



LEVTECH

User Manual

CE

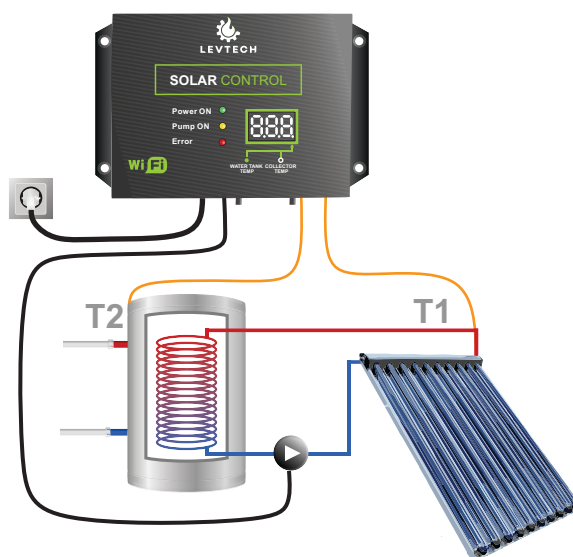
SOLAR CONTROL **(WiFi VERSION)** **LSP-SC2-WIFI**



Short description



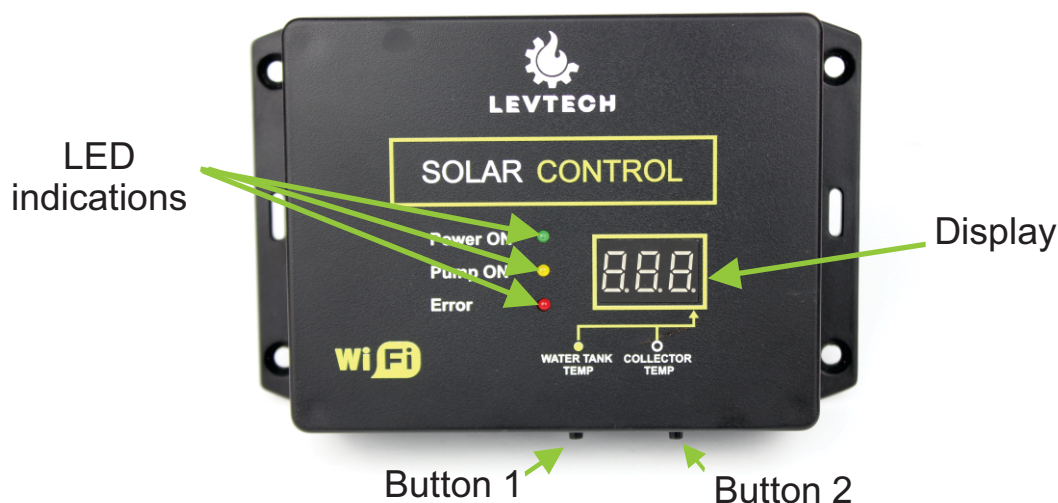
The purpose of the LSP-SC2-WIFI controller is to control a solar collector system consisting of a solar collector and a hot water storage tank. By comparing the collector and tank temperatures, the device controls the pump and assures the user that the system is operating safely and efficiently. The controller is configured using our smartphone or a laptop with which we connect to the device via WiFi.



Features

- Temperature measurement with Pt1000 sensors
- Heat resistant silicon sensor cables
- Sound alarm
- Wall mountable case
- Configurable via Wifi
- E-mail notifications in case of failures
- Manually contrallable
- Algorithm preventing the pump from sticking
- Displaying of measured temperatures

Description



Power supply
150-240V AC

Pump connection
(Max 4A/220V)

Pt1000 sensor from
the water tank

5A fuse for the
pump

Pt1000 sensor from
the collector

500mA fuse for the
power supply

Button 2 - for
activating the
Wifi and for
resetting

Button 1 - for turning
off the sound alarm
and for testing the
pump

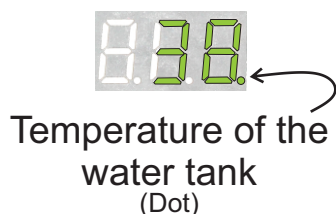
Description

The Solar Control controller is designed to control the efficient operation of a solar collector system by controlling the pump on the closed water system of the solar collector and the tank and by measuring the exact temperature in them. Compared to the previous version, the innovation is the configuration from the smartphone and the possibility to send a warning via e-mail about possible errors. The device has two temperature measuring inputs. Both sensors are Pt1000, one measures the temperature in the solar collector and the other in the water tank. The controller has one output that operates the circulation pump. The input voltage is displayed on this output, which can be 150V - 240V AC.

Display

On the display, the displayed temperature alternates between the temperature of the solar collector and the temperature of the tank at intervals set in the parameter settings, which can be distinguished by the appearance of the dot.

In the case of an error, the display shows the code of the active error, which is detailed in the error indications chapter. When connected to the device, the error signals can be seen online with an explanation on the main page, written in red.



Button 1

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.

Button 2

By long pressing button number 2, we can turn on WiFi on the device, if it has been turned off under the network settings tab.

Also, with this button, we can reset the controller, the process can be found on the "Restore factory settings" page.

Settings

The controller comes ready-to-use from the factory and provides safe control of the given system immediately after connection. In addition, personalization is possible, which can be carried out on the device through the Wifi connection of a smartphone or a laptop. To access the settings, use your device to find the **Solar_control** WiFi availability and connect to it.

Password of the wifi: **password**

After a successful connection, by scanning the QR code on the device, the main page of Solar Control opens in our browser or we enter the following IP address in the address bar of the browser (e.g.: Chrome/Google/Safari): **192.168.4.1**

If the browser has successfully opened the main page, here we can see the main data about the system, such as the current temperatures, the state of the pump, and from here we can choose between the group of parameters to be modified. It is possible to change the control (Setup) and network parameters (LAN Setup). *

Also, here is the firmware version (lower right corner) and the icon for the manual (upper right corner).

Attention! Internet access is required when trying to access the manual. Therefore, it is necessary to disconnect from the controller and provide Internet access.

* By default, the subtitles are displayed in English. The language can be changed by following the steps described in the chapter Changing the language.

Solar control



Collector temperature	28.14	°C
Water tank temperature	28.07	°C
Pump	OFF	

Setup

LAN Setup



LEVTECH



FW:1.01.00

Settings

Setup

Here we can change or set the parameters of the controller to the default position. You must enter a password to enter.

Username: admin

Password: password

SETUP PAGE

Parameters:

Start Temperature °C	40
Differential Temperature °C	2
Motor overrun Sec	0

Limits:

Default

Display Time Internal Temp Sec	5
Display Time External Temp Sec	10
Low Temperature °C	-20
Low Temperature Hysteresis °C	5
Temperature Without Antifreeze °C	4
Temperature Hysteresis Without Antifreeze °C	1
Dangerously High Temperature °C	115
Dangerously High Temperature Hysteresis °C	5
Over Temperature °C	105
Over Temperature Hysteresis °C	5
Without antifreeze	<input checked="" type="checkbox"/>
Holiday	<input type="checkbox"/>

Load

Save

Logout

Settings

Start Temperature: specifies the minimum temperature value of the collector from which the control starts. The unit of measurement is degrees Celsius.

Differential Temperature: specifies how many degrees the water in the collector must be warmer compared to the tank in order for the rotary pump to start. The unit of measurement is degrees Celsius.

Motor Overrun Sec: we can set the pump running time after the temperatures have equalized so that the hot water does not get stuck in the pipes. The unit is seconds.

Display Time Internal Temp Sec: the value measured by the two sensors alternates on the display and with this parameter we can set how many seconds the temperature in the tank is displayed. At this value, a dot appears on the display. The unit is defined in seconds.

Display Time External Temp Sec: the value measured by the two sensors alternates on the display and with this parameter we can set how many seconds the temperature in the solar collector is displayed. The unit is defined in seconds.

Low Temperature (Filled with antifreeze): if the temperature in the solar collector falls below this value, the controller starts the pump to circulate the liquid to prevent freezing. This value is taken into account if the system is loaded with antifreeze and the "Without antifreeze" mode is not checked in the parameters.

Low Temperature Hysteresis (Filled with antifreeze): this value determines by how many degrees the system must warm back up from the value specified in the Low temperature parameter, in order for the freezing error signal to disappear.

Temperature Without Antifreeze (Without antifreeze): the same as the Low temperature parameter, only in this case the system is not filled with antifreeze, because of this there is already a risk of freezing below 0 degrees. Even with the value set here, we receive an error message and the pump will run continuously until the specified value plus its hysteresis value is reached.

Temperature Hysteresis Without Antifreeze (Without antifreeze): in the case that the system is not filled with antifreeze liquid, the temperature of the Without Antifreeze mode and its sum will be the value that, if the temperature of the solar collector is reached, the pump will turn off.

Dangerously High Temperature: is the value that, when the temperature of the solar collector is reached, the controller sounds an alarm and the Error LED lights up. Together with these, the pump also comes into operation. Furthermore, if the email notification is enabled and set, the controller will send the error signal to the specified email address. Its unit is degrees Celsius.

Dangerously High Temperature Hysteresis: the Dangerously High Temperature and the difference of this value gives the value where the sound signal stops, but the Error LED and the pump still work.

Settings

Over Temperature: if the temperature of the solar collector has reached this value, the Error LED will light up and the pump will start. The controller also sends a notification if the notification sending function is activated.

Over Temperature Hysteresis: the value given by the Over Temperature and the difference of this value is the point below which, when the temperature of the solar collector drops, the controller stops the alarm and the pump.

Without antifreeze: It is activated when the system is not filled with antifreeze liquid. If it is not checked, the system will operate on the basis of Low Temperature values and it should be filled with antifreeze.

Holiday: this mode can be used to keep the tank temperature at 50 degrees Celsius. The system does this in such a way that when the temperature of the solar collector drops below 18 degrees Celsius (mostly during the night), the controller starts the pump and it works until the temperature of the tank drops below 50 degrees Celsius.

Default button: by clicking on this, we can restore the control parameters separately to the factory state. When you press it, the system will ask if you want to execute it for sure.

Limits:

Default

Load button: by pressing it, we can read the currently loaded parameters. After saving, we can use this to test whether the changes have been saved.

Save button: with this button we can save the changed parameters in the controller's memory. If we changed one of the parameters, we have to press it so that the desired values are stored. After pressing it, a window will pop up asking if you are sure you want to save the changes.

Logout button: we can use this to return to the home screen. After clicking on it, you will be asked to confirm whether you really want to exit the settings and save the changes. Furthermore, when pressed, the WiFi communication of the device restarts, after which we have to reload the page, if our phone or laptop does not load it automatically.

Load

Save

Logout

Settings

LAN Settings

Here we can change or reset the network parameters of the controller. For easier navigation, the menu is divided into 5 parts. You must enter a username and password to log in.

Username: admin

Password: password



LAN SETUP

Wifi AP User Email Language

Wifi Config:

Enable ☒

Scan

Wifi Password

DHCP ☒

IP Address

Subnet Mask

Default Gateway

Primary DNS

Secondary DNS

Wifi configurations

Here we can connect the controller to our own home Wi-Fi network, setting the appropriate parameters. For this, we need to tick the **Enable** window.

We can search for our network with the **Scan button**, and then enter the password of our network in the **Wifi password** field.

By checking **DHCP**, we can access the controller automatically, without entering the following IP address and other datas.

Save with the **Logout**, then **Save and Exit** button so that the controller can function properly. It is absolutely necessary to restart the Wi-Fi communication, which is automatically performed by the controller.

Attention! Once the controller has been connected to our own network, it can only be accessed via the Solar_control wifi network at the address **http://solar.local**.

Access point config:

AP enable ☒

AP SSID

AP Password

IP Address

Settings

Access point configurations

Access Point Enable: with the help of this we can make the controller visible (checked) or invisible (not checked) for other devices. If the device is currently invisible, you can use Button 2 on the controller to display it in the list of Wi-Fi devices when searching.

AP SSID: here we can change the name of the device so that it appears in the list of available devices when searching.

AP Password: we can change the connection password of our device.

IP Address: we can change the IP address of our device.

Attention!

Save the changes made here with the **Logout**, then **Save and Exit** button!

User config:

Setup admin

admin

Setup admin password

password

LAN setup admin

admin

LAN setup admin
password

password

User configurations

With this menu item, we can change the username and password used to enter the two menus on the main page, separately.

Settings

Email config:

Destination email address	<input type="text" value="user@user.com"/>
User	<input type="text" value="user@user.com"/>
Password	<input type="text" value="password"/>
Server	<input type="text" value="smtp.gmail.com"/>
Port	<input type="text" value="465"/>
Default SMTP	<input checked="" type="checkbox"/>
Notification enable	<input type="checkbox"/>
<input type="button" value="Test email"/>	

Email configurations

Here we have the option to set the parameters for sending email notifications. If you simply want to receive a notification, enter the email address where you want to receive the notification in the **Destination email address** field. Then we need to check both boxes: **Default SMTP** and **Notifications enable**. Finally, save your changes with the **Save** button at the bottom of the page.

Other changes to this menu item are only necessary in special cases.

E-mail notifications only work if the device is connected to our internal network based on the instructions described under the Wifi configurations menu item!

If you have set the email sending parameters correctly, you can check them with the **Test email** button.

Language:

Default

Language

EN

Load

Save

Logout

Language

Default button: by clicking this, you can reset the language of the user interface to the default. By default, the menu is in English (EN).

Changing the language

The controller menu is available in three languages:

- English
- Hungarian
- Romanian

By default, the menu is displayed in English and you can easily change it by following the steps below.

Step 1

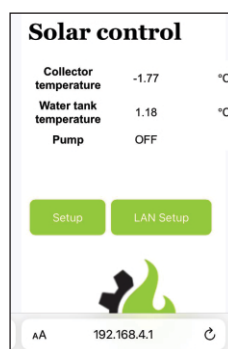
Find and connect to the Wi-Fi network of the controller - **Solar_control**

The password is: **password**



Step 2

Scan the QR code at the bottom of the product or type the IP address "**192.168.4.1**" into your browser (Chrome/Google/Safari).



Step 3

Enter the **LAN Setup** menu

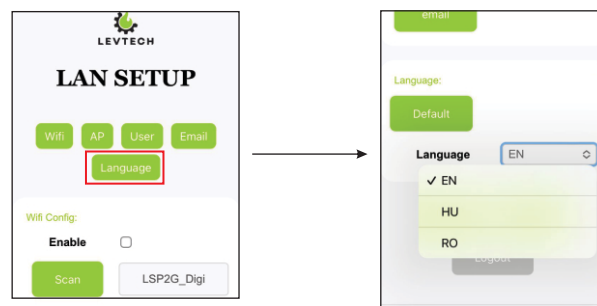
Username: **admin**

Password: **password**

Step 4

You can select the language under the **Language** menu item, which you can save with the **Save** button. In the same place, we can reset the language with the **Default** button.

After making a change, if the language is not updated, reload the page.



Factory reset

If you want to restore the factory settings, you can easily do it by following the steps below. After the reset, the parameters of the control and the network settings are also reset to the factory values. You can find these values in the Default settings chapter.

The controller can be restored to its factory state by following these steps:

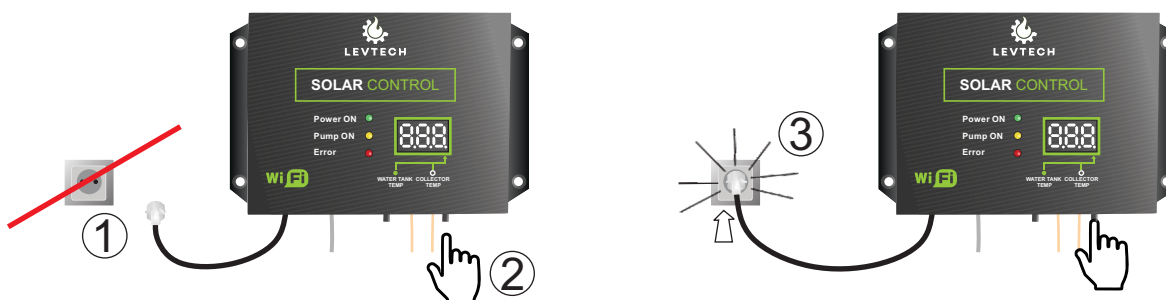
Step 1

Turn off the device. Simply unplug the power cord. Confirm that the device is not working by checking the status of the Power ON LED. If it is not lit, the device has been properly switched off.



Step 2

Press and hold the AP button (Button 2). While the button is pressed, reconnect the device's plug to the mains socket.



Step 3

After connecting, keep the button pressed for 5 seconds. Then a zero flashes on the display and a segment starts rotating on the display, as shown in the figure below. After the flashing ends, the current temperature value is displayed. When you see this, you can release the button. After that, the current temperature values will be read again on the display, alternately.



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 Button 1 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 (open loop)



ES-- the sensor of the water tank is shorted



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



E--S the sensor of the collector is shorted

Overheat alarm (by default)

Once the solar collector temperature exceeds the **Over Temperature** of 105°C, the Error LED will light up and the pump will start. They remain on until the temperature drops below 100°C.

If the temperature exceeds the **Dangerously High Temperature**, 115°C, the light signal and the sound signal will be active in addition to the pump operation.

The alarms are also displayed in detail if you are connected to the Wi-Fi user interface of the controller.

If the email notification sending function is activated, the controller will also send the error message to the specified email address.

Solar control



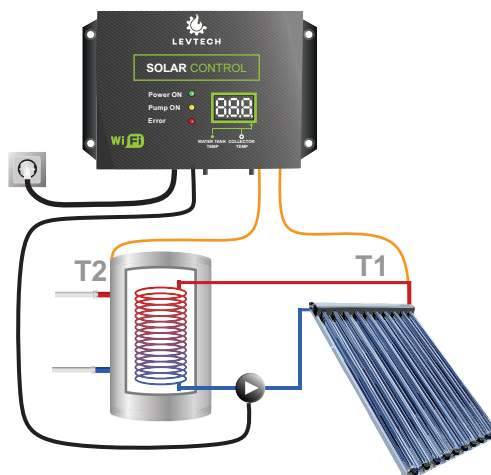
Collector temperature	299.15	°C
Water tank temperature	1.04	°C
Pump	ON	

Dangerously high temperature!
Sending Email successfully

Setup

LAN Setup

Operation



Normal mode

Under normal conditions, 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 tank is greater than the preset value, the pump starts and runs until the temperature in the solar collector (T1) is less than $T1 + \text{half of the set value}$.

Example:

Temperature difference = 10 degrees (difference between T1 and T2)

T1 => reaches 60°C and T2 = 50°C

The controller starts the pump and runs it until T1 cools below 55°C ($50 + (10 / 2)$).

Without antifreeze mode

The controller starts the pump at the **Temperature Without Antifreeze** of 4°C, thus preventing freezing. If the temperature in the solar collector exceeds 5°C, the controller will return to normal mode. Antifreeze mode is enabled by default, so if your system is loaded with antifreeze, uncheck the box.

Over temperature hysteresis °C	<input type="text"/>
Without antifreeze	<input checked="" type="checkbox"/>
Holiday	<input type="checkbox"/>

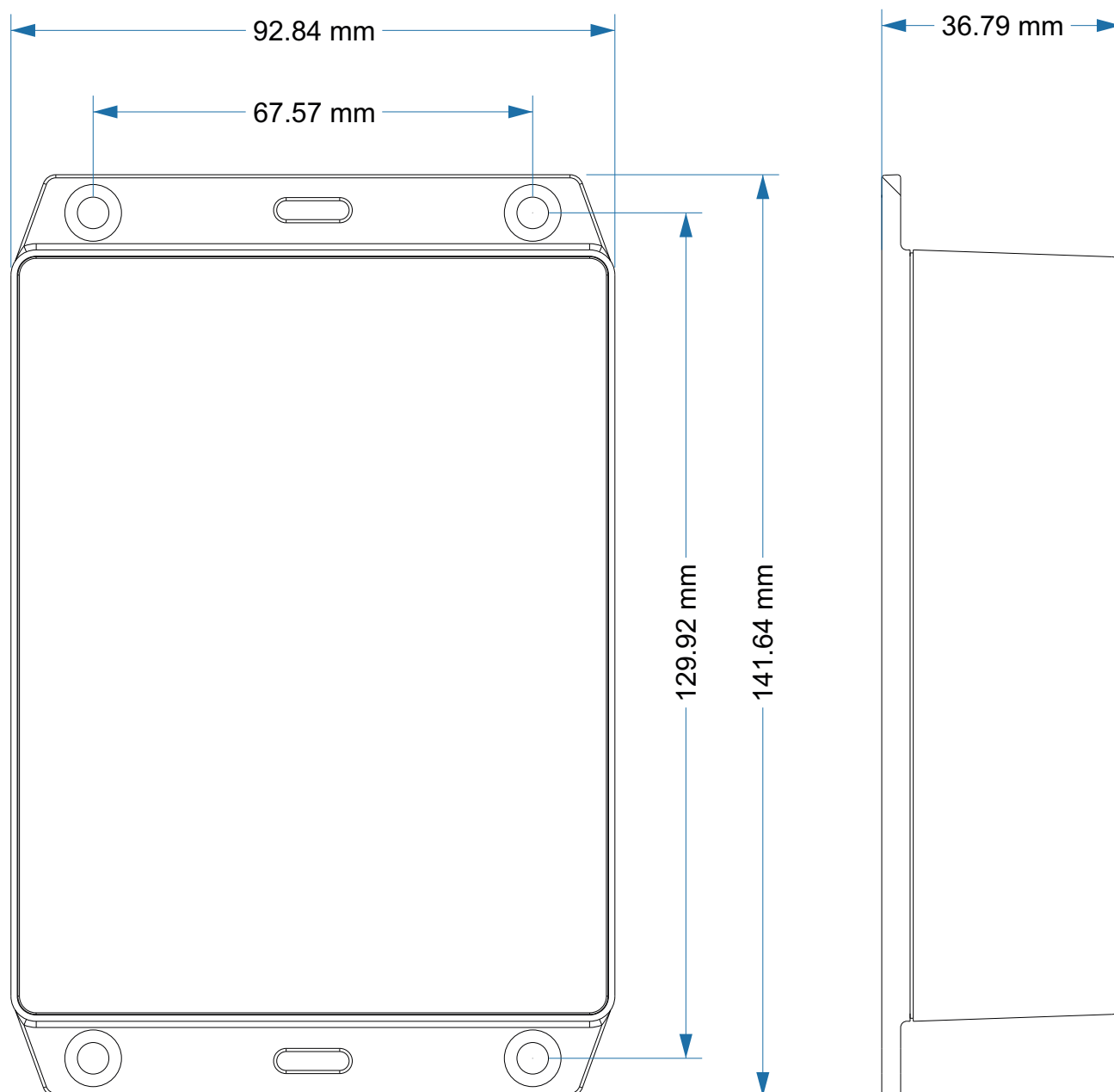
Holiday mode

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.

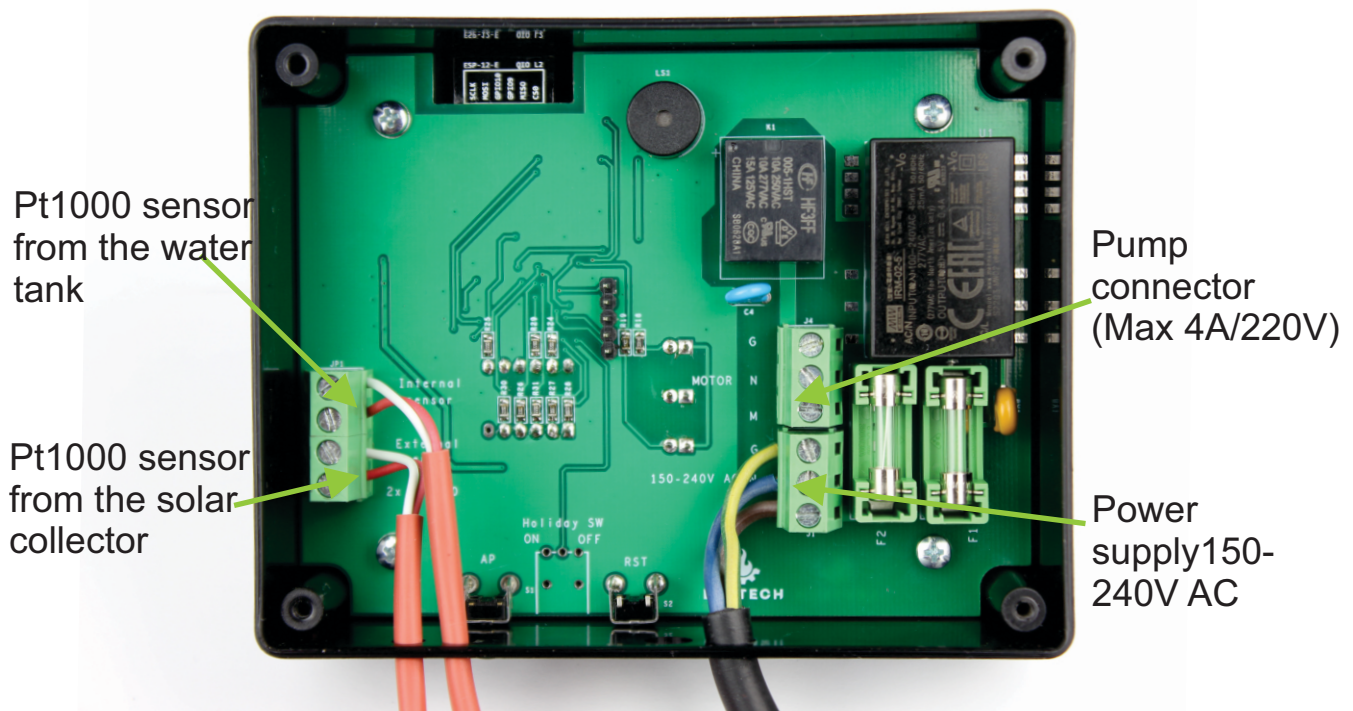
Pump protection

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 (515g with accessories)
Display	3-character 7-segment display
The pump max. current consumption	4A
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

Holiday mode	Off
Without antifreeze	On
Dangerously high temperature alarm with sound	115 °C in the collector
Over temperature alarm without sound	105 °C in the collector
Antifreeze operating 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 shutdown delay	0 sec
Temperature difference	2°C
Starting temperature	40°C
Access point	Enable
IP address	192.168.4.1
SSID	Solar_control
Password	password

Attention!

Before starting any work on the supply (wiring, installation of equipment, etc.), make sure that the device is not connected to the electrical network. The connections must be made by a qualified electrician. Before using the controller, check the connections and check the insulation of the wires!

In the event of a lightning strike, the device may be destroyed!

Make sure that the device is not connected to the network during a storm!



We are committed to protecting the environment. The production of electronic devices requires the safe disposal of used parts and electronic devices for the sake of environmental safety. The recycling of waste helps to protect the environment. The user is obliged to return the used equipment to a collection point, where all electrical and electronic components are recycled.

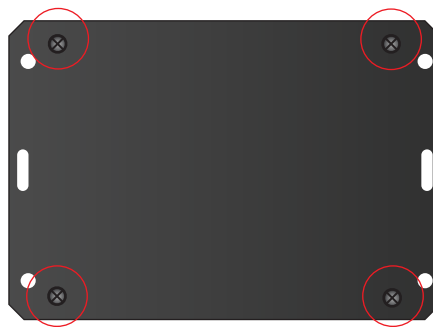


INSTALLATION GUIDE

SOLAR CONTROL

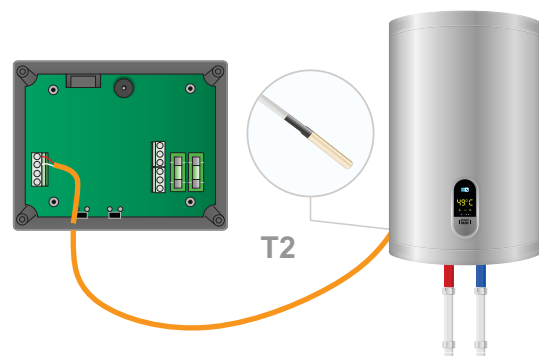
1

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



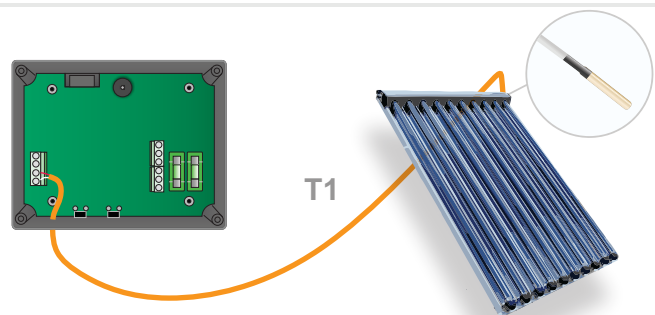
2

Insert the pre-wired temperature sensor into the measuring opening of the water tank. (Internal Sensor)



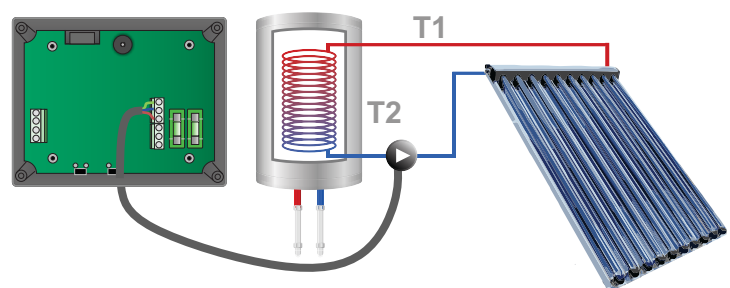
3

Insert the connected sensor into the measuring hole of the solar collector. (External Sensor) If it is short, extend the sensor cable up to 300m long.



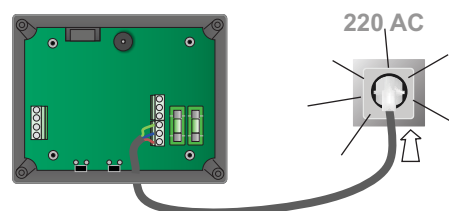
4

Connect the pump to the controller. Attention, the input voltage is displayed on it! The device must not be connected to the mains voltage during installation.



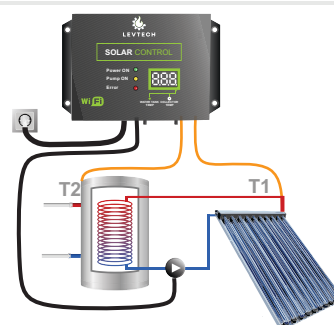
5

Connect the device's power cable to a power outlet. Check that the device is working, the Power ON led should light up.



6

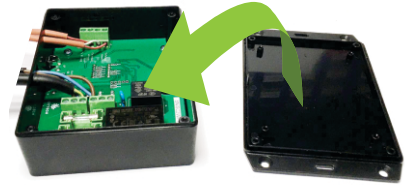
Once you have assembled the configuration shown in the image, follow the configuration instructions on the next page.



CONFIGURATION INSTRUCTIONS

SOLAR CONTROL

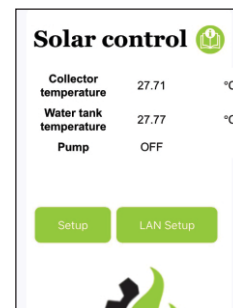
- 1 After you have connected the sensors and the pump and verified that the controller is working, reassemble the backplate.



- 2 Turn on Wi-Fi search on your phone and connect to the "**Solar_control**" network. Password: **password**. Select the automatic connection option.



- 3 After connecting, scan the QR code at the bottom of the controller. If you can't read it, open your browser (eg: Chrome/Google/Safari) and enter: **192.168.4.1** IP address in your browser. By default, the menu is in English, you can find how to change it in the manual.

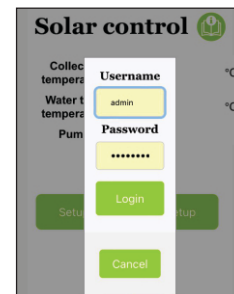


- 4 After loading the page, you can see the current state of the system and from here you can open the parameter settings by clicking on the "**Setup**" button.

*Username: **admin**

*Password: **password**.

**optional*



- 5 After logging in, there are three main control parameters at the top. These include **Start Temp**, **Differential Temp** and **Motor overrun**. For efficient operation, it is recommended to set them appropriately.

SETUP PAGE	
Parameters:	
Start Temperature °C	40
Differential Temperature °C	2
Motor overrun Sec	0

The main control parameters can be set in the **Setup** menu. Choose these setting values carefully, they affect the safe operation of the system. If you are not sure which setting covers exactly what, read the entire user guide or, if necessary, consult a professional.

To change the language of the menu, enter the **LAN Setup** menu, then under the **Language** menu item