产品规格承认书

Product Specification Approval

产品名称（Product Name）	智能板 8~16 串 150A~200A 同口带均衡 Smart BMS 8-16S 150A~200A common port with active balance	
产品型号（Product Number）	DL-R16LM-B TJ	
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.**
	A2	
编制(Prepared by)	**核准(Approved)**	**审核(Audit)**
MO Yepeng	**Yang Weihao**	**Yang Weihao**
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; Supplier reserves the right of final interpretation of this specification.

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 Content

1.简介 Brief introduction

- 随着铁锂电池在通信行业的广泛应用 ，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 对储能电池设计的 BMS，采用集成化的设计，将采集、管理、通信等功能集成于一体。该 BMS 产品以一体化作为设计理念，可广泛应用在室内室外储能电池系统，如 家庭储能、光伏储能、通信储能等。
- With the wide application of lithium iron batteries in the communication industry, the battery management system has also put forward high performance, high reliability and cost-effective requirements. This product is a BMS specially designed for energy storage battery. It adopts integrated design and integrates collection, management, communication and other functions into one. With integration as the design concept, the BMS product can be widely used in indoor and outdoor energy storage battery systems, such as home energy storage, photovoltaic energy storage, communication energy storage, etc.
- BMS 一体化设计，对于 Pack 厂家有更高的组装效率和测试效率，降低生产投入成本；一体化设计，减少对于整体安装质量保障有较大提升。
- BMS integrated design, for Pack manufacturers have higher assembly efficiency and test efficiency, reduce production input cost; Integrated design, reduce the overall installation quality assurance has a great improvement.

2.功能描述 Function Description

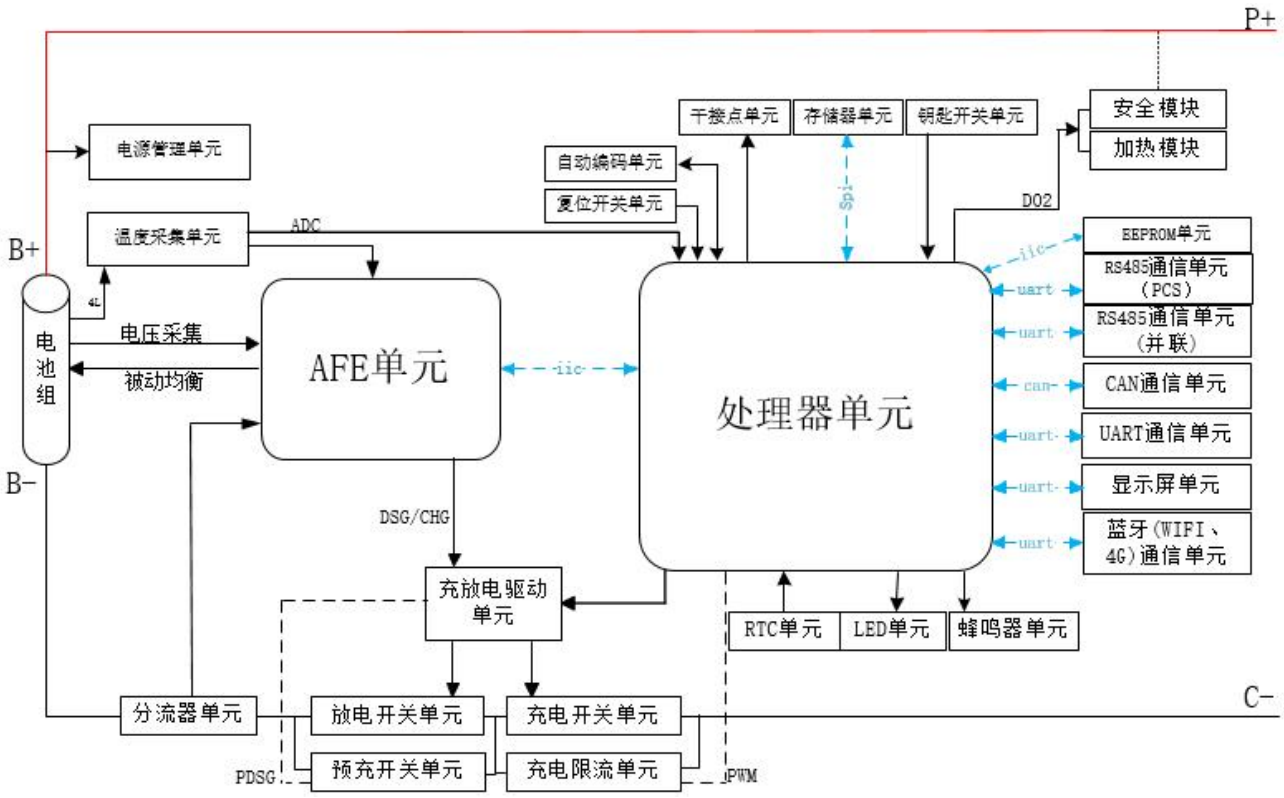
功能 Function	**说明 Description**
故障存储 Fault storage	可存储 10000 条故障信息 10000 fault information can be stored
充电限流 Charge current limiting	1~10A，当充电过流二级保护时开启 1~ 10A, open when charging over-current protection Level2
状态指示 status indicator	通过 LED 提示电池系统正处于告警、充电、放电等状态或者剩余电量等信息 The LED prompts indicate whether the battery system is in alarm, charging, discharging or other states or the remaining battery power and other information
外部通讯 external communication	RS485（波特率 Baud rate：9600bps）、CAN（波特率 Baud rate：500kbps）
内部通讯 internal communication	RS485（波特率 Baud rate：115200bps）； 电池组并联时使用 It is used when battery packs are connected in parallel
自动编码 auto-coding	内部通讯线连接&系统上电成功后，会自动给 BMS 进行编码 After the internal communication line is connected and the system is successfully powered on, it will automatically encode the BMS
干接点（选配） Dry contact（Option）	干接点 1——PIN1 to PIN2：常开，低电量闭合 Dry contact 1 -- PIN1 to PIN2: Open normally and close at low power 干接点 2——PIN3 to PIN4：常开，故障 保护时闭合 Dry contact 2 -- PIN3 to PIN4: Open normally and closed during fault protection
复位按钮 Reset button	按下按钮，可使 BMS 处于休眠、唤醒、复位状态、重新编码 By pressing the button, the BMS can be in sleep，wake up, or reset state，recode
蜂鸣器 Buzzer	可发出声音提示电池系统正处于故障、告警或保护状态； The buzzer sounds to inform you that the battery system is in the fault, alarm, or protection state;
钥匙开关 Key switch	可控制系统电路的通断 The on-off of the system circuit can be controlled
加热功能 Heating	需另配套相关硬件（如加热模块、加热膜、对应线束等）Additional related hardware (such as heating modules, heating films, corresponding wiring harnesses, etc.) is required.

主动均衡 Active equalization	可选配 2A 主动均衡，配有主动均衡功能的默认取消被动均衡 Optional 2A active balancing is available. The passive balancing function is automatically cancelled when the active balancing function is enabled.
防反接功能 Anti-reverse connection function	无 No
防盗功能 Anti-theft function	无 No
232 通讯 communication	无 No

3.产品选型 Product Selection

产品选型表 Product Selection list									
板型 Board type	☐一体式 integrated							☐分离式 split	
电流 Current	☐150A							☐200A	
电池类型 Battery Type	☐三元 Li-ion							☐铁锂 LiFePO4	
电池串数 Battery Strings	☐8	☐9	☐10	☐11	☐12	☐13	☐14	☐15	☐16
干接点 Dry contact	☐有/Yes							☐无/No	
WIFI/Bluetooth/GPS	☐WIFI		☐Bluetooth			☐GPS		☐无/No	
显示屏 Display	☐3.5 寸显示屏 3.5inches display			☐4.3 寸显示屏 4.3inches display				☐无/No	
接口板 interface board	☐R16L(V3.3)_WNT			☐DL-JKB-PJ			☐DL-JKB-ES		

4. 系统框图 System chart



5. 技术参数 Technical parameter

5.1 充放电与均衡 Charge&Discharge and equalization

注意：n=电池串数；Note：n=Battery Strings

检测内容 Test content		默认参数 default parameters		单位 Unit
		三元 Li-ion	铁锂 LiFePO4	
放电 Discharge	额定放电电流 Rated discharge current	150/200		A
充电 Charge	充电电压 Charge voltage	=4.2*n	=3.65*n	V
	额定充电电流 Rated charging current	150/200		A
	过充后标定更新 SOC 为 100%，当 SOC < 96%或有放电电流允许再次充电 After over-charging, update SOC to 100%, when SOC < 96% or there is discharge current to allow charging again			
主动均衡功能 Active equalization function	均衡开启电压 balance turn-on voltage	4.0	3.4	V
	均衡截止电压 Balance off voltage	4.2	3.6	V
	均衡开启压差 Equalize the opening voltage difference	20		mV
	均衡电流 Balance current	Max 2000		mA
	均衡开启条件 Equilibrium on condition 1.单体间的最大电压差≥均衡开启压差 The maximum voltage difference between individual cells is ≥ the equalization opening voltage difference 2.每个单体电压 > 均衡开启电压 The voltage of each individual cell > The balance turn-on voltage 3.每个单体电压 < 均衡截止电压 The voltage of each individual cell < The balance off voltage 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			

5.2 过充保护 over-Charge protection

检测内容 Test content		默认参数 default parameters		单位 Unit
		三元 Li-ion	铁锂 LiFePO4	
单体过充一级 Single Cell over-charge level1	过充告警电压 over-charge alarm voltage	4.2±0.05	3.6±0.05	V
	过充告警延时 over-charge alarm delay	1±0.8		S
	过充告警解除电压 over-charge alarm release voltage	4.1±0.05	3.5±0.05	V
单体过充二级 Single Cell over-charge level2	单体过充保护电压 Single Cell over-charge protection voltage	4.25±0.05	3.65±0.05	V
	单体过充保护延时 Single Cell over-charge protection delay	1±0.8		S
	过充保护解除电压 over-charge protection release voltage	4.1±0.05	3.5±0.05	V
单体过充三级 Single Cell over-charge level3	单体过充保护电压 Single Cell over-charge protection voltage	4.3±0.05	3.8±0.05	V
	单体过充保护延时 Single Cell over-charge protection delay	1±0.8		S
	过充保护解除电压 Over-charge protection release voltage	4.15±0.05	3.65±0.05	V
总压过充一级 Overall overcharge level1	过充告警电压 overcharge alarm voltage	4.15*n±0.8	=3.55*n±0.8	V
	过充告警延时 overcharge alarm delay	1±0.8		S
	过充告警解除电压 overcharge alarm release voltage	(4.15*n-1) ±0.8	(3.55*n-1) ±0.8	V
总压过充二级 Overall overcharge level2	过充保护电压 overcharge protection voltage	4.2*n±0.8	3.6*n±0.8	V
	过充保护延时 overcharge protection delay	1±0.8		S
	过充保护解除电压 overcharge protection release voltage	(4.2*n-1) ±0.8	(3.6*n-1) ±0.8	V
总压过充三级 Overall overcharge level3	过充保护电压 overcharge protection voltage	4.25*n±0.8	3.75*n±0.8	V
	过充保护延时 overcharge protection delay	1±0.8		S
	过充保护解除电压 overcharge protection release voltage	(4.25*n-1) ±0.8	(3.75*n-1) ±0.8	V
其它解除条件 Other conditions of release	剩余容量 SOC 解除 The SOC of remaining capacity release	< 96%		
	放电电流解除 Discharge current release	> 1		A

5.3 过放保护 over-Discharge protection

检测内容 Test content		默认参数 default parameters	单位 Unit
单体过放一级 Single Cell discharge level1	单体过放告警电压 Single Cell discharge alarm voltage	2.8±0.05	V
	单体过放告警延时 Single Cell discharge alarm delay	1±0.8	S
	单体过放告警解除电压 Single Cell discharge alarm release voltage	2.9±0.05	V
单体过放二级 Single Cell over-discharge level2	单体过放保护电压 Single Cell over-discharge protection voltage	2.7±0.05	V
	单体过放保护延时 Single Cell over-discharge protection delay	1±0.8	S
	过放保护解除电压 Over-discharge protection release voltage	2.9±0.05	V
	过放保护 30 秒后 ， 仍无法恢复时 ， 将进入休眠模式 Over discharge protection for 30 seconds， if the device still cannot be recovered, it enters sleep mode		
单体过放三级 Single Cell over-discharge level3	单体过放保护电压 Single Cell over-discharge protection voltage	2.6±0.05	V
	单体过放保护延时 Single Cell over-discharge protection delay	1±0.8	S
	过放保护解除电压 Over-discharge protection release voltage	2.8±0.05	V
总压过放一级 Overall discharge level1	总体过放告警电压 Overall discharge alarm voltage	=2.85*n±0.8	V
	总体过放告警延时 Overall discharge alarm voltage delay	1±0.8	S

	总体过放告警解除电压 Overall discharge alarm release voltage	=（2.85*n+1）±0.8	V
总压过放二级 Overall discharge level2	总体过放保护电压 Overall discharge protection voltage	=2.75*n±0.8	V
	总体过放保护延时 Overall discharge protection delay	1±0.8	S
	过放保护解除电压 Discharge protection release voltage	=（2.75*n+1）±0.8	V
	过放保护 30 秒后 ，仍无法恢复时 ，将进入休眠模式 Over discharge protection for 30 seconds if the device still cannot be recovered, it enters sleep mode		
总压过放三级 Overall discharge level3	总体过放保护电压 Overall discharge protection voltage	=2.65*n±0.8	V
	总体过放保护延时 Overall discharge protection delay	1±0.8	S
	过放保护解除电压 Discharge protection release voltage	=（2.65*n+1）±0.8	V

5.4 过流保护 over-current protection

检测内容 Test content		默认参数 default parameters	单位 Unit
放电过流 Discharge over-current	放电过流一级告警电流 Discharge over-current Level 1 alarm current	158±5/210±6	A
	放电过流一级告警延时 Discharge over-current Level 1 alarm delay	1±0.8	S
	放电过流二级保护电流 Discharge over-current Level 2 protection current	165±5/220±7	A
	放电过流二级保护延时 Discharge over-current Level 2 protection delay	1±0.8	S
	放电过流三级保护电流 Discharge over-current Level 3 protection current	225±7/300±9	A
	放电过流三级保护延时 Discharge over-current Level 3 protection delay	1±0.8	S
	解除条件 release condition 1、1min 后自动解除，连续出现 10 次将锁定该状态 ，不再自动解除 The lock will be automatically unlocked after 1 minute. If the lock occurs for 10 consecutive times, the lock will not be automatically unlocked 2、充电解除：充电电流 > 1A charge release: charging current > 1A 达到任一条件可解除 Meet any condition can be released		
充电过流 Charge over-current	充电过流一级告警电流 Charge over-current Level 1 alarm current	158±5/210±6	A
	充电过流一级告警延时 Charge over-current Level 1 alarm delay	1±0.8	S
	充电过流二级保护电流 Charge over-current Level 2 protection current	165±5/220±7	A
	充电过流二级保护延时 Charge over-current Level 2 protection delay	1±0.8	S
	充电过流三级保护电流 Charge over-current Level 3 protection current	225±7/300±9	A
	充电过流三级保护延时 Charge over-current Level 3 protection delay	1±0.8	S
	解除条件 release condition 充电过流保护会直接关闭充电 MOS 开启限流，每五分钟会关闭限流并打开充电 MOS，如继续触发过流保护，则继续断开充电 MOS 进行限流；当有放电电流时立即退出限流/过流；		

5.5 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	短路保护电流 Short-circuit protection current	1500/2000	A
	短路保护延时 Short-circuit protection delay（实际以客户寄回我司测试为准 The actual customer sent back to our test shall prevail）	300±200	uS
	短路保护解除：移除负载解除/充电解除 Short-circuit protection release：Remove Load release/charge release		

5.6 高温保护 High temperature protection

检测内容 Test content	默认参数 Default parameters	单位 Unit

充电高温 Charging high temperature	高温一级告警 high temperature level1 alarm	55±2	℃
	高温一级告警延时 high temperature level1 alarm delay	1±0.8	S
	高温一级告警释放 high temperature level1 alarm release	50±2	℃
	高温二级保护 high temperature level2 protection	60±2	℃
	高温二级保护延时 high temperature level2 protection delay	1±0.8	S
	高温二级保护释放温度 high temperature level2 protection release	55±2	℃
	高温三级保护 high temperature level3 protection	65±2	℃
	高温三级保护延时 high temperature level3 protection delay	1±0.8	S
	高温三级保护释放温度 high temperature level3 protection release	60±2	℃
放电高温 Discharge high temperature	高温一级告警温度 high temperature level1 alarm	60±2	℃
	高温一级告警延时 high temperature level1 alarm delay	1±0.8	S
	高温一级告警解除 high temperature level1 alarm release	55±2	℃
	高温二级保护 high temperature level2 protection	65±2	℃
	高温二级保护延时 high temperature level2 protection delay	1±0.8	S
	高温二级保护释放 high temperature level2 protection release	60±2	℃
	高温三级保护 high temperature level3 protection	70±2	℃
	高温三级保护延时 high temperature level3 protection delay	1±0.8	S
	高温三级保护释放 high temperature level3 protection release	66±2	℃

5.7 低温保护 Low temperature protection

检测内容 Test content		默认参数 Default parameters	单位 Unit
充电低温 Charge low temperature	低温一级告警温度 low temperature level1 alarm	5±2	℃
	低温一级告警延时 low temperature level1 alarm delay	1±0.8	S
	低温一级告警解除 low temperature level1 alarm release	10±2	℃
	低温二级保护 low temperature level2 protection	0±2	℃
	低温二级保护延时 low temperature level2 protection delay	1±0.8	S
	低温二级保护释放温度 low temperature level2 protection release	5±2	℃
	低温三级保护 low temperature level3 protection	-5±2	℃
	低温三级保护延时 low temperature level3 protection delay	1±0.8	S
	低温三级保护释放温度 low temperature level3 protection release	0±2	℃
放电低温 Discharge low temperature	低温一级告警 low temperature level1 alarm	-15±2	℃
	低温一级告警延时 low temperature level1 alarm delay	1±0.8	S
	低温告一级警解除 low temperature level1 alarm release	-10±2	℃
	低温二级保护 low temperature level2 protection	-25±2	℃
	低温二级保护延时 low temperature level2 protection delay	1±0.8	S
	低温二级保护释放温度 low temperature level2 protection release	-20±2	℃
	低温三级保护 low temperature level3 protection	-30±2	℃
	低温三级保护延时 low temperature level3 protection delay	1±0.8	S
	低温三级保护释放温度 low temperature level3 protection release	-25±2	℃

5.8 环境温度保护 Environment temperature protection

检测内容 Test content		默认参数 default parameters	单位 Unit
环境温度 Environment temperature	高温告警温度 high temperature alarm	65±2	℃
	高温保护温度 high temperature protection	70±2	℃
	高温保护解除 high temperature protection release	65±2	℃

5.9 MOS 温度保护 MOS temperature protection

检测内容 Test content		默认参数 default parameters	单位 Unit
MOS 温度保护 MOS temperature protection	高温告警 high temperature alarm	95±2	℃
	高温告警解除 high temperature alarm release	90±2	℃
	高温保护 high temperature protection	100±2	℃
	高温保护解除 high temperature protection release	65±2	℃

5.10 压差保护 voltage difference protection

检测内容 Test content		默认参数 Default parameters	单位 Unit
压差保护 voltage difference protection	压差一级告警 voltage difference level 1 alarm	0.3	V
	压差一级告警恢复 voltage difference level 1 alarm release	0.25	V
	压差二级告警 voltage difference level 2 alarm	0.5	V
	压差二级告警恢复 voltage difference level 2 alarm release	0.45	V
	压差三级保护 voltage difference level 3 protection	1	V
	压差三级保护解除 voltage difference level 3 protection release	0.8	V

5.11 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 temperature difference level 1 alarm	10±2	℃
	温差一级告警恢复 temperature difference level 1 alarm release	7±2	℃
	温差二级告警 temperature difference level 2 alarm	15±2	℃
	温差二级告警恢复 temperature difference level 2 alarm release	12±2	℃
	温差三级告警 temperature difference level 3 alarm	20±2	℃
	温差三级告警恢复 temperature difference level 3 alarm release	15±2	℃

5.12 其它 others

检测内容 Test content	默认参数 default parameters		单位 Unit
电池容量低告警 Battery capacity low alarm	< 10%		/
主回路导通内阻 The main circuit conducts the internal resistance	<20		mΩ
工作时自耗电电流	≤120	未开启均衡时	mA

Self-consuming electrical current during operation		when equalization is not enabled	
休眠模式自耗电电流 The sleep mode consumes electrical current	<900	不带外设 No external devices are included	uA
休眠时间 Sleep time	3600		S
通讯方式 communication mode	☐UART ☑CAN ☑485 ☐232		
重量 weight			

5.13 可靠性参数 Reliability parameter

项 目 Item	条 件 condition
检测精度 Detection accuracy	电流检测精度：≤3%FSR Current detection accuracy: ≤3%FSR 电压检测精度：≤15mV Voltage detection accuracy: ≤15mV 温度检测精度：≤3℃（常温下） Temperature detection accuracy: ≤3℃ (normal temperature)
信息存储 Information storage	最大存储 10000 条履历信息，含保护次数，当前总电压、电流、温度、SOC、等 Store a maximum of 10,000 biographical information, including protection times, current total voltage, current, temperature, SOC, etc
工作环境条件 Working environment condition	工作温度 Operating temperature :-20℃～75℃
	相对湿度 Relative humidity :5%～90%RH
存储环境条件 Storage environment condition	存储温度 Storage temperature : -40℃ ～85℃
	相对湿度 Relative humidity : 5%～90%RH

6. LED 指示说明 LED indication

状态 status	运行 LED RUN LED	告警 LED Alarm LED	电量指示 LED Battery Indicator LED				说明 Instructions
	●	●	●	●	●	●	
关机/休眠 Power Off /Sleep	灭 Off	灭 Off	灭 Off	灭 Off	灭 Off	灭 Off	/
待机 standby state	闪 1 Flash 1	灭 Off	Refer to 6.2				待机状态 standby state
	闪 1 Flash 1	闪 3 Flash 3					触发一级告警，未触发保护 A level one alarm was triggered, but no protection was activated
充电 charge	常亮 on	灭 off	Refer to 6.2				正常充电 Normal charge
	常亮 on	闪 3 Flash 3					过充告警，请拔掉充电器 Over-charge alarm，please unplug the charger
	常亮 on	灭 off	常亮 on	常亮 on	常亮 on	常亮 on	过充保护；拔掉充电器 ，指示灯转为待机状态 Overcharge protection; If the charger is unplugged, the indicator turns to standby state
放电 discharge	闪 3 Flash 3	灭 off	Refer to 6.2				正常放电 Normal discharge
	闪 3 Flash 3	闪 3 Flash 3					过放告警 Over-discharge alarm
	灭 off	灭 off	灭 off	灭 off	灭 off	灭 off	欠压休眠，请给电池充电 Enter undervoltage sleep state, please charge the battery
失效 Failure state	灭 off	常亮 on	灭 off	灭 off	灭 off	灭 off	系统处于温度、过流、短路保护等等，不能充放电，需排查原因 The system is in temperature, over-current, short circuit protection, etc., can not charge and discharge,

							need to check the cause

注意：触发充电限流时，充电过流保护的状态会被解除，此时指示灯状态会转为正常充电状态

Note：When the charging current limit is triggered, the status of the charging overcurrent protection will be released, and at this time, the indicator light status will switch to the normal charging state

6.1 LED 闪动说明 LED Flash Instructions

闪动方式Flash mode	亮on	灭off
闪1 Flash1	0.25S	3.75S
闪2 Flash2	0.5S	0.5S
闪3 Flash3	0.5S	1.5S

6.2 SOC 说明 SOC Instructions

电池剩余电量 SOC	充电 charging				放电 discharge				待机 standby state			
	L4 ●	L3 ●	L2 ●	L1 ●	L4 ●	L3 ●	L2 ●	L1 ●	L4 ●	L3 ●	L2 ●	L1 ●
0~25%	灭 off	灭 off	灭 off	闪 2 Flash2	灭 off	灭 off	灭 off	常亮 On	灭 off	灭 off	灭 off	常亮 On
25~50%	灭 off	灭 off	闪 2 Flash2	常亮 On	灭 off	灭 off	常亮 On	常亮 On	灭 off	灭 off	常亮 On	常亮 On
50~75%	灭 off	闪 2 Flash2	常亮 On	常亮 On	灭 off	常亮 On	常亮 On	常亮 On	灭 off	常亮 On	常亮 On	常亮 On
75~100%	闪 2 Flash2	常亮 On	常亮 On	常亮 On	常亮 On	常亮 On	常亮 On	常亮 On	常亮 On	常亮 On	常亮 On	常亮 On

7.复位按钮说明 Reset button description

1、BMS 处于休眠状态时 ，按下按钮后松开 ，保护板被激活 ，LED 指示灯从“RUN”开始依次点亮 0.5 秒。

When the BMS is in sleep state, press the button and release it. The protection board is activated, and the LED indicator turns on for 0.5 seconds from "RUN".

2、BMS 处于激活状态时 ，按下按钮（3~6S）后松开 ，保护板被休眠 ，LED 指示灯从最低电量灯开始依次点亮 0.5 秒。

When the BMS is in the active state, press the button (3~6S) and release it, the protection board will be hibernated, and the LED indicator will turn on for 0.5 seconds from the lowest power indicator.

3、BMS 处于激活状态时 ，按下按钮（6~10S）后松开 ，保护板被复位 ，LED 灯全部同时熄灭。

When the BMS is in the active state, press the key (6-10s) and release it, the protection board is reset, and all the LED lights are extinguished at the same time.

4、BMS 处于激活状态时 ，5s 内按 3 下按钮，即可重新自动编码。

When the BMS is in the active state, press the button three times within 5s, and the BMS can be automatically coded again.

8. 蜂鸣器逻辑 Buzzer logic

1、故障时 ，每 1S 鸣叫 0.25S ； When a fault occurs, 0.25S is emitted every 1S.

2、保护时 ，每 2S 鸣叫 0.25S (过压保护除外，欠压时 3S 响 0.25S) ；When protection, sound 0.25S every 2S (except overvoltage protection, 3S sound 0.25S when undervoltage);

3、告警时 ，每 3S 鸣叫 0.25S (过压告警除外) ；When an alarm is generated, the alarm is generated every 3S for 0.25S (except for an overvoltage alarm).

4、热失控时，每 2S 鸣叫 1S 。When the heat is out of control, sound 1S every 2S

蜂鸣器功能可通过上位机使能或禁止 ，出厂默认是禁止的 The buzzer function can be enabled or disabled by the host computer, but is disabled by factory default

9. 参数配置说明 Parameter configuration description

保存/加载配置：用户可对出厂配置或设置好的参数，通过上位机保存配置和加载；Save/load configuration: Users can save the configuration and load through the host computer for the factory-configured or set parameters;

10. 休眠与唤醒 Sleep and wake up

10.1 休眠 Sleep

当满足以下任意一条件时 ， 系统进入休眠模式 ：

If any of the following conditions are met, the system enters sleep mode:

1 ） 过放保护 30 秒内仍未解除。 over-charge protection is not removed within 30 seconds.

2 ） 按下按键（3~6S ） ，松开按键后。Press the button (3~6S) and release the button.

3 ） 同时满足无通信、无保护、无均衡、无电流，且持续时间达到休眠延迟时间。At the same time, no communication, no protection, no balance, no current, and the duration reaches the sleep delay time.

进入休眠前 ， 需确保输入端未接入外部电压 ， 否则将无法进入休眠模式。Before entering sleep mode, ensure that no external voltage is connected to the input terminal. Otherwise, the sleep mode cannot be entered.

10.2 唤醒 wake up

当系统处于休眠模式 ， 满足以下任意一条件时 ， 系统将退出休眠模式 ， 进入正常运行模式 ：

If any of the following conditions are met, the system exits the sleep mode and enters the normal running mode:

1 ）接入充电器/负载。 Plug in charger/load.

2 ）按下按键 ， 松开按键后。Press the button and release the button.

3 ）具 485、CAN 通讯 激活。With 485, CAN communication activation.

备注 ：单体或总体过放保护后进入休眠模式 ，每 4 个小时定时唤醒一次 ，开启充放电 MOS。如可以充电 ，将退出休 眠状态进入正常充电 ；Note: After the single or overall over-discharge protection, it enters sleep mode, wakes up periodically every 4 hours, and starts charging and discharging MOS. If it can be charged, it will exit the resting state and enter normal charging;

11. 通讯说明 Communication instructions

11.1 外部通讯 External communication

RJ45 单网口集成了 RS485、CAN 功能，BMS 可以通过 RJ45 单口与上位机进行通讯 ，从而可通过上位机监控电池的各种信息 ，包括电池电压、 电流、温 度、状态及电池生产信息等 ， 默认波特率为 9600bps。

RJ45 single network port integrates RS485, CAN functions, BMS can communicate with the host computer through RJ45 single port, so that the host computer can monitor various information of the battery, including battery voltage, current, temperature, status and battery production information, the default baud rate is 9600bps.

11.2 内部通信 Inner Communication

RJ45 双网口具有 RS485 的功能，可通过此网口进行 BMS 之间的内部通讯，实现 BMS 自动编码，波特率 115200bps

RJ45 dual network port has the function of RS485, through which internal communication between BMS can be carried out to achieve automatic coding of BMS, the baud rate is 115200bps.

12. 逆变器通讯 Inverter communication

保护板支持 RS485 和 CAN 通信接口的逆变器协议，上位机工程模式可以选择设置.

The protection board supports the inverter protocols of RS485, and CAN communication interfaces. The engineering mode of the upper computer can be selected.

协议类型 Protocol type	协议简称 Protocol abbreviation	协议名称 Protocol name	备注 Remark
RS485 协议 RS485 Protocol	SUNSYNK	阳光	
RS485 协议 RS485 Protocol	DEYE	德业	支持逆变器自识别 Support inverter self-identification
RS485 协议 RS485 Protocol	PYLON	派能	支持逆变器自识别 Support inverter self-identification
RS485 协议 RS485 Protocol	SOROTEC	索瑞德	
RS485 协议 RS485 Protocol	SACOLAR	尚科	支持逆变器自识别 Support inverter self-identification
RS485 协议 RS485 Protocol	GROWAT	古瑞瓦特	支持逆变器自识别 Support inverter self-identification
RS485 协议 RS485 Protocol	SOFAR	首航	支持逆变器自识别 Support inverter self-identification
RS485 协议 RS485 Protocol	SRNE	硕日	支持逆变器自识别 Support inverter self-identification
RS485 协议 RS485 Protocol	VOLTRONICPOWER	日月元	支持逆变器自识别 Support inverter self-identification
RS485 协议 RS485 Protocol	STUDER	特能	
CAN 协议 CAN Protocol	SUNSYNK	阳光	
CAN 协议 CAN Protocol	GOODWE	固德威	
CAN 协议 CAN Protocol	DEYE	德业	
CAN 协议 CAN Protocol	XMT		
CAN 协议 CAN Protocol	SOLARK		
CAN 协议 CAN Protocol	PYLON	派能	
CAN 协议 CAN Protocol	MEGAREVO	迈格瑞能	
CAN 协议 CAN Protocol	SOROTEC	索瑞德	
CAN 协议 CAN Protocol	SRNE	硕日	
CAN 协议 CAN Protocol	SOLIS	锦浪	
CAN 协议 CAN Protocol	LUXPOWERTEK	鹏程	
CAN 协议 CAN Protocol	SACOLAR	尚科	
CAN 协议 CAN Protocol	GROWAT	古瑞瓦特	
CAN 协议 CAN Protocol	SOFAR	首航	
CAN 协议 CAN Protocol	MUST	美克	
CAN 协议 CAN Protocol	VICTRONENERGY		
CAN 协议 CAN Protocol	SMA		
CAN 协议 CAN Protocol	AISWEI	爱士惟	
CAN 协议 CAN Protocol	STUDER	特能	

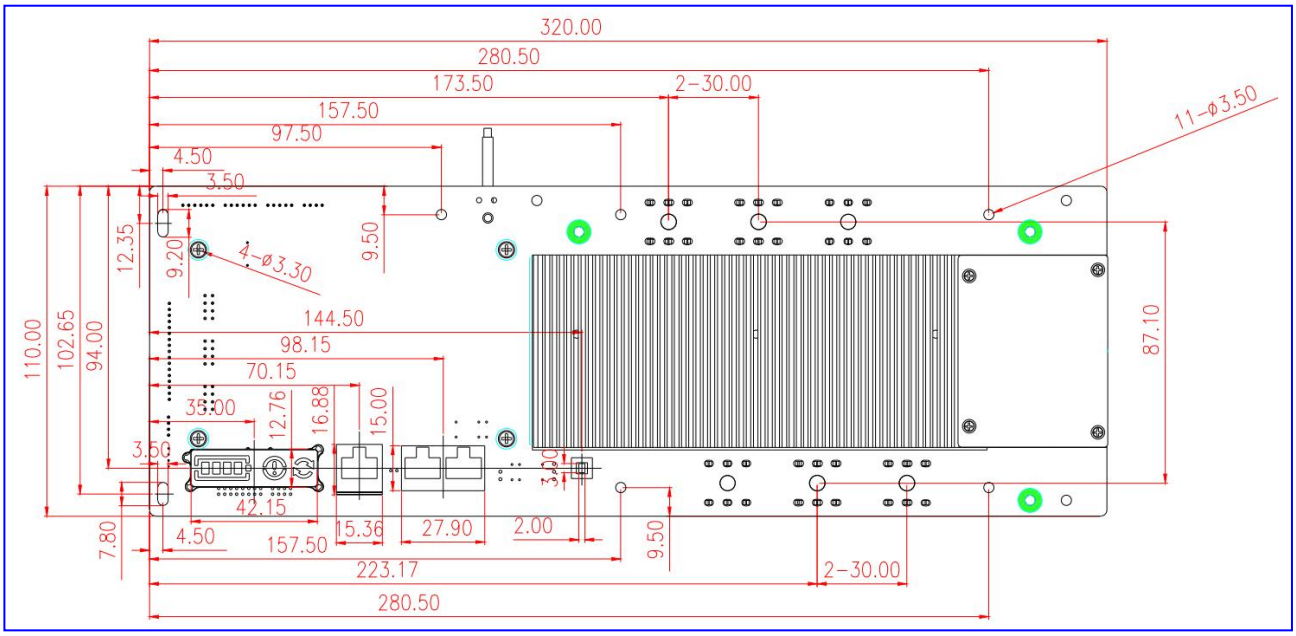
13. 尺寸图参考 Dimensional drawing reference

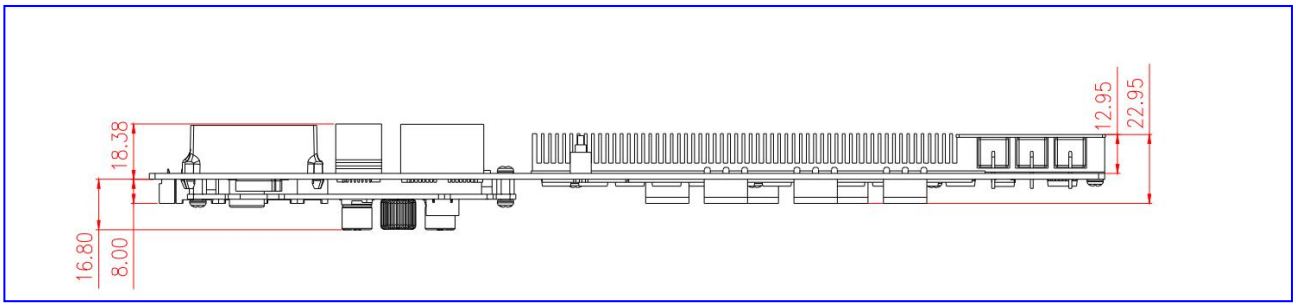
BMS 尺寸 Dimensions of the BMS	长*宽*高（mm）Long * Width * High (mm) 320*110*33

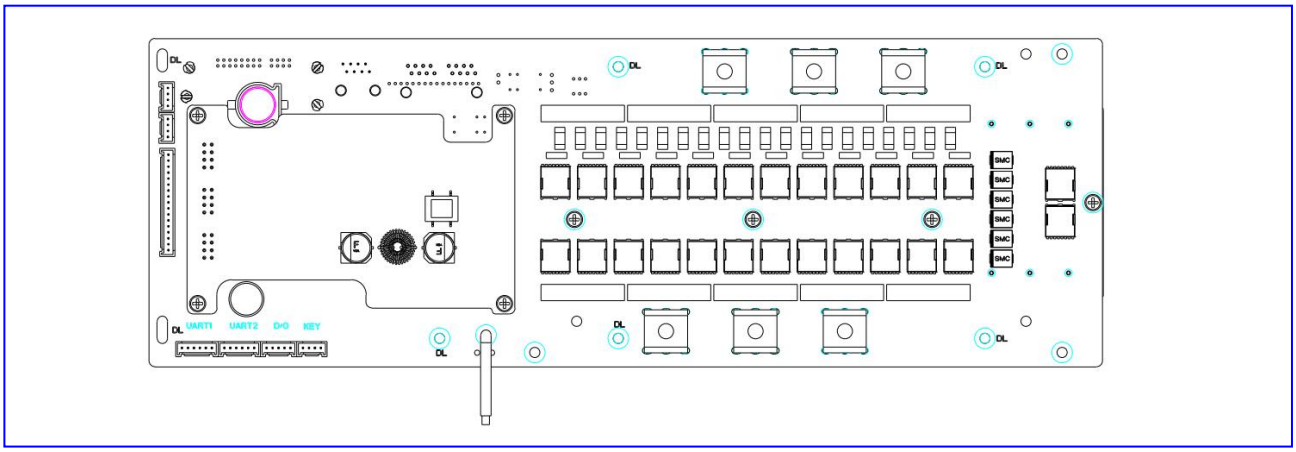
注:此尺寸不包括线束/配件尺寸，请参考 2D、3D 数模并预留合适的空间安装线束/配件

Note: This size does not include the size of cables and accessories. Please refer to 2D, 3D drawing and reserve appropriate space to install the cables and accessories.

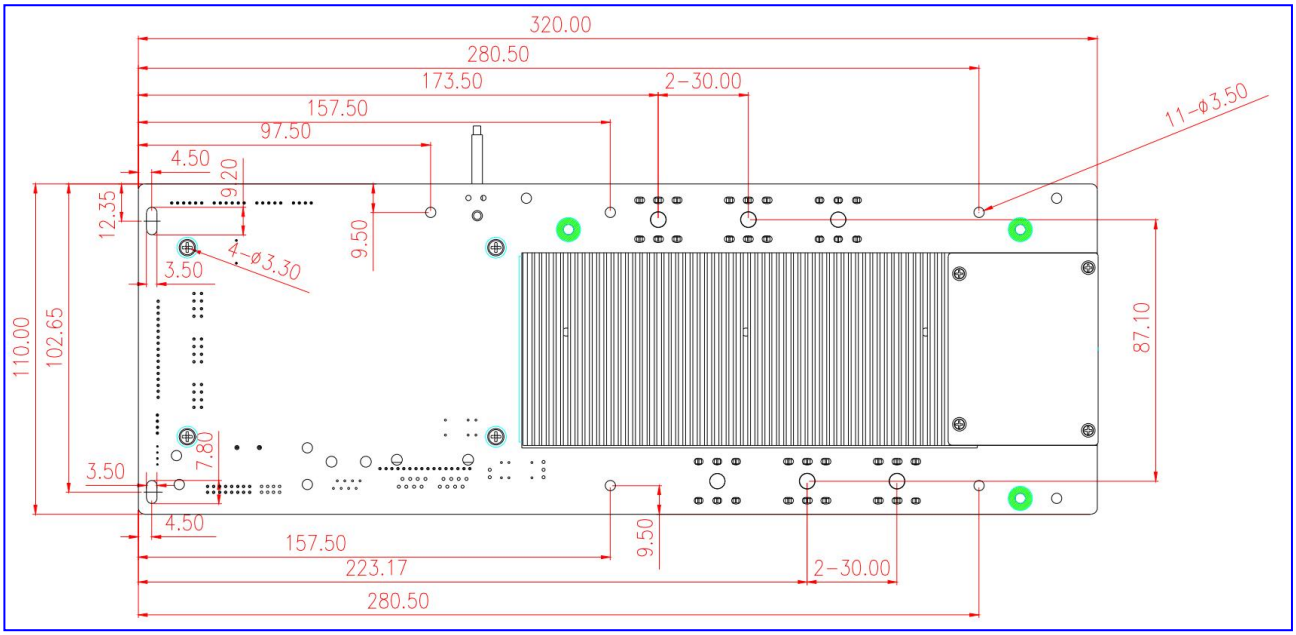
一体式（不带干接点） Integrated（without dry contact）

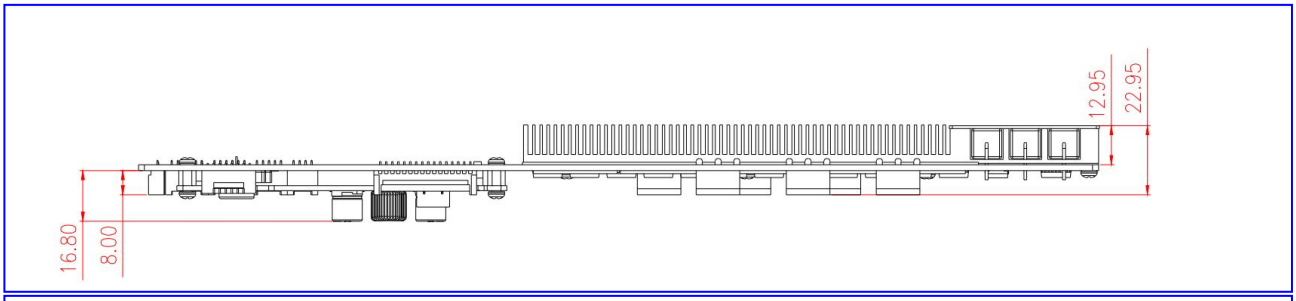


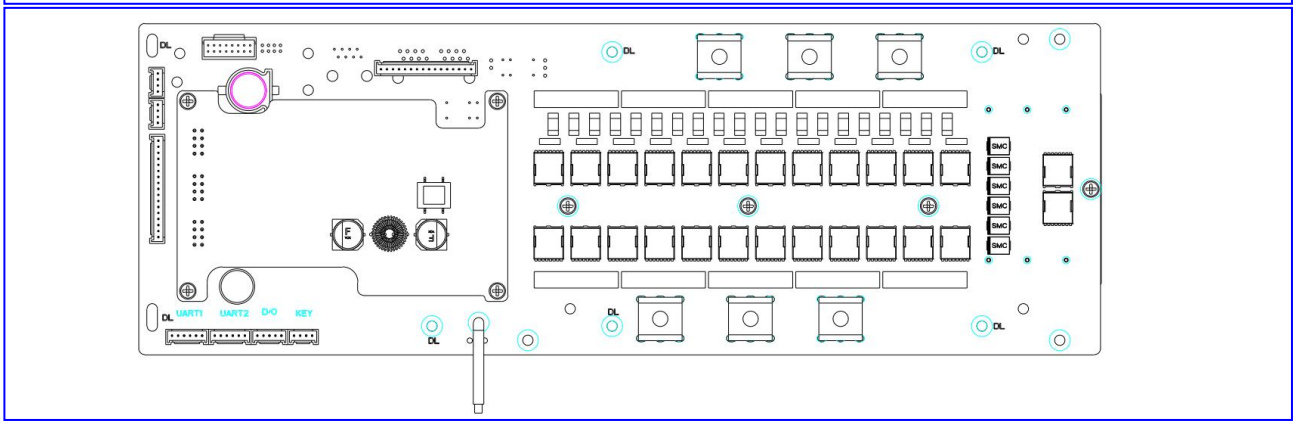




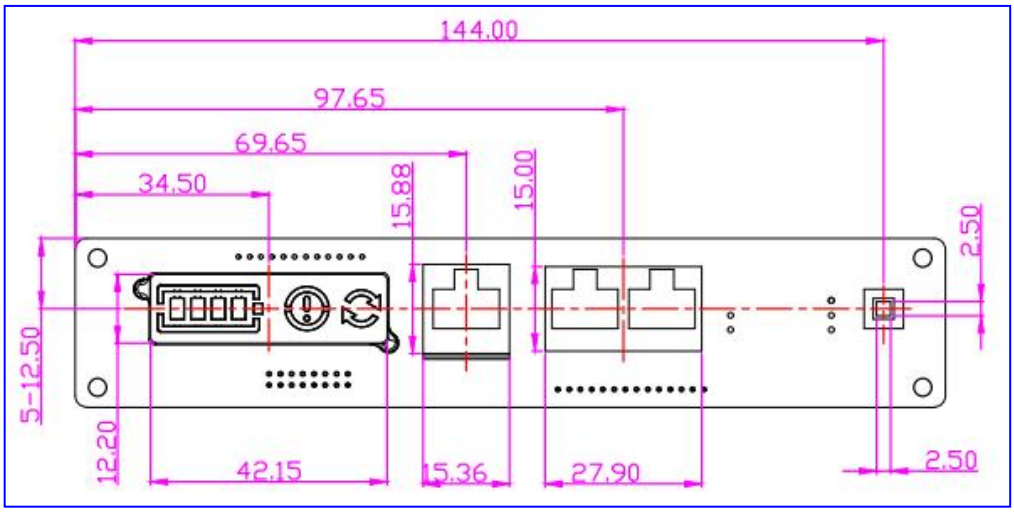
分离式（不带干接点） Split（without dry contact）

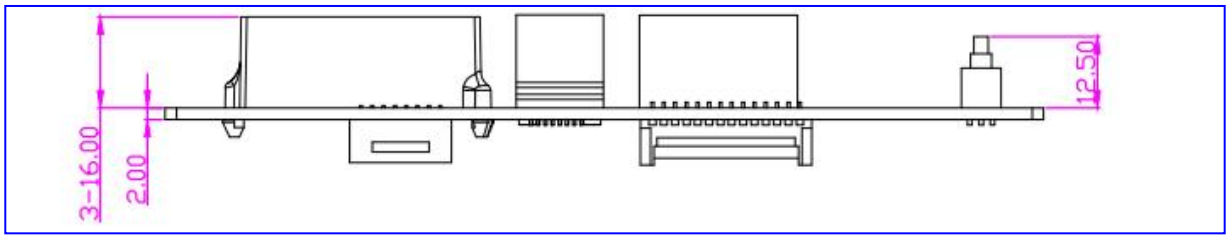


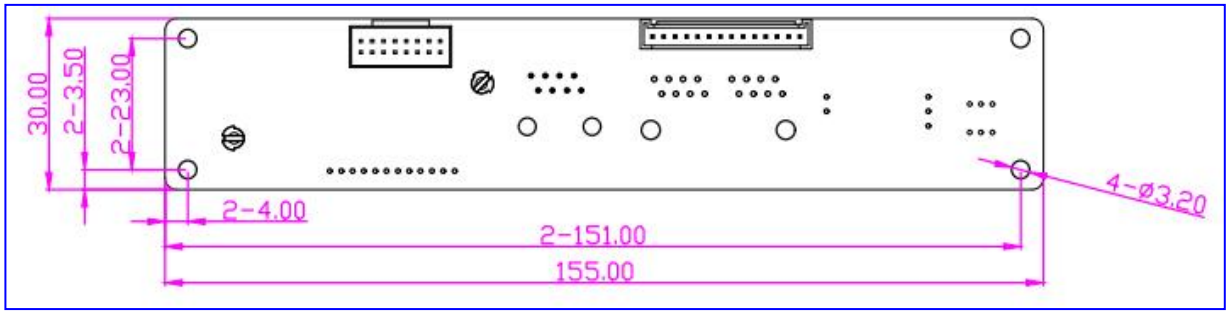




分离式接口板（不带干接点）Separated interface board（without dry contact）

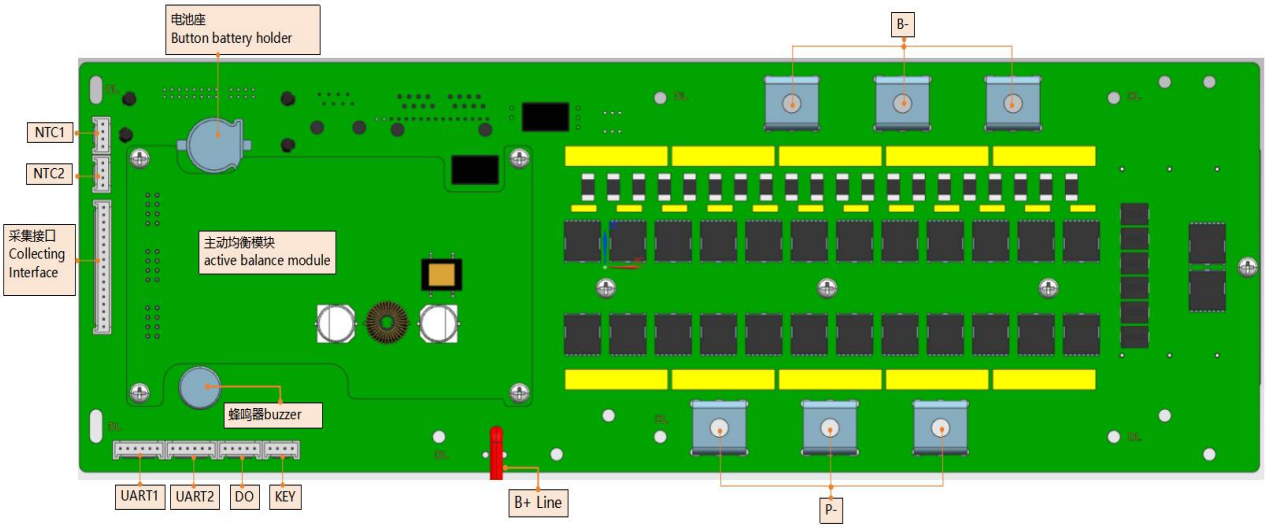


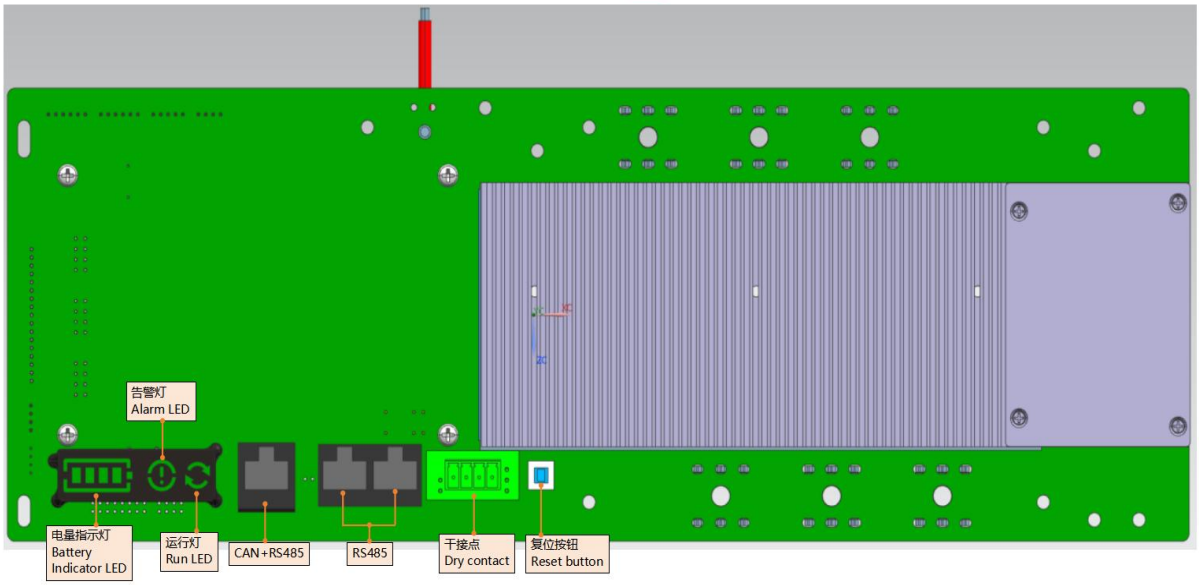




14. 接口定义 Interface definition

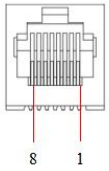
14.1 接口示意图 Interface schematic diagram



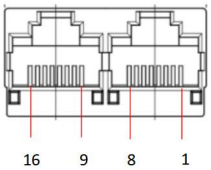


14.2 RJ45 网口 RJ45 network port

外部通讯 External communication	
引脚 pin	定义 Definition
1	485B1
2	485A1
3	ISO_GND
4	CAN1_H
5	CAN1_L
6	GND
7	485A1
8	485B1



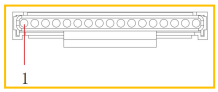
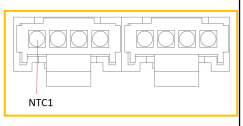
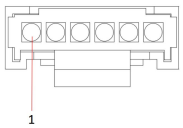
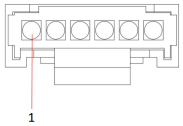
内部通讯并联接口 Internal communication parallel interface			
引脚 pin	定义 Definition	引脚 pin	定义 Definition
1	485B2	9	485B2
2	485A2	10	485A2
3	ISO_GND	11	ISO_GND
4	DI+	12	DO+
5	DI-	13	DO-
6	ISO_GND	14	ISO_GND
7	485A2	15	485A2
8	485B2	16	485B2

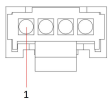
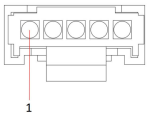
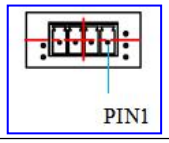


14.3 B-/P-/B+接口 B-/P-/B+ interface

接口名称 Interface name	引脚 Pin	定义 Definition	说明 Instructions
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 charging and discharging negative terminal of the protection board is connected to the charging and discharging negative terminal
B+接口 B+interface	/	B+	电芯、PACK 正极，用来给 BMS 供电；功率正极 P+直接接电芯正极 Battery cell, PACK positive electrode, used to supply power to BMS; The positive power terminal P+ is directly connected to the positive electrode of the cell

14.4 其它接口 Other interfaces

接口名称 Interface name	引脚 Pin	定义 Definition	说明 Instructions	接口规格 Interface spec	引脚示意图
采集接口 Collecting interface	1	B0	接第 1 节电池负级 Connect to the negative stage of the first battery	PHB2.0 （串数+1）pin 带扣 PHB2.0 （Strings+1）pin with buckle	
	2	B1+	接第 1 节电池正级 Connect to the positive stage of the first battery		
	3	B2+	接第 2 节电池正级 Connect to the positive stage of the second battery		
	...	...	接最后 1 节电池正级 Connect to the positive stage of the last battery		
NTC 接口 1 NTC interface 1	1	NTC1	1#温度线 1# temperature cable	PHB2.0 4pin	
	2	GND	地 GND		
	3	GND	地 GND		
	4	NTC2	2#温度线 2# temperature cable		
NTC 接口 2 NTC interface 2	5	NTC3	3#温度线 3# temperature cable		
	6	GND	地 GND		
	7	GND	地 GND		
	8	NTC4	4#温度线 4# temperature cable		
UART 接口 1 UART interface 1	1	GND	地 GND	PHB2.0 6pin	
	2	3.3	供电电源 3.3V Power supply 3.3V		
	3	12	12V 正极输出 12V positive output		
	4	S1	激活按键 Activate key		
	5	TX	通讯发送端 Communication sending terminal		
	6	RX	通讯接收端 Communication receiver		
UART 接口 2 UART interface 2	1	GND	地 GND	PHB2.0 6pin	
	2	3.3	供电电源 3.3V Power supply 3.3V		
	3	12	12V 正极输出 12V positive output（可改 5V can be changed to 5V）		
	4	S1	激活按键 Activate key		
	5	TX	通讯发送端 Communication sending terminal		
	6	RX	通讯接收端 Communication receiver		

钥匙开关接口 Key switch interface	1	TRIG+	钥匙开关正极 Key switch positive pole	PHB2.0 4pin	
	2	12	供电电源 12V Power supply 12V		
	3	GND	地 GND		
	4	TRIG-	钥匙开关负极 Key switch negative electrode		
DO 接口 DO interface	1	3.3	供电电源 3.3V Power supply 3.3V	PHB2.0 5pin	
	2	GND	地 GND		
	3	TBD	TBD		
	4	GND	地 GND		
	5	3.3	供电电源 3.3V Power supply 3.3V		
干接点 Dry contact	干接点 1 Dry contact 1		PIN1 to PIN2：常开，低电量闭合 PIN1 to PIN2: Open normally and close at low power		
	干接点 2 Dry contact 2		PIN3 to PIN4：常开，故障 保护时闭合 PIN3 to PIN4: Open normally and closed during fault protection		

15.主要线材说明 Main cable description

线材名称 Name of cable	默认规格 Default specification	数量 Qty	备注 remark
B-线 B- cable	双端导线_3512_6AWG_150mm_蓝色(B-)_SC25-5 端子 Double-ended wire 3512 6AWG 150mm blue (B-) SC25-5 terminal	3pcs	选配 Option
C-/P- 线 C-/P- cable	双端导线_3512_6AWG_150mm_黑色(P-)_SC25-5 端子 Double-ended conductor _3512_6AWG_150mm_ Black (P-)_SC25-5 terminal	1pcs	选配 Option
B+ 线 B+ cable	导线_14AWG_600mm_红色 Wire_ 14AWG_600mm_ red	1pcs	标配 standard config
NTC 线 NTC cable	带插头 NTC_2 路_PHB2.0_4Pin_3435_1%_24AWG_650mm With plug NTC _2pcs_ PHB2.0_4Pin_3435_1%_24AWG_650mm	2pcs	标配 standard config
RJ45（RS485）转 USB 线 RJ45 (RS485) to USB cable	转换器_DL-USB 转 RS485_RJ45-8P_1000mm Converter _DL-USB to RS485_ Glue _RJ-45-8P_1000mm	1pcs	选配 Option
钥匙开关线 Key switch cable	连接线_4Pin_PHB2.0_船型开关_24AWG_红黑线_450mm_带扣 Connecting cable_4pin_PHB2.0_Ship switch_24AWg_Red and black cable_450mm_ Buckle	1pcs	标配 standard config
采集线 Collection cable	参考：17. 采集线 VS 串数 Collection cables VS strings Refer to：17. 采集线 VS 串数 Collection cables VS strings	1pcs	标配 standard config
接口板连接线 1 Interface board cable 1	连接线_16Pin 转 14pin_PHB2.0_24AWG_300mm_带扣_R16L 接拓展板 Cable_16pin change to 14pin_phb2.0_24awg_300mm_ Buckle _R16L Expansion plate	1pcs	接口板标配 Standard config of interface board
接口板连接线 2 Interface board cable 2	连接线_2×8Pin_PHB2.0 双排_24AWG_300mm_R16L 接拓展板 Cables _2×8Pin_PHB2.0 Two rows _24AWG_300mm_R16L Connect expansion boards	1pcs	接口板标配 Standard config of interface board

16.可选配件说明 Optional accessories description

配件 accessories	默认规格（含线束）Default specification（Include cables）	数量 Qty	备注 remark
3.5 寸显示屏 3.5-inch display screen	显示屏_DL-A3.5L_3.5 寸显示屏(V0.1/PHB2.0) Display screen DL-A3.5L 3.5-inch display screen (V0.1/PHB2.0)	1pcs	选配 Option

4.3 寸显示屏 4.3-inch display screen	显示屏_DLP4.3C_4.3 寸带触摸+彩色显示屏_PHB2.0 Display screen: DLP4.3C 4.3-inch with touch + color display screen PHB2.0	1pcs	选配 Option
WIFI 模块 WIFI module	WIFI 模块_DL-APP 专用_注胶_Φ37×6.5_带按键_达锂 LOGO_PHB2.0 连接线带扣 WIFI module _DL-APP dedicated _ Glue _ Φ 37 × 6.5_ with keys _ Lithium LOGO_PHB2.0 cable buckle	1pcs	选配 Option
蓝牙模块 Bluetooth	蓝牙模块_注胶_Φ37×6.5_不带按键(低功耗防水/PHB2.0) Bluetooth Module _ Glue _Φ37×6.5_ Without keys (low-power waterproof /PHB2.0)	1pcs	选配 Option
加热模块 Heating module	加热模块_40×63×12mm(V4.1/连接线 PHB2.0) Heating module 40×63×12mm(V4.1/ Connecting wire PHB2.0)	1pcs	
主动均衡模块 Active balancing module	家储 2A 主动均衡模块 Home Storage 2A Active Balancing Module	1pcs	选配 Option

17. 采集线 VS 串数 Collection cables VS strings

串数 Strings	采集线规格 collecting cable specification	采集线抽线 collecting cable cutting
8	1007 24AWG L=600mm（9PIN）with buckle	/
9	1007 24AWG L=450mm（11PIN）with buckle	抽掉 11P 中最后 1P 线 cutting the last cable of the 11PIN cable
10	1007 24AWG L=450mm（11PIN）with buckle	/
11	1007 24AWG L=450mm（13PIN）with buckle	抽掉 13P 中最后 1P 线 cutting the last cable of the 13PIN cable
12	1007 24AWG L=450mm（13PIN）with buckle	/
13	1007 24AWG L=450mm（14PIN）with buckle	/
14	1007 24AWG L=450mm（15PIN）with buckle	/
15	1007 24AWG L=450mm（16PIN）with buckle	/
16	1007 24AWG L=800mm（17PIN）with buckle	/
采集线接口规格 collecting cable interface specification：PHB2.0 （n+1）pin with buckle		

n=电池串数；n=Strings

18.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

19. 注意事项 Precautions

①不同电压平台的保护板不能混用；Protection boards of different voltage platforms cannot be mixed;

②不同厂家的排线不通用，请确保使用我们公司配套排线；Different manufacturers of wiring is not common, please make sure to use our company matching wiring;

③在测试、安装、接触和使用保护板时，要做好放静电措施；When testing, installing, touching and using the protection board, take measures to discharge static electricity;

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 make the heat dissipation surface of the protection plate contact the battery directly, otherwise the heat will be transferred to the battery, affecting the safety of the battery;

⑤不可自行拆卸、更改保护板元器件；Do not disassemble, change the protection board components;

⑥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 protection board is abnormal, please stop using it and use it again after the problem is solved.

⑦勿将 B-和 P-接反，否则可能会烧板；Do not reverse the B- and P- connections, otherwise the board may be burned.

修订记录 Revision record

日期 Date	版本号 Ver.	修订说明 Revision note	制定人 Made by	核准人 authorizer
2026/03/16	A0	初版发行 Initial release	Mo Yepeng	Yang Weihao
2026/04/03	A1	删除 1A 主动均衡模块相关信息	Mo Yepeng	Yang Weihao
2026/04/13	A2	变更温度检测精度 Update Temperature detection accuracy	Mo Yepeng	Yang Weihao