产品规格承认书

Product Specification Approval

产品名称（**Product Name**）：	智能板 8~24 串 600-800A 同口带均衡 Smart BMS 8~24S 600~800A Common port with Balance	
产品型号（**Product Number**）：	DL-R32D-FTJ	
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.**
	A4	
编制(Prepared by)	**核准(Approved)**	**审核(Audit)**
赵希豪	**杨伟滈**	**闫连红**

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

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 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 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

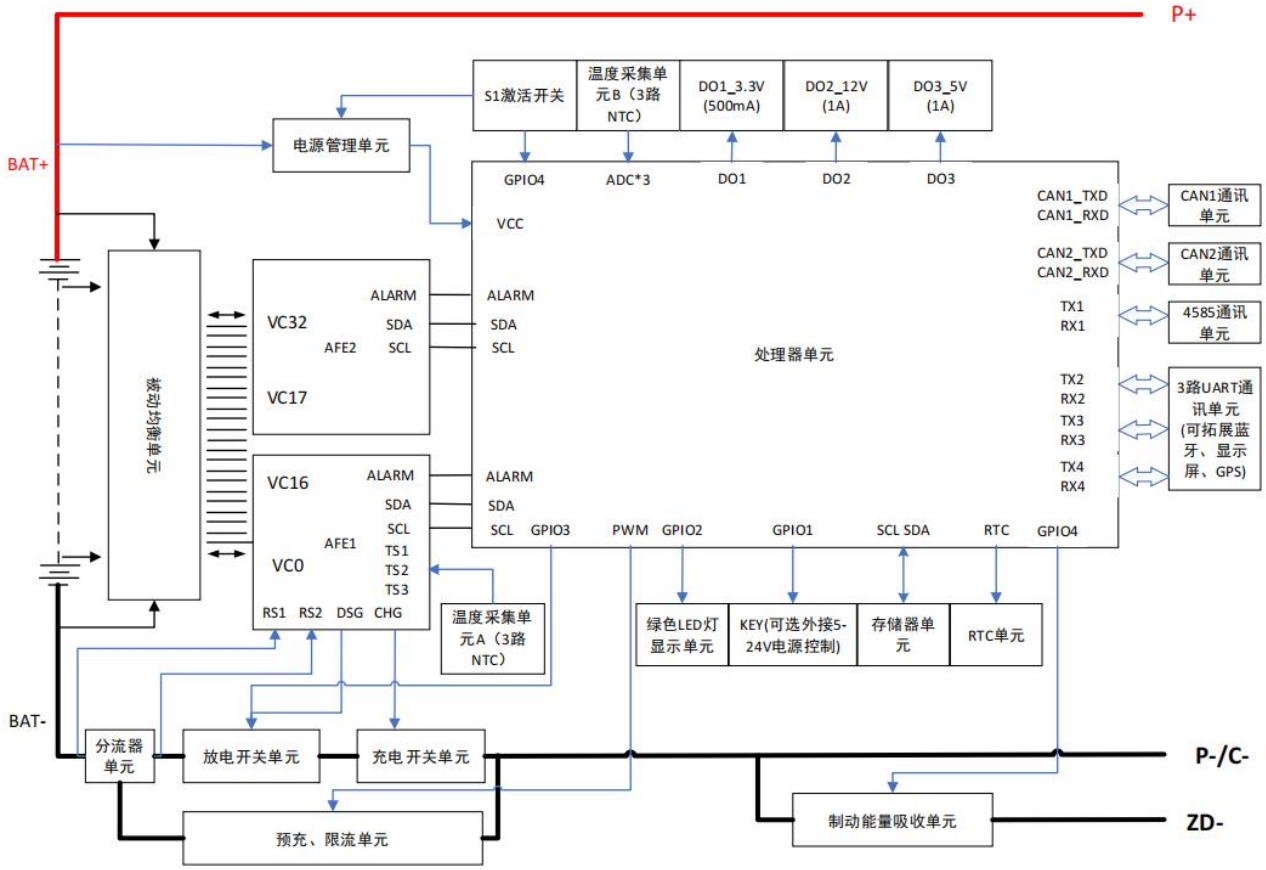
  With communication function, parameters such as over charge, over-discharge, over-current, charge-discharge over-current, equalization, over-temperature, under-temperature, sleep, capacity and other parameters can be set through the host computer

3.产品选型 Product Selection

产品选型表 Product Selection Table																	
电池类型 Battery Type	☐三元 Li-ion							☐铁锂 Lifepo4					☐钛酸锂 LTO				
电池串数 Battery String	☐8	☐9	☐10	☐11	☐12	☐13	☐14	☐15	☐16	☐17	☐18	☐19	☐20	☐21	☐22	☐23	☐24
额定放电电流 Rated Discharge	☐600A								☐800A								

Current				
加热模块/安全模块 Heating Module Safety Module	☐加热模块 Heating Module	☐安全模块 Safety Module	☐无 NO	
外置配件 External Accessories	☐Bluetooth	☐WiFi	☐GPS	☐无 NO

4. 系统框架图 System Framework Diagram



5.技术参数 Technical Parameters

5.1 充放电被动均衡 Charging & Discharging With Passive Equalization

检测内容 Test content	出厂默认参数 Factory default parameters			单位 Unit	备注 Remark
	三元 Li-ion	铁锂 Lifepo4	钛酸锂 LTO		

放电 Discharge	额定放电电流 Rated Discharge Current	600~800			**A**	
充电 Charge	充电电压 Charge Voltage	4.2*n（n 为电池串数）	3.65*n (n 为电池串数)	2.65*n (n 为电池串数)	**V**	
	额定充电电流 Rated Charge current	600~800			**A**	
被动均衡功能 Passive Equalization	均衡开启电压 Balanced Start Voltage	3.9	3.4	2	**V**	参数可以设置 Parameters Can Be Set
	均衡开启压差 Balanced Opening Voltage Difference	≥20			**mV**	参数可以设置 Parameters Can Be Set
	均衡电流 Balance Current	100±30			**mA**	
	均衡开启条件 Balanced start condition. 达到设定均衡开启压差 Reach the set balanced start voltage 最高电压达到设定平衡开启电压 The highest voltage reaches the set balanced start voltage.difference.					

5.2 过充保护 Over-Charging Protection

检测内容 Test content		**出厂默认参数 Factory default parameters**			**单位 Unit**	**备注 Remark**
		三元 Li-ion	铁锂 Lifepo4	钛酸锂 LTO		
单体过充告警 Single Cell Over-Charging Alarm	单体过充 1 级告警电压 Single Cell over-charge 1 level alarm voltage	4.15±0.05	3.65±0.05	2.65±0.05	**V**	参数可以设置 Parameters Can Be Set
	单体过充 1 级告警延时 Single Cell over-charge 1 level alarm delay	1±0.8			**S**	
	单体过充 1 级告警解除电压 Single Cell discharge alarm 1 level release voltage	4.05±0.05	3.55±0.05	2.6±0.05		
单体过充保护 Single Cell Over-Charging Protection	单体过充 2 级保护电压 Single Cell over-charge 2 level protection voltage	4.25±0.05	3.75±0.05	2.75±0.05	**V**	参数可以设置 Parameters Can Be Set
	单体过充 2 级保护延时 Single Cell over-charge 2 level protection delay	1±0.8			**S**	参数可以设置 Parameters Can Be Set
	单体过充 2 级保护解除电压 Single Cell over-charge 2level protection release voltage	4.15±0.05	3.65±0.05	2.7±0.05	**V**	参数可以设置 Parameters Can Be Set

	单体过充 3 级保护电压 Single Cell over-charge 3 level protection voltage	4.3±0.05	3.80±0.05	2.85±0.05	V	参数可以设置 Parameters Can Be Set
	单体过充 3 级保护延时 Single Cell over-charge 3 level protection delay	1±0.8			S	参数可以设置 Parameters Can Be Set
	单体过充 3 级保护解除电压 Single Cell over-charge 3level protection release voltage	4.20±0.05	3.70±0.05	2.80±0.05	V	参数可以设置 Parameters Can Be Set
总压过充告警 Total Voltage Over-Charging Alarm	总压过充 1 级告警电压 Total over-charge 1 level alarm voltage	4.1*n（n 为电池串数）	3.6*n（n 为电池串数）	2.6*n（n 为电池串数）	V	参数可以设置 Parameters Can Be Set
	总压过充 1 级告警延时 Total over-charge 1 level alarm delay	1±0.8			S	
	总体过充 1 级告警解除电压 Total discharge alarm 1 level release voltage	4*n（n 为电池串数）	3.5*n（n 为电池串数）	2.55*n（n 为电池串数）	V	
总压过充保护 Total Voltage Over-Charging Protection	总压过充 2 级告警电压 Total over-charge 2 level protection voltage	4.2*n（n 为电池串数）	3.7*n（n 为电池串数）	2.7*n（n 为电池串数）	V	参数可以设置 Parameters Can Be Set
	总压过充 2 级告警延时 Total over-charge 2 level protection delay	1±0.8			S	参数可以设置 Parameters Can Be Set
	总体过充 2 级告警解除电压 Total discharge protection 2 level release voltage	4.1*n（n 为电池串数）	3.6*n（n 为电池串数）	2.65*n（n 为电池串数）	V	参数可以设置 Parameters Can Be Set
	总压过充 3 级告警电压 Total over-charge 3 level protection voltage	4.25*n（n 为电池串数）	3.75*n（n 为电池串数）	2.8*n（n 为电池串数）	V	参数可以设置 Parameters Can Be Set
	总压过充 3 级告警延时 Total over-charge 3 level protection delay	1±0.8			S	参数可以设置 Parameters Can Be Set
	总体过充 3 级告警解除电压 Total discharge protection 3 level release voltage	4.15*n（n 为电池串数）	3.65*n（n 为电池串数）	2.75*n（n 为电池串数）	V	参数可以设置 Parameters Can Be Set

5.3 过放保护 Over-Discharging Protection

检测内容 Test content	出厂默认参数 Factory default parameters			单位 Unit	备注 Remark
	三元 Li-ion	铁锂 Lifepo4	钛酸锂 LTO		

单体过放告警 Single Cell Over-Discharging Alarm	单体过放 1 级告警电压 Single Cell discharge 1 level alarm voltage	2.8±0.05	2.3±0.05	1.9±0.05	V	参数可以设置 Parameters Can Be Set
	单体过放告警延时 Single Cell discharge 1 level alarm delay	1±0.8			S	
	单体过放告警解除电压 Single Cell discharge 1 level alarm release voltage	2.9±0.05	2.4±0.05	1.95±0.05	V	
单体过放保护 Single Cell Over-Discharging Protection	单体过放 2 级保护电压 Single Cell over-discharge 2 level protection voltage	2.7±0.05	2.2±0.05	1.8±0.05	V	参数可以设置 Parameters Can Be Set
	单体过放 2 级保护延时 Single Cell over-discharge 2 level protection delay	1±0.8			S	参数可以设置 Parameters Can Be Set
	单体过充 2 级保护解除电压 Single Cell over-discharge 2 level protection release voltage	2.8±0.05	2.3±0.05	1.85±0.05	V	参数可以设置 Parameters Can Be Set
	单体过放 3 级保护电压 Single Cell over-discharge 3 level protection voltage	2.6±0.05	2.1±0.05	1.7±0.05	V	参数可以设置 Parameters Can Be Set
	单体过放 3 级保护延时 Single Cell over-discharge 3 level protection delay	1±0.8			S	参数可以设置 Parameters Can Be Set
	单体过充 3 级保护解除电压 Single Cell over-discharge 3 level protection release voltage	2.7±0.05	2.2±0.05	1.75±0.05	V	参数可以设置 Parameters Can Be Set
总压过放告警 Total Voltage Over-Discharging Alarm	总体过放 1 级告警电压 Total discharge 1 level alarm voltage	2.85*n （n 为电池串数）	2.35*n（n 为电池串数）	1.95*n（n 为电池串数）	V	参数可以设置 Parameters Can Be Set
	总体过放 1 级告警延时 Total discharge 1 level alarm delay	1±0.8			S	
	总体过放 1 级告警解除电压 Total discharge 1 level alarm release voltage	2.9*n（n 为电池串数）	2.45*n（n 为电池串数）	2*n+1（n 为电池串数）	V	
总压过放保护 Total Voltage Over-Discharging Protection	总体过放 2 级保护电压 Total over-discharge 2 level protection voltage	2.75*n（n 为电池串数）	2.25*n（n 为电池串数）	1.85*n（n 为电池串数）	V	参数可以设置 Parameters Can Be Set
	总体过放 2 级保护延时 Total over-discharge 2 level protection delay	1±0.8			S	参数可以设置 Parameters Can Be Set

	总体过充 2 级保护解除电压 Total over-discharge 2 level protection release voltage	2.75*n （ n 为 电 池 串 数）	2.35*n（n 为电池串数）	1.9*n（n 为电池串数）	V	参数可以设置 Parameters Can Be Set
	总体过放 3 级保护电压 Total over-discharge 3 level protection voltage	2.65*n（n 为电池串数）	2.15*n（n 为电池串数）	1.75*n（n 为电池串数）	V	参数可以设置 Parameters Can Be Set
	总体过放 3 级保护延时 Total over-discharge 3 level protection delay	1±0.8			S	参数可以设置 Parameters Can Be Set
	总体过充 3 级保护解除电压 Total over-discharge 3 level protection release voltage	2.65*n （ n 为 电 池 串 数）	2.25*n（n 为电池串数）	1.8*n（n 为电池串数）	V	参数可以设置 Parameters Can Be Set

5.4 过流保护 Over-Current Protection

持续电流 Continuous Current		充放电过流一级 First Level Charging / Discharging Over-Current Value	充放电过流二级 Second Level Charging / Discharging Over-Current Value	充放电过流三级 Third Level Charging / Discharging Over-Current Value
充电 Charging	放电 Discharging			
600	600	720±3%A @ Delay 1±0.8s	900±3%A @ （放电延时 10s，充电延时 1s） Discharging delay 10S， Charging delay 1S	1200@ Delay 1±0.8s
800	800	960±3%A @ Delay 1±0.8s	1200±3%A @ （放电延时 10s，充电延时 1s） Discharging delay 10S， Charging delay 1S	1600@ Delay 1±0.8s
备注 Remark		参数可以设置 Parameters Can Be Set		

5.5 短路保护 Short Circuit Protection

检测内容 Test content		出厂默认参数 Factory default parameters 三元 Li-ion	铁锂 Lifepo4	钛酸锂 LTO	单位 Unit	备注 Remark
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**	
	实际以客户寄回电池包到我司测试为准 The actual test is subject to the customer sending the battery pack back to our company for testing.			
	短路保护解除 Short Circuit Protection Release：	移除负载解除/充电解除 Remove Load Release/Charge Release		

5.6 高温保护 High Temperature Protection

检测内容 Test content		出厂默认参数 Factory default parameters			单位 Unit	备注 Remark
		三元 Li-ion	铁锂 Lifepo4	钛酸锂 LTO		
充电高温保护 Charging High Temperature Protection	充电高温 1 级告警温度 Charging high temperature level 1 alarm temperature	60			℃	
	充电高温 1 级告警温度延时 Charging high temperature level 1 alarm temperature delay	1±0.8			S	
	充电高温 2 级保护温度 Charging high temperature level 2 protection temperature	65			℃	
	充电高温 2 级保护温度延时 Charging high temperature level 2 protection temperature delay	1±0.8			S	
	充电高温 3 级保护温度 Charging high temperature level 3 protection temperature	75			℃	
	充电高温 3 级保护温度延时 Charging high temperature level 3 protection temperature delay	1±0.8			S	
	充电高温 1 级告警释放温度 Charging high temperature level 1 alarm release temperature	55			℃	
	充电高温 1 级告警释放延时 Charging high temperature level 1 alarm release delay	1±0.8			S	
	充电高温 2 级保护释放温度 Charging high temperature level 2 protection release temperature	60			℃	

	充电高温 2 级保护释放延时 Charging high temperature level 2 protection release delay	1±0.8	S	
	充电高温 3 级保护释放温度 Charging high temperature level 2 protection release temperature	65	℃	
	充电高温 3 级保护释放延时 Charging high temperature level 2 protection release delay	1±0.8	S	
放电高温保护 Discharging High Temperature Protection	放电高温 1 级告警温度 discharge high temperature level 1 alarm temperature	60	℃	
	放电高温 1 级告警温度延时 discharge high temperature level 1 alarm temperature delay	1±0.8	S	
	放电高温 2 级保护温度 discharge high temperature level 2 protection temperature	70	℃	
	放电高温 2 级保护温度延时 discharge high temperature level 2 protection temperature delay	1±0.8	S	
	放电高温 3 级保护温度 discharge high temperature level 3 protection temperature	75	℃	
	放电高温 3 级保护温度延时 discharge high temperature level 3 protection temperature delay	1±0.8	S	
	放电高温 1 级告警释放温度 discharge high temperature level 1 alarm release temperature	55	℃	
	放电高温 1 级告警释放延时 discharge high temperature level 1 alarm release delay	1±0.8	S	
	放电高温 2 级保护释放温度 discharge high temperature level 2 protection release temperature	65	℃	
	放电高温 2 级保护释放延时 discharge high temperature level 2 protection release delay	1±0.8	S	
	放电高温 3 级保护释放温度 discharge high temperature level 3 protection release temperature	70	℃	

	放电高温 3 级保护释放延时 discharge high temperature level 3 protection release delay	1±0.8	S	

5.7 低温保护 Low Temperature Protection

检测内容 Test content		出厂默认参数 Factory default parameters			单位 Unit	备注 Remark
		三元 Li-ion	铁锂 Lifepo4	钛酸锂 LTO		
充电低温保护 Charging Low Temperature Protection	充电低温 1 级告警温度 Charging Low temperature level 1 alarm temperature	-30			℃	
	充电低温 1 级告警温度延时 Charging Low temperature level 1 alarm temperature delay	1±0.8			S	
	充电低温 2 级保护温度 Charging Low temperature level 2 protection temperature	-35			℃	
	充电低温 2 级保护温度延时 Charging Low temperature level 2 protection temperature delay	1±0.8			S	
	充电低温 3 级保护温度 Charging Low temperature level 3 protection temperature	-40			℃	
	充电低温 3 级保护温度延时 Charging Low temperature level 3 protection temperature delay	1±0.8			S	
	充电低温 1 级告警释放温度 Charging Low temperature level 1 alarm release temperature	-25			℃	
	充电低温 1 级告警释放延时 Charging Low temperature level 1 alarm release delay	1±0.8			S	
	充电低温 2 级保护释放温度 Charging Low temperature level 2 protection release temperature	-30			℃	
	充电低温 2 级保护释放延时 Charging Low temperature level 2 protection release delay	1±0.8			S	
	充电低温 3 级保护释放温度 Charging Low temperature level 3 protection release temperature	-35			℃	

	充电低温 3 级保护释放延时 Charging Low temperature level 3 protection release delay	1±0.8	S	
放电低温保护 Discharging Low Temperature Protection	放电低温 1 级告警温度 discharge Low temperature level 1 alarm temperature	-30	℃	
	放电低温 1 级告警温度延时 discharge Low temperature level 1 alarm temperature delay	1±0.8	S	
	放电低温 2 级保护温度 discharge Low temperature level 2 protection temperature	-35	℃	
	放电低温 2 级保护温度延时 discharge Low temperature level 2 protection temperature delay	1±0.8	S	
	放电低温 3 级保护温度 discharge Low temperature level 3protection temperature	-40	℃	
	放电低温 3 级保护温度延时 discharge Low temperature level 3 protection temperature delay	1±0.8	S	
	放电低温 1 级告警释放温度 discharge Low temperature level 1 alarm release temperature	-25	℃	
	放电低温 1 级告警释放延时 discharge Low temperature level 1 alarm release delay	1±0.8	S	
	放电低温 2 级保护释放温度 discharge Low temperature level 2 protection release temperature	-30	℃	
	放电低温 2 级保护释放延时 discharge Low temperature level 2 protection release delay	1±0.8	S	
	放电低温 3 级保护释放温度 discharge Low temperature level 3protection release temperature	-35	℃	
	放电低温 3 级保护释放延时 discharge Low temperature level 3 protection release delay	1±0.8	S	

5.8 MOS 温度保护 MOS Temperature Protection

检测内容 Test content		出厂默认参数 Factory default parameters			单位 Unit	备注 Remark
		三元 Li-ion	铁锂 Lifepo4	钛酸锂 LTO		
MOS 温度保护 MOS Temperature Protection	高温 1 级告警温度 high temperature level 1 alarm temperature	90±2			℃	
	高温 1 级告警温度延时 high temperature level 1 alarm temperature delay	1±0.8			S	
	高温 2 级保护温度 high temperature level 2 protection temperature	100±2			℃	
	高温 2 级保护温度延时 high temperature level 2 protection temperature delay	1±0.8			S	
	高温 3 级保护温度 high temperature level 3 protection temperature	110±2			℃	
	高温 3 级保护温度延时 high temperature level 3 protection temperature delay	1±0.8			S	
	高温 1 级告警恢复温度 high temperature level 1 alarm release temperature	85±2			℃	
	高温 1 级告警恢复延时 high temperature level 1 alarm release delay	1±0.8			S	
	高温 2 级保护恢复温度 high temperature level 2 protection release temperature	95±2			℃	
	高温 2 级保护恢复延时 high temperature level 2 protection release delay	1±0.8			S	
	高温 3 级保护恢复温度 high temperature level 2 protection release temperature	105±2			℃	
	高温 3 级保护恢复延时 Charging high temperature level 2 protection release delay	1±0.8			S	

5.9 电压差报警 Voltage Difference Alarm

检测内容 Test content		出厂默认参数 Factory default parameters			单位 Unit	备注 Remark
		三元 Li-ion	铁锂 Lifepo4	钛酸锂 LTO		
压差告警 Voltage Difference Alarm	压差过大 1 级告警 Level 1 alarm of excessive differential pressure	0.5			V	可设置 Can be set up
	压差过大 1 级告警延时 Excessive differential pressure level 1 alarm delay	1±0.8			S	
	压差过大 2 级告警 Excessive differential pressure Level 2 protection	0.8			V	
	压差过大 2 级告警延时 Excessive differential pressure level 2 protection delay	1±0.8			S	
	压差过大 3 级告警 Excessive differential pressure Level 3 protection	1.0			V	可设置 Can be set up
	压差过大 3 级告警延时 Excessive differential pressure level 3 protection delay	1±0.8			S	可设置 Can be set up
	压差过大 1 级告警恢复 Level 1 alarm recovery of excessive differential pressure	0.3			V	可设置 Can be set up
	压差过大 1 级告警恢复延时 Level 1 alarm recovery delay for excessive differential pressure	1±0.8			S	可设置 Can be set up
	压差过大 2 级告警恢复 Excessive differential pressure, level 2 protection recovery	0.5			V	可设置 Can be set up
	压差过大 2 级告警恢复延时 Recovery delay of level 2 protection due to excessive differential pressure	1±0.8			S	可设置 Can be set up
	压差过大 3 级告警恢复 Excessive differential pressure, level 3 protection recovery	0.8			V	可设置 Can be set up
	压差过大 3 级告警恢复延时 Recovery delay of level 3 protection due to excessive differential pressure	1±0.8			S	可设置 Can be set up

5.10 温差报警 Voltage Difference Alarm

检测内容 Test content		出厂默认参数 Factory default parameters			单位 Unit	备注 Remark
		三元 Li-ion	铁锂 Lifepo4	钛酸锂 LTO		
温差告警 Temperature Difference Alarm	温差过大 1 级告警 Level 1 alarm of excessive temperature difference	10±2			℃	
	温差过大 1 级告警延时 Level 1 alarm delay for excessive temperature difference	1±0.8			S	
	温差过大 2 级告警 Level 2 protection for excessive temperature difference	15±2			℃	
	温差过大 2 级告警延时 Temperature difference is too large 2-stage protection delay	1±0.8			S	
	温差过大 3 级告警 Level 3 protection for excessive temperature difference	20±2			℃	
	温差过大 3 级告警延时 Temperature difference is too large 3-stage protection delay	1±0.8			S	
	温差过大 1 级告警恢复 Temperature difference is too big 1 alarm recovery	5±2			℃	
	温差过大 1 级告警恢复延时 Temperature difference is too large 1-level warning recovery delay	1±0.8			S	
	温差过大 2 级告警恢复 Temperature difference is too large 2-level protection recovery	10±2			℃	
	温差过大 2 级告警恢复延时 Temperature difference is too large 2-stage protection recovery delay	1±0.8			S	
	温差过大 3 级告警恢复 Temperature difference is too large 3-level protection recovery	15±2			℃	
	温差过大 3 级告警恢复延时 Temperature difference is too large 3-stage protection recovery delay	1±0.8			S	

5.11 其他 Other

检测内容 Test content	出厂默认参数	单	备注

			Factory default parameters			位	Remark
			三元 Li-ion	铁锂 Lifepo4	钛酸锂 LTO	Unit	
SOC 告警 SOC alarm	电池容量低告警 Battery capacity low alarm		＜10%				
内阻 internal resistance	主回路导通内阻 The main circuit conducts the internal resistance		<20			mΩ	
	工作时自耗电 Self-consuming electrical during operation		≤ 1			W	
	休眠模式自耗电电流 The sleep mode consumes electrical current		<800			uA	
	休眠时间 Sleep time		3600			S	
	深度休眠模式 Deep sleep mode		<200			uA	
通讯方式 Communication Mode	☐UART 1	☐UART 2	☐UART 3	☐RS485	☐CAN1		☐CAN2

5.12 可靠性参数 Reliability Parameter

序号 NO	项 目 Item	条 件 condition
1	检测精度 Detection Accuracy	电流检测精度：≤0.5A(0~100A) ≤0.7A(100~300A) ≤1.5A(300~800A) Current Detection Accuracy:≤0.5A(0~100A) ≤0.7A(100~300A) ≤1.5A(300~800A)
		电压检测精度：≤10mV Voltage Detection Accuracy: ≤10mV
		温度检测精度：≤2℃（常温下） Temperature detection accuracy: ≤2℃ (normal temperature)
		SOC 精度(≤10%@50%容量量程以上) SOC accuracy (≤10%@50% capacity range or above)
2	信息存储 Information Storage	最大存储 400 条（标配 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 SOC Measurement	采用电流积分法，精度≤10%（受环境温度影响） Current integration method, accuracy ≤10% (affected by ambient temperature)

4	工作环境条件 Working Environment Condition	工作温度:-40℃～85℃ Operating Temperature :-40℃ ~ 85℃
		相对湿度:5%～85%RH Relative Humidity :5% ~ 85%RH
5	存储环境条件 Storage Environment Condition	存储温度:-40℃～85℃ Storage Temperature :-40℃ ~ 85℃
		相对湿度:5%～85%RH Relative Humidity :5% ~ 85%RH

6. 辅助模块参数 Auxiliary module parameters

序号 NO	名称 Name	电流 Current	是/否标配 Yes/No standard	备注 Remark
1	PACK 并联模块 Pack parallel module	☑1A 集成	是 yes	为了并联不损坏，内置恒功率 20W，最大电流 2A； For parallel connection without damage，Built in constant power 20W, maximum current 2A 如需大电流限流，需选择外挂模块； If you need high current limiting, you need to choose an external module.
		☐5A 外挂	否 no	
		☐15A 外挂	否 no	

7.通信说明 Communication Description

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

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

7.1 RS485 通信

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).

7.2 CAN 通信

默认达锂 CAN 1 协议，通信速率 250KB/S 或 500KB/S(自动识别匹对)。支持逆变器通讯，CAN2 通讯速率 250KB/S。

The default is the Lithium CAN 1 protocol, and the communication rate is 250KB/S or 500KB/S. Support inverter communication, CAN2 communication rate of 250KB/S.

7.3 蜂鸣器逻辑 Buzzer logic

在上位机配置蜂鸣器使能，且蜂鸣器接在 DO1 口；

充放电温度到达 60 度 响声 1 秒 停止一秒 如此持续进行蜂鸣报警

Configure a buzzer to enable on the computer APP , and connect the buzzer to the DO1 port;

When the charging and discharging temperature reaches 60 ° C, the sound will stop for one second, and then the buzzer alarm will continue

7.4 灯语逻辑 Indicator logic

本产品有一盏绿色 LED 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

7.5 钥匙开关逻辑 Keyswitch logic

支持 KEY 控制 MOS，分三种情况：

1、钥匙控制放电 MOS 管，2、钥匙控制放电 MOS 管与休眠，3、失能。控制逻辑为正逻辑，也可以支持 5V/12V/24 外部电源唤醒。

Support KEY control MOS, divided into three situations:

1. Key controlled discharge MOS tube, 2. Key controlled discharge MOS tube and sleep, 3. Deactivation. The control logic is positive logic and can also support 5V/12V/24 external power wake-up.

2、充放电互斥逻辑

Charge and discharge mutually exclusive logic

①有充电器无钥匙可以充电不可以放电；

②有钥匙无充电器可以放电；

③有钥匙有充电器不可以充放电；但有可能会出现反充电流的情况导致电池无法吸收问题

①There is a charger no key can charge can not discharge;

② There is no key charger can discharge;

③ There are keys and chargers can not be charged and discharged; However, there may be a situation where the charge flow is reversed and the battery cannot absorb the problem

8. 上位机说明 PC Master 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.

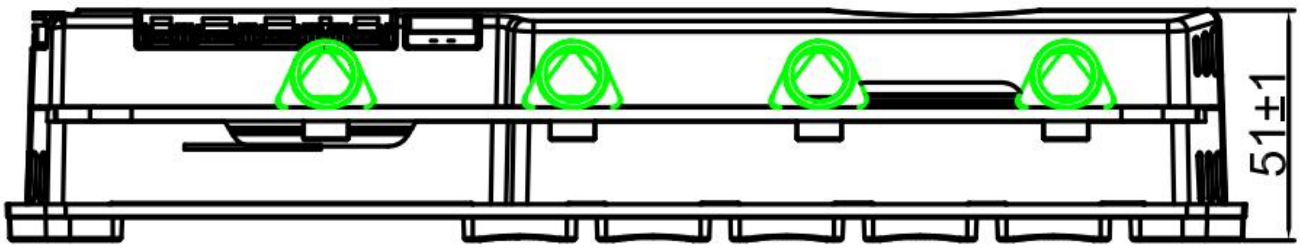
1. Analyze the data information sent by each module, and then display the voltage, temperature, configuration value, etc.;

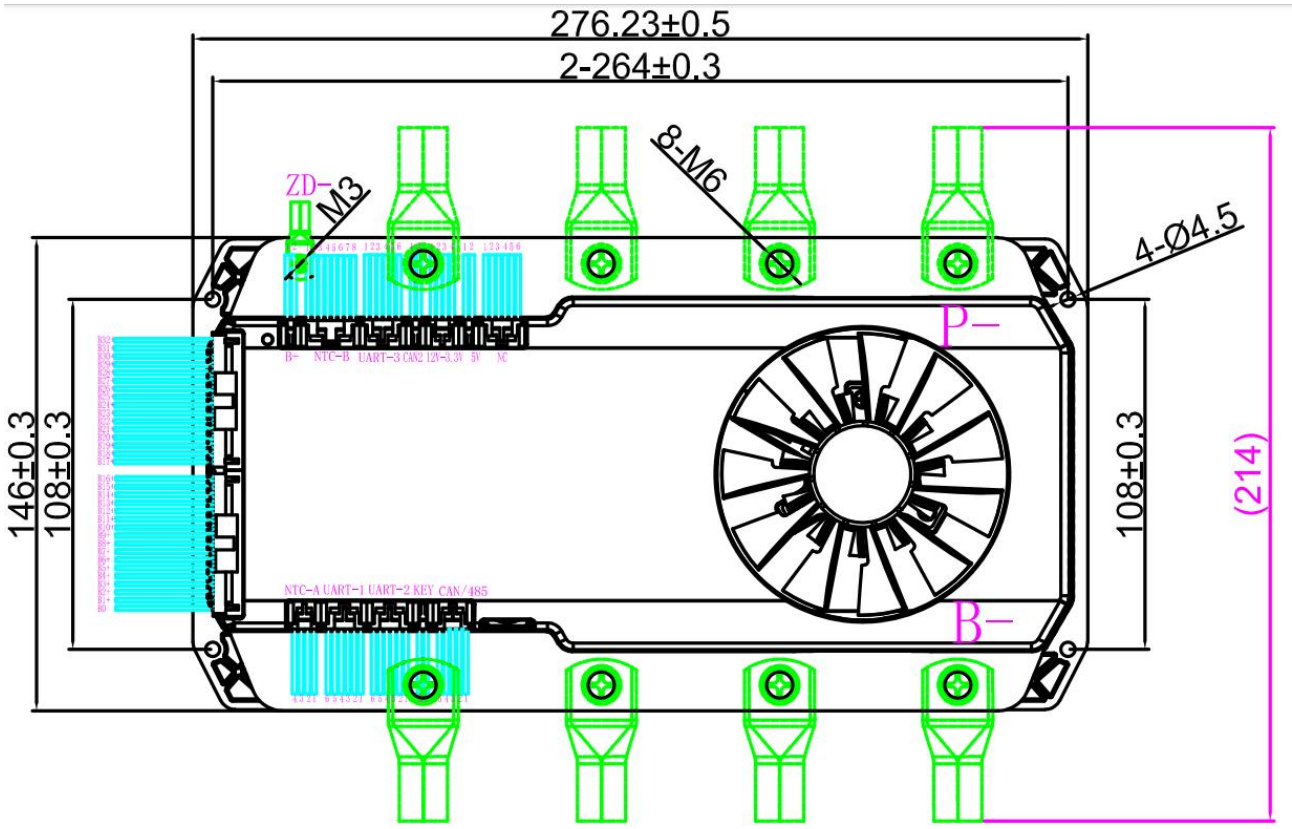
2. Configure information to each module through the host computer;

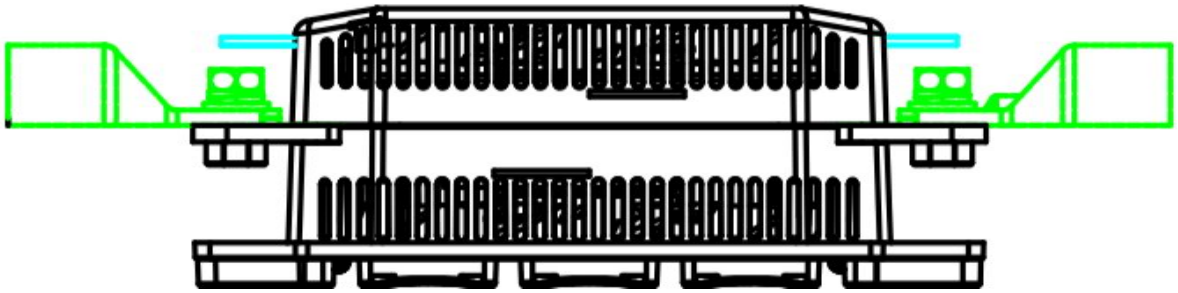
3. Calibration of production parameters;

4. BMS upgrade.

9.保护板尺寸图 Dimensional Drawing Reference


51±1


276.23±0.5
2-264±0.3
8-M6
ZD-
M3
4-Ø4.5
P-
B-
146±0.3
108±0.3
108±0.3
(214)



10. 接口定义 Interface Definition

10.1 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 XHB 2.5 n Pin 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
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
Uart1 蓝牙/GPS/UART/LCD/电量 SOC 接口/主动均衡 Bluetooth/GPS/UART/LCD interface/SOC display/Active Balance Module PHB2.0 6Pin	1	GND	地 GND
	2	3.3V	供电电源 3.3V Power supply is 3.3V
	3	12V	供电电源 8-12V Power supply is 8- 12V
	4	S1	激活按键 Activate button
	5	TX	通讯发送端 Communication sending end
	6	RX	通讯接收端 Communication receiving end
Uart2 蓝牙/GPS/UART/LCD/电量 SOC 接口/主动均衡 Bluetooth/GPS/UART/LCD interface/SOC	1	GND	地 GND
	2	3.3V	供电电源 3.3V Power supply is 3.3V
	3	12V	供电电源 8-12V Power supply is 8- 12V
	4	S1	激活按键 Activate button
	5	TX	通讯发送端 Communication sending end
	6	RX	通讯接收端 Communication receiving end

display/Active Balance Module PHB2.0 6Pin			
KEY 接口 KEY interface PHB2.0 2Pin	1	KEY-	钥匙开关负 Key switch negative
	2	KEY+	钥匙开关正 Key switch positive
RS485/CAN 接口 RS485/CAN interface PHB2.0 5Pin	1	485_B	485 通讯接收端 485 communication receiver
	2	485_A	485 通讯发送端 485 communication sender
	3	ISO_GND	隔离地 Isolation ground GND
	4	CAN1_H	CAN 通讯高 CAN communication high
	5	CAN1_L	CAN 通讯低 CAN communication low
B+接口 B+interface PHB2.0 2Pin	1	B+	电池总正，连接电池总正 Battery total positive, connect battery total positive
	2	B+	
NTC-B 接口 NTC-B interface PHB2.0 8Pin	1	NTC-3	3#温度线 3 # Temperature line
	2	GND	地 GND
	3	NTC-4	4#温度线 4 # Temperature line
	4	GND	地 GND
	5	NTC-5	5#温度线 5 # Temperature line
	6	GND	地 GND
	7	NTC-6	6#温度线 6 # Temperature line
	8	GND	地 GND
Uart3 蓝牙/GPS/UART/LCD/电量 SOC 接口/主动均衡 Bluetooth/GPS/UART/LCD interface/SOC display/Active Balance Module PHB2.0 6Pin	1	GND	地 GND
	2	3.3V	供电电源 3.3V Power supply is 3.3V
	3	12V	供电电源 8-12V Power supply is 8- 12V
	4	S1	激活按键 Activate button
	5	TX	通讯发送端 Communication sending end
	6	RX	通讯接收端 Communication receiving end

CAN 接口 CAN interface PHB2.0 2Pin	1	CAN2_H	CAN 通讯高 CAN communication high
	2	CAN2_L	CAN 通讯低 CAN communication low
DIO 接口 DIO parallel interface PHB2.0 4Pin	1	12V	12V ≤1A DO
	2	GND	地 GND
	3	3.3V	3.3V ≤500mA DO
	4	GND	地 GND
5VDO 接口 5VDO parallel interface PHB2.0 2Pin	1	5V	5V ≤1A DO
	2	GND	地 GND
隔离电源输入输出口 接口（选配） DIO parallel interface PHB2.0 6Pin	1	OUT	12V_OUT
	2	GND	地 GND
	3	NC	\
	4	IN	12V_IN
	5	GND	地 GND
	6	NC	\

10.2 主要线材说明

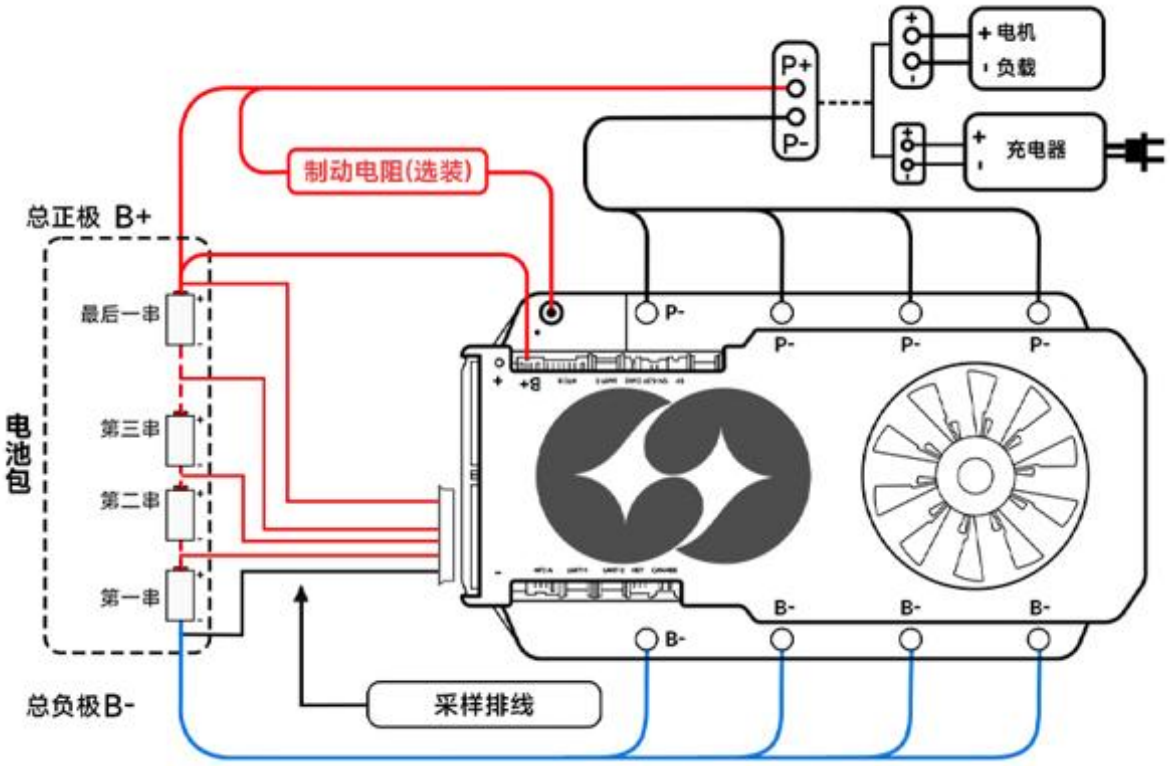
线材名称 Line name	默认规格 Default specification
采集线 Collecting line	1007 22AWG 注：对应 10.3 表
NTC-A 线	24AWG 2PIN
NTC-B 线	24AWG 8PIN（选配）
B+	24AWG 2PIN
KEY	24AWG 2PIN

10.3 采集与串数对应表 Collection and string number map

串数 Strings	采集线接口规格 collecting cable interface specification	采集线规格 collecting cable specification	采集线抽线 collecting cable cutting	串数 Strings
11	XHB2.5 13pin with buckle	1007 22AWG L=450mm（13PIN）with buckle 可选 L=600mm	抽掉 13P 中最后 1P 线 cutting the last cable of the 11PIN cable	11
12	XHB2.5 13pin with	1007 22AWG L=450mm（13PIN）		12

	buckle	with buckle 可选 L=600mm		
13	XHB2.5 14pin with buckle	1007 22AWG L=450mm（14PIN） with buckle 可选 L=600mm		13
14	XHB2.5 15pin with buckle	1007 22AWG L=450mm（15PIN）可选 L=600mm		14
15	XHB2.5 16pin with buckle	1007 22AWG L=450mm（16PIN） with buckle 可选 L=800mm		15
16	XHB2.5 17pin with buckle	1007 22AWG L=450mm（17PIN） with buckle 可选 L=800mm		16
17	XHB2.5 12+6pin with buckle	1007 22AWG L=450mm（12+6PIN） with buckle 可选 L=800mm		17
18	XHB2.5 15+6pin with buckle	1007 22AWG L=450mm（15+6PIN） with buckle 可选 L=800mm	抽掉 15P 中最后 2P 红线，6P 不用抽线 Draw the last 2P red line in 15P, and do not draw the 6P line	18
19	XHB2.5 15+6pin with buckle	1007 22AWG L=450mm（15+6PIN） with buckle 可选 L=800mm	抽掉 15P 中最后 1P 红线，6P 不用抽线 Draw the last 1P red line in 15P, and do not draw the 6P line	19
20	XHB2.5 15+6pin with buckle	1007 22AWG L=450mm（15+6PIN） with buckle 可选 L=800mm		20
21	XHB2.5 17+8pin with buckle	1007 22AWG L=450mm（17+8PIN） with buckle 可选 L=800mm	抽掉 17P 中最后 3P 红线，8P 不用抽线 Draw the last 3P red line in 17P, and do not draw the 8P line	21
22	XHB2.5 17+8pin with buckle	1007 22AWG L=450mm（17+8PIN） with buckle 可选 L=800mm	抽掉 17P 中最后 2P 红线，8P 不用抽线 Draw the last 2P red line in 17P, and do not draw the 8P line	22
23	XHB2.5 17+8pin with buckle	1007 22AWG L=450mm（17+8PIN） with buckle 可选 L=800mm	抽掉 17P 中最后 1P 红线，8P 不用抽线 Draw the last 1P red line in 17P, and do not draw the 8P line	23
24	XHB2.5 17+8pin with buckle	1007 22AWG L=450mm（17+8PIN） with buckle 可选 L=800mm		24

11. 接线说明 Cable Connection instructions



11.1 接线说明 Wiring Instructions

- 先将保护板 B-线到电池组总负极；
  First connect the B- line of the protection board 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；B+接到最后一串正极；
  The cable starts from the thin black wire connected to B-, the second wire is connected to the positive electrode 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； B+ is connected to the last string of positives
- 接线完成后，观察绿色指示灯是否工作，连接蓝牙 APP 或 PC 上位机查看是否有故障告警，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, Observe whether the green indicator light is working, connect the bluetooth APP or PC application to check for any fault alarms, 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，先断开负载电源开关并拔出排线（如果有两个排线，先拔高压排线，再拔低压排线），再拆 P-，最后拆动力线 B-.
  When removing the protection board, First disconnect the load power switch and unplug the ribbon cable (if there are two cables, first pull out the high-voltage cable, then pull out the low-voltage cable), and then Remove P -, and finally remove power line B.

11.2 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） 安装在保护板上面，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.
  当 NTC 漏插入时，BMS 会产生故障，不能进行正常的充放电。
  When NTC fails to insert, BMS will malfunction and cannot perform normal charging and discharging.
  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

12. 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

13. 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. 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.

9. 保护板内置小功率并联能力，大电流并联请选择单独配件，串联使用需另行定制。

The BMS board has built-in low-power parallel connection capability. For high current parallel connection, please choose a separate accessory. For series connection, it needs to be customized separately.

10.当电池为 4、5 串铁锂时，保护板的 Uart 及 DO 的 12V 电压不会稳压输出，会根据电池总压变化，实际电压值会略低于电池总压。故欠压时，涉及的 12V 输出的配件会因供电不足而无法使用，例如 WIFI 模块、4G 模块等；

When the battery is 4、5strings of LiFePO4, the 12V voltage of the Uart and DO of the BMS does not regulate the voltage output, and the actual voltage value will be slightly lower than the total battery voltage according to the total battery voltage change. Therefore, in the case of undervoltage, accessories with 12V output will be unable to be used due to insufficient power supply, such as WIFI module, 4G module, etc.

11、注意外部带载最大不得超过 20W，若有高负载需求请联系业务定制。

The maximum external load cannot exceed 20W. If a high load is required, contact the service provider for customization.

12. 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).

14. 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）	更改原因 （Reason for change）	更改日期 （Change date）	备注 （Remarks）
A0	首版	首版	2024/9/5	
