# SEPLOS MASON 49.6V210AH

# Sodium ion BATTERY PACK SPECIFICATION


DONGGUAN SEPLOS TECHNOLOGY CO., LTD

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## 1. Introduction

This battery pack System, is applicable both for residential and commercial energy storage system, which is assembled with 3.1V 210Ah lithium iron phosphate cell in 16 S1P configuration, and accompany with SEPLOS Smart BMS consist of 49.6V210Ah lithium battery system.Each pack support 16packs in parallel to easily expand capacity.Do not mix parallel the battery packs of different brands or models.

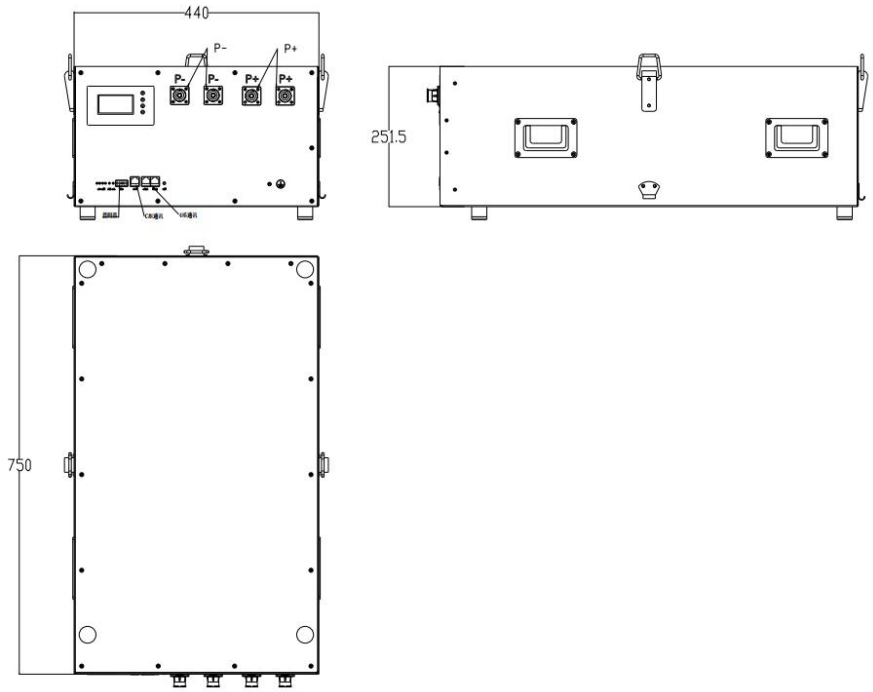
## 2. Functions

- Battery voltage calculation: 16 battery voltage sampling test, deviation ± 20mV
- Battery and ambient temperature detection: 4 battery temperature sensors, 1 ambient temperature sensor, 1 MOS temperature sensor, deviation ± 2℃.
- Battery capacity and cycle times: complete a complete charging, discharging cycle to set the actual capacity. Monitor the remaining capacity of the battery with the capacity estimation accuracy within 5% deviation. In addition, the charging and discharging cycle time and the complete charging and discharging cycle time can be configured.
- Smart cell balance: charging and static balance strategies can be flexibly set to effectively extend the service life.

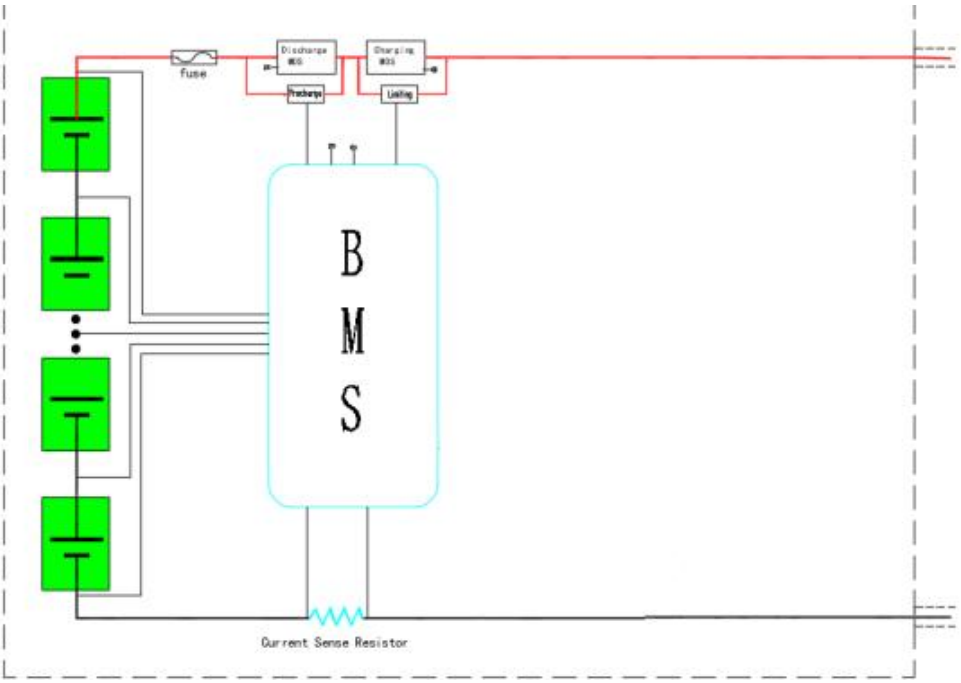
- Communication interface: PC or intelligent front-end can monitor battery data, control operation and set parameters through telemetry, remote signaling, remote adjustment, remote control and other commands. The communication protocol meets the requirements of YD/T 1363.3 and realizes cascade communication
- Historical data recording, saving and reading: when the battery is abnormal, record and save real-time battery status and alarm information. At present, up to 500 historical fault data can be stored.
- Battery management system parameter setting: battery management system parameters, including cell battery over voltage/under voltage, battery total voltage over voltage/under voltage, charge and discharge over current, battery high/low temperature, battery capacity, working mode, charge and discharge limit current, can be set in the battery monitoring system.
- Working mode: charging and discharging current limiting, constant voltage output, direct output and other working modes can be set in the monitoring system
- Multiple protection functions: hardware protection, battery protection, high and low temperature protection, output short circuit protection, etc.

# 3. Specifications

## 3.1 Appearance and interface




## 3.2 Electrical schematic diagram



## 3.3 Parameters

| Items | Specifications |
|---|---|
| Rated energy(kWh) | 10.416KWh |
| Configuration | 1P16S |
| Nominal Voltage(V) | 49.6V |
| Working Voltage(V) | 28.8V~62.4V |
| Nominal Capacity(Ah) | 210Ah |
| Rated charge/discharge Current(A) | 100A @25± 2℃ |
| Maximum charging current | 200A@25± 2℃ |
| Maximum discharge current | 200A @25± 2℃ |
| Working Temperature | 0-40℃(Charge) -20-40℃(Discharge) |
| Humidity(%) | 5~85% |
| Altitude Limited(m) | 0-3000m |
| Weight(Kg) | 100Kg± 3kg |
| Dimension(mm) | 750×439×252mm |
| Storage temperature and humidity | -10℃~35℃ (Within one month of storage)<br>25± 2℃(Within three months of storage)<br>65%±20% RH |
| Cycle life | 4000 cycles @25℃<br>100ACharge and discharge current 80%DOD<br>EOL 70% |
| IP grade | IP20 |
| Communication mode | CAN&RS485 |

## 3.4 Protection parameters

### 3.3.1 Individual cell over voltage parameters

| Individual cell over voltage parameter | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Over voltage warning | ON | Over voltage warning | 3800mV | Over voltage warning recovery - over voltage protection |
| | | Over voltage warning recovery | 3600mV | 3000mV - over voltage warning |
| | | Under voltage warning | 2000mV | Under voltage protection - under voltage warning recovery |
| | | Under voltage warning recovery | 2350mV | Under voltage warning - 3300mV |
| Over voltage protection | ON | Over voltage protection | 3950mV | Over voltage warning - 4500mV |
| | | Over voltage protection recovery | 3700mV | Over voltage warning recovery - over voltage protection |
| | | Over voltage recovery condition | 1. Individual cell voltage decrease to over voltage recovery threshold.<br>2. The remaining capacity lower than 96% of the intermittent power supply.<br>Both conditions should be satisfied. | |
| | | | Output current ≥3A | |

### 3.3.2 Individual cell low voltage parameters

| Individual cell low voltage parameter | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| under voltage protection | ON | Under voltage protection | 1800mV | 1500mV - under voltage protection recovery |
| | | Under voltage protection recovery | 2200mV | Under voltage protection - under voltage warning |
| | | Under voltage protection condition | When an individual cell gets under voltage protection threshold, BMS maintain communication with inverter for 1 minutes and powered off. | |
| | | Under voltage protection recovery | Input current≥1A | |

### 3.3.3 Pack over voltage parameters

| Pack over voltage parameter | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Over voltage warning | ON | Over voltage warning | 60.8V | Over voltage warning recovery - over voltage protection |
| | | Over voltage Warning recovery | 57.6V | 53.0V - over voltage warning |
| | | Under voltage warning | 32.0V | Under voltage protection - under voltage warning recovery |
| | | Under voltage Warning recovery | 37.6V | Under voltage warning - 55.0V |
| Over voltage protection | ON | Over voltage protection | 63.0V | Over voltage warning - 66.0V |
| | | Over voltage protection recovery | 59.2V | Over voltage warning recovery - over voltage protection |
| | | Over voltage protection recovery conditions | 1. Individual cell voltage decrease to over voltage recovery threshold.<br>2. The remaining capacity is lower than 96% of the intermittent power supply.<br>Both conditions should be satisfied. | |
| | | | Output current≥3A | |

### 3.3.4 Pack low voltage parameters

| Pack low voltage parameter | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Under voltage protection | ON | Under voltage protection | 30.0V | 36.0V - under voltage warning recovery |
| | | Under voltage protection recovery | 35.2V | Under voltage protection - under voltage warning |
| | | Under voltage protection condition | When the total voltage gets under voltage protection threshold, BMS maintain communication with inverter for 1 minutes and powered off. | |
| | | Under voltage protection recovery conditions | Input current＞1A | |

### 3.3.5 Cell high/low temperature(charging) parameters

| Cell high/low temperature (charging) parameters | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Cell temperature (Forbidden Charging) | ON | High temperature warning | 50℃ | High temperature warning recovery - high temperature protection |
| | | High temperature warning recovery | 47℃ | 35℃- high temperature warning |
| | | High temperature protection (charging) | 55℃ | High temperature protection recovery - 80℃ |
| | | High temperature protection recovery | 50℃ | High temperature warning recovery - high temperature protection |
| | | Low temperature warning | 2℃ | Low temperature protection - low temperature warning recovery |
| | | Low temperature warning recovery (charging) | 5℃ | Low temperature warning - 10℃ |
| | | Low temperature protection | - 10℃ | -20℃ - low temperature protection recovery |
| | | Low temperature protection recovery | 0℃ | Low temperature protection - low temperature warning recovery |

### 3.3.6 Cell high/low temperature(charging) parameters

| Cell high/low temperature (discharging) parameters | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Cell temperature (Forbidden discharging) | ON | High temperature warning | 52℃ | High temperature warning recovery - high temperature protection |
| | | High temperature warning recovery | 47℃ | 35℃~Discharging high temperature warning |
| | | High temperature protection | 55℃ | Discharging over temperature recovery~80℃ |
| | | High temperature protection recovery | 50℃ | High temperature warning recovery - high temperature protection |
| | | Low temperature warning | -10℃ | Low temperature protection - low temperature warning recovery |
| | | Low temperature warning recovery | 3℃ | Low temperature warning - 10℃ |
| | | Low temperature protection | -15℃ | -30℃ - low temperature protection recovery |

| | | | | |
|---|---|---|---|---|
| | | Low temperature recovery | 0℃ | Low temperature protection - low temperature warning recovery |

### 3.3.7 Ambient high/low temperature parameters

| Ambient high/low temperature parameters | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Ambient temperature | ON | High temperature warning | 60℃ | High temperature warning recovery - high temperature protection |
| | | High temperature warning recovery | 55℃ | -20℃ - high temperature warning recovery |
| | | High temperature protection | 68℃ | High temperature protection recovery -80℃ |
| | | High temperature protection recovery | 65℃ | High temperature warning recovery - high temperature protection |
| | | Low temperature warning | 0℃ | Low temperature protection - low temperature warning recovery |
| | | Low temperature warning recovery | 3℃ | Low temperature warning - 60℃ |
| | | Low temperature protection | - 10℃ | -30℃ - low temperature protection recovery |
| | | Low temperature protection recovery | 0℃ | Low temperature protection - low temperature warning recovery |

### 3.3.8 MOSFET high/low temperature parameters

| MOSFET high/low temperature parameters | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| MOSFET temperature | ON | High temperature warning | 90℃ | High temperature warning recovery - high temperature protection |
| | | High temperature warning recovery | 85℃ | 60℃- high temperature warning |
| | | High temperature protection | 100℃ | High temperature warning - 120℃ |

| | | | | |
|---|---|---|---|---|
| | | High temperature protection recovery | 85℃ | High temperature warning recovery - high temperature protection |

### 3.3.9 Charging current limiting parameters

| Charging current limiting parameters | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Current limiting (charging) | OFF | Active current limiting | 10A | When the charger current＞10A, current limiting activated. |
| | ON | Passive current limiting | | When the charger current＞charging over current warning (configurable), current limiting activated. |
| | | Charging current limiting time delay | 5 min | After the current limiting being activated, BMS re-check the current to judge whether to maintain current limiting. |

### 3.3.10 Charging over limiting parameters

| Charging current limiting parameters | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Over current warning (charging) | ON | Over current warning | 200A | Charging over current warning recovery - charging over current protection |
| | | Over current warning recovery | 195A | 0A - charging over current warning |
| Over current protection (charging) | ON | Over current protection | 210A | Charging over current alarm~250A |
| | | Over current protection time delay | 10S | 0S~ 10S |
| | | Over current protection recovery conditions | BMS detects any output discharge current. After 60 seconds, the protection recovers automatically. | |
| Effective charging current | Charging current (in) | | 600mA | |
| | Charging current (out) | | 500mA | |

### 3.3.11 Discharging over limiting parameters

| Discharging over current parameters | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Over current warning | ON | Over current warning | -205A | Over current protection - over current warning recovery |
| | | Over current warning recovery | -203A | Over current warning -0A |
| Over current protection | ON | Over current protection | -210A | Transient over current protection - 0A |
| | | Over current protection time delay | 10S | Configurable |
| | | Over current protection recovery conditions | BMS detects any input charge current. After 60 seconds, the protection recovers automatically. | |

### 3.3.12 Transient over limiting parameters

| Transient over current parameters | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Over current protection (Transient) | ON | Over current protection | -300A | Discharge over current protection - 300A |
| | | Over current protection time delay | 30mS | 0mS~ 100mS |
| | | Over current protection recovery | BMS detects any input charge current. After 60 seconds, the protection recovers automatically. | |
| | OFF | Over current lock | Continuously over current for 2 times. The over current lock times exceeded. | |
| | | Over current lock times | 5 times | |
| | | Over current lock release | Connected with charger | |

### 3.3.13 Short circuit parameters

| Short circuit parameters | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Short Circuit protection | ON (Closing Settings are not Currently supported) | Short circuit protection current value and time delay | Programmed into the software (can not be edited) Cannot be turned off | |
| | | Short circuit protection recovery | BMS detects any input charge current. After 60 seconds, the protection recovers automatically. | |
| | ON | Short circuit protection lock | Continuously short in the output circuit. The over current protection lock times exceeded. | |
| | | Short circuit protection lock times | 5 times | |
| | | Short circuit protection lock release | Connected with charger | |
| Effective Discharging current | Discharge current (in) | | -500mA | |
| | Discharge current (out) | | -400mA | |

### 3.3.14 Cell balance parameters

| Short circuit parameters | | | | |
|---|---|---|---|---|
| Functions | Status | Item | Default | Configurable Range |
| Cell balance | ON | Standby balance | When there is no charging and discharging current flow, the standby equalization will be activated. | |
| | | Standby time | 10 hours | configurable |
| | ON | Charging equalization | When at the charging or float charging status, the charging equalization will be activated. | |
| | Balance conditions | Activate voltage | 3750mV | Configurable |
| | | Activate voltage difference | 30mV | |
| | | End voltage | 20mV | |
| | ON | Temperature | According to the temperature range of no equalization (ambient temperature) | |

| | | | | |
|---|---|---|---|---|
| | | No balance high temperature | 50℃ | Configurable |
| | | No balance low temperature | 0℃ | |
| Cell failure | ON | Voltage difference | 600mV | Configurable |
| | | Voltage difference recovery | 400mV | |

## 3.3.15 Cell balance parameters

| Capacity parameters | | | | |
|---|---|---|---|---|
| Capacity | Nominal capacity | | 290AH | 5-300Ah |
| | Remaining capacity | Calculated accordingly to the cell voltage | | Configurable |
| | Cycle life accumulated capacity | 80% | Cycle life (configurable) | |
| | ON | Remaining capacity warning | 15% | |
| | OFF | Remaining capacity protection | 8% | Output current flow will be cut off. |

## 3.3.16 Other parameters

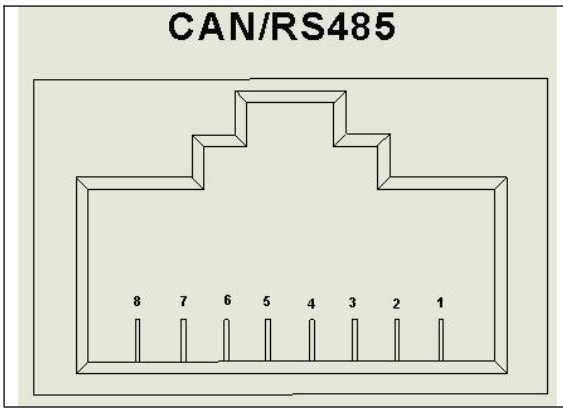
| | | | | |
|---|---|---|---|---|
| Pre-charging | 2000ms | 0-5000ms | The pre-charging function will be activated once the BMS powered on. | |
| BMS power consumption | ON | Longest standby time | 48 hours (Do not connected with charger, and no effective charging current.) | |
| | | | | |
| Heating | OFF | Start heating temperature | 0℃ | Configurable |
| | | Stop heating temperature | 10℃ | |
| | | Heating function activation | When connected with charger, and the cell temperature reaches the setting value, the heating function activated. Heating function disabled when at standby and discharge status. | |
| External switch | OFF | When at the standby status, the BMS can be powered on/off through external switches. | | |

| | | | | |
|---|---|---|---|---|
| LCD screen | ON | Monitoring software to check the cell voltage, temperature and current. | | |
| Charging activating | ON | 1 minutes | The BMS powered off after under voltage protection. Press the button for recovering from protection status and activate output current. | Configurable |
| Compensating impedance | Compensation 1 | 0m Q | 9 | Configurable |
| | Compensation 2 | 0m Q | 13 | |

# 4. Communication

## 4.1 Communication interface definition

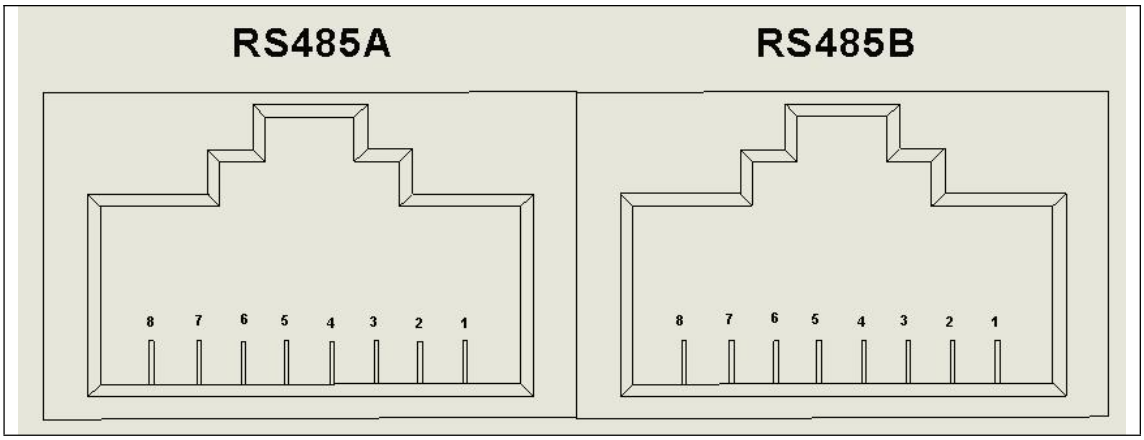
According to the definition of the communication interface of inverters of different brands, it corresponds to the BMS communication interface; the definition of the special inverter communication port is inconsistent with the definition of the BMS communication port. If you customize the network cable, if you use a regular network cable, the BMS may automatically turn on or fail to shut down; it should be confirmed before use. Whether the communication interface definition is consistent.




| CAN/RS485 | |
|---|---|
| **Pin** | **Definition description** |
| 1、8 | RS485-B |
| 2、7 | RS485-A |
| 4 | CAN-H |
| 5 | CAN-L |
| 3、6 | GND |

① Internal communication

For BMS internal communication, select the corresponding port and baud rate 19200.

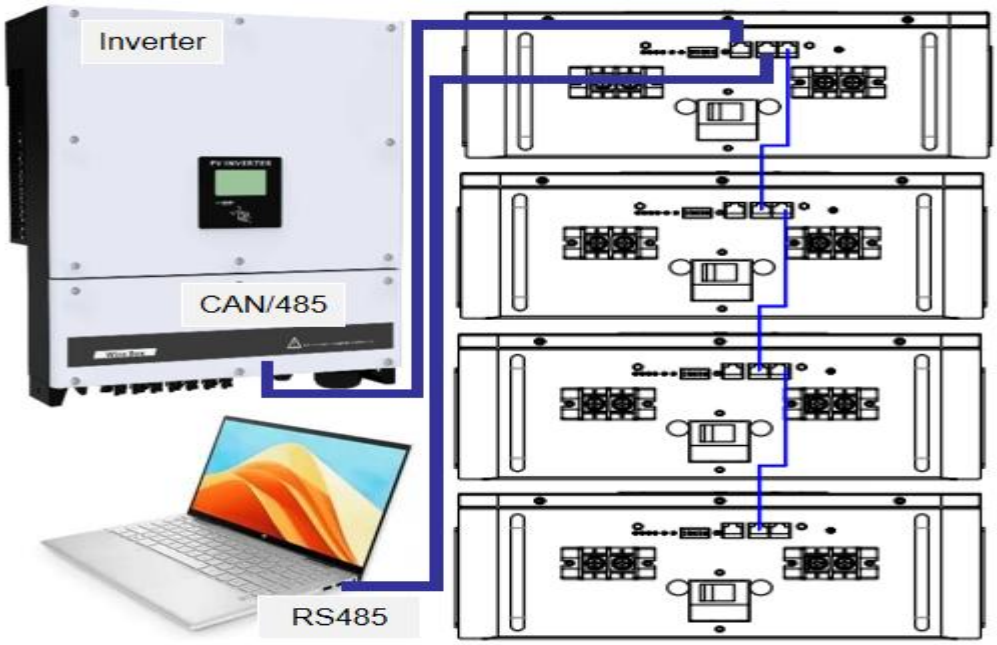


| RS485A | |
|---|---|
| **Pin** | **Definition description** |
| 1、8 | RS485-B |
| 2、7 | RS485-A |
| 3 | Master flag enable |
| 4 | Autocode address 2 |
| 5 | GND |
| 6 | GND |

| RS485B | |
|---|---|
| **Pin** | **Definition description** |
| 1、8 | RS485-B |
| 2、7 | RS485-A |
| 3 | GND |
| 4 | Autocode address 1 |
| 5 | GND |
| 6 | Salve flag enable |

## 4.2 Parallel communication

The BMS has the function of automatically assigning addresses, and no dialing is required (the dialing switch reserved on the BMS is not turned on), and conventional network cables can be used during parallel operation.



# 5. Working mode

## 5.1 Charging mode

When a charger was detected, and the charger voltage is 0.5V+ more than the battery voltage, BMS will turn on the charging MOSFET.And when the charging current reaches the effective charging current value,enters charging mode.

## 5.2 Discharging mode

When a loads was detected, and the discharging current reaches the effective discharging current value, BMS enters discharging mode.

## 5.3 Standby mode

When the BMS not in charging mode, nor discharging mode, it enters standby mode.

## 5.4 Power off mode

5.4.1 Power off

When meet any condition as below, the system will be power off(without charger only)

- ✓ Wake-up conditions in shutdown mode:
- ✓ Charging activation
- ✓ 48V voltage activation
- ✓ Press the button to power on

# 6. LED indicator

## 6.1 LED lights

One running indicator (Green)

One warning indicator (Red)

Four capacity indicator (Green)

| | | | | | |
|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ● |
| SOC | | | | ALARM | RUN |

## 6.2 Capacity indicators

| Status | Charging | | | | Discharging | | | |
|---|---|---|---|---|---|---|---|---|
| **Capacity** | L4● | L3● | L2● | L1● | L4● | L3● | L2● | L1● |
| **0-25%** | OFF | OFF | OFF | Blink | OFF | OFF | OFF | Green |
| **25%-50%** | OFF | OFF | Blink | Green | OFF | OFF | Green | Green |
| **50%-75%** | OFF | Blink | Green | Green | OFF | Green | Green | Green |
| **≥75%** | Blink | Green | Green | Green | Green | Green | Green | Green |
| **Running** | Green | | | | Blink | | | |

## 6.3 Lights blinking explanation A

| Blink Type | Lighten TIEM | OFF TIME |
|---|---|---|
| Blink A | 0.25S | 3.75S |
| Blink B | 0.5S | 0.5S |
| Blink C | 0.5S | 1.5S |

## 6.4 Running status indicators

| SYSTEM | Running | RUN | ALM | SOC | | | | REMARK |
|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ● | ● | ● | |
| OFF | Sleeping | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| STANDBY | Running | Blink A | OFF | OFF | OFF | OFF | OFF | Standby |
| | Running | Green | OFF | According to the remaining capacity | | | | LED Blink B |
| | Over current warning | Green | Blink B | According to the remaining capacity | | | | LED Blink B |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CHARGE | Over voltage protection | Blink A | OFF | OFF | OFF | OFF | OFF | |
| | Temp And over current protection | Blink A | Blink A | OFF | OFF | OFF | OFF | |
| DISCHARGE | Running | Blink C | OFF | According to the remaining capacity | | | | |
| | warning | Blink C | Blink C | | | | | |
| | Temp Over current, short circuit protection | OFF | RED | OFF | OFF | OFF | OFF | |
| | Under voltage protection | OFF | OFF | OFF | OFF | OFF | OFF | No discharge |

## 6.5 Installation and commissioning

| NO. | Item | Quantity | Photo |
|---|---|---|---|
| 1 | Battery Box | 1 PCS |   |

## 6.6 Installation instructions

Check battery status before installation

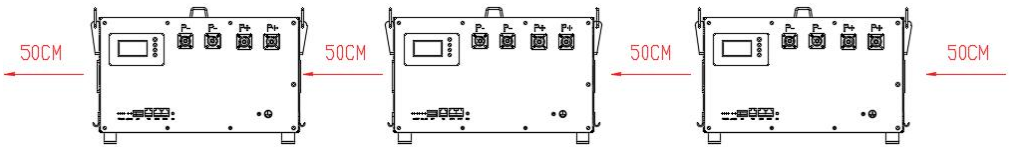

## 7. Safety precautions

✓ Recommended to hang the battery on the vertical wall.

✓ The temperature should be between 10 ℃ and 30 ℃ to maintain the best operating state.

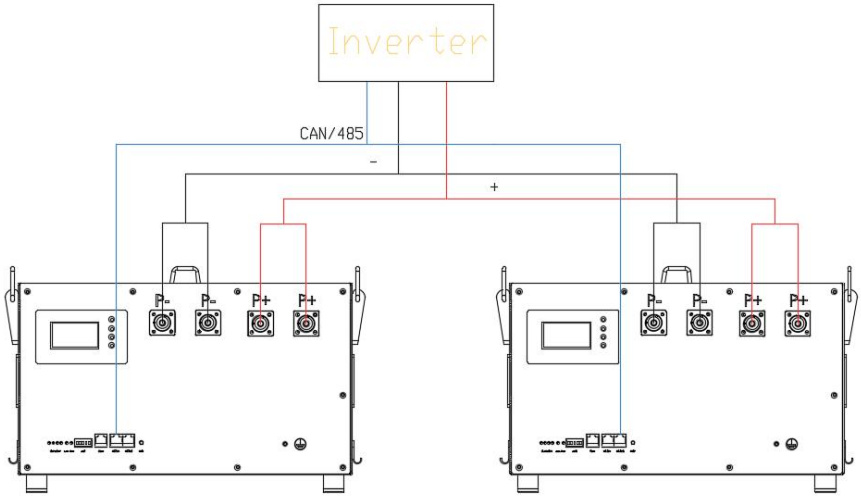
✓ The installation site should be some free space around the battery to dissipate heat (as shown in the figure below), which is suitable for installation on the concrete surface or other non-flammable surfaces.

✓ Do not place the battery on flammable building materials.



### 7.1 Harness connection

The battery should be turned off before connecting.



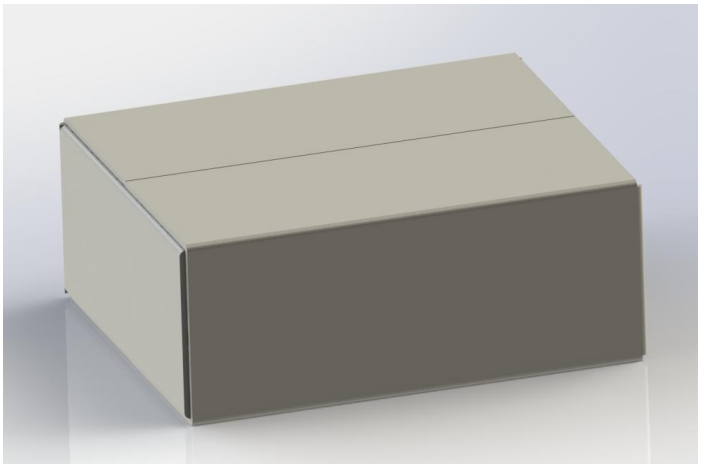

## 8. Package

Packed in a dry, dust proof and moisture-proof packaging box. The products shall be packed with plastic film/EPE and packed in cartons.

Specification: L 82.5cm*W51.5cm*H 33.5cm

Package quantity: 1 set

Weight: 103kg



## 9. Safety precaution

- Do not use the pack if there's any deformation.
- Do not stack up the battery.
- Please be notice the polarity of the battery and port.
- Make sure the insulation of equipment, use the tool and instrument correctly.
- The installation site should stay away from fire and Inflammable,keep ventilating and dry.
- Do not disconnect the battery terminals when its running.
- Not allow non-technology staff to open all of function module.
- Please fully charge a new battery pack, or a long-time-no-use battery pack with a designed charger.
- Do not uninstall,open, extrude, bend, impale or break the battery.
- Do not refit the battery or connect to other object, do not immerse the battery into any water, sea water, or drinks and other liquids.stay away from fire, explosive material or other dangerous item.
- Do not allow the battery short circuit, do not any metal or conductor contact the terminal.
- Do not let the battery fall. if does, especially on the solid surface, please contact the service center.
- If there is any signs of Electrolyte leakage, do not let it get any direct contact with your bare skin or eyes. If it happened, use plenty of water to clean up or ask doctor for help.
- Do not uninstall the battery cell, or there will cause internal short even fire disaster or other issue.
- Do not burn the battery or throw it to the fire, otherwise, there will be cause the fire of the battery.