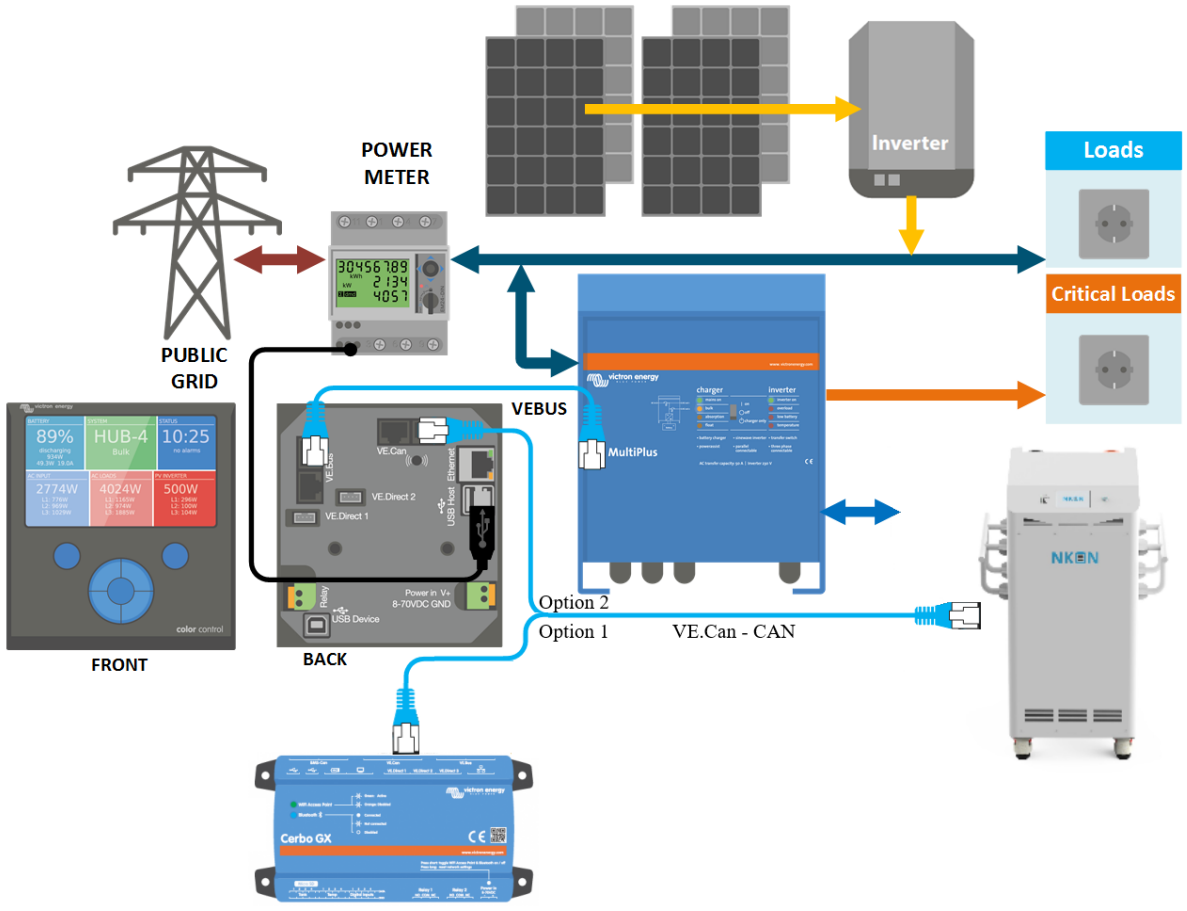
USER MANUAL

NKON ESS - Victron

OUR PRODUCTS ARE ALWAYS EVOLVING, SO THE UNIT DEPICTED BELOW MAY DIFFER SLIGHTLY FROM THE UNIT YOU RECEIVE.



We bring energy to you!

Contents

Foreword

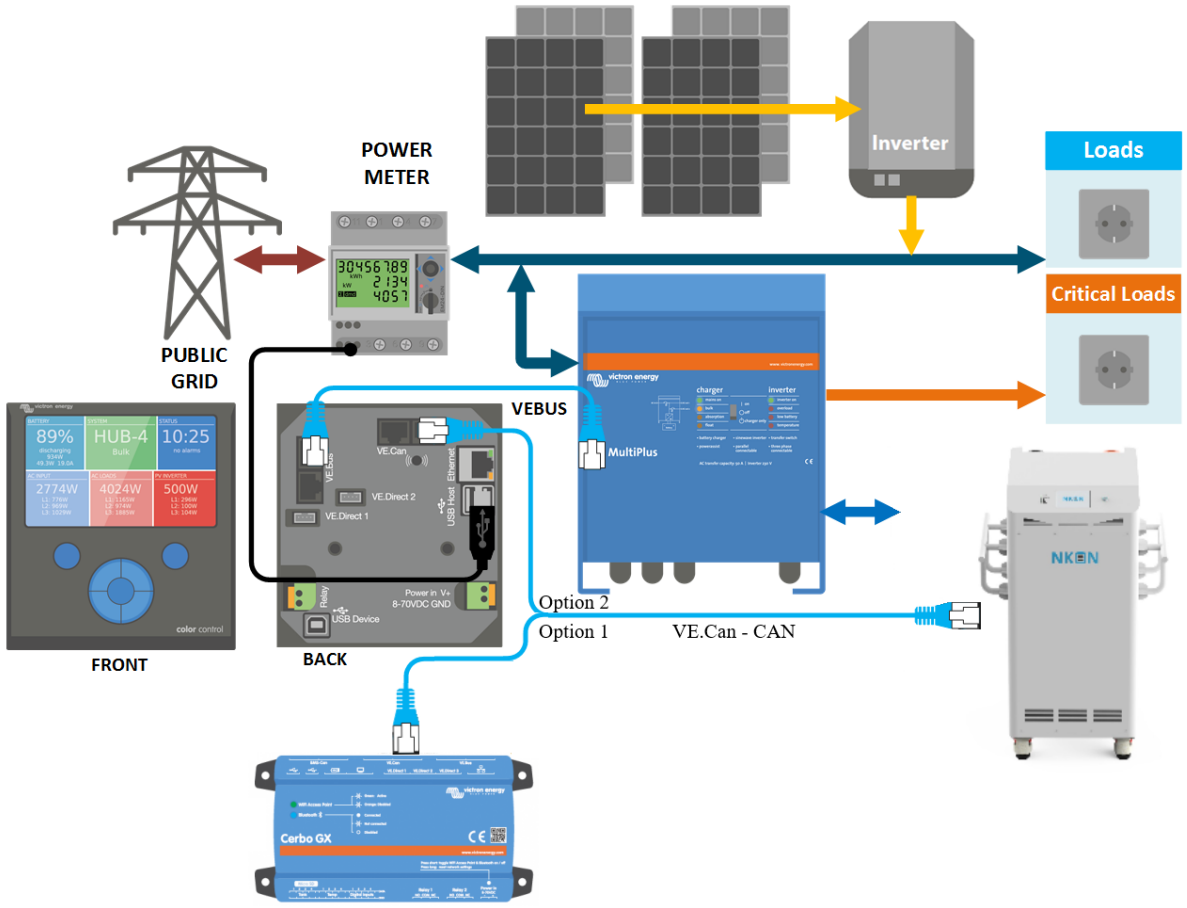
Thank you for choosing the NKON ESS Pro energy storage system. This manual has been carefully prepared to guide you through the installation, configuration, and integration of your NKON ESS Pro / Eco with Victron components — In this example we used a Nkon ESS Pro 32KWH including the Cerbo GX, Lynx power distribution system, and three Victron MultiPlus 3000 inverters.

This manual explains every step required to achieve a stable and safe integration between the NKON ESS battery system and Victron's advanced control platform. It covers hardware connections (CAN-bus, RS485, and parallel wiring), Venus OS configuration, VEConfigure 3 settings, and advanced features such as Dynamic ESS (DESS) — allowing your installation to automatically respond to real-time electricity prices for maximum energy efficiency and cost savings.

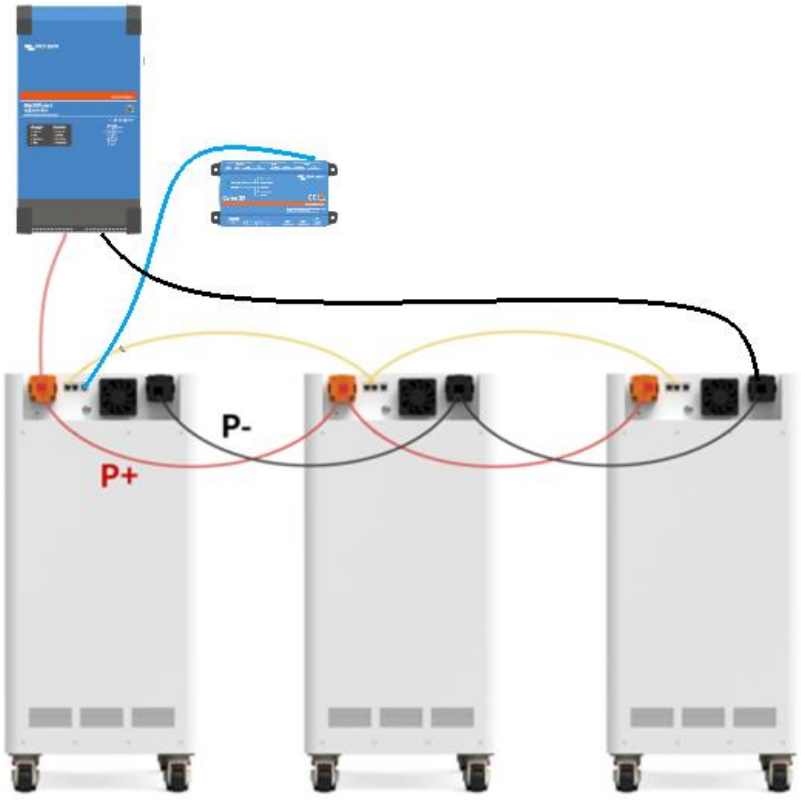
At NKON, we continually improve our products and software to meet the highest standards of performance and safety. The unit or interface shown in this document may differ slightly from the version you receive, but the functionality and setup process remain the same.

We recommend that all configuration steps be carried out by a qualified installer familiar with Victron Energy systems and lithium battery technology. Proper installation and setup will ensure optimal performance, long battery life, and safe operation.

System diagram



Parallel connection



Electrical connection

When installing NKON ESS batteries in parallel, up to 16 units can be connected. The batteries can be daisy-chained as shown in the image, where each unit is connected to the next.

GX-Device Required

In all cases a GX-device running Victron's Venus OS is required to receive, process, and transmit the commands and information communicated by the NKON ESS to the Victron system.

Firmware

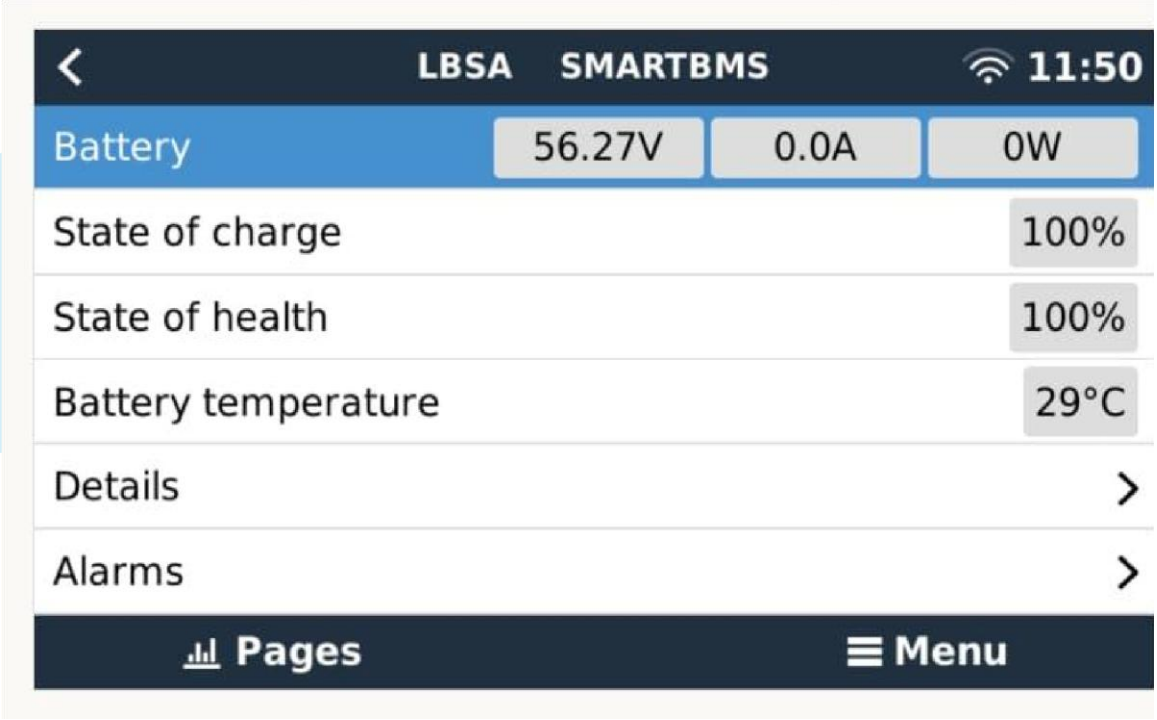
In all cases the latest available firmware should be installed on the Victron devices.

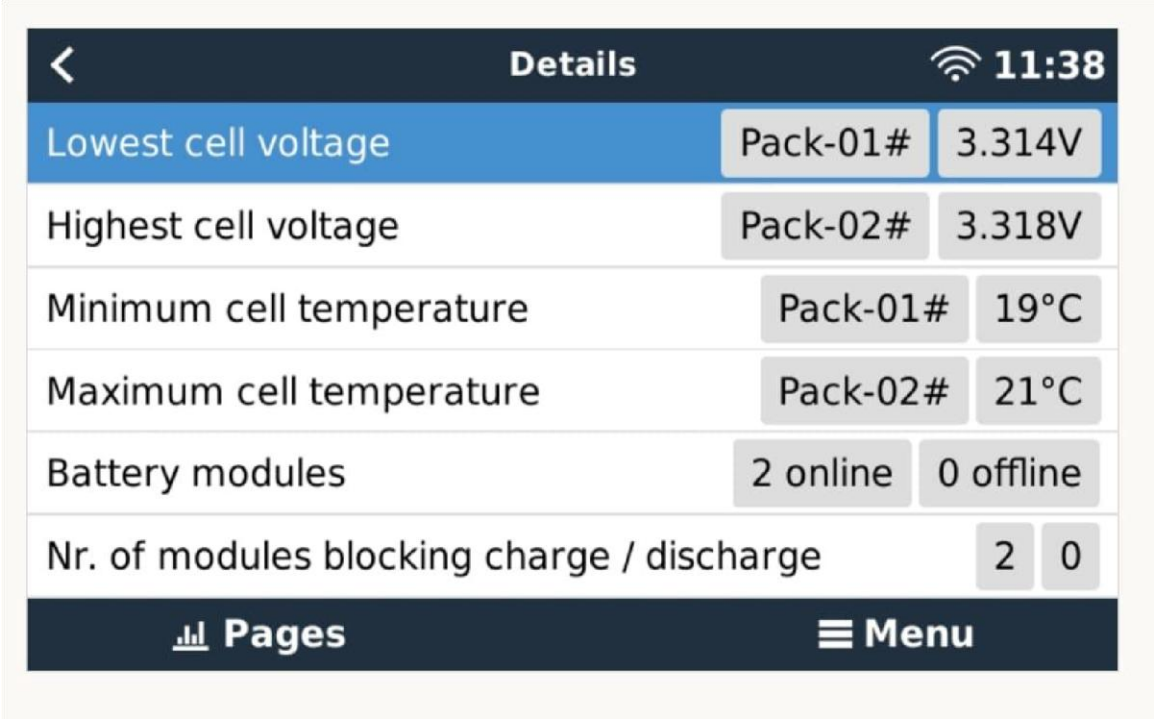
Connection with Victron protocol

The NKON ESS battery transmits, amongst others, the following messages to the GX-device:

1) Fixed Maximum Charge Voltage Limit Set-point (CVL) – the value transmitted varies from 57.6V to 56.6V depending on the state of balancing on the particular battery. Typically a well-balanced battery will request a maximum charge voltage of 56.2V. This allows superior system control and optimal battery management. The GX-device uses this set-point to control the real time operating or target voltage of the inverter/charger devices and the MPPTs. Note, the NKON ESS battery uses a Seplos BMS.
2) Charge Current Limit (CCL) – this is the maximum current that the battery will accept at any given time stated in Amps. This is a secondary control feature behind the more effective maximum charge voltage control method. This value reduces to 10 or 5-Amps as the battery approaches.
   100% State of Charge (SoC). The GX-device uses this value to ensure that the combined. The Victron system of inverter/chargers and MPPT's does not exceed the CCL of the NKON ESS battery. If the CCL drops to zero, the Victron system within a few seconds will ensure that there is no net current flow into the battery.
3) Discharge Current Limit (DCL) – this is the maximum discharge current that the battery is prepared to accept at any given time. This value typically decreases as the battery drops below 10% SoC. The Victron inverter cannot enforce a variable DCL unless in ESS mode where an AC input source can be used to supplement the power to the loads. If there is no AC input source the inverter will stop supplying power to the loads as soon as the DCL drops to zero.
   a) Additional Battery Information
      i) Battery temperature

ii) Minimum battery voltage
iii) Battery state of charge
iv) Battery state of health
v) Battery voltage
vi) Battery current
vii) Battery name
viii) Highest cell voltage
ix) Lowest cell voltage
x) Highest probe temperature
xi) Lowest probe temperature
xii) Battery gross capacity
xiii) Number of batteries online





All of the above information can be viewed in the NKON ESS device sub menus on the GX-device. Specific setup of the GX-device and the MultiPlus/Quattro is required to ensure the required control is implemented.

If the CAN bus cable is removed or damaged the Victron inverters will shut down within 5 minutes. This prevents continued operation in the absence of communication from the battery. Likewise, the MPPT's will stop producing power to the DC bus.

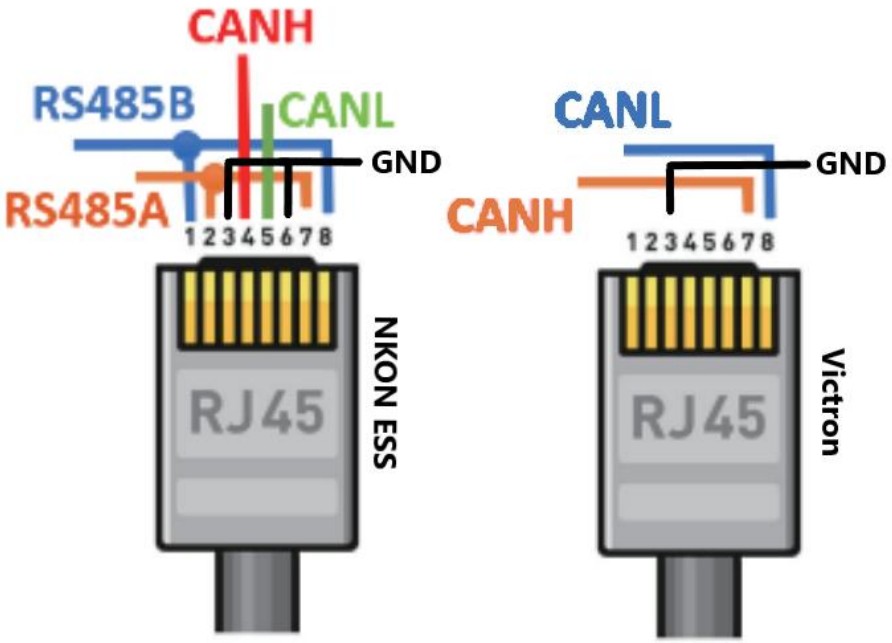
CAN-bus Wiring

Use the VE.Can to CAN-bus BMS type A Cable, part number ASS030710018.

Plug the side which is labelled Battery BMS into the CAN port of the battery. Plug the side labeled Victron VE.Can into the VE.Can port of the Cerbo GX.

Without properly connecting this cable, the battery will not show up on the display of the Cerbo GX.

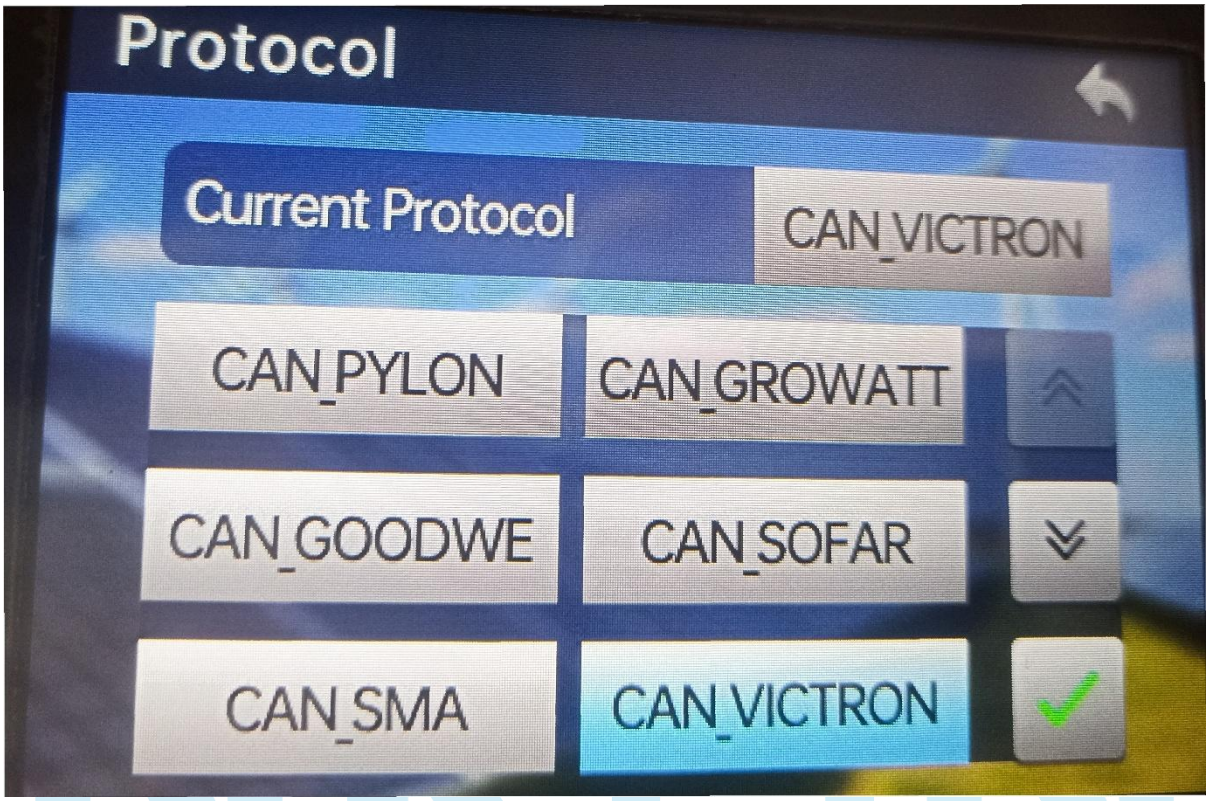
It is important to ensure this connection and display of the battery on the Cerbo GX display before attempting firmware updates or settings changes on other devices if they depend on the power supply from the battery. DO NOT attempt to operate the battery cells normally without connection to the BMS.



Note for the parallel connections of the batteries: The first RS485B is connected to the second batteries RS485A and then with the next one again from a RS458A to a RS485B and so on. A normal (straight) network cable should be used

Choose the right protocol to connect

Menu -> Protocol -> Can_Victron -> ✔

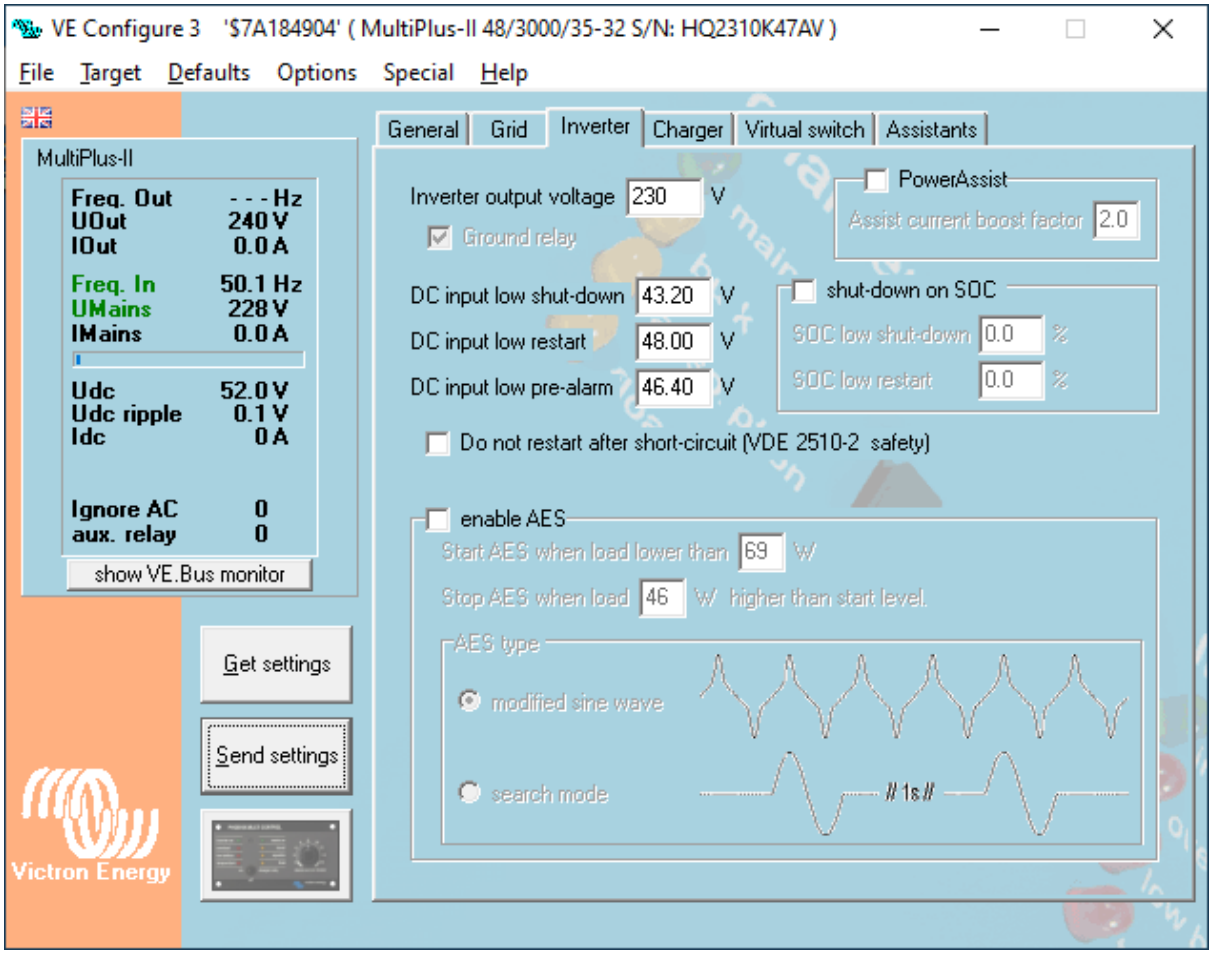


Software

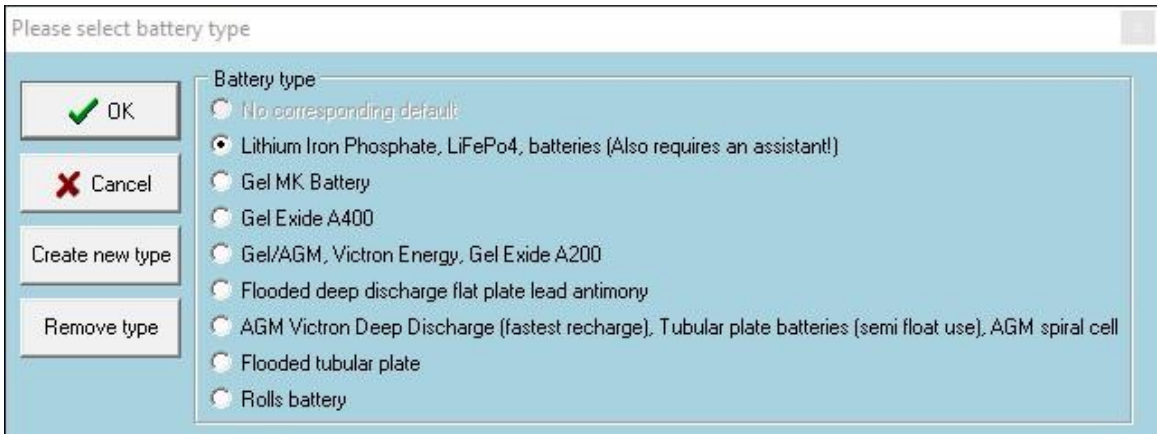
VEConfigure 3 Settings

The MultiPlus or Quattro devices must be correctly configured for operation with the NKON ESS batteries. The GX-device will use the battery monitor provided by the NKON ESS battery by default:

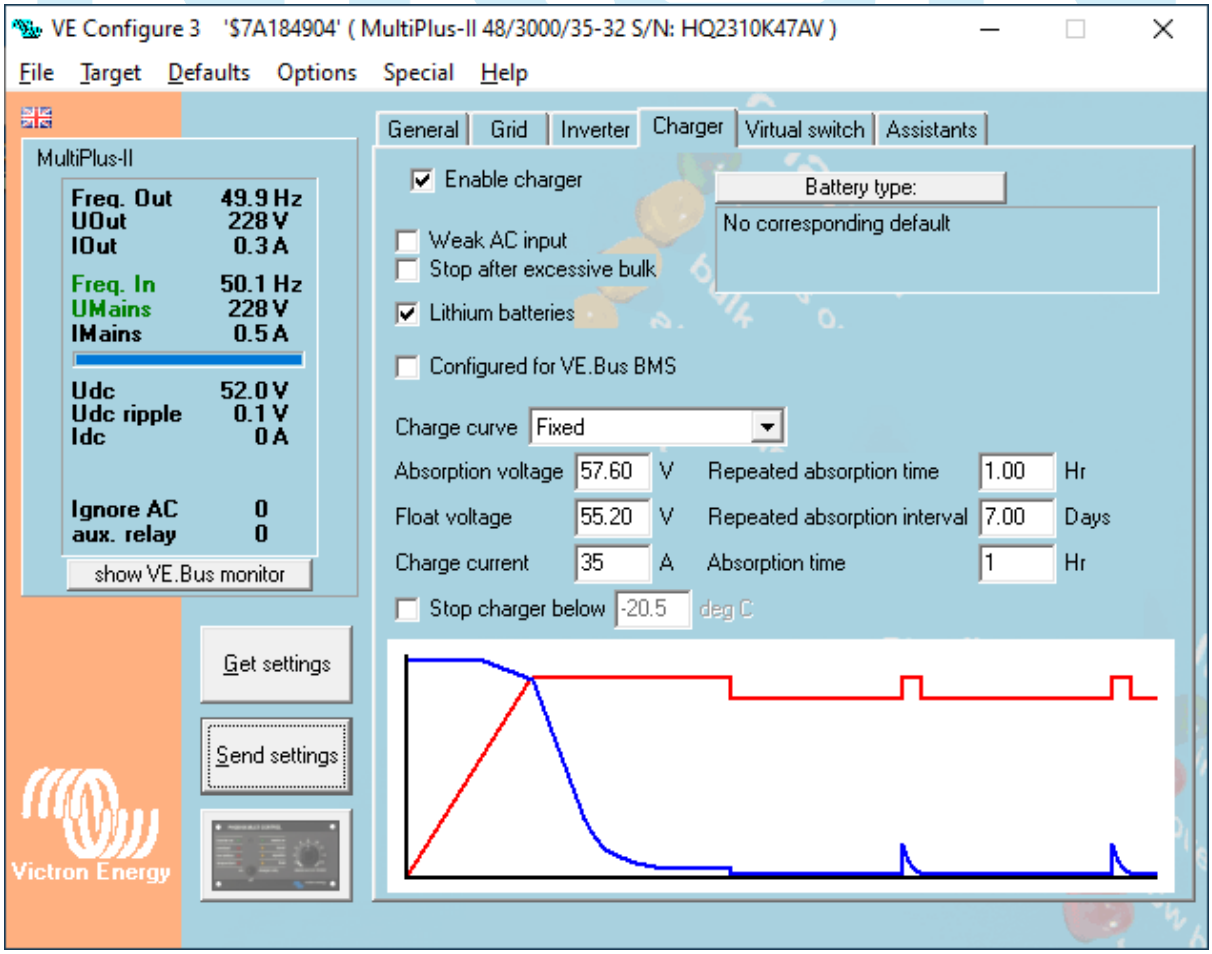
- Set the Low Shut-Down, Low Restart, and Low Pre-alarm voltages. The Low Pre-alarm only activates the low battery LED on the inverter and serves no other purpose in this setup. The Low Shut Down and Low Restart voltage settings are usually overridden by the commands from the NKON ESS but offer redundancy in instances of loss of communication and therefore should still be set correctly.
    - DC input low shut-down: 43.20
    - DC input low restart: 48.00
    - DC input low pre-alarm: 46.40



- Charger Settings Tab: Set Battery Type as “Lithium Iron Phosphate, LiFePo4 batteries”.

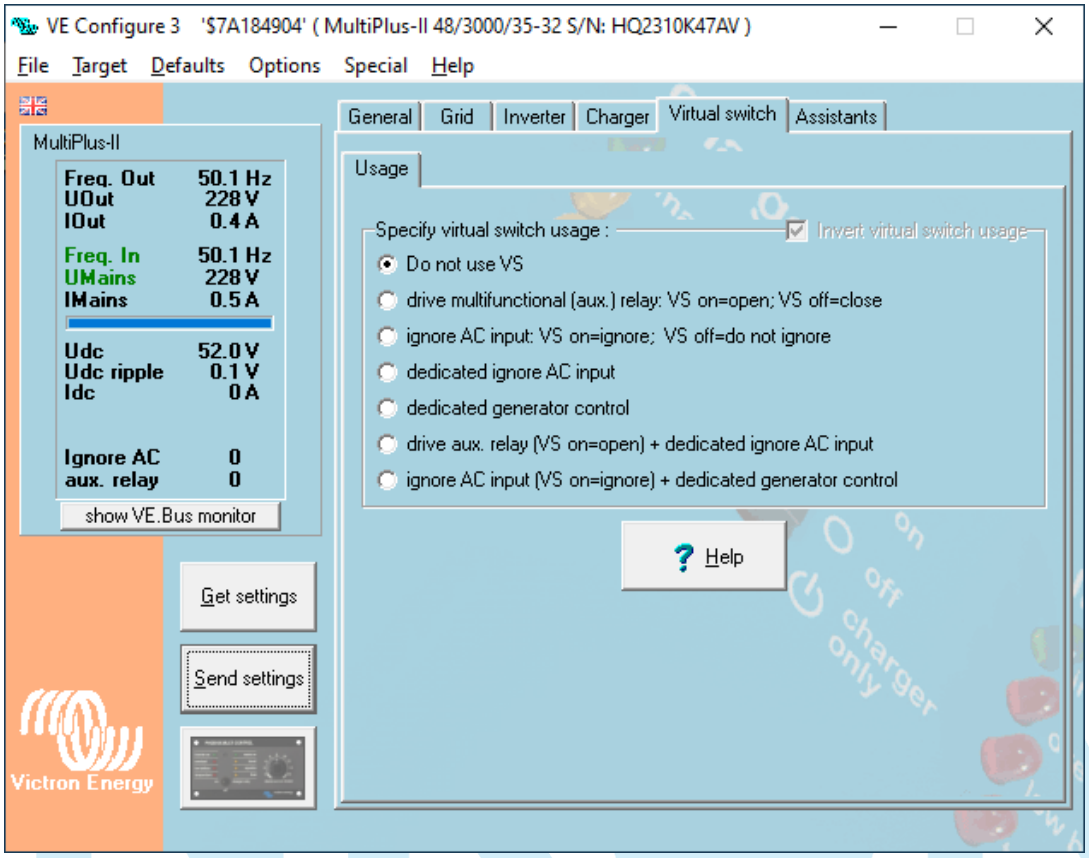


- Set Charger Settings. The charge voltage values are overridden by the NKON ESS BMS but should be set correctly regardless for redundancy. The charge current should be set according to the user’s requirements but this value combined with all other charge sources cannot exceed the charge limit of the battery – it is possible to select “Limit Charge Current” on the GX-device as an additional measure to prevent the total system charge current from exceeding the charge capacity of the NKON ESS.
    - ✔ Lithium batteries
    - Absorption voltage: 57.60 V
    - Float voltage : 55.20 V
    - Absorption time : 1 Hr



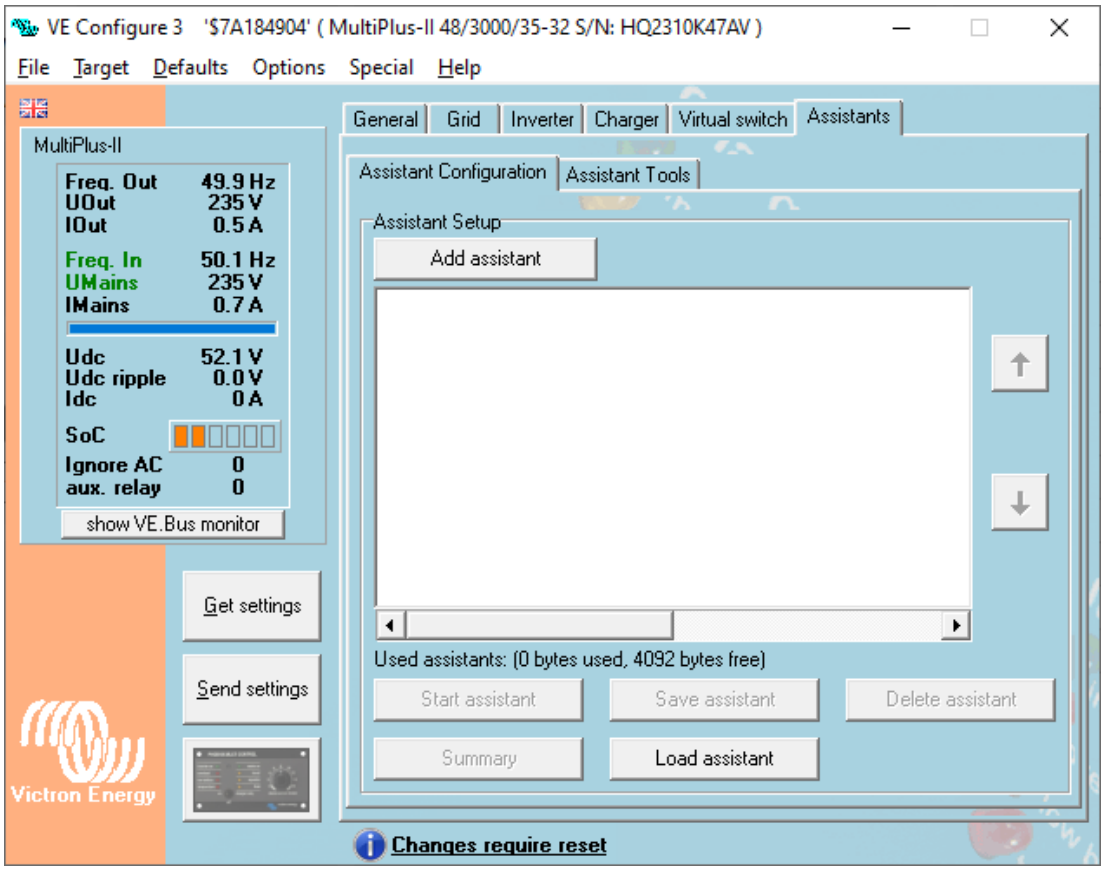
Virtual switch

- Specify virtual switch usage: Do not use VS (old system, before ESS assistant)

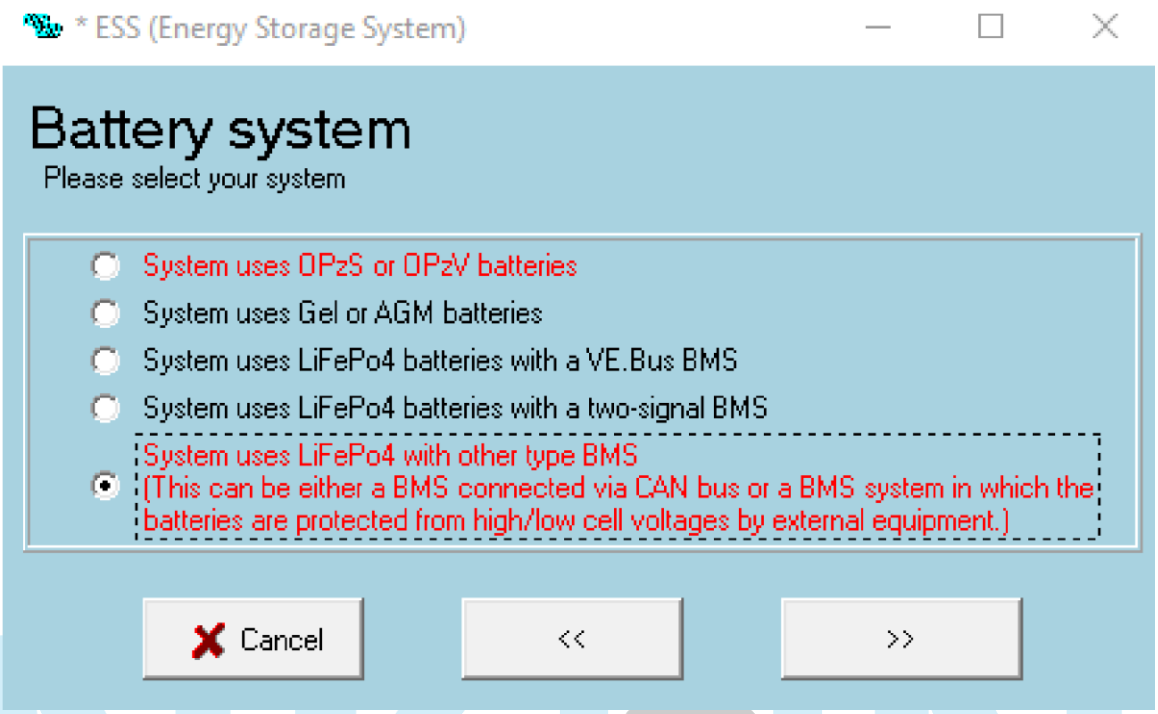


Assistants

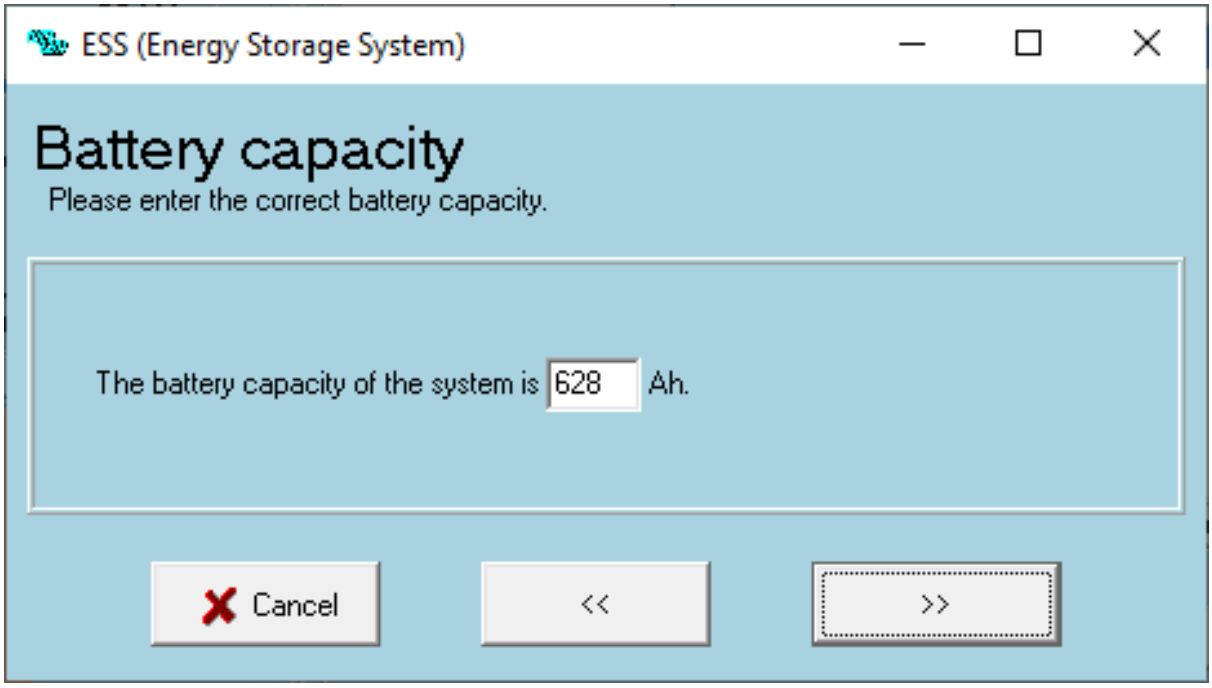
- Add assistant -> ESS



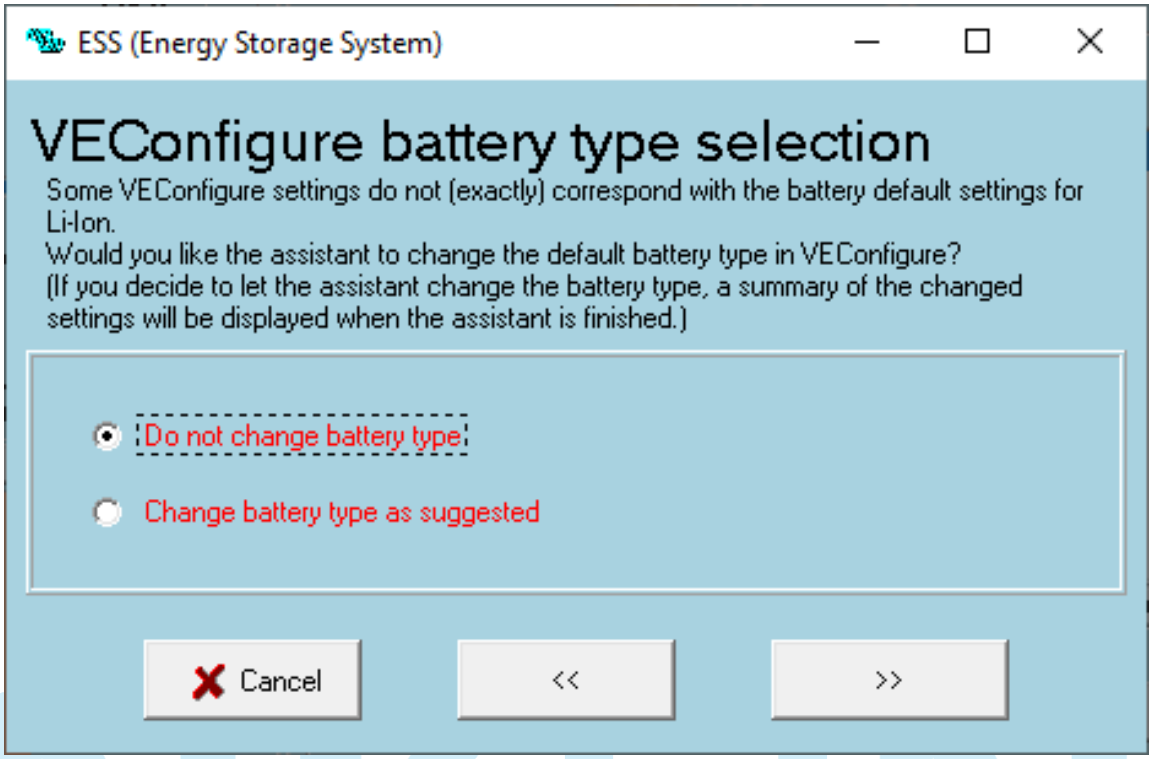
- When setting up the ESS Assistant (Start assistant) select: **System uses LiFePO4 with other type BMS**.



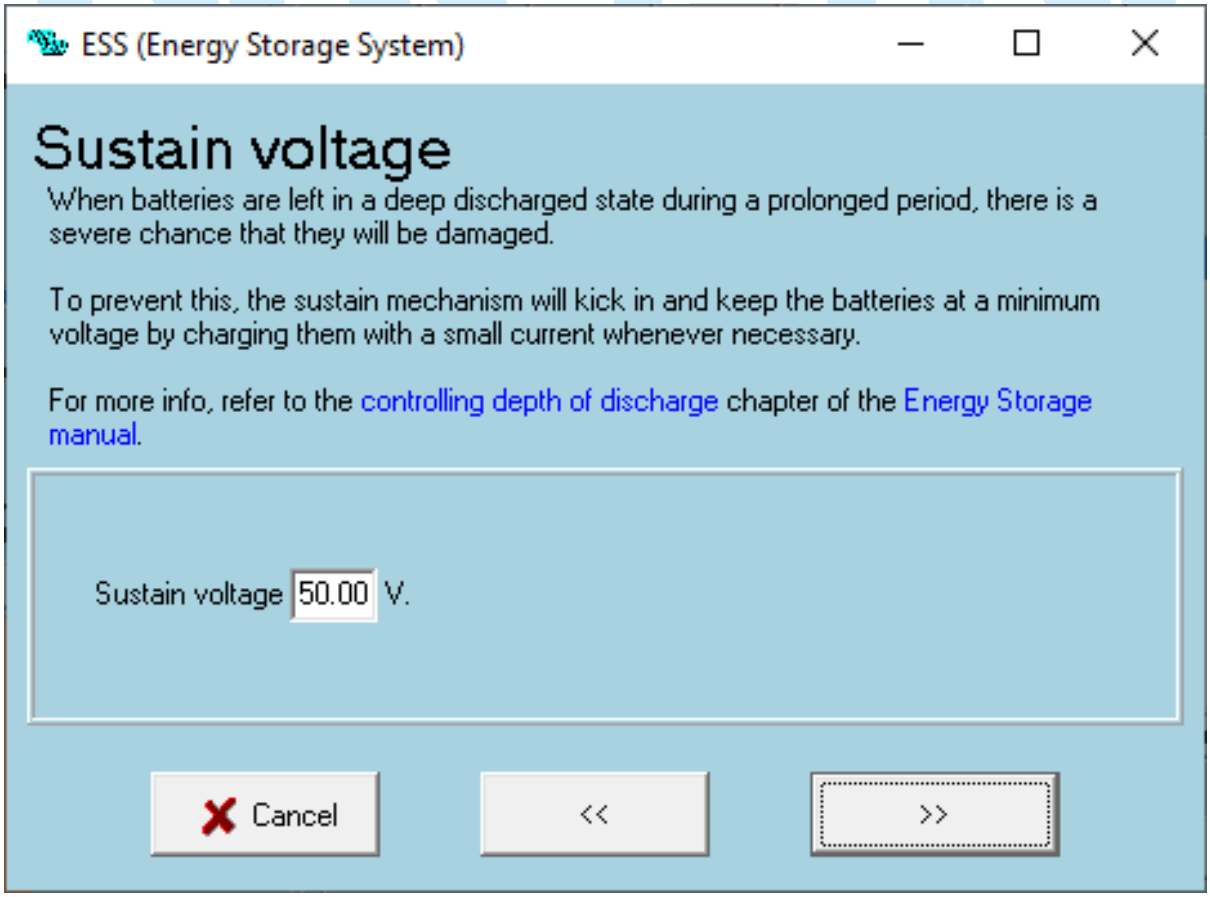
- Enter the Ah value of the NKON ESS (or the combination of NKON ESS batteries for a parallel battery system) as per the Ah rating provided in the NKON ESS specification sheet eg. NKON ESS Pro 32.153Wh / 51.2V = **628**Ah. Important: After setting the battery capacity in the ESS Assistant DO NOT disable the Battery Monitor on the General tab as it clears the battery size from the ESS Assistant



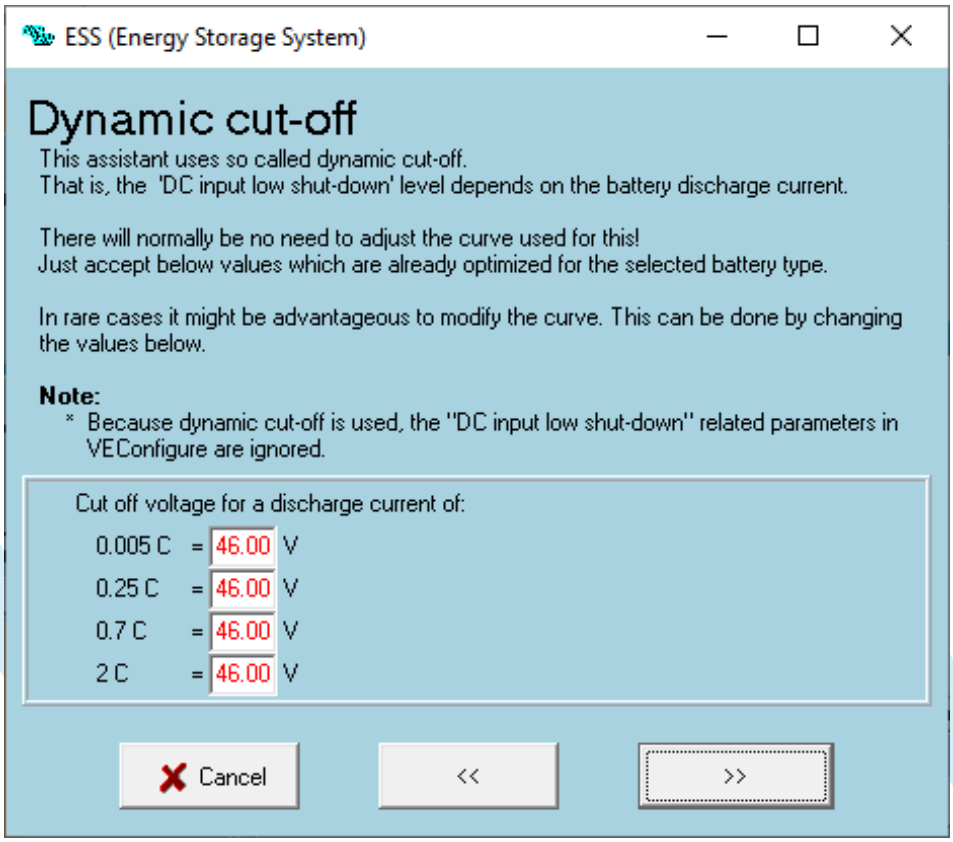
- Select – **Do not change battery type**



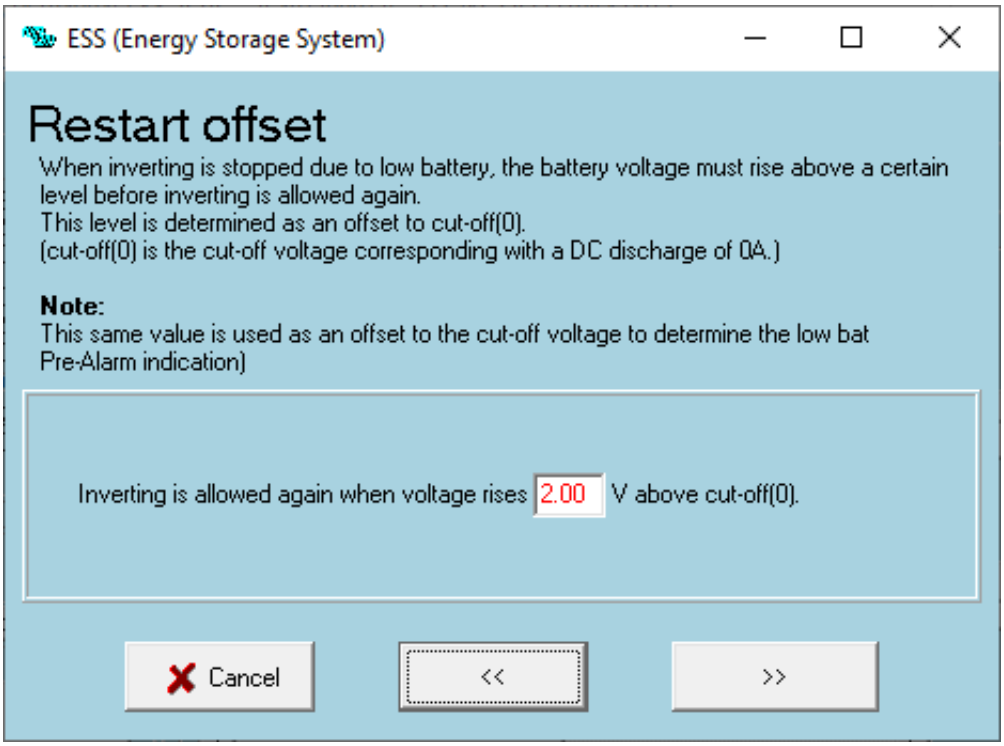
- Sustain voltage **50.00**V



- Enter Dynamic Cut-off values as below
  - 0.005 C = **46V**
  - 0.25 C = **46V**
  - 0.7 C = **46V**
  - 1 C = **46V**

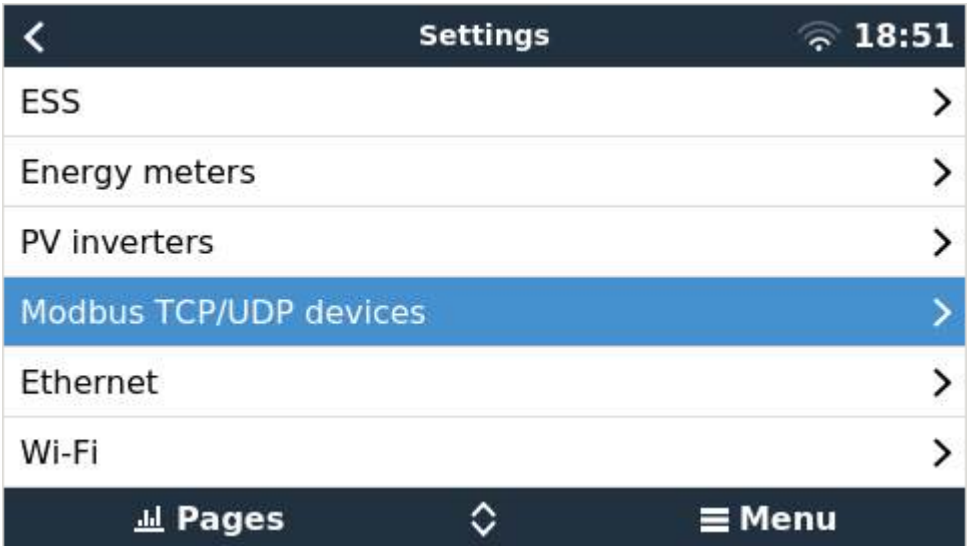


- Inverting is allowed again when voltage rises **2.00** V above cut-off (0)

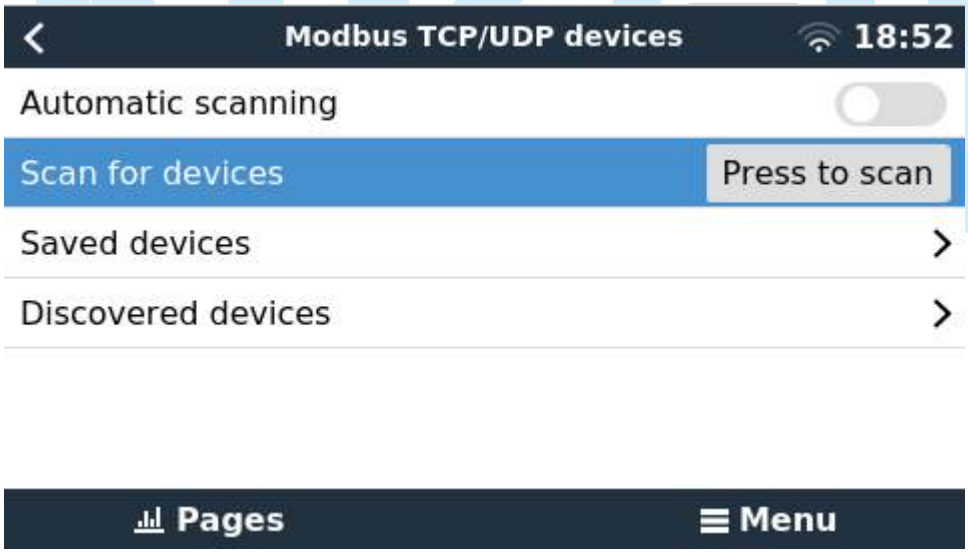


Connect VM-3P75CT

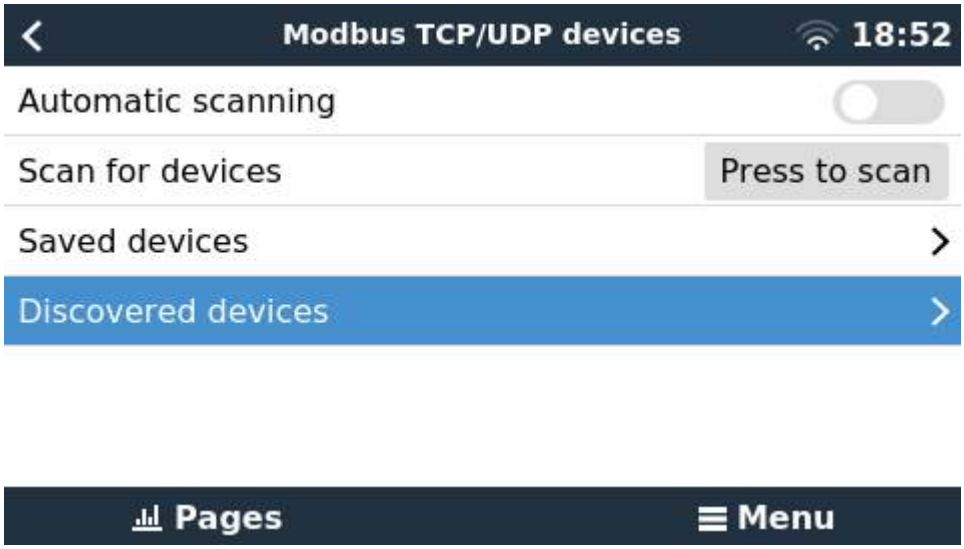
- Step 1



- Step 2



- Step 3


Modbus TCP/UDP devices
18:52
Automatic scanning
Scan for devices
Press to scan
Saved devices
Discovered devices
Pages
Menu

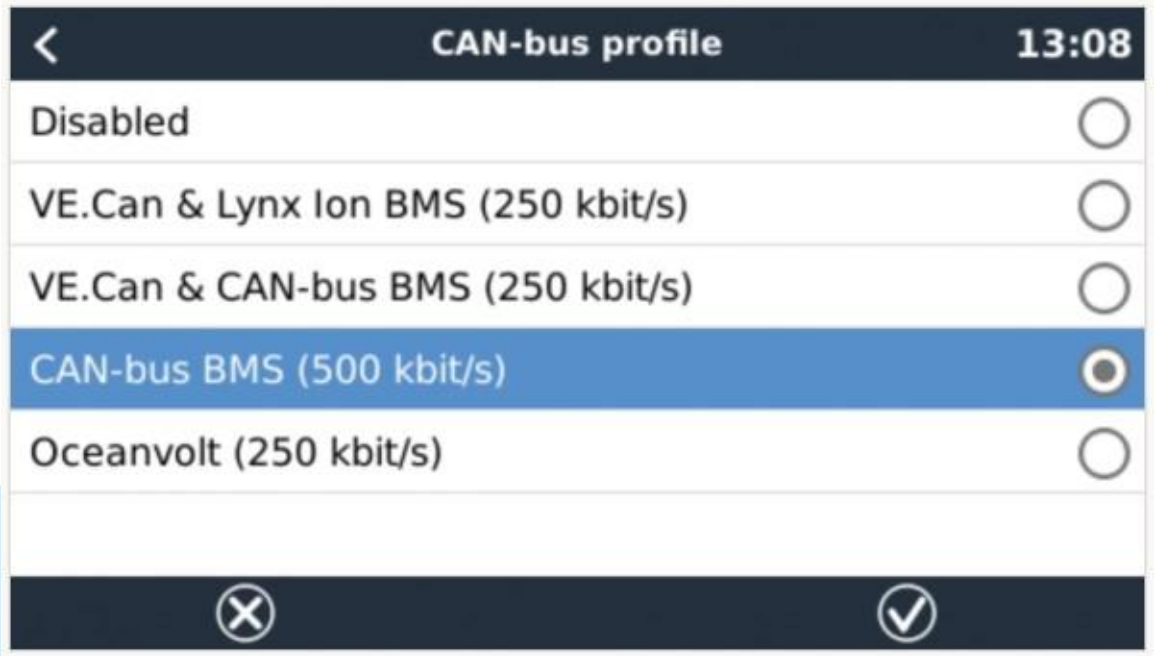
- Step 4


Modbus TCP/UDP devices
18:53
VM-3P75CT HQ2517UYPXK
Pages
Menu

GX-Device Venus OS Configuration

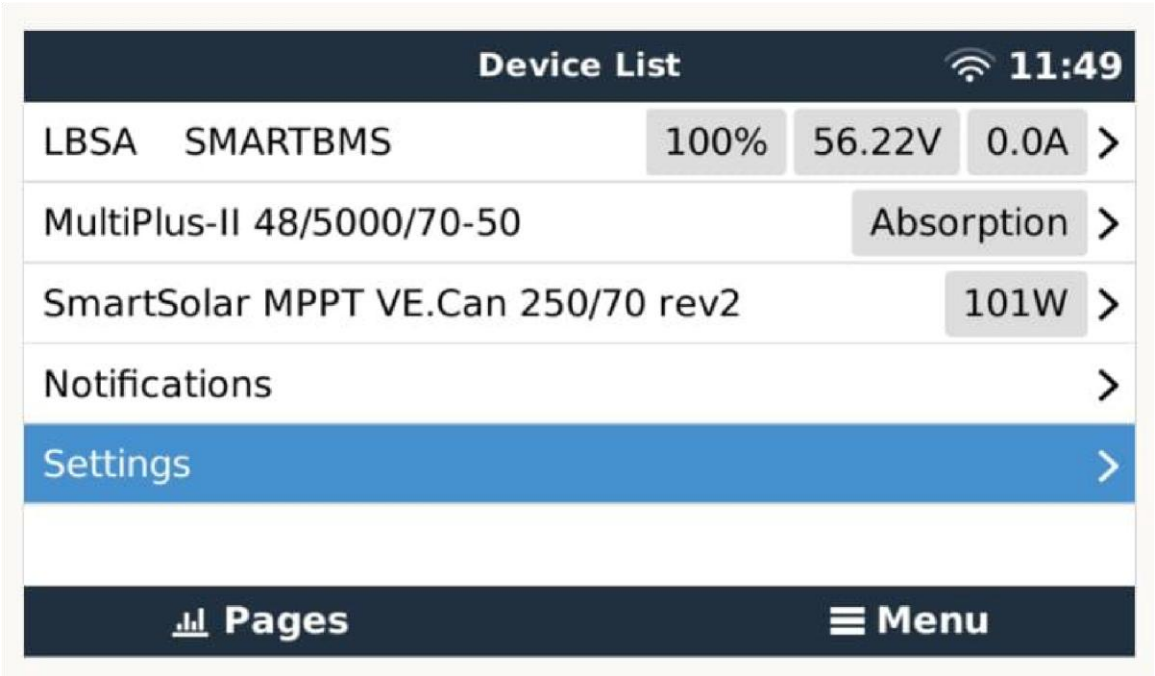
It is very important that the following settings are entered correctly for proper functioning of the NKON ESS communication interface:

- Settings -> Services -> Ve.CAN



- Can port -> CAN-bus Profile -> CAN-bus BMS (500kbit/s)

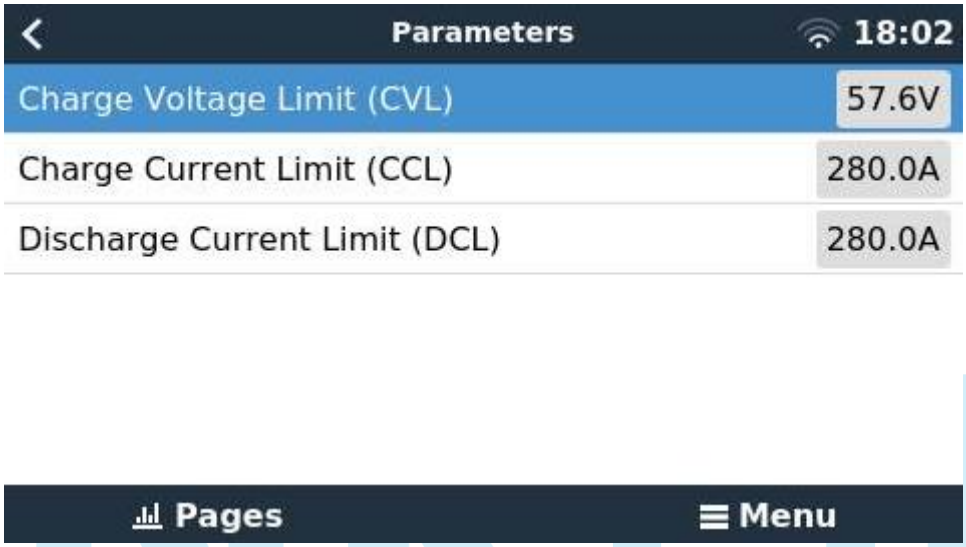
Confirm that the NKON ESS is showing in the device list (top of the menu structure) as per below



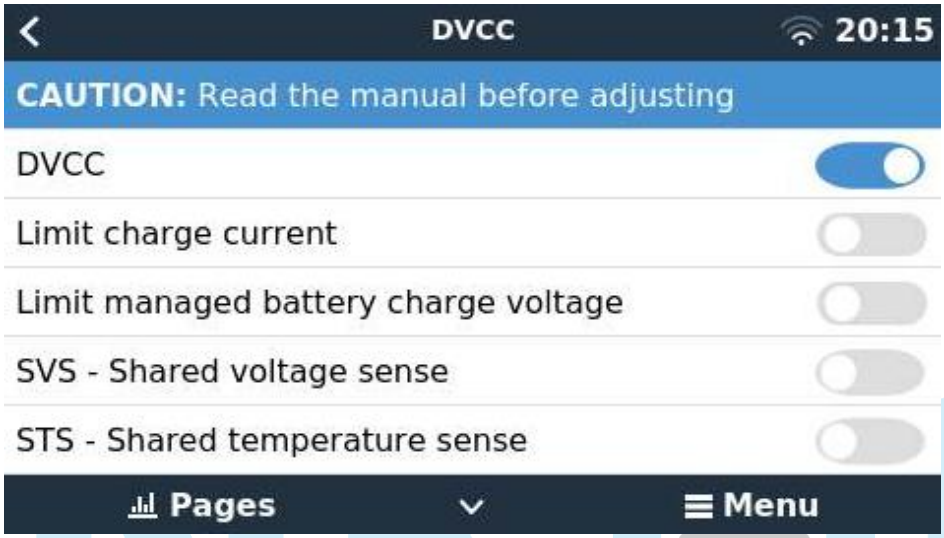
- NKON ESS (BMS) -> Parameters

Confirm that the Charge Current Limit and Discharge Current Limit are as per the NKON ESS specifications (will depend on how many batteries are connected).

Note: If the battery is fully charged the CCL may be reduced. Check that the voltage target is within the range 52.2V to 57.6V (Note: Above about 95% SoC the value reflected should be 55.6 or 57.6V depending on the state of balancing of the cells.

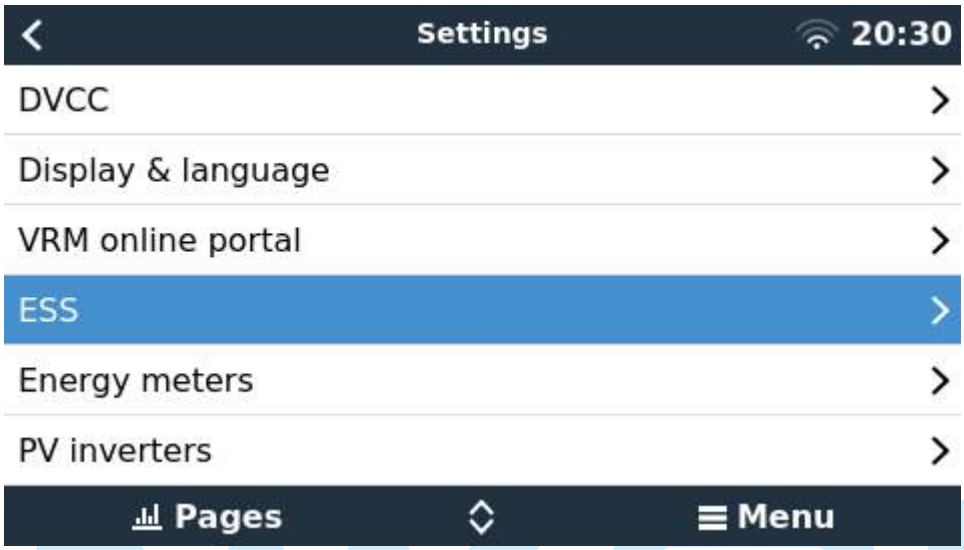


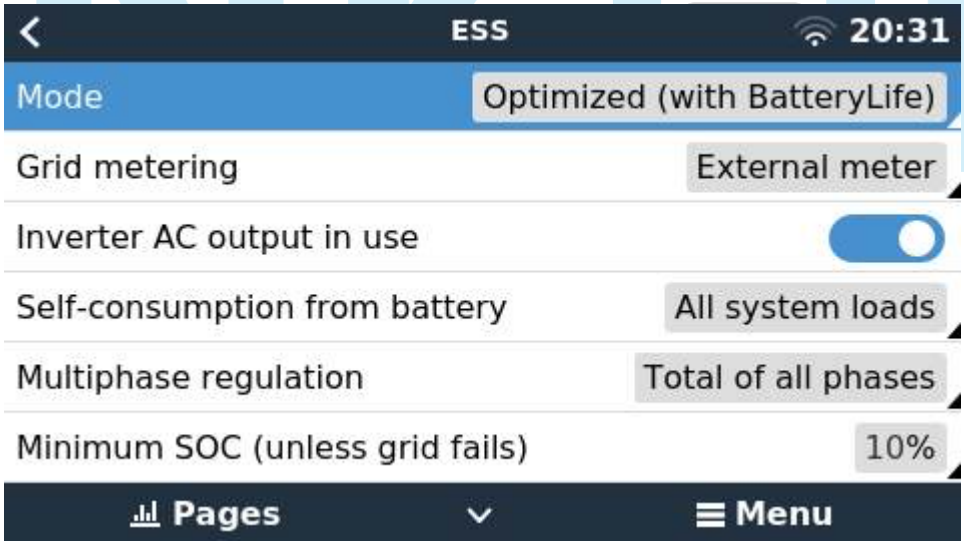
- Settings -> DVCC
    - DVCC: On
    - Limit charge current: Off
    - Limit managed battery charge voltage: Off
    - SVS - Shared voltage sense: Off
    - STS - Shared temperature sense: Forced off
    - SCS - Shared current sense: Off
    - Controlling BMS: Automatic selection



- Settings → ESS
- Use “Keep Batteries Charged” or “Optimized with BatteryLife” if ESS is being used:

BatteryLife is mandatory for NKON ESS that are being cycled. This is to prevent long durations without the battery seeing 100% charge, and this in turn eliminates SoC drift issues that creep in after several days without the battery having reached 100% SoC.



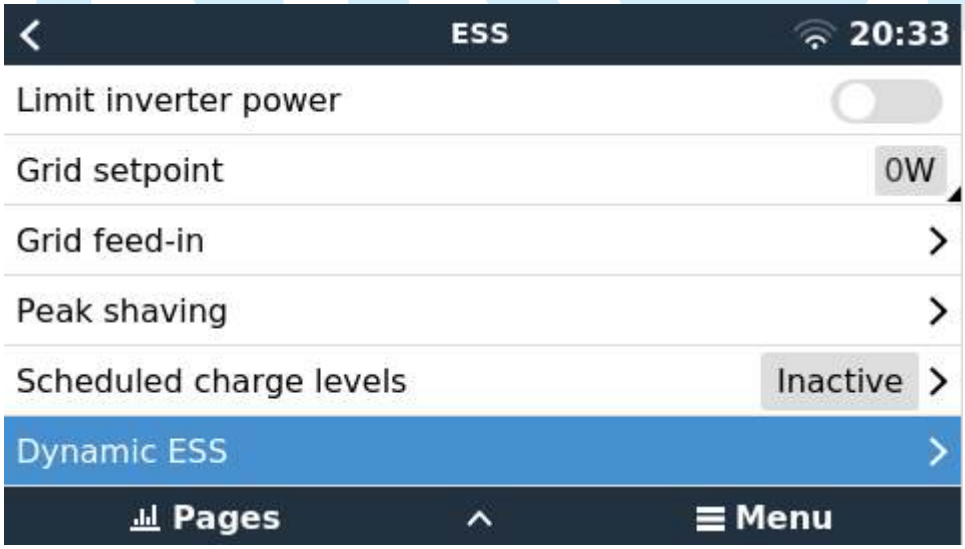


- Settings –> ESS -> Peak shaving (optional)
    - Peak Shaving: Always
    - Limit system AC import current: Disabled
    - Limit system AC export current: Disabled

In Victron systems, peak shaving is an optional energy management feature that helps limit the maximum power drawn from the grid or generator by supplementing it with battery power when consumption spikes above a certain threshold.

- Settings –> ESS -> Grid feed-in
    - AC-coupled PV – feed in excess: Enabled
    - DC-coupled PV – feed in excess: Disabled
        - You can enable it if your PV's are connected to the Victron
    - Limit system feed-in: Disabled
    - Feed-in limiting active: No

Dynamic ESS



You can only configure Dynamic ESS after enabling it in the VRM Portal (see chapter – Activate DESS). The settings on the Cerbo GX do not need to be changed — they must remain set to Auto.

MPPT Configuration

Under battery preset, select “User Defined”.

Select and set

- Absorption voltage: 57.60V
- Float voltage: 55.20V.
- Enable “expert mode”
    - Absorption curve: fixed
    - absorption time: 1hr.

Adjust the maximum current on the MPPT's to ensure that the combined total charge power cannot exceed the maximum rated charge current for the NKON ESS or NKON ESS’s in the system.

VRM Portal

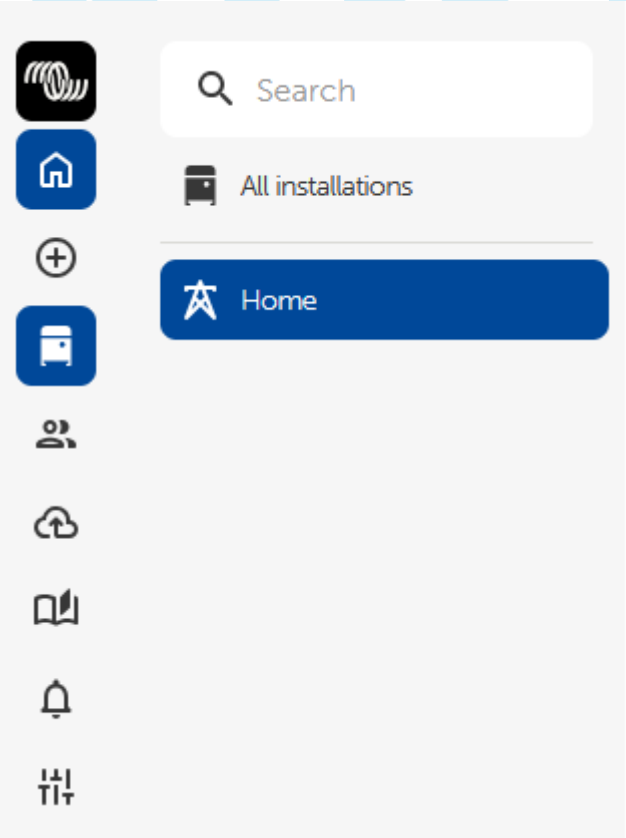
Activate DESS

Victron's Dynamic ESS (DESS) adds an intelligent control layer to your energy storage system. Instead of operating with fixed charge and discharge rules, DESS automatically responds to real-time electricity prices and external market signals. This allows your system to charge when energy is cheap or abundant and discharge when prices are high — maximizing savings and efficiency without manual intervention.

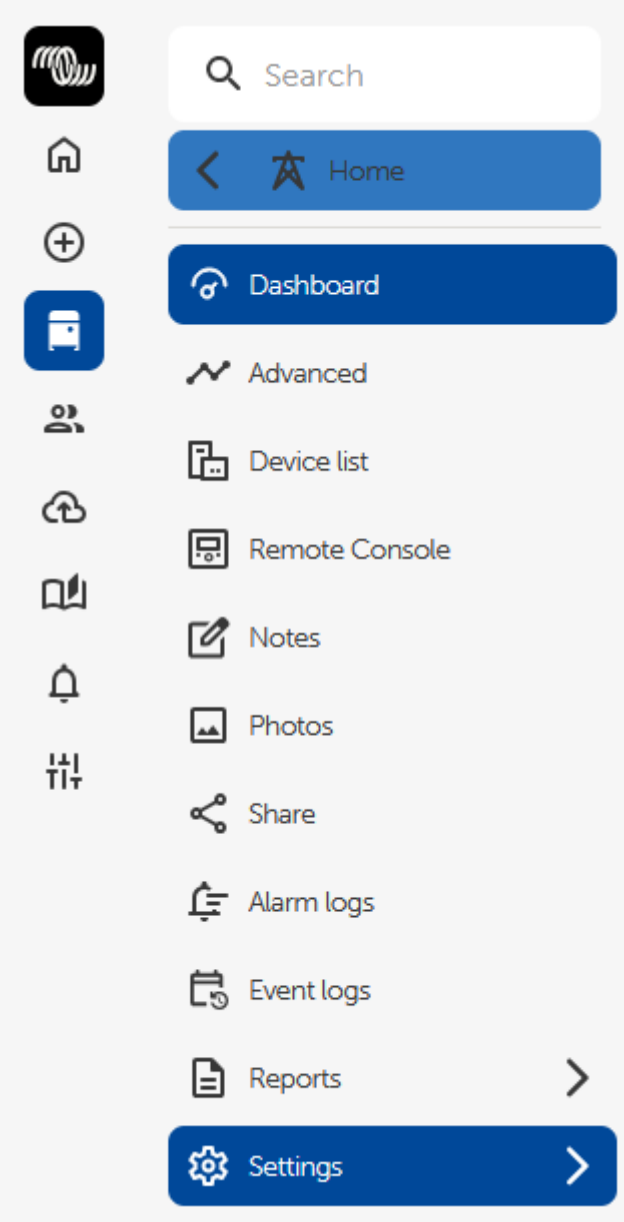
DESS can currently be activated through the Victron VRM Portal and is officially supported in several European countries with dynamic energy tariffs, including:

the Netherlands, Germany, Belgium, Norway, Sweden, Finland, Denmark, and the United Kingdom.

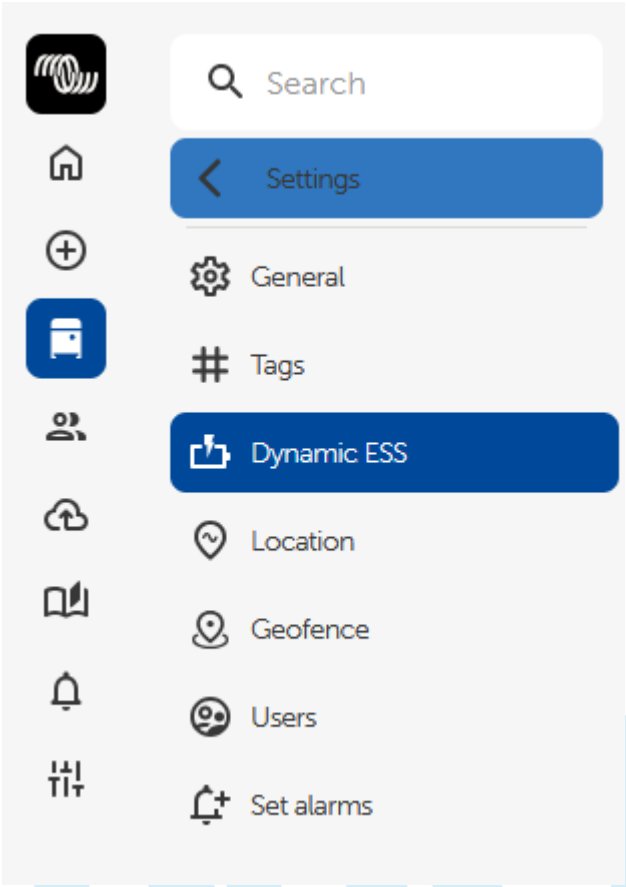
- Log in to your Victron VRM Portal.
- Open your installation overview.
- Choose your installation



- Click on Settings



- Click on Dynamic ESS

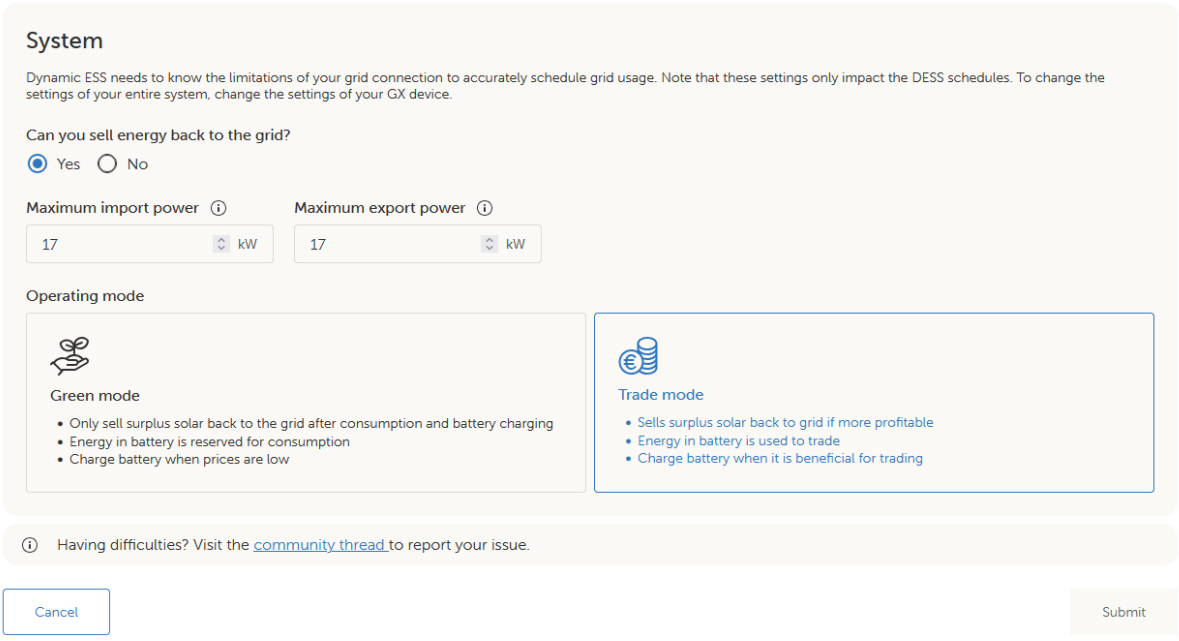


Adjust the parameters according to your grid connection, battery size, and inverter power.

- Can you sell energy back to the grid?
  - Select Yes if your energy contract and grid connection allow exporting power.
- Set power limits:
  - Maximum import power: enter the highest grid power you can draw (e.g. 17 kW).
  - Maximum export power: enter the maximum power you can feed back (e.g. 17 kW).
- Choose your operating mode:
  - Green Mode:
    - Only sells surplus solar energy after household consumption and battery charging.
    - Prioritizes self-consumption.
    - Charges the battery when prices are low.
  - Trade Mode:
    - Sells energy back to the grid when it's financially beneficial.
    - Uses the battery actively for trading based on dynamic prices.
  - Energy price and battery cost formulas:
    - Energy price → calculated automatically using the formula suggested by Victron.
    - Battery cost per kWh → calculate using the following formula:

Battery cost formula:

Purchase price (€) / (Cycle life × Battery kWh capacity)

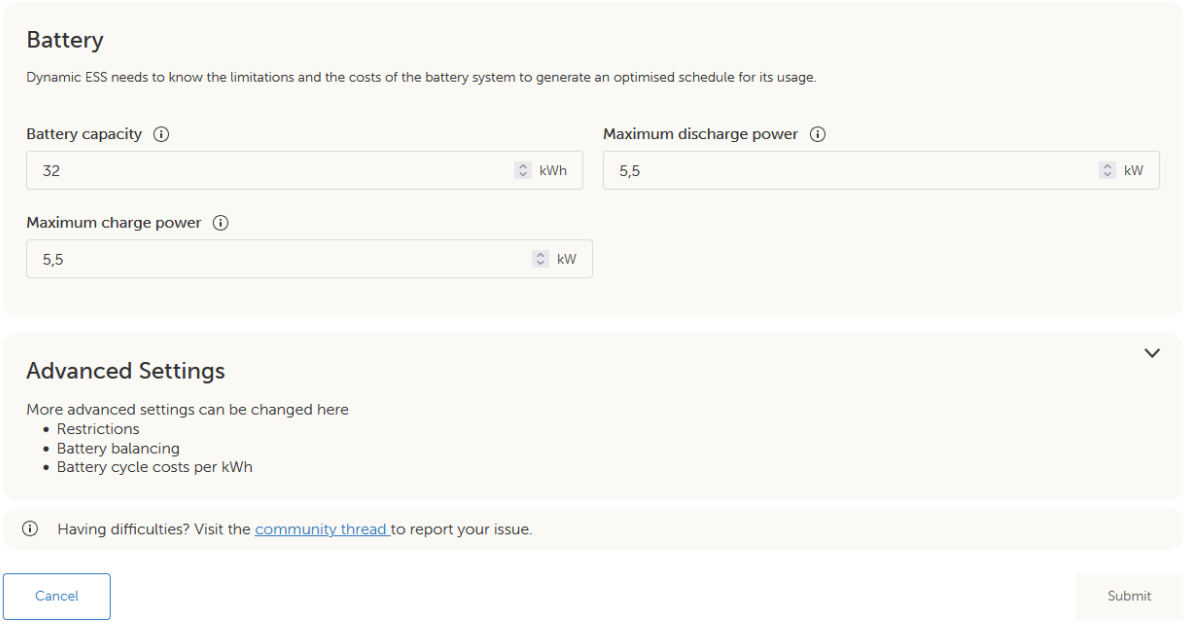


Set Up Battery Parameters

- Enter your battery capacity (e.g., 32 kWh).
- Set the maximum charge and discharge power (e.g., 5.5 kW).
- (Optional) Open Advanced Settings to define:
  - Restrictions
  - Battery balancing
  - Battery cycle cost per kWh

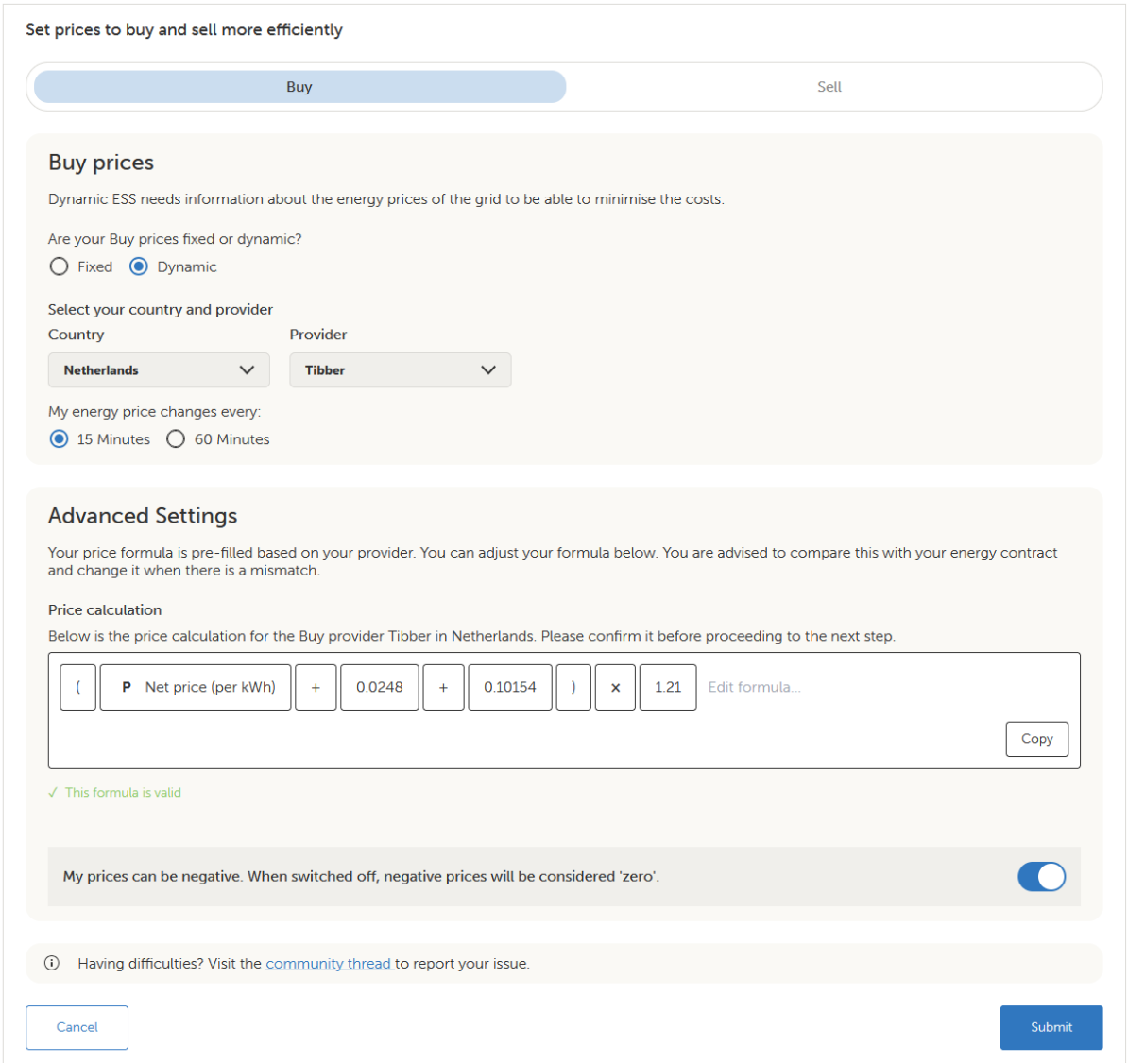
Battery cost formula:

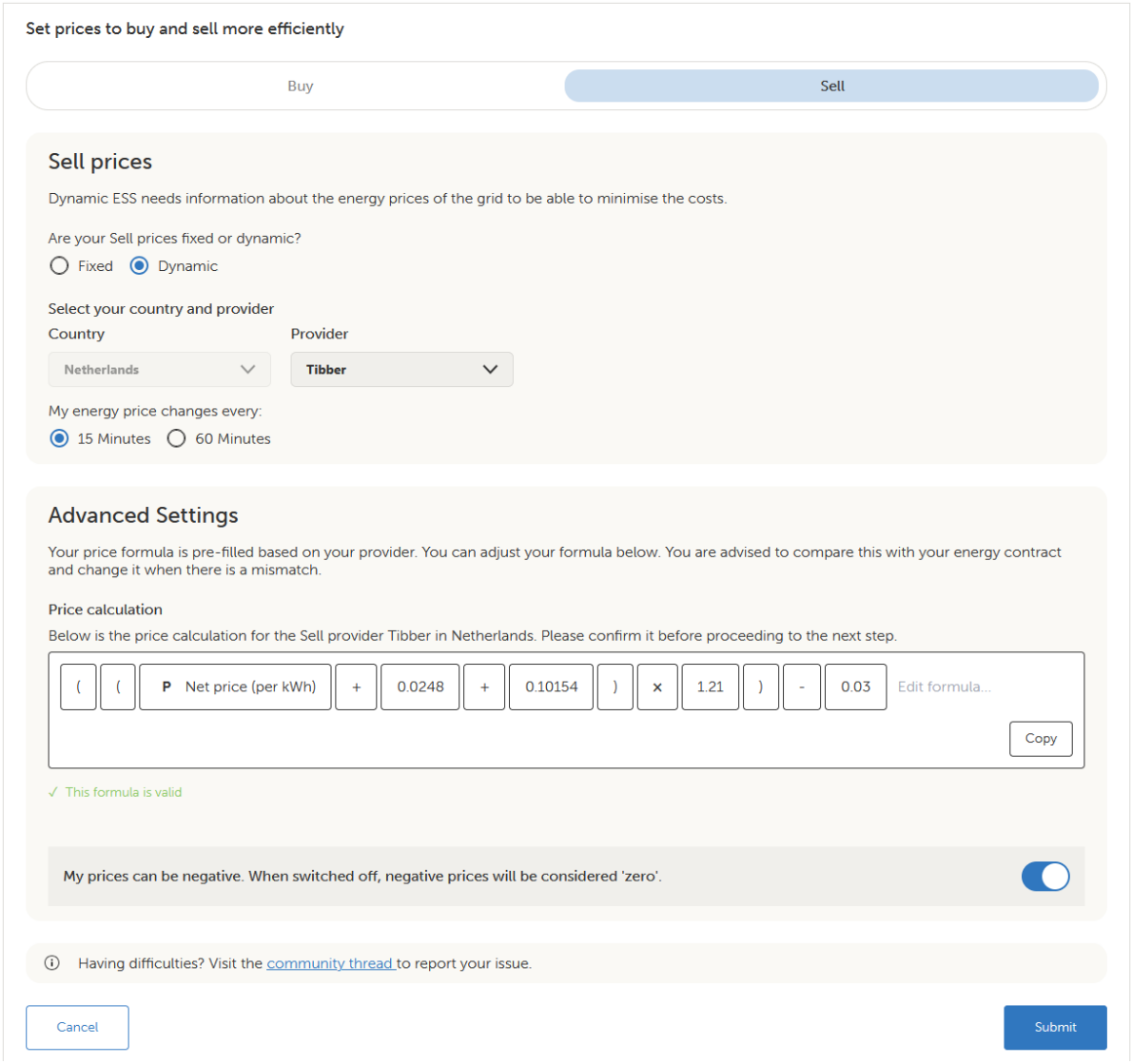
Purchase price (€) / (Cycle life × Battery kWh capacity)

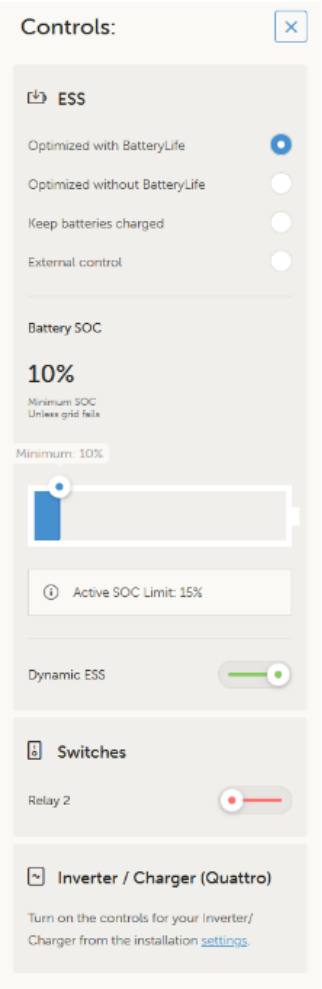


Configure Energy Prices

- Under Buy (& sell) prices, select whether your energy prices are Fixed or Dynamic.
- Choose your Country and Provider (e.g., Netherlands – Tibber).
- Set how often your energy price changes (15 min or 60 min).
- Review or adjust the price formula that Victron pre-fills based on your provider.
- Repeat the same process for Sell prices.
- Ensure both Buy and Sell formulas match your energy contract.
    - Verify that all formulas are valid (a green checkmark should appear).
    - Confirm that negative prices are handled according to your preference:
    - When off, negative prices are treated as zero.
- Click Submit to activate your Dynamic ESS configuration.




Set prices to buy and sell more efficiently
Buy
Sell
Sell prices
Dynamic ESS needs information about the energy prices of the grid to be able to minimise the costs.
Are your Sell prices fixed or dynamic?
Fixed
Dynamic
Select your country and provider
Country
Provider
Netherlands
Tibber
My energy price changes every:
15 Minutes
60 Minutes
Advanced Settings
Your price formula is pre-filled based on your provider. You can adjust your formula below. You are advised to compare this with your energy contract and change it when there is a mismatch.
Price calculation
Below is the price calculation for the Sell provider Tibber in Netherlands. Please confirm it before proceeding to the next step.
((P Net price (per kWh) + 0.0248 + 0.10154) × 1.21) - 0.03
Edit formula...
Copy
This formula is valid
My prices can be negative. When switched off, negative prices will be considered 'zero'.
Having difficulties? Visit the community thread to report your issue.
Cancel
Submit



Go to the Controls section.

- Under ESS, scroll down to find the Dynamic ESS slider.
- Switch the slider ON (green) to activate Dynamic ESS.
- Make sure Optimized with BatteryLife is selected as the operating mode.
- Keep all other settings (such as External control and Keep batteries charged) disabled.

Once activated, you can start configuring Dynamic ESS in the VRM portal.

Return to your VRM Home screen.

- You'll now see "External control" in the middle of your system diagram — confirming that Dynamic ESS is active.
- The system will now automatically optimize when to charge or discharge your battery based on live market prices.