

产品规格承认书

Product Specification Approval

产品名称 (Product Name)	智能板 8~16 串 100~200A 同口带均衡 Smart BMS 8-16S 100-200A common port with balance	
产品型号 (Product Number)	DL-R16L TJ-V3.3	
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)
莫业鹏	杨伟涛	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; 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		

Product revision record

[illegible]



目录 Content

产品规格承认书 Product Specification Approval	1
产品修订记录 Product revision record	2
1. 简介 Brief introduction	5
2. 产品选型 Product Selection	5
3. 系统框图 System chart	6
4. 技术参数 Technical parameter	6
4.1 充放电与均衡 Charge&Discharge and equalization	6
4.2 过充保护 over-Charge protection	7
4.3 过放保护 over-Discharge protection	8
4.4 过流保护 over-current protection	9
4.5 短路保护 Short circuit protection	10
4.6 高温保护 High temperature protection	10
4.7 低温保护 Low temperature protection	11
4.8 环境温度保护 Environment temperature protection	11
4.9 MOS 温度保护 MOS temperature protection	12
4.10 压差告警 voltage difference alarm	12
4.11 温差告警 temperature difference alarm	12
4.12 其它 others	13
4.13 可靠性参数 Reliability parameter	13
5. LED 指示说明 LED indication	14
5.1 LED 闪动说明 LED Flash Instructions	14
5.2 SOC 说明 SOC Instructions	15



6. 复位按钮说明 Reset button description	15
7. 蜂鸣器逻辑 Buzzer logic	15
8. 参数配置说明 Parameter configuration description	16
9. 休眠与唤醒 Sleep and wake up	16
9.1 休眠 Sleep	16
9.2 唤醒 wake up	16
10. 通讯说明 Communication instructions	17
10.1 外部通讯 External communication	17
10.2 内部通信 Inner Communication	17
11. 逆变器通讯 Inverter communication	17
12. 尺寸图参考 Dimensional drawing reference	18
13. 接口定义 Interface definition	23
13.1 RJ45 网口 RJ45 network port	23
13.2 B-/C-/B+接口 B-/C-/B+ interface	23
13.3 其它接口 Other interfaces	24
14.主要线材说明 Main cable description	25
15.主要配件说明 Description of main parts	26
16. 采集线 VS 串数 Collection cables VS strings	26
17. 接线说明 Cable connection instructions	27
18. 注意事项 Precautions	28

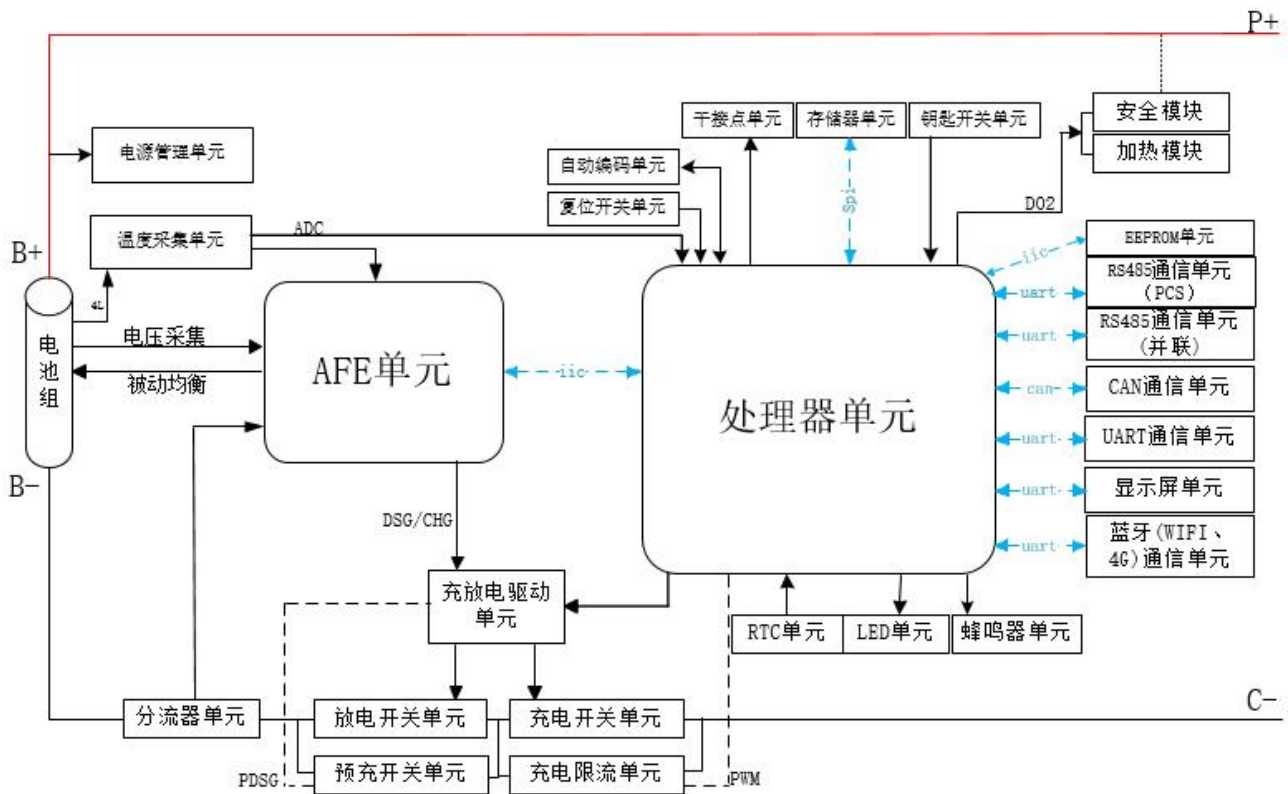
1. 简介 Brief introduction

- 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. 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
放电电流 Discharge current	☐ 100A					☐ 200A			
干接点 Dry contact	☐ 有/Yes					☐ 无/No			
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			
WIFI/Bluetooth/GPS	☐ WIFI		☐ Bluetooth		☐ GPS		☐ 无/No		
显示屏 Display	☐ 有/Yes					☐ 无/No			
外部通讯线 External communication cable	☐ 485 RJ45 cable			☐ UART RJ45 cable			☐ 无/No		

3. 系统框图 System chart



4. 技术参数 Technical parameter

4.1 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		出厂默认参数 Factory default parameters		单位 Unit
		三元 Li-ion	铁锂 LiFePO4	
放电 Discharge	额定放电电流 Rated discharge current	100/200		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	100/200		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			
被动均衡功能 Passive equalization function	均衡开启电压 balance turn-on voltage	4.0	3.4	V
	均衡开启压差 Equalize the opening voltage difference	20		mV
	均衡电流 Balance current	150 ± 30		mA
	均衡开启条件 Equilibrium on condition 1.达到设定均衡开启压差 Reach the set balanced opening voltage difference 2.达到设定均衡开启电压 Reach the set balanced start voltage			

4.2 过充保护 over-Charge protection

检测内容 Test content		出厂默认参数		单位 Unit
		Factory default parameters		
		三元 Li-ion	铁锂 LiFePO4	
单体过充告警 Single Cell over-charge alarm	单体过充告警电压 Single Cell over-charge alarm voltage	4.2±0.05	3.6±0.05	V
	单体过充告警延时 Single Cell over-charge alarm delay	1±0.8		S
	单体过充告警解除电压 Single Cell discharge alarm release voltage	4.1±0.05	3.5±0.05	V
单体过充保护 Single Cell over-charge protection	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
单体过充保护解除 Single Cell over-charge protection release	单体过充保护解除电压 Single Cell over-charge protection release voltage	4.1±0.05	3.5±0.05	V
	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
	备注：解除电压+SOC 96%需同时满足； 或者解除电压+放电电流 > 1A 同时满足，临时强开充电 MOS； 解除电压+放电电流 > 1A 同时满足，加上无充电电流&充电电压，可以直接解除保护； Note: Release voltage +SOC 96% must be met at the same time; Or discharge voltage + discharge current > 1A is met at the same time, temporary strong charge MOS; Discharge voltage + discharge current > 1A meets at the same time, plus no charging current & charging voltage, you can directly remove the protection;			
总压过充告警 Overall overcharge alarm	总体过充告警电压 Overall overcharge alarm voltage	=4.15*n±0.8	=3.55*n±0.8	V
	总体过充告警延时 Overall overcharge alarm delay	1±0.8		S
	总体过充告警解除电压 Overall overcharge alarm release voltage	= (4.15*n-1) ±0.8	= (3.55*n-1) ±0.8	V
总压过充保护 Overall overcharge protection	总体过充保护电压 Overall overcharge protection voltage	=4.2*n±0.8	=3.6*n±0.8	V
	总体过充保护延时 Overall overcharge protection delay	1±0.8		S
总压过充保护解除 Overall overcharge protection release	总体过充保护解除电压 Overall overcharge protection release voltage	= (4.2*n-1) ±0.8	= (3.6*n-1) ±0.8	V
	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
	备注：解除电压+SOC 96%需同时满足； 或者解除电压+放电电流 > 1A 同时满足，临时强开充电 MOS； 解除电压+放电电流 > 1A 同时满足，加上无充电电流&充电电压，可以直接解除保护； Note: Release voltage +SOC 96% must be met at the same time; Or discharge voltage + discharge current > 1A is met at the same time, temporary strong charge MOS; Discharge voltage + discharge current > 1A meets at the same time, plus no charging current & charging voltage, you can directly remove the protection;			



4.3 过放保护 over-Discharge protection

检测内容 Test content		出厂默认参数		单位 Unit
		Factory default parameters		
		三元 Li-ion	铁锂 LiFePO4	
单体过放告警 Single Cell discharge alarm	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
	单体过放保护 Single Cell over-discharge protection	单体过放保护电压 Single Cell over-discharge protection voltage	2.7±0.05	
单体过放保护延时 Single Cell over-discharge protection delay		1±0.8		S
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				
单体过放保护解除 Single Cell over-discharge protection release		2.9±0.05		V
总压过放告警 Overall discharge alarm	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
	总压过放保护 Overall discharge protection	总体过放保护电压 Overall discharge protection voltage	=2.75*n±0.8	
总体过放保护延时 Overall discharge protection delay		1±0.8		S
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				
总压过放保护解除 Overall discharge protection release		总体过放保护解除电压 Overall discharge protection release voltage	=（2.75*n+1）±0.8	

4.4 过流保护 over-current protection

检测内容 Test content		出厂默认参数 Factory default parameters	单位 Unit
放电过流保护 Discharge over-current Level protection	放电过流一级告警电流 Discharge over-current Level 1 alarm current	105±3/210±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	110±3/220±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	150±5/300±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 2、充电解除：充电电流 > 1A 达到任一条件可解除 1. 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, charge release: charging current > 1A Meet any condition can be released		
	充电过流一级告警电流 Charge over-current Level 1 alarm current	105±3/210±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	110±3/220±7	A
充电过流保护 Charge over-current protection	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	150±5/300±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 1、5min 后自动解除充电限流并打开 mos，持续监测是否继续触发过流； 2、放电解除：放电电流 > 1A 1. After 5min, the charge limit will be automatically lifted and mos will be turned on to continuously monitor whether overcurrent will continue to be triggered. 2, discharge discharge: discharge current > 1A		

4.5 短路保护 Short circuit protection

检测内容 Test content		出厂默认参数 Factory default parameters	单位 Unit
短路保护 Short circuit protection	短路保护电流 Short-circuit protection current	1000/2000	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 Short-circuit protection release:		
	移除负载解除/充电解除 Remove Load release/charge release		

4.6 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
充电高温保护 Charging high temperature protection	充电高温告警 Charging high temperature alarm	55±2	°C
	充电高温告警延时 Charging high temperature alarm delay	1±0.8	S
	充电高温告警释放 Charging high temperature alarm release	50±2	°C
	充电高温保护 Charging high temperature protection	60±2	°C
	充电高温保护延时 Charging high temperature protection delay	1±0.8	S
	充电高温保护释放温度 Charging high temperature protection release	55±2	°C
	放电高温告警温度 Discharge high temperature alarm	60±2	°C
	放电高温告警延时 Discharge high temperature alarm delay	1±0.8	S
放电高温保护 Discharge high temperature protection	放电高温告警解除 Discharge high temperature alarm release	55±2	°C
	放电高温保护 Discharge high temperature protection	65±2	°C
	放电高温保护延时 Discharge high temperature protection delay	1±0.8	S
	放电高温保护释放 Discharge high temperature protection release	60±2	°C

4.7 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
充电低温保护 Charge low temperature protection	充电低温告警温度 Charge low temperature alarm	5±2	°C
	充电低温告警延时 Charge low temperature alarm delay	1±0.8	S
	充电低温告警解除 Charge low temperature alarm release	10±2	
	充电低温保护 Charge low temperature protection	0±2	°C
	充电低温保护延时 Charge low temperature protection delay	1±0.8	S
	充电低温释放温度 Charge low temperature protection release	5±2	°C
放电低温保护 Discharge low temperature protection	放电低温告警 Discharge low temperature alarm	-15±2	°C
	放电低温告警延时 Discharge low temperature alarm delay	1±0.8	S
	放电低温告警解除 Discharge low temperature alarm release	-10±2	°C
	放电低温保护 Discharge low temperature protection	-25±2	°C
	放电低温保护延时 Discharge low temperature protection delay	1±0.8	S
	放电低温保护释放温度 Discharge low temperature protection release	-20±2	°C

4.8 环境温度保护 Environment temperature protection

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

4.9 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
MOS 温度保护 MOS temperature protection	MOS 高温告警 MOS high temperature alarm	95±2	°C
	MOS 高温告警解除 MOS high temperature alarm release	90±2	°C
	MOS 高温保护 MOS high temperature protection	100±2	°C
	MOS 高温保护解除 MOS high temperature protection release	65±2	°C

4.10 压差告警 voltage difference alarm

检测内容 Test content		出厂默认参数 Factory default parameters	单位 Unit
压差告警 voltage difference alarm	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

4.11 温差告警 temperature difference alarm

检测内容 Test content		出厂默认参数 Factory 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	°C
	温差一级告警恢复 temperature difference level 1 alarm release	7±2	°C
	温差二级告警 temperature difference level 2 alarm	15±2	°C
	温差二级告警恢复 temperature difference level 2 alarm release	12±2	°C

4.12 其它 others

检测内容 Test content		出厂默认参数 Factory default parameters		单位 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
消耗电流 current consumption	工作时自耗电电流 Self-consuming electrical current during operation	≤60	带显示屏 With display	mA
		≤45	不带显示屏 Without display	mA
	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
通讯方式 communication mode	☑UART ☑CAN ☑485 ☐232			
重量 weight	540±100g			

4.13 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：≤3%FSR Current detection accuracy: ≤3%FSR 电压检测精度：≤15mV Voltage detection accuracy: ≤15mV 温度检测精度：≤2℃（常温下） Temperature detection accuracy: ≤2℃（normal temperature） SOC 精度(≤5%@50%容量量程以上) SOC accuracy (≤5%@50% capacity range or above)
2	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
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% ~ 90%RH Relative humidity :5% ~ 90%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% ~ 90%RH Relative humidity :5% ~ 90%RH

5. 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
							
关机或休眠 Power Off Or 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					触发二级保护, 请连上位机查看故障信息采取相应措施 Secondary protection has been triggered. Connect the host computer to check the fault information and take appropriate measures
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					过放保护, 请给电池充电 Over-discharge protection, please charge the battery
	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

5.1 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

5.2 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

6. 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.

7. 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

8. 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;

9. 休眠与唤醒 Sleep and wake up

9.1 休眠 Sleep

当满足以下任意一条件时，系统进入休眠模式：

- 1) 单体或总体过放保护 30 秒内仍未解除。
- 2) 按下按键（3~6S），松开按键后。
- 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。

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。

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

- 1) Monomer or overall overrelease protection is not removed within 30 seconds.
- 2) Press the button (3~6S) and release the button.
- 3) At the same time, no communication, no protection, no balance, no current, and the duration reaches the sleep delay time.

Before entering sleep mode, ensure that no external voltage is connected to the input terminal. Otherwise, the sleep mode cannot be entered.

9.2 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：

- 1) 接入充电器/负载。
- 2) 按下按键，松开按键后。
- 3) 具 485、CAN 通讯 激活。

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；

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

- 1) Plug in charger/load.
- 2) Press the button and release the button.
- 3) With 485, CAN communication activation.

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;

10. 通讯说明 Communication instructions

10.1 外部通讯 External communication

RJ45 单网口集成了 RS485、UART、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, UART, 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.

10.2 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.

11. 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。

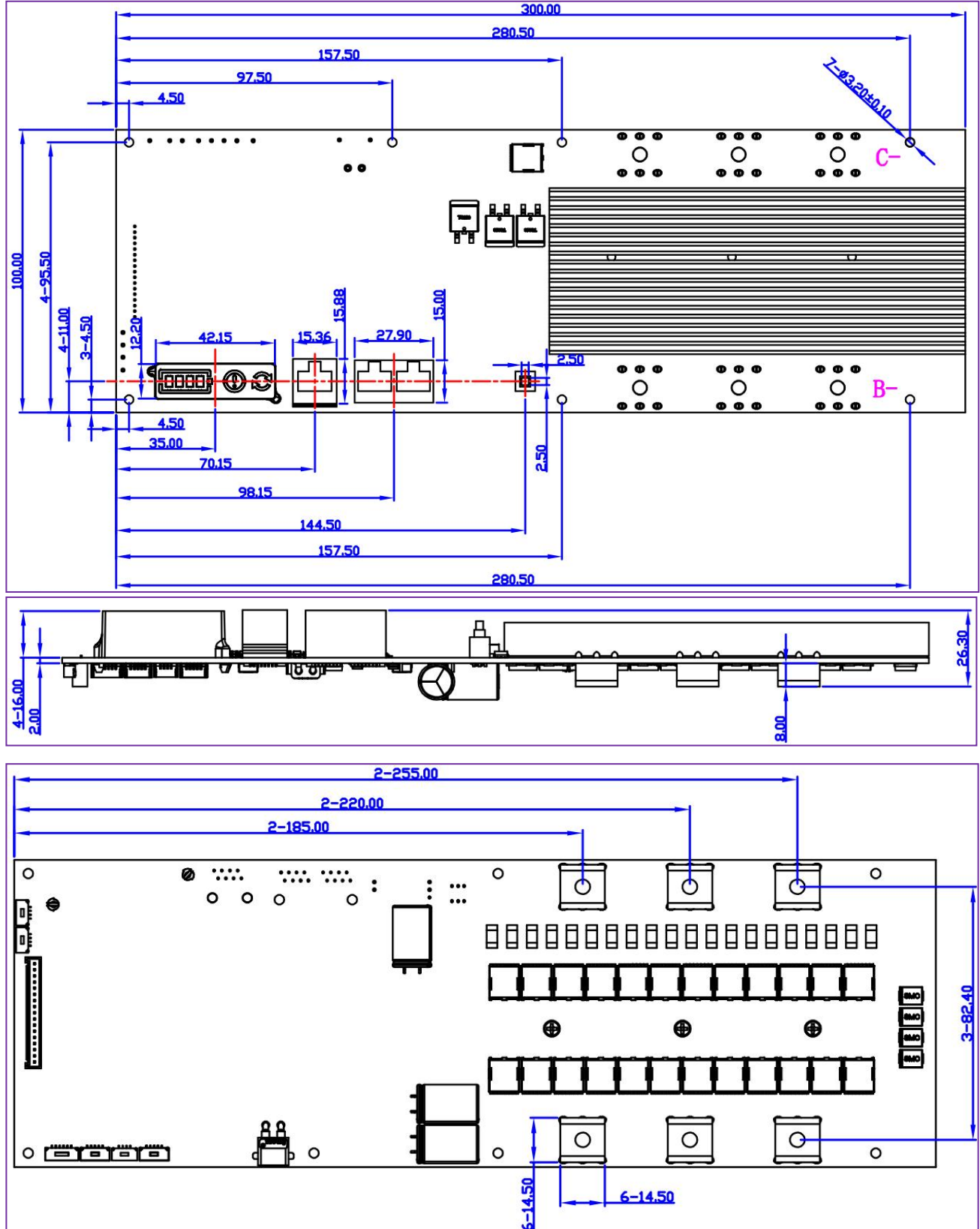
The protection board supports the inverter protocols of RS485, and CAN communication interfaces. The engineering mode of the upper computer can be selected.

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	Voltronic	日月元协议	
RS485 协议 RS485 Protocol	Growatt	古瑞瓦特协议	
RS485 协议 RS485 Protocol	SOLAX	艾罗协议	
RS485 协议 RS485 Protocol	LTW	力通威协议	
RS485 协议 RS485 Protocol	PV3500	MUST 协议	
RS485 协议 RS485 Protocol	SRNE	硕日协议	
RS485 协议 RS485 Protocol	BAYKEE	航天柏克	
RS485 协议 RS485 Protocol	Local	问鼎协议	
CAN 协议 CAN Protocol	GOODWE	固德威协议	
CAN 协议 CAN Protocol	Growatt	古瑞瓦特协议	
CAN 协议 CAN Protocol	SOLAX	艾罗协议	
CAN 协议 CAN Protocol	SOFAR	首航协议	
CAN 协议 CAN Protocol	LUXPower	鹏程协议	
CAN 协议 CAN Protocol	PV1800F	MUST 协议	
CAN 协议 CAN Protocol	LTW	力通威协议	
CAN 协议 CAN Protocol	Victron	威通协议	
CAN 协议 CAN Protocol	PYLONTECH	中兴派能协议	德业协议
CAN 协议 CAN Protocol	SOROTEC	索瑞德协议	
CAN 协议 CAN Protocol	SOALARFAM	SOALARFAM	
CAN 协议 CAN Protocol	Local	问鼎协议	

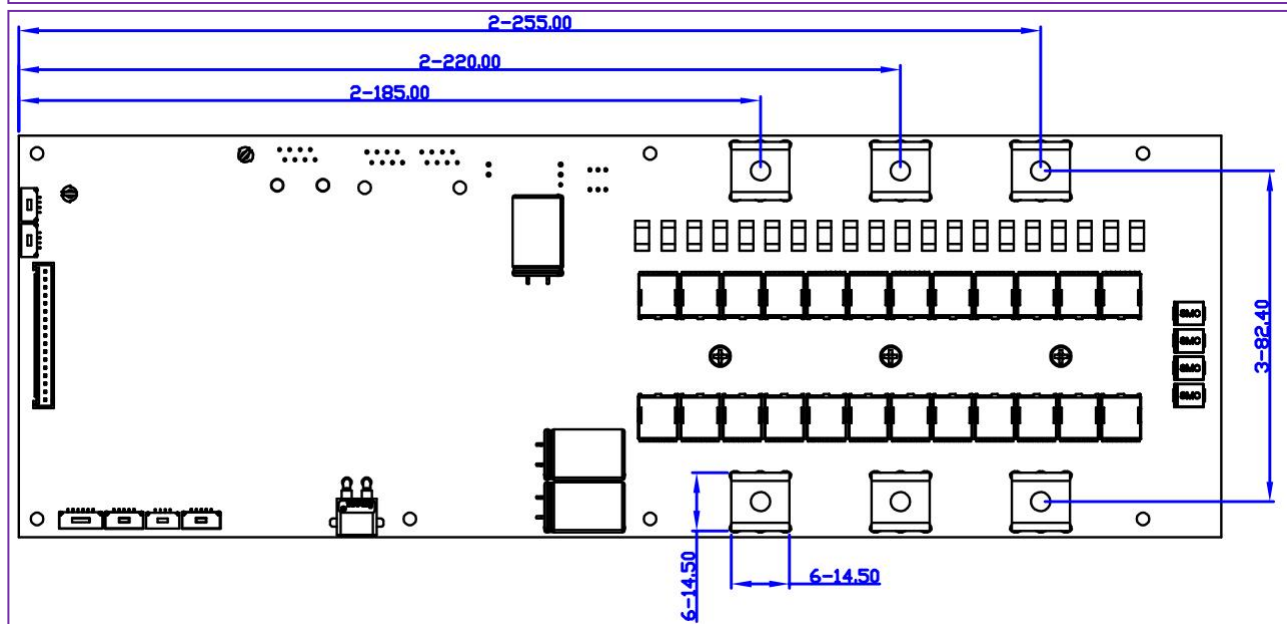
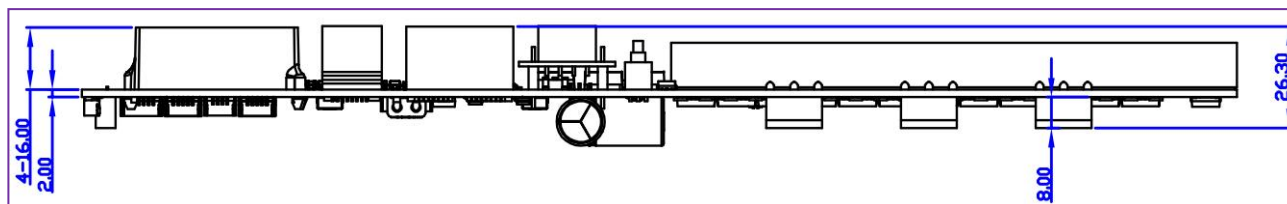
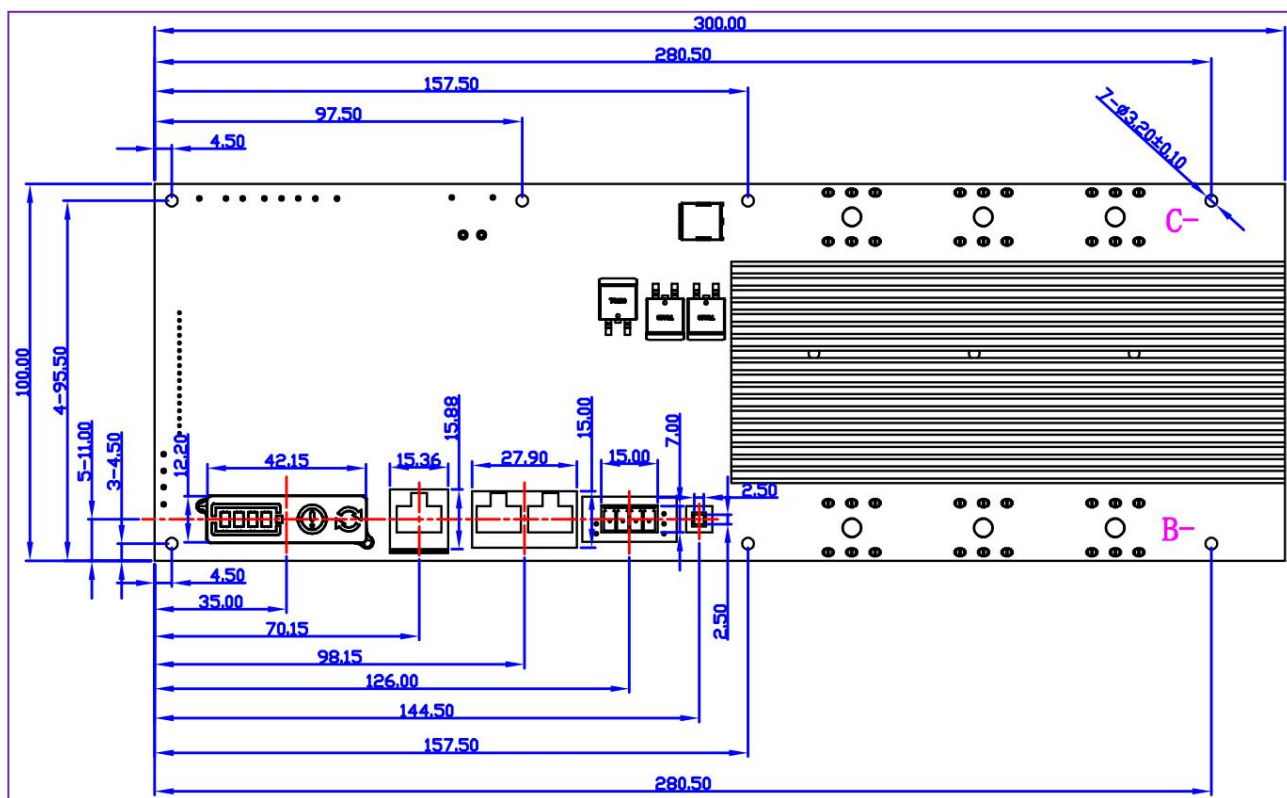
12. 尺寸图参考 Dimensional drawing reference

BMS 尺寸 Dimensions of the BMS	长*宽*高 (mm) Long * Width * High (mm) 300*100*26.3
---------------------------------	---

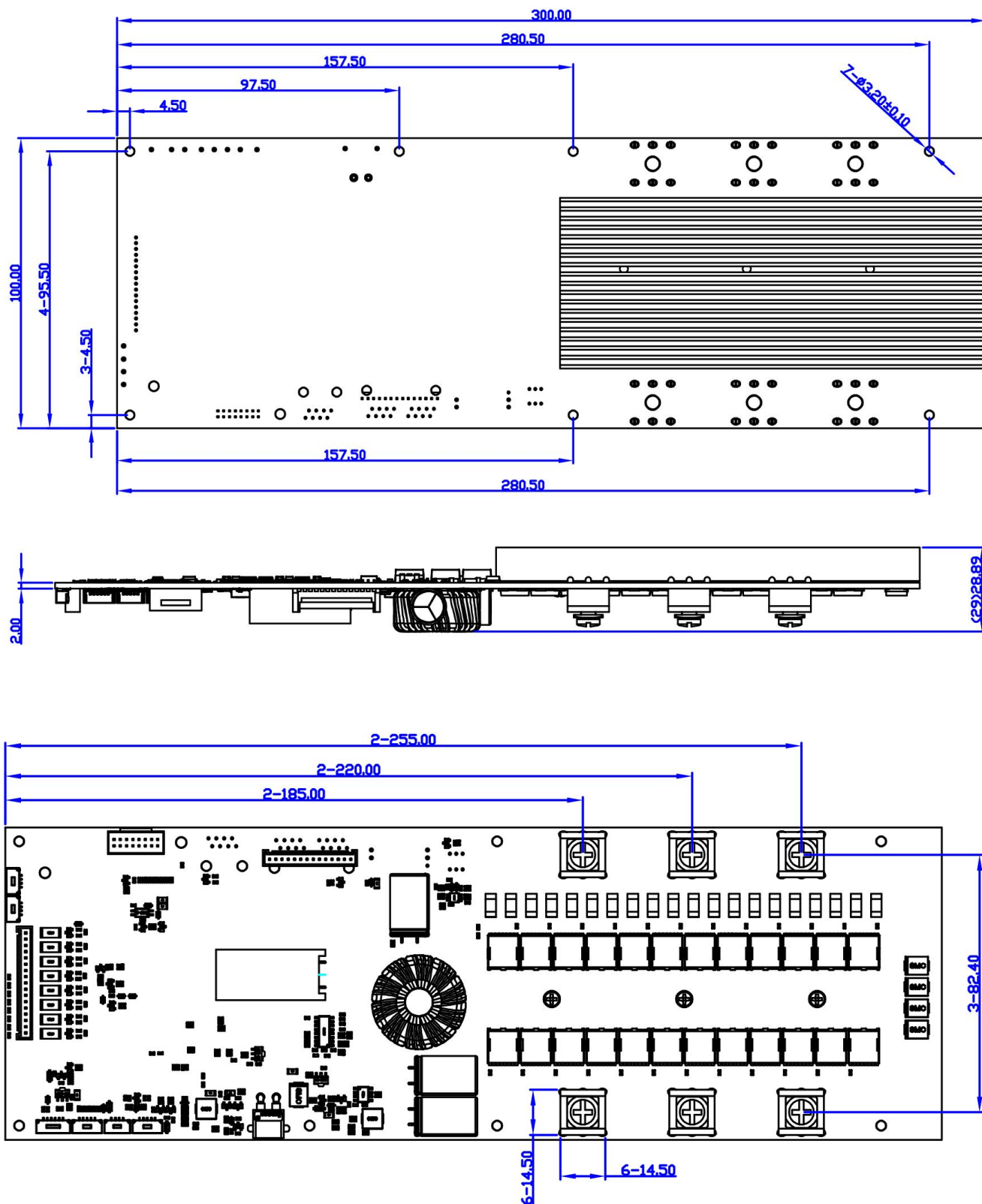
一体式 (不带干接点) Integrated (without dry contact)



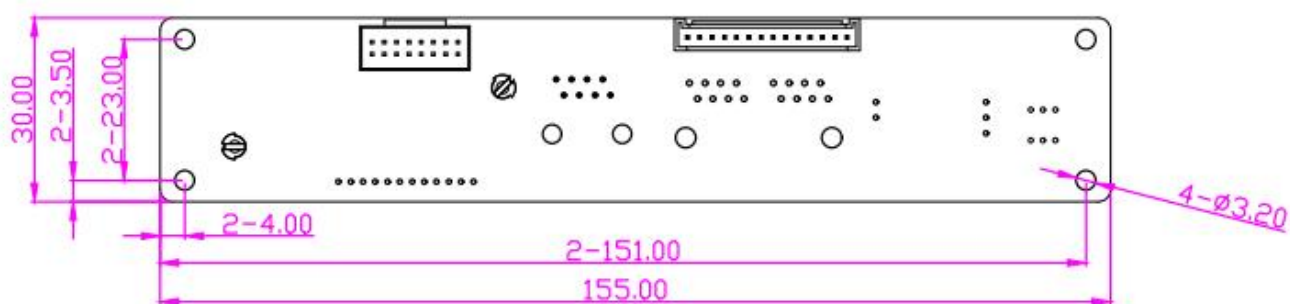
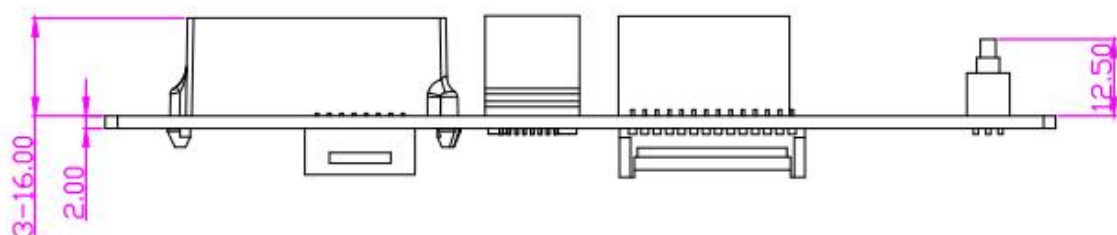
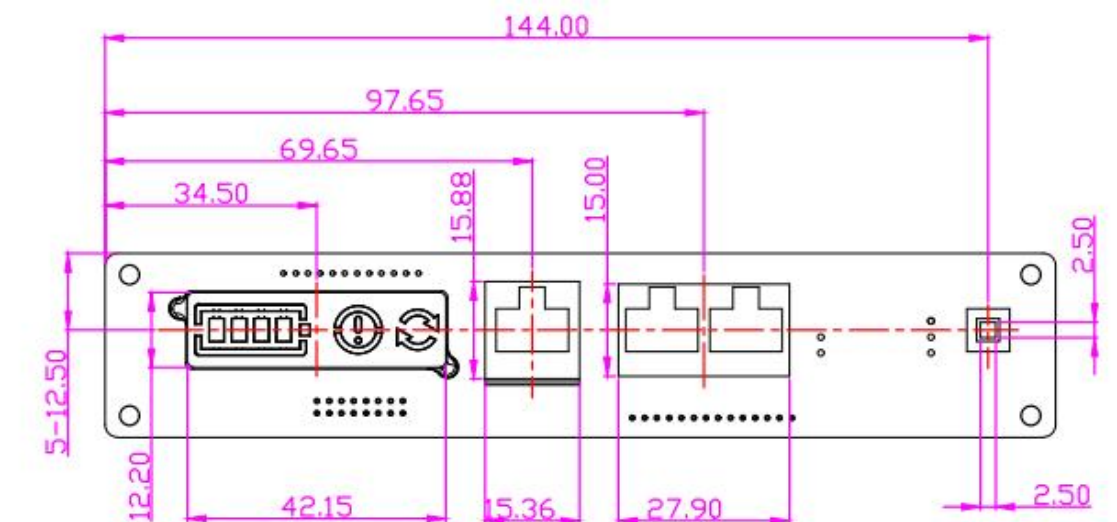
一体式（带干接点） Integrated （with dry contact）



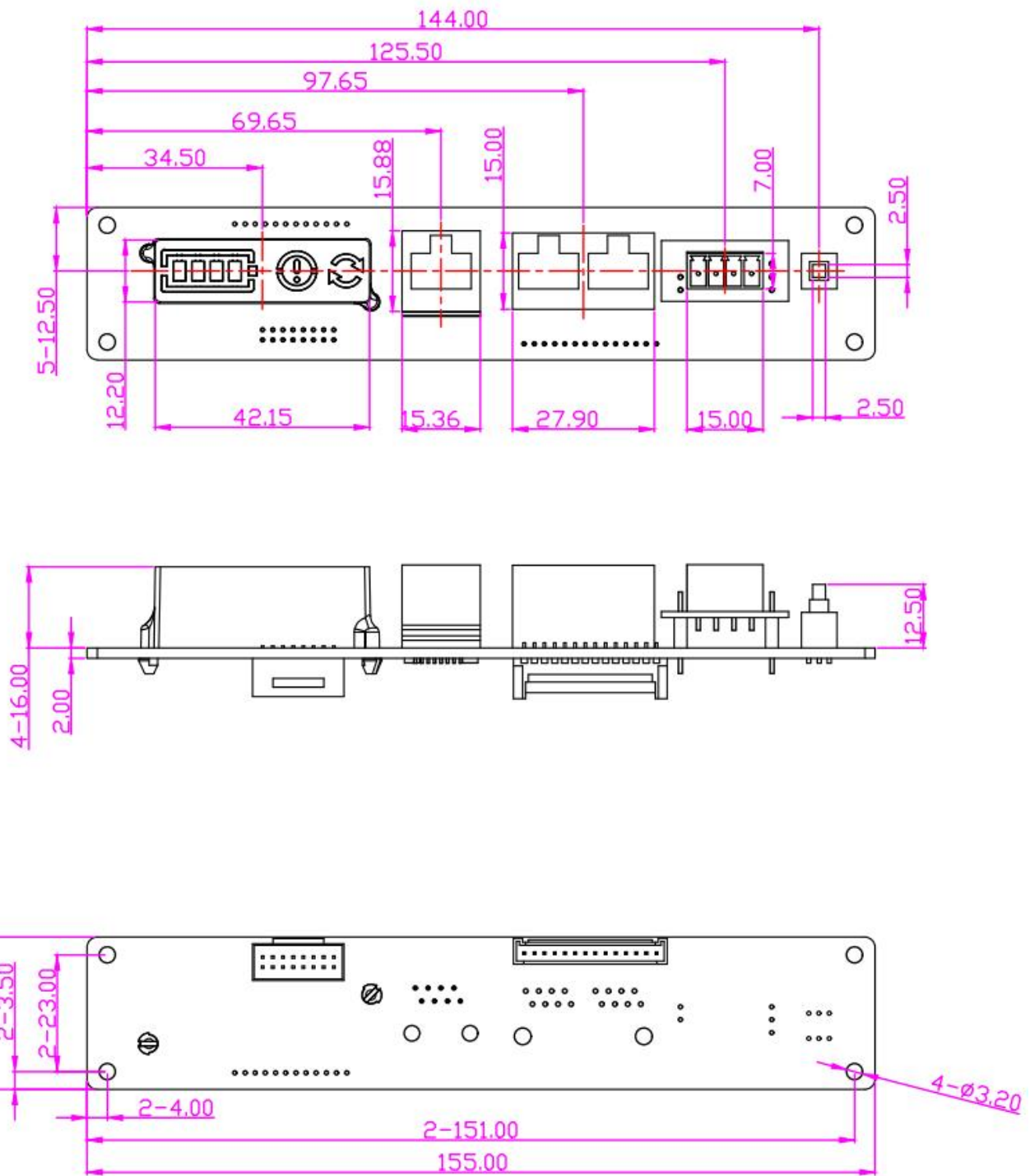
分离式主板 Separated Main Board



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

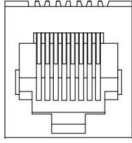


分离式接口板（带干接点） Separated ——interface board (with dry contact)

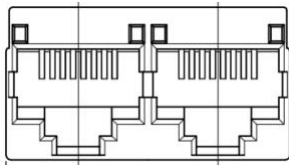


13. 接口定义 Interface definition

13.1 RJ45 网口 RJ45 network port



外部通讯 (RJ45 单网口) External communication (RJ45 single network port)	
引脚 pin	定义 Definition
1	485B1
2	485A1
3	ISO_GND
4	CAN1_H
5	CAN1_L
6	GND
7	TX
8	RX



内部通讯并联接口 (RJ45 双网口) Internal communication parallel interface (RJ45 double network port)			
引脚 pin	定义 Definition	引脚 pin	定义 Definition
1	485B2	1	485B2
2	485A2	2	485A2
3	ISO_GND	3	ISO_GND
4	TBD	4	TBD
5	TBD	5	TBD
6	ISO_GND	6	ISO_GND
7	485A2	7	485A2
8	485B2	8	485B2

13.2 B-/C-/B+接口 B-/C-/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
C-接口 P-interface	/	C-	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



13.3 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
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	GH1.25 4pin
	2	GND	地 GND	
	3	NTC2	2#温度线 2# temperature cable	
	4	GND	地 GND	
NTC 接口 2 NTC interface 2	1	NTC3	3#温度线 3# temperature cable	
	2	GND	地 GND	
	3	NTC4	4#温度线 4# temperature cable	
	4	GND	地 GND	
UART 接口 UART interface	1	GND	地 GND	GH1.25 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	
钥匙开关接口 Key switch interface	1	TRIG+	钥匙开关正极 Key switch positive pole	GH1.25 4pin
	2	TBD	TBD	
	3	TBD	TBD	
	4	TRIG-	钥匙开关负极 Key switch negative electrode	
LCD 接口 LCD interface	1	12V+	12V 正极输出 12V positive output	GH1.25 5pin
	2	TX	通讯发送端 Communication sending terminal	
	3	5V+	5V 正极输出 5V positive output	
	4	RX	通讯接收端 Communication receiver	
	5	GND	电源输出负极 Power output negative	
DO 接口 DO interface	1	TBD	TBD	GH1.25 5pin
	2	TBD	TBD	
	3	TBD	TBD	
	4	GND	地 GND	
	5	3.3	供电电源 3.3V Power supply 3.3V	

14.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- Line	100A: 双端导线_3512_7AWG_150MM_蓝色(B-)_SC16-5 端子 100A: Double-ended wire 3512 7AWG 150MM blue (B-) SC16-5 terminal 200A: 双端导线_3512_6AWG_150mm_蓝色(B-)_SC25-5 端子 200A: Double-ended wire 3512 6AWG 150mm blue (B-) SC25-5 terminal	100A: 2pcs 200A: 3pcs	选配 Option
C- /P- 线	100A: 双端导线_3512_7AWG_150MM_黑色(P-)_SC16-5 端子 100A: Double-ended conductor _3512_7AWG_150MM_ Black (P-) _SC16-5 terminal 200A: 双端导线_3512_6AWG_150mm_黑色(P-)_SC25-5 端子 200A: Double-ended conductor _3512_6AWG_150mm_ Black (P-) _SC25-5 terminal	100A: 2pcs 200A: 3pcs	选配 Option
B+ 线 B+ Line	输出线_并联模块-15A_B+线_XT30U-F+14AWG Output cable_Parallel module -15A_B+ cable_XT30U -F+14AWG	1pcs	标配 standard config 长/length: 600mm
NTC 线 NTC Line	带插头 NTC_2 路_GH1.25_4Pin_3435_1%_28AWG_250mm With plug NTC _2pcs_ GH1.25_4Pin_3435_1%_28AWG_250mm	2pcs	标配 standard config
RJ45 (RS485) 转 USB 线 RJ45 (RS485) to USB Line	转换器_DL-USB 转 RS485_注胶_达锂 LOGO_RJ45-8P_1000mm Converter _DL-USB to RS485_ Glue _ Lithium LOGO_RJ-45-8P_1000mm	1pcs	选配 Option
RJ45 (UART) 转 USB RJ45 (UART) to USB Line	转换器_DL-USB 转 UART_注胶_达锂 LOGO_RJ45-8P_1000mm Converter _DL-USB to Uart_ Glue _ up to lithium LOGO_RJ-45-8P_1000mm	1pcs	选配 Option
钥匙开关线 Key switch Line	连接线_4Pin_GH1.25_船型开关_26AWG_红黑线_450mm_打胶_带扣 Connecting cable_4pin_GH1.25_Ship switch_26AWg_Red and black cable_450mm_Glue _Buckle	1pcs	标配 standard config
采集线 Collection Line	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 Line 1	连接线_14Pin_PHB2.0_24AWG_300mm_打胶_带扣_R16L 接拓展板(V3.3) Cable_14pin_phb2.0_24awg_300mm_gluing _Buckle _R16L Expansion plate (V3.3)	1pcs	接口板标配 Standard config of interface board
接口板连接线 2 Interface board Line 2	连接线_2×8Pin_PHB2.0 双排_24AWG_300mm_R16L 接拓展板(V3.3) Cables _2×8Pin_PHB2.0 Two rows _24AWG_300mm_R16L Connect expansion boards (V3.3)	1pcs	接口板标配 Standard config of interface board

15.主要配件说明 Description of main parts

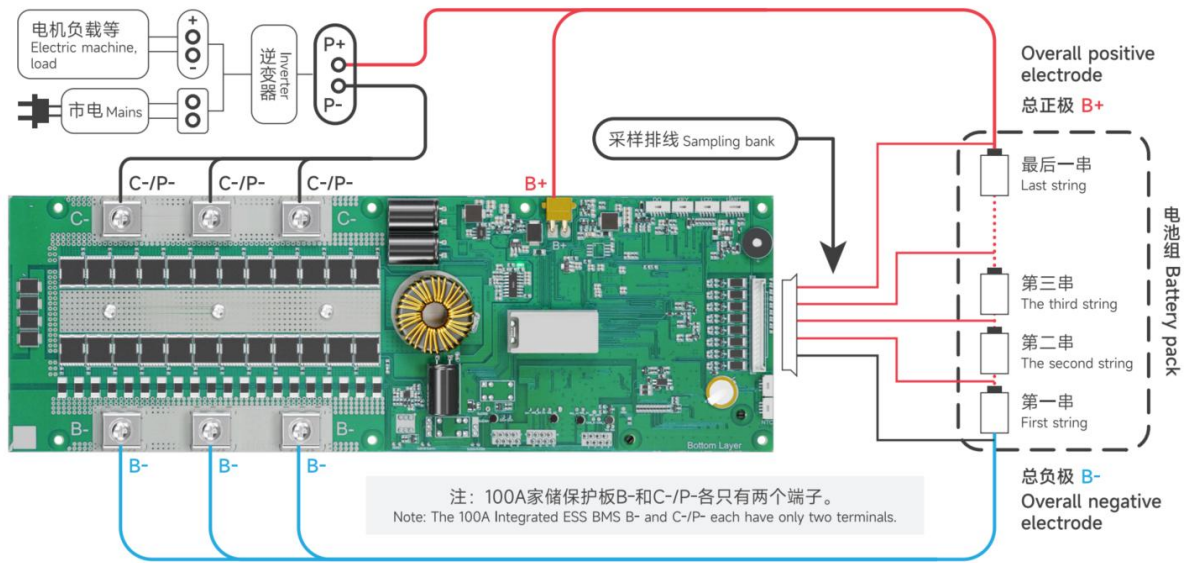
配件名称 parts name	默认规格 Default specification	数量 Qty	备注 remark
LCD	显示屏_DL-KDDBB08_3.2 寸显示屏_蓝底白字_GH1.25 Display DL-KDDBB08 3.2 inch display GH1.25 in white on blue background	1pcs	选配 (含线束) Option (Include cables)
WIFI 模块 WIFI module	WIFI 模块_DL-APP 专用_注胶_Φ37×6.5_带按键_达锂 LOGO_GH1.25 连接线带扣 WIFI module _DL-APP dedicated _ Glue _ Φ 37 × 6.5_ with keys _ Lithium LOGO_GH1.25 cable buckle	1pcs	选配 (含线束) Option (Include cables)
蓝牙模块 Bluetooth	蓝牙模块_注胶_Φ37×6.5_不带按键_达锂 LOGO_中英文(低功耗防水/GH1.25) Bluetooth Module _ Glue _ Φ 37 × 6.5_ Without keys _ Lithium LOGO_ Chinese and English (low-power waterproof /GH1.25)	1pcs	选配 (含线束) Option (Include cables)
加热模块 Heating module	加热模块_40×63×12mm_V4.1_GH1.25 Heating module 40 x 63 x 12mm V4.1GH1.25	1pcs	选配 (含线束) Option (Include cables)
安全模块 Safety module	安全模块_AQM Safety module AQM	1pcs	选配 (含线束) Option (Include cables)

16. 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=450mm (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=450mm (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

17. 接线说明 Cable connection instructions



- 先将保护板 B- 用动力线接到电池组总负极；

First connect the protection board B- with the power cable to the total negative electrode 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，使用线序检测器检测排线连接正确后再把排线插入保护板；

Start with a thin black wire connecting B-, connect the second wire to the first series of positive battery terminals, and then connect the positive terminals of each series of batteries in turn; Use the wire sequence detector to check that the cables are correctly connected, and then insert the cables into the protection board.

- 插上 NTC 线，最后用 B+ 线将电池组正极与 BMS B+ 接口相连接；

Plug in the NTC cable. Finally, the positive electrode of the battery pack is connected to the BMS B+ interface with the B+ cable.

- 以上线完成后即可唤醒 BMS 正常工作；否则请按照上面重新操作；

Wake up BMS after the above cable is completed & works normally; Otherwise, please follow the above operations again;

- 拆卸保护板时，先拔排线，再拆动力线 B-。

When removing the protection board, remove the power cable B-. If there are two protection boards, remove the high and voltage cables first, and then the low voltage cables.



18. 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，要做好防静电措施；

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.