# S52200User Manual of Home Energy Storage System(Split Type)

**Security Disclaimer**

When installing, using, and maintaining the product, read this chapter carefully and follow the safety precautions in this chapter. The Company has nothing to do with any injury or loss caused by any illegal operation.

| **Note** |
| --- |
| Hazards caused by failure to operate as required may result in moderate or minor injury to human and product damage. |
| **Danger** |
| Hazards caused by failure to operate as required may result in fire, serious injury or even life threatening. |

## Safe use

Thank you very much for choosing new energy split power supply product. In order to enable you to better use and maintain this product, please read the product manual carefully before use.

| | |
| --- | --- |
| **Open box inspection** | **Attention** |
| | 1. If the product is found to be damaged or missing parts, do not install it; otherwise, faults may occur;<br>2. If the packing list is inconsistent with the real name, please do not install it and contact the supplier in time; |
| **Installation** | **Danger** |
| | 1. Wiring work must be done by qualified electrical engineers, otherwise there is risk of electric shock or system damage;<br>2. Before wiring, make sure that the power supply is disconnected, otherwise there is danger of electric shock or fire;<br>3. The cables to be installed must meet the requirements, and the power distribution parts must meet the safety regulations.<br>4. Installation must be carried out strictly according to the following installation steps, otherwise the product may be damaged; |
| | **Attention** |
| | 1. When handling and installing, please lift and put gently to avoid foot injury or product damage;<br>2. The system should be kept away from flammable objects and heat sources;<br>3. Do not drop sundries into the system when installing the system, otherwise it may cause system failure; |
| **At work** | **Danger** |
| | 1. During normal operation, do not directly plug and remove the DC input socket or wiring bar, input and output sockets, to avoid electric shock;<br>2. During normal operation, do not directly open the shell of the system to avoid electric shock; |
| | **Attention** |

| | |
|---|---|
| | 1. Before operation, please ensure that the product is used within the permitted working range to avoid damage to the product;<br>2. When the product is not used for a long time, the battery must be fully charged and the power switch must be turned off to avoid the battery stand for a long time leading to empty power;<br>3. When not in use for a long time, charge the product regularly and turn off the battery switch after charging; |
| **Maintenance and repair** | **Danger** |
| | 1. Before removing the shell， Disconnect the DC input, DC output and power switch; otherwise, there is danger of electric shock;<br>2. Even after the shell is removed, there is still residual power inside the system. Do not touch the exposed part of the circuit directly to avoid electric shock;<br>3. Maintenance and repair must be carried out by professional maintenance personnel. Users should not disassemble the machine by themselves, otherwise it may cause equipment damage and personal injury; |
| **Handling** | **Danger** |
| | 1. In the process of handling the product, avoid strong vibration, fall, knock against, do not invert the packing case, do not lose the accessories and instructions when unpacking; |
| | **Attention** |
| | 1. Please pay attention to safety when handling, so as not to hurt your body; |
| **Other** | **Danger** |
| | 1. It is forbidden to modify the system by itself to avoid serious accidents;<br>2. If the system is abnormal, disconnect the power switch and power input/output cable immediately.<br>3. In case of fire, please use the dry chemical extinguisher and turn off all switches immediately; |

Manual description: Split-type power supply can provide energy storage function for photovoltaic power generation users and backup power support function for important electrical equipment. The excess photovoltaic power can be stored in the battery during the day, and the stored electric energy can be used to power the electrical equipment at night or when necessary, which can improve the efficiency of photovoltaic power generation, peak cutting and valley filling, emergency backup power and other functions. It can also be used to backup power for important equipment to avoid data and economic losses caused by unexpected power failure.

User Manual System Describes in detail the basic structure, parameters, installation, operation and maintenance procedures and methods of the device.

# Catalogue

# 1. Product introduction

Split power supply is an energy storage product based on lithium iron phosphate battery 51.2V. It is equipped with a customized battery management system (BMS), designed for the energy storage needs of home photovoltaic power generation users. The excess power of photovoltaic power generation can be stored in the battery during the day, and the stored electricity can be provided to the electrical equipment at night or when needed, which can improve the use efficiency of photovoltaic power generation, peak shifting and valley filling, and emergency power preparation.

## 1.1 Support for large-capacity energy storage

Power supply products in parallel with multiple parallel, can expand the energy storage capacity.

## 1.2 High Reliability system

Adopt high-performance processor and configure customized BMS protection board system to ensure the stable operation of the system;

Instant monitoring system, providing short circuit protection, reverse connection protection, high voltage protection, low voltage protection, over charge current protection, discharge over current protection, overcharge protection, over discharge protection, high temperature protection, low temperature protection, cell balance and other functions.

## 1.3 Powerful communication functions

Configure with a variety of communication interfaces: RS-485, CAN, through the upper computer can understand the battery operating state at any time;

Multiple cascades, address automatic acquisition, without manual operation.

## 1.4 Leading product advantage

Support high current charge and discharge, 100A(0.5C) charge and discharge modular design, the use of multi-stage energy consumption management before the operation, front wiring, convenient installation, maintenance, high compatibility, BMS and inverter seamless docking, one-button switch machine operation is more convenient, suitable for long-term charging and discharge cycle.

# 2. Specification parameters

## 2.1 Battery pack specification and parameters

| Type | | Parameter |
|---|---|---|
| **Inverter input （AC/DC）** | **Rated input voltage** | 54.4V |
| | **Input voltage range** | 36V≤U≤60V |
| | **Input current** | ≤100A |
| | **Interior input power** | ＜6000W |
| **System output (DC)** | **Nominal output voltage** | 51.2V |
| | **Output voltage range** | 44.8V＜U＜58.4V |
| | **Output** | ≤100A |
| | **Output power** | ＜6000W |
| | **Output overload** | When the current is higher than 110A, the duration is 10s, and the protection board is power off to stop discharging. |
| | **Short circuit protection** | The system is automatically closed |
| **Single module capacity** | 200Ah | |
| **Protection board function** | Overcharge, overdischarge, overcurrent, high temperature, short circuit protection and so on | |
| **Battery technology type** | Square lithium iron phosphate | |
| **Working temperature** | **Charge** | 0℃-55℃ |
| | **Discharge** | -10℃-55℃ |
| **Relative humidity** | ≤90% | |
| **Appearance size** | [672mm(L)×489mm(W)×409.5mm (H)] ± 2mm (excluding bracket, protrusion) | |
| **Single module weight** | 140±2Kg | |

**Note**: To ensure the optimal performance of the battery, each battery continuous charge and discharge current should be less than or equal to 100A.

## 2.2 Product standard configuration

| Part name | Quantity | Unit | Specifications | Remarks |
|---|---|---|---|---|
| **Split power supply** | 1 | pcs | Use lithium iron phosphate cell, with a capacity of 51.2V/200Ah, built-in BMS, reserved 1 CAN, 2 RS485 ports, with LED power indicator light, using insulation coated metal shell. | |
| **Output power cable** | 2 | pcs | 50 $mm^2$ , the length of 3 meters | |

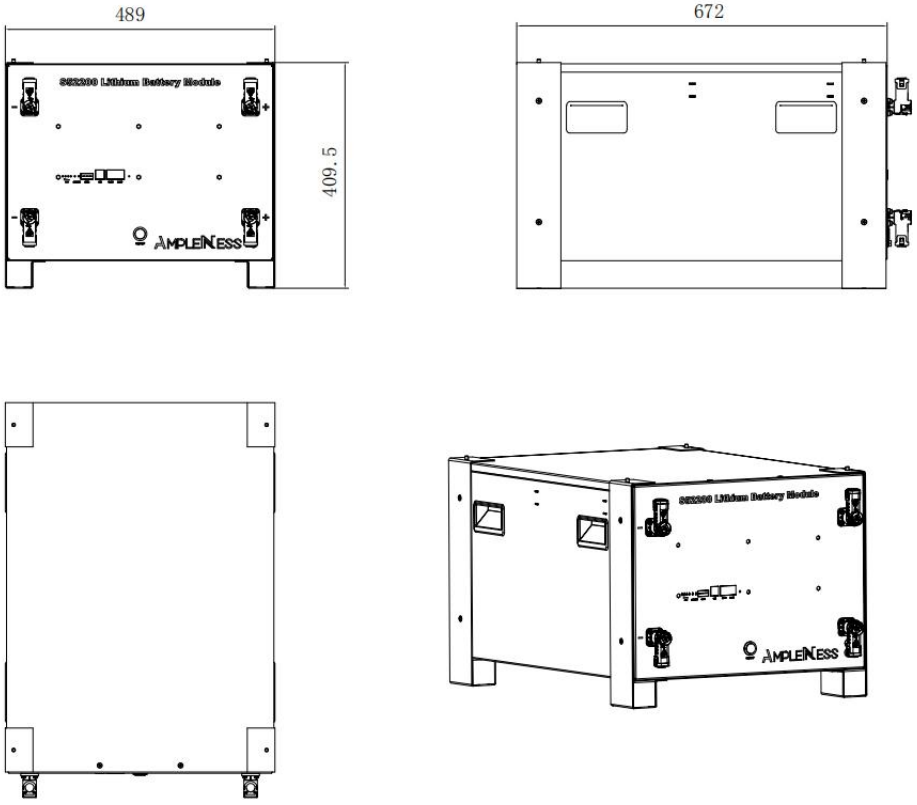
| | | | | |
|---|---|---|---|---|
| **Parallel power cable** | 2 | pcs | 50 mm², when used in parallel | |
| **Output communication cable (Network cable)** | 1 | pcs | CAT5e, the length of 3.5m | |
| **Products and connected to the Internet** | 1 | pcs | CAT5e, the length of 0.35m | |

### 2.3 List of attachment boxes

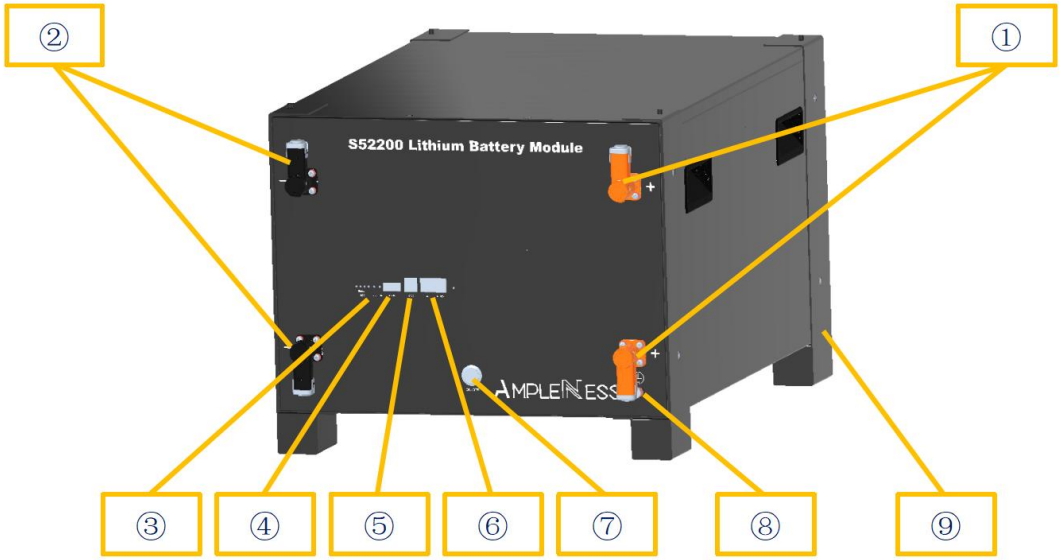
| Part name | Quantity | Unit | Specifications | Remarks |
|---|---|---|---|---|
| **Ground lead** | 1 | pcs | 4 mm², yellow green | |
| **Nuts, screws, and bolts** | 1 | pcs | / | |

## 3. Product Function Description

### 3.1 Battery size drawing



### 3.2 Schematic diagram of the battery front panel




### 3.3 Description of each product component

| No | Name | Function declaration | Remarks |
|---|---|---|---|
| ① | Positive terminal | Connect the positive terminal of the external device | |
| ② | Negative terminal | Connect the negative terminal of the external device | |
| ③ | Residual battery indicator , alarm indicator | Indicate working status, battery capacity | |
| ④ | Address DIP switch | Change product code when multiple units are connected in parallel | |
| ⑤ | CAN interface | Connect external device | |
| ⑥ | RS485 interface | Connect external device | |
| ⑦ | Battery switch | Battery switch | |
| ⑧ | Ground point | Avoid accidental leakage of electricity | |
| ⑨ | Support rack | Fix product on the support | |

### 3.4 Battery Management System (BMS protection board)Function

#### 3.4.1 Voltage Protection Function

| Discharging low-voltage protection | Charging over-voltage protection |
|---|---|
| In discharging, the over-discharge protection will start and battery stops to supply electricity if the voltage of any single cell is lower than the protection value. The protection will be dismissed after the voltage of all cells returns to the range of rated hysteresis value. | In charging, the system will stop charging if the voltage of battery module or any single cell reaches to the protection value. The protection will be dismissed after the battery module voltage and cell voltage return to the range of rated hysteresis value. |

### 3.4.2 Current Protection Function

| Charging over-current protection | Discharging over-current protection |
|---|---|
| System stops charging if charging current is over the protection value. Protection is dismissed after a period of time. Please pay attention that the maximum charging current shouldn't exceed to the protection value when using the battery. | System stops discharging if discharging current is over the protection value. Protection is dismissed after a period of time. Please pay attention that the current required by electrical equipment shouldn't exceed to the protection value when using the battery. |

### 3.4.3 Temperature Protection Function

| Charging low/over-temperature protection | Discharging low/over-temperature protection |
|---|---|
| In charging, system starts charging temperature protection and stops charging if the battery temperature is over protection range, and dismisses protection after temperature returns to rated hysteresis value. | In discharging, system starts discharging temperature protection and stops supplying electricity if the battery temperature is over the protection range, and dismisses protection after temperature returns to rated hysteresis value. |

### 3.4.4 Other Protection Function

| Short circuit protection | Automatic shutdown |
|---|---|
| System starts short circuit protection if it occurs to short circuit when battery starts working from a shutdown state. | Battery will shut down automatically after it has no external loads and power supply for 48 hours. |

## 4. Running Environment

| Running Environment | Condition |
|---|---|
| **Working temperature** | 0℃ - 50 ℃ |
| **Relative humidity** | 5% - 95% ， no condensation |

| | |
|---|---|
| **Altitude** | 2000m |
| **On-site environment** | Away from heat source, avoid direct sunlight, no corrosive gas, no explosive gas,non-destructive insulation gas, non-destructive insulation conductive dust |

# 5. Requirements of Package, Transportation, Storage

| Items | Methods | Requirements |
|---|---|---|
| **Transportation** | **Transport** | Please avoid violent vibration, impact or extrusion, and protect it from sun and rain during transportation. |
| | **Loading and unloading** | Please move it gently, and avoid falling, tumbling and pressing. |
| **Storage** | **Storage environment** | Storage temperature：-20 ℃~55℃；relative humidity ≤85%；Stored in the clean, dry, ventilated room and avoid the direct sunlight. |
| | **Gas environment** | Please prohibit harmful gas, flammable and explosive products, corrosive chemicals. |
| | **Away from danger** | Please keep away from corrosive substances, fire and heat sources |
| | **Battery storage SOC** | 20%--50% |
| | **Long-term storage** | Storage for more than 6 months, please ensure that the battery is charged for more than 80% capacity before storage, and charged once every 6 months with over 80% supplementary power. |

# 6. Installation and Configuration

## 6.1 Installation Preparation

### 6.1.1 Security regulations

Only those people who master the knowledge of power-supply system and electricity precautions are allowed to install this device. In installation, please always observe the local safety regulations and meet the security requirements listed below.

Please ensure that the battery is uncharged and in shutdown state before installing or disassembling it.

Please ensure that the power distribution cables are routed properly and have protection, avoiding touching these cables when people operate the device.

### 6.1.2 Running environment examination

The running environment should meet the above referred requirements. If it is not as request, please rectify it and re-examine running environment.

### 6.1.3 Tools and data

Required tools and instruments are as following form:

| Name | Remark |
|---|---|
| Multimeter | Examine product status.<br>Please avoid operating it with electricity. |
| Screwdriver (slotted, cross) | Disassemble, install screw bolt |
| Wrench | Fix the bracket |
| Diagonal pliers | Cut off cables |

### 6.1.4 Technical Preparation

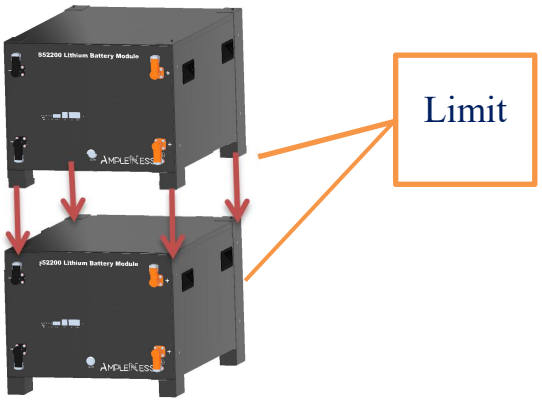
| Electrical interface setting | Security examination |
|---|---|
| Please kind do the following examination if the battery connects with the user's device directly:<br>Check whether the DC charging interface of inverter meets requirements of specification, voltage, current of battery pack.<br>Check whether power of electrical device matches with the parameters of battery pack. | Fire-fighting equipment should be prepared near the battery, like, the portable dry powder fire extinguisher. It is strictly forbidden to place flammable, explosive and other dangerous items next to the battery. |

### 6.1.5 Installation Instruction

Please take reference for the structure diagram of split type battery. The product includes battery module and fixed bracket. For using one battery alone, you just need to connect with an inverter by placing the product on flat ground.

For using in parallel, the battery packs can be stacked up to 4 layers.

Limit points are designed on top of and at bottom of battery bracket, which can strengthen stability and practicality, thus avoiding the danger of accidental displacement, side slip and others in working.




### 6.2 Unpacking

Please unload the product as requirements and prevent it from sun and rain when the device arrives at installing site. Before unpacking, please check the total number of materials in 【Shipping List】attached on package, and check whether is package is well packed or not.

In the process of unpacking, please pay attention to lift and put it down gently and protect its surface coating.

The installing person should read technical document, check the list, confirm whether accessories are completed and intact according to 【Configuration Table 】and【Packing List】at first after unpacking. If internal packages are damaged, please check it carefully and take records.

### 6.3 Preparation

1) Please ensure the POWER buttons of all batteries are in cut-off status.
2) Please ensure the charging voltage of the device is within the product allowable range.
3) Please cut off power to all related devices.

### 6.4 Installation and wiring

#### 6.4.1 Device installation

Please take reference of the way recommended by manual to place the product. All devices must be firm during installation. Please arrange the stacked number of devices flexibly as actual needs. Don't install batteries on sloping and unstable ground.

### 6.4.2 Ground wire connection

Please unscrew the screw at the ground hole on front panel, install the ground terminal on the screw and tighten it with a screwdriver. The other end of ground wire is connected to the nearby bracket, and the whole is connected to a reliable ground point.

Attention: the ground resistance ＜4Ω .

### 6.4.3 Power cable connection

Please check the continuity of the cable, distinguish the positive and negative terminals, and label the cables before connecting power cable. Please also check whether there is short circuit and reverse connection after the cable connection is finished. The checking method is as follows:

Cable continuity: please adjust to the buzzer gear of multimeter and test two ends of the cable by a probe. If the buzzer sounds, the cable is available.

Voltage diagnosis: please adjust to the DC voltage gear of multimeter and test the positive and negative electrode of battery by a probe. If it indicates the voltage within the normal range, the product can be used.

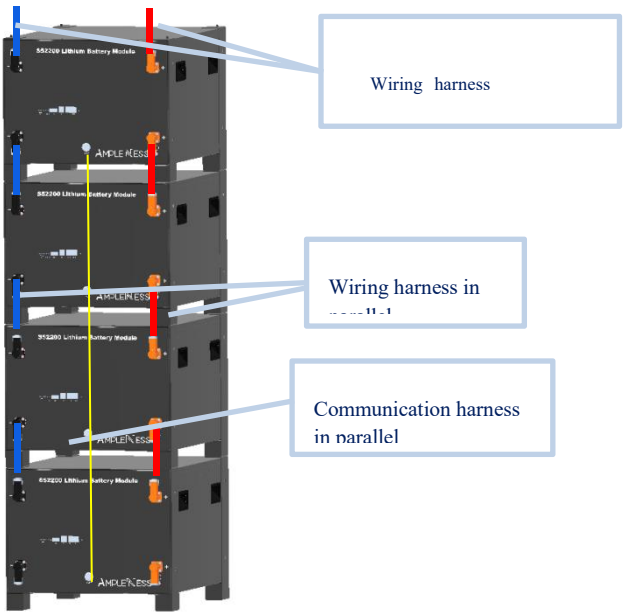
### 6.4.4 Cables connection

Please take reference of the following description of wiring method for installing battery pack.

A single battery: please connect the positive electrode of battery with the DC positive electrode of inverter by a red cable, and connect the negative electrode of battery with the DC negative electrode of inverter with a black cable.

Multiple batteries: please adopt the parallel connection method between battery and battery or battery and inverter. At first, please connect the positive terminals of the adjacent 2 batteries respectively by a red cable, and connect the negative terminals of the adjacent 2 batteries respectively by a black cable. Second, please connect the positive electrode of battery with the DC positive electrode of inverter by a red cable, and connect the negative electrode of battery with the DC negative electrode of inverter by a black cable.

Communication cable, please connect the CAN interface of battery with the communication interface of inverter. The RS485 interface of battery is used for the communication connection of two batteries.




### 6.4.5 Communication wire connection

A single battery: just select the corresponding interface according to the communication protocol of inverter.

Multiple batteries: the host and the slave batteries communicate in cascade mode, thereinto, one of them is the host, and the rest are slave batteries. Please take reference for cascade wiring of the above map. Then, the corresponding port can be connected to the host battery according to the communication protocol of inverter.

### 6.4.6 Start-up

1） Please confirm again whether all cables are correctly connected, firmly connected, and not short circuit or reverse connection before starting up.

2） Please turn all battery switch buttons to “ON” .

3） A single battery: If the battery SOC indicator is always on and the alarm indicator is off, it means that the battery has been started.

4） Multiple batteries: If all battery SOC indicators are always on and the alarm indicator is off, it means that all batteries have been started.

**Attention:** please connect the inverter immediately to charge if battery power is too low and cannot be started.

### 6.4.7 Power-on test

1. Please connect battery and inverter or DC switching power supply.

2. Please check whether battery state is normal according to the indicator table:

a. battery will be in charging mode if battery power is not full and inverter has successfully charged to battery.

b. battery will be in standby mode if battery power is full and is not supply power to loads.

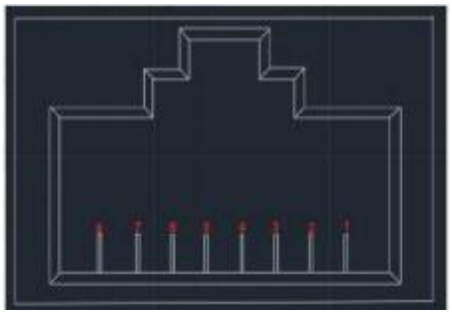
c. battery will be in discharging mode if battery is supply power to loads.

| System State | Running State | RUN | ALM | SOC | | | | Instruction |
|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ● | ● | ● | |
| Shutdown | Dormancy | OFF | OFF | OFF | OFF | OFF | OFF | All OFF |
| Standby | Normal | Flash 1 | OFF | OFF | OFF | OFF | OFF | Standby state |
| Charge | Normal | ON | OFF | Follow battery capacity indication | | | | LED flash 2 maximum |
| | Over-current warning | ON | Flash 2 | Follow battery capacity indication | | | | LED flash 2 maximum |
| | Over-voltage warning | Flash 1 | OFF | OFF | OFF | OFF | OFF | |
| | Temperature, over-current protection | Flash 1 | Flash 1 | OFF | OFF | OFF | OFF | |
| Discharge | Normal | Flash 3 | OFF | Follow battery capacity indication | | | | Follow battery ON indication |
| | Warning | Flash 3 | Flash 3 | | | | | |

## 7. Communication Settings

The product is designed with communication interfaces like the RS485 and CAN, and the battery status can be easily obtained or the internal parameters can be modified through the master computer.

### 7.1 RS485 interface



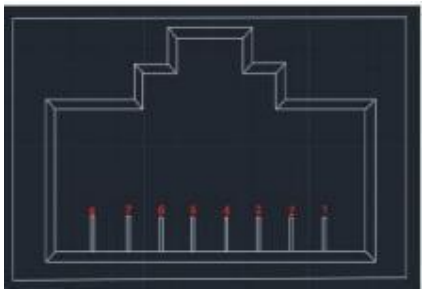
| Pin | Definition |
|---|---|

| | |
|---|---|
| 1、8 | Ground |
| 2、7 | RS485-B |
| 3、6 | RS485-A |
| 4、5 | NV （hanging） |

The product has RS485 communication between battery packs, and baud rate is 19200bps. Please take reference for the above figure of communication interface definition.

### 7.2 CAN interface

The product has the CAN communication function between battery packs and inverter, and baud rate is 500K. Battery can communication with the inverter and CAN TEST by connecting with standard network cables, and the current battery information can be uploaded to the related device.



| Pin | Definition |
|---|---|
| 1、2、7、8 | NV （hanging） |
| 4 | CAN-H |
| 5 | CAN-L |
| 3、6 | Ground |

## 8. Abnormal Conditions and Fault Handling

### 8.1 Fault and abnormal phenomenon handling

| Fault Phenomenon | Fault Causes | Handling Method |
|---|---|---|
| DC input fault | No DC input voltage | Please check whether DC input switch is closed, check whether circuit is open |
| Battery fault | No battery DC output | Please check whether switch is closed, check whether circuit is open |
| Overload | Too large power or short circuit | Please confirm whether load is less than the rated power, check |

| | | |
|---|---|---|
| | | whether load is short circuit |
| Abnormal temperature inside system | Over temperature inside box | Please turn off the load and restart it after temperature drops, check whether ambient temperature exceeds the standards |
| Low battery | SOC too low | Please charge the battery |
| System fault | System operation error | Please cut off load, shutdown switch, and restart battery |

The split-type battery is designed with indicators on the upper panel, and has perfect protection function. Battery system will stop to output power and indicators will indicate the abnormal condition once the abnormality or failure occurs.

# 9. Maintenance and Recycling

Frequent maintenance is required in order to ensure the continuous and normal operation of battery, and recycling of old equipment is also required in order to settle the environmental protection issues.

### 9.1 Operation environment

The installation and storage of battery should avoid the environment of high corrosiveness, high dust, high temperature and high humidity, especially avoid metal substances falling into the box.

### 9.2 Security examination

Please check regularly whether connecting line is aging, and whether connection point of cable is tight and safe.

### 9.3 Maintenance requirement

Please cut off power supply completely before opening the box for maintenance. Please don’t damage parts and components when disassembling, and pay attention to the sequence of wiring. Please also perform maintenance by wearing insulting gloves and using insulting tools.

### 9.4 Specific requirements of maintenance

Please clean the dust and debris in box, and check whether the terminals and screws in box are fastened, whether traces left and damaged components by overheating in the box. Please refer to user manual to deal with problems when the battery is in fault and cannot work normally. If the problem still cannot be solved, please contact with the dealer or the manufacturer as soon as possible. Don’t disassemble parts by yourself.

### 9.5 Battery Recycling

About the information on proper disposal of old battery, please contact with your local recycling center or hazardous waste disposal center. Please don't discard battery into fire as it may lead to the danger of explosion. Please take reference for your local regulations about battery disposal requirements and dispose the wasted battery properly. Don't disassemble battery randomly as the released electrolyte is harmful to your skins and eyes, and it even has toxic. Please don't discard battery into trash. For more detailed information, please contact with your local recycling/reuse center or hazardous waste disposal center. Don't discard the wasted electrical or electronic devices into trash. Please contact your local recycling/reuse center for proper disposal.