

BLUE NOVA energy

SBB™ MKII Series

Single Box Battery



Product User Manual

Document version	ver. 1.2
Compiled by	C. Delport
Approved by	J. Verster
Published on	7 July 2026

Table of Contents

01 DOCUMENT SCOPE	2
1.1 Applicable Products	<i>Lists all the product(s) to which the information in this manual applies.</i> 2
1.2 Target Audience	<i>Lists the types of users for which this manual was compiled.</i> 2
1.3 Symbols	<i>Lists the icons / symbols used throughout this manual.</i> 2
1.4 Terminology	<i>Lists the product- and industry-specific terms used in this manual.</i> 3
02 SAFETY REQUIREMENTS	4
2.1 Safety Introduction	<i>Chapter introduction incl. emphasis on the importance of safety.</i> 4
2.2 General Safety Requirements	<i>Lists industry-specific safety requirements.</i> 4
2.3 Battery Safety Requirements	<i>Lists product-specific safety requirements.</i> 5
03 PRODUCT OVERVIEW	6
3.1 Product Applications	<i>Lists applications suitable to the product.</i> 6
3.2 Summary of Features	<i>Lists some notable product features.</i> 6
3.3 Component Layout	<i>Illustrates the product's dimensions & external component layout.</i> 7
3.4 Technical Specifications	<i>Lists the product's technical (datasheet) specifications.</i> 8
04 PRE-INSTALLATION	9
4.1 Packing list	<i>Lists the components included with each product shipment.</i> 9
4.2 PPE & Tools	<i>Lists the equipment & tools potentially required for installation.</i> 9
4.3 Site Requirements	<i>Lists the requirements specific to installation sites/locations.</i> 9
05 INSTALLATION	10
5.1 Installation: Single Battery	<i>Step-by-step instructions for installing single batteries.</i> 10
5.2 Installation: Parallel Batteries	<i>Step-by-step instructions for installing parallel battery configurations.</i> 11
5.3 DIP Switch Array	<i>DIP switch array configuration guide for single & parallel batteries.</i> 12
5.4 Serial Communication	<i>RJ45 pinout configuration guide for CAN & RS485 communication.</i> 14
5.5 Voltage-based Setup	<i>Lists the parameters to configure for voltage-based installation.</i> 14
06 OPERATION	15
6.1 Indicators	<i>Explains how to interpret battery-integrated LED arrays & alarms.</i> 15
6.2 Touch-screen display	<i>Explains how to navigate & use the product's touch-screen display.</i> 16
6.3 Remote monitoring	<i>Instructions on how to set up & monitor batteries remotely.</i> 21
07 EMERGENCY & FIRST AID	22
7.1 Ruptured / leaking components	<i>Emergency procedure to follow in case of leaking electrolyte.</i> 22
7.2 Thermal events	<i>Emergency procedure to follow in case of fire.</i> 22
7.3 Water contact	<i>Emergency procedure to follow in case of contact with water.</i> 22
7.4 Damaged batteries	<i>General procedures applicable to damaged batteries.</i> 22

01 DOCUMENT SCOPE

1.1 Applicable products

This user manual contains information specific to the **BlueNova SBB™ (Single Box Battery) MKII Series**. At the time of publication of this manual, the SBB™ MKII Series consisted of only one product, namely **SBB™ MKII BN52V-314-16k**.

If you are unsure whether the information in this document is applicable to your specific product, please contact BlueNova's Technical Support department for confirmation before proceeding with carrying out any guidelines and/or instructions contained herein.

1.2 Target audience

This document has been compiled to provide supportive information predominantly to energy industry professionals tasked with installation and/or technical maintenance of SBB™ MKII Single Box Batteries. Such individuals should be:

- adequately trained and experienced in the installation and maintenance of electrical DC systems.
- capable of interpreting electrical circuit diagrams.
- familiar with the composition and basic operating principles of multi-product energy storage systems.
- aware of and compliant to the industry safety standards of the associated country / region.

This document also contains information of a more general nature which might be of use to any one or more individuals involved with the basic day-to-day operation, transportation, storage and/or disposal of SBB™ MKII Single Box Batteries, as well as those needing to act in the interest of occupational health & safety under associated circumstances.

1.3 Symbols

The table below lists the various symbols used throughout this manual alongside the meaning of each:

Symbol	Meaning	Description
	NOTICE	Indicates supplementary information relevant to the chapter / section. Taking note of this information may provide further insight into the topic at hand.
	WARNING	Indicates information that is of critical importance to product/system functionality. Failure to adhere to these instructions may lead to product/system malfunction and/or damage.
	DANGER!	Indicates information that is of critical importance to product/system functionality and personal safety. Failure to adhere to these instructions may lead to product/system malfunction and/or damage, serious personal injury or even death.

1.4 Terminology

The table below lists some of the product- and system-specific terms & abbreviations used throughout this manual:

Abbr.	Term	Description
BMS	Battery Management System	A battery-integrated electronic system used to facilitate balanced charging, autonomous protective countermeasures & other functions.
EMS	Energy Management System	An energy system-integrated solution used to facilitate serial communication, remote monitoring & other system control measures.
ESS	Energy Storage System	An electrical system which includes one or more batteries.
PCS	Power Conversion System	A bi-directional inverter used in energy storage systems.
PPE	Personal Protective Equipment	Equipment worn by operators to minimise the risk of personal injury.
SBB™ MKII	Single Box Battery, Mark II	The product / -range covered in this document.

Additionally, the table below lists some of the industry-specific terms & abbreviations used throughout this manual:

Term / abbr.	Meaning
A	Ampere. The unit of measurement of electrical current.
AC	Alternating current. Electrical current that changes direction several times per second, such as supplied by utility grids, inverter output to loads & other devices. In compatible with batteries directly.
Ah	Ampere-hour. The unit of measurement of cell capacity. Battery capacity is not specified in Ah as a rule, but instead in Wh / kWh / MWh.
C(n)	Battery rate of charge and/or discharge (where n = the number of hours required to hypothetically recharge the battery in question from 0-100% SoC at constant current).
CAN	Controller Area Network. A widely used serial communication protocol.
DC	Direct current. Electrical current that flows in one direction only, such as supplied by batteries and solar PV panels/-arrays.
EoL	End-of-life. The point at which a battery reaches a predetermined number of cycles. Normally specified alongside the minimum capacity retained at this point.
FW	Firmware. Specialised software normally installed directly onto one or more hardware-integrated ROM modules for the purposes of establishing functionality in the hardware.
HVAC	Heating, ventilation & air conditioning. In energy storage systems, this refers to the peripheral hardware and/or integrated subsystem(s) used for system temperature regulation.
IP(xy)	Ingress protection rating. Indicates how well an electrical device's enclosure protects the device from contamination by foreign matter (where x = numerical rating for solids, and y = for liquids).
kWh	Kilowatt-hour. The unit of measurement of energy (and by extension, also battery capacity).
LiFePO4	Lithium iron phosphate. Part of the lithium-ion family of battery chemistries. Unlike almost all other lithium battery chemistries, LiFePO4 (sometimes also: LFP) is inherently safe.
Ω	Ohm. The unit of measurement of electrical resistance.
RS485	Recommended Standard #485. A serial communication protocol standard for multi-node systems.
SoC	Battery state of charge. Expressed as a percentage.
SoH	Battery state of health. Expressed as a percentage of the maximum remaining usable capacity in comparison to the original capacity of a battery.
V	Voltage. The unit of measurement of an electrical source's potential to deliver energy.
VAC	The voltage of an electrical source with alternating current.
VDC	The voltage of an electrical component / source with direct current.
Wh	Watt-hour. The unit of measurement of energy (and by extension, also battery capacity).

02 SAFETY REQUIREMENTS

2.1 Safety introduction

IMPORTANT: Due to the inherently high risks associated with live electrical systems, the information included in this chapter should be regarded as of critical importance. Failure to adhere to any of the safety requirements included in this chapter may lead to damaged products/components, voiding of associated product warranties (where applicable), damage and/or destruction of assets in proximity to such systems, electrical shock, serious injury and even death.

2.2 General safety requirements

The following non-exhaustive list of safety requirements are applicable to electrical systems in general:



Electrical devices & components (incl. SBB™ MKII batteries) should always be installed, uninstalled, operated and/or serviced by suitably qualified personnel only.



Always wear appropriate PPE and use tools & equipment of the correct type and condition when installing, uninstalling, operating, servicing, transporting and/or otherwise handling electrical equipment.



Electrical connections between any two or more stand-alone electrical components/devices in an electrical system should include some slack. High tension connections between such components/devices may lead to deterioration of connection integrity over time, increase the risk of heat build-up and lead to thermal events.



Do not use water or other electrically conductive fluids to clean electrical device enclosures and/or any other surface(s) in close direct contact with connected components in an electrical system.



Electrically conductive accessories and/or jewellery should be removed before commencing with installation, uninstallation and/or maintenance of electrical systems, components or devices.



Before connecting any wires, cables or components in any electrical system which includes one or more live energy sources, measure the voltage between the relevant connector(s) and intended connection point(s) first. Do not proceed with any such connections if the measured voltage may damage connecting surfaces.



Air inlets and/or outlets of electrical device enclosures should remain free from obstruction. Obstructed air inlets/outlets may lead to insufficient heat dissipation and cause additional side effects incl. malfunction, damage and/or failure of such devices, thermal events & additional damage to peripheral assets.

2.3 Battery safety requirements

The following list of safety requirements are applicable specifically to SBB™ MKII Series batteries:



Avoid direct contact with non-isolated conductive surfaces & potentially live connection points (i.e. battery terminals) in an electrical system. Do not install, service or otherwise directly interact with batteries, battery-connected circuitry & components without wearing the required PPE or using the appropriate tools.

(continued from previous page)



Batteries must be isolated (i.e. switched off and disconnected from all peripheral components) before being installed, serviced, repaired, uninstalled or relocated for any purpose at any given time.



Do not short-circuit the positive and negative electrodes of individual battery cells, batteries or multi-battery configurations. Voltage may remain present over any two or more such electrodes even when the associated batteries/cells are disconnected from the associated electrical system and switched off.



All conductive wiring & connection points in battery-integrated systems should be electrically insulated to the fullest extent possible. Do not install batteries in systems where any of the connective wiring and/or connection points are not sufficiently insulated.



Take care when transporting, unboxing, relocating and/or otherwise moving SBB™ MKII Series batteries. SBB™ MKII Series batteries weigh $\pm 140\text{kg}$ each and may cause serious injuries if not handled correctly.



Before commencing with the installation of one or more SBB™ MKII Series batteries, each battery should be earthed first. Conversely, when uninstalling SBB™ MKII Series batteries, the earthing connection to each battery should be left intact (connected) until all other connections to each battery have been disconnected.



(Re)connecting & powering on the various components connected to any electrical system in which one or more SBB™ MKII Series batteries have been (re)installed should be done in strict accordance with the associated procedure(s) included in this document.



Do not store, install, service or repair batteries in locations where ambient factors such as temperature, humidity, etc. exceed (or will likely exceed in the foreseeable future) the acceptable range associated with each, as specified on the product datasheet.



Do not connect SBB™ MKII Series batteries to AC power sources directly. Do not connect SBB™ MKII Series batteries to non-compatible DC power sources directly. Do not connect SBB™ MKII batteries in series.



Do not connect batteries to PV panels or -configurations directly. Always install the appropriate fusing & compatible supplier pre-approved MPPT module(s) between batteries and PV panel configurations.



SBB™ MKII Series batteries of which any integrated LiFePO₄ cell(s) exhibit expansion/bulging should be discontinued from use immediately and repaired/replaced as necessary.

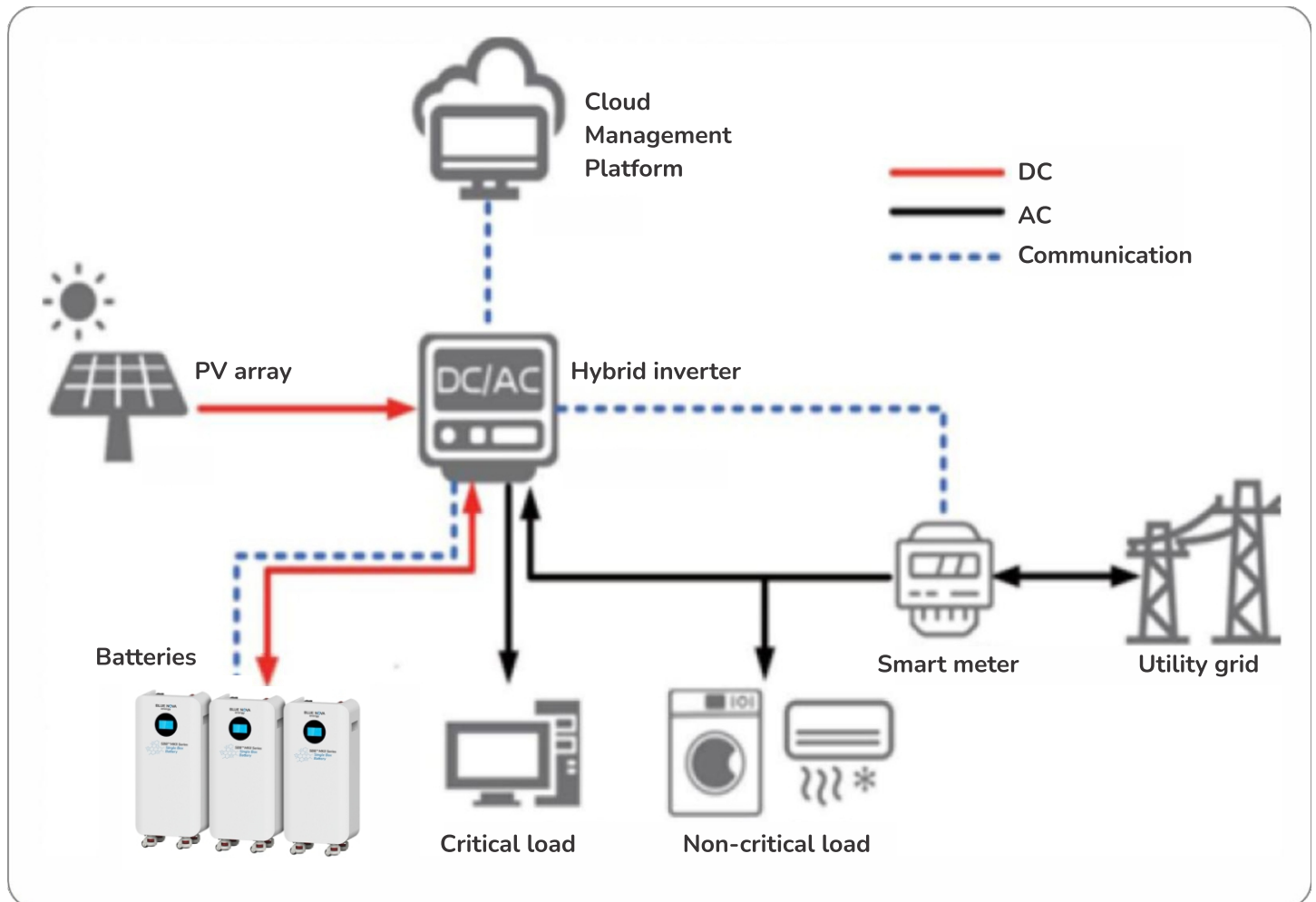


SBB™ MKII Series batteries stored for extended periods should be recharged at least once every 3 months. In such cases, a calibrated product-compatible inverter/charger should be used to recharge each battery individually to 40~60% SoC in accordance with the relevant procedure(s) contained in this document.

03 PRODUCT OVERVIEW

3.1 Product applications

SBB™ MKII Series batteries can be used to provide backup power, load shifting and peak shaving in residential and small commercial applications. The diagram below illustrates the general operational capability of a typical SBB™ MKII Series battery installation:



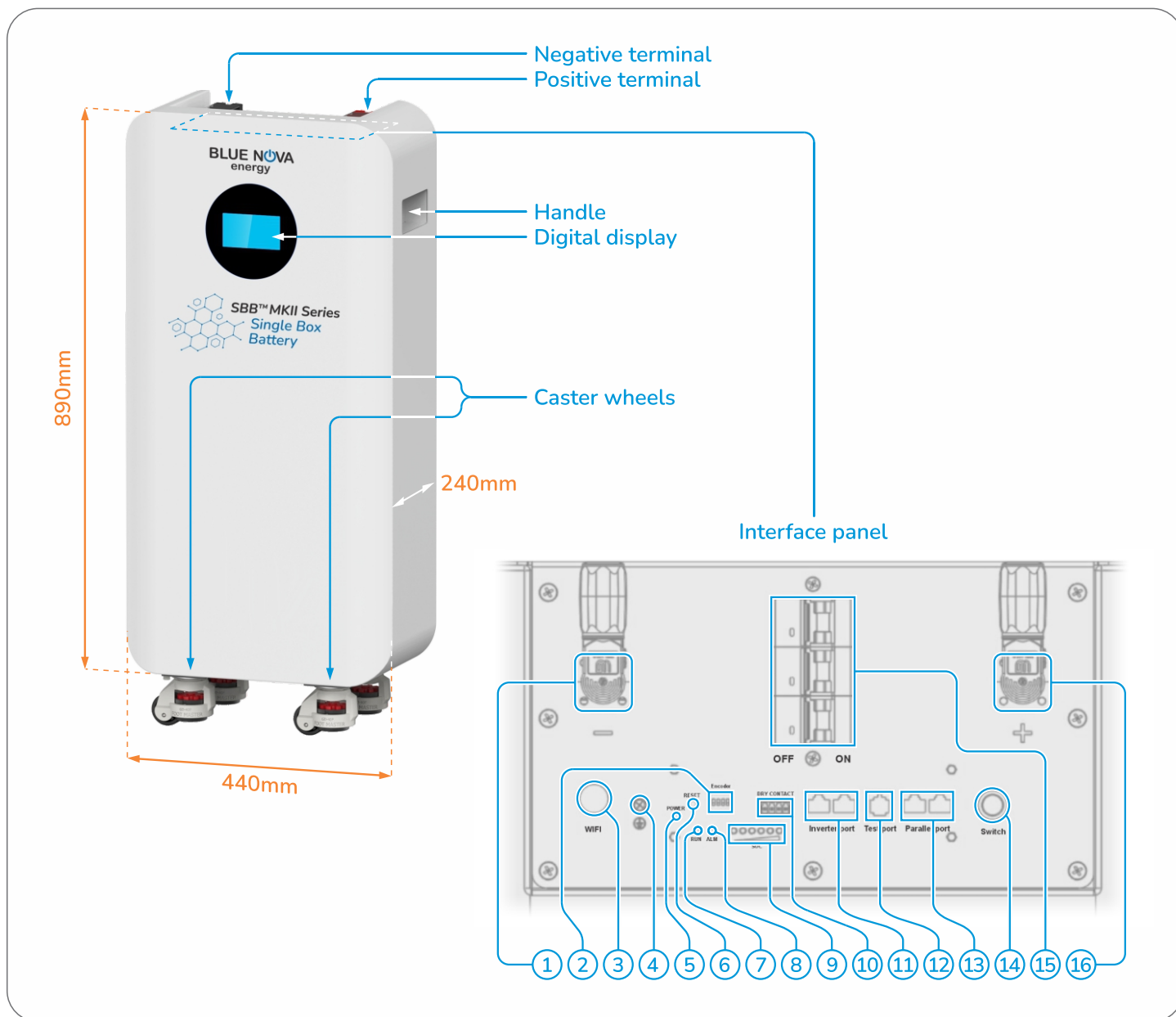
3.2 Summary of features

SBB™ MKII Series batteries include the following functions & features:

- **High performance BMS:** Ensures that the cells in each SBB™ MKII battery are balanced during charge cycles and includes autonomous protective measures against adverse operating conditions.
- **Alarms:** Triggered upon detection of operating conditions such as over-voltage, under-voltage, over-current, short circuit connections, temperature out-of-range, electronic component failure & battery failure.
- **Serial communication:** Includes serial communication (RS485 / CAN) integration capability with compatible peripheral devices. Supports uploading of measured health & performance data to select monitoring platforms.
- **Parallel configuration:** Up to 15 x SBB™ MKII batteries can be interconnected in parallel per system.

3.3 Component layout

The diagram below illustrates the dimensions and external component layout of an SBB™ MKII Series battery:



The 16 x numbered components on the interface panel in the diagram above are described in the table below:

#	Label	Type	Function
1	–	Terminal	The negative terminal of the battery.
2	Encoder	DIP switch array	Used to define the address of a specific battery in an interconnected parallel battery configuration.
3	WIFI	LED	Indicates the connection status of the battery to a compatible Bluetooth™ access point within range.
4	⏏	Connection point	Indicates the connection point from which the battery's enclosure should be connected to an electrical earthing point.

(Table continued from previous page)

#	Label	Type	Function
5	POWER	LED	Indicates whether the battery is switched on or off.
6	RESET	Push button	Press this button to reboot the battery.
7	RUN	LED	Indicates the operational status of the battery (see 3.3.1 below).
8	ALM	Button	Indicates whether the battery is in alarm status (see 3.3.1 below).
9	SOC	LED array	Indicates the state-of-charge of the battery (see 3.3.1 below).
10	DRY CONTACT	Connection point array	
11	Inverter port	2 x RJ45 ports	Used to connect the serial communication (CAN/RS485) of the battery/parallel battery configuration to a compatible inverter.
12	Test port	RJ11 port	Used for debugging purposes. Do not connect devices to this port.
13	Parallel port	2 x RJ45 ports	Used to establish serial communication between batteries interconnected in a parallel battery configuration.
14	Switch	Push button	Press this button to switch the battery on. Keep this button depressed for a few seconds to shut the battery down.
15	OFF ON	3 x breakers	Safety feature. Automatically opens to disconnect the associated battery whenever out-of-range operation is detected.
16	+	Terminal	The positive terminal of the battery.

3.4 Technical specifications

The table below lists the technical specifications of SBB™ MKII Series batteries:

General product specifications	
Cell chemistry & configuration	Lithium iron phosphate (LiFePO ₄) 16S1P
Cell specifications	V _(nom) = 3.2V Capacity = 314Ah @C2, 25°C
Battery voltage	51.2V nominal
Battery (energy) capacity	Total installed capacity @100% DoD = 16 077Wh; Usable capacity @recommended max. 80% DoD = 12 861Wh
Multi-unit configuration range	1S1P ~ 1S15P units (16 ~ 241kWh per system)
Communication	CAN; RS485; Bluetooth
User interface	Integrated 4.3" touch-screen display
Dimensions (unboxed)	440 x 240 x 970mm (W x D x H)
Net weight (unboxed)	±140kg
Voltage, current & cycle life specifications	
Operating voltage range	43.2 ~ 57.6VDC
Max. charge current	Continuous: 150A Peak: 160A (for ≤60 seconds)
Max. discharge current	Continuous: 200A Peak: 210A (for ≤60 seconds)
Cycle life	≥8000 cycles @80% DoD, C2, 25°C
Environmental & safety specifications	
Ambient temperature range	Charge: 0°C ~ 50°C Discharge: -20°C ~ 50°C
Ambient humidity range	0 ~ 95% relative humidity (non-condensing)
Ingress protection rating	IP20 (for indoor use only)
Certifications	CE-EMC; UN38.3; MSDS; IEC62619



While the above specifications are guaranteed to be correct at the time of publication of this user manual, BlueNova products remain subject to continued improvement where possible. Any information associated with such changes therefore remain subject to change and will be published in the relevant datasheet first.

04 PRE-INSTALLATION

4.1 Packing list

The following components are included with each newly ordered SBB™ MKII Series battery shipped:

Item no.	Item name	Qty	Note(s)
1	SBB™ MKII Series battery	1	Main component.
2	Positive terminal power cable	1	Red cable fitted with a terminal connector lug.
3	Negative terminal power cable	1	Black cable fitted with a terminal connector lug.
4	Serial communication cable	1	Fitted with 1 x RJ45 connector on each end.
5	Ground / earthing cable	1	Fitted with a connector lug.

Verify that each of the above components are included and undamaged upon delivery of each SBB™ MKII Series battery. Should any of the above not be included in a shipment, please contact BlueNova Technical Support before proceeding.

4.2 PPE & Tools

The PPE & tools which may be required to successfully install SBB™ MKII Series batteries are listed below:

Safety boots	Anti-static gloves	Safety goggles	Hard hat
Calibrated multimeter	Screwdriver set	Torque wrench & sockets	Insulation tape
Forklift / pallet jack	Foldable ladder	Measuring tape	Levelling instrument

4.3 Site requirements

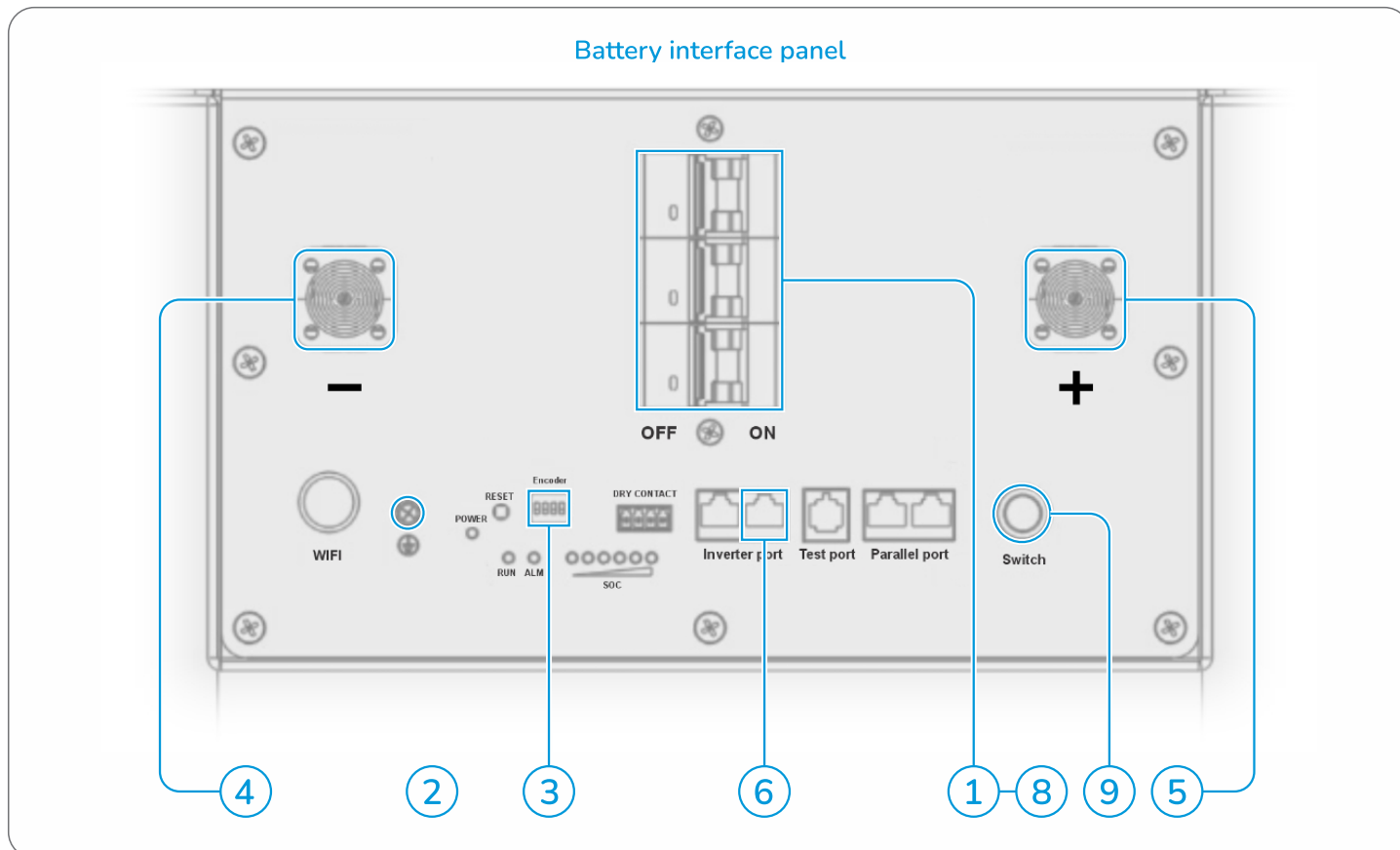
The following site requirements must be met before proceeding with the installation of SBB™ MKII Series batteries:

- The allocated site/area/building should be free from flammable and/or explosive materials in proximity.
- The surface on which SBB™ MKII Series batteries are due to be installed must be solid & level.
- SBB™ MKII Series batteries should not be installed near heat sources or in areas exposed to direct sunlight.
- The site/area/building should be protected against water leakage & excess ingress of other foreign materials.
- The appropriate measures should be taken to ensure that the temperature & humidity at the site/area/building remain within acceptable levels in accordance with product datasheet specifications.
- The allocated site/area/building should include sufficient ventilation.
- SBB™ MKII Series batteries should only be installed in locations where they will remain accessible to relevant technical personnel if/when necessary – especially in cases of emergency.
- The allocated site/area/building should include all the required industry-standard safety signage & equipment (fire extinguishers etc.) associated with electrical installations.

05 INSTALLATION

5.1 Installation: Single battery

The diagram and corresponding instructions below describe the procedure for installing a single SBB™ MKII battery:

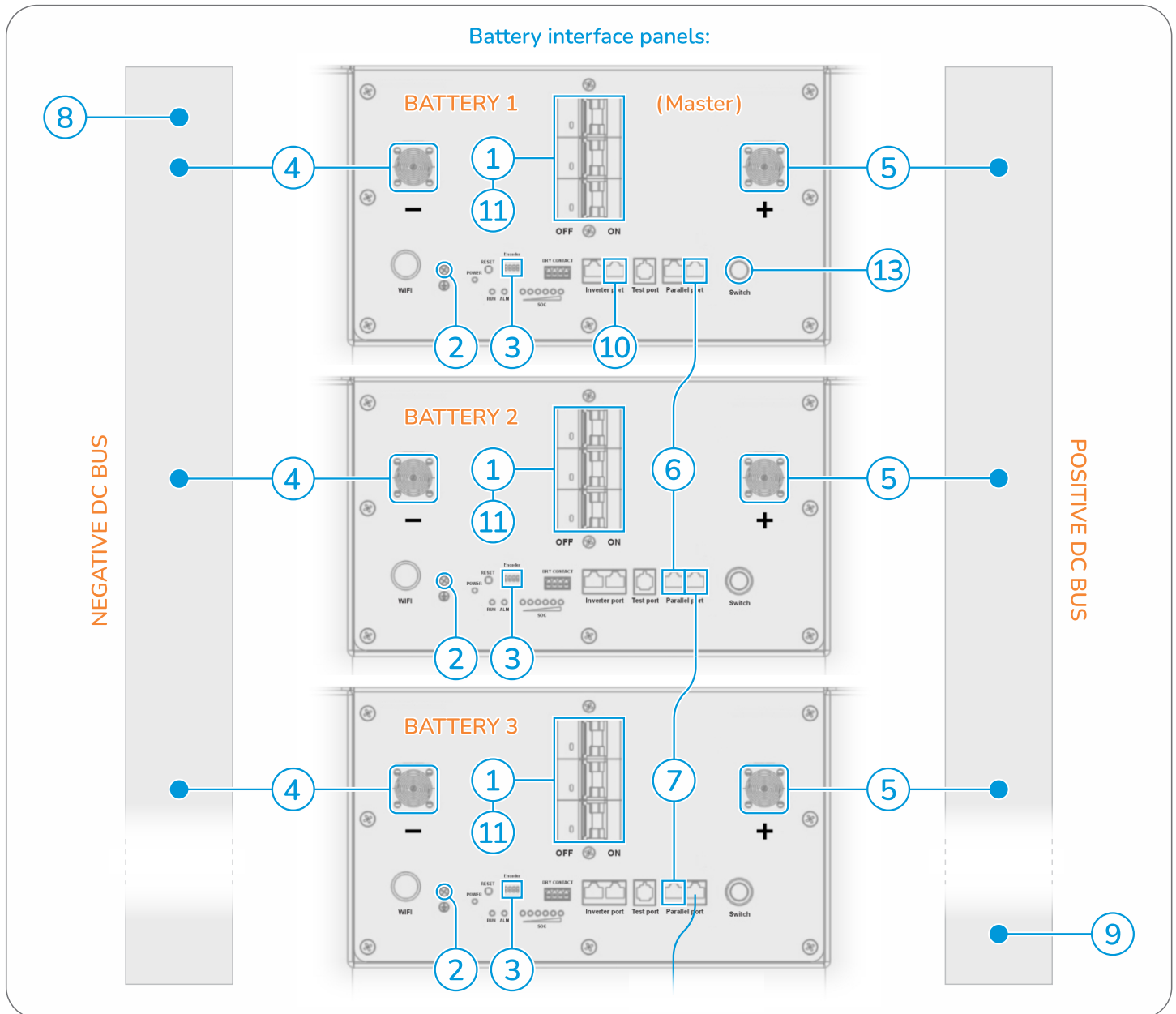


Step-by-step instructions:

1. Ensure that the battery-integrated breaker switches (and the inverter/charger to connect to) are switched off.
2. Connect the battery's enclosure to an electrical earthing point.
3. Set the switches on the DIP switch array to [ON | OFF | OFF | OFF] (see section 5.3 for more information).
4. Connect the battery's negative terminal to the appropriate negative terminal of the system's inverter/charger.
5. Connect the battery's positive terminal to the appropriate positive terminal of the system's inverter/charger.
6. Connect the battery's second RJ45 "Inverter port" to the appropriate serial communication port of the system's inverter/charger. See section 5.4 for more information on RJ45 connector pinout configuration.
7. Switch the inverter/charger on (not illustrated in the diagram above).
8. Switch battery-integrated breakers on.
9. Switch the battery on by pressing the indicated button.

5.2 Installation: Parallel batteries

The diagram and corresponding instructions below describe the procedure for installing SBB™ MKII batteries in parallel. Up to 15 x SBB™ MKII Series batteries can be installed in parallel per system:



Step-by-step instructions:

1. Ensure that each battery's integrated breaker switches (and the inverter/charger to connect to) are switched off.
2. Connect each battery's enclosure to an electrical earthing point.
3. Set the switches of the DIP switch array on each battery according to the instructions included in section 5.3 of this user manual.

(Instructions continued from previous page)

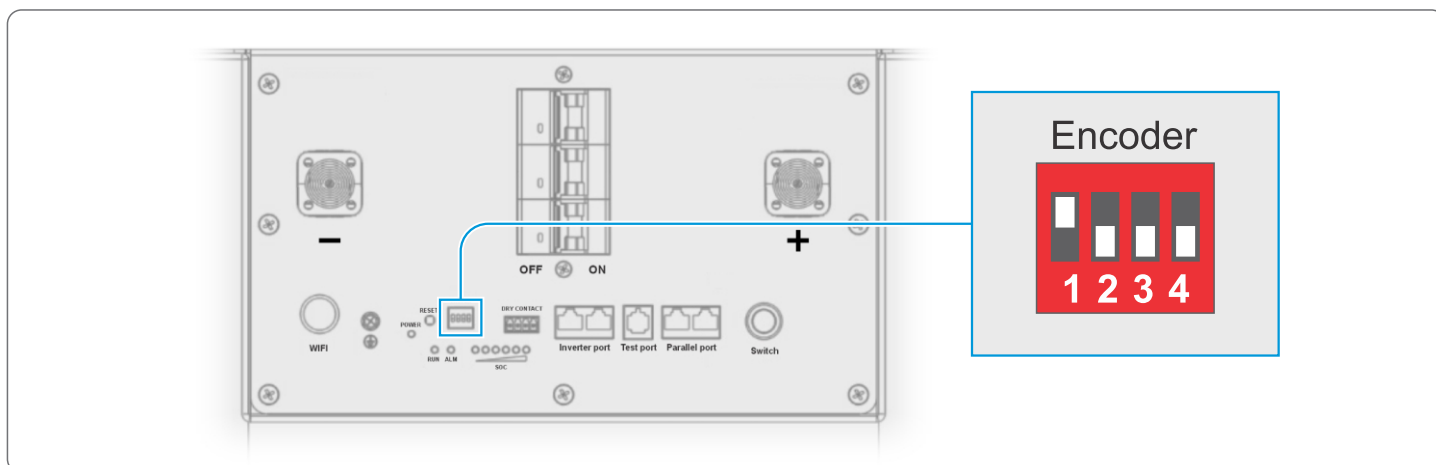
4. Connect the negative terminal of each battery to a common negative DC bus bar. Each cable used for this purpose should be of the same length, diameter, conductive material and quality.
5. Connect the positive terminal of each battery to a common positive DC bus bar. Each cable used for this purpose should be of the same length, diameter, conductive material and quality.
6. Connect the second RJ45 “Parallel port” of battery 1 (master) to the first RJ45 “Parallel port” of battery 2 with an appropriate RJ45 cable. See section 5.4 for more information on RJ45 pinout configuration.
7. Connect the second RJ45 “Parallel port” of battery 2 to the first RJ45 “Parallel port” of battery 3 with an appropriate RJ45 cable. Continue this process until the serial communication of all batteries included in the parallel configuration are interconnected. See section 5.4 for more information on RJ45 pinout configuration.
8. Connect the negative DC bus bar to the appropriate negative terminal on the system’s inverter/charger.
9. Connect the positive DC bus bar to the appropriate positive terminal on the system’s inverter/charger.
10. Connect the master battery’s second RJ45 “Inverter port” to the appropriate serial communication port of the system’s inverter/charger. See section 5.4 for more information on RJ45 pinout configuration.
11. Switch each battery’s integrated breakers on.
12. Switch the system’s inverter/charger on (not illustrated in the diagram above).
13. Switch the first (master) battery on by pressing the indicated button. The rest of the interconnected batteries in the configuration should then switch on automatically.



Parallel battery configurations should always be connected to the associated system’s inverter / charger from end-to-end, i.e. from the positive terminal of the first battery (or closest point thereto on a common positive DC bus bar) and the negative terminal of the last battery (or closest point thereto on a common negative DC bus bar) of the entire parallel configuration, or vice versa.

5.3 DIP switch array

The DIP switch array included on the interface of each SBB™ MKII Series battery is labelled with the text “Encoder” and includes 4 x DIP switches. The switch array is used to define the number of batteries connected to a specific system as well as the specific address of each individual battery included in parallel battery configurations (where applicable):

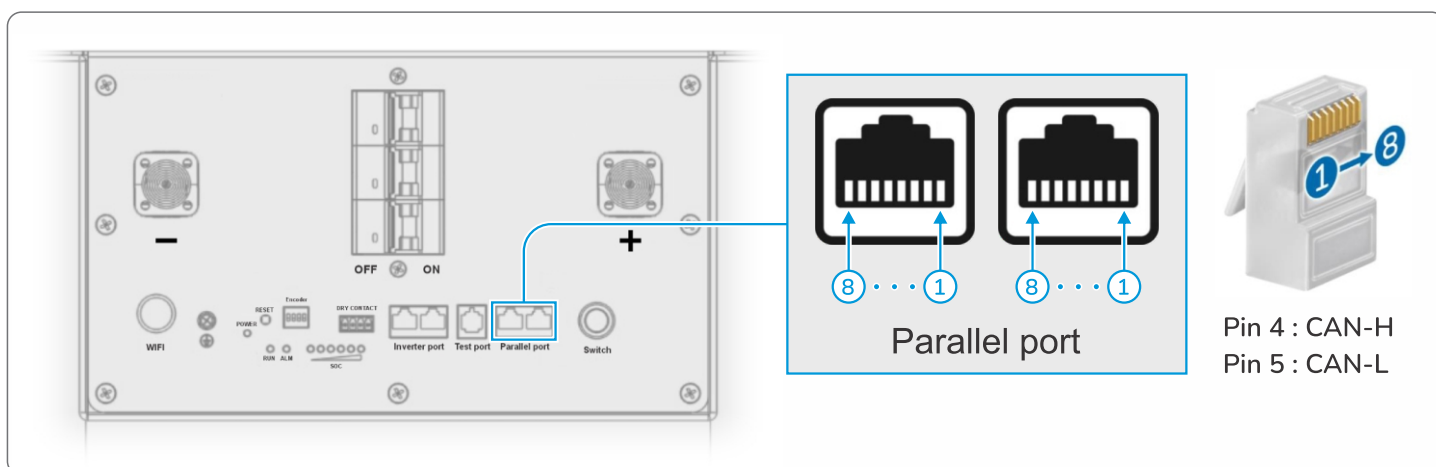


The DIP switch array(s) of both single and parallel-connected battery configurations are detailed in the table below:

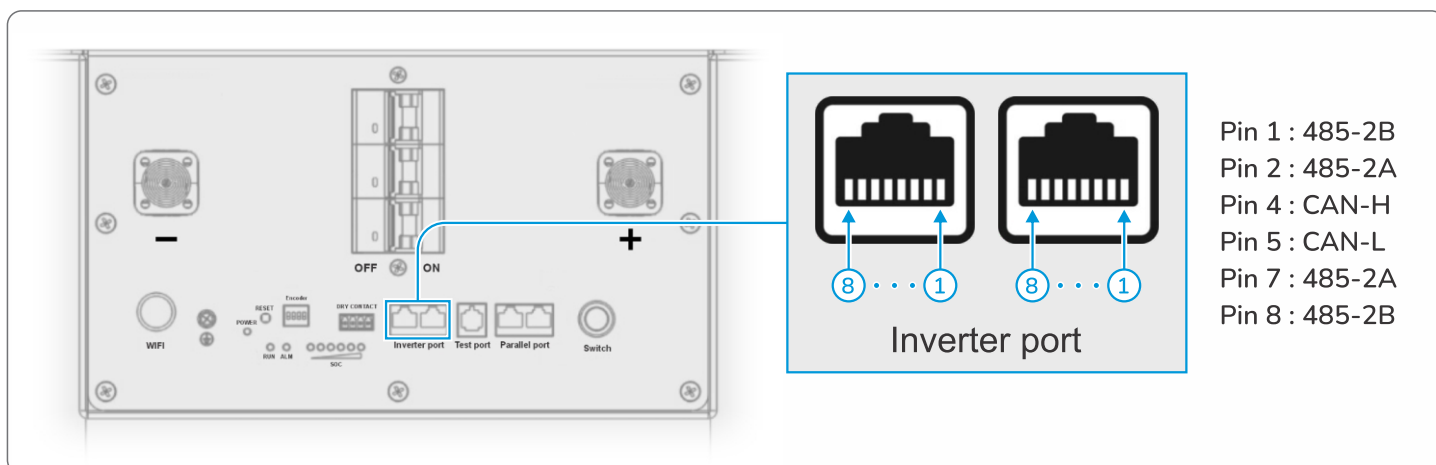
Battery number	Designation	DIP switch array configuration				Illustration
		#1	#2	#3	#4	
Battery #1	Master / single battery	▲ ON	▼ OFF	▼ OFF	▼ OFF	
Battery #2	Slave battery #1	▼ OFF	▲ ON	▼ OFF	▼ OFF	
Battery #3	Slave battery #2	▲ ON	▲ ON	▼ OFF	▼ OFF	
Battery #4	Slave battery #3	▼ OFF	▼ OFF	▲ ON	▼ OFF	
Battery #5	Slave battery #4	▲ ON	▼ OFF	▲ ON	▼ OFF	
Battery #6	Slave battery #5	▼ OFF	▲ ON	▲ ON	▼ OFF	
Battery #7	Slave battery #6	▲ ON	▲ ON	▲ ON	▼ OFF	
Battery #8	Slave battery #7	▼ OFF	▼ OFF	▼ OFF	▲ ON	
Battery #9	Slave battery #8	▲ ON	▼ OFF	▼ OFF	▲ ON	
Battery #10	Slave battery #9	▼ OFF	▲ ON	▼ OFF	▲ ON	
Battery #11	Slave battery #10	▲ ON	▲ ON	▼ OFF	▲ ON	
Battery #12	Slave battery #11	▼ OFF	▼ OFF	▲ ON	▲ ON	
Battery #13	Slave battery #12	▲ ON	▼ OFF	▲ ON	▲ ON	
Battery #14	Slave battery #13	▼ OFF	▲ ON	▲ ON	▲ ON	
Battery #15	Slave battery #14	▲ ON	▲ ON	▲ ON	▲ ON	

5.4 Serial communication

The 2 x RJ45 ports labelled “Parallel port” on each battery’s interface panel are used to interconnect the CAN serial communication of batteries included in a parallel battery configuration. The pin configuration is detailed below:



The 2 x RJ45 ports labelled “Inverter port” on each battery’s interface panel are used to connect the CAN / RS485 serial communication of batteries to a serial-compatible inverter. The pin configuration is detailed below:



Apart from connecting SBB™ MKII Series batteries with correctly configured RJ45 communication cables to serial communication-compatible inverters, additional configuration is required via the integrated touch-screen display of any such batteries to establish communication. See section 6.2 for more information.

5.5 Voltage-based setup

For battery installation with inverters that do not include serial communication, the following parameters must be set:

Battery voltage (nominal)	51.2V
Bulk / float charge voltage	57.6V
Recommended charge current	140A
Max. charge / discharge current	150A

Discharge cut-off voltage	43.2V
Temperature range (charge)	0°C ~ 55°C
Temperature range (discharge)	-20°C ~ 60°C
Temperature range (idle / stored)	15°C ~ 35°C

06 OPERATION

6.1 Indicators

The SOC LED array operates with the RUN & Alarm LED and integrated buzzer to indicate state-of-charge as follows:

Operational status	RUN LED	SOC LED array	State-of-charge	Alarm LED	Buzzer
Battery idle	●	● ● ● ● ● ● ●	84 ~ 100% SoC	○	—
	●	● ● ● ● ● ● ○	66 ~ 83% SoC	○	—
	●	● ● ● ● ● ○ ○	50 ~ 65% SoC	○	—
	●	● ● ● ● ○ ○ ○	33 ~ 49% SoC	○	—
	●	● ● ● ○ ○ ○ ○	17 ~ 32% SoC	○	—
	●	● ○ ○ ○ ○ ○ ○	0 ~ 16% SoC	①	④
Battery charging	●	● ● ● ● ● ● ●	100% SoC	○	—
	●	● ● ● ● ● ● ④	83 ~ 99% SoC	○	—
	●	● ● ● ● ● ④ ○	67 ~ 82% SoC	○	—
	●	● ● ● ● ④ ○ ○	51 ~ 66% SoC	○	—
	●	● ● ● ④ ○ ○ ○	33 ~ 50% SoC	○	—
	●	● ● ④ ○ ○ ○ ○	17 ~ 32% SoC	○	—
	●	④ ○ ○ ○ ○ ○ ○	0 ~ 16% SoC	○	—
Battery discharging	④	● ● ● ● ● ● ●	84 ~ 100% SoC	○	—
	④	● ● ● ● ● ● ○	66 ~ 83% SoC	○	—
	④	● ● ● ● ● ○ ○	50 ~ 65% SoC	○	—
	④	● ● ● ● ○ ○ ○	33 ~ 49% SoC	○	—
	④	● ● ● ○ ○ ○ ○	17 ~ 32% SoC	○	—
	④	● ○ ○ ○ ○ ○ ○	8 ~ 16% SoC	○	④
	④	④ ○ ○ ○ ○ ○ ○	0 ~ 7% SoC	○	①

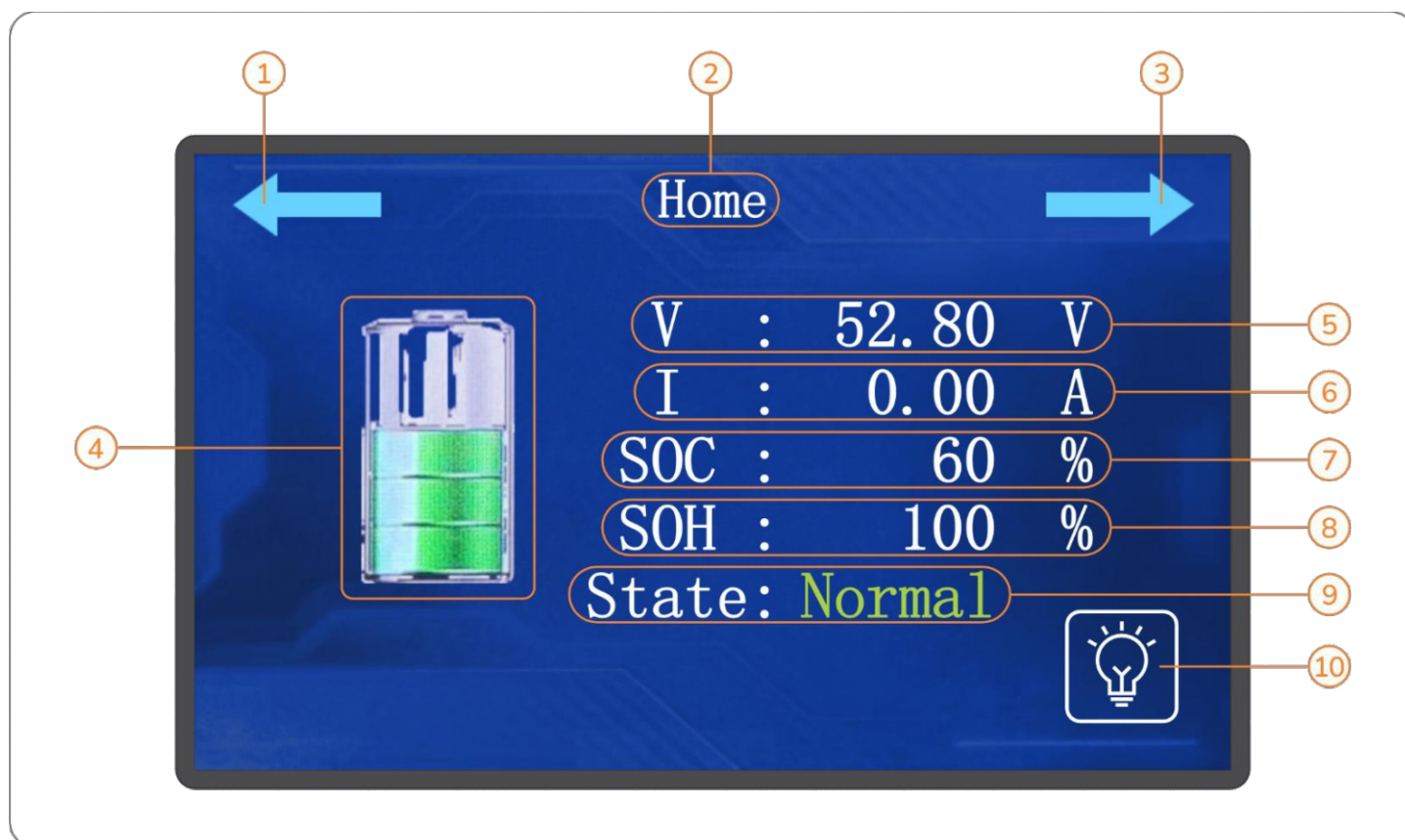
The LEDs, integrated buzzer and on-board display indicate specific warnings and/or fault conditions as described below:

Display #	RUN LED	SOC LED array	Alarm	Buzzer	Description of warning / fault
04	○	○ ○ ○ ① ○ ○ ○	●	④	Battery ID error.
18	○	○ ① ○ ○ ○ ① ○	●	①	Low temperature (discharge).
20	○	○ ① ○ ○ ① ○ ○	●	①	Low temperature (charge).
22	○	○ ① ○ ○ ① ① ○	●	④	High / over-voltage.
24	○	○ ① ① ○ ○ ○ ○	●	①	Low / under-voltage.
26	○	○ ① ① ○ ① ○	●	①	High temperature (discharge).
28	○	○ ① ① ① ○ ○ ○	●	④	Discharge over-current.
30	○	○ ① ① ① ① ○	●	①	High temperature (charge).
32	○	① ○ ○ ○ ○ ○ ○	●	④	Charge over-current.
34	○	① ○ ○ ○ ○ ① ○	●	①	MOS temperature too high.
36	○	① ○ ○ ○ ① ○ ○	●	④	Short-circuit connection.
38	○	① ○ ○ ○ ① ① ○	●	④	Ambient temperature high.
40	○	① ○ ① ○ ○ ○ ○	●	④	Ambient temperature low.

● ● = LED On | ① ④ = Flashing once every 4 seconds | ● ① = Flashing once per second | ○ = LED Off
 ④ = Buzzer on (continuous) | ① = Buzzer once per second | ④ = Buzzer once every 4 seconds

6.2 Touch-screen display

The diagram below illustrates the image that should be displayed on the integrated touch-screen display of an SBB™ MKII Series battery upon switching the battery on:



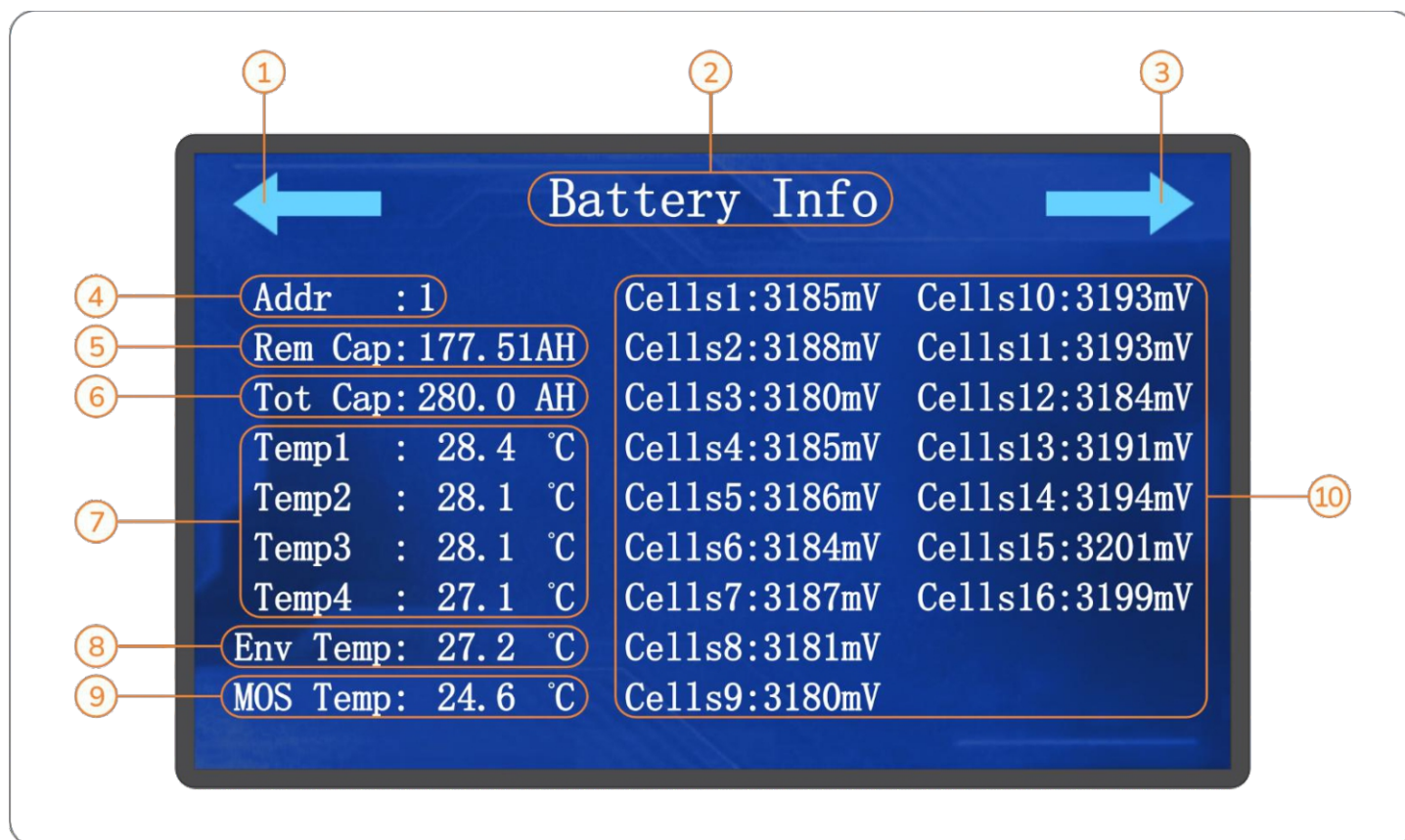
The numbered elements & sections in the diagram above are explained in the table below:

#	Designation	Type	Function / purpose
1	Previous page arrow	Button	Tap this arrow to navigate to the last page of the interface.
2	Page title	Text	Specifies the title of the specific page.
3	Next page arrow	Button	Tap this arrow to navigate to the next page of the interface.
4	State-of-charge	Graphic	Provides a visual indication of the current state-of-charge of the battery.
5	Voltage	Data	Specifies the measured voltage of the battery.
6	Current	Data	Specifies the measured current flowing into or out of the battery.
7	State-of-charge	Data	Provides a more accurate indication (compared to the SoC graphic) of the current state-of-charge of the battery.
8	State-of-health	Data	Specifies the battery's state-of-health (percentage of the total available capacity in comparison to the battery's original capacity at 100% SoC).
9	State	Data	Specifies the overall operational status of the battery.
10	Backlight	Button	Tap this icon to switch the backlight of the display ON  or OFF 



The integrated touch-screen display of SBB™ MKII Series batteries will automatically switch off when idle for more than 60 seconds. To switch the display on again in such cases, simply touch / tap the display.

Tap on the **Next page arrow** (numbered 3 in the previous diagram) to navigate to the next page below. This page mainly provides a more detailed overview of the various factors that influence the performance of the battery:



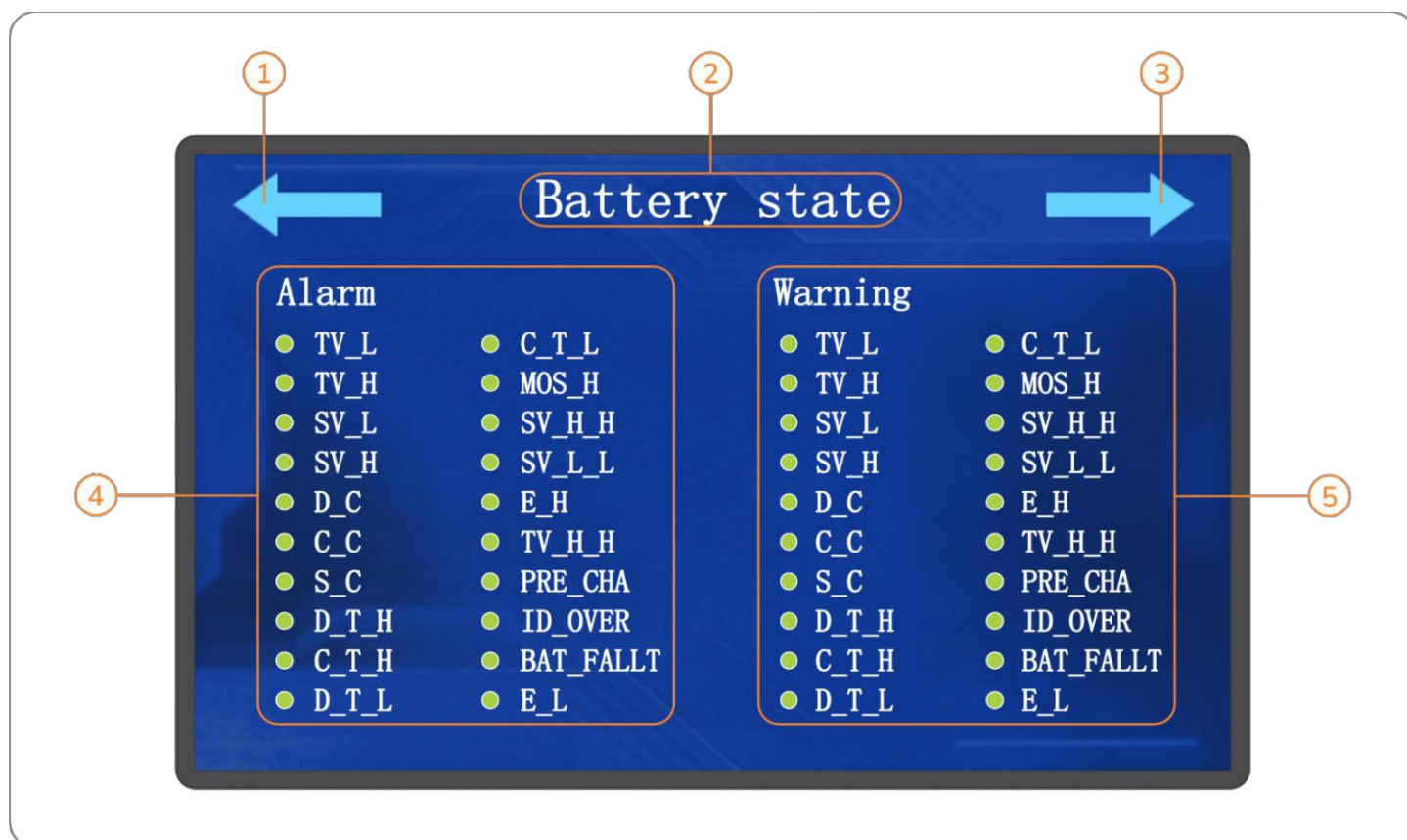
The numbered elements & sections in the diagram above are explained in the table below:

#	Designation	Function / purpose
1	Previous page arrow	Tap this arrow to navigate to the previous (main) page of the interface.
2	Page title	Specifies the title of the specific page.
3	Next page arrow	Tap this arrow to navigate to the next page of the interface.
4	Address	Specifies the address of the battery in a parallel configuration. For single batteries, this value will be 1. In parallel battery configurations, this value will be 1 for the master battery and increment for each additional battery connected in sequence.
5	Remaining capacity	Specifies the remaining Ampere-hour capacity of the battery (or the average cell capacity in the battery's cell configuration) based on its current state-of-charge.
6	Total capacity	Specifies the original Ampere-hour capacity of the battery.
7	Internal temperatures	Specifies the 4 x internal temperature values measured in the battery's enclosure.
8	Ambient temperature	Specifies the measured ambient temperature value.
9	Transistor temperature	Specifies the measured temperature value of the battery's integrated transistor.
10	Cell voltages	Specifies the measured individual cell voltage of each of the battery's 16 x cells.



Performance issues may arise in cases where the cell voltage difference between any 2 x cells in any single SBB™ MKII battery exceeds 10mV. In such instances the issue may be resolved via standard balance charge procedures. Should the issue persist, please contact BlueNova Technical Support for further assistance.

Tap on the **Next page arrow** (numbered 3 in the previous diagram) to navigate to the next page below. This page provides specific information on the various alarm & warning conditions that can be reported by SBB™ MKII batteries:



The numbered elements & sections in the diagram above are explained in the table below:

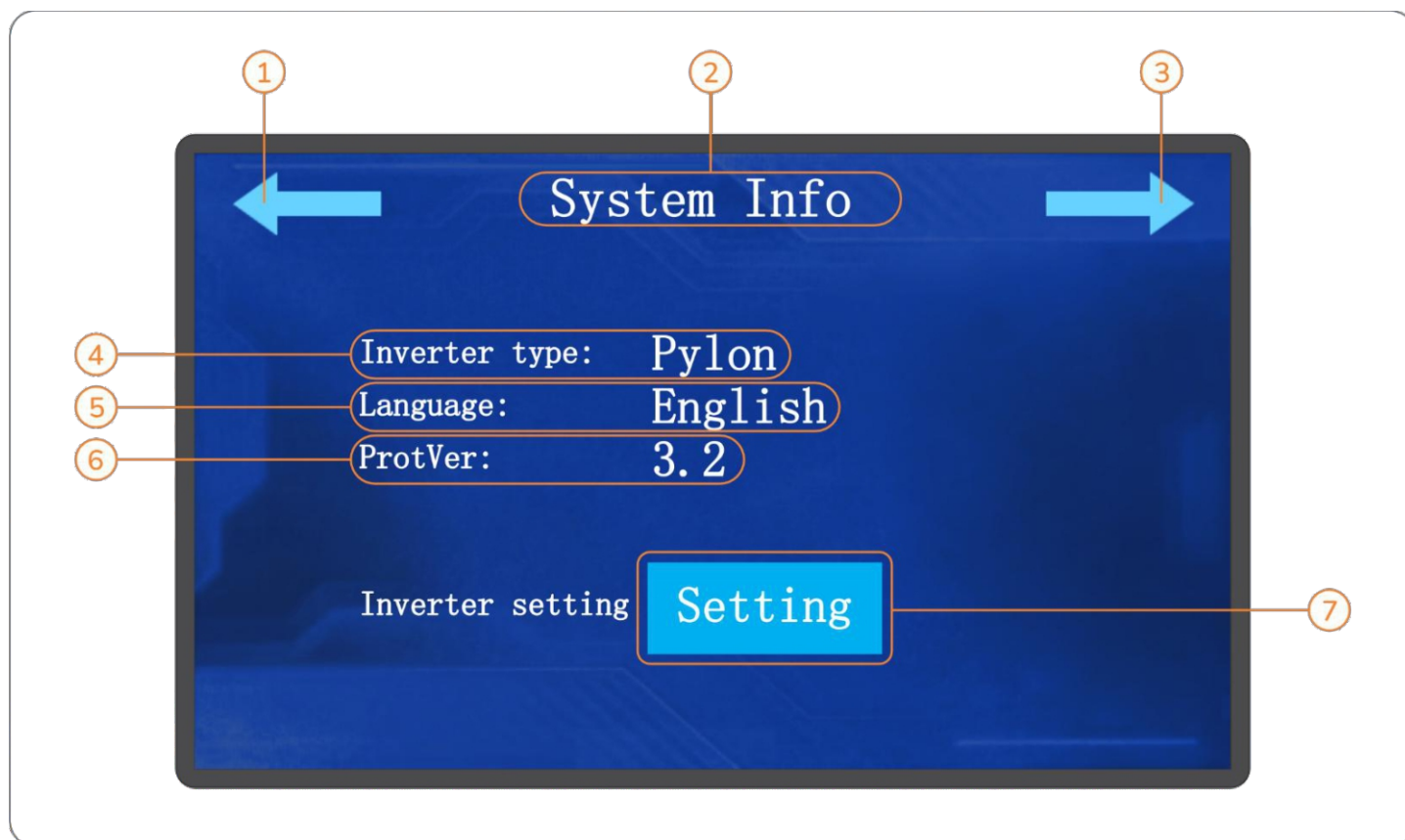
#	Designation	Function / purpose
1	Previous page arrow	Tap this arrow to navigate to the previous (main) page of the interface.
2	Page title	Specifies the title of the specific page.
3	Next page arrow	Tap this arrow to navigate to the next page of the interface.
4	Alarm indicators	Specifies the 20 x alarm conditions that can be reported by the battery.
5	Warning indicators	Specifies the 20 x warning conditions that can be reported by the battery.

Warnings & alarms are indicated on the above page with red ● bullets. Text abbreviations are explained below:

Abbreviation	Description
TV_L	Total (battery) voltage low.
TV_H	Total (battery) voltage high.
SV_L	Single (cell) voltage low.
SV_H	Single (cell) voltage high.
D_C	Discharge current error.
C_C	Charge current error.
S_C	Short-circuit current error.
D_T_H	Discharge temperature high.
C_T_H	Charge temperature high.
D_T_L	Discharge temperature low.

Abbreviation	Description
C_T_L	Charge temperature low.
MOS_H	MOS transistor temperature high.
SV_H_H	Singel (cell) voltage very high.
SV_L_L	Single (cell) voltage very low.
E_H	Ambient temperature high.
TV_H_H	Total (battery) voltage very high.
PRE_CHA	Pre-charge error.
ID_OVER	ID overtime error.
BAT_FALLT	Battery error.
E_L	Ambient temperature low.

Tap on the **Next page arrow** (numbered 3 in the previous diagram) to navigate to the next page below. This page specifies the existing serial communication protocol for which the battery has been configured (if any) and provides access to (re)configuring such protocols for successful integration with serial-compatible inverters:



The numbered elements & sections in the diagram above are explained in the table below:

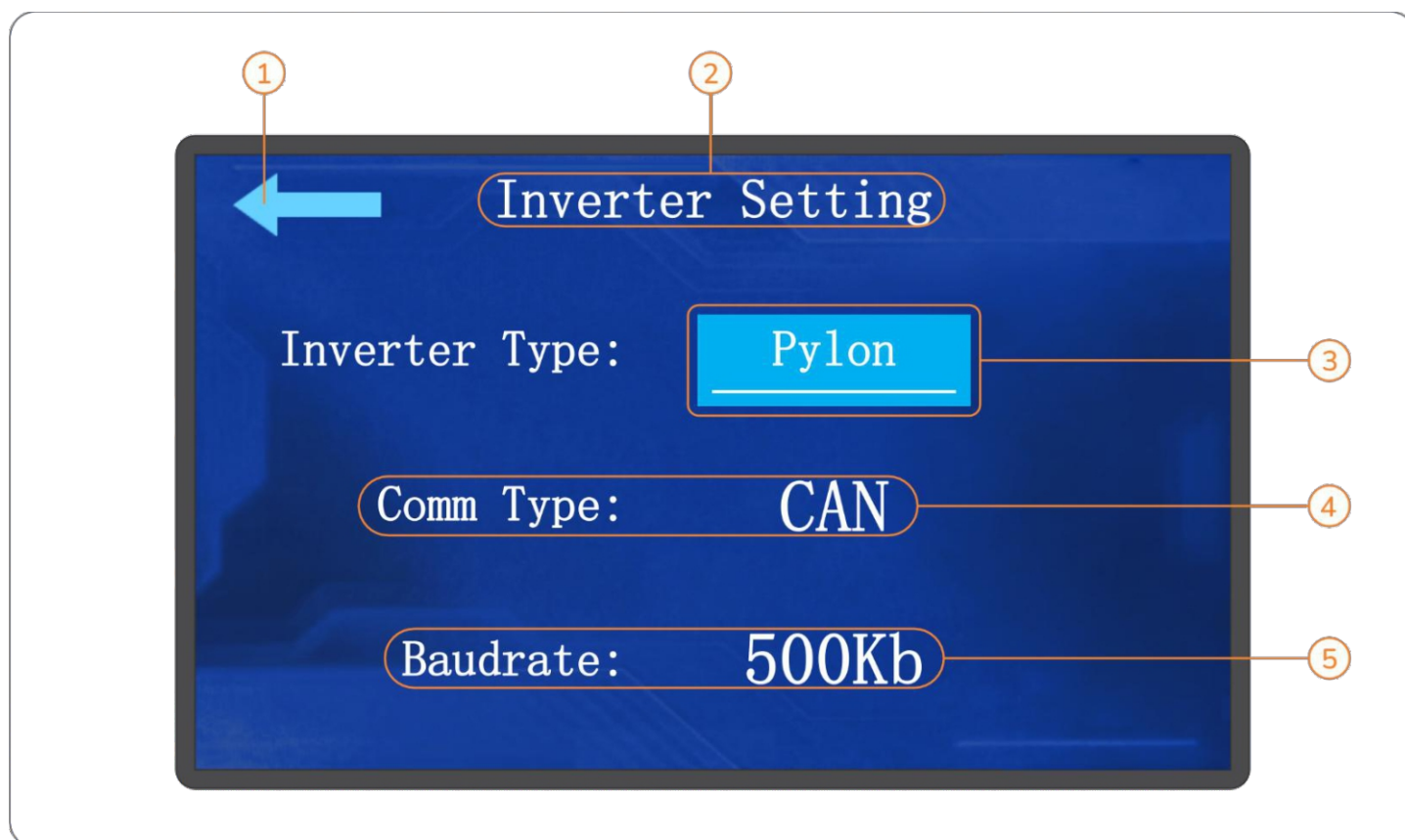
#	Designation	Function / purpose
1	Previous page arrow	Tap this arrow to navigate to the previous (main) page of the interface.
2	Page title	Specifies the title of the specific page.
3	Next page arrow	Tap this arrow to navigate to the first (main) page of the interface.
4	Inverter type	Specifies the inverter-specific serial communication protocol with which the battery has been configured (if any).
5	Language	Specifies the selected language for displaying text in the interface.
6	Protocol version	Specifies the software/firmware version number of the serial communication protocol currently installed on the battery (if any).
7	Setting button	Tap this button to access the subpage from which the battery may be (re)configured for serial communication with a specific compatible inverter.



At the time of publication of this manual, SBB™ MKII Series batteries have been serial communication compatible with specific 48V inverters manufactured by the following companies:



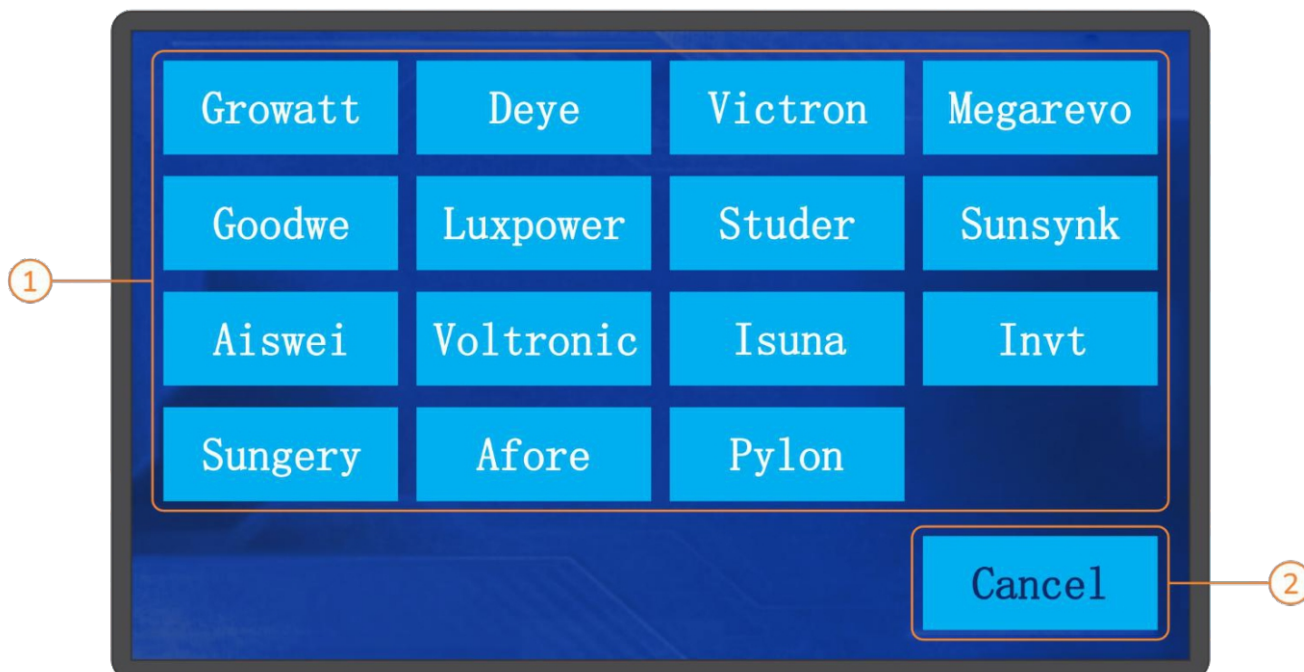
Tap on the **Setting** button (numbered 7 in the previous diagram) to navigate to the subpage below. This subpage specifies the inverter-specific serial communication protocol with which the battery has been configured (if any):



The numbered elements & sections in the diagram above are explained in the table below:

#	Designation	Function / purpose
1	Exit subpage arrow	Tap this arrow to exit the subpage and return to the previous main page.
2	Page title	Specifies the title of the subpage.
3	Inverter type (button)	The text on this button specifies the inverter-specific communication protocol with which the battery has been configured (if any). Tap this button to view a complete list of available inverter-specific protocols with which the battery may be (re)configured. See the next section in this subchapter for more information.
4	Communication type	Specifies the type of serial communication (CAN / RS485) associated with the inverter-specific protocol selected.
5	Baud rate	Specifies the BAUD rate at which serial communication data will be transferred between the battery and inverter.

Tap on the **Inverter type** button (numbered 3 in the previous diagram) to navigate to the subpage illustrated on the next page of this manual. This page lists all the inverter-specific serial communication protocols with which an SBB™ MKII Series battery may be configured:

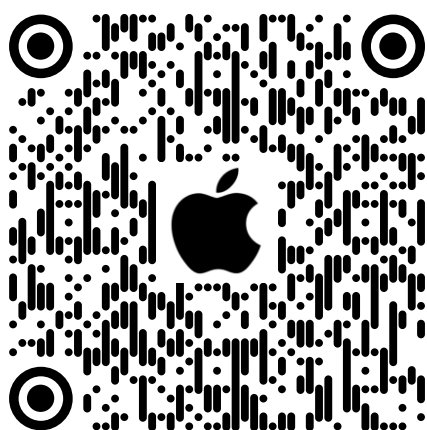


The numbered elements & sections in the diagram above are explained in the table below:

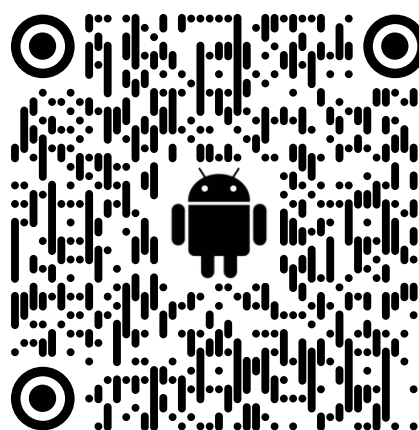
#	Designation	Function / purpose
1	Inverter protocols	Select the appropriate option from this section (as determined by the inverter connected to the battery) to initiate setup.
2	Cancel button	Tap this button to cancel (re)configuration and return to the previous subpage.

6.3 Remote monitoring

SBB™ MKII Series batteries can be remotely monitored via the **IOE Green Energy** mobile application. This application also allows SBB™ MKII Series batteries to be connected to an on-site Wi-Fi hotspot within range to enable remote monitoring from any internet-connected smart device. To download the application, scan the applicable QR code below:



<https://bit.ly/4tHMr99>



<https://bit.ly/4fuGlpc>

07 EMERGENCY & FIRST AID

Emergency condition:	Procedure to follow:
7.1 Ruptured / leaking components	• Inhalation: Evacuate the area. Seek medical attention immediately. • Eye contact: Rinse eyes with clean water continuously for 15 minutes. Seek medical attention immediately afterwards. • Skin contact: Wash the affected area thoroughly with soap and water. Seek medical attention immediately afterwards if irritation persists. • Ingestion: Induce manual (non-medicinal) vomiting if possible. Seek medical attention immediately afterwards.
7.2 Thermal events	• Evacuate the area immediately. Inform local firefighting authorities. • Extinguish any fires with CO₂ fire extinguishers if it is safe to do so.
7.3 Water contact	• Avoid making physical contact with batteries damaged by water/other fluid as well as the fluid itself. Disconnect such batteries only if/when safe.
7.4 Damaged batteries	• Visibly damaged and/or malfunctioning batteries should not remain in use but be safely removed & replaced as soon as possible.

NOTES