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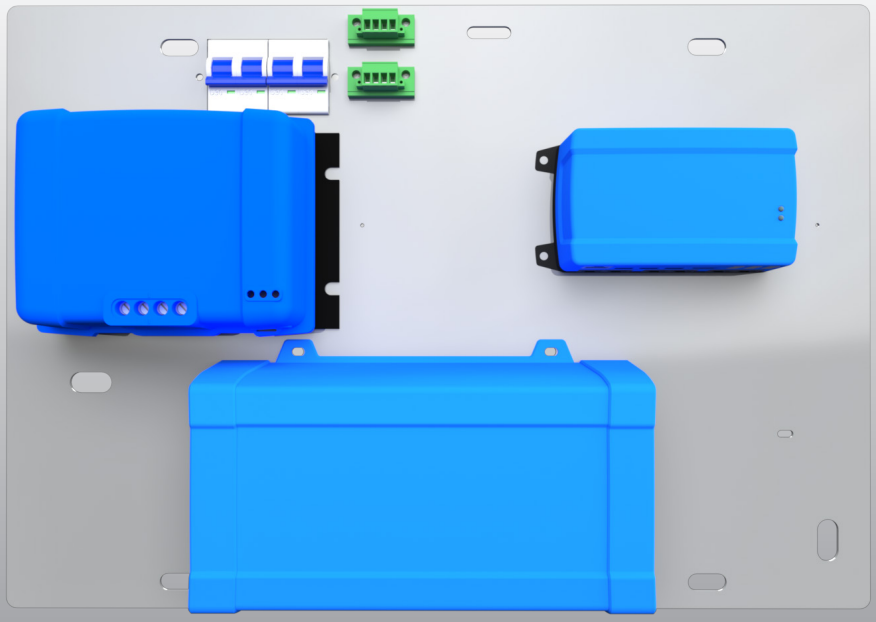
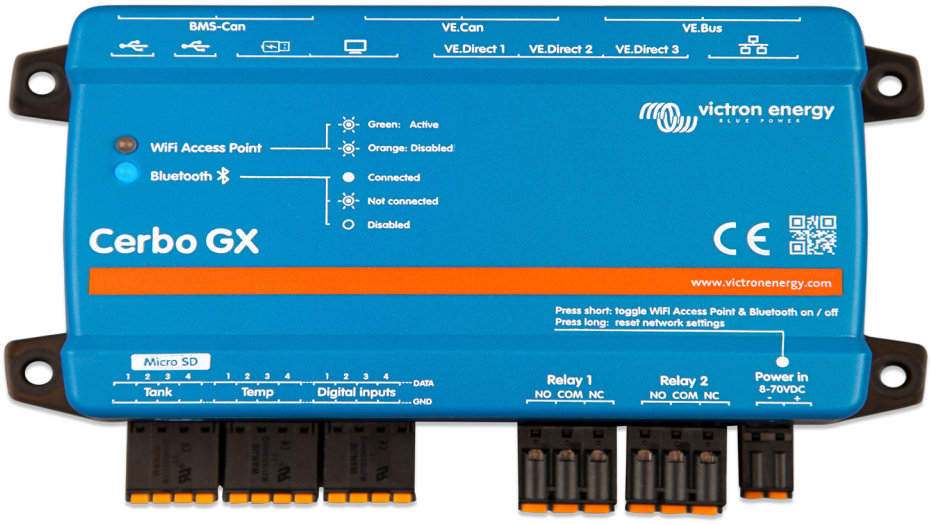
Remote M User Manual



Remote-M for use in the Vorp Energy Product Range

For Cameras, Communications, and Lighting



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Remote M User Manual

Description: Remote-M

This all-new communication center allows you to always have perfect control over your system from wherever you are and maximizes its performance. Simply connect through the VRM portal, or access directly, using the VictronConnect App thanks to its added Bluetooth capability.

Instantly monitor the battery state of charge, power consumption, power harvest from PV, generator, and mains, or check tank levels and temperature measurements (some components sold separately and do not come standard). Easily control the (auto)start/stop generator(s) or change any setting to optimize the system. Follow up on alerts, perform diagnostic checks and resolve challenges remotely.

Operation

The Remote-M is wired directly to the batteries and will be powered on as you receive the unit. An ethernet connection will be required to connect the device to VRM portal via internet; through the cellular gateway or other internet communication used in the project. This will require the use of a computer connected to the internet to access the VRM.

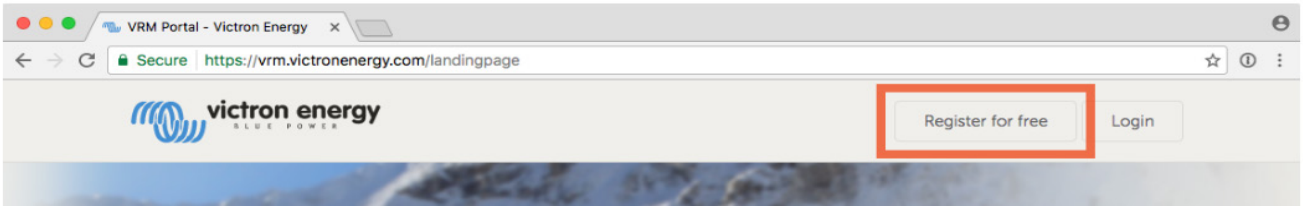
An independent LTE dongle is available for purchase separately which will require the use of a data plan provided by the customer.

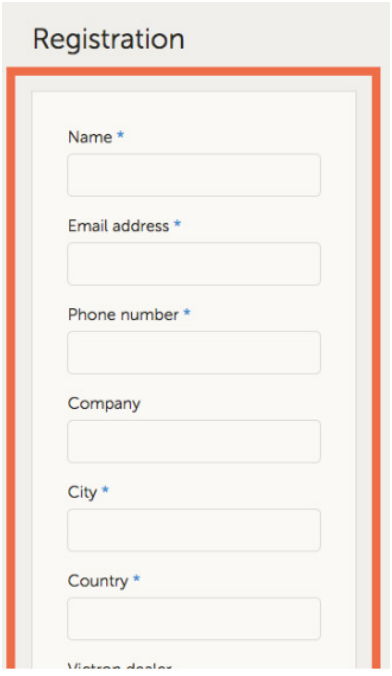
The Remote-M can be connected to a “USB to GPS dongle” as well in order to enable satellite tracking and Geofencing capabilities (a list of compatible devices can be provided upon request).

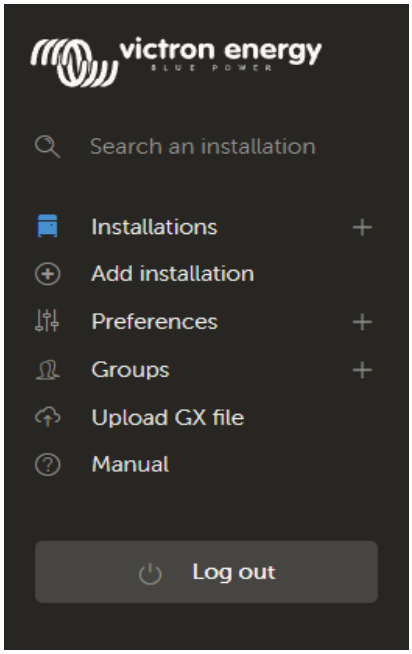
1.1 Registration

The Remote-M monitoring will require a subscription to the VRM portal https://vrm.victronenergy.com/login

The service is free to use and completing the registration is very easy. To begin click “Register for free”, complete the questionnaire, when asked “Victron Distributor” enter ‘Vorp Energy”.







Once registration is complete you will need to add your “installation”, to your account. Make sure the Remote-M is connected to the internet with a good signal. On the Remote-M device the “VRM Portal ID” is printed on a label on the side which is needed to request access. This is the unit’s unique identification code.

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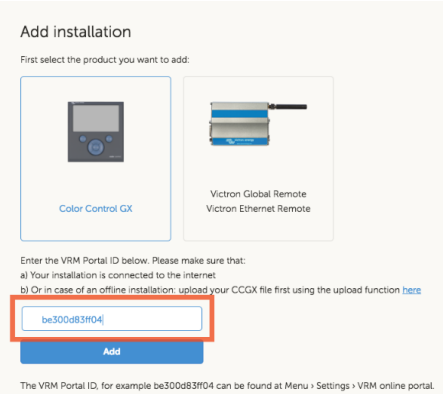
1.2 Adding Installations

Select “Add Installation” and choose the device you want to add. The Remote-M is called “Cerbo GX” in this portal. Enter the VRM ID in the box and click “Add”, if the connection is good the device will send a request to our support team. From here the team will add you to the unit as an administrator user within 24hrs of the request. When adding additional users anyone with administrator level can approve the request.



** The support team will defer additional user access to the customer. We will not approve additional users unless specifically requested to do so. To do so contact your sales rep who will direct the request to the tech team. **

1.3 Setup

In the Settings tab, only visible for installations at which you have admin rights, go through the following settings:

General

- GSM Number: Not applicable to our design
- Description: Name / description of the installation. This field will be filled with the PO number for your order by the production team. The customer can change it to the designation they wish to use to identify the units.

Tags

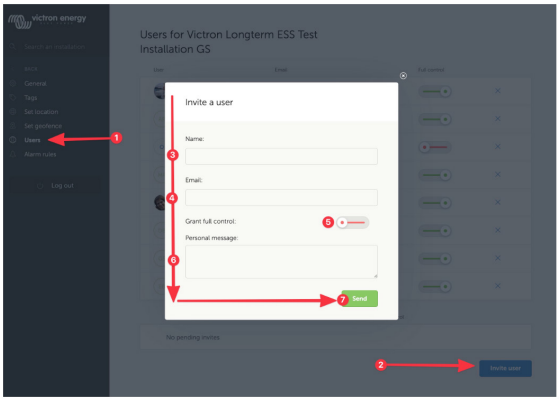
- Useful for accounts that have many installations. An example being a hybrid generator rental company with four depots: North, South, East and West. Add the tag of the right depot to all installations. Then in the installation overview you can filter on these tags.

Set location

- Set the location of the installation by dragging the cursor to the right place. This automatically sets the time zone that is used for all x-axes on the graphs as well.

Users

- Configure which users are admins and which not. Admins can change settings on all installations for which they have admin rights.
- Invite new users to this installation.



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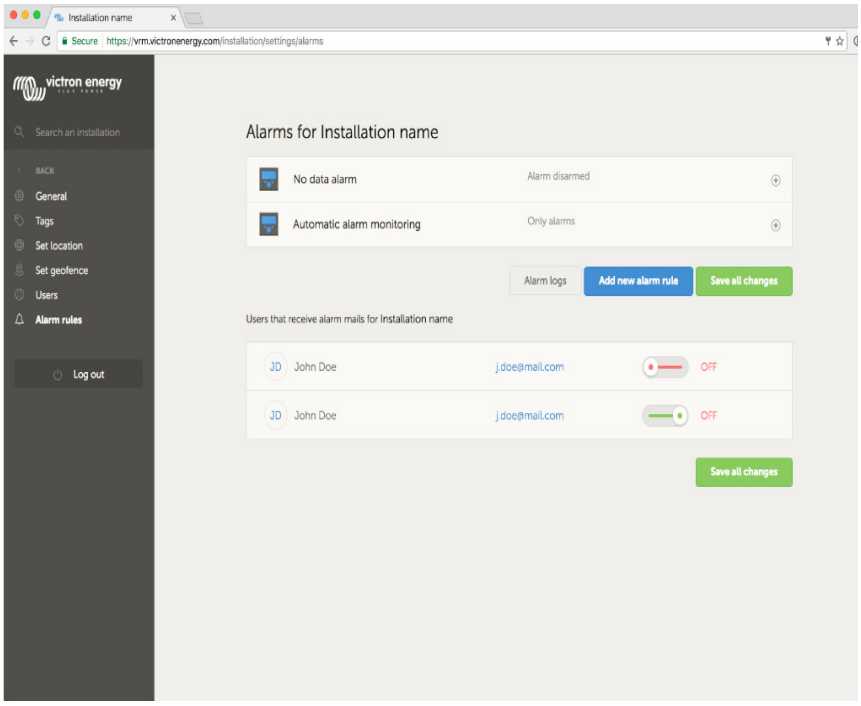
1.4 Alarm rules

The VRM uses alarm rules to notify “Installation” owners of any issues that may be happening with the system. An email is sent to the email address listed to receive the alerts. The type, “error” or “error cleared”, and frequency can be adjusted from the portal at any time. There is a large category of rules that can be monitored specific to each individual component connected to the GX device, or brain of the system. The easiest method to receive notifications would be to enable the “Automatic Alarm Monitoring” option. This allows the user to request notification of the default alarms preprogrammed to the components that make up the system without having to worry about creating specific rules for each device. These defaults can provide an overview of the system that covers 99% of all potential issues.

The default parameters this option is monitoring for are:

Solar charger

- Charger fault
- Charge state
- Equalization pending
- Alarm condition
- Low voltage alarm
- High voltage alarm
- Error code



Inverter

- Inverter state
- Temperature alarm (if sensor is present)
- Low battery alarm
- Overload alarm

Smart Shunt

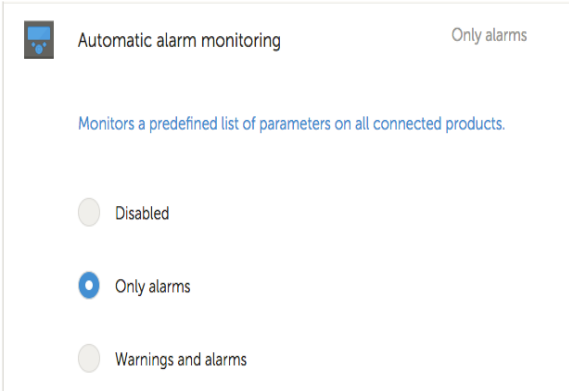
- High voltage alarm
- Low voltage alarm
- High starter-voltage alarm
- Low state-of-charge alarm
- Low battery temperature alarm (if sensor is present)
- High battery temperature alarm (if sensor is present)
- High internal-temperature alarm (if sensor is present)
- Low starter-voltage alarm
- High charge current alarm
- High discharge current alarm
- Cell Imbalance alarm
- Internal error alarm

Some of the alarms listed will be of no importance or not functioning as a component may be missing, or the specific conditions needed to have the alarm function are not present. In the case of installations that have the Vorp Energy Hybrid configuration AC current will not be monitored as the devices are unable to communicate with each other. Determining if the AC power is present when you are expecting it to be, will have to be determined by reviewing the data reports provided in the “Advanced” section of the installation page. If the system is charging when no solar power is available, in the case of AC power being available after dark, it would indicate the system is working as intended. The AC power is coming on and charging the batteries.

The VRM portal provides an online guide which can be used to learn further features available to the Remote-M. This is located in the options column on the left of the screen.

**If not first available click “back” several times and the option will become available.* https://www.victronenergy.com/live/vrm_portal:alarms

You can set the monitor to send an email alert for alarms only, for warnings and alarms, or disable it entirely. The default for new installations is “Only alarms”.



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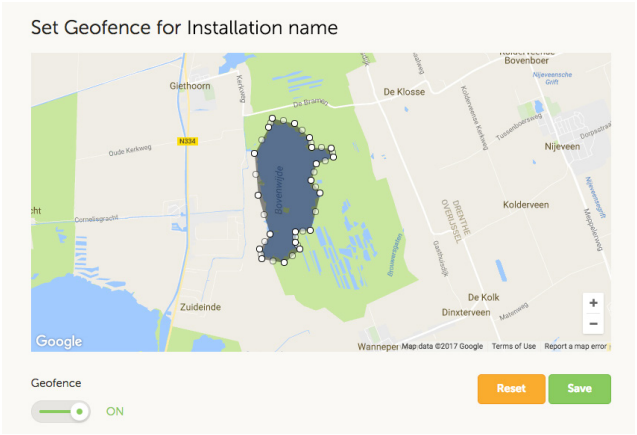
1.5 GPS Tracking

The VRM portal has the ability to set a Geo Fence to monitor the location of the installation using GPS satellite tracking. In the case of older installations of the
Solar trailer the USB to GPS dongle can be added to enable this feature. They can be connected to any of the USB ports on the Remote M device and setup is handled through the “Set geofence” page of the settings tab. The newer trailers have an antenna that is capable of data transmission and GPS location.

The image here shows an example of a geofence for a boat. When the boat leaves the lake an alarm will be created and emailed to the installation owner. The same applies to the trailers. When the geofence feature is used in combination with the “No Data” alarm, a field of full coverage is created.



1.6 Charging of the Batteries

The solar charger is the main source of charging for the system. The solar charger can charge a lower nominal-voltage battery from a higher nominal voltage solar array. The controller will automatically adjust to the battery voltage and will charge the battery with a current up to its rated current. The product name incorporates the maximum solar voltage and the maximum battery charge current for the given device. For example the MPPT 100/50 can accept a maximum of 100V of PV (solar) and can charge at a maximum of 50A to the batteries.

1.6.1 The battery is almost full

The solar charger will reduce its charge current when the battery is almost full.

If the state of charge of the battery is unknown, and the current is reducing while the sun is still shining, it can mistakenly be interpreted as the solar charger being faulty.

The first current reduction takes place at the end of the absorption stage, when the battery is approximately 80% charged.

The current will continue to reduce during the float stage, when the battery is approximately 80 and 100% charged.

The float stage starts when the batteries are 100% full. During the float stage the charge current is very low.

To find out what the state of charge (SoC) of the battery is, check the battery monitor (if present), or alternatively check the charge stage the solar charger is in.

• **Bulk**: 0-80% SoC

• **Absorption:** 80-100% SoC

• **Float storage:** 100% SoC

Default method to determine length and end of absorption for Lead-acid batteries

The charging algorithm behavior of solar chargers differs from AC connected battery chargers. Please read this section of the manual carefully to understand the solar charging behavior, and always follow the recommendations of your battery manufacturer.

**The voltage values mentioned in this chapter are for 12V systems, for 24V systems multiply by 2.*

By default, the absorption time is determined on idle battery voltage at the start of each day based on the following table:

Battery voltage at start up	Multiplier	Maximum absorption time
< 11.9V	X 1	6h
11.9V-12.2V	X 0.66	4h
12.2V-12.6V	X 0.33	2h
> 12.6V	X 0.16	1h

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The default absorption voltage is 14.4V and the default float voltage is 13.8V.

The absorption time counter starts once switched from bulk to absorption.

The MPPT solar chargers will also end absorption and switch to float when the battery current drops below a low current threshold limit, the “tail current”. The default tail current value is 2A.

The default settings (voltages, absorption time multiplier and tail current) can be modified with the VictronConnect App locally or the VRM portal through the Remote-M device.

Variations to the expected charging behavior

• Pausing of the absorption time counter:

The absorption time counter starts when the configured absorption voltage is reached and pauses when the output voltage is below the configured absorption voltage. An example of when this voltage drop could occur is when PV power (due to clouds, trees, buildings) is insufficient to charge the battery and to power the loads.

• Restarting the charge process:

The charging algorithm will reset if charging has stopped for an hour. This may occur when the PV voltage drops below the battery voltage due to bad weather, shade or similar.

• Battery being charged or discharged before solar charging begins:

The automatic absorption time is based on the start-up battery voltage (see table). This absorption time estimation can be incorrect if there is an additional charge source (e.g., AC Charge Source) or load on the batteries. This is an inherent issue in the default algorithm. However, in most cases it is still better than a fixed absorption time regardless of other charge sources or battery state. It is possible to override the default absorption time algorithm by setting a fixed absorption time when programming the solar charge controller. Be aware this can result in overcharging your batteries. Please see your battery manufacturer for recommended settings.

• Absorption time determined by tail current:

In some applications it may be preferable to terminate absorption time based on tail current only. This can be achieved by increasing the default absorption time multiplier (warning: the tail current of lead-acid batteries does not decrease to zero when the batteries are fully charged, and this “remaining” tail current can increase substantially when the batteries age).

1.6.2 Lithium batteries

Lithium Iron Phosphate (LiFePo4) batteries do not need to be fully charged to prevent premature failure. The default lithium (and recommended) settings are:

Setting	12V system	24V system
Absorption voltage	14.2V	28.4V
Absorption time	2h	2h
Float voltage	13.2V	26.4V

Default settings for LiFePO4 batteries

The default absorption voltage is 14.2V (28.4V) and the absorption time is fixed and set to 2 hours. The float voltage is set at 13.5V (27V). Equalization is disabled. The tail current is set to 0A, this is so that the full absorption time is available for cell balancing. The temperature compensation is disabled and the low temperature cut off is set to 5. These settings are the recommended settings for LiFePO4 batteries, but they can be adjusted if the battery manufacturer specifications advise otherwise.

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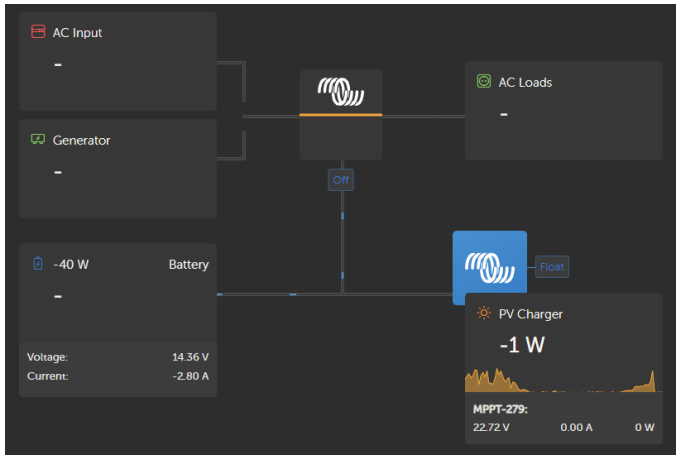
1.7 Understanding the data

The VRM presents the readings from each installation through graphs on the Dashboard and Advanced pages of the portal.

1.7.1 Dashboard

The dashboard is the main page. It shows all information on the installation at a glance. This includes the name given, the last update, status of the installation, and the local time if assigned properly.

Schematic visualization



The information shown adapts itself to the system installed. The solar charger, shunt, inverter, temperature, and DC load if the devices are available will be displayed here.

The system displays the flow of power using 'moving ants'.

Historical Data

Depending on available information, this block will either show a bar graph for kWh production and consumption, together with a blue line showing state of charge or, in case that information is not available, it will show a line diagram.

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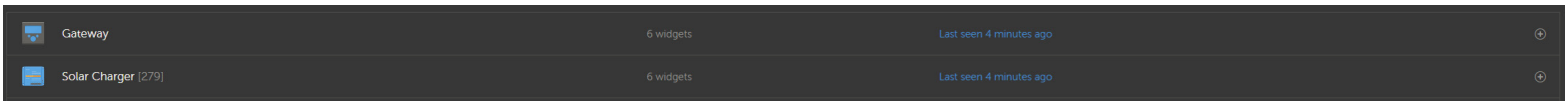
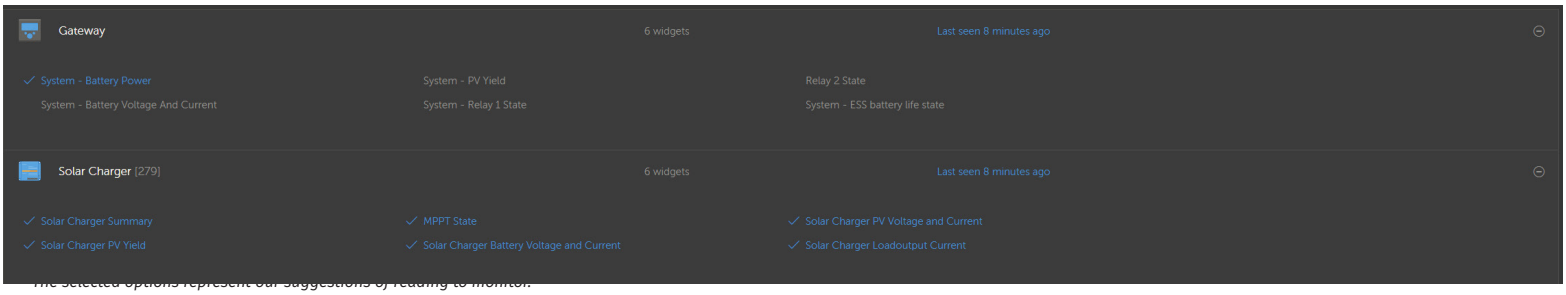
1.7.2 Advanced



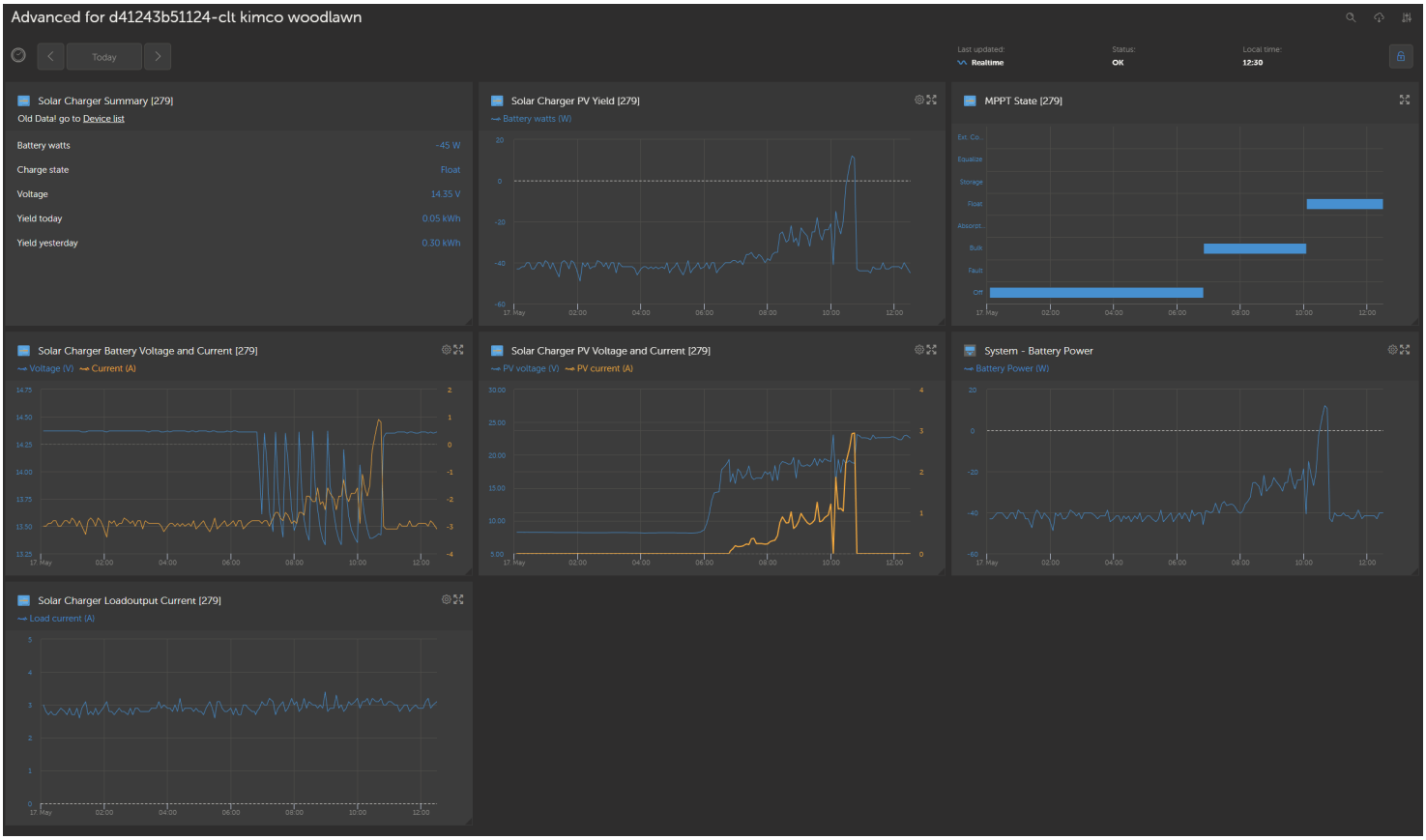
A new installation will show a bar displaying the devices available at the site. Click on the plus to open the options of graphs available to display readings for.



The selected options represent our suggestions of reading to monitor.

The selected graphs will display below this bar. After the initial selection this bar will become hidden and will need to be made visible using the “Widget” icon.

The page will show all of the graphs at once allowing the user the ability to compare the data of one graph with another by hovering over a point of interest.



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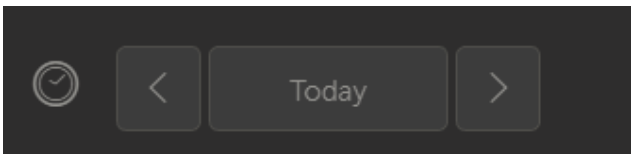
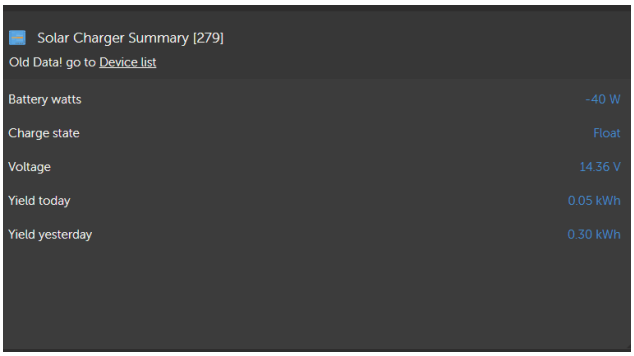
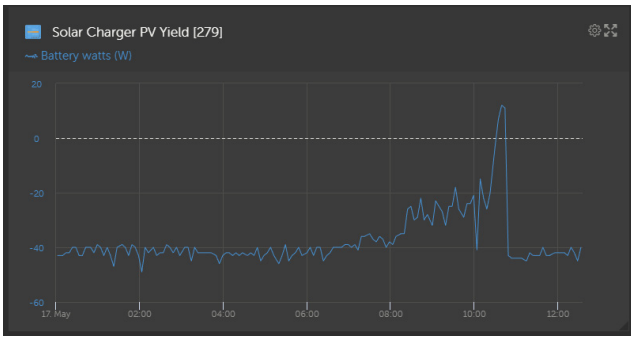


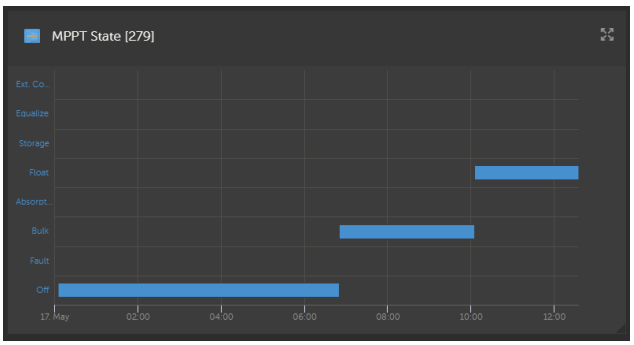
This tab allows you to view the data in these graphs in different ranges of time.



Status of the units production in the most current state - most general system summery



Solar Production over the time specified – refers to how much production was produced when being aided by a secondary source



Charge state the device has entered - Adaptive 3-stage battery charging The solar charger is a 3-stage charger. The charge stages are: Bulk – Absorption – Float

Bulk
During the bulk stage the solar charger delivers the maximum charge current, to rapidly charge the batteries. During this stage the battery voltage will slowly increase. Once the battery voltage has reached the set absorption voltage, the bulk stage stops and the absorption stage will commence.

Absorption
During the absorption stage the solar charger has switched to constant voltage mode. The current flowing to the battery will gradually decrease. Once the current has dropped below 1A (tail current), the absorption stage stops and the float stage will commence. When only shallow discharges occur the absorption time is kept short. This to prevent overcharging of the battery. But if the battery was deeply discharged, the absorption time is automatically increased, to make sure that the battery is fully recharged.

Float
During the float stage the voltage is reduced and batteries full charged state is maintained.

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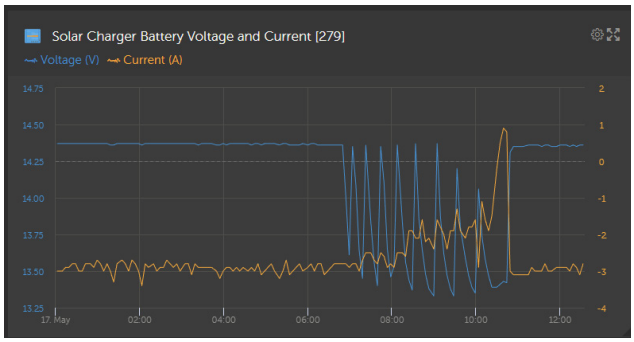
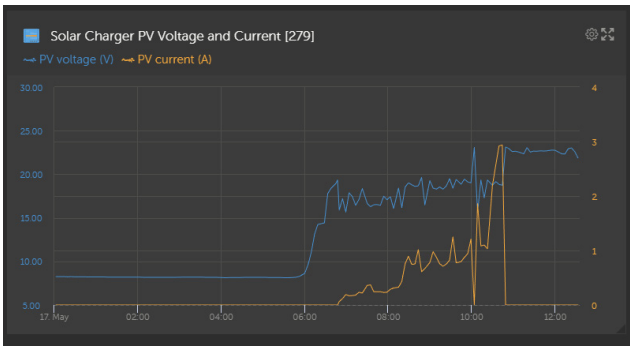
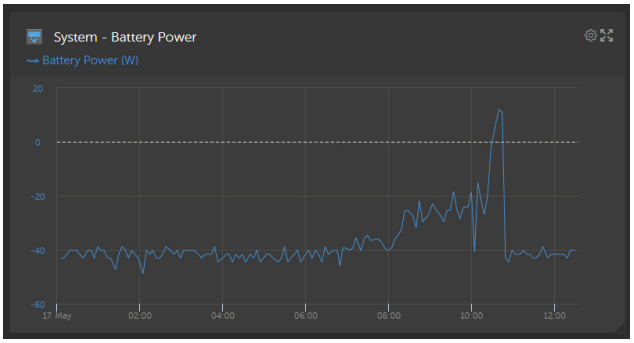


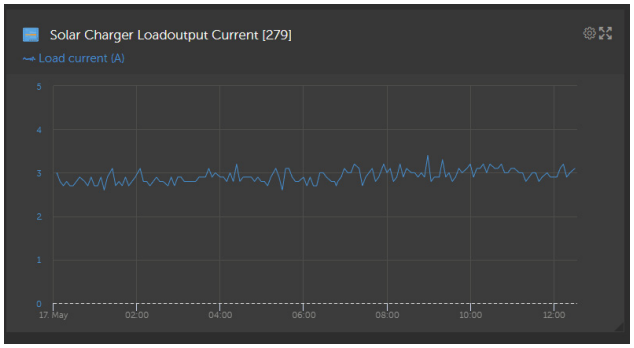
Chargers battery patterns – Voltage and current achieved by the device. Positive numbers represent the charger putting back into the batteries negative numbers are being taken out. *These numbers are in no way a direct correlation to what may be produced by the solar panel. MPPT (Maximum Power Point Tracking) chargers will take the available Voltage and convert it to Amperage in order to better charge the batteries. They are more efficient that PWM chargers in this regard.



Solar panels patterns – The charger takes the available power provided and uses it as best as it needs to in order to charge the batteries.
*In order to have the most accurate consumption figures find the range of the peaks (highest and lowest figures closest together) in these two graphs.



Summary of the Watts pulled from the battery – intended to be a rotuh figure for quick referencing.
*When excess power is being generated and the batteries are full the charger will send that extra power to the load. This in turn causes the Watts to be in the positive and negative range.



Displays the load output current of the installation.

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