深圳市嘉佰达电子科技有限公司

SHENZHEN JIABAIDA ELECTRONICS TECHNOLOGY.CO.,LTD

产 品 规 格 书

Product specification

嘉佰达C级-秘密

客户名（CUSTOMER）：		
产品名（SAMPLE NAME）：	7~24 串 20A~50A 硬件板	
产品型号（MODEL NAME）：	JBD-HP24SA 铁锂系列	
呈送日期（DATE）：	2022-07-20	
版本（VERSION）：	A.0	
客户签名盖章（SIGNATURES）：		
编制（compiler）	审核（Reviewer）	批准（Approver）
张万连	刘厚伟	张桥桥

修正记录(Correction record)

版本号 Version number	页码 Page number	修订人 Reviser	修订日期 Revision date	修订内容 Revised content	备注 remarks
A.0	全文	张万连	2022.07.20	全新拟制	

嘉佰达C级-秘密

1. 产品简介(Product introduction)

JBD-HP24SA 是专门针对 7~24 串锂电池包而设计的硬件保护板方案。保护参数由元器件参数固定。

JBD-HP24SA is a Hardware protection board scheme specially designed for 7~24 strings of lithium battery packs. The protection parameters are fixed by the component parameters.

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)**	7~24S	开关功能 **(Switch function)**	内置温控和外置温控和弱电开关(三选一)**(Built in temperature control and external temperature control and weak current switch)（One out of three）**
持续电流 **(Continuous current)**	20A ~50A	充电低温保护 **（Undertemperature Charge protection）**	不支持 **(Not supported)**
温控数量 **(Number of temperature control)**	1 路内置温控(标配) **（1-way external temperature control （Optional))**	充电过流保护功能（Charge overcurrent protection function）	不支持 **(Not supported)**
均衡功能 **(Balance Function)**	标配 **(Standard option)**	二次保护功能 **(Secondary protection)**	/
掉线保护功能 **（Open-Wire Detection）**	/	加热膜功能 **(Heating function)**	/
低压禁止充电功能 **（Low voltage charging prohibition function）**	不支持 **(Not supported)**		
电池组并联 **(Battery packs in parallel)**	不支持 **(Not supported)**	电池组串联 **(Battery packs in series)**	不支持 **(Not supported)**

嘉佰达C级-秘密

3. 参数设置(Parameter Setting)

3.1. 基本参数(Basic parameter)

电芯规格（Cell specifications）	7~24 串铁锂（7 ~24 strings of lithium iron batteries）
接口类型(Interface type)	充放电同口(Charge and discharge are both at the same port)
充电电压(charging voltage)	3.6V*串数(3.6V*Number of strings)
单体电压范围(Cell voltage range)	2.1~3.75V
持续充电电流(Continuous charging current)	20A~50A
持续放电电流(Continuous discharging current)	20A~50A
功耗(Consumption)	≤50uA
回路内阻(Circuit resistance)	≤20mR
工作温度(Operating temperature)	-30℃~75℃
保护板结构尺寸(Structure size of PCB)	
尺寸（size)	95±2mm * 87±2mm * 12±2mm (长度*宽度*高度) (Length*Width*Height)

注：测试需在温度 25±2°C，相对湿度 65±20% 的环境

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

嘉佰达科技一秘密

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 (Overvoltage and undervoltage protection)	过充保护电压(Overvoltage)	3.700	3.750	3.800	V
	过充保护延时(Overvoltage delay)	500	1000	1500	mS
	过充保护释放(Overvoltage release)	3.55	3.600	3.650	V
	过放保护电压(Undervoltage)	2.000	2.100	2.200	V
	过放保护延时(Undervoltage delay)	300	800	1300	mS
	过放保护释放(Undervoltage release)	2.200	2.300	2.400	V
	过放保护释放条件(Undervoltage release conditions)	断开负载或者充电恢复(Disconnect load or charge release)			
充电过流保护 (Overcurrent Charge)	充电过流保护值(Overcurrent Charge protection value)	见下面过流保护值配置表（See the configuration table of overcurrent protection value below）			
	充电过流延时(Overcurrent Charge delay)	--	--	--	mS
	充电过流释放条件(Charge over current release conditions)				
放电过流保护 (Overcurrent Discharge)	一级放电过流保护值 (1th Overcurrent Discharge)	见下面过流保护值配置表（See the configuration table of overcurrent protection value below）			
	一级放电过流保护延迟 (1th Overcurrent Discharge delay)	300	800	1300	mS
	二级放电过流保护电流值 (2th Overcurrent Discharge)	见下面过流保护值配置表（See the configuration table of overcurrent protection value below）			
	二级放电过流 2 保护延迟 (2th Overcurrent Discharge delay)	--	--	--	mS
	放电过流保护恢复条件 (Overcurrent Discharge release)	断开负载或者充电恢复(Disconnect load or charge release)			
短路保护 (Short Circuit Discharge)	短路保护电流(Short circuit protection current)	见下面过流保护值配置表（See the configuration table of overcurrent protection value below）			
	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)	断开负载或者充电恢复(Disconnect load or charge release)			
	短路说明：短路电流小于最小值或高于最大值可能会造成短路保护失效，短路电流超过2000A，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 2000A, short-circuit protection is not guaranteed, and short-circuit protection testing is not recommended.)				

工程C级 秘密

充电高温保护 Overtemperature Charge	温度保护值(Temperature protection value)	--	--	--	℃
	温度保护释放值(Temperature protection release value)	--	--	--	℃
充电低温保护 Undertemperature Charge	温度保护值(Temperature protection value)	--	--	--	℃
	温度保护释放值(Temperature protection release value)	--	--	--	℃
放电高温保护 Overtemperature Discharge	温度保护值(Temperature protection value)	--	--	--	℃
	温度保护释放(Temperature protection release value)	--	--	--	℃
	放电高温保护释放条件（Overtemperature Discharge protection release conditions）	断开负载或者充电恢复(Disconnect load or charge release)			
放电低温保护 Undertemperature Discharge	温度保护值(Temperature protection value)	---	---	---	℃
	温度保护释放(Temperature protection release value)	---	---	---	℃
FET 高温保护(内置) high temperature protection of FET(Built-in)	温度保护值(Temperature protection value)	80	85	90	℃
	温度保护释放值(Temperature protection release value)	45	60	75	℃
	放电高温保护释放条件（Overtemperature Discharge protection release conditions）	断开负载或者充电恢复(Disconnect load or charge release)			
均衡功能 (Balance Function)	均衡开启电压 (Equalization turn-on voltage)	3.55	3.60	3.65	V
	均衡电流 (Balance current)	14	24	34	mA
	均衡类型 （Balance type）	持续均衡 (Pulsed model)			

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.

深圳市嘉佰达科技有限公司 保密

3. 3. 过流保护值配置表(Overcurrent protection value configuration table)

持续电流 (Continuous current)	充电过流保护值 (Charge over current protection value)	一级放电过流保护值 (The first discharge over current protection value)	二级放电过流保护值 (The second discharge over current protection value)	短路保护值 (Short circuit protection value)
20A	/	65±30A	/	470±100A
30A	/	110A±30A	/	750±200A
40A	/	140±40A	/	930±300A
50A	/	160±40A	/	1050±300A

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 is turned 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. 放电过流保护和恢复(Discharge overcurrent protection and recovery)

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

嘉佰达C级-秘密

current values, and protects the battery more reliably.

5. 主要物料(main material)

序号 (Number)	物料名称(Name of Material)	生产厂家 (Manufacturer)	数量 (Quantity)
1	MOS 管\SMD\CRSS052N08N\TO-263	华润微	
2	IC\QFP\HY2112-CB 或 HY2212-AB\SOT23-6	宏康	
3	IC\HY2212-BB3A\SOT-23-6	宏康	
4	PCB\JBD-HP24SA\1.6mm\喷锡		
配件(Accessories)			
1		---	
2		---	

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。

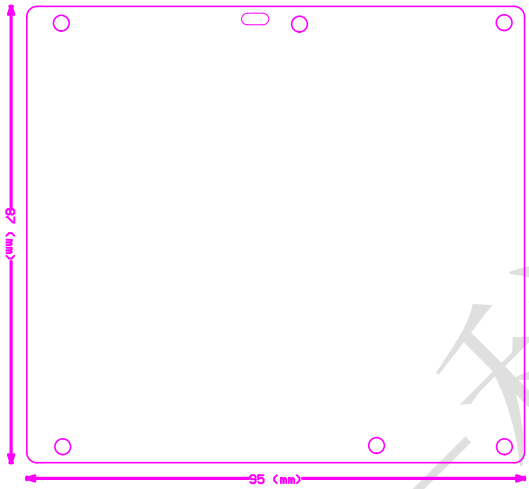
Note: The above materials may be replaced by materials with the same specifications or better specifications. If there are certification requirements, the replacement of materials is not allowed, and we need to notify our business to send samples again. The controlled specifications, the final interpretation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

嘉佰达C级二级保密

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)

6.1.1. 常规结构尺寸

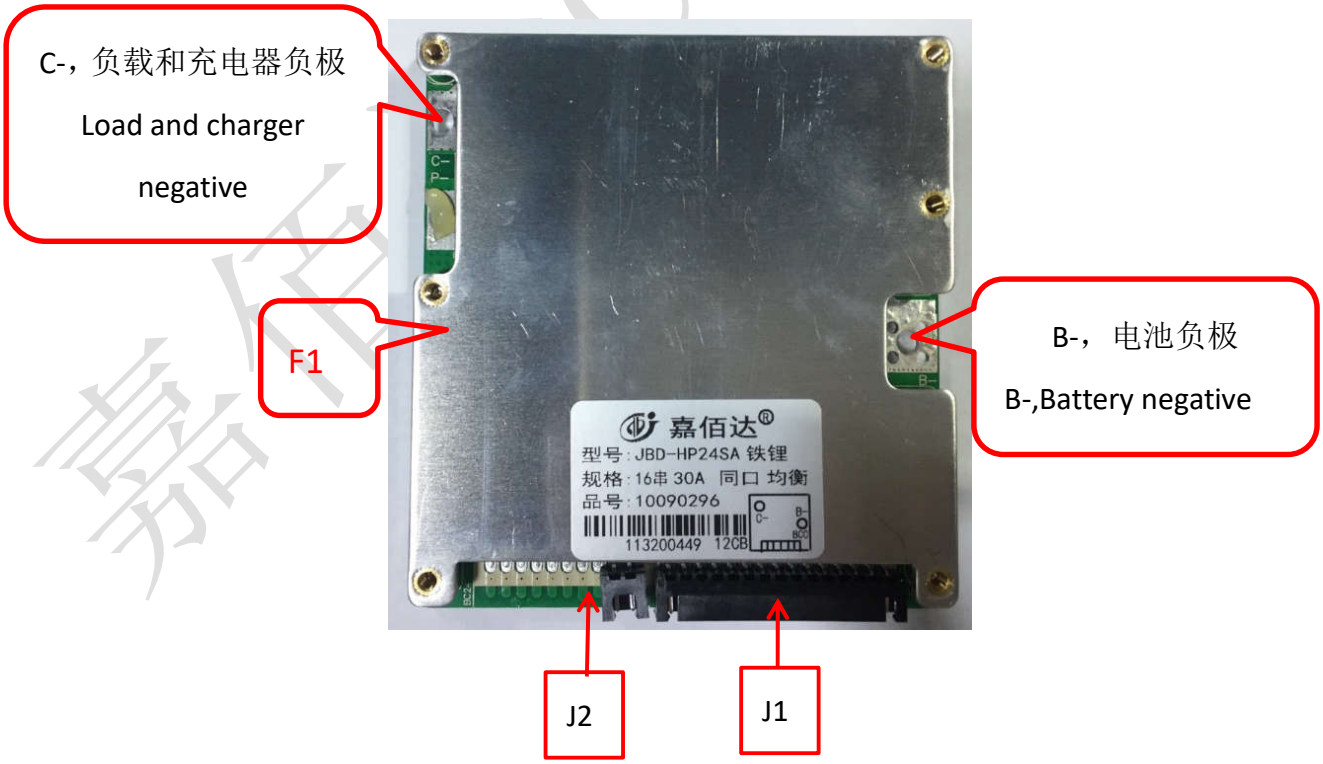


General structure size

7. 信号口定义(Signal port definition)

7.1. 示意图标注接口标号（图片为接线示意图，请以实物为准）

Schematic marking the interface label (The picture is the wiring diagram. Please refer to the real object)



嘉佰达-秘密

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 function)	备注 (Note)
1	J1 (HY2.0-15P) (带卡扣)	电压检测插座 (24 串连接方式) Voltage detection socket (24 series connection mode)		1	接最低节电芯负极 Connect to Negative Side of Cell 1.	BC0
				2	接第 1 节电芯正极 Connect to Positive Side of Cell 1	BC1
				3	接第 2 节电芯正极 Connect to Positive Side of Cell 2	BC2
				4	接第 3 节电芯正极 Connect to Positive Side of Cell 3	BC3
				5	接第 4 节电芯正极 Connect to Positive Side of Cell 4	BC4
				6	接第 5 节电芯正极 Connect to Positive Side of Cell 5	BC5
				7	接第 6 节电芯正极 Connect to Positive Side of Cell 6	BC6
				8	接第 7 节电芯正极 Connect to Positive Side of Cell 7	BC7
				9	接第 8 节电芯正极 Connect to Positive Side of Cell 8	BC8
				10	接第 9 节电芯正极 Connect to Positive Side of Cell 9	BC9
				11	接第 10 节电芯正极 Connect to Positive Side of Cell 10	BC10
				12	接第 11 节电芯正极 Connect to Positive Side of Cell 11	BC11
				13	接第 12 节电芯正极 Connect to Positive Side of Cell 12	BC12
				14	接第 13 节电芯正极 Connect to Positive Side of Cell 13	BC13
				15	接第 14 节电芯正极 Connect to Positive Side of Cell 14	BC14

嘉佰达级-秘密

2	J2 (HY2.0-10P) (带卡扣)	电压检测插座 (24 串连接方式) Voltage detection socket (24 series connection mode)		1	接第 15 节电芯正极 Connect to Positive Side of Cell 15	BC15
				2	接第 16 节电芯正极 Connect to Positive Side of Cell 16	BC16
				3	接第 17 节电芯正极 Connect to Positive Side of Cell 17	BC17
				4	接第 18 节电芯正极 Connect to Positive Side of Cell 18	BC18
				5	接第 19 节电芯正极 Connect to Positive Side of Cell 19	BC19
				6	接第 20 节电芯正极 Connect to Positive Side of Cell 20	BC20
				7	接第 21 节电芯正极 Connect to Positive Side of Cell 21	BC21
				8	接第 22 节电芯正极 Connect to Positive Side of Cell 22	BC22
				9	接第 23 节电芯正极 Connect to Positive Side of Cell 23	BC23
				10	接第 24 节电芯正极 Connect to Positive Side of Cell 24	BC24
3	F1	内置温控或弱电开关或外置温控	焊盘	内置温控或弱电开关或外置温控三选一		默认为内置 85℃温控

7.2 7~24S 接线（7 ~ 24S wiring）

	J1	对应采集线	J2	对应采集线
3S	4Pin	4Pin 采集线	/	/
4S	5Pin	5Pin 采集线	/	/
5S	6Pin	6Pin 采集线	/	/
6S	7Pin	7Pin 采集线	/	/
7S	8Pin	8Pin 采集线	/	/
8S	9Pin	9Pin 采集线	/	/
9S	10Pin	10Pin 采集线	/	/
10S	11Pin	11Pin 采集线	/	/
11S	12Pin	12Pin 采集线	/	/

嘉佰达C级-秘密

12S	13Pin	13Pin 采集线	/	/
13S	14Pin	14Pin 采集线	/	/
14S	15Pin	15Pin 采集线	/	/
15S	15Pin	15Pin 采集线	2Pin	2Pin 空 1Pin（空黑色起第 2Pin）采集线
16S	15Pin	15Pin 采集线	2Pin	2Pin 采集线
17S	15Pin	15Pin 采集线	3Pin	3Pin 采集线
18S	15Pin	15Pin 采集线	4Pin	4Pin 采集线
19S	15Pin	15Pin 采集线	5Pin	5Pin 采集线
20S	15Pin	15Pin 采集线	6Pin	6Pin 采集线
21S	15Pin	15Pin 采集线	7Pin	7Pin 采集线
22S	15Pin	15Pin 采集线	8Pin	8Pin 采集线
23S	15Pin	15Pin 采集线	9Pin	9Pin 采集线

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~106 kPa;

- 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 The protection board 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

嘉佰达级秘密

distance from the heat source (heating equipment, etc.) should not be less than 2m. Under the above storage conditions, the BMS protection board can be stored for one year.

9. 包装运输(Packing and shipping)

9.1. 标志(Logo)

BMS 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

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; 5. 3. 2 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; 5.3.2 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.

10. 注意事项(Precautions)

1. 本电池管理系统常规是不能串联使用的。
2. 多个使用本管理系统的电池包并联时，应确保并联之前各电池包的最大压差低于3V。

嘉佰达C级-秘密

3. 多个使用本管理系统的电池包并联使用时,适配器总的充电冲击电流可能施加到单个电池包上， 应确保适配器总的充电冲击电流不超过单个管理系统充电冲击电流的最大值。

4. 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 1800A、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。

5. 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。

6. 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。

7. 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。

8. 使用过程要注意防静电、防潮、防水等。

9. 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。

10. 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。

11. 本规格书中的参数、功能和外形仅供参考，以保护板实物为准。

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1) This battery management system cannot be used in series in general

2) When multiple battery packs using this management system are connected in parallel, make sure that the maximum voltage difference of each battery pack is lower than 3V before parallel connection.

3) When multiple battery packs using this management system are used in parallel, the total charging inrush current of the adapter may be applied to a single battery pack. It should be ensured that the total charging inrush current of the adapter does not exceed the maximum charging inrush current of a single management system.

4) 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 1800A, 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.

嘉佰达C级-秘密

5) 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.

6) 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.

7) 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.

8) During use, pay attention to anti-static, moisture-proof, waterproof, etc.

9) During use, 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.

10) 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.

11) The parameters, functions and appearances in this specification are for reference only, and the actual protection board shall prevail.

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