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Specification For Lithium Iron Phosphate Battery

磷酸铁锂电池规格书

Model:FEV130160160
型号：FEV130160160
Type: Fe10C
类型: Fe10C
Assembled: 1S
组合：1S
Revision：A
版本：A
Customer：
客户：
Date：2011-6-15
日期：2011-6-15

Prepared by 编写：凡磊 Date 日期：2011-6-15
Checked by 审核：成波 Date 日期：2011-6-15
Approved by 批准：曾华 Date 日期：2011-6-16

Customer Comment：
客户意见：

Customer Approval/Date：
客户批准/日期

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Product Modified Record List

产品变更履历表

Revision 版本	Date 日期	Prepared by 编写	Modified content 变更内容	Input 输入
A	2011-6-15	凡磊	Original Release 初版发行	

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1.Scope:

This specification describes the performance,testing method,warning and caution of the Lithium Iron Phosphate battery.

The specification applies to the lithium iron phosphate battery supplied by **FALCON EV CO. CTD**

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2.Battery: FEV130160160 Fe10C

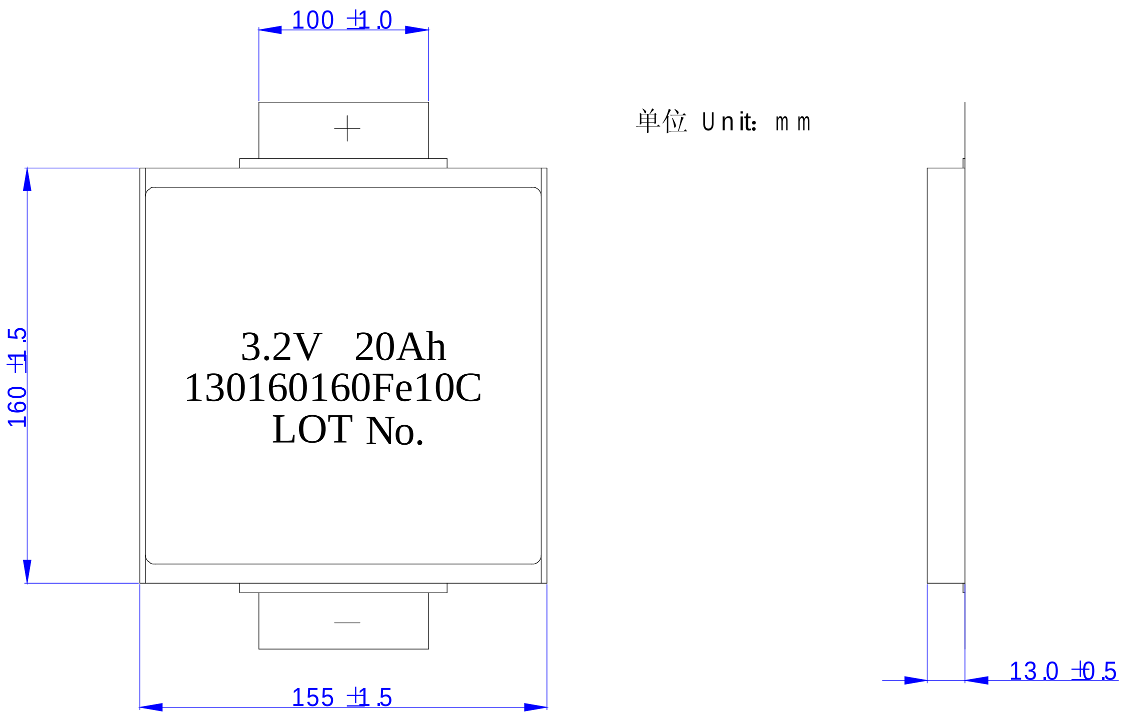

Fig.(1) The Dimension of Cell
图（1）电芯外形尺寸图

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3.Performance 基本性能

NO. 序号	Item 项目	Specification 规格	Remark 备注
1	Nominal Capacity 标称容量	20Ah	0.2C, CC(constant current)discharge to 2.0V cut off, at 23±3℃ 23±3℃，0.2C 恒流放电，2.0V 截止
2	Nominal Voltage 标称电压	3.2V	
3	Standard Charging Current 标准充电电流	0.5C	0～45℃ 0.5C CC(constant current)charged to 3.6V,then CV(constant voltage 3.6V)charge till charge current ≤0.02C 0～45℃ 0.5C CC（恒流）充电至 3.6V，再 CV（恒压）充电直至充电电流降至≤0.05C 时截止
4	Max. Charging Current 最大充电电流	4C	
5	Charge Ending Voltage 充电截止电压	3.6V	
6	Standard Discharging Current 标准放电电流	0.2C	0.2C CC(constant current)discharged to 2.0V -20～60℃ 0.2C CC（恒流）放电至 2.0V 截止
7	Max. Discharging Current 最大放电电流	10C	
8	Discharge Ending Voltage 放电截止电压	2.0V	
9	Standard Charging Time 标准充电时间	2～3h	
10	Impedance 内阻	≤3mΩ	AC Impedance 1KHz 1KHz AC 测量
11	Cell Weight 电芯重量	≤560g	
12	Volumetric Energy 体积比能量	≥198Wh/L	
13	Gravimetric Energy 重量比能量	≥114Wh/Kg	

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4.Performance Data 性能参数表

4.1 Electrochemical Characteristics 电化学性能

NO. 序号	Item 项目		Criterion 标准	Test Method 测试方法
1	C-rate characteristics 放电倍率特性	0.5C	100％	Test Temperature/测试温度:23±3℃ Charge:0.2C,CC/CV,3.6 V,current≤0.02C cut-off Discharge:0.5C/10C,CC, 2.0V cut off 充电：0.2C 恒流恒压充至 3.6V，电流≤0.02C 截止 放电：0.5C/10C 恒流放电至 2.0V 截止
		10C	80％	
2	Temperature Dependence of Capacity 容量温度特性	60℃	≥97%	Charge: 0.2C, CC/CV, 3.6V,current≤0.02C cut-off ,at 23±3℃ Discharge: at setting temperature 0.2C,CC,2.0V cut-off （Interval for temperature's change is 2Hrs） 充电：23±3℃，0.2C 恒流恒压充至 3.6V，电流≤0.02C 截止 放电：指定温度下，0.2C 恒流放电至 2.0V 截止 （温度变化间隔是 2 小时）
		45℃	≥97%	
		23℃	100%	
		0℃	≥65%	
		-20℃	≥45%	
3	Cycle Life Characteristics 循环寿命特性		≥800 cycles ≥800 次	Charge:1 C CC/CV,3.6 V,current≤0.1C cut-off Discharge:1C CC 2.0V cut-off When the discharge capacity reduced to 80% of initial capacity, Stop testing. 充电：1C 恒流恒压充至 3.6V，电流≤0.1C 截止 放电：1C 恒流放电 2.0V 截止 当放电容量降至初始容量的 80％时，停止测试

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4.2 Environment Characteristics 环境性能

NO. 序号	Item 项目	Criterion 标准	Test Method 测试方法
1	Constant temperature and constant humidity test 恒定湿热	No explosion, no fire ,no leakage. Discharging capacity is not less than 60% initial capacity 不起火、不爆炸、不泄漏。放电容量不低于初始容量的60%	After Standard Charging,test condition: Temperature:40±5℃ Relative Humidity:90~95%RH Storge Time:48Hours Then return to room temperature for 2 hours,Then 1C discharge to ending voltage 标准充电后，测试条件如下： 温度：40±5℃， 相对湿度：90～95％ 放置时间：48 小时 取出在室温下放置 2 小时，然后以 1C 电流放电至终止电压。
2	Vibration Test 振动	No explosion, no fire, no leakage. 不起火、不爆炸、不泄漏	After Standard Charging,fixed the cell to vibration table,then subjected to vibration test for 30 minutes per axis of XYZ axes Frequency rate :1 oct/min Vibration frequency : 10Hz-30Hz Excursion(single amplitude): 0.38mm Vibration frequency : 30Hz-55Hz Excursion(single amplitude): 0.19mm 电芯标准充电后，固定在振动台上，然后沿 XYZ 每个坐标方向振动 30 分钟 扫频速率：1 oct/min 振动频率：10Hz-30Hz 位移幅值（单振幅）：0.38mm 振动频率：30Hz-55Hz 位移幅值（单振幅）：0.19mm
3	Shock test 碰撞	No explosion, no fire,no leakage. 不起火、不爆炸、不泄漏	After Standard Charging, test condition: Acceleration :100m/s^2 Pulse lasting time :<16ms Shock times : 1000±10times 标准充电后，测试条件如下： 加速度：100 m/s^2 脉冲持续时间：< 16ms 碰撞次数：1000±10 次
4	Drop Test 跌落测试	No explosion, no fire,no leakage. 不起火、不爆炸、不泄漏	Drop the battery in the shipment condition from 1m height onto 5cm thicker concrete with p-tile on it 3 times each of X,Y and Z directions at 25±2℃. 在出货条件下将电池由高度 1m 的位置自由跌落到 5cm 厚的混凝土地板，X，Y，Z 方向上各三次

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4.3 Safety Performance of cell 电芯的安全性能

1	Overcharge Test 过充电测试	No fire、 No explosion 不起火、不爆炸	3C, CC/CV,10V at 23±3℃; When the capacity reach 2.5C or time reach 60 min , end test. 在 23±3℃的环境下用 3C、10V 进行恒流恒压充电，待其充电容量至 2.5C 或充电时间达 60 min 后，结束测试
2	Overdischarge Test 过放测试	No fire、 No explosion 不起火、不爆炸	After discharged to the cut-off voltage，the battery shall be subjected to a short-circuit condition with a load of resistance less than 30Ω for 24 hour. 放电至截止电压后，外接小于 30Ω 的负载电阻放电 24 小时
3	Heating Test 热冲击	No fire、 No explosion 不起火、不爆炸	A battery is to be heated in a gravity convection or circulating air oven. The temperature of the oven is to be raised at a rate of 5±2℃/min to a temperature of 130±2℃ at which temperature the oven is to remain for 30 minutes before the test is discontinued. 电池放于热箱中，温度以 5±2℃/min 的速率升至 130±2℃并保温 30min
4	Short circuiting Test 短路测试	No fire、 No explosion 不起火、不爆炸	After standard charge，the battery shall be subjected to a short-circuit condition with a wire of resistance less than 100mΩ for 1 hour. 标准充电后，将电池接电偶置于通风橱中，短路其正负极，线路总电阻不大于 100mΩ，测试 1 小时。

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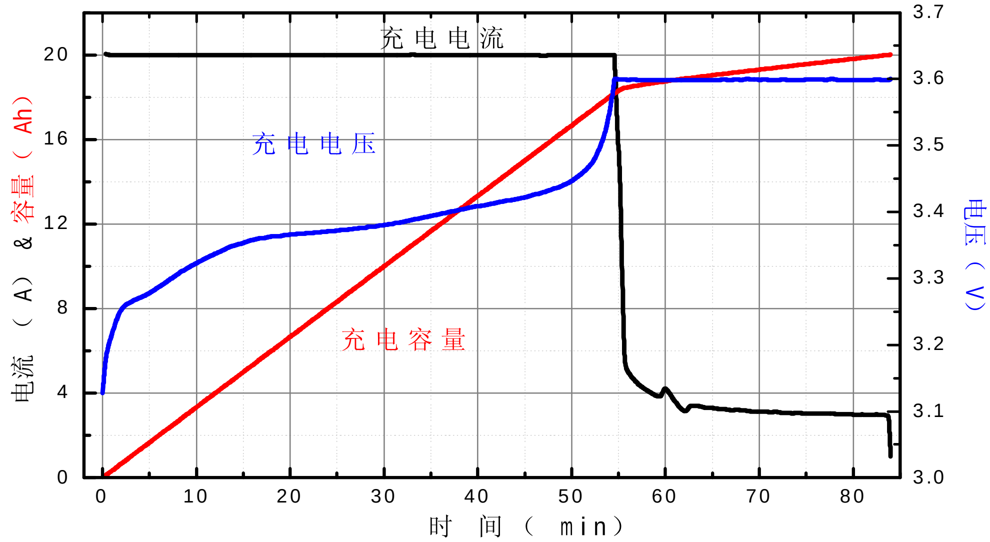
5.Charge/Discharge Characteristics 充/放电特性

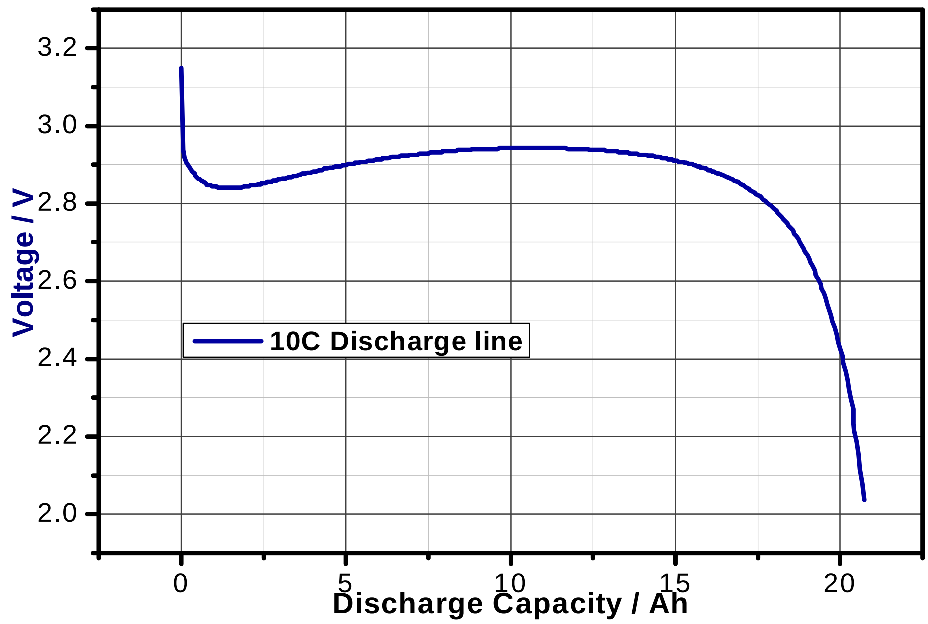
Charge: 20A CC/CV,3.6V, current≤1A cut off,at 23±3℃
充电：20A CC/CV,3.6V, 电流≤1A 截止，在 23±3℃



Fig(2) Charge Characteristic
图（2）充电特性图

Discharge: 200A CC,2.0V cut off, at 23±3℃

放电：200A CC, 2.0V 截止，在 23±3℃



Fig(3) Discharge Characteristic
图（3）放电特性图

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6.Storage and Shipment Requirement 存储及运输要求

Item 项目		Requirement 要求
Storage temperature 储存温度	Short period less than 1 month 少于 1 个月的短期存放	-20℃～＋45℃
	Long period less than 6month 不超过 3 个月的长期存放	-20℃～＋35℃
Humidity 湿度		<75%RH
Charged 荷电		About 5％charged state 5％荷电状态

7.Danger and Warning and Caution in handing the battery

电池使用时危险事项、警告事项及注意事项

Danger Warning 警告

(it should be indicated especially in manual or instruction for users.)
To prevent the possibility of the battery from leaking, heating, explosion.
Please observe the following precautions:

危险警告：（应在使用说明手册或说明书中，特别注明）为防止电池可能发生泄漏，发热，爆炸，请注意以下预防措施：

1. Do not disassemble or reconstruct battery.
   禁止拆卸或重组电池！
2. Do not short-circuit battery.
   禁止短路电池！
3. Do not use or leave battery near fire, stove or heated place (more than 80 ℃).
   禁止在热源旁使用！
4. Do not immerse the battery in water or sea water, or get it wet.
   禁止将电池投入水中、海水中或弄湿！
5. Do not charge battery near the fire or under the blazing sun.
   禁止在近火处或阳光照射下充电！
6. Do use the specified charger and observe charging requirement.
   使用指定充电器，遵照充电要求！
7. Do not drive a nail into the battery′ strike it by hammer, or tread it.
   禁止将钉子插入电池中、用铁锤敲打或用脚踩！
8. Do not give battery impact or fling it.
   禁止冲击或投掷！
9. Do not use the battery with conspicuous damage or deformation.
   禁止严重损害或变形下使用！
10. Do not make the direct soldering on battery.
    禁止在电池上直接焊接
11. Do not reverse charge or overdischarge the cell.

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禁止反向充电或过放电！

12. Do not reverse-charge or reverse-connect.
    禁止反向充电或反极连接！
13. Do not connect battery to the plug socket or car-cigarette-plug.
    禁止把电池连接到充电插座或汽车点烟插座上！
14. Do not use battery for unspecified equipment.
    禁止用于非指定设备上！
15. Do not touch a leaked battery directly.
    禁止直接接触漏液电池！

Warning 警告

1. Do not use Lithium ion battery in mixture.
   禁止将一、二次锂电池混合使用！
2. Keep the battery away from babies.
   远离小孩触手可及的地方！
3. Do not get into a microwave or a high pressure container.
   禁止将电池置于微波或高压容器中！
4. Do not use a leaked battery nearby fire.
   禁止在近火处使用漏液电池！
5. Do not use an abnormal battery. 禁止使用非正常电池！

Caution 小心

1. Do not use or leave the battery under the blazing sun(or heated car by sunshine). The battery may smoke, heat or flame. And also, it might cause the deterioration of battery’s characteristics or cycle life.
   禁止在阳光照射下（或阳光直射的汽车上）使用或放置电池，否则可能会引起电池过热，起火和功能实效，寿命减短。
2. Do not use near the place where static electricity (more than 64V) exists.
   禁止在静电（超过64V）场所旁使用！
3. Do not charge the battery out of recommended temperature range of 0℃ and 60℃.
   禁止在 0^oC 以下和 60^oC 以上环境充电！
4. When the battery has rust, bad smell or something abnormal at the first-usage, do not use the equipment .Bring the battery to the shop where it was bought.
   电池首次使用时，若有腐蚀、难闻气味或不正常现象，禁止使用 用电器并送回出售点！
5. In case children use the battery, their parents should teach how to use battery according to the manual with care.
   小孩要使用电池时，父母须根据手册详细指导其使用方法！
6. If the skin or cloth is smeared with liquid from the battery, wash with fresh water.
   若皮肤或衣服沾上电池里的电液，请用清水冲洗！