Fortress Power - Victron Inverter Guide

Introduction

Battery Datasheets / Manuals: See "Downloads" section of individual product pages
Email: techsupport@fortresspower.com
Discord Support: https://discord.gg/kxX6QMjKFw
Phone: (877) 497-6937 x 2
Hours: 9:00AM - 6:00PM EST – Use Discord for After Hours / Weekends
Warranty Submittal: https://www.fortresspower.com/warranty/

Join Our Discord Chat

Step 1 – Getting Started. Turn each battery on individually while unpacking the batteries and note the voltage of each battery as well as the serial numbers. The batteries must be within +/- 0.5V of each other before commissioning. Turn off the batteries and install in parallel. Install the battery-to-battery communication cables and proceed with system commissioning.

Pro tip: If the battery voltages are significantly different, wire the batteries in parallel without communication cables and only turn on the lowest voltage battery. Use the inverter or external charger to charge the battery to the voltage of the 2nd lowest battery. Turn the 2nd battery on and charge the battery bank to the 3rd lowest battery voltage. Repeat until all batteries are at the same voltage. Keep total charging voltages under 15A per battery during this process**.**

Pro tip: If the batteries are just slightly outside the +/- 0.5V range, you can avoid using an inverter or an external charger to balance the batteries by only turning the lowest voltage batteries on (ONLY if within 0.5V relative to each other) and allowing those batteries to balance. Repeat this process with the highest voltage batteries. This brings the lowest and highest voltage battery towards to the middle of the group.

Pro tip: It is not usually necessary to apply a firmware update to Fortress batteries during system commissioning, but our installer firmware update tool can help speed up commissioning times.

Step 2 – Setup the Victron Hardware. Victron monitoring is supported with a variety of accessories. For closed loop operation the VE.CAN protocol needs to be implemented. This is supported with the Cerbo GX, CCGX, VenusGX, Octo GX, CANVU GX communication centers. It is recommended prior to commissioning the batteries you use VictronConnect to get the latest release of firmware loaded.

Power up the Victron Inverter from grid, generator, or batteries. This step can be done during pre-commissioning while running the batteries in "master only" mode (all batteries need to be within 0.5V), ahead of installing the battery communication circuits. Set up Victron Quatro Inverter using the VE Configure App or using the touchpad and buttons.

FORTRESS
POWER
Secure your energy

Fortress Power - Victron Inverter Guide

Setup the Inverter for Voltage control or open loop with the batteries

Voltage control or Open Loop values for Absorption and Float Voltage should be 54.40V

Absorption time and interval are set at 0.25 Hrs and 45 days

Charge current is dependent on type and number of batteries and Inverter

Quatro 48/3000 – 35A
Quatro 48/5000 – 70A
eFlex < 55A
eVault < 150A

Pro tip: If a BMS error occurs when powering up the inverter, turn the batteries off. Connect the inverter and any battery breakers so that power can flow from the batteries to the inverter. Turn the batteries back on again. Then power up the inverter again. You may need to repeat this process up to three times to pre-charge the inverter enough for it to power up.

Fortress Power - Victron Inverter Guide

Step 3 – Install the battery-to-battery communication circuit

When installing multiple batteries use standard ethernet cables to enable communication between them. Each Fortress Battery type (eFlex, eVault, eVault MAX) has unique communication requirements. If a single battery is being used skip this section.

eFlex:
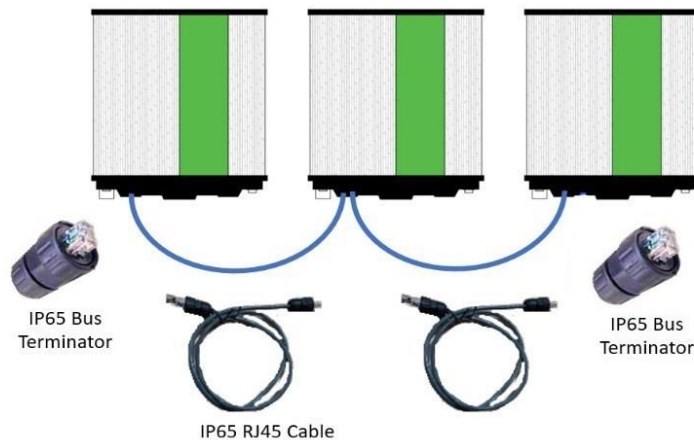
IP65 Bus Terminator + Cap. Installed on the last available communication port of the eFlex when paralleling multiple batteries.
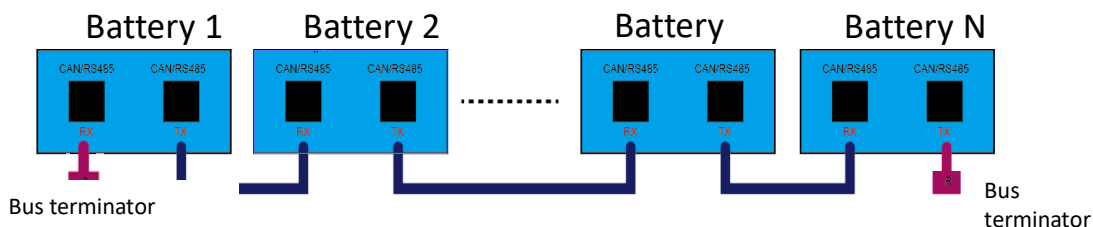

It does not matter which communication port you plug into on the eFlex – they are universal.

The batteries should Parallel with each other automatically. If a battery does not parallel the battery will disconnect and the BMS light (red) will turn on.

See product manuals for additional detail.

eVault

Bus Terminator. Installed on the last port of the eVault when paralleling multiple batteries.

It does not matter which communication port you plug into on the eVault– they are universal. The Bus terminator looks like a standard ethernet plug without a cable attached.

Fortress Power - Victron Inverter Guide

Set the battery number and identify specific battery to Master or slave on the front panel touchscreen
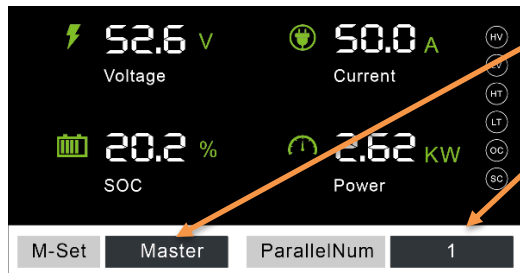
M-Set | Slave . One Battery is set to Master and all others are set to Slave. The Battery that is set to Master is typically at one end of the communication wiring.
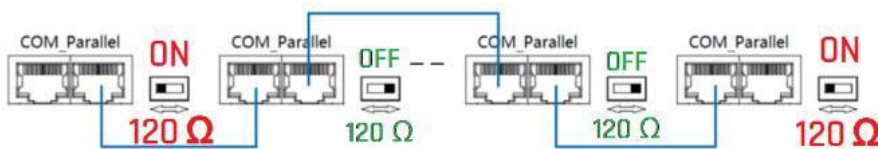
Parellel Num . This should be set to the total number of batteries being used. All batteries should have the same number

The batteries should Parallel with each other automatically. If a battery does not parallel the battery will disconnect and the Alarm light (red) will turn on.

NOTE: The eVault Classic can only parallel up to 2 eVaults when communicating to the inverter. If there are more than 2 eVaults run the system using this wiring (referred to as voltage mode or Open Loop).

 See product manuals for additional detail.

eVault MAX:

The eVault MAX has the bus terminators built into the unit. The two eVault MAX units on each end have the bus termination set to 120 (ON), all others set to OFF

It is does not mattery if termination is set to 120 or OFF when installing only one eVault MAX.

Set the battery ID to sequential numbers on each battery (1, 2, 3, 4, … number of batteries in the bank) using the front panel touchscreen.

NOTE: Protocol ID for Victron this is set to 4

The batteries should Parallel with each other automatically. If a battery does not parallel the battery will disconnect and the Alarm light (red) will turn on.

Fortress Power - Victron Inverter Guide

Skip to Step 6 if you are using eVault classic

Step 4 – Battery-to-Inverter communication setup

The Fortress batteries communicate with Victron GX using three wire CAN bus.

Closed loop communication between the Fortress eFlex and eVault MAX Batteries and Victron Inverter uses the VE.CAN bus. This is provided only on Victron GX communication modules. A unique communication cable and communication protocal is used to connect eFlex or eVault MAX batteries with Victron VE.Can. The setup is shown below for each battery

NOTE: eVault batteries are supported with Victron Inverters in voltage mode only.

Standard ethernet cables can be used to make the custom cable. This conversion can be made in the field with locally procurable items, but registered Fortress installer-dealers can also purchase pre-made cables at https://fortresspower.com/shop.

eFlex:

Modified Battery-to-Inverter Communication cable

eFlex RJ45 pins 4+5 correspond to Victron pins 7+8
Cut a standard ethernet cable
cut out wires 1+2+3 and 6+7+8, these are not used
cross wires connecting 4+5 on the eFlex to 7+8 in the Victron VE.Can port
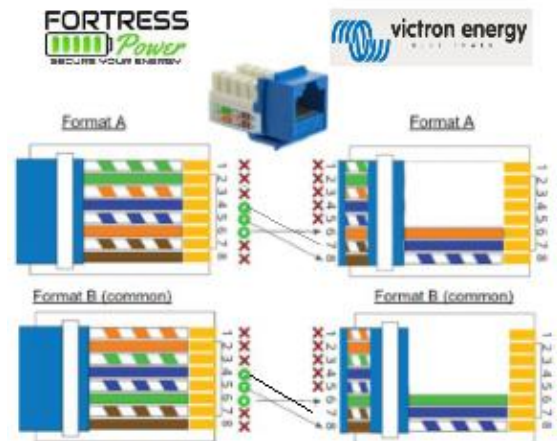
VE.Can

Fortress Power - Victron Inverter Guide

eFlex COMMUNICATION PROTCAL
Setting up closed loop with an eFlex requires running CANtool software. This is installed on a windows laptop to set the protocol ID. If you don't have a CANtool contact Fortress Power.

eFlex CAN Bus protocol is set using the BMS tool to a unique setting of 3 using following steps
1) All batteries on and connected to the fortress Can tool
2) With the BMS tool on the master (battery 01) select UPS WIFI
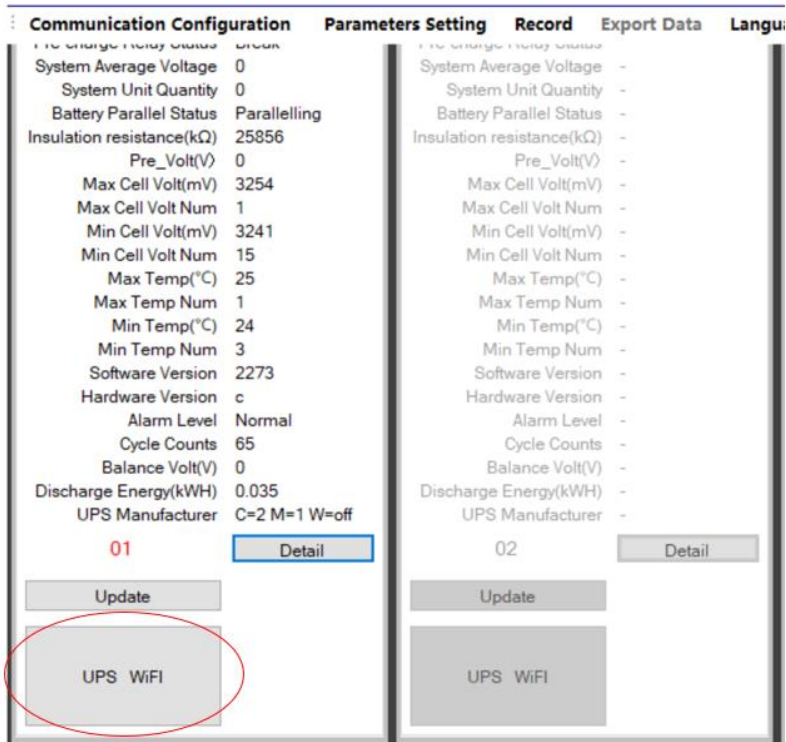
3) Change UPS CAN from 1 to 3 them Set
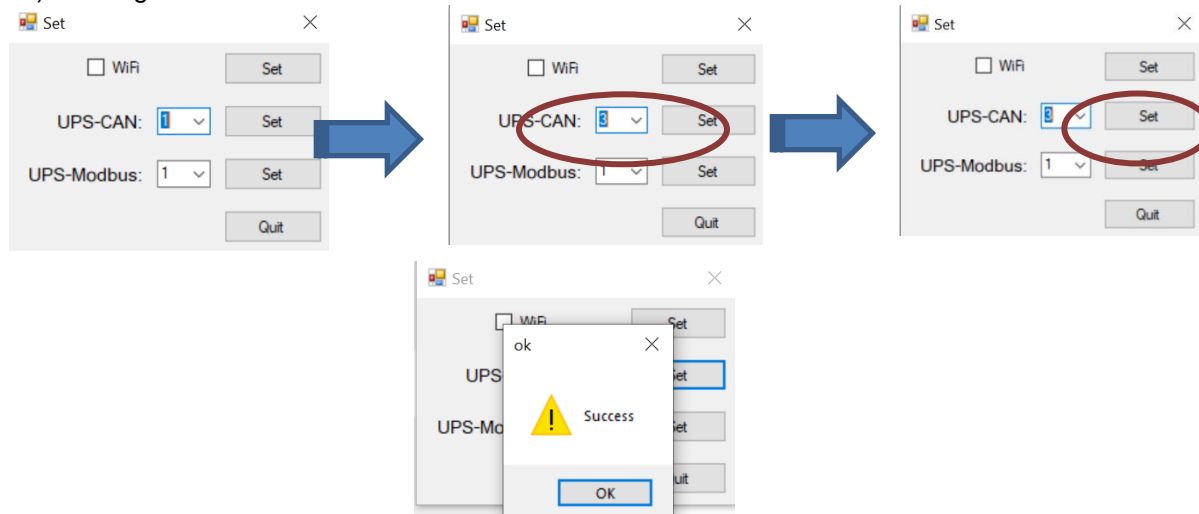
Fortress Power - Victron Inverter Guide

eVault MAX:
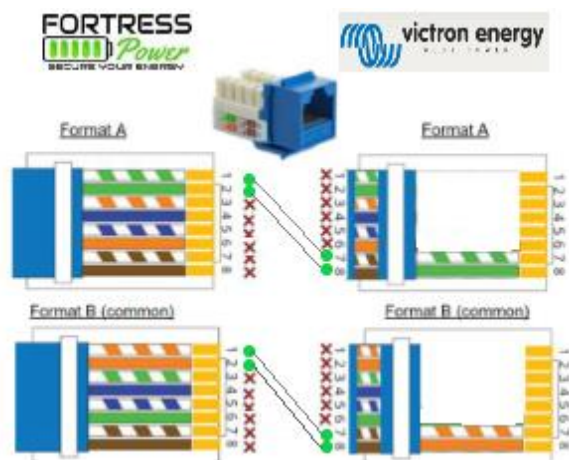
Modified Battery-to-Inverter Communication cable

eVault Inverter CAN port pins 1+2 correspond to Victron pins 7+8.
cut a standard ethernet cable,
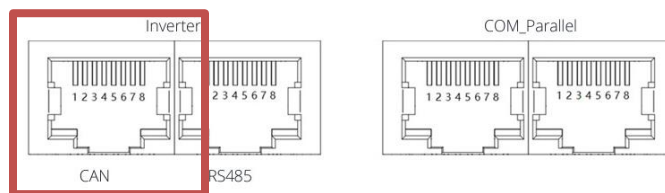cut out wires 3+4+5+6+7+8
cross wires connecting 1+2 on the eFlex to 7+8 in the Victron VE.Can port.

Note: nothing is connected to eVault Inverter RS485 port

The eVault MAX has dedicated a dedicatedport for inverter communication.
Connect the modified communication cable from the eVault Max Inverter CAN port to VE.CAN

If more than one eVault is being used the modified Inverter cable connects to eVault Battery number 1

eVault MAX COMMUNICATION PROTCOL
eVault MAX VE.CAN Bus protocol is used with the unique setting of 4

Protool ID is set to 4 for Victron GX using the front panel touchscreen.

FORTRESS POWER
Secure your energy

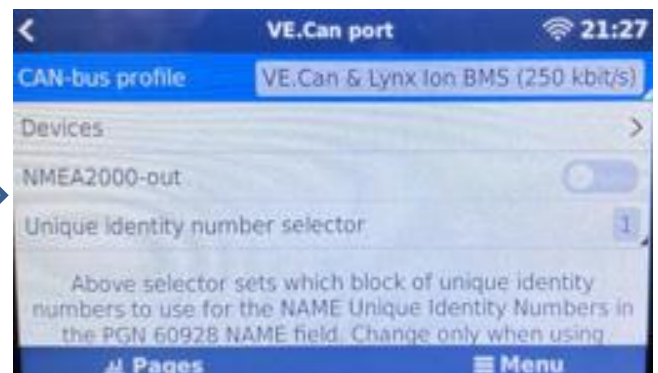## Fortress Power - Victron Inverter Guide

Step 5 – Configure the Victron GX for Closed Loop operation
Using Victron GX Touch or other interface set VE Can port for VE.Can & CAN-bus BMS (250 kbit/s)

On the GX display go to Settings then select Services
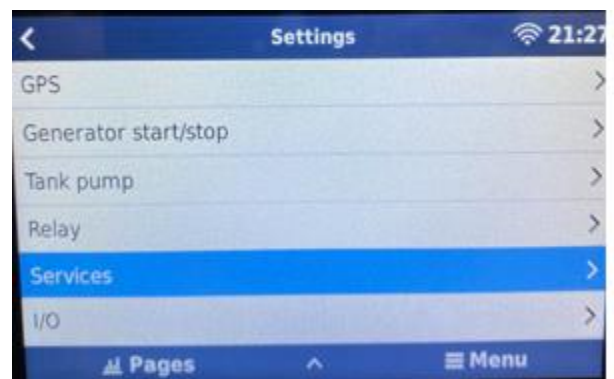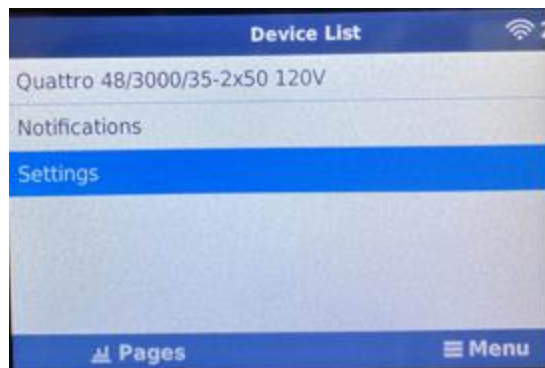
Then select CAN Port and CAN BUS profile

Then select VE.Can & CAN-bus BMS (250 kbit/s) and verify on main menu CAN-bus BMS battery data
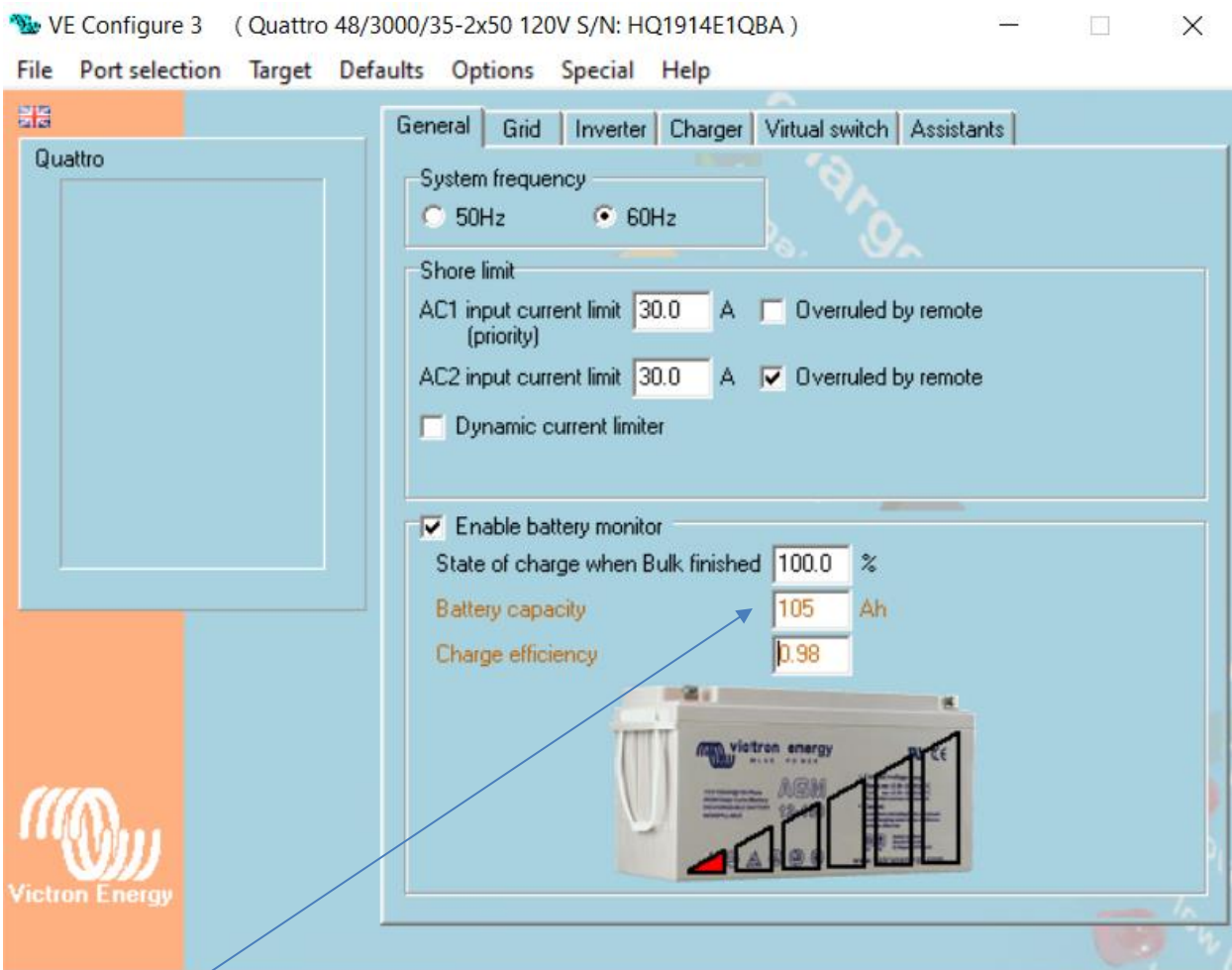
Fortress Power - Victron Inverter Guide

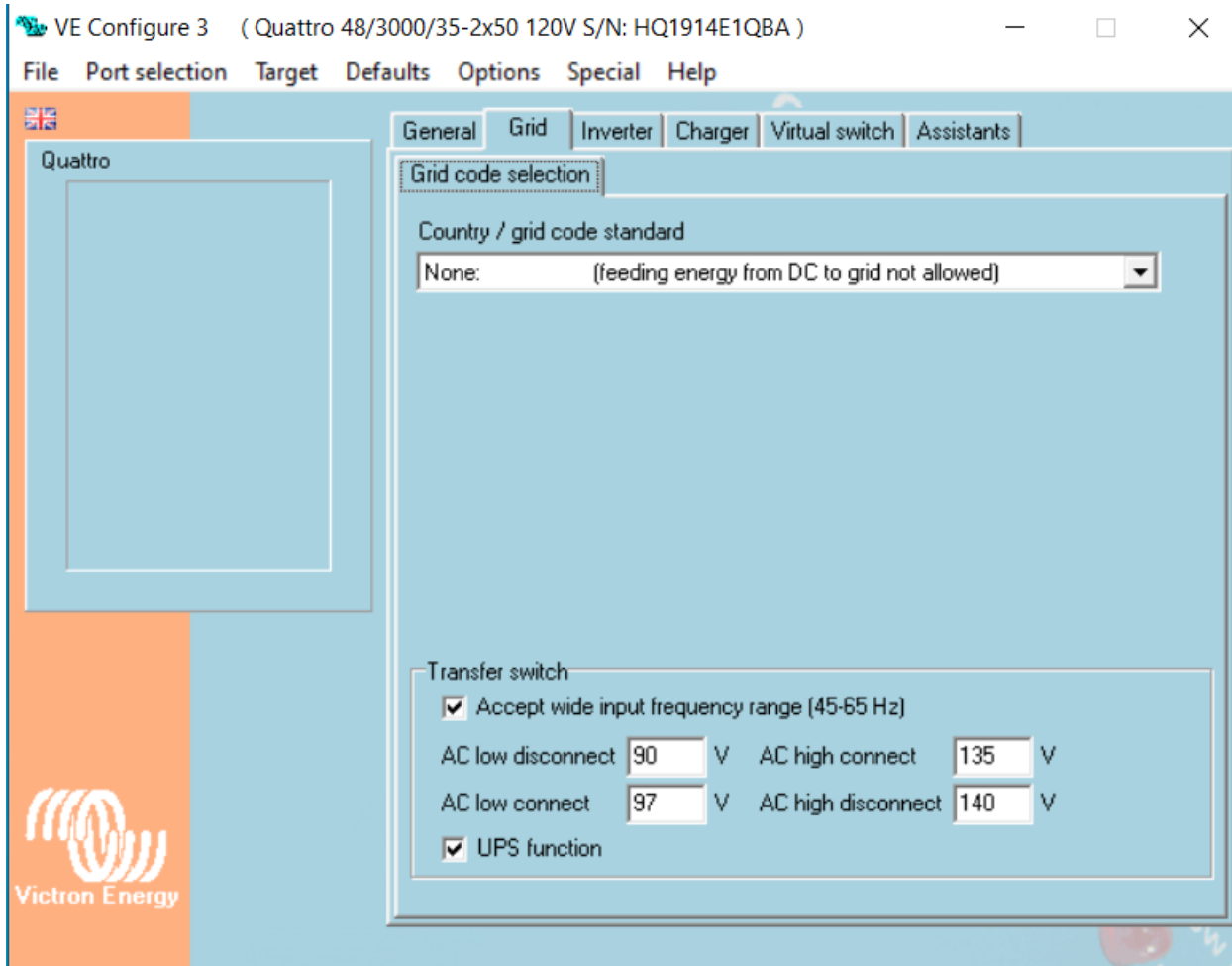## Step 6 – Setup Victron using VE Configure

The following parameters listed are for Quatro 48/3000
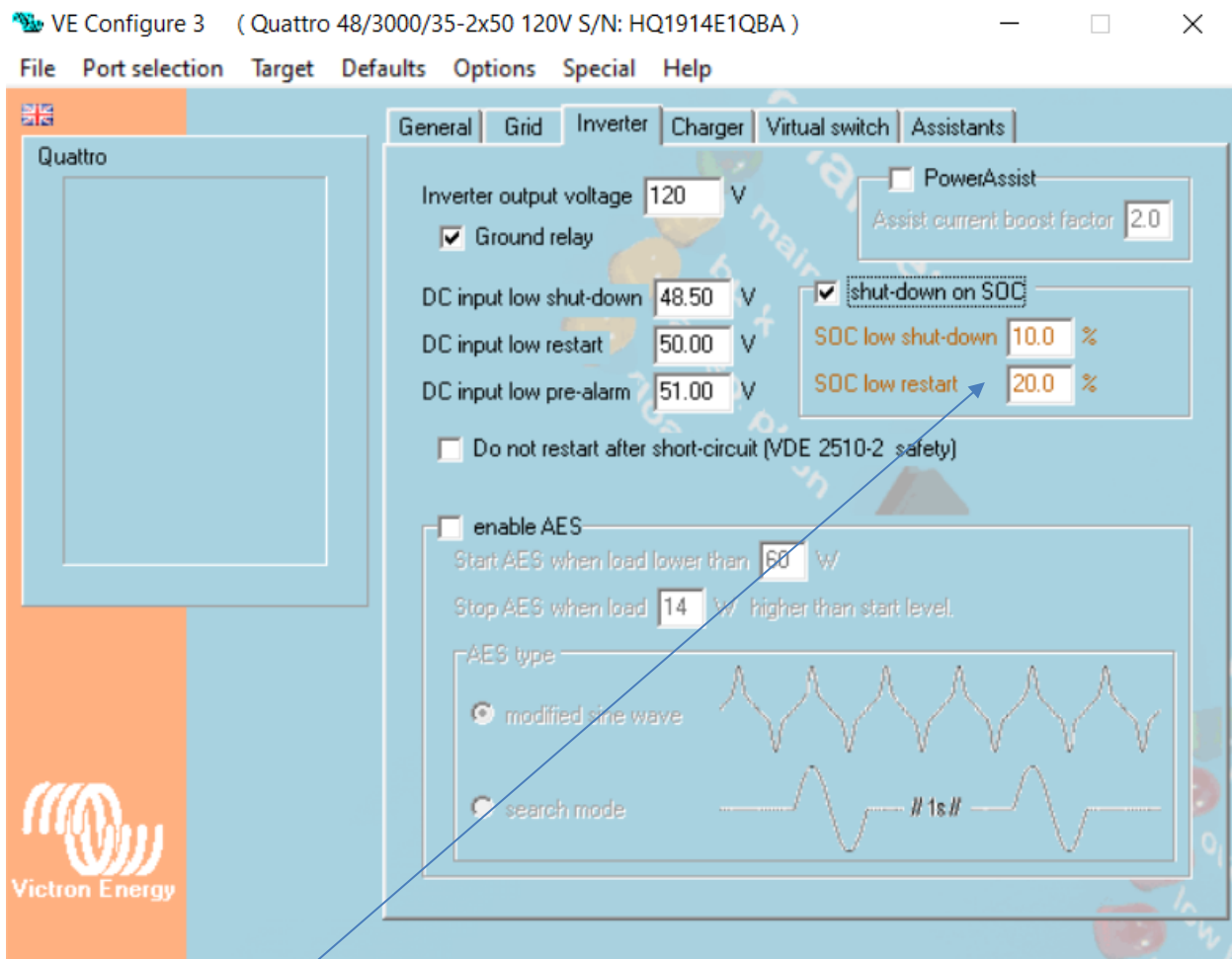

105/eFlex
315/eVault Max

FORTRESS POWER
Secure your energy

Fortress Power - Victron Inverter Guide

Grid Tab.

VE Configure 3   (Quattro 48/3000/35-2x50 120V S/N: HQ1914E1QBA)   — ☐ ✕

File   Port selection   Target   Defaults   Options   Special   Help

Quattro

General | Grid | Inverter | Charger | Virtual switch | Assistants

Grid code selection

Country / grid code standard

None: (feeding energy from DC to grid not allowed)   ▼

Victron Energy

Transfer switch
☑ Accept wide input frequency range (45-65 Hz)

AC low disconnect [90] V   AC high connect [135] V

AC low connect [97] V   AC high disconnect [140] V

☑ UPS function

Fortress Power - Victron Inverter Guide

Inverter Tab.

Set SOC Levels

FORTRESS POWER *Secure your energy*

Fortress Power - Victron Inverter Guide

Charger Tab.
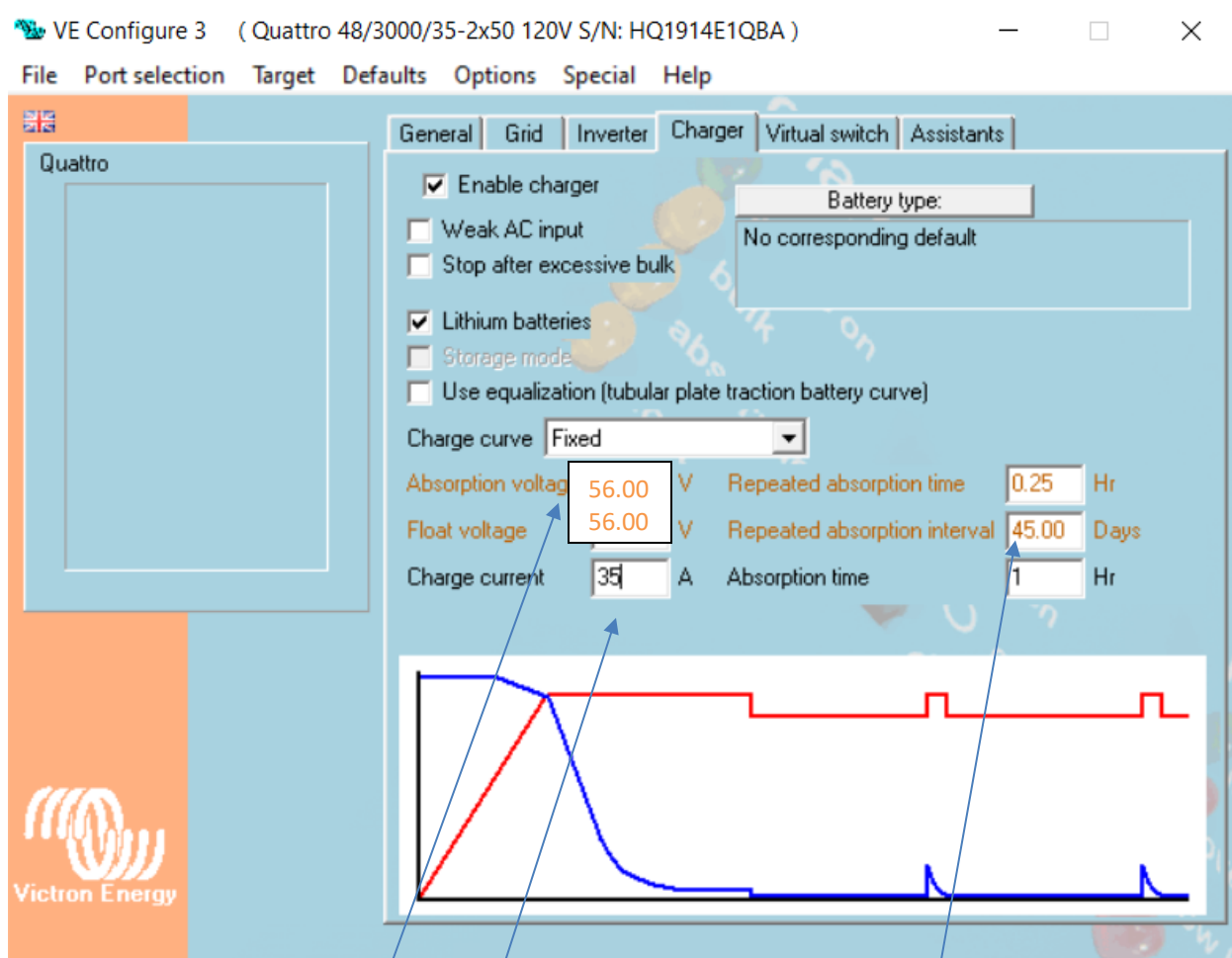
Set Absorption and Float voltage
    Increase to 56.00V for Closed Loop

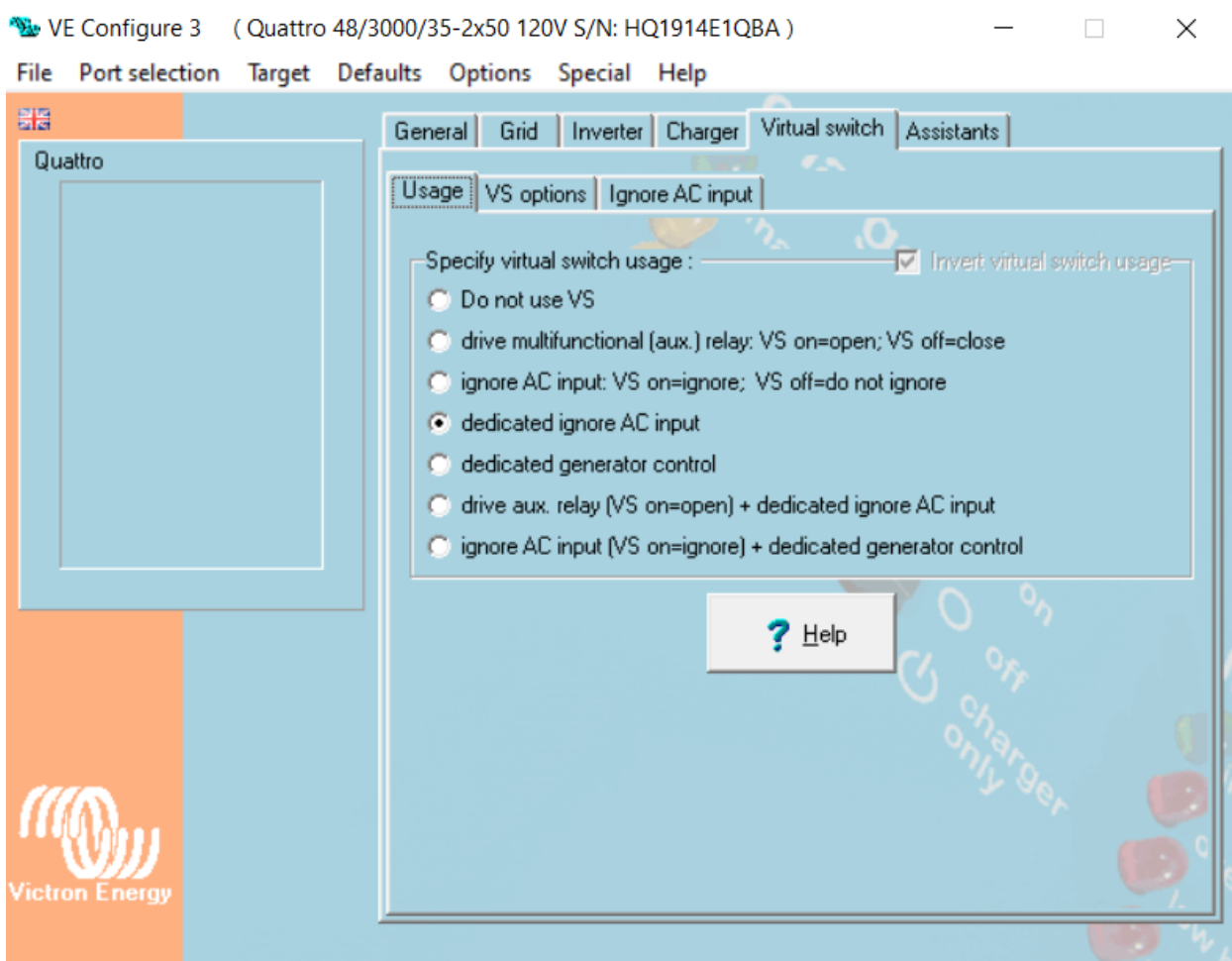Absorption is set at minimum levels

Inverter specific/how many batteries
    Charge current is set by inverter type and batteries
        Quatro 48/3000 – 35A
        Quatro 48/5000 – 70A
        eFlex < 55A
        eVault < 150A

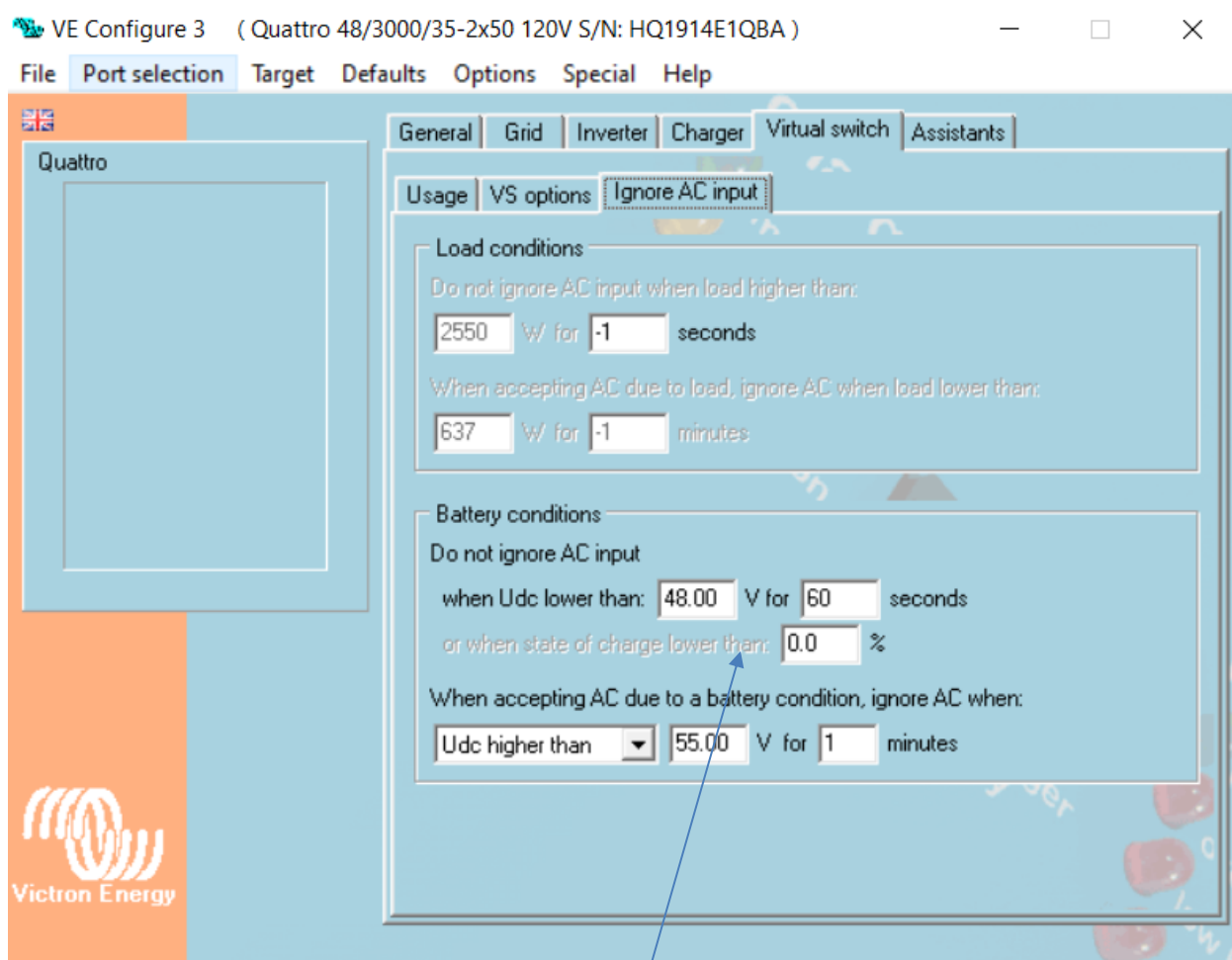# Fortress Power - Victron Inverter Guide

Virtual Switch.

This is used to for setting up a dedicated "AC Ignore", which is used for Load Shaving or Daily Battery cycling

Customer application specific (see next images)

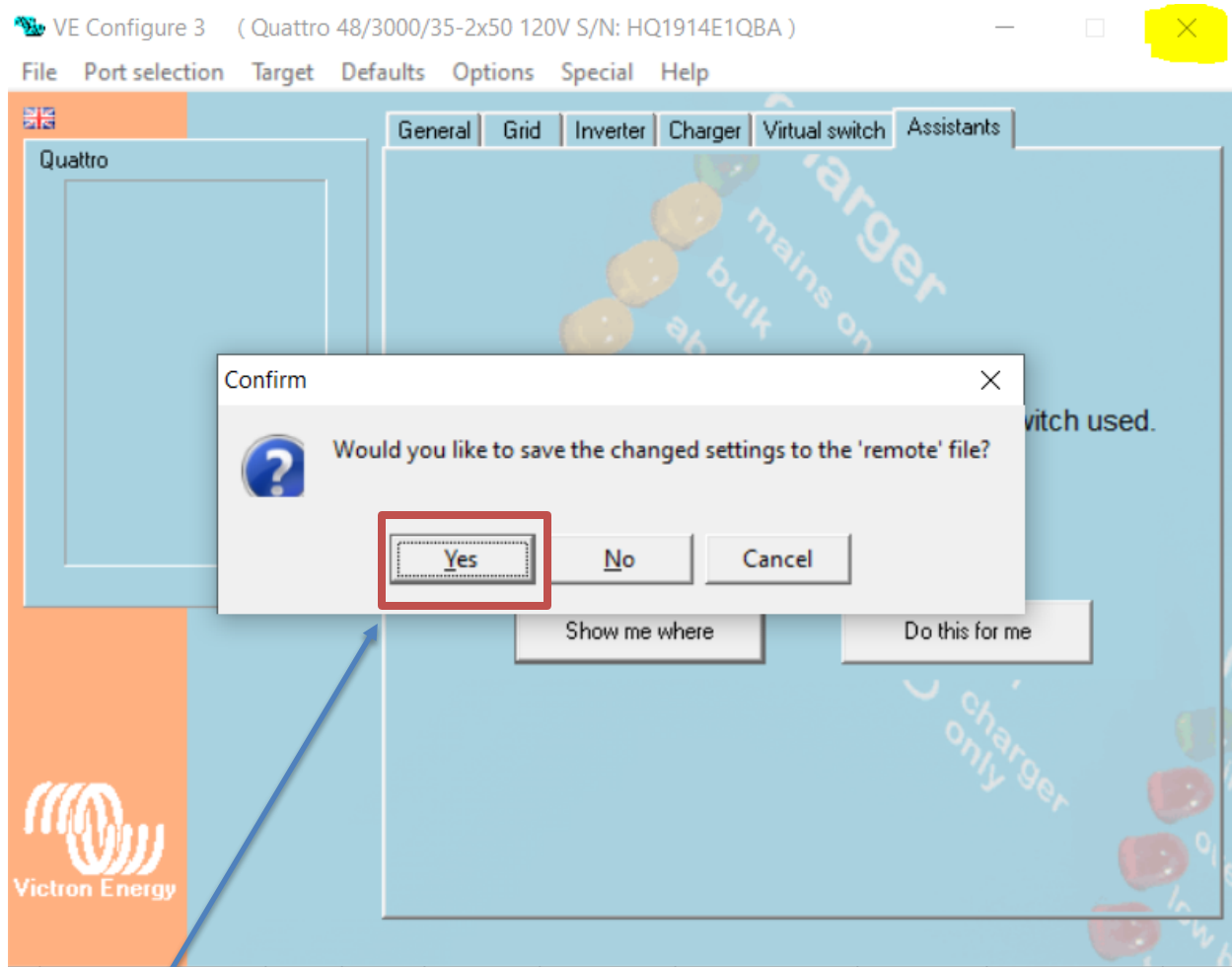## Fortress Power - Victron Inverter Guide

Virtual Switch continued

Customer application specific: Sets grid charging values

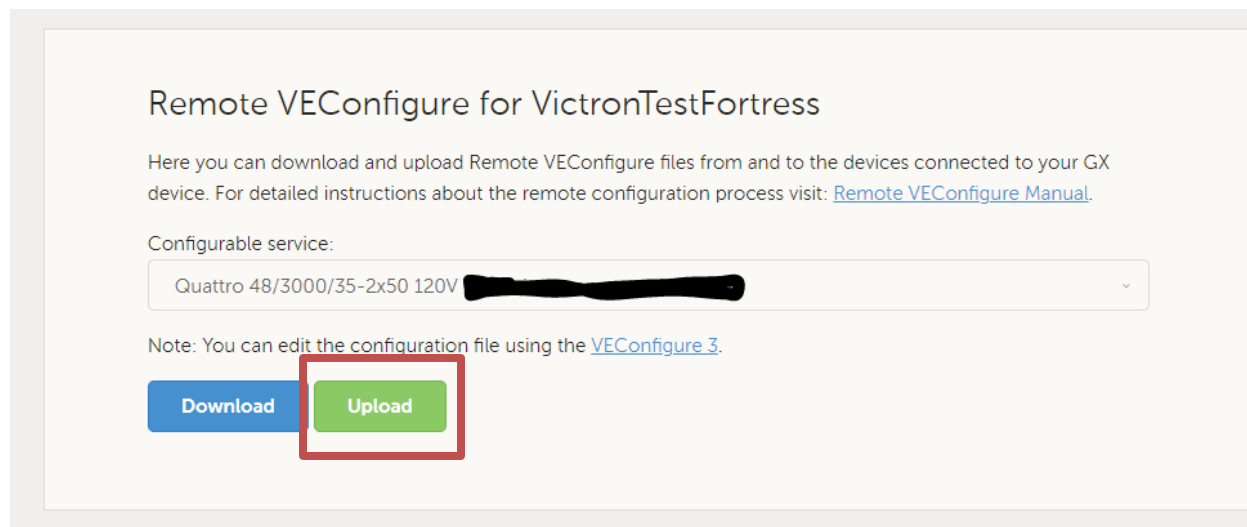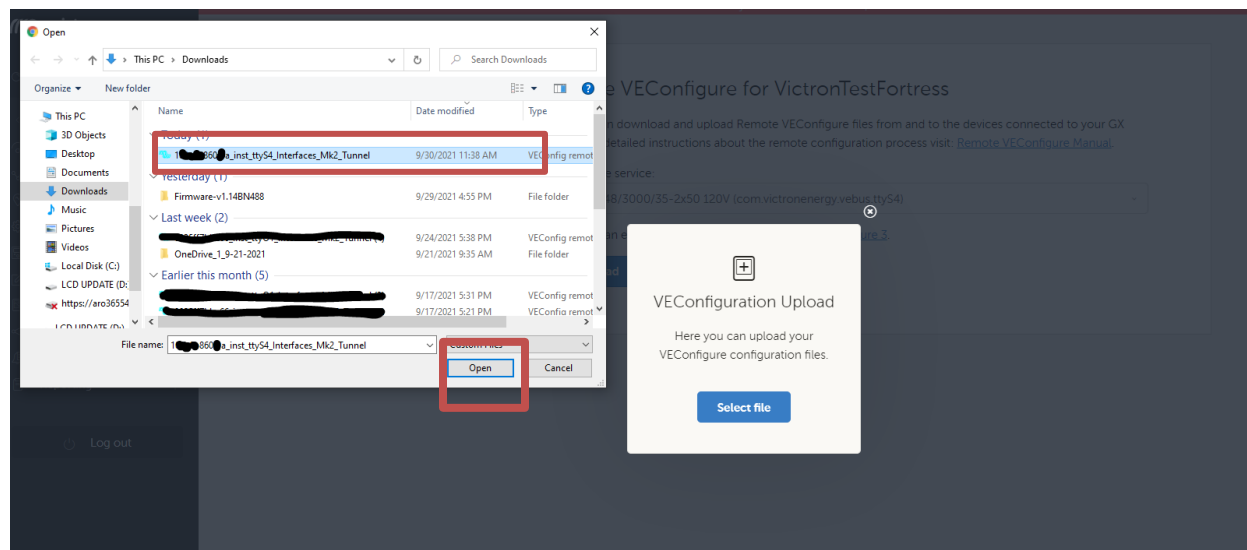**Fortress Power - Victron Inverter Guide**

SAVING the Setup

Select YES

Fortress Power - Victron Inverter Guide

Finishing up

Upload the specific file that you saved

Your Device is now configured and can be commissioned

FORTRESS POWER
Secure your energy

Fortress Power - Victron Inverter Guide

Steps 8 - Verification:

Confirm all batteries are "working" before leaving site by confirming amperage is flowing in or out of each battery. If the battery is showing 0 amps while other batteries are working, then that battery has not been commissioned correctly.

eFlex + Instructions

On eFlex batteries, apply a charge current and confirm the state-of-charge light is blinking on each battery or confirm using the Fortress firmware update tool.
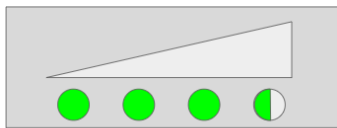
A blinking State of Charge Indicator Light confirms that the eFlex is charging.

eVault MAX / Classic Instructions

Touch the LCD screen to see that amperage is flowing in or out of each eVault. If either eVault is not turning on, switch the master-slave roles on the eVaults in the communication circuit and power cycle the batteries.

Fortress Power - Victron Inverter Guide

Step 9 – Updating firmware (optional):

All Fortress batteries are now shipping with firmware necessary for closed-loop communication with Victron inverters. While firmware updates are not something an end user should regularly perform, installers get in the habit of bringing the Fortress firmware update tool and Windows laptop to site during any site visit to update battery firmware and access detailed battery information that can speed up commissioning and diagnostics. Do not update battery firmware while the battery is under load.

Fortress installers should request a firmware update tool at https://www.fortresspower.com/support by filling out a support ticket. End users and installers who have not filled out the dealer form may purchase the tool for ~$50 by filling out the support ticket.

Visit https://www.fortresspower.com/firmware for instructions.

Step 10 – Operating in Voltage Based Control (for paralleled eVault Classics):

The eVault Classic BMS is not capable of BMS control. Voltage controls can actually be more accurate when the battery is near full or near empty – there is little if any real function difference between running in %-based BMS control or voltage based control. Use this chart to approximate battery voltage and state of charge for "Grid Limiter" settings. Also, change the float and absorption charge to 54.4V instead of 56V.

SOC (%)	Cell Voltage	Unit Voltage
0	< 2.8	<48.5
5	3.05	48.8
10	3.2	51.2
15	3.23	51.68
20	3.24	51.84
25	3.26	52.16
30	3.27	52.32
35	3.27	52.32
40	3.28	52.48
45	3.29	52.64
50	3.29	52.64
55	3.3	52.8
60	3.3	52.8
65	3.3	52.8
70	3.3	52.8
75	3.31	52.96
80	3.32	53.12
85	3.32	53.12
90	3.32	53.12
95	3.33	53.28
100	3.5	54.4

Congratulations on reading the entire Fortress / Victron integration guide. Don't forget to join our Discord chat group.

505 Keystone Rd, Southampton, PA 18966 ● **(877) 497 6937**● sales@fortresspower.com ● Fortresspower.com