



Best Solution Lithium Battery

BSLBATT & VICTRON
Installation Manual
7kw
V1.3



victron energy
B L U E P O W E R

SAFETY GUIDELINES

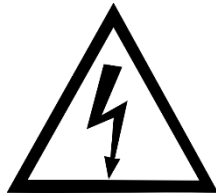


Work or maintenance on the BSLBatt should be carried out by qualified personal only.

Do not attempt to open or dismantle battery and / or cells.



The electrolyte contained in the battery cells is highly corrosive. In the event of any damage to or leakage from cells, treat contents with care, do not allow contact with exposed skin or eyes. **DO NOT INGEST!**



The Terminals of the BSLBatt should always be considered live, therefore do not place tools or any other items across the terminals. Do not pierce, short or damage the terminals in any way. Do not touch the terminals of the battery.



Fire Hazard: Do not discharge battery below specified minimum level as this poses an increased fire risk. Do not attempt to charge a swollen or damaged battery. In the event of a fire, a CO₂ or Dry Powder extinguisher should be used. Class D extinguishers are not suitable.



Dispose of batteries through the proper local regulations. Not suitable for regular refuse / recycling.

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1. Pin-out Diagram

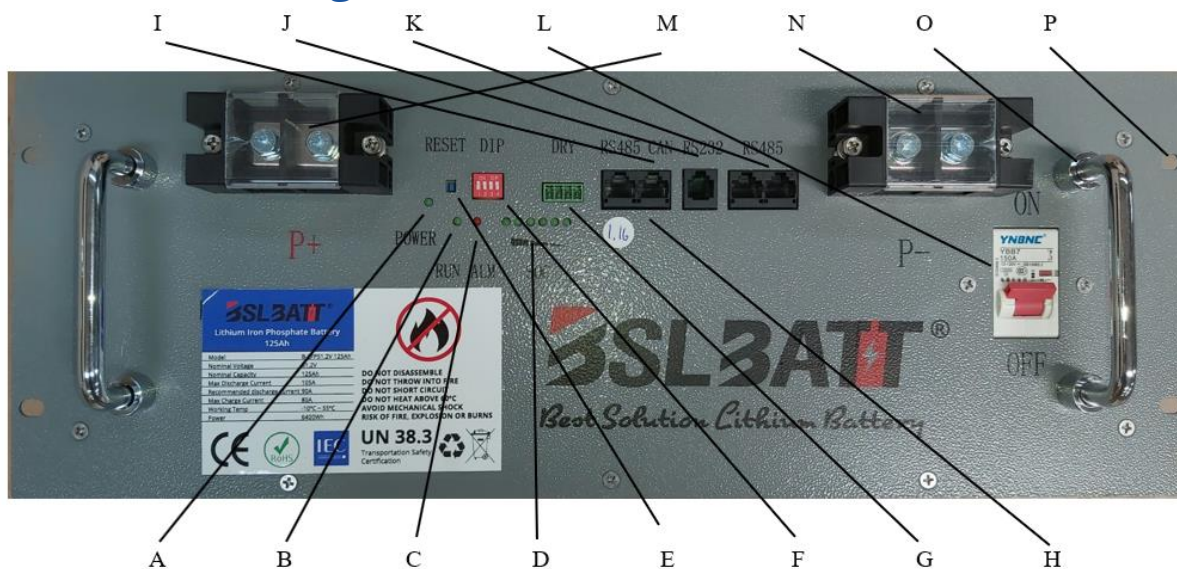


Figure 1: Pin-out diagram for 5.1kWh BSL Battery.

A	Power Indicator Light
B	Run Light (Battery activity)
C	Alarm indicator light
D	State of charge indicator lights
E	Reset Switch (BMS power on/off)
F	DIP switches for parallel connection
G	Dry contacts
H	RS485 left port (port 1)
I	CAN port (port 2)
J	RS232 programming port (port 3)
K	RS485 right ports (ports 4&5)
L	Circuit Breaker (Terminal power connect/disconnect)
M	Positive terminal
N	Negative Terminal
O	Carry handles
P	Mounting holes

2. Battery Set-up

2.1 General

2.1.1 Turning battery on & Off

The battery can be switched on or off by holding down the small recessed button marked "RESET" for around 3 seconds.

2.1.2 CAN Communication

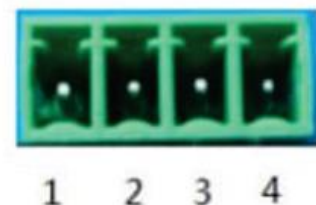
A VE.Can to CAN-bus BMS "Type B" cable is required for CAN-Bus communication between the BSL battery and the Victron GX device. Some inverters will use different cable configuration, please check this with inverter suppliers. (Black to inverter/GX device, red to battery).

Function	Victron <u>VE.Can</u> Side (GX)	Battery side
GND	Pin 3	Pin 2
CAN - L	Pin 8	Pin 5
CAN - H	Pin 7	Pin 4

2.1.3 Dry Contacts

Dry Contacts are mostly unused, but for communication with some non-smart systems please see the table below. Working current should be less than 2A, mainly to connect with an external indicator light or buzzer

PIN1 to PIN2	Always open, will close with low battery signal
PIN3 to PIN4	Always Open, will close with fault/protection signal.



2.1.4 Other Ports

Port 1 (RS485) and port 3 (RS232) are used for programming and retrieving information only and must be left open.

2.2 Multiple Batteries

2.2.1 Max Number of Parallel Batteries

A maximum of 15 batteries can be connected in parallel. Each battery will require a unique binary address which can be setup via the dip-switches located on the front of the battery.

2.2.2 Installing Multiple Batteries

When installing more than one battery in parallel, a standard RJ45 patch network cable will be required for inter-battery communication. These cables will need to be connected to port 4 or 5 between all the connected batteries. The ports are paralleled therefore any port can be used for in or out connection.

2.2.3 Cable Sizing with Multiple Batteries

It is recommended to make use of a common rail bus-bar when more than 4 batteries are to be installed. All positive cables running between the battery and bus-bar must be the same length and all negative cables must be the same length. The batteries should be evenly grouped where possible.

The recommended battery cable sizes from the batteries (going to the inverter) in parallel are as follows: 1 battery - 35mm², 2 batteries - 50mm², 3 batteries 70mm² or 2 × 35mm², 4 batteries - 95mm² or 2 × 50mm²

2.2.4 Dip Switch Settings for Multiple Batteries (5.1 kWh, 6.4 kWh, 10.2kWh)

Table 1: Dip-switch set-up for multiple batteries

Address	DIP Switch Position				Notes
	#1	#2	#3	#4	
-					-
1	ON	OFF	OFF	OFF	Master Pack
2	OFF	ON	OFF	OFF	Auxiliary Pack 1
3	ON	ON	OFF	OFF	Auxiliary Pack 2
4	OFF	OFF	ON	OFF	Auxiliary Pack 3
5	ON	OFF	ON	OFF	Auxiliary Pack 4
6	OFF	ON	ON	OFF	Auxiliary Pack 5
7	ON	ON	ON	OFF	Auxiliary Pack 6
8	OFF	OFF	OFF	ON	Auxiliary Pack 7
9	ON	OFF	OFF	ON	Auxiliary Pack 8
10	OFF	ON	OFF	ON	Auxiliary Pack 9
11	ON	ON	OFF	ON	Auxiliary Pack 10
12	OFF	OFF	ON	ON	Auxiliary Pack 11
13	ON	OFF	ON	ON	Auxiliary Pack 12
14	OFF	ON	ON	ON	Auxiliary Pack 13
15	ON	ON	ON	ON	Auxiliary Pack 14

2.2.5 Dip Switch Settings for Multiple Batteries (8.2 kWh, 15 kWh)

Table 2 Dip-switch set-up for multiple batteries

Address	DIP Switch Position						Notes
	#1	#2	#3	#4	#5	#6	
-							-
1	ON	OFF	OFF	OFF	OFF	OFF	Master Pack
2	OFF	ON	OFF	OFF	OFF	OFF	Auxiliary Pack 1
3	ON	ON	OFF	OFF	OFF	OFF	Auxiliary Pack 2
4	OFF	OFF	ON	OFF	OFF	OFF	Auxiliary Pack 3
5	ON	OFF	ON	OFF	OFF	OFF	Auxiliary Pack 4
6	OFF	ON	ON	OFF	OFF	OFF	Auxiliary Pack 5
7	ON	ON	ON	OFF	OFF	OFF	Auxiliary Pack 6
8	OFF	OFF	OFF	ON	OFF	OFF	Auxiliary Pack 7
9	ON	OFF	OFF	ON	OFF	OFF	Auxiliary Pack 8
10	OFF	ON	OFF	ON	OFF	OFF	Auxiliary Pack 9
11	ON	ON	OFF	ON	OFF	OFF	Auxiliary Pack 10
12	OFF	OFF	ON	ON	OFF	OFF	Auxiliary Pack 11
13	ON	OFF	ON	ON	OFF	OFF	Auxiliary Pack 12
14	OFF	ON	ON	ON	OFF	OFF	Auxiliary Pack 13
15	ON	ON	ON	ON	OFF	OFF	Auxiliary Pack 14
16	OFF	OFF	OFF	OFF	ON	OFF	Auxiliary Pack 15
17	ON	OFF	OFF	OFF	ON	OFF	Auxiliary Pack 16
18	OFF	ON	OFF	OFF	ON	OFF	Auxiliary Pack 17
19	ON	ON	OFF	OFF	ON	OFF	Auxiliary Pack 18
20	OFF	OFF	ON	OFF	ON	OFF	Auxiliary Pack 19
21	ON	OFF	ON	OFF	ON	OFF	Auxiliary Pack 20
22	OFF	ON	ON	OFF	ON	OFF	Auxiliary Pack 21
23	ON	ON	ON	OFF	ON	OFF	Auxiliary Pack 22
24	OFF	OFF	OFF	ON	ON	OFF	Auxiliary Pack 23
25	ON	OFF	OFF	ON	ON	OFF	Auxiliary Pack 24
26	OFF	ON	OFF	ON	ON	OFF	Auxiliary Pack 25
27	ON	ON	OFF	ON	ON	OFF	Auxiliary Pack 26
28	OFF	OFF	ON	ON	ON	OFF	Auxiliary Pack 27
29	ON	OFF	ON	ON	ON	OFF	Auxiliary Pack 28
30	OFF	ON	ON	ON	ON	OFF	Auxiliary Pack 29

3. Inverter Set-up

3.1 Batteries Per Inverter Size

3.1.1 5.1 kWh (100 Ah)

Inverter Size	Recommended Batteries	Minimum Batteries
15 kVA	4	3
10 kVA	3	2
8 kVA	2	2
5 kVA	2	1
3 kVA	1	1

3.1.2 6.4 kWh (125 Ah)

Inverter Size	Recommended Batteries	Minimum Batteries
15 kVA	4	3
10 kVA	3	2
8 kVA	2	2
5 kVA	2	1
3 kVA	1	1

3.1.3 7 kWh (135 Ah)

Inverter Size	Recommended Batteries	Minimum Batteries
15 kVA	4	3
10 kVA	3	2
8 kVA	2	2
5 kVA	2	1
3 kVA	1	1

3.1.4 8.2 kWh (160 Ah)

Inverter Size	Recommended Batteries	Minimum Batteries
15 kVA	3	2
10 kVA	2	2
8 kVA	2	1
5 kVA	1	1
3 kVA	1	1

3.1.5 8.8 kWh (172 Ah)

Inverter Size	Recommended Batteries	Minimum Batteries
15 kVA	3	2
10 kVA	2	2
8 kVA	2	1
5 kVA	1	1
3 kVA	1	1

3.1.6 10.2 kWh (200 Ah)

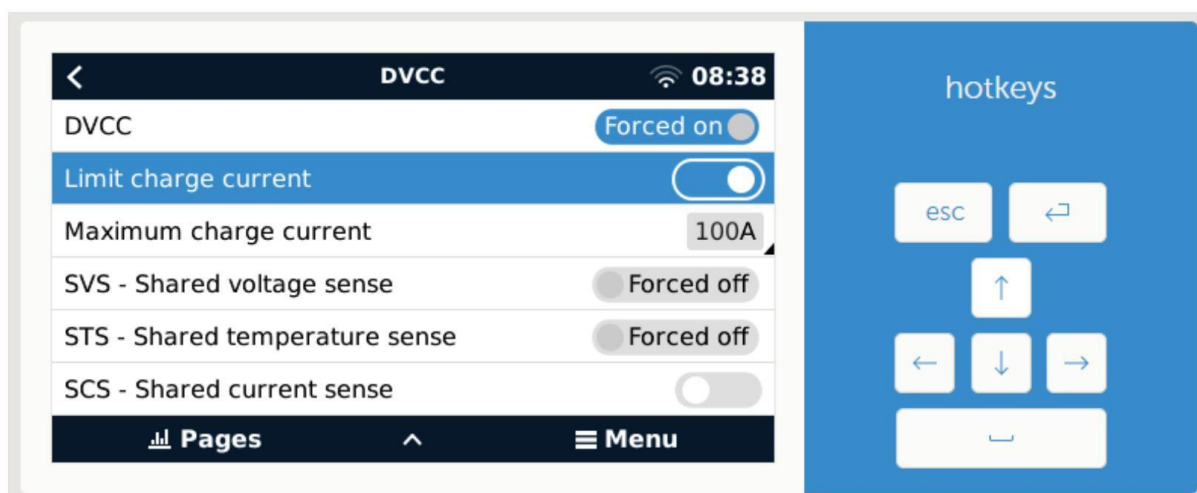
Inverter Size	Recommended Batteries	Minimum Batteries
15 kVA	4	3
10 kVA	3	2
8 kVA	2	2
5 kVA	2	1
3 kVA	1	1

3.1.7 15 kWh (300 Ah)

Inverter Size	Recommended Batteries	Minimum Batteries
15 kVA	2	2
10 kVA	2	1
8 kVA	1	1
5 kVA	1	1
3 kVA	1	1

3.2 Battery Set-up on Victron GX Device

1. The VE.Can to CAN-bus BMS Type B cable needs to be connected to the VE-Can port on the GX device and the second unused VE.Can port needs to be terminated with the Victron blue terminator. Ensure that the cable is marked CCGX at the end.
2. Press the enter button on the GX device. This should take you to the device list page. Scroll down to settings, press enter, and scroll to services and press enter again. Navigate to the CAN settings and change the CAN speed from 250 KB to 500 KB.
3. Scroll to DVCC and select Switch DVCC on. Flag SHARED VOLTAGE SENSE and CHARGE LIMIT. Set CCL (charge current limit) to 50% of battery capacity.
4. Navigate back to the device list and the BSL battery should appear on the device list.
5. Select the BSL battery set the parameters as follows:
 - Charge Voltage 54.5V.
 - Charge Current Limit: 50A per battery.
 - Discharge Current Limit: 150A per battery. (90Ah Recommended)



Please note to read point 5 in section 3.2 for correct charge/discharge current limits.

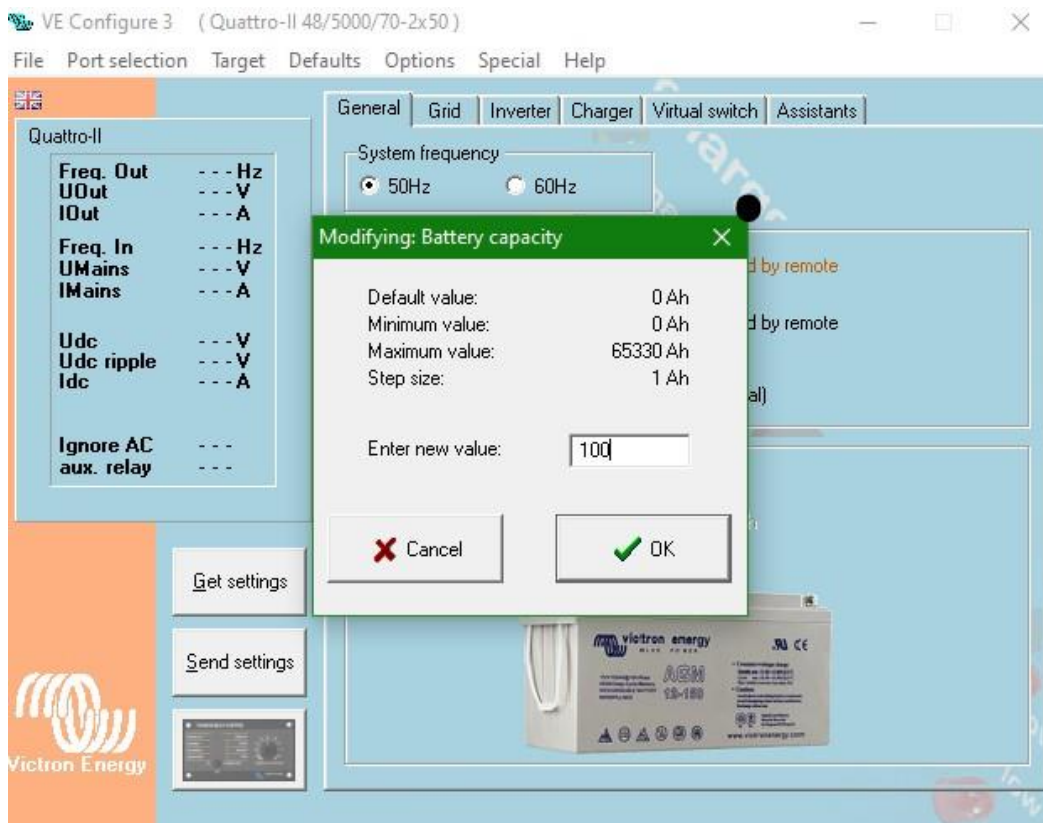
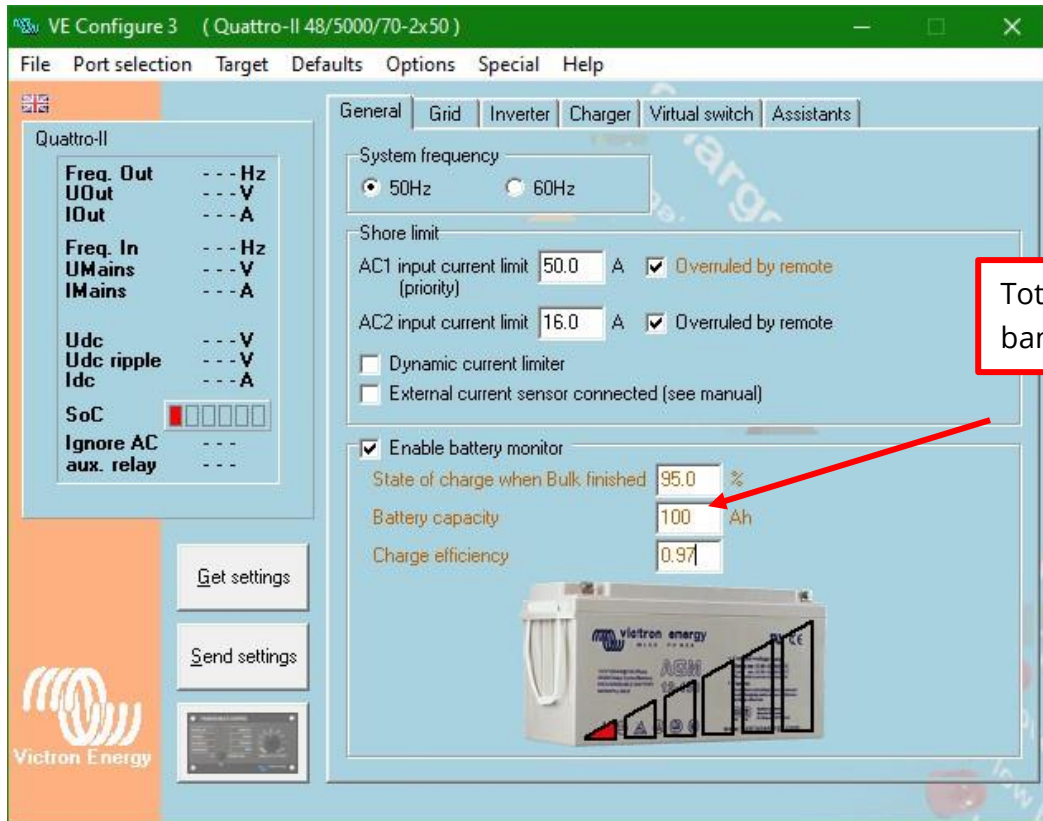
3.3 Battery Set-up on Victron MPPT Device

The screenshot displays the 'Settings' menu of a Victron MPPT device. The settings are organized into several sections:

- General Settings:**
 - Battery voltage: 48V (dropdown)
 - Max charge current: 100A
 - Charger enabled:
 - Battery preset: User defined (dropdown)
 - Expert mode:
 - BMS controlled: Yes >
- Charge voltages:**
 - Absorption voltage: 55.00V (checked)
 - Float voltage: 54.80V (checked)
 - Equalization voltage: 54.00V
- Equalization:**
 - Automatic equalization: Disabled
 - Manual equalization: [START NOW](#)
- Voltage compensation:**
 - Temperature compensation: Disabled
- Battery limits:**
 - Low temperature cut-off: 2°C (checked)

4. Inverter Settings (Victron)

4.1 General Tab



4.2 Grid Tab

The screenshot displays the 'VE Configure 3' software window for a 'Quattro-II 48/5000/70-2x50' inverter. The 'Grid' tab is active, showing the following configuration options:

- Grid code selection:** Country / grid code standard is set to 'Other: not compliant to any grid code standard'. A button for 'Show IP (NS) protection log' is present.
- AC input related settings:**
 - AC input 1: Above selected gridcode plus LOM B (safe)
 - AC input 2: Above selected gridcode plus LOM B (safe)
- Note:** Click [here](#) for more info on LOM.
- Transfer switch:**
 - Accept wide input frequency range (45-65 Hz)
 - AC low disconnect: 205 V
 - AC high connect: 253 V
 - AC low connect: 212 V
 - AC high disconnect: 258 V
 - UPS function

At the bottom of the window, a status bar indicates: **Changes require reset**

4.3 Inverter Tab

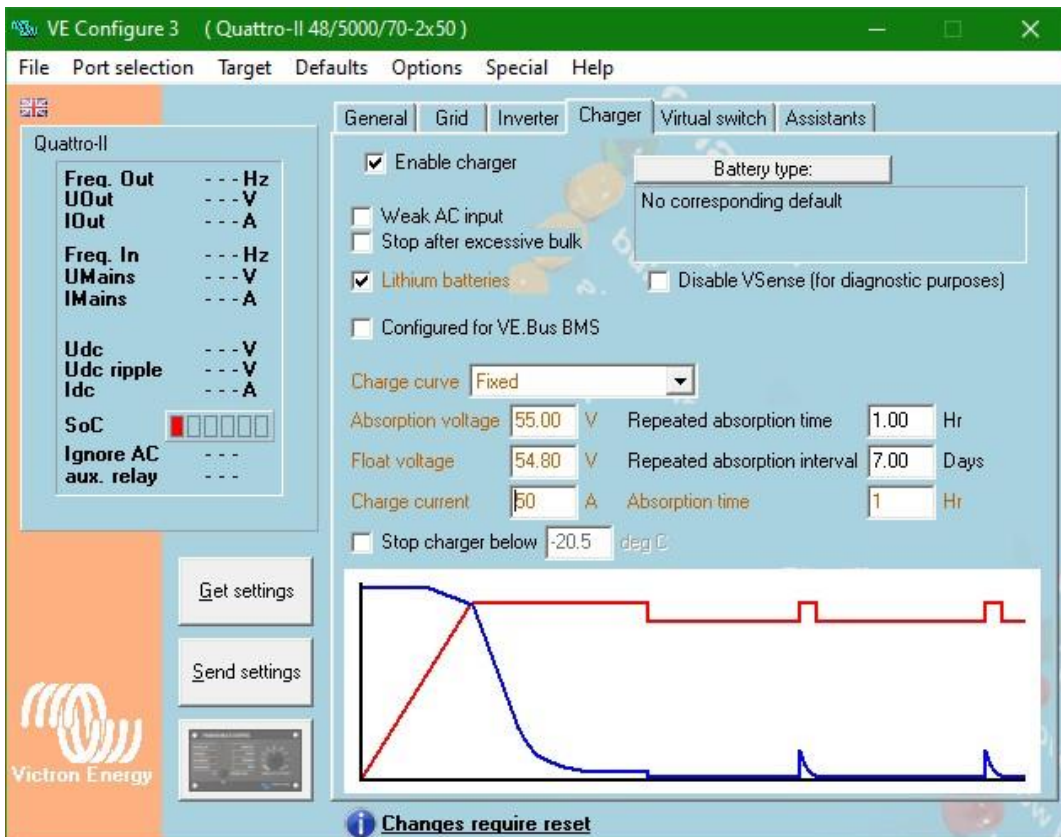
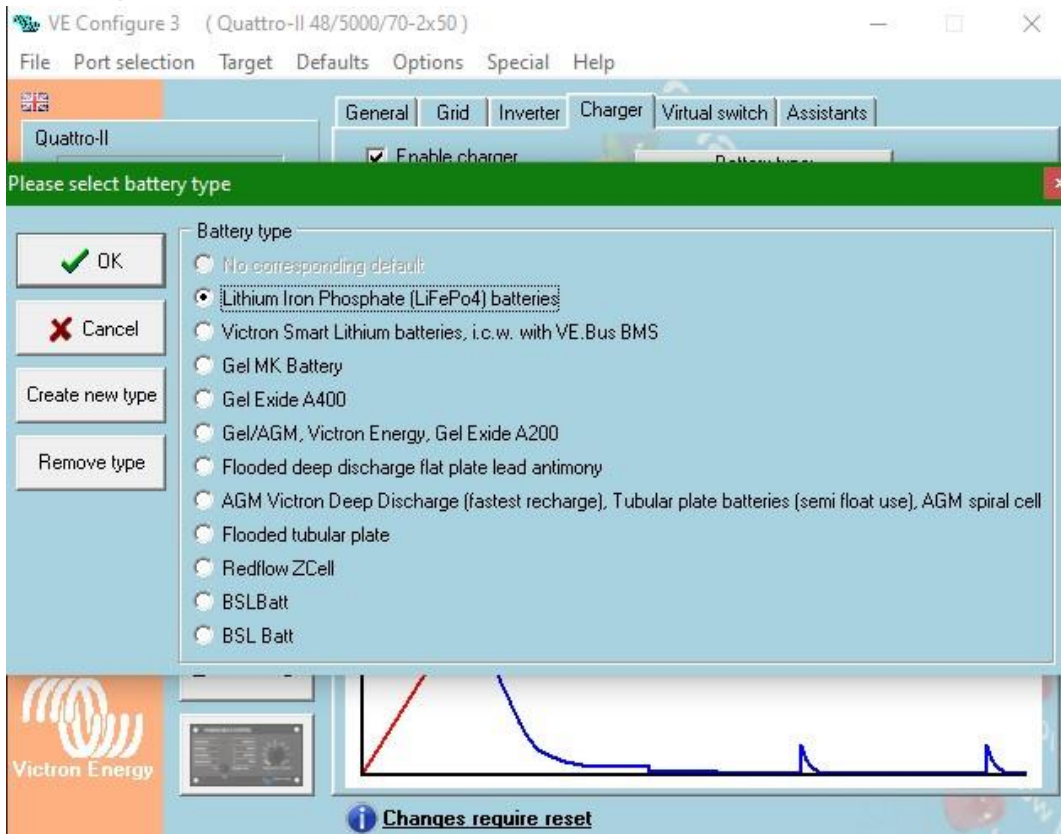
The screenshot shows the 'VE Configure 3' software window for a 'Quattro-II 48/5000/70-2x50' inverter. The 'Inverter' tab is selected, showing the following settings:

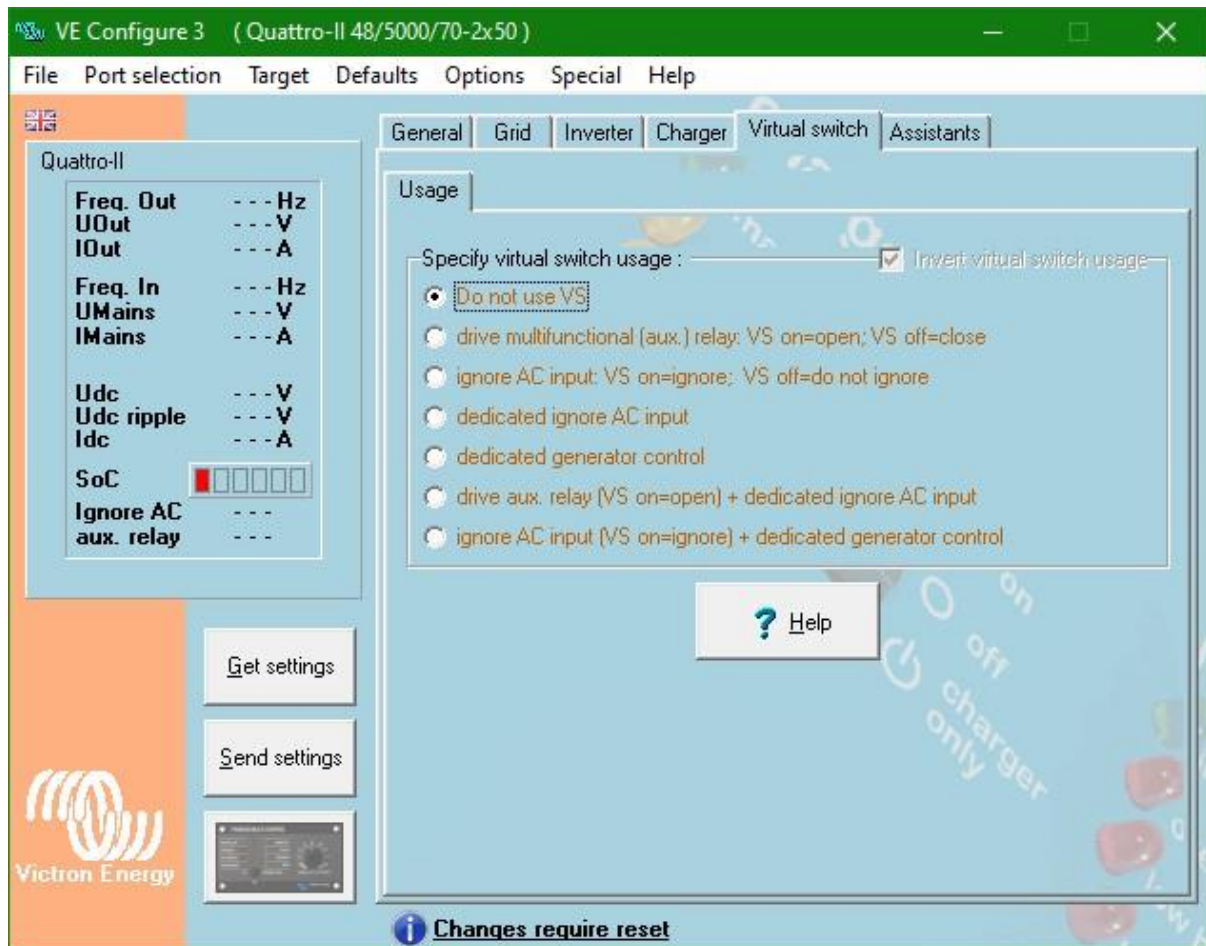
- General:**
 - Inverter output voltage: 230 V
 - Ground relay
 - DC input low shut-down: 48.00 V
 - DC input low restart: 52.50 V
 - DC input low pre-alarm: 51.00 V
 - Do not restart after short-circuit (VDE 2510-2 safety)
- Assistants:**
 - PowerAssist
 - Assist current boost factor: 2.0
 - shut-down on SOC
 - SOC low shut-down: 0.0 %
 - SOC low restart: 0.0 %
- enable AES:**
 - enable AES
 - Start AES when load lower than: 92 W
 - Stop AES when load: 46 W higher than start level
- AES type:**
 - modified sine wave
 - search mode

The sidebar on the left shows status indicators for Freq. Out, UOut, IOut, Freq. In, UMains, IMains, Udc, Udc ripple, Idc, SoC, Ignore AC, and aux. relay. The bottom status bar indicates 'Changes require reset'.

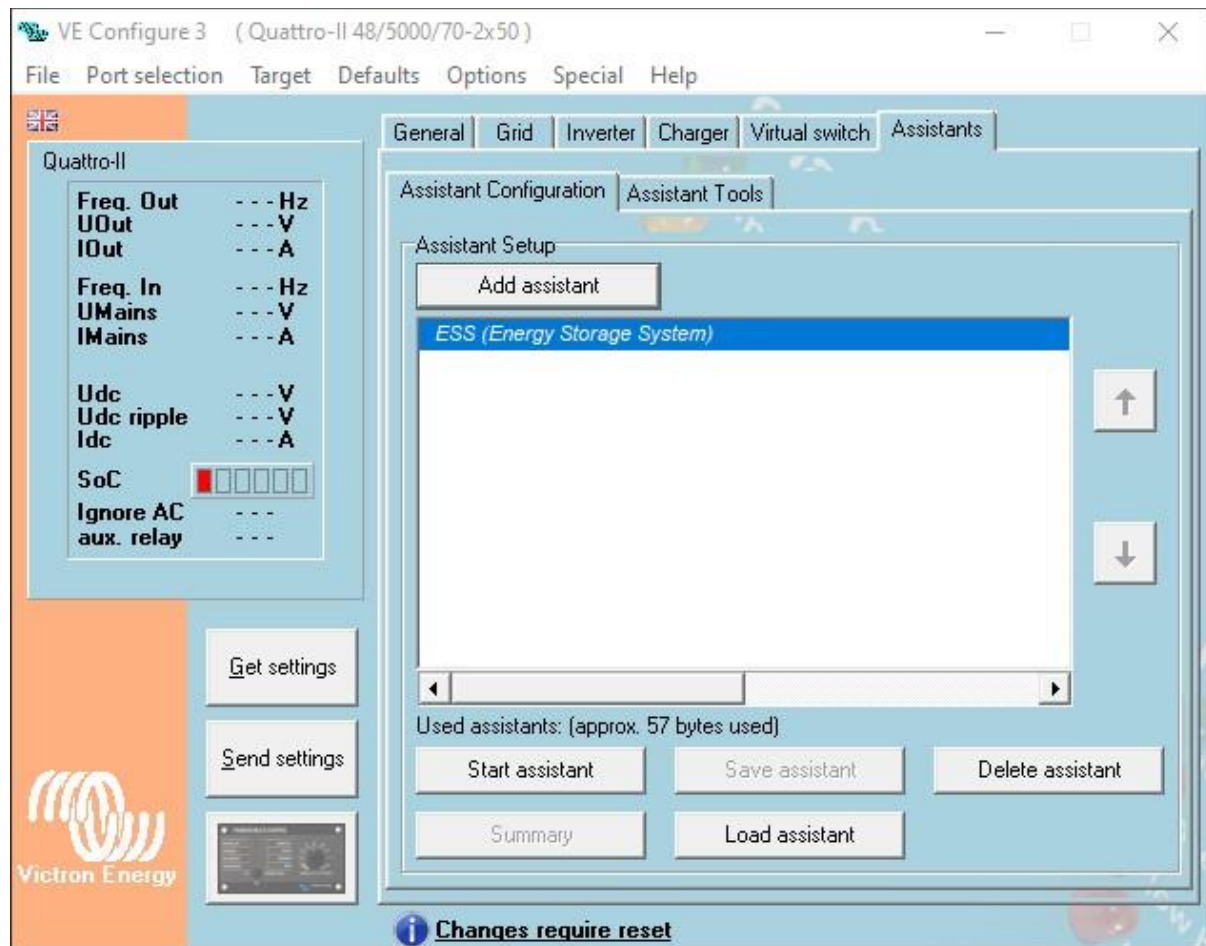
Please note: Shutdown on SOC unflagged.

4.4 Charger Tab





4.5 Assistant Tab (a)



Please note: Must add assistant and follow below configurations for setup

4.6 Assistant Tab (b)



4.7 Assistant Tab (c)



Please note: Battery capacity is full rated capacity on your bank to input above

4.8 Assistant Tab (d)



4.9 Assistant Tab (e)

VE Configure 3 (Quattro-II 48/5000/70-2x50)

File Port sel ESS (Energy Storage System)

Dynamic cut-off

This assistant uses so called dynamic cut-off.
That is, the 'DC input low shut-down' level depends on the battery discharge current.

There will normally be no need to adjust the curve used for this!
Just accept below values which are already optimized for the selected battery type.

In rare cases it might be advantageous to modify the curve. This can be done by changing the values below.

Note:
* Because dynamic cut-off is used, the "DC input low shut-down" related parameters in VEConfigure are ignored.

Cut off voltage for a discharge current of:

0.005 C	=	47.00	V
0.25 C	=	47.00	V
0.7 C	=	47.00	V
2 C	=	47.00	V

Cancel << >>

Summary Load assistant

Changes require reset

4.10 Assistant Tab (f)

The screenshot shows the VE Configure 3 software interface for a Quattro-II 48/5000/70-2x50. The 'Assistants' tab is active, and the 'ESS (Energy Storage System)' window is open. The 'Restart offset' parameter is being configured. The text in the window reads: "When inverting is stopped due to low battery, the battery voltage must rise above a certain level before inverting is allowed again. This level is determined as an offset to cut-off(0). (cut-off(0) is the cut-off voltage corresponding with a DC discharge of 0A.)" A note states: "Note: This same value is used as an offset to the cut-off voltage to determine the low bat Pre-Alarm indication)". The current value is set to 1.20 V. The interface includes a 'Cancel' button, navigation arrows, and a 'Changes require reset' warning at the bottom.

VE Configure 3 (Quattro-II 48/5000/70-2x50)

File Port selection Target Defaults Options Special Help

General Grid Inverter Charger Virtual switch Assistants

Quattro-II

ESS (Energy Storage System)

Restart offset

When inverting is stopped due to low battery, the battery voltage must rise above a certain level before inverting is allowed again. This level is determined as an offset to cut-off(0). (cut-off(0) is the cut-off voltage corresponding with a DC discharge of 0A.)

Note:
This same value is used as an offset to the cut-off voltage to determine the low bat Pre-Alarm indication)

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

Cancel << >>

Summary Load assistant

Changes require reset

5. Revision History

Version	Date	Editor	Changes
1	Nov 2021	D. E. Cornew	-
1.1	Feb 2022	P. J. Andrew	- Address 0 column removed from Dip switch settings for multiple batteries (Tables 1 and 2) - Formatting
1.2	Nov 2022	P.J. Andrew D. E. Cornew	- Update on BSLBatt Branding. - Formatting. - Update VE.Configure Inverter Tab. (4.3) - Update VE.Configure Charger Tab. (4.4) - Updated to include 300Ah
1.3	Jun 2023	P.J. Andrew, N. Jones	- Format overhaul - Readded Images. - Removed 4.11 & 4.12