



# 产品规格承认书

## Product Specification Approval

|                           |                                                                                   |                   |
|---------------------------|-----------------------------------------------------------------------------------|-------------------|
| 产品名称 (Product Name):      | 智能板铁锂 16 串 48V400A 同口带均衡<br>Smart BMS LiFePO4 16S48V400A Common port with Balance |                   |
| 产品型号 (Product Number):    | DL-R32ND-F16S400ATJ                                                               |                   |
| 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. |
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| 编制 (Prepared by)          | 核准 (Approved)                                                                     | 审核 (Audit)        |
| 蒋慧明                       | 梁连虎                                                                               | 冯耀辉               |

### 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

随着锂电池在锂电行业的广泛应用，对电池管理系统也提出了高性能、高可靠性及高性价比等要求。本产品专门针对锂电池设计的 BMS，它能够实时采集、处理和存储电池组在使用过程中的信息数据，保证电池组的安全性、可用性和稳定性。

With the wide application of lithium batteries in the lithium battery industry, requirements for high performance, high reliability and high cost performance are also put forward for battery management systems. This product is a BMS specially designed for lithium batteries. It can collect, process and store the information and data of the battery pack in real time during use to ensure the safety, availability and stability of the battery pack.

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

- ◆ 使用专业大电流走线设计及工艺，能经受超大电流冲击

Using professional high-current trace design and technology, it can withstand the impact of ultra-large current

- ◆ 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

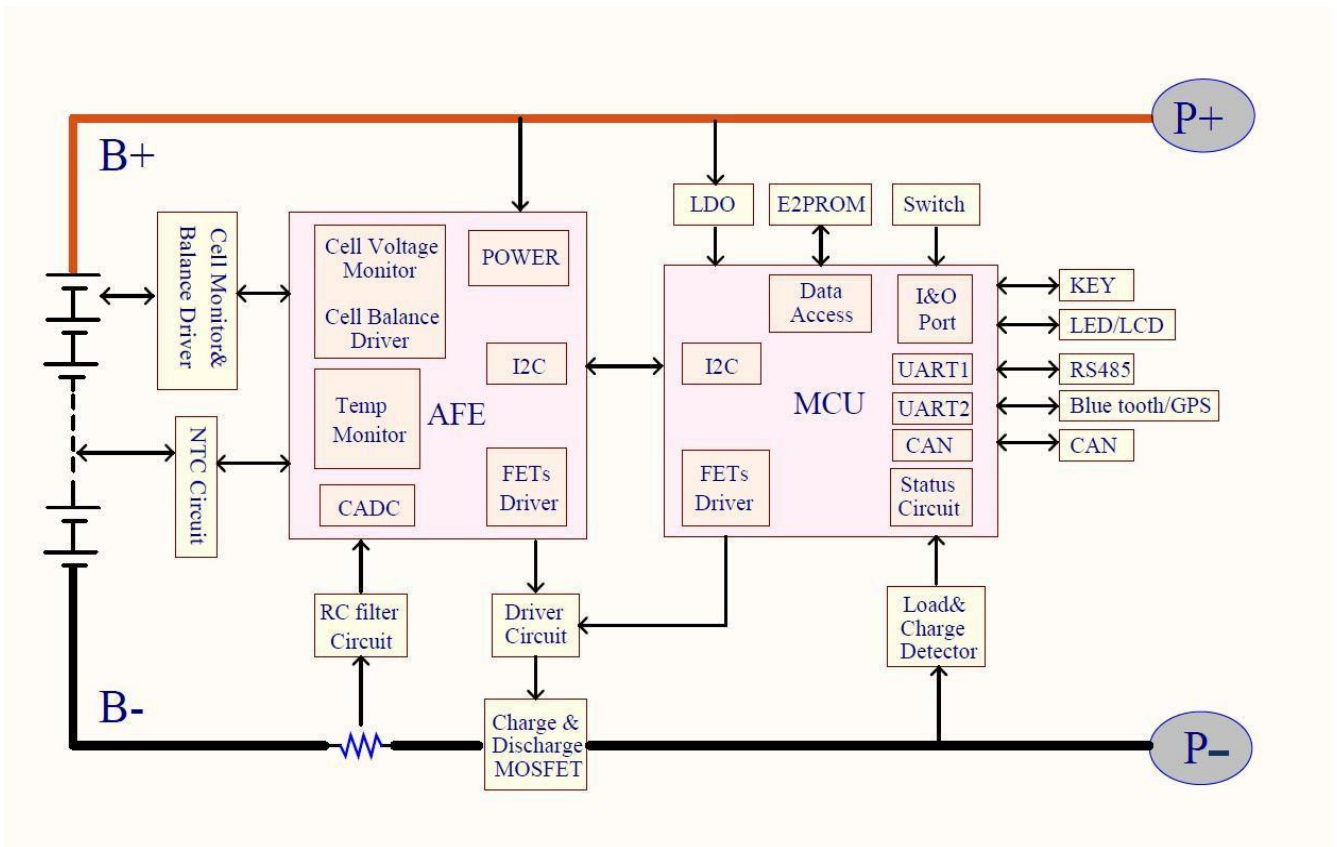
- ◆ 采用集成化的设计，将采集、管理、通信等功能集成于一体

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

- ◆ 具有通讯功能，可通过上位机对过流、过放、过流、充放电过流、均衡、过温、欠温、休眠、容量等参数进行设置

With communication function, parameters such as over-current, over-discharge, over-current, charge-discharge over-current, balance, over-temperature, under-temperature, sleep, capacity and other parameters can be set through the host computer

### 3.功能示意框图 Functional Schematic Block Diagram



### 4.电气特性 Electrical characteristics

#### 4.1 基本参数 Basic parameters

| 序号<br>No | 检测内容<br>Test content                    |                                                  | 出厂默认参数<br>Factory default parameters                          | 单位<br>Unit | 备注<br>Remark    |
|----------|-----------------------------------------|--------------------------------------------------|---------------------------------------------------------------|------------|-----------------|
| 1        | 放电<br>Discharge                         | 额定放电电流<br>Rated discharge current                | 400                                                           | A          |                 |
|          | 充电<br>Charging                          | 充电电压<br>Charging voltage                         | 58.4                                                          | V          |                 |
|          |                                         | 额定充电电流<br>Rated charging current                 | 200                                                           | A          | 0.5C            |
| 2        | 被动均衡功能<br>Passive equalization function | 均衡开启电压<br>Equalization turn-on voltage           | 3.2                                                           | V          |                 |
|          |                                         | 均衡开启压差<br>Equalize opening differential pressure | 50                                                            | mV         | 默认值<br>Defaults |
|          |                                         | 均衡开启条件<br>Equilibrium On Condition               | 同时满足： Satisfy both:<br>1.充电情况下 Under charging<br>2.达到设定平衡开启压差 |            |                 |



|   |                                                      |                                                                       |                                                                                                                     |    |                     |
|---|------------------------------------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----|---------------------|
|   |                                                      |                                                                       | Reach set equilibrium opening differential voltage<br>3.达到设定平衡开启电压<br>Achieving the set equilibrium turn-on voltage |    |                     |
|   |                                                      | 均衡电流<br>Balance current                                               | 30±10                                                                                                               | mA | 备注 Remark           |
| 3 | 单体过充保护<br>Single Cell over-charge protection         | 单体过充保护电压<br>Single Cell over-charge protection voltage                | 3.75±0.05                                                                                                           | V  |                     |
|   |                                                      | 单体过充保护延时<br>Single Cell over-charge protection delay                  | 1±0.5                                                                                                               | S  |                     |
|   |                                                      | 单体过充保护解除电压<br>Single Cell over-charge protection release voltage      | 3.65±0.05                                                                                                           | V  |                     |
|   |                                                      | 单体过充保护解除延时<br>Single Cell over-charge protection release delay        | 1±0.5                                                                                                               | S  |                     |
|   |                                                      |                                                                       |                                                                                                                     |    |                     |
| 4 | 单体过放保护<br>Single Cell over-discharge protection      | 单体过放保护电压<br>Single Cell over-discharge protection voltage             | 2.2±0.05                                                                                                            | V  |                     |
|   |                                                      | 单体过放保护延时<br>Single Cell over-discharge protection delay               | 1±0.5                                                                                                               | S  |                     |
|   |                                                      | 单体过放保护解除电压<br>Single Cell over-discharge protection release voltage   | 2.3±0.05                                                                                                            | V  |                     |
|   |                                                      | 单体过放保护解除延时<br>Single Cell over-discharge protection release delay     | 1±0.5                                                                                                               | S  |                     |
|   |                                                      |                                                                       |                                                                                                                     |    |                     |
| 5 | 总压过充保护<br>Total voltage overcharge protection        | 总体过充保护电压<br>Overall voltage overcharge protection                     | 60±0.8                                                                                                              | V  | Deviation<br><3%FSR |
|   |                                                      | 总体过充保护延时<br>Overall voltage overcharge protection delay               | 1±0.5                                                                                                               | S  |                     |
|   |                                                      | 总体过充保护解除电压<br>Overall voltage overcharge protection release           | 58.4±0.8                                                                                                            | V  |                     |
|   |                                                      | 总体过充保护解除延时<br>Overall voltage overcharge protection release delay     | 1±0.5                                                                                                               | S  |                     |
|   |                                                      |                                                                       |                                                                                                                     |    |                     |
| 6 | 总压过放保护<br>Total voltage over-discharge protection    | 总体过放保护电压<br>Overall voltage over-discharge protection                 | 35.2±0.8                                                                                                            | V  | Deviation<br><3%FSR |
|   |                                                      | 总体过放保护延时<br>Overall voltage over-discharge protection delay           | 1±0.5                                                                                                               | S  |                     |
|   |                                                      | 总体过放保护解除电压<br>Overall voltage over-discharge protection release       | 36.8±0.8                                                                                                            | V  |                     |
|   |                                                      | 总体过放保护解除延时<br>Overall voltage over-discharge protection release delay | 1±0.5                                                                                                               | S  |                     |
|   |                                                      |                                                                       |                                                                                                                     |    |                     |
| 7 | 充/放电过流保护<br>Charge/discharge over-current protection | 放电过流 1 级告警电流<br>Discharge over-current level 1 alarm current          | 480±3%                                                                                                              | A  |                     |
|   |                                                      | 放电过流 1 级告警延时<br>Discharge over-current level 1 alarm delay            | 1±0.5                                                                                                               | S  |                     |
|   |                                                      | 放电过流 2 级保护电流<br>Discharge over-current level 2 protection current     | 600±3%                                                                                                              | A  |                     |
|   |                                                      | 放电过流 2 级保护延时<br>Discharge over-current level 2 protection delay       | 1±0.5                                                                                                               | S  |                     |
|   |                                                      |                                                                       |                                                                                                                     |    |                     |



|   |                                  |                                                               |                                          |    |                                                                                                               |
|---|----------------------------------|---------------------------------------------------------------|------------------------------------------|----|---------------------------------------------------------------------------------------------------------------|
|   |                                  | Discharge over-current level 2 protection delay               |                                          |    |                                                                                                               |
|   |                                  | 解除条件<br>Release condition                                     | 移除负载解除<br>Removing the load is lifted    |    |                                                                                                               |
|   |                                  | 充电过流保护电流<br>Charge over-current protection current            | 600±3%                                   | A  |                                                                                                               |
|   |                                  | 充电过流保护延时<br>Charge over-current protection delay              | 1±0.5                                    | S  |                                                                                                               |
|   |                                  | 解除条件<br>Release condition                                     | 移除充电器解除<br>Remove the charger to release |    |                                                                                                               |
| 8 | 短路保护<br>Short circuit protection | 短路保护条件<br>Short circuit protection conditions                 | 外部负载短路<br>External load short circuit    |    |                                                                                                               |
|   |                                  | 短路保护延时<br>Short circuit protection delay                      | 10~500                                   | uS | 实际以客户电池寄回我司测试为准<br>The actual test is subject to the customer's battery sent back to our company for testing. |
|   |                                  | 短路保护解除<br>Short circuit protection released                   | 移除负载解除<br>remove load release            |    |                                                                                                               |
| 9 | 温度保护<br>Temperature protection   | 充电高温告警温度<br>Charging high temperature alarm temperature       | 63                                       | °C |                                                                                                               |
|   |                                  | 充电高温保护温度<br>Charging high temperature protection temperature  | 65                                       | °C |                                                                                                               |
|   |                                  | 充电高温保护延时<br>Charging high temperature protection delay        | 1±0.5                                    | S  |                                                                                                               |
|   |                                  | 充电高温释放温度<br>Charging high temperature release temperature     | 60                                       | °C |                                                                                                               |
|   |                                  | 充电低温告警温度<br>Charging low temperature warning temperature      | -38                                      | °C |                                                                                                               |
|   |                                  | 充电低温保护温度<br>Charging low temperature protection temperature   | -40                                      | °C |                                                                                                               |
|   |                                  | 充电低温保护延时<br>Charging low- temperature protection delay        | 1±0.5                                    | S  |                                                                                                               |
|   |                                  | 充电低温释放温度<br>Charging low temperature release temperature      | -35                                      | °C |                                                                                                               |
|   |                                  | 放电高温告警温度<br>Discharge high temperature alarm temperature      | 68                                       | °C |                                                                                                               |
|   |                                  | 放电高温保护温度<br>Discharge high temperature protection temperature | 70                                       | °C |                                                                                                               |
|   |                                  | 放电高温保护延时<br>Discharge high-temperature protection delay       | 1±0.5                                    | S  |                                                                                                               |
|   |                                  | 放电高温释放温度<br>Discharge high temperature release temperature    | 65                                       | °C |                                                                                                               |



|    |                              |                                                                                                                                                                                                                                                       |                                                                                 |                                   |                                                                        |
|----|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------|
|    |                              | 放电低温告警温度<br>Discharge low temperature alarm temperature                                                                                                                                                                                               | -38                                                                             | °C                                |                                                                        |
|    |                              | 放电低温保护温度<br>Discharge low temperature protection temperature                                                                                                                                                                                          | -40                                                                             | °C                                |                                                                        |
|    |                              | 放电低温保护延时<br>Discharge low- temperature protection delay                                                                                                                                                                                               | 1±0.5                                                                           | S                                 |                                                                        |
|    |                              | 放电低温释放温度<br>Discharge at low temperature release temperature                                                                                                                                                                                          | -35                                                                             | °C                                |                                                                        |
|    |                              | 温度保护解除条件<br>Temperature protection release conditions                                                                                                                                                                                                 | 达到恢复温度且断开负载<br>The recovery temperature is reached and the load is disconnected |                                   |                                                                        |
|    |                              | 温度个数<br>Number of temperatures                                                                                                                                                                                                                        | 1                                                                               | PCS                               |                                                                        |
|    |                              | 10                                                                                                                                                                                                                                                    | 压差告警<br>Differential voltage alarm                                              | 压差大告警<br>voltage difference alarm |                                                                        |
|    |                              | 压差大告警恢复<br>voltage difference alarm recovery                                                                                                                                                                                                          | 0.45                                                                            | V                                 |                                                                        |
| 11 | 内阻<br>Internal impedance     | 主回路导通内阻<br>Main circuit on-resistance                                                                                                                                                                                                                 | <20                                                                             | mΩ                                |                                                                        |
| 12 | 消耗电流<br>Current consumption  | 工作时自耗电电流<br>Self-consumption current during operation                                                                                                                                                                                                 | <35                                                                             | mA                                | 不包含模块自耗<br>Not include module self-consumption                         |
|    |                              | 休眠模式自耗电电流<br>Self-consumption current in sleep mode                                                                                                                                                                                                   | <800                                                                            | uA                                | 进入：无通讯、无电流、无钥匙信号<br>Entry: no communication, no current, no key signal |
|    |                              | 休眠时间<br>Sleep time                                                                                                                                                                                                                                    | 3600                                                                            | S                                 |                                                                        |
| 13 | 通讯方式<br>Communication method | <input checked="" type="checkbox"/> UART <input type="checkbox"/> RS485 <input type="checkbox"/> CAN <input type="checkbox"/> 蓝牙 Bluetooth<br><input type="checkbox"/> GPS <input type="checkbox"/> LCD <input type="checkbox"/> 电量显示模块 SOC indicator |                                                                                 |                                   |                                                                        |
| 14 | 钥匙开关<br>Key switch           | <input type="checkbox"/> 有 <input checked="" type="checkbox"/> 无                                                                                                                                                                                      |                                                                                 |                                   |                                                                        |
| 15 | 保护板尺寸<br>BMS size            | 长*宽*高 (mm)<br>Long * Width * High (mm)<br>257*148*52                                                                                                                                                                                                  |                                                                                 |                                   |                                                                        |
| 16 | 风扇开启温度                       | Fan Opening temperature:>47°C                                                                                                                                                                                                                         |                                                                                 |                                   |                                                                        |

**4.2 辅助模块参数 Auxiliary module parameters**

| 序号<br>NO | 名称<br>Name | 电流<br>Current | 是/否标配<br>Yes/No standard | 备注<br>Remark |
|----------|------------|---------------|--------------------------|--------------|
|          |            |               |                          |              |



|   |                        |                              |      |                                                                                                                                                                                                                                                                                                                                                     |
|---|------------------------|------------------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | PACK 并联模块              | <input type="checkbox"/> 1A  | 否 no |                                                                                                                                                                                                                                                                                                                                                     |
|   | Pack parallel module   | <input type="checkbox"/> 5A  | 否 no |                                                                                                                                                                                                                                                                                                                                                     |
|   |                        | <input type="checkbox"/> 15A | 否 no |                                                                                                                                                                                                                                                                                                                                                     |
| 2 | 加热模块<br>Heating Module | 5~30A                        | 否 no | <p>1.当检测到环境温度低于 0°C时开始加热并断开充放电</p> <p>When it is detected that the ambient temperature is lower than 0° C, it starts to heat up and disconnects the charge and discharge</p> <p>2.当检测到环境温度高于 5°C时断开加热并可以充放电</p> <p>When the ambient temperature is detected to be higher than 5° C, the heating is turned off and can be charged and discharged</p> |

**4.3 可靠性参数 Reliability parameters**

| 序号<br>NO | 项目<br>Project                            | 条件<br>Condition                                                                                                                                                                                                                        |
|----------|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | 检测精度<br>Detection accuracy               | 电流检测精度 Current detection accuracy: $\leq (\pm 3\%FSR)$<br>电压检测精度 voltage detection accuracy: $\leq \pm 15mV$<br>温度检测精度 Temperature detection accuracy: $\leq 2^{\circ}C$ (常温下)<br>SOC 平均精度 SOC average accuracy: $\leq 10\%$ (受环境温度影响) |
| 2        | 信息存储<br>Information storage              | 最大存储 380 条履历信息, 含保护次数, 当前总电压、电流、温度、SOC、等<br>Stores up to 380 message of history information, including protection times, current total voltage, current, temperature, SOC, etc.                                                        |
| 3        | SOC 计量<br>SOC metering                   | 采用电流积分法 Using current integration method                                                                                                                                                                                               |
| 4        | 工作环境条件<br>Working environment conditions | 工作温度:-40°C~85°C Operating temperature:-40°C~85°C                                                                                                                                                                                       |
|          |                                          | 相对湿度:5%~90%RH Relative humidity: 5%~90%RH                                                                                                                                                                                              |
| 5        | 存储环境条件<br>Storage environment conditions | 存储温度:-40°C~85°C Storage temperature: -40°C~85°C                                                                                                                                                                                        |
|          |                                          | 相对湿度:5%~75%RH Relative humidity:                                                                                                                                                                                                       |



## 5. 通信说明 Communication Description

默认为 UART 通讯，可定制客户 RS485、MODBUS、CAN、UART 等通讯协议

The default is UART communication, and communication protocols such as RS485, MODBUS, CAN, UART, etc. can be customized

### 5.1 RS485 通信

默认达锂 RS485 信协议，通过专用通讯盒与指定上位机进行通讯，波特率默认为 9600bps。从而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。（本上位机适用于 Windows 系列平台的 PC 机）。

The default is up to the lithium RS485 letter protocol, which communicates with the designated host computer through a special communication box, and the default baud rate is 9600bps. Therefore, various information of the battery can be viewed on the host computer, including battery voltage, current, temperature, state, SOC, and battery production information, etc., parameter settings and corresponding control operations can be performed, and the program upgrade function can be supported. (This host computer is suitable for PCs of Windows series platforms).

### 5.2 CAN 通信

默认达锂 CAN 协议，通信速率 250KB/S。

The default is lithium CAN protocol, and the communication rate is 250KB/S.

## 6. 上位机说明 PC software Description

上位机 DALY BMS-V1.0.0 功能主要分为六大部分：数据监控、参数设置、参数读取、工程模式、历史告警和 BMS 升级。

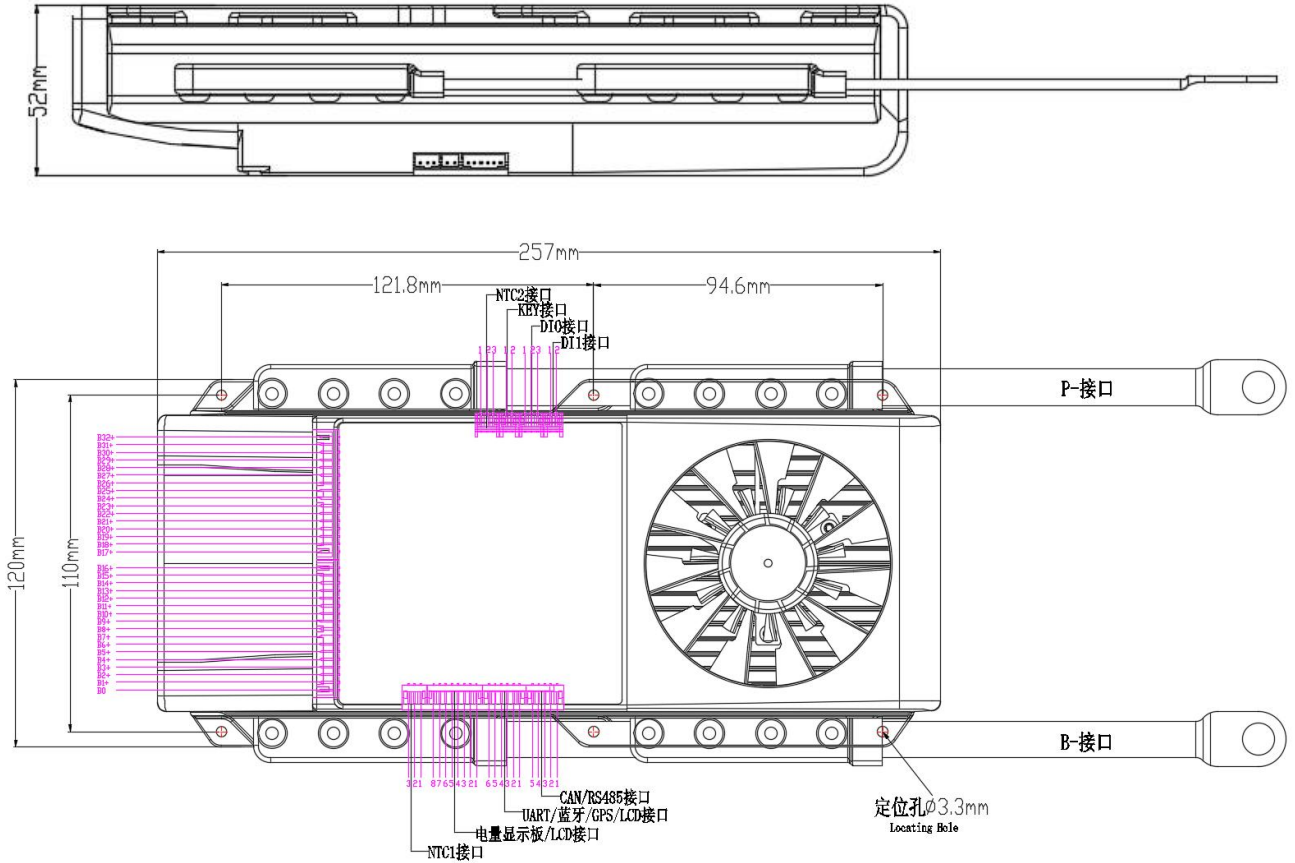
- 1、解析各模块发送的数据信息，然后将电压、温度、配置值等显示出来；
- 2、通过上位机向各模块配置信息；
- 3、生产参数校准；
- 4、BMS 升级。

The functions of the host computer DALY BMS-V1.0.0 are mainly divided into six parts: data monitoring, parameter setting, parameter reading, engineering mode, historical alarm and BMS upgrade.

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.

## 7.保护板尺寸图 (接口仅供参考, 非常规标配, 详情请参考 7.1 接口引脚说明)

**Dimensional drawing of BMS(interface for reference only, unconventional standard, please refer to 7.1 Interface pin specific**



### 7.1 接口引脚说明 Interface pin instructions

| 接口名称<br>Interface name                     | Pin 脚 | 标号<br>Label | 定义说明<br>Definition description                                                                                                                           |
|--------------------------------------------|-------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| B-接口 (标配)<br>B-interface<br>Standard Parts | /     | B-          | 电池总负, 接电池总负<br>Battery negative, connect to battery negative                                                                                             |
| P-接口 (标配)<br>P-interface<br>Standard Parts | /     | P-          | 保护板充放电负极, 接充放电负端<br>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 (标配)<br>Sampling line interface      | 1     | B0          | 接第 1 节电池负级 Connect to the negative terminal of the first battery                                                                                         |
|                                            | 2     | B1+         | 接第 1 节电池正级 Connect to the positive terminal of the first battery                                                                                         |
|                                            | 3     | B2+         | 接第 2 节电池正级 Connect to the positive terminal of the second battery                                                                                        |

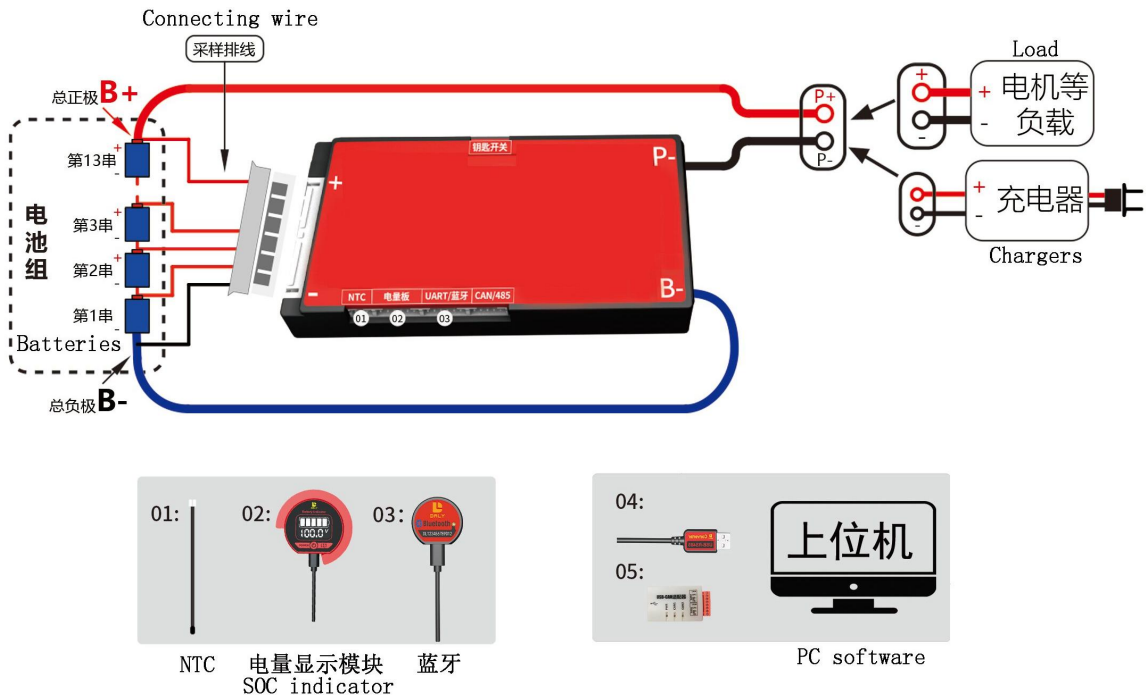
|                                                                                                           |                                      |                                                |                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard Parts<br>XHB 2.5 17 Pin 带扣                                                                       | ...                                  | ...                                            | 接最后 1 节电池正级 Connect the positive terminal of the last battery                                                                                                             |
| NTC1 接口 (标配)<br>NTC1 interface<br>PH2.0 3Pin                                                              | 1<br>2<br>3                          | NTC1<br>GND<br>NTC2                            | 1#温度线 1 # Temperature line<br>地 GND<br>2#温度线 2 # Temperature line                                                                                                         |
| NTC2 接口 (选配)<br>NTC2 interface<br>Optional accessories<br>PH2.0 3Pin                                      | 1<br>2<br>3                          | NTC5<br>GND<br>NTC4                            | 5#温度线 5 # Temperature line<br>地 GND<br>4#温度线 4 # Temperature line                                                                                                         |
| SOC indicator 电量显示<br>板接口 (标配)<br>Power display board<br>interface<br>Optional accessories<br>PH2.0 5 Pin | 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8 | GND<br>12V<br>S1<br>预留<br>TX<br>RX<br>预留<br>预留 | 地 GND<br>灯板供电电源 12V Light board power supply is 12V<br>灯板按键 Light board button<br>Reserved<br>通讯发送端 Communication sender<br>通讯接收端 Communication receiver<br><br>          |
| 蓝牙/GPS/UART/LCD 接口<br>(标配)<br>Bluetooth/GPS/UART/L<br>CD interface<br>Optional accessories<br>PH2.0 6Pin  | 1<br>2<br>3<br>4<br>5<br>6           | GND<br>3.3V<br>12V<br>S1<br>TX<br>RX           | 地 GND<br>供电电源 3.3V Power supply is 3.3V<br>供电电源 12V Power supply is 12V<br>灯板按键 Lamp button<br>通讯发送端 Communication sending end<br>通讯接收端 Communication receiving end       |
| RS485/CAN 接口<br>(选配) RS485/CAN<br>interface<br>Optional accessories<br>PH2.0 5Pin                         | 1<br>2<br>3<br>4<br>5                | 485_B<br>485_A<br>GND<br>CAN_H<br>CAN_L        | 485 通讯接收端 485 communication receiver<br>485 通讯发送端 485 communication sender<br>隔离地 Isolation ground GND<br>CAN 通讯高 CAN communication high<br>CAN 通讯低 CAN communication low |
| KEY 接口 (选配)<br>KEY interface<br>Optional accessories<br>PH2.0 2Pin                                        | 1<br>2                               | KEY+<br>KEY-                                   | 钥匙开关正 Key switch positive<br>钥匙开关负 Key switch negative                                                                                                                    |

|                                                                           |   |      |                                          |
|---------------------------------------------------------------------------|---|------|------------------------------------------|
| 预留 DIO 口 (选配)<br>Reserved DIO port<br>Optional accessories<br>PH2.0 3Pin  | 1 | DO1  | 输出控制信号 Output control signal             |
|                                                                           | 2 | GND  | 地 GND                                    |
|                                                                           | 3 | DI2  | 输入控制信号 Input control signal              |
| 软开关接口 (选配)<br>Soft switch interface<br>Optional accessories<br>PH2.0 2Pin | 1 | DI1  | 软开关检测输入脚 Soft switch detection input pin |
|                                                                           | 2 | 3.3V | 内部供电电源 3.3V Internal power supply 3.3V   |

## 7.2 主要线材说明

| 线材名称 Line name      | 默认规格 Default specification |
|---------------------|----------------------------|
| B- P-线 Output Line  | 3135 2AWG L=200mm M8 端子    |
| 采集线 Collecting line | 1007 22AWG L=450mm (17PIN) |
| NTC 线               | 24AWG L=250mm              |

## 8. 接线示意图 Wiring diagram



### 8.1 接线说明 Wiring Instructions

- 先将保护板 B-线 (蓝色粗线) 到电池组总负极;  
First connect the B-line of the protection board (thick blue line) to the total negative pole of the battery pack
- 排线从细黑线连接 B-开始, 第 2 根线连接第 1 串电池正极, 后面依次连接每一串电池的正极; 再把排线插入保护板;  
The cable starts from the thin black wire connected to B-, the second wire is connected to the positive electrode of the first battery cell, and then the remaining wires are connected to the positive electrodes of the other cells. Finally, insert the cable into the protection board.

of the first string of batteries, and the positive electrode of each string of batteries is connected in turn; then insert the cable into the protection board

- 线完成后，测量电池 B+，B-电压与 P+，P-电压值是否相同，相同即保护板工作正常；否则请按照上面重新操作：  
After the line is completed, measure whether the voltages of battery B+ and B- are the same as those of P+ and P-. The same means that the protection board is working normally; otherwise, please re-operate according to the above;
- 拆卸保护板时，先拔排线（如果有两个排线，先拔高压排线，再拔低压排线），再拆动力线 B-。  
When removing the protection board, first unplug the cable (if there are two cables, first pull out the high-voltage cable, then pull out the low-voltage cable), and then disconnect the power cable B-.

## 8.2 接线注意事项 Wiring Precautions

- 软件板连接顺序  
确认排线焊接无误之后，并且把随产品的配件（如：温控标配/电量板选配/蓝牙选配/GPS 选配/显示屏选配/定做通讯接口选配）安装在保护板上，然后再把排线插入保护板插座；保护板上面的蓝色 B-线接电池的总负极，黑色的 P-线接在充放电的负极上面。

Software BMS connection sequence:

After confirming that the cable is welded correctly, install the accessories (such as: standard temperature control/power board option/Bluetooth option/GPS option/display option/custom communication interface option) on the protection board, and then insert the cable into the socket of the protection board; the blue B-line on the protection board is connected to the total negative pole of the battery, and the black P-line is connected to the negative pole of charge and discharge.

保护板首次使用需要激活

方法 1: 电量板激活，电量板的上面是有一个激活按钮的。

方法 2: 充电激活。

方法 3: 蓝牙激活

The protection board needs to be activated for the first time:

Method 1: Activate the power board. There is an activation button on the top of the power board.

Method 2: Charge activation.

Method 3: Bluetooth Activation

参数修改

保护板的串数跟保护参数（三元、铁锂）在出厂的时候是有默认值的，但是电池组的容量是需要按电池组的实际容量 AH 进行设置的，若容量 AH 没有正确设置，则剩余电量的百分比就会不准，首次使用需充满 100%作为标定，其他保护参数也可以根据客户自身需求进行设置（不建议随意修改参数）。

Parameter modification:

The number of BMS strings and protection parameters (NMC, LFP, LTO) have default values when they leave the factory, but the capacity of the battery pack needs to be set according to the actual capacity AH of the battery pack. If the capacity AH is not set correctly, then The percentage of remaining power will be inaccurate. For the first use, it needs to be fully charged to 100% as a calibration. Other protection parameters can also be set according to the customer's own needs (it is not recommended to modify the parameters at will).

- 排线的接线方式参照背面的硬件保护板接线流程，智能板 APP 修改参数出厂密码：123456  
For the wiring method of the cable, refer to the wiring process of the hardware protection board on the back. The smart board APP modifies the parameters. Factory password: 123456

## 9. 保修 Warranty

本公司生产的所有锂电池保护板，质保一年；人为因素导致损坏的，有偿维修

All lithium battery BMS produced by our company has a one-year warranty; if the damage caused by human factors, paid maintenance

## 10. 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，要做好防静电措施；  
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。  
All lithium battery protection boards produced by our company are guaranteed for one year; if damaged due to human factors, paid maintenance.

## 11. 特别说明 Special Note

我司产品进行严格的出厂检验测试，但是因为客户使用的环境不同（特别是在高温、超低温、太阳下等），难免会出现保护板故障，所以客户在选择和使用保护板时，需要在友好的环境下使用，及选择一定冗余量的保护板。

Our products undergo strict factory inspection and testing, but due to the different environments used by customers (especially in high temperature, ultra-low temperature, under the sun, etc.), it is inevitable that the protection board will fail. Therefore, when customers choose and use BMS, they need to be in a friendly environment, and select a BMS with a certain redundancy capability.

