

User Manual

Traction Bull Bloc Lithium
12V Serie LFP



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1. LFP Series

Powerful & Versatile

The LFP series uses high-quality LiFePO_4 battery cells in combination with a high-performance battery management system (BMS). With an IP65 protection rating and the capability for series and parallel connection, it is an ideal solution for leisure, recreational, and solar applications such as compact energy storage systems, marine applications, recreational vehicles (RV), tiny houses, and similar applications.

The integrated BMS in the battery monitors and analyzes cell voltage, temperature, and current in real time. It provides comprehensive protection, including overvoltage, undervoltage, overtemperature, under-temperature, and short-circuit protection, as well as an integrated cell balancing function.



2. Product Specifications

		LFP 12-50 BL	LFP 12-75 BL	LFP 12-80 BL	LFP 12-100 BL	LFP 12-150 BL
Voltage [V]		12,8	12,8	12,8	12,8	12,8
Capacity [Ah]		50	75	80	100	150
Energy [Wh]		640	960	1024	1280	1920
Dimensions [mm]	Length	257	260	279	315	330
	Width	133	169	175	175	171
	Height	200	210	189	189	215
	max. Height	205	215	189	189	220
Terminal Type		M8	M8	Round Terminal 1	Round Terminal 1	M8

3. Performance Features

- High-precision voltage measurement with a resolution of 2 mV
- Configurable BMS functions and parameters
- Smart cell balancing management
- Comprehensive protection against overcharge, deep discharge, overtemperature, and short circuit
- The BMS supports series, parallel, and series/parallel configurations of up to 4 batteries
- Maximum system configuration: 4 in series and 4 in parallel

4. Installation

Instructions

4.1. Preparation

Read all safety instructions in this document carefully before installation. If you have any questions regarding the operation or the safe use of the battery system, contact technical support immediately.

Prerequisites Before Commissioning

- All work must be carried out exclusively by qualified electricians.
- Remove all metallic objects (e.g. jewelry, watches, pens) before starting work.
- For safety reasons, completely disconnect the battery pack from the system before wiring.
- Always ensure correct polarity of the battery terminals.
- Ensure that all installation tools are properly insulated and used according to specifications.
- Strictly follow the markings on the battery terminals as well as the system wiring diagram (Section 4.3).
- Never plug or unplug connectors while the battery is energized.
- Any required work must only be performed after the power supply has been completely disconnected.
- Before commissioning, ensure that all cable connections are correctly connected and firmly tightened.
- Install an external fuse that matches the system according to the technical specifications.
- Perform measurements with the utmost care to avoid short circuits and other accidents.
- Unauthorized opening or disassembly of the battery is strictly prohibited.
- Disassembly may only be carried out by service technicians authorized by the manufacturer.

4.2. Installation Tools

The use of suitable tools is essential for the safe and compliant installation of lithium battery systems.

The tools listed below support proper installation, ensure compliance with specified tightening torques, and enable electrical verification prior to commissioning. This minimizes installation errors, increases operational safety, and ensures the long-term reliability of the system.

Tip: Before installation, ensure that no hazardous live currents can flow (e.g. by disconnecting cables, covering the terminals, or removing connectors) and that appropriate short-circuit protection measures have been taken. Only insulated tools must be used.



Torque Wrench

Used to ensure the specified tightening torques are applied to the terminal connections. This prevents increased contact resistance and thermal overload caused by loose connections.



Phillips screwdriver

Used for the mechanical fastening of screw terminals (M6, M8, etc.).



Multimeter

Used to validate the open-circuit voltage and verify correct polarity before closing the electrical circuit.



Insulated gloves

Personal protective equipment (PPE) in accordance with applicable standards, used to protect against electric shock when working on live components.

4.3. Battery Configuration

It is permissible to connect multiple 12V LiFePO₄ battery packs in series or parallel to increase the total voltage or total capacity respectively. Each battery pack has its own BMS and there is no master BMS. The packs therefore operate as independent units within the system. TIPP: An external shunt could be used to monitor the Voltage and Current status on the system level.

For safe and reliable operation, the following points must be strictly observed when connecting batteries in series or parallel:

- Use identical batteries: same type, same voltage (± 20 mV), and the same state of charge (SoC) before connection.
- Ensure symmetrical wiring: identical cable lengths and cross-sections for uniform current distribution.
- Purchase batteries within a short time frame (preferably within one month).

4.3.1. Three Essential Steps Before Connection

Step 1

Charge each battery individually to full capacity using the IUa charging profile to achieve a good voltage and capacity balance between the battery packs.

Step 2

Place the fully charged batteries close to each other (disconnected) and allow them to rest for 12–24 hours to achieve thermal and electrical equalization.

Step 3

After this resting period, connect the batteries sequentially in series. Once the series connection is complete, the series strings can be connected in parallel.

A well-balanced system is essential for performance, safety, and service life. Significant imbalances lead to uneven loading and accelerated aging of individual battery packs.

4.3.2. Regular Monitoring of Connected Battery Packs

I. Check voltages regularly

- Monitor the voltages of the individual battery packs during operation.
- Possible tools: Banner BMS app, digital multimeter.
- Objective: To keep voltage differences between the packs as low as possible.

II. Evaluate deviations

- Check whether the voltage differences are within the normal range.
- Note: A voltage difference of 100–200 mV between connected battery packs is considered significant and indicates an imbalance.

III. In case of significant deviations:

Disconnect the system

- Switch off the entire battery system.
- Disconnect all battery packs completely from each other.
- Charge each battery pack individually to full capacity before reconnecting the system.
- Use an IUa charging profile (CC–CV) for LiFePO₄ batteries.

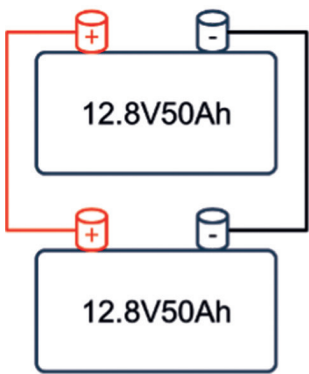
IV. Reconnect and test the system

- Then follow the steps described in Section 4.3.1.

By following the recommendations above, an efficient system operation of the connected battery packs can be maintained.

4.3.3. Connection Methods for Two Battery Packs

Using the example of 12.8 V / 50 Ah; the same method applies to other models.

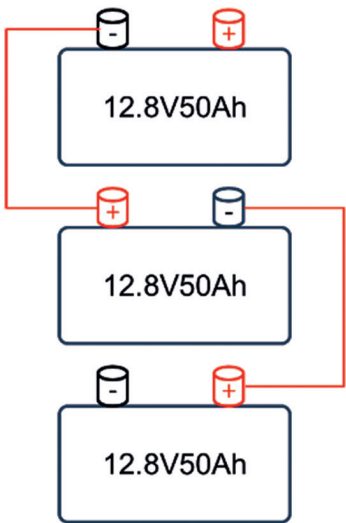
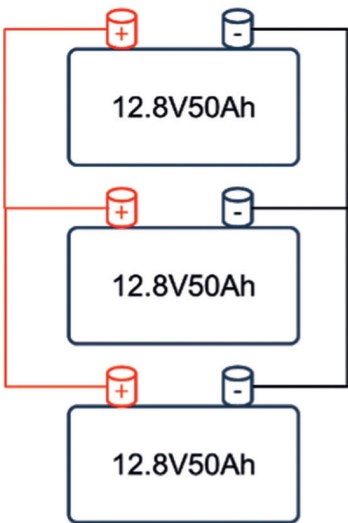


Parallel Connection [Capacity increase: 12.8V / 100 Ah]	
Recommended charging voltage	13.8 V
Overvoltage protection	14.6 V
Undervoltage protection	10.0 V

Series Connection [Voltage increase: 25.6V / 50 Ah]	
Recommended charging voltage	27.6 V
Overvoltage protection	29.2 V
Undervoltage protection	20.0 V

4.3.4 Connection Methods for Three Battery Packs

Using the example of 12.8 V / 50 Ah; the same method applies to other models.



Parallel Connection [Capacity increase: 12.8V / 150 Ah]	
Recommended charging voltage	13.8 V
Overvoltage protection	14.6 V
Undervoltage protection	10.0 V

Series Connection [Voltage increase: 38.4V / 50 Ah]	
Recommended charging voltage	41.4 V
Overvoltage protection	43.8 V
Undervoltage protection	30.0 V

5. Important

Performance Notes

- The charging current must not exceed the maximum value specified in the Technical Data Sheet. Exceeding the recommended charging current may result in damage or premature aging of the battery.
- The discharge current must not exceed the maximum value specified in the Technical Data Sheet. Excessive discharge current can permanently damage the battery.
- Disassembly of the battery by unqualified personnel is prohibited.
- Connect the charger to the battery correctly: connect the red cable to the positive terminal and the black cable to the ground point or negative terminal of the battery.
- The battery pack must not be used or stored in high-temperature environments, as this may lead to overheating, malfunction, or reduced service life.
- When not in use, store the battery in a dry, cool, and frost-free environment. Immersion in water is strictly prohibited.
- Installation or removal of the battery during operation (e.g. while charging or discharging) is strictly prohibited.
- For optimal performance, charge a single battery fully. Failure to do so may prevent the battery from reaching its full usable capacity.
- Inspection intervals: Inspect operational batteries once per month if they are not recharged after use. Batteries stored long-term must be checked every 3-5 months.
- Storage conditions: Charging during storage is required if the open-circuit voltage falls below 12.8 V per block (3.2 V per cell). Long-term stored batteries must be maintained at a state of charge between 60 % and 80 %. Batteries in operation may be fully charged using the IUa charging profile.

Note 1**Battery Recovery After Activation of Deep Discharge Protection**

If the battery's deep discharge protection has been activated, normal operation can be restored using one of the following methods:

- 1. Battery rest period:** Allow the battery to rest for 15–20 minutes. The protection mode will deactivate automatically afterwards.
- 2. Charging with a suitable charger:** Use a charger equipped with overvoltage protection (OV). After the battery has been fully charged, it will be fully operational again.
- 3. Recovery during solar operation:** Ensure that the charge controller is set to lithium battery charging mode to enable recovery.

Note 2

Charge Controller Settings (When Using the Load Output)

- When using a charge controller with an integrated load output (e.g. in solar applications), correct parameter configuration is essential for safe and reliable operation.
- If a load is continuously supplied via the controller, the battery may slowly discharge. In this case, if the voltage drops below the minimum threshold, the battery's internal BMS may activate protection mode (shutdown). Depending on the system, an automatic restart is not always guaranteed afterwards.
- To prevent this, the shutdown limits of the charge controller should be intentionally set above the BMS protection limits, allowing the controller to disconnect the load early.

Recommended Settings for 1 2.8V LiFePO ₄ Blocks	
End-of-charge voltage	14.4 V
Return voltage after full charge	13.8-14.0 V
Deep discharge protection (load disconnect)	11.0-11.5 V
Reconnect voltage (load reconnect)	12.0-12.5 V

Correct configuration of the charge controller ensures that its protection functions are triggered before the battery's BMS protection functions, which helps extend the service life of the battery.

6. Bluetooth-App

Banner BMS

For efficient monitoring of your energy storage system, the LFP series features an integrated Bluetooth interface. This enables wireless communication between the battery management system (BMS) and your end device for the visualization of all relevant operating parameters in real time.

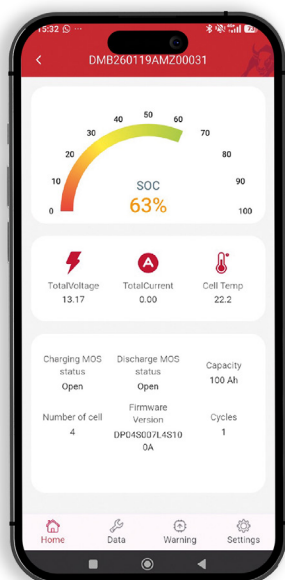
By using the dedicated app, you receive precise diagnostic data and full transparency of the system status without requiring direct physical access to the battery.

Overview of monitored parameters:

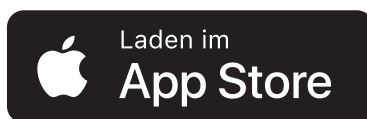
- State of Charge (SoC): Current state of charge in percentage.
- Cell voltage: Individual cell display for monitoring cell balancing.
- Energy flow: Real-time monitoring of charging and discharging currents.
- Temperature status: Monitoring of internal sensors for thermal protection.
- Cycle counter: Analysis of previous service life and battery health (State of Health).

6.1. Download Bluetooth-App

For access to real-time diagnostics, the corresponding monitoring app is available for downloading for both iOS and Android from the respective app stores.

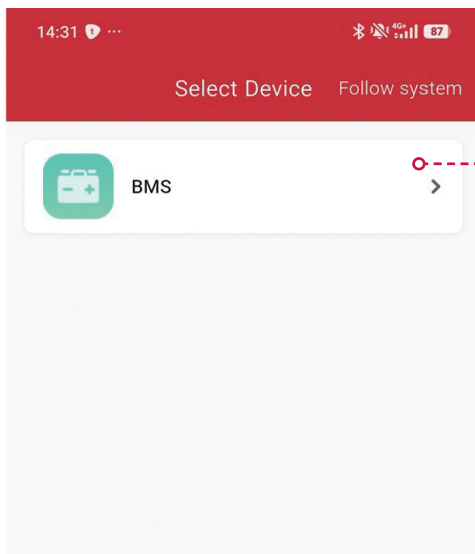


Search the store for "Banner BMS" or use the QR code below for a direct link to the installation page:



6.2. Login App

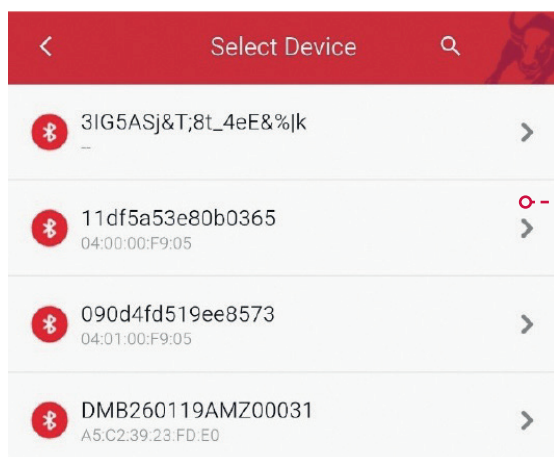
After successfully installing the app, launch it and grant permission for Bluetooth and location access. Then select the desired language (see figure below).



Click the arrow to display the list of nearby Bluetooth devices.

6.3. Battery Connection

After successful login, the app automatically switches to the Bluetooth device list. Enter the Bluetooth number printed on the battery housing to establish a connection. For multiple batteries, you can quickly find the target battery by searching for its Bluetooth name. Complete the device pairing process once the connection has been successfully established.



List of available nearby Bluetooth devices.
Select your battery ID.

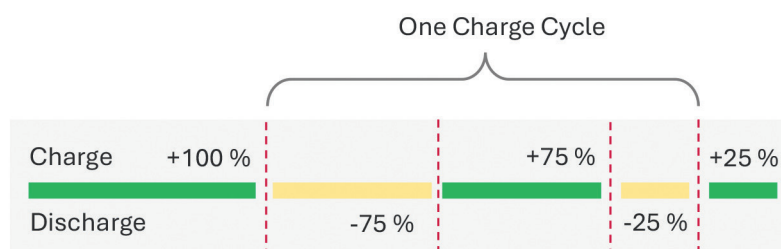
6.4. Real-Time Interface

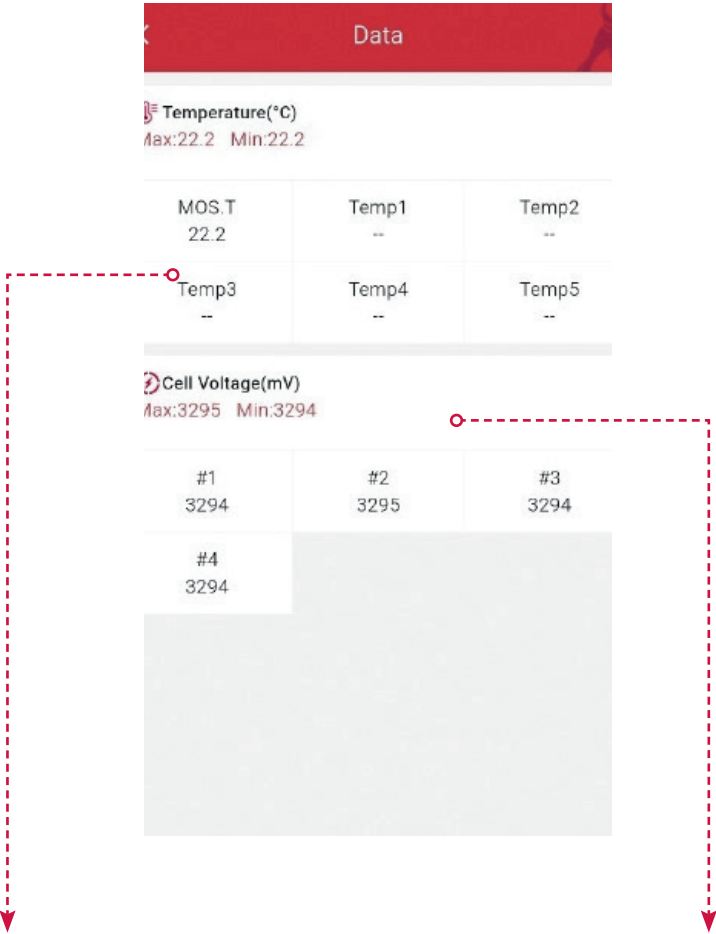
Tap the real-time interface icon in the center of the screen to display the following battery data. The interface enables real-time monitoring of all battery status information, as shown in the figure below.



The discharge current is displayed as a negative value, while the charging current is displayed as a positive value. For example, a charging current of 5 A is shown as +5 A, whereas a discharge current of 5 A is shown as -5 A.

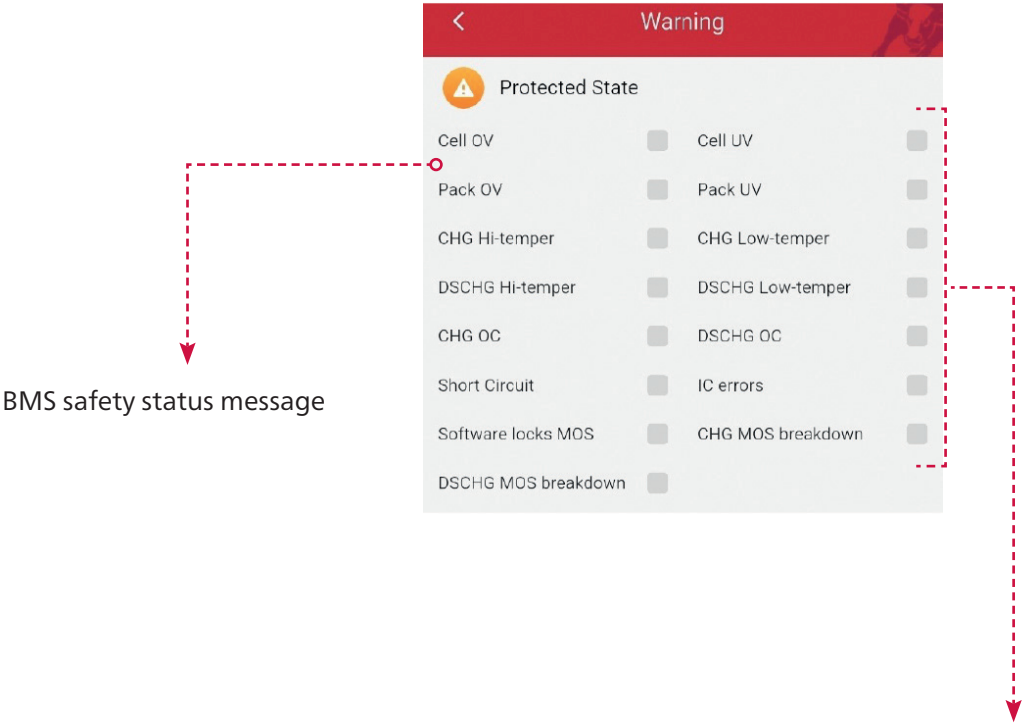
If the cumulative discharged capacity exceeds the configured cycle capacity, the cycle count is automatically increased by one. This measurement is not affected by charging the battery.



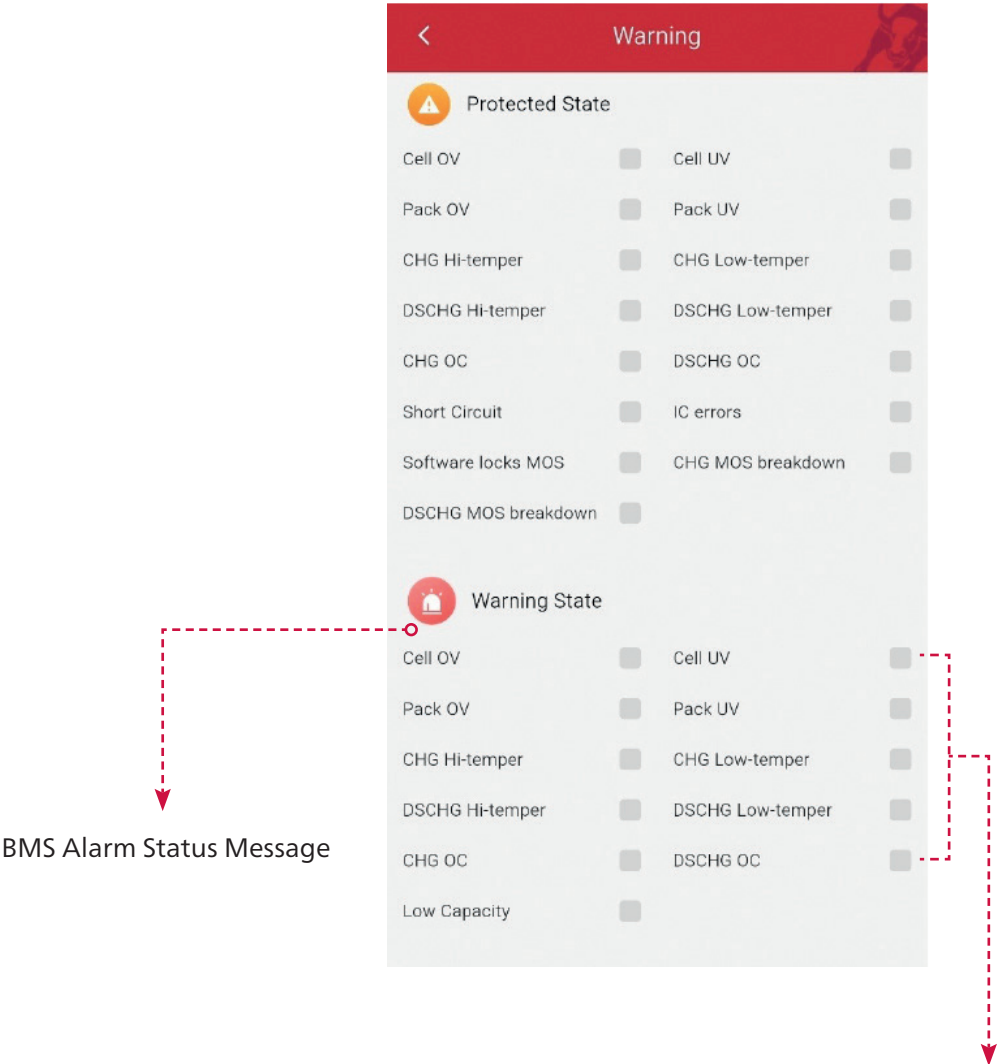


Display of the internal battery temperature.

The data show the minimum and maximum voltage of the battery cells.



Protection Status (Shutdown Triggered by the BMS)			
Cell OV	Overvoltage protection of an individual cell	Cell UV	Undervoltage protection of an individual cell
Pack OV	Overvoltage protection of the entire battery pack	Pack UV	Undervoltage protection of the entire battery pack
CHG Hi-temper	Overtemperature protection during charging	CHG Low temper	Under-temperature protection during charging
DSCHG Hi-temper	Overtemperature protection during discharging	DSCHG OC	Overcurrent protection during discharging
DSCHG Low-temper	Under-temperature protection during discharging	CHG OC	Overcurrent protection during charging
Short Circuit	Short circuit detected – the battery is shut down immediately	IC errors	Fault in the BMS controller / IC
Software locks MOS	MOSFETs are locked (charging/ discharging disabled)	CHG MOS breakdown	Fault of the MOSFET in the charging path
DSCHG MOS breakdown	Fault of the MOSFET in the discharge path		



Alarm status (Warning – no shutdown yet)

Cell OV	Warning: cell voltage too high	Cell UV	Warning: cell voltage too low
Pack OV	Warning: total battery pack voltage too high	Pack UV	Warning: total battery pack voltage too low
CHG Hi-temper	Warning: temperature too high during charging	CHG Low-temper	Warning: temperature too low during charging
DSCHG Hi-temper	Warning: temperature too high during discharging	DSCHG Low-temper	Warning: temperature too low during discharging
CHG OC	Warning: Overcurrent protection during charging	Low Capacity	Warning: Low-capacity value reached
DSCHG OC	Warning: Overcurrent protection during discharging		

7. Recycling of Used Batteries

General Rules (All Countries)

- Never dispose of LiFePO_4 batteries in household or commercial waste.
- Always fully discharge batteries and insulate at least the positive terminal with insulating power tape to prevent short circuits.
- Dispose of packaging materials separately via local recycling channels.



Austria (AT)

Used batteries must be collected separately and returned to municipal collection points or to manufacturer designated take-back locations.
[bmluk.gv.at]

The legal basis is the Battery Ordinance (BGBl. II No. 159/2008) and, as of August 18, 2025, the EU Battery Regulation 2023/1542.
[ris.bka.gv.at]

The objective is separate collection and a high recycling rate; disposal of residual waste is prohibited [ris.bka.gv.at].

Switzerland (CH)

There is a statutory return obligation for consumers and a take back obligation for retailers. Batteries can be returned free of charge wherever they are sold [swissrecycle.ch], [bafu.admin.ch].

Used batteries are classified as hazardous waste and must be disposed of separately [bafu.admin.ch]

The recycling costs are already included in the purchase price through the advance recycling fee (vorgezogene Entsorgungsgebühr (VEG)) [swissrecycle.ch].

Germany (DE)

Used batteries must not be disposed of in household waste; returning them to collection points or the manufacturer is mandatory. Legal basis: BattG (Batteriegesetz.de) and ElektroG (Elektro- und Elektronikgerätegesetz).

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