AYAA TECHNOLOGY CO., LTD

Datasheet

12S 81A Lithium Battery Smart BMS

BMS Product Specification

Customer Name	**Shenzhen Ayaa Technology Co., Ltd**
Model Name	**EF-006**
Output Mode	**Power MOSFET**
Comm Interface	CAN | UART | Type-C | BLE
FCS	PX4 & jiyiuav & VKCAN & SKYRCCAN & BOYINGCAN & DroneCAN (formerly UAVCAN/Cyphal)
Date	**2025/1/18**

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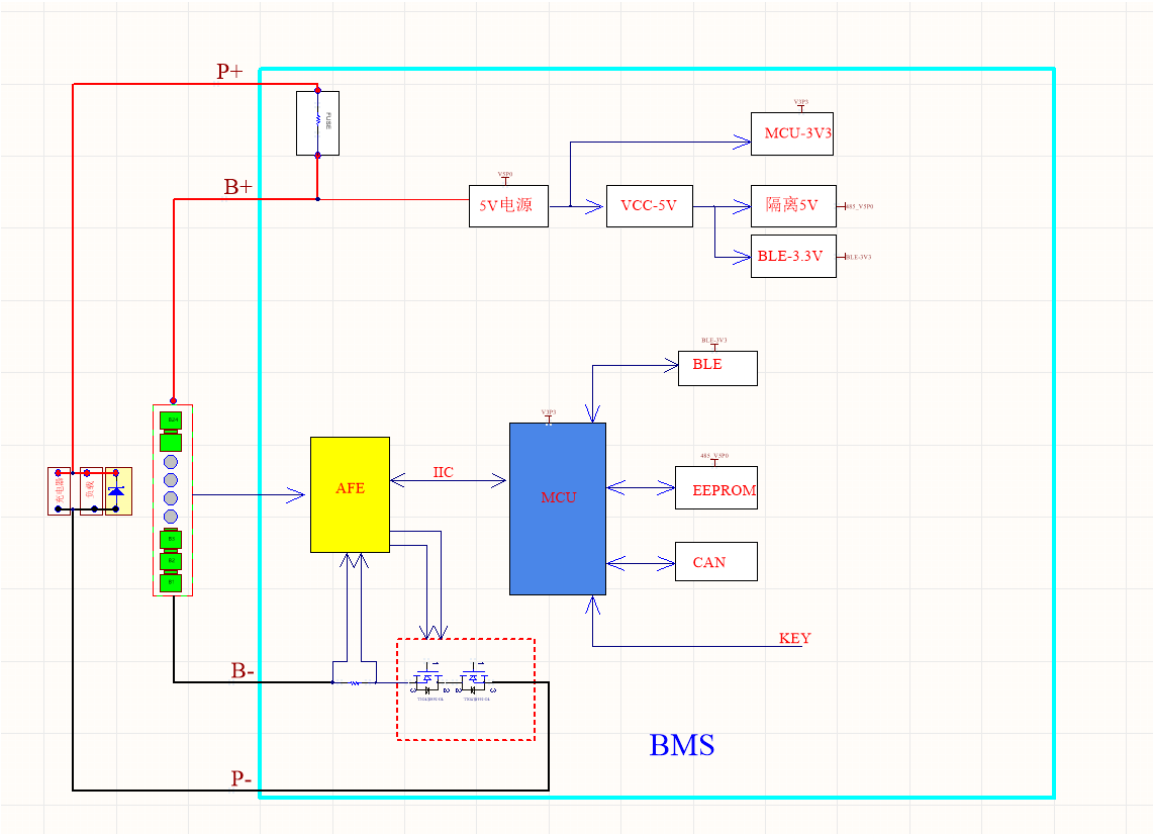
1. Product Introduction

EF-006 smart drone BMS is designed for a 12-series lithium battery pack (NMC, 3.0–4.2V per cell) with charge and discharge sharing a single port. It supports continuous discharging current of 81A. Temperature monitoring is handled by 3 NTC probes for the battery and 1 for the MOSFET. Communication options comprise isolated 485, UART, and CAN (standard), along with a Bluetooth module (115200 baud, ID:1) and CAN at 1000K baud. It operates from −20°C to 70°C, and draws ≤10 mA in active mode and ≤50 μA in deep sleep (triggered by cell undervoltage). Pre-discharge and history storage functions are provided as standard.

2. Function Block Diagram



3. Configuration

Function	Configuration	Function	Configuration
Number of Series Cells	12S	RS485 (Isolated)	/
Continuous Discharge Current	81A	UART (Isolated)	/
Continuous Charge Current	27A	CAN Communication (Isolated)	Standard
Number of NTCs	3 x Battery + 1 x MOS	Heating Function	/

Function	Configuration	Function	Configuration
Balancing Function	Passive Balancing	Bluetooth Module	Standard
Switch Function	/	Battery Packs in Series	/
Charge Current Limiting	/	Secondary Protection	/
Battery Packs in Parallel	/	LCD Display	/
History Storage	Standard	LED Indicator Interface	/
Pre-discharge Function	Standard	GPS Interface	/

Note: Non-isolated communication does not support communication with chargers or loads.

4. Parameter Settings

4.1 Basic Parameters

Battery Pack Configuration	12S
Interface Type	Common Charge/Discharge Port
Charge Voltage	50.4V
Cell Voltage Range	Ternary Lithium: 3.0-4.2 V
Continuous Charge Current	27A
Continuous Discharge Current	81A
Communication Interface / Host Baud Rate and ID	BLE Baud Rate: 115200 ID:1 CAN Baud Rate: 1000K ID:1
Operating Power Consumption	≤10mA
Sleep Power Consumption	≤3 mA (Bluetooth operating normally)
Sleep Condition	No current, communication, or protection state
Deep Sleep Power Consumption	≤50uA
Deep Sleep Condition	Cell under-voltage state
Operating Temperature	-20℃~70℃
Board Dimensions	120 mm x 90 mm x 20 mm ± 20 mm (L x W x H)
Weight	95g

4.2 Main Parameters

Parameter		Specification			
		MIN (Ternary Lithium)	TYP (Ternary Lithium)	MAX (Ternary Lithium)	Unit
Cell Voltage Protection Parameters					
Single-Cell Over-Charge Protection	Over-Charge Voltage Protection	4.225	4.25	4.275	V
	Over-Charge Protection Delay Time	2	3	4	S
	Over-Charge Protection Release Voltage	4.075	4.1	4.125	V
Single-Cell Over-Discharge Protection	Over-Discharge Voltage Protection	2.975	3.0	3.025	V
	Over-Discharge Protection Delay Time	2	3	4	S
	Over-Discharge Protection Release Voltage	3.475	3.5	3.525	V
Balancing Function					
Balancing Voltage	Balancing Start Voltage	3.775	3.8	3.825	V
	Balancing Start Voltage Difference	0.03	0.05	0.07	V
	Balancing Current	40	50	60	mA
	Balancing Mode	Passive Balancing			/
Current Protection Parameters					
Charge Over-Current Protection	Charge Over-Current Protection Current	28	30	32	A
	Charge Over-Current Protection Delay Time	4	5	6	S
	Charge Over-Current Protection Release	Delay 30 s / Automatic Recovery			
Discharge Over-Current Protection	Peak Current	130	180	230	A
	Peak Current Duration	4	5	6	S

Ayaatech BMS Datasheet

Parameter		Specification			
		MIN (Ternary Lithium)	TYP (Ternary Lithium)	MAX (Ternary Lithium)	Unit
	Discharge Over-Current Protection Current	31	81	131	A
	Discharge Over-Current Protection Delay Time	23	25	27	S
	Discharge Over-Current Protection Release	Delay 30 s / Automatic Recovery			
Short-Circuit Protection Parameters					
Short-Circuit Protection	Short-Circuit Protection Current	390	440	490	A
	Short-Circuit Protection Delay Time	200	400	600	uS
	Short-Circuit Protection Release	Delay 30 s / Automatic Recovery			
	Short-Circuit Description: The minimum and maximum values of the short-circuit current listed in the table define the effective range of the short-circuit protection function. If the current is lower than the minimum value or higher than the maximum value, it may cause the short-circuit protection to fail. Please thoroughly assess the actual short-circuit current value or series resistance before conducting short-circuit tests.				
Cell Temperature Protection Parameters					
Charge Temperature Protection Charging Temperature Protection	Charge High-Temperature Protection Charging High Temperature Protection	53	55	57	℃
	Charge High-Temperature Protection Release Charging High Temperature Protection Release	43	45	47	℃
	Charge Low-Temperature Protection Charging Low Temperature Protection	-2	0	2	℃
	Charge Low-Temperature Protection Release Charging Low Temperature Protection Release	1	3	5	℃
Discharge Temperature	Discharge High-Temperature Protection Discharging High Temperature Protection	73	75	77	℃
	Discharge High-Temperature Protection Release	53	55	57	℃

Ayaatech BMS Datasheet

Parameter		Specification			
		MIN (Ternary Lithium)	TYP (Ternary Lithium)	MAX (Ternary Lithium)	Unit
Protection Discharging Temperature Protection	Discharging High Temperature Protection Release				
	Discharge Low-Temperature Protection Discharging Low Temperature Protection	-22	-20	-18	℃
	Discharge Low-Temperature Protection Release Discharging Low Temperature Protection Release	-12	-10	-7	℃
MOS Temperature Protection Parameters					
MOSHigh-Temperature Protection High Temperature Protection of MOS	MOSTemperature Protection Value Temperature Protection Value	85	90	95	℃
	MOSTemperature Protection Release Value Temperature Protection Release Value	65	80	75	℃
Pack Voltage Protection Parameters					
Pack Over-Charge Protection Total Voltage Over charge Protection	Pack Over-Charge Protection Voltage Overall Overcharge Protection Voltage	50.7	51.0	51.3	V
	Pack Over-Charge Protection Delay Time Overall Overcharge Protection Delay	2	3	4	S
	Pack Over-Charge Protection Release Voltage Overall Overcharge Protection Release Voltage	48.	49.2	49.5	V
Pack Over-Discharge Protection Total Voltage Over discharge Protection	Pack Over-Discharge Protection Voltage Overall Over discharge Protection Voltage	35.7	36	36.3	V
	Pack Over-Discharge Protection Delay Time Overall Over discharge Protection Delay	2	3	4	S
	Pack Over-Discharge Protection Release Voltage Overall Over discharge Protection Release Voltage	41.7	42	42.3	V

Parameter		Specification			
		MIN (Ternary Lithium)	TYP (Ternary Lithium)	MAX (Ternary Lithium)	Unit
Heating Management					
Heating Management Heating Manage	Heating Start Temperature Heating Opening temperature		/		℃
	Heating Stop Temperature Heating Stop temperature		/		℃
	Heating Current	/			A
	Heating Mode	Heating During Charging Heating By Charge			

Important Note: This BMS is designed to support mixed sodium/lithium cells. Two sets of voltage protection parameters are provided for different cell types.

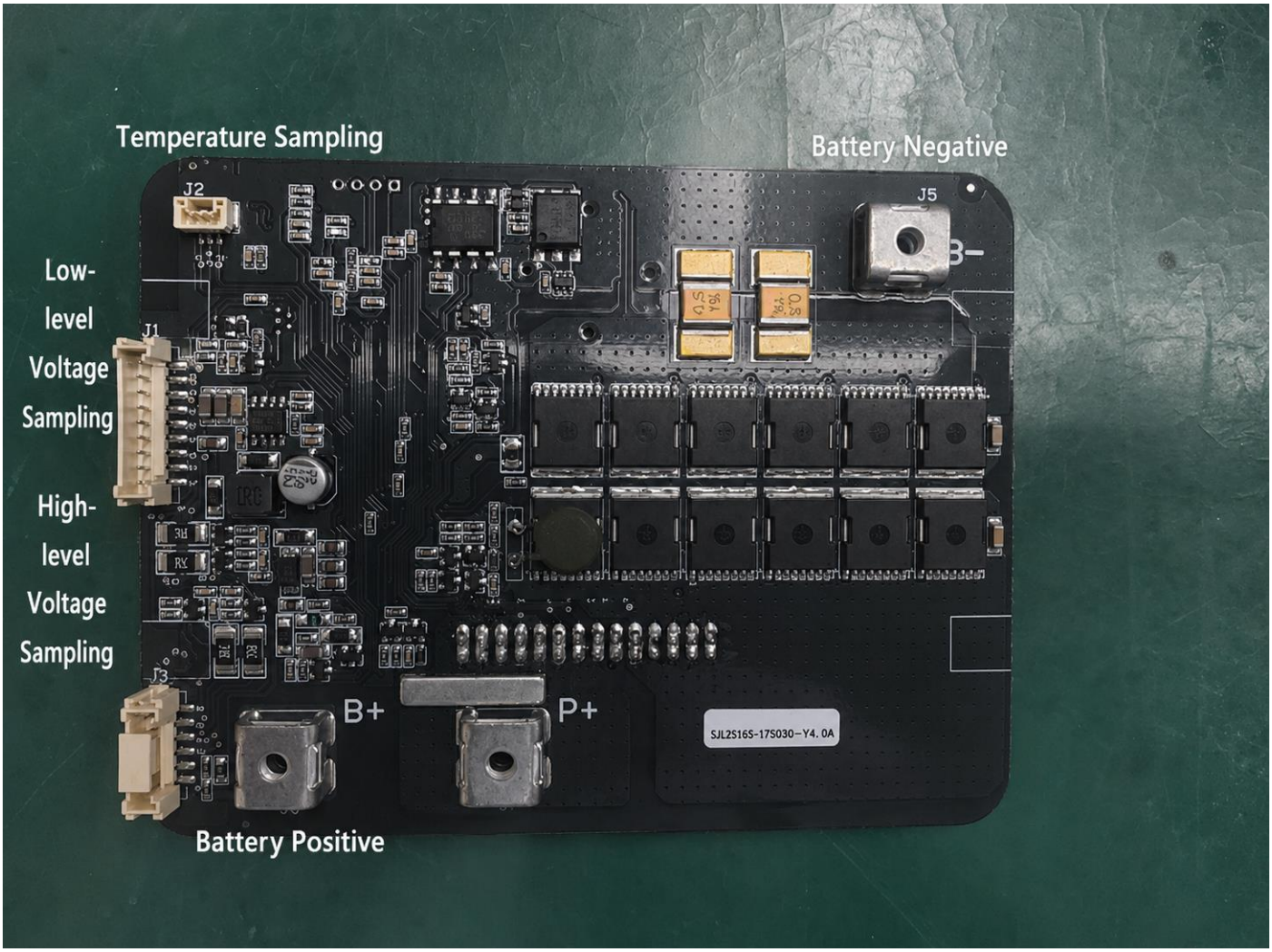
5. Bill of Critical Materials

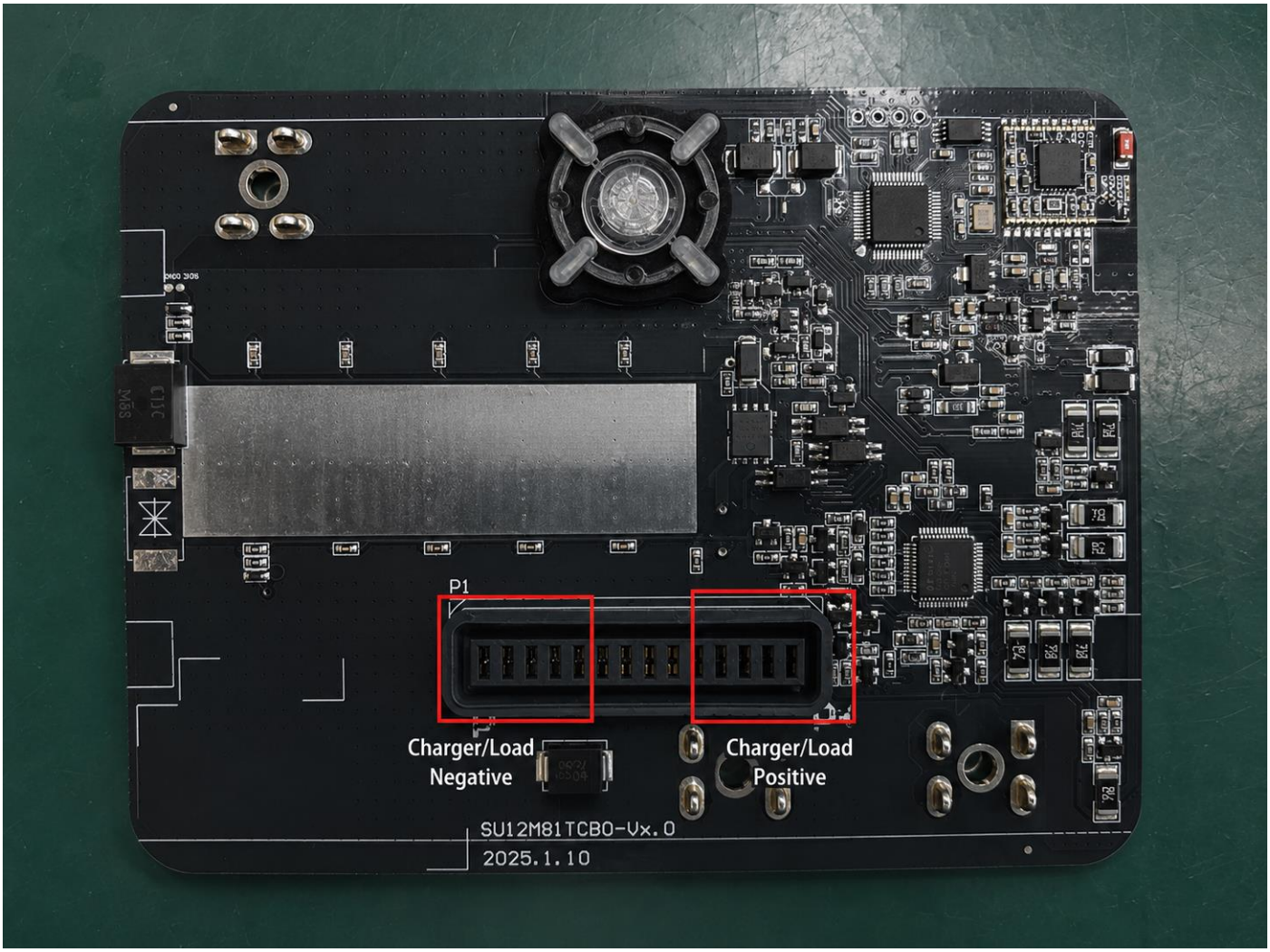
No.	Material Name	Manufacturer	Package	Qty
1	GD32F103CBT6	GigaDevice	TQFP48	1
2	SH367309	Sino Wealth	TQFP48	1
3	CRSZ025N10NZ	CR Micro	TOLL	12

Important Note: To ensure supply-chain security, equivalent alternatives with the same quality level and specifications may be used for all BMS materials, especially key components. If certification requirements prohibit replacement or require customer approval before replacement, notify our sales team to resubmit the sample proposal and confirm the specification.

6. Product Diagram and Dimensions

6.1 Product Photos and Interface




P1
Charger/Load
Negative
Charger/Load
Positive
SU12M81TCB0-Vx.0
2025.1.10

6.2 Cell Voltage Sampling Interface

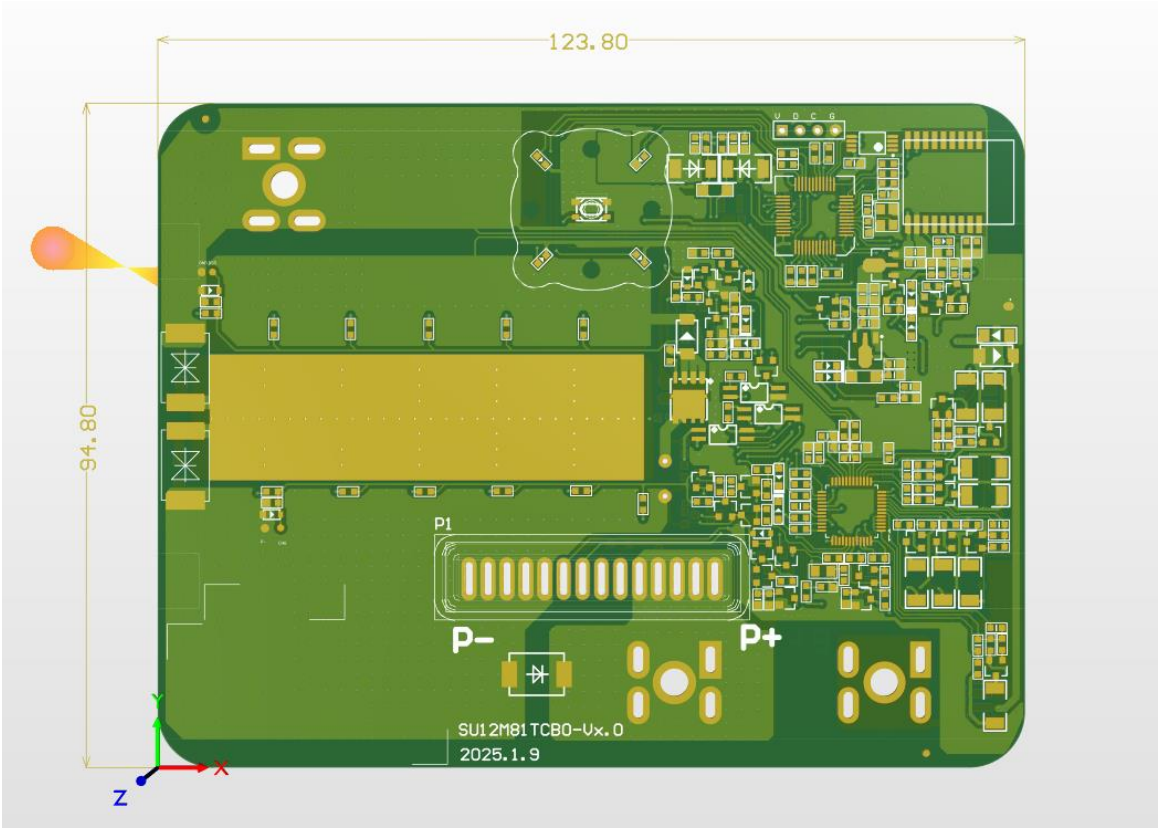
Low Cell Voltage Sampling Interface					
NO	**PIN**	Pin Function	**NO**	**PIN**	Pin Function
1	GND	Connect to Negative side of cell 1	2	B0	Connect to Negative side of cell 1
3	B1	Connect to Positive side of cell 1	4	B2	Connect to Positive side of cell 2
5	B3	Connect to Positive side of cell 3	6	B4	Connect to Positive side of cell 4
7	B5	Connect to Positive side of cell 5	8	B6	Connect to Positive side of cell 6
9	B7	Connect to Positive side of cell 7			
High Cell Voltage Sampling Interface					
NO	**PIN**	Pin Function	**NO**	**PIN**	Pin Function
1	B8	Connect to Positive side of cell 8	2	B9	Connect to Positive side of cell 9
3	B10	Connect to Positive side of cell 10	4	B11	Connect to Positive side of cell 11
5	B12	Connect to Positive side of cell 12	6	B+	Connect to Positive side of cell 12
Temperature Sampling Interface					
NO	**PIN**	Pin Function	**NO**	**PIN**	Pin Function
1	T3+	Positive side of temperature sensor3	2	T2+	Positive side of temperature sensor2
3	T1+	Positive side of temperature sensor3	4		

6.3Panel Interface Definition

6.4 Panel Interface Definition					
NO	**PIN**	Pin Function	**NO**	**PIN**	Pin Function
1	P-	Load or Charger Negative	2	P-	Load or Charger Negative
3	P-	Load or Charger Negative	4	P-	Load or Charger Negative

6.4 Panel Interface Definition					
5	P-	Load or Charger Negative	6	K-	Wake-Up Switch Negative
7	K+	Wake-Up Switch Positive	8	CANH	CAN High Level
9	CANL	CAN Low Level	10	P+	Load or Charger Positive
11	P+	Load or Charger Positive	12	P+	Load or Charger Positive
13	P+	Load or Charger Positive	14	P+	Load or Charger Positive

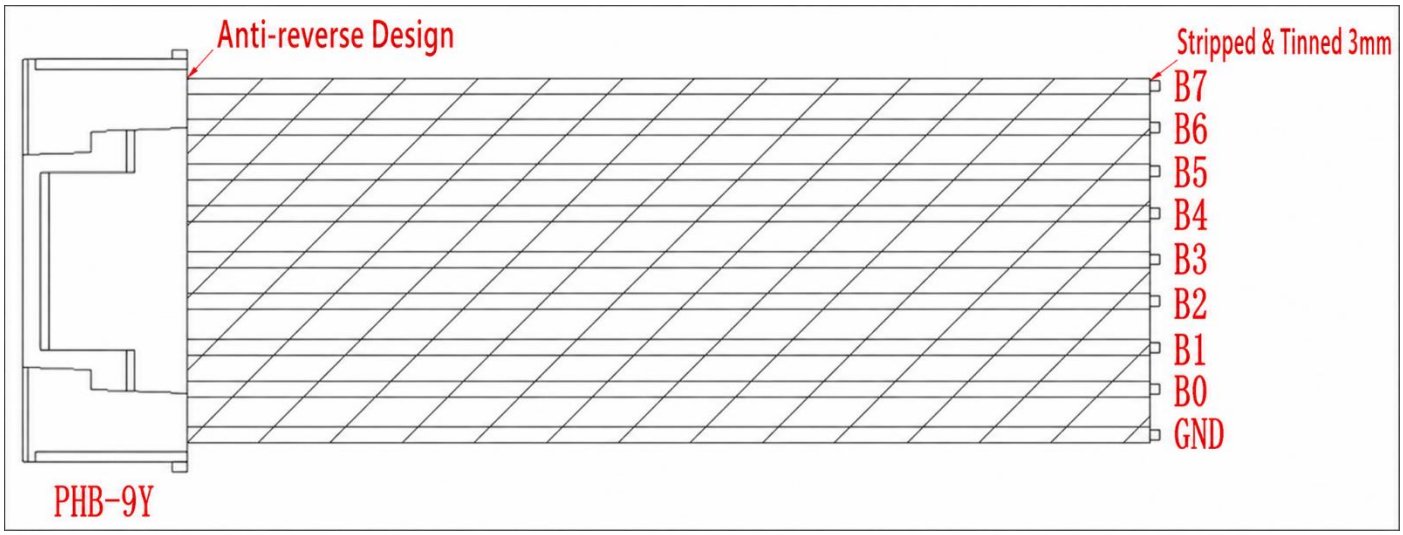
7. Product Dimensions



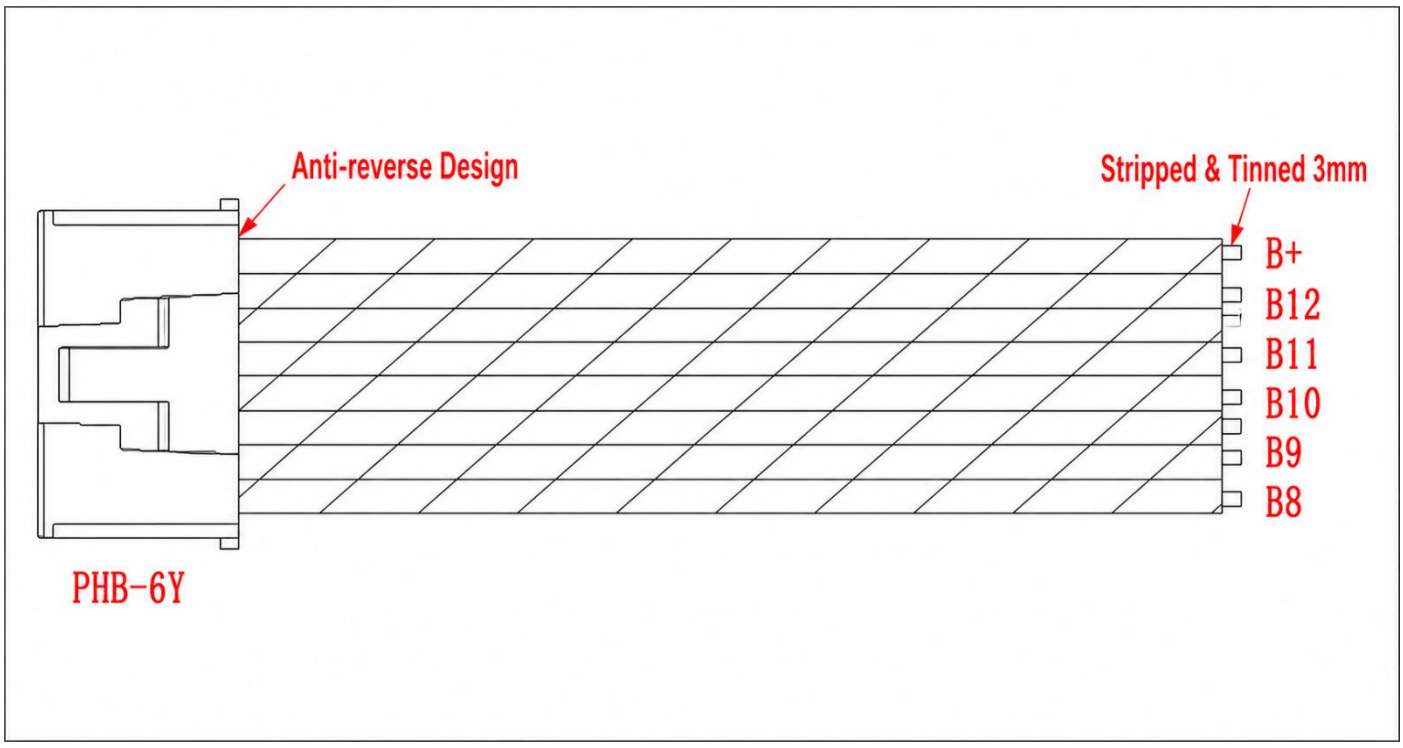
Note: Unit: mm

8. Wiring Harness

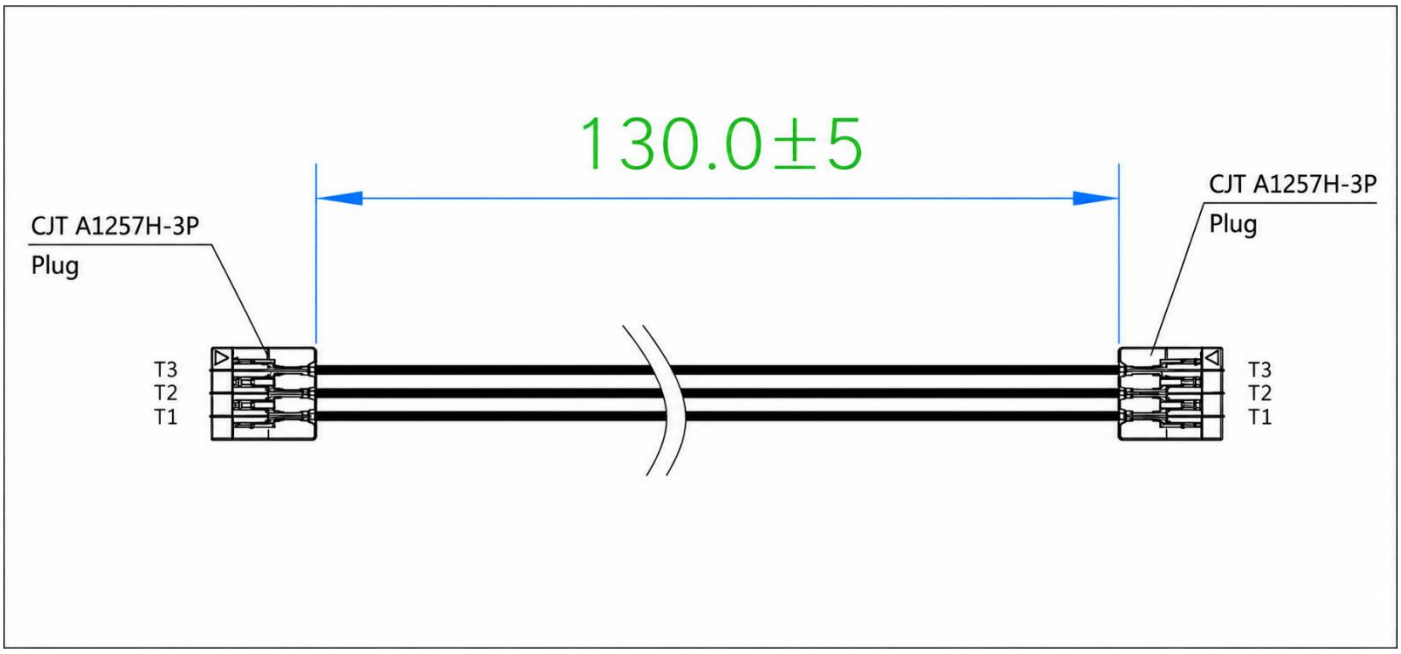
8.1 Low-side cell voltage sampling cable: PHB-9Y / soft silicone ribbon cable / 24# / 143 mm / FSTP2



8.2 High-side cell voltage sampling cable: PHB-6Y / soft silicone ribbon cable / 24# / 113 mm / FSTP02



8.3 Temperature cable: GH-3Y / UL3266-28AWG / 130 mm / FSTP02 / with A1257H-3P



9. Product Setup Instructions

9.1 Charge and Discharge Wiring Diagram

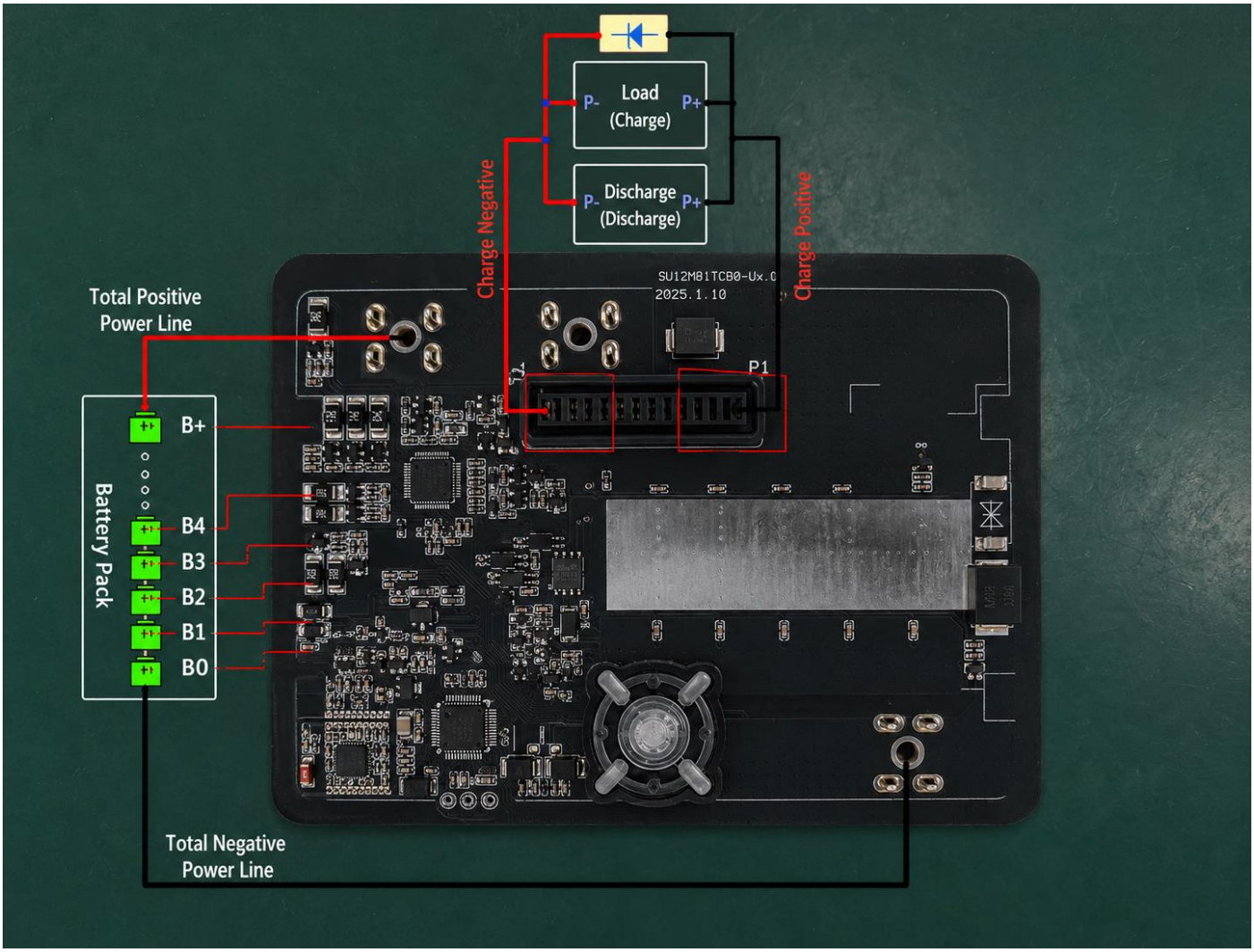


Figure: BMS Overall Wiring Diagram

10. **Electrical Connection Sequence**

10.1Power-Up Sequence:

Step 1: Connect the main board B- to the negative terminal of the battery pack.
Step 2: Connect the communication harness.
Step 3: Connect the low-side cell sampling harness first, then connect the high-side cell sampling harness.
Step 4: Connect the P- power cable to the negative terminal of the load or charger, or connect the C- power cable to the negative terminal of the charger.
Step 5: After confirming that all connections above are correct, short K+ and K- for 1 second and then disconnect them. The BMS will power on and start self-test. If the self-test is normal, the board status indicator flashes once per second. If an abnormal condition is detected, such as over-voltage, under-voltage, or over-temperature, the indicator flashes three times per second as an alarm.

10.2Power-Down Sequence:

Step 1: Disconnect the charger and load.
Step 2: Disconnect the voltage sampling harness.
Step 3: Disconnect all communication cables.
Step 4: Disconnect the main board B-.
Note: If the voltage sampling wires are soldered:
A. Pre-processing: Place the BMS on an anti-static workbench. The operator should pre-tin the pads to be soldered with a soldering iron. If incoming parts are not pre-tinned, tin them in advance as well to reduce live-soldering time.
B. Soldering sequence: Solder the battery sampling wires in the order B1 -> B2 -> ... -> B+. Power on only after confirming that all soldering is correct.
C. Avoid touching nearby components and PCB traces during soldering.

10.3Temperature Sensor Installation

The temperature sensor on the main board monitors the battery pack temperature. During installation, place the probe firmly against a cell near the middle of the battery pack to measure the area where pack heat is most concentrated.

10.4 Electrical Wiring Instructions

When connecting the BMS to the battery pack, first connect the pack negative terminal to B- on the BMS to ensure reliable system grounding. The impedance of the power cable from the pack negative terminal to B- on the BMS should be as low as possible, ideally within 0.1 mΩ, to ensure current detection accuracy during high-current charge and discharge.

When testing charge or discharge current above 50 A, all B- and P- power cables on the main board must be connected to ensure overcurrent capability and balanced current sharing among power devices.

11 BMS Unpacking Inspection and Precautions

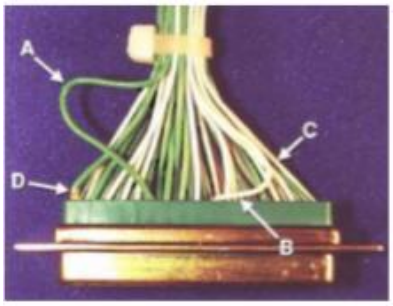
Before unpacking, check whether the packaging is intact, including signs of impact or damage. Handle the package and BMS gently and avoid placing them upside down.

Before installing the BMS, ensure that all cells are properly matched. If the power-on voltage is too high or too low, the BMS will report an alarm and may not operate normally. If any cell is overcharged or over-discharged, charge or discharge the cell back to the normal voltage range before connecting the BMS.

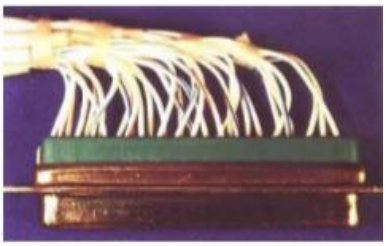
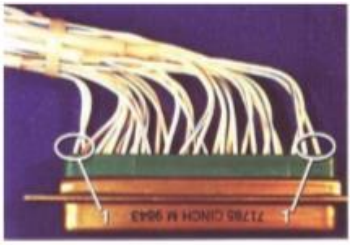
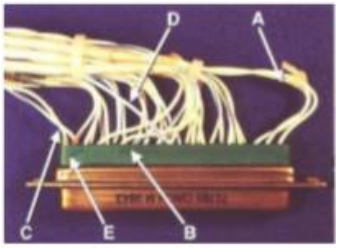
11.1 Wiring Harness Organization

Wiring harness organization depends on connector design, harness exit direction, and the amount of movement the harness may require inside the connector. The standards below apply to common stress-prone applications.

A. Straight routing: Place the harness tie point at a distance approximately equal to the connector width.

Objective (Figure A): The wiring harness exit is perpendicular to the connector's surface; there's enough distance between the tie point of the harness and the connector to prevent any stress on the wires.	Acceptable (Figure B): The wiring harness exit is almost perpendicular to the connector; the harness is free from stress.	Not Acceptable (Figure C,A): The length of the wiring harness is too long; The wiring harness exit forms a sharp angle with the connector's surface (Figure C, B); The harness is under stress (with no room for movement whatsoever).
 Fig. A (1: high-stress area)	 Fig. B	 Fig. C

B. Side routing: Place the harness bend point at approximately one-third of the connector width.

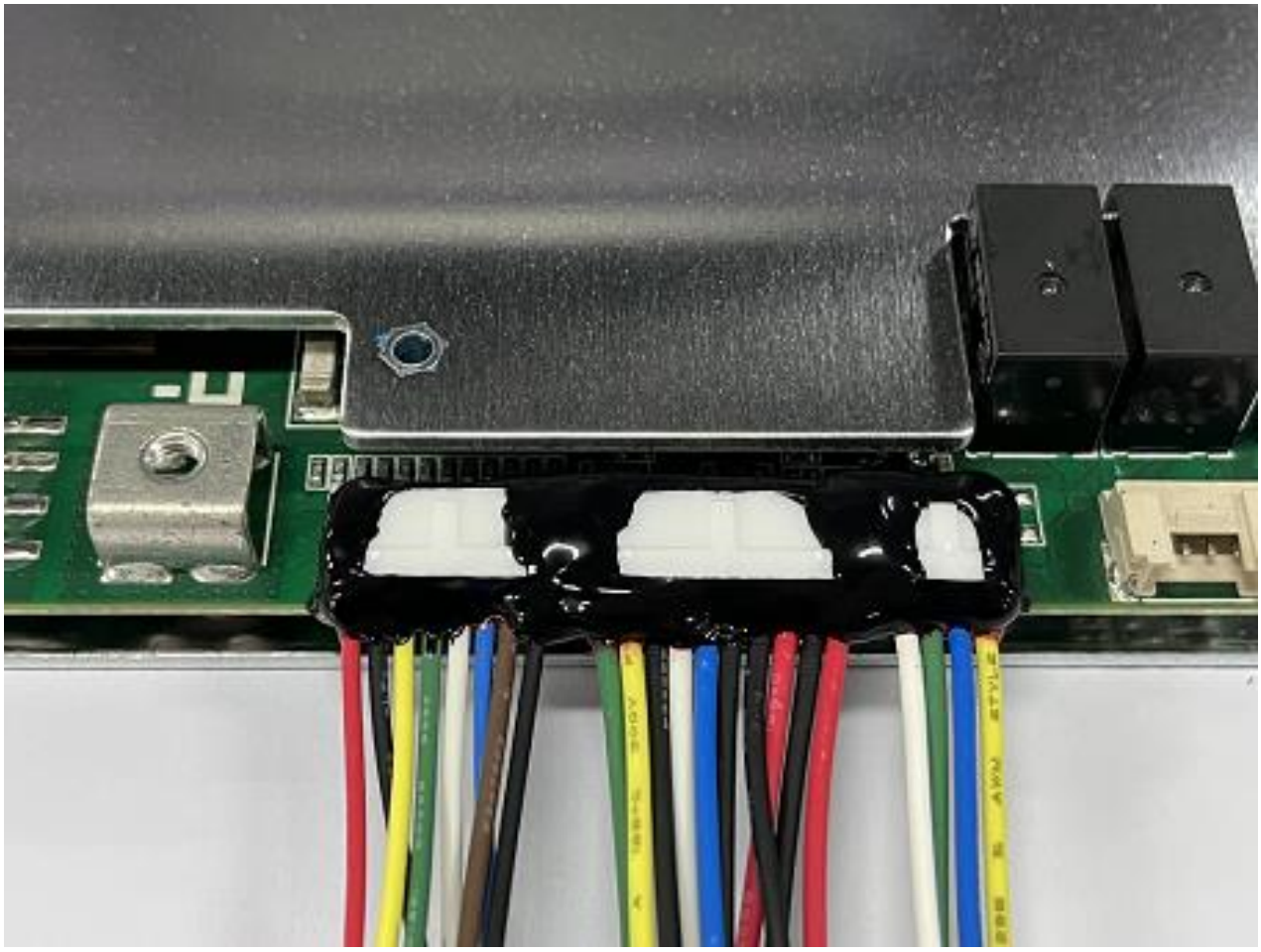
Objective (Figure A): The wire harness should be perpendicular to the connector before any bending; The harness should be free from stress; The harness shouldn't experience stress from any ties.	Acceptable (Figure B): The wire harness exit is nearly perpendicular to the face of the connector.	Not Acceptable (Figure C): The wire harness is excessively long (A). A sharp angle is formed between the wire harness exit and the connector (B). The wire harness has tension or stress (lacks slack or free movement) (C, D).
 Fig. A	 Fig. B (1: high-stress area)	 Fig. C

C. Harness fixation:

Secure the harness to the enclosure or mounting plate with clips or cable ties. Routing must be neat and firmly fixed, with no loose hanging, interference stress, friction, or wear. A fixing point is required 30-50 mm from the connector. Spacing between fixing points must not exceed 200 mm. Add fixing points within 80 mm on both sides of any corner or edge.

11.2 Securing Connectors with Adhesive

After harness installation, confirm that the connector latch is fully seated. Apply flame-retardant red or yellow hard adhesive around the latch and at the interface between the harness housing and the BMS connector. Apply adhesive on both the front and back sides.



Important Note:

Because motor controllers include freewheeling protection devices, this BMS board is not equipped with a high-power freewheeling diode. When using a large charge/discharge test cabinet for battery pack discharge testing, connect a freewheeling protection diode in parallel at the test cabinet output to prevent inductive effects at discharge shutdown. A 200 V / 100 A Schottky diode is recommended. Otherwise, induced voltage from the test cabinet may damage the BMS power devices.

11.3 Bluetooth/GPS Module Installation

The Bluetooth/GPS module is an independent module. To ensure signal strength, make sure the Bluetooth/GPS antenna is not shielded or obstructed by a metal enclosure.

11.4Assembly Precautions

1.1.1Prevent static electricity during assembly and use. Do not touch conductive areas of the circuit board directly by hand. Soldering irons and electric tools used for assembly must be properly grounded.
1.1.2During assembly and use, avoid applying stress to the circuit board to prevent damage to electronic components and possible circuit board failure.

12.Disclaimer

If operations are not performed in the required sequence, components on the protection board may be damaged, causing the board to lose its ability to protect the cells. The user is responsible for any resulting consequences.

13. Fault Diagnosis

NO	Fault Phenomenon	Troubleshooting
1	Smoke or burnt smell when plugging in the voltage collection harness	①. Immediately unplug the voltage collection harness and check whether the wiring on the cell end is soldered in the order of B0, B1, B2,... to the last string, and no sequence errors or cold solder joints are allowed; ②. For BMS boards with multiple voltage collection interfaces, check if the low-position collection harness is connected first, then the high-position; and if the high-position is unplugged first, then the low-position; ③. Check for any exposed wires short-circuiting or solder beads falling on the board.
2	BMS board does not power on	①. Check if there is an indicator light on the BMS board. If no light is on, try pressing the switch or charging to activate the BMS board. A 1-second flash indicates normal operation, meaning basic BMS functions and communication are normal. A 200ms fast flash indicates an alarm or abnormal protection; in this case, connect the communication interface or Bluetooth to check the BMS abnormal state. A flash every 10 seconds indicates the BMS board has entered sleep mode and needs charging or discharging to activate into normal operation; ②. If the light is constantly on, it generally indicates an accidental entry into the upgrade interface. Re-upgrade to solve this issue.

NO	Fault Phenomenon	Troubleshooting
3	Battery pack does not discharge	①. In normal operation mode, if there is no output, check if an external weak current switch is configured. Try pressing the external switch. You can also connect Bluetooth or the upper computer to check whether the discharge MOS status is set to "1", which means the discharge MOS is on and allows discharge, "0" means the discharge MOS is off and discharge is not allowed; ②. No output in sleep mode is normal as sleep mode saves power by shutting off output. Check if there is a weak current switch function; try the switch to wake up, or charge/discharge to wake up the BMS into normal operation mode; ③. Check if the indicator light is flashing at 200ms. If fast flashing, it indicates a battery abnormality, and the BMS protection action shuts off output. Connect communication or the Bluetooth APP to troubleshoot. Prioritize checking for voltage, current, or temperature abnormalities and related protections; ④. Check if abnormal protection has occurred without meeting recovery conditions.
4	Battery pack does not charge	①. Check if the charger matches. Normally, blind charging chargers connected to mains power have output voltage; confirm the output voltage is greater than or equal to the fully charged voltage of the battery pack. The charger voltage lower than the battery pack voltage cannot charge; ②. When using charge-discharge aging cabinets, some chargers require first identifying battery voltage. Protocol chargers may not match and fail to charge; ③. Check if the charger output voltage is about 1.2V higher than the current battery pack voltage. When the battery pack is nearly full, it might not charge or recognize the charger model, which is normal; ④. Some BMS boards have weak current switches, with charging controlled by the weak current switch. Try pressing the external switch to charge.
5	Voltage sampling harness overheats	①. Check if the end of the voltage collection harness is correctly connected to the cells, and if the high and low orders are reversed. Incorrect connections cause heating, and may damage the board's internal circuits and components; ②. Check if the number of harness strings matches the BMS board's factory strings. Mismatched harnesses and BMS board short-circuited strings cause heating and may damage the board's internal circuits and components.
6	One series cell voltage varies more as charge/discharge current increases, resulting in	①. Check if the soldering of the connecting pieces between the cell with large voltage changes and adjacent cells is firm;

NO	Fault Phenomenon	Troubleshooting
	a larger voltage difference from adjacent cells	②. Check if the soldering of the voltage collection wire of the cell with large voltage changes is firm; ③. Check if the internal resistance of the connecting piece between the cell with large voltage changes and adjacent cells is relatively large. Strongly recommend using soft copper bars for connections between battery groups instead of power cables.
7	Power cuts off when connecting a load or inverter	①. Check if the battery voltage is too low, triggering the BMS board's over-discharge protection. Connect the upper computer or Bluetooth APP to troubleshoot; ②. Check if the load or inverter power is too large, triggering the BMS board's overcurrent protection. Connect the upper computer or Bluetooth APP to troubleshoot; ③. Check if the device has large capacitors, triggering the BMS board's overcurrent or short-circuit protection. Connect communication or Bluetooth APP to troubleshoot.
8	Power cuts off during acceleration or climbing	①. Check if the BMS board's overcurrent protection is triggered. Connect the upper computer or Bluetooth APP to read alarms and operational data for troubleshooting, and optimize protection parameters; ②. Check if the battery power is sufficient and if under-voltage protection is triggered; ③. Check if the power cables are soldered firmly.
9	Bluetooth cannot connect	①. Check if the Bluetooth APP search interface can find the Bluetooth module's name. If found, the BMS board is working normally. If not found, the BMS board may be in sleep or under-voltage protection state; ②. Check if the Bluetooth module's indicator light is flashing green, indicating normal power supply to the Bluetooth module. Otherwise, check if the interface wiring is correct; ③. When the Bluetooth module indicator light is constantly on, it indicates the phone has paired with the Bluetooth module. If there is data on the interface, the Bluetooth connection is normal. Constant on with no data might be a setting error. Try modifying the ID number to 1 or 20 in the phone interface; ④. Check if the phone's Bluetooth function is turned on. In the Bluetooth search interface, try swiping down several times to refresh. Android phones also need to turn on location services.
10	CAN communication cannot connect	①. Check the brand of the CAN communication box. Recommended brand is Chuangxin Technology. Other brands may have connection issues; ②. Check if the driver is installed on the computer. Plug and unplug the CAN device's USB interface and observe the computer's device manager. If the

NO	Fault Phenomenon	Troubleshooting
		device appears when the USB is plugged in, the driver is normal. If the device disappears when unplugged, the driver installation is abnormal; ③. Check if the dip switch of the CAN communication box is set correctly. Generally, one up and one down is recommended; ④. Check if the BMS board's signal definitions H and L match the communication box to avoid only contacting the wire skin when locking the wiring slot screws; ⑤. Prioritize connecting to the CAN1 interface of the CAN box. The upper computer settings of CAN2 vary; ⑥. Check if multiple upper computer software are open on the computer. Close other CAN software or debugging assistants to avoid occupying the CAN device; ⑦. Check if the CAN setting interface is correct: device selection CANalyst-II, baud rate: refer to the specification, BMSID: refer to the specification, other default values are acceptable. After setting correctly, click the connect and collect buttons. Baud rate and BMSID are usually one of the following 8 combinations: 125Kbps, 1 or 125Kbps, 20; 250Kbps, 1 or 250Kbps, 20; 500Kbps, 1 or 500Kbps, 20; 1000Kbps, 1 or 1000Kbps, 20.
11	RS485 communication cannot connect	①. Check if the driver is installed on the computer. Plug and unplug the RS485 device's USB interface and observe the computer's device manager. If the serial port appears when the USB is plugged in, the driver is normal. If the serial port disappears when unplugged, the driver installation is abnormal; ②. Check if the BMS board's signal definitions A and B match the communication box to avoid only contacting the wire skin when locking the wiring slot screws; ③. Check if multiple upper computer software are open on the computer. Close other debugging assistants to avoid occupying the serial port number; ④. Check if the setting interface is correct: select the COM menu, select the correct COM number, baud rate: refer to the specification, BMSID: refer to the specification, other default values are acceptable. After setting correctly, click the connect and collect buttons. Baud rate and BMSID are usually one of the following 4 combinations: 9600, 1 or 9600, 20; 115200, 1 or 115200, 20.
12	Serial/UART communication cannot connect	①. Check if the driver is installed on the computer. Plug and unplug the serial device's USB interface and observe the computer's device manager. If the serial port appears when the USB is plugged in, the driver is normal. If the serial port disappears when unplugged, the driver installation is

NO	Fault Phenomenon	Troubleshooting
		abnormal; ②. Check if the BMS board's signal definitions TXD, RXD, and GND match the communication box to avoid only contacting the wire skin when locking the wiring slot screws. Typically, the BMS's TXD corresponds to the communication box's TXD, RXD corresponds to RXD. Some models have TXD, RXD crossed; ③. Check if multiple upper computer software are open on the computer. Close other debugging assistants to avoid occupying the serial port number; ④. Check if the setting interface is correct: select the COM menu, select the correct COM number, baud rate: refer to the specification, BMSID: refer to the specification, other default values are acceptable. After setting correctly, click the connect and collect buttons. Baud rate and BMSID are usually one of the following 4 combinations: 9600, 1 or 9600, 20; 115200, 1 or 115200, 20.