规格承认书/Specification

拓达通编码/TDT code：	
品牌/Brand：	**TDT BMS**®
产品型号/Model：	动力板 TDT-6064-4S-50A　铁锂 Power BMS TDT-6064-4S-50A　LFP
销售厂商/Sales:	
制造厂商/Manufacturer:	深圳市拓达通电子有限公司/Shenzhen Tuodatong Electronics Co.,Ltd
承认原因/Reason:	□新供应商/New supplier　　□新物料/New material　　□工程变更/ECN　　□其他/Other

确认状况/Confirm the status			
尺寸/Size:	□通过/Pass	□拒收/Refuse	□其他/Other
外观/Appearance:	□通过/Pass	□拒收/Refuse	□其他/Other
性能/Function:	□通过/Pass	□拒收/Refuse	□其他/Other
材质/Material:	□通过/Pass	□拒收/Refuse	□其他/Other
ROHS:	□通过/Pass	□拒收/Refuse	□其他/Other
可靠性/Reliability:	□通过/Pass	□拒收/Refuse	□其他/Other
认证标准/Certificate standard:	□UL	□CE	□其他/Other
检验结果/Test result:	□合格/Pass	□不合格/Fail	□其他/Other
改善要求： Improvement requirement：			
备注/Note：			
地址： Address:	深圳市光明区白花社区兴华雄科技园A9栋4楼 4 / F, Building A9, Xinghuaxiong Science Park, Baihua Community, Guangming District, Shenzhen		

(客户Customer) 承认Confirm			（供应商Supplier) 承认Confirm		
品质/QC	工程师/Engineer	经理/Manager	品质/QC	开发工程师/R&D engineer	业务/Sales
				颜涛 TAO YAN	
核准日期： Approved date：			核准日期： Approved date：	2024 . 07 . 30	

注意（**Notice**）：

1. 收到样机确认好后请及时回签，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，此规格书拓达通保留最终解释权. **After receiving the sample and confirming it, please sign back in time. If there is no sign back and problem feedback within 7 days, our company defaults that the sample test is qualified. The picture in the specification is a general model picture, which may be different from the sample. TDT BMS 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，我司才安排批量.**Before mass production, please sign the specification and return it, and explain the detailed function, and our company will arrange the mass production.**

配件清单 Parts list

	序号 No	客户料号 Customer Part NO	名称 Name	型号 Model	数量 Quantity
标配清单 List of standard parts	1		保护板 BMS	TDT-6064-V1.1	1 块 pcs
	2		采集线 Cables	HY2.0_500mm 5P UL1007_反向 带扣 24# Reverse _ Buckle	1 条 pcs
	3		NTC	HY2.0 500mm 2P UL1007_带扣_28# Belt buckle	1 条 pcs
	4		螺丝 Screw	M5*10 十字外内脚三组合螺丝，碳钢镀镍 Cross outer and inner foot three-combination screw, nickel plated carbon steel	4 颗 pcs
	5		弱电开关 On/off switch	HY2.0_2P_500mm_UL1007_反向_带扣_24# Reverse _ Buckle	一条 pcs
	6				
	7				

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2

修改记录 Correction record

Revision 修改	Description 描述	Date 日期	Approver 批准
A	New released	2023-10-31	

深圳市拓达通电子有限公司
SHENZHEN TUODATONG ELECTRONICS CO., LTD

R&D Address: Phoenix City Metro Station, Guangming District, Shenzhen, Guangdong Province
Factory address: 4th Floor, Building A9, Xinghuaxiong Industrial Park, Baihua Community, Guangming District, Shenzhen

3

目录 Table of contents

R&D Address: Phoenix City Metro Station, Guangming District, Shenzhen, Guangdong Province
Factory address: 4th Floor, Building A9, Xinghuaxiong Industrial Park, Baihua Community, Guangming District, Shenzhen

4

1. 产品简介(Product introduction)

　　随着锂电池在新能源行业的广泛应用，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。本产品是专门针对锂电池设计的 BMS，可广泛应用在三轮车、两轮车、汽车打火电池、太阳能路灯、机器人、移动储能等等。

　　With the wide application of lithium batteries in the new energy industry, the battery management system has been also put forward in these requirements of high performance, high reliability and cost-effective. This BMS is specifically designed for lithium battery, which can be widely used in electric vehicles, tricycles, robots, mobile energy storage and so on.

2. 功能(Function)

2.1. 功能配置(Function Configuration)

温控数量 (Number of NTC)	_1 路电芯(1 NTCs for battery pack) _1 路 MOS(1 NTC for MOS)	均衡功能 (Balance Function)	☑ 被动均衡(passive balance)__50 mA
电池组并联 (Battery packs in parallel)	☑ 不支持 Not support □ 支持 Support	充放电端口 (Charge and discharge port)	☑ 同口 Common port □ 分口 Separate port
电池组串联 (Battery packs in series)	□ 不支持 Not support ☑ 支持_4 个 support 4 battery packs in series	弱电开关 (On/off switch)	□ 无 N ☑ 有 Y □ 选配 Optional

2.2. 功能特性(Functional Features)

集成IC (integrated IC)	具有过流保护功能 (with over-current function)
高电压精度 (high Accuracy Voltage)	具有高低温保护功能 (with high and low temperature protection function)
高电流精度 (high Accuracy Current)	具有充电均衡功能 (with charge balancing function)
1路电池温度检测 (1NTC to detect temperature)	具有过充保护功能 (with overcharge protection function)
1路MOS温度检测 (NTC for detecting MOS temperature)	具有过放保护功能 (with over-discharge protection function)
低功耗 (low power consumption)	具有短路保护功能 (with short-circuit protection function)
具有MOS高温保护功能 (with MOS high temperature protection function)	具有弱电开关功能 (with on/off switch)

2.3. 功能示意框图(Schematic Diagram of Function)
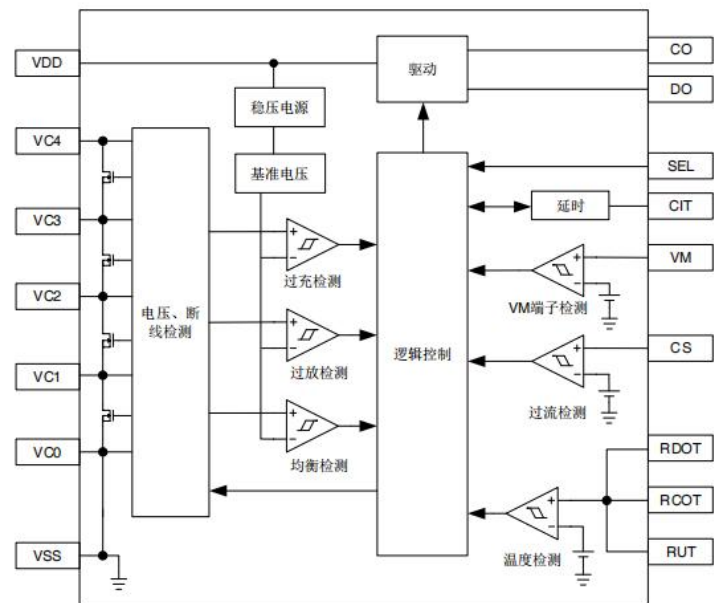
3. 参数设置(Parameters Setting)

3.1. 基本参数(Basic parameters)

电芯规格（Cell specification）	磷酸铁锂LFP
接口类型（Interface type）	充放电同口(Charging and discharging common port)
充电电压（Charging voltage）	3.65V*串数(3.65V*strings)
单体电压范围（Battery cell voltage range）	2.20~3.65V
持续充电电流（Continuous charging current）	50A
持续放电电流（Continuous discharging current）	50A
持续放电电流（最大时间）(Continuous discharging current)（maximum time）	1h
放电峰值电流（Peak discharge current）	150A120mS/300A300mS
工作温度（Operating temperature）	-20℃~75℃
电芯失效(Cell malfunction)	压差Voltage difference>1V(不允许充放电Can not charge and discharge)

3.2. 主要参数(Main parameter)

项目(Project)		规格(Specification)			单位(Unit)	是否可设(Set or not)
		最小值(MIN)	典型值(TYP)	最大值(MAX)		
过充保护（Overcharge protection）	过充保护电压(Overcharge protection voltage)	3.510	3.650	3.690	V	不可设N
	过充保护延时(Overcharge protection delay)	400	1200	2000	mS	不可设N
	过充保护释放(Overcharge protection release)	3.300	3.550	3.400	V	不可设N
均衡功能(Balance function)	均衡开启电压(Balance turn-on voltage)	3.485	3.525	3.565	V	不可设N
	均衡电流（Balanced currend）	30	50	70	mA	不可设N
过放保护(Over-discharge protection)	过放保护电压(Over-discharge protection voltage)	2.220	2.300	2.380	V	不可设N
	过放保护延时(Over-discharge protection delay)	200	1000	1800	mS	不可设N
	过放保护释放(Over-discharge protection release)	2.620	2.700	2.780	V	不可设N
	有充电时解除(Release when charging)	接入充电器可激活Can be activated by plugging in a charger				
过流保护(Over-current protection)	充电过流释放条件（Over-current Charge release conditions）	放电电流Discharge current ＞5A				
	过放保护释放条件（Over-discharge protection release conditions）	接入充电器可激活Can be activated by plugging in a charger				
	充电过流保护值(Charge over-current protection value)	见下面过流保护值配置表（Refer to configuration table of over-current protection value below）				可设Y
	充电过流延时（Charge over-current delay）	0.4	1.2	2.0	S	不可设N
	一级放电过流保护值(1th discharge over-current value)	见下面过流保护值配置表（Refer to configuration table of over-current protection value below）				可设Y
	一级放电过流保护延迟（1th discharge over-current delay）	0.4	1.2	2.0	S	不可设N
	二级放电过流保护电流值(2th discharge over-current value)	见下面过流保护值配置表（Refer to configuration table of over-current protection value below）				可设Y
	二级放电过流2保护延迟（2th discharge over-current 2 protection delay）	200	300	400	mS	不可设N
	放电过流保护恢复条件(Discharge over-current protection recovery conditions)	延时32S后自动恢复（Automatic recover after a delay of 32S）				
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 protectionvalue below）				
	短路保护延迟时间（Short circuit protection delay time）			400	uS	
	短路保护恢复(Short circuit protection recovery)	有充电时，短路保护解除Short circuit protection release while charging 负载移除后，将自动解除After the load is removed,				

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Factory address: 4th Floor, Building A9, Xinghuaxiong Industrial Park, Baihua Community, Guangming District, Shenzhen

6

		it automatically 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**950A**，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 **950A**, 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(Charge high temperature protection value)	50	55	60	℃	
	充电高温保护释放值(Charge high temperature protection release value)	45	50	55	℃	
	充电低温保护值(Charge low temperature protection value)	-10	-5	0	℃	
	充电低温保护释放值(Charge low temperature protection release value)	-5	0	5	℃	
	放电高温保护值(Discharge high temperature protection value)	55	60	65	℃	
	放电高温保护释放值(Discharge high temperature protection release value)	50	55	60	℃	
	放电低温保护值(Discharge low temperature protection value)	-25	-20	-15	℃	
	放电低温保护释放值(Discharge low temperature protection release value)	-20	-15	-10	℃	
	MOS 过温保护温度(MOS over-temperature protection temperature)	90	95	100	℃	
	MOS 保护恢复温度（MOS protection recovery temperature ）	80	85	90	℃	
自耗电 （Self-consuming）	工作模式自耗电流(Self-consuming current at operating mode)	≤70μA			A	不可设N
	休眠模式电流(Current at sleep mode)	≤50μA			A	不可设N

注：测试需在温度25±2℃，相对湿度65±20% 的环境　Note: Test should be at temperature 25±2℃, and relative humidity 65±20% of environment.

过流保护值配置表(Configuration table of over-current protection value)

电流选型 (Current selection)	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 (2nd discharge over-current value)	短路保护值 (Short circuit protection value)	是否可设 (Set or not)	
	充电电流 Charge	放电电流 Discharge						
☑	50A	50A	60±10A	150±10A	300±20A	≥ 600A		
☐	60A	60A	75±10A	180±10A	360±30A	≥ 720A		
☐	70A	70A	85±10A	210±10A	420±30A	≥ 840A		
☐	80A	80A	95±10A	240±10A	480±30A	≥ 960A		常规 Common
☐	90A	90A	105±10A	270±10A	540±30A	≥ 1080A		
☐	100A	100A	120±10A	300±30A	600±50A	≥ 1200A		
☐	150A	150A	170±20A	350±40A	650±80A	≥ 1500A		
☐	200A	200A	240±20A	600±40A	1000±100A	≥ 2000A		
☐								客定 Customization

4. 功能说明 (Function Description)

4.1. 休眠及唤醒功能（Sleep and Arousal）

4.1.1. 休眠（Sleep）

当满足以下任意一条件时，系统进入低功耗模式：

R&D Address: Phoenix City Metro Station, Guangming District, Shenzhen, Guangdong Province
Factory address: 4th Floor, Building A9, Xinghuaxiong Industrial Park, Baihua Community, Guangming District, Shenzhen

7

When any of the following conditions is met, the system is in low-power consumption mode.

1）最低单体电压低于休眠电压，并且持续时间达到休眠延迟时间 。

The lowest monomer voltage is lower than the sleep voltage, and the time of duration reaches the sleep delay time

4.1.2. 唤醒（Arousal）

当系统处于低功耗模式，满足以下任意一条件时，系统将退出低功耗模式，进入正常运行模式：

When the system is in low-power consumption mode and meets any of the following conditions, the system exits the low-powerconsumption mode. And then it will be in the normal run mode:

1）接入充电器，充电器输出电压需大于电池电压2V以上。

Connecting to the charger, and the output voltage of the charger should be more than 2V of the battery voltage.

注意：单体或总体过放保护后BMS进入深度休眠，必需充电器才能换醒。**Note:** After monomer or overall over-discharge protection, BMS is in deep sleep mode, so a charger is required to wake it up.
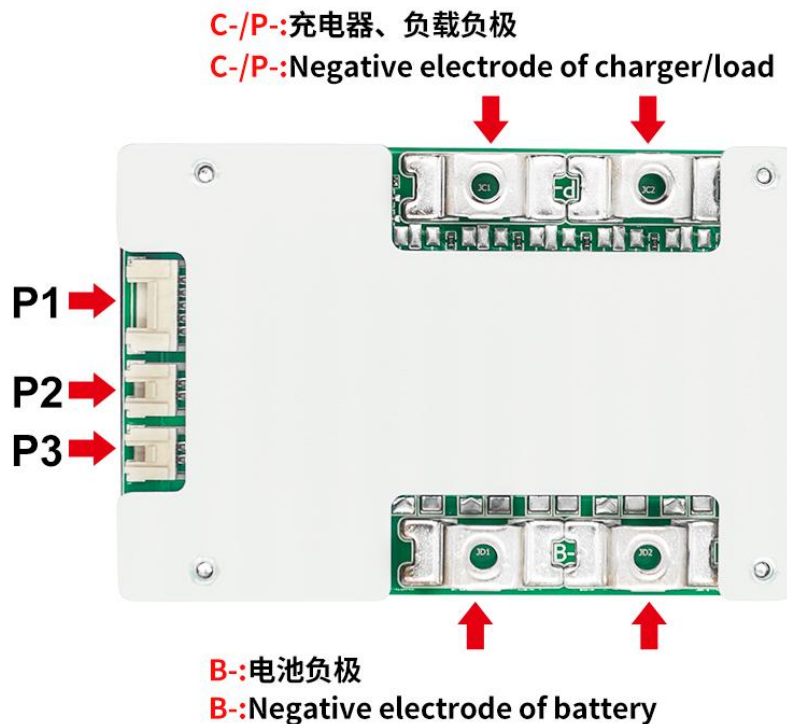
4.2. 弱电开关说明(The instructions of on/off switch)

弱电开关闭合时，打开充、放电MOS，BMS处于正常工作状态。弱电开关断开时，关闭充放电MOS，BMS处于保护状态。

When the on/off switch is on, then the charge and discharge of MOS is turned on, and the BMS is in normal working state. When the on/off switch is off, then the charge and discharge of MOS is turned off, and the BMS is in the protection state.

5. 信号口定义 (Definition of signal port)

5.1. 示意图标注接口标号见下图 (Illustration annotation refer to the following figures)

C-/P-:充电器、负载负极
C-/P-:Negative electrode of charger/load

P1
P2
P3

B-:电池负极
B-:Negative electrode of battery

5.2. 电气接口定义（Definition of Electrical Interface）

标号 (Label)	位号 (Tag number)	接插件功能 (Connector)	规格型号(Model)	PIN 功能定义 (Pin function definition)	备注 (Note)
1	**P1**	电压检测插座	HY2.0-5P	接最低节电芯负极 Connect to Negative Side of Cell 1	B0

R&D Address: Phoenix City Metro Station, Guangming District, Shenzhen, Guangdong Province
Factory address: 4th Floor, Building A9, Xinghuaxiong Industrial Park, Baihua Community, Guangming District, Shenzhen

8

				接第 1 节电芯正极 Connect to Positive Side of Cell 1	B1
		(Voltage detection interface)		接第 2 节电芯正极 Connect to Positive Side of Cell 2	B2
				接第 3 节电芯正极 Connect to Positive Side of Cell 3	B3
				接第 4 节电芯正极 Connect to Positive Side of Cell 4	B+
2	**P2**	NTC 插座 NTC interface	HY2.0-2P	NTC 插口 NTC interface	
3	**P3**	弱电开关插座 On/off interface	HY2.0-2P	弱电开关接口 On/off switch interface of Integrated style board	

6. 接线图、接线顺序以及注意事项 （Wiring diagram、Wiring sequence and Cautions）

6.1. 接线图说明(Description of the wiring diagram)

R&D Address: Phoenix City Metro Station, Guangming District, Shenzhen, Guangdong Province
Factory address: 4th Floor, Building A9, Xinghuaxiong Industrial Park, Baihua Community, Guangming District, Shenzhen

9
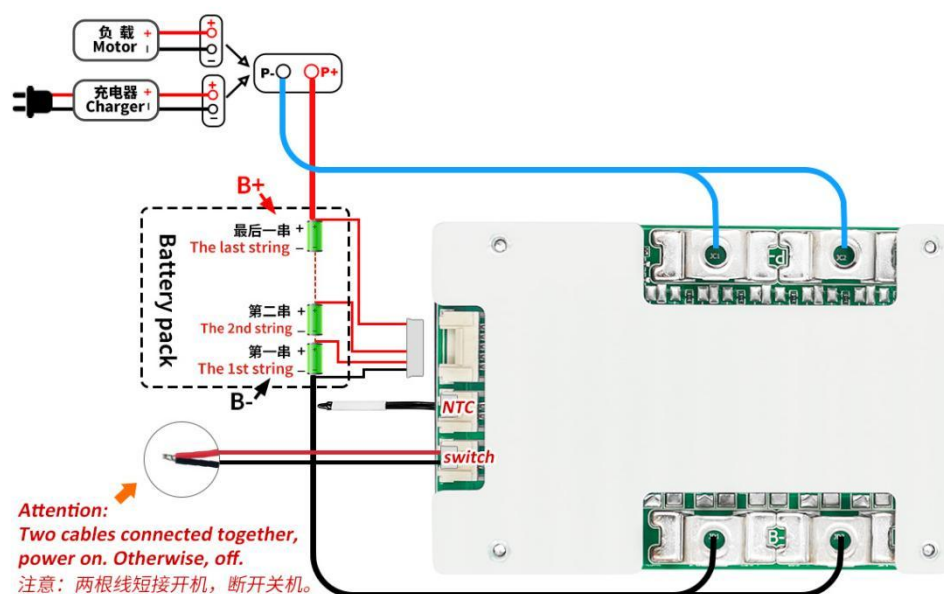
6.2. 接线顺序以及注意事项（Wiring sequence and Cautions）

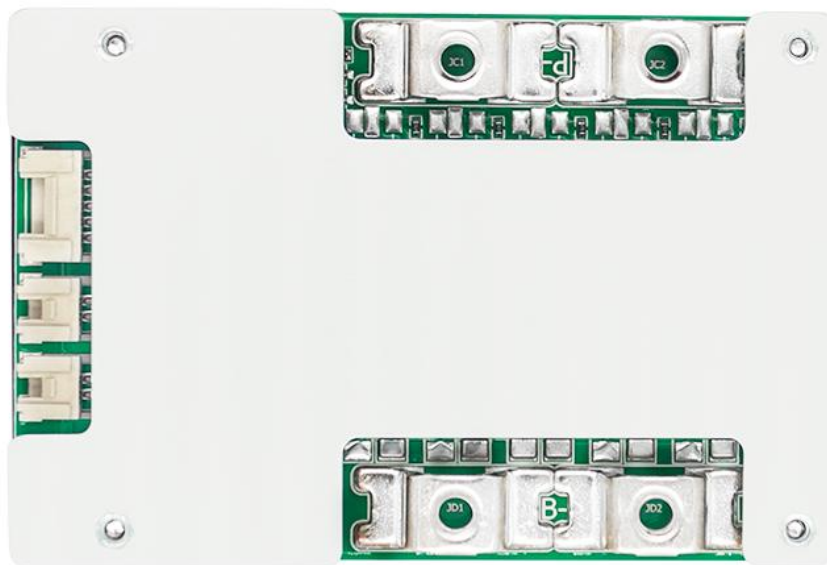保护板上电有严格的顺序要求，先接 B-、然后B0~B+依次由低到高的顺序插接电池采样线连接器，最后接上B＋，上电后需要充电或按键激活。所有连接线安装好后才能加负载或充电器。

拆除时，先拔掉充电器或负载，从B+~B0依次由高到低的顺序拆卸电池采样线连接器，最后拆卸 B-。

The BMS is powered on in a strict sequence. Connecting B- first, then connecting sampling cable connector of battery in ascending order B0 to B+, and finally connecting to B+. After power-on, you need to charge the battery or press a button to activate it. Load or charger can only be connected after all cables are installed.

When removing, first removing the charger and load, and then removing to the sampling cable connector of battery in descending order B+ to B0, and finally removing B-.

7. 实物图和尺寸图（Picture of Real Products and Dimension Figure）

7.1. 参考实物图: (以实物为准)Picture of real products for reference:(subject to our available products)

7.2. 主板尺寸图: (以结构图为准)　Dimension figure of the main board:（subject to our available products）

R&D Address: Phoenix City Metro Station, Guangming District, Shenzhen, Guangdong Province
Factory address: 4th Floor, Building A9, Xinghuaxiong Industrial Park, Baihua Community, Guangming District, Shenzhen

10

8. 环境要求（Environmental Requirement）

项目 Items	参数 Parameters	单位 Unit
工作温度 Work Temperature	- 20 ~ 55	℃
储存温度 Storage Temperature	- 20 ~ 55	℃
工作湿度 Work Humidity	10 ~ 85	%RH
储存湿度 Storage Humidity	10 ~ 85	%RH

9. 特别说明 (Special Note)

1. 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。

3The 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 2000A, the inductance of the short-circuit loop is very large, or the total length of the short-circuit wire is very long, please test to determine whether this management system can be used.

2. 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。

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.

3. 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。

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.

4. 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。

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.

5. 使用过程要注意防静电、防潮、防水等。

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

6. 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。

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.

7. 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。

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.

8. 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。

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

9. 我司产品进行严格的出厂检验测试，但是因为客户使用的环境不同（特别是在高温、超低温、太阳下等），难免会出现保护板故障，所以客户在选择和使用保护板时，需要在友好的环境下使用，及选择一定冗余量的保护板。

Our products undergo strict factory inspection and testing, but due to the different environments used by customers (especially in high temperature, ultra-low temperature, under the sun, etc.), it is inevitable that the BMS will fail. Therefore, when customers choose and use BMS, BMS needs to be in a friendly environment, and they need to select a BMS with a certain redundancy capability.

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11

10. 电池组串联说明（Battery Pack Series Connection Instructions）

注：电池组串联前请先跟本公司工程师确认保护板 MOS 耐压值，避免 MOS 耐压值小于电池组串联总压导致保护板损坏

Note: Before connecting the battery packs in series, please confirm the MOS voltage with our engineers to avoid the damage of the BMS due to the MOS voltage being less than the total voltage of the battery packs in series.

1. 将BMS安装到电池组后，测量电池B+,B-电压与B+,P-电压是否相等(即:电池组本身电压和经过保护板之后的电压是否相等)，相等即保护板正常工作,可以进行下一步电池组串联。如不相等,请按照接线顺序重新检查一遍

1.After installing the BMS into the battery pack, please measure whether the battery pack B+,B-voltage and B+,P-voltage are the same or not(i.e. whether the voltage of the battery pack itself is the same as the voltage of passed BMS). If the voltage are same , the BMS can work normally, then you can move to the next step of series connection of the battery pack. If the voltage are different, please check wiring connection again.

2.请将第一个电池组的负极（P-）连接到第二个电池组的正极（B+），依此类推，直到第四个电池组。

测量从第一个电池组的 B+ 到最后一个串联电池组的 P- 的电压。确认串联电池组的总电压与每个电池组之间的电压总和相匹配。如果电压不同，请重新检查上述步骤。（由于电池组是串联的，四个12V电池组的总电压将是 12V × 4 = 48V）

Please connect the negative pole (P-) of the first battery pack to the total positive pole (B+) of the second battery pack, and connect the negative pole (P-) of the second battery pack to the total positive pole (B+) of the third battery pack, and so on until the fourth battery pack.

Measure the total voltage after series connection(the voltage between the total positive pole B+ of the first battery pack and the positive pole P- of the fourth battery pack). Please confirm whether the total voltage after series connection is same with the sum of each battery pack voltage or not. If voltage is different, recheck the above steps. (Since the batteries are connected in series, the total voltage of the four 12V batteries will be 12V × 4 = 48V)