



软件主动均衡模块

V1.1 规格书

Software active balance module

V1.1 specification

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1.概述 summary

因电池的容量、内阻和电压等参数值不能完全一致，这种差异导致充电时容量最小的电池容易过充，过放，受损后最小的电池容量变得更小，进入恶性循环。单体电池性能的优劣直接影响到整组电池的充放电特性及电池组容量降低。没有均衡功能的BMS 只是一个数据采集器，很难称得上是管理系统。均衡板可以实现最大持续 1A 的均衡电流。将单体能量高的转移到单体能量低的电池，或用整组能量补充到单体最低电池，在实施的过程中通过储能环节把能量重新进行分配，最大程度的保证电池一致性、提高电池续航里程、延缓电池衰老。

Because the battery capacity, internal resistance, voltage and other parameters are not completely consistent, this difference causes the battery with the smallest capacity to be easily overcharged and discharged during charging, and the smallest battery capacity becomes smaller after damage, entering a vicious cycle. The performance of single battery directly affects the charge and discharge characteristics of the whole battery and the reduction of battery capacity. BMS without balance function is just a data collector, which is hardly a management system. The software active balance module can realize the maximum continuous 1A balance current. Transfer the high-energy single battery to the low-energy single battery, or use the whole group of energy to supplement the lowest single battery. During the implementation process, the energy is redistributed through the energy storage link, so as to ensure the battery consistency to the greatest extent, improve the battery life mileage and delay the battery aging.

2. 主要技术参数 main technical parameters

2.1 技术规格参数 Technical specification parameter

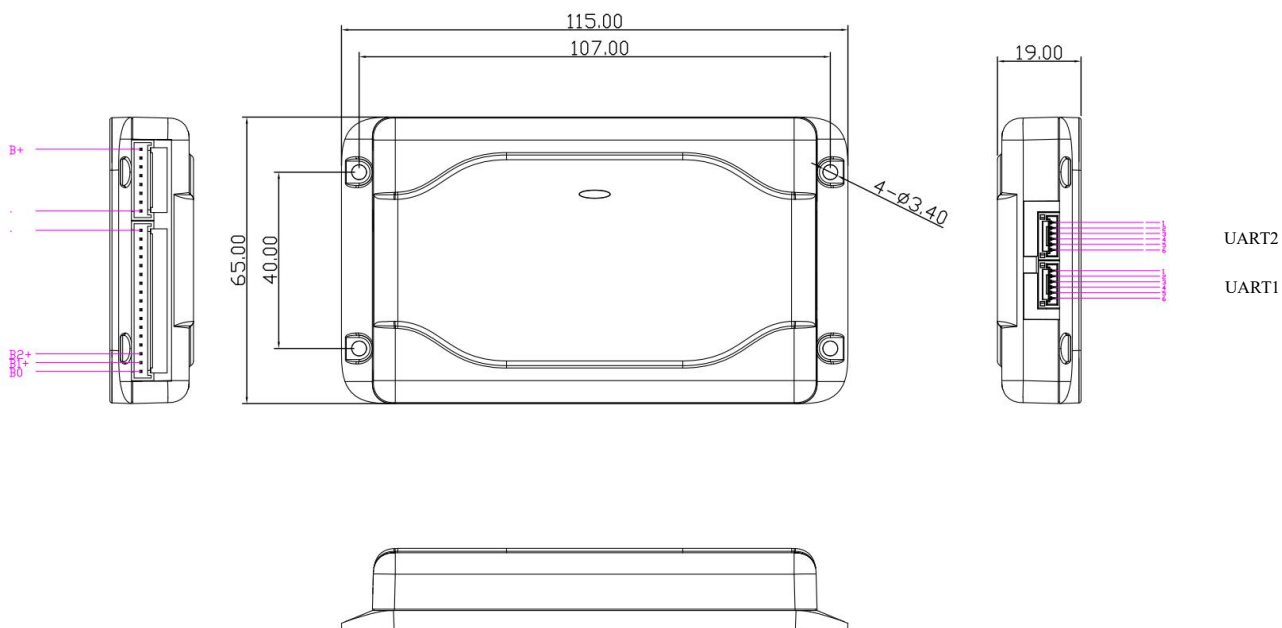
技术指标 Qualification	数据说明 Data specification
电池组类型 Battery pack type	三元、铁锂、钛酸锂 Li-ion、LiFePO4、LTO
底板及版本号 PCB ver.	如 DL_ZDJH-R24_V1.1 Such as DL_ZDJH-R24_V1.1 注意：不同的串数对应的底板不同 Note: Different strings correspond to different PCB
电池组串数 Number of battery strings	三元/铁锂：4~24s；钛酸锂：6~24s； Li-ion/LiFePO4：4~24s；LTO：6~24s；
电池组电压 Battery voltage	需≥10V；Need≥10V
均衡电流 Balance current	可设置范围 0~1A，默认 1A，精度±0.1A The range can be set from 0 to 1A, the default is 1A, the accuracy is ±0.1A 注意：当电池处于低压且放电状态时，最大均衡电流为 0.8±0.2A； Note: When the battery is at low voltage and discharged, the maximum balance current is 0.8±0.2A
均衡方式 Balance mode	主动均衡 Active balance
均衡开启电压 Balance on voltage	可设置范围 1.5V 至 4.5V，是均衡工作电压的下限； Can be set from 1.5V to 4.5V, is the low limit of Balance work voltage;
均衡截止电压 Balance off voltage	可设置范围 1.5V 至 4.5V，是均衡工作电压的上限； Can be set from 1.5V to 4.5V, is the up limit of Balance work voltage;
均衡工作电压 Balance work voltage	均衡截止电压 > 均衡工作电压 > 均衡开启电压 Balance off voltage > Balance work voltage > Balance on voltage
均衡开启压差 Balance on voltage diff	出厂默认 20mV；可设置范围：0.01V~1.5V Factory default 20mV；Configurable range: 0.01V~1.5V
均衡开启条件 Balance on condition	每串电池电压达到均衡工作电压，且电池间的电压差≥均衡开启压差 The voltage of each battery string reaches the balance work voltage, and the voltage difference between batteries ≥ Balance on voltage diff
均衡关闭条件 Balance off condition	单串电压≠均衡工作电压，或压差 < 均衡开启压差 voltage of single unit≠ Balance work voltage , or the voltage difference between batteries < Balance on voltage diff
工作功耗 Working power consumption	参考 2.2 Refer to 2.2
休眠电流 Sleep current	参考 2.2 Refer to 2.2
工作温度 Working temperature	-20°C ~ 60°C
低温保护 low temperature protection	默认-40°C；可设置 The default is -40°C; Can be set
高温保护 high temperature protection	默认 85°C；可设置 The default is 85°C; Can be set
尺寸 size	115*65*19

线束 Wiring Harness	与 BMS 相匹配 Matches the BMS
通讯 Communication	双 UART; Double UART
数据监控 Data Monitoring	蓝牙 APP/上位机 Bluetooth APP Smart BMS or PCMaster
均衡指示灯 Balance Indicator Light	亮/闪: 均衡开启; 灭: 未开启均衡、故障 On / Flash: balance on; Off: balance not on, fault
过放保护 Over-discharge protection	可设置; 低于该值 55s 后会被强制进入休眠保护状态, 无其它唤醒源时 3600s 后会自动被唤醒 Can be set; When single voltage is lower than the over-discharge protection value, it will be entered sleeping condition and will be awoken after 3600s without other awakening source
重量 Weight	100g±30g

2.2 功耗参考 power consumption reference

串数	3	4	8	16	24	备注 Remark
工作功耗 Working power consumption	< 50mA	< 35mA	< 20mA	< 20mA	< 20mA	在均衡关闭状态时 Balance off condition
休眠电流 Sleep current	≤650μA	≤550μA	≤550μA	≤550μA	≤550μA	单串电压 4.2V, 不带蓝牙 When the single string voltage is 4.2V, sleep current without Bluetooth

3.尺寸图 dimensional drawing



4.接口定义说明 Interface definition description

接口名称 Interface name	Pin 脚	定义 definition	定义说明 Description of definition
采集接口 Collecting Interface PHB 2.0 带扣	1	B0	接第 1 节电池负级 Connect cell 1 negative
	2	B1+	接第 1 节电池正级 Connect cell 1 positive
	3	B2+	接第 2 节电池正级 Connect cell 2 positive
	...	...	接最后 1 节电池正级 Connect the last cell positive
UART1 接口 UART1 Interface GH1.25 6Pin	1	GND	地 GND
	2	3.3V	供电电源 3.3V Power supply is 3.3V
	3	5V	供电电源 5V Power supply is 5V
	4	S1	按键 button
	5	TX	通讯发送端 Communication TX
	6	RX	通讯接收端 Communication RX
UART2 接口 UART1 Interface GH1.25 6Pin	1	GND	地 GND
	2	3.3V	供电电源 3.3V Power supply is 3.3V
	3	5V	供电电源 5V Power supply is 5V
	4	S1	灯板按键 button
	5	TX	通讯发送端 Communication TX
	6	RX	通讯接收端 Communication RX

5.主要线材说明 Main wire description

5.1 主要线材 Main wire

线材名称 Line name	默认规格 Default specification
采集线 Collecting cables (标配) standard configuration	依串数匹配, 参考 5.2 Match by strings, refer to 5.2
BMS 连接线 1 BMS connection cables (选配) Optional accessories	连接线_智能板(UART)通信线_GH1.25_6P_300mm connection cables_BMS (UART) communication cables_GH1.25_6P_300mm
PC 连接线 PC connection cables (选配) Optional accessories	转换器_DL-USB 转 UART 数据线_注胶_GH1.25_6Pin_带扣_达锂 LOGO Convertcables_DL-USB convert to UART data cables_glue_GH1.25_6Pin_buckle_Daly LOGO

5.2 采集与串数对应表 Collection and string number mapping sheet

串数 Strings	采集线接口规格 collecting cables interface specification	采集线规格 collecting cables specification	采集线抽线 collecting cables cutting
3	PHB2.0 4pin with buckle	1007 24AWG L=300mm (4PIN) with buckle	/
4	PHB2.0 5pin with buckle	1007 24AWG L=300mm (5PIN) with buckle	/
5	PHB2.0 6pin with buckle	1007 24AWG L=300mm (6PIN) with buckle	/
6	PHB2.0 7pin with buckle	1007 24AWG L=300mm (7PIN) with buckle	/
7	PHB2.0 8pin with buckle	1007 24AWG L=350mm (8PIN) with buckle	/
8	PHB2.0 9pin with buckle	1007 24AWG L=450mm (9PIN) with buckle	/
9	PHB2.0 11pin with buckle	1007 24AWG L=450mm (11PIN) with buckle	抽掉 11P 中最后 1P 线 cutting the last cables of the 11PIN line
10	PHB2.0 11pin with buckle	1007 24AWG L=450mm (11PIN) with buckle	/
11	PHB2.0 13pin with buckle	1007 24AWG L=450mm (13PIN) with buckle	抽掉 13P 中最后 1P 线 cutting the last cables of the 13PIN line
12	PHB2.0 13pin with buckle	1007 24AWG L=450mm (13PIN) with buckle	/
13	PHB2.0 14pin with buckle	1007 24AWG L=450mm (14PIN) with buckle	/
14	PHB2.0 15pin with buckle	1007 24AWG L=450mm (15PIN) with buckle	/
15	PHB2.0 16pin with buckle	1007 24AWG L=450mm (16PIN) with buckle	/
16	PHB2.0 17pin with buckle	1007 24AWG L=450mm (17PIN) with buckle	/
17	PHB2.0 12+6pin with buckle	1007 24AWG L=450mm (12+6PIN) with buckle	/
18	PHB2.0 13+6pin with buckle	1007 24AWG L=450mm (13+6PIN) with buckle	/
19	PHB2.0 14+6pin with buckle	1007 24AWG L=450mm (14+6PIN) with buckle	/
20	PHB2.0 15+6pin with buckle	1007 24AWG L=450mm (15+6PIN) with buckle	/
21	PHB2.0 15+7pin with buckle	1007 24AWG L=450mm (15+7PIN) with buckle	/
22	PHB2.0 17+6pin with buckle	1007 24AWG L=450mm (17+6PIN) with buckle	/
23	PHB2.0 17+7pin with buckle	1007 24AWG L=450mm (17+7PIN) with buckle	/
24	PHB2.0 17+8pin with buckle	1007 24AWG L=450mm (17+8PIN) with buckle	/

6. 主要配件说明 Main mountings description

配件 mountings	默认规格 Default specification
低功耗蓝牙 low-power dissipation Bluetooth (选配) Optional accessories	蓝牙模块_注胶_Φ37×6.5_不带按键_达锂 LOGO_中英文(低功耗防水/GH1.25)

7. 蓝牙显示界面 Bluetooth Display

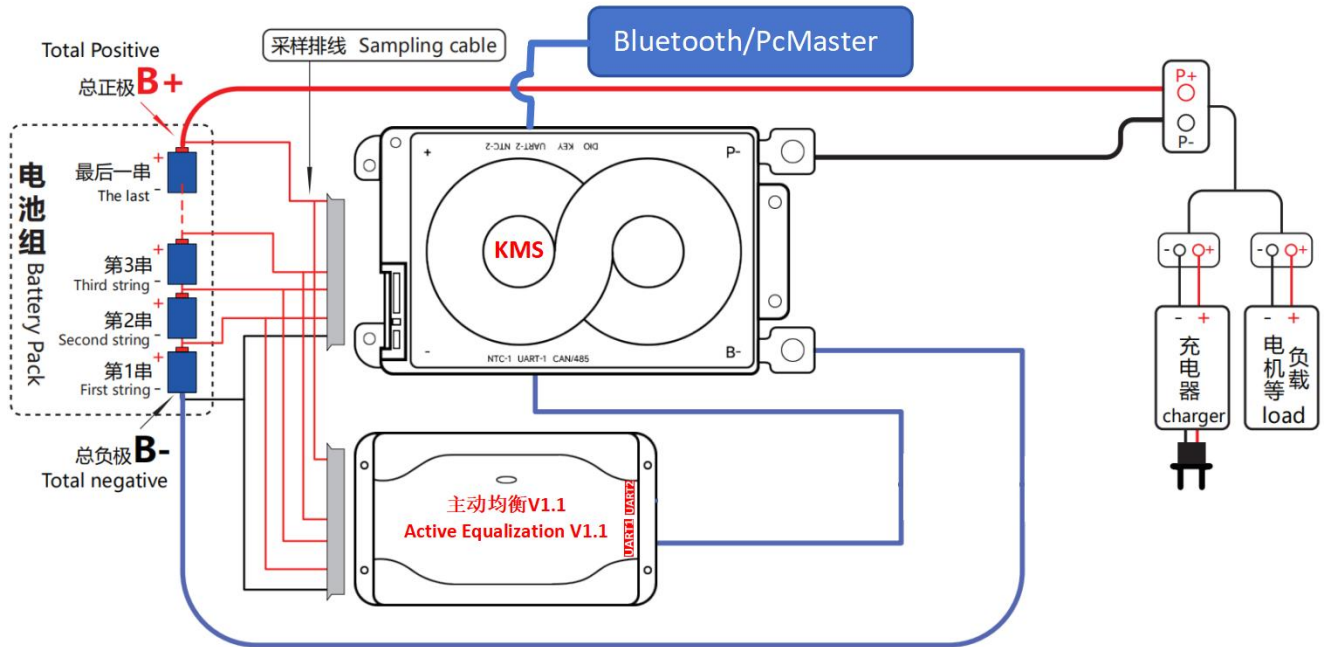


8. 上位机显示界面 PC Display



9. 接线&操作说明 Wiring & Operating instructions

9.1 与 KMS 通讯 Communication with KMS



注意：在 K/M/S 与主动均衡通讯前，需要将 K/M/S 与上位机连接，并设置“主动均衡模块”为“ON”

Note: Before K/M/S communicates with active balancing, connect K/M/S to the host computer, and set active Balancing Module to ON.

1、将采集线和电池组进行焊接：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；
Weld the collection cables to the battery pack: The cable starts from the thin black wire connected to B-, the second wire is connected to the positive of the first string of batteries, and the positive of each string of batteries is connected in turn;

2、插上均衡板排插

Insert the cable into the software active balance module

3、将 Daly Smart K/M/S BMS 的 **UART1** 和均衡板连接

Connect **UART1** of Daly Smart K/M/S BMS to the balance module

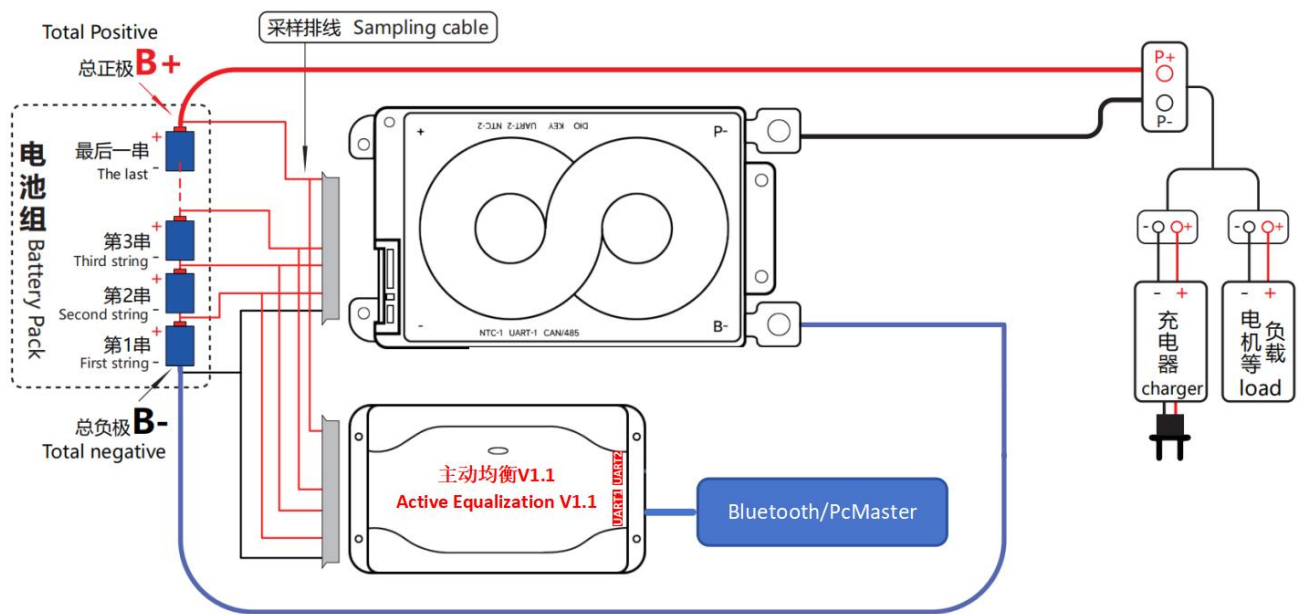
4、将 Daly Smart K/M/S BMS 和低功耗蓝牙或者上位机连接

Connect the Daly Smart K/M/S BMS to low-power dissipation Bluetooth/PCMaster

5、设置均衡板以及 Daly Smart K/M/S BMS 的相关参数

Set parameters related to the software active balance module and Daly Smart K/M/S BMS

9.2 不与 KMS 通讯 No communication with KMS



注意：蓝牙从 UART1 转到 UART2 时，需要将 APP 重启或者将手机蓝牙重启；

Note: When transferring Bluetooth from UART1 to UART2, you need to restart the APP or restart the Bluetooth of the phone;

1、将采集线和电池组进行焊接：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；
Weld the collection line to the battery pack: The cable starts from the thin black wire connected to B-, the second wire is connected to the positive of the first string of batteries, and the positive of each string of batteries is connected in turn;

2、插上均衡板排插

Insert the cable into the software active balance module

3、将均衡板和低功耗蓝牙或者上位机连接

Connect the software active balance module to low-power dissipation Bluetooth/PCMaster

4、设置均衡板的相关参数

Set parameters related to the software active balance module

10.注意事项 Precautions

①均衡板可以在没有 Daly smart BMS 的情况下工作

The software active balance module can work without Daly smart BMS

②均衡板需匹配相同串数的 BMS/电池,不同串数的不可混用

The software active balance module must match BMS/battery with the same number of strings, different string numbers cannot be mixed and used

③Daly 软件板的接线说明请参考对应的规格书

For details about how to connect lines to a Daly Smart BMS, see the Smart BMS specifications

④不同厂家的排线不通用, 请确保使用我们公司配套排线;

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

⑤在测试、安装、接触和使用均衡板时, 要做好防静电措施;

Take measures to discharge static electricity when testing, installing, touching and using the software active balance module

⑥不可自行拆卸、更改主动均衡的元器件;

Do not disassemble or change the software active balance module components by yourself

11.保修 Warranty

本公司生产的所有锂电池保护板配件, 质保一年; 人为因素导致损坏的, 有偿维修

All lithium battery bms accessories produced by the company are guaranteed for one year; If the damage is caused by human factors, it shall be repaired with compensation

12.产品修订记录 Product revision record

日期 Date	版本号 Ver.	修订说明 Revision note	制定人 Made by	核准人 authorizer
20240605	A0	初版发行 Initial release	莫业鹏	杨伟涛
20240915	A1	更新与 KMS 通讯的接线说明 Updated wiring instructions for communication with KMS	莫业鹏	杨伟涛