聚合物锂离子可充电电池

Lithium ion Polymer Rechargeable Battery

产品规格书

Specification

型号 / Model: **F20-08180225**

标称容量 / Nominal Capacity: **20 Ah**

日期 / Date: **2011-02-10**

制定 Prepared by	审核 Checked by	批准 Approved by

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1、适用范围 Scope

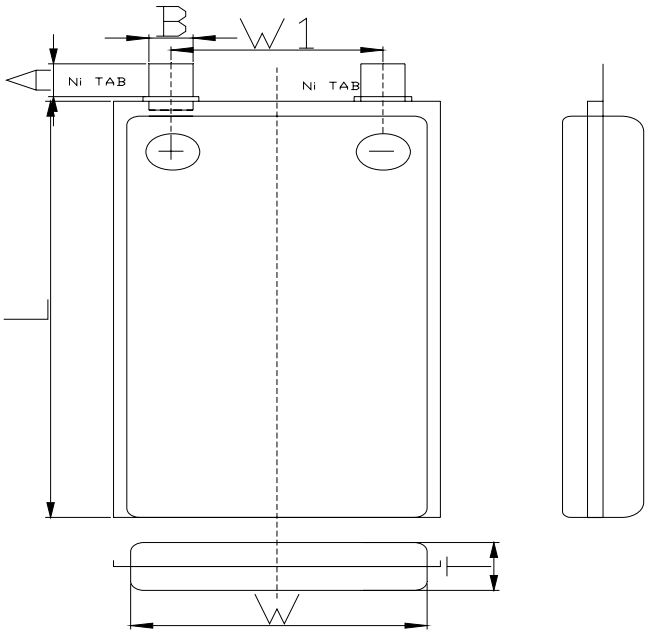
本产品规格书描述了山东润峰集团新能源科技有限公司(以下简称润峰新能源)生产的聚合物锂离子电池的产品性能指标。

This specification describes the performance index of the lithium ion polymer rechargeable battery manufactured by Shandong RealForce Enterprises Co., Ltd. (RealForce Enterprises for short below).

2、规格型号 Model：F20-08180225

其中“F”代表磷酸亚铁锂材料；“20”为电池的容量 20 Ah ；“08”为电池的厚度 8.0mm；“180”为电池的宽度 180mm；“225”为电池的高度 225mm。

“F” represents $LiFePO_4$ material；“20”battery nominal capacity 20Ah；“08” battery Thickness 9.0mm；“180” battery width 180mm；“225” battery height 225mm.

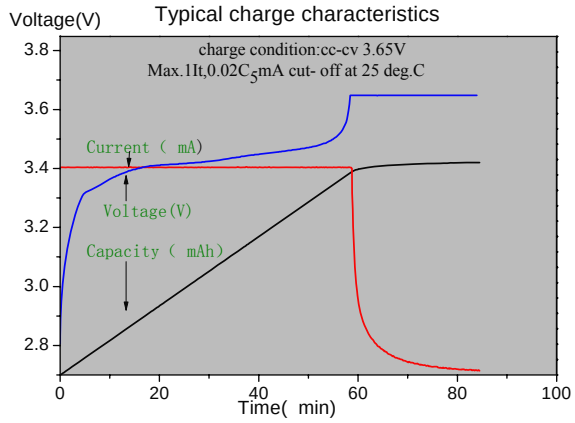


项目 Items	描述 Discriptions	尺寸 Size（mm）
T	电芯厚度 Thickness	8.2 (max)
W	电芯宽度 Width	180.5 (max)
L	电芯高度 Height	226.0 (max)
B	极耳宽度 Tab Width	30.0±0.2
A	极耳长度 Tab Length	50±2
W1	极耳中心距 Tab Distance	90±2

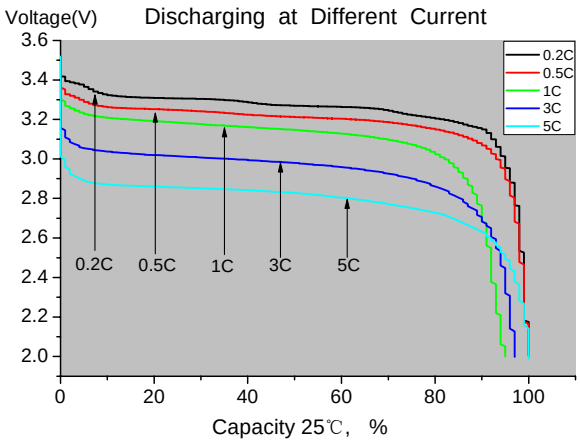
3、规格 Specification

项目 Items		标准 Standards	备注 Remarks
1. 容量 Capacity	标称容量 Typical	20Ah	CC/CV, 0.5C_5mA Discharge
	最小容量 Minimum	19.5Ah	CC/CV, 0.5C_5mA Discharge
2. 标称电压 Nominal Voltage		3.2V	
3. 内阻 Internal Resistance		≤3mΩ	交流 AC, 1 kHz, Full Charged
4. 电池重量 Battery Weight		560g±15 g	
5. 充电方法 Battery Charge	标准充电 Standard Charge	0.5C	2.5 小时(CC/CV, 参考 4.2) 2.5hrs(CC/CV, Refer to 4.2)
	快速充电 Quick Charge	1C	1.5 小时(CC/CV，参考 4.3) 1.5hrs(CC/CV, Refer to 4.3)
6. 恒流充电终止电压 CC Charge Cut-off Voltage		3.65±0.05V	/
7. 放电 Discharge	标准放电 Standard Discharge	10A, 2.00V	0.5C恒流放电 CC discharge@0.5C_5mA
	最大放电 Maximum Discharge	40A, 2.00V	2C恒流放电 CC Discharge@2C_5mA
8. 脉冲放电 8 秒 Pulse Discharging 8 seconds		100A	5C @25℃

9. 充电特性 Typical Charge Characteristics

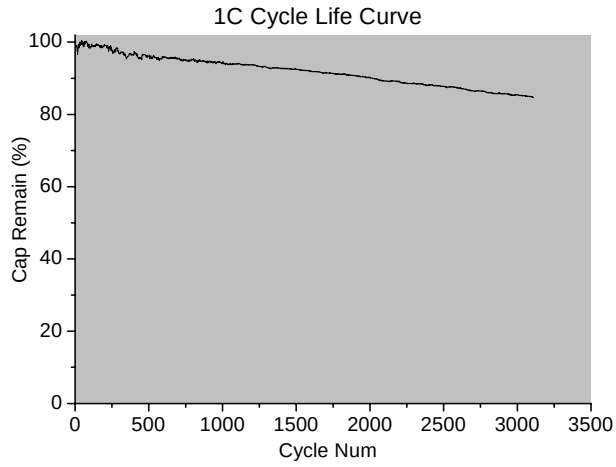


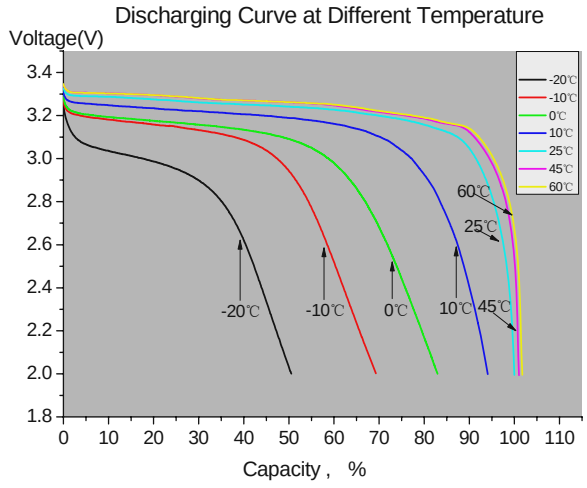
10. 倍率放电特性 Discharge Characteristics at Different Current



11.循环寿命 Cycle Life	大于 3000 次 > 3000times	具体见 5.6 节 Refer to 5.6

12. 温度放电特性 Discharging Curve at Different Temperature





13.使用温度范围 Operating Temperature Range	充电温度范围 Charging Temperature	0℃～45℃	环境温度(电池表面温度必须小于 65℃) Environment temperature(battery surface temperature must be less than 65℃)
	放电温度范围 Discharging Temperature	-20℃～60℃	环境温度(电池表面温度不超过 80℃) Environment temperature(battery surface temperature not to exceed 80℃)
	存储温度范围 Storage Temperature	-10℃～60℃	建议长期储存的温度范围是 0~35℃ recommended long-term storage temperature is 0~35℃
14.存储寿命 Storage Life		一年 One year	装运的常用值 Nomal shippment
15.外观 Appearance		无变形、污迹、电解液泄露等 No deformations, stains, or electrolyte leakages	

4、测试条件 Testing Conditions

4.1 标准测试条件 Standard Testing Condition

若无特别要求，此规格书上产品测试条件均为：温度 25℃±2℃，湿度(65±20)%RH，气压 101.325kPa。

Without special requirements, all the tests of this specification shall be done under: temperature 25℃±2℃, humidity (65±20)%RH, air pressure 101.325kPa。

4.2 标准充电 Standard Charge

在 4.1 规定条件下，先用 0.5C_5mA充电至 3.65V，再以 3.65V恒压充电至电流小于 0.03 C_5mA。

Under 4.1 specified conditions, charge at 0.5C_5mA to 3.65V, then charge with constant voltage 3.65V until the current is less than 0.03C_5mA.

4.3 快速充电 Quick Charge

在 4.1 规定条件下，先以 1C_5mA充电至 3.65V，再以 3.65V的恒压充电至电流小于 0.02 C_5mA。

Under 4.1 specified conditions, charge at 1C_5mA to 3.65V, then charge with constant voltage 3.65V util the current is less than 0.02C_5mA.

5、电性能 Electrical Performance

测试项目 Test Items	测试方法 Test Methods	测试标准 Test Standards
5.1 0.5C 放电性能 0.5C Discharging Performance	电芯按 4.2 或 4.3 规定充电后,在 4.1 规定条件下搁置 0.5～1 小时，而后以 0.5 C_5mA放电到终止电压。 Charge the battery with 4.2 or 4.3 specified methods, stored for 0.5～1hr under 4.1, then discharge at 0.5C_5mA to cut-off voltage.	放电时间不低于 117 分钟 Discharging time should not be less than 117mins

5.2 1C 放电性能 1C Discharging Performance	电芯按 4.2 或 4.3 规定充电后,在 4.1 规定条件下搁置 0.5～1 小时，而后以 1C_5mA放电到终止电压。 Charge the battery with 4.2 or 4.3 specified methods, stored for 0.5～1hr under 4.1, then discharge at 1C_5mA to cut-off voltage.	放电时间不低于 57 分钟 Discharging time should not be less than 57 mins
5.3 高温性能 High Temperature Performance	电芯按 4.2 或 4.3 规定充电结束后，将电芯放入 55℃±2℃的高温箱中恒温 2 小时，然后以 1 C_5mA放电至终止电压，实验结束后，将电芯取出在 4.1 规定条件下搁置 2 小时，然后目测电芯外观。 Charge the battery with 4.2 or 4.3 specified methods, put cells into 55℃±2℃ high temperature box with constant temperature for 2hrs, discharging at 1C_5mA to cut-off voltage. Then take the cell out, stored for 2hrs under 4.1, check the exterior appearance.	1.放电时间不低于 54 分钟 Discharging time should not be less than 54mins 2.电芯外观无变形，无爆裂 Exterior appearance no deformations and cracks
5.4 低温性能 Low Temperature Performance	电芯按 4.2 或 4.3 规定充电结束后,将电芯放入 -20±2℃的低温箱中恒温 2 小时，然后以 0.5 C_5mA 放电至终止电压，实验结束后，将电芯取出在 4.1 规定条件下搁置 2 小时，然后目测电芯外观。 Charge the battery with 4.2 or 4.3 specified methods, put the cells into -20±2℃ low temperature box with constant temperature for 2hrs, discharging at 0.5 C_5mA to cut-off voltage. Then take the cells out, stored for 2hrs under 4.1, check the exterior appearance.	1.放电时间不低于 45 分钟 Discharging time should not be less than 45mins 2.电芯外观无变形，无爆裂 Exterior appearance no deformations and cracks
5.5 荷电保持能力 Charge Retainability	电芯按 4.2 或 4.3 规定充电结束后，在 4.1 规定条件下搁置 28 天，再以 0.2 C_5mA放电至终止电压。 Charge the battery with 4.2 or 4.3 specified charging methods, stored for 28 days under 4.1, then discharge at 0.2C_5mA to cut-off voltage.	容量保持率≥95% Capacity retention rate≥95%
5.6 循环寿命 Cycle Life	电芯按 4.3 规定充电后,搁置 0.5～1hr，然后以 1 C_5mA放电至终止电压，放电结束后，搁置 0.5～1hr，再进行下一个充放电循环，连续循环 3000 次。 Charge the battery with 4.3 specified charging methods, stored for 0.5~1hr, discharge at 1C_5mA to cut-off voltage. After discharging, stored for 0.5~1hr, then do charge and discharge cycles more than 3000 times.	容量保持率≥80% Capacity retention rate≥80%

6、环境性能 Environmental Function

测试项目 Test Items	测试方法 Test Methods	检验标准 Test Standards
6.1 恒定湿热测试 Constant Heat & Humidity Test	电芯按 4.2 或 4.3 规定充电结束后,将电芯放入 40℃±2℃(90%～95%RH)的恒温恒湿箱中搁置 48hrs后，将电芯取出在室温下搁置 2 h,目测电池外观，在以 1 C_5mA放电至终止电压。 Charge the battery with 4.2 or 4.3 charge methods, put cells into 40℃±2℃ (90%～95%RH) constant temperature and humidity box, and stored for 48hrs, then take cell out, stored for 2 hrs under room temperature. Check the exterior appearance, discharge at 1C_5mA to cut-off voltage	1 电池外观应无变形，锈蚀，冒烟或爆炸 Exterior appearance no deformations, corrosion, smoke or explosion 2 放电时间应不低于 36 分钟 Discharging time no less than 36mins

6.2 振动测试 Vibration Test	电芯按 4.2 或 4.3 规定充电结束后，将电芯安装在振动台的台面上，按下面的振动频率和对应的振幅调整好实验设备。X.Y.Z.三个方向上每个方向上从 10～55 Hz 环扫频振动 30mins,扫频速率为 1oct/min: 振动频率：10Hz～30 Hz; 位移幅值(单幅)：0.38 mm; 振幅频率：30Hz～55 Hz; 位移幅值(单幅)：0.19mm。 Charge the battery with 4.2 or 4.3 charge methods, install battery on the vibration table, adjust the equipment according to the following vibration and amplitude frequency. From X,Y,Z three directions in 10Hz~55Hz sweep vibration to sweep for 30mins with the sweep frequency speed rate at 1oct/min: Vibration frequency：10Hz~30 Hz(single amplitude) Displacement amplitude(single)：0.38mm; Amplitude frequency：30Hz~55 Hz(single amplitude) Displacement amplitude(single): 0.19mm.	1.电芯外观无明显损伤，漏液，冒烟或爆炸 Exterior appearance no apparent stain, leakage,smoke and explosion 2.电芯电压不低标称电压 Battery voltage no less than nominal voltage
6.3 碰撞测试 Crash Test	电芯按 6.2 的规定实验结束后，将电池分别按 X.Y.Z 三个互相垂直轴通过夹具固定在震动台面上，按下述要求调好加速度、脉冲持续时间，进行碰撞试验；脉冲峰加速度：100m/s²,每 min 碰撞次数：40～80 脉冲持续时间：16 mins,碰撞次数：1000±10。After battery tested with 6.2 specified methods, fix the battery through the fixture from the three perpendicular X,Y,Z axes respectively to the viabration table, then following the requests below to adjust the acceleration, pulse duration time for crash test: Pulse peak acceleration: 100m/s^2, Collision frequency per min: 40~80 Pulse duration time: 16mins collision Frenquency: 1000±10.	1.电芯外观无明显损伤，漏液，冒烟或爆炸 Exterior appearance apparent stain, leakage ,smoke and exposion. 2.电芯电压不低标称电压 Battery voltage no less than nominal voltage
6.4 自由跌落测试 Free Drop Test	电芯按 6.3 的规定实验结束后，将电芯样品从高度为 1000mm 的位置自由跌落到置于水泥地面上的 18-20mm 后的木板上，从 X.Y.Z 正负方向(六个方向)每个方向自由跌落 1 次，自由跌落结束后，将电芯进行 1C 充放电循环，直至放电时间不低于 51mins,即可终止充放电循环，充放电循环数应不低于 3 次。After battery tested with 6.3 specified methods, let the sample drop from the height of 1000mm to 18-20mm wooden board on the cement floor. Drop from the positive and negative pole in X, Y, Z (6 directions) once respectively. Then at $1C_5A$ to act on the charge and discharge cycles until the discharging time is no less than 51mins. The cycles is no less than three times.	电芯应不漏液，冒烟或爆炸 Battery no electrolyte leakage, smoke or explosion

7、安全测试 Safety Test

测试项目 Test Items	测试方法 Test Methods	测试标准 Test Standards
7.1 重物冲击测试 Heavy Impact Test	将电芯放在冲击台上，将直径为 Φ15.8mm 重量为 9.1kg 的铁球置放于电池中心上方，让其自 610mm 高度自由落下，冲击电芯，电芯允许发生变形。Put the Battery on the impact platform, let the steel column of Φ15.8mm 9.1kg right above the battery center, then drop it from the height of 610mm to impact the cell. Distortion is allowed	电芯不起火，不爆炸 Battery with no fire or explosion
7.2 挤压测试 Extrusion Test	将电芯放在挤压设备的两个挤压表面之间，电芯轴平行于挤压平面，逐渐增加压力至 13kN,保持压力 1min。 Put the Battery between the surface of the extrusion equipment, with the Battery mandrel parallel to the extrusion plane, and gradually increase the pressure to 13kN, stored for 1min	电芯不起火，不爆炸 Battery with no fire or explosion
7.3 热冲击测试 Thermal Shock Test	将电芯放在电热鼓风干燥箱中，然后以 5±2℃/min 的速度由室温升至 130±2℃并保持 30mins。 Put the cell in the electric blast oven with speed of 5±2℃/min to increase the room temperature to 130±2℃, stored for 30mins	电芯不起火，不爆炸 Battery with no fire or explosion
7.4 过充电测试 Over-charge Test	先将电池以 0.2 C_5mA放电至终止电压，然后将电池正负极连接于恒压电源，调节电流至 3 C_5mA,电压为 10V,然后对电芯以 3 C_5mA充电，直到输出电压不低于 10V，持续充电 1hr或电压不再上升。Discharge at 0.2C_5mA until cut-off voltage, then connect the battery positive and negative poles to constant voltage power supply. Adjust the current to 3 C_5mA, voltage of 10V, and then charge at 3 C_5mA till the output voltage is no less than 10V, then continuous charge for 1hr or till the voltage has stopped increasing	电芯不起火，不爆炸 Battery with no fire or explosion
7.5 短路测试 Short-circuit Test	将接有热电偶的电芯置于通风橱中，用铜线短路其正负极(线路总电阻不大于 50mΩ)，实验过程中监视电芯温度变化，当电芯温度下降到比峰值低约 10℃时，结束实验。 Put the battery connected with thermocouples into the stink cupboard, short-circuit the positive and negative electrodes with copper wire (total resistance of circuit ino greater than 50mΩ). Monitor the temperature of the Batterys in the process, and stop the test when the temperature is 10℃ lower than the peaks	1 电芯不起火，不爆炸 Battery with no fire or explosion 2.最高温度<150℃ Highest temperature < 150℃
7.6 针刺测试 Nail Test	将接有热电偶的电芯置于通风橱中，用 Φ3.0mm 的不锈钢针以 20～40mm/s 的速度刺透电芯最大表面的中心位置。 Put the battery connected with thermocouples into the stink cupboard, with a Φ3.0mm stainless steel pin in the speed of 20～40mm/s to nail the largest surface center of the battery.	电芯不起火，不爆炸 Battery with no fire or explosion

8、装运 Shipping

装运电池的电压要求在 3.20～3.40 V 之间，或者根据客户的要求更改，充电前电池的残余容量由存储时间和存储条件决定。

Battery voltage for shipping is required between 3.20～3.40V, or subjected to change according to customers' requirement. The residual capacity is determined by the storage time and conditions.

9、保证书 Warranty

保质期以贸易合同规定为准，但是如果保质期内发生的问题不是由于本公司的生产过程造成的或是由于客户本身滥用或使用不当造成的，本公司将不会无偿包换.

The warranty period is specified in sales contracts. Problems arise not caused by RealForce production process, but due to customers' negligence or improper usage, RealForce will not be responsible for any replacements.

- 若不按说明书中的预防措施操作而引发事故，本公司将不承担责任。
- RealForce will not be responsible for any accidents caused by not following the precaution methods or directions.
- 由电路、包装和充电器引发的事故本公司概不负责。
- RealForce will not be responsible for any accidents caused by short-circuits, packing and the battery charger.
- 成交后组装过程造成的电池缺陷本公司概不负责。
- RealForce will not be responsible for any defects in assembling after delivery.

10、预防措施和安全说明 Precautions and Safety Instructions

锂离子电池如果使用不当会引起电池损坏甚至危害人身安全。使用前请仔细阅读并注意采取预防措施。

Please read the precautions carefully before usage, for improper usage will damage the battery and endanger personal safety.

注意 1：若顾客想了解此份规格书没有提到的说明或使用条件请联系本公司。

Note 1: Please contact RealForce for information not covered in the specifications.

注意 2：由于客户不按规格书操作规范而造成的事故本公司概不负责。

Note 2: RealForce will not be responsible for accidents caused by acts not in conformance with specifications.

10.1 电池的预防措施 Precautions for Battery:

a. 禁止将电池放置在高热温源或火旁；Don't leave battery near a heat source such as fire and heater;

b. 严禁电池短路、过充和过放；Forbid to short-circiut, over-charge and over-discharge batteries;

c. 谨防电池遭到严重的机械冲击；Beware of severe mechanical impact of the battery;

d. 严禁将电池浸入海水或水中；Forbid to immerse battery in water or seawater;

e. 禁止重装或改装电池；Forbid to reassemble or refit the battery;

f. 禁止将电池与金属，如项链，发卡等一起运输或存储；Forbid to transport or store battery together with metal objects such as hairpins, necklaces, etc;

g. 谨防电池发生严重损坏和变形；Beware of severe damage and deformations of battery;

h. 不要让电池和插槽或汽车烟槽接触；Don't let the battery, socket and the car's smoke slot come in contact;

i. 禁止直接接触漏液电池；Forbid to touch electrolyte leakage from battery directly;

j. 不要用在其它设备中；Don't use the battery in other devices;

k. 不要混用锂离子电池；Don't mix li-ion batteries;

l. 不要将电池放在直射的阳光下(或在阳光下暴晒的汽车中)；Don't put the battery under direct sunlight (or in hot cars under direct sunlight);

m. 远离儿童放置电池；Keep battery out of reach of children;

n. 禁止用钉子刺穿电池或用锤子敲电池或踩踏电池；Forbid to nail, knock or trample battery;

o. 禁止敲击或抛掷电池。Forbid to strike or throw battery.

10.2 电池操作说明书 Battery Operation Instructions:

10.2.1. 充电 Charging

a. 电池充电的温度范围是 0～45℃；

Battery charging temperature range is 0℃～45℃.

b. 电池充电：参考 4.2 和 4.3。

Battery charging: Refer to 4.2 and 4.3.

c. 使用锂离子恒流恒压充电器充电。

Charge with constant voltage and current charger.

充电时间不要超过规定时间。

Charging time not to exceed the specified time.

10.2.2. 放电 Discharging

电池放电：参考 3.7。

Battery discharging: refer to 3.7 .

为了使电池发挥出最好的性能，请在 15～45℃温度范围内放电。

In order to get the best performance of battery, please discharge with temperature between 15～45℃.

10.2.3. 储存建议 Storage Suggestions

储存温度和相对湿度：

Storage temperature and relative humidity:

请将电池保存在 –10～60℃的温度范围和低相对湿度且无腐蚀性气体的地方;不要压缩电池。

Please store battery with temperature between –10～60℃, with low relative humidity and without corrosion gases.

Don't compress the battery.

长期储存 Long-term Storage

若电池要长期储存(超过三个月)，请将电池保存在 0～+35℃的温度范围和低相对湿度且无腐蚀性气体地方；

不要挤压电池。

If the battery need to be placed under long term storage (more than three months), please store with temperature between 0～35℃, with low relative humidity and no corrosion gases.

Don't compress the battery.

11、咨询 Consultation

如有疑问，请按以下地址联系：

If any doubt, please contact with:

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