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For Any Detail and question, Please Tel Engineer: 86(0)756-3922353 FAX: 86(0)756-3922218

GREAT POWER BATTERY(ZhuHai) CO., LTD
珠海鹏辉能源有限公司

Add:XINQING TECHNOLOGY PARK, ZHUFENG AVENUE, JING AN TOWN, DOUMEN DISTRICT, ZHUHAI CITY, GUANGDONG PROVINCE
地址:广东省珠海市斗门区井岸镇珠峰大道新青科技园

CUSTOMER NO:

Specification Approval Sheet
规格确认书

MODEL/型号: GSP34135214F

（100Ah 3.2V）

机型：低速车使用

Prepared By/Date 编 制/日 期	Checked By/Date 审 核/日 期	Approved By/Date 批 准/日 期
陈怡静 **2019.12.25**		

Customer Approval 客户确认	Signature/签 字	Date/日 期
	Company Name/公司名称	
	Company Stamp/公司印章	

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1 Scope/适用范围

This specification is applies to describe the related Battery product in this Specification and the Battery/cell supplied by Great Power Battery Co., Ltd only.

本说明书只适用于描述本规格书中相关的产品以及鹏辉电池有限公司提供的电池。

2 Model/型号：GSP34135214F

3 Cell Specification/电芯产品规格

No.	Items/项目	Specifications/规格	Remark 备注
1	Material system 材料体系	Lithium iron phosphate 磷酸铁锂	
2	Nominal Capacity 标称容量	100Ah	0.5C Standard discharge 0.5C 标准放电
3	Minimum Capacity 最小容量	100Ah	
4	Nominal Voltage 标称电压	3.2V	Mean Operation Voltage 工作电压
5	Delivery voltage 交货电压	3.00~3.20V	Within 10 days from Factory 在出厂 10 天内
6	Charge Voltage 充电电压	3.65V±0.03V	By standard charge method 标准充电方式
7	Standard charging method 标准充电方式	0.5C constant current,3.65V constant voltage charge to 3.65V,continue charging till current deadline to ≤0.05C 0.5C 恒流 3.65V 恒压充至电流≤0.05C ,时间 2.5h(供参考)	/
8	Standard discharging method 标准放电方式	0.5C constant current discharge to 2.5V, 0.5C 恒流放电至 2.5V	/
9	Cell Internal Impedance 单电芯内阻	≤0.7mΩ	Internal resistance measured at AC 1KHz after 50% charge 半电态下用交流法测量内阻
10	Weight 重量	2.04±0.03Kg	(参考)

3 Cell Specification/产品规格(continuous/续上表)

No.	Items/项目	Specifications/规格			Remark 备注
11	Single Cell Charge Current （25℃） 单体电芯充电电流（25℃）	Max Continuous Charge Current 最大持续充电电流			0.5C
12	Single Cell Discharge Current （25℃） 单体电芯放电电流（25℃）	Max Continuous Discharge Current 最大持续放电电流			1.0C
13	Module Charge Current （25℃） 模组充电电流（25℃）	Max Continuous Charge Current 最大持续充电电流			0.5C
		Max Peak （50%SOC，10s） 最大脉冲（50%SOC，10s）			1.0C
14	Module Discharge Current （25℃） 模组放电电流（25℃）	Max Continuous Discharge Current 最大持续放电电流			1.0C
		Max Peak （50%SOC，10s） 最大脉冲（50%SOC，10s）			2.0C 当再次进行脉冲放电时电池需要进行搁置，搁置时间 T＞20s
15	Operation Temperature and relative humidity Range 工作温度和湿度范围	Charge/充电 60±25%R.H.	0~10℃	0.1C	High/low temperature environment reduce battery charge efficiency and influence battery life. Long time working under 55 ℃ environment will lead to battery abnormal. 高/低温充电效率会下降，会影响电池使用寿命，长期在高于 55℃环境中使用会出现导致电池异常
			10~20℃	0.2C	
			20~40℃	0.5C	
			40~45℃	0.3C	
		Discharge/放电 60±25%R.H.	-20~0℃	0.5C	
			0~20℃	0.6C	
			20~45℃	1.0C	
			45~50℃	0.8C	
			50~55℃	0.6C	
16	Storage temperature for a long time 长时间储存温度 60±25%R.H.	-20~25℃≤6 个月 -20~25℃≤Six months -20~45℃≤一个月 -20~45℃≤one month			Do not storage exceed half year. Must charge once when storage for half year. Must charge the battery which with protect Circuit when storage for three months. (under normal storage conditions for long periods required storage capacity can lead to decay and fall of the life cycle,such as Environmental requirements exceeded the storage capacity will be further exacerbated decline and decay cycle life) 不可超过半年,达到半年须充电一次 带保护板电池 3 个月充电一次(在正常要求的储存环境下长时间存储会导致容量衰减和循环寿命的下降，如超出存储环境要求则会进一步加剧容量的衰减和循环寿命的下降.)

4 Battery/Cell performance test Criteria/电池性能标准

4.1 Appearance inspection by visual/外观目测

There shall be no such defect as flaw, crack, rust, leakage, which may adversely affect commercial value of battery.

电池外观应没有裂纹、爆裂、锈渍、污渍、漏液等影响商业价值的缺陷存在。

4.2 Environmental test condition/外界环境条件

Unless otherwise specified, all test stated in this product specification are conduct at below test condition

所有测试应按以下环境条件进行，除非特殊指定外。

Temperature: 25±5℃

Relative Humidity:60%±25% R.H.

4.3 Cell Electrical characteristics/电气特性

No	Items/项目	Test Method and Condition/测试方法及条件	Criteria/标准
1	Capacity RT 室温放电容量	After standard charge,the capacity shall be measured on0.5C discharge till the voltage discharge to 2.5V, 标准充电后，放电至 2.5V 截止，测量 0.5C 放电容量	≥100Ah
2	Cycle Life RT 常温循环寿命	Charging and discharging battery as blew conditions 0.2C standard charge to 3.65V end-off 0.2C standard discharge to 2.5V cut-off Continuous charge and discharge for 2000 cycles,the capacity will be measure after the 2000th cycle，ambient temperature 20~25℃ 充放电按以下条件： 0.2C 标准充电至 3.65V，0.2C 标准放电至 2.5V，连续充放电循环 2000 周，在第 2000 周结束后测量容量	≥80% of initial capacity for 2000 cycles 2000 周循环≥80%初始容量

4.4 Mechanical characteristics/电气特性

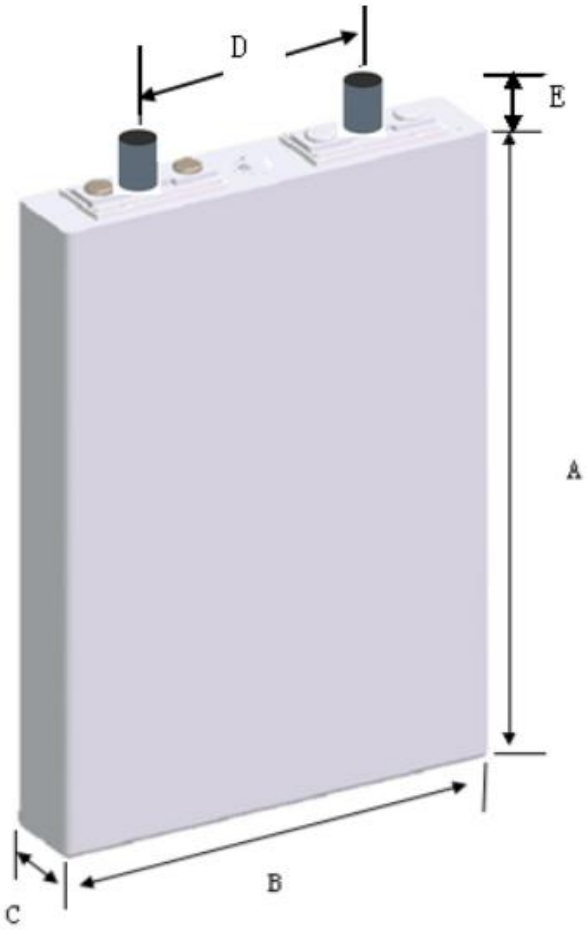
No	Items/项目	Test Method and Condition/测试方法及条件	Criteria/标准
1	H/L temperature discharge 高低温放电性能	Full charged cell by standard charge displace in -20±2℃ for 24hrs then 1.0C discharge to 2.0V 将电芯放置在-20±2℃恒温箱内 24 小时，以标准放电方式放电	Capacity remain ≥70% initial capacity 放电容量≥70%初始容量
		Full charged cell by standard charge displace in 55℃±2℃ for 5hrs then 1.0C standard discharge to 2.5V 标准充电方式充电后，将电芯放置在 55±2℃恒温箱内 5 小时，以标准放电方式放电	Capacity remain ≥90% initial capacity 放电容量≥90%初始容量
2	Capacity retention 容量保持	The battery to be charge in accordance with standard charge condition at 20~25℃,then storage the battery at an ambient temperature 20~25℃ for 28 days. Measure the capacity after 28 days with 1.0C at 20~25℃ as retention capacity 将电池在 20~25℃标准充电后储存在 20~25℃的环境中 28 天，测试 1.0C 放电容量作为保持容量	Retention capacity≥90% initial capacity 容量保持≥90%初始容量
		The battery to be charge in accordance with standard charge condition at 20~25℃,then storage the battery at an ambient temperature 55±2℃ for 7 days. Measure the capacity after 1 days with 1.0C at 20~25℃ as retention capacity 将电池在 20~25℃标准充电后储存在 55±2℃的环境中 7 天后，测试电池在 20~25℃环境下 1.0C 放电容量作为保持容量	Retention capacity≥90% initial capacity Thickness change≤10%initial capacity 容量保持≥90%初始容量 厚度变化≤10%初始厚度
3	Capacity recovery 容量恢复	The battery to be charge in accordance with standard charge condition at 20~25℃,then storage the battery at an ambient temperature 20~25℃ for 28 days. Measure the rate capacity at 1.0C after 28 days 20~25℃ as recovery capacity 将电池在20~25℃标准充电后储存在20~25℃的环境中28天，测试1.0C放电容量作为恢复容量	Recovery capacity≥95% initial capacity 容量恢复≥95%初始容量
		The battery to be charge in accordance with standard charge condition at 20~25℃,then storage the battery at an ambient temperature 55±2℃ for 7 days. Measure the rate capacity at1.0C after 7 days 20~25℃ as recovery capacity 将电池在20~25℃标准充电后储存在55±2℃的环境中7天后，测试电池在20~25℃环境下1.0C容量作为恢复容量	Recovery capacity≥95%initial capacity Thickness change 10%initial capacity 容量恢复≥95%初始容量 厚度变化≤10%初始容量

4.5 **Safety performance/安全性能**

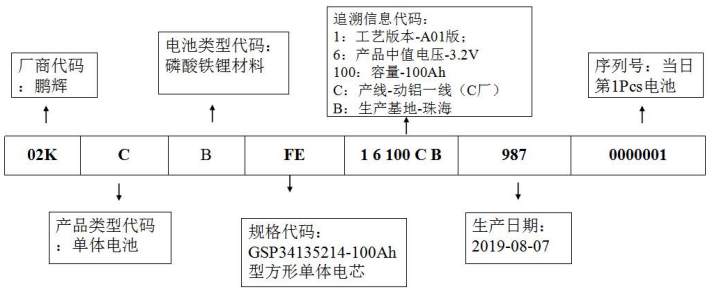
No	Items/项目	Test Method and Condition/测试方法及条件	Criteria/标准
1	Thermal exposure test 高温热冲击测试	Each fully charged cell,placed in a circulating air-convection oven. The oven temperature is raised at a rate of 5 °C/min ± 2 °C/min to a temperature of 130 °C ± 2 °C. The cell remains at this temperature for 30 min before the test is discontinued. 充满电的电池温度稳定到常温后，放置入循环空气烘箱里，从常温以5°C/分± 2 °C/分的速率升至130°C后，在130°C放置30分钟	No explosion,No fire 不起火,不爆炸
2	Short test 短路测试	The fully charged battery is to be short-circuited by connecting the positive and negative terminals with resistance load not exceed 5mΩ.Tests are to be conducted at temperature 25±2℃. 在室温 25±2℃把充满电的电池的正负极用不超过5mΩ的负载连接起来，连接起来使电池外部短路	No explosion,No fire The Temperature of the Battery surface not exceeded than 150℃ 不起火,不爆炸 电池表面温度不超过 150℃
3	Over discharge test 过放电测试	After 1C charge，With 1C 90 minutes of constant current discharge and observed for 1 hour. 电芯 1C 充满电后，以 1C 的恒定电流放电 90 分钟，观察 1 小时	No explosion, No fire, No leakage 不爆炸，不起火，不漏液
4.	Over charge test 过充电测试	After 1C charge, continue to charge with a constant voltage 5.5V per a cell, holding 1h. 电芯 1C 充满电后，以 5.5V 的恒定电压继续充电，保持 1 小时	No explosion, No fire 不爆炸，不起火
5	Free fall test 自由跌落测试	After 1C charge, then drop the battery three times from a height of 1.5 m onto a concrete floor. The batteries are dropped so as to obtain impacts in random orientations and observe 1h. 电芯1C充满电后，然后从1.5m高度跌落电池到一个水泥地面，随机跌落三次,观察1小时	No explosion, No fire，No leakage 不起火，不爆炸，不漏液

6	Crush test 挤压测试	After 1C charge, Half a cylinder with a radius of 75 mm to (5 + 1mm)/s velocity perpendicular to the cell pressure, when the battery voltage reaches 0 v or deformation of 30% or stop pressing after extrusion of 200 kn. 电池1C充满电后，用半径75mm的半圆柱体，以（5±1）mm/s的速度垂直于电池施压，当电池电压达到0V或变形量达到30%或挤压力达到200KN后停止挤压。。	No explosion,No fire 不起火不爆炸
7	Seawater immersion 海水浸泡	After 1C charge ， All immersed in 3.5% brine concentration, to maintain a minimum of 2 hours or until thermal runaway when to stop，observe 1h. 电池 1C 充满电后，全部沉浸在浓度 3.5%的盐水中，保持 2 小时以上或直到发生热失控时停止，观察 1 小时	No explosion, No fire 不起火，不爆炸
8	Temperature cycle 温度循环	After 1C charge，Put the battery in 25 ℃ /-40 ℃, 25 ℃ / 85 ℃ condition transformation temperature,after repeat 5 times observe 1h 电池 1C 充满电后，将电池放入 25℃/-40℃、25℃/85℃环境条件下转换温度搁置，重复 5 次后观察 1 小时	No explosion, No fire, No leakage 不起火，不爆炸，不漏液
9	Low pressure test 低气压测试	After 1C charge，Into the low pressure experiment box, adjust air pressure in the test chamber is 11.6 KP,Temperature to room temperature,take out after 6 h , observe 1h. 电池 1C 充满电后，放入低气压箱中，调节试验箱中气压为 11.6KP，温度为室温，放置 6h 后取出，观察 1 小时	No explosion, No fire, No leakage 不爆炸，不起火，不漏液

5 Cell initial Dimensions/电芯初始尺寸



Data code/追溯码(参考)



注：测试电池为到货时间不超过 1 个月的新鲜电池；

Note: The test battery is a fresh battery that arrives for less than 1 month.

NO	Items	Units:mm	Remark
1	C/厚度 thickness	$34.6^{+1.5}_{-0}$	
2	B/宽度 width	$135.0^{+1.0}_{-0}$	
3	A/长度 length	$216.0^{0+1.0}_{-0}$	
4	D/极柱间距 pole center distance	70.0±0.5	极柱可采用 M8 螺柱
5	E/极柱高度 pole center height	14.0±0.5	/

电池配组标准(配组电池数量≤20 个)					
电压范围(V)	电压极差(mV)	内阻范围(mΩ)	内阻极差(mΩ)	容量范围(Ah)	容量极差(mAh)
以集群值为准	20	≤0.7	≤0.5	＞100.0	≤1000

注：当配组电池数量＞20 个情况下，配组条件需放宽；

配组电池为到货时间不超过 0.5 个月的新鲜电池；

6 Notice for Assembling Battery Pack 电池装配注意事项

Shocks, high temperature, or contacts of sharp edge components should not be allowed in battery pack assembling process.

在电池装配过程中不允许撞击、高温或接触尖锐部分。

6.1 Cell connection/电池连接

1) Direct soldering of wire leads or devices to the cell is strictly prohibited.

2) Lead tabs with pre-soldered wiring shall be spot welded to the cells.

Direct soldering may cause damage of components, such as separator and insulator, by heat generation.

1) 严禁直接焊接引线或设备到电池上。

2) 极片在焊接引线之前应该先点焊到电池上，直接与电池热焊接，产生的热量会使电池的隔离体及绝缘体受损。

6.2 Prevention of short circuit within a battery pack/电池内部的短路预防

Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection. The battery pack shall be structured with no short circuit within the battery pack, which may cause generation of smoke or firing.

在电池和引线之间应该有足够的绝缘层用于安全保护。电池的包装构成应没有导致起烟起火的短路情况。

6.3 Prohibition of disassembly/不要拆卸电池

1) Never disassemble the cells

The disassembling may generate internal short circuit in the cell, which may cause gassing, firing, explosion, or other problems./拆卸电池会发生电池内部短路，会引起起火、爆炸、有害气体或者其它问题。

2) Electrolyte is harmful/电解液是有害的

LIP battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought./万一电解液沾到皮肤、进入眼睛，应立即用清水冲洗以及求助医生。

6.4 Prohibition of dumping of cells into fire/不要把电池倾倒于火中

Never incinerate nor dispose the cells in fire. These may cause explosion of the cells, which is very dangerous and is prohibited.

不要焚毁电池，否则会致电池爆炸，这个很危险，必须禁止。

6.5 Prohibition of cells immersion into liquid such as water/禁止浸泡电池

The cells shall never be soaked with liquids such as water, seawater, drinks such as soft drinks, juices, coffee or others.

请不要把电池浸泡在液体当中，像清水、海水，及非酒精饮料、果汁、咖啡或者其它的饮料。

6.6 Battery cells replacement/更换电池

The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.

更换电池应由电池生产商或设备供应商完成，用户不要自行更换。

6.7 Prohibition of use of damaged cells/禁止使用损坏的电池

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of an electrolyte, an electrolyte leakage and others, the cells shall never be used any more.

The Cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing or explosion.

电池可能在出货途中碰撞而受损。如果发现电池有异常，例如包装损坏、电池包裹变形，有电解液的味道、发现漏液等等，不要再使用这些电池。

电池如果有电解液的味道或者出现漏液，电池放置应该远离火源避免起火及爆炸。

7 Period of Warranty/保质期

The period of warranty is three year from the date of shipment. Great Power guarantees to give a replacement in case of cells with defects proven due to manufacturing process instead of the customer abuse and misuse.

电池的保质期从出货之日算起为 3 年。如果电池的缺陷是在制造过程中形成的而不是由于用户滥用及错误使用造成，本公司负责退换电池。

8 Storage of the Batteries/电池的存放

The batteries should be stored at room temperature, charged to about 3% to 30% of capacity.

We recommend that batteries be charged about once per half a year to prevent over discharge.

电池应当在室温下存放，应充到 3%至 30%的电量。如长时间储存，建议每半年充一次电以防止电池过放电。

9 Other The Chemical Reaction/其它化学反应

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

由于电池是利用化学反应的原理，所以随时间的增加电池的性能会降低，即使是存放很长一段时间而不使用。如果使用条件如充电、放电及周围环境温度等情形不在指定的使用范围内，会使缩短电池的使用寿命，或者会产生漏液导致设备损坏。如果电池长周期不能充电，即使充电方法正确，这样需要更换电池了。

10 Note/注释

Any other items which are not covered in this specification shall be agreed by both parties.

本说明书未包括事项应由双方协议确定。