



SEPLoS HITEN 104 LITHIUM-ION BATTERY PACK SPECIFICATION

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1. Introduction

This battery system is suitable for home energy storage and small and medium-sized commercial storage battery systems. It uses 3.2V 104AH lithium cells to form a 16-string battery module and intelligent BMS to form a lithium battery system. The system supports up to 16 batteries in series. This system is prohibited from mixed connection and use with other batteries of different brands and models.

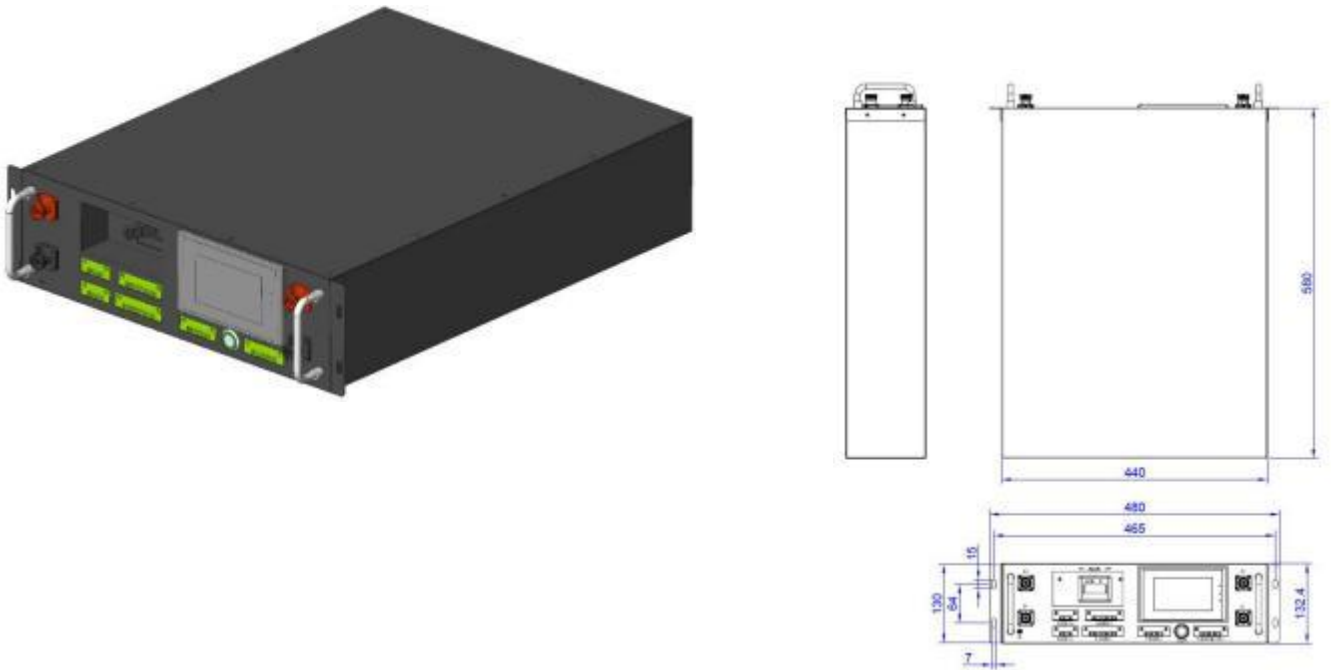
2. Function

- 1) Reliable charge and discharge. Efficient charging and discharging through lithium iron phosphate batteries, long service life and high reliability.
- 2) Automatic protection function. Quick response, high-precision data sampling, and complete and reliable protection function:
 - Overall battery pack over voltage and under voltage protection, single battery cell over voltage and under voltage protection;
 - Charge and discharge over current protection;
 - Charge and discharge over temperature protection;
 - Short-circuit protection;
- 3) Protection reset mode. When the battery pack or cell is under overcharge protection, the voltage returns to the overcharge reset voltage value, and the over current or over discharge protection is automatically reset.
- 4) Battery balancing function. Balance control is performed based on the voltage of each cell, passive discharge balancing method.
- 5) Run historical event storage function.
- 6) The upper computer software control function allows you to protect parameters such as overcharge, over discharge, charge and discharge over current, over temperature and under temperature. Setting parameters such as capacity, sleep, balance and storage.
- 7) RS485, RS232 communication function with screen monitoring display.
- 8) CAN communication function, adopts isolated communication and support automatic address encoding or address dialing function.

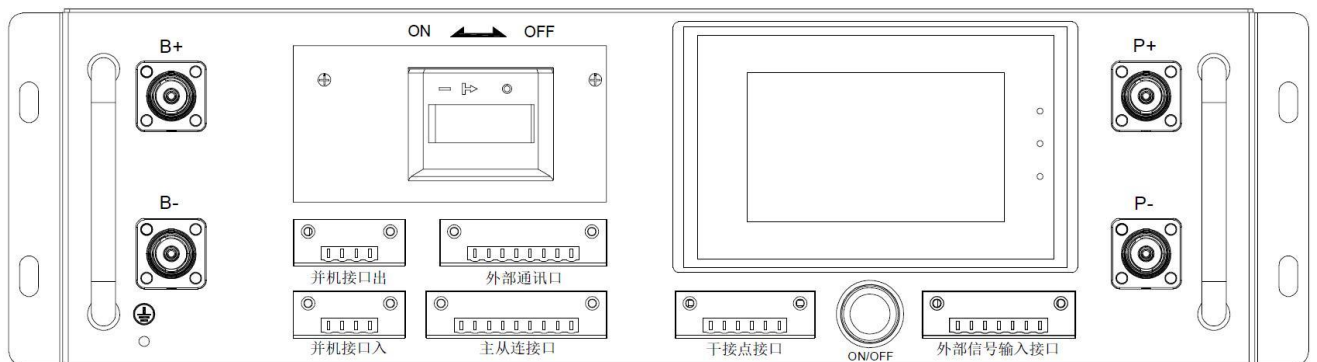
3. Product detail information

3.1 High voltage box module

3.1.1 High voltage box appearance and structural dimensions



3.1.1 - 1 High voltage box appearance dimension drawing



3.2.2 Panel interface diagram

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3.1.2 Interface definition

| Dry contact interface | | | | | |
|------------------------------|----------------|--|----|----------------|--|
| NO | PIN definition | Instruction | NO | PIN definition | Instruction |
| 1 | RLY-OUT1+ | Dry contact 1 output positive terminal | 4 | RLY-OUT2- | Dry contact 2 output negative terminal |
| 2 | RLY-OUT1- | Dry contact 1 output negative terminal | 5 | NC | Vacant |
| 3 | RLY-OUT2+ | Dry contact 2 output positive terminal | 6 | NC | Vacant |

| External signal input interface | | | | | |
|--|----------------|------------------|----|----------------|------------------|
| NO | PIN definition | Instruction | NO | PIN definition | Instruction |
| 1 | 5VO | Output DC5V/1A | 5 | SIN1- | Input detection1 |
| 2 | 5V_GND | Output DC5V/1A | 6 | SIN2+ | Input detection2 |
| 3 | DOPWM | Output PWM | 7 | SIN2- | Input detection2 |
| 4 | SIN1+ | Input detection1 | | | |

| Parallel output interface | | | | | |
|----------------------------------|----------------|-------------------------|----|----------------|--------------------------|
| NO | PIN definition | Instruction | NO | PIN definition | Instruction |
| 1 | ADDR_out | Local CAN code output | 3 | CAN-H2 | Local CAN communication |
| 2 | CAN-L2 | Local CAN communication | 4 | CAN-GND | CAN communication ground |

| Parallel input interface | | | | | |
|---------------------------------|----------------|-------------------------|----|----------------|--------------------------|
| NO | PIN definition | Instruction | NO | PIN definition | Instruction |
| 1 | ADDR_IN | Local CAN code input | 3 | CAN-H2 | Local CAN communication |
| 2 | CAN-L2 | Local CAN communication | 4 | CAN-GND | CAN communication ground |

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| External communication interface | | | | | |
|----------------------------------|----------------|---------------------------------------|----|----------------|---------------------------|
| NO | PIN definition | Instruction | NO | PIN definition | Instruction |
| 1 | RS485-A1 | Local 485 communication | 5 | RS485-A3 | Reserve 485 communication |
| 2 | RS485-B1 | Local 485 communication | 6 | RS485-B3 | Reserve 485 communication |
| 3 | GND_A1 | 485_A1communication location | 7 | CAN-L3 | Communicate with PCS |
| 4 | GND_A3 | Reserve 485_A3 communication location | 8 | CAN-H3 | Communicate with PCS |

| Master-slave connection port | | | | | |
|------------------------------|----------------|--|----|----------------|-------------------------------|
| NO | PIN definition | Instruction | NO | PIN definition | Instruction |
| 1 | VO | Slave control power supply output positive (BMU) | 6 | DC24V+ | 24V power input positive pole |
| 2 | CAN-L1 | Slave control CAN communication (BMU) | 7 | DC24V- | 24V power input negative pole |
| 3 | CAN-H1 | Slave control CAN communication (BMU) | 8 | DC24V+ | 24V power input positive pole |
| 4 | PGND | Slave control power supply output negative (BMU) | 9 | DC24V- | 24V power input negative pole |
| 5 | DN-OP | Slave control code output | | | |

3.1.3 BCU Main technology parameters

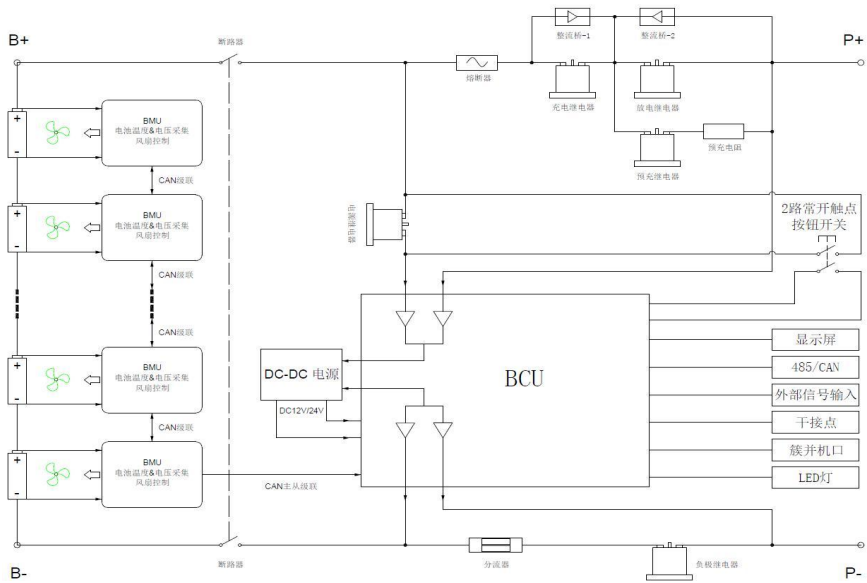
| Technology parameters | | |
|------------------------|-------------------------|--------------------------------------|
| Applicable platforms | <1000V | |
| Supply voltage | 12-30V | |
| Power consumption | Rated power consumption | <3W |
| | Static power | 0 |
| Total voltage sampling | Sampling range | 50~1650V |
| | Sampling Accuracy | ±0.3%FSR |
| Current sampling | Sampling range | <300A (default shunt) / >300A (Hall) |
| | Sampling Accuracy | 0.5% |
| | Sampling cycle | 20ms |
| | Sampling range | -40~125℃ |
| | Sampling Accuracy | ±2℃ |

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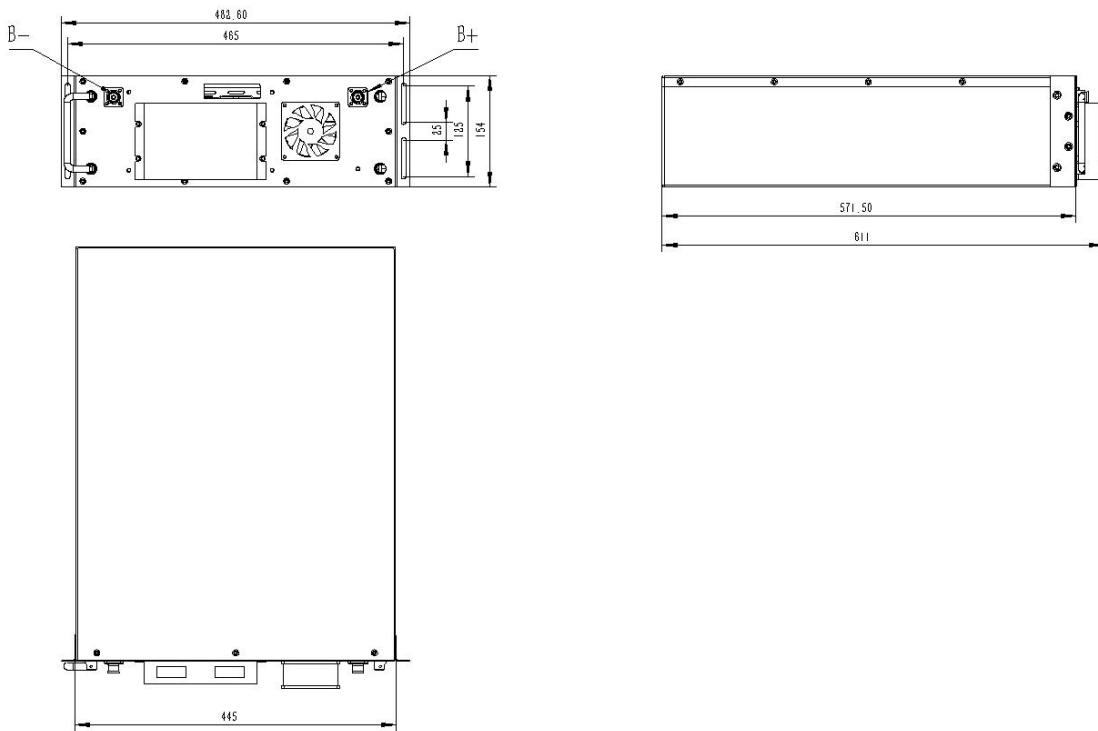
| | | | |
|----------------------------------|-----------------------------|--|--|
| Temperature sampling | Sampling cycle | 200ms | |
| | Sampling channels | 5 way | |
| Insulation testing | Range | >1MΩ/kV | |
| | Accuracy | >100K 10%、<100K 15%、Min 10K,<2MΩ treated es fault | |
| Status estimate | SOC | ≤5% | |
| | SOH | ≤10% | |
| Communication interface | CAN-1 | Slave control (125k ~1000kbps) , default baud rate : 250K | |
| | CAN-2 | Cluster parallel machine (125k ~1000kbps) , default baud rate : 500K | |
| | CAN-3 | Connect PCS , baud rate based on the protocol provided by customer | |
| | RS485-1 | Host computer (9600~115200bps) , default baud rate : 57600 | |
| | RS485-2 | Display (9600~115200bps) , default baud rate : 9600 | |
| | RS485-3 | Reserve | |
| Relay adhesion testing | Fault diagnosis | CAN matching resistor | External |
| DOH | - | Automatic coding | Support/with coding line |
| DOL | 6 pic | Data storage | 128M |
| DO output range | Depending on supply voltage | Working temperature range | -40~85℃ |
| DO output current | - | Working humidity range | 5~90% |
| Dry contact | 2 pic | DI testing (12V withstand voltage) | 2 way DI , External stem node signal (High voltage interlock,emergency stop) |
| Dry contact Max. Power withstand | Max power withstand 60W | Installation method | Wall hanging |

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3.2 Electrical schematic diagram



3.3 Battery box dimensions



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3.4 Battery parameters

| Item | HV-AC-S7 | HV-AC-S8 | HV-AC-S9 | HV-AC-S10 | HV-AC-S11 |
|---------------------------------------|-------------|------------|------------|-----------|------------|
| Rated capacity(kWh) | 37.38 kWh | 42.59kWh | 47.88 kWh | 53.2kWh | 58.5kWh |
| Battery type | LFP | LFP | LFP | LFP | LFP |
| Configuration | 7*16S1P | 8*16S1P | 9*16S1P | 10*16S1P | 11*16S1P |
| Rated voltage(V) | 358.4V | 409.6V | 460.8V | 512V | 563.2V |
| Rated capacity(Ah) | 104Ah | 104Ah | 104Ah | 104Ah | 104Ah |
| Working voltage range(V) | 280V-408.8V | 320-459.9V | 360-526.6V | 432-584V | 440-642.4V |
| Rated charge and discharge current(A) | 100A | 100A | 100A | 100A | 100A |
| Rated charge and discharge power(kW) | 35 kW | 40kW | 46 kW | 51 kW | 56 kW |
| Communication | CAN/RS485 | CAN/RS485 | CAN/RS485 | CAN/RS485 | CAN/RS485 |
| Cycle (time) | 6000 | 6000 | 6000 | 6000 | 6000 |
| Working temperature range(°C) | -15-45 | -15-45 | -15-45 | -15-45 | -15-45 |
| Humidity(%) | 5%-65% | 5%-65% | 5%-65% | 5%-65% | 5%-65% |
| Altitude(m) Use beyond derating | 2000m | 2000m | 2000m | 2000m | 2000m |

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| Item | HV-AC-S12 | HV-AC-S13 | HV-AC-S14 | HV-AC-S15 | HV-AC-S16 |
|---------------------------------------|-------------|------------|------------|-----------|------------|
| Rated capacity(kWh) | 63.89 kWh | 69.22kWh | 74.54 kWh | 79.87kWh | 85.19kWh |
| Battery type | LFP | LFP | LFP | LFP | LFP |
| Configuration | 12*16S1P | 13*16S1P | 14*16S1P | 15*16S1P | 16*16S1P |
| Rated voltage(V) | 614.4V | 665.6V | 716.8V | 768V | 819.2V |
| Rated capacity(Ah) | 104Ah | 104Ah | 104Ah | 104Ah | 104Ah |
| Working voltage range(V) | 480V-700.8V | 520-759.2V | 560-817.6V | 600-876V | 640-934.4V |
| Rated charge and discharge current(A) | 100A | 100A | 100A | 100A | 100A |
| Rated charge and discharge power(kW) | 61kW | 66 kW | 71 kW | 76 kW | 81kW |
| Communication | CAN/RS485 | CAN/RS485 | CAN/RS485 | CAN/RS485 | CAN/RS485 |
| Cycle (time) | 6000 | 6000 | 6000 | 6000 | 6000 |
| Working temperature range(°C) | -15-45 | -15-45 | -15-45 | -15-45 | -15-45 |
| Humidity(%) | 5%-65% | 5%-65% | 5%-65% | 5%-65% | 5%-65% |
| Altitude(m) Use beyond derating | 2000m | 2000m | 2000m | 2000m | 2000m |

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3.4 Battery protection parameter

| NO | ITEM | | Default parameters | WHETHER Configurable | REMARK |
|----|--|--|------------------------------------|-------------------------------|--|
| 1 | Monomer overcharge protection | Cell overcharge alarm voltage | 3550mV | Configurable | |
| | | Cell overcharge protection voltage | 3600mV | Configurable | |
| | | Cell overcharge protection delay | 1.0S | Configurable | |
| | Monomer overvoltage protection release | Cell overcharge protection release voltage | 3380mV | Configurable | |
| | | Capacity release | SOC<96% | Configurable | |
| | | Discharge release | Discharge current>1.0A | | |
| 2 | Monomer overdischarge protection | Cell overcharge alarm voltage | 2800mV | Configurable | After overdischarge protection 30s, if recovery still not possible,the system automatically shuts down |
| | | Cell overcharge protection voltage | 2500mV | Configurable | |
| | | Cell overcharge protection delay | 1.0S | Configurable | |
| | Monomer overcharge protection release | Cell overcharge protection release voltage | 2900mV | Configurable | |
| | | Release when charging | Activated by plugging in a charger | | |
| 3 | Total overcharge protection | Overcharge alarm voltage | 112V | Configurable: monomer*32S/box | |
| | | Overcharge protection voltage | 115.2V | Configurable: monomer*32S/box | |
| | | Overcharge protection delay | 1.0S | Configurable | |
| | Total overvoltage Protection release | Overcharge protection release voltage | 108.16V | Configurable: monomer*32S/box | |
| | | Capacity release | SOC<96% | Configurable | |
| | | Discharge release | Discharge current >1.0A | | |
| 4 | Total overdischarge protection | Overcharge alarm voltage | 89.6V | Configurable: monomer*32S/box | |
| | | Overcharge protection voltage | 86.4V | Configurable: monomer*32S/box | |
| | | Overcharge protection delay | 1.0S | Configurable | |
| | Total overdischarge protection release | Cell overcharge protection release voltage | 92.8V | Configurable: monomer*32S/box | |
| | | Release when charging | Activated by plugging in a charger | | |

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| | | | | | |
|---|--|--|----------------------------------|--------------|--|
| 5 | Charging overcurrent protection | Overcurrent alarm | 52A | | This state will be locked and will no longer be automatically released if it appears 10 times in a row |
| | | Overcurrent protection | 55A | | |
| | | Overcurrent protection delay | 5.0S | | |
| | Charging overcurrent protection release | Automatically release | After 1min automatically release | | |
| | | Discharge release | Discharge current >1.0A | | |
| 7 | Discharge overcurrent 1 protection | Overcurrent 1 alarm current | 52A | | This state will be locked and will no longer be automatically released if it appears 10 times in a row |
| | | Overcurrent1 protection current | 55A | | |
| | | Overcurrent1 protection relay | 5.0S | | |
| | Discharge overcurrent 1 protection release | Automatically release | After 1min automatically release | | |
| | | charge release | Charging current >1.0A | | |
| 8 | Discharge overcurrent 2 | Overcurrent2 protection current | ≥90A | | This state will be locked and will no longer be automatically released if it appears 10 times in a row |
| | | Overcurrent 2 protection relay | 500mS | | |
| | Discharge overcurrent 2 protection release | Automatically release | After 1min automatically release | | |
| | | charge release | Charging current >1.0A | | |
| 9 | Cell temperature protection | Charging low temperature alarm | 2°C | | |
| | | Charging low temperature protection | 0°C | | |
| | | Charging low temperature protection release | 5°C | Configurable | |
| | | Charging high temperature alarm | 50°C | Configurable | |
| | | Charging high temperature protection | 55°C | Configurable | |
| | | Charging high temperature protection release | 50°C | Configurable | |

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| | | | | | |
|----|-------------------------------|---|---|------------------------------------|---|
| | | discharging low temperature alarm | -15℃ | Configurable | |
| | | discharging low temperature protection | -20℃ | Configurable | |
| | | discharging low temperature protection release | -15℃ | Configurable | |
| | | discharging high temperature alarm | 55℃ | Configurable | |
| | | discharging high temperature protection | 60℃ | Configurable | |
| | | discharging high temperature protection release | 55℃ | Configurable | |
| 10 | Environment temperature alarm | Low temperature alarm | -20℃ | Configurable | |
| | | High temperature alarm | 65℃ | Configurable | |
| 11 | Current consumption | Self-consumption current during operation | ≤50mA (not include relay drive current) | | |
| | | Turn off mode current | NO | | |
| 12 | Fan control | Turn on condition | NC | | |
| | | Turn off condition | NC | | |
| 13 | Balance function | Balanced turn on voltage | 3400mV | Configurable | |
| | | Open voltage difference | 30mV | Configurable | |
| 14 | Capacity default settings | Low battery alarm threshold | SOC<5% | Configurable | Not alarm when charging |
| 15 | Cell failure protection | Voltage difference | Voltage difference > 1V | Can not Configurable | Not allow to charge and discharge current |
| 16 | Full of judgment | Full charging voltage | >560V | Configurable: 3.5V*total string | Stop charging when both are satisfied, and update SOC to 100% |
| | | Cut-off current | <1A | Configurable | |

3.5 CAN Communication

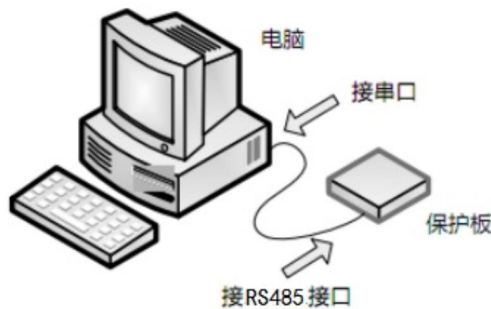
CAN communication protocol compatible with the following brands:

| SOFAR | Goodwe | GROWATT | DEYE | Afore |
|---|---|---|--|---|
|  |  |  |  |  |

3.6 RS485 communication

BMS can communicate with the upper computer through the RS485 interface, thereby viewing various battery information on the host computer, including battery voltage, current, temperature, status, SOC, SOH and battery production information, etc.

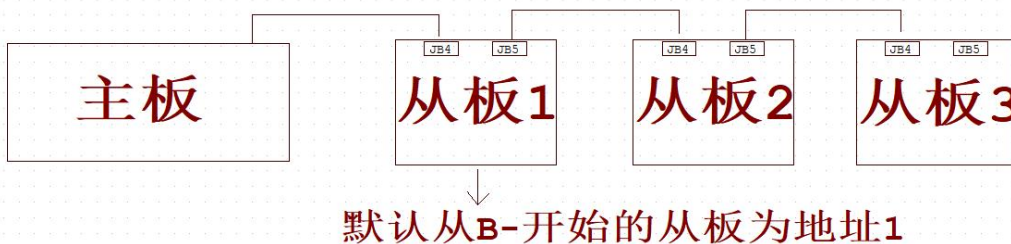
The default baud rate is 57600bps;



3.7 Automatically coding

When the battery modules are connected in series and the slave boards on each module perform cascade communication; or when the battery packs are connected in parallel and the main board performs parallel communications, the system will automatically encode.

The coding between slave boards can also be configured through software, and the coding will be automatically performed according to the wiring sequence. The direction of the superior connection to the main board will automatically determine the sequence. The instructions are as follows:



4 Working mode

4.1 Charging mode

BMS start charging when it detects that the charger is connected and the external charging voltage is greater than the internal battery voltage by more than 0.5V. When the charging current reaches the effective charging current, it enters the charging mode.

4.2 Discharge mode

The BMS enters the discharge mode when it detects that the load is connected and the discharge current reaches the effective discharge current.

4.3 Standby mode

When the above two modes are not satisfied, it enters standby mode.

4.4 Turn off and wake up

4.4.1 Turn off

When any of the following conditions is met, the system enters shutdown mode (it can only be shutdown when there is no external):

- 1) Single or overall over-discharge protection has not been released within 30 seconds.
- 2) Shut down after long pressing the button (3S).

Before entering hibernation, make sure that no charger is connected, otherwise it will not be able to enter low power mode.

4.4.2 Wake up

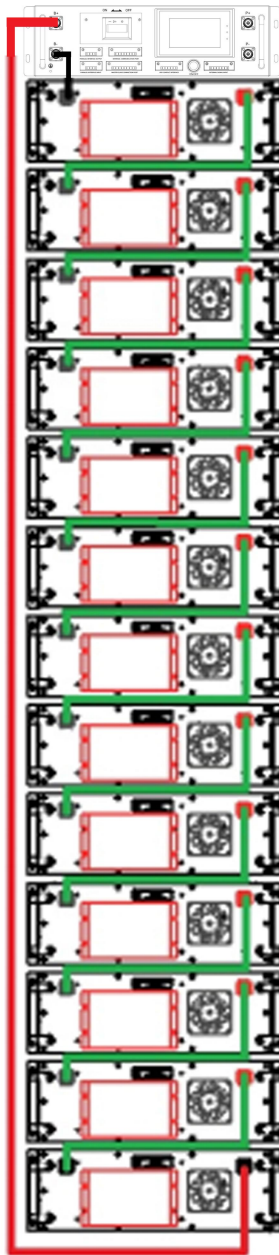
When the system is in shutdown mode and any of the following conditions are met, the system will exit shutdown mode and enter normal operating mode:

- 1) Connect to the charger, the charger output voltage must be greater than 300V.
- 2) Restart the system via the start button (3S).

5 SYSTEM WIRING

5.1 Main circuit wiring

Connect the positive and negative poles of the battery box and main control box as shown in the figure (do not reverse the positive and negative poles, as it will cause a short circuit of the battery, burn the plug-in and damage the battery)



5.2 Communication wiring

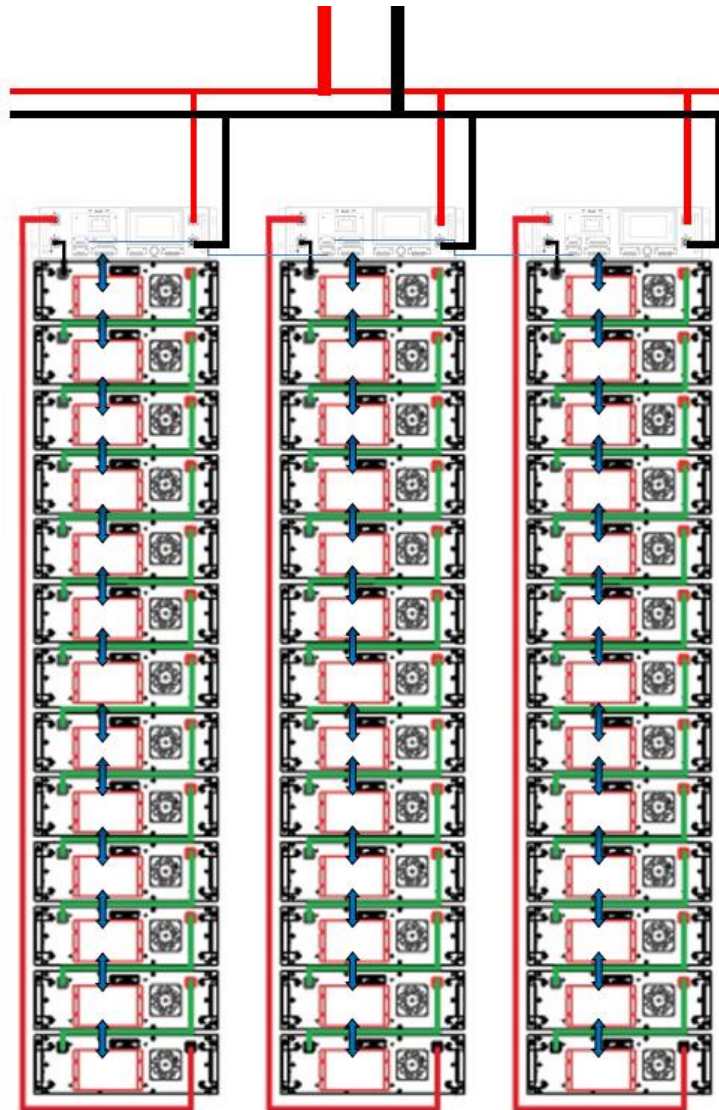
The total negative BMU of the battery box is connected to the communication port of the main

control box. The communication line is connected in sequence from the total negative BMU of the battery box to the total positive BMU of the battery box.

5.3 Power-on


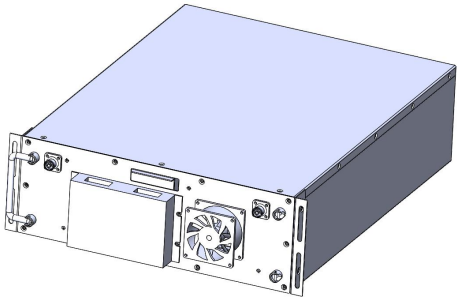
After using a voltmeter to check that the total battery voltage is normal, check again whether the main circuit wiring and communication wiring are correct. After confirming that they are correct, close the circuit breaker to the ON position and turn on the weak current switch of the main control box. Wait for about a minute. After checking that the display data is normal and there is no error message, the system connection is correct and the system can be powered on and loaded normally.

5.4 Parallel expansion




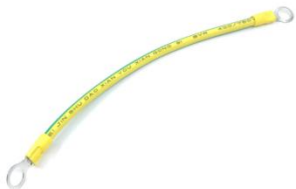

6 Installation and commissioning

6.1 List

| NO | NAME | QUANTITY | PICTURE |
|----|------------------|----------|--|
| 1. | MAIN CONTROL BOX | 1 PCS |  |
| 2. | BATTERY BOX | SEVERAL |  |

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6.2 List

| NO | NAME | QUANTITY | PICTURE |
|----|-----------------------------|---|---|
| 1. | Cabinet (optional) | 1 | |
| 2. | Series line | Several (quantity depends on the number of the battery boxes) |  |
| 3. | Ground wire | Several (quantity depends on the number of the battery boxes) |  |
| 4. | Communication line | Several (quantity depends on the number of the battery boxes) | |
| 5. | 2.0m power line | 1PIC |  |
| 6. | External communication line | 1PIC | |

7.Package

Packed in a dry,dust proof and moisture-proof packing box.

The products shall be packed with plastics film/EPE and packed in cartons.

Battery box specification: L 0.7m*W0.5m*H 0.22m Weight: 48kg

Main control box specification: L 0.78m*W0.5m*H 0.21m Weight: 25kg



8.Safety precaution

- Don't 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 the 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.