Product Manual

Lithium Battery Balancing Protection Board

Product Models：EC(3-24)S(40-200)A

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Contents

1. Product Overview

Lithium battery intelligent protection board is a management system tailored for large capacity series lithium battery pack, with voltage acquisition and balancing, overcharge over pass temperature protection, coulomb meter,

Bluetooth communication and other functions. It is suitable for various battery types including lithium iron phosphate (LiFePO4), ternary lithium, and lithium titanate.

The protection board is equipped with energy transfer balancing technology, which enables voltage equalization between battery cells, thereby maximizing battery consistency, improving battery range, and delaying battery aging.

The protection board comes with a matching mobile app that supports both Android and iOS operating systems. The app can connect to the protection board via Bluetooth to monitor battery operating status, modify various working parameters of the protection board, control charge/discharge switches, and more. This protection board features a compact size, simple operation, and comprehensive functionality, making it widely applicable in fields such as battery PACKs for small sightseeing vehicles, mobility scooters, shared electric vehicles, high-power energy storage, base station backup power supplies, solar power stations, and other related products.

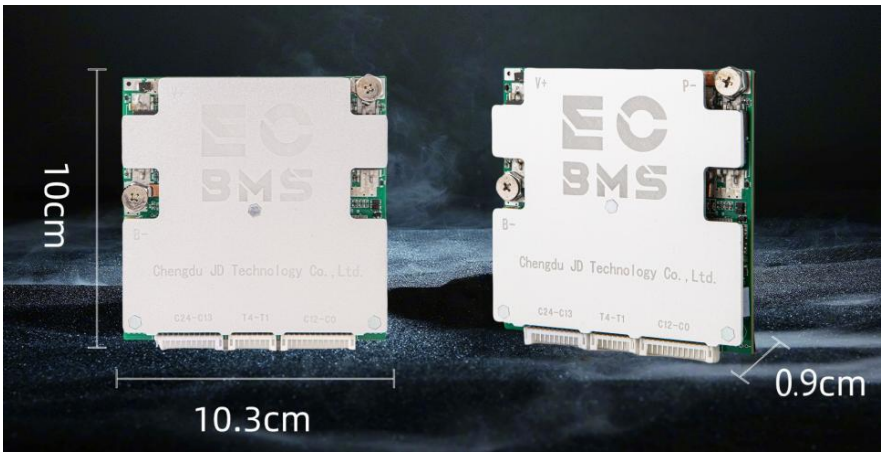
2. Functional characteristics

LED Bluetooth status indicator	**Supports RS485/CAN expansion**

APP Bluetooth remote operation	**Multi-string domain support**
Battery capacity calculation	**Support all Ternary/iron lithium**
High precision voltage acquisition (±3mV)	**Built-in and external 4-cell temperature detection**
High precision current acquisition	**Charge overcurrent protection**
Support information screen display	**Charge overvoltage protection**
Charge over temperature protection	**Discharge over temperature protection**
Low temperature protection during charge	**Short circuit protection**
Discharge overcurrent protection	**Long-term inactivity sleep mode（Discharge for 18h ）**
Discharge undervoltage protection	**Dormancy and simple activation(Charge&Load)**
Dormancy and simple activation(Charge&Load)	**Independent watchdog and never crash**

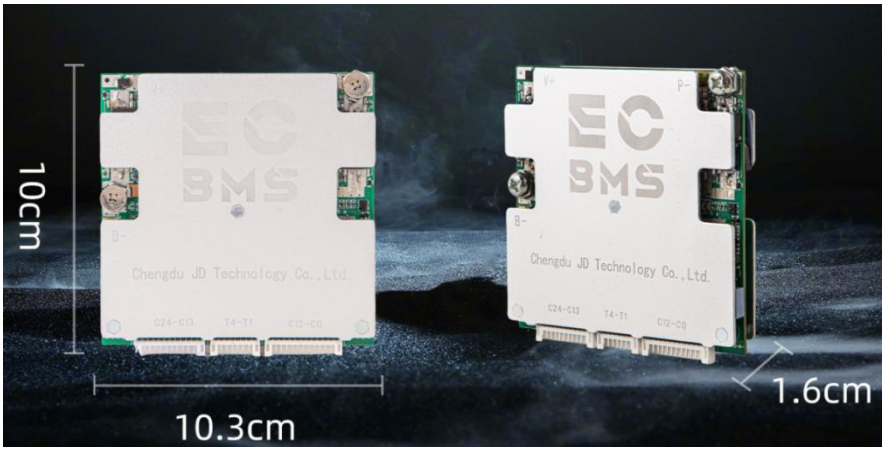
3. Front view of the product

3.1 Product Dimensions Display)(40/50/60/80/100A



Dimensions:EC(0-24)S(40-100)A

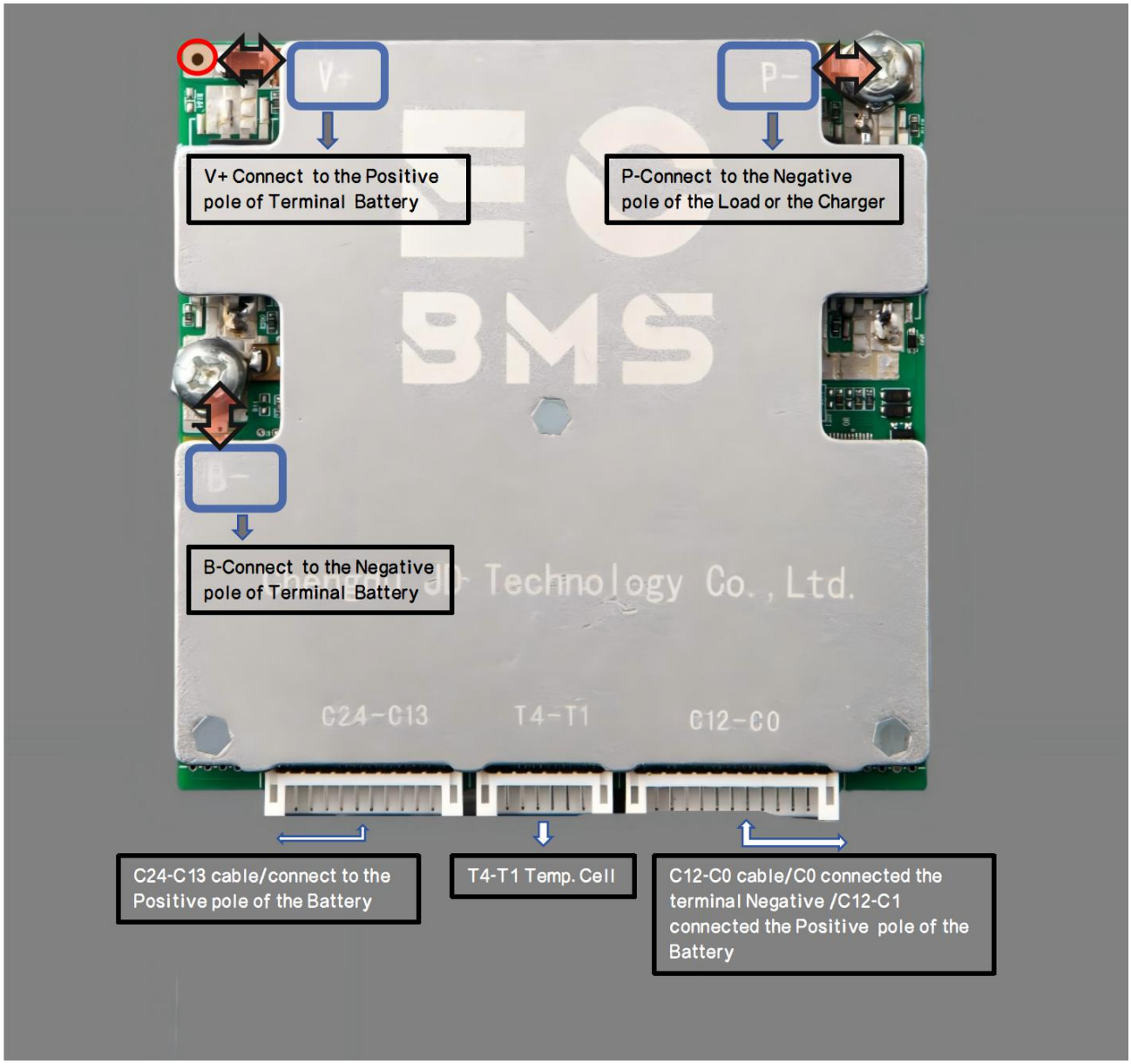
3.2 Product Dimensions Display)(120/150/200A



Dimensions:EC(0-24)S(120-200)A

3.3Product Connection Interface Introduction-EC(8/16/20/24)S(40-200)A

The attached figure shows the Chinese-English comparison of the front interface area of the product, with special attention to the V+ interface.



Schematic diagram ofthe EC(8/16/20/24)S(40-200)A connector

4. Installation Precautions and Instructions

4.1 Installation Precautions

4.1.1 The unpacking inspection and precautions：

Unpacking inspection and precautions are as follows:

The packing box and protection board should be handled gently and not upside down. Before unpacking, pay attention to whether the package is intact, such as whether there are impact marks, whether there is damage, etc.;

4.1.2 Accessories description (special attention)

For models with less than 12 strings, the standard configuration is a set of collection cables;

For models with more than 12 strings, the standard configuration is two sets of collection cables + external NTC line;

4.1.3 General Wiring Precautions

To ensure the protection board can work normally and avoid burning the board or abnormal operation, it is strictly required to follow these precautions for wiring operations:

1.Ensure the battery wiring is correct: To guarantee proper series connection of the battery pack, it is recommended to measure the battery string voltage with a multimeter at first;

2.Before thoroughly verifying the correctness of the wiring, do not form a complete electrical circuit with the battery, external load, and protection board；

3.First connect V+ hole: The anti-static design can effectively prevent accidental breakdown caused by static electricity, pulse voltage, surge voltage, etc.;The diameter of the V+ wiring should be comparable to the C-X cable.

4.Connect the battery's total negative to the protection board B-(Black cable); Connect the load's total negative to the protection board P-(Red cable);**It is strictly prohibited to connect wires after inserting the terminal block throughout the entire process;**

There are two methods for connecting the B- and P- terminals of the protection board:

1) M6 Ring、Round Crimp Terminales or Copper Lug can be used;

2) Remove the B- and P- nuts on the protective cover, and directly solder the corresponding cables to the B- and P- connection points. During soldering, ensure not to connect to adjacent resistors or pins.

5.First insert the 13P cable (the group with more black wires), and you will see a light in the middle of the board shines. After the light flashes, insert the 12P cable (the group with more red wires).

Once the light is on, the protection board can already be controlled via the APP.

For specific connection methods of the cables, please refer to Section 4.3: Wiring Diagrams for Batteries with Different Cell Counts.

6.Line inspection: Conduct a comprehensive check of the circuit. Before connecting the load, never reverse the positive and negative wires or short-circuit the positive terminal!

7.The BMS board is set with “disable short-circuit protection”. It will prevent circuit interruption caused by excessive starting current, thereby avoiding potential safety hazards (such as sudden vehicle stops).

During initial use, the discharge can be disabled via the mini-program first, followed by turning off charging, before connecting the load.

★Before starting the protection board, check whether the BMS is properly connected, whether P- and B- are correctly connected. Check whether the protection board has been securely fixed with the battery core, and confirm that it is correct before you can switch on the protection board, otherwise it may cause serious consequences such as abnormal work and even burning.

4.2C0/C12/C24 Wiring Rules

1.The C0 cable (blue wire tag) of the protection board must be connected to the total negative terminal of the battery or the negative terminal of the first battery string;

2.If the battery strings is less than 12, the C12 cable (yellow wire tag) must be connected to the last battery cell's corresponding wire and then linked to the positive terminal of the last battery cell;

3.If the battery strings is 12, the C12 cable (yellow wire tag) only needs to be connected to the positive terminal of the 12th battery string;

4.If the battery strings is more than 16 but less than 24, the C24 cable (yellow wire tag) must be connected to the positive terminal of the last battery string after being bridged with the wiring harness corresponding to the last battery string.

5.When the number of battery strings is between 13 and 16, since the 13S-24S chip requires power supply from the C13-C16 wiring, it is essential to ensure that the C13-C16 and C24 wiring are connected to the corresponding battery positive terminals according to Rule 4; while the C0-C12 wiring should be connected to the corresponding battery positive terminals according to Rule 2: the 13S wiring connection is 9S+ (C13-C16 connection method), the

14S wiring connection is 10S+ (C13-C16 connection method), the 15S wiring connection is 11S+ (C13-C16 connection method), and the 16S wiring connection is 12S+ (C13-C16 connection method).

6.If the number of battery strings is 24, the C24 cable (yellow wire tag) only needs to be connected to the positive terminal of the 24th battery string;

4.3Detailed wiring diagram for different strings

To demonstrate the connection method between the cable of the BMS and the battery strings, also to prevent situations such as board burnout caused by incorrect wiring by customers, users **must strictly follow the wiring diagrams provided below for different battery strings.**

Please refer to Attachment 1 for the specific wiring diagram.