锂离子电池组技术规格书

Lithium-ion Battery Pack Specification

电池型号 Battery Model	**51.2V105Ah**
标称电压 Nominal Voltage	**51.2V**
标称容量 Nominal Capacity	**105Ah**
电芯类型 Cell Type	**磷酸铁锂** LFP
制定日期 Develop Date	**2025.11.15**

供方确认 The supplier confirmed	确认 Confirm	审核 Audit	批准 Approval
需方确认 Demand side confirmed	确认 Confirm	审核 Audit	批准 Approval

目录

Directory List

1、产品概述 Product Overview

本产品为 Supercustom.vip设计制造的**磷酸铁锂电池组**、含 BMS 管理系统、充电机（根据客户要求选配）、显示器，本产品适用于观光车，高尔夫车，叉车等车辆动力系统。This product is designed and manufactured by Supercustom.vip. Lithium iron phosphate battery pack, including BMS management system, charger, display, this product is suitable for sightseeing vehicles, golf carts, forklifts and other vehicle power system.

2、产品技术规格 Technical Specifications

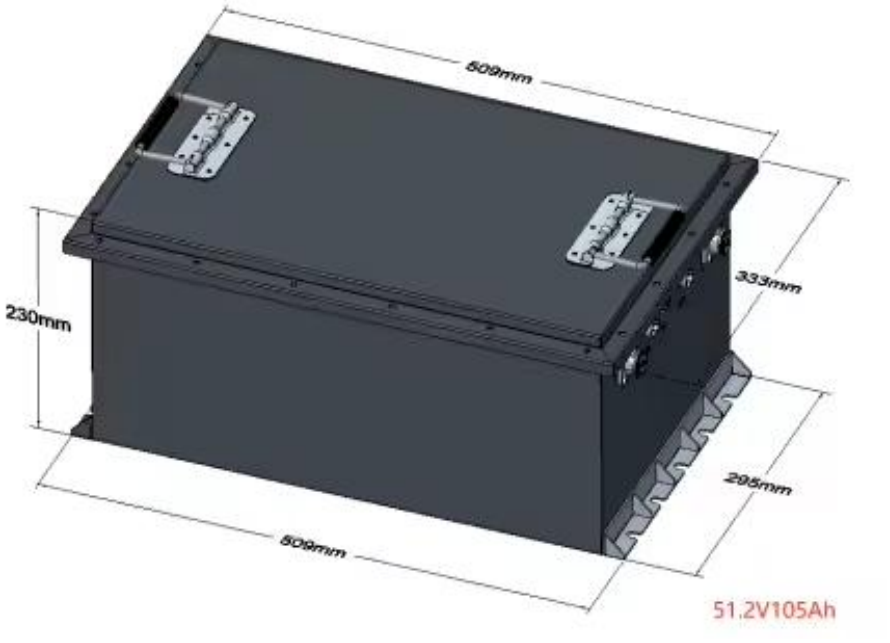
该型号产品为 51.2V105Ah 电池组，带通讯功能(CAN/485 通讯)，配套显示屏，充电机（根据客户要求选配）等。This product is 51.2V 105 Ah battery pack, with communication function (CAN/485 communication), display screen, etc.

2.1 电池组常规技术参数：Battery pack routine technical parameters

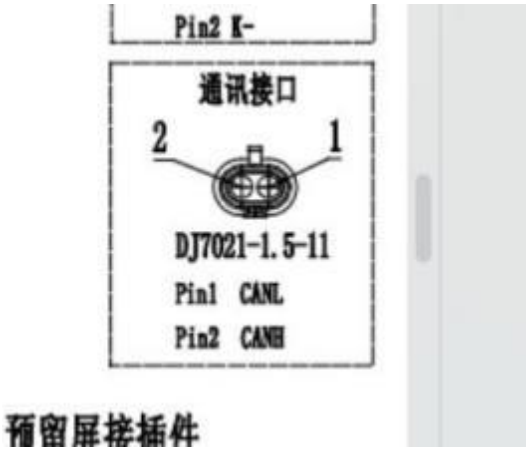
	No. (序号)	Item （项目）	General Parameter (常规参数)		Remark （备注）
电池组 Battery	1	组合方式 Combination type	16S1P		
	2	总能量 Total energy	5376Wh		
	3	循环寿命 Cycle life	≥4000 次		
	4	额定容量 Rated capacity	Typical （标称容量）	105Ah	标准充电后标准放电（针对电池组） standard discharge after charge (for battery pack)
			Minimum (最小容量)	105Ah	
	5	额定电压 Rated voltage	51.2V		工作电压 Working voltage
	6	放电截止电压 Discharge cutoff voltage	44V		放电截止电压 Discharge cutoff voltage
	7	充电电压 Charging voltage	58.4		电池上限电压 maximum battery voltage
	8	内阻 Internal resistance	≤60m Ω（不同电芯及 PACK 方案，此数值会有调整）≤60m Ω (the value will be adjusted for different cell and PACK scheme)		半电态下用交流法 AC 1KHz 测量内阻 Under half electric state, use AC method to measure internal resistance 1kHz

	9	一致性 Consistency	充放电末端单体压差≤250mV 250mVThe monomer pressure difference at the end of charge and discharge is less than 250mV	记录的是充放电单节最高/低 3.65V/2.5V 瞬间压差 What is recorded is the highest/low 3.65V/2.5V instantaneous pressure difference in a single charging section
	10	最大放电持续电流 Maximum discharge duration current	150A	
	11	最大放电瞬间电流 Maximum instantaneous discharge current	300A(30S)	350(3S)
	12	最大充电持续电流 Maximum charge duration current	40A	
	13	工作温度范围 Working temperature range	Charge（充电）: 0~55℃	可选配加热功能，<0 ° C 自动加热。Optional heating function, <0 ° C automatic heating.
			Discharge（放电）: -20~55℃	
	14	尺寸/ mm Size	509（长）*333（宽）*230（高） ±2mm	详见示意图 See the 3D schematic diagram
	15	重量 weight	55kg	以实测为准 Subject to actual measurement
	16	出货产品带电量 Shipment of products with electricity	50%-70%电量发货	
	17	包装材质 Package material	纸箱/栈板 Carton box or pallet	

2.2 电池箱尺寸结构示意图：Battery box size structure diagram：



No	丝印 ()	描述	出线接头	备注
1	DISCH+ DISCH-	放电正负极接口	防水格兰头	外接灰色安德森 175A，外部线长 500mm。
2	CHG+ CHG-	充电正负极接口	防水格兰头	外接灰色安德森 50A，外部线长 400mm
3	LCD	调试 CAN 通讯/显示屏	6pin 金属接口	配线长 600mm
4	SW	电池总开关/急停接口	2pin 金属接口，另一端 DJ7041-1.5-21	配线长 600mm
5	COM	整车通讯口	3pin 金属口	配线长 600mm



整车通讯定义示意图

开关定义示意图

3、电池管理系统 Battery management system

3.1 电池管理系统说明 Description of battery management system

1. BMS 为磷酸铁锂电池组设计； **BMS is designed for 16 series lithium iron phosphate battery pack;**

2.该 BMS 系统具有以下一些功能： **The BMS system has the following functions:**

单体电压采集，温度采集，通讯功能（CAN 通讯/485），显示屏，限流，过充电保护功能，过放电保护功能，过电流保护功能，短路保护功能（以外置保险为准），均衡功能，告警功能。

Single voltage collection, temperature collection, communication function (CAN communication / 485), display, current limit, over charge protection function, over discharge protection function, over current protection function, short circuit protection function, balance function, alarm function.

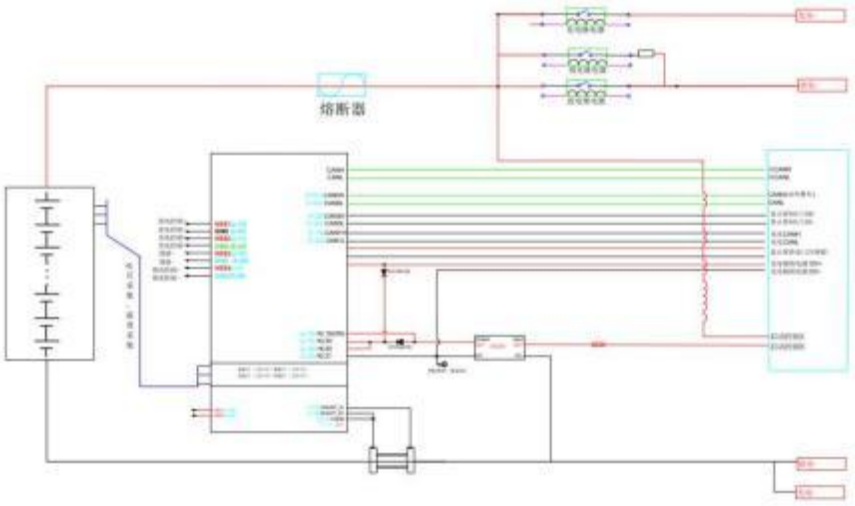
3.1.1 电池管理系统参数 Battery management system

项目item	参数 parameter	备注remark
BMS工作电压 BMS Working voltage	9V DC~36V DC	

静态功耗 Static power	0.36W		参考值
工作环境温度 Operating environment temperature	-40~80℃		
单体电压采集 Single cell voltage collection	采集范围 Collection scope	0~5V	
	采集精度 Collection accuracy	0~2.3V，误差（Error）±5mV	
	采集周期 Collection cycle	≤300ms	
电池温度采集 Battery temperature collection	采集范围 Collection scope	-40~+85℃	
	采集精度 Collection accuracy	-40~-30℃， 误差（Error）±2℃	
		-30~+60℃， 误差（Error）±1.5℃	
		+60~+85℃， 误差（Error）±2℃	
		+85~+125℃， 误差（Error）±4℃	
	采集周期 Collection cycle	≤110ms	
充放电电流采集 Current collection	采集范围 Collection scope	-150~500A	有外置的分流器/霍尔，以外置元件精度为准 If there is an external shunt/hall, the external component accuracy shall prevail
	采集精度 Collection accuracy	<0.5% FSR	
高压采集 High voltage collection	电压采集范围0~100V Voltage collection scope 0~100V		
	单体电压累积和采集精度5‰FSR Cell voltage accumulation and collection accuracy		
均衡 Equilibrium	均衡电流 The equilibrium current	80mA	开启条件： 充放电末端/压差过大 Opening conditions: The charging and discharging end/pressure difference is too large
SOC估算 SOC calculate	估算误差 Calculate error	≤5%	
预充 Charge in advance	带放电预充功能 Pre-charge function with discharge		
通信	CAN 接口，3 路(支持 Bootloader) CAN interface,3way (support Bootloader)		以实际沟通为准

Communication	485 接口，1 路(支持 Bootloader) 485 interface, 1 way (support Bootloader)		

3.2 参考电气原理图 Refer to electrical schematics



3.3 控制策略 The control strategy

3.3.1 休眠功能 Dormancy

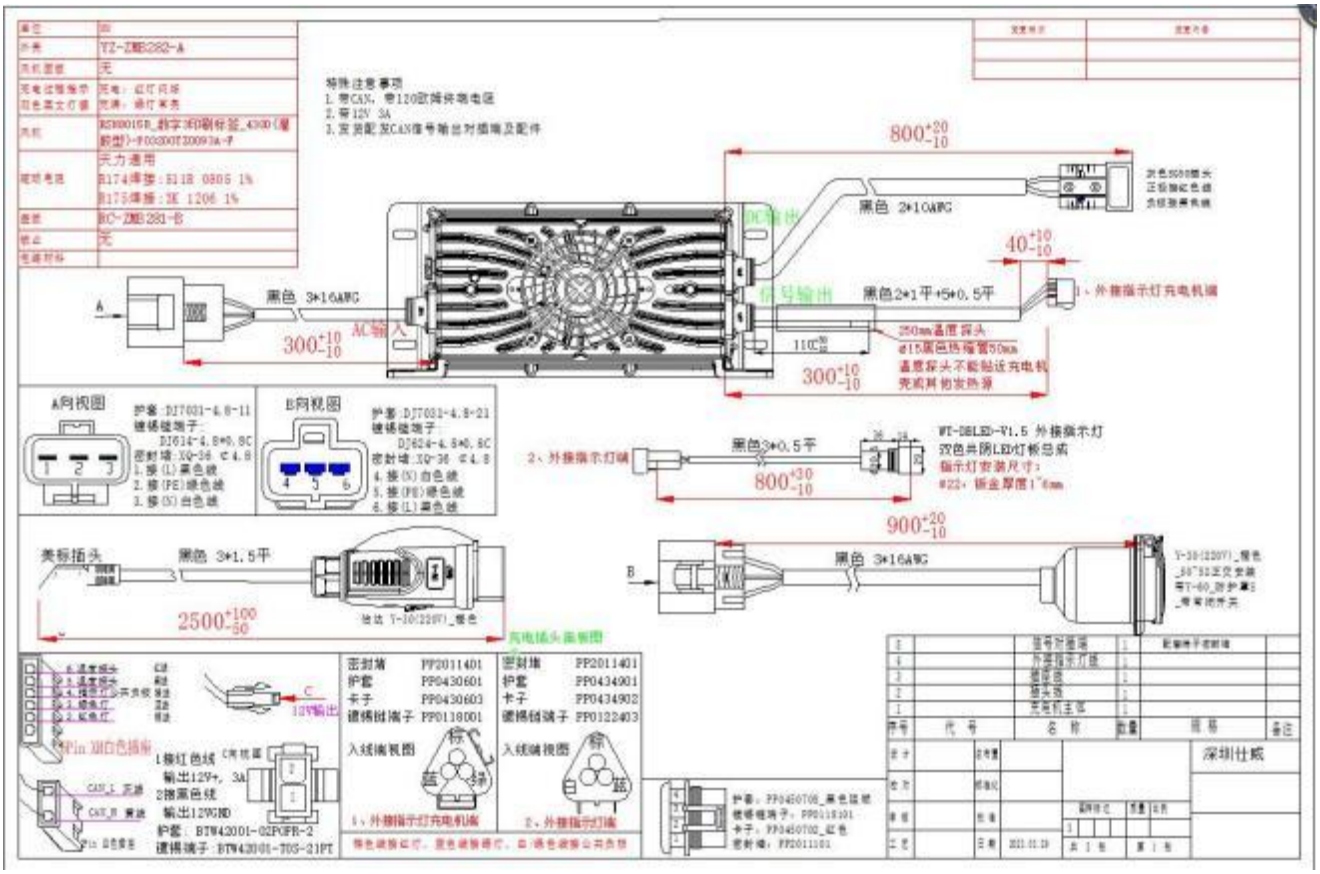
当电池总回路电流≤2A，且持续时间≥48h，进入休眠状态，需重启后方可上电激活，重新工作。If the total circuit current of the battery is less than or equal to 2A and the duration is greater than or equal to 48 hours, the battery enters the hibernation state. Restart the battery before it is powered on and activated

3. 3.2 定位和远程管理 Location and remote management

通过无线数据传输网络，电池数据云平台与 BMS 智能终端模块连接，支持电池系统实时信息与状态查询、远程报警预警、软硬件信息追溯等功能。Through the wireless data transmission network, the battery data cloud platform is connected to the BMS intelligent terminal module, supporting the battery system real-time information and status query, remote alarm and early warning, software and hardware information traceability and other functions.

4、显示屏 Display

5、充电机



6、电池组测试条件 Battery pack test condition

除特殊指出外，所有测试都在以下条件进行（标准测试条件）：Unless otherwise specified, all tests are performed under the following conditions (standard test conditions) :

环境温度： 25±5℃(若周边环境温度低于 20℃， 电池组需在≥20℃条件下静置 5 小时以上，再进行测试)

Ambient temperature: 25±5℃ (if the ambient temperature is lower than 20℃, the battery pack shall stand for more than 5 hours at ≥20℃, and then carry out the test)

环境湿度： 30%~80%

Environmental humidity： 30%~80%

大气压力： 86kpa~106kpa

Atmospheric pressure: 86kPa ~ 106kPa

成组标准充放电 Group standard charge and discharge

标准充电：将电池组以 0.2~0.5C 电流恒流恒压充电至截止电压，截止电流 0.02C；Standard charging: charge the battery pack at 0.2-0.5C current constant voltage to cut-off voltage, cut-off current 0.02C ;

标准放电：将电池组以 0.5~1.0C 电流恒流放电至截止电压；Standard discharge : charge the battery pack to cut-off voltage at 0.5~1.0C constant discharge current ;

5.1、电池组电性能/安全性能/机械性能测试 Battery electrical/safety/mechanical performance test

（表中未提及项目符合相关国家部分标准）(Items not mentioned in the table comply with: YD/T2344.1-2011 "Lithium-Iron Phosphate Battery Pack for Communication Part 1: Integrated Battery Pack" and "QB-H-005-2012 Lithium-Iron Phosphate Battery for Communication Base Station" China Mobile Communications Enterprise Standard)

①电气性能测试 Electrical performance test

测试项目 Test item	测试方法 The test method	技术要求 The technical requirements

放电容量 Discharge capacity	在标准测试条件下，对电池组进行标准充电，以 0.1C 电流放电，记录放电容量。Under standard test conditions, charge the battery pack standard, discharge at 0.1C current, and record the discharge capacity	≥100%标称容量 ≥100% nominal capacity
-20℃低温放电容量 -20℃ low temperature discharge capacity	电池组标准充电后，在-20±2℃低温环境中储存 8H 后，以 0.1C 电流放电至终止电压，记录放电容量。After standard charging, the battery pack was stored in a low temperature environment of -20 ± 2 ℃ for 8H, then discharged at 0.1C current to the termination voltage, and the discharge capacity was recorded.	≥65%标称容量 （不带 BMS）≥65% nominal capacity (without BMS)
55℃高温放电容量 55℃ high temperature discharge capacity	电池组标准充电后，在 55±2℃高温环境中储存 4H 后，以 0.1C 电流放电至终止电压，记录放电容量。After standard charging, the battery pack was stored in a high temperature environment of 55 ± 2 ℃ for 4H, then discharged at 0.1C current to the termination voltage, and the discharge capacity was recorded.	≥97%标称容量≥97% nominal capacity
荷电保持能力（残余容量）和容量恢复能力Charge retention capacity (residual capacity) and capacity recovery capacity	电池组标准充放电后，记录初始容量；电池标准充电后，在 15~35℃的条件下搁置 28d，然后放电记录残余容量；在将电池进行标准充放电，记录恢复容量 。The initial capacity of the battery pack is recorded after standard charge and discharge. After standard charging, the battery was stored at 15~35 ℃ for 28d, and then discharged to record the residual capacity. After standard charging and discharging of the battery, record the recovery capacity.	残余容量（荷电保持率）≥95% 恢复容量≥97%Residual capacity (charge retention rate) ≥95% Recovery capacity ≥97%
循环寿命 Cycle life	将电池组标准充电后，以 0.5C 放电，当放电容量小于起始容量的 80%时终止循环寿命测试。After standard charging, the battery pack is discharged at 0.5C, and the cycle life test is terminated when the discharge capacity is less than 80% of the initial capacity.	≥2000 次

55℃7 天储存 55 ℃ for 7 days storage	电池组标准充放电后，记录初始容量；电池标准充电后，在 55±2℃高温环境中储存 7 天，然后放电记录残余容量；在将电池进行标准充放电，记录恢复容量。The initial capacity of the battery pack is recorded after standard charge and discharge. After standard charging, the battery was stored in a high temperature environment of 55±2℃ for 7 days, and then discharged to record the residual capacity. After standard charging and discharging of the battery, record the recovery capacity.	残余容量≥92% 恢复容量≥95% Residual capacity ≥92% Recovery capacity ≥95%

②安全性能 Safety performance

测试项目 Test project	测试方法 Test method	技术要求 Technical requirements
短路 A short circuit	将电池组标准充电后，放置在防爆箱中，用内阻小于 100mΩ的导线短路于电池组外部的正负极，试验过程中记录电池表面温度，短路持续时间 10min，即完成测试。 或以单体电芯进行短路安全评估测试。After standard charging of the battery pack, place it in the explosion-proof box, short-circuit the positive and negative poles outside the battery pack with wires with internal resistance less than 100m Ω , record the battery surface temperature during the test, and the short-circuit duration is 10min, then the test is completed. Or to carry out short circuit safety assessment test with single cell.	不起火，不爆炸 （不带保护线路及壳体试验） No fire, no explosion (without protective circuit and shell test)

过充电 charging	将电池组标准充电后，用恒流恒压源对电池组某一单节进行 0.2C 充电，恒流充电至 5V 后转为恒压充电，直到截止电流到 0A 或表面温度小于环境温度+10℃以下时，结束试验。After standard charging of the battery pack, charge a single section of the battery pack with a constant current constant voltage source at 0.2C. After constant current charging to 5V, switch to constant voltage charging. The test ends when the cut-off current reaches 0A or the surface temperature is less than the ambient temperature +10℃	不起火，不爆炸 （不带保护线路及壳体试验） No fire, no explosion (without protective circuit and shell test)
过放电 Discharge	将电池组标准充电后，用负载仪对电池组进行 0.5C 持续放电，直至某一单节电池电压到达 0~0.5V 时，结束试验。After the battery pack is charged standard, the load meter is used to discharge the battery pack continuously at 0.5C until the voltage of a single battery reaches 0~0.5V, and the test ends.	不起火，不爆炸 （不带保护线路及壳体试验） No fire, no explosion (without protective circuit and shell test)

③机械性能 Mechanical property

振动 vibration	1. 将整组包装完整待出货试验品放置于振动台面上，以 10~90HZ 来回扫描振动 3h，扫描速度为 1HZ/S,分别以前后，上下，左右六个面扫描振动；振动完成检查内部和外部包装，并对电池组进行检查和标准充放电测试。 2. 将电池组放置于振动台面上，以 10~90HZ 来回扫描振动 3h，扫描速度为 1HZ/S,分别以前后，上下，左右六个面扫描振动；振动完成后对电池进行检查并进行标准充放电；1. Place the whole package of test products to be shipped on the shaking table, and scan them back and forth at 10~ 90Hz for 3h with a scanning speed of 1Hz /S. Scan the vibration on the front and back, up and down, and left and right surfaces respectively; Vibration completion inspection of the internal and external packaging, and battery pack inspection and standard charge and discharge tests. 3. 2.The battery pack is placed on the shaking table, and the vibration is scanned back and forth at 10~ 90Hz for 3h, and the scanning speed is 1Hz /S. The vibration is scanned on the front and back, up and down, and left and right surfaces respectively. After the vibration is completed, the battery shall be checked and standard charge and discharge shall be carried out.	1. 内部包装部件无破损，电池组无变形破损及任何安全隐患；放电容量≥99%标称容量 2. 电池组外部无变形破损；放电容量≥99%标称容量 1. No damage to the internal packaging parts, no deformation damage to the battery pack and no potential safety hazard; Discharge capacity ≥ 99% nominal capacity 2. There is no deformation or damage outside the battery pack; Discharge capacity ≥ 99% nominal capacity

6、箱内附装 Package

待沟通，按需求出，封箱、打包带、批量配套栈板+护角，层高符合外纸箱承重要求；

According to customer requirement,Wooden box.pallet,carton box.etc

7、唛头 Shipping mark

唛头待出货前通知 According to customer requirement before shipping.

8、产品贮存及运输 Product storage and transportation

产品贮存 Product storage

产品长期存放不使用时，请放置于干燥通风处，避开易燃易爆物品；每三个月定期对电池组进行充点电维护，确保电池处于最佳性能状态。When the product is not used for a long time, please place it in a dry and ventilated place to avoid flammable and explosive items. Perform charging point maintenance on the battery pack every three months to ensure the battery is in the best condition。

产品运输 Product transportation:

电池组应经过外部包装后才能运输，在运输过程中应防止剧烈震荡、冲击或挤压，防止日晒雨淋。 The battery pack shall be transported only after external packaging. During transportation, it shall be prevented from violent shock, impact or extrusion, and from sun and rain.

9、产品使用注意事项 Notes for product use

1) 切勿将电池投入水中。 Never put the battery in water.

2) 禁止将电池处于我们所规定温度范围以外充电及使用；请勿在火源，热源附近对本产品进行贮存、充电以及使用。 Do not charge or use the battery outside the specified temperature range ; Do not store, charge or use the product near the fire source or heat source.

3) 当电池组散发出异味或泄露，应立即停止使用或停止充电，并移至空旷通风处，远离火源，及时与我司取得联系。When the battery pack gives off odor or leaks, stop using or charging immediately, and move to an open and ventilated place, away from the fire source, and contact us in time.

4) 接负载使用中，请勿将正负极接反。 Connect the load in use, do not connect the positive and negative poles.

5) 请勿用金属导体将电池组正负极短路。Do not short-circuit the positive and negative poles of the battery pack with metal conductors.

6) 请勿将电池组投入火中或给其加热。Do not put the battery pack into the fire or heat it.

7) 严禁将电池组进行人为解剖，严禁用钉子或尖锐物体刺穿电池组，严禁用锤子或其他外力敲击电池组，严禁

人为踩踏和摔落电池组。 It is strictly prohibited to conduct artificial dissection of the battery pack, to puncture the battery pack with nails or sharp objects, to strike the battery pack with hammers or other external forces, and to tramp and drop the battery pack artificially.

8) 严禁将电池组放入微波炉或压力容器中。 Do not put the battery pack in the microwave oven or pressure vessel.

9) 充电或使用过程出现任何异常现象，请立即停止充电和使用。If any abnormal phenomenon occurs during charging or using, please stop charging and using immediately.

10) 产品的最佳使用温度为 25±5℃， 若产品在使用过程中未处于此温度范围内，放电容量将有所降低。The best use temperature of the product is 25±5℃. If the product is not in this temperature range during use, the discharge capacity will be reduced.

11) 如在使用过程中出现故障或异常，请与我们联系，请勿私自拆卸电池组。If any fault or abnormality occurs during use, please contact us and do not remove the battery pack without permission.

12) 以上测试为到货时间不超过 1 个月的新电池。The above tests refer to the new batteries with the arrival time of less than one month.

13) 电量低于 5%或者单体电压低于 2.8V 时请及时充电，否则电池久置容易欠压无法充电。13)When the battery is lower than 5% or the single voltage is lower than 2.8V, please charge in time, otherwise the battery is easy to undervoltage and cannot be charged for a long time.

14) 3~6 月长期不用，请充电 70~100% SOC 电量，并按下关闭总开关/急停开关，以免电池过放电。If it is not used for a long time from March to June, please charge 70-100% SOC power and press off the main switch/emergency stop switch to avoid overdischarge of the battery

15) 每次充电建议充满到 100%电量（偶尔不满充也没有影响）， 电池会在电量 100%时进行校正 。 15) It is recommended that the battery be charged to 100% power each time (it will not be affected if it is not charged occasionally), and the battery will be corrected when the power is 100%.

16) 休眠处理：断开电池总开关/急停开关，等待 3-5s，闭合开关， 电池解除休眠。16) Hibernation treatment: Turn off the battery main switch/emergency stop switch, wait for 3-5s, close the switch, and the battery will be released from hibernation.

17) 勿将总开关线束与其他线束接在一起，总开关线束为电池高压部分。Do not connect the main switch harness with other wiring harnesses. The main switch harness is the high-voltage part of the battery

18) 外部线束接线按标签定义接线。External wiring harness shall be connected according to the label definition.