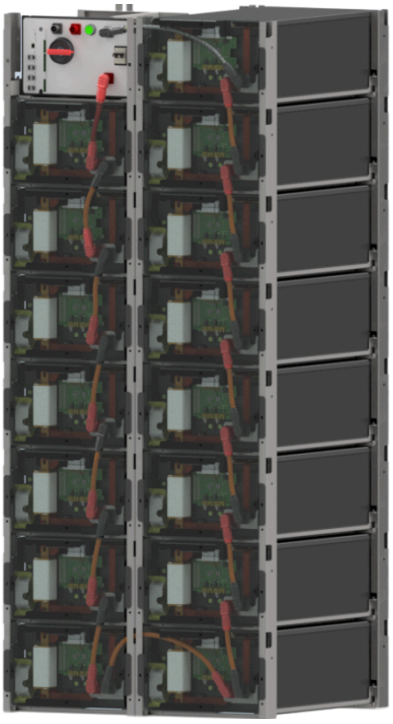
Rev 1.0

SS7000 Series

ESS

User Manual



Introduction

The SS7000 series batteries are high voltage energy storage systems (ESS) manufactured by Solar MD. They are manufactured using the highest quality materials and cutting edge technology, including the Solar MD advanced BMU and BMS technology. The SS7000 series are integrated with major inverter brands as well as our data logger, the Logger V2. Their application is extremely versatile, from residential to commercial and industrial application, there is a battery solution to suit your needs.

Document modifications

Version	Date	Modification	By
1.0	26/04/2024	Creation	I. Smith

Overview of this Manual

About this Manual

This manual contains information regarding:

- technical specifications
- installation
- remote monitoring
- troubleshooting BMU warnings and errors
- maintenance

Usage

This manual should be used during operation and adjustment of the SS7000 Series ESS. It should be referenced when:

- integrating the SS7000 Series ESS into a complete BESS system
- operating and adjusting the SS7000 Series ESS
- commissioning the SS7000 Series ESS

Who should read this manual?

This manual is intended for:

- integrators of the SS7000 Series ESS
- installation personnel
- operators

Prerequisites

An installation/repair/operator person working with the SS7000 Series ESS must:

- hold a local electrician certificate and Solar MD HV maintenance certificate

Note: if you do not have the Solar MD HV maintenance certificate, please contact SolarMD support at support@solarmd.co.za to provide the links for the training material and test. A pass mark of 80% is needed.

Hardware Revision

This user manual applies to SS7000 Series ESS with BMU hardware revision H17.

Safety Notices

Read the entire document before installing or using the Solar MD battery. Failure to comply with the instructions or warnings in this document could result in electrical shock or serious injury that can result in death to the operator or damage to the product that can render the Solar MD battery inoperable.

This manual contains important information regarding the operation of the SS7000 Series ESS. This manual provides technical and operational guidance for operators. The following safety instructions are to be observed.

DANGER

This manual does not provide sufficient information for safe service of the SS7000 Series ESS. For such information refer to the appropriate manual.

Please pay due regard to safety as the SS7000 Series ESSs are high energy devices and require strict precautions to be taken

CAUTION - Trained Operators

All operations on a Solar MD HV battery must be performed by a trained operator (minimum qualification: electrician certificate) familiar with the contents of this manual. Hazardous conditions could arise from incorrect adjustment.

Ensure power to the product is isolated and locked off before attempting any work on it.

DANGER - Stored Charge

Stored charge is present after switching the device off.

DANGER - Arc Flash

Shorted terminals can cause arc flash resulting in severe burns, severe eye injury or blindness. Use insulated tools and do not short any terminals.

DANGER – Protective Covers

Normal operation of this product requires a protective perspex front cover to be bolted to each module

DANGER – Personal Protection Equipment

Insulated gloves, insulated boots and goggles shall be worn at all times during the operation and maintenance of the battery system. It is forbidden to wear metal ornaments such as watches and jewellery during maintenance operations.

Table of Contents

1 Overview

1.1 Features

The batteries are fully modular to allow for easy installation and maintenance. The battery cabinet comes flat packed for easy on-site installation, the battery modules and BMUs are individually packaged for easy and convenient transportation and installation. On account of the modular design it also allows for seamless application with the addition of SS6143 modules to an existing HV battery setup. The rated voltage per module is 51.2V nominal. Connecting multiple modules in series allows for system expansion provided the PCS supports higher battery voltages.

1.2 Applications

- Off-grid electricity supplying your own mini grid
- Back-up power
- Peak shaving
- Increased self-consumption and PV usage
- Time of use (Via Logger V2 - limited PCS brands)
- Manual and AI based charging and discharging when you need it
- Power management via Logger V2 and advanced switching of consumers

2 Technical Specification

2.1 SS6143 Module Specification

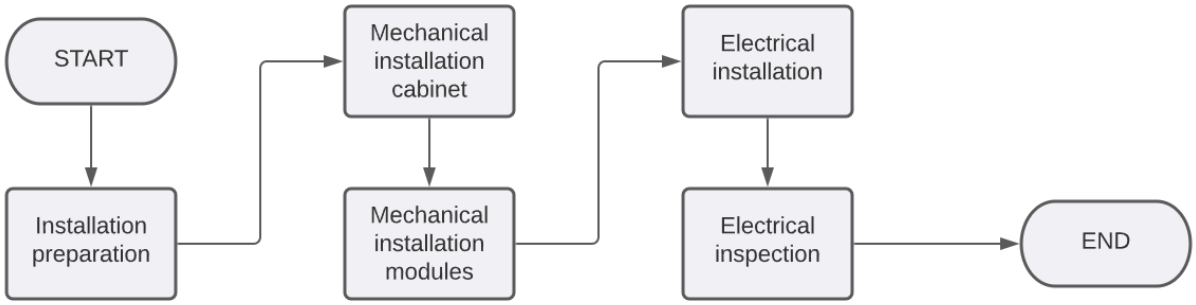
Parameter	Description
Cell chemistry	Lithium Iron Phosphate ($LiFePO_4$)
Cell manufacturer	CATL
Rated capacity	14.3kWh
Nominal power	10.0kW
Usable battery energy @ 0.3C	13.0kWh
Nominal voltage	51.2V
Weight per module	115kg
Operational voltage	41.6 - 57.6Vdc
Communication	CANBUS / RS485
Dimensions W x D x H	364mm x 700mm x 234mm
Cycle life @ 25°C	≥6000
Charging efficiency	99%
Operational temperature	0°C to +50°C
Transport	UN3480 & UN38.3
Storage duration	6 months @ 25°C
Safety standard compliance	IEC 62619 / UN38.3 / UL1642
Cell certificate	TUV / CE / UL1642

2.2 SS7000 Series ESS Model Range

Battery Name	Module Quantity	Voltage Range (V)	Nominal Voltage (V)	Nominal Capacity (kWh)	Current Rating (A)
SS7011	8	332.8V - 460.8	409.6	114.4	200
SS7013	9	374.4V - 518.4	460.8	128.7	200
SS7014	10	416V - 576	512	143	200
SS7016	11	457.6V - 633.6	563.2	157.3	200
SS7017	12	499.2V - 691.2	614.4	171.6	200
SS7019	13	540.8V - 748.8	665.6	185.9	200
SS7020	14	582.4V - 806.4	716.8	200.2	200
SS7021	15	624V - 864	768	214.5	200
SS7023	16	665.6V - 921.6	819.2	228.8	200
SS7024	17	707.2V - 979.2	870.4	243.1	200

3 Installation

3.1 Installation flow



3.2 Installation preparation

3.2.1 Installation Tools

		
Insulation gloves	Hex socket set	Hydraulic crimper

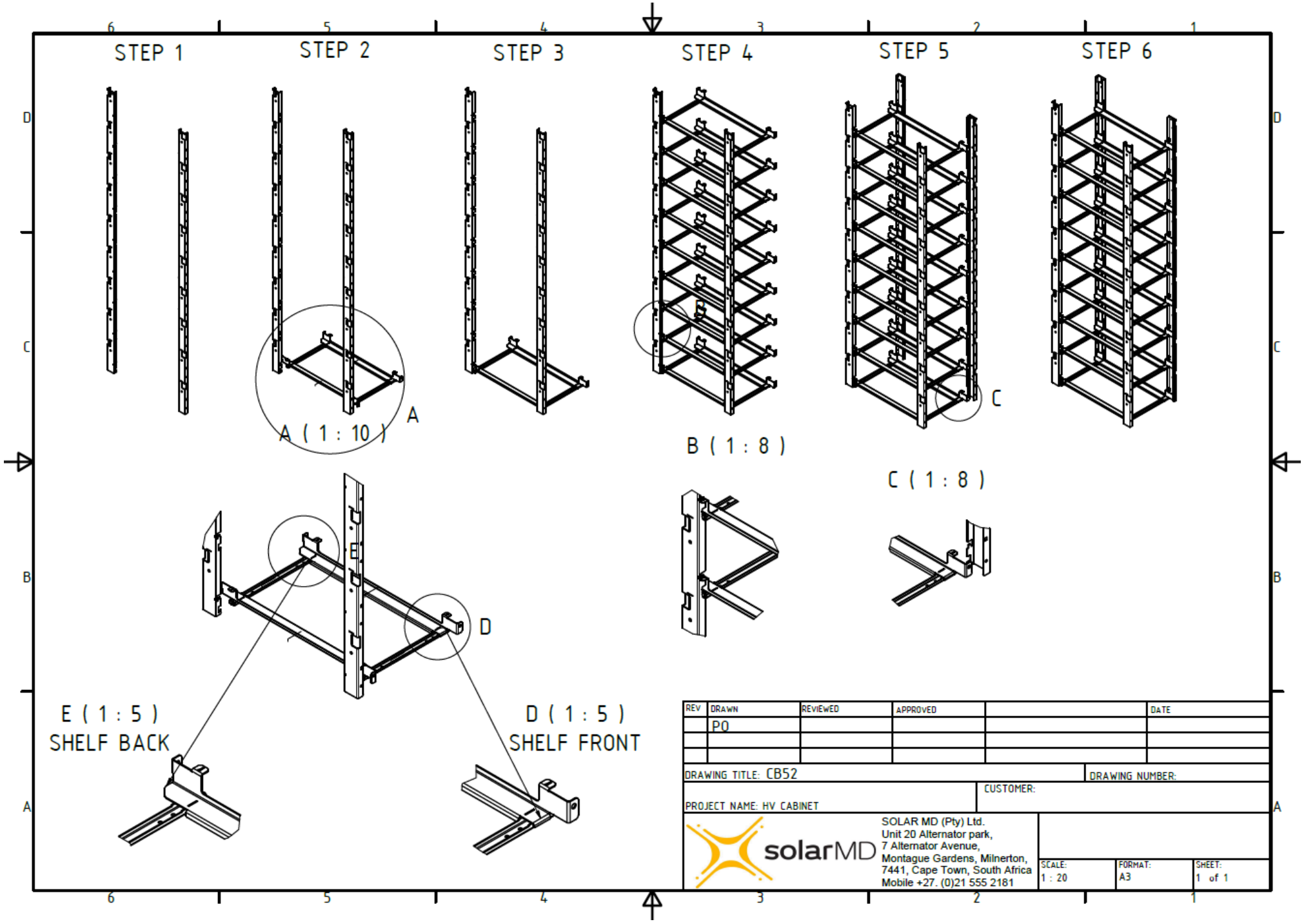
3.3 Mechanical Installation

3.3.1 Cabinet Assembly

1. Place two columns next to each other spaced about 590mm apart, with the flanges facing upwards. Ensure the shelf hook tabs of all the columns face inwards.
2. Ensure that all shelves are facing the same direction. The front of the shelf has a rounded edge, while the back of the shelf has a 45 deg chamfer.
3. Insert the shelves by hooking each shelf over the positioning tab.
4. Continue until all the shelves have been positioned on the two columns.
5. Insert the remaining columns by hooking the positioning tabs of the column into the positioning tab of the shelves until the tabs have bottomed out.
6. Secure the shelves in place with the provided bolts.

Note: 1 ensure that the cabinet is grounded, with a minimum cable thickness of 16mm^2.
2 ensure that there is bonding between cabinets.

See the cabinet assembly diagram on the next page.

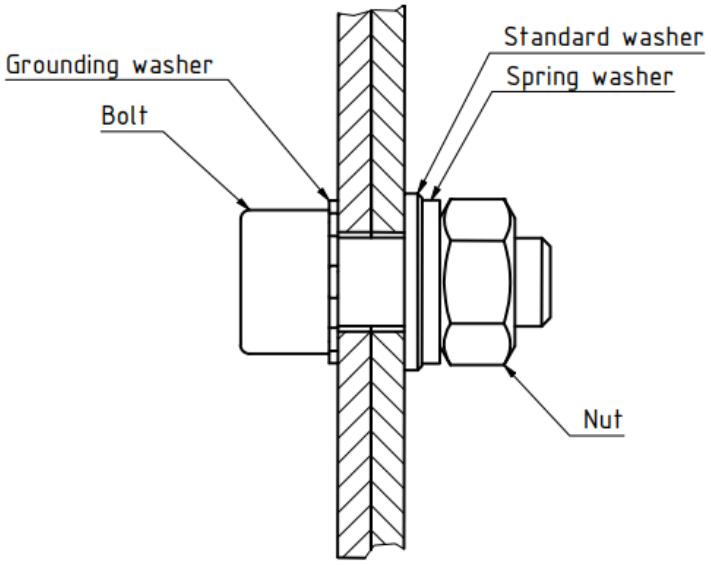

STEP 1
STEP 2
STEP 3
STEP 4
STEP 5
STEP 6
A
A (1 : 10)
B (1 : 8)
C
C (1 : 8)
D
E
E (1 : 5)
SHELF BACK
D (1 : 5)
SHELF FRONT
REV
DRAWN
PO
REVIEWED
APPROVED
DATE
DRAWING TITLE: CB52
DRAWING NUMBER:
PROJECT NAME: HV CABINET
CUSTOMER:
solarMD
SOLAR MD (Pty) Ltd.
Unit 20 Alternator park,
7 Alternator Avenue,
Montague Gardens, Milnerton,
7441, Cape Town, South Africa
Mobile +27. (0)21 555 2181
SCALE:
1 : 20
FORMAT:
A3
SHEET:
1 of 1

3.3.2 SS7000 Series ESS Assembly

1. Slide the BMU into the top left space of the rack.
2. Ensure the main isolator of the BMU is open/OFF.
3. Slide the individual battery modules into their respective slots in the battery cabinet.
4. Secure the modules and BMU with two M6 bolts and grounding washers, tightened with a torque value of 6Nm.

Note: 1 failure to use grounding washers, means that the BMU and metal work aren't grounded properly which can cause electrical interference

2 if the battery consists of an even number of modules, then the bottom right hand slot should be left open



3.3.2.1 BMU Connections

The BMU is equipped with five communication interfaces hosted over nine connection ports. Each of the CAN bus and RS485 interfaces have two connection ports and ethernet has one. Ethernet is used for information management and reporting to the Logger V2. CANBUS 3, RS485 or ethernet is used for communication with external devices (eg. PCS/HPS/Charger etc). Communication with other BMUs in the battery cluster is done via CANBUS 2. And communication with the BMS of each battery module is done via CANBUS 1.

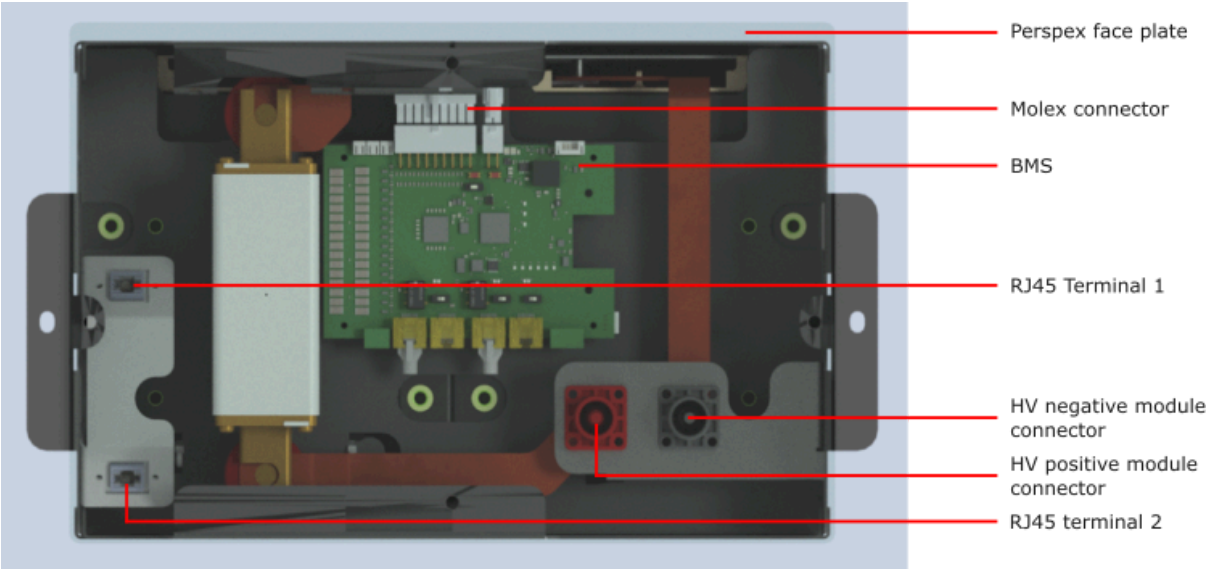
All BMUs in a battery system connected in parallel need to communicate with each other. This is handled by daisy chaining the CANBUS 2 communication ports between the BMUs. All BMUs in the same cluster need to have their CANBUS 3, RS485 or ETHERNET communication to the externally connected devices (PCS/HPS/charger etc), connected in a

daisy chain (for CAN bus and RS485) or to a common network for ethernet, to ensure redundant communication and control to the externally connected devices. For CAN bus and RS485 connected devices ensure the first and last device in the line is terminated using the 120Ω RJ45 termination jumper.

3.3.2.2 Module Connections

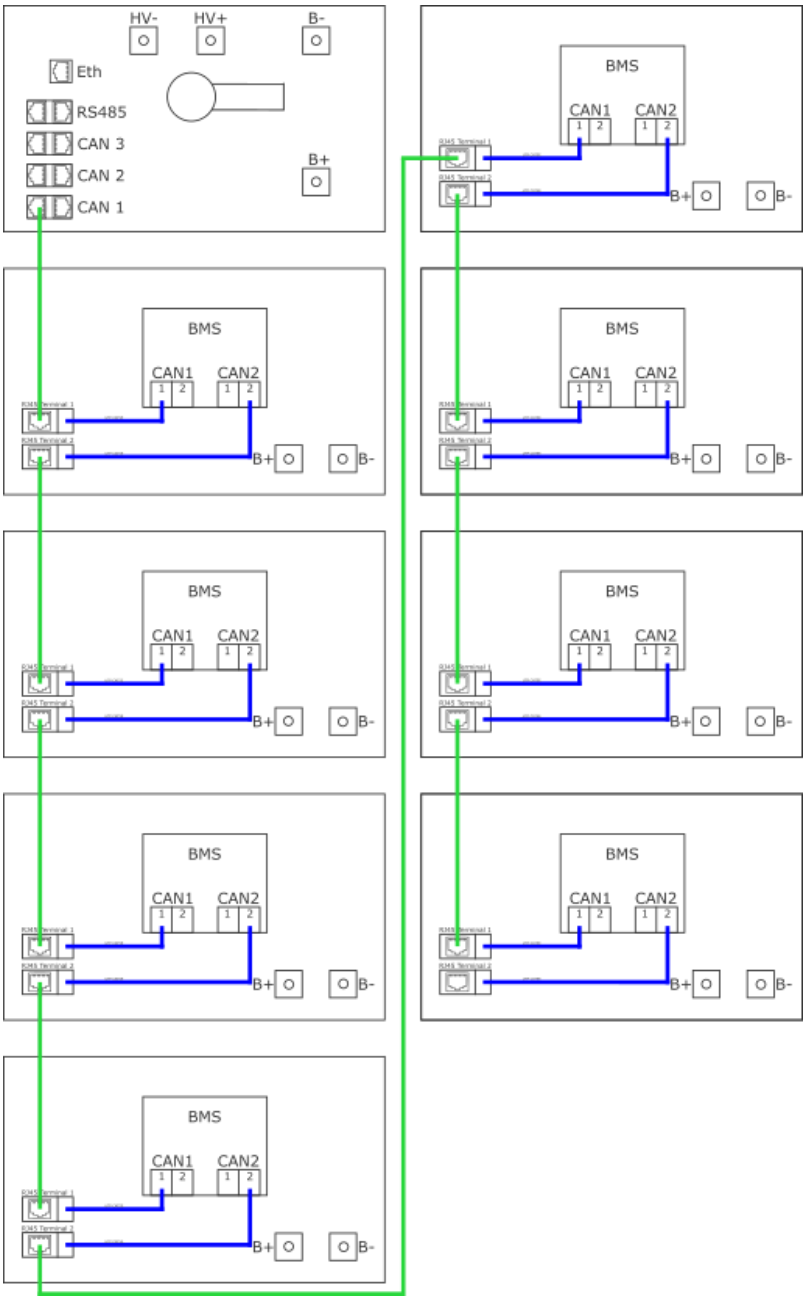
The BMU communicates with the BMS of each battery module via CANBUS 1.

Note: any break in the communication between the BMU and battery modules will result in the BMU going into error mode and disconnecting the battery from the DC bus.



1. Using the 0.22m CAT5 fly leads provided, connect the CANBUS 1 - PORT 1 of the BMU to RJ45 terminal 1 of the first module.
2. On the BMU, insert the 120Ω termination jumper on CANBUS 1 - PORT 2.
3. Continue connecting the modules via the RJ45 terminals by connecting from terminal 2, to the next module's terminal 1.
4. When you have reached the bottom left module, continue the CAN bus line by feeding a longer CAT5 fly lead through the cabinet frame to the top right module and continue connecting the RJ45 terminals downwards, until you have reached the last module in the battery pack (i.e. the bottom right module).
5. Ensure that all the modules BMS ON/OFF switches are in the OFF position.
6. Check that the molex connector is secure on each BMS and that the pins are properly seated in the connector.

7. Ensure that the LAN cables connected to the BMSs' RJ45 ports are securely connected. The RJ45 terminal 1 should be connected to CANBUS 1-1 of the BMS. RJ45 terminal 2 should be connected to CANBUS 2-2 of the BMS.
8. On each module's BMS ensure the termination resistor switches are in the following positions:
    - CANBUS 1: ON
    - CANBUS 2-1: OFF
    - CANBUS 2-2: ON
9. The CANBUS 1 connections should look as follows:



Note: the blue communication cables come pre installed as part of the module, the green communication cables need to be installed

3.4 Electrical Installation

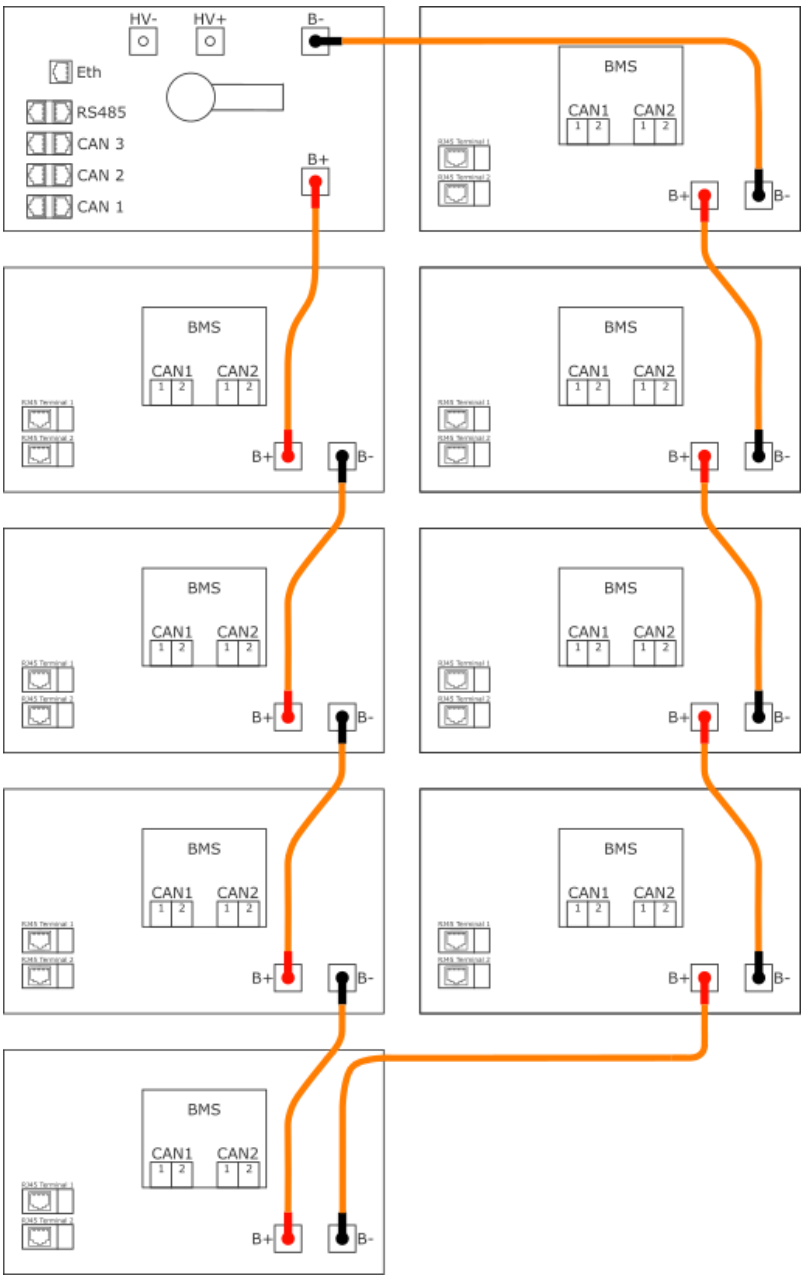
1. Take note of the power cable quick connector colours. Each HV battery comes with one positive-to-positive cable, one negative-to-negative cable and the relevant amount of positive-to-negative cables to connect the battery modules in series.
2. Before connecting any power cables, ensure that the main isolator of the BMU is switched to the open/OFF position.
3. Starting with the BMU, connect the positive-to-positive power cable from the BMU's positive connector to the first module's positive connector.
4. Then connect the first module's negative connector to the next module's positive connector to connect the modules in series.
5. Continue connecting the power cables in series between the battery modules as per the diagram below.
6. Lastly connect the negative-to-negative power cable from the top right battery module's negative connector to the BMU's negative input connector.

Note: [1] the power cable connector colour should be the same as the connector colour on the module.

[2] there is a risk of causing a short circuit on a module if the positive and negative terminals of the same module are connected together.

[3] if connected incorrectly the internal module fuse could blow.

7. The power cable connections should look as follows:



8. Switch the modules BMS ON/OFF switches to the ON position.
9. Install all perspex covers securing each with four M4 button head bolts and flat washers, tightened with a torque value of 1.35Nm.
10. On the BMU press and hold the green multifunction push button for 2 seconds. This will turn the BMU communication on and if CANBUS 1 to the BMS's is connected correctly, the BMS's will turn on sequentially. All the BMS's need to be illuminated at this point.
    a. If the BMU does not turn on, see section under Apendices.
    b. If the modules do not initialise, see section under Apendices.

11. The BMU output connectors should be connected to the relevant OUTPUT terminals on the BMU. Ensure that the power cables are terminated on the other end and that it is safe to turn on the battery DC isolator before doing so.
12. Turn the main isolator into the closed/ON position.

3.5 Electrical Inspection

1. Cabinet grounded, minimum cable thickness of 16mm^2.
2. Bonding between cabinets.
3. Grounding washers installed where modules and BMU are secured to the cabinet.
4. BMU in the left top slot in the cabinet.
5. If there is an even number of modules, the bottom right slot is left open.
6. Battery modules are connected correctly in series.
7. CANBUS 1 terminated on BMU.
8. CANBUS 2 of BMUs connected and terminated on the first and last BMU in the line.
9. CANBUS 3 of BMUs connected and terminated on the last BMU in the line.
10. CANBUS terminated on the inverter.

4 Remote Monitoring

4.1 Connecting the Logger V2

The Logger V2 is required for commissioning the system, but is not required for the operation of the battery system, we do however recommend having a logger connected to the system for remote access and monitoring.

An external power supply will be required. Do not power the logger with a battery module. Power supplies can be a DC source with 9-65V via the screw terminals or a 5V USB Type-C with at least 2A rated current connected to the USB-C port on the Logger V2. Do not connect the USB-C and the 9-65V power supplies simultaneously to the logger.

4.1.1 Ethernet

1. Connect a LAN cable from the router to the internet port (Eth 1) on the Logger V2.

Note: if an older generation Logger V2 is being used, the internet port is labelled as Eth0.

or

1. Connect a LAN cable from the router to the network switch.
2. Connect a LAN cable from the network switch to the internet port (Eth 1) on the Logger V2.

4.1.2 WiFi

1. To access the logger locally, do one of the following:
    a. Using a phone or laptop, connect to the logger's WiFi AP (Access Point) - eg. LoggerV2-SLV216076568. The network name (SSID) and password are printed on the logger sticker.
    b. Connect a LAN cable from your laptop to the local port, Eth 2, on the logger.
2. Open your internet browser and type in the local address as printed on the logger sticker (192.168.222.1). You'll be redirected to a login screen.
3. The default login details are:
   Username: admin
   Password: admin
4. Click Sign In/Sign Up
5. Navigate to My Devices > Logger myPower > Network Tab
    a. Expand the wlan1 drop down tab. A list of available signals will be displayed.

b. Click on the desired network you wish to connect to wirelessly, if the network is secure, you will be prompted for the WiFi password. Enter the password, and click ‘Save’.

c. The logger will now connect to the WiFi, this will be visible on the logger as the connection LED turns green.

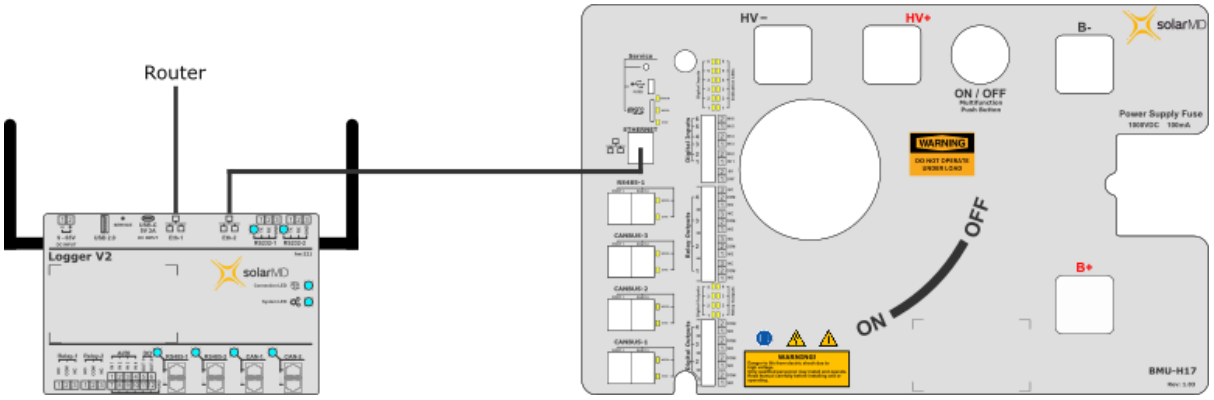
6. You can now close the browser window and disconnect from the logger’s WiFi and open the MyPower24 web portal.

4.2 Connecting the BMU

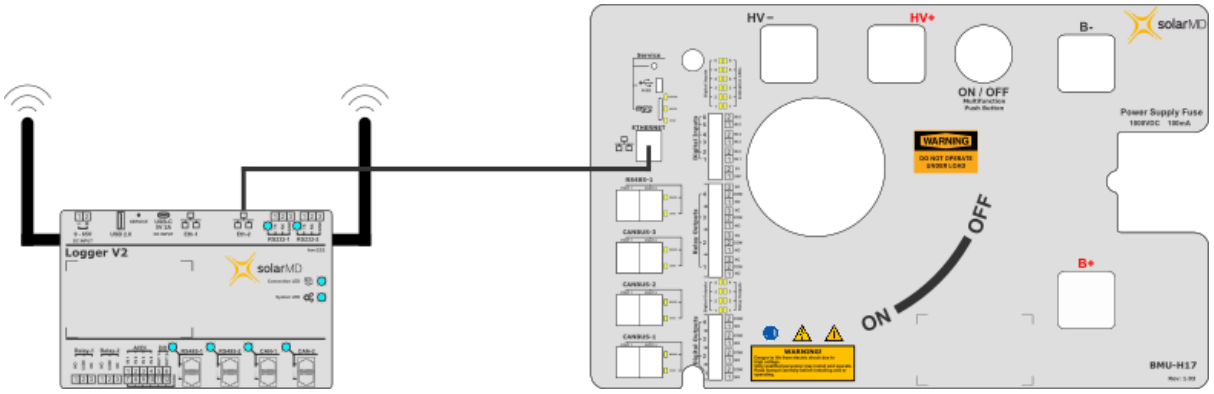
Note: the logger and the BMUs must be connected to the same network in order for the batteries to show online on the logger.

4.2.1 One battery in the cluster

If there is only one battery in the cluster, you can connect the BMU’s Eth port directly to the logger’s eth2 (local) port.The logger will serve as a DHCP server for the BMU and will allocate it an IP address, starting with 192.168.222.xxx. In this case the logger must be connected to a DHCP server, either through ethernet or wifi.



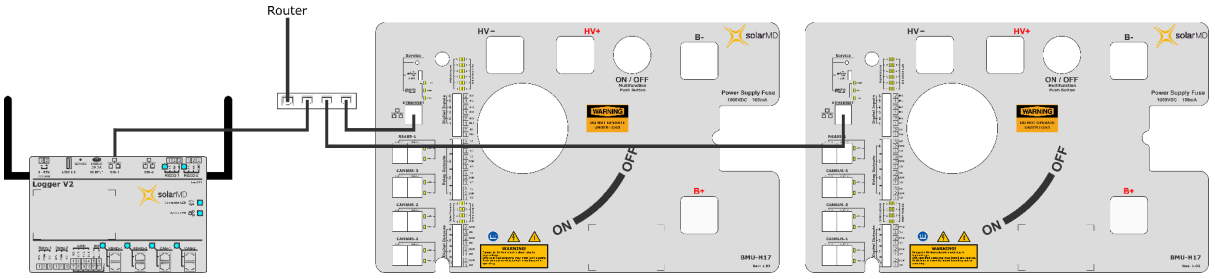
Or



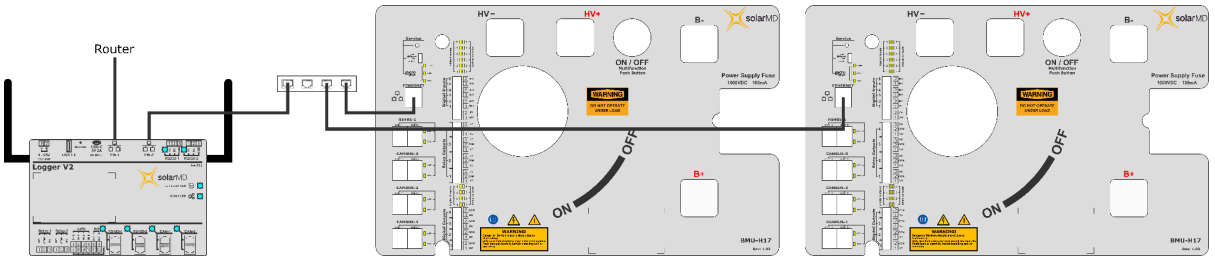
4.2.2 More than one battery in the cluster

If there is more than one battery in the cluster, you will need a network switch to connect the logger and BMUs to the same network. Each BMU's Eth port must be connected to the network switch.

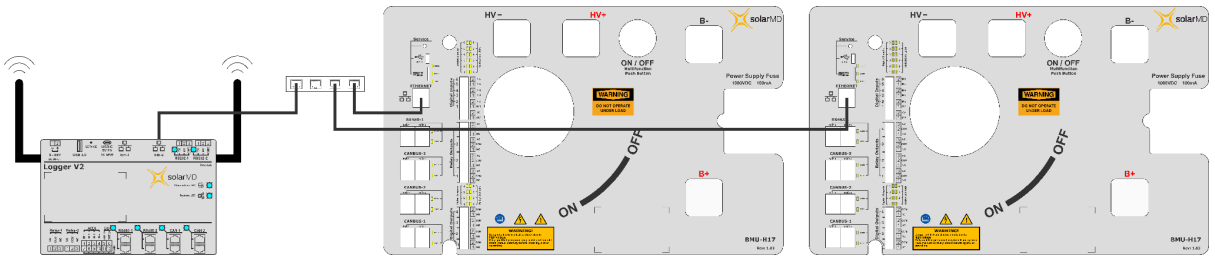
Either the logger's eth1 (internet) or eth2 (local) port must be connected to the switch. If eth1 is connected to the switch, a DHCP server must be connected to the switch, which will provide and assign IP addresses to the logger and BMUs.



If eth2 is connected to the switch, a DHCP server must be connected to the logger, either through ethernet or wifi. In this case the logger will serve as a DHCP server for the switch and all devices connected on the switch will be allocated an IP address by the Logger V2, starting with 192.168.222.xxx.

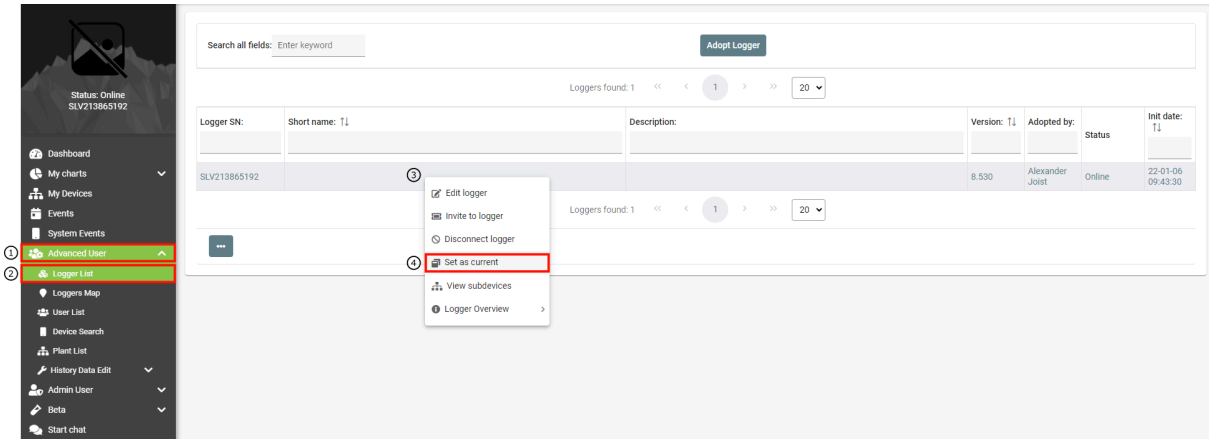


Or



4.3 Getting the batteries online

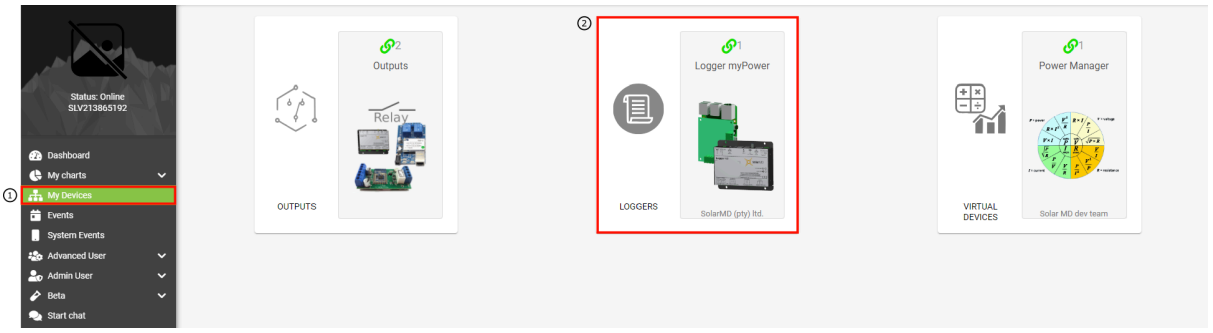
1. Once the logger is powered up and connected to the same network as the BMUs, navigate to the MyPower 24 portal and login using the link below.
   https://login.mypower24.co.za/myPower24-ClientWeb/login/
2. Selecting the logger connected onsite.



1) Navigate to Advanced User tab
2) Click on “Logger List”
3) Right click
4) Select “Set as current”

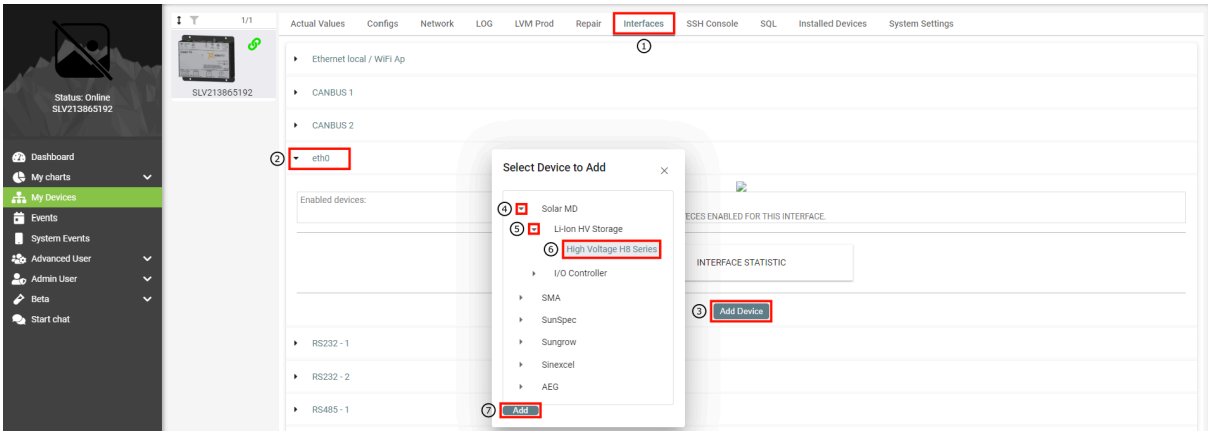
Note: if the logger is not on your logger list, adopt the logger by scanning the QR code on the logger and log in using your account details.

3. Navigating to Logger myPower



1) Click on “My Devices”
2) Select “Logger myPower”

4. Adding the High Voltage H8 Series bridge on the eth0 interface.

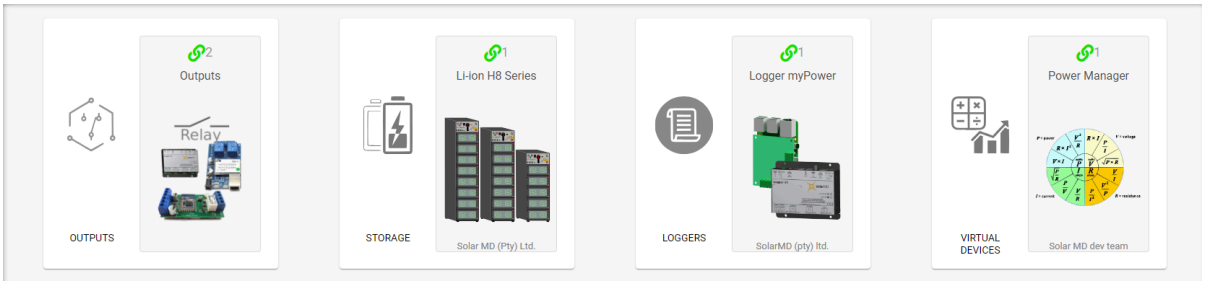


1) Go to the “Interfaces” tab
2) Expand the “eth0” tab
3) Click on “Add Device”
4) Click on the arrow next to “Solar MD” to expand the list
5) Click on the arrow next to “Li-Ion HV Storage” to expand the list
6) Select the High Voltage H8 Series
7) Click on “Add”

5. Once the High Voltage H8 Series batteries have been added. Follow these steps:

1) Click on “Scan”. The batteries that are connected to the network switch will now show in the list. If there are no batteries available:
   - Go to Logger myPower > System Settings > Soft Reboot > Confirm and wait +/- 30 seconds for the logger service to restart, then go back to Interfaces > eth0 > Scan to see if the list has now populated correctly.
   - If there are still no devices available on the list, check that your Ethernet network between the Logger and the BMUs is connected correctly and that the BMUs are ON.
2) Click on the BMU serial number that you wish to add to the logger.
3) Click connect.
4) Continue until all the BMUs you wish to connect to the Logger are connected.

6. Successful connections will show under My Devices as Li-ion H8 Series.

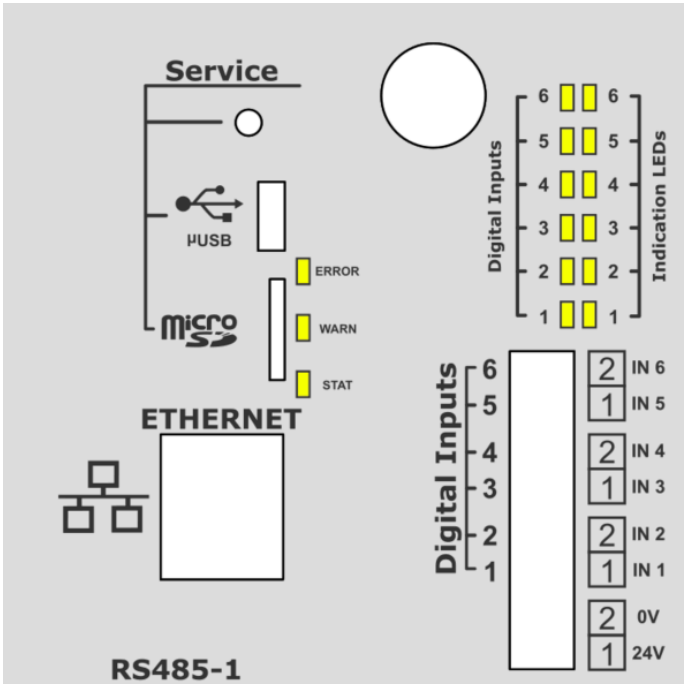


7. Once the Li-ion H8 Series has been added to the Logger, please contact the Solar MD Support team to commission the batteries.

5 Warnings, Errors and other Events

5.1 BMU Warnings and Errors

Method of displaying general warnings and errors:

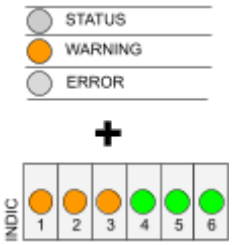


The status LEDs determine what the indication LEDs will show.

1. When the STAT LED is pulsing green the indication LEDs can show either:
    a. Battery capacity
    b. Current flow and direction
    c. Off
2. If the WARN LED is flashing orange
    a. The indication LEDs will show the warning number in binary, which corresponds to that tabulated below in the warning register.
3. If the ERROR LED is flashing red
    a. The indication LEDs will show the error number in binary, which corresponds to that tabulated below in the error register.

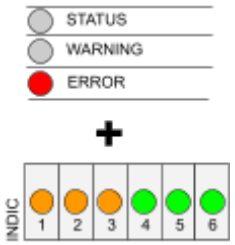
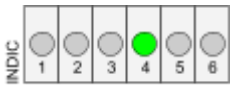
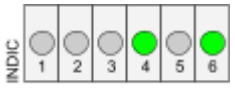
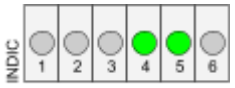
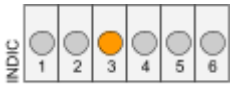
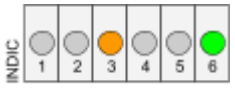
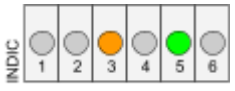
5.2 BMU Warning Register

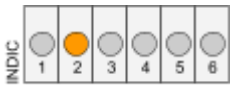
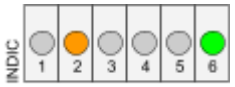
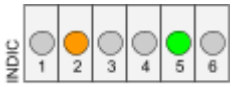
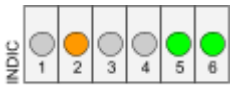
If the warning LED blinks ORANGE, refer to the indication LEDs to find the corresponding warning event in the table below.

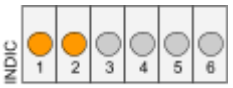
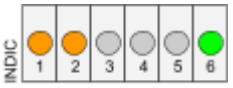
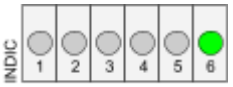
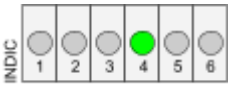
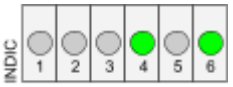
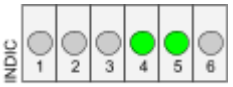
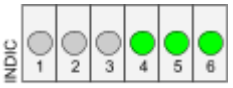
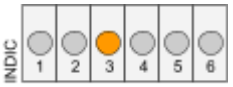
Warning Code	Visual Representation	Description
		
1		Cell voltage too low
2		Cell voltage too high
3		One or more batteries in the cluster have different firmware
13		One of or more batteries in the cluster are not DC connected
14		One or more batteries in the cluster are offline
65		Current sensor internal fault

5.3 BMU Error Register

If the error LED blinks RED, refer to the indication LEDs to find the corresponding error event in the table below.

Error Code	Visual Representation	Description
		
1		Shunt temperature sensor malfunction
2		External NTC 1 malfunction
3		External NTC 2 malfunction
4		External NTC 3 malfunction
5		Main isolator opened
6		User request OFF
8		Protection relay coil fault
9		Protection relay coil fuse fault
10		Protection relay coil overcurrent fault

12		Temperature too low
13		Temperature too high
14		Overcurrent discharge
15		Overcurrent charge
16		Cell voltage too low. Sleep mode active
17		Overvoltage sleep mode
18		Overvoltage sleep wait condition
19		Override out of range
20		Cell voltage too low. Battery in shutdown state
21		Temperature charge overcurrent
22		Temperature discharge overcurrent
46		Precharge overtemperature

47		Precharge timeout
48		BMU fuse fault
49		BMU current detected while relay is open
64		Modules incorrect polarity or incorrect connection. Check power cables
65		Modules initialization not completed
66		Module count not configured
67		One or more modules not communicating. Check power cable
68		Invalid module configuration
69		Module comms timeout
70		Main relay fault
71		Main relay contact welded
72		Transfer current out of range

5.4 Troubleshooting BMU Warnings and Errors

Code	Cause	Solution
	Warnings	
1-2	1. Inverter/rectifier settings may not be correct. 2. Module cells may be disbalanced.	1. Check the battery settings 2. Contact Solar MD support
3	The BMUs have different firmware versions	Contact Solar MD support
13	1. Main isolator is off 2. BMU could have another error	1. Switch main isolator on 2. Check user manual for error codes
14	BMU is off in cluster	1. Switch any off BMUs on 2. Contact Solar MD support
65	1. BMU does not measure current correctly 2. BMU firmware	Contact Solar MD support
	Errors	
5	Main isolator is in the OFF position	Switch main isolator to ON position
6	Main BMU relay switched off remotely	Contact Solar MD support
8-10	BMU relay fault	Contact Solar MD support
12-13	Ambient temp is too warm/cold	1. Check BMU temp on mypower24 2. Adjust room temp accordingly 3. Contact Solar MD support
14-15	Inverter/rectifier settings may not be correct	1. Check inverter settings 2. Contact Solar MD support

16-20	1. Inverter/rectifier settings may not be correct 2. Module cells may be disbalanced	1. Check the battery settings 2. Contact Solar MD support
47	Voltage difference between bus and battery is out of range	Contact Solar MD support
48	Blown BMU fuse	Contact Solar MD support to confirm
49	1. Welded BMU relay 2. Shunt reading current incorrectly	Contact Solar MD support
64	1. Incorrect connection. 2. Modules incorrect polarity	1. Check power cables configuration 2. Contact Solar MD support
65	Break in CANBUS 1 line	1. Check Appendices - Modules not Initialised 2. Switch BMU off and on again
66	Module count not configured	Contact Solar MD support
67	Break in CANBUS 1 line	1. Check Appendices - Modules not Initialised 2. Switch BMU off and on again
68	Module count set on BMU is less than number of modules BMU detects	Contact Solar MD support
69	Break in CANBUS 1 line	1. Check Appendices - Modules not Initialised 2. Restart BMU 3. Contact Solar MD support
70-71	Main relay of BMU could be welded	Contact Solar MD support
72	BMU firmware	Contact Solar MD support

6 Maintenance

6.1 BMS Replacement

Note: BMS replacement will only be handled on a case by case basis.

1. Switch the battery isolator OFF.
2. Turn off the BMU by holding in the green push button until all LEDs switch off.
3. Remove the perspex cover of the module that needs its BMS to be replaced as well as the module above and below it.
4. Disconnect and remove the HV power cables that connect to the module by pressing the release button on the connector and simultaneously pulling.
5. Turn off the BMS on the ON/OFF microswitch.
6. Disconnect and remove the communication cables that are connected to the BMS.
7. Disconnect the temperature sensor and molex connector harness.
8. Remove the 4x button head screws holding the board in place.
9. Remove the BMS board and replace it with the new BMS board.
10. Screw the BMS board into place with the 4x button head screws.
11. Ensure the ON/OFF micro-switch is in the off position.
12. Reconnect the molex connector harness and temperature sensor.
13. Reconnect the communication cables to the BMS.
14. Ensure the terminations switches on both BMSs are as follows:
    CANBUS 1: ON. CANBUS 2-1: OFF. CANBUS2-2: ON.
15. Turn the ON/OFF micro-switch to the ON position.
16. Reconnect the HV power cables to the module.
17. Reinstall the module perspex protective cover.
18. Press and hold the green push button on the BMU to turn it back on.

6.2 Module Replacement

Note: 1 module replacement will only be handled on a case by case basis.
2 ensure that the pack voltage of the replacement module is similar to the rest of the modules in the battery.

1. Switch the battery isolator OFF.
2. Press and hold the battery ON/OFF switch until all the LEDs on the BMU switch off. After 10 seconds all the BMSs should automatically shutdown.

3. Remove the perspex cover of the module that needs to be replaced as well as the module above and below it.
4. Disconnect and remove the HV power cables that connect to the module by pressing the release button on the connector and simultaneously pulling.
5. Disconnect and remove the communication cables that connect to the module.
6. Remove the two M6 bolts securing the module to the battery frame.
7. The module may now be removed from the battery cabinet.
8. Install the new battery module as per the installation instructions.

6.2 BMU Replacement

Note: BMU replacement will only be handled on a case by case basis.

1. Switch the battery isolator OFF.
2. Press and hold the battery ON/OFF switch until all the LEDs on the BMU switch off. After 10 seconds all the BMSs should automatically shutdown.
3. Disconnect and remove the HV power cables that connect to the BMU by pressing the release button on the connector and simultaneously pulling.
4. Disconnect and remove the communication cables that connect to the BMU.
5. Remove the two M6 bolts and grounding washers securing the module to the cabinet.
6. The BMU may now be removed from the battery cabinet.
7. Install the new BMU as per the installation instructions.

7 Appendices

BMU not switching on

1. Ensure that the main isolator is switched to the open/OFF position.
2. Check that the power cables between the modules and the BMU are connected correctly.
3. Disconnect the power cables from the BMU input connectors, and check that there is voltage from the modules, by measuring the voltage on the power cables from the modules with a multimeter.
    a. If not, check if one of the module's 250A fuses has blown.
4. Check that the DC supply fuses of the BMU are intact.
5. Remove the top cover of the BMU and check that all cables going into the powerboard are securely connected.

Modules not Initialised

The module initialisation will happen in the sequence that the BMSs have been connected from BMU CANBUS 1 - PORT 1. For troubleshooting, identify the last point of initialisation. This will help to diagnose the issue more efficiently.

1. Ensure all BMS ON/OFF switches are in the ON position.
2. Check that the BMU CANBUS 1 - PORT 1 is being used to initialise the first module.
3. Ensure that CANBUS 1 - PORT 2 on the BMU is terminated with the 120Ω termination jumper.
4. Ensure that all the BMS termination resistor switches are in the correct positions:

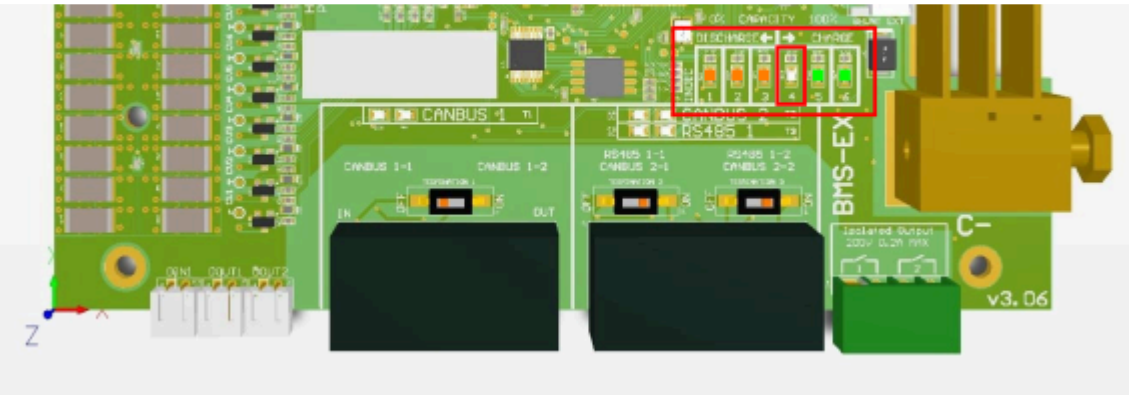
   CANBUS 1: ON

   CANBUS 2-1: OFF

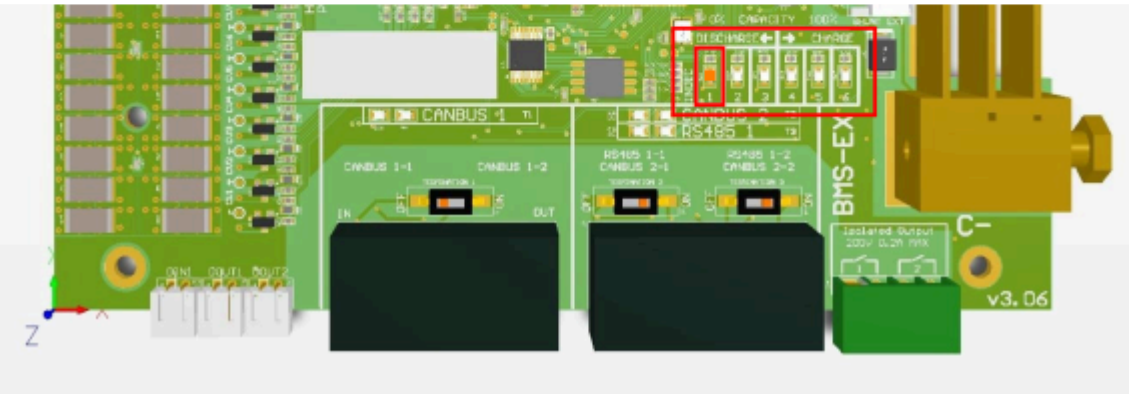
   CANBUS 2-2: ON
5. Check that all RJ45 terminal connector fly leads are securely connected and that the communication line is complete.
6. Make sure that all the RJ45 terminal connections are securely connected to the BMS ports:
   a. The top module connector cable should be plugged into the BMS CANBUS 1-1.
   b. The bottom module connector should be plugged into CANBUS 2-2.
7. Check that the BMS where the initialisation stops is in high voltage mode.
8. Check if any cables were crimped by the installer, recrimp or replace.
9. To troubleshoot whether or not the RJ45 terminal connector is faulty, use a pre-made CAT5 fly lead and bypass the communication line through the RJ45 terminal connectors and connect the 2 BMSs directly to each other. Eg. BMS (1) - CANBUS 2-2 is connected directly to BMS (2) - CANBUS 1-1.

Selecting HV Mode on BMS

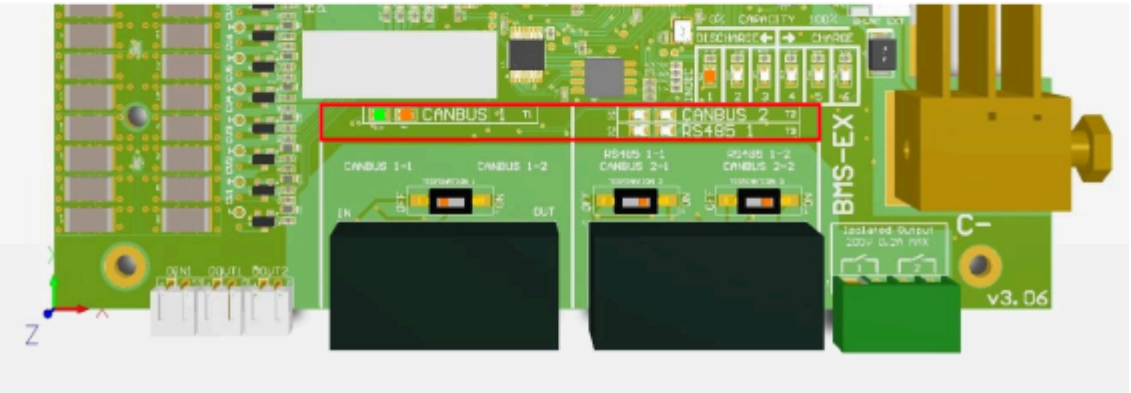
1. Switch the main isolator to the OFF position.
2. Press and hold the battery ON/OFF switch until all the LEDs on the BMU switch off.
3. Remove the perspex cover.
4. Disconnect all HV power cables to the module you are working on.
5. Connect the push button to the push button connector on the BMS.
6. Press and release the push button to turn the BMS on.
7. Once the BMS is on, hold in the push button, the indication LEDs will flash sequentially from 1 through to 6.
8. Hold in the push button until indication LED 4 flashes and then release.



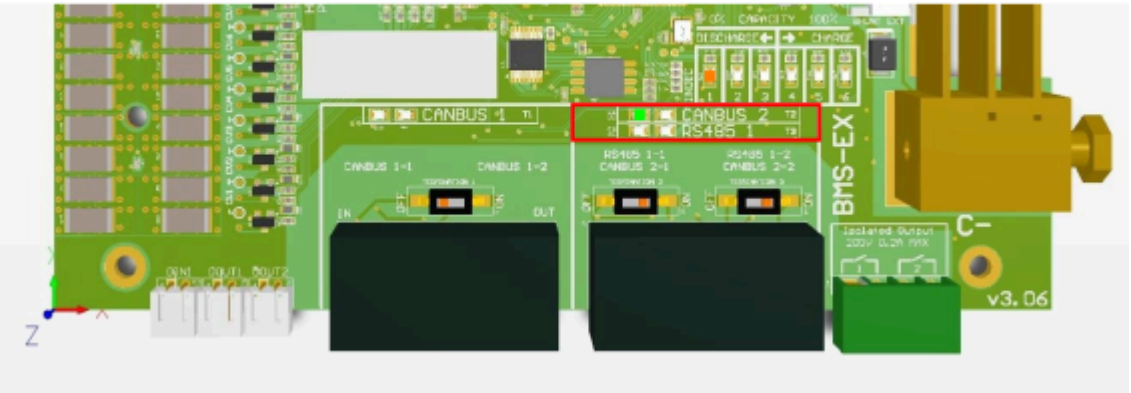
9. Give short presses until indication LED 1 is illuminated (orange). Hold down on the push button for 2 seconds and then release to make your selection.



10. The CANBUS LEDs should now be illuminated.



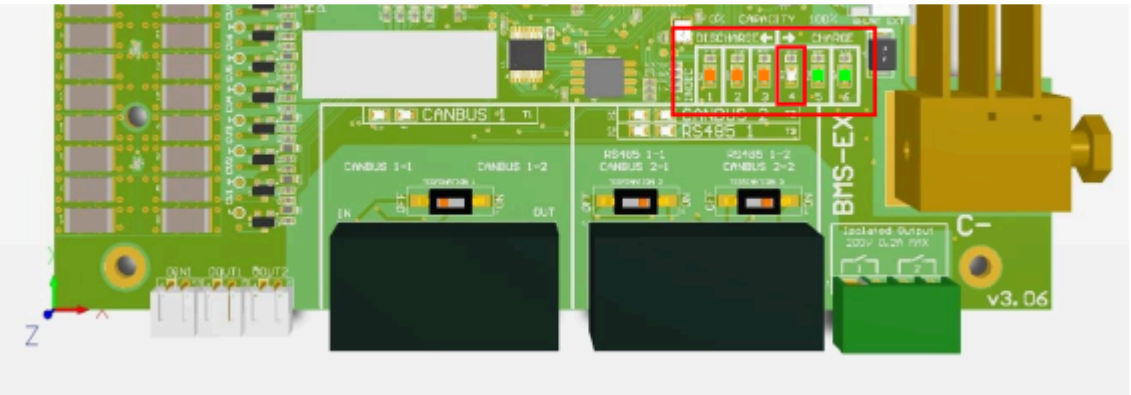
11. Give short presses on the push button to change the LED position until only CANBUS 2 is illuminated green. Hold down on the push button for 2 seconds and then release to make your selection.



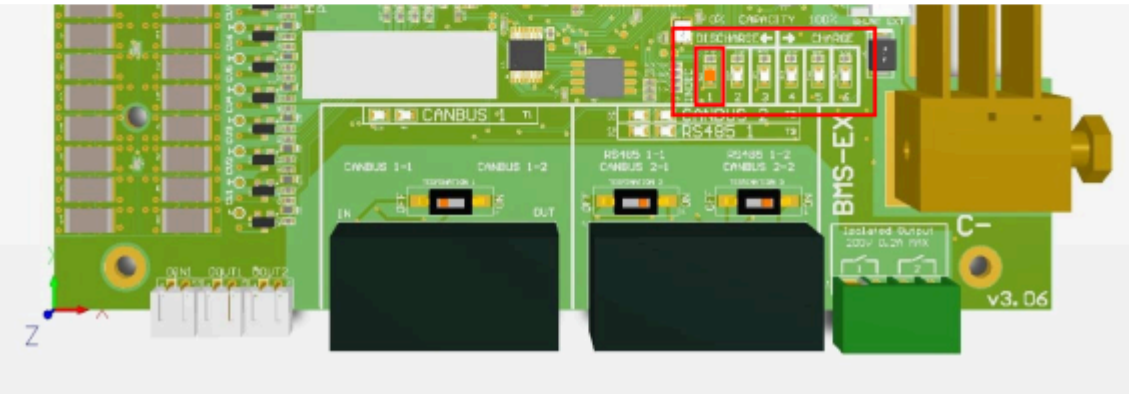
12. Switch the BMS ON/OFF switch to the OFF position and then switch it to the ON position again.
13. The BMS should now be in high voltage mode. To test, use the push button to turn the BMS on again, as in step 3. If done correctly, the BMS should automatically switch off after 10-15 seconds.

Selecting LV Mode on BMS

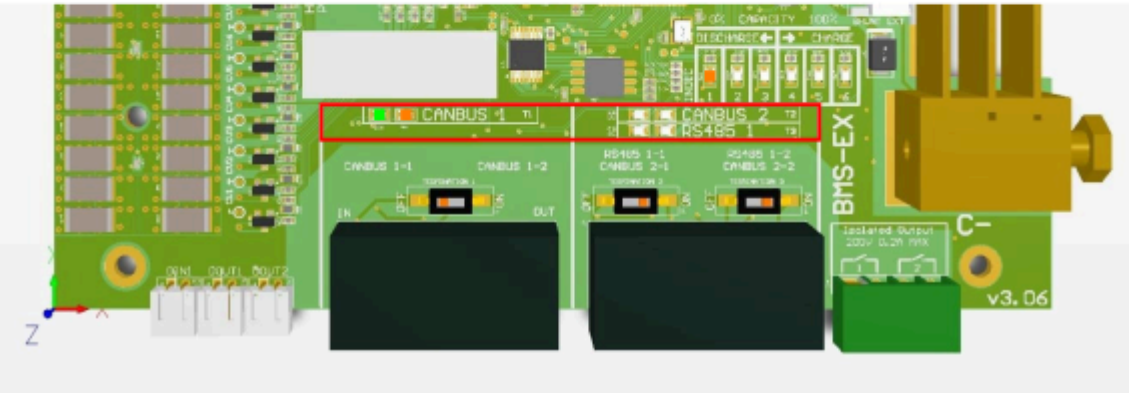
1. Switch the main isolator to the OFF position.
2. Press and hold the battery ON/OFF switch until all the LEDs on the BMU switch off.
3. Remove the perspex cover.
4. Disconnect all HV power cables to the module you are working on.
5. Connect the push button to the push button connector on the BMS.
6. Press and release to turn the BMS on.
7. Once the BMS is on, hold in the push button, the indication LEDs will flash sequentially from 1 through to 6.
8. Hold in the push button until indication LED 4 flashes and then release.



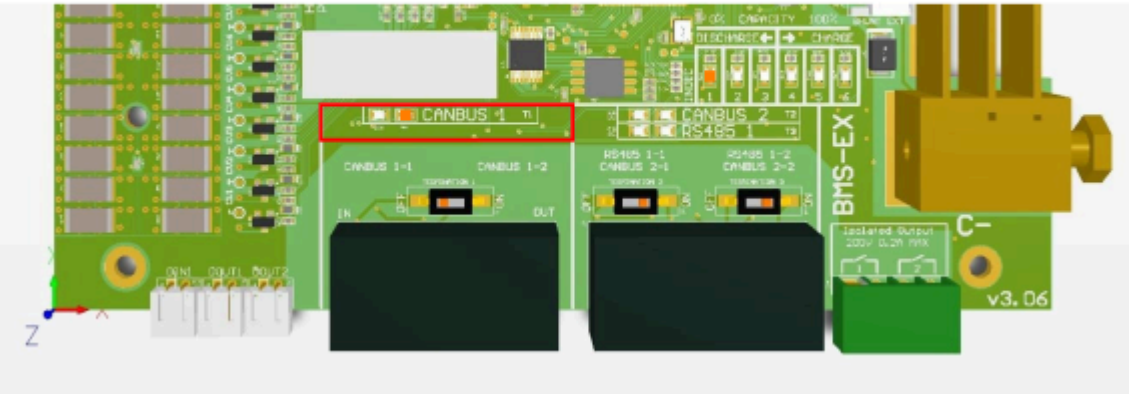
9. Give short presses until indication LED 1 is illuminated (orange). Hold down on the push button for 2 seconds and then release to make your selection.



10. The CANBUS LEDs should now be illuminated.



11. Give short presses on the push button to change the LED position until only CANBUS 1 is illuminated orange. Hold down on the push button for 2 seconds and then release to make your selection.



12. Switch the BMS ON/OFF switch to the OFF position and then switch it to the ON position again.
13. The BMS should now be in low voltage mode. To test, use the push button to turn the BMS on again, as in step 3. If done correctly, the BMS will stay on.

Decommissioning the SS7000 Series ESS

1. Switch the battery isolator OFF.
2. Press and hold the battery ON/OFF switch until all the LEDs on the BMU switch off. After 10 seconds all the BMSs should automatically shutdown.
3. Remove the perspex cover of the modules.
4. Disconnect and remove the HV power cables between the modules and BMU by pressing the release button on the connector and simultaneously pulling.
5. Turn off the BMS on the ON/OFF microswitch.
6. Disconnect and remove the communication cables that connect to the BMU and modules.
7. Remove the two M6 bolts and grounding washers securing the module and BMU to the cabinet.
8. The BMU and modules may now be removed from the battery cabinet.
9. Disassemble the cabinet.