

香港明達科技發展有限公司

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AAA高电压高功率型 聚合物 锂离子蓄电池 规格书
Specification for HV Super Power Type Li-Po Battery
产品型号 Part No.: EP7897197VVP

制定 Prepared by	审核 Checked by	批准 Approved by
李/Li	张/Zhang	贾/Jia

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香港明達科技發展有限公司
HONGKONG MINGDA INDUSTRIAL INT'L CO., LIMITED
Add: FLAT/RM A 12/F KIU FU COMMERCIAL BLDG,
300 LOCKHART ROAD, WAN CHAI, HONG KONG
Tel: 00852-6586 2586
Http://www.epbattery.cn
E-mail: info@epbattery.cn (Sales); support@epbattery.cn (Technical Support)

客户承认书
Approval Sheet

客户名称 Customer		To:	
电池组型号 Pack Model No.		规格 Specification	
电芯型号 Cell Model No.	EP7897197VVP	规格 Specification	20000mAh, 3.90V 10C
保护板型号 PCM No.	/	规格 Specification	/
规格书编号 Specification No.		总页数 Total Pages	10 pages including this page
工程图纸编号 Drawing No.	/	附件 Attachment	Data Sheet

样品跟踪记录表/Record Form of Sample Tracing

版本 Revision	送样时间 Date	样品批号 Lot No.	确认结果 Confirmation Result	备注 Note
	/	/		未送样

客户意见 (Customer comment):

承办: HONGKONG MINGDA INDUSTRIAL INT'L CO., LIMITED <hr/> 签名: _____ 职务: _____ 日期: _____	认可: <hr/> 印章: _____ 签名: _____ 职务: _____ 日期: _____
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Please return this sheet after your approvals.

1、范围**Scope**

本规格书描述了由香港明達科技發展有限公司生产的高倍率聚合物锂离子蓄电池有关参考技术指标及测试方法、使用要求。

This specification describes the technical parameter, testing method and using requirement of polymer Li-ion battery manufactured by HONGKONG MINGDA INDUSTRIAL INT'L CO., LIMITED.

2、主要技术参数**Main Technical Parameter****2.1 电芯和电池组规格参数 Technical Parameter Of Cell and Pack:**

项目 Item	电芯 Cell	成品 Pack	备注 Remark
1. 主要化学成分 Cell Chemistry	LiCoO2	N/A	
2. 标称容量 Rated Capacity	20000mAh	N/A	电芯标准充电后 0.2C 放电至 2.75V Fully Discharge to 2.75V @ 0.2C. after the cell standard charge
3. 额定电压 Rated Voltage	3.90V	N/A	平均放电电压 Average Discharge Voltage (discharged at 1CmA)
4. 内阻 Internal Resistance	Typical: 0.88mΩ; Max: 1.2mΩ	N/A	通过电芯的正负极耳测试 Measure the resistance with the cathode and anode tab
5. 最大连续放电电流 Max. Constant Discharge Current	200A	N/A	10C
6. 最大峰值放电电流 Max. Peak Current	400A	N/A	20C
7. 峰值电流放电时间 Time for peak discharge current	3S	N/A	
8. 放电截止电压 Discharge Cut-off Voltage	2.75V	N/A	2.75V/Cell
9. 最大持续充电电流 Max. Constant Charge Current	60A	N/A	3CmA *
10. 最大峰值充电电流 Max. Peak Charge Current	120A	N/A	6CmA *
11. 最大峰值电流充电时间 Time for peak charge current	3S	N/A	
12. 充电截止电压 Charging Cut-off Voltage	4.45V	N/A	4.45V/Cell
13. 尺寸 Product Size	N/A	N/A	
14. 重量 Weight	309g	N/A	±10g
15. 工作温度范围 Range of Work Temperature	充电 Charge		0~+45°C <i>Can be charged at 60°C, but may cause swell.</i>
	放电 Discharge		-20~+60°C

* The cell can achieve constant charging of 5C and peak charging of 10C for 3S for fields with low requirements of cycle life and KERS systems.

3、测试方法及条件

Testing method

3.1 标准测试条件

Standard test conditions

被测试电池须为本公司出厂时间不超过一个月的新电池，且电池未进行过五次以上充放电循环。除其它特殊要求外，本产品规格书规定的测试条件为：温度 $23\pm 2^{\circ}\text{C}$ ，相对湿度 45%~65%RH,大气压 86kPa~106kPa。如果已经证明测试结果不受这些测试条件影响，实验也可以在温度 $15\sim 30^{\circ}\text{C}$ ，相对湿度 25%~85%RH 的条件下进行。

The battery for test must be new produced no more than 1 month and charge-discharged less than 5 cycles. Unless otherwise specified, all tests stated in this Specification shall be conducted at the temperature of $23\pm 2^{\circ}\text{C}$ and the relative humidity of 45%~65%RH, and atmospheric pressure is 86kPa~106kPa. If it is judged that the test results are not affected, the tests may be conducted at the temperature in the range from 15°C to 30°C and the relative humidity in the range from 25%RH to 85%RH.

3.2 测试设备要求

Measuring Equipment

- (1) 测量尺寸的仪器精度应大于等于 0.01mm。
- (2) 万用表测量电压及电流的准确度应不低于 0.5 级，测量电压时内阻不应小于 $10\text{k}\Omega/\text{V}$ 。
- (3) 内阻测试仪测量原理应为交流阻抗法（1kHz LCR）。
- (4) 电池测试系统的电流精度应为 $\pm 0.1\%$ 以上，恒压精度 $\pm 0.5\%$ ，计时精度不低于 $\pm 0.1\%$ 。
- (5) 测量温度的仪表准确度应不低于 $\pm 0.5^{\circ}\text{C}$ 。
- (1) Slide caliper should have an accuracy of the grade 0.01mm or higher.
- (2) The multi-meter should have an accuracy of the grade 0.5 or higher. The impedance when testing voltage should be more than $10\text{K}\Omega/\text{V}$.
- (3) The impedance meter with AC 1 kHz should be used.
- (4) For the battery testing system, the accuracy of current should be more than $\pm 0.1\%$, the accuracy of voltage should be more than $\pm 0.5\%$ and the accuracy of time should be more than $\pm 0.1\%$.
- (5) The thermometer should be have an accuracy of the grade 0.5°C or higher.

3.3 标准充电

Standard Charge

1.0CmA(20000mA) 4.45V(CC-CV), 截止电流为 0.05CmA;

1.0CmA(20000mA) 4.45V(CC-CV), Cut-off current is 0.05CmA.

3.4 搁置时间

Rest Time

如无特殊要求,电池充放电间隔 30min。

Unless otherwise specified, between battery charging and discharging, there is a 30min interval.

4、产品性能

Performance

4.1、电性能测试

Electricity Characteristics

项目 Item	测试方法 Testing method	要求 Requirement	
1. 开路电压 Open-circuit voltage	标准充电后, 24 小时内测量开路电压 Measure the open-circuit voltage of the battery within 24 hours after the Standard Charge	≥4.45V	
2. AC 内阻 AC Resistance	充半电后, 在 23±2°C 采用交流法测量内阻 (正负极耳测试) After half charge, measure the resistance with the cathode and anode tab at AC 1KHz ,23±2°C	电池总内阻 ≤1.2mΩ Resistance of Cells≤1.2mΩ	
	充半电后, 在 23±2°C 采用交流法测量内阻 (通过放电导线两端测试) After half charge, measure the resistance with the discharge wires at AC 1KHz ,23±2°C	成品组合内阻 ≤/mΩ Resistance of Battery Pack≤/mΩ	
3. 容量 Capacity	充满电后, 搁置 30min, 0.2CmA 放电至 2.75V Discharge the battery at a constant current of 0.2CmA to 2.75V after Standard Charge and rest 30min	放电容量 Discharge Capacity≥98% (Nominal Capacity)	
4. 倍率放电特性 C-rate Discharge Characteristics	电池在标准充电后, 用标称最大连续放电电流 200A 进行恒流放电到 2.75V 截止 Discharge the battery at a constant current of 200A to 2.75V after Standard Charge	放电容量 Discharge Capacity≥85% (1C)	
5. 放电温度特性 Temperature Dependence of the Discharge Capacity	电池在 23±2°C 标准充电, 然后在 30 分钟内冷却或加热到测试温度。放电前电池在此温度下保持 2 小时, 放电电流为 1.0CmA(20000mA), 做完一个温度实验后, 电池在室温下放置 2h 然后进行充电 (23±2°C) Heat or cool the battery to the testing temperature within 30min and rest for 2 hours after standard charge at 23±2°C, then discharge at 1.0CmA (20000mA. When a test finished, charge the battery after rested 2 hours at room temperature (23±2°C)	-20°C	≥60%
		25°C	≥100%
		60°C	≥95%
6. 循环性能 Cycle Life characteristics	标准充电后, 搁置 30min, 1C 放电至 3.0V, 搁置 30min, 重复上述步骤进行循环, 直至电池放电容量连续 3 次 ≤80% (1C), 测试温度 23 ± 2 °C (影响电池循环性能的重要参数) Measure capacity under the cycle conditions described below, until the discharge capacity ≤80% (1C) for three times. Cycle conditions: Standard Charge (CC-CV, 10000mA, 4.45V), Rest for 30min; Discharge at 1C to 2.75V cut-off. Testing temperature is 23 ± 2°C	循环次数 ≥500 次 Cycle Life ≥500 cycles 放电容量 Discharge Capacity ≥80% (1C)	

4.2 储存特性 Storage Characteristics

项目 Item	测试方法 Testing method	要求 Requirement
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常温贮存 General Temperature Storage Characteristics	1	标准充电后电池在 23±2°C 的环境中贮存 30 天, 测试 1.0CmA 放电容量 (保持容量) Store the battery, which is charged at standard charge condition, for 30 days at 23±2°C. Measure the remaining capacity of the battery at 1.0CmA discharge	容量保持≥85% C1.0 Remaining Capacity≥85% C1.0
	2	1.0CmA 循环 3 次, 测试恢复容量 (3 周循环的最大放电容量) Charge and discharge at 1.0CmA for 3 cycles. Measure the recovery capacity (the max. discharge capacity for three cycles)	容量恢复≥90% C1.0 Recovery Capacity≥90% C1.0
高温贮存 High Temperature Storage Characteristics	1	标准充电后电池在 60±2°C 的环境中贮存 7 天, 测试 1.0CmA 放电容量 (保持容量) Store the battery, which is charged at standard charge condition, for 7 days at 60±2°C. Measure the remaining capacity of the battery at 1.0CmA discharge	容量保持≥60% C1.0 Remaining Capacity≥60% C1.0
	2	1.0CmA 循环 3 次, 测试恢复容量 (3 周循环的最大放电容量) Charge and discharge at 1.0CmA for 3 cycles. Measure the recovery capacity (The max. discharge capacity for three cycles)	容量恢复≥80% C1.0 Recovery Capacity≥80% C1.0
长期贮存性能 Long-term Storage Characteristics		贮存前给电池充入 50% 的容量, 然后开路搁置 365 天, 在 23±2°C 的环境条件下 1.0CmA 循环 3 次, 测试恢复容量 (3 周循环的最大放电容量) Store the battery at 23±2°C for 365 days after charging the battery with 50% capacity, then charge and discharge the battery at 1.0CmA, at 23±2°C for 3 cycles. Measure the recovery capacity (The Max. discharge capacity for three cycles)	容量恢复≥85% C1.0 Recovery Capacity≥85% C1.0

4.3 机械特性

Mechanical Performance

项目 Item	测试方法 Testing method	要求 Requirement
恒定湿热性能 Constant humidity and temperature test	标准充电后, 将电池放入 40±2°C, 相对湿度为 90%~95% 的恒温恒湿箱中搁置 48h, 取出电池在环境温度 23±2°C 条件下, 搁置 2h, 若外观无明显变化则以 1.0CmA 放电至 2.75V Put the battery into an oven of constant humidity (90%~95%) and constant temperature (40±2°C), rest for 48 hours, take it out and rest for 2 hours at 23±2°C, then discharge at 1.0CmA to 2.75V cut-off	放电容量≥80% C1.0 Discharge Capacity≥80% C1.0
振动 Vibration test	标准充电后, 将电池安装在振动台上, 在 X、Y、Z 三个垂直方向进行实验, 振动频率在 10~55Hz 间以 1Hz/min 的速度变化, 往复振动 30min 振动频率: 10~30Hz 位移振幅: 0.38mm 振动频率: 30~55Hz 位移振幅: 0.19mm Fix the battery on a vibration table, vibrate it at X, Y, Z orientation. Change the frequency of vibration with 1Hz/min from 10Hz to 55Hz, redo it for 30min	电池外观无明显损伤、漏液、冒烟或爆炸, 电池电压≥4.0V The battery has no obvious defaced, no leakage, no smoking or no explosion. The voltage of battery

	Frequency: 10~30Hz Swing distance: 0.38mm Frequency: 30~55Hz Swing distance: 0.19mm	≥4.0V
自由跌落 Free drop test	<p>电池振动试验结束后按下列条件进行自由跌落试验： 跌落高度：1.0m 承接物：18~20mm 厚硬木板 跌落方向：沿水平方向正反面各跌落一次 将电池以 1.0CmA 恒流放电至 3.0V, 然后进行 3 次循环 Do the free drop test according to the condition described below after finished the vibration test Altitude: 1.0m Receiver: a hard board of 18~20mm Orientation: two sides of battery at horizontal Discharge the battery to 2.75V at 1.0CmA, then charge-discharge the battery 3 cycles, measure the discharge capacity</p>	<p>电池外观无明显损伤、漏液、冒烟或爆炸 容量保持率≥85% C1.0 容量恢复率≥90% C1.0 The battery has no obvious defaced, no leakage, no smoking or no explosion Remaining Capacity≥85% C1.0. Recovery capacity≥90% C1.0</p>

5、储存及运输要求

Storage and Shipment Requirement

项目 Item	要求 Requirement	备注 1 Remark1	备注 2 Remark2
1、贮存温度 Storage temperature	-20°C~+35°C	小于 1 个月 Less than 1 month	运输时推荐贮存温度为 23±5°C
	-20°C~+35°C	超过 6 个月 More than 6 months	The best temperature in shipment is 23±5°C
2、湿度 Humidity	≤75%RH		
3、荷电量 Charged Capacity	30-60%	Cell 电压 3.75-3.90V Cell Voltage 3.75-3.90V	Pack 电压 3.75-3.90V Pack Voltage 3.75-3.90V

6、电池保质期

Warranty period of battery

电池保质期为从工厂发货起半年期限内，如果确实证明电池没有经受过异常使用而是因为本身的材料或制造过程导致的品质问题，明達科技免费赔偿等值的新电池。

The warranty period of a battery is half year after shipment. However, if the battery is unusual within this period, Mingda Industrial will replace a new battery for free as long as it is clear that the problem is the failure of material or manufacturing process and the battery is not used abnormally.

7、免责条款

Exemption from Warrantee

对超出说明书外的误操作导致的问题，明達科技不承担任何责任。

如因保护电路、电池组、RC 模型和充电器的匹配使用不当导致的问题，明達科技不承担任何责任。

对超出保质期的产品，明達科技不承担任何责任。

产品已经验收合格，在客户端装配过程导致的电池损坏，明達科技不承担任何责任。

Mingda Industrial will not be responsible for trouble occurred by handling outside of the

precautions in this specification.

Mingda Industrial will not be responsible for trouble occurred by miss-matching electric circuit, battery pack, RC model and charger.

Mingda Industrial will not be responsible for any problems caused beyond warranty period of battery.

Mingda Industrial will be exempt from warrantee to any defect cells during assembling after acceptance.

8、电池使用指南

User manual

认真阅读下面的注意事项，确保正确使用锂离子蓄电池。对于客户的使用超出规格说明书外的情况，香港明達科技發展有限公司或者其销售商不承担有关事故的责任。

For the use of the battery exactly, the Customer shall strictly observe this item described below. The defects other than those caused by user overstep this Specification shall be excluded from the warranty of HONGKONG MINGDA INDUSTRIAL INT'L CO., LIMITED.

警告!

不仔细阅读下述事项可能导致电池泄露、爆炸或起火

- ◆ 不能把电池进入水中，长时间不用时把电池放在阴凉和干燥的地方保存。
- ◆ 禁止与一次电池（如干电池）或不同容量、型号、品种电池组合使用。
- ◆ 电池应放在小孩接触不到的地方，如果小孩不小心吞咽电池应立即寻求医疗救济助。
- ◆ 不能在产热源的附近使用或存放电池，比如火源或加热炉。
- ◆ 充电时必需使用符合规格的充电器。
- ◆ 请勿将正负板接反。
- ◆ 请勿将电池直接连接到墙上插座或车载点烟式插座上。
- ◆ 请勿将电池投入火中或给电池加热。
- ◆ 禁止用导线或其它金属物体将电池正负极短路。
- ◆ 禁止将电池与项链、发夹或其它金属物体一起运输或贮存。
- ◆ 禁止撞击、投掷电池，使电池受到硬物撞击。
- ◆ 禁止直接焊接电池端子。
- ◆ 禁止用钉子或其它尖锐物体刺穿电池壳体，禁止锤击或脚踏电池。
- ◆ 禁止以任何方式分解电池。

WARNINGS!

The battery will fire, explode or leak if not strictly observing this item described below.

- ◆ Do not immerse the battery in water or seawater, and keep the battery in a cool dry environment during stands by period.
- ◆ Do not mix use the battery with one-off battery (such as dry battery) or different performance together.
- ◆ Keep all batteries out of the reach of little children. Consult a doctor immediately if a battery is swallowed.
- ◆ Do not use or leave the battery near a heat source such as fire or heater.
- ◆ When re-charging, use the battery charger specifically for that purpose.
- ◆ Do not reverse the positive (+) and negative (-) terminals.
- ◆ Do not connect the battery to an electrical outlet.

- ◆ Do not dispose the battery in fire or heat.
- ◆ Do not short-circuit the battery by directly connecting the positive (+) and negative (-) terminals with metal objects such as wire.
- ◆ Do not transport or store the battery together with metal objects such as necklaces, hairpins etc.
- ◆ Do not strike or throw the battery against hard surface.
- ◆ Do not directly solder the battery.
- ◆ Do not pierce the battery with a nail or other sharp object.
- ◆ Never disassembling the battery in any way.

注 意!

- ◆ 不要在极热环境中使用或者储存电池，如阳光直射或热天的车内。否则，电池会过热，可能着火（点燃），这样就会影响电池的性能、缩短电池的使用寿命。
- ◆ 不要在强静电场所使用电池，否则电子保护装置可能会受到损坏导致危险事故。
- ◆ 如果电池漏液后电解液进入眼睛，不要擦，应用水冲洗，立即寻求医疗救助。如不及时处理，眼睛将会受到伤害。
- ◆ 如果电池发出异味、发热、变形、变色或出现其它任何异常现象时不得使用；如果电池正在使用或充电，应立即从用电器中或充电器上取出并停止使用。
- ◆ 如果电池的端子变脏，使用前用干布擦干净。否则电池会接触不良，从而引起能量损耗或无法充电。
- ◆ 随意丢弃电池可能会导致火灾，处理电池前需要把电池 100%放电并用绝缘胶带把电池的输出端进行绝缘。

CAUTIONS!

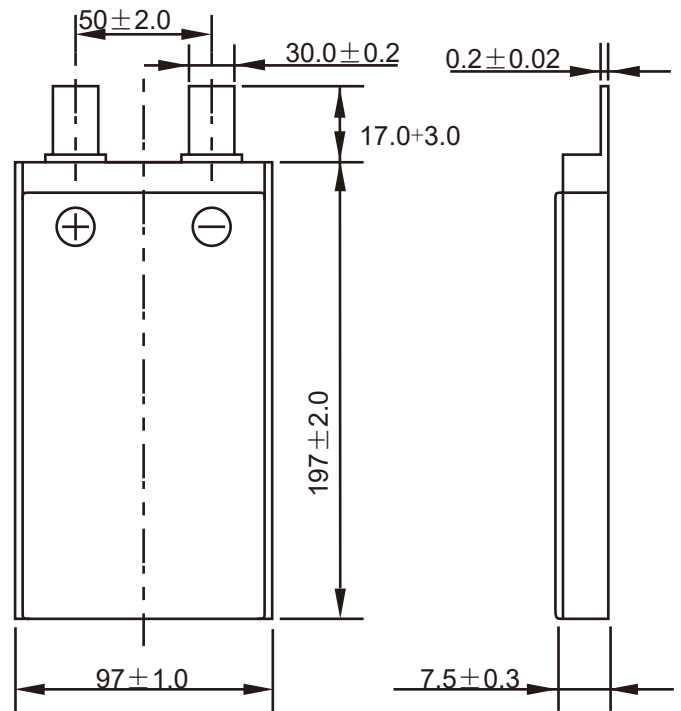
- ◆ Do not use or leave the battery at very high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). Otherwise, it can overheat or fire or its performance will be degenerate, and its service life will be shortened.
- ◆ Do not use it in a location where static electricity is rich, otherwise, the safety devices may be damaged, causing a harmful situation.
- ◆ In case the electrolyte getting into the eyes due to the leakage of battery, do not rub the eyes! Rinse the eyes with clean running water and seek medical attention immediately. Otherwise, it may injure eyes or cause a loss of sight.
- ◆ If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charger and place it in a container vessel such as a metal box.
- ◆ In case the battery terminals are contaminated, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection between the battery and the electronic circuitry of the instrument.
- ◆ Be aware discarded batteries may cause fire, 100%discharged the battery and tape the battery terminals to insulate them before disposal.

Data Sheet for EP7897197VVP-20000mAh 3.90V

Specifications

Model		EP7897197VVP
Nominal Capacity		20000mAh
Nominal Voltage		3.90V
Weight(Approx.g)		309±10g
AC-Impedance(mΩ) at 1KHz		Typical: 0.88mΩ; Max: 1.2mΩ
Dimensions	Thickness	7.5±0.3mm
	Width	97±1mm
	Length	197±2.0mm
Nominal Charge Condition	Current	20000mA(1.0C)
	Voltage	4.45V
	Cut-off Current	1000mA(C/20)
	Ending Time	1.5h
Nominal Discharge	Current	20000mA(1C)
	Cut-off Voltage	2.75V
Max. Continuous Charge Current		60A(3C)
Max Discharge Current	Continuous	200A(10C)
	Burst	400A(20C)
Temperature Condition	Charge	0~45°C *
	Discharge	-20~60°C
	Storage	-20~35°C

Dimensions(mm)



* Can be charged at 60°C, but may cause swell.