产品规格承认书

Product Specification Approval

产品名称（**Product Name**）：	智能板 7~17 兼串 40~100A 同口带均衡 Smart BMS 7~17S 40~100A Common Port With Balance	
产品型号（**Product Number**）：	DL-R17IK-TZJ	
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)**
XH Zhao	**WH Yang**	**FG Yang**

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 to confirm OK, please sign back in a timely manner, within 7 days without signing back and problem feedback, our default customer test qualified; specifications in the picture for the general model picture, may be different from the delivery of the prototype, this specification by the Dongguan Daly Electronics Co.

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.

目录

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。本产品是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 industry, the battery management system also puts forward the requirements of high performance, high reliability and high cost-effective. This product is specially designed for lithium battery BMS, it can real-time acquisition, processing and storage of battery pack information data in the process of 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
- 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 over charge, 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，可通过上位机对过充、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 charge, over-discharge, over-current, charge-discharge over-current, equalization, over-temperature, under-temperature, sleep, capacity and other parameters can be set through the host computer

3. 基础规格(Basic specification)

指标 Index	参数 Specification	备注 Remarks
电池组类型 Battery pack type	三元、铁锂 NCM、LFP	
电池组串数 Number of battery strings	三元（NCM)：7~16S 铁锂(LFP)：8~17S	
单体采样电压范围 Cell sampling voltage range	1.5V-4.9V	
工作电压范围 Operating voltage range	＞16V	
均衡方式 Balance method	被动均衡 Passive Balance	
工作功耗 Working power consumption	≤30mA； 注：该电流为常压且无外设配件下	空载状态 Idle State

	Note: Regular voltage and no peripheral accessories；	
休眠功耗 Sleep current	<950uA； 注：该电流为常压且无外设配件下 Note: Regular voltage and no peripheral accessories；	空载状态 Idle State
关机模式功耗	<100uA； 注：该电流为常压且无外设配件下 Note: Regular voltage and no peripheral accessories；	空载状态 Idle State
产品重量 Product weight	330g	
产品尺寸 Product size	长*宽*高 ：160*90*14（mm） Length*Width*Height：160*90*14（mm）	
预充大小（uF）Precharge size	☐4700 ☐10000 ☐22000 ☑33000	并 25R 电阻
并联限流功能	1A	最大电流

4. 技术参数 (Technical Parameters)

4.1. 充放电及均衡 Charging & Discharging With Passive Equalization

检测内容 Test content		默认参数 Default parameters		单位 Unit	备注 Remark
放电 Discharge	额定放电电流 Rated Discharge Current	40/60/80/100		A	
充电 charge	额定充电电流 Rated Charge current	80/100		A	
被动均衡功能 Passive Equalization	均衡开启电压 Balanced Start Voltage	三元 NCM 3.9	铁锂 LFP 3.4	V	可设置 Can Be Set
	均衡开启压差 Balanced Opening Voltage Difference	≥50	≥20	mV	可设置 Can Be Set
	均衡电流 Balance Current	150±30		mA	
	均衡开启条件为同时满足以下两个条件: Balanced start when both of the following conditions are met: 1、达到设定的均衡开启压差 Reach the set balanced start voltage 2、达到设定的均衡开启电压 The highest voltage reaches the set balanced start voltage difference.				

4.2. 单体电压保护 Single cell voltage Protection

电压保护参数 Voltage Protection parameters	电池类型 Battery Type	
	三元 NCM	铁锂 LFP
单体过压一级告警（V） Single cell over-voltage level 1 alarm (V)	4.15±0.05	3.65±0.05
单体过压一级告警恢复（V） Single cell over-voltage level 1 alarm recovery (V)	4.05±0.05	3.55±0.05
单体过压一级延时 Single cell over-voltage Level 1 delay	1±0.8s	
单体过压二级保护（V） Single cell over-voltage level 2 protection (V)	4.25±0.05	3.75±0.05
单体过压二级保护恢复（V） Single cell over-voltage level 2 protection recovery (V)	4.15±0.05	3.65±0.05
单体过压二级保护延时 Single cell over-voltage Level 2 delay	1±0.8s	
单体过压三级保护（V） Single cell over-voltage level 3 protection (V)	4.30±0.05	3.80±0.05
单体过压三级保护恢复（V） Single cell over-voltage level 3 protection recovery (V)	4.20±0.05	3.70±0.05
单体过压三级保护延时 Single cell over-voltage Level 3 delay	0.5±0.4s	
单体欠压一级告警（V） Single cell under-voltage level 1 alarm (V)	2.80±0.05	2.30±0.05
单体欠压一级告警恢复（V） Single cell under-voltage level 1 alarm recovery (V)	2.90±0.05	2.40±0.05
单体欠压一级延时 Single cell under-voltage Level 1 delay	1±0.8s	
单体欠压二级保护（V） Single cell under-voltage level2 protection (V)	2.70±0.05	2.20±0.05
单体欠压二级保护恢复（V） Single cell under-voltage level 2 protection recovery (V)	2.80±0.05	2.30±0.05
单体欠压二级延时 Single cell under-voltage Level 2 delay	5±0.8s	
单体欠压三级保护（V） Single cell under-voltage level 3 protection (V)	2.60±0.05	2.10±0.05
单体欠压三级保护恢复（V） Single cell under-voltage level 3 protection recovery (V)	2.70±0.05	2.20±0.05
单体欠压三级延时 Single cell under-voltage Level 3 delay	3±0.8s	
一级&二级保护延时 Level 1& Level 2 Protection delay	1±0.8s	
三级保护延时 Level 3 Protection delay	0.5±0.4s	
注：保护参数可被设置，恢复及延时参数不可设置； Note: Protection parameters can be set, recovery and delay parameters cannot be set;		

4.3. 总压保护 Total Voltage Protection

总压保护参数 Voltage Protection parameters	电池类型 Battery Type	
	三元 NCM	铁锂 LFP
过充告警电压（一级）Over-Charging Alarm（First Level）	（4.15-0.05）*N	（3.65-0.05）*N

过充告警解除电压（一级）Over-Charging Alarm Recover（First Level）	（4.05-0.05）*N	（3.55-0.05）*N
过充保护一级延时 Over-Charging Level 1 delay	1±0.8s	
过充保护电压（二级）Over-Charging Protection（Second Level）	（4.25-0.05）*N	（3.75-0.05）*N
过充保护解除电压（二级）Over-Charging Protection Recover（Second Level）	（4.1-0.05）*N	（3.65-0.05）*N
过充保护二级延时 Over-Charging Level 2 delay	1±0.8s	
过充保护电压（三级）Over-Charging Protection(Level 3)	（4.3-0.05）*N	（3.8-0.05）*N
过充保护解除电压（三级）Over-Charging Protection Recover(Level 3)	（4.2-0.05）*N	（3.7-0.05）*N
过充保护三级延时 Over-Charging Level 2 delay	0.5±0.4s	
过放告警电压（一级）Over-Discharging Alarm（First Level）	（2.8+0.05）*N	（2.3+0.05）*N
过放告警解除电压（一级）Over-Discharging Alarm Recover（First Level）	（2.9+0.05）*N	（2.4+0.05）*N
过放保护一级延时 Over-Discharging Level 1 delay	1±0.8s	
过放保护电压（二级）Over-Discharging Protection（Second Level）	（2.7+0.05）*N	（2.2+0.05）*N
过放保护解除电压（二级）Over-Discharging Protection Recover（Second Level）	（2.8+0.05）*N	（2.3+0.05）*N
过放保护二级延时 Over-Discharging Level 2 delay	5±0.8s	
过放保护电压（三级）Over-Discharging Protection(Level 3)	（2.6+0.05）*N	（2.1+0.05）*N
过放保护解除电压（三级）Over-Discharging Protection Recover(Level 3)	（2.7+0.05）*N	（2.2+0.05）*N
过放保护三级延时 Over-Discharging Level 3 delay	3±0.8s	
一级&二级保护延时 Level 1& Level 2 Protection delay	1±0.8s	
三级保护延时 Level 3 Protection delay	0.5±0.4s	
注：1、保护参数可被设置，恢复及延时参数不可设置；2、N 为电池串数； Note: 1、Protection parameters can be set, recovery and delay parameters cannot be set;2、N is the number of battery strings;		

4.4. 充电过流保护 Chargingover-Current Protection

持续电流 Continuous Current 充电 Charging	充电过流告警(一级) Charging Over-Current Value Alarm (Level 1)	充电过流保护(二级) Charging Over-Current Value Protection (Level 2)	充电过流保护(三级) Charging Over-Current Value Protection （Third Level）
40A	48±3%A @ Delay 1±0.8s	60±3%A @ Delay 25±0.8s	120±3%A @ Delay 0.5±0.8s
60A	72±3%A @ Delay 1±0.8s	90±3%A @ Delay 25±0.8s	180±3%A @ Delay 0.5±0.8s
80A	96±3%A @ Delay 1±0.8s	120±3%A @ Delay 25±0.8s	240±3%A @ Delay 0.5±0.8s
100A	120±3%A @ Delay 1±0.8s	150±3%A @ Delay 25±0.8s	300±3%A @ Delay 0.5±0.8s
备注 Remark	1、参数可设置 Can Be Set; 2、充电过流保护解除条件：移除充电器 Charging Over-Current Protection Recover condition：Remove the charger		

4.5. 放电过流保护 Discharging Over-Current Protection

持续电流 Continuous Current	放电过流告警(一级) Discharging	放电过流保护(二级) Discharging	放电过流保护(三级) Discharging

放电 Discharging	Over-Current Value Alarm (Level 1)	Over-Current Value Protection (Level 2)	Over-Current Value Protection （Third Level）
40A	48±3%A @ Delay 1±0.8s	60±3%A @ Delay 25±0.8s	120±3%A @ Delay 0.5±0.8s
60A	72±3%A @ Delay 1±0.8s	90±3%A @ Delay 25±0.8s	180±3%A @ Delay 0.5±0.8s
80A	96±3%A @ Delay 1±0.8s	120±3%A @ Delay 25±0.8s	240±3%A @ Delay 0.5±0.8s
100A	120±3%A @ Delay 1±0.8s	150±3%A @ Delay 25±0.8s	300±3%A @ Delay 0.5±0.8s
保护解除延迟 Protection Release Delay	只告警不保护 Alarm only, no protection	30S	30S
备注 Remark	1、参数可设置 Can Be Set； 2、放电过流保护解除条件：移除负载 Discharging Over-Current Protection Recover condition：Remove the load 3、过流保护后 Try 5 次后锁定 Lock after 5 attempts		

4.6. 短路保护 Short Circuit Protection

检测内容 Test content		默认参数 Default parameters	单位 Unit
短路保护 Short Circuit Protection	短路保护条件 Short Circuit Protection Conditions	外部负载短路 External load short circuit	A
	短路保护延时 Short Circuit Protection Delay	10~500	uS
	说明：短路电流小于最小值或高于最大值可能会造成短路保护失效，不保证有短路保护，也不建议做短路保护测试。实际以客户寄回电池包到我司测试为准。Note: Short-circuit current less than the minimum value or higher than the maximum value may cause short-circuit protection failure, does not guarantee short-circuit protection, and is not recommended to do short-circuit protection test. It is not recommended to do the short-circuit protection test. The actual test is subject to the customer sending back the battery pack to our company for testing.		
	解除条件 Release Condition	移除负载解除/充电解除 Remove Load Release/Charging Release	

4.7. 外部温度保护 Temperature Protection

检测内容 Test content		默认参数 Default parameters	单位 Unit
充电高温 Charging High Temperature	充电高温告警温度（一级）Charging High Temperature Alarm(Level 1)	60±3	℃
	充电高温告警释放温度（一级）Charging High Temperature Alarm Release(Level 1)	55±3	℃
	充电高温保护温度（二级）Charging High Temperature Protection(Level 2)	65±3	℃
	充电高温保护释放温度（二级）Charging High Temperature Protection Recover(Level 2)	60±3	℃
	充电高温保护温度（三级）Charging High Temperature Protection(Level 3)	75±3	℃
	充电高温保护释放温度（三级）Charging High Temperature Protection Recover(Level 3)	65±3	℃
放电高温 Discharging High Temperature	放电高温告警温度（一级）Discharging High Temperature Alarm(Level 1)	65±3	℃
	放电高温告警释放温度（一级）Discharging High Temperature Alarm Recover(Level 1)	60±3	℃
	放电高温保护温度（二级）Discharging High Temperature Protection(Level 2)	70±3	℃
	放电高温保护释放温度（二级）Discharging High Temperature Protection Recover(Level 2)	65±3	℃
	放电高温保护温度（三级）Discharging High Temperature Protection(Level 3)	75±3	℃
	放电高温保护释放温度（三级）Discharging High Temperature Protection Recover(Level 3)	70±3	℃

充电低温 Charging Low Temperature	充电低温告警（一级）Charging Low Temperature Alarm (Level 1)	-30±3	℃
	充电低温告警释放温度（一级）Charging Low Temperature Alarm Recover (Level 1)	-25±3	℃
	充电低温保护（二级）Charging Low Temperature Protection (Level 2)	-35±3	℃
	充电低温保护释放温度（二级）Charging Low Temperature Protection Recover (Level 2)	-30±3	℃
	充电低温二级保护（三级）Charging Low Temperature Protection(Level 3)	-40±3	℃
	充电低温保护释放温度（三级）Charging Low Temperature Protection Recover(Level 3)	-35±3	℃
放电低温 Discharging Low Temperature	放电低温告警（一级）Discharging Low Temperature Alarm (Level 1)	-30±3	℃
	放电低温告警释放温度（一级）Discharging Low Temperature Alarm Recover (Level 1)	-25±3	℃
	放电低温保护（二级）Discharging Low Temperature Protection (Level 2)	-35±3	℃
	放电低温保护释放温度（二级）Discharging Low Temperature Protection Recover (Level 2)	-30±3	℃
	放电低温保护（三级）Discharging Low Temperature Protection(Level 3)	-40±3	℃
	放电低温保护释放温度（三级）Discharging Low Temperature Protection Recover(Level 3)	-35±3	℃
说明 Description	一级&二级温度告警及保护延时 Level1&Leve2 Temperature Alarm&Protection Delay	1±0.8	S
	三级温度告警及保护延时 Leve3 Temperature Alarm&Protection Delay	0.5±0.4	S
	逻辑说明：达到开启条件时，会触发告警或保护，告警不会关闭充放电 MOS，保护时会关闭充放电 MOS。 Logic description: When the open condition is reached, alarm or protection will be triggered, alarm will not turn off the charging/discharging MOS, and protection will turn off the charging/discharging MOS.		

注：1、以上参数可设置；Note: 1, the above parameters can be set;

4.8. MOS 温度保护 MOS Temperature Protection

检测内容 Test content		默认参数 Default parameters	单位 Unit
MOS 温度 MOS Temperature	高温告警（一级）High Temperature Alarm (Level 1)	90±3	℃
	高温告警恢复（一级）High Temperature Alarm Release (Level 1)	85±3	℃
	高温保护（二级）High Temperature Protection (Level 2)	110±3	℃
	高温一级保护恢复（二级）High Temperature Protection Release (Level 2)	105±3	℃
	高温二级保护（三级 High Temperature Protection(Level 3)	120±3	℃
	高温二级保护恢复（三级）High Temperature Protection Release(Level 3)	115±3	℃
说明 Description	一级&二级温度告警及保护延时 Level1&Leve2 High Temperature Alarm&Protection Delay	1±0.8	S
	三级温度告警及保护延时 High Temperature Alarm&Protection Delay	0.5±0.4	S
	逻辑说明：达到开启条件时，会触发告警或保护，告警不会关闭充放电 MOS，保护时会关闭充放电 MOS。 Logic description: When the open condition is reached, alarm or protection will be triggered, alarm will not turn off the charging/discharging MOS, and protection will turn off the charging/discharging MOS.		

注：1、以上参数可设置；Note: 1, the above parameters can be set;

4.9. 压差告警 Voltage Difference Alarm

检测内容 Test content		默认参数 Default parameters	单位 Unit
压差告警 Voltage	压差过大一级告警 Level 1 alarm of excessive differential pressure	0.5	V
	压差过大二级告警 Excessive differential pressure Level 2 protection	0.8	V

Difference Alarm	压差过大三级告警 Excessive differential pressure Level 3 protection	1	V
	压差过大一级告警恢复 Level 1 alarm recovery of excessive differential pressure	0.3	V
	压差过大二级告警恢复 Excessive differential pressure, level 2 protection recovery	0.5	V
	压差过大三级告警恢复 Excessive differential pressure, level 3 protection recovery	0.8	V
延时 Delay	一级&二级压差告警及保护延时 Level 1&level 2 Excessive differential pressure Alarm&Protection Delay	1±0.8	S
	三级压差告警及保护延时 Level 3 Excessive differential pressure Alarm&Protection Delay	0.5±0.4	S

注：1、以上参数可设置；Note: 1, the above parameters can be set;

4.10. 温差告警 Temperature Difference Alarm

检测内容 Test content		默认参数 Default parameters	单位 Unit
温差告警 Temperature Difference Alarm	温差一级告警 First Level Temperature Difference Alarm	10±2	℃
	温差一级告警恢复 First Level Temperature Difference Alarm Recover	5±2	℃
	温差二级告警 Second Level Temperature Difference Alarm	15±2	℃
	温差二级告警恢复 Second Level Temperature Difference Alarm Recover	10±2	℃
	温差三级告警 Third Level Temperature Difference Alarm	20±2	℃
	温差三级告警恢复 Third Level Temperature Difference Alarm Recover	15±2	℃
延时 Delay	一级&二级温差告警延时 Level 1&level 2 Temperature Difference Alarm Delay	1±0.8	S
	三级温差告警延时 Level 3 Temperature Difference Alarm Delay	0.5±0.4	S

注：1、以上参数可设置；Note: 1, the above parameters can be set;

4.11. 热失控 Thermal runaway

热失控 Thermal runaway		
检测内容 Test content		动作 Action
开启条件一 Opening condition I	单体电压持续下降(每秒下降≥0.1V 判断，持续检测三秒)，且瞬时温升过大(参考阈值温度每 2 秒上升 5℃以上判断) The voltage of the single unit drops continuously (≥0.1V per second judgement, continuous detection for three seconds)，And the instantaneous temperature rise is too large (reference threshold temperature rises more than 5 ℃ every 2 seconds to judge)	关断充放电 MOS 管，且蜂鸣器(DO1 输出高电平)持续响；上位机报热失控故障； Turn off the charging and discharging MOS tubes, and the buzzer (DO1 output high level) continues to sound; the host computer reports thermal runaway fault;
开启条件二 Opening condition II	单体电压持续下降(参考阈值为：每秒下降≥0.2V 以上为判断，持续检测三秒)且瞬时温升过大(参考阈值：温度以每 2 秒上升 10℃以上为判断) The voltage of the single unit continues to drop (reference threshold: a drop of ≥0.2V per second or more is judged, and continuous detection for three seconds) and the instantaneous temperature rise is too large (reference threshold: the temperature rises by more than 10 ℃ every 2 seconds as a judgement)	
开启条件三 Opening condition III	电池温度上升(超过最大工作温度 70℃)且瞬时温升过大(参考阈值：温度以每 2 秒上升 10℃以上为判断) Battery temperature rises (above the maximum operating temperature of 70°C) and the instantaneous temperature rise is too large (reference threshold: the temperature is judged to rise by more than 10°C every 2 seconds)	
关闭	重启 BMS	解除热失控故障

Turn off	Reboot BMS	Deactivating Thermal Runaway Failure

4.12. 性能参数 Reliability Parameter

序号	项 目	条 件
1	检测精度 Detection Accuracy	电流检测精度：≤3%FSR（常温下） Current Detection Accuracy: ≤3%FSR (normal temperature)
		电压检测精度：≤10mV（常温下） Voltage Detection Accuracy: ≤10mV (normal temperature)
		温度检测精度：≤2℃（常温下） Temperature detection accuracy: ≤2℃ (normal temperature)
2	信息存储 Information storage	最大存储 400 条（可配置 512Kb EEPROM）履历信息，含保护时间，当前总电压、电流、温度、SOC 等 Stores up to 400 (Standard configuration 512Kb EEPROM) message of history information, including protection times, current total voltage, current, temperature,SOC, etc.
3	SOC 计量 measurement	采用电流积分 uses current integration
4	休眠时间 Sleep time	3600s 注：可设置永不休眠 Note: Can be set to never sleep
5	短路 Short circuit	电池包短路电流超过系统参数的短路电流，使用空气开关短路 5 次，且能正常恢复。短路回路线长不超过 1.2m，回路内阻低于 20mΩ The short-circuit current of the battery pack exceeds the short-circuit current of the system parameters. Use an air switch to short-circuit 5 times and recover normally. The length of the short-circuit loop should not exceed 1.2m, and the internal resistance of the loop should be lower than 20mΩ.
6	工作环境条件 Working Environment Condition	工作温度:-30℃～70℃ Operating Temperature :-30℃ ~ 70℃
		相对湿度:5%～90%RH Relative Humidity :5% ~ 90%RH
7	存储环境条件 Storage Environment Condition	存储温度:-40℃～85℃ Storage Temperature :-40℃ ~ 85℃
		相对湿度:5%～75%RH Relative Humidity :5% ~ 90%RH
8	主回路导通内阻 The main circuit conducts the internal resistance	<20m Ω

5. 通信说明(Communication Description)

5.1. UART 通讯

默认为达锂 UART 通讯协议，可直接与达锂蓝牙、显示屏、上位机等进行通讯使用，也可定制客户通讯协议；The default

communication protocol is UART, which can be used to communicate directly with Bluetooth, display, and host computer, etc., and can also be customised to meet the customer's communication protocol;

5.2. RS485 通讯

默认达锂 RS485 通讯协议，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，可授权登陆后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 Daly RS485 communication 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 after login, and the program upgrade function can be supported. (This host computer is suitable for PCs of Windows series platforms).

5.3. CAN 通讯

默认达锂 CAN 协议，通信速率为 250KB/S。The default is Daly CAN protocol, and the communication rate is 250 kb/s.

5.4. 蜂鸣器逻辑 Buzzer logic

上位机可以配置蜂鸣器功能，且蜂鸣器需接在 DO1 口；默认逻辑为当充放电温度到达 60℃时，响 1 秒停 1 秒，如此持续进行蜂鸣报警，直到温度小于 60℃。其他逻辑可联系我司业务进行软件定制；Configure a buzzer to enable on the **PC Master** , and The **PC Master** can be configured with buzzer function, and the buzzer should be connected to DO1 port; the default logic is that when the charging and discharging temperature reaches 60℃, it will ring for 1 second and stop for 1 second, and so on continuously beeping the alarm until the temperature is less than 60℃. Other logics can be customized by contacting our business for software;

5.5. 指示灯逻辑 Indicator light logic

本产品有一颗绿色 LED 指示灯灯，对灯语状态如下表。

This product has a green LED light, and the status of the light is shown in the table below：

1	关机、断电、休眠 Shutdown, power outage,hibernation	灯灭 light off
2	工作中，放电状态 During operation, discharge status	灯闪，0.5s 亮，2.5s 灭，3s 为一个周期 The light flashes, turns on for 0.5 seconds, turns off for 2.5 seconds, and takes 3 seconds as a cycle
3	工作中，充电状态 Charging state during operation	灯闪，0.5s 亮，0.5s 灭，1s 为一个周期 The light flashes, turns on for 0.5 seconds, turns off for 0.5 seconds, and takes 1 second as a cycle
4	工作中，无充放电 No charging or discharging during operation	灯闪，0.5s 亮，9.5s 灭，10s 为一个周期 The light flashes, turns on for 0.5 seconds, turns off for 9.5 seconds, and takes 10 seconds as a cycle

5.6. 钥匙开关逻辑 Keyswitch logic

支持钥匙开关控制 MOS 跟休眠，默认为失能，有以下两种可选逻辑通过上位机或出厂配置：

逻辑一：钥匙控制放电 MOS 管；

逻辑二：钥匙控制放电 MOS 管与休眠；

钥匙开关的控制逻辑为正逻辑，也就是开关闭合时才做控制。

其他逻辑可联系我司业务进行软件定制，例如 5V/12V/24 外部电源唤醒，同时控充放电 MOS 等。

Support key switch control MOS to follow the sleep, the default is disable, there are the following two optional logic through the host computer or factory configuration:

Logic one: key control discharge MOS tube;

Logic two: key control discharge MOS tube with hibernation;

The control logic of the key switch is positive logic, that is, the control is done when the switch is closed.

Other logic can contact our business for software customisation, such as 5V/12V/24 external power supply wake-up, simultaneous control of charging and discharging MOS and so on.

5.7. 二次保护逻辑（需定制）Secondary Protection Logic (Customizable)

发生条件：

①放电 MOS 关闭，但是还能检测到大于 3A 的放电电流，持续三秒则报“MOS 击穿故障”

②充电 MOS 关闭，但是还能检测到大于 3A 的放电电流，持续三秒则报“MOS 击穿故障”

二次保护产生：检测到 MOS 击穿故障，则触发保险丝熔断
注意：若定制此功能则无法兼容兼串功能，只能定串使用；
Trigger Conditions
Discharge MOS is OFF, yet a discharge current greater than 3A persists for 3 seconds → Report "MOS Short Circuit Fault".
Charge MOS is OFF, yet a discharge current greater than 3A persists for 3 seconds → Report "MOS Short Circuit Fault".
Secondary Protection Activation
Upon detection of a MOS Short Circuit Fault, the fuse will blow.
Note: If this feature is customized, it will be incompatible with the universal strings fucntion; it can only be used in single strings.
(eg: customize 16s bms for 16s battery).

6. 辅助参数

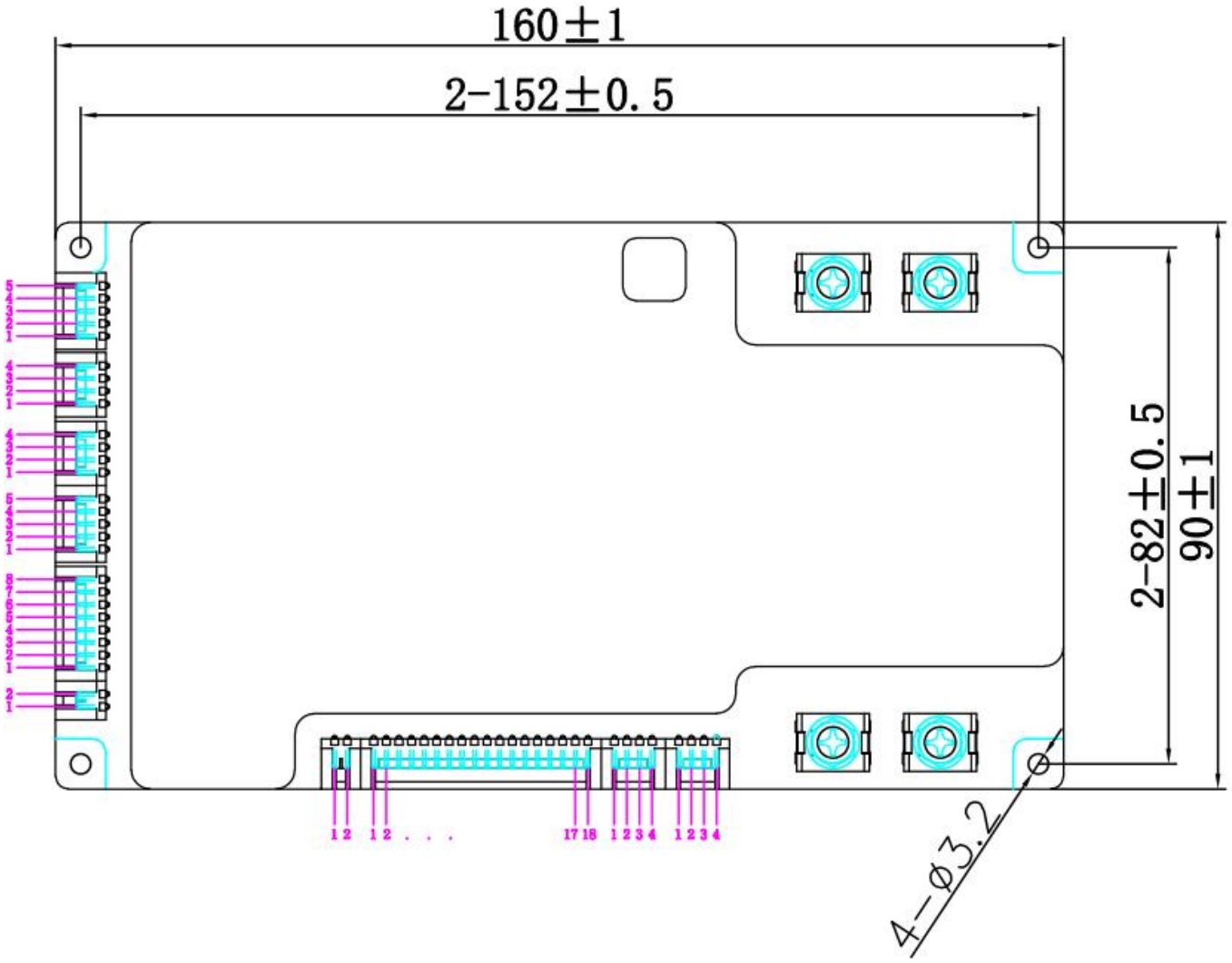
序号 NO	名称 Name	电流 Current	是/否标配 Yes/No standard	备注 Remark
1	并联模块 Parallel module	☑1A 集成 Built in	是 yes	为了并联不损坏，内置恒功率 1.5W，最大电流 1A； For parallel connection without damage， Built in constant power 1.5W, maximum current 1A 内置限流：压差越大，电流越小 Built-in current limiting: the larger the dropout voltage, the smaller the current
		☐5A 外挂 external module	否 no	如需大电流限流，需选择外挂并联模块； If you need high current limiting, you need to choose an external module.
		☐15A 外挂 external module	否 no	

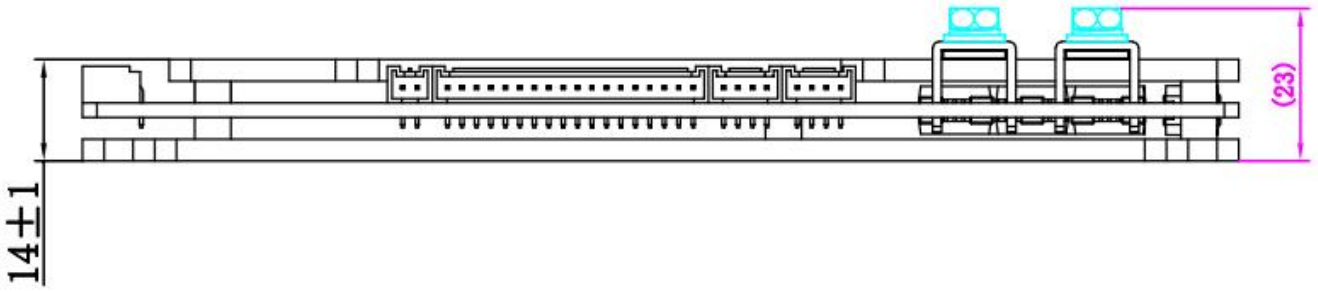
7. 上位机说明(PC Master Description)

PC 上位机 (DALY BMS Tool)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(二级)参数。
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,BMS 升级。
The DALY BMS 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,BMS upgrade.

8. 保护板尺寸图(Dimensional Drawing Reference)

40/60/80/100 结构尺寸（不含配件） Dimensions of mainframe structure (without accessories)	长*宽*高 ：160*90*14（mm） Length*Width*Height：160*90*14（mm）
注：示意图为最大串数全功能版本，以实物的配置为准 Note:The schematic is for the maximum number of strings full-featured version, the configuration of the physical object shall prevail	





9. 接口定义(Interface Definition)

9.1. 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
采样接口 Sampling interface PHB 2.0 带扣	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
	...	...	接最后 1 节电池正级 Connect the positive terminal of the last battery
B+	接入电池总正 Connect to the main positive terminal of the battery		
NTC-A 接口 NTC-A interface PHB2.0 4Pin	1	NTC-1	1#温度线 1 # Temperature line
	2	GND	地 GND
	3	GND	地 GND
	4	NTC-2	2#温度线 2 # Temperature line
NTC-B 接口 NTC-B interface PHB2.0 4Pin	1	NTC-3	3#温度线 3 # Temperature line
	2	GND	地 GND
	3	GND	地 GND
	4	NTC-4	4#温度线 4 # Temperature line
通讯接口 communication interface PHB2.0 5Pin	1	CAN_L	CAN 通讯低 CAN communication low
	2	CAN_H	CAN 通讯高 CAN communication high
	3	ISO_GND	隔离地 Isolation ground GND
	4	485_A	485 通讯发送端 485 communication sender
	5	485_B	485 通讯接收端 485 communication receiver
IOT_CAN 接口 IoT_CAN interface PHB2.0 4Pin	1	POW_12V	IOT 模块供电正极（12V 输出） connect IOT module power supply positive pole (12V output)
	2	GND	IOT 模块供电负极 connect IOT module power supply negative pole
	3	CAN2_L	IOT 模块 CAN 通讯 L 信号端口 connect IOT module CAN communication L signal port
	4	CAN2_H	IOT 模块 CAN 通讯 H 信号端口 connect IOT module CAN communication H signal port

蓝牙模块接口 Bluetooth interface PHB2.0 4Pin	1	UART1_RX	接蓝牙端 TX connect BT module TX
	2	UART1_TX	接蓝牙端 RX connect BT module RX
	3	P_3.3V	接蓝牙模块正端，3.3V 输出 connect BT module positive，3.3V output
	4	GND	接蓝牙地 connect BT ground
弱电接口 Weak current signal interface PHB2.0 5Pin	1	KEY-	钥匙开关负极 Key switch negative pole
	2	KEY+	钥匙开关正极 Key switch positive pole
	3	CIN	NA
	4	DIN	放电握手信号 Discharge handshake signal
	5	ACC	识别主机信号 recognition signal
显示屏接口 LED interface PHB2.0 5Pin	1	\	
	2	\	
	3	\	
	4	UART2_RX	接显示屏 RX 通讯 Receive LED RX communication
	5	UART2_TX	接显示屏 TX 通讯 Receive LED TX communication
	6	S1	按键 Button
	7	POW_12V	接显示屏 12V 供电 Receive LED 12V power supply
	8	GND	接显示屏供电负极 Receive LED negative power supply
蜂鸣器接口 Buzzer Interface PHB2.0 2PIN	1	GND	接蜂鸣器负极 Connect the negative terminal of the buzzer
	2	12VDO	接蜂鸣器正极 Connect the positive terminal of the buzzer

9.2. 主要线材说明 Description of main wires

线材名称 Line name	默认规格 Default specification	选配规格 Optional specifications
NTC 线 NTC line	28AWG L=250mm DL1.25	L=500mm 、L=700mm、L=900mm
采样线 Sampling line	24AWG L=550mm PHB2.0	L=450mm 、L=600mm、L=800mm
CAN/485 线 CAN/485 line	无	26AWG L=300mm DL1.25
B- P-线 C- P- line	M6 螺母端子，不带线 M6 Nut Terminal, No line.	M6_SC16-5_3512 L=100mm
B+	18AWG L=450mm PHB2.0	/
Key(选配) Key optional	/	26AWG L=450mm DL1.25

10. 接线使用说明及 APP 下载 (Wiring instructions and APP downloads)

扫码查看说明书及下载 APP，或使用电脑浏览器登录：https://www.dalyelec.com/service.html

Scan the QRcode using the browser to view the user manual and download APP， or use a computer browser to access this website: https://www.dalyelec.com/service.html

注意：采样线接线（关键步骤）：采样线用于检测每串电芯电压，顺序绝对不能错。以常见的 4 - 24 串通用排线为例，从右边第一根黑色排线接电池组总负极（对应 B0），靠近黑色的第一根红线接 B1+，第二根红线接 B2+，依此类推。若为 16 串电池，第 16 根红线接 B16+；多余排线可不接，直接剪断，注意做好端口防护。

Note: Sampling Line Wiring (Key Step): The sampling line is used to detect the voltage of each battery cell, and the sequence must not be wrong. Taking the common 4-24 series universal ribbon cable as an example, connect the first black wire on the right to the total negative terminal of the battery pack (corresponding to B0), the first red wire next to the black one to B1, the second red wire to B2, and so on. For a 16-series battery, the 16th red wire is connected to B16; any extra wires can be left unconnected and cut off directly, making sure to properly protect the terminals.

11. 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 one-year warranty; if the damage caused by human factors, paid maintenanc

12. 注意事项(Precautions)

12.1. 不同电压平台的电池使用前需对 BMS 进行电池类型的设置，一般情况出厂默认为铁锂参数；Batteries of different voltage platforms need to be set for the BMS before use of the battery type, the general situation of the factory default lithium iron parameters;

12.2. 产品出厂时默认为最大串数，初次上电使用时会自动识别串数，如识别失败，可用 APP 或者上位机进行设置；The product defaults to the maximum number of strings when the product is shipped from the factory, and the number of strings will be recognized automatically when the product is first powered up and used, if the recognition fails, it can be set by APP or the host computer;

12.3. 焊接采样排线：从细黑线连接电池 B- (总负极)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；最后将 B+线也焊接在最后一串(总正极)上。Welding sampling cable:Start with the thin black wire connecting battery B-(total negative electrode),the second wire connects the positive electrode of the first string of batteries,and then connects the positive electrode of each string of batteries in turn;finally,weld the B+wire on the last string (total positive pole)

12.4. 不同厂家的排线不通用，请确保使用我们公司配套排线；The cables of different manufacturers are not universal, please make sure to use our company's matching cables

12.5. 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

12.6. 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

12.7. 不可自行拆卸、更改保护板元器件；Do not disassemble or change BMS components by yourself

12.8. 组装作业中避免散热片与电芯、镍带接触； Avoid contact between the heat sink and the battery core and nickel strip during assembly operations.

12.9. 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

12.10. 插拔针座连接线，注意按压卡扣位拔插，否则可能造成线材损坏；Plug and unplug the connector cable, pay

attention to press the buckle position to unplug and unplug, otherwise the wire may be damaged.
12.11. accessory. For series connection, it needs to be customized separately.

13. 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.

产品更改说明 Product change Instructions			
版本 （Version）	更改内容 （Change content）	更改人 （Editor）	更改日期 （Change date）
A0	初版 First edition	赵希豪	2026/3/17
