鹏辉 GREAT POWER	**PRODUCT SPECIFICATION**	**Version:**	**A02**
		DATE:	**2022-03-02**
		DOC No:	**GP-PS-0173**

Guangzhou Great Power Energy & Technology CO., Ltd
广州鹏辉能源科技股份有限公司
Add: No. 912 Shiliang Rd(Xicun Section), Shawan, Panyu , Guangzhou, China
地址:中国广州市番禺区沙湾镇市良路西村段 912 号

CUSTOMER NO: _____

Specification Approval Sheet
规格确认书

MODEL/型号: GSP3914895F

（50Ah 3.2V）

Prepared By/Date 编 制/日 期	Checked By/Date 审 核/日 期	Approved By/Date 批 准/日 期

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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Amendment Records/修正记录

Revision 版 本	Description/记 述	Prepared by 编 制	Approved by 批 准	Date/日 期
A01	初版编制（软连接）			2022-02-14
A02	第一次修订			2022-03-02

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1 Scope/适用范围

This specification is applied to describe the related battery product in this specification and the battery/cell supplied by Guangzhou Great Power Energy & Technology 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广州鹏辉能源科技股份有限公司提供的电池。

2 Model/型号：GSP3914895F

3 Cell specification/电池规格

No.	Items/项目	Specifications/规格	Remark/备注
1	Nominal voltage 额定容量	50Ah	1C standard charge-discharge 1C 标准充放电
2	Operation voltage 工作电压	2.5-3.65V 2.0-3.65V	Cell temperature T＞0℃; 电芯温度 T＞0℃; Cell temperature T≤0℃; 电芯温度 T≤0℃;
3	Delivery capacity 出货容量	3%-40% DOD 3%-40%的充电状态	Within 15 days from factory 在出厂 15 天内
4	Delivery voltage 出货电压	2.90~3.40V	
5	Standard charge method 标准充电方式	1C constant current charge to 3.65V, 3.65V continue charging till current decline to 0.05C 1C 恒流充电至 3.65V，恒压充至电流为 0.05C；	25±2℃; 1C=50A
	Standard discharge method 标准放电方式	1C constant current discharge to 2.5V 1C 恒流放电至 2.5V	
6	Cell internal impedance 交流内阻	≤0.55mΩ	Fresh cell, Internal resistance measured at AC 1KHz after 3% charge 新电池状态，3%SOC，1KHz 交流电阻
7	Cell weight 电池重量	1.10±0.05Kg	参考值

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3 Cell specification/电池规格(continuous/续上表)

No.	Items/项目	Specifications/规格			Remark 备注
8	Max charge current 最大连续充电电流	1C			2.5-3.65V, 25±5℃ For continuous charge/discharge mode 连续充放电模式
9	Max discharge current 最大连续放电电流	2C			
10	Operation（cell） temperature and C-rate range 工作(电池)温度和倍率范围	Charge 0~55℃ 充电 0~55℃	0~5℃	≤0.1C	No matter what charge/discharge mode the battery is in, stop charging/discharging once the cell temperature exceeds operation charge/discharge temperature range 无论电池处于哪种充放电模式，一旦电池温度超过工作温度范围即停止充放电
			5~10℃	≤0.2C	
			10~15℃	≤0.4C	
			15~20℃	≤0.6C	
			20~45℃	≤1.0C	
			45~50℃	≤0.8C	
			50~55℃	≤0.5C	
		Discharge -20~60℃ 放电 -20~60℃	-20~-10℃	≤0.2C	
			-10~-5℃	≤0.3C	
			-5~0℃	≤0.4C	
			0~5℃	≤0.5C	
			10~15℃	≤0.8C	
			15~50℃	≤1.0C	
			50~55℃	≤0.7C	
			55~60℃	≤0.5C	
11	High temperature discharge capacity 高温放电容量	≥98%			55±2℃，1C/1C，2.5V
12	Low temperature discharge capacity 低温放电容量	≥80%			-20±2℃，1C/1C，2.0V
13	Operation humidity range 湿度范围	10%~ 95% R.H.			No condensation 无凝露
14	Altitude 应用海拔	≤4500m			N.A.
15	Storage temperature for a long time 长时间储存温度	-20~25℃≤6 个月 -20~25℃≤Six months -20~45℃≤3 个月 -20~45℃≤Three months -20~60℃≤1 个月 -20~60℃≤One month			Do not store the battery more than half a year. Up to half a year must be charged once. The battery with protect circuit should be charged-discharged one time when stored for three mouths. 电池存储不可超过半年，达到半年须充电一次，带保护板电池 3 个月充放电一次

4 Battery/Cell performance test criteria/电池测试性能标准

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 conducted 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±2℃
Relative Humidity: 10%~95% R.H.

4.3 Cell characteristic/电池特性

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	25±2℃, 1C standard charge to 3.65V, rest 30min; 1C standard discharge to 2.5V 25±2℃，1C 标准模式充电至 3.65V；静置 30min；1C 标准模式放电至 2.5V；	≥50Ah
2	Cycle life RT 室温循环寿命	25±2°C, cycle test by 1C charge-discharge method under 300±20Kgf preload for 4000cycles 初始夹紧力 300Kgf，1C 标准模式充放电	≥80% of nominal energy@4000 ≥80%额定能量@4000 次
3	RT storage & recovery 室温存储和恢复	25±2°C，storage for 28 days，standard charge and discharge method 25±2℃，28 天，1C/1C 充放电	Capacity retention rate≥95% 容量保持率≥95% Capacity recovery rate≥96% 容量恢复率≥96%
4	HT storage & recovery 高温存储和恢复	55±2°C，storage for 7 days ；25℃ stand for 5h ，standard charge and discharge method 55±2℃，存储 7 天，25℃存放 5h，1C/1C 充放电	Capacity retention rate≥95% 容量保持率≥95% Capacity recovery rate≥96% 容量恢复率≥96%
5	Residual capacity loss 月自放电	Fresh cell after 3 month, 27%SOC, 25±2°C storage 出货三个月以后的电芯，标准充电到 27%SOC，25±2℃储存	Per month ≤3.5% ≤3.5%/月

4.4 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	Over charge test 过充电试验	The cell is standard charged. Stopping discharge when the cell is charged till the voltage reaches 1.5 times charging end voltage or the times reaches 1h. The discharge current is the smaller value between 1C and the maximum continuous discharge current of the product. 电池单体初始化充电，电池单体以恒流方式充电至电压达到电池单体充电终止电压的 1.5 倍或时间达到 1h 时停止充电，充电电流取 1C 与产品最大持续充电电流中的较小值；观察 1h;	No explosion, no fire 不起火，不爆炸
2	Forced discharge test 过放电试验	The cell is standard charged. Stopping discharge when the cell is discharged till the time reaches 90min or voltage reaches 0V. Observe 1h. The discharge current is the smaller value between 1C and the maximum continuous discharge current of the product. 电池单体初始化充电；电池单体以恒流方式放电至时间达到 90min 或电压达到 0V 时停止放电，放电电流取 1C 与产品的最大持续放电电流中的较小值；观察 1h；	No explosion, no fire 不起火，不爆炸
3	Short test 短路试验	The cell is standard charged. Short-circuit the positive and negative electrodes of the battery cell though the outside for 10min and observe 1h. External resistance should be less than 5mΩ. 电池单体初始化充电，将电池单体正、负极经外部短路 10min，外部线路电阻应小于 5mΩ；观察 1h。	No explosion, no fire 不起火，不爆炸
4	Crush test 挤压测试	The cell is standard charged, placed under a semi-cylinder with a diameter of 75mm. The battery is pressed at a rate of (5±1)mm/s, until the voltage reach 0V or the deformation amount reaches 30% or the extrusion force reaches 13±0.78 kN. Holding for 10min and stop, observe 1h. 电池初始化充电，放置在直径75mm的半圆柱体下，以（5±1）mm/s 的速度垂直于电池方向施压，直到电压达到0V 或者变形量达到30%或挤压力达到13±0.78kN，保持10min后停止挤压，观察1h。	No explosion, no fire 不起火，不爆炸

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No	Items/项目	Test method and condition/测试方法及条件	Criteria/标准
5	Drop test 跌落试验	The cell is standard charged, turn the positive or negative terminal down and drop the battery down from the height of 1.5m to the cement floor once and observe for 1h. 电池单体初始化充电，将电池单体的正极或负极端子朝下从1.5m高度处自由跌落到水泥地面上1次，观察1h	No explosion, no fire 不起火，不爆炸
6	Low pressure 低气压试验	The cell is standard charged. Putting the battery into a low-pressure box, adjust the air pressure to 11.6kPa, and the temperature is (25±5) ℃. Stand for 6h and observe for 1h. 电池单体初始化充电，将电池单体放入低气压箱中，将气压调节至11.6kPa，温度为（25±5）℃，静置6h，观察1h。	No explosion, no fire, no leakage 不起火，不爆炸，不漏液
7	Heating test 加热试验	The cell is standard charged. Placing the battery in the heating test chamber, which was increased from the ambient temperature to (130±2) ℃ at a rate of 5℃/min. After maintaining the temperature for 30min, stopping heat and observe for 1h. 电池单体初始化充电，将电池放入加热试验箱，以5℃/min 的速率由环境温度升至（130±2）℃，并保持此温度30min后停止加热，观察1h。	No explosion, no fire 不起火，不爆炸
8	Thermal runaway test 热失控试验	The cell is standard charged. Charging it with 1C constant current for 12min, and then start the heating device to heat the test object continuously. When thermal runaway occurs or when the temperature of the monitoring point reaches 300℃, stop starting and turn off the heating device. Thermal runaway: heating rate ≥1℃/s, battery voltage drop or heating rate ≥1℃/s, temperature reaches 300℃. 电池单体初始化充电后，再用 1C 恒流充电 12min，启动加热装置对测试对象持续加热，当发生热失控或 监测点温度达到 300℃时，停止出发，关闭加热装置。 发生热失控：升温速率≥1℃/s，电池产生电压降或升温速率≥1℃/s，温度达到 300℃。	No explosion, no fire 不起火，不爆炸

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No	Items/项目	Test method and condition/测试方法及条件	Criteria/标准
9	Vibration Test 振动测试	The vibration shall be a sinusoidal wave form with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face. From 7 Hz a peak acceleration of 1 g n is maintained until 18 Hzis reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 8 g n occurs (approximately 50 Hz). A peak acceleration of 8 g n is then maintained until the frequency is increased to 200 Hz. 以正弦波形式，15min 内以 7Hz 增加至 200Hz，减少回到 7Hz 为一个循环，一个循环持续 15min 的对数扫频，样品从三个互相垂直的方向循环 12 次，每个方向 3h，共 12h。 从 7 赫兹开始，保持 1g n 的最大加速度，直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米(总偏移 1.6 毫米)，并增加频率直到最大加速度达到 8 g n (频率约为 50 赫兹)。将最大加速度保持在 8 g n 直到频率增加到 200 赫兹。	Open circuit voltage＜90%before test Weight loss≤ 0.2% before test No leakage, no venting, no disassembly, no rupture and no fire 开路电压应＞测试前的 90% 重量损失应≤测试前的 0.2% 无泄露、泄气、解体、破裂、着火

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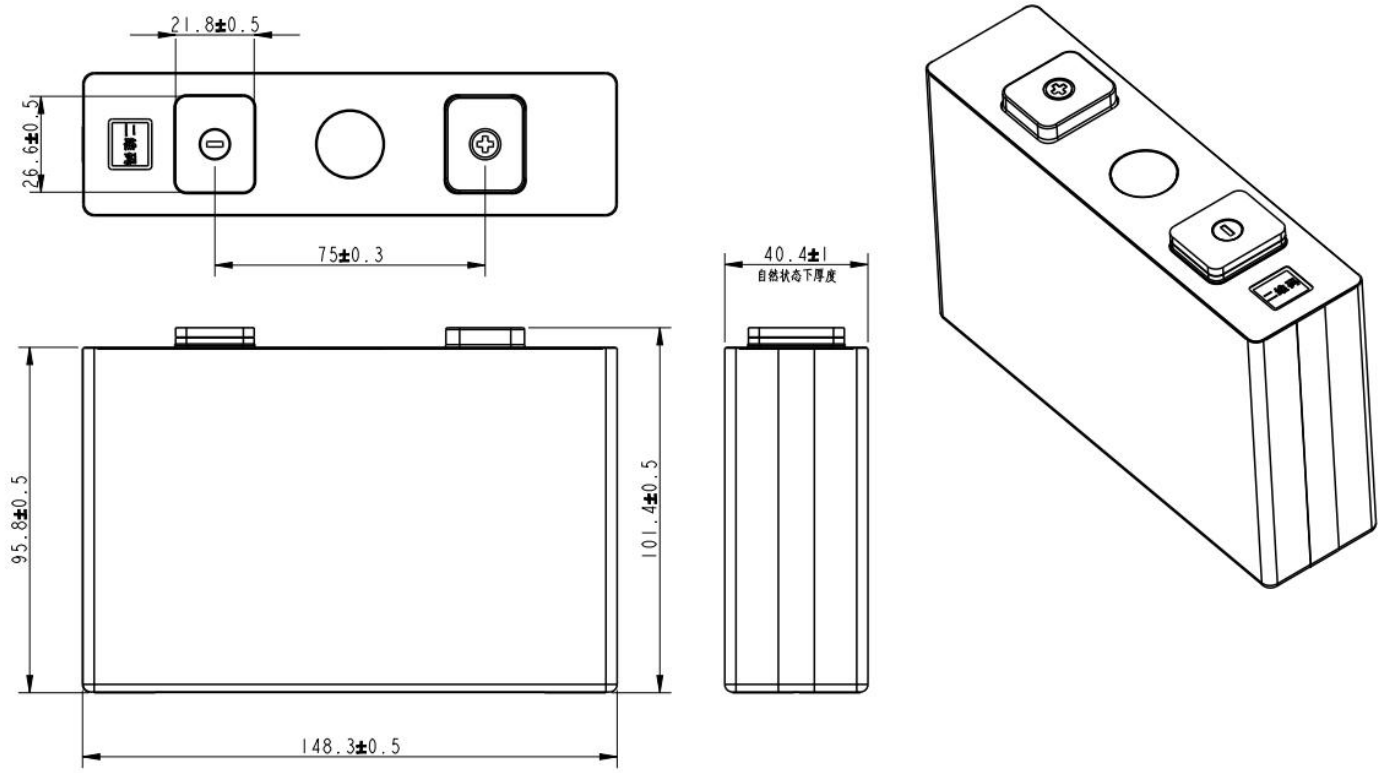
5 Cell initial Dimensions/电芯初始尺寸



NO	Items	Units: mm	备注 Remark
1	厚度（300Kgf）	39.7±0.6	参考值，实际为准
	自然厚度	40.4±1.0	参考值，实际为准
2	宽度	148.3±0.5	参考值，实际为准
3	高度（不含极柱）	95.8±0.5	参考值，实际为准
4	极柱间距	75.0±0.3	参考值，实际为准

Drawled/制图	Checked/审核	Approved/批准

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/禁止拆卸

1) Never disassemble the cells

the disassembling may generate internal short circuit in the cell, which may cause gassing, firing, explosion, or other problems.

2) Electrolyte is harmful

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.

1) 不要拆卸电池。

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) 电解液是有害的

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三年。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 30% to 50% 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 30%至 50%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。