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1. Product Overview

EB480 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), EB480 is designed for lithium battery pack daily discharge, charge, and equalizing maintenance.
- Based on wide voltage range design, EB480 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.

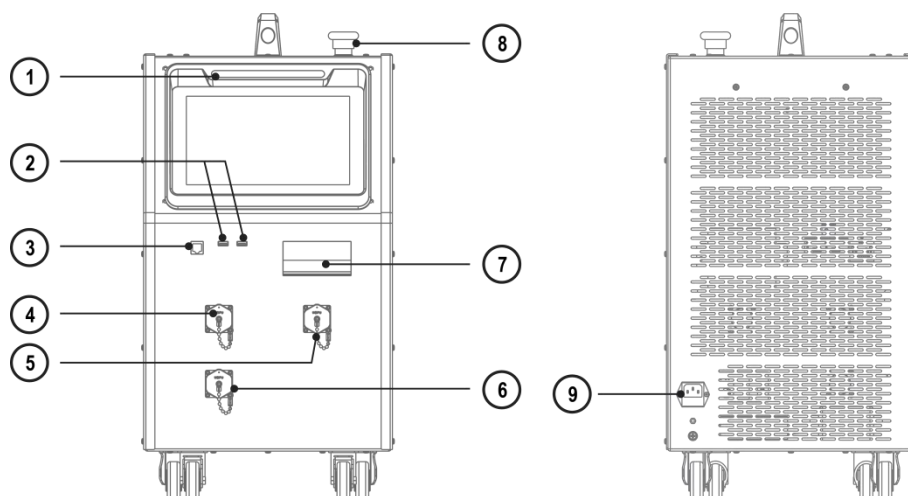
3. Technical Features

Function Parameter	
Model	EB480
Power input	AC 90~264V, 50/60Hz
Charging & discharging voltage range	1.8~4.5V
Voltage measurement accuracy	$\pm(0.1\%FS \pm 2mV)$
Charging & discharging current range	0.1~ 5A
Current measurement accuracy	$\pm(1\%FS \pm 0.05A)$
Battery Temperature Detection accuracy	$\pm 2^{\circ}C$ ($-25^{\circ}C$ -- $-85^{\circ}C$) Charge and discharge temperature range is settable

Max channel quantity in single unit	4 string x Max 12 cells
Charging & discharging power	1200W Max
Equalization Test Port	26Pin*2
Temp Test Port	24Pin
Display	10-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 335.0 x 643.2 mm

4. Operating Instructions

4.1 Device interface and buttons



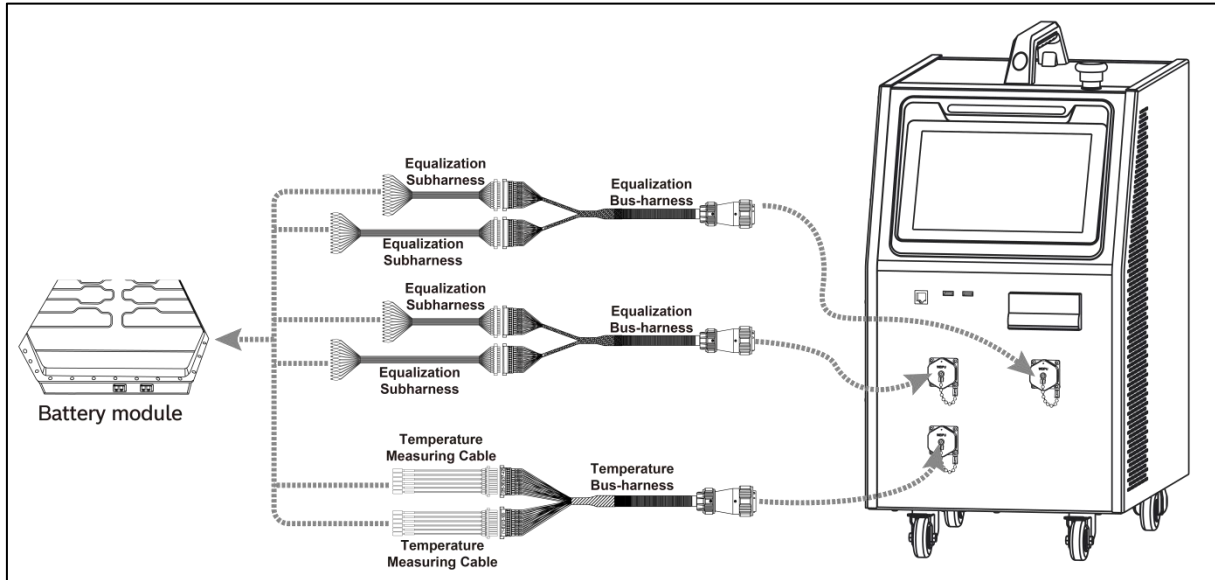
No.	Name	Description
1	Light strip	Green constant light indicates that the device is in standby mode; Blue constant light indicates work in progress; Yellow constant light indicates a non-stop warning; Red flashing indicates a fault/shutdown warning.
2	USB interface	Used to export data.
3	Communication interface	Used for communication and other expandable functions.
4	VOLTAGE #1	Balance test terminal #1, used to connect the equalization bus-harness.
5	VOLTAGE #2	Balance test terminal #2, used to connect the equalization bus-harness.
6	TEMP	Temperature test terminal, 24-pin temperature sampling interface.
7	AC circuit breaker	Turn on/off the AC input.
8	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.
9	Power socket	90V ~ 264V power input.

4.2 Main Unit Connection

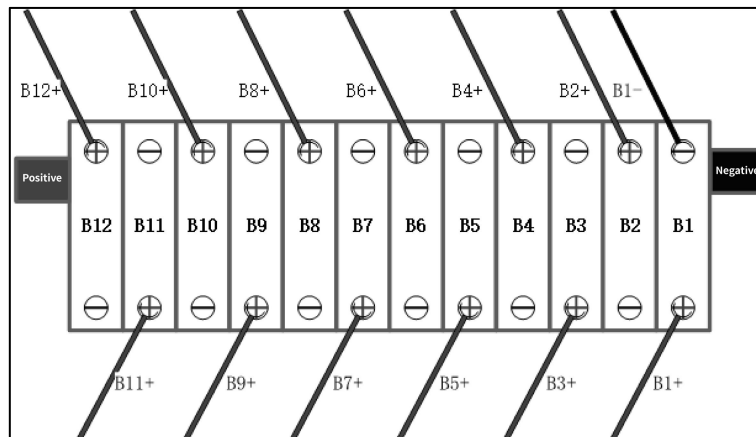
- 1) Insert the aviation plug of the equalization bus-harness into the balance test terminal of the device, and connect the other end to the equalization subharness.

Note: Please make sure to turn off the power of the device before connecting the balancing bus harness to avoid damage to the device.

- 2) Insert the aviation plug of the temperature bus harness into the temperature test terminal of the device, and connect the other end to the temperature measuring cable.
- 3) Connect the clip end of the equalization subharness and the probe end of the temperature measuring cable to the battery module under test.



4.2.1 Equalization subharness and Battery Pack Connection



According to the wire label on the equalization subharness, 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**.

Balancing

Record

Update

Settings

Battery Cell Equalizer

07:54
2024-12-05

Module NO.:
Target Vol(V): 0.0
V): 92

Cell Type: NCM
Max Voltage (V): 3.286
Balancing Time: 00:00:00

Connected Cell Count: 10
Min Voltage (V): 3.194

Channel 1Standby

Highest Voltage(V)3.286 | B09

Lowest Voltage(V)3.194 | B05

Cell Voltage Deviation(mV)92

Cells Connected10

Max Temperature (°C)24.9

Min Temperature (°C)24.5

Channel 2Standby

Highest Voltage(V)0.000 | -

Lowest Voltage(V)0.000 | -

Cell Voltage Deviation(mV)0

Cells Connected0

Max Temperature (°C)-

Min Temperature (°C)-

Instruction ManualSettingsDetailsStart

4.3.2 Balancing

*Note: In the balancing interface, users can click **Instruction Manual** to check the device operation manual.*

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

Module NO.:

Cell Type
NCM

Enter the module Name

Nominal Capacity
 kWh

Connected Cell Count
10

Enter 1 ~ 48

Target Voltage
 V

Enter 3.0 ~ 4.2

Balancing Initial Current
 A

Enter 0.05 ~ 5.0

Terminate Current
 A

0.05

BackConfirm

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 screenshot displays the 'Expert Mode' settings screen. It features several adjustable parameters with their respective ranges and units:

- Terminate Current:** Range 0.05 ~ 4.2 A, current value is 0.05 A.
- Battery Temperature Warning Threshold:** Range 0.05 ~ 5.0 °C, current value is 5.0 °C.
- Terminate Cable Voltage Drop:** Range 6000 ~ 9999 mV, current value is 6000 mV.
- Alarm Cable Voltage Drop:** Range 4000 ~ 9999 mV, current value is 4000 mV.
- Adjusting Times:** Range 0 ~ 9999, current value is 3.
- Over-charging/Over-discharging Protect Voltage:** Range 50 ~ 999 mV, current value is 50 mV.
- Data Save Interval:** Range 10S ~ 999S, current value is 10S.

At the bottom of the screen, there is a status bar indicating 'Expert Mode' and two buttons: 'Back' and 'Confirm'.

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 overcharge protection voltage threshold.
Data Save Interval	The interval time for automatic data storage.

- 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.

Module NO.: abc	Cell Type: NCM	Connected Cell Count: 10
Target Vol(V): 3.0	Max Voltage (V): 3.286	Min Voltage (V): 3.194
(mV): 92	Balancing Time: 00:00:05	

Channel 1 Balancing		Channel 2 Not Connected	
Highest Voltage(V)	3.286 B09	Highest Voltage(V)	0.000 -
Lowest Voltage(V)	3.194 B05	Lowest Voltage(V)	0.000 -
Cell Voltage Deviation(mV)	92	Cell Voltage Deviation(mV)	0
Cells Connected	10	Cells Connected	0
Max Temperature (°C)	24.9	Max Temperature (°C)	-
Min Temperature (°C)	24.6	Min Temperature (°C)	-

[Instruction Manual](#)
[Details](#)
[Stop](#)

- 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.

Module NO.: abc	Cell Type: NCM	Connected Cell Count: 10
Target Vol(V): 3.0	Max Voltage (V): 3.270	Min Voltage (V): 3.170
(V): 100	Balancing Time: 00:00:00	

Channel 1 Standby		Channel 2 Standby	
Highest Voltage(V)	3.270 B09	Highest Voltage(V)	0.000 -
Lowest Voltage(V)	3.170 B05	Lowest Voltage(V)	0.000 -
Cell Voltage Deviation(mV)	100	Cell Voltage Deviation(mV)	0
Cells Connected	10	Cells Connected	0
Max Temperature (°C)	24.9	Max Temperature (°C)	-
Min Temperature (°C)	24.5	Min Temperature (°C)	-


[Instruction Manual](#)
[Settings](#)
[Details](#)
[Start](#)

- 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.

























00 : 00 : 38

Voltage

























Temperature



Channel 1

	V	A	Ah		V	A	Ah
 B1	3.268	5.001	-0.027	 B13	-	-	-
 B2	3.224	5.001	-0.027	 B14	-	-	-
 B3	3.278	5.001	-0.027	 B15	-	-	-
 B4	3.247	4.999	-0.027	 B16	-	-	-
 B5	3.184	5.001	-0.027	 B17	-	-	-
 B6	3.239	5.001	-0.027	 B18	-	-	-
 B7	3.270	5.001	-0.027	 B19	-	-	-
 B8	3.267	4.999	-0.027	 B20	-	-	-
 B9	3.280	5.001	-0.027	 B21	-	-	-
 B10	3.253	4.999	-0.027	 B22	-	-	-
 B11	-	-	-	 B23	-	-	-
 B12	-	-	-	 B24	-	-	-

Channel 2

	V	A	Ah		V	A	Ah
 B1	-	-	-	 B13	-	-	-
 B2	-	-	-	 B14	-	-	-
 B3	-	-	-	 B15	-	-	-
 B4	-	-	-	 B16	-	-	-
 B5	-	-	-	 B17	-	-	-
 B6	-	-	-	 B18	-	-	-
 B7	-	-	-	 B19	-	-	-
 B8	-	-	-	 B20	-	-	-
 B9	-	-	-	 B21	-	-	-
 B10	-	-	-	 B22	-	-	-
 B11	-	-	-	 B23	-	-	-
 B12	-	-	-	 B24	-	-	-

4.3.3 Record

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

Battery Cell Equalizer

07:43
2024-12-05

Balancing

Record

Update

Settings

Please enter Module NO.,Time, or CellType to search

Search

No.	Module NO.	Time	Cell Type	Operation	
1	pepe	December 04, 2024 07:09:36	LFP	Details	Delete
2	test	December 04, 2024 03:33:07	LFP	Details	Delete
3	test	December 04, 2024 03:30:16	LFP	Details	Delete
4	test	December 04, 2024 03:27:20	LFP	Details	Delete
5	test	December 04, 2024 03:26:36	LFP	Details	Delete
6	test	November 29, 2024 00:56:01	LFP	Details	Delete
7	test	November 29, 2024 00:52:50	LFP	Details	Delete
8	test	November 29, 2024 00:43:57	LFP	Details	Delete

Total 49 Records

First Page

Previous Page

Next Page

Last Page

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.

Module Information		
Module NO.:	pepe	Cell Type: LFP
Number of Cells:	10	Balancing Time: 00:04:10
Target Vol(V):	3.15V	Lowest Limited Voltage: 2.8V
Initial Balancing Current:	5.0A	Terminate Current: 0.05A
Initial Deviation of Cell Voltage:	93mV	Ended Deviation of Cell Voltage: 97mV
Nominal Capacity:	0.0kWh	Battery Temperature Warning Threshold: 0.0°C

Overall Balancing Results		
Cell Type:	Before Balancing	After Balancing
Highest Cell Voltage (V)	3.282(PA9)	3.261(PA9)
Lowest Cell Voltage (V)	3.189(PA5)	3.164(PA5)
Deviation of Cell Voltage (mV)	93	97
Highest Temperature (°C)	25.1	25.2
Lowest Temperature (°C)	25.1	25.0

Delete
Print
Export PDF
Export Excel
Back

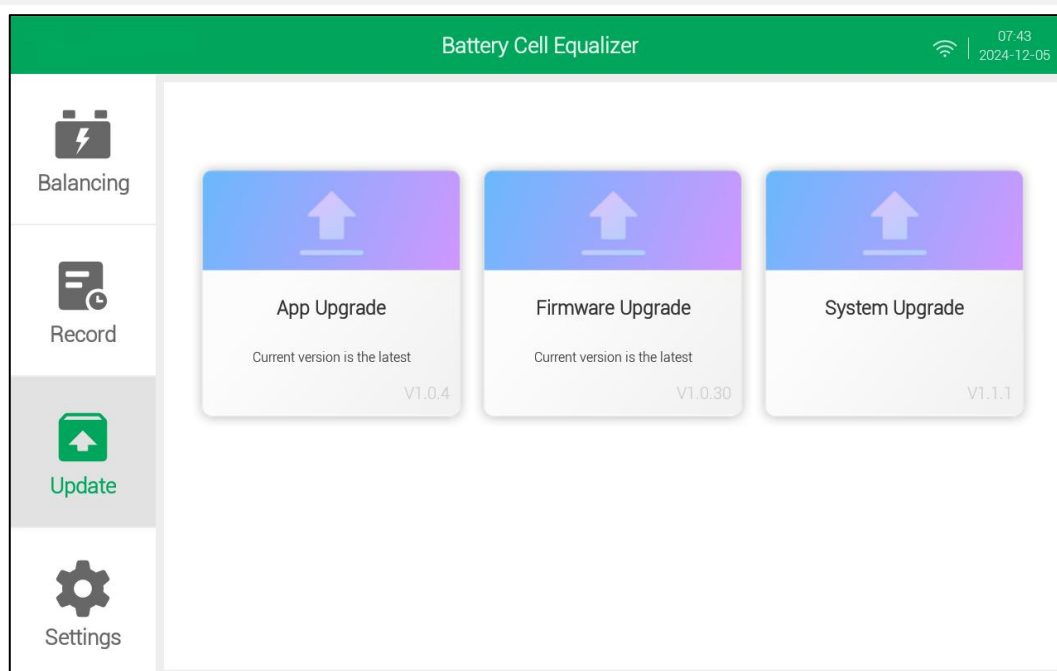
4) On the individual record details page, click the **Print** button to print the record.

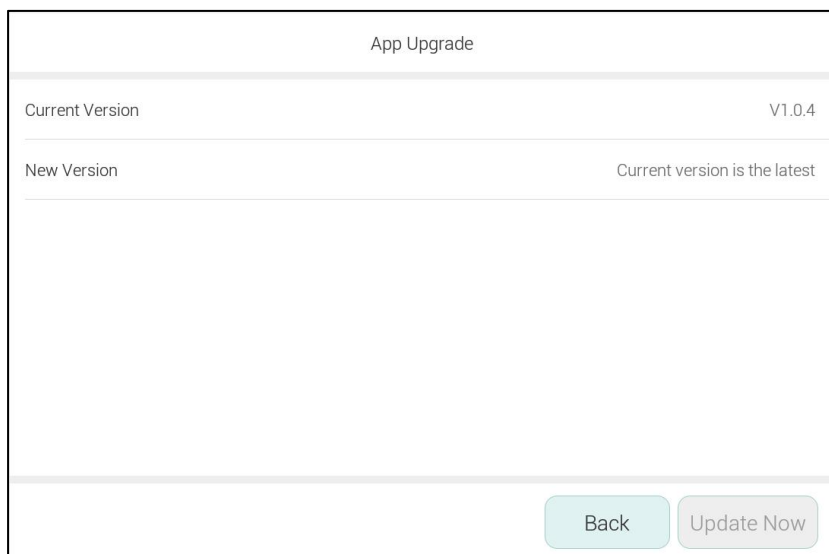
5) Insert the USB memory stick, click the **Export PDF** or **Export Excel** button on the individual record details page, and you can export the record to the USB memory stick.

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.

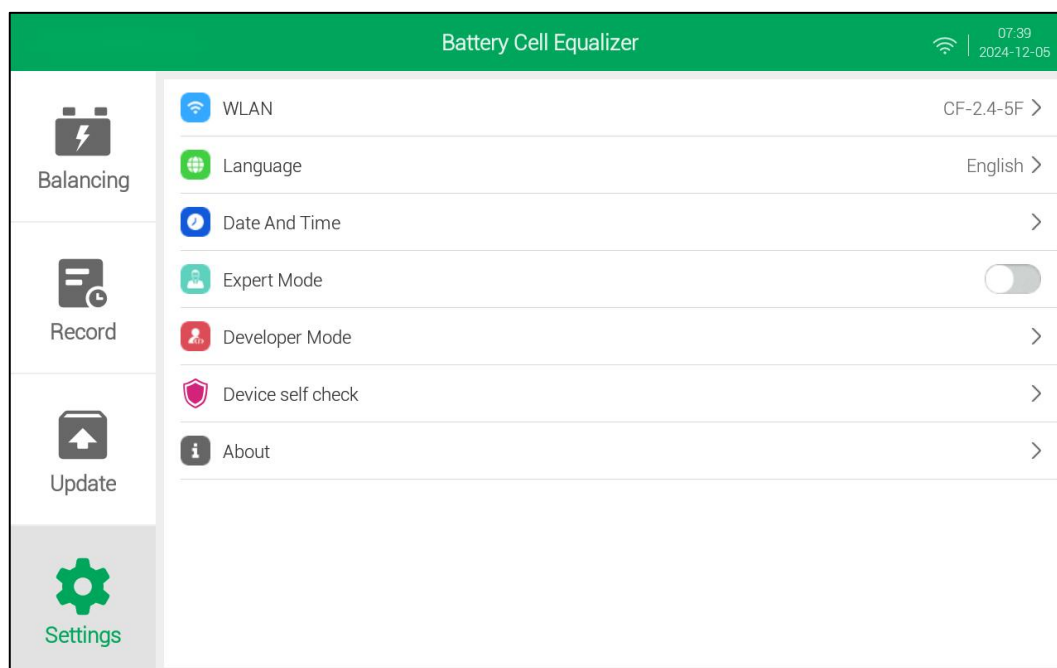
Note: To perform software update functions, it is necessary to connect to a wireless network firstly; To ensure the normal update, please ensure network stability during the update process.



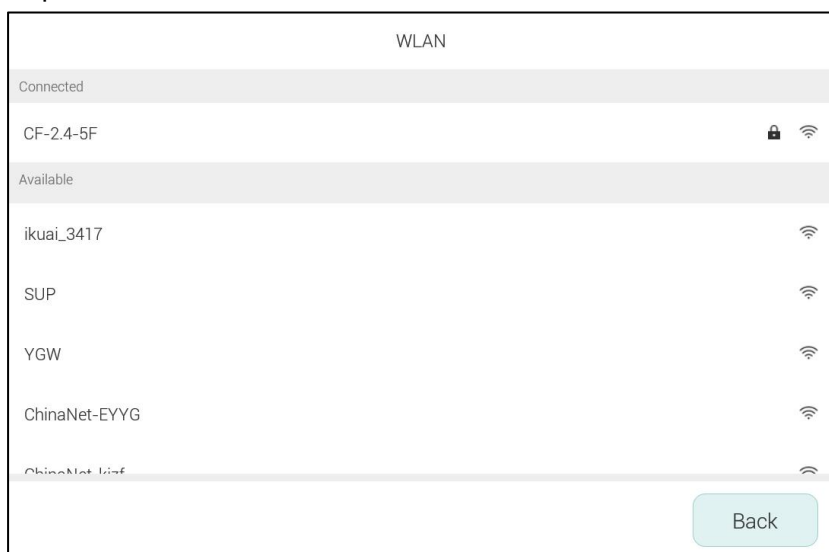


4.3.5 Settings

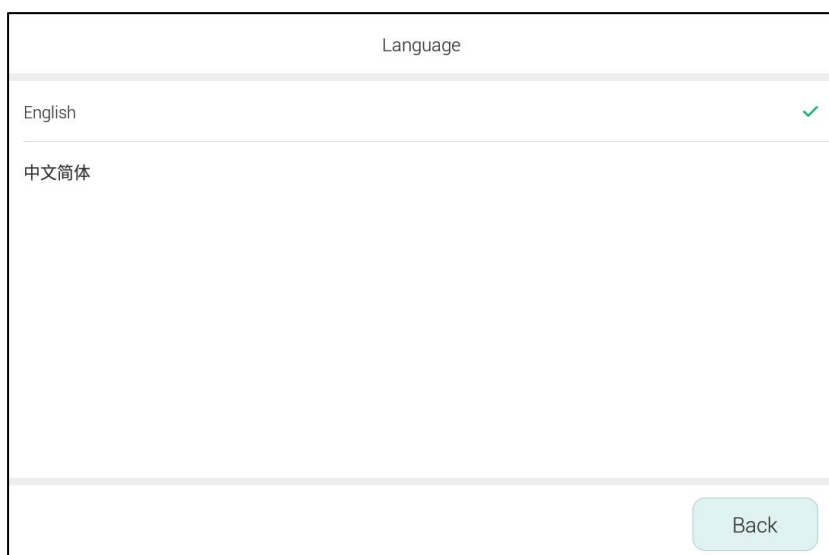
Click **Settings** in the function menu on the left to enter the system settings interface. The system settings include **WLAN**, **Language**, **Date and Time**, **Expert Mode**, **Developer Mode**, **Device Self check** and **About**.



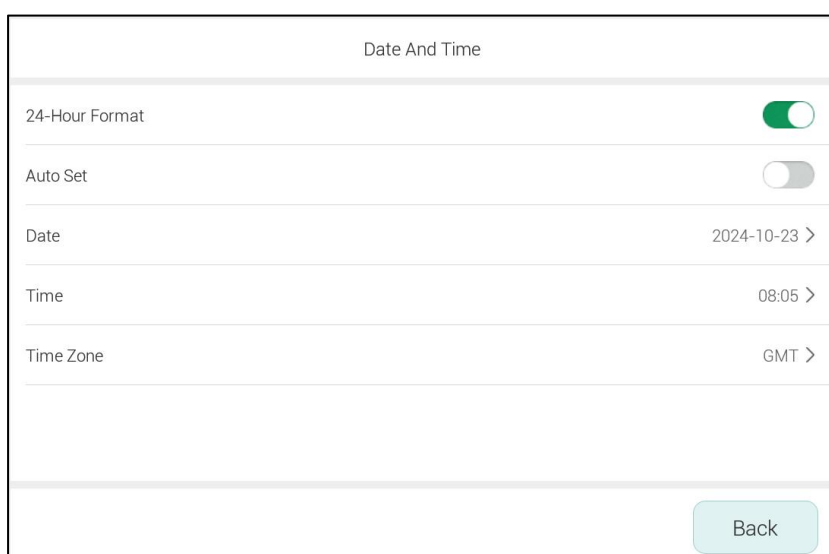
WLAN: Used to set up the device's wireless network connection.



Language: Used to set the system language.



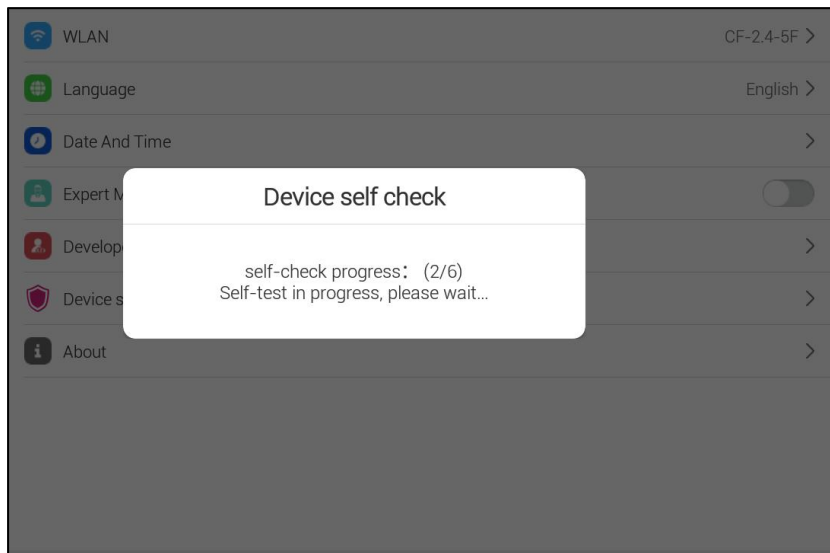
Date and time: Used to set date, time and time zone, etc.



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 self-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.

About	
Device Model	EB480
APP Version	V1.0.1
Firmware Version	V1.0.32
System Version	V1.1.1
Device Serial Number	806024900005
Back	

Warranty

THIS WARRANTY IS EXPRESSLY LIMITED TO PERSONS WHO PURCHASE SMARTSAFE PRODUCTS FOR PURPOSES OF RESALE OR USE IN THE ORDINARY COURSE OF THE BUYER'S BUSINESS.

SMARTSAFE electronic product is warranted against defects in materials and workmanship for one year from date of delivery to the user.

This warranty does not cover any part that has been abused, altered, used for a purpose other than for which it was intended, or used in a manner inconsistent with instructions regarding use. The exclusive remedy for any automotive meter found to be defective is repair or replacement, and SMARTSAFE shall not be liable for any consequential or incidental damages.

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.

Disclaimer

The above warranty is in lieu of any other warranty, expressed or implied, including any warranty of merchantability or fitness for a particular purpose.

Purchase Order

Replaceable and optional parts can be ordered directly from your SMARTSAFE authorized dealer. Your order should include the following information:

- Order quantity
- Part number
- Part name

Statement:

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