

## 产品规格确认书（铁锂电池）

## Specification Approval Sheet (lithium battery)

Model/型号: GSK-51.2VAC-10KW-1

Capacity/容量: 200 A hVoltage/电压: 51.2V

Custoner/客户:

制定 (Prepared By)	审核 (Checked By)	客户批准 (Approved By)
2023-10-30	2023-10-30	

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产 品 目 录

01. General Performance 常规性能 .....	4
02. Type 电池型号 .....	4
03. Characteristic 电池性能 .....	4
04. Electrical Characteristic 电化学性能 .....	6
05. Safety Characteristic 安全性能 .....	7
06. Environment Characteristic 环境适应能.....	8
07. Warranty Period & Product Liability 保质期及产品责任 .....	8
08. Warnings and Cautions in Using the Battery 电池使用时警告事项及注意事项...	9
09. 附图 1: Dimension 电池尺寸图 .....	10

# 深圳市卓立佰科技有限公司

ShenzhenZhuolibaiTechnologyCo.,Ltd

REV. :    A

PAGE:    of    10

## 1.0 常规性能 General Performance

型号 Model	GSK-51.2VAC-5KW-1	
材质 Can Material(电芯)	可充电锂铁 Rechargeable lithium iron	
标称容量 Nominal Capacity	200Ah	
最低容量 Minimum capacity	190Ah	
充电截止电压 Max Charge Voltage	58.4V	
放电终止电压 Discharge Cut-off Voltage	38.4V	
最大充电电流 Max. Charge Current	50A	
标准持续放电电流 Standard Discharge Current	100A	
最大瞬间放电电流 Max. Discharge Current	250A	
电池最大长度（光壳） Max. Length		
电池最大宽度（光壳） Max. Width		
电池最大高度（光壳） Max. Height		
电池重量 (Approx.) Weight (Approx.)		
充电方法 Charge Method (CC/CV)	标准 Standard	0.2C <sub>5</sub> A (20A)
	快速 Quick	0.5C <sub>5</sub> A (50A)
操作温度 Operating Temperature	充电 Charge	-0℃~60℃
	放电 Discharge	-20℃~60℃
	贮存 Storage	-10℃~45℃

## 2.0 Type 电池型号

2.1 Battery Type 电池型号: GSK-51.2VAC-5KW-1

2.2 Cell Type 电芯型号: 100Ah 3.2V

2.3 The products of all materials are in compliance with ROHS requirements

本产品所有物料均符合 ROHS 要求。

## 3.0 电池性能 Characteristic

若没有特别说明,电池在做各项试验前,均需在 86KPa~106 KPa 大气压,环境温度 20℃±5℃,相对湿度为 45%~75%的条件下,以 0.2C<sub>5</sub>A 恒流放电至终止电压 38.4V,并在收到产品两周内进行以下试验。

If no specific instructions, battery before doing the test, must be in 86 KPa to 106 KPa atmospheric pressure, temperature of 20 °C + / - 5 °C, relative humidity is 45% ~ 75% of the condition, with 0.2C<sub>5</sub>A electric constant exile to termination voltage 8.0V, and carried out the following test within two weeks after receipt of the product.

一些术语的定义: the definitions of some nomenclatures of this specification

标准充电: 在环境温度 20℃±5℃的条件下,以 0.2C<sub>5</sub>A 充电,当电池端电压达到充电截止电压时,改为恒压充电,直到充电电流小于或等于 0.02C<sub>5</sub>A 后停止充电。

standard Charge: Charge with current 0.2C<sub>5</sub>A to limit charge voltage under the condition of 20℃±5℃ surrounding temperature, then change to charge with constant voltage till the current less than or equal to 0.02 C<sub>5</sub>A.

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REV. : \_\_\_A  
PAGE: 10 of 10

额定容量 Rated Capacity		10000VA/10000W
输入 enter	输入系统 Input system	L+N+PE
	额定输入电压 Rated input voltage	208/220/230/240VAC
	电压范围 voltage range	170~280VAC (计算机设备 computer equipment);90~280VAC (家用电器 household appliance)
	频率范围 Frequency Range	50Hz / 60Hz (adaptive)
输出 Output	输出系统 Output system	L+N+PE
	输出电压 The output voltage	220/110V AC±5%
	输出频率 Output frequency	50/60Hz±0.1%
	波形 Waveform	纯弦波 Pure string wave
	切换时间 Switch time	电脑设备 10ms, 家用电器 10ms Computer equipment 10ms, household appliances 10ms
	视在功率 Peak power	10000VA
	超载 Overload	电池模式: 1min@102%~110%负载 10s@110%~130%Load3s@130%~150%Load200ms@ >150%负载 Battery mode: 1min@102%~110% Load 10s@110%~130% Load3s@130%~150% Load200ms@ >150% Load
峰值效率 (电池模式) Peak efficiency (battery mode)	>94%	
电池 Battery	额定电压 Rated voltage	48 VDC
	恒压充电电压 (可设定) Constant voltage charging voltage (can be set)	56.4 VDC
	浮充充电电压 (可设定) Floating charge charging voltage (can be set)	54 VDC
充电器 charger	光伏充电方式 PV charging method	MPPT
	最大光伏输入电压 Maximum PV input voltage	65-150V
	最大光伏充电电流 Maximum PV charging current	80 A
	最大城市充电电流 Maximum city charge charging current	80 A
	最大充电电流 Maximum charging current	80 A
显示 show	LCD 接口 LCD interface	2 × 8pin / PITCH 2.54mm, 支持 128 位段码, 最多 4 键+4LED, 可显示运行模式/负载/输入/输出等。 2 × 8pin / PITCH 2.54mm, support 128-bit segment code, up to 4 buttons +4LED, can display Run mode / load / input / output, etc.
接口 interface	并行接口 Parallel interface	并联功能 Parallel function
环境的参数 Environmental parameters	运行环境温度 Run ambient temperature	-20°C~40°C
	操作环境湿度 Operating environment humidity	20% ~ 95% (无凝结) 20% ~ 95% (no condensation)
	储存温度 Storage temperature	-10°C~45°C
	高度 Altitude	海拔高度不超过 1000m, 1000m 以上, 最高 4000M, The altitude should not exceed 1000m, 1000m or more up to 4000M,
	噪声 noise	≤50db

## 4.0 Electrical Characteristic 电化学性能

序号 NO.	项目 Item	标准 Standard	测试方法 Test Method
1	常温放电性能 Discharge Characteristics	A) $1C_5A \geq 1h$ B) $10C_5A \geq 5.4min$ C) $15C_5A \geq 3.2min$	<p>在 1 标准大气压，环境温度 <math>20^{\circ}C \pm 5^{\circ}C</math>，相对湿度为 45%~75%的条件下，电池标准充电后（以下若没有特别说明，均在此条件下放置，皆按此充电方式），搁置 30min，分别以 <math>1C_5A</math>、<math>10C_5A</math>、<math>15C_5A</math> 进行放电至终止电压，循环三次，当有一次达到标准，即达到标准要求（下同）。</p> <p>Standard charged under the condition of normal atmospheric pressure and the environmental temperature of <math>25^{\circ}C \pm 5^{\circ}C</math> and 45%~75% RH, then rest for 30min and discharge at <math>1C_5A</math>、<math>10C_5A</math>、<math>10C_5A</math> to the discharge cut-off voltage respectively. Charge/discharge cycle can be conducted for 3 times before meeting the Standards (the same below)</p>
2	常温荷电保持能力 Normal Storage	放电时间 $\geq 255min$ Discharge Time $\geq 255min$	<p>电池标准充电后，开路放置 28 天，再以 <math>0.2C_5A</math> 放电至终止电压。</p> <p>Store for 28 days after standard charged, then discharge at <math>0.2C_5A</math> to the discharge cut-off voltage.</p>
3	循环寿命 Cycle Life	容量保持率 $\geq 80\%$ Capacity retention rate is greater than or equal to 80%	<p>在环境温度为 <math>20^{\circ}C \pm 5^{\circ}C</math> 下，<math>0.2C_5A</math> 充电至 58.4V，搁置 10min，然后放电至终止电压，放电结束后搁置 10min，再进行下一次充放电循环，连续进行充放电循环 6000 次。</p> <p>At an ambient temperature of <math>20^{\circ}C \pm 5^{\circ}C</math>, <math>0.2C_5A</math> is charged to 58.4V, set aside for 10min, then discharged to the termination voltage, and then shelved for 10min after the discharge is over, and then carry out the next charge-discharge cycle, and carry out the charge-discharge cycle for 2000 consecutive times.</p>

## 5.0 安全性能 Safety Characteristic

序号 NO.	项目 Item	标准 Standard	测试方法 Test Method
1	过充性能 Overcharge	不爆炸、不起火 No fire、No explosion	<p>将电芯正负极连接于恒压电源,调节电流至3C<sub>5</sub>A,电压为14.6V,然后对电芯以3C<sub>5</sub>A充电,直到电压为10V,电流接近0A.当电芯温度下降到比峰值低约10℃时,结束实验。</p> <p>Connect the positive and negative terminals of the battery to the constant voltage power supply, adjust the current to3C<sub>5</sub>A , and the voltage is 14.6V.Then charge the battery with 3C<sub>5</sub>A, until the voltage is 14.6V, and the current is close to 0A. When the batteryThe experiment was terminated when the temperature dropped to about 10° C lower than the peak.</p>
2	过放性能 Over Discharge	不起火、不爆炸 No fire、No explosion	<p>电池标准充电后,以1C<sub>5</sub>A进行放电至终止电压,然后用10Ω的电阻将电池正负极相连,搁置14天。</p> <p>Standard charged. Discharge at 1C<sub>5</sub>A to discharge cut-off voltage and then connect the positive and negative terminals with a resistor of 10Ω for 14 days.</p>
3	常温短路性能 Short Circuit at Room Temperature	不爆炸、不起火 最高温度<150℃ No fire No explosion Max.temperature<150℃	<p>电池标准充电后,置于防爆玻璃罩中直接短路其正负极(线路总电阻不大于50mΩ),当电池温度下降到比峰值约低10℃时试验结束.观察电池的温度及外观变化。Standard charged. Keep the battery into a ventilation cabinet and short-circuit the positive and negative terminals directly (general resistance shall be less than or equal to 50mΩ). Stop the test when the temperature falls to value 10 °C lower than the peak value. Observe the variation of the battery's appearance and temperature.</p>
4	挤压测试 Crush	不着火不爆炸 No fire and no explosion	<p>挤压测试前电池用0.2C充满电,搁置24小时。从径向挤压压力达到13KN。</p> <p>Charge at 0.2C,and then leave for 24hrs, The crushing was continued until a force of 3000 lb (13 kN)</p>

5	重物冲击性能 Impact	不爆炸、不起火 No fire No explosion	<p>电池标准充电后，放在平面上，并与热电偶相连，将一直径为15.8mm的棒放在电池高度方向中间位置，让重量9.1kg的重物从610mm高度自由垂落至冲击台面。Standard charge. Keep the battery connected with a thermocouple and put it on a impaction platform, place a 15.8mm diameter bar across the center of the biggest surface, then let a 9.1kg heavy hammer self fall off to the platform from a height of 610mm. Observe the variation of the battery's appearance.</p>
6	热冲击安全性能 Hot Oven	不起火、不爆炸 No fire、 No explosion	<p>电池标准充电后，放置于热箱中，并与热电偶相连，温度以(5℃±2℃)/min的速率升至130℃±2℃并保温30Min。Standard charge. Keep the battery connected with a thermocouple and put it into a circulating air oven. Temperature is raised at a rate of 5℃±2℃ per minute to a temperature of 130℃±2℃ and remained for 30min at this temperature. Observe the variation of the battery's appearance.</p>

## 6.0 环境适应性能 Environment Adaptation Performance

序号 NO.	项目 Item	标准 Standard	测试方法 Test Method
1	针刺性能 Needle	不着火、不爆炸 No fire no explosion	<p>针刺测试前电池用0.2C充满电，搁置24小时。用Φ4mm钢针刺穿电池</p> <p>Charge at 0.2C, and then leave for 24hrs, check battery before / after cut through battery with Φ4mm needle</p>
2	恒定湿热性能 Static Humidity	电池不起火、不爆炸 放电时间 ≥120min Discharge Time ≥120min No remarkable deformation No smoking\ explosion	<p>电池标准充电后，置于温度为40℃±2℃，相对湿度为90%的恒温恒湿箱中，搁置48h后，取出电池20±5℃环境下搁置2h。观察电池外观变化。然后以0.2C<sub>5</sub>A放电至终止电压。</p> <p>Standard charge. Put the battery into a 40℃±2℃ and 90% RH chamber for 48h, then get it out and store it for 2h at room temperature. Observe the variation of the battery's appearance and then discharge at 0.2C<sub>5</sub>A to discharge cut-off voltage, measuring final capacity.</p>



3	跌落性能 Drop	不起火、不爆炸 放电时间 $\geq 125\text{min}$ No smoking 、 No fire、No explosion Discharge time $\geq 125\text{min}$	<p>标准充电后，将电池样品由高度(最低点高度)为 1m 的位置自由跌落到 18~20mm 的硬木板上，要求各面各跌落一次。然后将电池以 0.2C<sub>5</sub>A 放电至终止电压，做 0.2C<sub>5</sub>/0.2C<sub>5</sub> 循环达到要求停止，充放电循环次数不高于 3 次</p> <p>Standard charge. Then let it self fall off from a height of 1.0m (the lowest height) to a smooth wooden surface. The self fall off should be conducted from every positive and negative direction. Then discharge at 0.2C<sub>5</sub>A to discharge cut-off voltage. Conduct 0.2C<sub>5</sub>A /0.2C<sub>5</sub>A cycle for 3 times.</p>
4	不同温度下的 放电性能  High-low Temperature  Discharge	A)60 °C时 $\geq 120\text{min}$ B)0 °C时 $\geq 110\text{min}$ ; C)-20 °C时 $\geq 100\text{min}$  电池不爆炸、不起火。  A)60 °C时 $\geq 120\text{min}$ B)0 °C时 $\geq 110\text{min}$ ; C)-20 °C时 $\geq 100\text{min}$  No fire\explosion	<p>电池标准充电后，在 60±2°C 条件下恒温搁置 2h、以 0.2C<sub>5</sub>A 放电至终止电压，然后在室温条件下标准充电，依次按照 0±2 °C /-20±2 °C 的顺序在相应的恒温条件下搁置 16h，以 0.2C<sub>5</sub>A 放电至终止电压。</p> <p>Standard charge. Then store for 2h at 60±2 °C and discharge at 0.2C<sub>5</sub>A to discharge cut-off voltage. then standard charge at room temperature and store for 20h according to the order of 0±2 °C /-20±2 °C and discharge at 0.2C<sub>5</sub>A measuring corresponding discharge capacity.</p>
5	振动环境 适应性性能 Vibration	电池外观无明显损伤、 不漏液、不冒烟、不爆炸  No remarkable damage、  No smoking 、  No explosion	<p>电池标准充电后，安装在振动台面上，按下面的振动频率和对应的振幅调整好试验设备,X、Y、Z 三个方向每个方向上从 10Hz~55Hz 循环扫频振动 30min，扫频速率为 1oct/min: A)振动频率: 10Hz~30Hz ; 位移幅值(单振幅): 0.38mm ; B)振动频率: 30Hz~55Hz ; 位移幅值(单振幅): 0.19mm。</p> <p>Standard charge. Measure initial status. Equip it to the vibration platform, adjust and prepare the test equipment according to following vibration frequency and relevant swing, doing frequency sweeping from X, Y, Z three directions, each from 10Hz to 55Hz for 30 minutes of recycling, rating of which is 1oct/min:A)vibration frequency:10Hz ~ 30Hz ; Displacement breadth (single swing): 0.38mm ; B) vibration frequency: 30Hz~55Hz ; Displacement breadth(single swing): 0.19mm。</p> <p>Measure final status after sweeping and Observe the variation of the battery's appearance.</p>

## 7.0 保质期及产品责任 Warranty Period & Product Liability

保质期是从出厂日期（喷码）开始起12个月。注：深圳市卓立佰科技有限公司对因没有按本规格书规定操作而导致的意外概不负责任（人为所造成的品质和意外一概不负任何责任）。请务必按我司的规格书操作

The shelf life is 12 months from the date of manufacture (printed code)Note: Shenzhen Zhuolibai Technology Co., Ltd. will not take any responsibility for any damage caused by not operating in accordance with the provisions of this specification.

We are not responsible for any accidents caused by the product (we are not responsible for the quality and accidents caused by humans). Please be sure to operate according to our company's specifications

## 8.0 电池使用时警告事项及注意事项 Warnings and Cautions in Using the Battery

为防止电池可能发生泄漏,发热、爆炸,请注意以下预防措施:

To prevent a possibility of the battery from leaking, heating or explosion please observe the following precautions:

- 严禁将电池浸入海水或水中,保存不用时,应放置于阴凉干燥的环境中.

Do not immerse the battery in water or seawater, and keep the battery in a cool dry surrounding if it stands by.

- 禁止将电池在热高温源旁,如火、加热器等使用和留置

Not use or leave the battery near a heat source as fire or heater.

- 充电时请选用锂离子电池专用充电器.

Use the battery charger specifically for that purpose when recharging.

- 严禁颠倒正负极使用电池

Do not reverse the position and negative terminals.

- 严禁将电池直接插入电源插座.

Do not connect the battery to an electrical outlet.

- 禁止将电池丢于火或加热器中

Do not discard the battery in fire or a heater.

- 禁止用金属直接连接电池正负极短路.

Do not short-circuit the battery by directly connecting the positive and negative terminals with metal objects.

- 禁止将电池与金属,如发夹、项链等一起运输或贮存

Do not transport or store the battery together with metal objects such as hairpins, necklaces, etc

- 禁止敲击或抛掷、踩踏电池等

Do not strike, trample or throw the battery..

- 禁止直接焊接电池和用钉子或其它利器刺穿电池.

Do not directly solder the battery and pierce the battery with a nail or other sharp objects.

## 9.0 附图 1: Dimension 电池尺寸图



- |                                  |                           |                                       |                          |
|----------------------------------|---------------------------|---------------------------------------|--------------------------|
| 1.液晶显示器 LCD                      | 2.状态指示 Status Indication  | 3. 功能键 Function Key                   | 4. 电源开关 Power switch     |
| 5.直流风扇 DC fan                    | 6.直流风扇 DC fan             | 7.AC 输出口 AC output port               | 8.AC 输出口 AC output port  |
| 9. AC 输出口 AC output port         | 10. AC 输出口 AC output port | 11. 开关 switch                         |                          |
| 12.DC51.2V100A 输入/输出             | 13.输入火线 Enter FireWire    | 14.输入零线 Enter the zero line           | 15.输出零线 Output zero line |
| 16.输出火线 Output Firewire          | 17.接地线 Ground wire        | 18. XT90 太阳能输入口 XT90 solar input port |                          |
| 19.通信接口 Communication interfaces | 20.输入电源插座                 |                                       |                          |