



东莞鲸鱼电池有限公司
WHALE BATTERY CO., LTD

编号 (Number) : WB-102024022106 版本 (Version) : A/0 第 1 页 共 7 页

Specification Of Lithium Battery

锂离子电池规格书

客户名称 (Customer Name) : _____

产品型号 (Product Model) : 48V60Ah 13S1P

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客户确认 Customer Approve		
签名 Signature	日期 Date	



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1. Preface 前言

This standard specifies the technical requirements, test methods and precautions for lithium-ion batteries produced by Whale Battery Co., Ltd. Which should be tested strictly in accordance with the specifications.
 本标准规定了由东莞鲸鱼电池有限公司生产的锂离子电池技术要求，测试方法及注意事项，需严格按照此规格书标准进行测试。

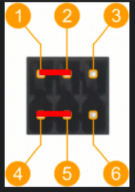
2. Battery Pack Specifications

2.1 Battery Pack Dimension Structural Diagram 电池尺寸结构图



Item 项目	Specification and size (mm)规格尺寸
Lenth 长度	240
Width 宽度	154
Thickness 高度	234
Power Wires Length 充放电电线长	300mm (connector not included)
RS485 Wires Length RS485 线长	250mm (connector not included)
Power Connector 充放电端子头	Molex Mini-Fit Sr male
RS485 Connector RS485 端子头	WANJIE WJ15EDGKN-3.5 male (Connection please see picture)
PVC	blue
Spray code content 喷码内容	please see the tag 见标签
Remarks 备注	生产码随生产日期变动! Production code changes with the production date!

RS485 connector pinout		
Pin	Name	Description
1	D_N	Driver negative signal
2	R_N	Receiver negative signal
3	GND	Device ground
4	D_P	Driver positive signal
5	R_P	Receiver positive signal
6	Vin	Power Input 9-30 VDC



2.2 Battery Pack Performance Parameters 电池包性能参数

Item 项目	Standard parameters 标准参数	Remarks 备注
Rated capacity 额定容量	60Ah	
Nominal voltage 标称电压	48V	
Shipment Voltage 出货电压	49.4V	
Charging mode 充电方式	CC/CV	
Cut-off voltage of charging 充电截止电压	54.6V	
Cut-off voltage of discharging 放电截止电压	39V	
Maximum continuous charging current 最大持续充电电流	10A	



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Maximum continuous discharge current 最大持续放电电流		10A
Weight of Battery Pack 电池包重量		15.6kg (Approx)
Working temperature 工作温度	charging 充电	0~50°C
	discharge 放电	-20~60°C
Storage temperature 存储温度	State of charge:50%~70% SOC. 荷电状态: 50%~70%SOC 1 month -10°C~45°C 3 months -10°C~40°C 12 months 0°C~30°C	

3. Cell Specifications 电芯参数

3.1 Construction (电芯结构)

cell is made of cathode, anode, separator, steel can and header etc..

电芯由正极、负极、隔膜、电解液和铝壳等组成。

3.2 Nominal Specifications 常规指标

Item 项目	Specification 参数
Charging voltage 充电电压	4.2V
Nominal voltage 额定电压	3.7V (0.2C 放电 discharge)
Standard charging method 标准充电模式	30A CC (constant current) charge to 4.20V, then CV (constant voltage 4.20V) charge till charge current decline to 0.02C at 25±2°C. 25±2°C温度下, 以 30A 恒流充电至 4.20V, 然后 4.20V 恒压充电至 电流小于 0.02C 截止。
Charging current 充电电流	Standard charge: 30A (0.5C) 标准充电: 30A (0.5C) Rapid charge: 60A (1C) 快速充电: 60A (1C)
Max continuous discharge current 最大持续放电电流	180A
Discharge cut-off voltage 放电截止电压	2.50V
Cell weight 电芯重量	Max weight: 0.9kg 最大重量:0.9kg
Cell Dimension 电池尺寸	29*148*103h mm
Operating temperature 工作温度	Charging (充电): 0~45°C Discharging (放电): -20~55°C
Storage temperature 存储温度	State of charge:50%~70% SOC. 荷电状态: 50%~70%SOC 1 month -10°C~45°C



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3 months -10℃~40℃	12 months 0℃~30℃
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3.3 Electrical characteristics 电性能

Items 项目	Test Methods and Condition 测试方法和条件	Criteria 标准
Rated Capacity 0.5C 额定容量 0.5C	Capacity measured with discharge current of 0.5C to 2.75V cut-off voltage after the standard charge. 标准充电后, 以 0.5C 电流恒流放电至 2.75V 截止所测得的容量。	≥60Ah
Cycle Life 循环寿命	Test condition: Temperature: 25± 2℃ Charge: standard charge Discharge: 0.5C discharge (4.1V to 3.0V) 80% or more capacity of 1st cycle capacity at 0.5C discharge 测试条件: 温度: 25± 2℃ 充电: 标准充电 放电: 0.5C 放电 (4.1V~3.0V) 容量低于 1st 容量 (1C) 80%, 停止测试。读取循环次数	≥1500times 次 @ 80%(80%DOD)
Initial Impedance 初始电阻	Impedance measured at AC 1KHz after 50% SOC 半充电电池 (50%SOC) 在 1KHz 下的交流电阻	/
Different Rate of Discharge 倍率放电	The battery shall be charged fully using standard charge flow , then discharge at different rate ,measure the capacity, and calculate percentage to 0.5C capacity. 标准充电的电池, 按照不同倍率要求的电流恒流放电至 2.75, 放出的容量和 0.5C 倍率放电的容量比较	0.5C ≥100% 1C ≥95% 3C ≥90%
Temperature Dependence of Discharge Capacity 高低温放电	The battery to be fully charged with standard charge condition, and shall be stored for 24 hours at the test temperature prior to discharging and then shall be discharged at the temperature with standard discharge condition. The capacity of the cell at each temperature shall be compared to the capacity achieved at 25℃ and the percentage shall be calculated. 充满电的电池, 在恒温箱中放置 24 小时后, 按照标准放电方法放电, 放出的容量即此温度条件下的容量。不同温度下的容量和 25℃ 条件下的 0.5C 容量比较	55℃ 95% 25℃ 100% 0℃ 80% -20℃ 70%
Temperature Dependence of charge Capacity 高低温充电	Capacity comparison at each temperature, measured with standard discharge at 25℃ after the Standard charge at the test temperature 在不同温度下, 按照标准放电方法充电, 测试 25± 2℃ 下标准放电容量	45℃ 100% 25℃ 100% 0℃ 80% -10℃ 70%
Storage Characteristics at Room Temperature 25℃ 存储特性	After standard charge, store the testing cells at 25±2°℃ for 28 days. discharge current of 0.5C with 2.75V cut-off voltage the residual discharge capacity >90% of Initial capacity 电芯标准充电后, 在 25±2℃ 下存储 28 天, 然后以 0.5C 的电流放电至 2.75V, 容量保持率 > 初始容量的 90%	≥90%



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3.4 Safety Performance Of Cell 电芯安全性能

No 序号	Items 项目	Test Method and Condition 测试方法和条件	Criteria 标准
1	Vibration test 振动测试	After standard charging, fixed the battery cell to vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz and 55Hz, the excursion of the vibration is 1.6mm. The cell shall be vibrated for 30 minutes per axis of XYZ axes. 将标准充满后的电池固定在振动平台上, 按照以下条件进行振动: 1) 频率范围 10Hz~55Hz, 频率变化速度: 1Hz/Min 2) 振幅: 1.6mm 3) 振动方向和时间: XYZ 三个方向, 每个方向振动 30 分钟。	No leakage, No fire No explosion 不漏液、不起火、不爆炸
2	Crush test 挤压测试	The battery to be fully charged with standard charging condition, and crushed between two flat plates. Applied force is 13kN. 将电池按标准充电模式充满, 然后将电池放在两平台中间, 采用 13KN 力进行挤压测试	No fire, No explosion 不起火、不爆炸
3	Overcharge test (1C10V) 过充测试 1C10V	The battery to be fully charged with standard charging condition, and be charged to 5.0V with 1C current, than keep CV (5V) charge for 2.5H. 将电池按标准充电模式充满, 1C 持续充电至 10V, 然后保持 5V 恒压充电 2.5H。	No fire, No explosion 不起火、不爆炸
4	Impact test 冲击测试	The battery to be fully charged with standard charging condition, and put a rod with diameter=15.8mm on the cell, and then heavy block (weight=9.1Kg) crash on the cell from a certain height (height=61.0cm) 将电池按标准充电模式充满, 上面横放一根直径为 15.8mm 钢棍, 然后将一重锤 (9.1kg) 从 61 cm 的高度跌落到电池上。	No fire, No explosion 不起火、不爆炸
5	Drop test 跌落实验	The battery to be fully charged with standard charging condition, and dropped from a height of 1m to concrete floor for 6times (+/- direction on x, y, z axes) 将电池按标准充电模式充满, 从 1m 高度自由跌落 6 次 (高度和直径方向正反各一次)	No leakage, No fire No explosion 不漏液、不起火、不爆炸
6	Short test 短路测试 25℃	The battery to be fully charged with standard charging condition, and short the positive and negative terminals for 1 hrs with wire resistance <5mOhm. and 25℃. 将电池按标准充电模式充满, 采用电阻<5mOhm 的导线将正负极短路 1h, 环境温度 25± 2 度。	No leakage, No fire No explosion 不漏液、不起火、不爆炸
7	Heating test 热箱测试 130℃	The battery to be fully charged with standard charging condition, Store the testing cells connecting with thermocouple in constant temperature box, heating the cells and box (speed of ascending temperature is 5℃ ±2℃per min) together at room temperature simultaneity, monitor the temperature change of the box, keep for 30 minutes after the box temperature reaches 130°C±2°C, then stop the test. 按标准方式充满电的电池放置到恒温加热箱中, 用热电偶连接电池监测电池温度。恒温箱升温加热电池, 要求恒温箱升温速度为每分钟 5±2℃。监测恒温箱	No fire, No explosion 不起火、不爆炸



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		温度变化, 当恒温 箱温度达到 130±2℃后恒温保持 30 分钟, 结束测试。	
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4. PCM Specifications 保护板参数

4.1 Electrical Performance Parameters of PCBA 保护板电性能参数

保护IC:	DW01	参数值 parameter value			
Protection IC:		常温25℃ General temperature 25℃			
项目 item	最小值 Min.	典型值 Type value	最大值 Max.	单位 Unit	
过充保护电压 Over charge protection voltage	4.25±0.05			V	
过充保护恢复电压 Over charge release voltage	4.15±0.05			V	
过放保护电压 Over discharge protection voltage	2.70±0.01			V	
过放保护恢复电压 Over discharge release voltage	3.00±0.01			V	
放电过流保护电流 Over current protection current	30-50			A	
过充保护延迟时间 Over charge protection delay time	1			ms	
短路保护延迟时间 Short protection delay time	250			us	
过放状态下静态电流 Current consumption (Power down)	0			uA	
导通内阻 Impedance	≤20			mΩ	
平衡电流 Balance current	30±5			A	
最大持续放电电流 Max continuous discharge	10			A	
最大持续充电电流 Maximum Continuous	10			A	
工作温度 Operating temperature	-20-70			℃	
推荐存储条件 Recommendatory storage condition	Temperature range: -5~+35℃		Humidity: 0%~75%RH		
其它功能 Other functions	过放自恢复允许				
0V电池充电功能 0V battery charge function	Available				

5. Shipment (运输)

The capacity of delivery cell is approximately at 40%~50% of charging. It is not specified more than 40%~40% capacity remain at customer, because of self-discharge. During transportation, keep the cell from acutely vibration, impacting, solarization, drenching.

出货电芯处于 40~50%充电状态, 由于电芯存在自耗, 运送到客户端的电芯无法完全保证 40~50%荷电量。运输过程应防止剧烈振动、冲击、日晒雨淋。

6. Warranty (质量保证)

Up to the date of shipment, the battery warranty period depends on the contract. However, during this period, Whale Battery Co., Ltd. will not promise free replacement if it is not the process cause of Whale Battery Co., Ltd., but the core quality problems caused by customer misuse.

至出货之日起, 电池的保修期取决于合同。但是, 在此期间, 如果不是东莞鲸鱼电池有限公司的工艺原因, 而是客户误用造成的核心



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质量问题, 东莞鲸鱼电池有限公司不会承诺免费更换。

Whale Battery Co., Ltd. No liability shall be assumed for any problems arising from the violation of safety codes.
东莞鲸鱼电池有限公司对因违反安全规范而引起的问题不承担任何责任。

7. Precautions and Safety Instructions(安全守则)

Abuse of lithium-ion rechargeable batteries may cause battery damage or personal injury. Before using lithium-ion rechargeable batteries, please read the following safety codes carefully:

滥用锂离子充电电池可能会造成电池的损害或人身的伤害。在使用锂离子充电电池以前, 请仔细阅读以下的安全守则:

Note 1. If customers need to operate or apply batteries under conditions other than this document, please consult Whale Battery Co., Ltd first.

注 1. 如果客户需要在本文件以外的条件下操作或使用电池, 请先咨询东莞鲸鱼电池有限公司。

Note 2. Whale Battery Co., Ltd. shall not be liable for any accident arising from the use of the battery in addition to the conditions specified in the document.

注释 2. 在该文件说明的条件之外使用该电池而产生的事故, 东莞鲸鱼电池有限公司不承担任何责任。

Standard battery Precaution 电池防范措施

- ◆Do not expose the battery to extreme heat or flame.
不要将电池暴露在极热或有火星的环境中。
- ◆Do not short circuit, over-charge or over-discharge the battery.
不要将电池短路, 过充或过放。
- ◆Do not subject the battery to strong mechanical shocks.
不要使电池承受过重的机械冲击。
- ◆Do not immerse the battery in water or sea water, or get it wet.
不要将电池浸入海水或水中, 或者使其吸湿。
- ◆Do not reverse the polarity of the battery for any reason.
不要颠倒电池的正负极。
- ◆Do not disassemble or modify the battery.
不要拆卸或修整电池。
- ◆Do not handle or store with metallic like necklaces, coins or hairpins, etc.
不要和项链, 硬币或发夹等金属物品放置在一起。
- ◆Do not use the battery with conspicuous damage or deformation.
不要使电池受到明显的损害或变形。
- ◆Do not touch a leaked battery directly.
不要直接接触泄漏的电池。
- ◆Do not mix lithium-ion battery with other battery.
不要将锂离子电池与其它电池混合使用。
- ◆Do not use or leave the battery under the blazing sun (or in heated car by sunshine).
不要将电池放置在太阳光直射的地方。
- ◆Keep battery away from children.
将电池放置在远离儿童的地方。

8. Consultation (技术咨询)

For the sake of safety assurance, please discuss the equipment design, its system and protection circuit of Lithium-ion battery with Whale Battery Co., Ltd in advance. And consult about the high rate current, rapid charge and special application in the same way.
为了安全起见, 如有设备设计, 锂离子电池系统保护电路或高电流, 快速充电和其它方面的特殊应用, 请先咨询东莞鲸鱼电池有限公司相关事宜。

As to the obscurity, contact the following:

如有疑问, 请按以下方式咨询:

Contact our sales/engineer

联系销售或者工程

网址(website): www.whalebattery.com