东莞市嘉佰达电子科技有限公司

DONGGUAN JIABAIDA ELECTRONICS TECHNOLOGY.CO.,LTD

产 品 规 格 书

Product specification

客户名（CUSTOMER）：	
产品名（SAMPLE NAME）：	10~24 串 100A~200A 同口软件板
产品型号（MODEINAME）：	JBD-DB24SA09 铁锂系列
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1.产品简介(Product introduction)

●JBD-DB24SA09 是专门针对 10-24 串锂离子电池包设计的软件保护板方案，该产品采用**迈巨微**采集芯片与**泰凌微**处理器架构。部分参数可以根据客户需求，通过上位机灵活调整。

●JBD-DB24SA09 is a software BMS scheme specially designed for 10-24 strings of lithium battery packs.The product adopts architecture of front-end acquisition chip by **Amagic Tech** and MCU by **Telink**. The part of protection parameters can be flexibly adjusted through the upper computer according to customer needs.

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)	(10~24S) for option	隔离 485 通讯 485 communication (isolated)	不支持 (Not supported)
持续电流 (Maximum continuous current)	(100-200A) for option	一线通 (One-wire communication)	选配 (Optional)
温度监测 (Temperature detection)	1 路内置，2 路外置 (1 internal,2 external)	CAN 通讯 (CAN communication)	不支持 (Not supported)
均衡功能 (Balance Function)	被动均衡 (Passive balance)	232 通讯 (232 Communication)	不支持 (Not supported)
非隔离 UART 接口 UART (non-isolated)	标配 (Standard option)	隔离 UART 接口 UART interface (isolated)	不支持 (Not supported)
开关功能 (Switch function)	选配 (Optional)	加热膜功能 (Heating function)	选配 (Optional)
充电限流功能 (Charging current limit)	不支持 (Not supported)	蓝牙模块 (Module of Bluetooth)	支持 (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)
履历 (History storage)	支持 (Supported)	二次保护功能 (Secondary protection)	不支持 (Not supported)
预放电功能 (Previous discharge)	支持 (Supported)	LCD 显示屏 (LCD display)	选配 (Optional)
蜂鸣器 (Buzzer)	不支持 (Not supported)	LED 指示灯接口 (Interface of LED indicator)	不支持 (Not supported)
EDI 接口 (Interface of externalEDI)	不支持 (Not supported)	GPS 接口 (Interface of GPS)	不支持 (Not supported)

CAUTION

非隔离 UART 口不能用于给负载或者充电器通讯

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

保护板支持无限防打火功能，但是当充放电结束后，需要等待 30 秒后重新启动防打火功能

After the charging and discharging are completed, it is necessary to wait for 30 seconds, The connection load will not generate spark discharge

3.参数设置(Parameter Setting)

3.1.基本参数(Basic parameter)

电芯规格(Cell specifications)	10~24 串磷酸铁锂(10~24 strings of LiFePo4 battery)
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)	2.30~3.75V
持续充电电流(Continuous charging current)	≤200A
持续放电电流(Continuous discharging current)	≤200A
运行功耗(Consumption of running)	≤6mA
休眠功耗(Consumption of sleep)	≤1.3mA (包含 6S 一次自唤醒时的平均功耗。)
储运模式功耗（Consumption of Shutdown）	≤50uA
休眠条件(Sleep conditions)	无电流\通讯\保护状态下延时 60±20S。 Delay 60±20s under no current \ communication \ protection state
休眠唤醒条件（Sleep Wakeup Conditions）	充放电、通讯、拨开关唤醒。 Charging and discharging, communication, and switch wake-up.
储运条件(Shutdown conditions)	无通讯\无电流\单节电压低于欠压值延时 5min。 No communication, no current, and a delay of 5 min for a single section voltage below the undervoltage value.
退出储运条件（Exit shutdown conditions）	充电退出储运。 Charging exit shutdown mode。
最小检测电流（Minimum detection current）	放电≥5mA，充电≥50mA
休眠唤醒电流（Sleep wake-up current）	≥0.6A
回路内阻(Circuit resistance)	≤10mΩ
工作温度(Operating temperature)	-20℃~75℃
保护板结构尺寸(Structure size of PCB)	
尺寸(size)	190±1mm * 90±1mm * 14±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.

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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)	3.700	3.750	3.800	V
	过充保护延时(Over-voltage delay)	1000	2000	3000	mS
	过充保护释放(Over-voltage release)	3.550	3.600	3.650	V
	过放保护电压(Under-voltage) temp≥0℃	2.200	2.300	2.400	V
	过放保护延时(Under-voltage delay)	3500	5000	6500	mS
	过放保护释放(Under-voltage release) temp≥0℃	2.300	2.400	2.500	V
	过放保护电压(Under-voltage) temp < 0℃	1.900	2.000	2.100	V
	过放保护释放(Under-voltage release) temp < 0℃	2.300	2.400	2.500	V
	过放保护释放条件 (Under-voltage release conditions)	充电恢复\60±20S 内电压自恢复 Charging recovery Voltage self recovery within 60 ± 20S			
	充电过流保护值 (Over-current Charge protection value)	参考过流保护配置表：3.2.1 Refer to the overcurrent protection configuration table: 3.2.1			
	充电过流延时 (Over-current Charge delay)	参考过流保护配置表：3.2.1 Refer to the overcurrent protection configuration table: 3.2.1			
	充电过流释放条件 (Over-current Charge release conditions)	延时 30±7S 后自动恢复 (Automatic recover after a delay of 30±7S) **连续触发三次充电过流后，需要放电才能解除充电过流保护。 After three consecutive triggering of charging overcurrent, discharge is required to release the charging overcurrent protection**			
	一级放电过流保护值 (1st Over-current Discharge value)	参考过流保护配置表：3.2.1 Refer to the overcurrent protection configuration table: 3.2.1			
	一级放电过流保护延迟 (1st Over-current Discharge delay)	参考过流保护配置表：3.2.1 Refer to the overcurrent protection configuration table: 3.2.1			
	二级放电过流保护电流值 (2nd Over-current Discharge value)	参考过流保护配置表：3.2.1 Refer to the overcurrent protection configuration table: 3.2.1			
	二级放电过流保护延迟时间 (2nd Over-current Discharge delay)	参考过流保护配置表：3.2.1 Refer to the overcurrent protection configuration table: 3.2.1			
	放电过流保护恢复条件 (Over-current Discharge release)	延时 30±7S 后自动恢复 (Automatic recover after a delay of 30±7S) **连续触发三次放电过流保护后，需要断开负载或充电才能解除。 After three consecutive triggering of discharge overcurrent protection, the load needs to be disconnected or charged to be released.**			
短路保护 (Short Circuit Protection)	短路保护电流 (Short circuit protection current value)	参考过流保护配置表：3.2.1 Refer to the overcurrent protection configuration table: 3.2.1			
	短路保护延迟时间 (Short circuit protection delay time)	参考过流保护配置表：3.2.1 Refer to the overcurrent protection configuration table: 3.2.1			
	短路保护恢复 (Short circuit protection recovery)	断开负载后约 5±2 秒自动释放 Recover by disconnecting load (approximate 5±2S)			
	*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.)*				
温度保护 (Temperature Protection)	充电高温保护值 (High temperature protection value in charging)	60	65	70	℃
	充电高温保护释放值 (High temperature protection release value in charging)	50	55	60	℃
	充电低温保护值 (Low temperature protection value in charging)	-35	-30	-25	℃
	充电低温保护释放值 (Low temperature protection release value in charging)	-30	-25	-20	℃
	放电高温保护值 (High temperature protection value in discharging)	70	75	80	℃
	放电高温保护释放值 (High temperature protection release value in discharging)	60	65	70	℃
	放电低温保护值 (Low temperature protection value in discharging)	-35	-30	-25	℃
	放电低温保护释放值 (Low temperature protection release value in discharging)	-30	-25	-20	℃
	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)	85	90	95	℃
均衡功能 (Balance Function)	均衡开启电压(Balance function turn-on voltage)	3.250	3.300	3.350	V
	开启压差(Difference opening voltage value)		15		mV
	均衡电流(Balance current)	30		150	mA
	均衡模式(Balance model)	静态均衡/充电均衡(Idle Balance/ charging Balance)			
	均衡类型(Balance type)	脉冲模式(Pulsed model)			

加热功能	加热膜开启（Activate Heating function）	充电状态，温度＜5℃，开启加热功能， Charging Temperature＜5℃
	加热膜关闭（Turn off the heating function）	温度高于 15℃或者放电状态 Temperature＞15℃ or discharging
	加热电流（heating current）	≤7A；**加热膜供电由充电器提供，所以充电器充电电流一定要大于加热膜最大电流）** （The power supply for the heating film is provided by the charger, so the charging current of the charger must be greater than the heating film current）

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.

3.2.1.过流保护配置表(Configuration table of Over-current protection)

过流保护配置表(Configuration table of Over-current protection)					
持续电流 persistent current 保护项目 Protection project	持续电流 100A Continuous current 100A	持续电流 120A Continuous current 120A	持续电流 150A Continuous current150A	持续电流 180A Continuous current 180A	持续电流 200A Continuous current 200A
充电过流\延时时间（±3S）Charging overcurrent/delay time (± 3S)	140±15A\10S	170±20A\10S	210±20A\10S	250±25A\10S	280±30A\10S
放电一级过流\延时时间（±5S）Discharge primary overcurrent/delay time (± 5S)	140±15A\60S	170±20A\60S	210±20A\60S	250±25A\60S	280±30A\60S
放电二级过流\延时时间（±200mS）Discharge secondary overcurrent/delay time (± 200ms)	300±80A \1000mS（检流电阻 0.05mR 实际过流值为设置值 2 倍）	300±80A \1000mS（检流电阻 0.05mR 实际过流值为设置值 2 倍）	300±80A \1000mS（检流电阻 0.05mR 实际过流值为设置值 2 倍）	500±150A \1000mS（检流电阻 0.05mR 实际过流值为设置值 2 倍）	500±150A\1000mS（检流电阻 0.05mR 实际过流值为设置值 2 倍）
短路保护电流\延时时间（±20uS）Short circuit protection current/delay time (± 20uS)	1200±300A \62uS（注 3）	1200±300A \62uS（注 3）	1200±300A \62uS（注 3）	1200±300A \62uS（注 3）	1200±300A \62uS（注 3）
多级放电过流\延时时间 Multilevel Discharge overcurrent/delay time	放电多级过流值计算方式：（放电过流 1 值÷1.2）×1.4 延时 16±3.0S （1st Over-current Discharge valuet÷1.2）×1.4 delay time 16±3.0S （放电过流 1 值÷1.2）×1.6 延时 8±2.0S （1st Over-current Discharge valuet÷1.2）×1.6 delay time 8±2.0S （放电过流 1 值÷1.2）×1.8 延时 4±1.5S （1st Over-current Discharge valuet÷1.2）×1.8 delay time 4±1.5S （放电过流 1 值÷1.2）×2.0 延时 2±1.0S （1st Over-current Discharge valuet÷1.2）×2.0 delay time 2±1.0S				

注：1、因为此型号保护板短路方式与防打火方式比较特殊，因此不建议客户自行更改短路保护电流与短路保护延时。

Due to the specialshort-circuit and anti ignition methods of this modelof protection board, it is not recommended for customers to change the short-circuit protection current and short-circuit protection delay on their own.

2、使用老化柜或者负载放电时，需要先将放电电流设置 1A，（老化柜放电 1A 工步中，截至电压设置为欠压保护乘以串数），放电 10S 左右，再设置到需要的放电电流，否则可能触发短路保护；

When using cyclic charging and discharging equipment or load discharge, it is necessary to first set the discharge current to 1A, （In the 1A discharge step of the aging cabinet, the cut-off voltage is set to undervoltage protection multiplied by the number of strings）discharge for about 10 seconds, and then adjust it to the required discharge current, otherwise it may trigger short-circuit protection；

3、短路保护值与上位机设置显示值不一致，实际短路电流是按挡位除检流电阻值计算，第一档为 40mV，第二档为 60mV，第三档为 80mV，依次类推；

The short-circuit protection value is inconsistent with the displayed value set by the upper computer. The actual short-circuit current is calculated by dividing the current detection resistance value by the gear position. The first gear is 40mV, the second gear is 60mV, the third gear is 80mV, and so on;

3.3.参数设置(parameter settings)

150A 上位机参数截图

150A Screenshot of the upper computer parameters

上位机下载地址：https://jbdtools.oss-cn-beijing.aliyuncs.com/packfile/JBDTools.zip

*注意事项：

1、上位机为 JBDTOOLS - V3.6 或以上版本，右上角区域选择芯片“AFE_O2_OZ3717”。

2、因为此型号保护板短路方式与防打火方式比较特殊，因此不建议客户自行更改短路保护电流与短路保护延时。

*Attention:

1、The version of software in upper computer is JBDTOOLS - V3.6 or later version, and please choose the ‘AFE_O2_OZ3717’ at top right corner.

2、Due to the specialshort-circuit and anti ignition methods of this modelof protection board, it is not recommended for customers to change the short-circuit protection current and short-circuit protection delay on their own.

4.功能说明(Function Description)

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

4.1.1.单体过充保护及恢复(Cellovercharge 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 cellis higher than the set value of the cellovercharge voltage, and the duration reaches the cellovercharge delay, the system enters the overcharge protection state, the charging MOS willturn off, and the battery cannot be charged.

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

4.1.2.总体过充保护及恢复(Entire overcharge protection and recovery)

当总体电压高于总体过压设定值，并且持续时间达到总体过充延时，系统进入过充保护状态，关闭充电 MOS，不能对电池充电。

当总体电压降到总电压过压保护恢复值以下时，解除过充保护状态，也可放电解除。

When the entire voltage is higher than the entire Over-voltage set value, and the duration reaches the entire overcharge delay, the system enters the overcharge protection state, turns off the charging MOS, and cannot charge the battery.

When the entire voltage drops below the recovery value of the entire voltage Over-voltage protection, the overcharge protection state is released, and it can also be released by discharge.

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

4.2.1.单体过放保护及恢复(Cellover-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。 连续三次触发单体过放保护，保护板会自动锁定状态，不允许自动恢复，需要断开负载或充电才能解除过放保护状态。

When the minimum cellvoltage 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 cellover-discharge protection occurs, charging the battery pack can release the over-discharge protection state. Triggering the individualover discharge protection three times in a row, the protection board willautomatically lock the state and not allow automatic recovery. It is necessary to disconnect the load or charge to release the over discharge protection state.

4.2.2.总体过放保护及恢复(Entire over-discharge protection and recovery)

当总体电压低于总体过放电压设定值，并且持续时间达到总体过放延时，系统进入过放保护状态，关闭放电 MOS，不能对电池放电。

发生总体过放保护后，对电池组充电可以解除过放保护状态。

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

After the entire 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。

连续三次触发充电过流保护后，保护板会自动锁定，此时不允许延时恢复，需要检测到放电电流才能解除充电过流保护状态。

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 willautomatically 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.

After triggering the charging overcurrent protection three times in a row, the protection board willautomatically lock. At this time, delayed recovery is not allowed, and the charging overcurrent protection state can only be lifted by detecting the discharge current.

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。

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连续三次触发放电过流保护后，保护板会自动锁定，此时不能延时恢复，需要充电或者断开负载才能解除放电过流保护。

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-levelOver-current protection function, which has different response speeds for different current values, and protects the battery more reliably.

After triggering the discharge overcurrent protection for three consecutive times, the protection board willautomatically lock and cannot delay recovery. Charging or disconnecting the load is necessary to release the discharge overcurrent protection.

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 cellsurface 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 celldrops 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 cellsurface 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 cellsurface 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.

4.6.均衡功能(Balance function)

管理系统采用电阻旁路的方式进行电芯均衡,充电\静置过程中电池组最高节单体电芯电压达到设定的均衡启动电压值，且电池组单体电芯最低电压与最高电压压差大于设定值时，达到条件的电芯均衡功能开启，相邻的两路均衡不能同时开启。

当电芯压差小于设定值或者电芯电压小于均衡开启电压时均衡停止。

The management system adopts a resistor bypass method for cellbalancing. During the charging/quiescent process, when the highest single cellvoltage of the battery pack reaches the set equilibrium starting voltage value, and the difference between the lowest and highest voltage of the single cellof the battery pack is greater than the set value, the cellbalancing function that meets the conditions is activated, and adjacent two equalization circuits cannot be activated simultaneously.

When the voltage difference of the battery cellis less than the set value or the voltage of the battery cellis less than the equalizing start voltage, the equalizing stops.

4.7.容量计算(Capacity calculation)

可以通过对电流、时间积分的方式精准地进行电池组的 SOC 计算。电池组满容量、及循环容量可以通过上位机进行设

置，在进行完整充放电循环后容量可自动更新。 具有充放电循环次数计算功能，当电池组累积放电容量达到设定循环容量时，循环次数增加一次。

The SOC calculation of the battery pack can be accurately performed by integrating current and time. The fullcapacity and cycle capacity of the battery pack can be set through the upper computer, and the capacity can be automatically updated after a complete charge and discharge cycle. It has the function of calculating the number of charge and discharge cycles. When the cumulative discharge capacity of the battery pack reaches the set cycle capacity, the number of cycles increases once.

注：新装电池请根据电池容量设定标称容量和循环容量，并进行一次容量学习，否则可能出现容量不准问题。 容量学习操作：先放电至低压保护，然后充电至过压保护，再放电电即可。

Note: For newly installed batteries, please set the nominalcapacity and cycling capacity based on the battery capacity, and conduct a capacity learning, otherwise there may be inaccurate capacity issues. Capacity learning operation: First discharge to low voltage protection, then charge to overvoltage protection, and then discharge.

4.8.休眠功能(Sleep function)

保护板处于静态时(无通讯，无电流，无均衡及过压保护)，延时 1 分钟后进入休眠状态。

进入此状态后，保护板仅降低检测频率和自身功耗。通讯、拨开关、充放电可以自动退出休眠模式。

When the protection board is in a static state (no communication, no current, no equalization or overvoltage protection), it enters a sleep state after a delay of 1 minute.

After entering this state, the protection board only reduces the detection frequency and its own power consumption. Communication, switching, and charging/discharging can automatically exit sleep mode.

4.9.储运功能（Shutdown mode）

保护板默认自带储运功能，在任一单节电压低于欠压保护值后，且在储运条件设置的时间内没有回升至欠压保护点以上，保护板会进入储运模式，此时保护板无法放电，如果有接蓝牙模块则蓝牙模块也会被断电，进入极低功耗的模式（＜50uA）。仅保留充电的硬件检测，此时如果充电器接入，保护板会自动退出储运模式，SOC 会被重新估算。

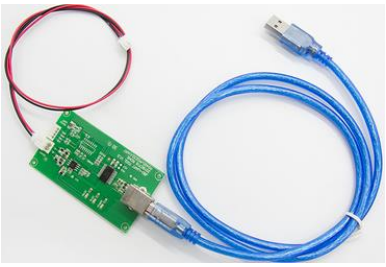
The protection board defaults to its built-in storage and transportation function. If the voltage of any single section is lower than the under voltage protection value and does not rise above the under voltage protection point within Shutdown mode time, the protection board willenter storage and transportation mode. At this time, the protection board cannot discharge. If a Bluetooth module is connected, the Bluetooth module willalso be powered off and enter an extremely low power consumption mode (<50uA). Only charging hardware detection are retained. At this time, if charger is connected, the protection board willautomatically exit the storage and transportation mode, and SOC willbe re estimated.

4.10.通讯功能(Communication)

4.10.1.串口通讯(SerialCommunication)

UART 通讯盒

(UART communication box)



RS485 通讯盒

(RS485 communication box)

蓝牙模块

(Bluetooth module)

注：上述工具都需要另行购买。

Note: The above tools need to be purchased separately.

连接方式：在电脑端安装我司通讯盒专用驱动程序后，将通讯盒的 USB 端插在电脑的 USB 端口，另一头接在已经接好电池的保护板对应接口。打开上位机，点通讯口设置，选择通讯盒对应 COM 口，其他选项不用动，确认后点击开始，即可读取保护内数据。

如需更改保护板参数，一定要先在参数页面点击读取参数后，再来更改参数。

The connection method: After installing the specialdriver for our communication box on the computer, insert the USB end of the communication box into the USB port of the computer, and connect the other end to the corresponding interface of the BMS that has been connected to the battery. Open the upper computer, click the communication port settings, select the COM port corresponding to the communication box, and do not change other options. After confirming, click Start to read the data in the protection.

If you need to change the parameters of the BMS, you must click on the parameter page to read the parameters before changing the parameters.

通讯设置：

●波特率：9600；

●校验位：无；

●数据位长度：8 位；

●停止位长度：1 位

COM Settings:

●Baud rate:9600;

●Parity Bit:NONE;

●Data Bit:8 bits;

●Stop Bit:1 bi

4.10.2.CAN 总线(CAN BUS)

环境配置：将“USBCAN Driver”安装至电脑中，首先需要核对电脑操作系统，32 位操作系统与 64 位操作系统匹配不同的驱动文件。(32 位操作系统匹配文件后缀“x86”,64 位操作系统匹配文件后缀“x64”)。最后可在电脑的设备管理器中查看端口以检查是否成功安装。

连接方式：将通讯盒的 USB 线插入电脑的 USB 端口，另一端连接在电池的保护板对应接口。

通讯格式：ID 默认状态下选择 CAN_ID_0，CAN 设备根据通讯盒类型选择，波特率默认为 500K，通道选择默认为 0。

Environment configuration:To installthe ‘USBCAN Driver’ into computer, you need to check the computer operating system initially. The 32-bit operating system and the 64 bit operating system match different driver files. (32-bit operating system matching file suffix "x86", 64 bit operating system matching file suffix "x64"). Finally, find the port in the device manager of the computer to check whether the installation is successful.

Connection method:Insert the USB cable of the communication box into the USB port of the computer, and connect the other end to the corresponding interface of the BMS.

Connection format:ID Address is CAN_ID_0(default). The can device is selected according to the type of communication box. The baud rate is 500K(default), and the channelselection is 0(default).

4.11.加热功能 (Heating function)

当电池温度低于设置的加热膜开启温度；此时如果保护板检测到电池处于充电状态（有充电电流）；则开启加热 MOS，将加热膜负极与充电负极接通；

加热膜正极接在电池正极与充电器正极，负极接到保护板 H-，加热膜焊盘，或者插座；

带加热膜的电池组，充电器功率应大于加热膜功率，否则有可能损坏加热功能；

When the battery temperature is lower than the set heating film opening temperature; If the protection board detects that the battery is in a charging state (with charging current) at this time; Then turn on the heating MOS and connect the negative electrode of the heating film to the negative electrode of the charging;

connected to the positive electrode of the battery and the positive electrode of the charger, and the negative electrode is connected to the protective plate H -, the heating film pad, or the socket;

For battery packs with heating film, the charger power should be greater than the heating film power, otherwise it may damage the heating function;

5.主要物料(Main material)

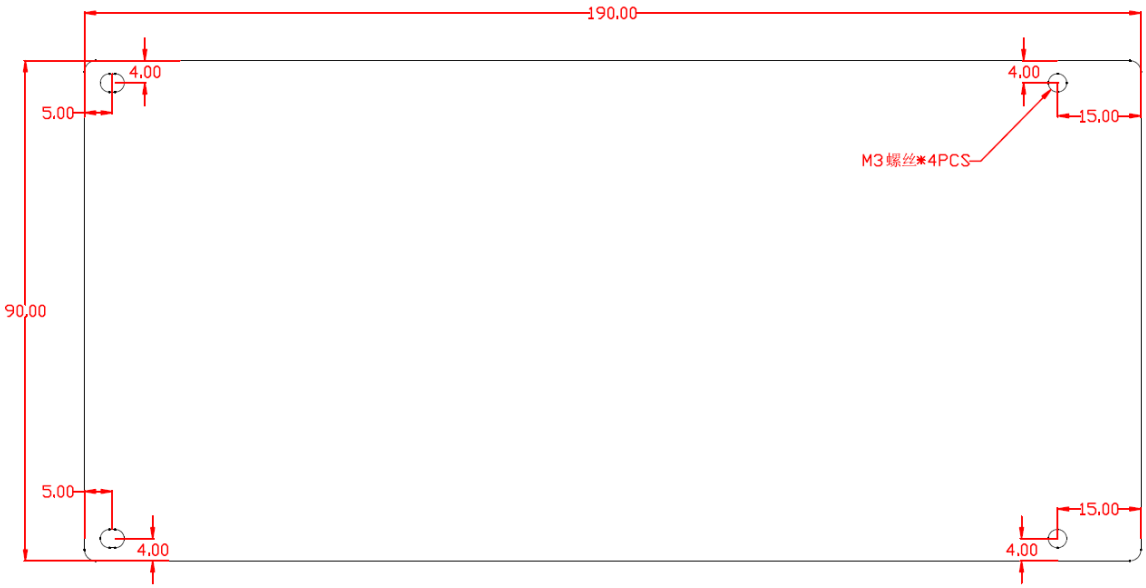
序号 (Number)	物料类型 Materialtype	物料名称 (Name of Material)	生产厂家 (Manufacturer)	数量 (Quantity)
1	前端芯片	IC\QFN\AMG8824A\LQFP64	迈巨微（Amagic Tech）	1PCS
2	MCU	IC\TLSR8250F512ET32\QFN32	Telink(泰凌微)	1PCS
3	MOS	HYG017N10NS1TA\TOLL SDN10N1P5T-AB\TOLL LSGT10R015\TOLL	华羿微 芯迈 龙腾	XPCS
4	NTC	NTC*2\10K\3950\250mm\带端子\HY2.0	---	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 finalinterpretation 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)

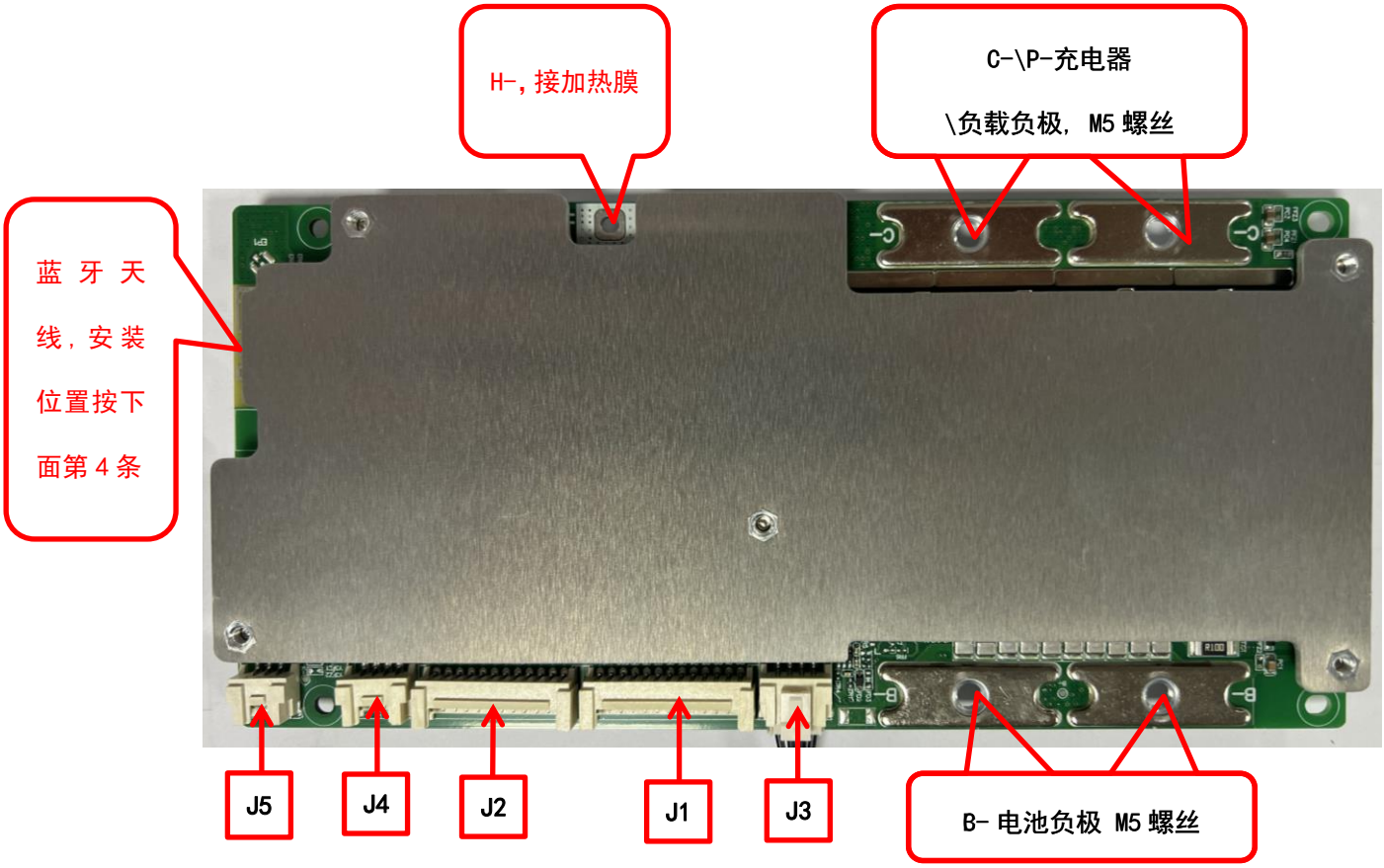


结构尺寸图（单位：毫米）

Figure of structure size (Unit: mm)

7.信号口定义(Definition of signalport)

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



连接电池步骤：

1、先将B-与电池负极连接（Connect the negative pole of the battery to B-）；

2、再将检测线在电芯上连接好之后，先插入保护板J2（高串数排线）,再插入J1（低串数排线），J2和J1插入时间小于30秒；（不可将排线插入保护板后再焊接电池，可能造成保护板损坏）（After connecting the detection line to the battery cell, insert the protective board J2 (high string count cable) first, and then insert J1 (low string count cable). The insertion time for J2 and J1 should be less than 30 seconds;)

3、最后将负载或者充电器负极与 C-/P-线连接（The final step Connect to Negative of Charger\Load）；

4、安装保护板时蓝牙天线要靠近插口位置，或者外壳屏蔽较弱的位置，盒上外壳后，用手机距离电池1 米，测试信号强度大于-70db；（The BMS Bluetooth antenna should be installed near the socket or in a location with weak shielding on the casing. After installing the casing, use a mobile phone 1 meter away from the battery and test the signal strength to be greater than -70db）；

Port definition

Label	Definition	Notes
B -	接电池组负极 Negative of battery pack	
C-\P-	接充电器、负载负极 Negative of Charger\Load	
B+	接电池组正极 Positive of battery pack	
H-	接加热膜 Connect to Heating film	

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 (HY2.0-13P) （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	
				6	接第 5 节电芯正极 Connect to Positive Side of Cell 5	
				7	接第 6 节电芯正极 Connect to Positive Side of Cell 6	
				8	接第 7 节电芯正极 Connect to Positive Side of Cell 7	
				9	接第 8 节电芯正极 Connect to Positive Side of Cell 8	
				10	接第 9 节电芯正极 Connect to Positive Side of Cell 9	
				11	接第 10 节电芯正极 Connect to Positive Side of Cell 10	
				12	接第 11 节电芯正极 Connect to Positive Side of Cell 11	
				13	接第 12 节电芯正极 Connect to Positive Side of Cell 12	
2	J2 (HY2.0-12P) （带卡扣）	电压检测插座 (Voltage detection)		1	接第 13 节电芯正极 Connect to Positive Side of Cell 13	
				2	接第 14 节电芯正极 Connect to Positive Side of Cell 14	
				3	接第 15 节电芯正极 Connect to Positive Side of Cell 15	
				4	接第 16 节电芯正极 Connect to Positive Side of Cell 16	
				5	接第 17 节电芯正极 Connect to Positive Side of Cell 17	
				6	接第 18 节电芯正极 Connect to Positive Side of Cell 18	
				7	接第 19 节电芯正极 Connect to Positive Side of Cell 19	
				8	接第 20 节电芯正极 Connect to Positive Side of Cell 20	
				9	接第 21 节电芯正极 Connect to Positive Side of Cell 21	
				10	接第 22 节电芯正极 Connect to Positive Side of Cell 22	
				11	接第 23 节电芯正极 Connect to Positive Side of Cell 23	
				12	接第 24 节电芯正极 Connect to Positive Side of Cell 24	B+
3	J3 (HY2.0-4P) (带卡扣)	NTC1		1	NTC1	10k\3950
				2		
		NTC2		3	NTC2	10k\3950
				4		
4	J4 (HY2.0-4P) (带卡扣)	UART		1	UART - GND	
				2	UART - RXD	
				3	UART - TXD	
				4	B+	
5	J5 (HY2.0-3P) (带卡扣)	弱电开关/一线通 (weak current switch/ Single line communication)		1	K+	
				2	K-	
				3	一线通 Single line communication	

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7.2.备用配置串数(Configuring alternative cellcounts)

8-15 串接线配置

Cell Input	10S	11S	12S	13S	14S	15S
BC 24	Cell 10+	Cell 11+	Cell 12+	Cell 13+	Cell 14+	Cell 15+
BC 23	NC	NC	NC	NC	NC	NC
BC 22	NC	NC	NC	NC	NC	NC
BC 21	NC	NC	NC	NC	NC	NC
BC 20	NC	NC	NC	NC	NC	NC
BC 19	NC	NC	NC	NC	NC	NC
BC18	NC	NC	NC	NC	NC	NC
BC 17	NC	NC	NC	NC	NC	NC
BC 16	NC	NC	NC	NC	NC	NC
BC 15	NC	NC	NC	NC	NC	Cell 15+
BC 14	NC	NC	NC	NC	Cell 14+	Cell 14+
BC 13	NC	NC	NC	Cell 13+	Cell 13+	Cell 13+
BC 12	NC	NC	Cell 12+	Cell 12+	Cell 12+	Cell 12+
BC 11	NC	Cell 11+	Cell 11+	Cell 11+	Cell 11+	Cell 11+
BC 10	Cell 10+	Cell 10+	Cell 10+	Cell 10+	Cell 10+	Cell 10+
BC 9	Cell 9+	Cell 9+	Cell 9+	Cell 9+	Cell 9+	Cell 9+
BC 8	Cell 8+	Cell 8+	Cell 8+	Cell 8+	Cell 8+	Cell 8+
BC 7	Cell 7+	Cell 7+	Cell 7+	Cell 7+	Cell 7+	Cell 7+
BC 6	Cell 6+	Cell 6+	Cell 6+	Cell 6+	Cell 6+	Cell 6+
BC 5	Cell 5+	Cell 5+	Cell 5+	Cell 5+	Cell 5+	Cell 5+
BC 4	Cell 4+	Cell 4+	Cell 4+	Cell 4+	Cell 4+	Cell 4+
BC 3	Cell 3+	Cell 3+	Cell 3+	Cell 3+	Cell 3+	Cell 3+
BC 2	Cell 2+	Cell 2+	Cell 2+	Cell 2+	Cell 2+	Cell 2+
BC 1	Cell 1+	Cell 1+	Cell 1+	Cell 1+	Cell 1+	Cell 1+
BC 0	Cell1-	Cell1-	Cell1-	Cell1-	Cell1-	Cell1-

16-24 串接线配置

Cell Input	16S	17S	18S	19S	20S	21S	22S	23S	24S
BC 24	Cell 16+	Cell 17+	Cell 18+	Cell 19+	Cell 20+	Cell 21+	Cell 22+	Cell 23+	Cell 24+
BC 23	NC	NC	NC	NC	NC	NC	NC	Cell 23+	Cell 23+
BC 22	NC	NC	NC	NC	NC	NC	Cell 22+	Cell 22+	Cell 22+
BC 21	NC	NC	NC	NC	NC	Cell 21+	Cell 21+	Cell 21+	Cell 21+
BC 20	NC	NC	NC	NC	Cell 20+	Cell 20+	Cell 20+	Cell 20+	Cell 20+
BC 19	NC	NC	NC	Cell 19+	Cell 19+	Cell 19+	Cell 19+	Cell 19+	Cell 19+
BC18	NC	NC	Cell 18+	Cell 18+	Cell 18+	Cell 18+	Cell 18+	Cell 18+	Cell 18+
BC 17	NC	Cell 17+	Cell 17+	Cell 17+	Cell 17+	Cell 17+	Cell 17+	Cell 17+	Cell 17+
BC 16	Cell 16+	Cell 16+	Cell 16+	Cell 16+	Cell 16+	Cell 16+	Cell 16+	Cell 16+	Cell 16+
BC 15	Cell 15+	Cell 15+	Cell 15+	Cell 15+	Cell 15+	Cell 15+	Cell 15+	Cell 15+	Cell 15+
BC 14	Cell 14+	Cell 14+	Cell 14+	Cell 14+	Cell 14+	Cell 14+	Cell 14+	Cell 14+	Cell 14+
BC 13	Cell 13+	Cell 13+	Cell 13+	Cell 13+	Cell 13+	Cell 13+	Cell 13+	Cell 13+	Cell 13+
BC 12	Cell 12+	Cell 12+	Cell 12+	Cell 12+	Cell 12+	Cell 12+	Cell 12+	Cell 12+	Cell 12+
BC 11	Cell 11+	Cell 11+	Cell 11+	Cell 11+	Cell 11+	Cell 11+	Cell 11+	Cell 11+	Cell 11+
BC 10	Cell 10+	Cell 10+	Cell 10+	Cell 10+	Cell 10+	Cell 10+	Cell 10+	Cell 10+	Cell 10+
BC 9	Cell 9+	Cell 9+	Cell 9+	Cell 9+	Cell 9+	Cell 9+	Cell 9+	Cell 9+	Cell 9+
BC 8	Cell 8+	Cell 8+	Cell 8+	Cell 8+	Cell 8+	Cell 8+	Cell 8+	Cell 8+	Cell 8+
BC 7	Cell 7+	Cell 7+	Cell 7+	Cell 7+	Cell 7+	Cell 7+	Cell 7+	Cell 7+	Cell 7+
BC 6	Cell 6+	Cell 6+	Cell 6+	Cell 6+	Cell 6+	Cell 6+	Cell 6+	Cell 6+	Cell 6+
BC 5	Cell 5+	Cell 5+	Cell 5+	Cell 5+	Cell 5+	Cell 5+	Cell 5+	Cell 5+	Cell 5+
BC 4	Cell 4+	Cell 4+	Cell 4+	Cell 4+	Cell 4+	Cell 4+	Cell 4+	Cell 4+	Cell 4+
BC 3	Cell 3+	Cell 3+	Cell 3+	Cell 3+	Cell 3+	Cell 3+	Cell 3+	Cell 3+	Cell 3+
BC 2	Cell 2+	Cell 2+	Cell 2+	Cell 2+	Cell 2+	Cell 2+	Cell 2+	Cell 2+	Cell 2+
BC 1	Cell 1+	Cell 1+	Cell 1+	Cell 1+	Cell 1+	Cell 1+	Cell 1+	Cell 1+	Cell 1+
BC 0	Cell1-	Cell1-	Cell1-	Cell1-	Cell1-	Cell1-	Cell1-	Cell1-	Cell1-

注：Cellx- 指该串数的负极。Cellx - refers to the negative electrode of the string number.

Cellx+ 指该串数的正极。Cellx+ refers to the positive pole of the string number.

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8.环境适用性(Environmentalsuitability)

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：-20℃~75℃;

●相对湿度：5%~90%;

●大气压力：86kPa~106kPa;

●BMS The protective plate allows normaloperation under the following conditions:

●Ambient temperature: -20°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 electricalinsulation, and must not be affected by any mechanicalShock 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 modelof product

●Modelof 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.

●Externalcarton 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 shallnot be subject to severe mechanicalimpact, exposure to the sun, rain, chemicalcorrosive substances and harmfulgases; 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 shallbe less than 5 layers.

Allright reserved

10.注意事项(Precautions)

1.本电池管理系统是不能串联使用的。

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 2000A、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 battery management system cannot be used in series.

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 totalinternalresistance 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 2000A, the inductance of the short-circuit loop is very large, or the totallength 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 cellto avoid damage to the circuit board. Assembly should be firm and reliable.

5.During use, be carefulnot 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 actualproduct.