无人机专用智能电池管理系统

Smart Battery Management System for Drones

PRODUCT SPECIFICATION

产品名称: *Product Name :* **12S 120A UAV BMS**

产品型号: *Product Model :* **EF-007**

版本编号: *Version No.:* **AYEF007-M12S120A**

尺寸: *Dimensions:* **95mm*85mm*25mm**

重量: *Weight:* **g**

规格 : *Configuration:* **12 串、同口、充 120A 放 120A、CAN、蓝牙**

12S NMC Liion, Common Port, 120A Charge 120A Discharge, CAN, BLE-

客户确认 *Customer Confirmation*		
审 核/日 期 *Reviewed by / Date*	批 准/日 期 *Approved by / Date*	公司印章 *Company Seal*
编 制/日 期 *Prepared by / Date*	审 核/日 期 *Reviewed by / Date*	批 准/日期 *Approved by / Date*

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版本历史

Revision History

日期 *Date*	版本号 *Version*	修订说明 *Revision Description*	制作人 *Prepared by*	核准人 *Approved by*
2026/8/20	AYEF007M12S120A	首次发布 *Initial Release*	Mr.Dong	Mr.Chen

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1、简介

1、 Introduction

1.1 产品简介

1.1 Product Overview

本产品为面向无人机锂电池组设计的 12S 120A 电池管理系统（BMS），适用于标称电压为 3.7V 的锂离子电芯。系统支持主控板与功率输出板一体式或分体式结构，可适配不同机型的空间与安装要求，同时支持开源(例如:DroneCAN 等)与非开源的飞控协议；功率输出部分支持最大持续 300A 放电电流。系统具备单体电压采集与均衡、单体过充/过放保护、电池组温度监测、充放电控制、热管理和数据通信等功能，可实时监控电池运行状态，并在异常工况下实施保护。内置高精度 SOC、SOH 估算算法，可提高剩余电量与电池健康状态的评估准确性，同时也具有无人机专用的预充预放、热拔插防打火、过流延时以及飞行模式关闭保护等功能，为无人机电池组的安全运行、可靠供电和使用寿命管理提供支持。

This product is a 12S 120A Battery Management System (BMS) designed for drone lithium-ion battery packs, suitable for lithium-ion cells with a nominal voltage of 3.7V. The system supports both integrated and modular configurations for the main control board and power output board, accommodating the space and installation requirements of different drone models. It also supports both open-source (e.g., DroneCAN) and proprietary flight control protocols; the power output section supports a maximum continuous discharge current of 300A. The system features cell-level voltage sensing and balancing, cell overcharge/overdischarge protection, battery pack temperature monitoring, charge/discharge control, thermal management, and data communication. It monitors the battery's operating status in real time and implements protective measures under abnormal conditions. It incorporates high-precision SOC and SOH estimation algorithms to improve the accuracy of remaining charge and battery health assessments. It also features functions specifically designed for drones, such as pre-charge and pre-discharge, hot-swap spark prevention, overcurrent delay, and flight mode shutdown protection, thereby supporting the safe operation, reliable power supply, and service life management of drone battery packs..

1.2 功能特性

1.2 Functional Features

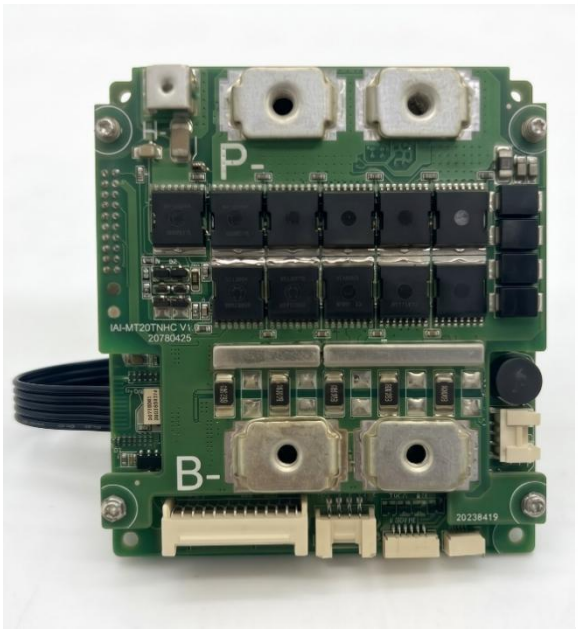
序号 *No.*	项目 *Item*	参数规格 *Specification*	序号 *No.*	项目 *Item*	参数规格 *Specification*
1	支持串数 *Number of strings supported*	12S	11	485(隔离)485 *Communication(Isolated)*	/
2	放电持续电流 *Discharging Continuous current*	120A	12	*UART*(隔离) *UART Communication (Isolated)*	标配 *Standard option*
3	充电持续电流 *Charging continuous current*	120A	13	*CAN* 通讯 *CAN Communication Isolated*	标配(不带 120Ω 电阻) *Standard option (Without a 120Ω resistor)*
4	*NTC* 数量 *Number of NTCs*	4 路电池 *Four temperature probes for battery* 1 路 MOS *One temperature probe for MOS*	14	加热功能 *Heating Function*	标配 *Standard option*
5	均衡功能 *Balance Function*	被动均衡 *Passive balance*	15	蓝牙模块 *Bluetooth Module*	标配 *Standard option*
6	开关功能 *Switch Function*	标配 *Standard option*	16	电池组串联 *Battery packs in series*	/

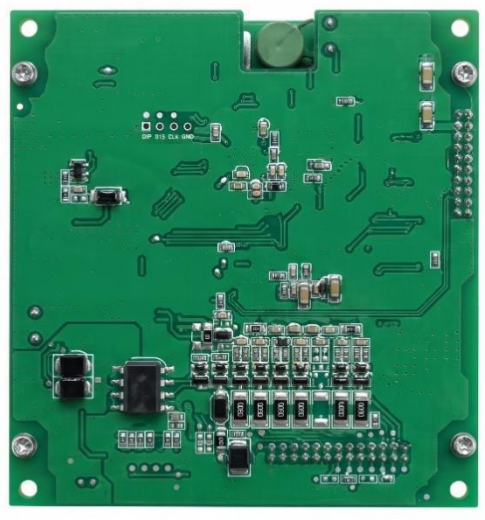
7	充电限流功能 *Charging current limit*	不支持 *Not supported*	17	电池组并联 *Battery packs in parallel*	标配 *Standard option*
8	履历 *History storage*	标配 *Standard option*	18	预放电功能 *Pre-discharge function*	标配 *Standard option*
9	二次保护功能 *Secondary protection*	/	19	*LCD* 显示屏 *LCD Display*	/
10	LED 指示灯接口 *LED indicator interface*	标配 *Standard option*	20	GPS 接口 *GPS interface*	选配 *Optional*

备注：1.非隔离通信不支持与充电器或负载通讯

Note: 1.Non-isolated communication with charger or loads is not supported.

- 具有单体电压、总体电压检测，过充、过放告警及保护功能，短路保护功能。常温下静态电压采样精度可达≤5mV。
  Provides cell-voltage and total-voltage measurement, overcharge and overdischarge warnings and protection, and short-circuit protection. Static voltage sampling accuracy at room temperature is ≤5 mV.
- 具有充、放电电流检测，充、放电过流及保护功能。充电电流显示为正，放电电流显示为负，常温下电流采样精度可达≤3%.
  Provides charge/discharge current measurement and charge/discharge overcurrent and protection. Charge current is displayed as positive and discharge current as negative. Current sampling accuracy at room temperature is ≤3%.
- 具有电芯、环境、MOS 温度检测，电芯高、低温告警及保护功能，MOS 高温告警及保护功能，环境高、低温告警功能。常温下温度采样精度可达≤2℃。
  Provides cell, ambient, and MOSFET temperature measurement; cell high/low-temperature warning and protection; MOSFET high-temperature warning and protection; and ambient high/low-temperature warning. Temperature sampling accuracy at room temperature is ≤2°C.
- 具有充电均衡功能，均衡电流 100mA。
  Provides charge balancing with a balancing current of 50 mA.
- 电芯容量估算功能。电池组满充容量、当前容量、设计容量可以通过上位机进行设置，在进行完整充放电循环后容量可自动更新。
  Provides cell-capacity estimation. The full-charge capacity, current capacity, and design capacity of the battery pack can be configured using the host-computer software; capacity is updated automatically after a complete charge/discharge cycle.
- SOC 静态校准功能，通过对比静态电压校准 SOC，降低 SOC 计算误差。
  Provides static SOC calibration based on open-circuit voltage comparison to reduce SOC calculation error.
- 上位机软件控制功能，可通过上位机软件对过充、过放、充放电过流、过温、欠温等保护参数，容量、等参数进行设置。
  Provides host-computer software control for configuring protection parameters—including overcharge, overdischarge, charge/discharge overcurrent, overtemperature, and undertemperature—as well as capacity and other parameters.
- CAN 通信接口，采用隔离通信，支持 CAN2.0B；可用程序包实现软件升级。
  Provides an isolated CAN communication interface supporting CAN 2.0B; firmware can be upgraded using an update package.





2、电气特性

2 / Electrical Characteristics

2.1 基本参数设置

2.1 Basic Parameter Settings

(注：以下参数除特殊注明以外，25℃环温下测试)

Note: Unless otherwise specified, the following parameters are tested at an ambient temperature of 25°C.

电池包规格 *battery pack Specifications*	12 串三元 *12 Strings of Ternary Lithium Battery*
接口类型 *Interface type*	充放电同口 *Charge and discharge are both at the same port*
充电电压 *Charging voltage*	4.2V*串数 *4.2V*Number of Strings*
单体电压范围 *Cell voltage range*	2.5~4.2V
持续充电电流 *Continuous charging current*	120A
持续放电电流 *Continuous discharging current*	120A
通信接口 *Communication Interface* 连接上位机波特率，*ID* *Connected upper computer Baud Rate and ID*	CAN Baud Rate: 1M ID:1 GPS Baud Rate: 115200 ID:1 UART Baud Rate: 115200 ID:1 BLE Baud Rate: 115200 ID:1
动行功耗 *Consumption of running*	≤40mA
休眠功耗 *Consumption of sleep*	≤2mA
休眠条件 *Sleep conditions*	无电流、通讯、保护状态下 *No current、communication、protection state*
深度休眠功耗 *Consumption of deep sleep*	≤100uA
深度休眠条件 *Deep sleep conditions*	单体欠压状态下 *In cell under voltage state*
工作温度 *Operating temperature*	-30℃~70℃
板子结构尺寸(*L***W***H*) *Size*	95*mm**85*mm**25*mm*±1*mm*

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2.2 电气性能

2.2 Electrical Performance

(注：以下参数除特殊注明以外，25℃环温下测试)

Note: Unless otherwise specified, the following parameters are tested at an ambient temperature of 25°C.

项目 Project		规格 Specification			
		最小 MIN	典型 TYP	最大 MAX	单位 Unit
单串电池参数 Cell Parameter					
单节过充保护 Single Cell Over-Charge Protection	过充保护 Over-Charge Voltage Protection	4.22	4.25	4.27	V
	过充保护延时时间 Over-Charge voltage Protection Delay Time	2000	3000	4000	mS
	过充保护恢复电压 Over-Charge voltage Protection Release	4.12	4.15	4.17	V
单节过放保护 Single Cell Over-Discharge Protection	过放保护 Over-Discharge Voltage Protection	2.45 (只预警，不保护) 2.45 Alerts Only, No Protection	2.5 (只预警，不保护) 2.5 Alerts Only, No Protection	2.55 (只预警，不保护) 2.82 Alerts Only, No Protection	V
	过放保护延时时间 Over-Discharge voltage Protection Delay Time	2000	3000	4000	mS
	过放恢复电压 Over-Discharge voltage Protection Release	2.95	3.0	3.22	V
均衡功能 Balance Function					
均衡电压 Balanced Voltage	均衡开启电压 Balanced Opening Voltage	3.98	4	4.02	V
	均衡开启压差 Balanced Opening Voltage Different	0.3	0.5	0.7	V
	均衡电流 Balanced Opening Current	50	70	90	mA
	均衡方式 Balanced Opening Mode	被动均衡 Passive Balancing			\
电流保护参数 Current Protection Parameter					
充电过流保护 Over Charge Current Protection	充电过流保护电流 Over-Current Charge Protection	170	180	190	A
	充电过流保护延时 Over-Current Charge Protection Delay Time	2000	3000	4000	mS
	充电过流保护解除 Over-Current Charge Protection is lifted	延时 30S 自动恢复, 3 次后需要移除充电器 Delay 30S Self-recovery，After 3 times, need to remove the charger to restore			
放电过流保护 Over Discharge Current Protection	一级放电过流保护电流 1th Ove Protection Current	170 (只预警，不保护) Alerts Only, No Protection	180 (只预警，不保护) Alerts Only, No Protection	190 (只预警，不保护) Alerts Only, No Protection	A

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	一级放电过流保护延时 *1th Over Protection Delay Time*	2000	3000	4000	*mS*
	二级放电过流保护电流 *2nd Level Over Protection Current*	450 (只预警，不保护) *Alerts Only, No Protection*	500 (只预警，不保护) *Alerts Only, No Protection*	550 (只预警，不保护) *Alerts Only, No Protection*	*A*
	二级放电过流保护延时 *2nd Level Over Protection Current Delay Time*	110	160	210	*mS*
	放电过流保护解除 *Over-Current Discharge Protection Release*	延时 30S 自动恢复,3 次需要移除负载 *Delay 30S Self-recover，After 3 times, need to remove the load to restore*			
短路保护参数 ***Short-Circuit Protection Parameter***					
短路保护 *Shor-Circuit Protection*	短路保护电流 *Short-Circuit Protection Current*	900	1000	1100	*A*
	短路保护延时 *Short-Circuit Protection Delay Time*	40	70	100	*uS*
	短路保护解除 *Short-Circuit Protection is lifted*	移除负载解除 *Removing the load is lifted*			
	短路说明：表中的短路电流最小值与最大值是短路保护功能的有效作用范围，电流低于最小值或高于最大值，都会可能导致短路保护功能失效。请充分评估实际的短路电流值，或者串联电阻，再进行短路测试！ *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.*				
电池温度保护参数 ***Cell Temperature Protection Parameter***					
充电温度保护 *Charging Temperature Protection*	充电高温保护 *Charging High Temperature Protection*	62	65	68	℃
	充电高温恢复 *Charging High Temperature Protection Release*	52	55	58	℃
	充电低温保护 *Charging Low Temperature Protection*	-8	-5	-2	℃
	充电低温恢复 *Charging Low Temperature Protection Release*	-3	0	3	℃
放电温度保护 *Discharging Temperature Protection*	放电高温保护 *Discharging High Temperature Protection*	67 (只预警，不保护) *Alerts Only, No Protection*	70 (只预警，不保护) *Alerts Only, No Protection*	73 (只预警，不保护) *Alerts Only, No Protection*	℃
	放电高温恢复 *Discharging High Temperature Protection Release*	57	60	63	℃
	放电低温保护 *Discharging Low Temperature Protection*	-23 (只预警，不保护) *Alerts Only, No Protection*	-20 (只预警，不保护) *Alerts Only, No Protection*	-17 (只预警，不保护) *Alerts Only, No Protection*	℃
	放电低温恢复 *Discharging Low Temperature Protection Release*	-18	-15	-12	℃
MOS* 温度保护参数** ***MOS Temperature Protection Parameter					
MOS 高温保护 *High Temperature Protection of MOS*	*MOS* 温度保护值 *Temperature Protection Value*	87 (只预警，不保护) *Alerts Only, No Protection*	90 (只预警，不保护) *Alerts Only, No Protection*	93 (只预警，不保护) *Alerts Only, No Protection*	℃

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	MOS 温度保护解除值 *Temperature Protection Release Value*	77	80	83	℃
电池总压保护参数 ***Total Voltage Protection Parameter***					
总压过充保护 *Total Voltage Over charge Protection*	总压过充保护电压 *Overall Overcharge Protection Voltage*	4.22*12	4.25*12	4.27*12	*V*
	总压过充保护延时 *Overall Overcharge Protection Delay*	2000	3000	4000	*mS*
	总压过充保护解除电压 *Overall Overcharge Protection Release Voltage*	4.12*12	4.15*12	4.17*12	*V*
总压过放保护 *Total Voltage Over discharge Protection*	总压过放保护电压 *Overall Over discharge Protection Voltage*	2.45*12 (只预警，不保护) *Alerts Only, No Protection*	2.5*12 (只预警，不保护) *Alerts Only, No Protection*	2.55*12 (只预警，不保护) *Alerts Only, No Protection*	*V*
	总压过放保护延时 *Overall Over discharge Protection Delay*	2000	3000	4000	*mS*
	总压过放保护解除电压 *Overall Over discharge Protection Release Voltage*	2.95*12	3.0*12	3.02*12	*V*
加热管理 ***Heating Manage***					
加热管理 *Heating Manage*	加热开启温度 *Heating Opening temperature*	-5	0	5	℃
	加热停止温度 *Heating Stop temperature*	10	15	20	℃
	加热电流 *Heating Current*	≤10			*A*
	加热方式 *Type Of Heating*	充电加热 *Heating By Charge*			

2.3 充电 MAP

2.3 Charging MAP

充电 MAP 只针对智能充电器，并根据电芯规格书设定。

The charging map applies only to smart chargers and is configured according to the cell specification.

2.4 均衡功能

2.4 Balancing Function

保护板内置被动均衡功能，均衡电流 100mA 左右，均衡开启后每次均衡最高串，每次均衡时间为 0.5S，每秒均衡一次；

The BMS incorporates passive balancing with a balancing current of approximately 100 mA. Once balancing is enabled, the highest-voltage cell is balanced for 0.5 s during each one-second cycle.

2.4.1 均衡开启

2.4.1 Balancing Enable

满足以下条件均衡会打开：

Balancing is enabled when any of the following conditions is met:

保护板充电状态下，压差大于 50mV，则开启最高串均衡；

While the BMS is charging, if the cell-voltage difference exceeds 50 mV, balancing of the highest-voltage cell is enabled.

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2.4.2 均衡关闭

2.4.2 Balancing Disable

满足以下任一条件均衡会关闭：

Balancing is disabled when any of the following conditions is met:

(1) 放电状态下；

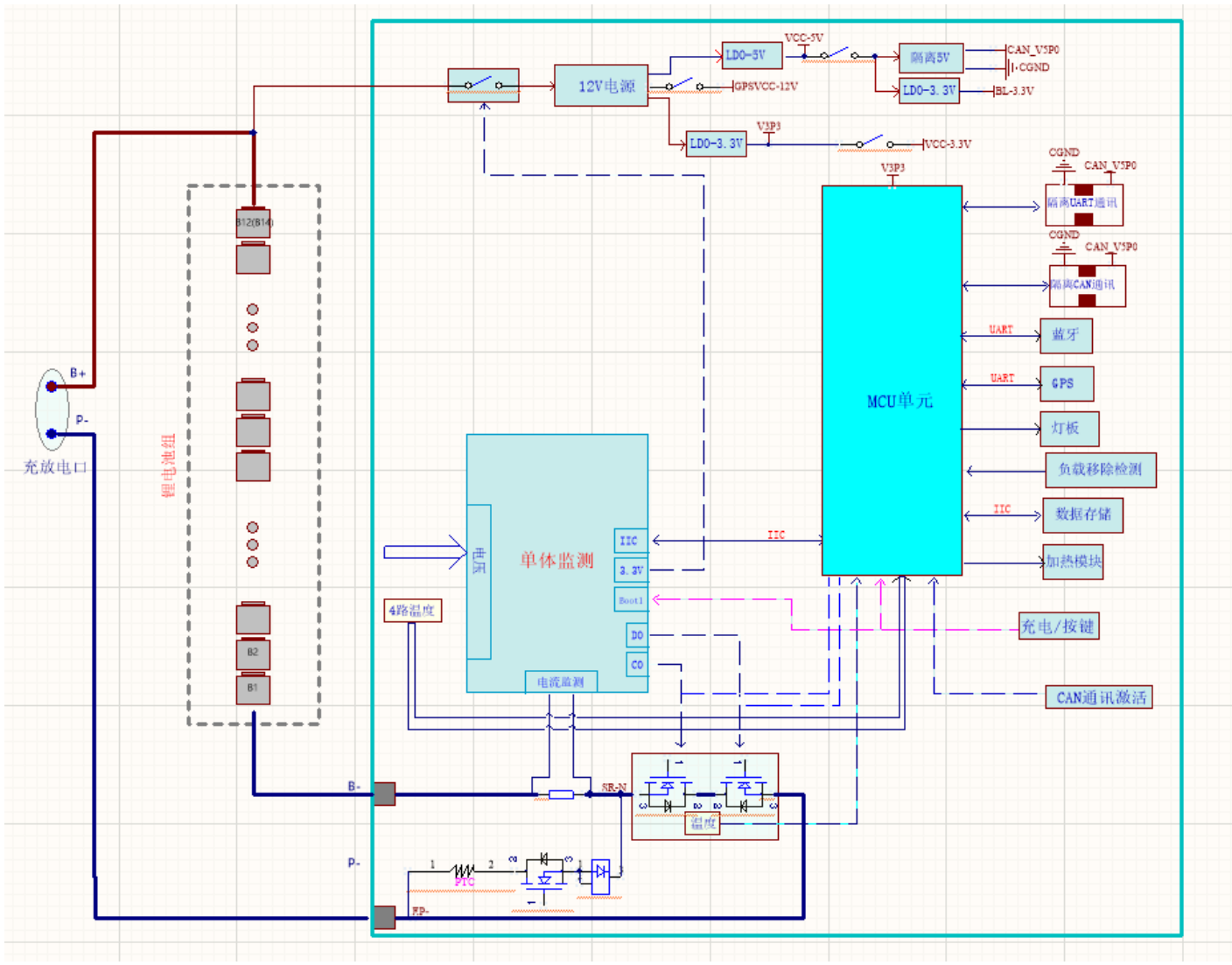
The battery is discharging;

(2) 任何状态下，压差小于等于 20mV；

In any state, the cell-voltage difference is ≤20 mV.

3、功能示意图

3 / Functional Diagram

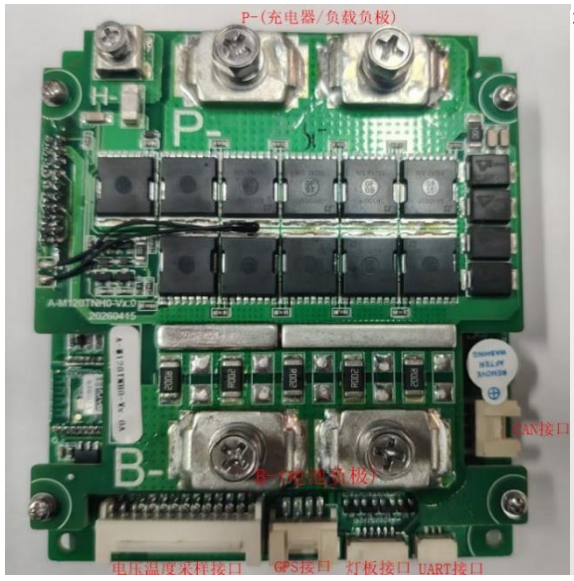


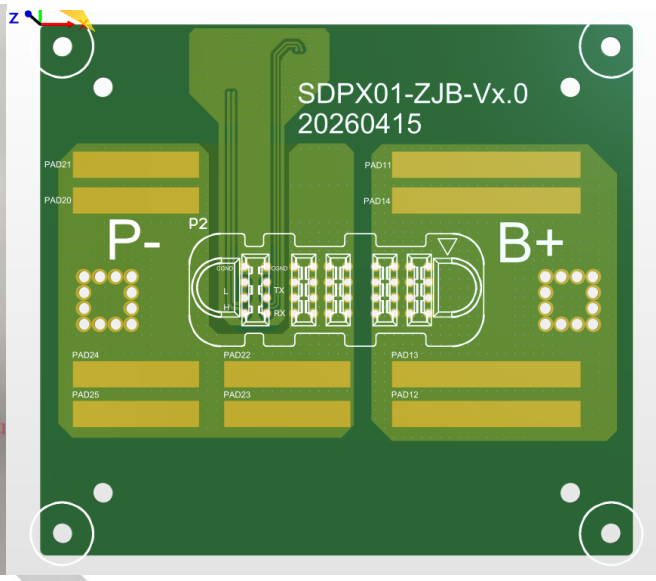
4、产品示意图及尺寸

4 / Product Schematic and Dimensions

4.1 产品实物图及接口

4.1 Product Photos and Interface





4.2 电压温度采样接口定义

4.2 Cell Voltage and Temperature Interface

NO	PIN	PIN 功能定义 *Pin Function*	NO	PIN	PIN 功能定义 *Pin Function*
10	T4-	温度传感器 4 负极 *Negative side of temperature sensor 4*	23	T4+	温度传感器 4 正极 *Positive side of temperature sensor 4*
11	T3-	温度传感器 3 负极 *Negative side of temperature sensor 3*	24	T3+	温度传感器 3 正极 *Positive side of temperature sensor 3*
12	T2-	温度传感器 2 负极 *Negative side of temperature sensor 2*	25	T2+	温度传感器 2 正极 *Positive side of temperature sensor 2*
13	T1-	温度传感器 1 负极 *Negative side of temperature sensor 1*	26	T1+	温度传感器 1 正极 *Positive side of temperature sensor 1*

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4.3 灯板接口定义

4.3 LED Interface

LED 接口定义 *LED Interface*					
NO	**PIN**	**PIN 功能定义** *Pin Function*	**NO**	**PIN**	**PIN 功能定义** *Pin Function*
1	G	灯板负极 GND *Light Panel Negative Terminal (GND)*	2	D1	LED-1
3	D2	LED-2	4	D3	LED-3
5	D4	LED-4	6	K+	按键正极 *Button Positive Terminal*

4.4 通信接口定义

4.4 Communication Interface

GPS 通信线束接口定义 *GPS Communication Harness Connector Definitions*					
NO	**PIN**	**PIN 功能定义** *Pin Function*	**NO**	**PIN**	**PIN 功能定义** *Pin Function*
1	VCC	GPS 模块电源正极 12V *GPS module power supply positive terminal 12V*	2	GND	GPS 模块电源负极 GND *GPS Module Negative Power Supply (GND)*
3	GPS-TX	GPS-TX(主板) *GPS-TX (Mainboard)*	4	GPS-RX	GPS-RX(主板) *GPS-RX (Mainboard)*

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UART 通信线束接口定义 *UART Communication Cable Assembly Interface Definition*					
NO	**PIN**	**PIN 功能定义** *Pin Function*	**NO**	**PIN**	**PIN 功能定义** *Pin Function*
1	G	URAT 隔离电源地 CGND *URAT Isolated Power Supply Ground CGND*	2	TX	UART-TX(主板) *UART-TX (Mainboard)*
3	RX	UART-RX(主板) *UART-RX (Motherboard)*			

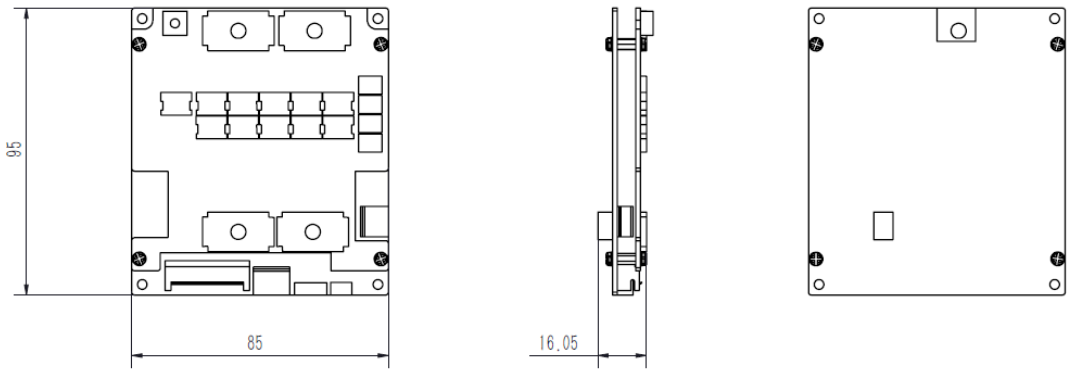
CAN 通信线束接口定义 *CAN Communication Harness Interface Definitions*					
NO	**PIN**	**PIN 功能定义** *Pin Function*	**NO**	**PIN**	**PIN 功能定义** *Pin Function*
1	G	CAN 隔离电源地 CGND *CAN Isolated Power Supply Ground (CGND)*	2	L	CAN L
3	H	CAN H			

备注：CAN 和 RS485 的地线必须与外部设备的地线相连接，避免信号被干扰造成数据丢失。

Mark: The GND lines for the CAN and RS485 buses must be connected to the GND lines of the external devices to prevent signal interference and avoid data loss.

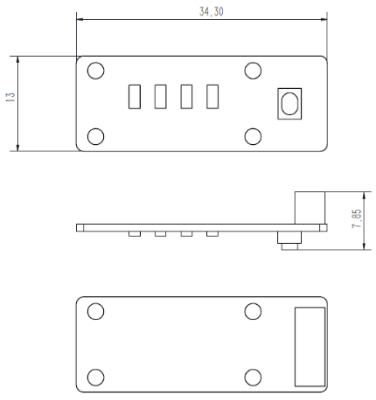
4.5 产品结构尺寸图

4.5 Product Dimensions

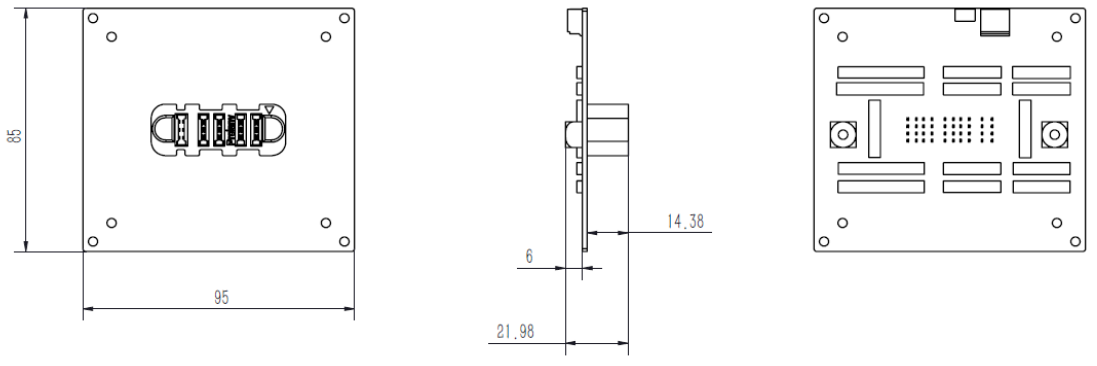


（主板：95*85*16.05mm）

Motherboard: 95 × 85 × 16.05 mm



(灯板：34.3*13*7.9mm) *Lighting board: 34.3 × 13 × 7.9 mm*



（转接板：95*85*22mm）

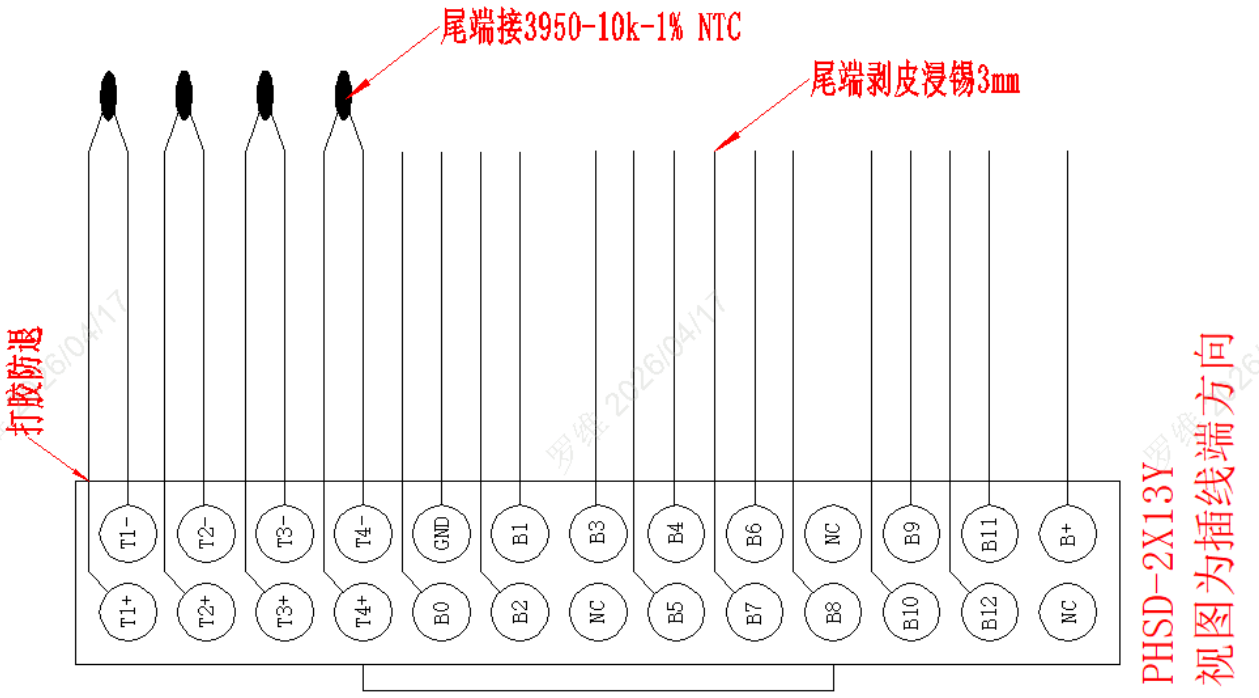
(Adapter plate: 95 × 85 × 22 mm)

5、线束

5 / Wiring Harness

5.1 电压温度采样线

5.1 Voltage and Temperature Sampling Line

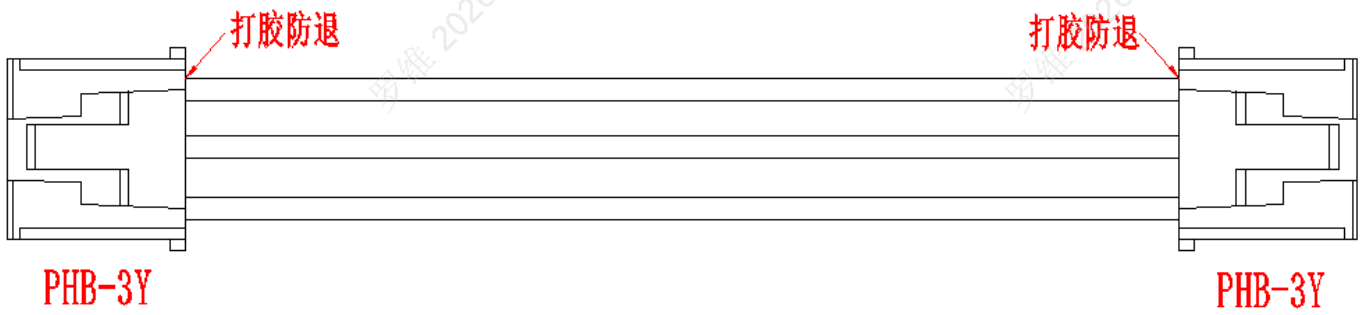


（电压温度采样线定义）

Definition of Voltage and Temperature Sampling Lines

5.2 CAN 通讯连接线

5.2 CAN Communication Cable

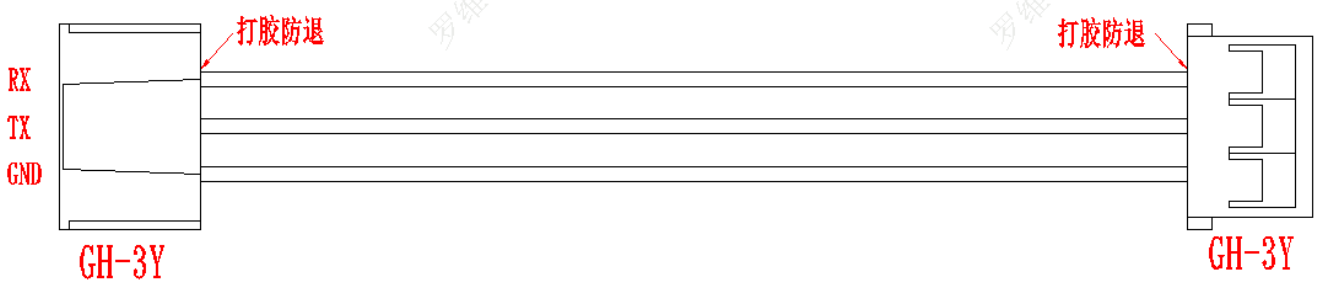


(CAN 通讯连接线定义）

(CAN Bus Connection Cable Definitions)

5.3 UART 通讯连接线

5.3 UART Communication Cable

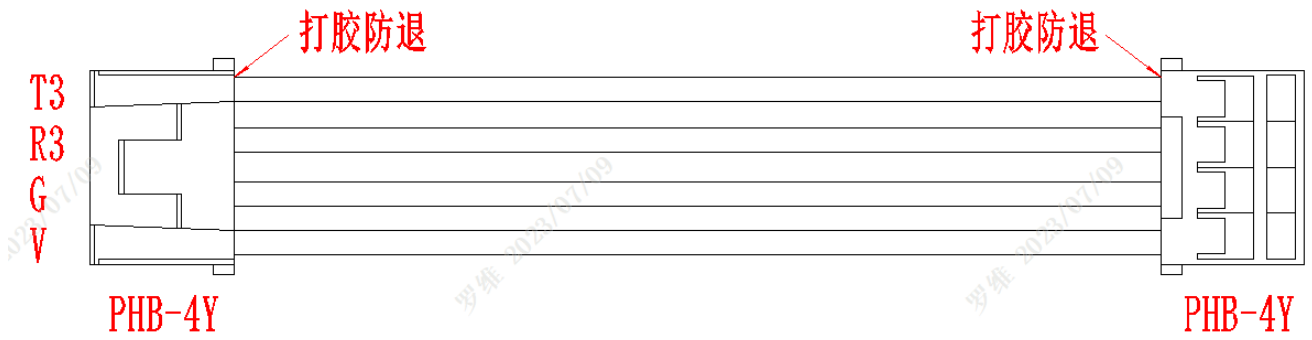


(UART 连接线定义）

(UART Cable Definitions)

5.4 GPS 连接线

5.4 GPS Cable

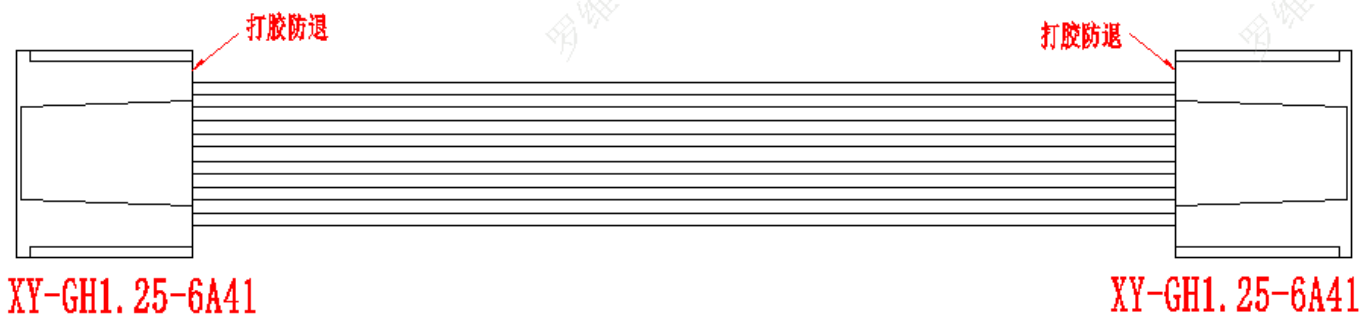


(UART 连接线定义)

(UART Cable Definitions)

5.5 灯板连接线

5.5 Light Panel Connecting Cables



(灯板连接线定义)

(Definition of Light Panel Connectors)

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6、通信说明

6 / Communication

6.1 通信

6.1 Communication

波特率：1M，BMSID:1

Baud Rate：1M, BMSID:1

TYPE-C: 115200 ID:1

Baud Rate：115200, BMSID:1

6.2 上位机 CAN 通讯

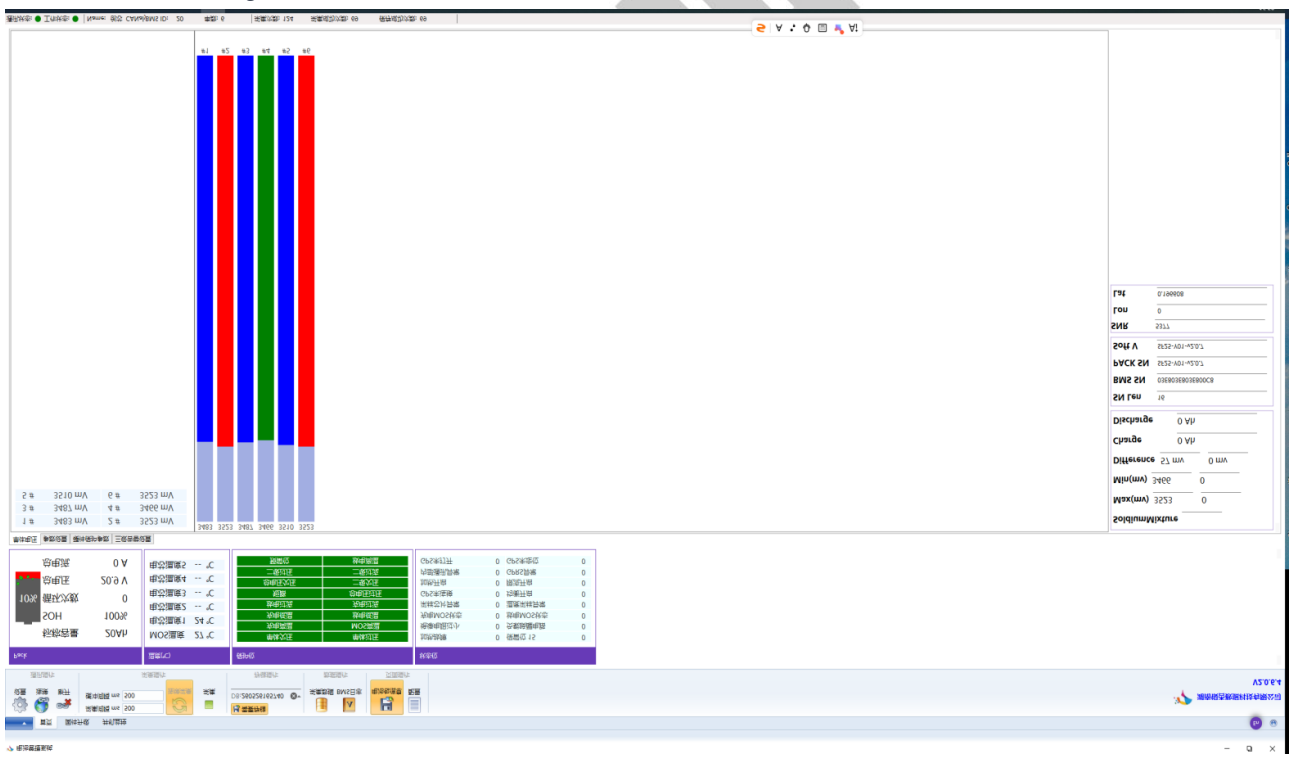
6.2 Host Computer CAN Communication

6.2.1 调试上位机说明

6.2.1 Commissioning Software Instructions

调试上位机使用 CAN 接口，软件界面如下，

The commissioning software uses the CAN interface. The software interface is shown below.



上位机主界面分为单体电芯电压显示，单体 1 电压为第一串电压（最低串，靠近总负极 B-），温度显示，电池信息显示（包括电池总压、SOC，剩余容量，充放电电流，充电电流为正，放电电流为负），MOS 状态包括充电 MOS、放电 MOS、和加热 MOS，导通即 MOS 管打开。

The main host-computer interface includes individual cell-voltage display (Cell 1 is the first series cell, nearest the pack negative terminal B-), temperature display, and battery information (including total pack voltage, SOC, remaining capacity, and charge/discharge current; charging current is positive and discharging current is negative). MOSFET status includes the charge, discharge, and heating MOSFETs; "on" indicates that the corresponding MOSFET is enabled.

(1) 单体电压可显示每串的电池电压，以及最高电压和最低电压，最高电压为红色背景框，最低电压为绿色背景框。

The cell-voltage panel displays the voltage of each series cell together with the maximum and minimum values. The maximum voltage is highlighted in red and the minimum voltage in green.

(2)电池工作状态可显示各种保护标志以及单串电池状态，若变红且显示故障，则表示有相应的故障触发。

The battery operating-status panel displays protection indicators and individual-cell status. A red fault indication means that the corresponding fault has been triggered.

(3) 通讯状态可显示通讯状态，若没有数据显示，则通讯异常。

The communication-status panel indicates the communication state. If no data is displayed, communication is abnormal.

(4) 打开串口后，需要点击‘采集’才会开始通讯，打开后部分功能才会使能。

After opening the communication port, click “Acquire” to start communication. Some functions are enabled only after acquisition begins.

6.2.2 参数设置

6.2.2 Parameter Settings

(1) 参数设置分为系统信息、保护阈值、恢复阈值、延时和其它。

Parameter settings are divided into system information, protection thresholds, recovery thresholds, delays, and other settings.

(2) 系统信息包括了板子的一些基本信息。（警告参数仅用于客户特定需求，若不需要，则忽略不影响使用）

System information contains basic board information. (Warning parameters are intended only for customer-specific requirements; if not required, they may be ignored without affecting operation.)

(3) 保护阈值包括过冲过放电压、高低温保护、以及充放电过流阈值。

Protection thresholds include overcharge/overdischarge voltage, high/low-temperature protection, and charge/discharge overcurrent thresholds.

(4) 恢复阈值包括过冲过放、高低温恢复阈值。

Recovery thresholds include overcharge/overdischarge and high/low-temperature recovery thresholds.

(5) 延时包括过冲过放电压、高低温保护、以及充放电过流延时。

Delay settings include overcharge/overdischarge voltage, high/low-temperature protection, and charge/discharge overcurrent delays.

6.2.3 程序更新

6.2.3 Firmware Update

BMS 支持固件在线升级，在保证 BMS 通讯正常的情况下，可以通过 CAN 或者 UART 下载固件更新程序。

The BMS supports online firmware upgrades. When BMS communication is operating normally, firmware updates can be downloaded through CAN or UART.

6.2.4 历史数据

6.2.4 Historical Data

(1) BMS 具有历史故障和数据记录功能，可通过上位机查看故障记录和电池历史工作状态；

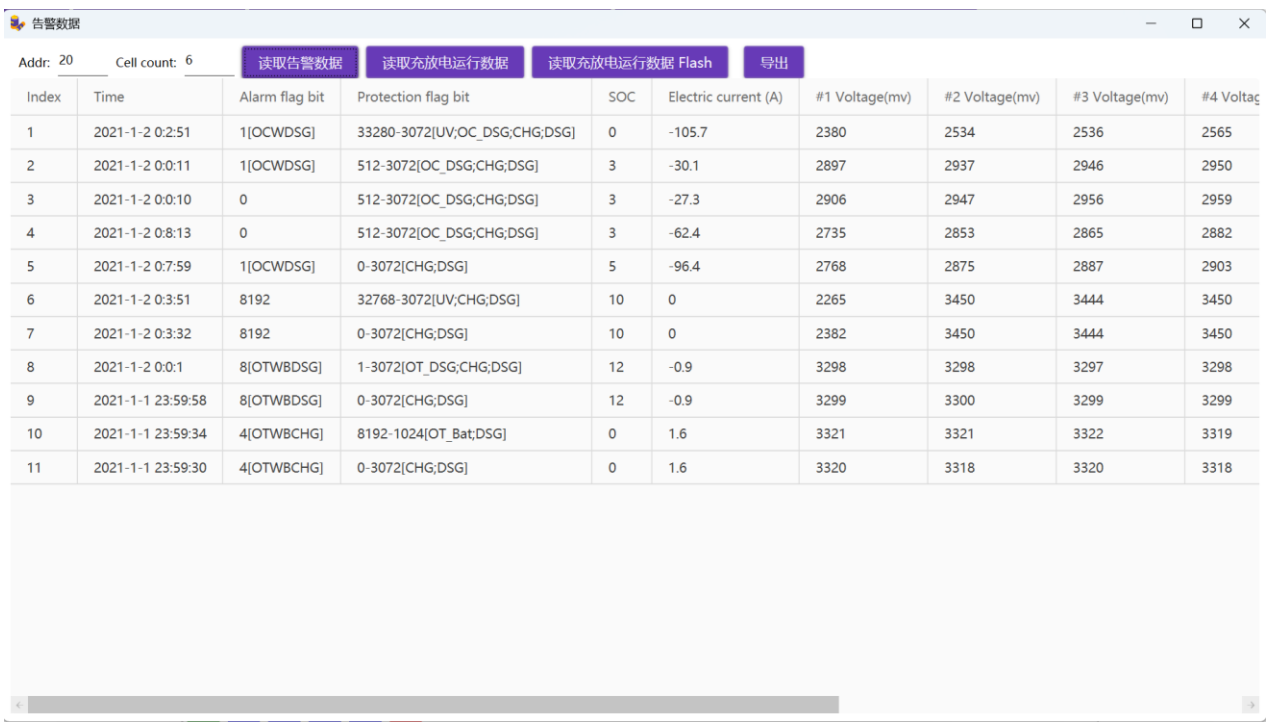
The BMS records historical faults and operating data. Fault records and historical battery operating status can be viewed using the host-computer software.

(2) 点击读取故障后，会出现相应的故障触发次数以及循环次数；

After clicking “Read Faults,” the number of occurrences of each fault and the cycle count are displayed.

实时数据可实时显示上位机读取的电池状态信息，并可以表格的形式导出到上位机根目录下。

The real-time data view displays battery-status information read by the host computer and can export the data as a table to the host-computer root directory.



Index	Time	Alarm flag bit	Protection flag bit	SOC	Electric current (A)	#1 Voltage(mv)	#2 Voltage(mv)	#3 Voltage(mv)	#4 Voltag
1	2021-1-2 0:2:51	1[OCWDSG]	33280-3072[UV;OC_DSG;CHG;DSG]	0	-105.7	2380	2534	2536	2565
2	2021-1-2 0:0:11	1[OCWDSG]	512-3072[OC_DSG;CHG;DSG]	3	-30.1	2897	2937	2946	2950
3	2021-1-2 0:0:10	0	512-3072[OC_DSG;CHG;DSG]	3	-27.3	2906	2947	2956	2959
4	2021-1-2 0:8:13	0	512-3072[OC_DSG;CHG;DSG]	3	-62.4	2735	2853	2865	2882
5	2021-1-2 0:7:59	1[OCWDSG]	0-3072[CHG;DSG]	5	-96.4	2768	2875	2887	2903
6	2021-1-2 0:3:51	8192	32768-3072[UV;CHG;DSG]	10	0	2265	3450	3444	3450
7	2021-1-2 0:3:32	8192	0-3072[CHG;DSG]	10	0	2382	3450	3444	3450
8	2021-1-2 0:0:1	8[OTWBDSG]	1-3072[OT_DSG;CHG;DSG]	12	-0.9	3298	3298	3297	3298
9	2021-1-1 23:59:58	8[OTWBDSG]	0-3072[CHG;DSG]	12	-0.9	3299	3300	3299	3299
10	2021-1-1 23:59:34	4[OTWBCHG]	8192-1024[OT_Bat;DSG]	0	1.6	3321	3321	3322	3319
11	2021-1-1 23:59:30	4[OTWBCHG]	0-3072[CHG;DSG]	0	1.6	3320	3318	3320	3318

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6.2.5 历史放电数据

6.2.5 Historical Discharge Data

(1) BMS 具有历史充放电数据记录功能，当开启充电或者开机放电后，每秒记录一次，可记录运行时间、电池电压、电流、温度、状态标志、容量等；

The BMS records historical charge and discharge data. Once charging is enabled or power-on discharge begins, data is recorded once per second, including operating time, battery voltage, current, temperature, status flags, and capacity.

(2) 每次从静置状态进入充电或者放电状态，都会重新开始记录；

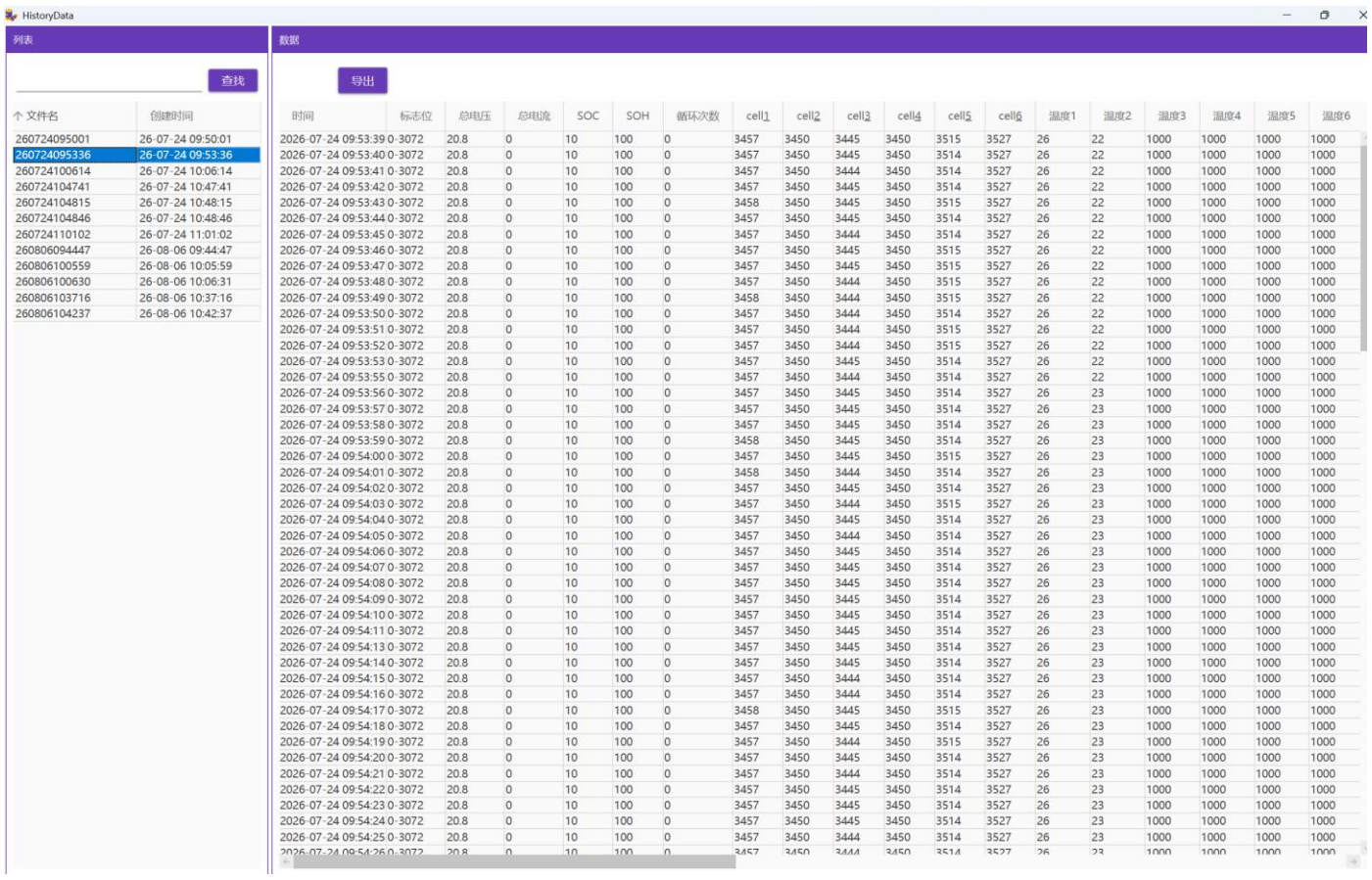
Recording restarts whenever the battery transitions from idle to charging or discharging.

(3) 点击‘历史信息’，则会显示 BMS 存储的历史数据记录；

Click “Historical Information” to display the historical data records stored in the BMS.

(4) 点击导出数据可将历史数据以表格的形式保存到上位机目录下；

Click “Export Data” to save the historical data in table format to the host-computer directory.

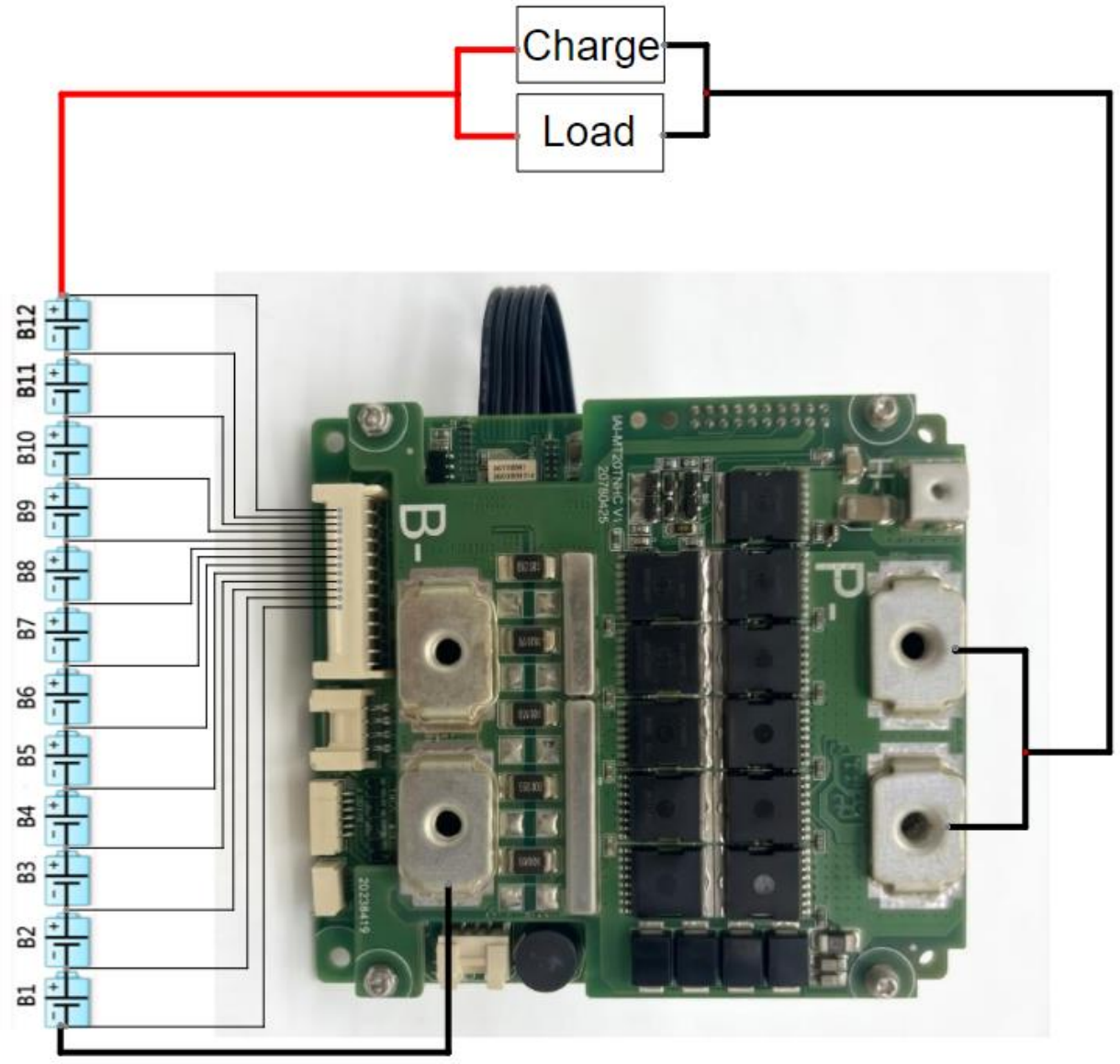


7、产品安装说明

7 / Product Setup Instructions

7.1 充放电接线示意图

7.1 Charge and Discharge Wiring Diagram



9、保修条款

9 / Warranty Terms

9.1 保修条款

9.1 Warranty Terms

本产品的保修期为 12 个月，在这期间正常使用下损坏的由爱雅科技有限公司提供服务，以下任一一种情况损坏的，不在保修范围：

This product is covered by a 12-month warranty. AYA Technology Co., Ltd. will provide service for failures occurring under normal use during this period. Damage resulting from any of the following is excluded from warranty coverage:

(1) 不正确的操作或使用

Incorrect operation or use

(2) 使用环境条件超过了规格

Operating conditions exceeding the specification

(3) 擅自拆装和维修

Unauthorized disassembly or repair

(4) 人为蓄意之破坏

Intentional human damage

(5) 进水或受潮

Water ingress or moisture exposure

(6) 不可抗拒的自然因素

Force majeure or natural causes

(7) PCB 条码损坏或撕毁

PCB barcode damaged or removed

9.2 重要通知

9.2 Important Notice

此规格书只有深圳市爱雅科技有限公司有权更改和更新,更改、更新新版本时不会告知客户，客户应在订单之前获取最新的相关信息，应当确认最新信息是否能满足当前使用。

Only Shenzhen AYAA Technology Co., Ltd. is authorized to revise and update this specification. Customers will not be notified when a revised or updated version is issued.

Before placing an order, customers shall obtain the latest relevant information and confirm that it meets the requirements of the intended application.

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9.3 重要说明

9.3 Important Notice

客户签字或盖章确认本产品规格书，即表示客户已充分阅读、理解并认可本规格书所载全部产品技术参数、配置要求、质量标准及其他约定内容，并确认其符合客户的采购及使用需求。
深圳市爱雅科技有限公司将以经客户确认的本产品规格书作为本订单生产、检验及交付的技术依据，严格按照本规格书约定的产品参数和要求组织生产并完成订单履行。
本产品规格书经双方签字及/或盖章确认后，将作为《合同书》的组成部分，与合同书一并回传、留存，并与合同书具有同等法律效力。如本规格书与合同书约定存在不一致，以双方书面确认的补充协议或合同中约定的优先适用条款为准。

By signing or affixing a seal to confirm this Product Specification Sheet, the Customer acknowledges that it has fully read, understood, and accepted all product technical parameters, configuration requirements, quality standards, and other agreed-upon terms set forth herein, and confirms that they meet the Customer's procurement and usage requirements.

SHENZHEN AYAA TECHNOLOGY CO., LTD. will use this Product Specification Sheet, as confirmed by the Customer, as the technical basis for the production, inspection, and delivery of this order, and will organize production and fulfill the order in strict accordance with the product parameters and requirements specified herein.

Upon confirmation by the signatures and/or seals of both parties, this Product Specification Sheet shall constitute an integral part of the "Contract," be returned and retained together with the Contract, and have the same legal effect as the Contract. In the event of any inconsistency between this Specification Sheet and the Contract, the terms of any supplementary agreement confirmed in writing by both parties or the priority provisions stipulated in the Contract shall prevail.