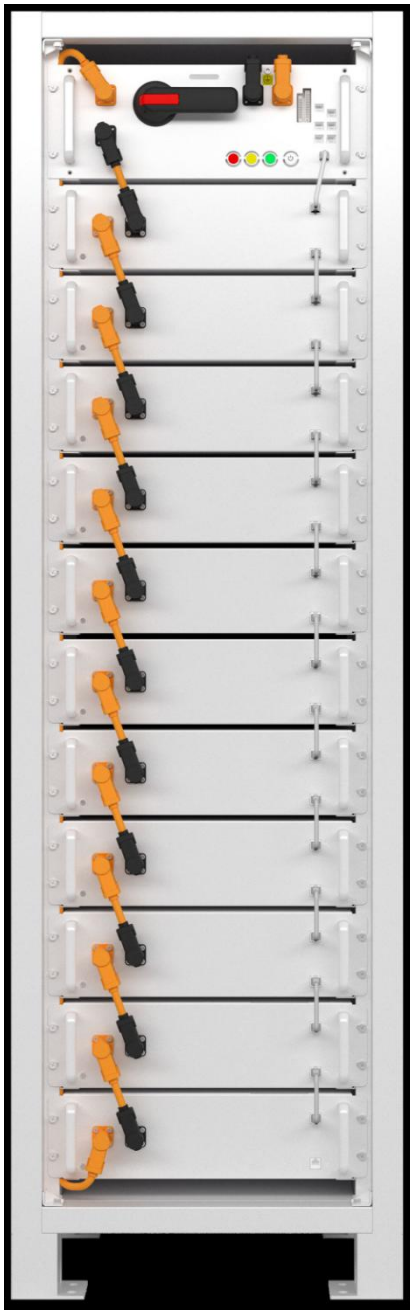
BATTERY-MAX LITEIN Service Manual

LITEIN 30.0/ 37.5/ 45.0/ 52.5/ 60.0/ 67.5/ 75.0/ 82.5

Version 1.0



Always make sure to use the latest version of this service manual, available at: https://bydbatterybox.com

Content

1. Overview

This manual is subject to technical revisions, and no responsibility is accepted for the accuracy of this manual.

Before contacting the service team, please read this manual to try to solve the problem. If the problem remains, please contact BYD service team.

Attention: High Voltage! Improper handling can cause danger and damage.

Important Note: The installation and all other kinds of works or measurements in correlation with the battery are only allowed by professional and qualified personnel.

1.1. Claim and Contact

If after completing the inspection with the steps described in this manual or under the guidance of the service team, it is confirmed that there could be a part failure that needs to be resolved by replacement.

If the appearance of the product is damaged, please take photos of the product and the packaging on site and provide them to the service team.

The contact information for the service team is as follows:

Africa BYD Global Service
Email bboxservice@byd.com
Telephone +86 755 89888888- 47175 (CN)
Address No.3009, BYD Road, Pingshan, Shenzhen, 5118118, P.R. China
Website www.bydbatterybox.com / www.bydenergy.com

1.2. General Steps

If there is any problem of the battery system, please follow the steps for an initial check.

No.	Inspection items	Inspection steps
1	Settings	Check if the settings are correct. Refer to the latest “BATTERY-MAX LITEIN Operating Manual” or “BATTERY-MAX LITEIN Quick Start Guide”, available at: https://bydbatterybox.com. Make sure the inverter is configured correctly.
2	External connections	1) Please check if the wrong port is plugged in; 2) Check whether the cable is loose; 3) Check the cable itself for any problems.
3	Latest Firmware	Check if the firmware is latest, if not, please use the BCP to update it.
4	Restart	**Note: It is important that the battery system is switched on before the inverter! Otherwise, the PDU might not start and not show any reaction (e.g., no Wi-Fi).** (mind the sequence) 1) Switch off the inverter; 2) Switch off the air switch on the PDU 3) Press the button on the PDU for 5 seconds 4) Rotate the handle switch 90° counterclockwise； 5) Wait at least 3 minutes; 6) Rotate the handle switch 90° clockwise; 7) Press the button on the PDU for 3 seconds 8) Switch on the air switch on the PDU 9) Turn on the inverter.
5	Checking the correct operation	The system runs properly if : - Inverter displays battery SOC correctly; - System charges/discharges. **Note: If you can not complete the commissioning, then turn off the battery before you leave the site. If it is not possible, remove the PDU and then close the PDU. After that, contact the service team.**

2. Error Analysis

If a fault occurs, the red LED on the PDU will light up.

If there is an alarm but it has not yet failed, the yellow LED on the PDU will light up.

If the battery is functioning properly, the green LED on the PDU stays on and the yellow LED and red LED go off.

2.1. System cannot be turned on

1) PDU shows no reaction.

a. If you are commissioning the battery, but Wi-Fi is not detected and the LED on the PDU does not turn on, please try to restart the system in the correct sequence (refer to Step 4 in **1.2**).

b. If the problem remains, please refer to **4.3** to check the voltage. If the voltage is normal, replace the PDU

c. If the voltage is abnormal, please refer to the events on BCP to identify the faulty module.

2) The relay is heard to trip immediately after battery is powered on.

No.	Inspection items	Inspection steps
1	Wiring	1) Switch off the inverter and battery, disconnect all external cables and restart the battery in the correct sequence. 2) If it works, check if the inverter is short-circuited; If the problem remains, proceed to the next step.
2	Voltage	Refer to **4.3** for the voltage check: 1) If the voltage is abnormal, identify the faulty module referring to **the events on BCP**. 2) If the voltage is normal, replace the PDU

2.2. LED is red or off after a period of operation

Restart the system in the correct order:

1) If successful:

a. If events appear on the BCP, please refer to Appendix 1 for more details.

b. If not, please download the logs and send them to BYD service team. Repair under the guidance of the service team.

(Sporadic alarms can be difficult to detect because they only occur occasionally. Therefore, it is very important to download and provide all historical battery log files available to find the root cause.)

2) If failed: Refer to **2.1**.

3. Frequently Asked Questions

3.1. WiFi Issues

Common WiFi failures: no Wi-Fi signal / unstable WiFi / unable to connect to WiFi.

When these failures occur, follow the steps below:

1) Disconnect LAN cable

Remove the LAN cable when your device is connecting to the Wi-Fi. After that you can connect it again to the Internet.

2) Try other mobile devices

Sometimes the problem comes from the mobile device itself, try to see if other mobile devices can connect to the Wi-Fi.

3) Reset the WiFi

Press the button on the PDU once one second for WiFi reset

4) Restart the system

Restart the system in the correct sequence (refer to Step 4 in **1.2**).

5) Replace WiFi unit

If none of the steps above work, please replace the WiFi unit on PDU.

3.2. Firmware Update Issue

1) Fix WiFi

If it is caused by unstable WiFi, please refer to 3.1.

2) Restart

Restart the system in the correct sequence.

3) Try again with other devices.

Sometimes the problem comes from the mobile device itself, try to see if other devices can update.

4) Replace the PDU

If none of the above steps work, please replace the PDU

3.3. Changes in SOC

1) SOC jumps

The SOC of a battery cannot be measured. It is an estimated value. In general, the state of charge (SOC) of a battery is estimated using the voltage, but other factors such as temperature, current flow and charging behavior also play a role. The calculation of the SOC is generally more precise if the battery regularly sees full cycles. It is normal to have a SOC correction/calibration now and then.

2) SOC at commissioning

New modules have 30% SOC upon delivery. A new PDU might show a different SOC at the beginning (mostly 30%). However, this is only to be understood as a placeholder value, as a new PDU cannot measure the SOC of modules. As soon as the system starts to run (charge/discharge), the SOC is corrected gradually. The SOC calibration is completed after the latest full cycle.

4. Tools and Methods

4.1. BCP（For LITE/LITEIN）

With the BCP you can:

1) read the battery information;

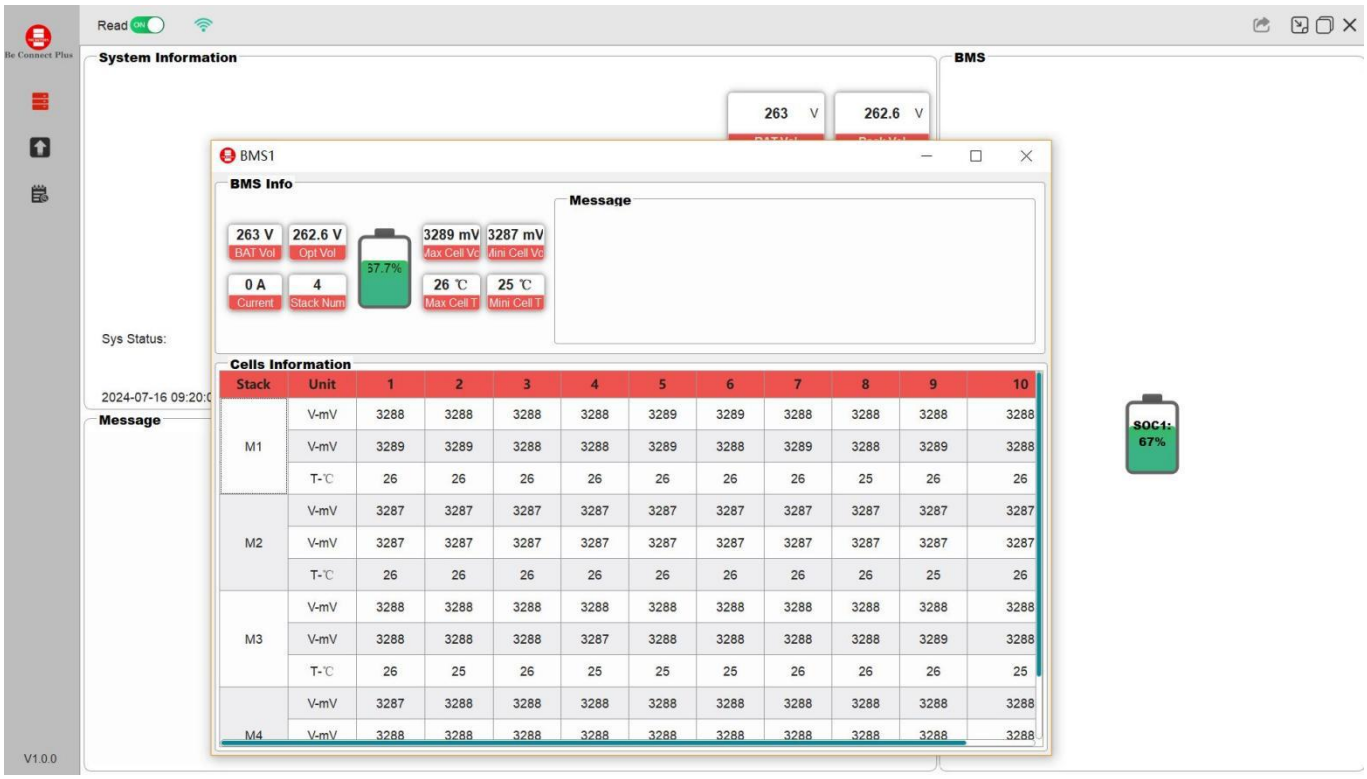
2) update firmware;

3) export / download battery logs.

The BCP is constantly being improved and updated. Make sure to use the latest program version.

For the service analysis, please download and provide the data / logs as described in the program instructions.

Note: You need a Windows computer that can connect to the battery WiFi.



Stack	Unit	1	2	3	4	5	6	7	8	9	10
M1	V-mV	3288	3288	3288	3288	3289	3289	3288	3288	3288	3288
	V-mV	3289	3289	3288	3288	3289	3288	3289	3288	3289	3288
	T-℃	26	26	26	26	26	26	26	25	26	26
M2	V-mV	3287	3287	3287	3287	3287	3287	3287	3287	3287	3287
	V-mV	3287	3287	3287	3287	3287	3287	3287	3287	3287	3287
	T-℃	26	26	26	26	26	26	26	26	25	26
M3	V-mV	3288	3288	3288	3288	3288	3288	3288	3288	3288	3288
	V-mV	3288	3288	3288	3287	3288	3288	3288	3288	3289	3288
	T-℃	26	25	26	25	25	25	26	26	26	25
M4	V-mV	3287	3288	3288	3288	3288	3288	3288	3288	3288	3288
	V-mV	3288	3288	3288	3288	3288	3288	3288	3288	3288	3288

4.2. Faulty module identification

4.2.1. Single Module Failure

When a module failure occurs, you can view the number of the failed module through BCP.

4.2.2. Communication failure between modules

When the BCP indicates that a communication failure has occurred between modules, there may be a communication failure in this module or in the module below it.

Try removing both modules separately to determine the which is fault. If the BCP shows that module 1 has a communication failure, it may be caused by PDU or module 1. You can remove module 1 and restart the system to check whether the system can operate normally, if not, please try another PDU.

4.2.3. Voltage Measurement

ATTENTION: High voltage!

You can see the max./min. cell voltage in the BCP. You can also get the detailed voltage of the modules and cells in the BCP or measure it manually according to the below description:

Measurement of Tower Voltage

Disconnect the PDU and measure the tower voltage between the P+ and P- for PDU.

B+ and B- of tower voltage

Measurement of tower voltage

Measurement of Module Voltage

Note: The nominal voltage for per module is 64.8V~88.8V

Individual module measurement

If the measured voltage of the tower deviates from the nominal value, please check the voltage of the individual modules

4.2.4. Under-voltage

A module in which one of the cells has a voltage of <1.5 V is in over-charged (check with BCP if possible).

A LITEIN module with >64.8 V should be fine and you can continue to check other points according to the service manual. Always make sure the version of firmware is the latest! If the module voltage is <64.8 but the single cell voltage is >1.5 V, the battery needs to be charged as soon as possible.

If only one module is in under-voltage: remove that module and try to start the system without it (if the number of the remaining modules still meets the minimum module number requirement). Otherwise, make sure to avoid further discharge (e.g., remove PDU)

If more than one, or all modules are in under-voltage: Contact the service team and make sure to avoid any further discharge of the battery (e.g remove PDU from the system)

When contacting the service team, make sure to fill the service checklist completely and add the following information:

1) Serial Numbers of the PDU and all (affected) modules;

2) Tower voltage and individual module voltages of all modules (related to Serial Number)

3) Detailed description of how and why the system reached under-voltage if known. Information of when the system was installed and commissioned and in which circumstance and when the under-voltage occurred. If the battery was never running before: Why did it never work before, and what was the status of the battery when the battery was left (on / off / Display).

4) If possible: Logs from the battery using BCP showing the cell voltages and Initial Firmware Version of the Battery when under-voltage occurs.

Appendix 1 Event and Operation

Events	Possible Cause	Operation
No.# Module Failures	Failure within the modules	The number in front of '#' represents the number of the faulty module, please replace the faulty module corresponding to the number.
Over current occurs in charging/ discharging	1) The charging/discharging power is too high and the inverter fails to limit the charging/discharging current in time. 2) PDU fault.	1) Check whether there is a high-power load starts when this fault occurs. If yes, check whether the load power is within the power range of the inverter: a) If yes, reduce the loads to ensure that the power is within the range. b) If not, please also contact the inverter service; If not, proceed to the next step. 2) Restart, if the problem remains, replace the PDU
Over/under temperature in charging/discharging	1) Ambient temperature too high/ low 2) PDU fault	1) Determine if the ambient temperature is suitable for battery operation 2) Restart, if the problem remains, replace the PDU

Events	Possible Cause	Operation
Memory Abnormal	Memory chipset fault.	Restart, if the problem remains, replace the PDU
Communications failure between modules	Single or multiple modules are not recognized	Please refer to **4.2.2** for processing
Pack V-sensor failed	Battery voltage is too different from the output voltage	1) Disconnect external connections. 2) Restart, if the problem remains, check if the fuse in the PDU is blown. 3) If the fuse is normal, replace the PDU
Current sensor failed	1) When the SOC is 0% or 100%, there is still discharge/charge current in the system. 2) Current value exceeds system limit.	Restart, if the problem remains, replace the PDU (If it's possible, observe the current value on the BCP and on the inverter during charging or discharging the battery, and record the results for feedback to BYD service team).

Events	Possible Cause	Operation
Relay failed	Positive or negative relay disconnected	Restart, if the problem remains, replace the PDU
Failure to start pre-charge	The voltage between P+ and P- of the PDU is 0 1) DC connection faults 2) Inverter DC side short circuit 3) PDU main circuit failure	1) Check whether the power cable connection is correct (if correct, proceed to the next step; if incorrect, then connect the power cable correctly). 2) Check whether there is a high-power load starts when this fault is reported. If yes, check whether the load power is within the power range of the inverter: a) If yes, stop using some loads to ensure that the power is within the range. b) If not, please also contact the inverter service; If not, proceed to the next step. 3) Restart, if the problem remains, replace the PDU
Parameter Abnormal	1) Data loss when loading parameters 2) BMU failure	1) Check if the settings are correct. 2) Restart. 3) Use BCP to update the firmware and restart again. 4) If this is a parallel system, replace the communication cable between the PDU. 5) If the problem remains, replace the PDU

Events	Possible Cause	Operation
Incorrect module number	1) The number of setting modules is different from the actual number installed 2) Different amounts of modules in parallel system	1) Check if the settings are correct. 2) Make sure that the amount of modules in the parallel system is the same 3) If the problem remains, replace the PDU
Internal communication failure	1) Internal CAN communication fault. 2) BMU and BMS communication failure 3) Communication interface failure 4) Address assignment failure	1) Check if the terminal resistor is normal 2) Check whether the communication cable is faulty. 3) For a single tower system, replace the PDU 4) For multiple tower systems, separate them into single towers, and follow the instructions according to the events on each display. If there are no events on each display, but this event remains after connecting all the towers, check whether the RJ45 ports have mechanical damage.

Events	Possible Cause	Operation
Communication failure with the inverter	1) Inverter not matched 2) Communication cable failure between battery and inverter 3) Wrong type of battery/inverter is set	1) Check the settings: If the Terminal Res is normal. Default Set 2) Check the connection Does the inverter properly detect the battery? Check if the inverter detects the battery parameters (e.g., SOC, battery temperature) correctly. If not, check the cabling, especially the pin definition. 3) Restart in the correct order. 4) If none of the above work, replace the PDU
Pre-charge not completed	1) Inverter failure that prevents the battery from pre-charging it 2) PDU fault	1) Restart 2) If the problem remains, turn off the battery and disconnect all the power cables from the inverter, black start through the LCD. a) If the problem remains, replace the PDU; b) If the problem disappears, check the connection of power cables between the battery and the inverter.
Update Failed	1) Data loss during update 2) BCP fault 3) PDU fault	1) Restart. 2) Re-download BCP or use another device，update the firmware again and restart. 3) If the problem remains, replace the PDU

Events	Possible Cause	Operation
DC switch abnormal	Hand switch abnormal	Restart, if the problem remains, replace the PDU
Fire Alarm	1) Smoke or overheating is detected in the PDU 2) A fire has been detected in the battery PDU.	For Cause 1 1) Send trainedpersonnel to the site and observe thesystem for 30 minutes from a safedistance. If there is smoke or fire,remotely power off the system,evacuate the onsite personnel as soonas possible, and call the fireemergency number. 2) If no exception is found during observation, manually clear the alarm remotely by restart the system. If the alarm persists, contact BYD service. For Cause 2 Do not open the PDU doors. Evacuate onsite personnel. Contact BYD service
Insulation failures	1) Ground cable not connected 2) Ground cable fault 3) Module Leakage 4) PDU leakage	1) Check the ground cable (ground cable of battery and inverter should be connected separately) 2) Restart, if the problem remains, replace the PDU If the problem still remains, find the faulty module by BCP or exclusionary method
Chip Function Alarm	Chip running lagging	Restart, if the problem remains, replace the PDU