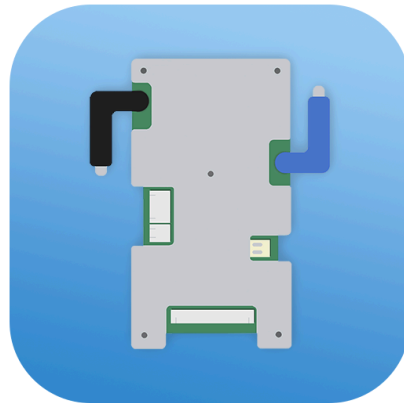




SmartBMS Utility

User Manual

*Monitor, configure, and log Daly, JBD and JK Battery Management Systems
for iOS, macOS, Android, and Windows*

Version 3.5.5

smartbmsutility.com



Table of Contents

Table of Contents	2
1. Welcome	3
What the app does	3
Supported BMS hardware	3
Supported platforms	3
How to use this manual	3
2. Safety Information	5
General safety rules	5
Before you change the configuration	5
Data and privacy	5
Regulatory notes	5
3. Installation	7
3.1 iOS and iPadOS	7
3.2 Android	7
3.3 macOS	7
3.4 Windows	7
4. First Connection	9
4.1 Prepare your BMS	9
4.2 Connecting via Bluetooth	9
4.3 Device actions on the list screen	9
4.4 Connecting via USB / Serial (Windows, macOS, Linux)	10
4.5 Demo mode	10
4.6 Bluetooth password (JBD only)	11
5. Overview	12
5.1 Basic Information	12
5.2 MOSFET Control	12
5.3 Battery State	13
5.4 Cell Voltages	13
5.5 BMS Information	13
5.6 Protection and error messages	14
6. Configuration	15
6.1 Layout of the Configuration tab	15
6.2 Reading the current configuration	15
6.3 Changing a value	15
6.4 Writing configuration to the BMS	16
6.5 Password-protected parameters	16
6.6 Typical parameter groups	16
7. Data Logging	18
7.1 What is recorded	18
7.2 The Logging tab	18
7.3 Choosing what to plot	18
7.4 Selecting a time range	19



7.5 Changing the logging interval	19
7.6 Exporting data to CSV	19
7.7 Deleting logged data	19
7.8 Offline chart viewing	20
8. GPS and Speed	21
8.1 Enabling GPS	21
8.2 The GPS tab	21
8.3 Setting the maximum speed of the dial	21
8.4 Resetting statistics	21
8.5 Units	22
9. Settings	23
9.1 App settings	23
Colour themes	23
Language selection	24
9.2 Device settings	24
9.3 Calibration	24
Voltage calibration	24
Current calibration	24
Temperature calibration	24
9.4 Change BMS password	25
9.5 Change Bluetooth password	25
9.6 Background operation	25
9.7 Feedback and help	25
10. Multi-Device View	26
10.1 Opening the Multi-Device view	26
10.2 Adding devices	26
10.3 The summary card	26
10.4 Individual device cards	27
10.5 Removing a device	27
11. Notifications	28
11.1 Opening the Notifications screen	28
11.2 Anatomy of a trigger	28
11.3 Creating a trigger	28
11.4 Permissions	28
11.5 Action triggers with caution	29
11.6 Editing and deleting	29
12. BMS Technology: a short introduction	30
12.1 Why a BMS is needed	30
12.2 Cells, modules, and packs	30
12.3 State of charge (SOC)	30
12.4 Cell balancing	31
12.5 Protection functions	31
12.6 Communication protocols	32
12.7 Battery chemistries	32



13. Data Privacy	33
13.1 What is stored locally	33
13.2 What is NOT transmitted	33
13.3 Permissions the app asks for	33
13.4 Sharing data	33
13.5 Deleting data	34
14. Troubleshooting	35
14.1 My BMS does not appear in the device list	35
14.2 Connection drops repeatedly	35
14.3 The app asks for a Bluetooth password but I don't know it	35
14.4 Values seem wrong or stuck at zero	35
14.5 Write operation fails	36
14.6 The app crashes on start-up	36
14.7 Logging data is growing large	36
14.8 Notifications do not fire	36
14.9 CSV exports don't open correctly in Excel	36
15. Frequently Asked Questions	37
Q: Is SmartBMS Utility free?	37
Q: Does it work offline?	37
Q: Can I use several phones to monitor the same BMS?	37
Q: Can I connect two BMS to my phone at the same time?	37
Q: Why does the SOC sometimes jump?	37
Q: My current reads negative when charging. Is that wrong?	37
Q: Can I use SmartBMS Utility with BMS models other than Daly, JK and JBD?	37
Q: Does the app drain my phone battery?	37
Q: Can I use the app on a rooted / jailbroken device?	37
Q: Is my data shared with the developers?	37
Q: I bought a BMS from a different vendor that says it is "JBD-compatible". Will it work?	38
Q: Can I change the language?	38
16. Glossary	39
17. Support and feedback	41
Acknowledgements	41



1. Welcome

Thank you for choosing SmartBMS Utility, the cross-platform companion app for your Battery Management System (BMS). This manual will guide you through installation, first-time setup, and every feature the app offers.

SmartBMS Utility gives you a clear, real-time view of your battery pack: state of charge, individual cell voltages, currents, temperatures, and protection events. Beyond pure monitoring, you can configure parameters directly on your BMS, log data over time, export it for further analysis, and receive notifications when something needs your attention.

What the app does

- Connects to your BMS via Bluetooth or a wired serial link.
- Displays live operating data in a clean, mobile-friendly layout.
- Lets you read and write BMS configuration parameters.
- Records historical data and visualises it in charts.
- Supports multiple batteries side-by-side in a unified view.
- Optionally records GPS data such as speed and position when the battery is used in a vehicle or boat.
- Notifies you about low SOC, voltage limits, high temperatures, and more.

Supported BMS hardware

This release supports three families of BMS:

- **Daly BMS** (Smart Daly with Bluetooth dongle or UART/RS485 link)
- **JBD BMS** (also sold under labels such as Overkill Solar, Heltec, etc., with the original JBD Bluetooth module)
- **JK BMS**

Additional BMS families are planned for future releases. Check for app updates to stay current.

Supported platforms

SmartBMS Utility is available for:

- iOS (iPhone and iPad)
- macOS (Apple Silicon and Intel)
- Android (phones and tablets, Android 5.0 / API 21 or newer)
- Windows 10 and Windows 11 (version 1903 / build 19041 or newer)

The app is built as a single codebase, so the look and feel is consistent across all devices.

How to use this manual

The manual is organised so you can read it cover-to-cover or jump straight to the chapter you need:



- **Chapter 2** covers safety; read this before changing configuration.
- **Chapter 3** explains installation on every platform.
- **Chapter 4** walks you through your first connection.
- **Chapters 5 to 11** describe each feature in detail.
- **Chapter 12** gives a short technical background on BMS and battery monitoring.
- **Chapter 14** helps you resolve common problems.
- **The Glossary** explains technical terms such as SOC, cell delta or MOSFET.

i Symbols used in this manual

Note – useful information that improves your experience.

Warning – action that could damage the battery or void a warranty.

Danger – safety-critical action; read carefully before proceeding.

2. Safety Information

Lithium-based batteries store a large amount of energy. Mishandling them can cause fire, chemical burns, or personal injury. Please read this chapter carefully before you change any setting on your BMS through the app.

Risk of fire and injury

Incorrect BMS parameters can disable protection features, allowing the battery to be over-charged, deeply discharged, or short-circuited. In extreme cases this may lead to fire or explosion. Only change configuration values if you understand what they do and which limits apply to your specific battery chemistry and cells.

General safety rules

- Only connect the app to a BMS you own or are authorised to configure.
- Keep the battery in a safe, ventilated environment during any configuration change.
- Never disconnect the BMS or remove cells while a write operation is in progress.
- Always verify the values you have written by reading them back afterwards.
- Keep a record of the factory / previously working configuration so you can restore it.
- If a battery shows unusual behaviour (swelling, heat, smell, smoke) disconnect it immediately and move it to a safe location.

Before you change the configuration

Manufacturer warranty

Changing BMS parameters can void the warranty provided by your battery dealer or manufacturer. If in doubt, contact your dealer before writing new values.

Write operations in SmartBMS Utility are always protected by a confirmation dialog. Read the warning carefully and cancel if you are unsure.

Data and privacy

SmartBMS Utility stores your data locally on your device. The app does not upload telemetry, device data, GPS coordinates, or BMS passwords to any external server. See Chapter 13 for a detailed description of what is stored and where.

Regulatory notes

- Bluetooth is used in Low-Energy mode in accordance with local radio regulations. No additional license is required for normal operation.



- If you use the GPS feature in a vehicle, comply with local traffic laws; do not interact with the app while driving.
- The app is not certified as a medical, automotive-safety, or life-support tool. It is intended for informational and configuration purposes only.



3. Installation

SmartBMS Utility is distributed through the official app stores for each platform. Always install the app from one of the sources listed below to make sure you get a trusted build.

3.1 iOS and iPadOS

Install the app from the Apple App Store.

1. Open the App Store on your iPhone or iPad.
2. Search for "SmartBMS Utility".
3. Tap Get, then confirm with Face ID, Touch ID, or your Apple ID password.
4. Once installed, open the app from your home screen.

Requirements: iOS 13 or newer. Bluetooth must be enabled on the device.

3.2 Android

Install the app from the Google Play Store.

1. Open the Play Store on your Android device.
2. Search for "SmartBMS Utility".
3. Tap Install and wait for the download to complete.
4. Open the app from your app drawer.

Requirements: Android 5.0 (API 21) or newer. Bluetooth and Location services must be enabled; Location permission is required by Android for Bluetooth scanning (see Chapter 4).

3.3 macOS

macOS users can install the app from the Mac App Store:

1. Open the App Store on your Mac.
2. Search for "SmartBMS Utility".
3. Click Get / Install.
4. Launch the app from Launchpad or the Applications folder.

Requirements: macOS 11 (Big Sur) or newer, Apple Silicon or Intel. The app uses the built-in Bluetooth adapter.

3.4 Windows

Windows users install the app through the Microsoft Store:

1. Open the Microsoft Store on your PC.
2. Search for "SmartBMS Utility".
3. Click Get / Install.
4. Launch the app from the Start menu.



Requirements: Windows 10 build 19041 (version 2004 / May 2020 Update) or newer, or any Windows 11 build. A Bluetooth LE-capable adapter is required to connect wirelessly. For serial connections, a USB-to-UART adapter is needed (see Chapter 4.4).

i First launch

On first launch the app may ask for permissions such as Bluetooth, Location (Android only, required by the OS for Bluetooth scanning) and Notifications. Grant these permissions to enable all features. You can review and change permissions later in your operating system settings.

4. First Connection

This chapter shows you how to connect to your BMS for the first time. Follow the steps carefully; once the connection is established most features become self-explanatory.

4.1 Prepare your BMS

Before you open the app, make sure:

- The battery is connected to the BMS and the BMS is powered on.
- For Bluetooth-equipped Daly BMS, the Bluetooth dongle is attached to the UART port.
- For JBD BMS, the built-in Bluetooth module is active (some units need the B- terminal connected before Bluetooth starts).
- You are within about 5 metres of the BMS during the first connection.

4.2 Connecting via Bluetooth

Open SmartBMS Utility. You will be greeted with the home screen, which has two tabs at the bottom: Single Device and Multi Device.

Make sure Bluetooth is enabled on your phone or computer. The app automatically starts scanning for supported BMS devices as soon as it opens.

- 1.Wait a few seconds while the app scans for nearby BMS devices.
- 2.Your BMS should appear in the Single Device list. The name is usually the BMS default, for example "DL-xxxxxxx" (Daly) or "Xiaoxiang BMS" (JBD).
- 3.Tap the device tile to connect.
- 4.Wait for the app to load live data. While connecting, a skeleton loader is shown in place of the values.

4.3 Device actions on the list screen

The Single Device screen has three floating action buttons in the bottom-right corner, and a filter button that appears automatically when many devices are in range:

Button	Purpose
Refresh	Stops the current scan, disconnects any unpinned devices and starts a fresh scan. Use this if a device does not appear or keeps showing as unavailable.
Unfiltered scan (magnifier+)	Shows every Bluetooth device in range, even those the app does not recognise as a BMS. Use this only when your BMS does not appear in the normal list; most generic devices you see here are not actually compatible.
Filter (funnel)	Appears once you have more than about eight devices in the list. Lets you search by device name or alias.

Button	Purpose
Settings (gear, top bar)	Opens app-wide settings.
Chart (top bar)	Opens the logging device selection for offline chart viewing without an active connection.

4.4 Connecting via USB / Serial (Windows, macOS, Linux)

For wired connections you will need a USB-to-UART adapter (typical CH340, CP2102 or FTDI based).

1. Enable the Serial Device in Settings (see Chapter 9.1). A new "Native Serial" device tile will then appear in the list.
2. Plug the adapter into your computer and connect it to your BMS using the manufacturer-provided cable or pin-out.
3. Tap the "Native Serial" tile in the device list.
4. A serial port selector appears; choose the COM / tty port your adapter uses.
5. The app opens the port and starts polling the BMS.

i Baud rate and protocol

The app automatically uses the baud rate and protocol expected by the BMS type selected for this connection. JBD and Daly use different framing, so the right interface is selected automatically once data is received.

4.5 Demo mode

If you do not have a BMS at hand, you can explore the entire app using the built-in Demo Device. It simulates a realistic JBD-style battery pack so you can try every feature safely.

1. Open Settings (gear icon, top right).
2. Enable Demo Device.
3. Go back to the device list. A "Demo" tile is now available.
4. Tap the tile to "connect" to the virtual battery.

4.6 Bluetooth password (JBD only)

Some JBD Bluetooth modules ship with a hardware password set by the dealer. When you connect to such a device, the app recognises this and prompts you for the 6-character password.

If you have never set a password, the default is usually "000000". If you do not know the password, contact the dealer or the party who installed the BMS.

⚠ Password mismatch



A wrong Bluetooth password does not damage anything, but you will be unable to connect. See Chapter 9.5 for how to change the Bluetooth password once you are connected.



5. Overview

Once connected, you are taken to the device screen. At the bottom you will see a navigation bar with several tabs. The Overview tab is the default view and shows the most important information about your battery at a glance.

The overview is composed of several cards stacked vertically. Each card represents a different group of information. You can scroll through them to see all of the data.

5.1 Basic Information

The first card at the top of the Overview shows the current state of the battery at a glance:

- **State of Charge (SOC)** – a large battery icon or circular gauge showing the remaining charge as a percentage.
- **Total voltage** – the sum of all cell voltages, in volts.
- **Current** – positive values indicate charging, negative values indicate discharging.
- **Power** – calculated from voltage × current, shown in watts.
- **Remaining capacity** – expressed in ampere-hours (Ah).

i Battery widget style

Tap the battery icon to toggle between two visual styles: a modern battery outline with colour-coded fill, or a classic circular progress gauge. The app remembers your choice.

5.2 MOSFET Control

This card gives you direct control over the charge and discharge paths of the BMS:

- **Charge MOS** – allow or block current flowing into the battery.
- **Discharge MOS** – allow or block current flowing out of the battery.

Each switch shows its current state (ON / OFF). Tapping a switch toggles the MOSFET after a confirmation prompt.

⚠ Disabling MOSFETs

Disabling the discharge MOSFET while a load is drawing current will cut off the load. In vehicles or critical loads this can have unwanted consequences. Make sure it is safe to do so before toggling these switches.

5.3 Battery State

The Battery State card shows detailed live readings:

- **Cycle count** – total number of full charge/discharge cycles registered by the BMS.



- Remaining / nominal capacity – how much energy the BMS believes is stored vs. the maximum design capacity.
- Balance status – indicates which cells are currently being actively balanced.
- Temperature readings – one value per temperature sensor. Most BMS have between 2 and 4 sensors.
- Humidity – available on some Daly BMS that include a humidity sensor.

5.4 Cell Voltages

This card lists every individual cell and its voltage, typically in millivolts. Cells are shown in two columns when your batteries have 12 or more cells in series..

- **Highest and lowest cell** are highlighted.
- **Cell delta** – the difference between the highest and lowest cell. A small delta (typically under 30 mV in a healthy pack) indicates a well-balanced battery.
- **Balancing indicator** – cells that are currently being balanced are marked.

i What is cell balancing?

See Chapter 12 for a short explanation. In short: your BMS periodically equalises the voltage of individual cells to keep the whole pack healthy.

5.5 BMS Information

The BMS Information card shows identity data reported by the BMS hardware:

- Hardware / firmware version.
- Production date, when provided by the BMS.
- Battery code or serial number, when provided by the BMS.
- Number of cells in series (connected in string).
- Number of temperature sensors connected.

This information is particularly useful when contacting support, as it lets the dealer identify your hardware revision.

5.6 Protection and error messages

Whenever the BMS reports an active protection event (such as over-voltage, over-current, over-temperature, short-circuit, etc.), a coloured alert is shown at the top of the Overview tab. The exact list of possible events depends on the BMS:

- **JBD BMS** reports cell / pack under-voltage and over-voltage, charge / discharge over-temperature and under-temperature, charge / discharge over-current, short-circuit, IC error and MOS lock-in.



- **Daly BMS** provides multi-level alarms (Level 1 warning, Level 2 protection) for cell and pack voltages, temperatures, currents and cell / temperature differences, plus detailed MOSFET and communication faults.

i Historical event counters

JBD BMS additionally report counters for how many times each protection has been triggered. These counters help you spot recurring issues even if the BMS is not currently in a protected state.



6. Configuration

The Configuration tab lets you inspect and change the parameters stored in your BMS. These include protection thresholds, balancing behaviour, capacity settings, function switches, and many more. The exact list of parameters depends on whether your BMS is a Daly, a JK or a JBD.

Read this before making changes

Incorrect configuration can disable safety features and lead to damaged cells, fire, or personal injury. Only change values if you fully understand them and have confirmed the acceptable range for your specific battery chemistry.

Changing parameters can void the warranty granted by your dealer.

6.1 Layout of the Configuration tab

Parameters are grouped into collapsible sections such as Basic Parameters, High Voltage Protection, Low Voltage Protection, Temperature, Balancing, Function Configuration, etc. Tap a section header to expand or collapse it.

Expand or collapse all

Double-tap the device name in the top title bar while on the Configuration tab to expand or collapse all sections at once.

6.2 Reading the current configuration

For JBD BMS, parameter values are read on demand. Tap the Read button (downward arrow) in the top-right corner of the Configuration tab to fetch the current values from the BMS.

For Daly BMS, parameters are fetched automatically during the polling cycle. You do not need to press a dedicated read button.

6.3 Changing a value

Each parameter is shown as one of several editor types, depending on its kind:

- **Text field** – for numbers, voltages, currents, timings. The editor enforces the valid range for that parameter.
- **Switch** – for on/off settings such as "Enable balancing".
- **Drop-down** – for choices such as battery chemistry (LiFePO4, Li-Ion, LTO).

When you change a value, the app tracks it as a pending change. The parameter is visually marked until you either write it to the BMS or discard it.

6.4 Writing configuration to the BMS

1. Make all desired changes. They stay pending until written.
2. Tap the Write button (floppy disk icon) in the top-right corner.
3. A confirmation dialog appears, warning you about the consequences of changing parameters. Read it carefully.
4. Confirm by tapping Submit.
5. A progress indicator shows how many values have been written. Do not disconnect the BMS during this operation.

Write errors

If the BMS rejects a value (because it is out of range or requires a password), the value is shown in red and you can retry or reset it to the previously stored value. Communication errors during a write are normally non-destructive: the BMS only applies values it successfully receives with a valid checksum.

6.5 Password-protected parameters

JBD BMS protects configuration parameters with a factory or user password. Before you can write protected values, you must unlock the BMS.

1. Go to Device Settings.
2. Tap "Enter password" and type your current password.
3. Once unlocked, the Write operation is available for protected parameters.

To change the password itself, see Chapter 9.4.

Password security

It is up to you to set a password. A BMS password is not required. We recommend you to set it up as it protects your battery configuration being altered by third-parties.

6.6 Typical parameter groups

The names of parameter groups vary slightly between Daly, JK and JBD, but most BMS expose similar categories:

Group	Examples of parameters
Basic	Nominal capacity, battery chemistry, number of cells, production date.
High-voltage protection	Cell / pack over-voltage thresholds, release delay, release threshold.
Low-voltage protection	Cell / pack under-voltage thresholds, release delay, release threshold.
Current protection	Charge / discharge over-current thresholds, short-circuit delay.
Temperature protection	Charge / discharge over-temperature, charge / discharge under-temperature.



Group	Examples of parameters
Balancing	Start voltage, minimum cell delta, balancing window / current.
SOC calibration	Full-charge detection voltage, empty detection voltage.
Function switches	Enable charging, enable discharging, LED signaling, buzzer, etc.

i Every parameter in context

SmartBMS Utility shows a short description below many parameters, with acceptable ranges and units. Tap the value field to see any help tooltip available.



7. Data Logging

SmartBMS Utility records key battery data while you are connected to a BMS, so you can review how the pack has behaved over time, diagnose issues, or share data with your dealer.

7.1 What is recorded

The following values are written to the local log at the configured interval:

- Total pack voltage (V)
- Pack current (A, positive = charge, negative = discharge)
- Remaining capacity (Ah)
- State of Charge (%)
- Temperatures (one value per sensor)
- Cell voltages (one value per cell)

i Where logs are stored

Logs are stored in an encrypted, on-device database (Hive). They never leave your device unless you export them explicitly. See Chapter 13 for details.

7.2 The Logging tab

Open the Logging tab from the bottom navigation while connected to a device. The tab shows a chart with one of the recorded values against time.

7.3 Choosing what to plot

At the top of the chart you can pick the value to display. Available options are:

- Total voltage
- Current
- Power
- Remaining Capacity
- State of Charge
- Temperature
- Cell voltage

The chart automatically adjusts the vertical axis and units. For multi-value series (temperature, cell voltage), each sensor or cell is drawn as its own coloured line.

7.4 Selecting a time range

Use the calendar control to pick which days to show. The chart reloads with only the points in the selected range.



- Tap a date to plot a single day.
- Tap and drag across dates to select a range of days.

7.5 Changing the logging interval

The interval between log entries can be tuned in the device Settings → Change Logging Interval. Shorter intervals produce more detailed data but increase storage usage and file size on export.

7.6 Exporting data to CSV

You can export the recorded data for further analysis in Excel, Python, Matlab or any tool that reads CSV files.

- 1.Open the Logging tab.
- 2.Tap the Export icon (upload-file) in the top-right corner.
- 3.Choose the values to include and the time range to export.
- 4.Tap Export. The app creates a CSV file.
- 5.Share the file through the system share sheet (e-mail, AirDrop, cloud storage) or save it to local storage.

i CSV format

The CSV uses a semicolon separator and includes a header row with column names. Timestamps are in ISO 8601 format. The file can be opened in any spreadsheet tool.

7.7 Deleting logged data

To free storage space, tap the trash-can icon in the Logging tab title bar. You can choose to delete:

- All data for the current device.
- Only data older than a given date.
- Data from a specific date range.

⚠ Deletion is permanent

Deleted logging data cannot be recovered. Export it first if you want to keep a copy.

7.8 Offline chart viewing

Even when no BMS is connected, you can view past logs:

- 1.From the home screen, tap the chart icon at the top of the screen.
- 2.Select the device whose data you want to inspect from the list.
- 3.The familiar Logging view opens with all stored data for that device.



8. GPS and Speed

When you install your battery in a vehicle, boat, scooter, or other mobile application, you can enrich the recorded data using the GPS Tab. This allows you to correlate battery behaviour with speed and movement and estimate range.

8.1 Enabling GPS

GPS is optional and disabled by default.

- 1.Open Settings → Show GPS tab and enable it.
- 2.Return to a connected device. A new GPS tab appears in the bottom navigation.
- 3.The first time you open the GPS tab, the app asks for Location permission. Grant it.

8.2 The GPS tab

The GPS tab shows following information:

- **Speed panel** – a large speedometer gauge, current speed, average speed, and maximum speed since the last reset.

8.3 Setting the maximum speed of the dial

The speedometer can be tuned to the vehicle you are using. Go to Settings → Max dial speed and enter a value that matches the typical maximum for your vehicle (for example 25 km/h for an e-bike, 120 km/h for a car).

8.4 Resetting statistics

A reset button lets you clear the average and maximum speed counters — useful at the start of a trip.

i Battery impact

Using GPS continuously drains your phone battery. If you do not need GPS on a particular trip, disable it in Settings.

8.5 Units

Speed and distance are shown in the unit configured in Settings → Distance unit (km/h or mph). Temperature has its own unit setting; see Chapter 9.

9. Settings

SmartBMS Utility has two separate settings areas: application-wide Settings (the gear icon on the home screen) and per-device Settings (the Settings tab when connected to a BMS).

9.1 App settings

Open the gear icon from the home screen to reach the global Settings:

Setting	Description
Enable Demo Device	Adds a fake BMS to the device list so you can explore the app without hardware.
Enable Serial Device	Shows the Native Serial option for wired connections.
Enable Background operation	Keeps polling the BMS while the app is in the background. May affect battery life.
Screen always on	Prevents the screen from sleeping while the app is in the foreground — useful during long charging sessions.
Enable automatic Theme	Follows the system Light / Dark setting.
Enable Dark Mode	Forces dark mode when automatic theme is off.
Use system Language	Follows your device language. Disable to pick one manually.
Show GPS tab	Adds the GPS tab to each connected device.
Temperature unit	Celsius or Fahrenheit.
Distance unit	km/h or mph.
Max dial speed	Maximum speed shown on the GPS dial.

Colour themes

The app supports multiple colour schemes: Default, Orange, Grey, Red, Green, Colorblind and Outdoor. The Outdoor theme uses high-contrast colours for better readability in bright sunlight. The Colorblind theme uses colour combinations designed to be distinguishable for common forms of colour blindness.

Language selection

SmartBMS Utility is translated into English, German, French, Italian and Simplified Chinese. Either follow the system language or pick one manually. Changes take effect immediately.

9.2 Device settings

While connected to a BMS, the Settings tab in the bottom navigation gives you access to per-device actions:



- **Change name** – set a custom name for the device that replaces the hardware default in lists and charts.
- **Change logging interval** – how often the app logs data for this device.
- **Notifications** – define triggers for alerts (see Chapter 11).
- **Calibration** – fine-tune sensor readings (see 9.3).
- **Change password** – set or change the BMS configuration password.
- **Change Bluetooth password** – set or change the Bluetooth hardware password on JBD dongles.
- **Configuration backup / import** – save and restore the entire configuration as a file.

9.3 Calibration

Calibration lets you align the BMS readings with an external reference instrument. This is useful when the voltage, current or temperature reading in the app differs from your bench multimeter or clamp meter.

Voltage calibration

Measure the actual total pack voltage with a calibrated voltmeter, then enter the measured value. The BMS computes a correction factor so that all subsequent readings match.

Current calibration

Two-point calibration is typical: a zero-current point (no load) and a non-zero reference (using a known current). Follow the on-screen instructions.

Temperature calibration

Enter the actual temperature from a reference thermometer. The BMS applies the offset to all its sensors.

Calibration changes affect safety

Voltage calibration influences the cut-off decisions of the BMS. Only calibrate with a trustworthy reference instrument.

9.4 Change BMS password

JBD BMS requires a 6-digit password to modify protected parameters. To change it, open Device Settings → Change password, enter the current password, then enter and confirm the new one.

Forgotten passwords

If you forget the BMS password, contact your dealer. Depending on the hardware revision a factory reset may be required, which is not a feature of SmartBMS Utility.



9.5 Change Bluetooth password

This setting is specific to JBD Bluetooth dongles with a hardware password. It differs from the BMS configuration password described above. Once set, every new connection will require the password before data can flow.

To change it, go to Device Settings → Change Bluetooth password and follow the on-screen steps.

9.6 Background operation

By default the app pauses polling when the screen is locked or the app is in the background. To keep logging while your phone is locked, enable Background operation. On iOS, additional system-level permissions may be required.

9.7 Feedback and help

Tap the help icon in the top-right of the Settings screen to reach the feedback form. You can report bugs, request features, or contact support.



10. Multi-Device View

If you run multiple batteries in parallel — for example in an off-grid installation, a larger vehicle, or a test bench — the Multi-Device view lets you monitor all of them side by side in a single screen.

10.1 Opening the Multi-Device view

On the home screen, tap the Multi Device tab at the bottom. On first use, the list is empty.

10.2 Adding devices

1. Tap the plus (+) button in the bottom-right corner.
2. A list of currently discovered devices is shown.
3. Select the devices you want to monitor. You can pick multiple at once.
4. Confirm. The app establishes a connection to each selected device and keeps them connected as a multi-device group.

10.3 The summary card

Once two or more devices are connected, a Summary card is shown at the top. It aggregates the key numbers across all devices:

- Total pack voltage (average of all packs, if they are in parallel)
- Total current (sum)
- Total power (sum)
- Average state of charge
- Combined remaining and nominal capacity
- Highest and lowest cell voltage across all packs
- Highest and lowest temperature across all packs

10.4 Individual device cards

Below the summary, each device has its own compact card showing its name, SOC, voltage, current, and temperature. Tap a card to jump into the full device view for that BMS.

10.5 Removing a device

To stop monitoring a device click the three dots in the top right of the device widget, a dialog should open where you can click disconnect to remove the device.

i Connection limits

The number of simultaneous Bluetooth connections is limited by your phone or computer's Bluetooth hardware. Most modern smartphones can keep 3 to 5 BLE connections active at the same time. If a device drops out, reduce the number of simultaneously active devices.

11. Notifications

Notifications let you define custom triggers that execute an action when a value crosses a threshold. They are useful for unattended monitoring: if the battery SOC falls too low, a cell drifts too far from the others, or the pack voltage rises above a safe limit, you can get a system notification or have the BMS automatically stop charging or discharging.

11.1 Opening the Notifications screen

Open the connected device, then go to Settings → Notifications.

11.2 Anatomy of a trigger

Each notification trigger has three components:

Component	Possible values
Monitored value	Total voltage, Current, State of Charge, Cell delta
Comparison	Below, Above
Action	Notification, Stop charging, Stop discharging, Start charging, Start discharging

For example: "When SOC is below 20 %, send me a notification" or "When cell delta is above 80 mV, stop charging".

11.3 Creating a trigger

1. Tap the Add button to open the trigger editor.
2. Choose the monitored value (for example State of Charge).
3. Choose the comparison direction (Below / Above).
4. Enter the threshold value and unit.
5. Choose the action to execute.
6. Save the trigger. It is immediately active.

11.4 Permissions

For notifications to reach you outside the app, you must grant the notification permission:

- **iOS / macOS** – the permission is requested on first use. Enable it in System Settings → Notifications → SmartBMS Utility if needed.
- **Android** – from Android 13, notifications require explicit consent. Grant it when prompted or in system Settings → Apps → SmartBMS Utility → Notifications.
- **Windows** – notifications appear in the Action Center if enabled for the app.



Trigger limitations

Triggers only fire while the app is actively communicating with the BMS. If the app is fully closed or the BMS is disconnected, no threshold is being evaluated.

Enable "Background operation" in App Settings if you want triggers to work while the app is in the background.

11.5 Action triggers with caution

Actions such as "Stop charging" or "Stop discharging" send MOSFET control commands to the BMS. They should not be the sole safety mechanism: the BMS itself already has hard-coded protections. Use action triggers to enforce softer limits (for example, stop charging at 90 % SOC to extend cycle life) rather than as a replacement for hardware protection.

11.6 Editing and deleting

Existing triggers are listed on the Notifications screen. Tap a trigger to edit or delete it. Deleting a trigger does not delete related log data.



12. BMS Technology: a short introduction

This chapter gives you a high-level overview of what a Battery Management System does and how the values shown in SmartBMS Utility relate to what is happening inside your battery. It is intended as a general introduction, not as a replacement for the manual of your specific battery.

12.1 Why a BMS is needed

Modern lithium-based batteries — LiFePO₄, Li-Ion (NMC, NCA), and Lithium-Titanate — deliver high energy density and cycle life, but they are sensitive to how they are used. Charging a cell too high, discharging it too low, exceeding its temperature range, or drawing too much current can permanently damage the cell and, in some cases, create a fire hazard.

A BMS is an electronic circuit that sits between the battery cells and the outside world. Its main job is to measure key values and to cut the connection if any limit is exceeded. A typical BMS does the following:

- Measures the voltage of every individual cell.
- Measures the current flowing in or out of the pack.
- Measures temperature at one or more points on the cells.
- Controls the charging and discharging paths using MOSFET switches.
- Balances the cells to keep them at similar voltages.
- Tracks the state of charge (SOC) and cycle count.
- Reports everything it knows over a communication interface — which is what SmartBMS Utility reads.

12.2 Cells, modules, and packs

A battery pack is built from individual cells connected in series to raise the voltage and in parallel to raise the capacity. You will often see notations like "4S2P", which means four cells in series and two of these series strings connected in parallel.

- **Series connection (S)** – adds voltages. Four LiFePO₄ cells of 3.2 V in series give 12.8 V.
- **Parallel connection (P)** – adds capacities. Two 100 Ah strings in parallel give 200 Ah.

The BMS measures the voltage of every single cell in the series path, which is why you see one cell voltage per cell count. Parallel-connected cells within one series position share the same voltage and are measured together.

12.3 State of charge (SOC)

SOC is the percentage of charge remaining in the pack, where 100 % is fully charged and 0 % is fully discharged. SOC is normally estimated in one of two ways:

- **Coulomb counting** – integrating the current over time. Accurate in the short term, but drifts without recalibration.

- **Voltage-based estimation** – mapping the open-circuit voltage to a known charge level. Accurate when the pack is at rest but unreliable under load.

Most BMS combine the two methods: they primarily count coulombs and periodically recalibrate at a well-known voltage point (typically full charge).

i Calibrating SOC

If the SOC displayed by the BMS drifts away from reality, a full charge cycle to the absorption voltage usually recalibrates it. See Chapter 9.3 for additional options.

12.4 Cell balancing

Even cells from the same production batch never have exactly the same capacity. When charged together in series, small capacity differences accumulate: one cell reaches its upper voltage limit slightly earlier than the others, and the BMS has to stop charging — leaving the rest of the pack below 100 %.

Balancing reduces this effect. Two approaches exist:

- **Passive balancing** – the BMS discharges the highest cells through small resistors until all cells are at roughly the same voltage. Most small BMS, including typical Daly, JK and JBD units, use this method.
- **Active balancing** – energy is transferred from the highest cells to the lowest ones using capacitors or transformers. More complex and more efficient, but more expensive.

The app shows which cells are being actively balanced at any moment, and the cell delta gives you a quick measure of how well the pack is balanced.

12.5 Protection functions

When a measured value is outside safe limits, the BMS opens one of the MOSFET switches to break the current path. Different limits trigger different actions:

Condition	Typical BMS response
Cell over-voltage	Stop charging. Resume when cell voltage drops below the release threshold.
Cell under-voltage	Stop discharging. Resume when cell voltage rises above the release threshold.
Over-current (charge or discharge)	Open the relevant MOSFET. Resume after a cool-off delay or on manual reset.
Short-circuit	Open both MOSFETs immediately. Manual reset or load removal usually required.
Over-temperature / under-temperature	Stop charging, discharging, or both, depending on the affected sensor.



SmartBMS Utility shows every active protection event on the Overview tab in real time. The Configuration tab lets you adjust the thresholds that trigger each protection, within the ranges permitted by the BMS.

12.6 Communication protocols

The BMS talks to the outside world using one or more communication channels. SmartBMS Utility currently supports:

- **Serial UART over a Bluetooth Low Energy (BLE) bridge** – Daly, JK and JBD offer BLE modules that convert the BMS's native UART protocol into BLE characteristics.
- **Direct serial UART over a USB-to-UART adapter** – available on desktop platforms, using the same frames as the BLE variant.

Each BMS family uses its own frame format, but the logical content is similar: the app sends a request, the BMS sends a response containing the requested data. The app handles all of this transparently; you only have to worry about selecting the right device and connection type.

12.7 Battery chemistries

SmartBMS Utility works with the chemistries supported by Daly, JK and JBD:

- **LiFePO₄ (LFP)** – nominal 3.2 V / cell, very safe, long cycle life, best for storage and slow-discharge applications.
- **Li-Ion (NMC / NCA)** – nominal 3.6–3.7 V / cell, higher energy density, more sensitive to abuse.
- **LTO (Lithium Titanate)** – nominal 2.3 V / cell, very wide temperature range and long cycle life but lower energy density.

The chemistry selection is a parameter of the BMS and can be changed in the Configuration tab — with caution, because the BMS then applies default voltage limits appropriate to the chosen chemistry.

13. Data Privacy

SmartBMS Utility is designed to respect your privacy. All data stays on the device unless you export it yourself.

13.1 What is stored locally

- The list of recently connected devices and their user-assigned names.
- Device-specific logging data (voltage, current, SOC, cell voltages, temperatures).
- Notification triggers and their thresholds.
- App preferences (theme, language, units, etc.).
- Optionally: the Bluetooth password you supplied for a JBD dongle. This is stored locally so you don't have to re-enter it every time.
- GPS data is only stored when the GPS tab is enabled and you are connected to a device.

13.2 What is NOT transmittsed

- No telemetry, analytics, or crash reports are sent automatically.
- No BMS passwords leave the device.
- No battery data, cell voltages, or location data are sent to us or any third party.
- No advertising identifiers are used.

13.3 Permissions the app asks for

Permission	Purpose
Bluetooth	Required on all platforms to scan for and connect to BMS devices.
Location	Required by Android for Bluetooth scanning. Also used by the GPS tab (all platforms) when enabled.
Notifications	Required to show alerts from notification triggers.
Storage / Files	Used only when you export CSV files.

13.4 Sharing data

When you export a CSV or share a screenshot, you decide where it goes. Consider the following before sharing:

- CSV files contain time-stamped battery data. Timestamps reveal when your battery was in use.
- Configuration backups contain operating thresholds; share them only with people you trust.



13.5 Deleting data

To remove all data associated with the app:

- 1.Delete logging data for each device (Logging tab → trash icon).
- 2.Remove devices from the Multi-Device list.
- 3.Uninstall the app to remove everything else.

Uninstalling the app removes the local database and all locally stored preferences.



14. Troubleshooting

This chapter collects the most common problems and how to resolve them. If your issue is not listed here, see Chapter 15 (FAQ) or contact support via the in-app feedback form.

14.1 My BMS does not appear in the device list

- Make sure your BMS is powered on and within 5 metres of your phone / computer.
- Check that Bluetooth is enabled in your device's system settings.
- On Android, check that Location is enabled in system settings and that SmartBMS Utility has Location permission. Android requires this for Bluetooth scanning, even though the app itself does not use your location unless you enable GPS.
- Tap the Refresh button (bottom-right of the device list) to restart the scan.
- Tap the magnifier-plus button to enable the unfiltered scan. All Bluetooth devices in range will be shown not only what the app identified as BMS.
- Reboot the BMS by briefly disconnecting the power source, then re-connect.
- If you have entered a filter on your device list, check if the filter is empty or matches the name of the missing BMS, in case it still applies or mismatches your device does not get shown.

14.2 Connection drops repeatedly

- Reduce the distance between the device and the BMS. BLE range is usually 5–10 metres line-of-sight.
- Move away from strong Wi-Fi access points or other 2.4 GHz sources that may cause interference.
- On Android, some aggressive battery savers can suspend Bluetooth in the background. Exclude SmartBMS Utility from battery optimisation in system settings.
- If you are monitoring several devices at once, try reducing the number of simultaneously connected BMS to three or fewer.

14.3 The app asks for a Bluetooth password but I don't know it

- Try the factory default "000000".
- Contact the dealer who supplied the BMS; the password is often printed on the invoice or packaging.
- If you set the password yourself previously but have forgotten it, some JBD dongles can be reset to factory default through a hardware button. Consult your dealer.

14.4 Values seem wrong or stuck at zero

- Wait a few seconds after connecting: the app shows skeleton placeholders while values are still being fetched.



- If only temperature or cell voltage values look wrong, check that the BMS has the correct number of cells and temperature sensors configured in the Configuration tab.
- If voltage or current values seem consistently off by a constant factor or offset, use the Calibration feature (Chapter 9.3).
- If no values ever arrive, the BMS may be configured with a different protocol than expected. Disconnect, close and re-open the app, and try again.

14.5 Write operation fails

- Confirm you are not entering a value outside the allowed range — the app will refuse to send out-of-range values.
- For JBD BMS, make sure the configuration password has been supplied and is correct.
- If the connection drops mid-write, reconnect and retry. The app will re-read the current values so you can see which were applied.

14.6 The app crashes on start-up

- Update to the latest version from the store.
- Restart your device.
- If the problem persists, reinstall the app. Your local data will be lost unless you export it first.

14.7 Logging data is growing large

- Increase the logging interval to reduce the number of records.
- Export the CSV and then delete historical data (Logging tab → trash icon).
- Large log files can make the Logging tab slow on mobile devices; exporting and deleting periodically keeps things responsive.

14.8 Notifications do not fire

- Check that notification permission is granted for SmartBMS Utility in system settings.
- Confirm that the trigger condition actually occurred while the app was running. Triggers only fire when data is being read from the BMS.
- Enable Background operation in App Settings if you want triggers to work while the app is minimised.

14.9 CSV exports don't open correctly in Excel

- Set Excel to expect a semicolon separator, or use the Import Data wizard and choose "Delimited / Semicolon".
- If numbers appear as text, check your system's decimal separator. The CSV uses a period "." as the decimal separator.

i Still stuck?



Open the app settings (gear icon), tap the help icon (top-right) and use the feedback form to contact support. Include as much detail as possible: platform, app version, BMS model, and a description of what you expected to happen vs. what actually happened.



15. Frequently Asked Questions

Q: Is SmartBMS Utility free?

A: No. The app needs to be purchased in the official store of your platform.

Q: Does it work offline?

A: Yes. Connecting to your BMS does not require an internet connection. Only optional features such as app-store updates or web links require internet.

Q: Can I use several phones to monitor the same BMS?

A: Bluetooth can only be connected to one phone at a time. You can switch between phones, but you cannot have two phones actively connected simultaneously.

Q: Can I connect two BMS to my phone at the same time?

A: Yes. Use the Multi-Device view (Chapter 10). The number of simultaneous connections depends on your phone or computer's Bluetooth hardware.

Q: Why does the SOC sometimes jump?

A: SOC is a calculated value. When the BMS recalibrates at full charge (or manually), the displayed percentage may change to reflect the new reference point. This is normal and usually indicates a more accurate reading.

Q: My current reads negative when charging. Is that wrong?

A: Sign conventions differ between BMS. SmartBMS Utility uses positive for charge and negative for discharge. If your BMS reports the opposite sign, it is usually a hardware setting that can be changed in the Configuration tab.

Q: Can I use SmartBMS Utility with BMS models other than Daly, JK and JBD?

A: The current release supports only Daly, JK and JBD. Additional BMS families are planned. Follow our website for updates or register for our newsletter on our website.

Q: Does the app drain my phone battery?

A: The app uses Bluetooth Low Energy, which is lightweight. Continuous screen-on use is the biggest power consumer. Disable Screen always on when you don't need it, and disable GPS when it is not in use.

Q: Can I use the app on a rooted / jailbroken device?

A: The app does not require root or jailbreak, but it may not work reliably on modified operating systems. We can only support unmodified systems.

Q: Is my data shared with the developers?

A: No automatic telemetry is transmitted. Only information you submit intentionally (e.g. through the feedback form, including log excerpts you choose to attach) is transmitted. See Chapter 13.



Q: I bought a BMS from a different vendor that says it is "JBD-compatible". Will it work?

A: Most rebadged JBD BMS (sold under names such as Overkill Solar, Robur, Xiaoxiang) are fully compatible, because they use the same firmware and Bluetooth protocol. Some non-genuine clones may have minor differences; if you encounter problems, contact support with the exact model.

Q: Can I change the language?

A: Yes. Turn off "Use system Language" in Settings and select one of the available languages. See Chapter 9.1.

16. Glossary

A short reference for the technical terms used in this manual and throughout the app.

Term	Definition
Ah (ampere-hour)	Unit of electric charge. A 100 Ah battery can deliver 100 A for one hour, 10 A for ten hours, and so on.
Balancing	The process of equalising the voltage of individual cells in a series string, so the pack as a whole can be charged and discharged fully.
BLE	Bluetooth Low Energy. The wireless protocol used by the BMS to communicate with the app.
BMS	Battery Management System. The electronic circuit that monitors and protects a lithium battery pack.
Cell	The smallest unit of a battery. Lithium cells typically have a nominal voltage between 2.3 V (LTO), 3.2 V (LiFePO4) and 3.7 V (Li-Ion NMC).
Cell delta	The voltage difference between the highest and the lowest cell in the pack. A small delta indicates good balancing.
CSV	Comma-Separated Values. A plain-text file format used by SmartBMS Utility to export logging data.
Cycle	One full charge and discharge of the battery. Manufacturers rate battery life in cycles.
Daly	Chinese BMS manufacturer. One of the two BMS families currently supported by SmartBMS Utility.
Discharge	Current flowing out of the battery into a load.
Dongle	In the context of this app, a small Bluetooth module that plugs into the BMS and converts its serial output into BLE messages.
JBD	Chinese BMS manufacturer (also known as Jiabaida). The second BMS family supported by SmartBMS Utility. Many re-branded JBD BMS exist under names such as Overkill Solar, Heltec, or LLT Power.
LFP / LiFePO4	Lithium Iron Phosphate battery chemistry. Very safe and long-lived; nominal voltage 3.2 V per cell.
Li-Ion	Umbrella term for lithium-ion chemistries, typically NMC or NCA. Higher energy density than LFP; nominal voltage 3.6–3.7 V.
LTO	Lithium Titanate. Very long cycle life and wide temperature range but lower energy density; nominal voltage 2.3 V per cell.
MOSFET	Metal-Oxide-Semiconductor Field-Effect Transistor. The electronic switch used by the BMS to connect or disconnect the charge and discharge paths.
Nominal capacity	The design capacity of the battery, expressed in Ah.

Term	Definition
Parallel (P)	Connection of cells or strings that adds capacity while keeping the voltage constant.
Pack	The complete battery assembly including cells, BMS, connections, and housing.
Polling	Periodic requesting of data by the app from the BMS.
Protection	An action taken by the BMS to prevent damage — typically opening a MOSFET.
Remaining capacity	The amount of charge still available in the pack, in Ah.
RSOC	Relative State Of Charge. The SOC expressed as a percentage of the current usable capacity.
Series (S)	Connection of cells that adds voltages. A 4S pack has four cells in series.
SOC	State of Charge. The amount of charge remaining in the pack, usually expressed as a percentage.
UART	Universal Asynchronous Receiver / Transmitter. The serial communication protocol used by the BMS internally.



17. Support and feedback

If you have questions, bug reports, or suggestions, please reach out through any of the following channels:

- **Website:** smartbmsutility.com
- **In-app feedback form:** Settings → Help icon → Feedback.
- **App store reviews:** ratings help other users find the app and tell us what works.

When reporting a bug, please include:

- Platform and OS version (for example: iPhone 14, iOS 17.4).
- App version (shown at the bottom of the Settings screen).
- BMS manufacturer and model.
- A short description of what you did, what you expected, and what actually happened.
- Screenshots or CSV exports if relevant.

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— End of Manual —