产品规格承认书

Product Specification Approval

产品名称(Product Name)：	铁锂 8 串 24V150A 同口带均衡 LiFePO4 8S 24V 150A Common port with Balance
产品型号（Product Number）：	DL-R10Q-F8S150ATJ-V2.x
客 户 名（Customer Name）：	
客户料号（Customer P/N）：	

送样日期 Sample delivery date：	版次 Version	文件编号 Document No.
	A0	
编 制(Prepared by)	核 准(Approved)	审 核(Audit)
赵希豪	杨伟滈	林田生

客户确认栏 Customer Confirmation Column
确认意见 Confirm opinion   客户签章 Customer signature: 日期 Date:

注意（Notice）：

1.收到样机确认 OK 后请及时回签，7 天内没有回签及问题反馈，我司默认客户测试合格；规格
　书中的图片为通用机型图片，可能与送样样机有差异，此份规格书达锂电子保留最终解释权
After receiving the prototype confirmation, please sign back in time. If there is no sign back and problem feedback within 7 days, our company defaults that the customer test is qualified; specifications

　2.客户批量前，请在规格书中签字回传，并说明详细功能说明，我司才安排批量
Before the customer batches, please sign the specification and return it, and explain the detailed function description, and our company will arrange the batch

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1. 简介 Introduction

DL-R10Q-F8S24V150A 产品是专门针对汽车启动电源电池组而设计的软件保护板方案，支持 8 串 24V 磷酸铁锂电池组使用，使用 N-MOS 方案，带有一键强行启动功能.

整套系统采用前端采集芯片和 MCU，部分参数可以根据客户需求，通过上位机灵活调整.

The DL-R10Q-F8S24V150A product is a software protection board solution specifically designed for automotive starting power battery packs. It supports the use of 8 series of 24V lithium iron phosphate battery batteries and uses an N-MOS scheme with a one click forced start function

The entire system adopts AFE(front-end acquisition chip) and MCU, and some parameters can be flexibly adjusted through the upper computer according to customer needs

2. 产品概述及特点（Product Overview and Features）：

◆功率板使用铜基板大电流走线设计及工艺，能经受超大电流冲击

The power board uses aluminum substrate with high current wiring design and process, which can withstand large current impacts

◆外观采用注塑密封工艺，提升防潮，防元器件氧化程度，延长产品使用寿命

The appearance adopts the injection molding sealing process to improve moisture resistance, prevent the oxidation of components, and prolong the service life of the product

◆具有防尘、防震、防挤压等防护功能

dust proof, shockproof, anti-squeezing and other protective functions

◆有完整的过充、过放、过流、短路、均衡功能

There are complete overcharge, over-discharge, over-current, short circuit, equalization functions

◆ 采用集成化的设计，将采集、管理、通信等功能集成于一体

The integrated design integrates acquisition, management, communication and other functions into one

3. 电气特性 Electrical characteristics

3.1 基本参数 Basic parameters

序号 NO.	检测内容 Test content		出厂默认参数 Factory default parameters	单位 Unit	备注 Remark
1	放电 Discharge	额定放电电流 Rated discharge current	150	A	
	充电 Charging	充电电压 Charging voltage	29.2	V	
		额定充电电流 Rated charging current	150	A	
2	被动均衡功能 Passive equalization function	均衡开启电压 Equalization turn-on voltage	3.4±0.05	V	
		均衡开启压差 Equalize opening differential pressure	20	mV	

		均衡电流 Equalizing current	150±30	mA	
		均衡开启条件 Equilibrium On Condition	同时满足：Satisfy both: 1.达到设定平衡开启压差 Reach set equilibrium opening differential voltage 2.达到设定平衡开启电压 Achieving the set equilibrium turn-on voltage		
3	单体过充告警 Single overcharge alarm	单体过充告警电压 Single Cell over-charge alarm voltage	3.50±0.05	V	
		单体过充告警延时 Single Cell over-charge alarm delay	5±1	S	
		单体过充告警解除电压 Single Cell over-charge alarm release voltage	3.40±0.05	V	
4	单体过充保护 Single Cell over-charge protection	单体过充保护电压 Single Cell over-charge protection voltage	3.70±0.05	V	
		单体过充保护延时 Single Cell over-charge protection delay	2±1	S	
		单体过充保护解除电压 Single Cell over-charge protection release voltage	3.40±0.05	V	
5	单体过放告警 Single Cell over-dischargealarm	单体过放告警电压 Single Cell over-discharge alarm	3.20±0.05	V	
		单体过放告警延时 Single Cell over-discharge alarm delay	6±1	S	
		单体过放告警解除电压 Single Cell over-discharge alarm release voltage	3.30±0.05	V	
6	单体过放保护 Single Cell over-discharge protection	单体过放保护电压 Single Cell over-discharge protection voltage	3.10±0.05	V	
		单体过放保护延时 Single Cell over-discharge protection delay	7±1	S	
		单体过放保护解除电压 Single Cell over-discharge protection release voltage	3.20±0.05	V	
7	总压过充告警 Total pressure overcharge alarm	总体过充告警电压 Overall overcharge alarm voltage	27.6±0.4	V	
		总体过充告警延时 Overall overcharge alarm delay	5±1	S	
		总体过充告警解除电压 Overall overcharge alarm release voltage	27.1±0.4	V	
8	总压过充保护 Total voltage overcharge protection	总体过充保护电压 Overall voltage overcharge protection	29.2±0.4	V	
		总体过充保护延时 Overall voltage overcharge protection delay	5±1	S	
		总体过充保护解除电压 Overall voltage overcharge protection release	28.7±0.4	V	

9	总压过放告警 Total pressure over discharge alarm	总体过放告警电压 Overall overvoltage alarm voltage	26 ± 0.4	V	
		总体过放告警延时 Overall over discharge alarm delay	6 ± 1	S	
		总体过放告警解除电压 Overall overvoltage alarm release voltage	26.5 ± 0.4	V	
10	总压过放保护 Total voltage over-discharge protection	总体过放保护电压 Overall voltage over-discharge protection	25.2 ± 0.4	V	
		总体过放保护延时 Overall voltage over-discharge protection delay	6 ± 1	S	
		总体过放保护解除电压 Overall voltage over-discharge protection release	25.7 ± 0.4	V	
11	充/放电过流保护 Charging/discharging overcurrent protection	放电过流一级保护电流 Discharge overcurrent primary protection current	300 ± 50	A	备注：过流保护后 Try5 次后锁定 Lock after 5 attempts
		放电过流一级保护延时 Delay of discharge overcurrent primary protection	15 ± 1	S	
		放电过流二级保护电流 Discharge overcurrent secondary protection current	700 ± 50	A	
		放电过流二级保护延时 Delay of discharge overcurrent secondary protection	5 ± 1	S	
		放电过流三级保护电流 Discharge overcurrent secondary protection current	1200 ± 50	A	
		放电过流三级保护延时 Delay of discharge overcurrent secondary protection	2 ± 1	S	
		解除条件 Release conditions	移除负载解除 Remove load to release		
		充电过流警告电流 Charging overcurrent alarm current	180 ± 20	A	
		充电过流警告延时 Charging overcurrent alarm delay	3 ± 1	S	
		充电过流保护电流 Charging overcurrent protection current	225 ± 20	A	
		充电过流保护延时 Charging overcurrent protection delay	3 ± 1	S	
		解除条件 Release conditions	移除充电器解除 Remove charger to release		
12	短路保护 Short circuit protection	短路保护电流 Short circuit protection current	$2000\pm500A$		
		短路保护延时	$10\sim500$	uS	实际以客户电池寄

		Short circuit protection delay			回我司测试为准 The actual test is subject to the customer's battery sent back to our company for testing
		短路保护解除 Short circuit protection released	移除负载解除 Remove load to release		
13	温度保护 Temperature protection	充电高温保护温度 Charging high temperature protection temperature	65±3	℃	
		充电高温保护延时 Charging high temperature protection delay	3±1	S	
		充电高温释放温度 Charging high temperature release temperature	60±3	℃	
		充电低温保护温度 Charging low temperature protection temperature	0±3	℃	
		充电低温保护延时 Charging low- temperature protection delay	3±1	S	
		充电低温释放温度 Charging low temperature release temperature	5±3	℃	
		放电高温保护温度 Discharge high temperature protection temperature	75±3	℃	
		放电高温保护延时 Discharge high-temperature protection delay	3±1	S	
		放电高温释放温度 Discharge high temperature release temperature	70±3	℃	
		放电低温保护温度 Discharge low temperature protection temperature	-40±3	℃	
		放电低温保护延时 Discharge low- temperature protection delay	3±1	S	
		放电低温释放温度 Discharge at low temperature release temperature	-35±3	℃	
14	压差告警 Differential voltage alarm	压差过大一级告警 voltage difference alarm	0.5	V	
		压差过大一级告警恢复 voltage difference alarm recovery	0.45	V	
		压差过大二级告警 voltage difference alarm	0.8	V	
		压差过大二级告警恢复 voltage difference alarm recovery	0.75	V	
15	内阻 Internal impedance	主回路导通内阻 Main circuit on-resistance	<20	mΩ	
16	消耗电流 Current consumption	工作时自耗电电流 Self-consumption current during operation	<30	mA	不含外设 Excluding peripherals

		休眠模式自耗电电流 Self-consumption current in sleep mode	<600	uA	不含外设 Excluding peripherals
		休眠时间 Sleep time	3600	S	
17	通讯方式 Communication method	☑UART（默认 default）　　☑CAN（默认 default）			

4.2 3.2 辅助模块参数 Auxiliary module parameters

名称 Name	电流 Current	是/否标配 No standard	加热模式	备注 Remark
加热 模块 Heating Module	5~25A	是	自动加热	充电加热开启条件： ①NTC 最小温度 0 度以下（上位机配置加热开启温度）。 ②充电状态(有充电电流或者充电负载) Conditions for enabling charging heating: ①NTC temperature below 0 degrees Celsius (heating activation temperature configured by the host computer). ②Charging status (presence of charging current or charging load).
				充电加热退出条件：（满足任一条件） ①5 度以上（默认 5 度回差，软件写死）。 ②加热膜故障（持续 15min， 电芯温升<2℃）。 ③放电电流大于 8A 持续 15S 或放电负载。 Conditions for exiting charging heating (any of the following conditions must be met): ①Temperature above 5 degrees Celsius (default 5-degree hysteresis, fixed in software). ②Heating film malfunction (continuous for 15 minutes, battery temperature rise < 2℃). ③Discharge current greater than 8A continuously for 15 seconds or discharge load present.
			手动加热	手动加热进入条件(同时满足以下条件)： ①按下强启按键（2S-4S）或蓝牙 APP 的强启开关及加热开关触发。 ②5 度以下（上位机配置加热开启温度加 5°）。 Conditions for manual heating activation (both of the following conditions must be met): ①Pressing the strong start button (2-4 seconds) or

				triggering the strong start and heating switch on the Bluetooth APP. ②Temperature below 5 degrees Celsius (heating activation temperature configured by the host computer plus 5℃).
				手动加热退出条件（满足任一条件）： ①温度在 5 度以上。 ②低于 2.5V。 ③加热膜故障（持续 15min， 电芯温升<2℃）。 ④蓝牙 APP 的加热开关退出关闭。 Conditions for exiting manual heating (any of the following conditions must be met): ①Temperature above 5 degrees Celsius. ②Voltage below 2.5V. ③Heating film malfunction (continuous for 15 minutes, battery temperature rise < 2℃). ④The heating switch on the Bluetooth APP is manually turned off.

3.3 可靠性参数 Reliability parameters

序号 NO.	项 目 Project	条 件 Condition
1	检测精度 Detection accuracy	电流检测精度Current detection accuracy：≤(±3%FSR) 电压检测精度voltage detection accuracy：≤±15mV（常温下room temperature） 温度检测精度Temperature detection accuracy：≤2℃（常温下room temperature）
3	信息存储 Information storage	最大存储 400 条履历信息，含保护次数，当前总电压、电流、温度、SOC、等 Stores up to 400 message of history information, including protection times, current total voltage, current, temperature, SOC, etc.
4	SOC 计量 SOC metering	采用电流积分法 Using current integration method，精度 accuracy≤10%（受环境温度影响 Affected by the ambient temperature）
5	工作环境条件 Working environment conditions	工作温度:-40℃～85℃ Operating temperature:-40℃~85℃
		相对湿度:5%～90%RH Relative humidity: 5%～90%RH
6	存储环境条件 Storage environment conditions	存储温度:-40℃～85℃ Storage temperature: -40℃~85℃
		相对湿度:5%～75%RH Relative humidity:

4. 通信说明 Communication Description

4.1 UART 通讯 UART communication

本机默认为 UART 通讯，波特率 9600bps，正常通讯后可从上位查看电池包数据，包括电池电压、电流、温度、SOC、BMS 状态，循环次数、历史记录及电池生产信息等等，可进行参数设置及相应控制操作，支持程序升级功能.

This machine defaults to UART communication with a baud rate of 9600bps. After normal communication, the battery pack data can be viewed from the upper computer, including battery voltage, current, temperature, SOC, BMS status, cycle times, historical records, and battery production information. Parameter settings and corresponding control operations can be performed, and program upgrade functions are supported

4.2 CAN 通讯 CAN communication

本机支持 CAN 通讯配置，默认波特率 250Kbps，正常通讯后在上位机端察看电池的各种信息，包括电池电压、电流、温度、状态、SOC 及电池生产信息等，可进行参数设置及相应控制操作，支持程序升级功能，默认达锂 CAN 协议，支持协议定制.

This machine supports CAN communication configuration, with a default baud rate of 250Kbps. After normal communication, various information of the battery can be viewed on the upper computer, including battery voltage, current, temperature, status, SOC, and battery production information. Parameter settings and corresponding control operations can be carried out, and program upgrade function is supported. The default protocol is lithium CAN protocol, and protocol customization is supported

5. 保护板尺寸图 Dimensional drawing of BMS

保护板尺寸 BMS size	长*宽*高（mm） Long * Width * High (mm) 151x90x17

128.50

P−

B−

60.00

30.00

11.00

2-M6

4-Ø3.30

150.45

89.95

17.00
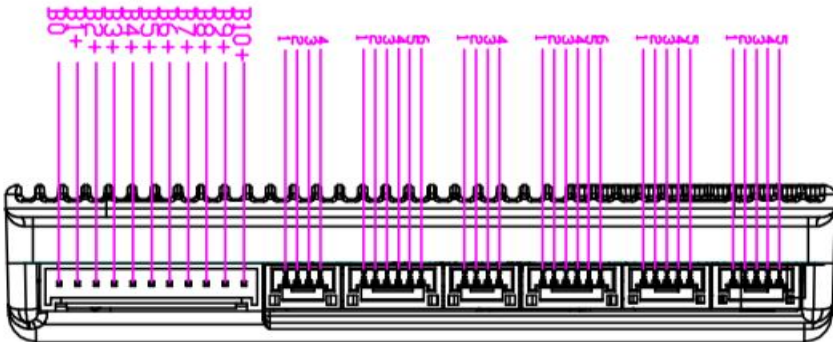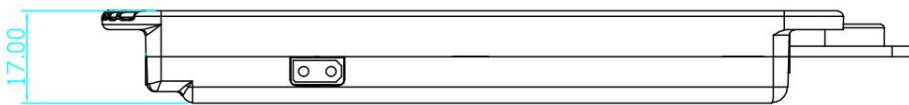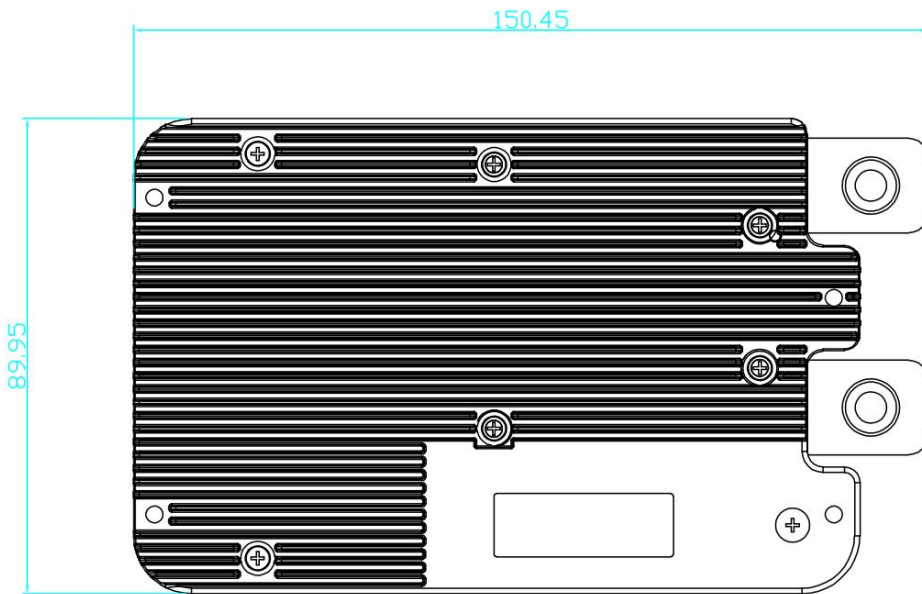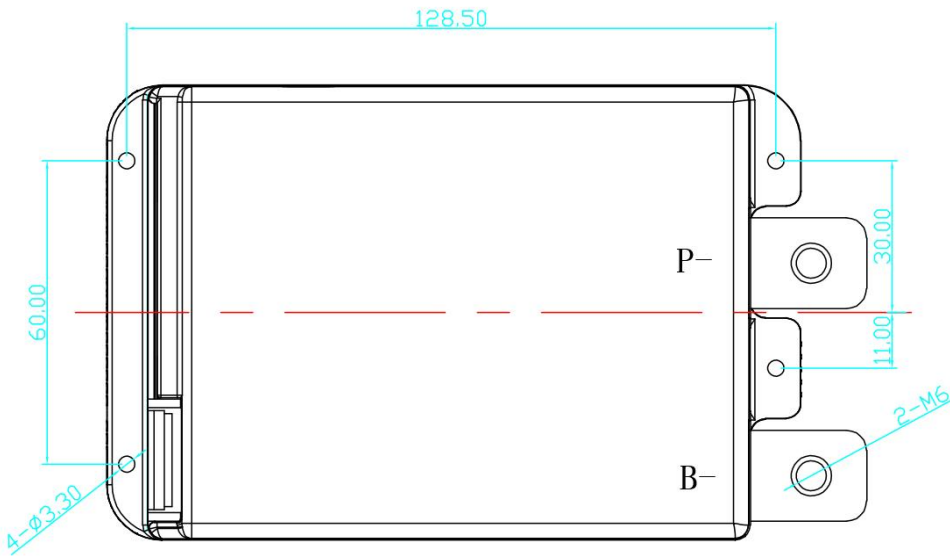
6. 接口定义 Interface Definition

6.1 接口引脚说明 Interface pin instructions

接口名称 Interface name	Pin 脚	标号 Label	定义说明 Definition description
B-接口 B-interface	/	B-	电池总负，接电池总负 Battery negative, connect to battery negative
P-接口 P-interface	/	P-	保护板充放电负极，接充放电负端 The charge and discharge negative terminal of the protection board is connected to the negative terminal of the charge and discharge
采样线接口 Sampling line interface PHB 2.0 9Pin 带扣	1	B0	接第 1 节电池负极 Connect to the negative terminal of the first battery
	2	B1+	接第 1 节电池正极 Connect to the positive terminal of the first battery
	...	...	...
	9	B8+	接第 8 节电池正极 Connect the positive terminal of the 8th battery
NTC 接口 NTC1 interface GH1.25 4Pin	1	NTC1	1#温度线 1 # Temperature line
	2	GND	地 GND
	3	GND	地 GND
	4	NTC2	2#温度线 2 # Temperature line
UART1 接口 UART interface GH1.25 6Pin	1	GND	地 GND
	2	3.3	供电电源 3.3V Power supply is 3.3V
	3	12	供电电源 12V Power supply is 12V
	4	S1	按键/强启开关正极 Button/forced start switch positive pole
	5	TX	通讯发送端 Communication sending end
	6	RX	通讯接收端 Communication receiving end
S1 口 DO interface GH1.25 4Pin	1	DO2	强启 LED（12V+）Forced start LED（12V+）
	2	GND	强启 LED（12V-）Forced start LED（12V-）
	3	S1	按键/强启开关正极 Button/forced start switch positive pole
	4	GND	强启开关负极 Negative pole of forced start switch
UART2 接口 UART interface GH1.25 6Pin	1	GND	地 GND
	2	3.3	供电电源 3.3V Power supply is 3.3V
	3	12	供电电源 12V Power supply is 12V
	4	S1	按键/强启开关正极 Button/forced start switch positive pole
	5	TX	通讯发送端 Communication sending end
	6	RX	通讯接收端 Communication receiving end

DO 口 DO interface GH1.25 Pin	1	//	
	2	//	
	3	//	
	4	GND	地 GND
	5	DO1	预留 DO 输出口 3.3V

CAN 通讯口 CAN interface GH1.25 5Pin	1	//	
	2	//	
	3	AGND	隔离地 Isolated ground
	4	CAN-H	CAN 通讯高 CAN communication high
	5	CAN-L	CAN 通讯低 CAN communication low

6.2 主要线材说明 Main Wire Description

| 线材名称 Line name	默认规格 Default specification
采集线 Collecting line	24AWG　L=450mm 　（9PIN）
NTC 线 line	28AWG　L=250mm
CAN 线 line	26AWG　L=300mm
加热输出线 Heating output line	XT-30 14AWG　L=450mm
强启复位开关线 Strong start reset switch line	26AWG　L=450mm

7. 蓝牙 APP 强启功能 Bluetooth APP forced start function

　　如选配蓝牙模块的情况下，可以使用手机 APP,搜索到蓝牙广播号，连接后可以强启保护板。安卓版本蓝牙界面使用说明：

1）下载好 SMART BMS 后，打开 APP。

If equipped with a Bluetooth module, you can use the mobile app to search for a Bluetooth broadcast number connection and forcefully activate the protection board. Instructions for using the Android version of the Bluetooth interface:

1) After downloading the SMART BMS, open the app.
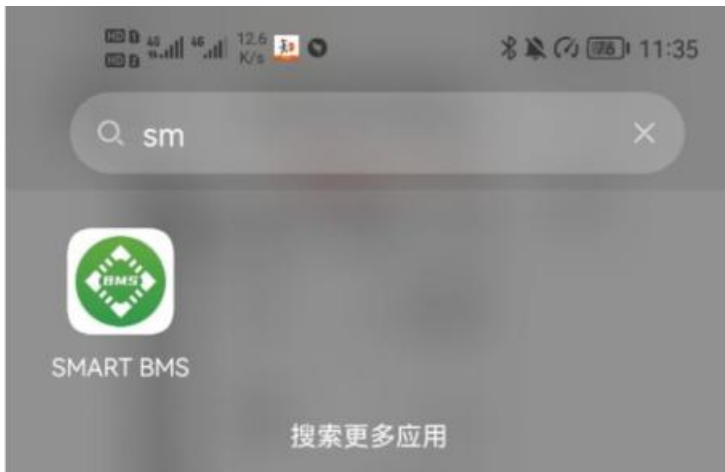
2）进入界面后选择三种模式的任意一种即可进入蓝牙名称选择界面

    After entering the interface, select any of the three modes to enter the Bluetooth name selection interface

3）点击任意一种模式之后，找到自己的蓝牙名称单击或点击"+"号，都可连接蓝牙模块

    After clicking on any mode, find your Bluetooth name and click or click the"＋"sign to connect to the Bluetooth module

4）连接成功后就可进入蓝牙 APP 操作界面

After successful connection, you can enter the Bluetooth APP operation interface

5) 进入操作界面后，进入参数设置点击一键强启的"打开"按钮即可

After entering the operation interface, enter the parameter settings and click the "Open" button, which is a one click forced start button

8. 上位机说明 PC software Description

PC 上位机 DALY BMS Tool V1.0.0 功能默认显示数据监控界面，登陆界面输入密码并连接上位机通讯后，显示数据监控，参数读写，生产制造，更多等界面。

手机 APP 设置保护参数，同步二级和三级保护。

1、解析各模块发送的数据信息，然后将电压、温度、配置值等显示出来；

2、通过上位机向各模块配置信息；

3、生产参数校准；

4、BMS 升级。

The DALY BMS-V1.0.0 function of the PC software displays the data monitoring interface by default. After entering a password and connecting to the upper computer for communication, the data monitoring, parameter reading and writing, production manufacturing, and more interfaces are displayed.

The mobile app sets protection parameters and synchronizes secondary and tertiary protection.

1. Analyze the data information sent by each module, and then display the voltage, temperature, configuration value, etc.;

2. Configure information to each module through the host computer;

3. Calibration of production parameters;

4. BMS upgrade.
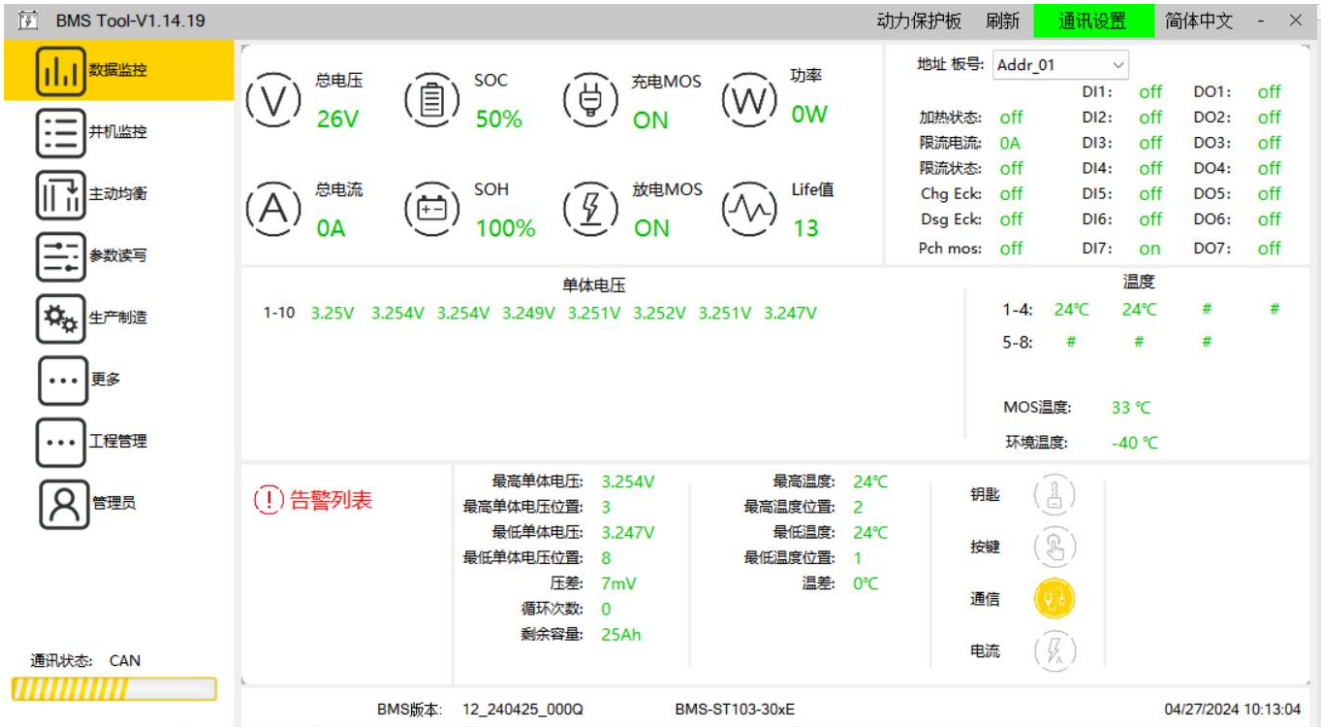
9. 按键功能说明 Key Function Description

按键唤醒：当保护板处于低功耗休眠状态，短按按键 1S±0.5S 保护板被唤醒；

按键强启：当电池欠压后或者其他放电相关故障产生，BMS 会关闭放电 mos 管，此时汽车就不能进行点火启动，通过按键长按 3S±1S 后 BMS 会强制闭合放电 MOS 持续 60S±10S，以满足特殊情况下的用电需求；

按键进入装车模式：长按 10s 以上，按键灯会亮 0.5s 灭 1s 进程装车模式。进入装车模式后，mos 管断开，bms 进入休眠状态。强起开关和蓝牙按键可以将其唤醒；

注意：若按下强启开关，MOS 强制闭合功能失效需要排查电池组外部是否短路

Button wake-up: When the protection board is in a low-power sleep state, briefly press the button for 1s ± 0.5s to wake up the protection board;

Key forced start: When the battery is under voltage or other discharge related faults occur, the BMS will turn off the discharge MOS tube, and at this time, the car cannot start the ignition. By pressing and holding the key for 3S ± 1S, the BMS will forcibly close the discharge MOS for 60S ± 10S to meet the power demand under special circumstances;

To enter the loading mode using the button: Press and hold for 10 seconds or more. The button light will turn on for 0.5 seconds and then off for 1 second to indicate that the loading mode is activated. Once in the loading mode, the MOSFET is turned off and the BMS enters sleep mode. It can be awakened by CAN

communication, button press, or Bluetooth activation；

Attention: If the forced start switch is pressed, the MOS forced close function will fail, and it is necessary to investigate whether there is a short circuit outside the battery pack

10. 接线说明 Wiring Instructions

步 骤 1 ： 焊接排线：排线中第 1 根排线（黑线）接电池总负极，第 2 根排线（红线）接到第一串电池正极，第 3 根排线（红线）接到第二串电池正极一如此类推，接完所有排线 。

Step 1: Welding wire: The first row of wires (black wire) is connected to the total negative pole of the cell, and the second row of wires (red wire) is connected to the positive pole of the first series of cells. The third cable (red wire) is connected to the positive pole of the second power supply pool.

步 骤 2 ： 检排线：接好排线后，从排头开始测量相邻两根排线之间的电压，确认排线煌接顺序没有接满、漏接等问题 。

Step 2: Check the line: After the line is connected, measure the electrical pressure between the two adjacent lines from the start of the row, and make sure that there is no full connection, missing connection and other problems.

步 骤 3 ： 连接输出线：将保护板 B-线接到电池总负极，然后将采样排线插头接入保护板，保护板自动激活。确认板前电压（电池电压 B+ B-）和板后电压(P+. P-)一 致 。

Step 3: Connect the branch out line: Put the protection board B. The line is connected to the total negative pole of the cell, and then the sample bank plug is connected to the protection plate, and the protection plate is activated automatically. Confirm the front voltage of the board (cell voltage B) and the rear voltage of the board (P+.p -).

注 ： 若要接入加热膜，可将加热线接入 BMS 的 heater 接口，将加热线与加热膜进行连接，最后加热膜接入电池的总正极 B+或充电器正极。

Note: To access the heating film, the heating hotline can be connected to the heater interface of the BMS, and the heating hotline can be connected to the heating film, and finally the heating film can be connected to the total positive electrode B+ of the battery or the positive electrode of the charger.
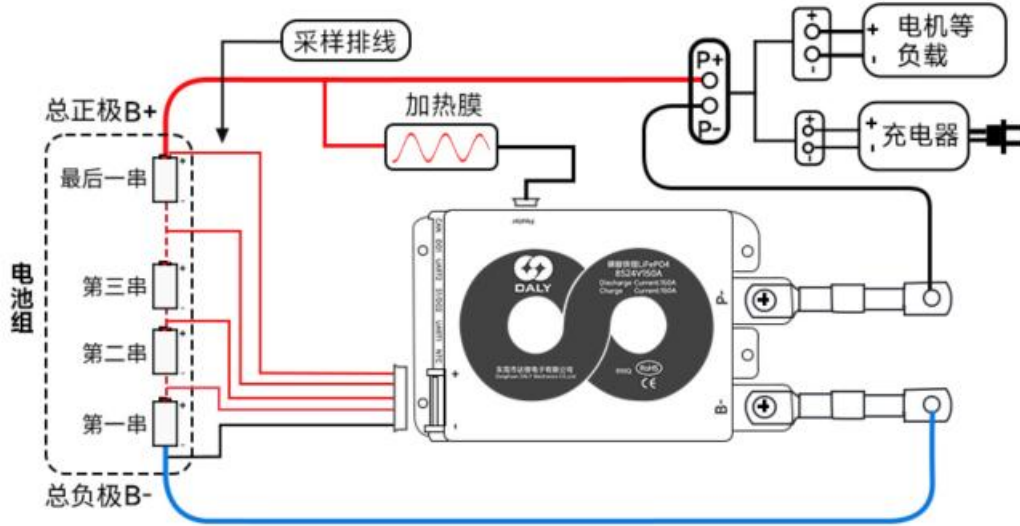
11. 注意事项 Precautions

1. 不同电压平台的保护板不能混用，如三元类保护板不能使用铁锂电池上；

   BMS of different voltage platforms cannot be mixed. For example, NMC BMSs cannot be used on LFP batteries.

2. 不同厂家的排线不通用，请确保使用我们公司配套排线；

   The cables of different manufacturers are not universal, please make sure to use our company's matching cables

3. 在测试、安装、接触和使用保护板时，要做好放静电措施；

   Take measures to discharge static electricity when testing, installing, touching and using the BMS

4. 不要使保护板的散热面直接接触电芯，否则热量会传送到电芯，影响电池的安全；

   Do not let the heat dissipation surface of the BMS directly contact the battery cells, otherwise the heat will be transferred to the battery cells and affect the safety of the battery

5. 不可自行拆卸、更改保护板元器件；

   Do not disassemble or change BMS components by yourself

6. 本公司保护板金属散热片进行了阳极氧化绝缘处理，氧化层破坏后仍会导电，组装作业

   中避免散热片与电芯、镍带接触；

   The company's protective plate metal heat sink has been anodized and insulated. After the oxide layer is damaged, it will still conduct electricity. Avoid contact between the heat sink and the battery core and nickel strip during assembly operations.

7. 如果保护板出现异常，请停止使用，等问题解决了再使用；

   If the BMS is abnormal, please stop using it and use it after the problem is solved

8. 不要让两个保护板串联或并联使用。

   Do not use two BMS in series or parallel.

9. B-P-锁螺丝建议扭矩为 8~10N·m(牛米)

   The recommended torque of B-P-lock screw is 8~10N·m (Nm).

10. B-线内阻需要在 0.5mR～0.8mR 范围内。

    The internal resistance of the B-wire must be in the range of 0.5mR To 0.8mR.

产品更改说明

Product change Instructions

版本 （Version）	更改内容 （Change content）	更改原因 （Reason for change）	更改日期 （Change date）	备注 （Remarks）
A0				初版

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