

BLUE NOVA energy

User Manual

52V RacPower Range

**BN52V-100-5.2k BP
with CAN communication**

Document Revision No.	Ver. 1.0.3
Revision Date	2021-06-22
Approved by	D. Nel

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® BN52V-100-5.2k BP (Backup Power)**

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

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 BP RacPower	435 x 480 x 150mm	47kg

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.

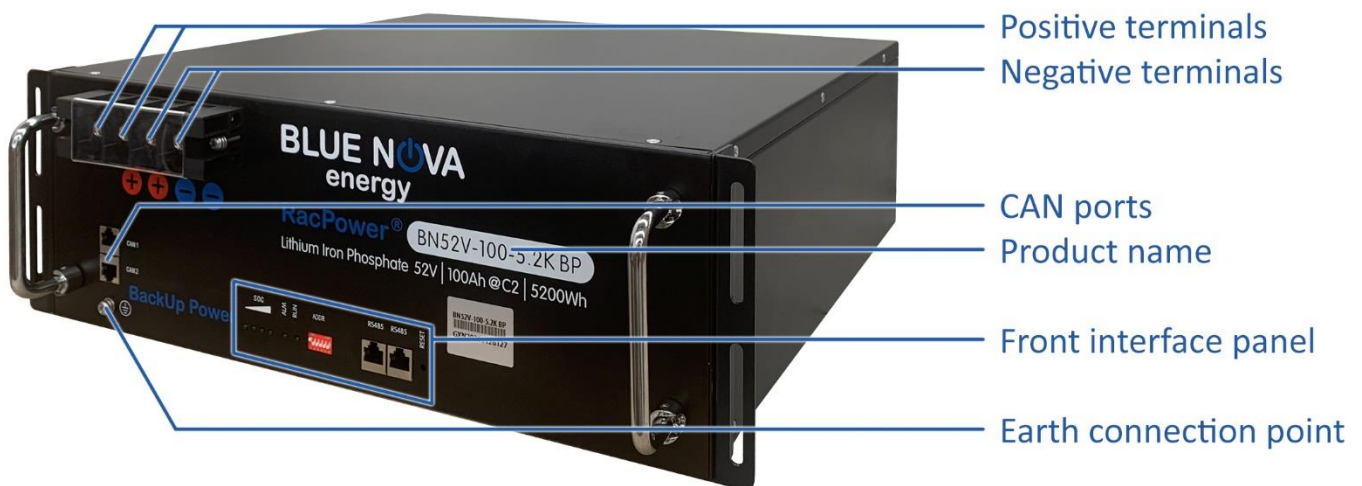


Diagram: BN52V-50-5.2k RacPower

C. FRONT INTERFACE PANEL

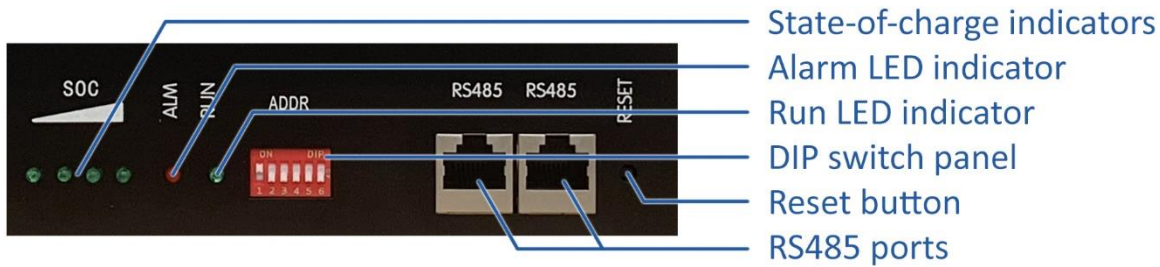


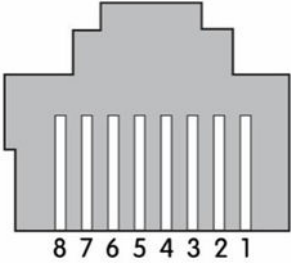
Diagram: Front Interface Panel (BN52V-100-5.2k)

SYSTEM START / SHUT DOWN / RESET:





FUNCTION	OPERATION
Start	Keep the RESET button depressed for 3 seconds while the battery is off. LED's on the panel will then flash from left to right.
Shut down	Keep the RESET button depressed for 3 seconds while the battery is on. LED's on the panel will then flash from right to left.
Reset	Press the RESET button for 6 seconds while the battery is on.

COMMUNICATION PORTS:

COMPONENT	FUNCTION / DESCRIPTION
RS232 (RJ11)	Not active
CAN Ports (RJ45 x 2)	Serial communication via CAN Bus. PIN configuration as follows: <ul style="list-style-type: none"> - 7 : CAN-H - 8 : CAN-L
RS485 Ports (RJ45 x 2)	Pin configuration as follows: <ul style="list-style-type: none"> - 1 : A - 2 : B - 3/6 : GND - 4/5 : NC



STATE-OF-CHARGE:

COMPONENT	FUNCTION / DESCRIPTION
State-of-charge indicator	   
	<div style="display: flex; justify-content: space-around;"> 0% – 25% SoC 25% – 50% SoC 50% – 75% SoC 75% – 100% SoC </div>

D. INSTALLATION

1. VOLTAGE-BASED INSTALLATION

The following values highlighted in blue must be set on the inverter/charger:

Parameter	Cell V	Value	Comment
V _{high set}	3.53 V	55.0 V	Typical bulk/absorption charge setpoint.
V _{float}	3.44 V	54.0 V	Floating voltage set point.
V _{reconnect}	3.06 V	49.0V	Mains or generator must reconnect to charge batteries.
V _{low set}	2.9 V	48.0V	Inverter must switch off the load.

- Maximum Continuous Charge Current limit = 50A
- Recommended Charge Current = 25A
- Maximum 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

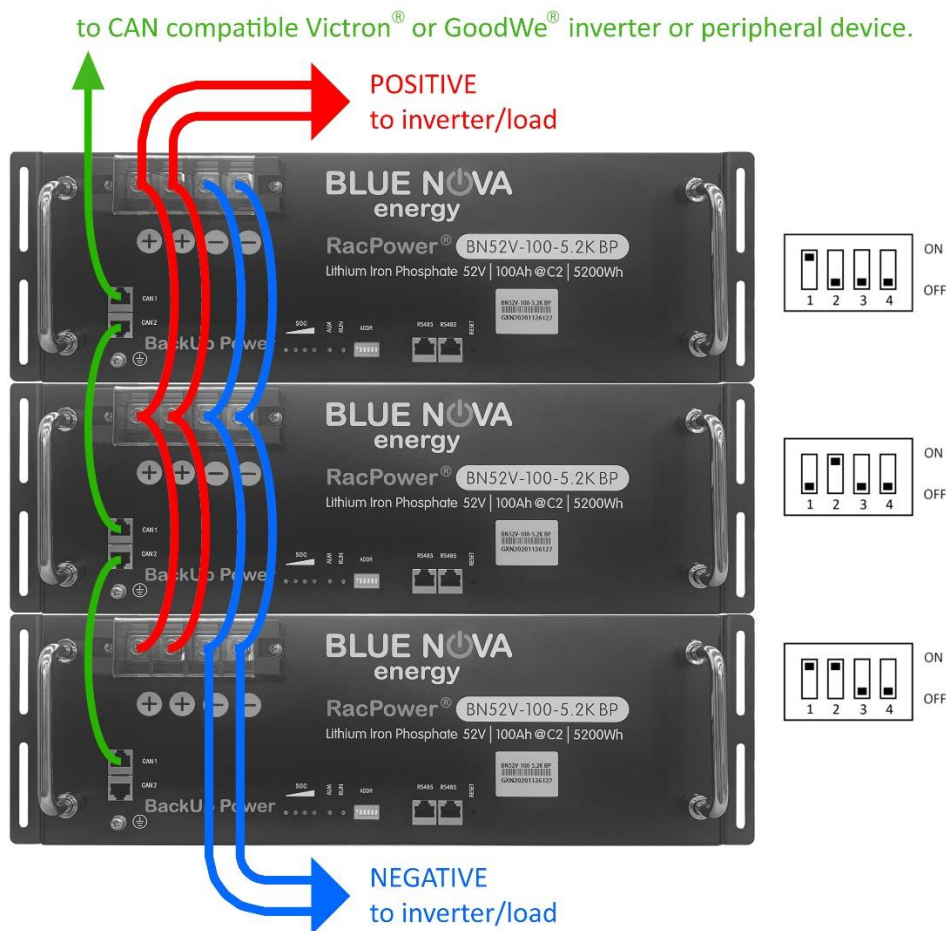
Address	DIP Switch Number				Master / Slave (CAN)	Definition (RS485)			
	Parallel Configuration						Inverter Protocol configuration		
	#1	#2	#3	#4	#5	#6	Inverter		
1	ON	OFF	OFF	OFF	OFF	OFF	Master	Master	Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	Slave 1	Slave 1	Pack2
3	ON	ON	OFF	OFF	ON	OFF	Slave 2	Slave 2	Pack3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

BlueNova® 52V RacPower 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.

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 PARALLEL CONFIGURATIONS TO VICTRON® / GOODWE® PERIPHERALS

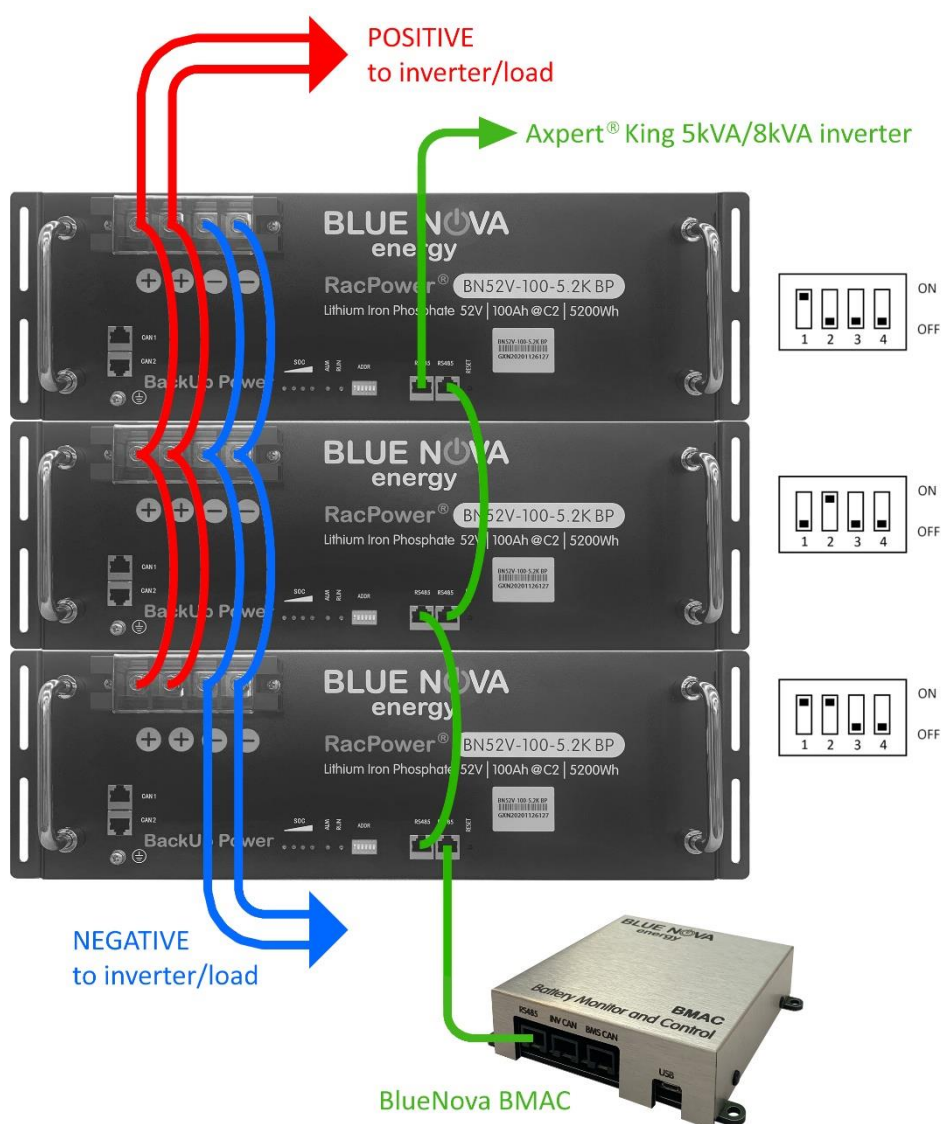


STEP-BY-STEP INSTRUCTIONS:

- 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 1mm².
- 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 8mm².

3. Connect the **NEGATIVE** 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 8mm².
4. Configure the dip switches for the master battery and slave batteries respectively.
5. Connect the CAN ports of all parallel batteries with each other with a straight 1-to-1 pin RJ45 cable if the battery versions are the same. To connect older version batteries to newer version batteries, please reference pinout diagram in section 3. BMAC modules should not be connected on the CAN bus.
6. Connect the master battery's remaining CAN port to the Victron® or GoodWe® device.

2.2 CONNECTING PARALLEL CONFIGURATIONS TO AXPERT® KING INVERTERS

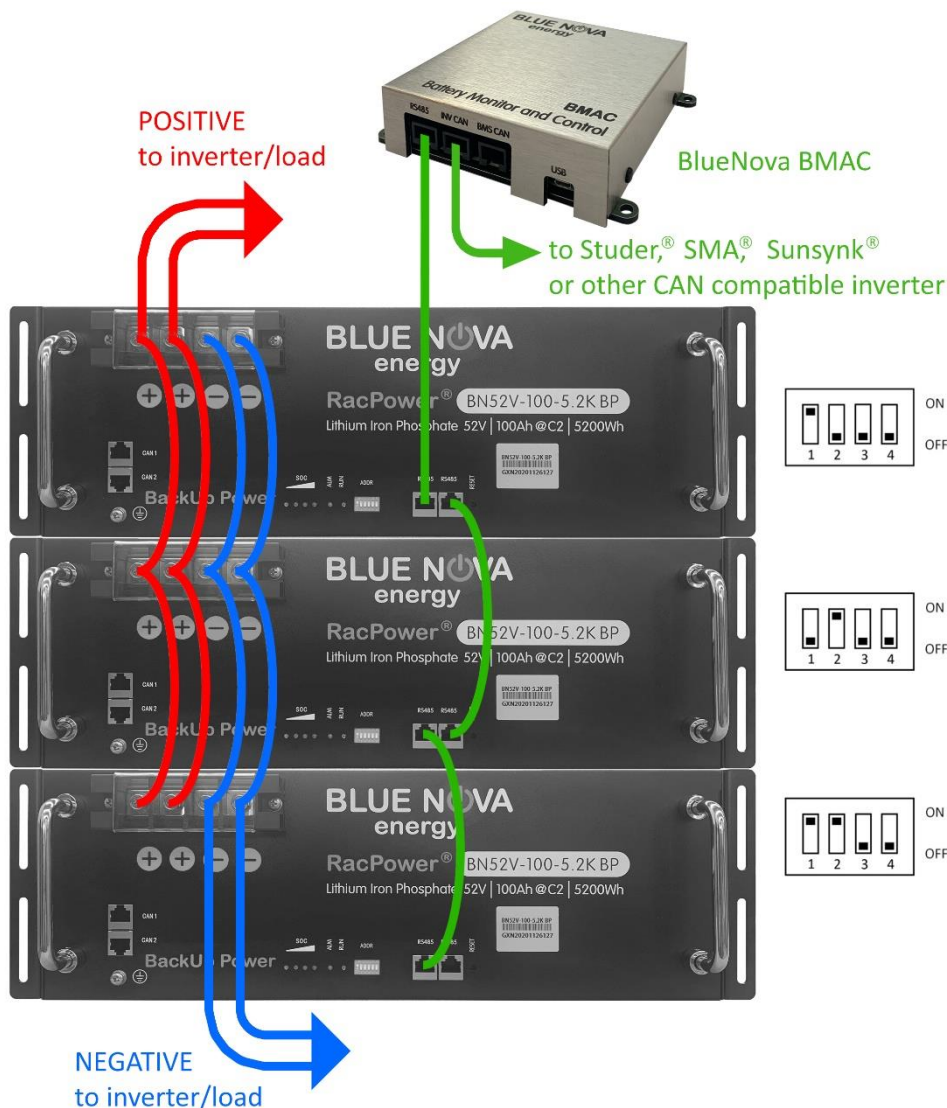


STEP-BY-STEP INSTRUCTIONS:

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 1mm².

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 8mm².
3. Connect the **NEGATIVE** 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 8mm².
4. Configure the dip switches for the master battery and slave batteries respectively.
5. Connect the RS485 ports of all parallel batteries with each other with a straight 1-to-1 pin RJ45 cable if the battery versions are the same. To connect older version batteries to newer version batteries, please reference the relevant pinout diagram listed in section 3 of this manual.
6. Connect the master battery's remaining RS485 port to the Axpert® inverter. Connect the last slave battery's remaining RS485 port to a BMAC module's RS485 port. See pinout diagrams in section 3.

2.3 CONNECTING PARALLEL CONFIGURATIONS TO STUDER®, SMA® OR SUNSYNK® PERIPHERALS



STEP-BY-STEP INSTRUCTIONS:

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 1mm².
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 8mm².
3. Connect the **NEGATIVE** 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 8mm².
4. Configure the dip switches for the master battery and slave batteries respectively.
5. Connect the RS485 ports of all parallel batteries with each other with a straight 1-to-1 pin RJ45 cable if the battery versions are the same. To connect older version batteries to newer version batteries, please reference the relevant pinout diagram listed in section 3 of this manual.
6. Connect the master battery's remaining RS485 port to a BMAC module's RS485 port. Connect the BMAC module's INV CAN port to the relevant port of a compatible inverter. See pinout diagrams in section 3.

2.4 SWITCHING ON PARALLEL CONFIGURATIONS

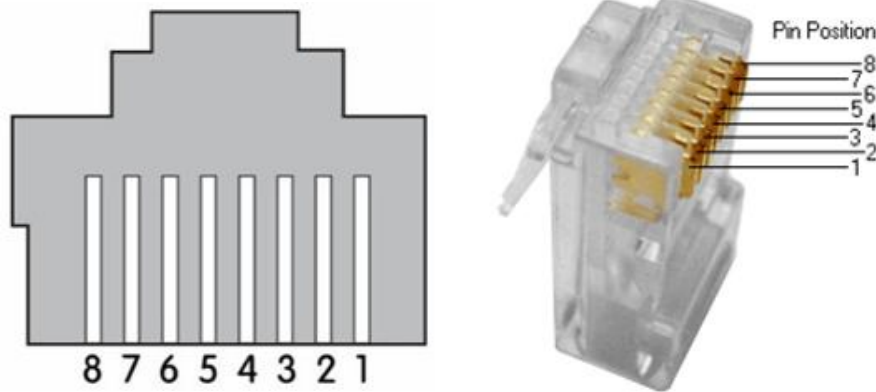
1. After the system has been fully installed ensure that all the battery units are switched off. All LED's on the front panel should be off.
2. Switch on the first (master) unit. The rest of the batteries will then switch on automatically.
3. To ensure that batteries in a parallel configuration communicate correctly, reset the master battery by pressing & holding the reset button for at least 6 seconds.

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 BP battery to a Victron® Cerbo GX module

↓ RacPower (CAN port)

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

↓ 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 BP battery to a new (v2) RacPower battery

↓ Older RacPower (CAN port)

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

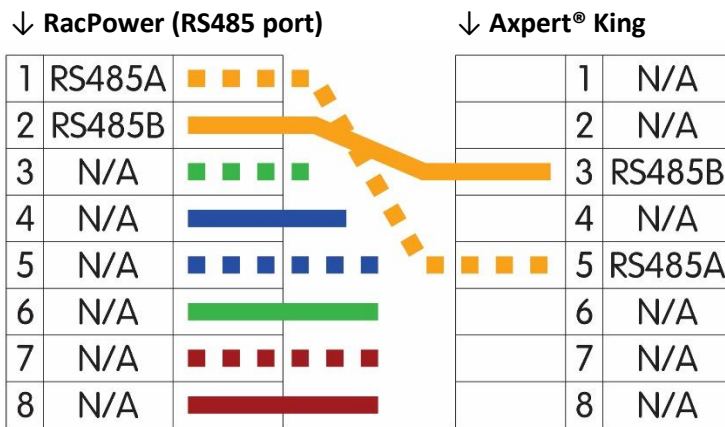
↓ New RacPower

	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.

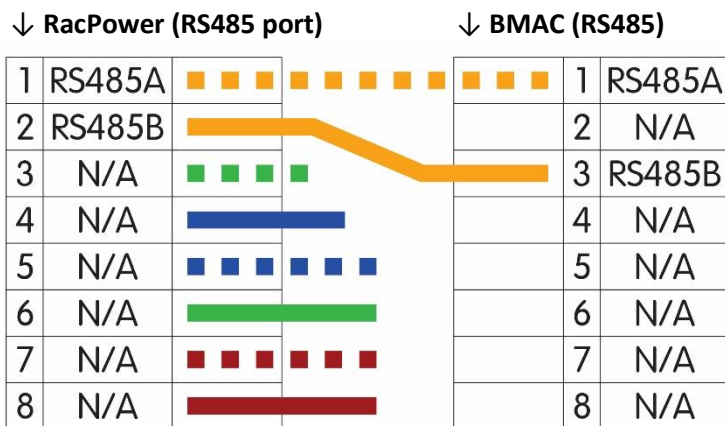
3.3 Connecting a RacPower BP battery to an Axpert® King 5kVA or 8kVA inverter



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.

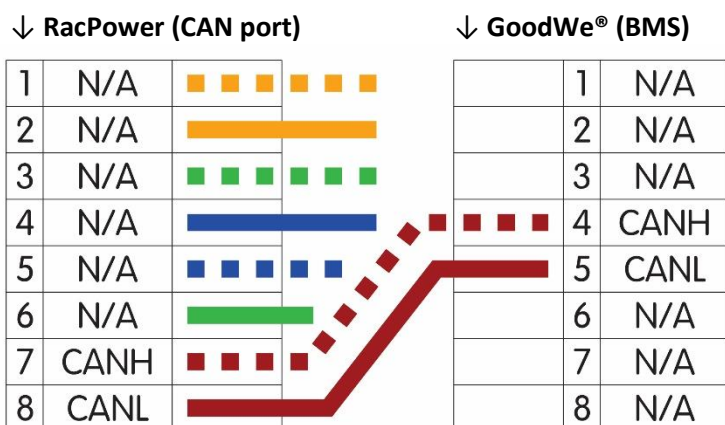
3.4 Connecting a RacPower BP battery to a BMAC module



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.

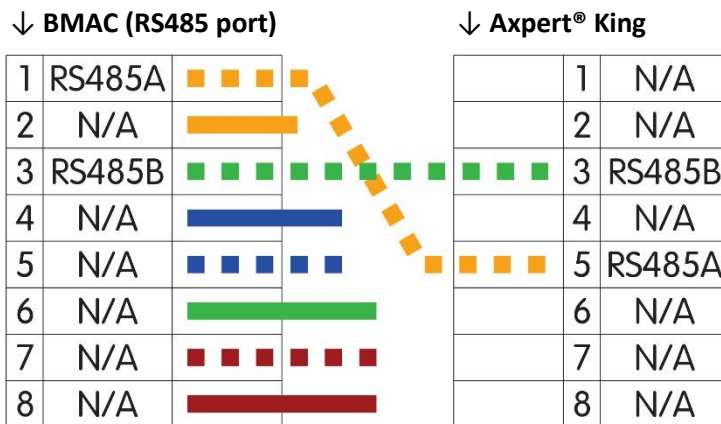
3.5 Connecting a RacPower BP battery to a GoodWe® inverter



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:

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

E. 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

- Ensure that the battery is switched off when stored.
- Disconnect the communication cable.
- Always store batteries in a cool and well-ventilated area – ideally 25°C ± 3°C.
- Store away from moisture and heat.
- Do not store batteries upside down for overly long periods.
- 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.
- The battery needs to be charged every 6 months if out of use.
- Ensure that the stored battery's state of charge is always above 50%. 100% SOC is optimal.
- Don't place more than 6 units on top of each other.

F. TROUBLESHOOTING

Please cross-reference the behaviour of the battery's LED indicators with the table below to determine whether your battery is operating correctly. Kindly contact BlueNova Technical Support for assistance if necessary.

Battery Status	State	SOC Indicators				RUN LED	ALM LED
		●	●	●	●	●	●
Off	Sleep mode	OFF	OFF	OFF	OFF	OFF	OFF
Stand by	Normal	Indicates state-of-charge				ON	OFF
	Warning	Indicates state-of-charge				ON	Flash 2
	Protection	Indicates state-of-charge				OFF	ON
Charging	Normal	Indicates state-of-charge				Flash 1	OFF
	Warning	Indicates state-of-charge				Flash 1	Flash 2
	Protection	Indicates state-of-charge				OFF	ON
Discharging	Normal	Indicates state-of-charge				Flash 2	OFF
	Warning	Indicates state-of-charge				Flash 2	Flash 2
	Protection	Indicates state-of-charge				OFF	ON
BMS Failure	Sleep mode	OFF	OFF	OFF	OFF	Flash 2	

Flash 1: LED flashes once every second / **Flash 2** – LED flashes once every 2 seconds

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.