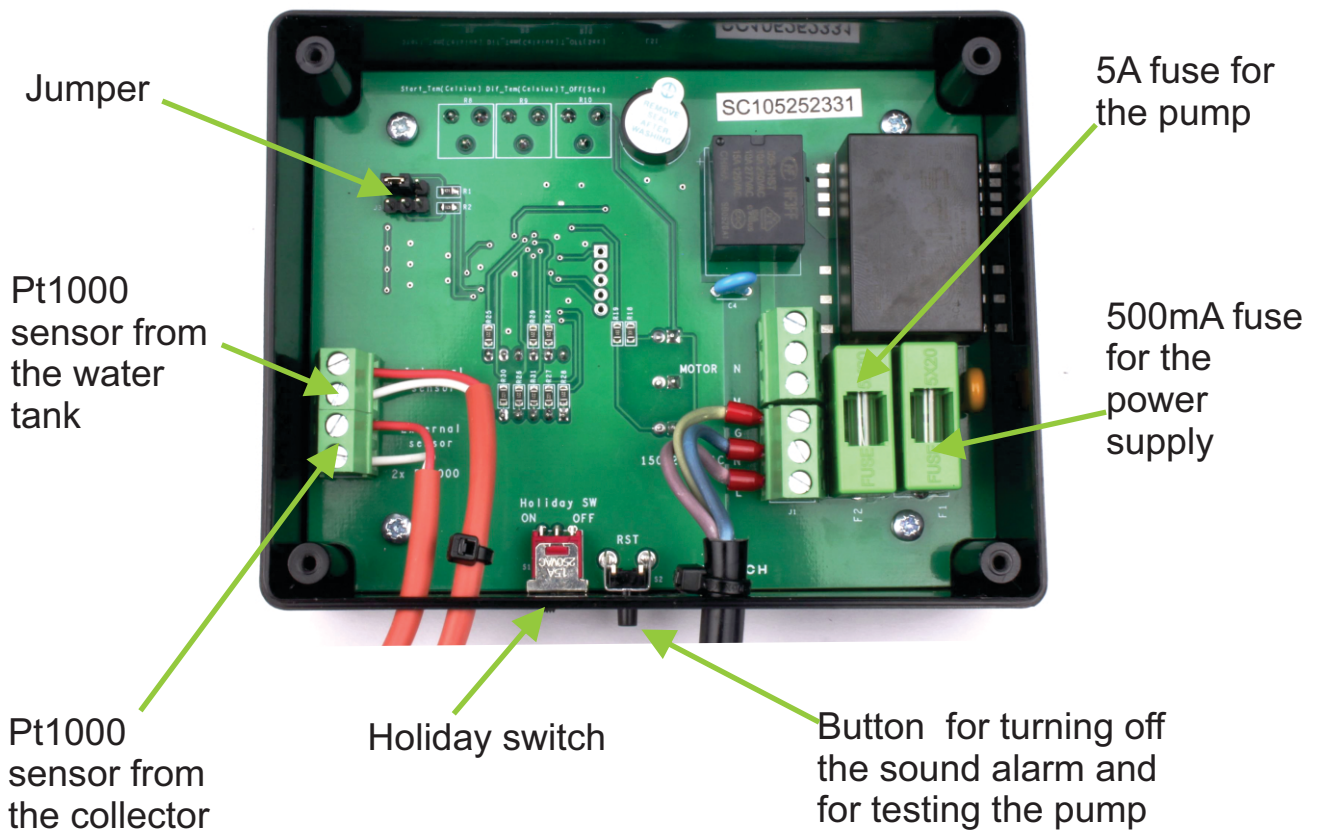
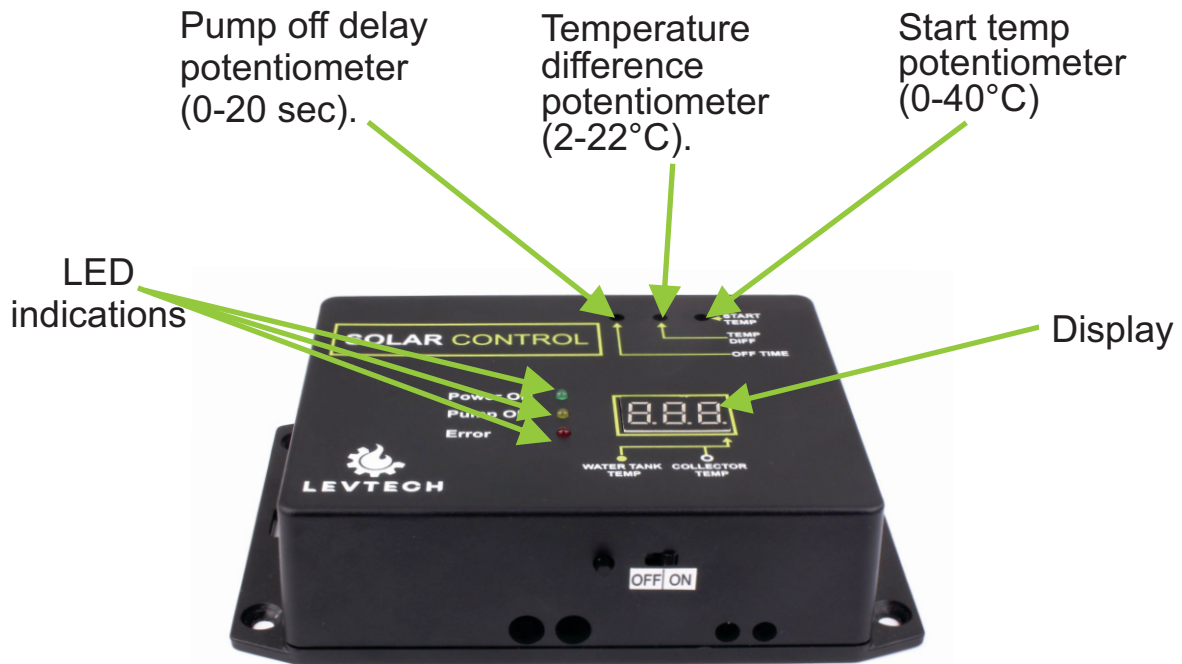
The LSP-SC2 is designed to control a solar collector system consisting of a solar collector and a hot water storage tank. By comparing the temperatures of the solar collector and the storage tank, the unit controls the pump and assures the user that the system is operating safely and efficiently. Simplicity and cost effectiveness were the main considerations in its design.

## Features

- Temperature measurement with Pt1000 sensors
- Heat resistant silicon sensor cables
- Sound alarm
- Wall mountable case
- Easy configuration
- Manually contrrollable
- Algorithm preventing the pump from sticking
- Displaying of measured temperatures



# Description



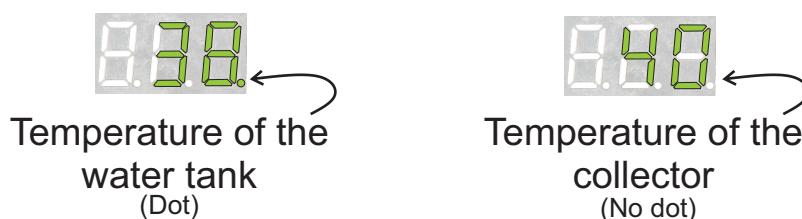
## Description

You can easily change the settings, but it is recommended to seek the advice of a professional. Our controller is equipped with potentiometers, a switch, a button and a jumper. To change the position of the jumper, the back cover must be removed. It has two temperature sensor inputs. Both sensors are Pt1000, one measuring the temperature in the collector and the other in the water tank. There is one output on the controller which operates the circulating pump. On this output appears the input supply voltage, which can be 150V - 240V AC. The maximum current drawn by the pump is 5A.

## Display

When changing potentiometers, the display automatically shows the value of the changing potentiometer.

Otherwise, it shows the tank temperature for 3 seconds and the solar collector temperature for 10 seconds. A dot is displayed to distinguish between the two values.



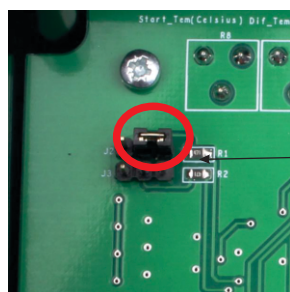
## Potentionmeters

- With the **OFF TIME** potentiometer, you can set how long the pump will run after the temperatures have equalised. This can be useful to prevent the warmer heat transfer medium from stagnating in the pipes, possibly damaging them. Its value can be set from 0 to 20 seconds.
- **TEMP DIFF** determines the temperature difference at which the controller should switch. When the solar collector temperature becomes higher than the tank temperature with this value, the controller will start the pump. Adjustable from 2 to 22 degrees.
- The **START TEMP** potentiometer is used to set the system start temperature. The collector temperature must be higher than this value for the pump to start, regardless of the temperature difference between the collector and the tank. E.g.: solar collector = 38, tank = 30, START TEMP = 40, TEMP DIFF = 6 degrees Celsius. Even if you have the 6 degrees difference, since the collector temperature has not reached 40 degrees, the pump will not start.

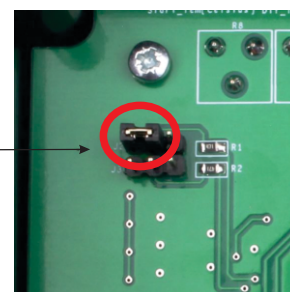
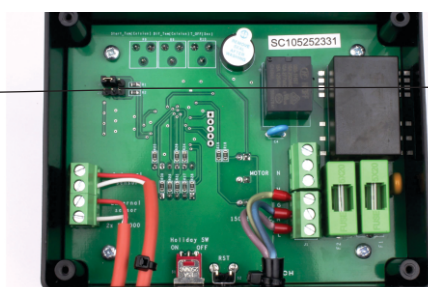
# Description

## Jumper

In winter, when the outside temperature (solar collector) falls below a certain value, the pump starts to avoid freezing. The jumper allows you to select whether the system is or is not filled with antifreeze. When antifreeze mode is selected, the controller will start the pump at -20 degrees Celsius and stop it when it goes above -15. If antifreeze mode is selected, the control will start at 3 degrees Celsius and stop if it exceeds 5 degrees, preventing possible freezing of the water.



Without  
antifreeze



With  
antifreeze

## Button

The main function of the push button is to start the pump when pressed. As long as the button is pressed, the pump is active, when it is released it turns off. It can be operated at any time by pressing the button, regardless of operating mode, it can also be used to test the operation of the pump.

Another function of the button is to stop the alarm. When pressed, the sound signal stops, only the light signal remains.

## Holiday mode

Holiday mode can be activated by moving the switch at the bottom of the controller to the **ON** position. When activated, it ensures that the system remains at a specific temperature where it has no chance of overheating when not in use. The controller achieves this by operating the pump at night when the water in the tank is above 40 degrees Celsius but the water in the collector is below 40 degrees Celsius. The pump is operated by the controller until the water in the tank falls below 40 degrees Celsius.

# Alarms

## Sensor failure alarm

If any sensor wire is broken, the buzzer will sound and the pump will start until the controller receives a readable value from the sensor again. The sound signal can be turned off by pressing of the Button on the bottom of the controller. After the beep stops, the pump continues to operate until the problem is resolved.

The display indicates which sensor has a problem and what the error is. These can also appear in combination.

EO-- the sensor of the water tank is not connected or broken (open loop)

ES-- the sensor of the water tank is shorted

E--O the sensor of the collector is not connected or broken (open loop)

E--S the sensor of the collector is shorted

## Overheat alarm

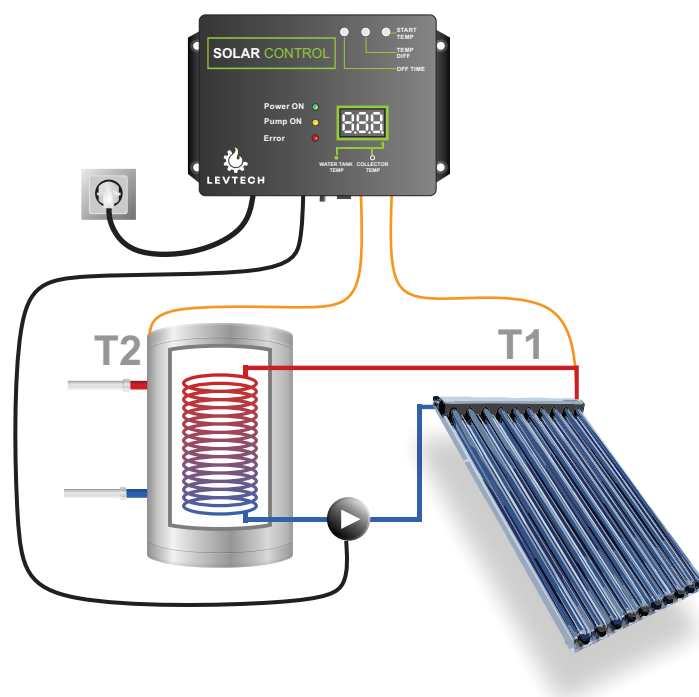
This alarm is triggered when the water temperature in the solar collector reaches 115°C. The pump will start, the red Error LED will light up and an audible alarm will sound. The beep can be stopped by pressing the button on the bottom of the unit. If the temperature falls below 105°C, the beep will automatically stop, but the light will remain on and the pump will continue to run. If the temperature drops below 100°C, the alarm stops and the controller returns to normal operation.

## Low temperature alert

If the antifreeze mode is not active, i.e. the system is filled with antifreeze, when the collector temperature reaches -20°C, the pump will start and the Error LED will be active. The pump will continue to run until the temperature rises to -15°C. At that point the light will also stop.

If the jumper is in antifreeze mode and the solar collector temperature drops below 4°C, the pump and the Error LED will start and run until the temperature exceeds 5°C.

# Operation



## Normal mode

In normal operating mode, the controller measures the temperature in the solar collector (T1) and the water tank (T2). If the temperature difference between the solar collector and the water tank becomes greater than the preset value, the pump will start and run until the temperature of the collector (T1) drops by half of the preset value.

For example: preset difference = 10 degrees Celsius

T2 = 50 degrees Celsius

When T1 reaches 60 degrees Celsius, the controller starts the pump and runs it until the solar collector temperature T1 drops to 55 degrees Celsius ( $50 + (10 / 2)$ ). During this time, the temperature of the water tank (T2) should increase

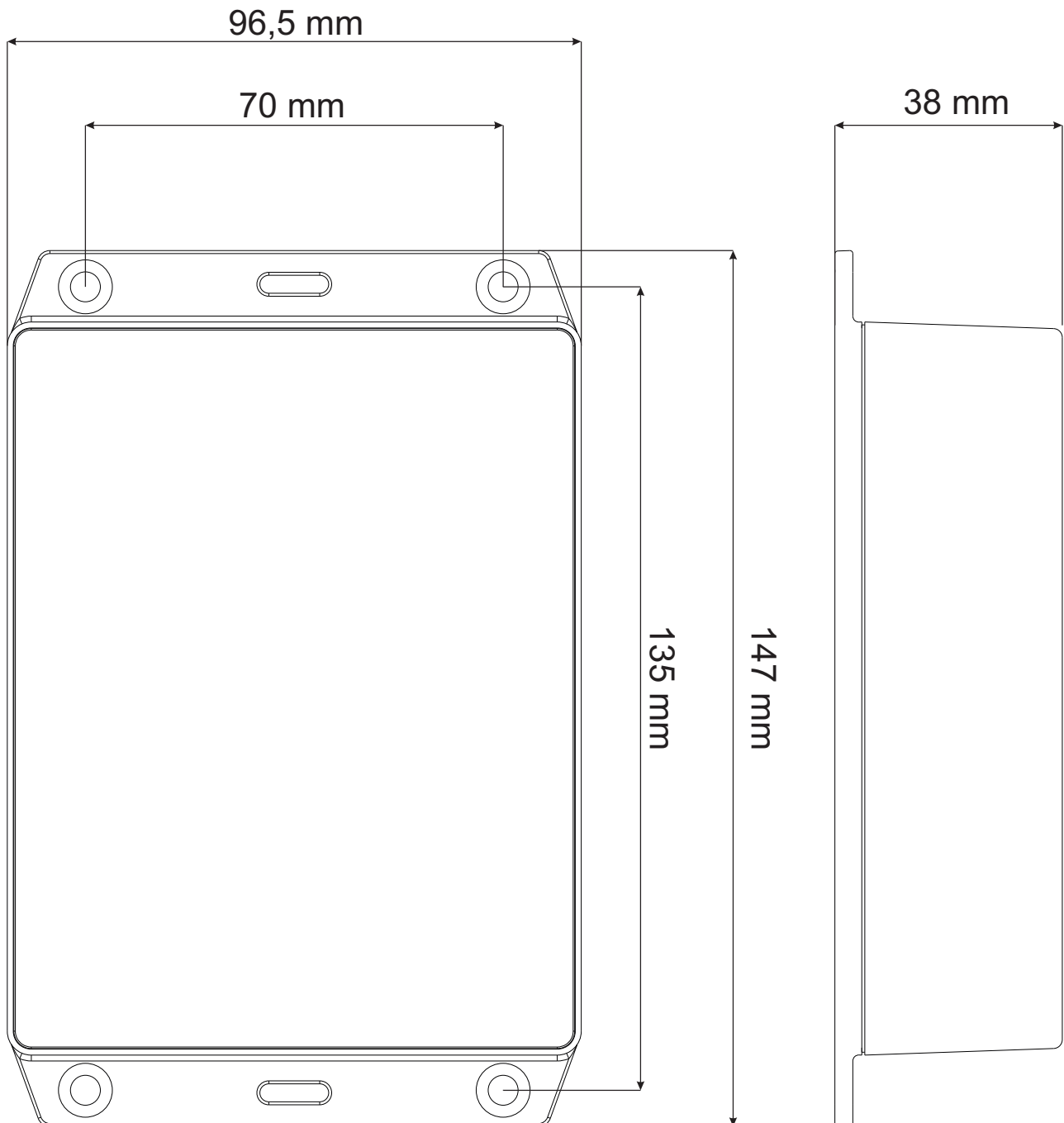
## Holiday mode

This mode can be used to keep the tank temperature at 50 degrees Celsius. It does this so that when the temperature of the solar collector drops below 18 degrees Celsius during the night, the controller starts the pump and runs until the temperature of the tank drops below 50 degrees Celsius.

## Pump protection

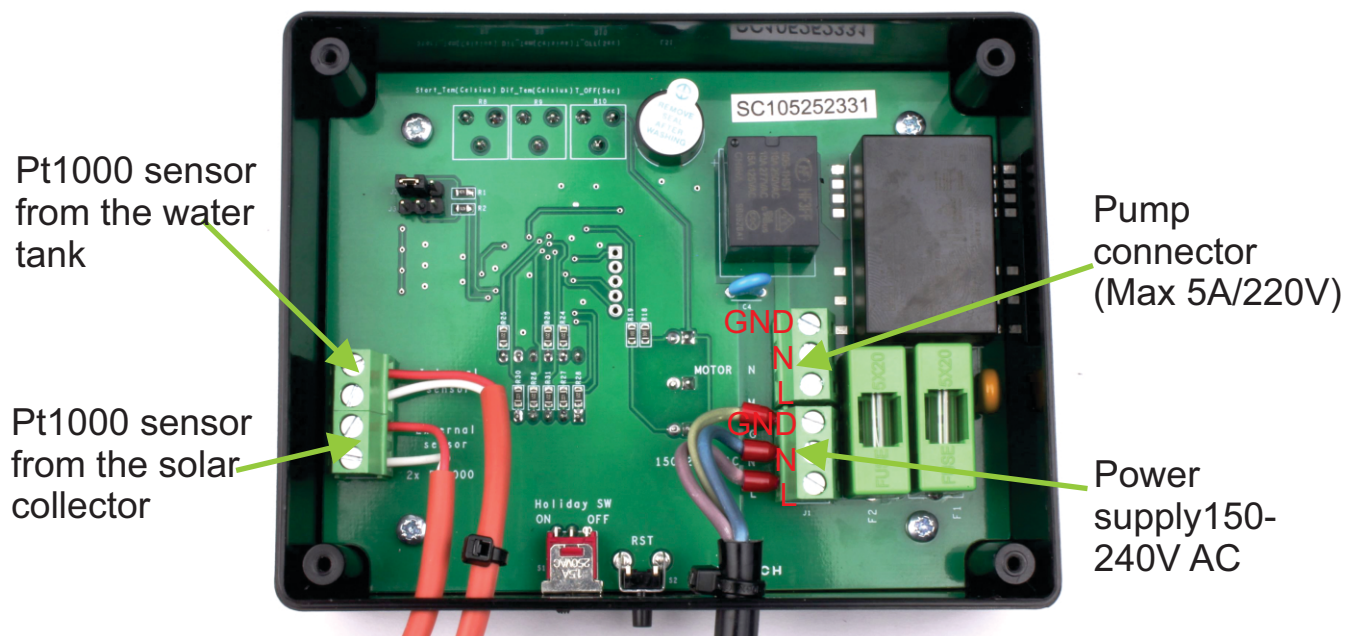
If the pump has not been in operation for 8 days, the controller will start it and run it for 3 minutes.

# Dimensions





# Connectors



By default, the two temperature sensors and the power cable are connected to the controller. Before use, it is only necessary to connect the motor wires properly. If the wires of one of the sensors need to be extended, it is justified to dismantle, splice and reassemble them. The sensors can be extended to a length of up to 300 m without affecting the accuracy of the measurement.

The polarity of the Pt1000 sensors does not matter, their conductors are interchangeable.

A 3-polarity connector is available for connecting the pump. This means that a three-conductor pump can be connected using protective earth (G), neutral (N) and phase (M).

The power supply is also connected based on the picture. Based on the image, the phase (L) is at the bottom, neutral (N) is above it, and the protective ground (G) is above it.

## Technical data

---

Power supply	150 - 240V AC 50Hz
Consumption	1W
Controller operating temperature	-20 °C to 60 °C
Dimensions (H x L x W)	147 x 96 x 38 mm
Weight	185g (460g with accessories)
Display	3-character 7-segment display
The pump max. current consumption	5A
Type of sensors	Pt1000 / Pt1000
Sensor wire length	3m / 3m
Measuring range	-50 °C to 180 °C
Temperature setting accuracy	+/- 0.5 °C

## Default settings

---

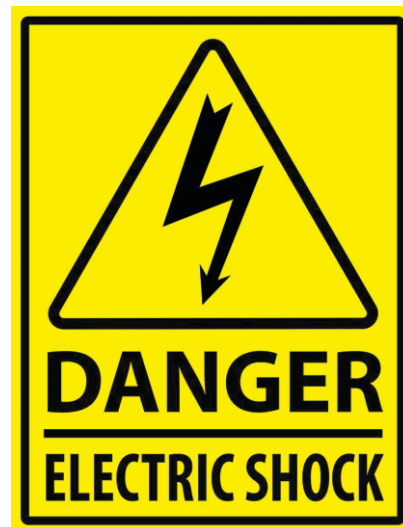
Jumper	Without antifreeze
Holiday switch	OFF
High temperature alarm with sound	115 °C in collector
High temperature alarm without sound	105 °C in collector
Antifreeze mode	Pump starts at -20 °C and stops at -15 °C
Without antifreeze mode	Pump starts at 4°C and stops at 5 °C
Pump off delay potentiometer	5 sec
Temperature difference potentiometer	6°C
Start temperature potentiometer	30°C

## Attention!

Before starting work on the controller (cable connection, equipment installation, etc.), make sure the equipment is disconnected from the main power source. All connections must be made personally by a qualified electrician. Before switching on the controller, check the correct connection of the cables and inspect the insulation of the wires!

**The device may be damaged if struck by a lightning.**

**Make sure the plug is disconnected from the power supply during storm.**



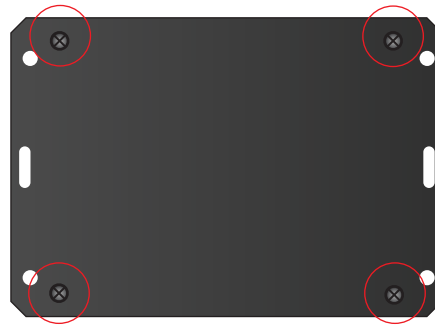
We are committed to protecting the environment. The manufacture of electronic devices imposes an obligation to ensure the safe disposal of components and electronic devices used for environmental safety. Recycling waste helps protect the environment. The user is obliged to transfer used equipment to a collection point, where all electrical and electronic components will be recycled.



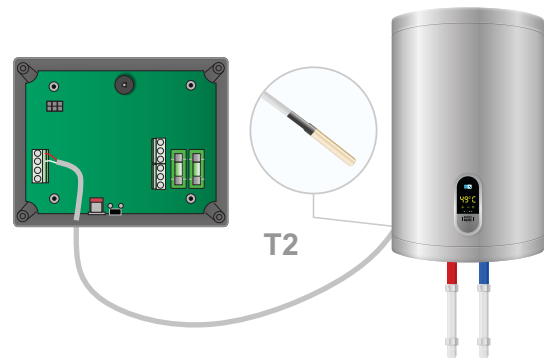
# INSTALLATION GUIDE

SOLAR CONTROL

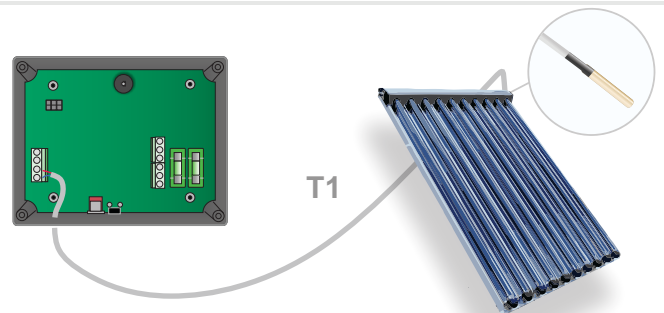
- 1 Remove the back of the device by removing the 4 screws on it.



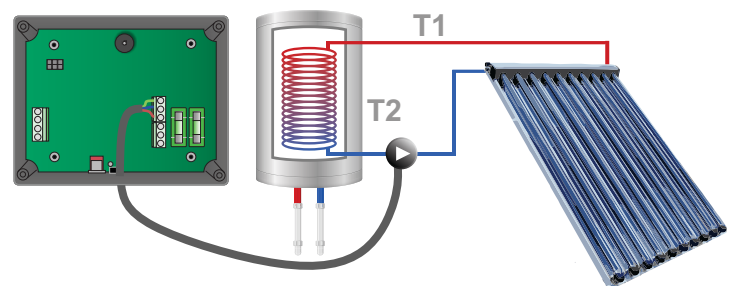
- 2 Insert the pre-wired temperature sensor (Internal Sensor) into the measuring port of the water tank. If necessary, extend it up to 300m.



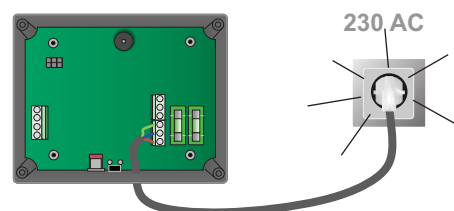
- 3 Insert the connected sensor into the measuring socket of the solar collector (External Sensor). If necessary, extend the sensor cable up to 300m.



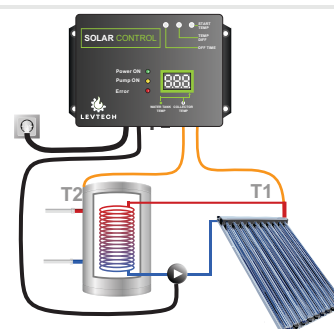
- 4 Connect the pump to the controller. Caution, the input supply voltage can appear on the connector! Do not connect the device to mains voltage during installation.



- 5 Plug the power cord of the device into an AC outlet. Check that the appliance is working, the Power ON LED should be lit.



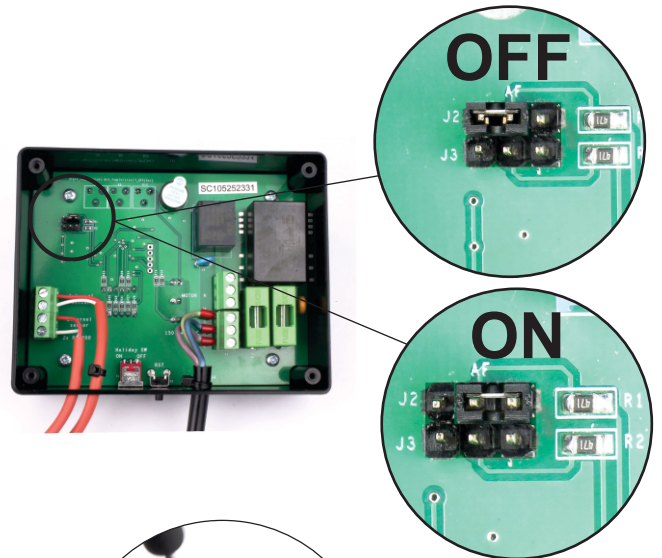
- 6 Once you have assembled the configuration shown in the image, follow the configuration instructions on the next page.



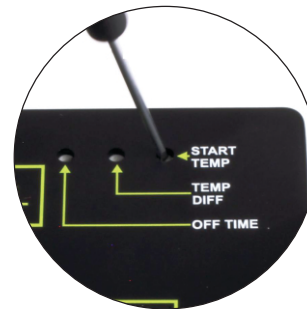
# CONFIGURATION INSTRUCTIONS

## SOLAR CONTROL

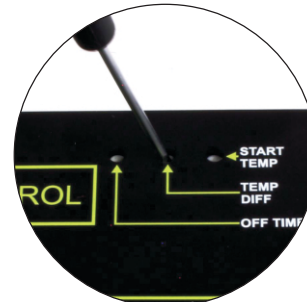
- 1 Position the jumper according to your system. If not filled with antifreeze, leave it in the **ON** position. If it is filled with antifreeze, move it to the **OFF** position.



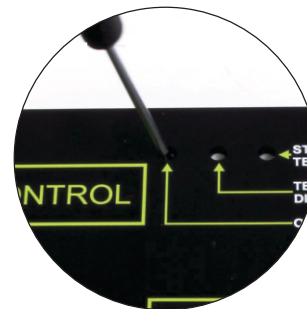
- 2 Use a screwdriver to set the minimum temperature from which the controller should operate. You can do this by using the potentiometer on the right. It is set to 30°C by default.



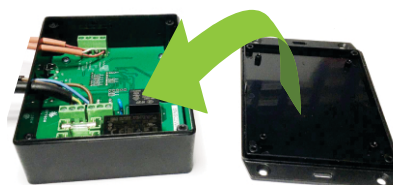
- 3 Adjust the temperature difference between the solar collector and the tank using the central potentiometer. By default, this value is 6°C.



- 4 The third potentiometer on the left can be used to delay the pump's stop. This is factory set to 5 seconds.



- 5 Reinstall the back cover.



- 6 Test the pump by pressing the indicated button .

