BMS APP and Parameter Settings Instruction Manual

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Contents

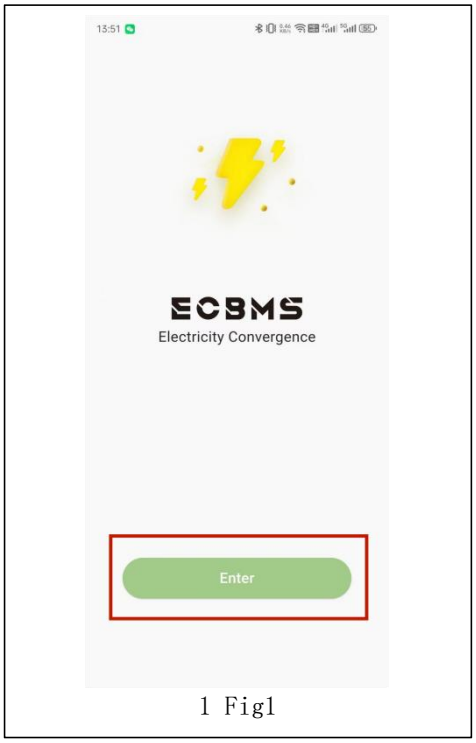
1. APP installation

Bluetooth link for Phone APP-ECBMS :

Download link-IOS :Search (ECBMS) in the APP STORE

Download link-Andriod :Search (ECBMS) in the Google APP STORE

2. Connected APP



1 Fig1

2 Fig2

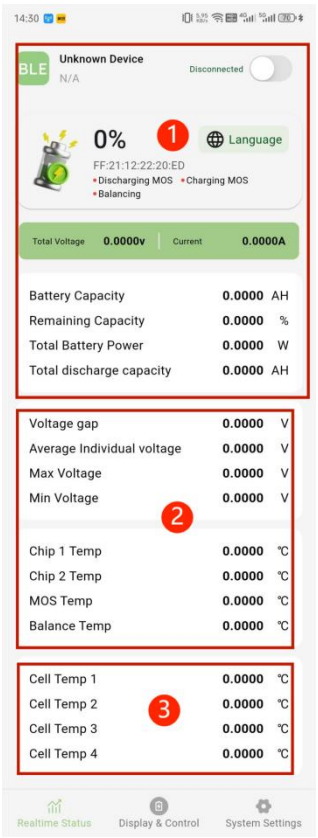
Open the APP then the app prompts that it requires Bluetooth activation permission and location permission. Click "Confirm/Yes." After authorizing the software to access Bluetooth and location permissions, click "Start Scanning," as shown in Figure 1.

Click the "Start Scan" icon in the lower right corner, wait for the scan to complete, then click on the name of the device you wish to connect to, such as "EC-XXXX", as shown in Figure 2.

3. Status Check

3.1 Real-time Status

The real-time status interface is shown in Figure 3, which primarily displays the real-time status of the protection board during operation.



3 Fig3

The real-time status page is divided into2 sections.

Figure 1 Area is the battery comprehensive information panel, with the parameter definitions from top to bottom as follows:

1) Remaining Capacity

Indicates the percentage of remaining battery power;(The value requires the battery to undergo a complete discharge and charge cycle before updating to an accurate figure.),Moreover, when the protection board triggers its protection mechanism (such as battery undervoltage, overvoltage, overcurrent, etc.), this value will be reset to 0, requiring the customer to reconfigure it;

2) Language

Switch the APP display language and supports both Chinese and English;

3) Discharge / Charge MOS

Indicates the discharge/charge MOS."Green" means the current protection board's discharge/charge MOS is turned on, and the battery is allowed to discharge/charge； "Red" means the current protection board's discharge/charge MOS is turned off, and the battery is not allowed to discharge/charge;

4) Balancing Status

Indicates the balancing status. "Green" means the BMS will initiate balancing once the balancing trigger conditions are met; "Red" indicates that balancing is disabled, and the BMS will not perform balancing on the battery cell voltage.

5) Total Voltage

Real-time display of the total battery voltage, where the total voltage is the sum of all individual cell voltages, unit: V;

6) Current

The total current of the battery in real time. The current is positive when the battery is Discharging and negative when charging, unit: A;

7) Battery Capacity

Indicates the actual battery capacity calculated by the high-precision SOC of BMS,unit : AH; (The value requires the battery to undergo a complete discharge and charge cycle before updating to an accurate figure.)

8) Remaining Capacity

Indicates the remaining battery capacity calculated by the high-precision SOC of the BMS,unit: AH. (The value requires the battery to undergo a complete discharge and charge cycle before updating to an accurate figure.)

9) Total Battery Power

Indicates the total output or input power of the battery, the value equals the current battery voltage multiply the absolute value of the battery current, unit: W;

10) Total discharge capacity

Cycle capacity represents the cumulative discharge capacity of the battery, unit: AH;

The parameter definitions for Zone 2 in the figure are listed from top to bottom as follows:

1) Voltage gap

The pressure difference represents the difference between the highest cell voltage and the lowest cell voltage in the current battery pack, unit: V;

2) Average Individual voltage

Indicates the average voltage of individual cells in the current battery, unit: V.

3) Max Voltage

Indicates the highest voltage among the current battery cells, unit: V;

4) Min Voltage

Indicates the lowest voltage among the current battery cells, unit: V;

5) Main chip and slave chip temperature

Real-time display of the chip temperature inside the current protection board, unit: ℃;Chip 1 Temp represents the main chip temperature, and Chip 2 Temp represents the secondary chip；

6) Mos Temp

Real-time display of the current temperature of the MOS transistor inside the protection board, unit: ℃;

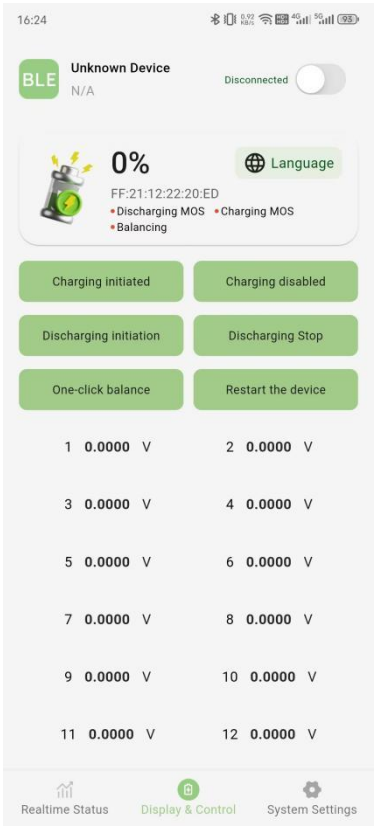
7) Balance Temp

Display the real-time temperature during balancing inside the current protection board, unit: ℃;

8) Cell l/2/3/4 Temp

When temperature sensors 1/2/3/4 are not installed, "-70℃" will be displayed. When the temperature sensors are installed and the number of battery strings exceeds 12S (for 12 strings or below, the operating temperature can be measured by built-in sensors to form protection), the temperatures in the areas of temperature sensors 1/2/3/4 will be displayed in real time, unit: ℃;

3.2 Display & Control



4 Fig4

The display and control interface is shown in Figure 5, which primarily presents basic control functions and real-time voltage display of individual battery cells.

Figure 4 shows the battery comprehensive control information panel, with the parameter definitions from top to bottom as follows:

1) Charging initiated/disabled

Use these two buttons to control the BMS initiate/disable charge;

2) Discharging initiation /Stop

Use these two buttons to control the BMS initiate/disable discharging;

3) One-click balance

When the BMS is in the equalization working state, clicking once can turn off the equalization; clicking the button again will re-enter the current equalization state (not turning off the active/passive equalization state);

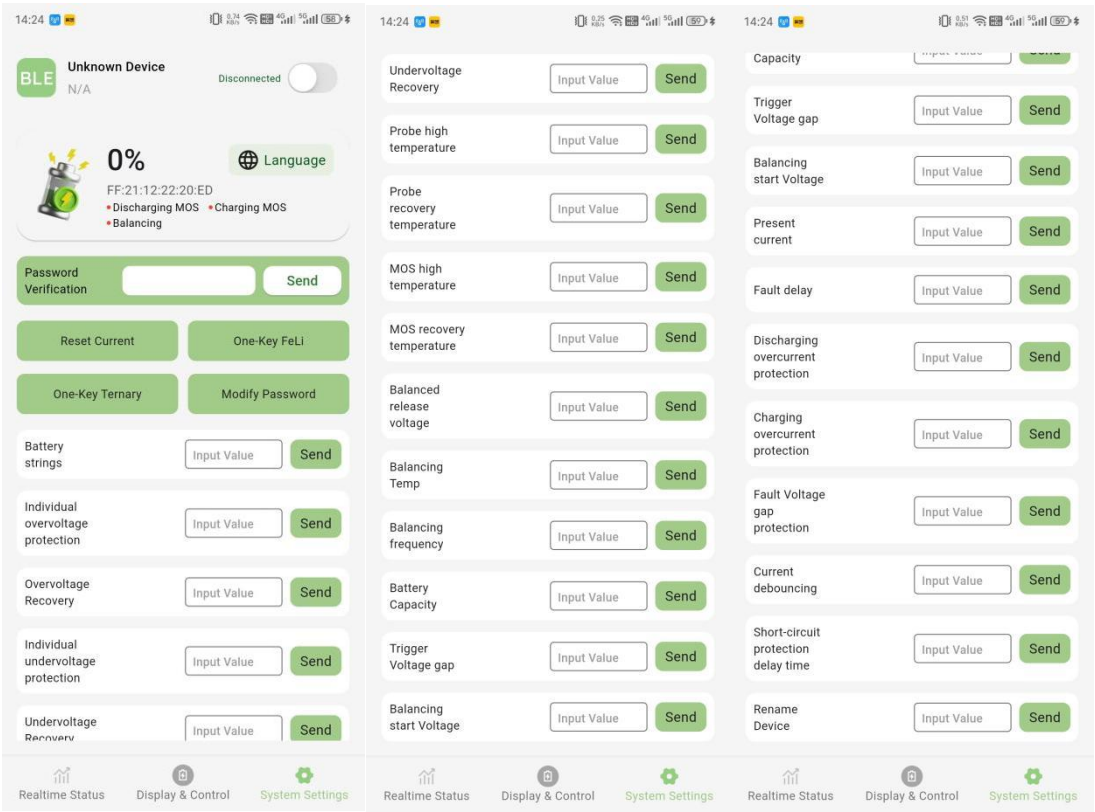
4) Restart the device

Click this button to restart the current protection board, and normal usage can be resumed after reconnecting;

5) Real-time display of each battery string voltage

It can display the voltage data of each battery string managed by the BMS in real time, with the highest voltage marked in red and the lowest voltage in blue, allowing customers to promptly understand the battery status;

3.3 System Setting



5 Fig5

The system setting page shown in Figure 5. The customer use this page to verify passwords, set basic battery information, and modify various initial parameter settings, facilitating the management of customers' own batteries.

The parameter definitions in Figure 5 are as follows from top to bottom:And each modification requires clicking “send” to confirm the modification command;

1) Password Verification

The initial password is empty, simply click “send” to verify; Subsequent parameters can only be adjusted after successful password verification; Each password verification remains valid for 4 minutes, if parameter adjustments are required after this period, the password must be verified again.

2) (Reset Current)

If the battery pack is in a non-charging and non-discharging state, if the current displays abnormal values, clicking this button will reset the current to zero；

3) (One-Key FeLi)

Clicking this button will modify all working parameters of the protection board to lithium iron phosphate battery parameters. The default values for lithium iron phosphate parameters can be found in the appendix;

4) (One-Key Ternary)

Clicking this button will modify all working parameters of the protection board to the ternary battery parameters. The default values for ternary lithium parameters can be found in the appendix;

5) (One-Key LTO)

This button can modify all working parameters of the protection board to lithium titanate battery parameters. The default values for lithium titanate parameters are shown in the appendix;

6) (Modify Password)

Click modify password, verify the original password in the pop-up password box, then enter the new password, click send to complete the password modification;

7) (Battery strings)

Indicates the current number of battery cells connected in series; Please set this value accurately, otherwise it may cause the BMS malfunction or incorrect data collection;

8) (Individual overvoltage protection/Recovery)

"The Individual overvoltage" refers to the saturation voltage of the battery cell. Whenever the voltage of any single cell in the battery pack exceeds this value, it triggers an 'Xth cell overvoltage' alarm, and the BMS will turn off the charging MOS. At this point, the battery cannot be charged and can only discharge. Only when the voltage values of all single cells fall below the value “overvoltage Recovery”,the BMS will lift the 'overvoltage alarm' and reactivate the charging switch；

9) Individual undervoltage protection/Recovery）

"The Individual undervoltage" refers to the immediate cutoff voltage of the battery cell. Whenever the voltage of any single cell in the battery pack falls below this value, it triggers an 'Xth cell undervoltage' alarm, and the BMS will turn off the discharging MOS, rendering the battery unable to discharge and only allowing charging. Only when all single cell voltages rise above the "undervoltage recovery" value,the BMS will clear the 'undervoltage alarm' and reactivate the discharge switch;

10) (Probe high temperature/recovery)

During the charging and discharging process, when the temperature of any battery or any external area probe detected exceeds "high-temperature protection", the BMS will terminate the charging and discharging state to ensure the battery pack remains in normal working condition. Only when the temperature of all batteries or the corresponding detection area falls below the "over temperature recovery", the BMS will lift the 'high-temperature protection' warning and simultaneously reactivate the charging and discharging switch;

11) MOS/（MOS high temperature/recovery)

During the charging and discharging process, when the temperature of MOS exceeds "high-temperature protection", the BMS will terminate the charging and discharging state to ensure the battery pack remains in normal working condition. Only when the temperature of MOS falls below the "over temperature recovery", the BMS will lift the 'high-temperature protection' warning and simultaneously reactivate the charging and discharging switch;

12) (Balanced release voltage)

The BMS will terminate the equalization state when the voltage difference between any two single cells falls below this set value;

13) (Balancing Temp)

Under Balancing conditions, when the equilibrium temperature exceeds this "high-temperature protection", the protection board will terminate the balancing state to ensure the battery pack remains in normal working condition; only when the equilibrium temperature falls below "this set value" will the protection board lift the ‘high-temperature protection’;

14) (Balancing frequency)

The balancing operating frequency of the protection board, measured in milliseconds, is limited to a range of 1-100ms for balancing operations;

15) (Battery Capacity)

This value represents the design capacity of the battery, unit: AH; accurate filling is beneficial for remaining power calibration and usage safety;(The value will not be updated until the battery completes a full discharge and charge cycle.)

16) (Trigger Voltage gap)

When the voltage difference between any two battery strings exceeds this set value, the protection board will initiate balancing to protect the batteries;

17) (Balancing start Voltage)

When the voltage of any battery string exceeds the set value, the protection board will initiate balancing to prevent excessive voltage differences between batteries, thereby protecting the batteries;

18) ()(Present current,Internal parameters)

When a discrepancy is detected between the total current collected by the protection board and the actual current of the battery, input the accurate current value into the setting box and click the "Send" button to achieve current calibration functionality. (This requires using a clamp meter to measure the actual current of the battery or referring to the current displayed by the charger);

After entering specific current values, the app will provide feedback and display a set of internal calibration parameters, which users do not need to focus on; the actual input current should be checked on the "Real-time Status" page.

19) Fault delay

When the protection board switches from normal working state to abnormal working state (including but not limited to situations such as short circuit), and this state duration exceeds the set value, the protection board will attempt to enable charging/discharging to ensure safety; this value is limited to the range of 1-250s;

20) Discharging over current protection

When discharging the battery, if the continuous current exceeds the set value, the protection board generates a 'discharge overcurrent alarm' and simultaneously turns off the discharge switch;

21) Charging over current protection

When charging the battery, if the continuous current exceeds the set value, the protection board generates a 'charging overcurrent alarm' and simultaneously turns off the charging switch;

22) Fault Voltage gap protection

When the maximum and minimum single-cell voltage gap exceeds this value, the protection board will trigger the string disconnection protection, cutting off charging and discharging operations. The customer must promptly check whether the battery exhibits any abnormalities.

23) Current debouncing)

When the charge/discharge current is below the set value, the system defaults to displaying the current as 0A, with a default setting of 2A;

24) Short-circuit protection delay time

When the protection board detects a short circuit or excessive current lasting longer than the "short circuit protection delay" time, it triggers a 'short circuit alarm' and simultaneously shuts off the corresponding charge/discharge switch.

After the alarm is triggered, following either a "minimum of 60 seconds" or the fault delay time (whichever is longer), the customer must recharge/discharge the battery or apply a load again for the protection board to reactivate the charge/discharge switch.

(It is recommended to use the factory default settings; setting the short circuit protection to '0s' means disabling short circuit protection).

25) RenameDevice

Enter the desired Bluetooth device name (within 25 characters), click send, and the protection board name will be modified;

4. Appendix: Default Parameter for Various Battery Types

NO.	parameters	One-Key Ternary	One-Key FeLi	One-Key LTO	Un
1	Battery strings	0-24	0-24	0-24	S
2	Individual overvoltage protection	4.2	3.75	2.8	V
3	Individual overvoltage Recovery	4.1	3.65	2.7	V
4	Individual undervoltage protection	2.9	2.4	1.6	V
5	Individual undervoltage Recovery	3.1	2.7	1.8	V
6	Probe high temperature	65	65	65	℃
7	Probe temperature recovery	55	55	55	℃
8	MOSProbe high temperature	80	80	80	℃
9	MOSProbe temperature recovery	70	70	70	℃
10	Balanced release voltage	0.01	0.01	0.01	V
11	Balancing Temp	60	60	60	℃
12	Balancing frequency	80	80	80	ms
13	Battery Capacity	100	100	100	AH
14	Trigger Voltage gap	0.4	0.4	0.4	V
15	Balancing start Voltage	4.1	3.65	2.7	V
16	Present current	800	800	800	A
17	Fault delay	10	10	10	s
18	Discharging over current protection	3000	3000	3000	A
19	Discharging over current protection	3000	3000	3000	A
20	Fault Voltage gap protection	2.5	2.5	2.5	V
21	Current debouncing	2	2	2	A
22	Short-circuit protection delay time	200	200	200	us