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1. Product Overview

EB240 is a EV battery cell equalizer developed by Smartsafe, mainly used to balance the voltage between cells of new energy vehicle battery packs with excessive voltage difference, so as to improve battery performance and extend the life of battery pack. This product mainly achieves independent balancing control for each connected battery cell, using low voltage and low current, and accurately configuring the connected battery cells to the same voltage level according to the voltage target set by the user.

1.1 Product Features

- Adopt the latest equalizing maintenance technology and avoid the interference to BMS (Battery Management System), EB240 is designed for lithium battery pack daily discharge, charge, and equalizing maintenance.
- Based on wide voltage range design, EB240 can be applied to lithium battery packs testing with various voltage levels.
- Voltage and temperature monitoring and protection during test can prevent over-charge and over-discharge.
- Multiple discharge auto-stop conditions make testing mode more intelligent and flexible, and avoid over-charge and over-discharge.
- Intelligent equalizing function based on each cell voltage monitoring and equalizing charge.
- Support equalizing maintenance parameter customization.
- Support multiple protection design and alarm settings of voltage, current, temperature abnormal to protect the battery and the balancer.
- Support functions such as overvoltage, undervoltage, overcurrent, output short circuit, anti-reverse protection and overheating protection.
- Adopt wave width modulation technology, high efficiency, high power factor, low noise, low electromagnetic interference.
- 10.1-inch touch screen, easy to operate.

1.2 Main Function and Test Range

Mainly used for lithium battery pack charge & discharge test and equalizing maintenance, suitable for various voltage levels.

1.3 System Components

The device consists of main unit and equalizing cables. The main unit includes color display screen, data processing unit, data monitoring unit, auxiliary power unit, power consuming unit, and panel operation unit.

1.4 Working Conditions

NO CORROSIVE, NO EXPLOSIVE, NO ELECTRICAL BREAKDOWN AIR OR CONDUCTIVE DUST.

1.5 Environment & Energy Impact

Placed in a dry storage room, temperature: -20℃ ~ 70℃, humidity: 10% ~ 93%.

2. Precautions for Safe Use

2.1 General Rule

Please follow the user manual to use this balancer.

2.2 Common Incorrect Operation

1） Tools for connecting is not well insulated.

2） Operating without following the user manual.

2.3 Damage Probably Caused By Incorrect Operation

1） Short circuit accident: Tools is not well insulated, or battery pack positive and negative electrodes are too close.

2） Failure to follow the correct operation method will cause the device not working properly.

2.4 Emergency Treatment In Exceptional Cases

Disconnect the device power supply and test cables.

2.5 Precautions In Exceptional Circumstances

If the operator uses tools without well insulation or improper operate to cause short circuit, please separate the cables immediately.

2.6 Other Safety Alerts

Strict compliance with safety operating norms and correct operating procedure.

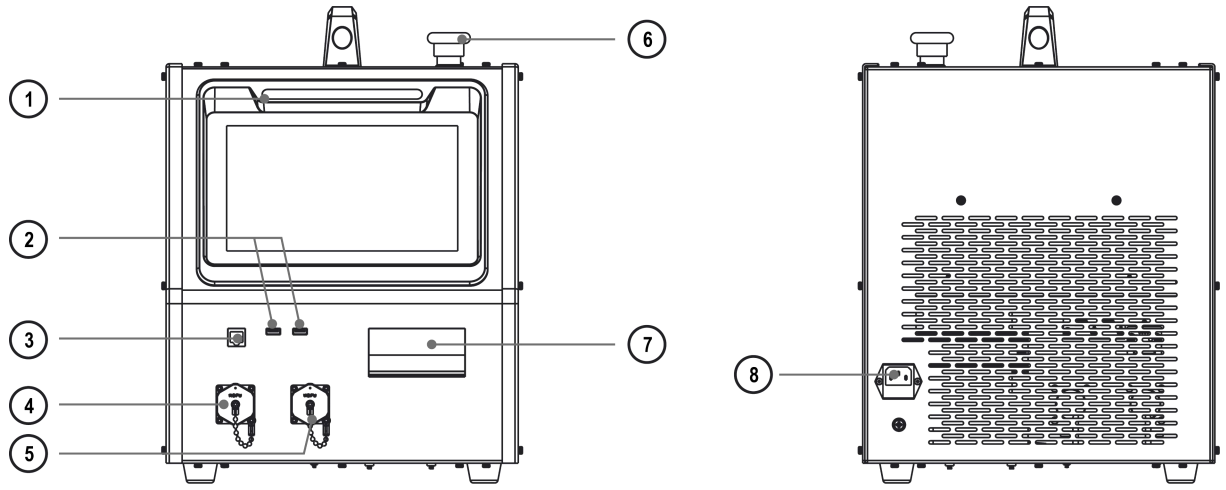
3. Technical Features

Function Parameter	
Model	EB240
Power input	AC 90~264V, 50/60Hz
Charging & discharging voltage range	1.8~4.2V
Voltage measurement accuracy	±(0.1%FS±2mV)
Charging & discharging current range	0.1~ 5A
Current measurement accuracy	±(1%FS±0.05A)
Battery temperature detection accuracy	±2℃（-25℃--85 ℃) Charge and discharge temperature range is settable
Max channel quantity in	2 string x Max 12 cells

single unit	
Charging & discharging power	600W Max
Voltage & temperature test port	24Pin*2
Display	10.1-inch TFT LCD screen, resolution 1280*800
PC Data communication	TCP/IP， USB-Device
Wireless communication	Wi-Fi
Data transfer	Internal storage of device or data transfer to USB flash drive
Charging mode	Constant current charging + constant voltage charging
Discharge mode	Constant current (constant power, constant resistance discharge selectable)
Protection mechanism	Overcharge and over discharge protection Over voltage, over current, over temperature protection Battery short connection, reverse connection protection Abnormal protection against power cord and main cable failure Fan abnormal protection
Safety Testing	
Breaking down test	AC input-metal shell: 2200Vdc 1min
	DC input-metal shell: 2200Vdc 1min
Working Environment	
Cooling	Forced air cooling
Working Temperature	-5℃ ~ 45℃
Working Humidity	5% ~ 93%
Size and Weight	
Dimension	500.5 x 337.8 x 445.7 mm

4. Operating Instructions

4.1 Device interface and buttons

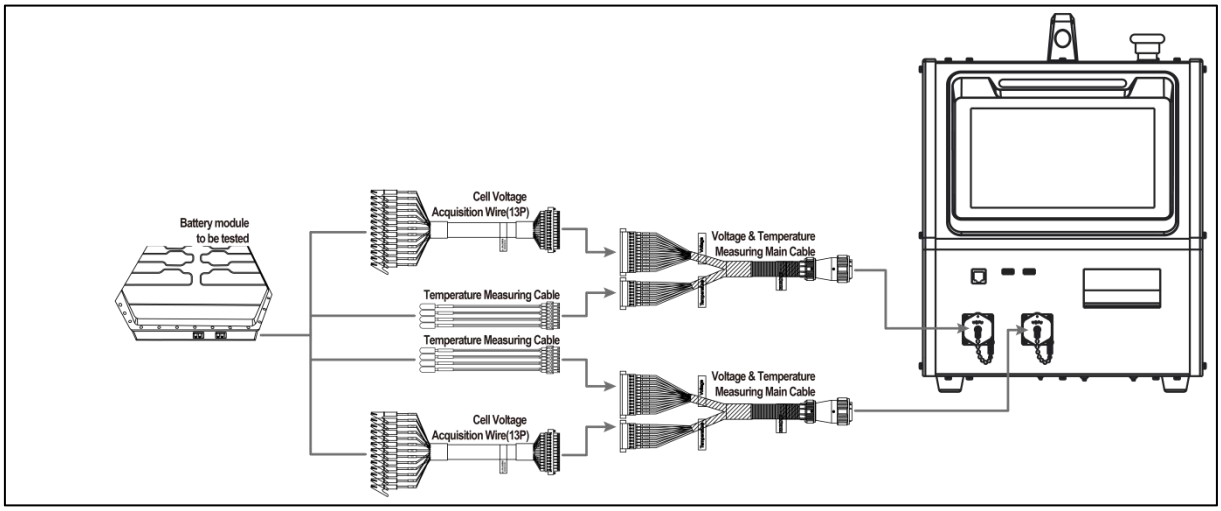


No.	Name	Description
1	Light strip	Green constant light indicates that the device is in standby mode; Blue constant light indicates work in progress; Yellow constant light indicates a non-stop warning; Red flashing indicates a fault/shutdown warning.
2	USB interface	Used to export data.
3	Communication interface	Used for communication and other expandable functions.
4	Channel 1 port	Connect to the channel 1 of the voltage and temperature measuring main cable.
5	Channel 2 port	Connect to the channel 2 of the voltage and temperature measuring main cable.
6	Emergency stop switch	Used to cut off the power supply of the device in an emergency and stop the device immediately. After pressing this emergency stop switch button, the emergency stop switch must be turned to the right to reset it before the AC circuit breaker can be closed again.
7	AC circuit breaker	Turn on/off the AC input.
8	Power socket	Connect the AC power cord.

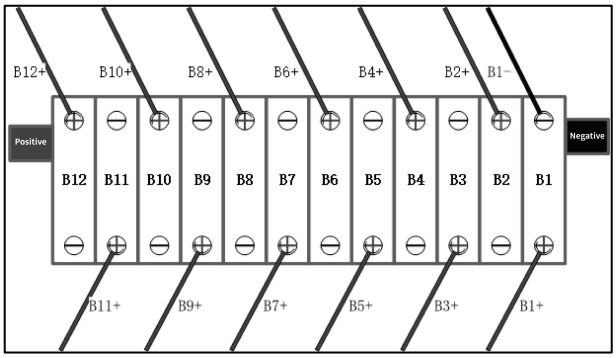
4.2 Connection Method

1) Insert the aviation plug of the voltage & temperature measuring main cable into the Channel 1/Channel 2 port, and connect the other end to the cell voltage acquisition wire and temperature measuring cable.
2) Connect the cell voltage acquisition wire and temperature measuring cable to the cell being tested.
3) Insert the power cord into the power input port of main unit, and connect the other end to the power source.

Note: Please make sure to turn off the power of the device before connecting the voltage & temperature measuring main cable to avoid damage to the device.



4.2.1 Cell Voltage Acquisition Wire and Battery Pack Connection



According to the wire label on the cell voltage acquisition wire, B1 - is connected to the negative electrode of No. 1 cell (B1), B1 + is connected to the positive electrode of No. 1 cell (B1), B2 + is connected to the positive electrode of No. 2 cell (B2), and connected in sequence.

Note: the nearest to the negative terminal of the battery module is the No. 1 cell.

4.2.2 Working Power Supply Connecting

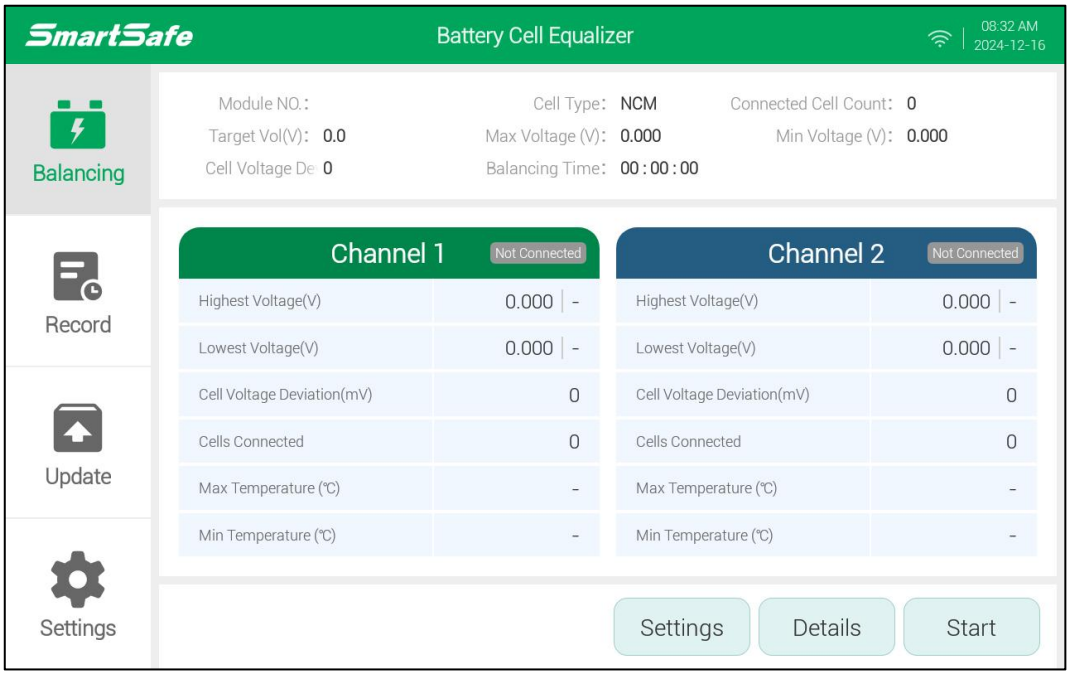
Connect the power supply cord with the main unit power socket, and please ensure AC power supply can support Single phase 90~264V AC Max 10Amp output.

4.3 Main Unit Operation

After the device is connected, close the AC circuit breaker and turn on the device.

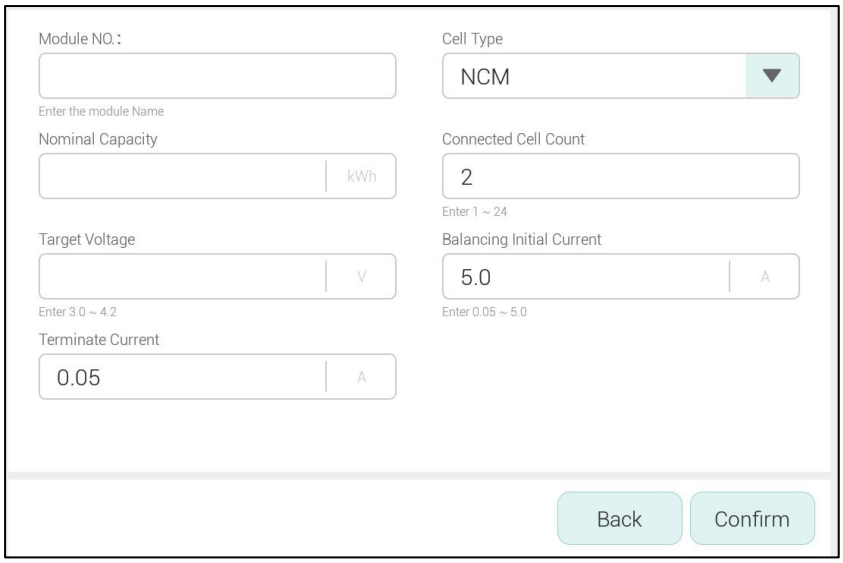
4.3.1 Main Menu

After the device is turned on, it enters the balancing interface by default. Users can click the function module icon on the left side of the screen to switch to different function module interfaces. The function modules on the left include **Balancing**, **Record**, **Update** and **Settings**.



4.3.2 Balancing

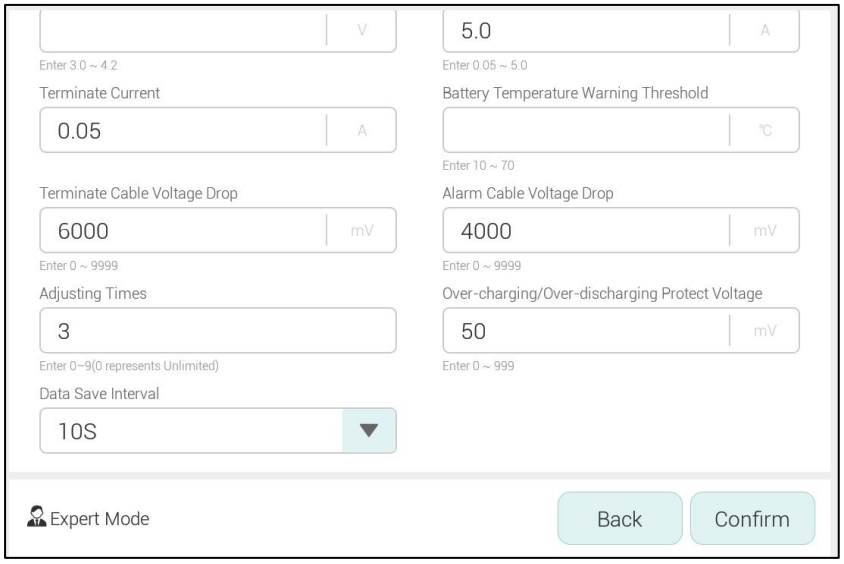
1) In the balancing interface, click **Settings** to preset the balancing test parameters.



Name	Description
Module NO.	Battery module number.
Cell Type	Select the type according to the battery to be tested, supporting ternary lithium batteries, lithium titanate batteries, lithium manganese batteries and lithium iron phosphate batteries.

Nominal Capacity	The nominal capacity of the battery pack, according to the actual input, can be identified from the rating plate.
Connected Cell Count	Number of cells in series, according to the actual number of battery strings contained in the connected battery pack module.
Target Voltage	Cell balancing target voltage value.
Balancing Initial Current	The balancing initial current value.
Terminate Current	Current threshold for terminating balancing.

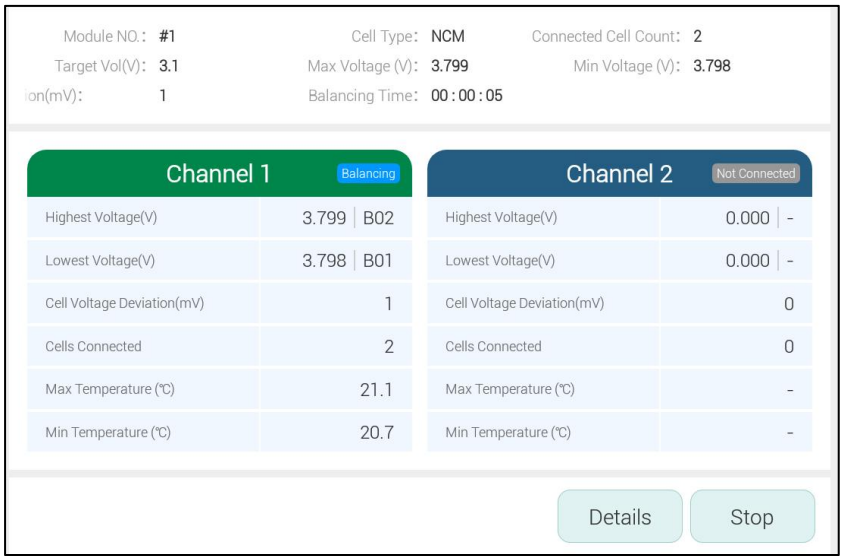
The parameter settings interface defaults to normal mode. To enter expert mode to set more parameter items, you can click on the **Settings** function module on the left side of the screen to enter the system settings interface. Click on **Expert Mode** in the system settings interface and then enter the parameter setting interface.



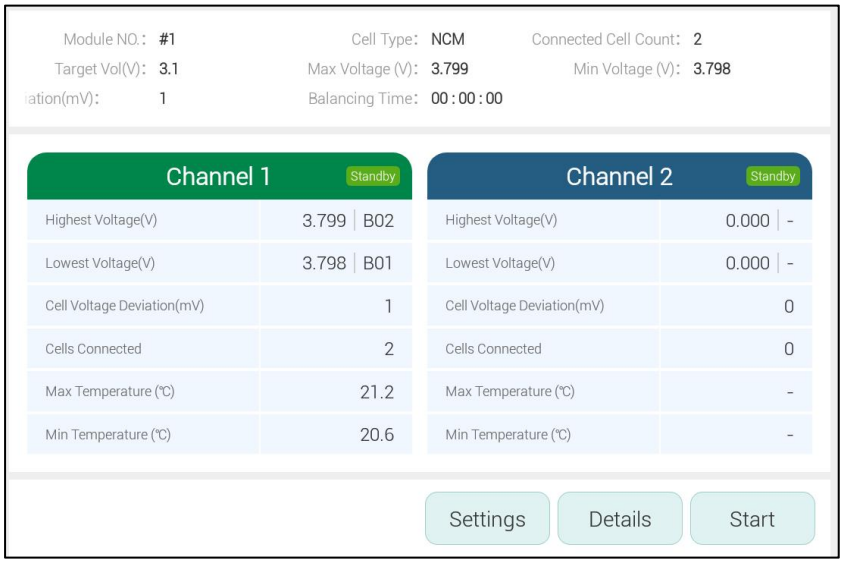
The following parameters can only be set in Expert Mode.

Name	Description
Battery Temperature Warning Threshold	Temperature threshold for battery cell over-temperature protection.
Terminate Cable Voltage Drop	Cable voltage drop threshold used to terminate balancing.
Alarm Cable Voltage Drop	Cable voltage drop threshold for alarming .
Adjusting Times	Set the balancing cycles to achieve more precise cell balancing, range 0~9, with 0 representing infinite cycles.
Over-charging/Over-discharging Protect Voltage	Battery over-charging/over-discharging protection voltage threshold.
Data Save Interval	The interval time for automatic data storage.

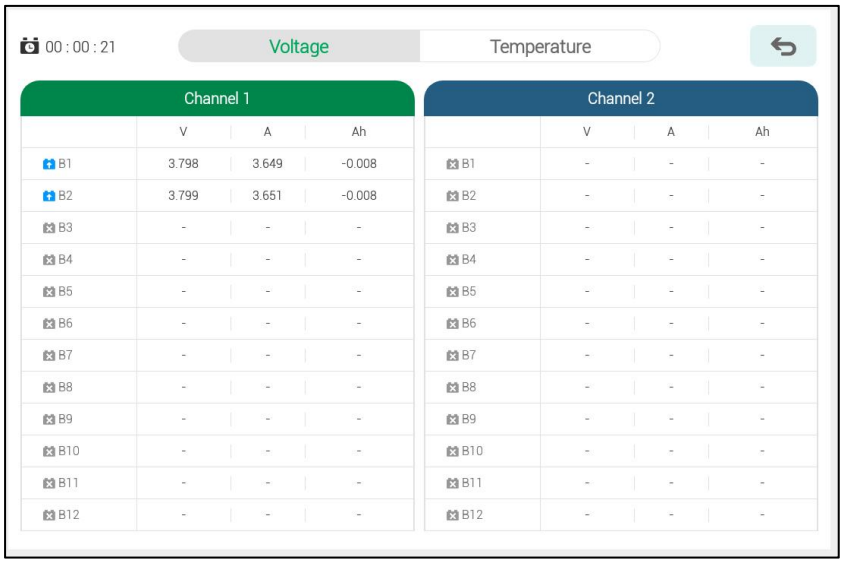
2) After setting the parameters, click **Confirm** to save the current settings and return to the balance interface. Click **Start** on the balance interface to start balancing.



3) During the balancing process, you can check the test progress and wait for the test results. Click **Stop** to end the current balancing process.

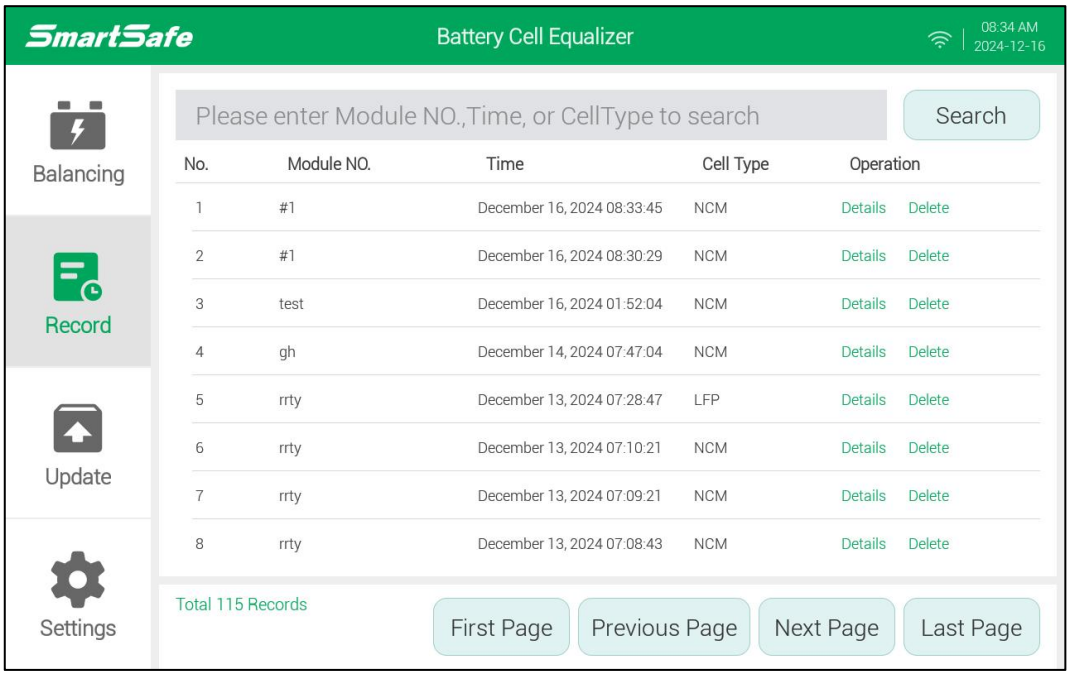


4) Click **Details** to view the specific data of the tested battery, including balancing time, cell voltage, cell balancing current, charge and discharge capacity, and temperature of each temperature monitoring point.



4.3.3 Record

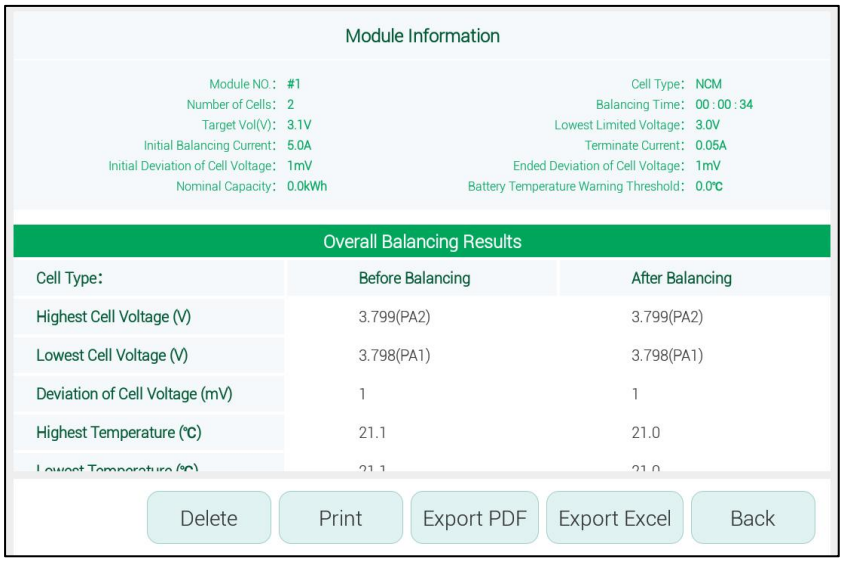
1) Click on **Record** in the left function menu to enter the record interface.



2) Click the **Delete** button on the right side of an individual record or click the **Delete** button on the record details page to remove the record from the list.

3) Click the **Detail** button on the right side of an individual record to view the record details.

Note: By entering keywords in the top search bar, you can quickly find the corresponding record.



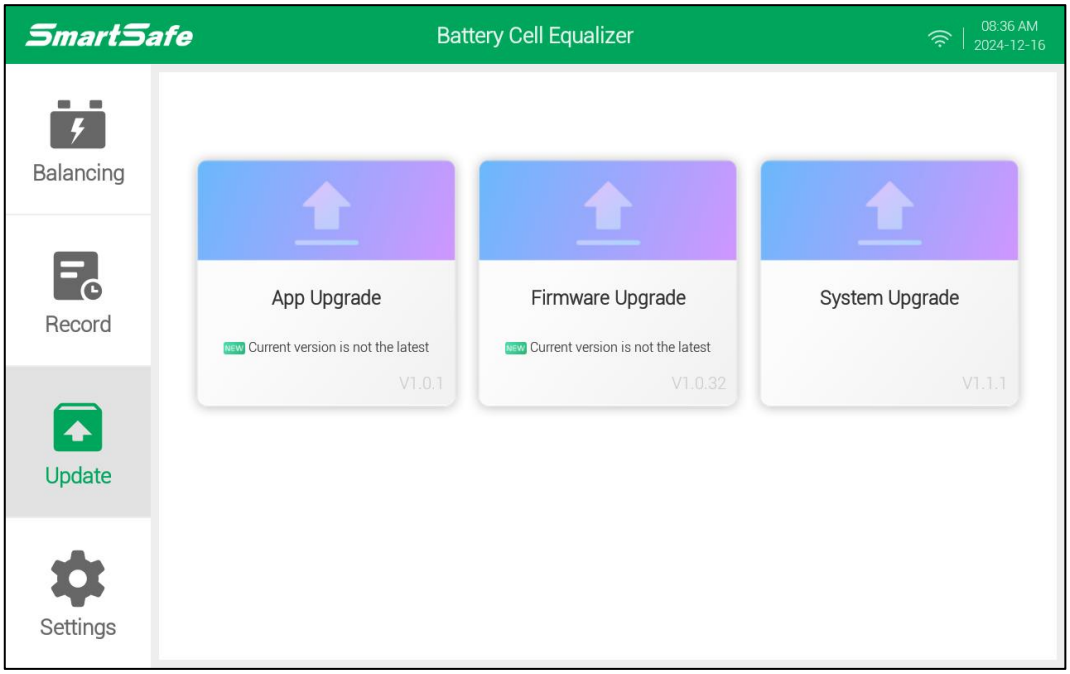
4) On the individual record details page, click the **Print** button to print the record.

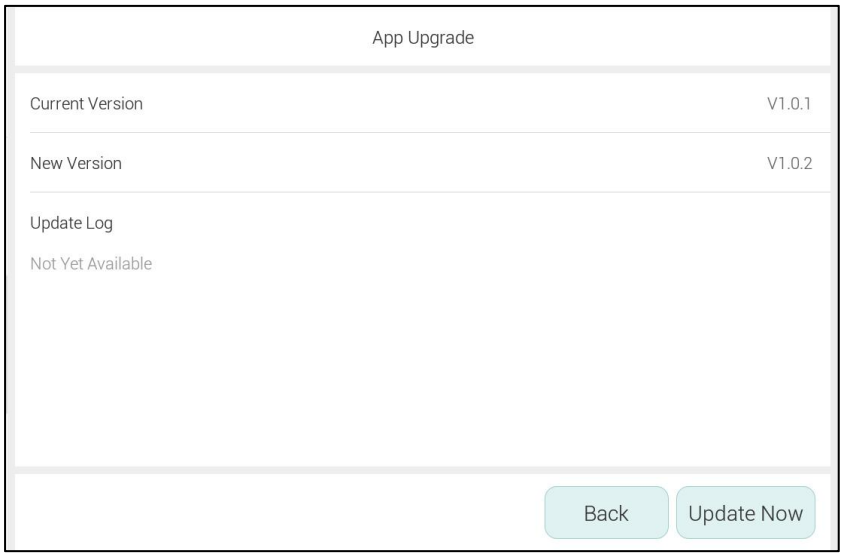
5) Insert the USB memory stick, click the **Export PDF** or **Export Excel** button on the individual record details page, and you can export the record to the USB memory stick.

4.3.4 Update

Click **Update** in the function menu on the left to enter the software Update interface. Select options such as **APP Upgrade**, **Firmware Upgrade** or **System Upgrade** to view the current version and the latest version, and click **Update Now** to upgrade the APP, firmware or system to the latest version.

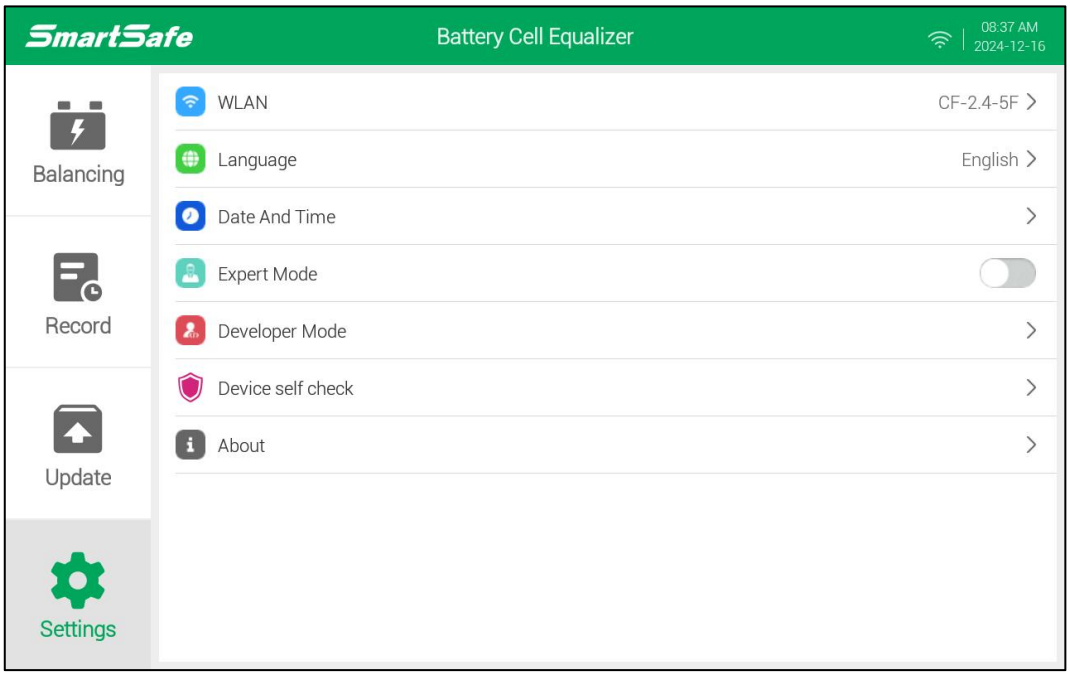
Note: To perform software update functions, it is necessary to connect to a wireless network firstly; To ensure the normal update, please ensure network stability during the update process.





4.3.5 Settings

Click **Settings** in the function menu on the left to enter the system settings interface. The system settings include **WLAN**, **Language**, **Date and Time**, **Expert Mode**, **Developer Mode**, **Device Self Check** and **About**.



WLAN: Used to set up the device's wireless network connection.



Language: Used to set the system language.



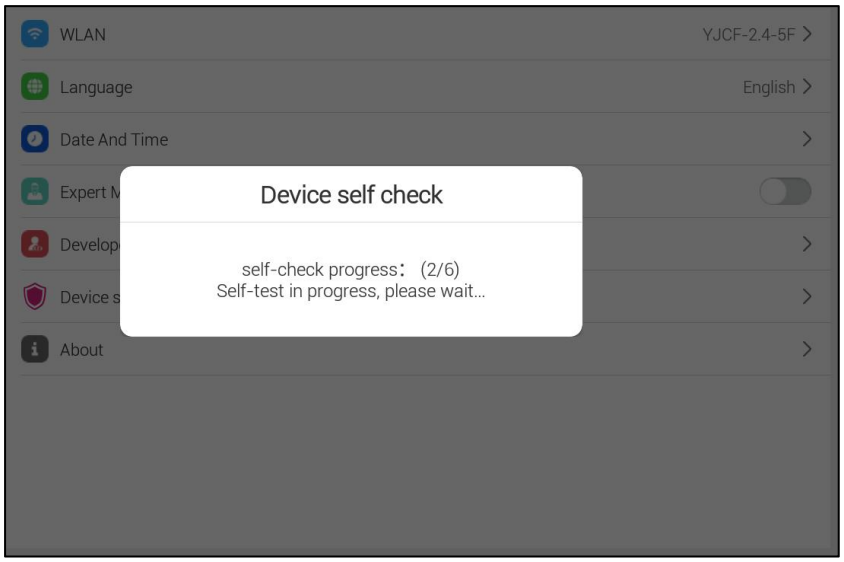
Date and time: Used to set date, time and time zone, etc.



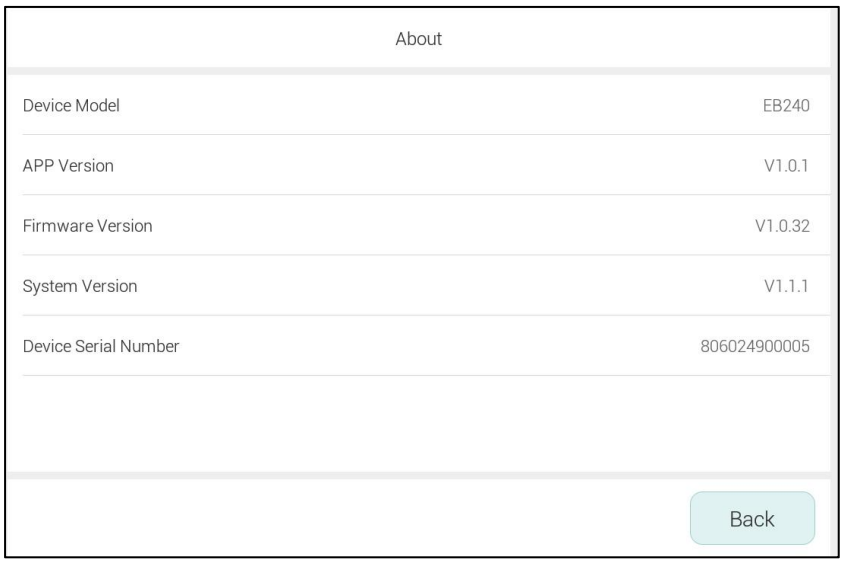
Expert mode: Used to switch the parameter setting mode of charging and discharging to Expert mode.

Developer Mode: This function is only for development and maintenance, a password is required.

Device seft-test: Support automatic self-check of device.



About: Used to view information such as Device Model, APP Version, Firmware Version, System Version and Device Serial Number.



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Final determination of defects shall be made by SMARTSAFE in accordance with procedures established by SMARTSAFE. No agent, employee, or representative of SMARTSAFE has any authority to bind SMARTSAFE to any affirmation, representation, or warranty concerning SMARTSAFE automotive meters, except as stated herein.

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- Order quantity
- Part number
- Part name

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