

USER MANUAL

5.1KWH LITHIUM-ION BATTERY



SAFETY GUIDELINES



Work or maintenance on the BSL battery should be carried out by qualified personnel 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 the cells, treat contents with care, do not allow contact with exposed skin or eyes. DO NOT INGEST.



The terminals of the BSL battery 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 fire, a CO_2 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.

Contents

1	Pin	out di	lagram	1
2	Bat	tery se	et-up	2
	2.1	Genera	al	2
		2.1.1	Turning battery on and off	2
		2.1.2	CAN communication	2
		2.1.3	Smart shunt	2
		2.1.4	Dry contacts	2
		2.1.5	Other ports	2
	2.2	Multip	ble batteries	3
		2.2.1	Max number of parallel batteries	3
		2.2.2	Installing multiple batteries	3
		2.2.3	Cable sizing with multiple batteries	3
		2.2.4	Dip switch settings for multiple batteries	3
3	Inve	erter se	et-up	4
	3.1		ries per inverter size	4
	3.2		ry set-up on Victron GX device	4
4	Inve	erter se	ettings (Victron)	5
	4.1		al Tab	5
	4.2		fab	5
	4.3		er Tab	6
	4.4	Charge	er Tab	6
	4.5	0	ant tab (a)	7
	4.6		ant tab (b)	7
	4.7		ant tab (c)	8
	4.8		ant tab (d)	8
	4.9		ant tab (e)	9
	4.10		ant tab (f)	9
5	Oth	er spe	cifications	10
\mathbf{L}	ist	of Fi	gures	

1	Pin-out diagram	for 5.1kWh B	SL battery.	 						1
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1 Pin out diagram

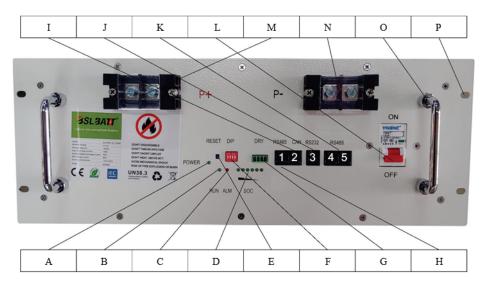


Figure 1: Pin-out diagram for 5.1kWh BSL battery.

- A Power indicator light
- B Run light (battery activity)
- C Alarm indicator light
- D State of charge indicator lights
- E Reset switch (BMS Power button)
- F Dip switches for parallel connection
- G Dry Contacts (mostly unused)
- H RS485 Left port (Port 1)
- I CAN Port (Port 2)
- J RS232 Port (Unused)
- K RS485 Right Ports (Ports 4 & 5)
- L Circuit breaker (terminal power)
- 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 and off

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

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

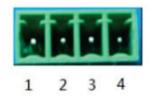
2.1.3 Smart shunt

A Battery Monitoring Device (Victron BMV/Smartshunt) is not required as State of Charge (SOC) is sent to the GX device via the CAN-Bus cable.

2.1.4 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.



2.1.5 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 - $35mm^2$, 2 batteries - $50mm^2$, 3 batteries - $70mm^2$ or $2 \times 35mm^2$, 4 batteries - $95mm^2$ or $2 \times 50mm^2$

Address		DIP swit	ch position	Note	
	#1	#2	#3	#4	
0	ON	OFF	OFF	OFF	stand-alone use
1	ON	OFF	OFF	OFF	master Pack
2	OFF	ON	OFF	OFF	Auxiliary Pack1
3	ON	ON	OFF	OFF	Auxiliary Pack2
4	OFF	OFF	ON	OFF	Auxiliary Pack3
5	ON	OFF	ON	OFF	Auxiliary Pack4
6	OFF	ON	ON	OFF	Auxiliary Pack5
7	ON	ON	ON	OFF	Auxiliary Pack6
8	OFF	OFF	OFF	ON	Auxiliary Pack7
9	ON	OFF	OFF	ON	Auxiliary Pack8
10	OFF	ON	OFF	ON	Auxiliary Pack9
11	ON	ON	OFF	ON	Auxiliary Pack10
12	OFF	OFF	ON	ON	Auxiliary Pack11
13	ON	OFF	ON	ON	Auxiliary Pack12
14	OFF	ON	ON	ON	Auxiliary Pack13
15	ON	ON	ON	ON	Auxiliary Pack14

2.2.4 Dip switch settings for multiple batteries



3 Inverter set-up

3.1 Batteries per inverter size

Inverter size	Recommended N.O. batteries	Minimum N.O. of batteries
15kVA	4	3
10kVA	3	2
8kVA	2	2
5kVA	1	1
3kVA	1	1

3.2 Battery set-up on Victron GX device

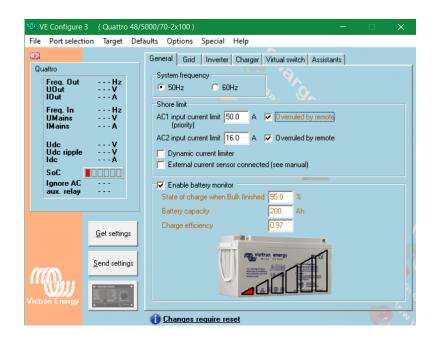
- 1. The VE.Can to CAN-bus BMS Type B cable needs to be connected to the VE-Can port on the GX device and the second unused VE.Can port needs to be terminated with the Victron blue terminator. Ensure that the cable is marked CCGX at the end.
- 2. Press the enter button on the GX device. This should take 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 amps/battery.**
- 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: 80A per battery.
 - Discharge Current Limit: 150A per battery.

<	DVCC	্ন 08:38	hotkeys
DVCC		Forced on	
Limit charge c	urrent	\bigcirc	
Maximum cha	rge current	100A	esc ←
SVS - Shared v	voltage sense	Forced off	
STS - Shared t	emperature sense	Forced off	
SCS - Shared o	current sense		
<u>네</u> Pag	es ^	≡ Menu	



4 Inverter settings (Victron)

4.1 General Tab



4.2 Grid Tab

VE Configure 3 File Port selection	/3000/35-2x50) — aults Options Special Help	• ×
MultiPlus	General Grid Inverter Charger Vitual switch Assistants Grid code selection Country / grid code standard Other: not compliant to any grid code standard Dther: not compliant to any grid code standard Other: not compliant to any grid code standard Loss Off Mains (LOM) detection LOM detection AC input 1 Type B (safe) Image: Type B (safe) Note: Click here for more info on LOM. Image: Dot AC input 1 Type B (safe) Image: Dot AC input 1	
Viction Energy	Transfer switch ✓ Accept wide input frequency range (45-65 Hz) AC low disconnect 195 V AC high connect 260 V AC high disconnect 265 V UPS function	



4.3 Inverter Tab

$^{\circ}\overline{\mathcal{B}}^{\circ}$ /	/E Configure	3 (Quattro	48/5	5000/70-2x100) — 🗆 🗙	
File	Port select	ion Target	Defa	faults Options Special Help	
				General Grid Inverter Charger Virtual switch Assistants	
Qu	attro			PowerAssist	
	Freq. Out UOut IOut	Hz V A		Inverter output voltage 230 V Ground relay	
	Freq. In UMains	Hz		DC input low shut-down 48.00 V 🔽 shut-down on SOC	
	IMains	A		DC input low restart 52.00 V SDC low shut-down 10.0 %	
	Udc Udc ripple	v		DC input low pre-alarm 49.00 V SOC low restart 18.0 %	
	Idc	À		Do not restart after short-circuit (VDE 2510-2 safety)	
	SoC				
	Ignore AC aux. relay			enable AES	
				Start AES when load lower than 69 W	
				Stop AES when load 12 W higher than start level.	
		Get setting	s	AES type A A A A A A	
				modified sine wave	
		Send settin	as l		
11	A L			• search mode • • • • • • • • • • • • • • • • • • •	2
	WIII	•			٩,
	on Energy				
			_	1 Changes require reset	r,

4.4 Charger Tab

🐿 VE Configure 3 🕧	Quattro 48/5000/70-2x100)	—		×
File Port selection	Target Defaults Options Special Help			
	General Grid Inverter Charger Virtual switch Assista	nts		
Quattro	Enable charger			
UOut -	Hz V A Stop after excessive bulk Stop after excessive bulk			
UMains -	Hz V A			
Udc	V V A Charge curve Fixed			
SoC 📕 🗌	Absorption voltage 55.00 V Repeated absorption time	1.00	Hr	
Ignore AC	Float voltage 54.80 V Repeated absorption interv Charge current 45 A Absorption time	al 7.00	Days	
	Stop charger below -20.5 deg C	1.		
-	nd settings		∩	-
				-
	() Changes require reset			w,



4.5 Assistant tab (a)

le Portsele Fa	ection Target Defaults Options Special Help General Grid Inverter Charger Virtual switch Assistants	1
MultiPlus	Se ESS (Energy Storage System) —	×
	Battery system Please select your system	
	System uses DPzS or DPzV batteries System uses Gel or AGM batteries System uses LiFePo4 batteries with a VE.Bus BMS System uses LiFePo4 batteries with a two-signal BMS	Ť
	System uses LiFePo4 with other type BMS (This can be either a BMS connected via CAN bus or a BMS system in which the batteries are protected from high/low cell voltages by external equipment.) System uses Redflow ZCell batteries	he 📕
	Cancel </td <td></td>	
	Summary Load assistant	Delete assistant

4.6 Assistant tab (b)

	re 3 (MultiPlus 48/3000/35-2x50) — ction Target Defaults Options Special Help	
해요 MultiPlus	General Grid Inverter Charger Vitual switch Assistants Assistant Configuration Assistant Tools	
	 ESS (Energy Storage System) - A Battery capacity Please enter the correct battery capacity. 	Ť
	The battery capacity of the system is Ah.	Ŧ
	X Cancel << >>	
Victron Energy	Start assistant Save assistant Delete as Summary Load assistant	sistant
	Changes require reset	CO N



4.7 Assistant tab (c)

	re 3 (MultiPlus 48/3000/35-2x50) —		×
File Port sele	ction Target Defaults Options Special Help		
MultiPlus	General Grid Inverter Charger Virtual switch Assistants	_	
	🐿 ESS (Energy Storage System) - 🗆 🗙		
	VEConfigure battery type selection Some VEConfigure settings do not (exactly) correspond with the battery default settings for Li-lon. Would you like the assistant to change the default battery type in VEConfigure? (If you decide to let the assistant change the battery type, a summary of the changed settings will be displayed when the assistant is finished.)	Ť	
	 Do not change battery type Change battery type as suggested 	Ŧ	
	X Cancel << >>	1	
((()))	Start assistant Save assistant Delete	assistant	
	Summary Load assistant		
	1 Changes require reset	9	w,

4.8 Assistant tab (d)

	e 3 (MultiPlus 48/3000/35-2x50) — tion Target Defaults Options Special Help	· 🗆 🗙
		×
MultiPlus	Sustain voltage When batteries are left in a deep discharged state during a prolonged period, there is a severe chance that they will be damaged. To prevent this, the sustain mechanism will kick in and keep the batteries at a minimum voltage by charging them with a small current whenever necessary. For more info, refer to the controlling depth of discharge chapter of the Energy Storage manual. Sustain voltage 50.00 V.	↑ ↓
Victron Energy	Cancel << >> Start assistant Save assistant De Summary Load assistant	elete assistant
	Changes require reset	- "h



4.9 Assistant tab (e)

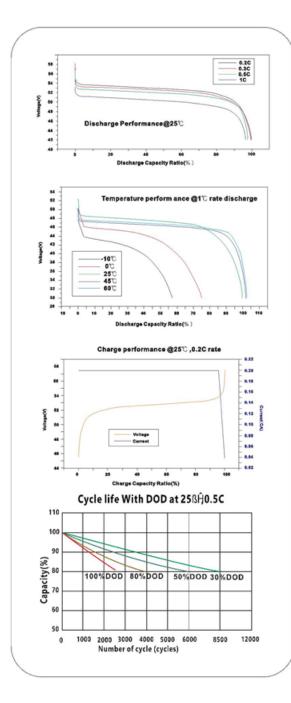
💁 VE Configu	📽 ESS (Energy Storage System) — 🗆 🗙	
File Port sele	Dynamic cut-off This assistant uses so called dynamic cut-off. That is, the 'DC input low shut-down' level depends on the battery discharge current. There will normally be no need to adjust the curve used for this! Just accept below values 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. 0.005 C = $\frac{47.00}{47.00}$ V 0.7 C = $\frac{47.00}{47.00}$ V	↑ ↓
	X Cancel << >>	
Victron Energy	Start assistant Save assistant Delete Summary Load assistant	e assistant
	Changes require reset	C. h

4.10 Assistant tab (f)

	rre 3 (MultiPlus 48/3000/35-2x50) — ection Target Defaults Options Special Help	×
	🐿 ESS (Energy Storage System) — 🗆 🗙	
MultiPlus	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 1.20 V above cut-off(0).	↑ ↓
	Cancel << >>	
	Start assistant Save assistant Delete assistant Summary Load assistant	sistant
Freedom Energy	Changes require reset	



5 Other specifications



ELECTRICAL SPECIFICATIONS	
Nominal Voltage	51.2V (16S)
Nominal Capacity	100 AH
Energy	5120 WH
Efficiency	99%
Self Discharge	<1% per Month
DISCHARGE SPECIFICATIONS	
Max. Discharge current	105A
Max. continues Discharge current	90A
RecommendDischarge current	90A
Voltage at end ofDischarge	47-48V
TEMPERATURE SPECIFICATIONS	
Discharge Temperature	(-20~60)
Charge Temperature	(0~45)
Storage Temperature	(-20~55)

Dimensions (L x W x H)	442*520*177MM	
Weight	45KG	
Case Material	Steel	
Cell Type	Prismatic	
Chemistry	LiFePO4	
CHARGE SPECIFICATIONS		
Recommended Charge Current	50A	
Maximum Charge Current	80A	
Recommended Charge Voltage	55V	
COMPLIANCE SPECIFICATIONS		
	CE (battery)	
Certifications	UN38.3 (battery)	
Certifications		

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