

# BLUE NOVA energy

## User Manual

### 52V RacPower Range

**BN52V-100-5.2k DU**  
**( Daily Use )**

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<b>Approved by</b>	J.P. Verster

### A. DOCUMENT SCOPE

Congratulations on purchasing a high quality BlueNova® product.

This document covers structural information, installation instructions, troubleshooting, safety & maintenance instructions, storage guidelines as well as emergency & first aid procedures specific to:

- **BlueNova® 52V RacPower** product range, consisting of BN52V-100-5.2k

If you are unsure whether this document is applicable to your battery, or if you have any questions or comments, kindly contact BlueNova® Technical Support:

☎ Office: +27 21 205 2000    ✉ E-mail: [support@bluenova.co.za](mailto:support@bluenova.co.za)

Please do not discard this document as it contains valuable information that might have to be referenced at a later stage.

### B. STRUCTURAL OVERVIEW

The BlueNova® 52V RacPower range has been designed to be installed in 19" (11U) server racks. The weight & dimensions of each enclosure in this range is listed below:

		Dimensions (L x W x H)	Weight (net)
1	BN52V-100-5.2k DU RacPower	442 x 520 x 178mm	55kg

**Note:** The dimensions above are the dimensions of the main chassis (excluding the front panel) in each case. For a more detailed overview of dimensions, please see latest product data sheets.

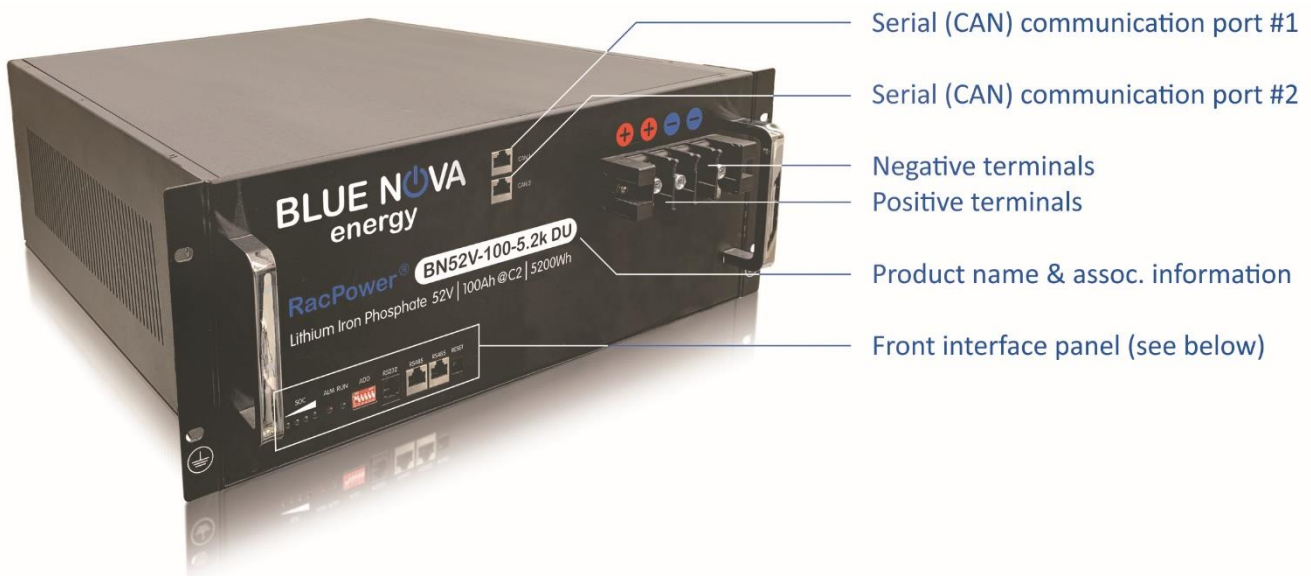
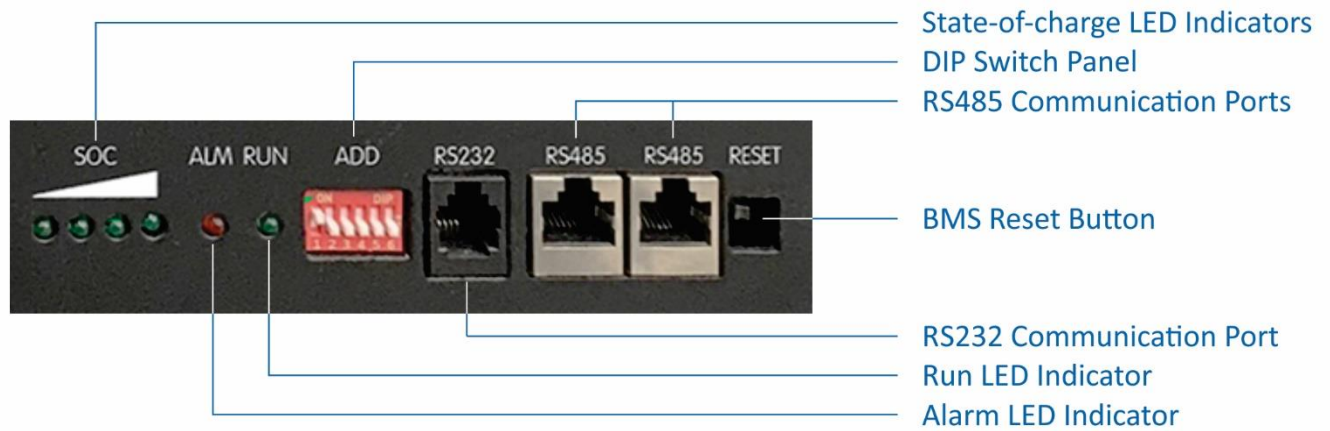


Diagram: BN52V-50-5.2k RacPower

## C. FRONT INTERFACE PANEL



**Diagram: Front Interface Panel (BN52V-100-5.2k)**





### SYSTEM START / SHUT DOWN / RESET:

FUNCTION	OPERATION
<b>Start</b>	Press the RESET button for 3s when the battery is in sleep mode to switch it on. Led on the panel flashes from the Left to Right.
<b>Shut down</b>	Press the RESET button for 3s when the battery is in idle/discharge mode to switch it OFF. Led on the panel flashes from Right to Left.
<b>Resetting</b>	Press the RESET button for 6s when the battery is in idle/discharge mode to reset the BMS.

### COMMUNICATION PORTS:

COMPONENT	FUNCTION / DESCRIPTION
<b>RS232 (RJ11)</b>	Not active
<b>CAN Ports (RJ45 x 2)</b>	Serial communication via CAN Bus. PIN configuration as follows: - 7 : CAN-H - 8 : CAN-L
<b>RS485 Ports (RJ45 x 2)</b>	Pin configuration as follows: - 1 : A - 2 : B - 3/6 : GND - 4/5 : NC

## STATE-OF-CHARGE:

COMPONENT	FUNCTION / DESCRIPTION			
State-of-charge indicator				
	0% – 25% SoC	25% – 50% SoC	50% – 75% SoC	75% – 100% SoC

## LED indicators:

Status	Running condition	SOC				RUN	ALM	Description
		●	●	●	●	●	●	
Switch Off	Sleep mode	off	off	off	off	off	off	All off
Stand by	Normal	off	off	off	off	Flash 1	off	Idle
	Alarm	off	off	off	off	Flash 3	Flash 3	ALM and RUN Flash 3
Charging	Normal	According to real-time capacity				on	off	Highest LED Flash 2
	OV Alarm	According to real-time capacity				on	off	Highest LED Flash 2
	OC Alarm	According to real-time capacity				on	Flash 3	Highest LED Flash 2
	OV Protect	on	on	on	on	on	off	
	OC Protect (charge limit off)	off	off	off	off	off	on	Stop charging
	Charge limit	According to real-time capacity				on	off	Highest LED Flash 2
Discharging	Normal	According to real-time capacity				Flash 3	off	According to real-time capacity indicate
	Alarm	According to real-time capacity				Flash 3	Flash 3	ALM and RUN Flash 3
	OC/short circuit/revere connection	off	off	off	off	off	on	Stop discharging
	UV	off	off	off	off	off	off	Stop discharging
Temp	Normal	According to status						
	Charge alarm	According to real-time capacity				on	Flash 3	Highest LED Flash 2
	Discharge alarm	According to real-time capacity				Flash 3	Flash 3	
	Protect	off	off	off	Off	off	on	

METHOD	ON	OFF
Flash 1	0.25s	3.75s
Flash 2	0.5s	0.5s
Flash 3	0.5s	1.5s

## D. INSTALLATION

### 1. VOLTAGE-BASED INSTALLATION

If the battery is not connected to hardware that is serial communication compatible, the following values highlighted in blue must be set on the inverter/charger:

Parameter	Cell V	Value	Comment
V <sub>high set</sub>	3.44 V	55.0 V	Typical bulk/absorption charge setpoint.
V <sub>float</sub>	3.38 V	54.0 V	Floating voltage set point.
V <sub>reconnect</sub>	3.01 V	49.0V	Mains or generator must reconnect to charge batteries.
V <sub>low set</sub>	2.9 V	46.5V	Inverter must switch off the load.

- Maximum continuous charge current limit = 50A
- Recommended charge current = 25A
- Maximum continuous discharge current limit = 100A
- Recommended discharge current limit = 50A

#### IMPORTANT: Inverter/charger voltage calibration

Some inverters/chargers have been known to return inaccurate results when measuring voltage. In such cases, the inverter/charger should be calibrated as follows:

Compare the voltage values displayed by the inverter/charger with that of a calibrated voltmeter. If the actual voltage differs by more than 100mV from that measured by the inverter/charger, apply this difference to the highlighted values above (i.e. if actual voltage = 56V while inverter voltage = 56.5V, the voltage difference = 0.5V should be subtracted from each of the set values above).

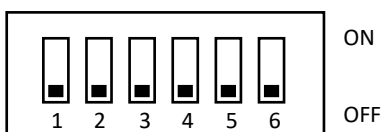
**Note:** Some inverters/chargers have pre-programmed lead-acid related algorithms & functionalities such as *auto-desulfation* and *equalisation*. These functionalities should be disabled, where possible.

## 2. PARALLEL CONNECTION

BlueNova batteries can be connected in parallel to each other to increase overall capacity **ONLY IF ALL** the requirements below are met:

- The nominal voltage of all parallel-connected batteries is the same (52V), and
- The installed capacity for all batteries is the same, and
- Each battery is operating within its warranty period.

### DIP SWITCH PANEL CONFIGURATION:



Address	DIP Switch Number						Master / Slave (CAN)	Definition (RS485)	
	Parallel Configuration				Inverter Protocol configuration				
	#1	#2	#3	#4	#5	#6	Inverter		
1	ON	OFF	OFF	OFF	OFF	OFF	Victron 250	Master	Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	Victron 500	Slave 1	Pack2
3	ON	ON	OFF	OFF	OFF	OFF	Goodwe	Slave 2	Pack3
4	OFF	OFF	ON	OFF	OFF	OFF	Reserved	Slave 3	Pack4
5	ON	OFF	ON	OFF	OFF	OFF		Slave 4	Pack5
6	OFF	ON	ON	OFF	OFF	OFF		Slave 5	Pack6
7	ON	ON	ON	OFF	OFF	OFF		Slave 6	Pack7
8	OFF	OFF	OFF	ON	OFF	OFF		Slave 7	Pack8
9	ON	OFF	OFF	ON	OFF	OFF		Slave 8	Pack9

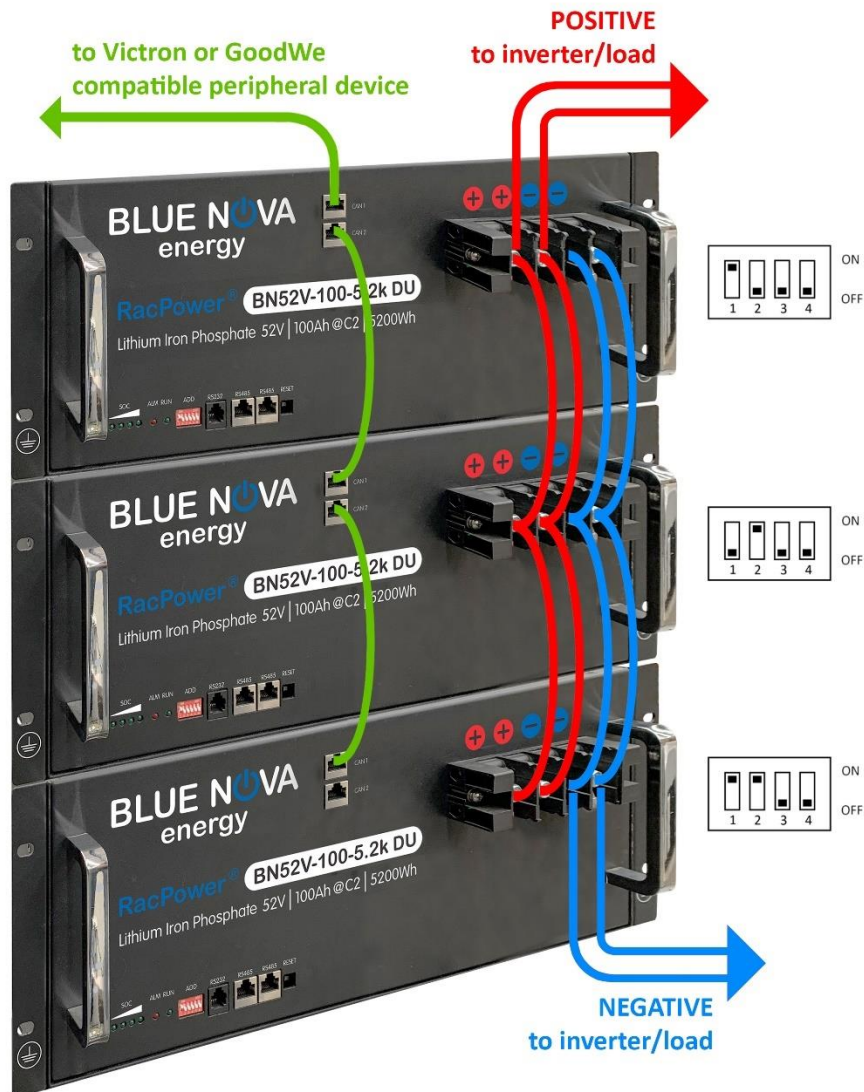
**Note:** Ensure to have the same protocol configuration on all parallel units.

It is essential to set the DIP address number in order when connected with a CAN bus inverter, otherwise the BMS will report an error.

A total of 9 units can be connected in parallel, for total installed capacity of 46.8kWh @C2, 25°C.

RacPower batteries can only pre-charge 5kW inverters & smaller. Larger inverters must be pre-charged manually.

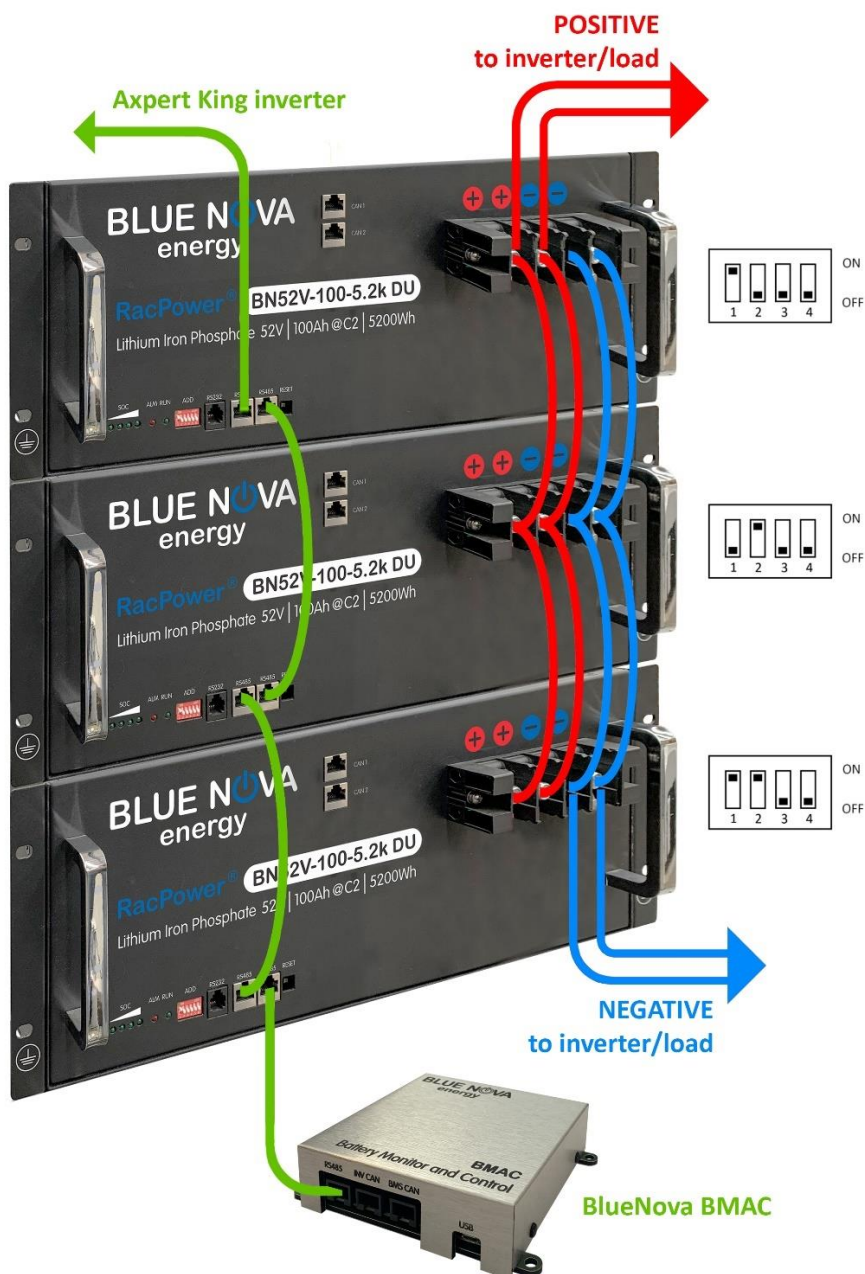
### 2.1 CONNECTING TO VICTRON® OR GOODWE® PERIPHERALS



1. Ensure that all units are grounded by connecting each chassis to GROUND from the rear right panel. Wire diameter should be equal to or exceed 1mm<sup>2</sup>.
2. Connect the **POSITIVE** terminals of the first (top) unit to the second unit, then from the second unit to the third etc. as illustrated above. Wire diameter should be equal to or exceed 8mm<sup>2</sup>. Do the same for the **NEGATIVE** terminals.
3. Connect the **CAN** port of each unit as illustrated above with a standard 1-to-1 pin RJ45 network cable.
4. Connect the bottom- or topmost unit's **CAN** to the third-party Victron® or GoodWe® serial communication device. Cable connector pin configuration is determined by the device being connected to. See C. CONTROL PANEL in this manual for the battery's RJ45 port pin configuration.
5. Configure the dip switches for the master battery and slave batteries respectively.

- Ensure that a BlueNova's CAN-bus terminator (supplied) is inserted in the last battery in the parallel pack. Also place the inverter manufacturer's CAN-bus terminator on the inverter's end.
- For CAN communication a direct RJ45 cable is supplied and to be used between Master battery and inverter. In a case where the inverter's pin-outs are different from the BlueNova's battery pin-outs a custom cable should be made according to the pin-out configurations detailed in this manual.

### 2.2 CONNECTING TO AXPERT® KING INVERTERS (WITH BMAC MODULE)

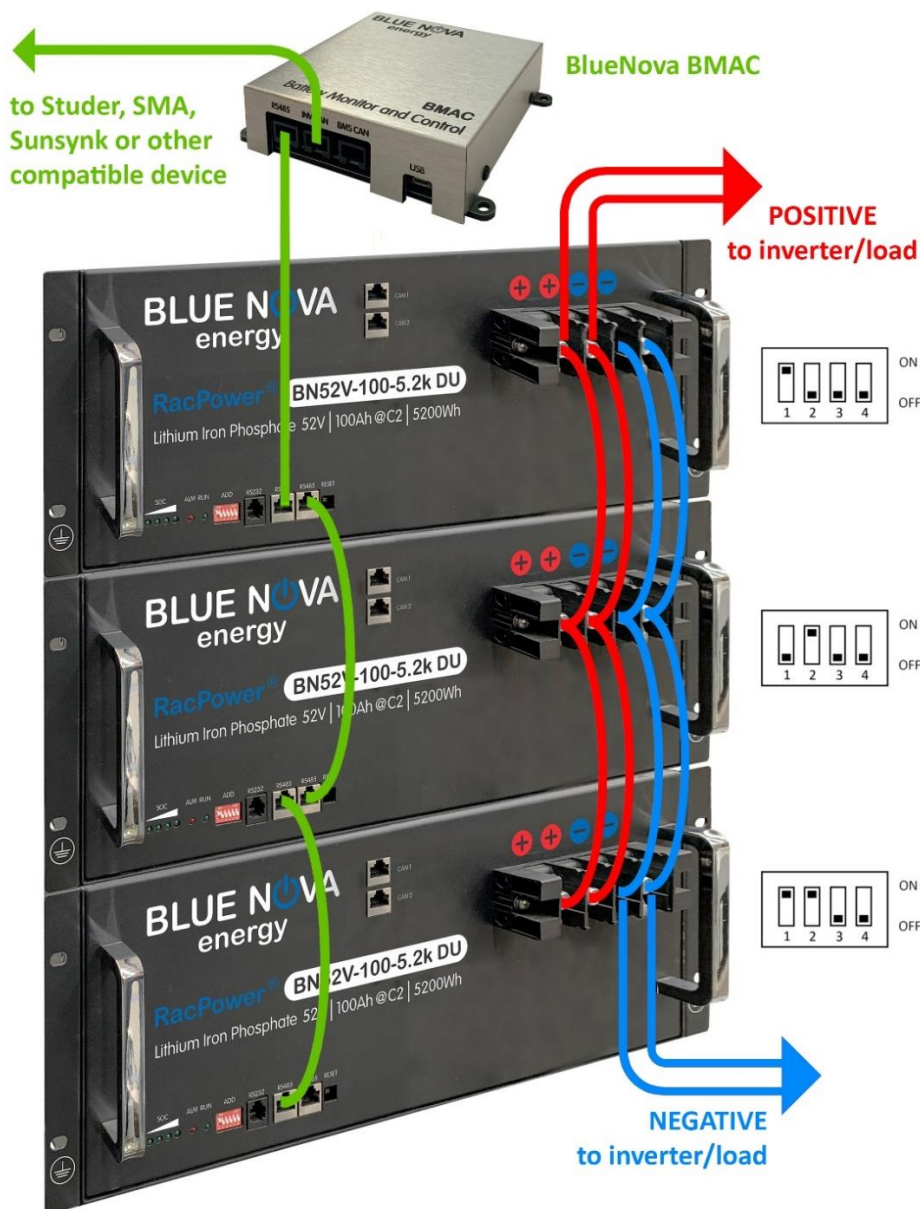


- Ensure that all units are grounded by connecting each chassis to GROUND from the rear right panel. Wire diameter should be equal to or exceed 1mm<sup>2</sup>. Configure the dip switches for the master battery and slave batteries respectively.



2. Connect the **POSITIVE** terminals of the first (top) unit to the second unit, then from the second unit to the third etc. as illustrated above. Wire diameter should be equal to or exceed 8mm<sup>2</sup>. Do the same for the **NEGATIVE** terminals.
3. Connect the **RS485** port of each unit as illustrated above with a standard 1-to-1 pin RJ45 network cable. Connect the bottom- or topmost unit's **RS485** to the Xpert® inverter. This specific cable should be included in the BMAC product packaging. Should this cable not be included, please reference section 3 below for the correct cable connector pinout configuration.
4. The remaining RS485 port on the bottom- or topmost battery should be connected to the BMAC module's RS485 port.

### 2.3 CONNECTING TO VICTRON®, GOODWE®, STUDER®, SMA® & SYNSYNK® (WITH BMAC MODULE)



1. Ensure that all units are grounded by connecting each chassis to GROUND from the rear right panel. Wire diameter should be equal to or exceed 1mm<sup>2</sup>.
2. Connect the **POSITIVE** terminals of the first (top) unit to the second unit, then from the second unit to the third etc. as illustrated above. Wire diameter should be equal to or exceed 8mm<sup>2</sup>. Do the same for the **NEGATIVE** terminals.
3. Connect the **RS485** port of each unit as illustrated above with a standard 1-to-1 pin RJ45 network cable.
5. Connect the topmost unit's **RS485** to the BMAC module's RS485 port. This specific cable should be included in the BMAC product packaging. Should this cable not be included, please reference section 3 below for the correct cable connector pinout configuration.
6. Connect the BMAC's **INV CAN** port to a serial communication compatible inverter or device. Please reference the RJ45 cable connector pinout diagrams contained in this manual. The remaining CAN port on the inverter or peripheral device might have to be terminated.
7. Configure the dip switches for the master battery and slave batteries respectively.

## 2.4 START-UP SEQUENCE FOR PARALLEL BATTERY CONFIGURATIONS

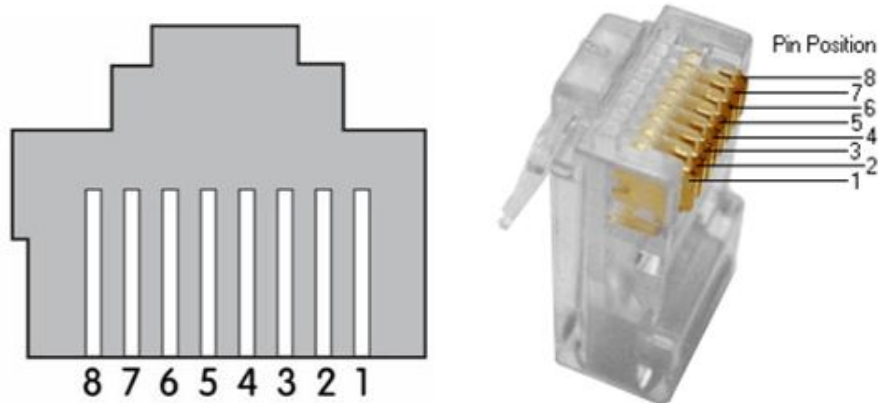
1. After the system has been fully installed ensure that all the battery units are switched off (All LED's on the front panel are off). Ensure that the provided RJ45 cable (black) is connected between the master battery and the inverter.
2. Each battery should not be turned on individually! Instead press and hold the reset button on the master battery only. This will automatically turn on all the batteries in parallel.
3. To ensure that batteries in a parallel configuration communicate correctly, reset the master battery by pressing & holding the reset button for at least 6 seconds.
4. Ensure that the communication between the BMS and the inverter is functioning correctly by checking the visible devices on the inverter's interface.

## 3. SERIAL COMMUNICATION CONNECTIONS

BlueNova RacPower® batteries are serial communication-compatible with select Victron®, Goodwe® and Axpert® peripherals without having to install a BlueNova BMAC module. For installations with SMA®, Studer®, Ingeteam® and Sunsynk® peripherals that include serial communication (i.e. not simply voltage-based), a BMAC module will have to be installed as well.

Serial communication connections from your RacPower battery to a compatible peripheral device is done from either the "CAN" port or the "RS485" port on the battery with an RJ45 cable. The wiring of these cables differs depending on the peripheral device being connected to and are detailed in the following section.

The pin numbering of RJ45 ports and connectors are as follows:



### 3.1 Connecting a RacPower DU battery to a Victron® Cerbo GX module

↓ RacPower (CAN port)

1	N/A	Orange dashed	Orange dashed
2	N/A	Orange solid	Orange solid
3	N/A	Green dashed	Green dashed
4	N/A	Blue solid	Blue solid
5	N/A	Blue dashed	Blue dashed
6	N/A	Green solid	Green solid
7	CANH	Red dashed	Red dashed
8	CANL	Red solid	Red solid

↓ Victron® Cerbo GX

	1	N/A
	2	N/A
	3	N/A
	4	N/A
	5	N/A
	6	N/A
	7	CANH
	8	CANL

**Step-by-step instructions:**

1. Connect **pin 7** (battery CAN) to **pin 7** (Cerbo GX - BMS CAN).
2. Connect **pin 8** (battery CAN) to **pin 8** (Cerbo GX - BMS CAN).
3. Pins 1-6 should not be connected.
4. Terminate the remaining CAN port on the last battery in the configuration.

### 3.2 Connecting an older (v1) RacPower DU battery to a new (v2) RacPower battery

↓ Older RacPower (CAN port)

1	N/A	Orange dashed	Orange dashed
2	N/A	Orange solid	Orange solid
3	N/A	Green dashed	Green dashed
4	N/A	Blue solid	Blue solid
5	N/A	Blue dashed	Blue dashed
6	N/A	Green solid	Green solid
7	CANH	Red dashed	Red dashed
8	CANL	Red solid	Red solid

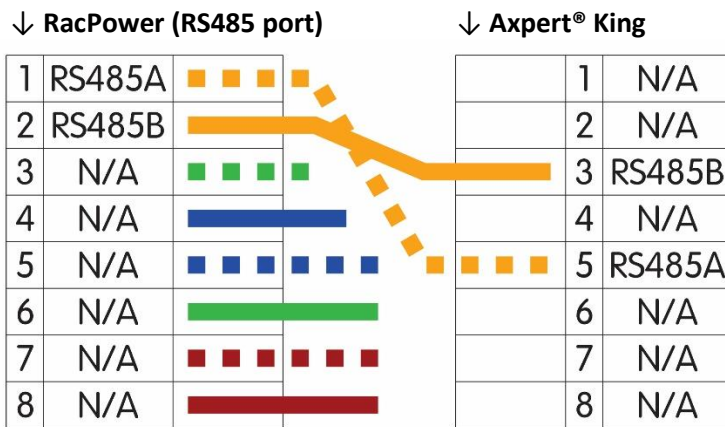
↓ New RacPower

	1	N/A
	2	N/A
	3	N/A
	4	N/A
	5	N/A
	6	N/A
	7	CANL
	8	CANH

**Step-by-step instructions:**

1. Connect **pin 7** (older battery) to **pin 8** (latest version battery).
2. Connect **pin 8** (older battery) to **pin 7** (latest version battery).
3. Pins 1-6 should not be connected.
4. Terminate the remaining CAN port on the last battery in the configuration.

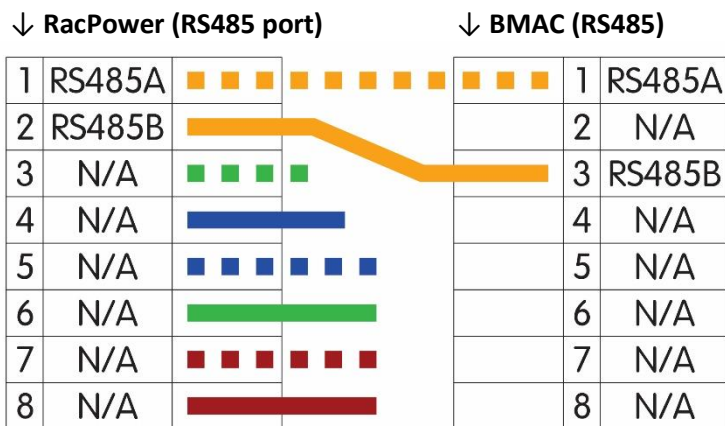
### 3.3 Connecting a RacPower DU battery to an Axpert® King 5kVA or 8kVA inverter



#### Step-by-step instructions:

1. Connect **pin 1** (battery RS485) to **pin 5** (Axpert® King RS485 port).
2. Connect **pin 2** (battery RS485) to **pin 3** (Axpert® King RS485 port).
3. Do not connect the remaining pins.
4. No need to terminate the remaining RS485 port on the last battery.

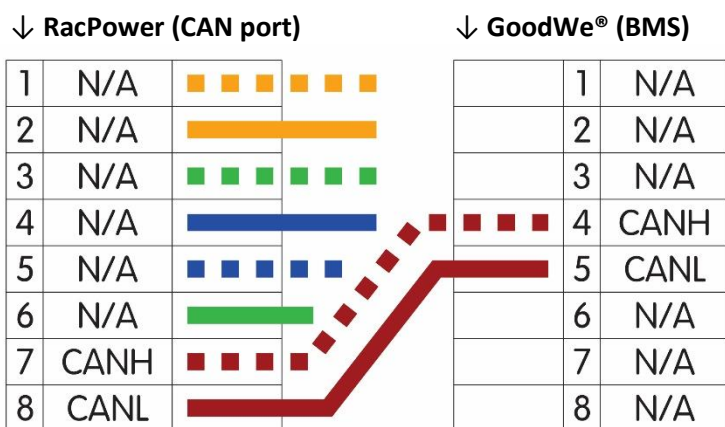
### 3.4 Connecting a RacPower DU battery to a BMAC module



#### Step-by-step instructions:

1. Connect **pin 1** (battery RS485) to **pin 1** (BMAC RS485).
2. Connect **pin 2** (battery RS485) to **pin 3** (BMAC RS485).
3. Do not connect the remaining pins.

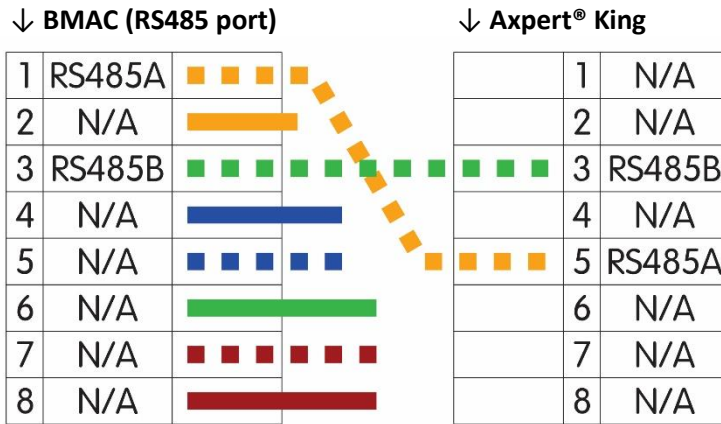
### 3.5 Connecting a RacPower DU battery to a GoodWe® inverter



#### Step-by-step instructions:

1. Connect **pin 7** (battery CAN) to **pin 4** (GoodWe® BMS CAN).
2. Connect **pin 8** (battery CAN) to **pin 5** (GoodWe® BMS CAN).
3. Do not connect the remaining pins.
4. Terminate the remaining CAN port on the last battery in the configuration.

### 3.6 Connecting a BMAC module to an Axpert® King inverter



#### Step-by-step instructions:

5. Connect **pin 1** (battery RS485) to **pin 5** (Axpert® King RS485 port).
6. Connect **pin 3** (battery RS485) to **pin 3** (Axpert® King RS485 port).
7. Do not connect the remaining pins.
8. No need to terminate the remaining RS485 port on the last battery.

## E. EXTRA FEATURES

### 1. Standby Mode

The system will enter **Standby Mode** immediately whenever the battery is not being charged nor discharged. In standby mode, the green RUN LED will flash (as with discharging).

### 2. Sleep Mode

The system will enter **Sleep Mode** whenever Standby Mode has been active & uninterrupted for 96 hours.

In Sleep Mode, the system will become inactive & all LED's on the Control panel will switch off.

The system will wake up from sleep mode:

- (automatically) whenever a charge current is detected, or
- (manually) the battery/batteries are switched off and then on again.

## F. MAINTENANCE

### 1. General Guidelines

- Do not short circuit the battery terminals.
- Do not use the battery without a BlueNova® approved integrated BMS solution.
- Do not disassemble, pierce, cut or in any way physically alter any part of the battery.
- Do not burn, incinerate or otherwise subject the battery to extreme heat.

## 2. Storage Instructions

- a. Ensure that the battery is switched off when stored.
- b. Disconnect the communication cable.
- c. Always store batteries in a cool and well-ventilated area – ideally  $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ .
- d. Store away from moisture and heat.
- e. Do not store batteries upside down for overly long periods.
- f. Check the open circuit voltage of stored batteries at least once per month. Recharge batteries sufficiently and frequently enough to prevent the open circuit voltage falling below 40V.
- g. The battery needs to be charged every 6 months if out of use.
- h. Ensure that the stored battery's state of charge is always above 50%. 100% SOC is optimal.
- i. Don't place more than 6 units on top of each other.

## G. EMERGENCY & FIRST AID

### 1. In case of fire

- a. Evacuate danger zone. Open ventilation in the room if possible.
- b. Extinguish fire with a CO2 fire extinguisher.
- c. After the fire has been extinguished, immerse any remaining smoking cells completely in water. Wear protective gear during this procedure.

### 2. Skin contact

- a. Wash the affected area immediately with soap and water.
- b. If irritation persists, seek medical attention.

### 3. Eye contact

- a. Rinse eyes immediately with clean water continuously for at least 15 minutes.
- b. Seek medical attention immediately afterwards.

### 4. Ingestion

- a. Refrain from taking any emetic or vomit-inducing medicine.
- b. Seek medical attention immediately.