Manual english

5.5" display for HUAWEI SUN2000 and FRONIUS inverters

Manual Version February 2024

The BOPV.uno is designed as a convenient control centre and for the output of real-time data from up to three Huawei and Fronius inverters and accessories. It retrieves the real-time data from the inverters via Modbus TCP (Huawei) or V1 API (Fronius). It's easy to configure and use

Roland B., Developer and Programmer

Requirements and Compatibility

Minimum Requirements Huawei:

1. Huawei SUN2000 Inverters
2. Huawei SDongleA-05
3. WIFI network

Minimum Fronius requirements:

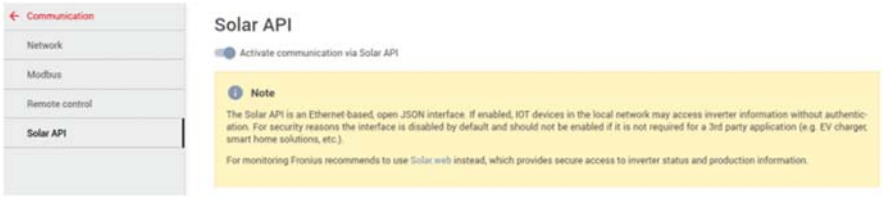
4. Fronius inverters
5. Support of the V1 API (GEN24, Symio ...)
6. WIFI network

Required Prerequisites: Huawei

You will need the IP address of the SDongleA-05. Modbus TCP must be enabled on the dongle and the Modbus addresses of each device must be known. If you have admin rights, you can make these settings in the FusionSolar itself. Otherwise, you will need to request this information from your installer or electrician. All Huawei components should have up-to-date firmware versions.

Required Prerequisites: Fronius

You will need a Fronius inverter with up-to-date firmware that also supports the "API V1". API access must be activated directly in the inverter.



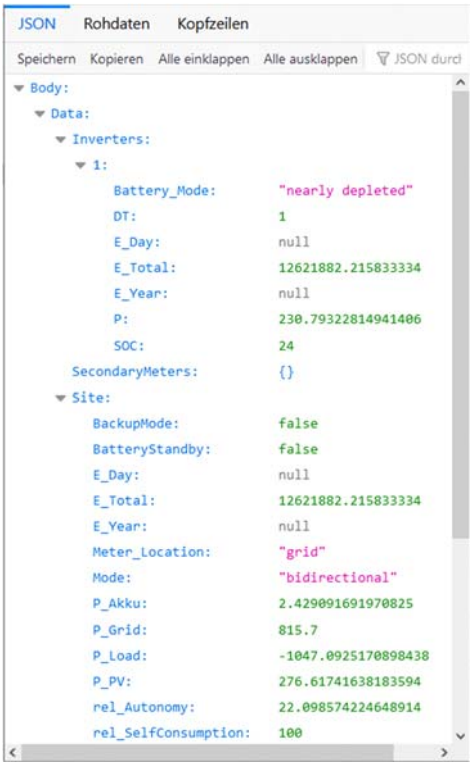
You can easily find out if your inverter supports this API V1.

In a web browser on a device on the same network as the inverter, enter the following URL:

http://0.0.0.0/solar_api/v1/GetPowerFlowRealtimeData.fcgi

(Replace 0.0.0.0 with the IP-address of your inverter).

If you receive feedback, similar to the one shown on the screenshot on the right side, then your inverter supports the API V1.



Packing

1. 5.5" basic unit
2. Built-in battery
3. 220V power adapter with EU plug and USB-C charging p
4. Magnetic Aluminum Stand
5. Ring adapter for the magnetic stand
6. Angled plug for concealed power supply
7. Rubber covers for all connections
8. License card with your license number

Unpacking and initial commissioning

The BOPV.uno is delivered ready for use. If you want to use the magnetic stand, attach the self-adhesive metal ring to the back of the BOPV.uno first. The instructions for this can be found in the packaging of the magnetic stand.

Connect the power adapter to the USB-C port. Use the angle adapter if the protruding cable seems bothersome to you.

The use of a USB mouse and USB keyboard is helpful for start-up, but not absolutely necessary.

The scope of delivery also includes rubber plugs for all connections. Use these optionally to prevent dust from entering.

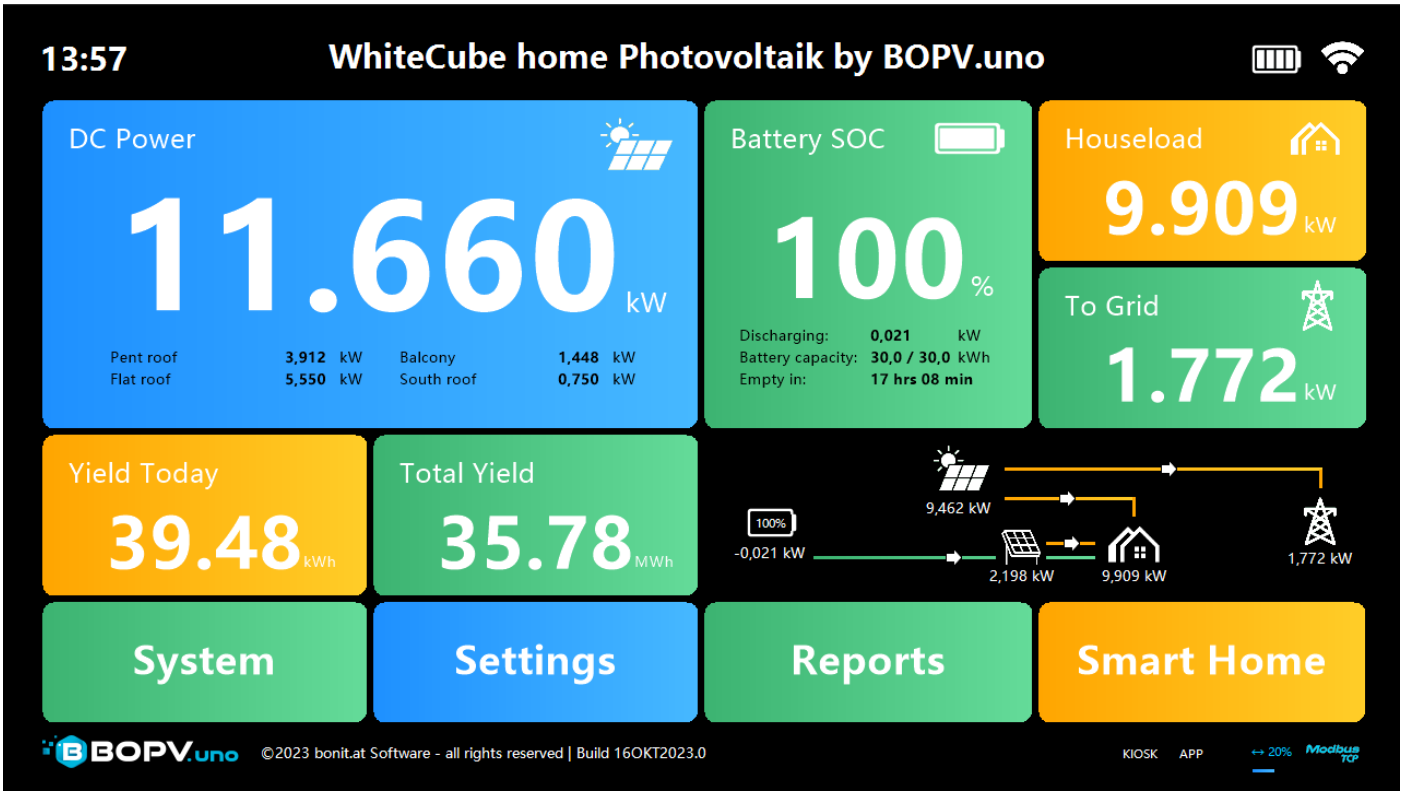
Turn on the BOPV.uno by clicking on the power button on the bottom left side of the screen for about 3 seconds. The BOPV.uno starts the operating system (Windows 11) and automatically the startup application and then the BOPV.uno application.

Licensing: To activate the BOPV.uno, please enter the enclosed license number. In the case of "app only", plug in the supplied USB license dongle while the app is in operation.

Before you can make any further settings, you should connect the BOPV.uno to your home network (to which your inverter is also connected). You can either use a network cable or the built-in Wi-Fi. To connect the BOPV.uno to your Wi-Fi network, click on "System" and "Exit" and then on "Close" in the top right corner of the startup application. You are now on the familiar Windows 11 interface, where you can connect the BOPV.uno to your Wi-Fi. Once this is done, we recommend restarting Windows. This will also restart the startup application, making it easier to launch the BOPV.uno application on the 5.5" screen.

The Main Interface

After launching the BOPV.uno software, the main interface will automatically appear. If no parameters have been set yet, the displays will change randomly with random values to demonstrate the function.



DC Power

This field contains the power from the solar panels. By clicking on the field, you can show or hide the inverter details or switch to power source details. If there is no energy coming from the solar panels, the display switches to "house load".

Battery SOC

Here you can find information about the battery level. With one click, you can display additional details. This field is only available if you also have a battery AND a smart meter installed.

Houseload

Here you can find the current house consumption. This field is only available if you also have a smart meter installed.

To Grid / From Grid

The energy that is fed into the public power grid or drawn from the public power grid.

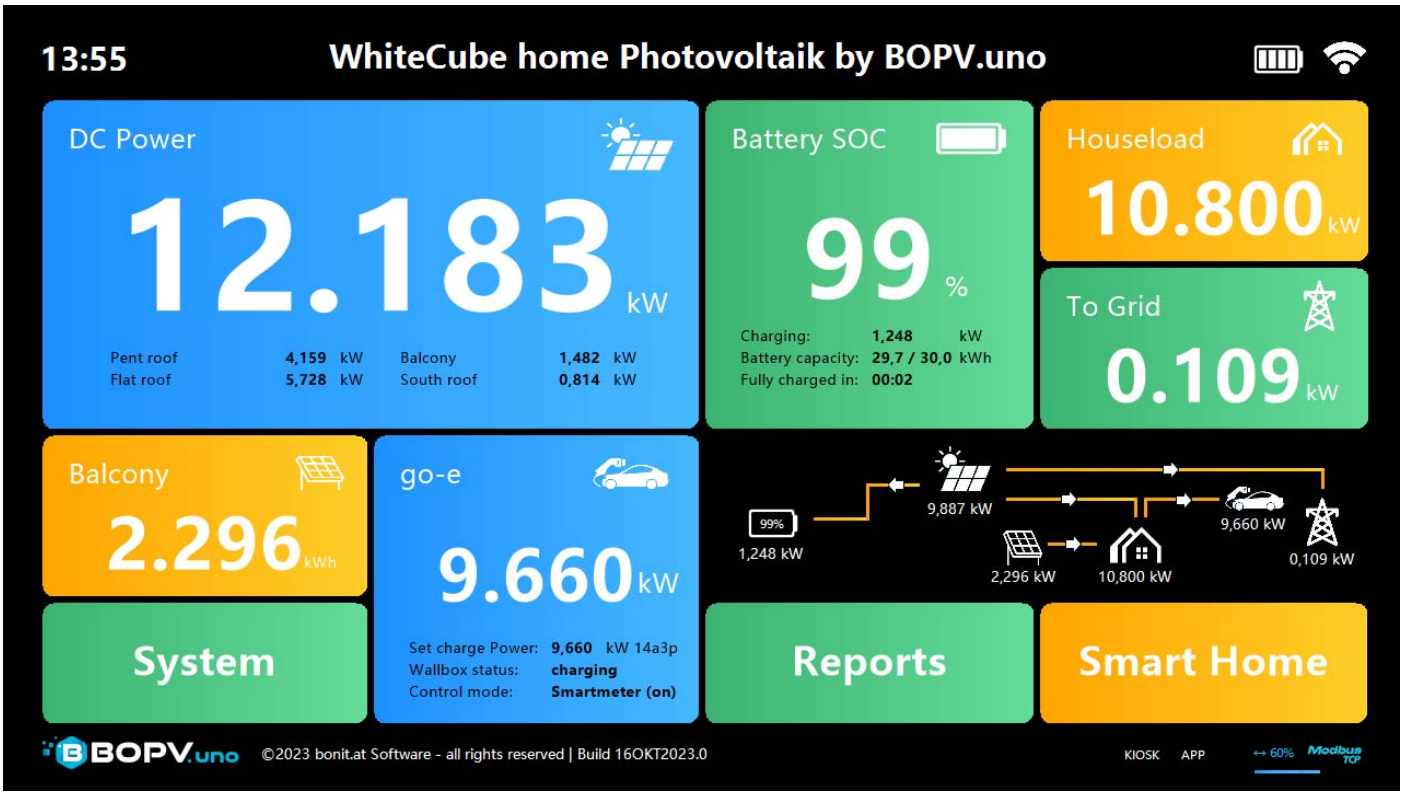
Yield Today / Total Yield / Balcony

These two buttons on the left can display multiple contents. By clicking on the button, you can change the content. Depending on the configuration and inverter type, the daily yield, the total yield, balcony power plant capacity, degree of autonomy, self-consumption or hourly energy price can be displayed here.

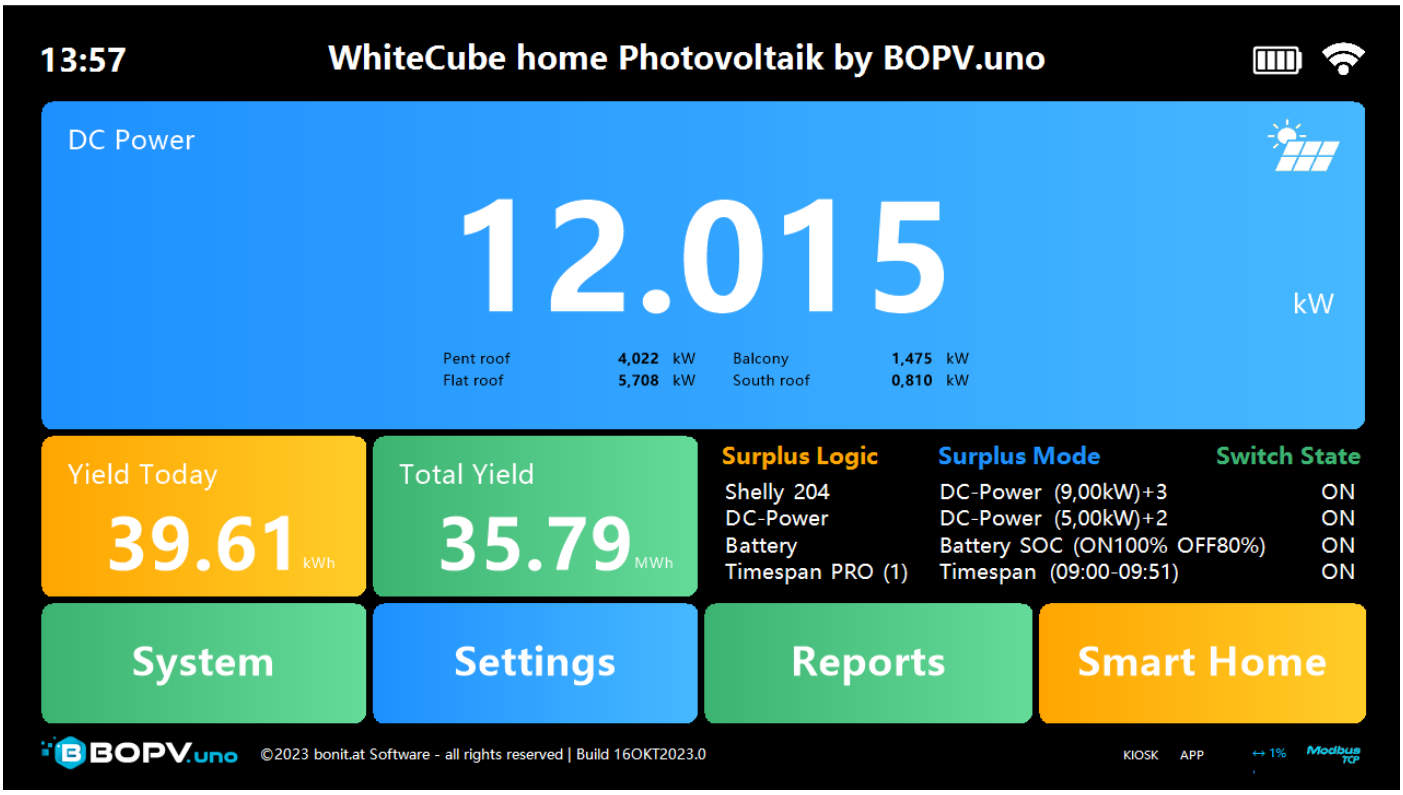
Indicator right center

This display can have three different modes. Graphical Energy Flow Display, Energy Flow Bar Graph or Surplus Control Display. See also the screenshots below:

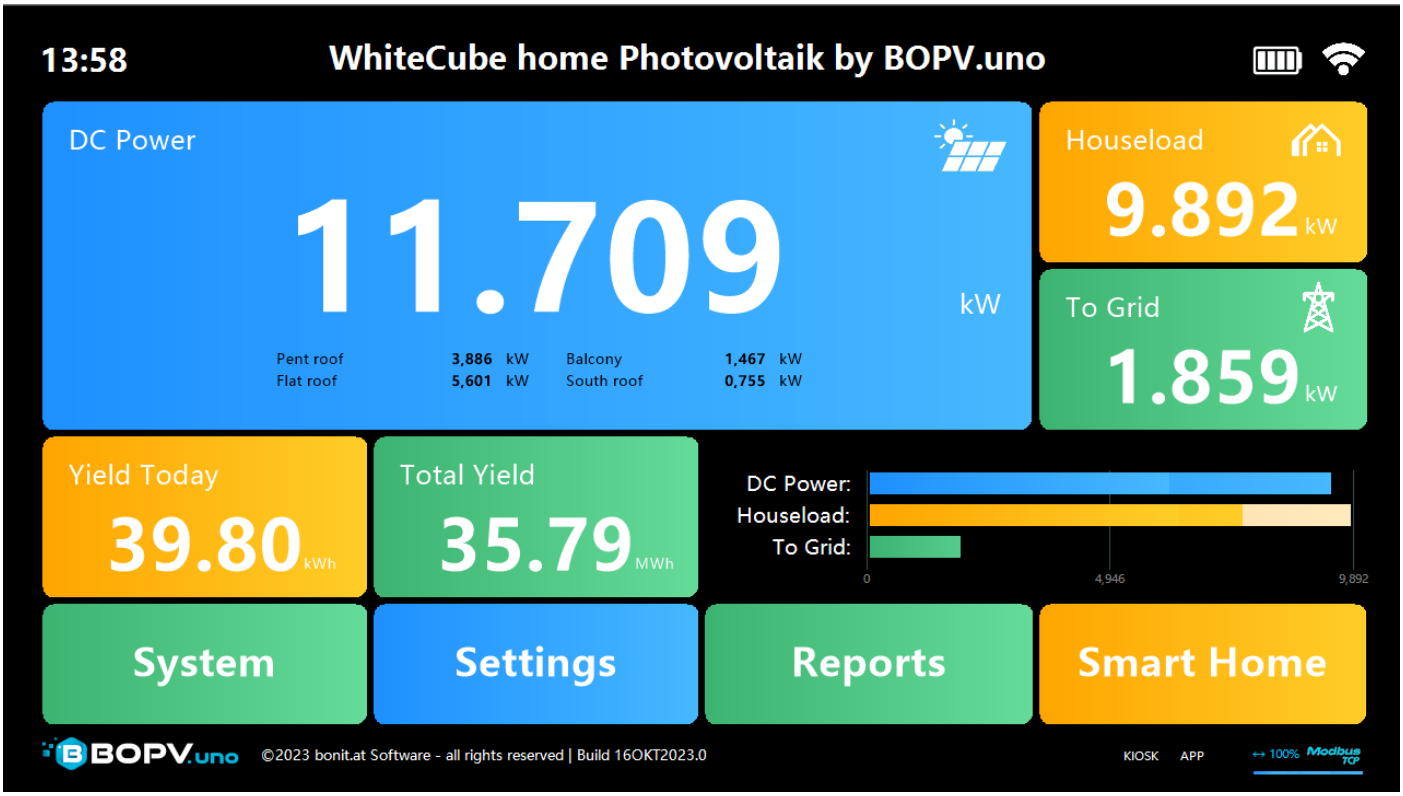
In this screenshot, the GO-E wallbox is configured and active and in addition two balcony power plants are shown in addition to the two (out of 3 possible) inverters:



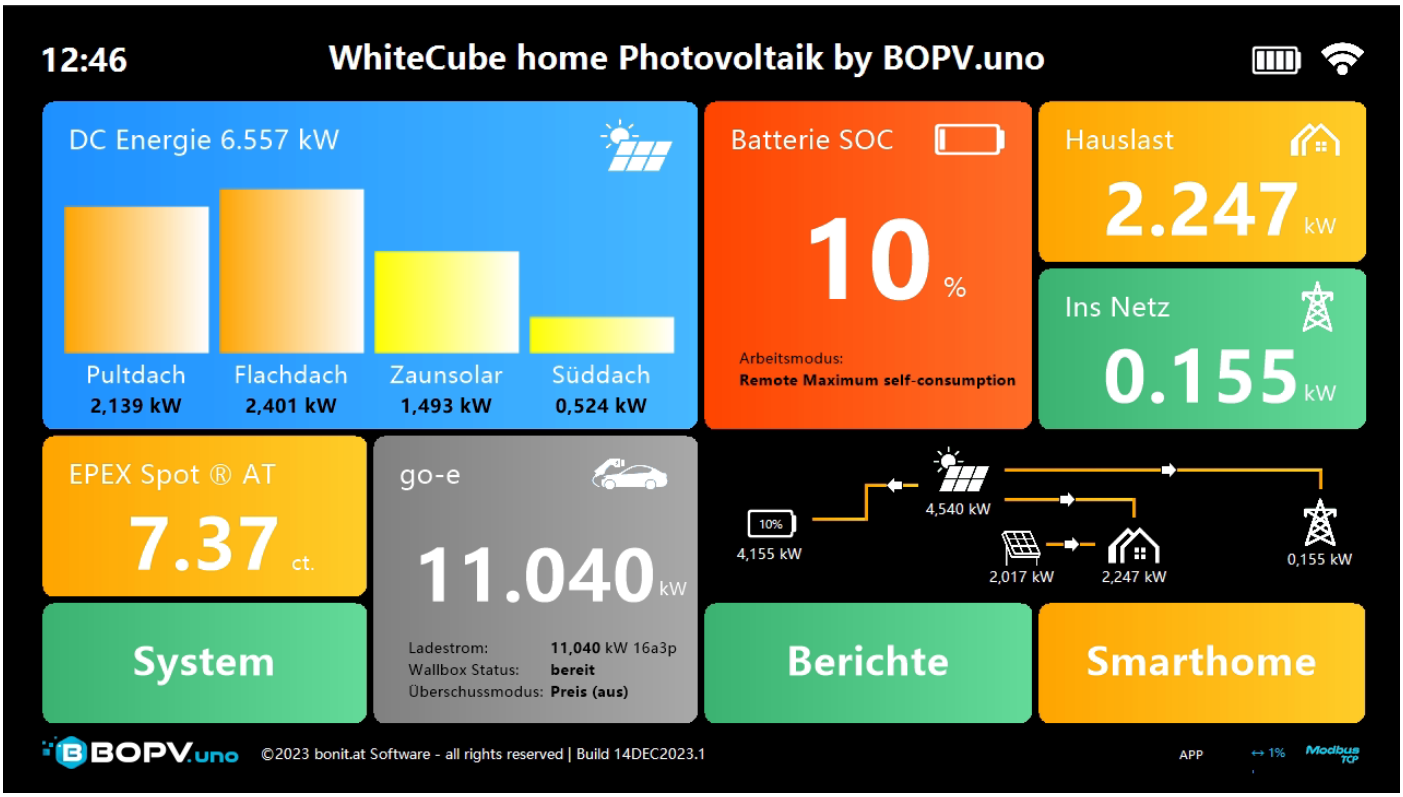
If no smart meter or battery is installed, the DC power display is extended to the entire width of the screen. Here you can also see the surplus management as an example:



If you have a smart meter installed but no battery, the main screen will look like this. Here, the energy flow indicator "Bar Chart" has been activated.



Here, for DC energy, the source view (each energy source individually) is shown. The working mode of the battery is shown (click on the tile 3 times). At the bottom left, the current hourly energy price is displayed.



Configuring Inverter Queries

Click on "Settings" (or "System" > "Settings") to go to the configuration. Here you can change the language in the upper right corner. Click "Save & Restart" to apply.

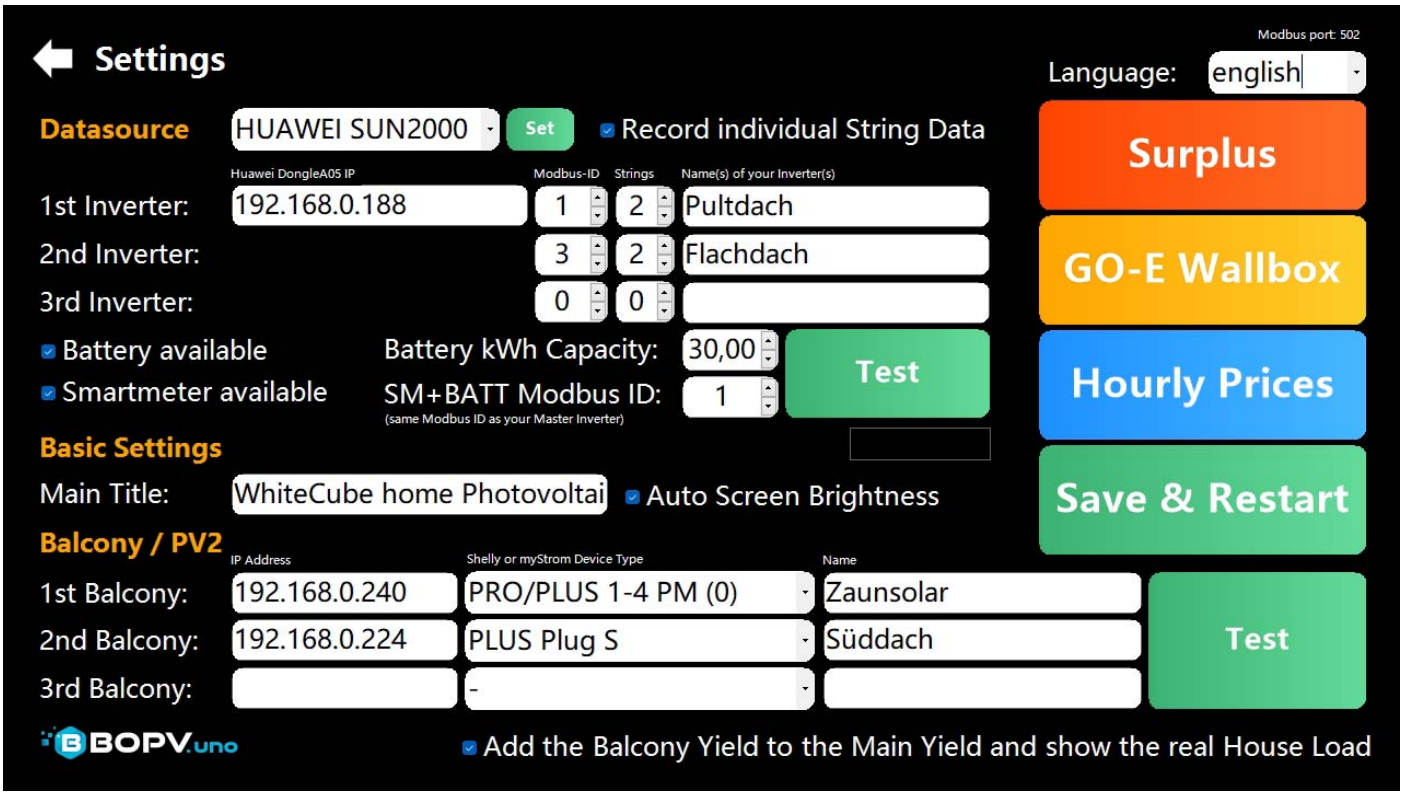
At "Main Title" you can give your BOPV.uno a name. This will appear at the top of the main screen.

"Auto Screen Brightness" reduces the screen brightness in the darker part of the day. Thus, there is no annoyingly strong glow of the screen in the evening.

"Balcony / PV2" will be explained further down in the next chapter.

Select the inverter type under "Datasource" and confirm the selection with "Set". Depending on the type of inverter, you will now need to set various parameters.

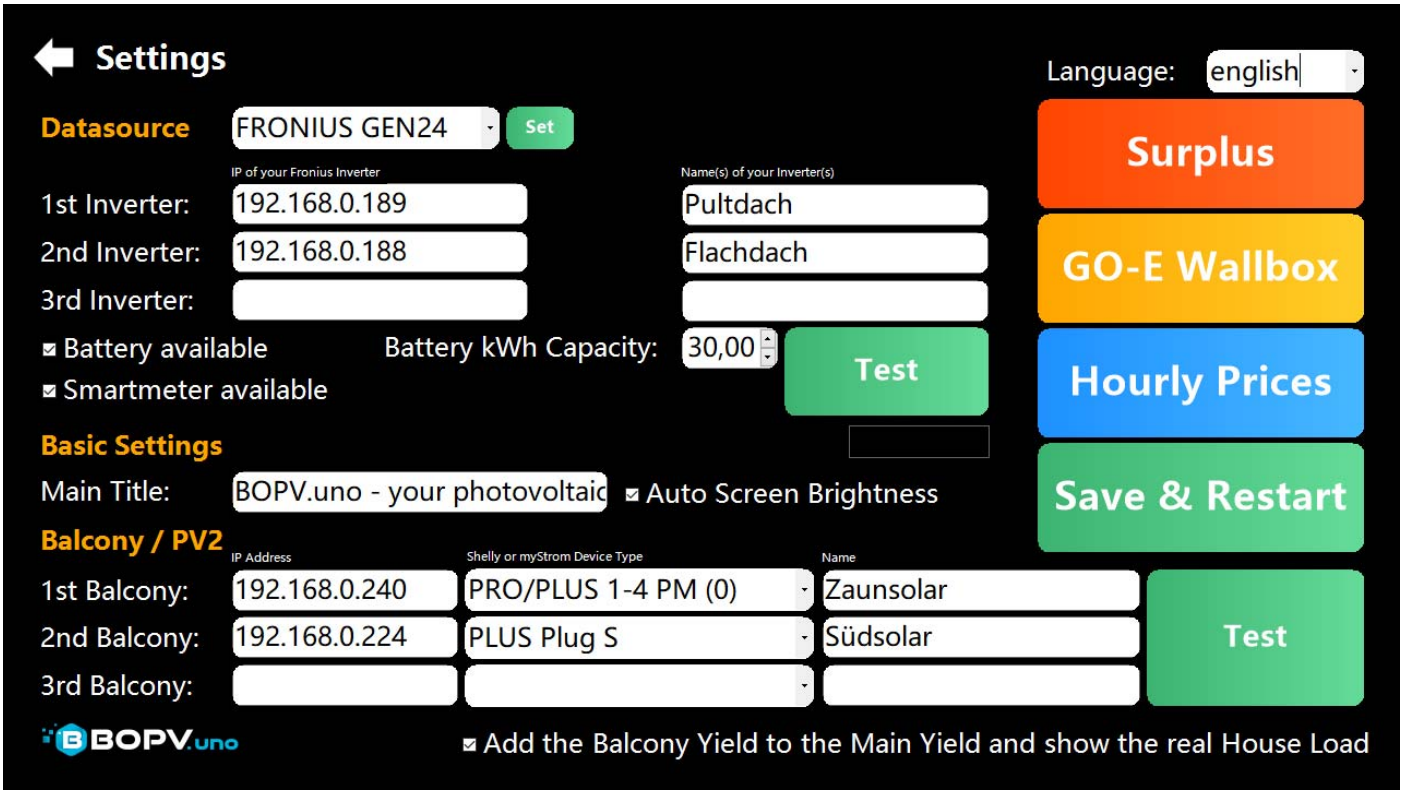
Configuration of Huawei SUN2000, LUNA2000 and smart meters



For "1th Inverter:", enter the IP address of the Huawei dongle. For up to three inverters, you then enter the Modbus ID, the number of strings per inverter and a name for the inverters. If you have installed a battery or smart meter, check the respective boxes. Under "SM+BATT Modbus ID" you enter the Modbus ID of the master inverter. Also specify the size of your battery in kWh. Optionally, you can activate "Record individual String Data" – this activates the query and recording of the individual strings per inverter. This may cause the query to take a few seconds longer.

You can use the "Test" button to test the settings. If everything is correct, then save with "Save & Restart".

Configuration Fronius inverter with battery and smart meter

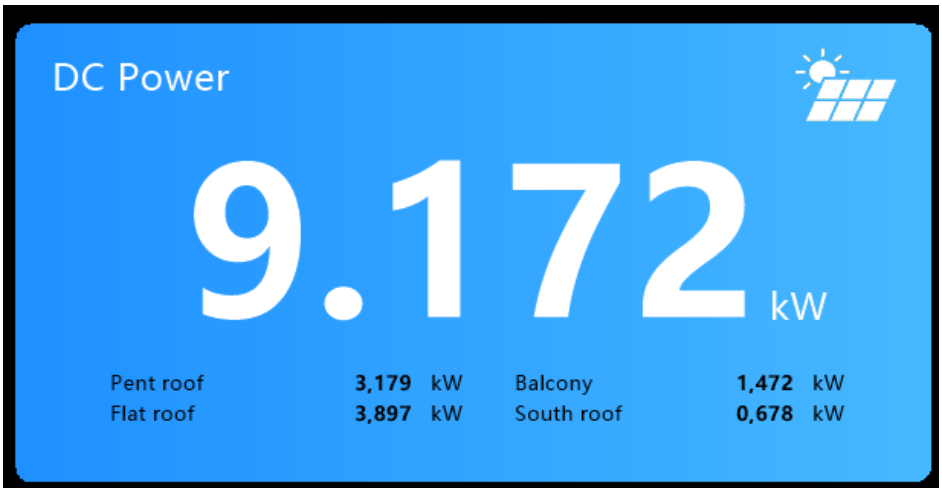


Simply enter the IP address of the inverter and a descriptive name for each inverter you are using. If you have installed a battery or smart meter, check the respective boxes. Also, specify the size of your battery in kWh.

You can use the "Test" button to test the settings. If everything is correct, then save with "Save & Restart".

Balcony power plants, wind power plants or hydroelectric power plants

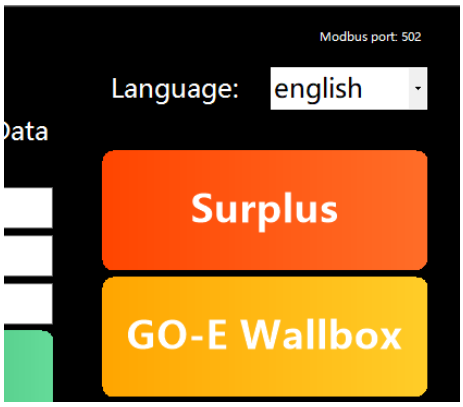
In the settings, you can add up to 3 additional energy sources at the bottom. The energy flows are transmitted via Shelly or myStrom measuring devices. To do this, simply enter the IP address of the Shelly or myStrom meter, the type of meter and a meaningful name for it. Both energy sources are fed into the house grid and thus naturally reduce the house load. With "Add the Balcony Yield to the Main Yield and show the real House Load" you can include these additional energy sources in the main display and thus get a real house load and a real DC power displayed. Here's an example:



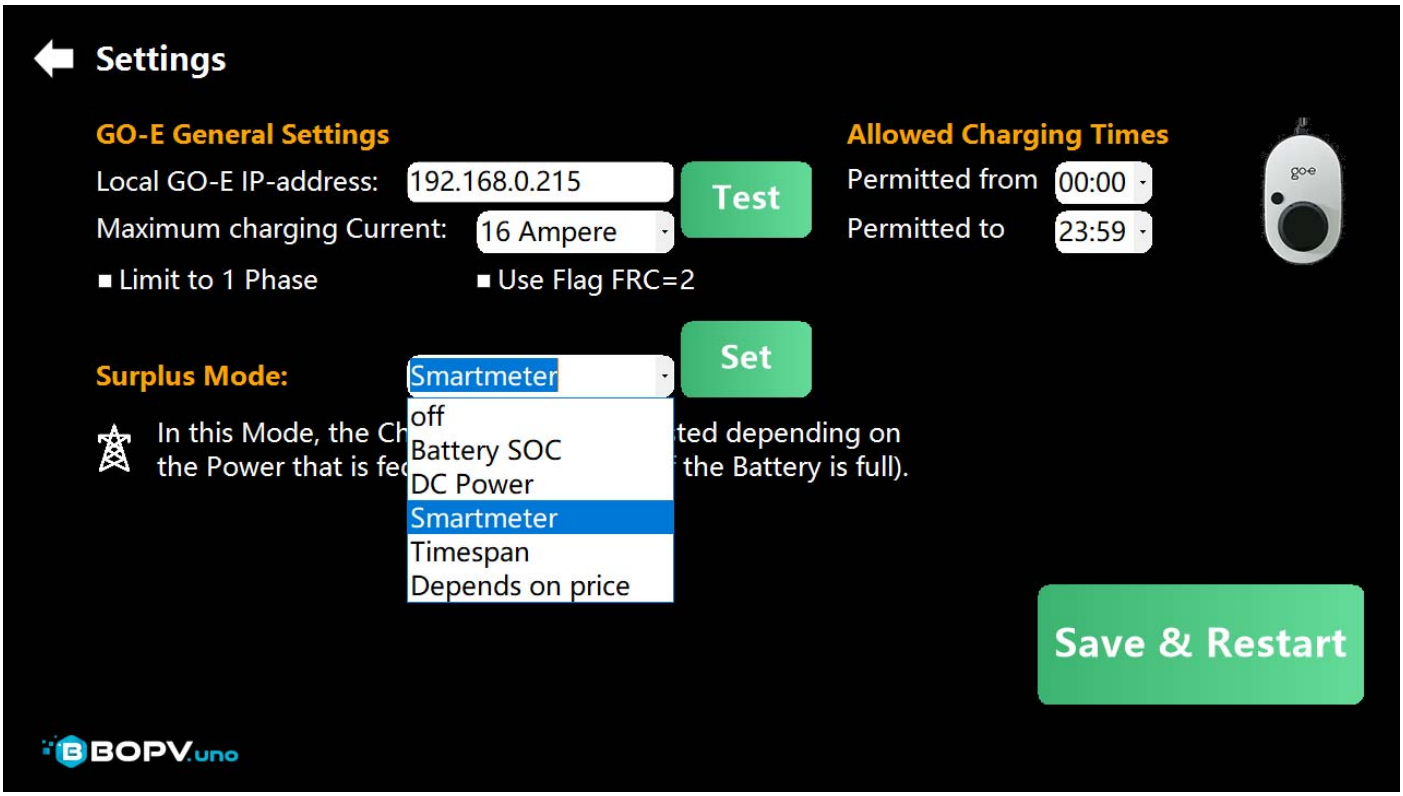
Integrate GO-E wallbox for surplus charging

If you want to use a GO-E wallbox for surplus charging of your electric vehicle, then this is very easy to set up with BOPV.uno. The local API in the GO-E must be enabled and the IP address of the GO-E must be known.

Go to "GO-E Wallbox" in the settings.



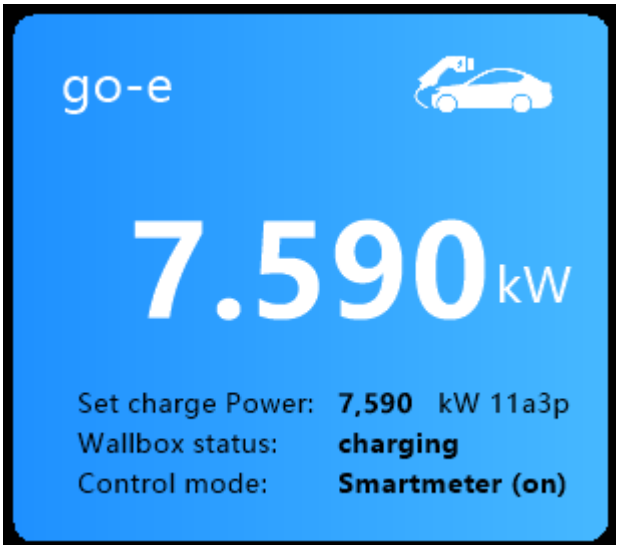
Enter the IP address of your GO-E wallbox and define whether it is an 11 or 22 kW charging station (16 or 32 amps). You can use the "Limit to 1 Phase" option to limit charging to one phase if the GO-E is only connected to a 230 volt line. Please only activate the option "Use Flag FRC=2" for a few vehicle types as instructed by the GO-E app.



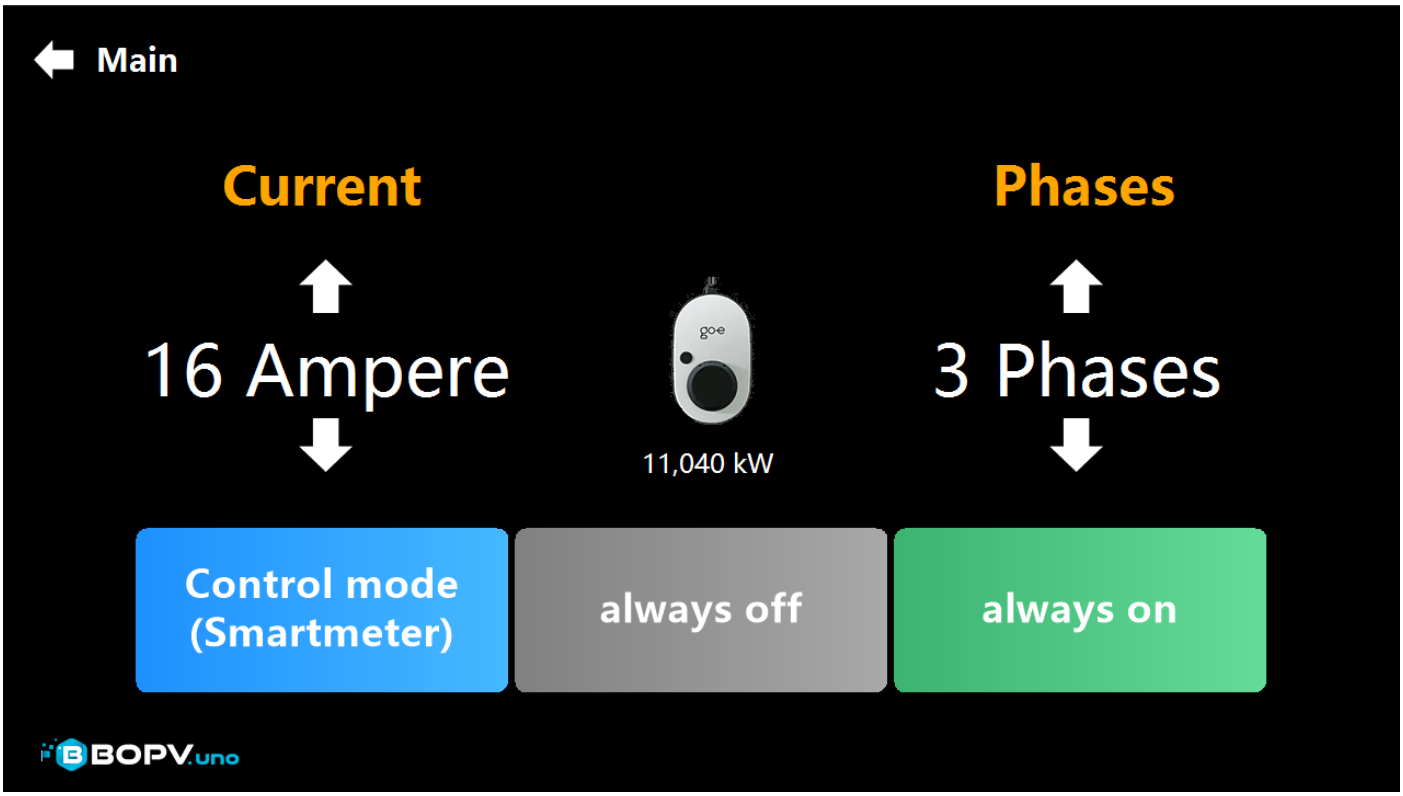
Under "Surplus Mode", specify the calculation method for the surplus loading. You will see the explanations as soon as you have selected a mode and set it with "Set".

You can also set allowed charging times if you want to prevent charging at certain times. With "Save & Restart" the setting is saved and the surplus function is active.

On the main screen, you can see the current state of the GO-E wallbox. Here in the example, "smart meter" is currently used by surplus calculation (blue background) and the vehicle is charged with 11 amps and 3 phases.



If you click on this GO-E tile, a drop-down menu will appear where you can change the charging current for certain surplus modes. However, you can also stop the charging process in general (always off) or start it in general (always on).



Surplus control of other devices

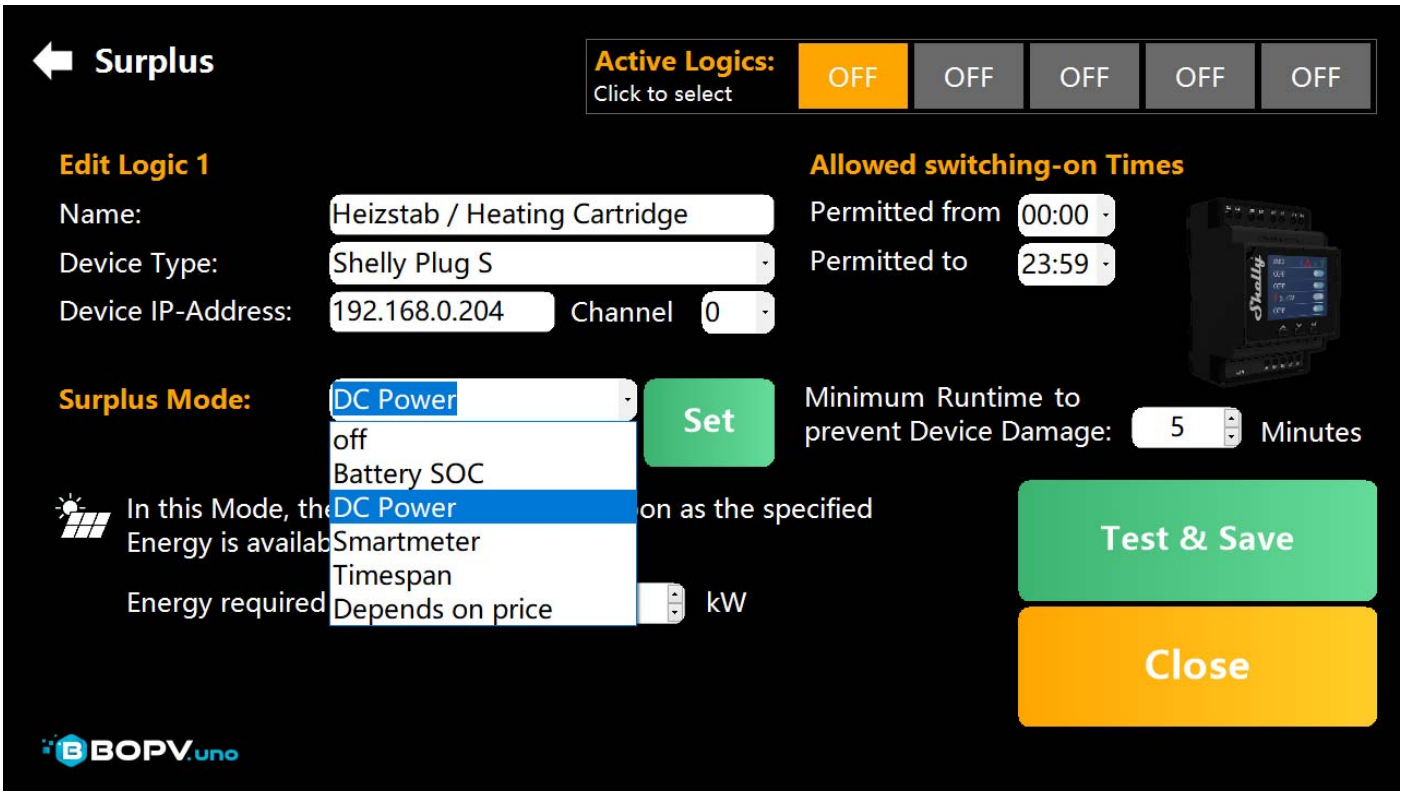
For example, would you like to switch on a heating element if more than 5 kW of energy comes from the roof? Nothing could be easier. Here's an example:

To create the first logic, simply click on the first area at "Active Logics" in the upper right corner. Assign a descriptive name, select the device to be switched on (e.g. Shelly Plug S) and the IP address of the device to be switched. In "Channel" you can choose between channels 0, 1, 2 and 3 if it is a Shelly device with multiple circuits.

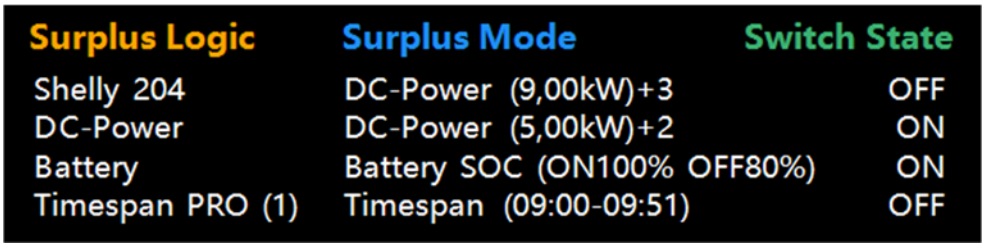
Select the excess mode and click on "Set" to activate it and get the explanation (and other options for it).

Set 'allowed switching times' if you want to prevent switching at certain times. The option "Minimum Runtime to prevent Device Damage" causes a "delay time". So that a device is not switched on and off too many times in a row in different productive weather.

With "Test & Save" the settings are saved and the surplus function is programmed. The 5 areas in the upper right corner also indicate whether a logic is currently active.



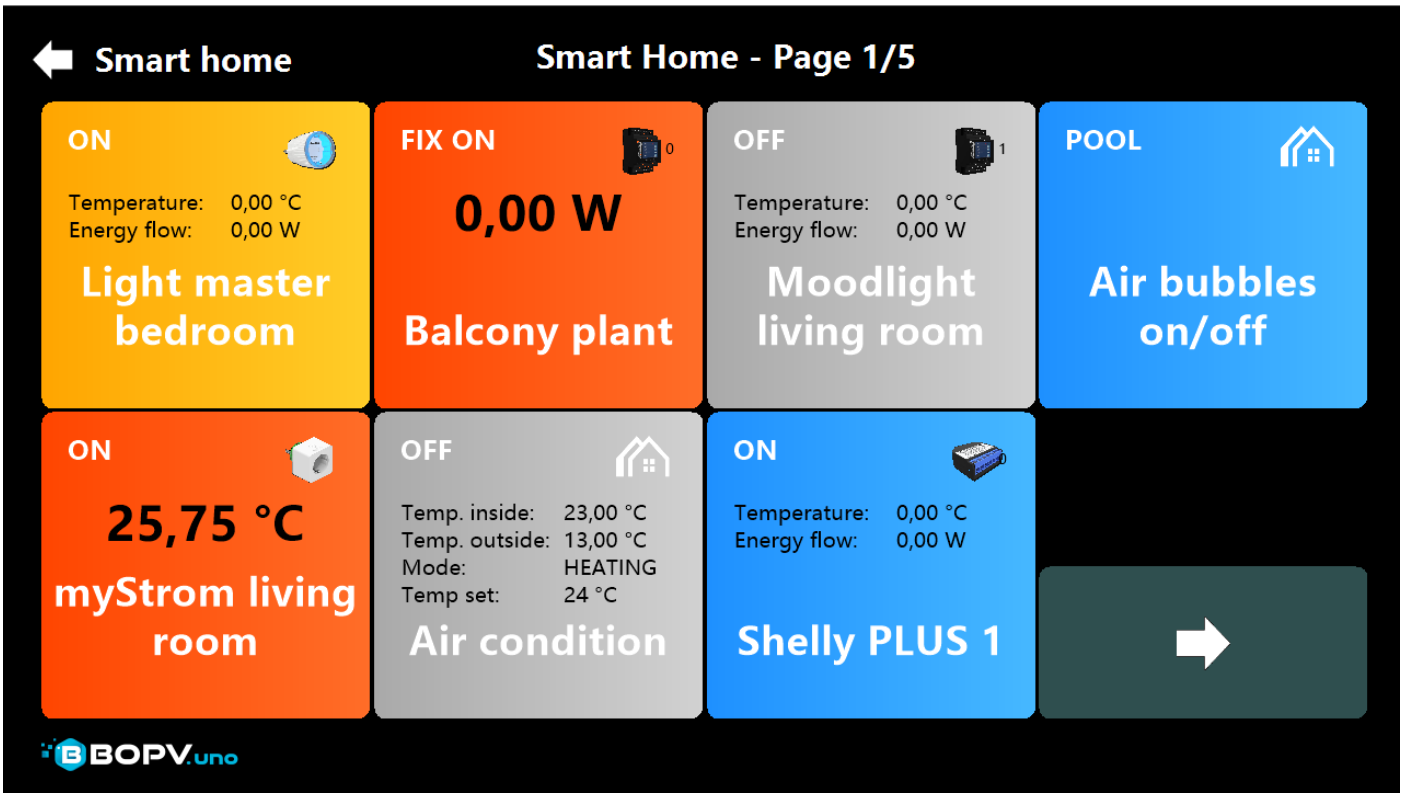
In the main screen, you can see up to 4 excess logics if you have switched the widget accordingly with one click on it.



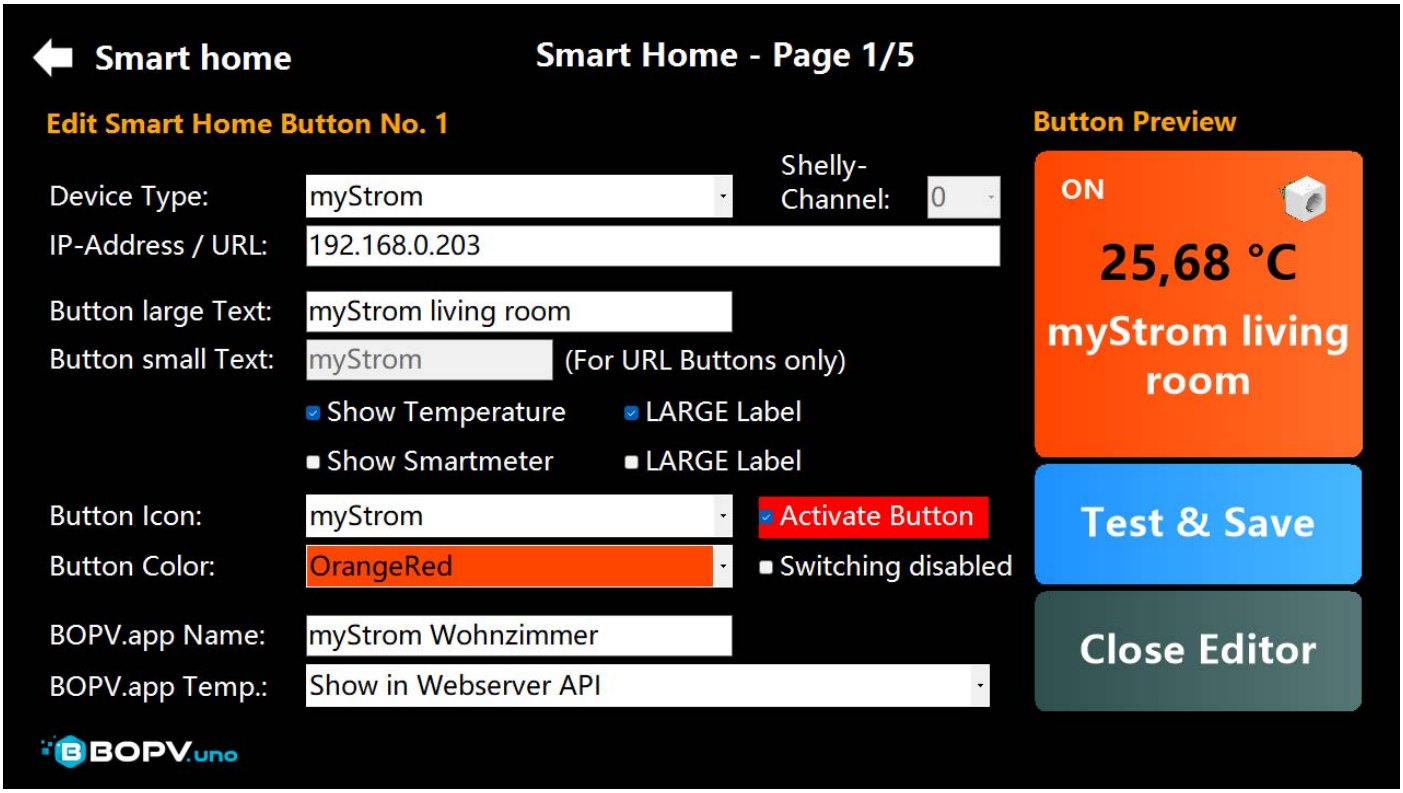
Smarthome Features

You can use the "Smarthome" to switch or read out up to 35 devices in the house. These would be, for example:

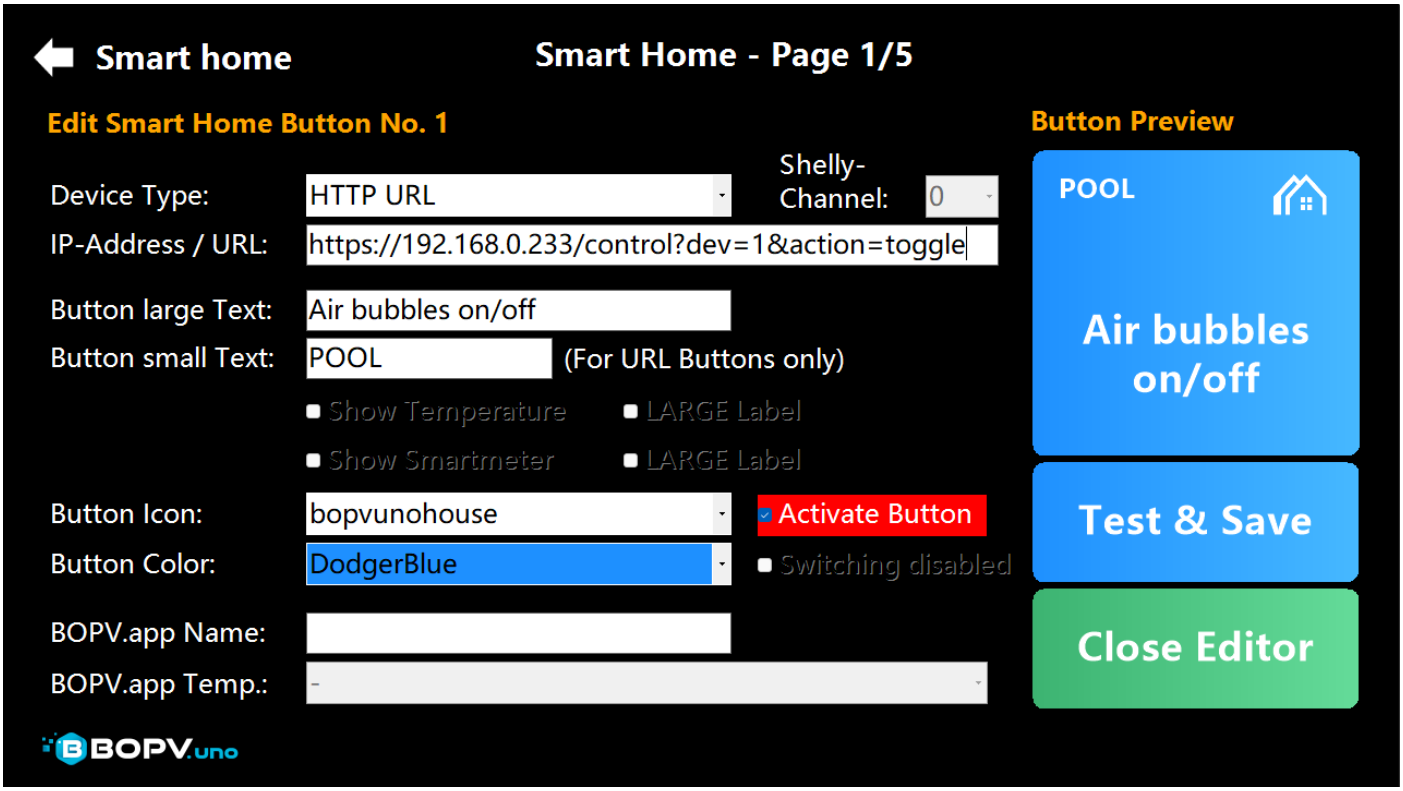
* All Shelly devices (switching, measuring energy flow, temperature)
* myStrom Switch (switching, measuring energy flow, temperature)
* Daikin air conditioning (switching, displaying settings, querying 2 temperatures)
* Home automation devices with a local http interface.



To configure a tile, simply right-click (hold down the touch):



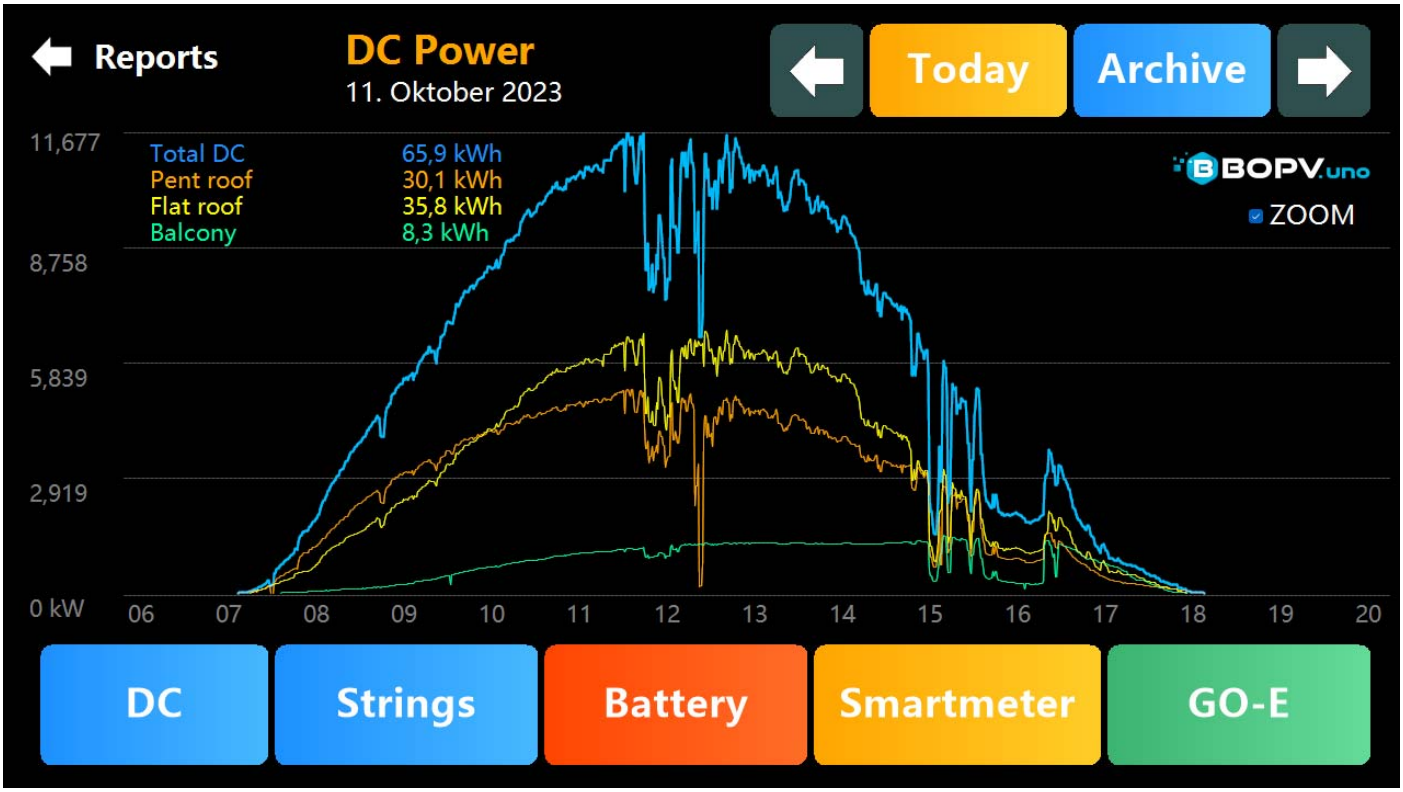
Above: Example of Shelly device / Bottom: Example of pool control via HTTP interface

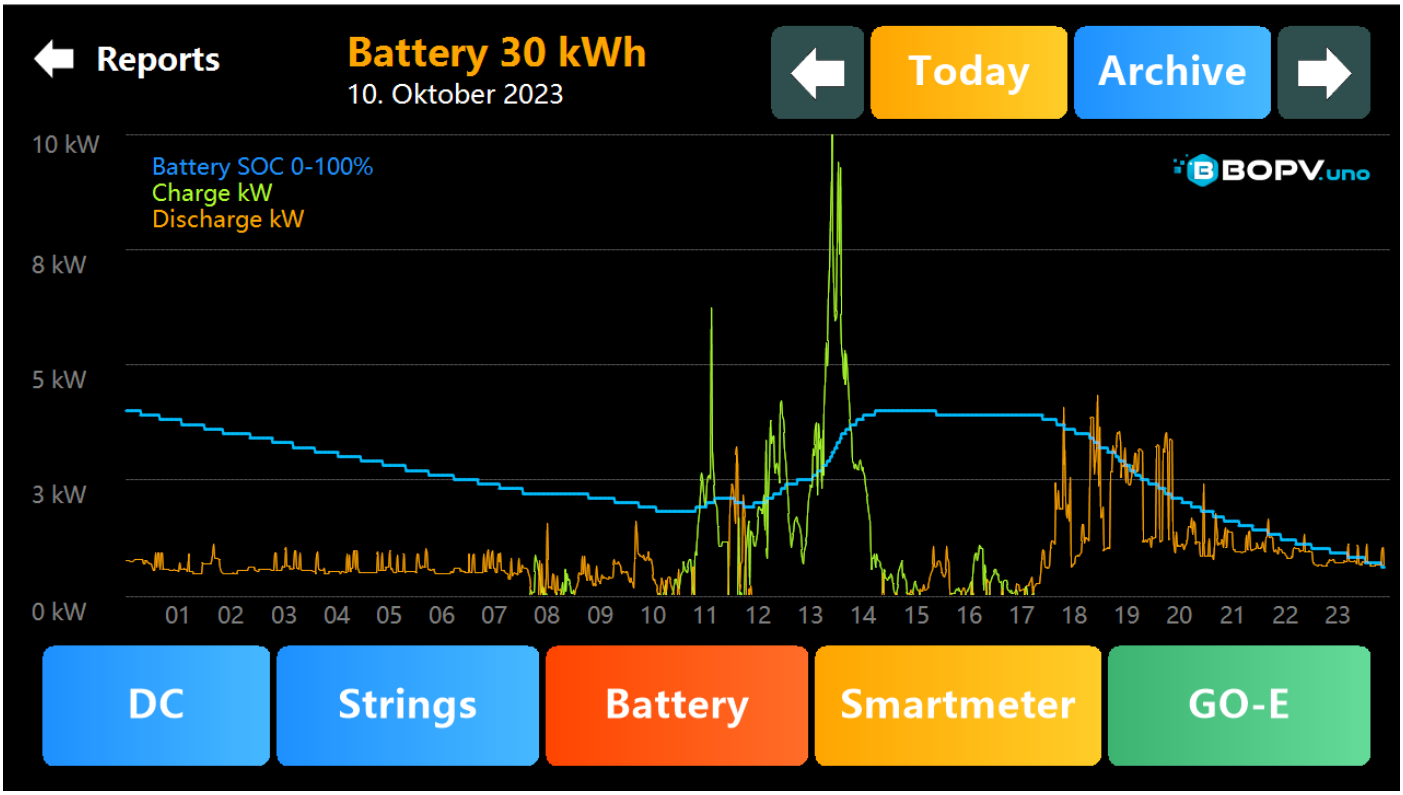


"BOPV.app Name" and "BOPV.app Temp" are used for the BOPV.App (described below). The name is a descriptive name for the temperature measurement of the device. At "BOPV.app Temp" you activate the transfer to the BOPV.app.

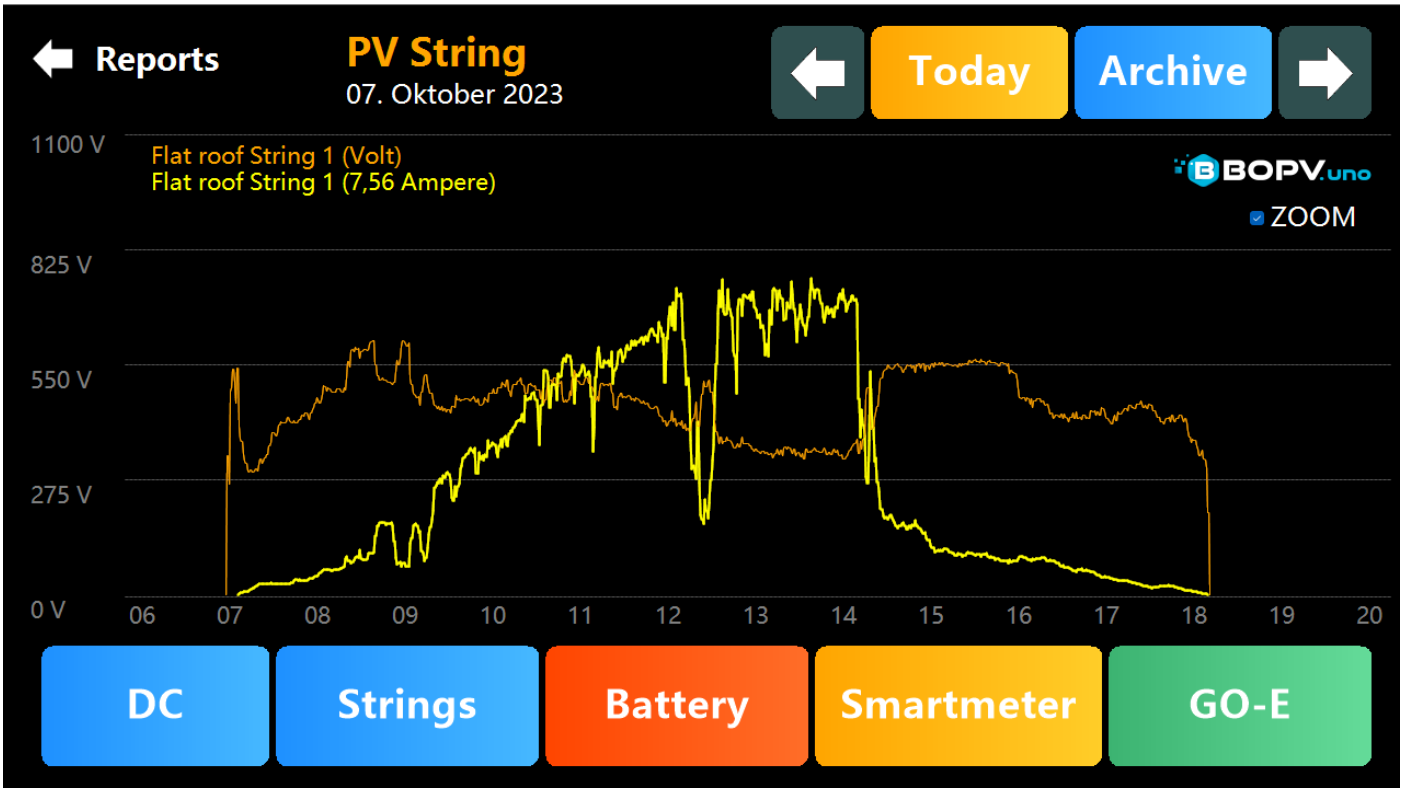
Reports

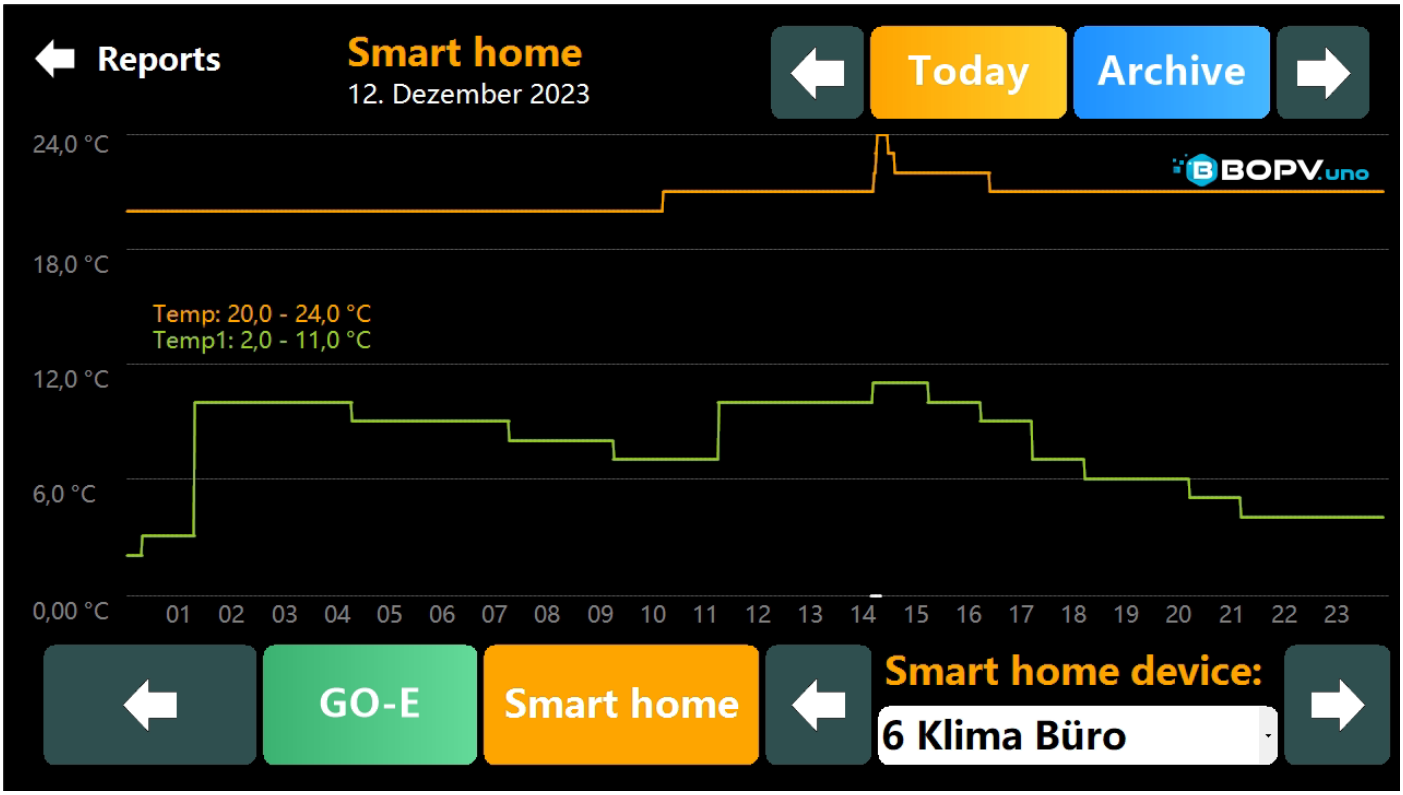
This point is actually self-explanatory. The "Strings" feature is only available on Huawei inverters. At Fronius, you will find the button for "Autonomy / Self Consumption" there.





If the SMOOTHLOGS=1 option is enabled in the uno_config.txt, "recording gaps" are automatically smoothed out up to 10% of the day. Such recording gaps could be caused by reboots or updates.

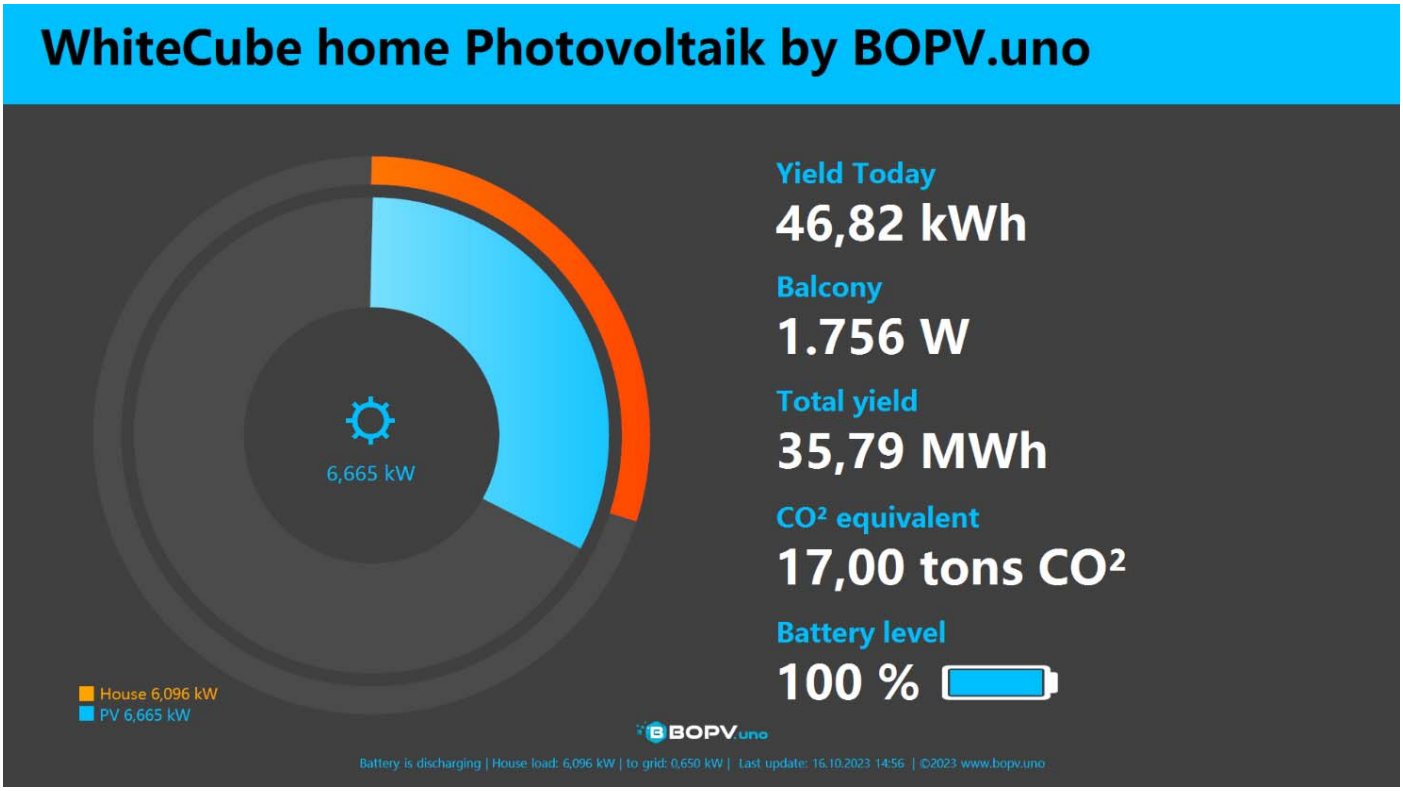

Reports
PV String
07. Oktober 2023
Today
Archive
1100 V
825 V
550 V
275 V
0 V
Flat roof String 1 (Volt)
Flat roof String 1 (7,56 Ampere)
BOPV.uno
ZOOM
06 07 08 09 10 11 12 13 14 15 16 17 18 19 20
DC
Strings
Battery
Smartmeter
GO-E


Reports
Smart home
12. Dezember 2023
Today
Archive
24,0 °C
18,0 °C
12,0 °C
6,0 °C
0,00 °C
BOPV.uno
Temp: 20,0 - 24,0 °C
Temp1: 2,0 - 11,0 °C
01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23
GO-E
Smart home
Smart home device:
6 Klima Büro

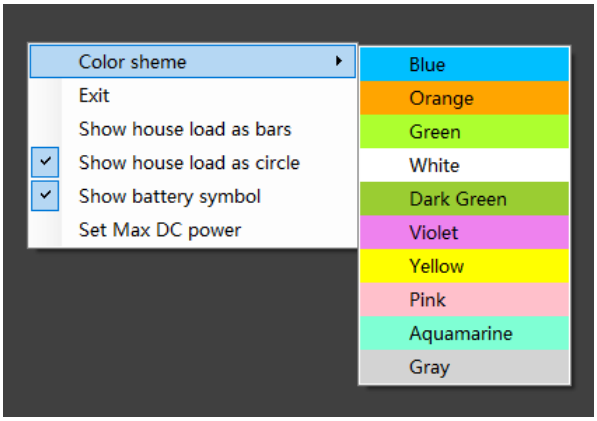
KIOSK mode via HDMI / Duplicate screen via HDMI

As soon as an external display with a resolution of 1920x1080 (or higher) is plugged in, the KIOSK display is displayed there. Alternatively, you can simply duplicate the display of the BOPV.uno. To do this, simply switch from "Extended Desktop" to "Duplicate Display" in the Windows display settings.

The KIOSK display is interesting for reception rooms, hotel lobbies or other presentations.



The colour scheme and appearance of the KIOSK display can be changed individually via the context menu (right-click or touch and hold for a long time).



Making smart use of hourly energy prices

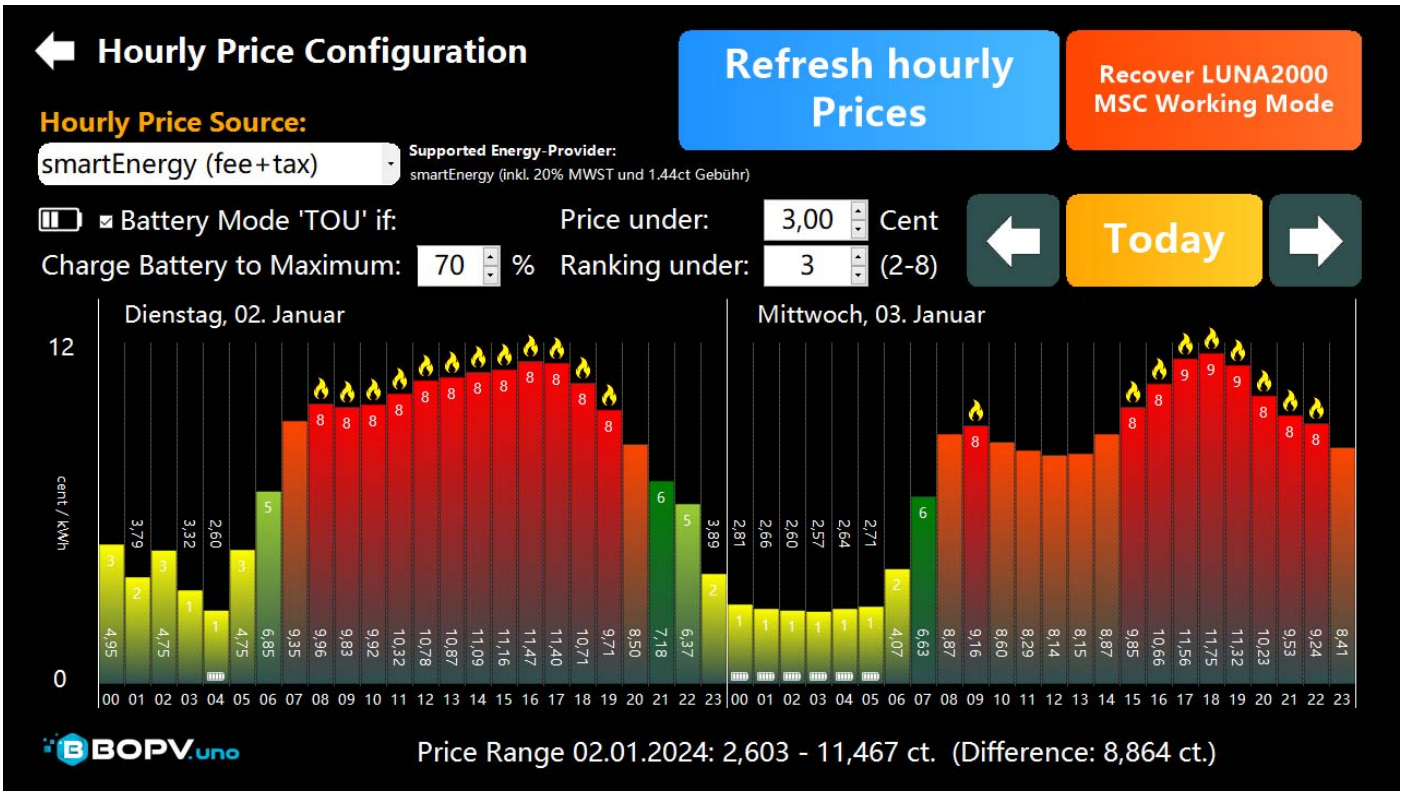
If you have an energy provider with hourly electricity prices, you can query and evaluate them with BOPV.uno and react accordingly. For example, you can start the charging process of the go-e wallbox when the electricity price is cheapest. In the same way, you can charge electricity from the grid to the house battery* when the electricity price is cheap and consume it from the battery (instead of from the mains) in expensive hours.

All electricity prices based on the exchange price "EPEX Spot" are supported. These are e.g. aWATTar, smartEnergy, Spotty and many more. In addition, "Tibber" is also supported.

Under "Settings" > "Hourly Prices" you will get to the pricing function. For EPEX Spot based prices, simply select EPEX Spot ® AT or EPEX Spot DE, depending on the ® country. Prices are loaded automatically. Please note that the next day's prices are usually only available in the afternoon.

If you're using Tibber, you'll need to add your Tibber token in the uno_config.txt first. To do this, create the following entry and enter your token after TIBBERTOKEN=.

```
//** If you use Tibber for hourly prices, enter your personal tibber token here and remove the //
TIBBERTOKEN=8254284582941025728734512372348192373051 89
```

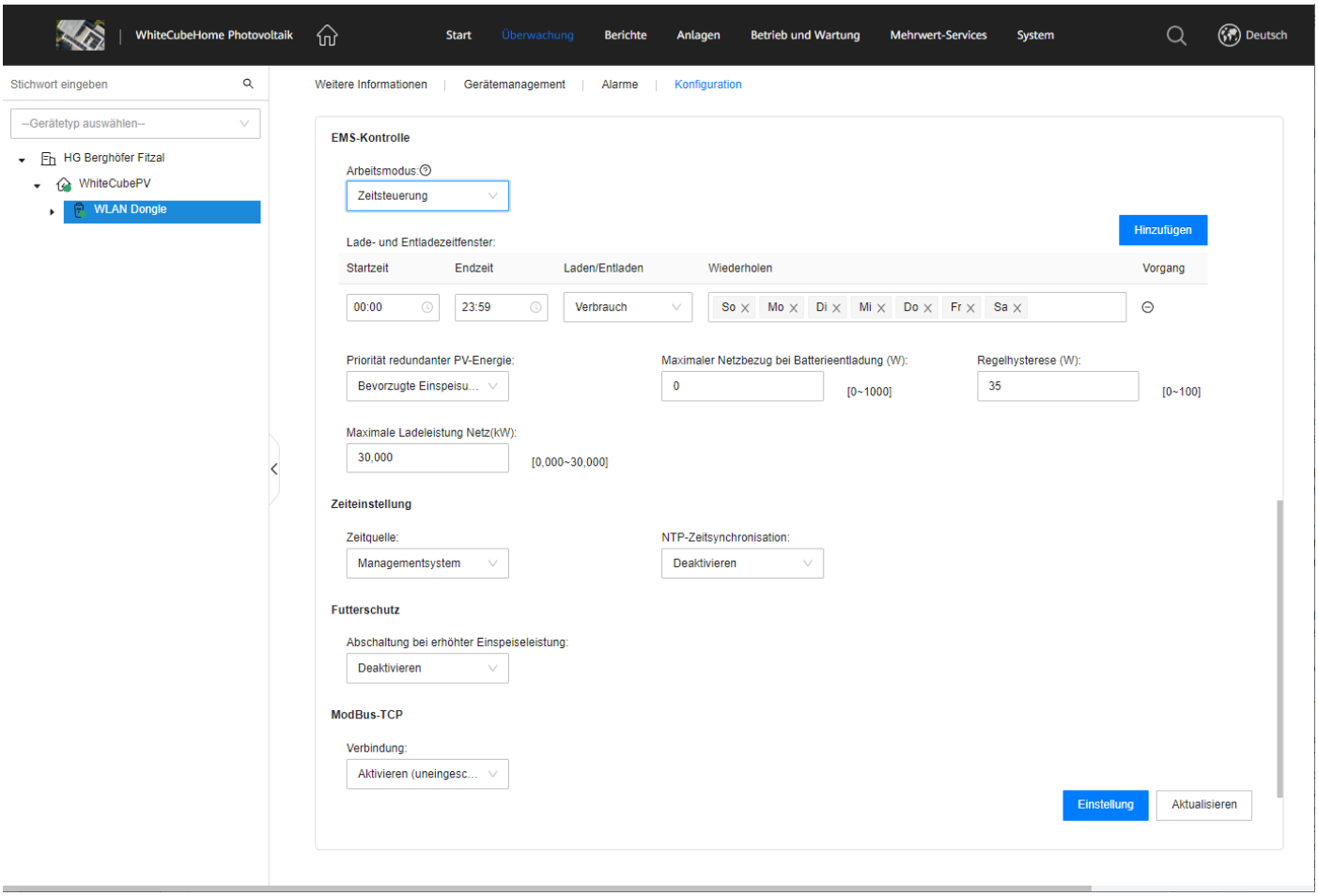


* If you have a Huawei LUNA2000 battery, you can configure BOPV.uno to charge the battery from the mains at certain hours with low energy prices. Then you can use the charged energy from the battery during the following expensive hours. This is especially interesting for many users in winter. To do this, the intelligent ranking system is used. The price of energy is divided into two categories. In RED (above the daily average) and GREEN (below the daily average). Extremely expensive hours are categorized as 8 and the most expensive as 9. The low prices are divided into categories from 1-7. Where 1 is the cheapest price and 7 is the least cheap.

Now, for example, you can set the battery to charge at an hourly price below category 3 (i.e. 1-4). In the screenshot above, the setting is chosen exactly as it is. The battery is charged on January 2nd at 04:00 via the **battery mode TOU** until it reaches 70% SOC. After that, it switches back to the standard mode **Remote Maximum Self Consumption** .

You can proceed in the same way with the go-e wallbox or with the surplus control – in both menus there is a selection for the hourly prices.

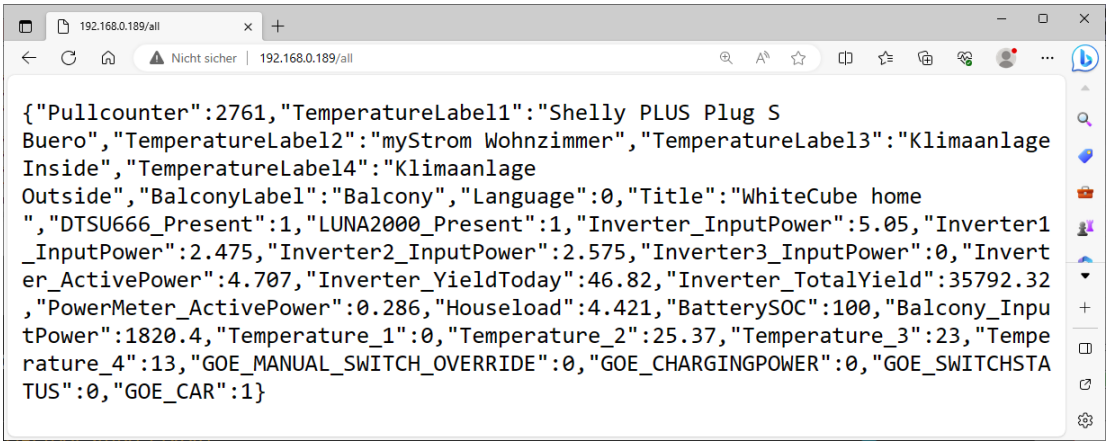
In order for charging from the mains to the battery to work, the TOU mode must first be configured in the FusionSolar. To do this, you have to log in to the FusionSolar and call up the Wi-Fi dongle on the left side of the overview and then the menu item "Configuration" at the top. Scroll down to "Work Mode". This is usually "Maximum Self-Consumption". Toggle it to "Time Control" and configure the whole thing as shown in the screenshot. "Consumption" is a mistranslation from Chinese and means "battery is charging". You can define periods of time in which this may happen. To save this setting, click on "Setting" in the bottom right. Wait 2 minutes and then go back to this menu item and reset the EMS control back to "Maximum self-consumption". So you have configured TOU (time control), but for the time being you have set normal controls.



If you look at the price history in the screenshot above, you would use the electricity price intelligently if you charge your car at night from 23:00 to 05:00. At the same time, you can also charge the battery. The next day, the battery is enough to cover the daily requirement. If you have additional PV yield and the battery is also charged a little during the day, then you should not fully charge the battery when charging at night. A bit of tact is required here. You also have to adjust these settings depending on the season. For example, in summer, if there is enough PV yield and daily surpluses, you are unlikely to charge anything from the grid into the battery.

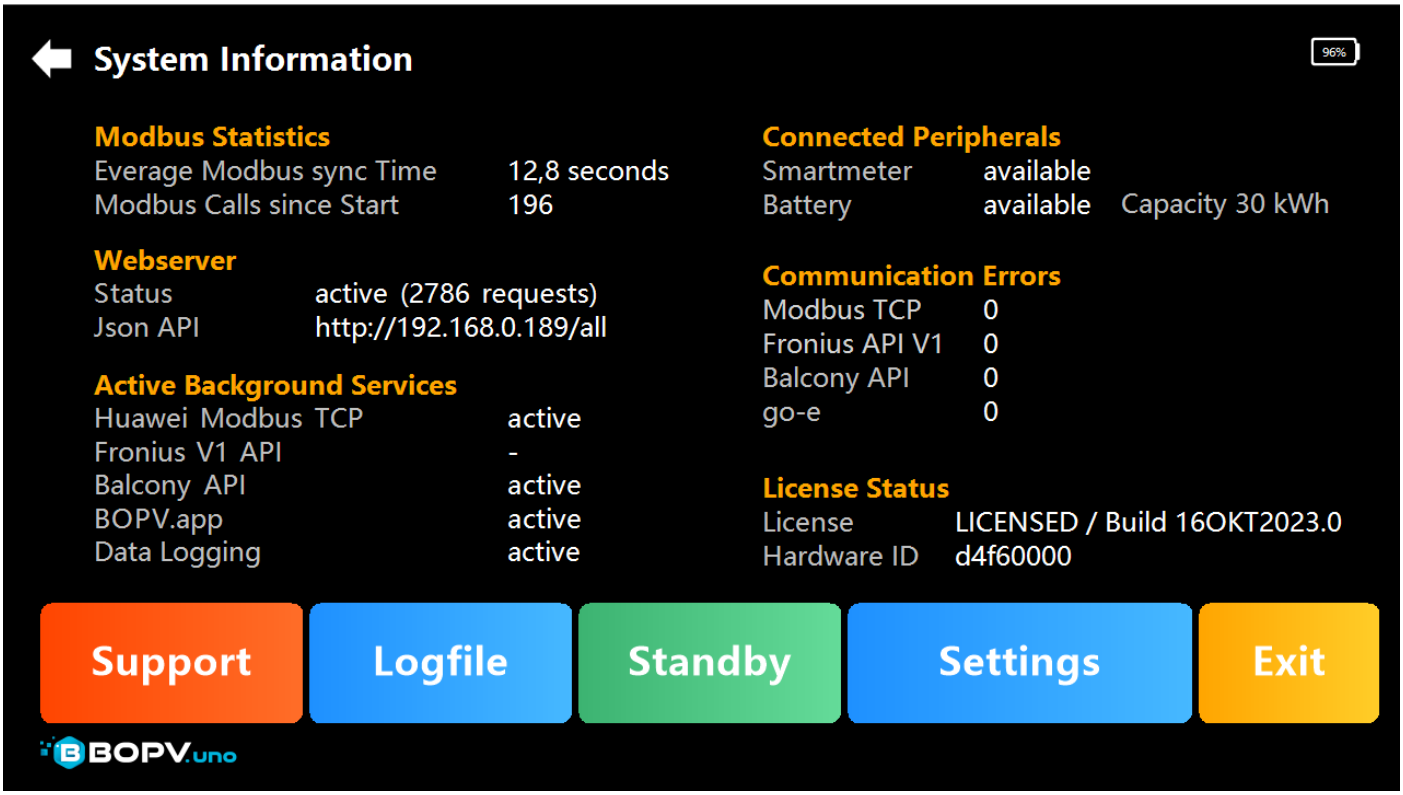
Web server for downstream systems

All data collected by BOPV.uno can be queried via the internal web server. Note that the firewall must be configured accordingly. This web server is also used, for example, to connect other BOPV.uno, BOPV.mini or BOPV.Info in the network.



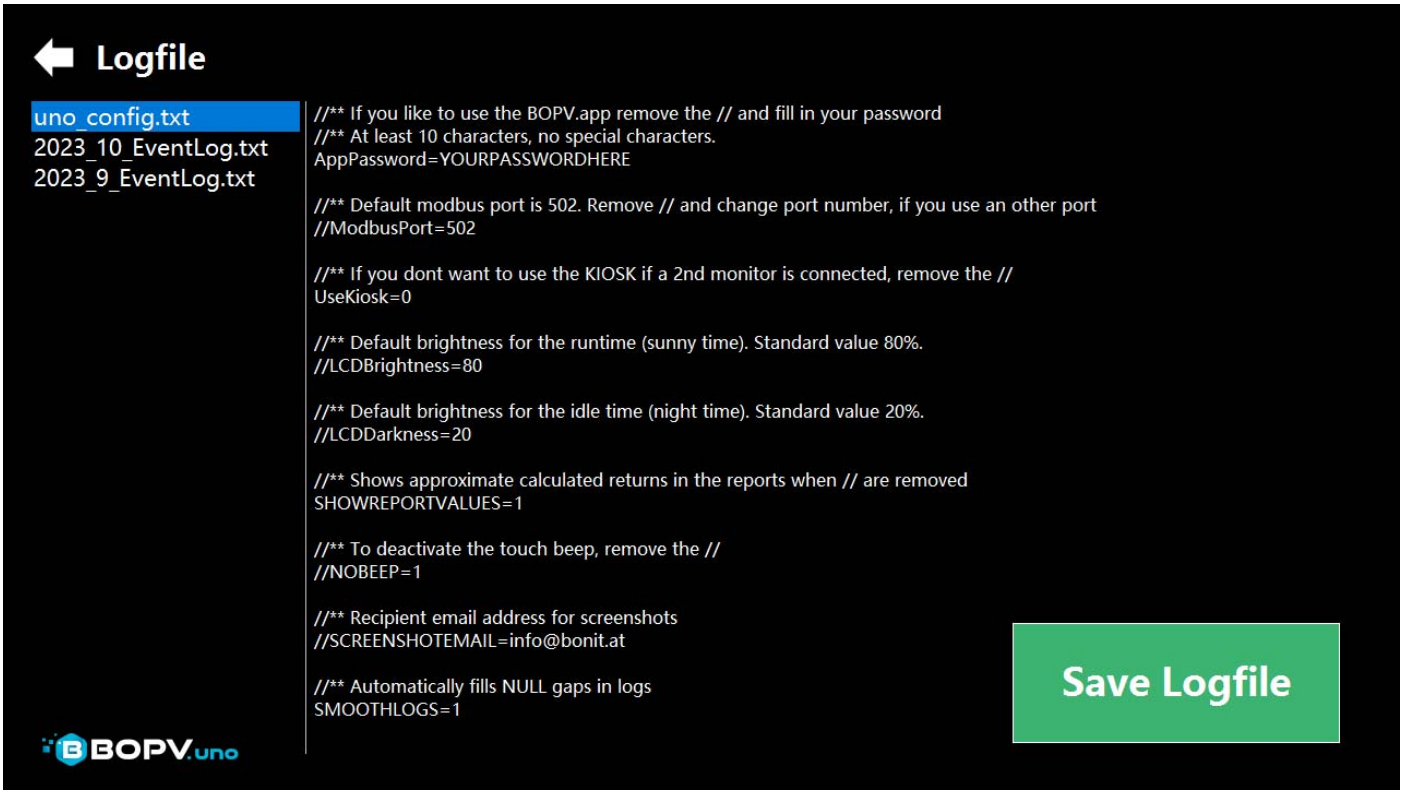
System

Here you will find an overview of the entire system, possible error messages and the license status.



Logfile / uno_config.txt - Special Functions

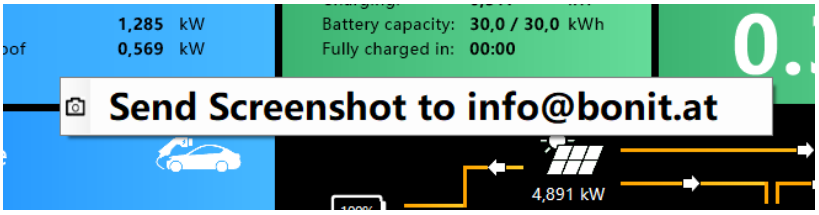
A look at the log file can help to track down any problem that may arise. The uno_config.txt can also be viewed and edited here.

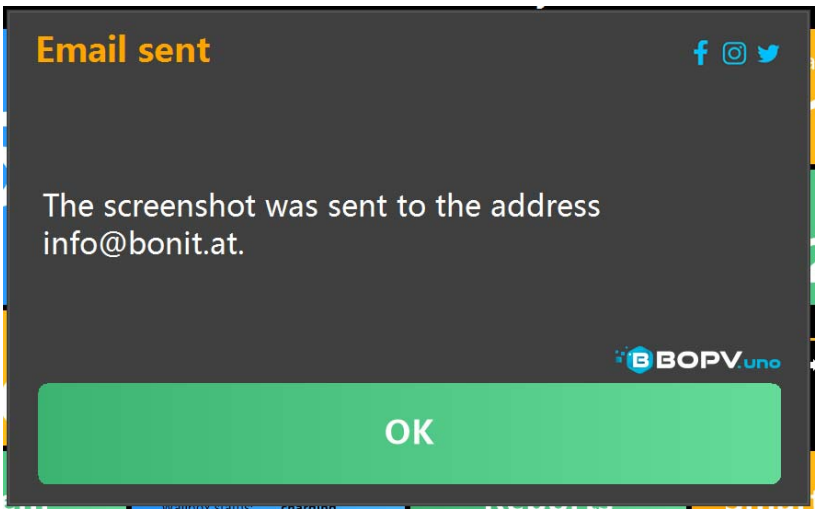


Other features

Sending screenshots by email

As soon as you have entered your email address in the uno_config.txt (// before the parameter remove), you can send a screenshot of each screen mask to yourself by right-clicking (holding down the touch for a long time). No installed email client is required.





Automatic brightness control

As soon as there is no more power coming from the solar panels, the brightness of the BOPV.uno switches down. If electricity comes back from the solar panels, the brightness increases again. In the uno_config.txt, you can also adjust the brightness factors in percent individually.

Sleep Function

Under the "System" button you will find the "Sleep" button. Click once and the screen will go dark. However, the BOPV.uno continues to work in the background. Another click on the screen wakes it up again.

Battery

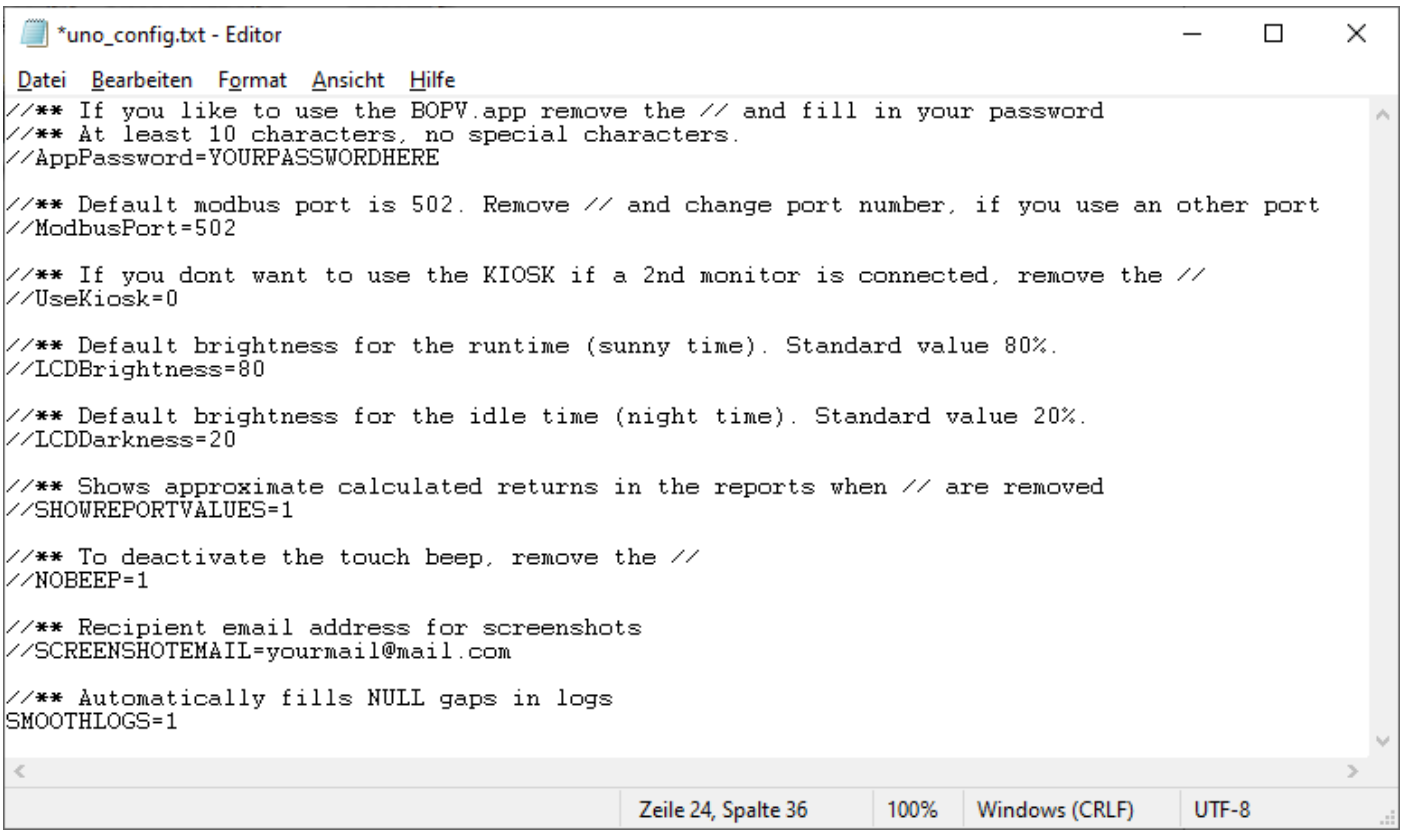
The battery life of the device is about 7 – 8 hours. So you can also carry it around the house or in the garden at any time. Optionally, there is also a spare power supply in the shop to operate the device in several locations.

uno_config.txt

This configuration file can be found at c:/bopvuno/uno_config.txt. It contains settings for special functions or special cases. They can also be referred to as "hidden functions". The explanation of the parameters can be found directly in the file.

If there is "//" in front of the respective parameter, then the parameter is inactive.

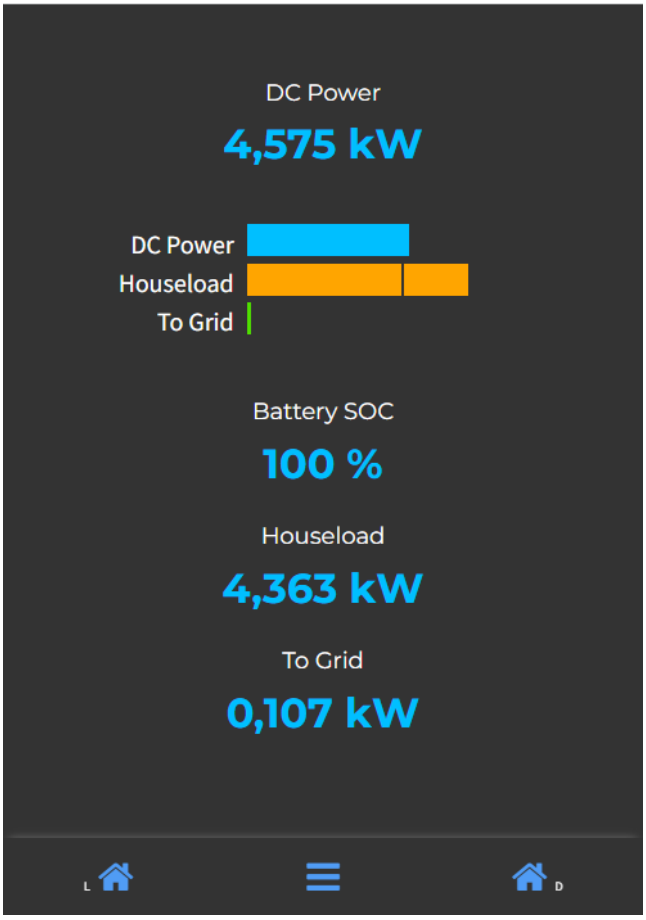
If the uno_config.txt is deleted, it will be regenerated the next time you restart.

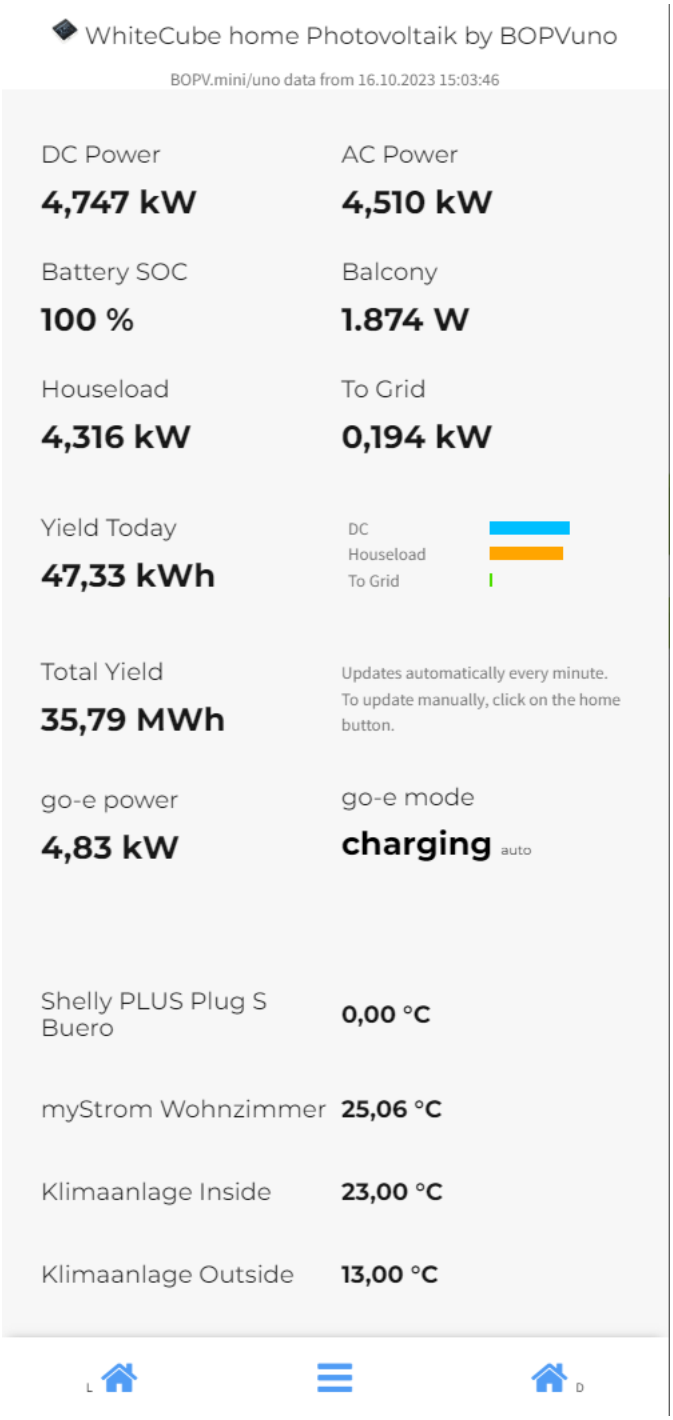


BOPV.app (web application for iOS, Android, Polestar...)

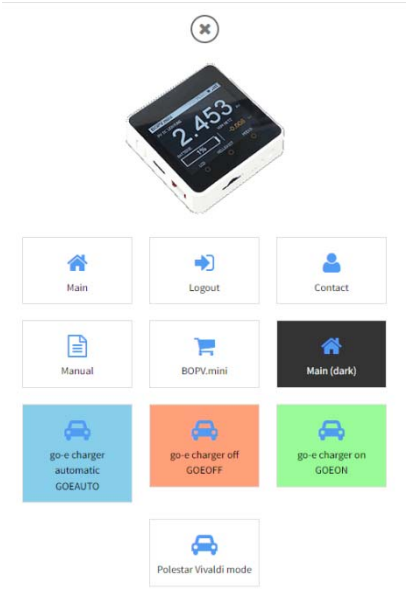
When the

function is activated, the BOPV.uno sends its collected real-time data to the server on www.bonit.at every 40 seconds (server location IONOS Germany). The web app reads the data and displays it clearly. The address for the web app is: https://www.bopv.app . Simply log in to the web app with the password stored in uno_config.txt and the automatically generated login.

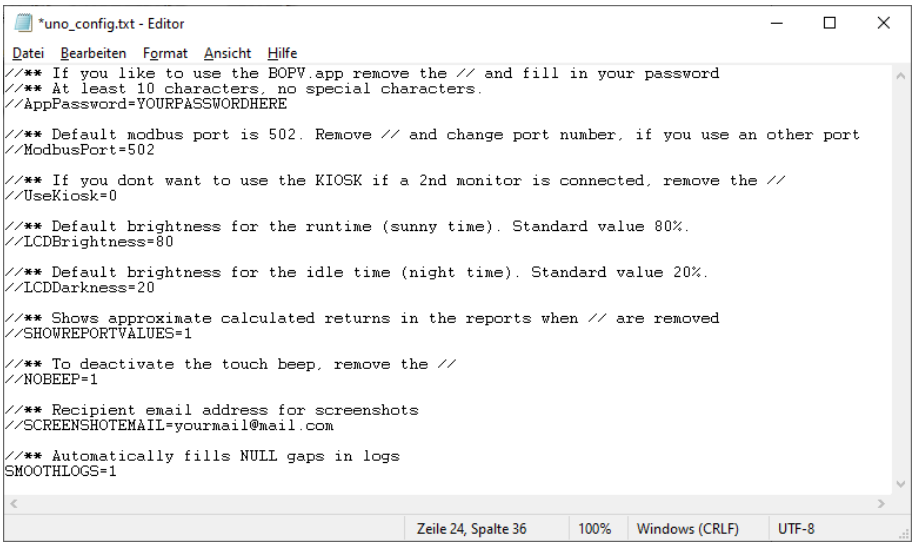




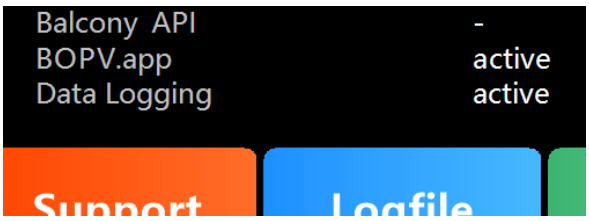
Configuring the BOPV.app



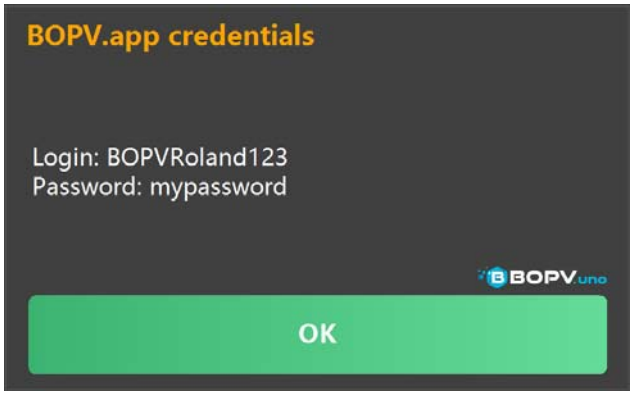
Define a password of at least 10 characters (without special characters or spaces) and enter this after "AppPassword=" in the uno_config.txt. Remove the // in front of the parameter to enable it.



The complete login data for the BOPV.app can be easily accessed by clicking on the text "BOPV.app" in the system information. You can use these login details to log in to https://www.bopv.app.



The web app runs on all smartphones, tablets and computers. It doesn't matter if it's Android, iOS, Apple, Linux or Windows.



Note to the manual

The manual is deliberately kept short and sweet so as not to bore users. BOPV.uno is self-explanatory in many respects, so there is no need for long explanations in the manual. If you have any questions, just log in to the Facebook group and exchange ideas with other users. Of course, I also answer myself. The links to the Facebook groups (Huawei and Fronius) can be found at www.bopv.uno (at the bottom).

Field of application of the BOPV.uno hardware

The BOPV.uno is only suitable for indoor use. Do not expose the BOPV.uno to extreme heat, humidity or frost. Operating temperature 5-40 degrees, non-condensing. Avoid direct sunlight on the display. Damage caused by UV radiation is not covered by the guarantee or warranty.

Troubleshooting Modbus TCP (Huawei)

Modbus TCP is designed for exclusive access. If another system (home automation or BOPV.Info app) accesses the Modbus TCP of the SDongleA-05 at the same time, then the BOPV.uno can no longer communicate properly.

Warranty, Guarantee and Repair

If the BOPV.uno does not work to your satisfaction, please contact us directly. We will find a solution together. Please do not return the device to us without prior consultation.

Do not change the power settings

Under no circumstances should you change the power settings of the device. Do not set the maximum performance state of the processor above 65%. This could cause the device to overheat and the built-in battery to explode, or it could lead to other dangerous situations. This is not covered by the guarantee or the warranty.

Changing other Windows settings, installing software, reinstalling Windows

We recommend NOT changing the Windows settings. Any support call that is due to a change in the system must be charged at our current prices (€ 68.40 / half hour).

If you uninstall the BOPV.uno application, you can download and reinstall it at any time.

A Windows reinstallation is usually not necessary. If this is necessary, send us the device and we will install an up-to-date image with all settings (cost: half hourly rate). Please do not tinker with this yourself, as the settings for the proper operation of the BOPV.uno application are very complex.

Installation support via remote maintenance within 1 month of purchase (only set with BOPV.uno hardware)

Up to one month after the purchase you can take advantage of our professional remote maintenance service. If you need help with installation and configuration, please call the hotline number 0043 2622 33144 (Mon-Thu 9:30-16:00). A remote maintenance call / hotline call is free of charge. Further support services would have to be charged (use our Facebook groups here). The right of revocation expires as soon as you have made use of the installation support via remote maintenance or have entered the license key into the device.

bonit.at Software OG
Roland Berghöfer, Hans Grünseis-Gasse 3, 2700 Wiener Neustadt, info@bonit.at , www.bopv.uno