

smallBMS NG

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This manual is also available in [HTML5](#).

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1. Safety precautions



- Installation must strictly follow the national safety regulations in compliance with the enclosure, installation, creepage, clearance, casualty, markings and segregation requirements of the end-use application.
- Installation must be performed by qualified and trained installers only.
- Carefully study the product manuals of all connected devices before installing them.
- Switch off the system and check for hazardous voltages before altering any connection.
- Do not open the lithium battery.
- Do not discharge a new lithium battery before it has been fully charged first.
- Charge a lithium battery only within the specified limits.
- Install the battery in a vented area.
- Do not mount the lithium battery upside down.
- Do not install batteries in a living area.
- Check if the lithium battery has been damaged during transport.

2. Introduction

2.1. General description

The smallBMS NG with pre-alarm is an all-in-one Battery Management System (BMS) for [Victron Lithium NG](#) batteries (not to be confused with the lithium smart batteries without NG). These batteries are Lithium Iron Phosphate (LiFePO₄) batteries and are available in 12.8V, 25.6V and 51.2V in various capacities. They can be connected in series, parallel, or a combination of both to create battery banks for system voltages of 12V, 24V, or 48V. A maximum of 50 batteries can be used when configuring a bank with 12V or 24V batteries, while up to 25 batteries can be used with 48V batteries. This allows for a maximum energy storage capacity of 192 kWh with 12V batteries, up to 384 kWh with 24V batteries, and 128 kWh with 48V batteries. For comprehensive details about these batteries, visit the [Victron Lithium NG battery product page](#).

The smallBMS NG is a simple and cost-effective alternative to the VE.Bus BMS NG, but lacks a VE.Bus interface and is therefore not suitable for use with VE.Bus MultiPlus and Quattro inverterchargers.

2.2. Features and functionality

• Bluetooth Smart

- The smallBMS NG has built-in Bluetooth Smart, enabling wireless configuration, monitoring, and firmware updates via Apple and Android smartphones, tablets, or other compatible devices. Various parameters can be adjusted using the [VictronConnect App](#).
- This also includes Instant Readout, allowing key BMS and battery data - SoC, battery temperature, warnings, and alarms - to be displayed on the VictronConnect device list without needing to connect to the product.

• Load Disconnect output

- Controls the remote on/off input of a [BatteryProtect](#), [Inverters](#), [DC-DC converter](#), or other loads with remote on/off functionality.
 - The output is normally high, becomes free-floating when cell undervoltage is imminent. Maximum output current: 1A (not short-circuit protected).
- Note that a non-inverting or inverting on/off cable may be required (see [Appendix A \[20\]](#)).

• Charge disconnect output

- Controls the remote on/off port of chargers such as the [Smart Charger IP43](#), a [Cyrix-Li-Charge relay](#), a [Cyrix-Li-ct Battery Combiner](#) or a [BatteryProtect](#). Note that the Charge disconnect output is not suitable to power an inductive load such as a relay coil.
- The output is normally high, becomes free-floating in case of imminent cell overvoltage or overtemperature. Maximum output current: 500mA (not short-circuit protected).

• Remote on/off terminal

- Allows remote control of the Load and Charge Disconnect outputs. When off, both outputs become free-floating, turning off connected loads and chargers.
- Consists of two terminals: Remote L and Remote H.
- Can be operated using:
 - A switch or relay contact between L and H.
 - H switched to battery plus or L switched to battery minus.



An on/off switch or the default wire loop must be installed for correct operation.

• Pre-alarm output

- Triggers a visible or audible warning when battery voltage is low, activating at least 30 seconds before the Load Disconnect output is disabled due to cell undervoltage.
- Can drive a relay, LED, or buzzer. Maximum output current: 1A (not short-circuit protected).
- The output is normally free-floating, becomes high in case of imminent cell undervoltage.
- The pre-alarm level can be adjusted via VictronConnect.

• Configurable discharge floor

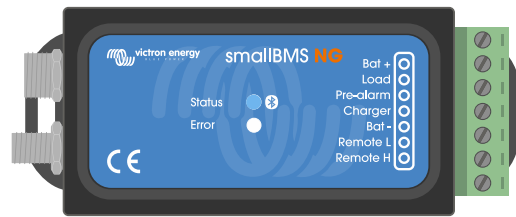
- Defines the minimum SoC to prevent excessive discharge and ensure enough energy remains for self-discharge after a low SoC shutdown.
- A low SoC warning level can be set, triggering a warning in VictronConnect that the discharge floor is about to be reached. The pre-alarm output is activated as soon as the warning level is reached. The value should be set high enough to leave enough time to recharge the battery to prevent a low SoC shutdown.
- A low SoC alarm is triggered when the discharge floor is reached, and the BMS immediately deactivates the ATD output, effectively shutting off any loads it controls.

• LED indicators

- **Blue Bluetooth Status LED:**
 - Blinks when no connection to VictronConnect. Lit solid when connected.
- **Red Error LED:**
 - Solid when an error occurs (details available in VictronConnect). Blinks in case of a warning (details available in VictronConnect).

2.3. What's in the box

smallBMS NG with removable 7-pin terminal block for easy wiring



3. Installation

3.1. Important warning



Lithium batteries are expensive and can be damaged due to over-discharge or overcharge.

The shutdown by the BMS due to low cell voltage should always be used as a last resort to be safe at all times. We recommend not letting it get that far and instead either switching off the system automatically after a defined state of charge via the BMS discharge floor limit so that there is always sufficient reserve capacity in the battery or using the BMS remote on/off port as a system on/off switch.

Damage due to over-discharge can occur if small loads (such as alarm systems, relays, standby currents of certain loads, back current drain of battery chargers, or charge regulators) slowly discharge the battery when the system is not in use.

In case of any doubt about possible residual current draw, isolate the battery by opening the battery switch, pulling the battery fuse(s) or disconnecting the battery plus when the system is not in use.

A residual discharge current is especially dangerous if the system has been discharged completely and a low cell voltage shutdown has occurred. After shutdown due to low cell voltage, a capacity reserve of approximately 1Ah per 100Ah battery capacity is left in the battery. The battery will be damaged if the remaining capacity reserve is drawn from the battery; for example, a residual current of just 10mA can damage a 200Ah battery if the system is left discharged for more than 8 days.

If a low cell voltage disconnect has occurred, immediate action (recharge the battery) is required.

3.2. Things to consider

3.2.1. Controlling DC loads via Load disconnect

To prevent deep discharge, DC loads must be switched off or disconnected when there is a risk of cell undervoltage. The Load disconnect output of the smallBMS NG can be used for this purpose.

- The Load disconnect output is normally high (equal to battery voltage) and switches to a free-floating (open-circuit) state in case of imminent cell undervoltage.
- DC loads with a remote on/off terminal that activates when pulled high (to battery plus) and deactivates when left free-floating can be controlled directly via the Load disconnect output. See [→Appendix A] for a list of Victron products with this behavior.
- For DC loads with a remote on/off terminal that switches the load on when the terminal is pulled low (to battery minus) and switches it off when the terminal is left free-floating, a [Inverting remote on-off cable](#) can be used. See [Appendix A \[20\]](#).

3.2.2. Controlling DC loads with a BatteryProtect

The smallBMS NG can control the remote on/off terminal of a BatteryProtect to manage load disconnection.

A BatteryProtect will disconnect the load when:

- The input voltage (battery voltage) falls below a preset threshold (adjustable in BatteryProtect), or when
- The remote on/off terminal is pulled low.

3.2.3. Controlling a battery charger via Charge disconnect

Battery chargers must interrupt charging in case of imminent cell overvoltage or low/high cell temperature. The Charge disconnect output of the smallBMS NG can be used for this purpose.

- The Charge disconnect output is normally high (equal to battery voltage) and switches to an open-circuit state when cell overvoltage or temperature issues occur.
- Chargers with a remote on/off terminal that activates when pulled high (to battery plus) and deactivates when left free-floating can be directly controlled by the Charge disconnect output. See [Appendix A \[20\]](#) for a list of Victron products with this behavior.
- Alternatively, a Cyrix-Li-Charge can be used. This unidirectional battery combiner sits between the charger and battery, engaging only when a charge voltage is detected. Its control terminal connects to the Charge disconnect output of the smallBMS NG.

3.2.4. Battery

- In case of several batteries in parallel and or series configuration, the two M8 circular connector cord sets of each battery should be connected in series (daisy chained). Connect the two remaining cords to the BMS.
- Be sure to read and follow the installation instructions in the [Lithium NG battery manual](#).

3.3. System examples

3.3.1. smallBMS NG with SmartSolar Charger and a BatteryProtect for DC loads

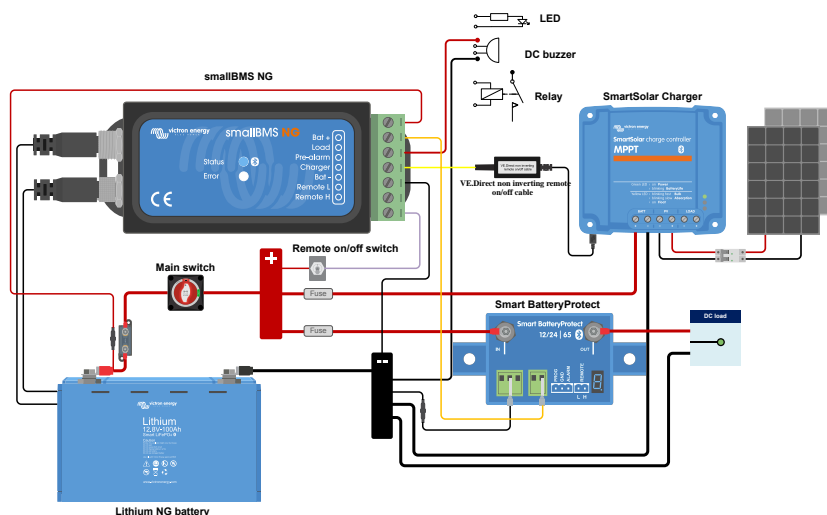
The below system example shows a small DC off-grid system. The main components are:

- [smallBMS NG](#)
- [12.8V 100Ah Lithium NG battery](#)
- [SmartSolar MPPT 75/15](#)
- [Smart BatteryProtect 12/24V 65A](#)
- [VE.Direct non-inverting remote on/off cable](#)

The Charge disconnect output controls a SmartSolar Charger via a VE.Direct non-inverting remote on/off cable (not necessary with larger MPPTs with a remote on/off port). The solar charger will stop charging in the event of low/high temperature or cell overvoltage.

DC loads are controlled via a Smart BatteryProtect. Its remote H input connects to the Load disconnect output of the smallBMS NG. In the event of a low cell voltage, the Load disconnect output and, as a result, the remote H input of the Smart BatteryProtect becomes free-floating and disconnects the DC load to prevent further battery discharge.

A remote on/off switch wired between the battery positive busbar and the remote H input of the smallBMS NG can be used to switch DC loads and chargers off. Additionally, a main switch can be used to isolate the positive busbar from the battery.



3.3.2. smallBMS NG with Cyrix-Li-ct as a battery combiner

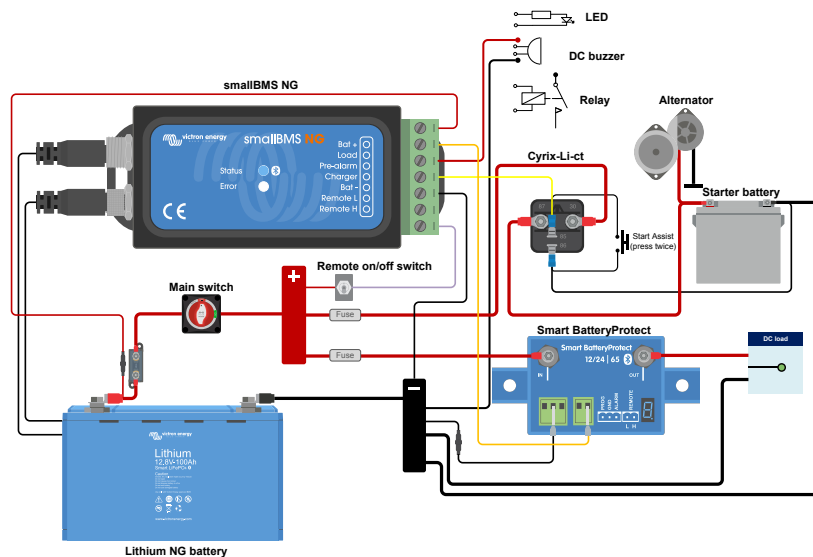
The below system example shows a small DC system in an RV or Boat. The main components are:

- [smallBMS NG](#)
- [12.8V 100Ah Lithium NG battery](#)
- [Cyrix-Li-ct](#)
- [Smart BatteryProtect 12/24V 65A](#)

The Charge disconnect output of the smallBMS NG controls the BMS charge disconnect input of the Cyrix-Li-ct (pin 85). In the event of low/high temperature or cell overvoltage, the Cyrix-Li-ct will stop charging the lithium battery.

DC loads are controlled via a Smart BatteryProtect. Its remote H input connects to the Load disconnect output of the smallBMS NG. In the event of a low cell voltage, the Load disconnect output and, as a result, the remote H input of the Smart BatteryProtect becomes free-floating and disconnects the DC load to prevent further battery discharge.

A remote on/off switch wired between the battery positive busbar and the remote H input of the smallBMS NG can be used to switch DC loads and chargers off. Additionally, a Main switch can be used to isolate the positive busbar from the battery.



3.3.3. smallBMS NG with Inverter VE.Direct

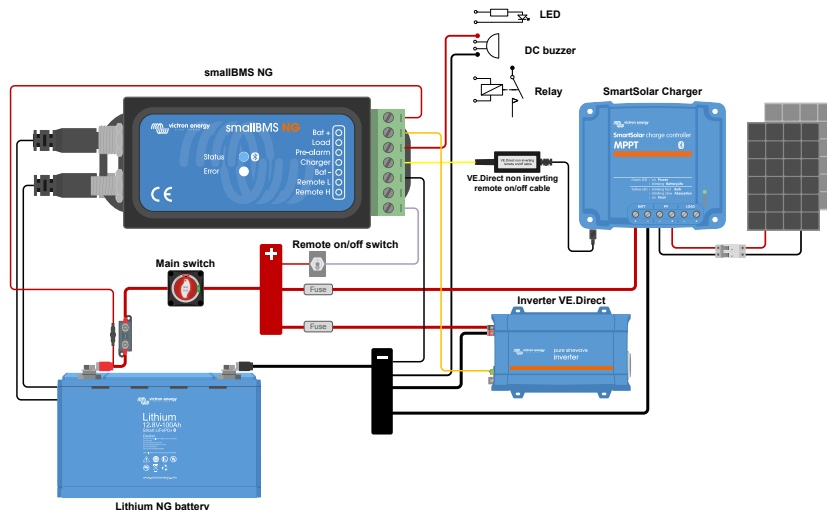
The below system example shows a small DC system. for example, in a Camper. The main components are:

- [smallBMS NG](#)
- [12.8V 100Ah Lithium NG battery](#)
- [SmartSolar MPPT 75/15](#)
- [Inverter VE.Direct 12/375](#)
- [VE.Direct non-inverting remote on/off cable](#)

The Charge disconnect output of the smallBMS NG controls a SmartSolar Charger via a VE.Direct non-inverting remote on/off cable (not necessary with larger MPPTs with a remote on/off port). The solar charger will stop charging in the event of low/high temperature or cell overvoltage.

An Inverter VE.Direct 12/375 allows powering domestic equipment. Its remote H input connects to the Load disconnect output of the smallBMS NG. In the event of a low cell voltage, the Load disconnect output and, as a result, the remote H input of the inverter becomes free-floating and disconnects the inverter to prevent further battery discharge.

A remote on/off switch wired between the battery positive busbar and the remote H input of the smallBMS NG can be used to switch DC loads and chargers off. Additionally, a Main switch can be used to isolate the positive busbar from the battery.



3.4. Installation

Before installation, make proper system design considerations to avoid unnecessary connections and to keep cable lengths as short as possible. See also the [System examples \[7\]](#) chapter.

1. Preferably mount the smallBMS NG on a flat surface.
2. Pull off the wire loop of the remote on/off terminal to prevent unwanted switching of the smallBMS NG.
3. Install and connect all electrical wiring and appropriate fuses and ensure that the Bat + terminal is fused. Leave the negative pole of the lithium battery disconnected from the system during installation.
4. Daisy chain the battery control cables between the lithium batteries and connect the ends to the BMS port. To extend the communication cables between the lithium battery and the BMS, use the [M8 circular connector Male/Female 3 pole cable](#) extensions, which are compatible with the NG battery and NG BMS product line.
5. Reinsert the wire loop into the remote on/off terminal of the smallBMS NG. Alternatively, install either an on/off switch between Remote L and Remote H or switch Remote H to battery plus or Remote L to battery minus.
6. Connect the negative pole of the lithium battery to the system.
7. The smallBMS NG is now ready for use.

4. Configuration and settings

4.1. Configuration of chargers and loads

Before turning on the system, ensure that chargers and loads are correctly configured, particularly their maximum combined charge and combined discharge currents, to avoid exceeding battery limits.

Maximum charge current

The maximum continuous charge current is 1C. The maximum pulse charging current depends on the battery model. Please refer to the [Lithium NG battery datasheet](#) for details.



For optimal battery performance, a charge current of 0.3C is recommended.

Maximum discharge current

The maximum continuous discharge current is 1C. The maximum pulse discharge current is 2C for a maximum of 10 seconds.



For optimal battery performance, a discharge current of 0.5C is recommended.



Chargers and loads not controlled by the BMS (via ATC and ATD) can permanently damage the battery.

Maximum battery charge- and discharge currents for 12.8V Lithium NG batteries

	12.8/100	12.8/150	12.8/200	12.8/300
Max continuous discharge current	100A	150A	200A	300A
Max pulse discharge current (10s)	200A	300A	400A	600A
Max continuous charge current	100A	150A	200A	300A
Max pulse charge current (10s)	200A	225A	400A	450A

Maximum battery charge- and discharge currents for 25.6V and 51.2V Lithium NG batteries

	25.6/100	25.6/200	25.6/300	51.2/100
Max continuous discharge current	100A	200A	300A	100A
Max pulse discharge current (10s)	200A	400A	600A	200A
Max continuous charge current	100A	200A	300A	100A
Max pulse charge current (10s)	200A	400A	450A	200A

4.2. Power up for the first time

The smallBMS NG switches on when the following conditions are met:

1. **Battery connection:** The Bat+ and Bat- terminals of the 7-pin terminal block must be connected to Battery Plus and Battery Minus.
2. **Remote on/off wiring:**
 - The wire loop must be placed between Remote L and Remote H of the 7-pin terminal block, or
 - If a remote on/off switch is used, it must be wired between Remote L and Remote H and switched on.

4.3. smallBMS NG and Lithium NG battery settings

Once powered up, use the VictronConnect app to configure the BMS settings.

Certain parameters such as Battery capacity, Battery voltage, Number of batteries, Number of batteries in series, Number of batteries in parallel are automatically configured and cannot be changed, but they should still be verified for accuracy.

Battery monitor settings:

Unlike other battery monitors, the smallBMS NG has mostly fixed settings that cannot be customised. This is because the smallBMS NG is designed to work exclusively with Victron Lithium NG batteries, where many parameters are predefined based on battery type.

- **Charged voltage:** The voltage above which the battery monitor synchronises and resets SoC to 100%, provided tail current and charged detection time conditions are met.
- **Tail current:** The current below which the battery monitor synchronises and resets SoC to 100%, provided charged voltage and charge detection time conditions are met. Default: 4%, adjustable if needed.
- **Charged detection time:** The duration charged voltage and tail current must be met for SoC synchronisation. Default: 3 minutes, adjustable if needed.
- **Low SoC warning level:** The level at which a warning is issued before the discharge floor has been reached.
The pre-alarm output is activated and a warning is displayed in VictronConnect when the warning is active.
- **Discharge floor:** This parameter has two functions:
 - Its primary use is to set the minimum SoC to determine how far the battery may be discharged and to ensure that there is enough energy left for self-discharge after the battery is no longer allowed to discharge (Allowed to discharge = No).

A restricted depth of discharge extends battery life and provides backup power, e.g., for solar systems until sunrise.

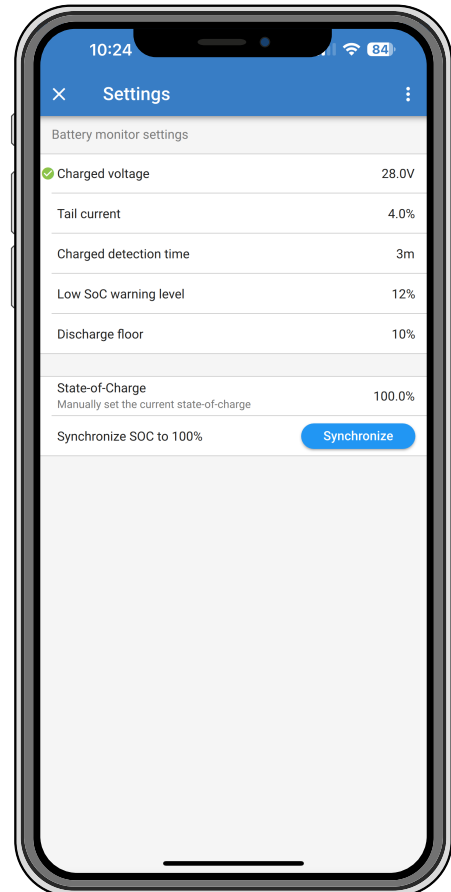
When the discharge floor is reached, a low SoC alarm is triggered, and ATC is disabled.

Setting the discharge floor to zero (not recommended) disables this feature.



The discharge floor prevents full discharge and should be set to retain enough energy for self-discharge until recharging is possible.

- It determines the 'Time remaining' value in the VictronConnect app, calculated based on the actual discharge current and the set discharge floor.
- **State of charge:** Manually set the current state of charge.
- **Synchronise SoC to 100%:** Manually synchronise SoC to 100%.



4.4. Update BMS and Battery firmware

Firmware updates for the BMS and Lithium NG battery are performed via the VictronConnect app.

General notes on firmware updates

- **Newer isn't always better** – only update if necessary.
- **If it works, don't break it** – avoid unnecessary updates.
- **Read the changelog first** – available on [Victron Professional](#).

Use this feature with care. Our main advice is not to update a running system unless problems occur or before the first startup.

Notes on updating the smallBMS NG and Lithium NG battery firmware

- The firmware update does not cause a full system shutdown.
- During the update, the Charge disconnect output opens, preventing battery charging.
- If the update fails, the Load disconnect output will open after 120 seconds as a safety measure, allowing time to retry the update.

Updating the firmware via VictronConnect

Please note the following before performing a firmware update via VictronConnect:

1. Before updating, refer to the [firmware update chapter](#) in the VictronConnect manual for detailed instructions.
2. If a newer firmware version is available, VictronConnect (ensure it's up to date) will notify you upon connecting to the BMS.

5. Monitoring and control

5.1. Monitoring and control via VictronConnect

The battery and BMS are monitored and controlled using the VictronConnect app.

VictronConnect has three pages for this purpose: a status page, a battery page and a history page. The individual parameters are explained below.

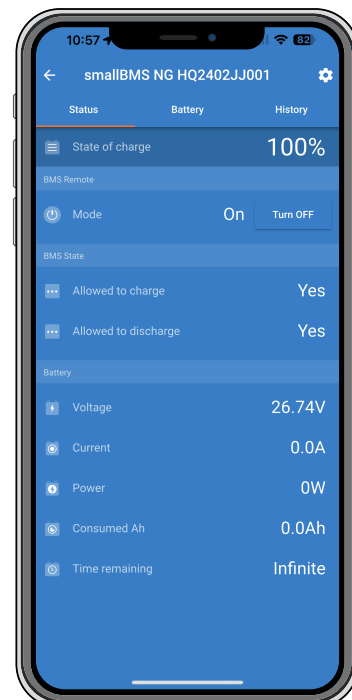
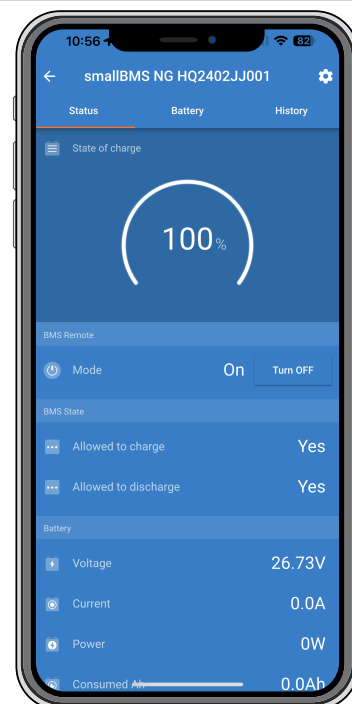
Status page:

The status page provides information about the current battery and BMS status.

- **State of Charge:** Shows the battery charge level in percent.
- **Mode:** Displays the system status (On or Off) and allows powering off the system with a tap.
- **Allowed to charge:** Shows the BMS status for Allowed to charge. Reasons why the status shows "No" are as follows:
 - Battery temperature below 5 °C.
 - Battery temperature too high.
 - One or more battery cell voltages have reached the high cell voltage threshold (hardcoded in the battery).
- **Allowed to discharge:** Shows the BMS status for Allowed to discharge. Reasons why the status shows "No" are as follows:
 - The configured Discharge floor has been reached.
 - One or more cells reached the hard-coded low cell voltage threshold.

Note that "Allowed to discharge" will show "Pre-Alarm" in the event of a pre-alarm.

- **Voltage:** The battery voltage as reported by the battery.
- **Current:** The battery current that is currently flowing, as reported by the battery.
- **Power:** The battery power as reported by the battery.
- **Consumed Ah:** Consumed Ah since last full charge cycle.
- **Time remaining:** The time that remains at current consumption until the defined [Discharge floor \[12\]](#) is reached.



Battery page:

The battery page provides information about the installed battery bank and gives more detailed information about each individual battery.

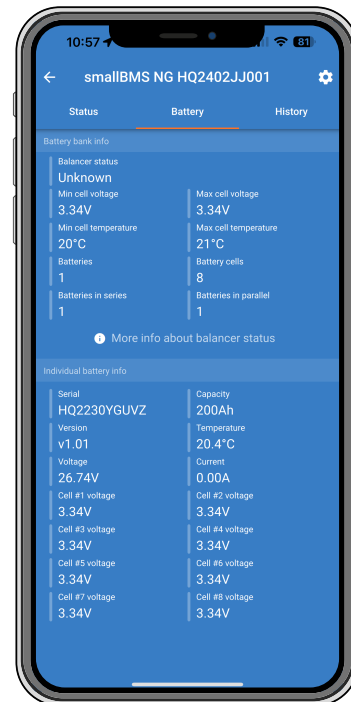
Battery bank info

- **Balancer status:** Shows the battery balancer status. Possible states are:
 - **Unknown:** The current balancer status is unknown. Reasons for this could be:
 - The battery has not been fully charged for more than 30 days.
 - The battery has just been added to the system.
 - State of charge is unknown.
 In all cases, start a new charging cycle.
 - **Balanced:** All battery cells are well balanced.
 - **Imbalanced:** An imbalance has been detected between one or more battery cells. Start a full charge cycle to balance the battery.
- **Balancing:** The battery is currently charging and the cells are being balanced.
- **Min cell voltage:** Displays the lowest cell voltage detected in the battery.
- **Max cell voltage:** Displays the highest cell voltage detected in the battery.
- **Min cell temperature:** Displays the lowest cell temperature detected in the battery.
- **Max cell temperature:** Displays the highest cell temperature detected in the battery.
- **Batteries:** Number of batteries installed in the system. This is automatically recognised by the BMS.
- **Battery cells:** Number of battery cells in total. This is automatically recognised by the BMS.
- **Batteries in series:** Number of batteries connected in series configuration. This is automatically recognised by the BMS.
- **Batteries in parallel:** Number of batteries connected in parallel configuration. This is automatically recognised by the BMS.

Individual battery info

The lower half of the battery page contains specific information about the selected battery. If there is more than one battery installed, the respective battery can be selected using the "Battery number" selector.

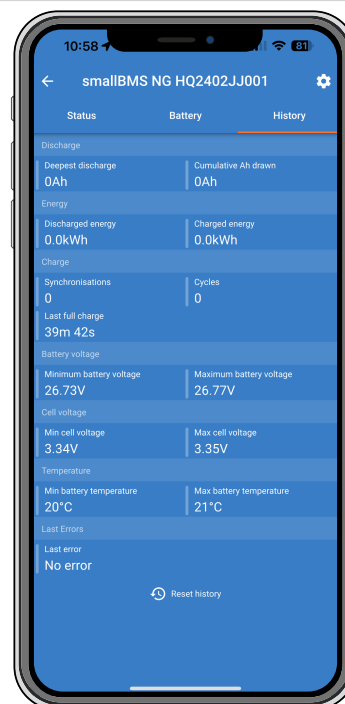
- The information for each individual battery is: battery serial number, nominal capacity, firmware version, battery temperature, battery voltage, battery current, individual cell voltages.



History page:

The history page shows information about the battery over time since installation or since the history was last reset.

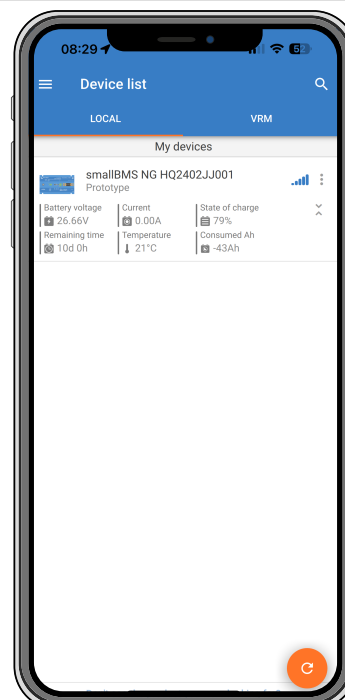
- **Deepest discharge:**
- **Cumulative AH drawn:**
- **Discharged energy:**
- **Charged energy:**
- **Synchronisations:**
- **Cycles:**
- **Last full charge:**
- **Minimum battery voltage:**
- **Maximum battery voltage:**
- **Min cell voltage:**
- **Max cell voltage:**
- **Min battery temperature:**
- **Max battery temperature:**

**5.1.1. Instant Readout**

VictronConnect can display key smallBMS NG data directly on the Device List page—without needing to connect to the product. This includes visual notifications for warnings, alarms, and errors, allowing quick diagnostics at a glance.

Available parameters:

- **Battery voltage**
- **Battery current**
- **State of charge**
- **Remaining time**
- **Battery temperature**
- **Consumed Ah**
- **Visual notifications for warnings, alarms and errors**



For details on enabling Instant Readout, refer to the VictronConnect manual, available on the [VictronConnect download page](#).

5.1.2. Reset to factory defaults

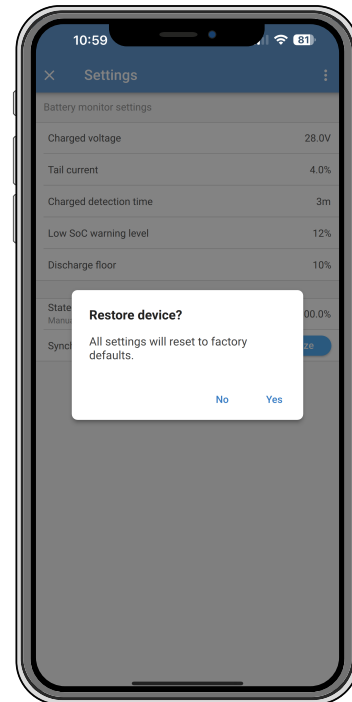
The smallBMS NG can be reset to factory settings via the VictronConnect app.

How to reset:

1. Open VictronConnect
2. Tap the cogwheel icon to access Settings.
3. Tap the three vertical dots in the Settings menu.
4. Select Reset to defaults, then confirm with Yes.

The following settings will be restored to their default values:

- Charged voltage
- Tail current
- Charged detection time
- Low SoC warning level
- Discharge floor



6. Specifications

smallBMS NG	
Operating voltage (Vbat)	8 - 70 Vdc
Power supply cable and fuse (not supplied)	Recommended fuse size 0.3 A - 2.5 A, dependent on devices connected to Load disconnect and pre-alarm output
Current consumption, remote on	3mA (excluding Load and Charge disconnect output current)
Current consumption, low cell voltage	1.2 mA
Current consumption, remote off	1.2 mA
Load disconnect output	Normally high (Vbat – 0.1 V) Source max current: 1 A (not short circuit protected) Sink current: 0 A (output free-floating)
Charge disconnect output	Normally high (Vbat – 0.1 V) Source max current: 500 mA (not short circuit protected) Sink current: 0 A (output free-floating)
Pre-alarm output	Normally free-floating (low) In case of alarm: output voltage Vbat -0.1 V Max output current: 500 mA (not short circuit protected)
Remote on/off: Remote L and Remote H	Use modes: 1. ON when the L and H terminals are interconnected 2. ON when the L terminal is pulled to battery minus ($V < 3.5$ V) 3. ON when the H terminal is high ($2.9 \text{ V} < V_H < V_{bat}$) 4. OFF in all other conditions
GENERAL	
Operating temperature range	-20 °C to +50 °C (0 - 120 °F)
Humidity	Max 95 % (non-condensing)
Protection, electronics	IP20
ENCLOSURE	
Weight	0.1 kg
Dimensions (hwxwd)	106 x 42 x 23 mm
Material and colour	ABS, matt black
STANDARDS	
Safety	EN 60950
Emission	EN 61000-6-3, EN 55014-1
Immunity	EN 61000-6-2, EN 61000-6-1, EN 55014-2
Automotive Directive	Regulation UN/ECE-R10 Rev.4 - pending

7. Compliance

smallBMS NG EU Compliance

SIMPLIFIED EU DECLARATION OF CONFORMITY: Hereby, Victron Energy B.V. declares that the smallBMS NG is in compliance with **RED Directive 2014/53/EU, RoHS (2011/65/EU and 2015/863/EU)** and **EC REACH Regulation (EC 1907/2006)**. The full text of the EU declaration of conformity is available at the following internet address: <https://ve3.nl/83>

UK PSTI STATEMENT OF COMPLIANCE

UK PSTI STATEMENT OF COMPLIANCE: We, Victron Energy B.V., confirm that our products smallBMS NG complies with the security requirements outlined in Schedule 1 of The Product Security and Telecommunications Infrastructure (Security Requirements for Relevant Connectable Products) Regulations 2023. The official Statement of Compliance is available at the following internet address: <https://ve3.nl/UK-PSTI-smallbmsng>

8. Appendix A

1. Loads which can be controlled directly by the Load disconnect output of the smallBMS:

- **Inverters:**

All Inverters VE.Direct and Inverters Smart. Connect the Load disconnect output of the BMS to terminal H of the 2-pole connector of the inverter.

- **DC-DC converters:**

All Tr-type DC-DC converters with remote on/off connector, the Orion 12/24-20 and the Orion XS. Connect the Load disconnect output of the BMS to the right-hand terminal of the 2-pole connector.

- **BatteryProtect and Smart BatteryProtect:**

Connect the Load disconnect output of the BMS to terminal 2.1 (right hand terminal) for the BatteryProtect and H pin of the 2-pole connector for the Smart BatteryProtect.

- **Cyrix-Li-Load:**

Connect the Load disconnect output of the BMS to the control input of the Cyrix.

2. Loads for which an **inverting remote on-off cable** is needed (article number ASS030550100 or -120):

- **VE.Bus inverters and VE.Bus Inverter Compact rated at 1200VA or more**

3. Solar charge controllers which can be controlled directly by the Charge disconnect output:

- **BlueSolar MPPT 150/70 and 150/80 CAN-bus:**

Connect the Charge disconnect output of the BMS to the left hand terminal of the 2-pole connector (B+).

- **SmartSolar MPPT 150/45 and higher, 250/60 and higher**

Connect the Charge disconnect output of the BMS to the **right-hand** terminal (marked +) or the **left-hand** terminal (marked H) of the 2-pole connector

4. Solar charge controllers for which a **VE.Direct non-inverting remote on-off cable** is needed (article number ASS030550320):

- **BlueSolar MPPT models except the BlueSolar MPPT 150/70 and 150/80 CAN-bus**

- **SmartSolar MPPT up to 150/35**

5. Battery Chargers:

- **Smart IP43 Chargers:**

Connect the Charge disconnect output of the BMS to terminal H of the 2-pole connector.

- **Skylia TG battery chargers:**

Use a **non-inverting remote on-off cable** (article number ASS030550200).

- **Skylia-i battery chargers:**

Use a **Skylia-i remote on-off cable** (article number ASS030550400).

- **Other battery chargers:**

Use a Cyrix-Li-Charge.