POWERHERO

HOME ENERGY SYSTEM

FOR A CLEANER
BRIGHTER TOMORROW

POWERHERO

V16

家用储能系统

Home Energy Storage System

产品说明书

User Manual

安全 · 智能 · 可靠 · 融入生活

SAFE · SMART · RELIABLE · A PART OF YOUR LIFE

Free your power
for everyday life.

HOME | SUSTAINABLE | EVERTDAY

产品规格书

PRODUCT SPECIFICATION

型号(Model)：V16

电压/容量(Voltage/Capacity)：51.2V/314Ah

POWERHERO

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1. 适用范围Range of application

本规格书详细描述了苏文电能生产的16S314-001储能用磷酸铁锂电池系统的产品性能指标以及产品使用条件。

This specification document provides detailed descriptions of the product performance indicators and operating conditions for the16S314-001 lithium iron phosphate battery system for energy storage, manufactured by SUWEN.

2. 产品特点Product features

- 内置高稳定BMS，具有过充过放过流、高低温等保护功能；

  Built in high stability BMS, with overcharge, discharge, overcurrent, high and low temperature protection functions;

- 自带LED屏显示电压、电流、温度等信息，方便用户查询；

  Equipped with LED display display voltage, current, temperature and other information, convenient for users to query;

- 最大支持16组并联使用，应对长时间用电环境；

  Support up to 15 groups in parallel for long periods of power usage;

- 适配市场上主流品牌逆变器，为用户提供更多选择；

  Adapt to mainstream brand inverters in the market to provide users with more choices;

3. 产品电性能指标Product Electrical Performance Index

No.	项目 Items	规格 Specifications	备注Notes
3.1	标称能量 Nominal energy	160768Wh	标准充放电模式测试 Standard charge/discharge mode test
3.2	串并联方式 Series-parallel connection method	16串1并	16S1P
3.3	标称容量 Nominal capacity	314Ah	标准充放电模式测试 Standard charge/discharge mode test
3.4	标称电压 Nominal voltage	51.2V	/
3.5	工作电压范围 Operating voltage range	40～57.6V	温度范围：-18～60℃ Temperature range:-18～60℃
3.6	工作温度（充电） Operating temperature (Charging)	0～55℃ ≤90%ROH	

3.7	工作温度（放电） Operating temperature (Discharging)	-10～60℃ ≤90%ROH	
3.8	标准充电 Standard charging	恒流充电：157A Constant current charging:157A 充电电压：57.6 V Charging voltage：57.6 V	最高单体电压3.6V Maximum unit voltage 3.6V
3.9	最大充电持续电流 Maximum continuous charging current	恒流充电：200A Constant current charging:200A 持续电压：57.6V Charging voltage：57.6 V	最高单体电压3.6V Maximum unit voltage 3.6V
3.10	标准放电 Standard discharge	恒流放电：157A Constant current discharge：157A 截止电压：40.0V Cut off voltage：40V	T≥0℃，最低单体电压2.5V Minimum monomer voltage 2.5V
3.11	最大放电持续电流 Maximum continuous discharge current	恒流放电：200A 截止电压：40.0V	T≥0℃，最低单体电压2.5V Minimum monomer voltage 2.5V
3.12	存储温度 Storage temperature	-30~60℃	存储环境湿度≤95%ROH，无凝露 Storage environment humidity ≤ 95%ROH, no condensation.
3.13	循环寿命 Cycle life	容量衰减至 251.2Ah， 循环次数≥6000次； Capacity decay to 251.2Ah, Number of cycles ≥ 6000;	90% DOD，@25±2℃,标准充放电模式 90% DOD, @25±2°C, standard charge and discharge mode
3.14	月自放电 Monthly self discharge	≤2%/月	出货三个月以后的电池，标准充电到30%SOC， @25±2℃储存 After three months' shipment, the battery will be charged to 30%SOC and stored at @ 25 2℃
3.15	监控通信 Monitoring communication	RS485/CAN	
3.16	均衡方式 Balanced approach	被动均衡 Passive equalization	
3.17	出货容量 Shipping capacity	SOC 30～70%（TBD）	SOC 30～70%（TBD）
3.18	重量 Weight	130±2kg	
3.19	尺寸 Dimension	(830±1)*(480±2)*(230±1)mm	

4. 产品外观结构Product appearance and structure

4.1 结构 Structural

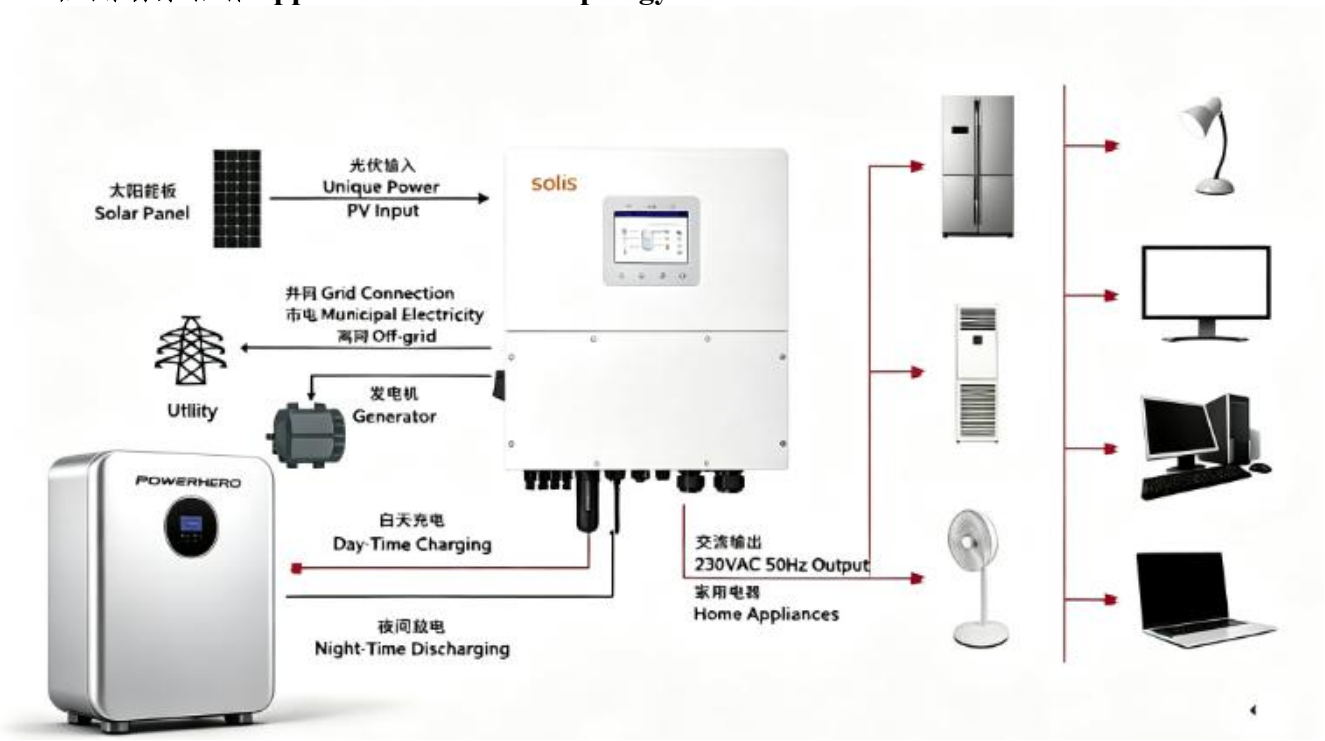
接口及定义 Interfaces & definitions

序号No.	名称Name	详细介绍Detailed introduction
1	显示屏Display screen	显示电量、告警等信息 Display information such as battery level, alarms, etc.
2	弱电开关 Weak electricity switch	控制保护板开/关 Control BMS on/off
3	正极 Positive electrode	系统正极，接逆变器正极 Positive system terminal, connected to positive inverter terminal
4	RS485	RS485通讯口，并机 RS485 communication port, parallel connection
5	RS232	RS232通讯口，调试口 RS232 communication port, debugging port
6	RS485/CAN	RS485/CAN通讯口，与逆变器通讯 RS485/CAN communication port for communication with inverter
7	干接点接口 Dry contact	干接点接口，输出高低频信号 Dry contact , output high and low frequency signals
8	拨码开关 DIP-switch	设置地址 Set address
9	复位开关 Reset switch	复位开关，激活、重启等 Activation, restart
10	负极 Negative electrode	系统负极，接逆变器负极 Negative system terminal, connected to the negative inverter terminal

4.3 附件：配置清单Appendix ： Configuration list

品名Name	规格Type	数量QTY
电池Battery	16S314-001	1
通讯线Communication line	485 Parallel Communication Cable Harness	1
	485 BMS-PCS Communication Cable Harness	1

4.4 应用场景拓扑Application Scenario Topology



5. 电池管理系统设计 Battery management system design

5.1 工作模式及状态 Working mode and status

（1）充电模式Charging mode

BMS 在检测到外部有充电电压且≥48V，同时电芯电压及温度均在可充电范围内时，开启充电MOSFET 进行充电。充电电流达到有效充电电流时，进入充电模式。充电模式下充、放电MOSFET都导通。

When the BMS detects that the external charging voltage is ≥ 48V, and the cell voltage and temperature are within the chargeable range, the charging MOSFET is turned on for charging. When the charging current reaches the effective charging current, it will enter the charging mode. Both charging and discharging MOSFETs are on in charge mode.

（2）放电模式 Discharging mode

BMS 在检测到负载连接且电芯电压及温度在可放电范围内，放电电流达到有效放电电流时进入放电模式。

The BMS enters the discharge mode when it detects that the load is connected, the cell voltage and temperature are within the dischargeable range, and the discharge current reaches the effective discharge current.

（3）待机模式 standby mode

以上两种模式都不满足时，进入待机模式。

When neither of these modes is satisfied, enter standby mode.

（4）休眠模式 Sleep mode

到正常待机规定时间后、电池触发欠压保护、执行按键关机或上位机执行关机命令，BMS 进入休眠（关机）模式。

The BMS enters sleep (shutdown) mode when the normal standby time is reached, the battery triggers undervoltage protection, the button is pressed to shutdown or the host computer executes a shutdown command.

休眠模式的唤醒条件：1、充电激活； 2、按键开机。

Wake up conditions of sleep mode: 1. Charging is active; 2. Press the button to start.

5.2 电气参数表 Electrical parameter table

功能名称 Function description	项目列表 Item	参考值 Reference	设置说明 Setting descript	设置 Set
单体电压告警 Cell voltage alarm	过压告警电压Overvoltage alarm voltage	3500mV		可设Can be set
	欠压告警电压Undervoltage alarm voltage	2700mV		可设Can be set
单体过压保护 Cell overvoltage protection	过压保护电压Overvoltage protection voltage	3600mV		可设Can be set
	过压保护延时Overvoltage protection delay time	1S		可设Can be set
	过压保护恢复电压Overvoltage protection release voltage	3400mV		可设Can be set
单体欠压保护 Cell undervoltage protection	欠压保护电压Undervoltage protection voltage	2500mV		可设Can be set
	欠压保护延时 Undervoltage protection delay time	1S		可设Can be set
	欠压恢复电压Undervoltage release voltage	2700mV		可设Can be set
总体电压告警 Pack voltage alarm	过压告警电压Overvoltage Alarm voltage	56V		可设Can be set
	欠压告警电压Undervoltage alarm voltage	43.2V		可设Can be set
总体过压保护 Pack overvoltage protection	过压保护电压 Overvoltage protection voltage	57.6V		可设Can be set
	过压保护延时Overvoltage protection delay time	1S		可设Can be set
	过压恢复电压Overvoltage release voltage	54.4V		可设Can be set
电池欠压保护 Battery undervoltage protection	欠压保护电压Undervoltage protection voltage	40V		可设Can be set
	欠压保护延时Undervoltage protection delay time	1S		可设Can be set
	欠压恢复电压Undervoltage release voltage	43.2V		可设Can be set
电芯温度告警 Cell temperature alarm	充电高温告警Charging over temperature alarm	50℃		可设Can be set
	充电低温告警Charging Under-temperature alarm	5℃		可设Can be set
	放电高温告警Discharge over temperature alarm	55℃		可设Can be set
	放电低温告警Discharge Under-temperature alarm	-15℃		可设Can be set
电芯充电温度保护 Cell charge temperature protection	充电高温保护Over-temperature Protection(OTD)	55℃		可设Can be set
	充电高温恢复Over-temperature release	50℃		可设Can be set
	充电低温保护 Under-temperature Protection(UTD)	2℃		可设Can be set
	充电低温恢复Under-temperature release	5℃		可设Can be set
电芯放电温度保护Cell discharge temperature protection	放电高温保护 over temperature protection(OTD)	60℃		可设Can be set
	放电高温恢复 over temperature release	55℃		可设Can be set
	放电低温保护 Under-temperature Protection(UTD)	-18℃		可设Can be set
	放电低温恢复Under-temperature release	-10℃		可设Can be set
环境温度告警 Environment temperature alarm	环境高温告警Over temperature alarm	60℃		可设Can be set
	环境低温告警Under-temperature alarm	-15℃		可设Can be set
MOS高温告警 MOS Over temperature alarm	MOS高温告警Over temperature alarm(MOS)	110℃		可设Can be set
充电过流告警 Charging overcurrent alarm	充电告警电流Charge overcurrent alarm	190A		可设Can be set
充电过流保护Charging overcurrent protection	充电保护电流 Charge protection current	195A		可设Can be set
	充电过流延时Charge overcurrent delay time	1S		可设Can be set
放电过流告警Discharge overcurrent alarm	放电告警电流Discharge alarm current	190A		可设Can be set
放电过流保护Discharge Over-Current protection	放电保护电流Discharge protection current	195A		可设Can be set
	放电过流延时Disharge overcurrent delay time	1S		可设Can be set
二级放电过流保护 Secondary discharge overcurrent protection	二级保护电流Secondary Over-Current Discharge Protection（OCD2)	≥200A		可设Can be set
	二级过流延时Delay time	1S		可设Can be set

输出短路保护 Output short circuit protection	短路保护功能Short circuit protection function		有		/
	短路保护延时Short circuit protection delay time		≤500uS		可设Can be set
	短路保护解除Short-circuit protection release		充电解除或负载移除 Charge release or load removal		
放电过流恢复 Discharge overcurrent release	自动恢复延时Automatic release delay time	1min	1分钟后自动恢复 Automatic recovery after 1 minute		
	充电解除Charge release	/	充电电流≥1A Charging current ≥ 1A		
电芯均衡功能 Equalization function	电芯充电均衡Charge balance	开启条件：有效充电电流的状态 Opening condition: state of effective charging current			
	均衡开启电压Balance threshold		3380mV		可设Can be set
	均衡开启压差 Balance ΔVcell		30mV		可设Can be set

6. 安装、维护注意事项 Precautions for installation and maintenance

6.1 安装注意事项Precautions for installation

(1)安装前拆箱、检测配件数量和电池外观；

Unpacking, checking the number of accessories and the appearance of the batteries before installation;

(2)安装壁挂支架，测量电池电压，一般电池出厂电压在50.4V–53.5V（电量20%-60%）之间；

Install the wall-mounted bracket and measure the battery voltage. Generally, the factory voltage is in the range of 50.4V-53.5V (SOC 20%-60%);

(3)接线前查看好电池正负极，严禁在安装电池时正负极端子安装反；

Check the positive and negative terminals of the batteries before wiring. It is strictly forbidden to install the positive and negative terminals backwards when installing the batteries;

(4)在电池连接过程中请戴好防护手套，使用扭矩扳手等金属工具时，请将金属工具进行绝缘包装，绝对避免扭矩扳手等金属工具两端同时接触到电池正、负端子，造成电池短路；

Please wear protective gloves during battery connection. When using metal tools such as torque wrench, please pack the metal tools in insulation, so as to avoid the battery short circuit caused by both ends of metal tools such as torque wrench touching the positive and negative terminals of the battery at the same time;

(5)跟外接设备连接之前，使设备处于断开状态，并再次检查电池的连接极性和总电压是否正确,然后再将电池的正极连接设备的正极，电池的负极连接设备的负极端，并紧固好连接线；

Before connecting to an external device, leave the device disconnected and check again that the battery connection polarity and total voltage are correct, then connect the positive terminal of the battery to the positive terminal of the device and the negative terminal of the battery to the negative terminal of the device, and fasten the connection cable;

(6)电池在搬运和摆放中必须轻拿轻放，严禁坠落、冲击，禁止抛掷、敲打电池， 以免损坏电池或导致安全隐患；

Batteries must be handled and placed gently, no dropping, impacting, throwing and knocking, to prevent damage to the battery or cause safety hazards;

(7)禁止使用工具的尖锐部件接触到电池箱表面，划伤或损坏电池箱；

It is forbidden to use sharp parts of tools to touch the surface of the battery box, and scratch or damage the battery box;

(8)禁止私自拆解电池箱；

It is forbidden to disassemble the battery box without permission.

(9)禁止将任何金属、导电材质物件与电池放置一起或者一起组装进电池箱；

It is forbidden to put or assemble any metal or conductive materials together with the battery box;

(10)安装前确保墙体符合壁挂要求；

Ensure the wall meets the wall hanging requirements before installation;

6.2 维护注意事项 Maintenance precautions

◆安装使用后期可以对电池进行简单的维护检验，如6个月进行一次；

Simple maintenance and inspection of the batteries can be carried out at a later stage of installation and use, e.g. once every 6 months;

◆检查电池正负极极柱、连接线是否出现松动、损伤、变形成腐蚀等现象，电池壳体有无损伤、变形；

Check the positive and negative battery poles and connecting wires for looseness, damage, corrosion, etc., and the battery case for damage and deformation;

◆如果出现故障，电池发出告警，请检查电池连接是否正确或是否存在过流情况；之后按复位按键，电池重启后看故障是否消除，如无法消除请联系厂家处理，请勿擅自打开电池组箱体；

If a fault occurs and the battery gives an alarm, please check if the battery is connected correctly or if there is an overcurrent situation, then press the reset button and check if the fault is eliminated after the battery is restarted, if it cannot be eliminated please contact the manufacturer for handling, please do not open the battery pack case without permission;

◆针对多组电池并联的应用场景，如果当中的一组电池出现故障需要替换，请确保新替换的电池组电压和需要并联的其他电池组的电压压差在2V 以内，如果压差较大，会发生电压高的电池组给电压低的电池组大电流充电，电压低的电池组发生充电过流保护，导致无法充电；

For applications where multiple batteries are connected in parallel, if one of the batteries fails and needs to be replaced, ensure that the voltage difference between the new battery pack and the other batteries to be connected in parallel is within 2V. If the voltage difference is large, the battery pack with high voltage will charge the battery pack with low voltage at high current and the battery pack with low voltage will be over-current protected, resulting in failure to charge;

◆记录停电的时间和次数，对电池的供电时间做详细的统计；

Record the time and number of power failure, and make detailed statistics on the power supply time of the battery;

7. 包装、运输、存储 Packaging, transportation and storage

7.1 包装 Packaging

磷酸铁锂电池组进行整体包装，以确保产品在搬运、运输、贮存中不受任何有害气体、化学 污染、静电、潮湿和机械损伤。

The lithium iron phosphate battery pack is packaged as a whole to ensure that the product is protected from any harmful gases, chemical pollution, static electricity, humidity and mechanica damage during handling, transportation and storage.

7.2 运输 Transportion

电池搬运过程应注意以下方面：

The following aspects should be noted during battery transportation:

（1）应轻拿轻放，避免设备受剧烈震动；

It should be handled gently to avoid violent shocks to the equipment;

（2）禁止倒置、翻滚、摔、撞电池，避免破坏电池的外观；

Avoid damaging the appearance of the battery by inverting, tumbling, dropping or hitting it;

（3）电池应避免暴晒、雨淋，禁止直接将电池整体淹入水中；

Batteries should be protected from exposure to the sun and rain, and direct submersion of th whole battery in water is forbidden;

（4）禁止正负极短路；

Negative and positive short circuits are prohibited;

7.3 储存Storage

(1)电池组的外接端子处于绝缘防护状态；

The external terminal of the battery pack is in an insulation protection state;

(2)存期超过6个月的电池组要相应进行补充电，打开电池开关，指示灯点亮，当电量为30%-50%时，以0.2C充电1小时；当电量为30%及以下时，以0.2C充电3小时；

Battery packs that have been in storage for more than 6 months should be recharged accordingly by turning on the battery switch, with the indicator light up, and charging at 0.2C for 1 hour when the charge is 30%-50%, and at 0.2C for 3 hours when the charge is 30% or less;

(3)电池不要在60℃高温下长期存储或放置，否则会引起功能衰退、寿命减小；

Do not store or leave batteries at 60°C for long periods of time as this may cause deterioration of function and reduced life;

8. 质保及其他 Warranties and others

(1)产品在质保期内，保质期：3年；

The product is within the warranty period，Guarantee period of quality: 3 years;

(2)客户需遵从产品的维护使用说明进行使用，需经授权专业人员安装、调试、维护；

The customer is required to follow the instructions for the maintenance and use of the product, which is subject to installation, commissioning and maintenance by authorised professionals;

(3)客户必须通过畅行新能源或者畅行新能源授权的经销商处购买此产品；

Customers must purchase this product through Freego or Freego authorized distributors;

(4)产品在未被授权的情况下不得私自打开、修改、加工或维护；

The product shall not be opened, modified, processed or maintained without authorization;

(5)不得修改产品的记录数据；

Do not modify the recorded data of the product;

(6)客户若需要将电池用于超出文件规定以外的设备，或在文件规定以外的使用条件下使用电池，应事先联系畅行新能源，因为需要进行特定的实验测试以验证电池在该使用条件下的性能及安全性；

Customers who need to use batteries in equipment other than that specified in the documentation, or to use batteries under conditions of use other than those specified in the documentation, should contact Freego UP in advance, as specific laboratory tests are required to verify the performance and safety of the batteries under those conditions of use;

(7)对于在超出文件规定以外的条件下使用电池而造成的任何意外事故，畅行新能源概不负责；

Freego is not responsible for any accidents caused by the use of batteries under conditions other than those specified in the documentation;

(8)任何本说明书中未提及的事项，须经双方协商确定；

Any matter not mentioned in this specification shall be determined by negotiation between the parties;

9. 风险警告 Risk Warning

警 告 Warning

电池存在潜在的危险，在操作和维护时必须采取适当的防护措施！不正确地滥用测试实验，可能导致严重的人身伤害和财产损失！必须使用正确的工具和防护装备操作电池。

Batteries are potentially dangerous and must be operated and maintained with appropriate precautions! Improper misuse of test experiments can lead to serious personal injury and property damage! Batteries must be handled with the correct tools and protective equipment.

电池的维护必须由具有电池专业知识并经过安全培训的人士执行。不遵守上述警告可能造成多种灾难。

Battery maintenance must be carried out by persons with specialist knowledge of batteries and who have received safety training. Failure to comply with the above warnings could result in a number of disasters.