东莞市嘉佰达电子科技有限公司

DONG GUAN JIABAIDA ELECTRONICS TECHNOLOGY.CO.,LTD

产 品 规 格 书

Product specification

客户名（CUSTOMER）：	
产品名（SAMPLE NAME）：	4 串 50~150A 铁锂控负同口硬件板
产品型号（MODEL NAME）：	JBD-CP04S024-铁锂系列
呈送日期（DATE）：	2025-04-15
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客户签名盖章（SIGNATURES）：

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1.产品简介(Product introduction)

JBD-CP04S024 是专门针对小储能电池、路灯、12V 铅酸换锂电等产品 4 串电池包而设计的硬件保护板方案，可适用不同化学性质的锂电芯，如三元锂、磷酸铁锂等。该产品支持掉线保护功能。

JBD-CP04S024 is a hardware protection board scheme specially designed for 4 series battery packs of small energy storage batteries, street lamps, 12V lead acid for lithium batteries and other products. It can be applied to lithium batteries with different chemical properties, such as lithium ternary, lithium iron phosphate, etc. The product supports the drop line protection function.

2.功能配置(Configuration)

功能(Function)	配置(Configuration)	功能(Function)	配置(Configuration)
支持串数 (Number of strings supported)	(4S) for option	开关功能 (Switch function)	选配 (Optional)
持续电流 (Maximum continuous current)	(50-150A) for option	加热膜功能 (Heating function)	不支持 (Not supported)
温度监测 (Temperature detection)	1 路内置温控，1 路外置 NTC (1 interna temperature controll,1 external NTC)	充放电低温保护 （Undertemperature Charge and discharge protection）	支持 (supported)
均衡功能 (Balance Function)	被动均衡 (Passive balance)	断线保护功能 (Wire breakage protection function)	支持 (supported)
低压禁止充电功能 （Low voltage charging prohibition function）	有，小于 1.5V 不能充电（Yes, it cannot be charged if it is less than 1.5V）	二次保护功能 (Secondary protection)	不支持 (Not supported)
电池组并联 (Battery packs in parallel)	选配 (Optional)	电池组串联 (Battery packs in series)	选配 (Optional)

CAUTION

The UART interface (non-isolated) can not be supported to communicate with chargers or loads.

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3.参数设置(Parameter Setting)

3.1.基本参数(Basic parameter)

电芯规格(Cell specifications)	4 串铁锂(4 strings of $LiFePO_4$ battery)
接口类型(Interface type)	控制负极\充放电同口(Control negative\Charge and discharge are both at the same port)
充电电压(Charging voltage)	3.60V*串数(3.60V*Number of strings)
单体电压范围(Cell voltage range)	2.30~3.65V
持续充电电流(Continuous charging current)	≤150A
持续放电电流(Continuous discharging current)	≤150A
运行功耗(Consumption of running)	≤60uA
回路内阻(Circuit resistance)	≤10mΩ
工作温度(Operating temperature)	-30℃~75℃
保护板结构尺寸(Structure size of PCB)	
尺寸(size)	144±1mm * 85±1mm * 10±2mm (长度*宽度*高度) (Length*Width*Height)

注：测试需在温度 25±2℃，相对湿度 65±20% 的环境

Note: Test should be at temperature25±2°C, and relative humidity 65±20% of surroundings.

3.2.主要参数(Main parameter)

	项目(Project)	规格(Specification)			单位 (Unit)
		最小值 MIN	典型值 TYP	最大值 MAX	
过压和欠压保护 (Over-voltage and Under-voltage protection)	过充保护电压(Over-voltage)	3.620	3.650	3.680	V
	过充保护延时(Over-voltage delay)	500	1000	1500	mS
	过充保护释放(Over-voltage release)	3.500	3.550	3.600	V
	过放保护电压(Under-voltage)	2.220	2.300	2.380	V
	过放保护延时(Under-voltage delay)	500	1000	1500	mS
	过放保护释放(Under-voltage release)	2.600	2.700	2.800	V
	过放保护释放条件 (Under-voltage release conditions)	过放恢复值恢复\充电恢复 Overdischarge recovery value recovery\Charging recovery			
	充电过流保护值 (Over-current Charge protection value)	见下面过流保护值配置表 (Refer to configuration table of over-current protection value below)			A
	充电过流延时 (Over-current Charge delay)	200	500	800	mS
	充电过流释放条件 (Over-current Charge release conditions)	断开充电器 Disconnect the charger			
	一级放电过流保护值 (1st Over-current Discharge value)	见下面过流保护值配置表 (Refer to configuration table of over-current protection value below)			A
	一级放电过流保护延迟 (1st Over-current Discharge delay)	50	200	350	mS
	二级放电过流保护电流值 (2nd Over-current Discharge value)	见下面过流保护值配置表 (Refer to configuration table of over-current protection value below)			A
	二级放电过流保护延迟时间 (2nd Over-current Discharge delay)	5	20	35	mS
	放电过流保护恢复条件 (Over-current Discharge release)	断开负载后延时 10±5S 自动释放或充电解除 After disconnecting the load, the automatic release or charging release will be delayed by 10 ± 5 seconds			
短路保护 (Short Circuit Protection)	短路保护电流 (Short circuit protection current value)	见下面过流保护值配置表 (Refer to configuration table of over-current protection value below)			A
	短路保护延迟时间 (Short circuit protection delay time)	100	350	600	uS
	短路保护恢复 (Short circuit protection recovery)	断开负载后延时 10±5S 自动释放或充电解除 After disconnecting the load, the automatic release or charging release will be delayed by 10 ± 5 seconds.			
	短路功能测试条件：外接短路电阻小于 80 毫欧空开测试（Short circuit protection function test condition:external load<80mR,connect air switch for test。				
	短路说明 1：用我司内部电芯测试有短路保护，批量前请客户端务必提供实际应用电池组做短路测试，建议按实际应用环境进一步评估。(Short-circuit description: Use our internal battery cells to test for short-circuit protection. Before bulk production, please ensure that the client provides the actual application battery pack for short-circuit testing. It is recommended to further evaluate according to the actual application environment.)				
	短路说明2：短路电流小于最小值或高于最大值可能会造成短路保护失效，短路电流超过3500A，不保证有短路保护，也不建议做短路保护测试。(Short-circuit description: The short-circuit current is less than the minimum value or higher than the maximum value, which may cause the short-circuit protection to fail, and the short-circuit current exceeds 3500A, short-circuit protection is not guaranteed, and short-circuit protection testing is not recommended.)				
温度保护 (Temperature Protection)	外置NTC 充电高温保护值 (High temperature protection value in charging)	60	65	70	℃
	外置NTC 充电高温保护释放值 (High temperature protection release value in charging)	55	60	65	℃
	外置NTC 充电低温保护值 (Low temperature protection value in charging)	-15	-10	-5	℃
	外置NTC 充电低温保护释放值 (Low temperature protection release value in charging)	-10	-5	0	℃
	外置NTC 放电高温保护值 (High temperature protection value in discharging)	70	75	80	℃
	外置NTC 放电高温保护释放值 (High temperature protection release value in discharging)	60	65	70	℃
	外置NTC 放电低温保护值 (Low temperature protection value in discharging)	-35	-30	-25	℃
	外置NTC 放电低温保护释放值 (Low temperature protection release value in discharging)	-30	-25	-20	℃

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	内置温	FET 高温保护值(high temperature protection value)	100	105	110	℃
		FET 高温保护释放值 (high temperature protection release value)	60	75	90	℃
功能 (Balance Functio	均衡开启电压(Balance function turn-on voltage)		3.475	3.525	3.575	V
	均衡电流(Balance current)		120	170	220	mA
	均衡类型(Balance type)		脉冲模式(Pulsed model)			

注：1、测试需在温度 25±2℃，相对湿度 65±20% 的环境。

Note: 1、Test should be at temperature25±2°C, and relative humidity 65±20% of surroundings.

过流保护值配置表(Over-current protection value configuration table)

持续电流 (Continuous current)		充电过流保护值 (Charge Over-current value)	一级放电过流保护值 (1st discharge Over-current value)	二级放电过流保护值 (The second discharge Over-current value)	短路保护值 (Short circuit protection value)
Charge	Discharge				
50A	50A	90±30A	225±80A	450±120A	600±150A
60A	60A	110±40A	275±100A	550±150A	800±250A
80A	80A	150±50A	375±150A	750±250A	1200±300A
100A	100A	180±60A	450±150A	900±300A	1400±400A
120A	120A	210±80A	520±200A	1040±350A	1800±500A
150A	150A	300±120A	750±300A	1500±400A	3000±600A

4.功能说明(Function Description)

4.1.过充保护和恢复(Overcharge protection and recovery)

当任意一节电芯电压高于单体过充电压设定值，并且持续时间达到单体过充延时，系统进入过充保护状态，关闭充电MOS，不能对电池充电。

单体过充保护后，当所有单体电压降到单体过充恢复值以下时，解除过充保护状态。也可放电解除。

When the voltage of any cell is higher than the set value of the cell overcharge voltage, and the duration reaches the cell overcharge delay, the system enters the overcharge protection state, the charging MOS will turn off, and the battery cannot be charged.

After the cell overcharge protection, when the voltage of all cells drops below the cell overcharge recovery value, the overcharge protection state is released. It can also be released by discharge.

4.2.过放保护和恢复(Over-discharge protection and recovery)

当最低节电压低于单体过放电压设定值，并且持续时间达到单体过放延时，系统进入过放保护状态，关闭放电 MOS，不能对电池放电。

发生单体过放保护后，对电池组充电可以解除过放保护状态。

When the minimum cell voltage is lower than the set value of the over-discharge voltage of the cell, and the duration reaches the over-discharge delay of the cell, the system enters the over-discharge protection state, turns off the discharge MOS, and cannot discharge the battery.

After the cell over-discharge protection occurs, charging the battery pack can release the over-discharge protection state.

4.3.充电过流保护和恢复(Over-current protection and recovery in charging)

当充电电流超过充电过流保护电流且持续的时间达到过流检测延迟时间，系统进入到充电过流保护状态，不能对电池进行充电。发生充电过流保护后延时自动恢复，如需不要自动恢复可将对应的释放时间设长; 放电也可以解除充电过流状态。

When the charging current exceeds the charging protection current and the duration reaches the Over-current detection delay time, the system enters the charging Over-current protection state and cannot charge the battery. After the charging Over-current protection occurs, it will automatically recover after a delay. If you want to automatically recover or not, you can set the corresponding release time to be longer; the charging Over-current state can also be released by discharging.

4.4.放电过流保护和恢复(Over-current protection and recovery in discharging)

当放电电流超过放电过流保护电流且持续的时间达到过流检测延迟时间，系统进入到放电过流保护状态，关闭放电 MOS。发生放电过流后延时自动恢复，如需不要自动恢复可将对应的释放时间设长。充电也可以解除放电过流状态。放电有两级过流保护功能，对不同的电流值具有不同的响应速度，更加可靠地保护电池。

When the discharge current exceeds the discharge Over-current protection current and the duration reaches the Over-current detection delay time, the system enters the discharge Over-current protection state and turns off the discharge MOS. Delayed automatic recovery after discharge Over-current occurs, and the corresponding release time can be set longer if automatic recovery is required. Charging can also release the discharge Over-current protect condition. Discharge has two-level Over-current protection function, which has different response speeds for different current values, and protects the battery more reliably.

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4.5.温度保护和恢复(Temperature Protection and Recovery)

4.5.1.充放电高温保护及恢复(High temperature protection and recovery in charging and discharging)

当充放电时 NTC 检测电芯表面的温度高于设定的高温保护温度时，管理系统进入高温保护状态，充电或放电 MOSFET 关闭，在该状态不能对电池包充电或放电。

当电芯表面的温度下降到高温恢复设定值时，管理系统从高温状态恢复，重新导通充放电 MOS。

When the NTC detects that the temperature of the battery cell surface is higher than the setting of high temperature protection value during charging and discharging, the management system enters the high temperature protection state, the charging or discharging MOSFET is turned off, and the battery pack cannot be charged or discharged in this state.

When the temperature of the surface of the cell drops to the high temperature recovery set value, the management system recovers from the high temperature state and turns on the charge and discharge MOS again.

4.5.2.充放电低温保护和恢复(Low temperature protection and recovery in charging and discharging)

当充放电时 NTC 检测电芯表面的温度低于设定的低温保护温度时，管理系统进入低温保护状态，充电或放电 MOSFET 关闭，在该状态不能对电池包充电或放电。

当电芯表面的温度上升到低温恢复设定值时，管理系统从低温状态恢复，重新导通充放电 MOS。

When the NTC detects that the temperature of the cell surface is lower than the setting of low temperature protection value during charging and discharging, the management system enters the low temperature protection state, the charging or discharging MOSFET is turned off, and the battery pack cannot be charged or discharged in this state.

When the temperature of the cell surface rises to the low temperature recovery set value, the management system recovers from the low temperature state and turns on the charge and discharge MOS again.

5.主要物料(Main material)

序号 (Number)	物料类型 Material type		物料名称 (Name of Material)	生产厂家 (Manufacturer)	数量 (Quantity)
1	IC		IC\CW1244AFAS\SSOP-16	赛微	1PCS
2	MOS	不支持串联	MOS 管\SMD\HYG011N04LS1TA\TOLL	华羿微	
		支持串联	MOS 管\DP038NE8T\TOLL-8	德普微	
			MOS 管\PES016N08R\TOLL-8	芯电元	
4	NTC		NTC\10K\3950\250mm\带端子\HY2.0\±1%	---	1PCS
配件(Accessories)					
1	电压检测线		5PIN\HY2.0\带卡扣\24AWG\550mm\BlackWhiteRed	---	1PCS
2	开关控制线		2PIN\HY2.0\带卡扣\24AWG\400MM\White	---	1PCS

注：以上物料可能用同等规格参数或者更好的规格参数的物料替代，如有认证需求不允许更换物料，需要通知我司业务重新送样，受控规格书，最终解释权归嘉佰达所有。

Note: The above materials may be replaced by materials with the same specifications or better specifications. If there are certification requirements, the replacement of materials is not allowed, and we need to notify our business to send samples again. The controlled specifications and the final interpretation right belongs to JBD.

6.示意图及尺寸(Schematic and Dimensions)

6.1.尺寸及安装点标注图(Dimensions and installation point drawing)

Figure of structure size

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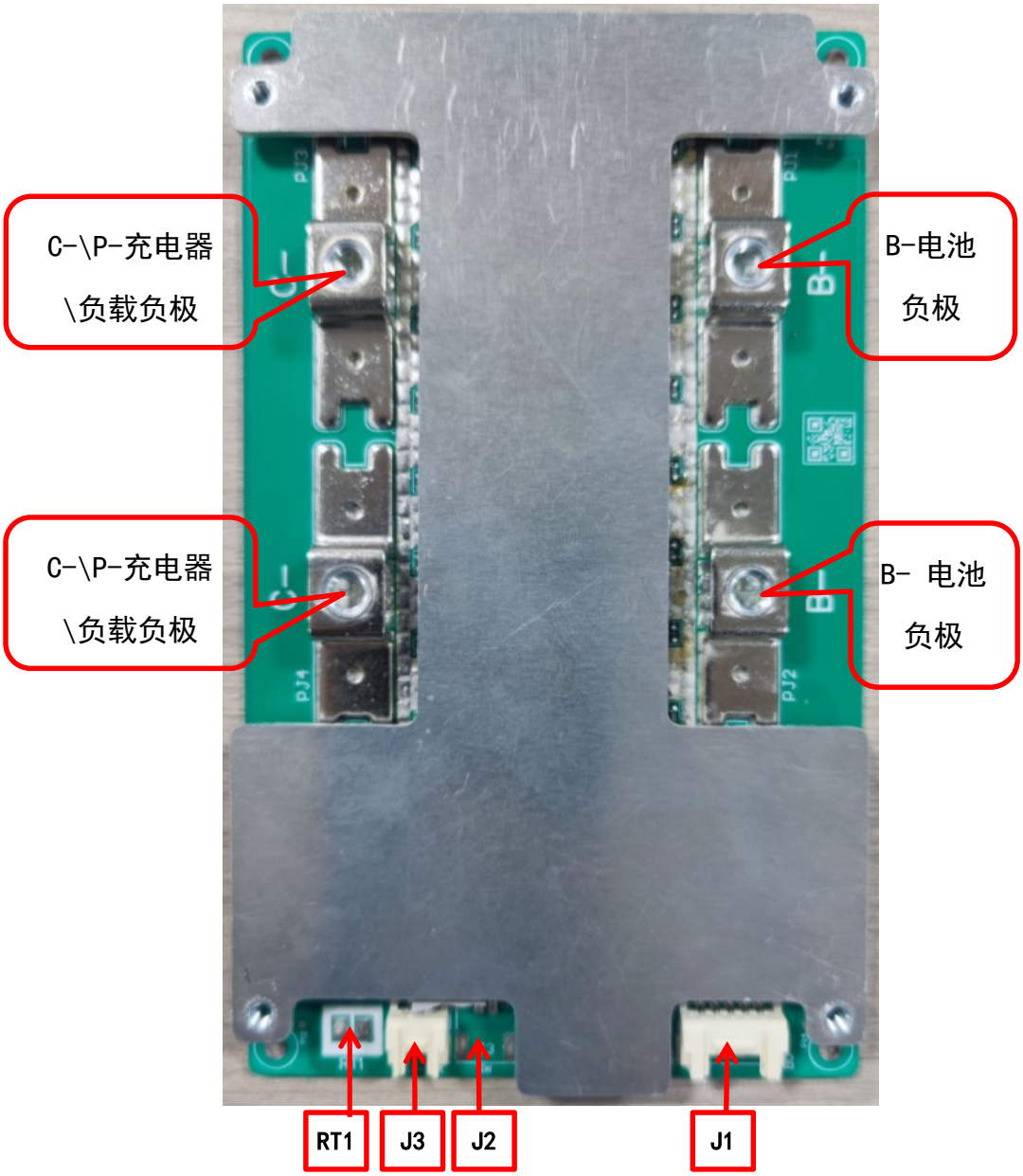
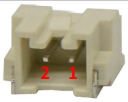
7.信号口定义(Definition of signal port)

7.1.示意图标注接口标号(Illustration annotation)



Port definition

Label	Definition	Notes
B -	接电池组负极 Negative of battery pack	M5 端子
C-\P-	接充电器、负载负极 Negative of Charger\Load	M5 端子

标号 (Label)	位号 (Tag number)	接插件功能 (Connector)	接插件示意图 (Schematic diagram)	PIN	PIN 功能定义 (Pin definition)	备注 (Note)
1	J1 (HY2.0-5P) （带卡扣）	电压检测插座 (Voltage detection)		1	接最低节电芯负极 Connect to Negative Side of Cell 1	B-
				2	接第 1 节电芯正极 Connect to Positive Side of Cell 1	
				3	接第 2 节电芯正极 Connect to Positive Side of Cell 2	
				4	接第 3 节电芯正极 Connect to Positive Side of Cell 3	
				5	接第 4 节电芯正极 Connect to Positive Side of Cell 4	BC4
3	J2 (HY2.0-2P) (带卡扣)	弱电开关 (weak current switch)		1	K+	预留
				2	K-	
4	J3 (HY2.0-2P) (带卡扣)	NTC1		1	NTC1	10k\3950
				2		
5	RT1	外置温控	焊盘	1	外置常开温控	预留
				2		

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8.环境适用性(Environmental suitability)

8.1.工作环境(The environment of working)

●BMS 保护板允许在下列条件下正常工作:

●环境温度：-30℃~75℃;

●相对湿度：5%~90%;

●大气压力：86kPa~106kPa;

●BMS The protective plate allows normal operation under the following conditions:

●Ambient temperature: -30°C~75°C;

●Relative humidity: 5%~90%;

●Atmospheric pressure: 86kPa~106kPa;

8.2.存储环境(The environment of storage)

●BMS 保护板应存储在环境温度为-5°C~+40°C、相对湿度不大于 70%、清洁通风良好的库房内，空气中不得含有腐蚀性气体及影响电气绝缘的介质，不得受任何机械冲击或重压。不受阳光直射，与热源(暖气设备等)之间的距离不得少于 2m。在以上存储条件下，BMS 保护板可存放一年。

●BMS should be stored in a clean and well-ventilated warehouse with an ambient temperature of -5°C~+40°C, a relative humidity of not more than 70%, and the air must not contain corrosive gases and media that affect electrical insulation, and must not be affected by any mechanical Shock or heavy pressure. Not subject to direct sunlight, and the distance from the heat source (heating equipment, etc.) should not be less than 2m. Under the above storage conditions, the BMS BMS can be stored for one year.

9.包装运输(Packing and shipping)

9.1.标志(Logo)

保护板应有下列清晰耐久标志:

●产品名称、型号

●电芯型号

●出厂日期及编号

The following marks should be clearly display on this product:

●Name and model of product

●Model of battery cell

●Manufacture date and number

9.2.包装(Package)

●包装应符合防潮、防振动的要求，包装箱应牢固可靠，箱内应衬有防潮材料，产品在箱内不应窜动。

●外部纸箱包装箱，单板防静电袋加气泡袋包装;

●The packaging should meet the requirements of moisture-proof and anti-vibration, the packing box should be firm and reliable, the inside of the box should be lined with moisture-proof material, and the product should not move in the box.

●External carton box, veneer anti-static bag plus bubble bag packaging;

9.3.运输(transportation)

●在运输中，产品不得受剧烈机械冲撞、暴晒、雨淋、化学腐蚀性物品及有害气体侵蚀;在装卸过程中，产品轻搬轻放，严禁摔掷、重压。

●包装箱码放高度小于 5 层。

●During transportation, the product shall not be subject to severe mechanical impact, exposure to the sun, rain, chemical corrosive substances and harmful gases; During the loading and unloading process, the product should be handled with care, and it is strictly forbidden to throw or press it.

●The height of the packing boxes shall be less than 5 layers.

All right reserved

10.注意事项(Precautions)

1.本电池管理系统常规是不能串、并联使用的，需要定制版本才支持串、并联使用。

2.本管理系统的短路保护功能适用于多种应用情景，但并不能保证可以在任意条件下短路。当电池包和短路回路的内阻值总和低于 40mΩ、电池组容量超出额定值 20%、短路电流超过 1000A、短路回路的电感非常大或者短路的导线总长度非常长时，请自行测试确定是否可以使用本管理系统。

3.焊接电池引线时，一定不可有错接或反接。如果确实已接错，这块电路板可能已损坏，需要重新测试合格后才可使用。

4.装配时管理系统不要直接接触到电芯表面，以免损坏电路板。装配要牢固可靠。

5.使用中注意引线头、烙铁、焊锡等不要碰到电路板上的元器件，否则有可能损坏本电路板。焊接本电路板请不要使用膏状助焊剂，否则有可能导致本电路板工作不正常。

6.使用过程要注意防静电、防潮、防水等。

7.使用过程中请遵循设计参数及使用条件，不得超过本规格书中的值，否则有可能损坏管理系统。

8.将电池组和管理系统组合好以后，初次上电如发现无电压输出或充不进电，请检查接线是否正确。

9.本规格书中的参数、功能和外形仅供参考，请以保护板实物为准。

1.This BMS cannot be used in series or parallel in general. It needs a customized version to support the use of series or parallel.

2.The short-circuit protection function of this management system is suitable for a variety of application scenarios, but it does not guarantee that it can be short-circuited under any conditions. When the total internal resistance of the battery pack and the short-circuit loop is lower than 40mΩ, the capacity of the battery pack exceeds the rated value by 20%, the short-circuit current exceeds 1000A, the inductance of the short-circuit loop is very large, or the total length of the short-circuit wire is very long, please test yourself to determine whether This management system can be used.

3.When soldering the battery leads, there must be no wrong or reverse connection. If it is indeed connected incorrectly, the circuit board may be damaged and needs to be re-tested before it can be used.

4.When assembling, the management system should not directly touch the surface of the cell to avoid damage to the circuit board. Assembly should be firm and reliable.

5.During use, be careful not to touch the components on the circuit board such as lead tips, soldering iron,solder, etc., otherwise the circuit board may be damaged. Please do not use paste flux when soldering this circuit board,otherwise it may cause this circuit board to work abnormally.

6.Pay attention to anti-static, moisture-proof, waterproof and so on while using this product.

7.Please follow the design parameters and conditions of use,and must not exceed the values in this specification, otherwise the management system may be damaged.

8.After the battery pack and the management system are combined, please check whether the wiring is correct if you find that there is no voltage output or charging fails when the battery is powered on for the first time.

9.The Parameter,function and outlook of BMS in this specification are for reference only,please refer to actual product.