ENERGY TECHNOLOGIES
BUILD LIFE BETTER

RESIDENTIAL
BATTERY


# MANA 16.0
## Product Description

**Contact Details**

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# 01 TECHNICAL DATA

## NOTE

The battery is not rated 1C continuously. Operating current derating according to the cell voltage and battery temperature.

**Safe and Reliable**
Meet diverse home energy needs with LFP batteries that last up to 6,000 cycles, ensuring safety and reliability.

**Flexible and Expandable**
Easily connect up to 15 units in parallel, don't worry about future power increases in your home.

**Hassle-Free Setup**
Easily choose between floor or wall installation, and effortless maintenance.

**Smart Home**
Use your smartphone to control your home energy freely.





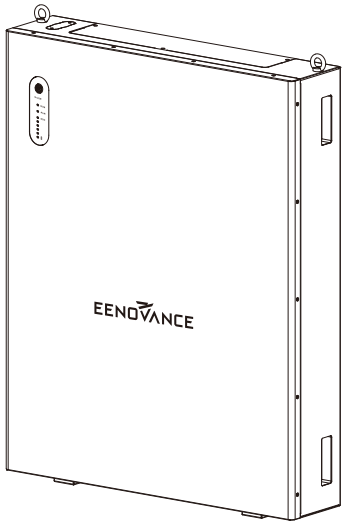

## Datasheet

| Model | MANA 16.0 |
|---|---|
| **Performance** | |
| Cell technology | LFP ( $LiFePO_4$) |
| Battery usable energy [1] | 15.970 kWh |
| Nominal voltage | 51.2 Vdc |
| Operating voltage | 44.8 - 56.16 Vdc |
| Max.charge and discharge current [2] | 300 A |
| **Communication** | |
| Display | SOC status indicator, LED indicator |
| Communication | CAN / RS485 / RS232 / Wi-Fi |
| **General Specification** | |
| Dimension (W×D×H) | 720×160×916 mm |
| | 28.3×6.3×36.1 inch |
| Weight | 130 kg (286.6 lbs) |
| Installation | Floor stand or wall mounted |
| Operating temperature [3] | Charge : 0 to 50°C (32 to 122°F)<br>Discharge: -15 to 50°C (5 to 122°F) |
| Environmental humidity | ≤ 95%RH (No condensation) |
| Ingress protection rating | IP 20 |
| Cycle life [4] | 6000 Cycles or ten (10) years @ 80% DOD / 25°C / 0.5C, 70% EOL |
| Scalability | Max 15 batteries in parallel |
| Application | ON Grid / ON Grid + Backup / OFF grid |
| Compatible inverters | Refer to compatible inverter list (Compatible with major PCS brands) |
| **Standard Compliance** | |
| Compliance | UN38.3 / IEC62619 / IEC61000 (More available upon request) |
| **Ordering and Deliverable Part** | |
| Part | MANA 16.0 Battery |
| | MANA 16.0 Parallel cable |
| | MANA 16.0 to PCS cable |

[1] Test conditions: 100% depth of discharge (DOD), 0.2C rate charge & discharge at 25°C.
[2] There is 0.5C or 1C configurations optional in factory default.
[3] Charge/discharge derating occurs when the temperature is below 0°C or above 45°C.
[4] Please refer to the Warranty Letter for applicable conditions, the warranty is due whichever comes first.

# 02 PRODUCT OVERVIEW

## 2.1 Brief Introduction




PRODUCT OVERVIEW

MANA 16.0 is a lithium battery with an operating voltage range between 44.8-56.16V. It is designed for residential energy storage applications and works together with a 48V battery hybrid inverter. MANA 16.0 is not suitable for supporting life-sustaining medical devices.

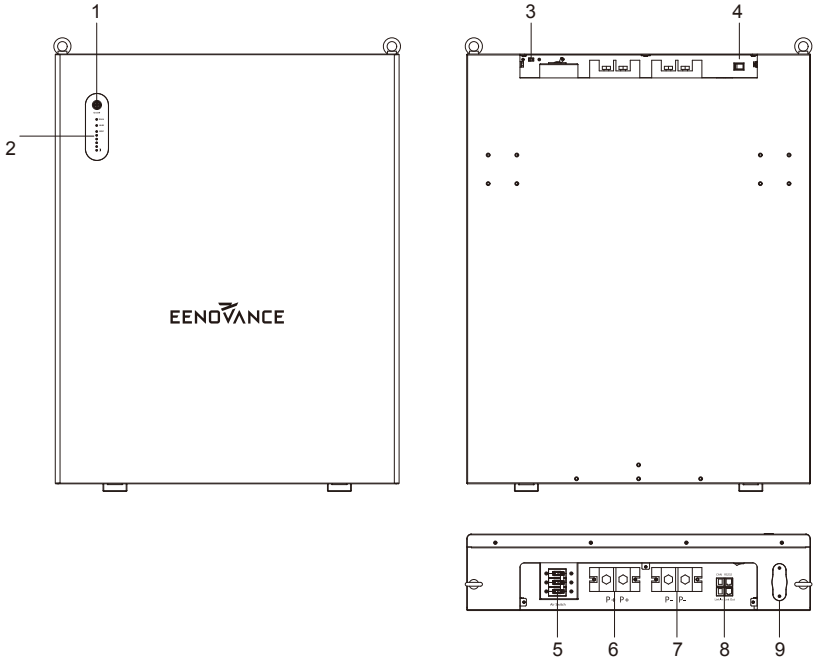
MANA 16.0 has built-in BMS (Battery Management System), which can manage and monitor cells information including voltage, current and temperature. Besides that, BMS can balance cells charging to extend cycle life. BMS has protection functions including over-discharge, over-charge, over-current and high/low temperature; the system can automatically manage charge state, discharge state and balance state.

Multiple MANA 16.0 can be connected in parallel to expand capacity and power, 15 MANA 16.0 can be connected in parallel at most.





## 2.2 Interface Introduction




Operation interface description:

| Serial Number | Name | Description |
|---|---|---|
| 1 | ON / OFF button | Start-up switch |
| 2 | Status Indicator | Operation, alarm, and SOC status |
| 3 | Slide switch | BMS power supply switch |
| 4 | Rocker switch | BMS switch |
| 5 | Air Switch | Output switch |
| 6 | Positive terminal | Total positive terminal |
| 7 | Negative terminal | Total negative terminal |
| 8 | Communication port | Communication interface |
| 9 | WiFi interface | Port for WiFi |

### 2.2.1 Switch ON / OFF

**1. Switch ON**

For single MANA 16.0, switch ON rocker switch (near positive / negative connector), then long press (more than 3 seconds) ON / OFF button on front panel, LED will flash then battery will operate normally. L1 to L6 shows battery SOC, L7 / L8 shows battery status.

For multiple MANA 16.0 in parallel, switch ON rocker switch on all batteries, long press (more than 3 seconds) ON / OFF button of MASTER battery, LED will flash, battery system will automatically encode and assign ID to each slave battery, then battery system will operate normally.

**2. Switch OFF**

Press start button of Master PACK more than 3s and then release the button, the master pack will shut down after all slave packs shut down (Sleep mode)

For single MANA 16.0, switch OFF rocker switch (near positive / negative connector).

For multiple MANA 16.0 in parallel, switch OFF rocker switch on all slave batteries first. Then switch OFF rocker switch on MASTER battery.

## 2.2.2 LED Indicator Definition

Note:

flash 1 - 0.25s light / 3.75s off

flash 2 - 0.5 light / 0.5s off

flash 3 - 0.5s light / 1.5s off

### LED Indicators Instructions

| | | RUN | ALM | Battery Level Indicator | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Status | | L8 | L7 | L6 | L5 | L4 | L3 | L2 | L1 | Descriptions |
| | | | | | | | | | | |
| Shut down | | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | All OFF |
| Standby | | Flash 1 | OFF | According to the battery level | | | | | | Indicates Standby |
| Charging | Normal | Light | OFF | According to the battery level | | | | | | The highest capacity indicator LED flashes(flash 2),others lighting |
| | Full Charged | Light | OFF | Light | Light | Light | Light | Light | Light | Turn to standby status when charger off |
| | Protection | OFF | Light | OFF | OFF | OFF | OFF | OFF | OFF | Stop charging |
| Discharge | Normal | Flash 3 | OFF | According to the battery level | | | | | | |
| | UVP | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | Stop charging |
| | Protection | OFF | Light | OFF | OFF | OFF | OFF | OFF | OFF | Stop discharge |
| Fault | | OFF | Light | OFF | OFF | OFF | OFF | OFF | OFF | Stop charging and Discharge |

### Charging / Battery Level Indicators Instructions

| Status | | Charging | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Battery Level Indicator | | L8 | L7 | L6 | L5 | L4 | L3 | L2 | L1 |
| | | | | | | | | | |
| Battery Level (%) | 0~17% | Light | OFF | OFF | OFF | OFF | OFF | OFF | Flash 2 |
| | 18~33% | | | OFF | OFF | OFF | OFF | Flash 2 | Light |
| | 34~50% | | | OFF | OFF | OFF | Flash 2 | Light | Light |
| | 51~66% | | | OFF | OFF | Flash 2 | Light | Light | Light |
| | 67~83% | | | OFF | Flash 2 | Light | Light | Light | Light |
| | 84~100% | | | Flash 2 | Light | Light | Light | Light | Light |
| | Full Charged | | | Light | Light | Light | Light | Light | Light |





### Discharging Battery Level Indicators Instructions

| Status | | Discharge | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Battery Level Indicator | | L8 | L7 | L6 | L5 | L4 | L3 | L2 | L1 |
| | | | | | | | | | |
| Battery Level (%) | 0~17% | Flash 3 | OFF | OFF | OFF | OFF | OFF | OFF | Light |
| | 18~33% | | | OFF | OFF | OFF | OFF | Light | Light |
| | 34~50% | | | OFF | OFF | OFF | Light | Light | Light |
| | 51~66% | | | OFF | OFF | Light | Light | Light | Light |
| | 67~83% | | | OFF | Light | Light | Light | Light | Light |
| | 84~100% | | | Light | Light | Light | Light | Light | Light |

### Protection Fault Indicators Instructions

| Status | | Protection Fault | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Status Battery Level Indicator | | L8 | L7 | L6 | L5 | L4 | L3 | L2 | L1 |
| | | | | | | | | | |
| Battery Level(%) | | | | 84～100% | 67～83% | 51～66% | 34～50% | 18～33% | 0～17% |
| Cell failure | | OFF/Light | Light | OFF | OFF | OFF | OFF | OFF | OFF |
| NTC failure | | | | Light | OFF | OFF | OFF | OFF | OFF |
| Precharge failure | | | | OFF | Light | OFF | OFF | OFF | OFF |
| Short circuit fault | | | | Light | Light | OFF | OFF | OFF | OFF |
| Charging MOS failure | | | | OFF | OFF | Light | OFF | OFF | OFF |
| Discharge MOS fault | | | | Light | OFF | Light | OFF | OFF | OFF |
| Precharge failure | | | | OFF | Light | Light | OFF | OFF | OFF |
| Total negative contact failure | | | | Light | Light | Light | OFF | OFF | OFF |
| Overvoltage protection of charging cells | | | | OFF | OFF | OFF | Light | OFF | OFF |
| Overall charging overvoltage protection | | | | Light | OFF | OFF | Light | OFF | OFF |
| Charging overcurrent protection | | | | OFF | Light | OFF | Light | OFF | OFF |
| Discharge cell undervoltage protection | | | | Light | Light | OFF | Light | OFF | OFF |
| Discharge overall undervoltage protection | | | | OFF | OFF | Light | Light | OFF | OFF |
| Discharge overcurrent protection | | | | Light | OFF | Light | Light | OFF | OFF |
| Charging high temperature protection | | | | OFF | Light | Light | Light | OFF | OFF |
| Charging low temperature protection | | | | Light | Light | Light | Light | OFF | OFF |
| High temperature protection for discharge | | | | OFF | OFF | OFF | OFF | Light | OFF |
| Discharge low temperature protection | | | | Light | OFF | OFF | OFF | Light | OFF |
| MOS tube high temperature protection | | | | OFF | Light | OFF | OFF | Light | OFF |
| Environmental low temperature protection | | | | Light | Light | OFF | OFF | Light | OFF |
| Ambient high temperature protection | | | | OFF | OFF | Light | OFF | Light | OFF |

Notes: 1. The fault lamp ALM is not on in normal state, at this time the SOC lamp is used as a power indication, the fault lamp ALM is always or when the fault occurs, the SOC lamp is on according to the fault sequence number (priority sequence number from low light), if a variety of protection faults exist, the RUN lamp also needs to be on constantly.

### 2.2.3 CAN / RS485 Port

CAN/ RS485 Communication Terminal (RJ45 port), connects to inverter, and follows CAN / RS485 protocol.

| PIN | Definition |
|---|---|
| Pin 1, Pin 8 | RS485-B (to Inverter, reserved ) |
| Pin 2, Pin 7 | RS485-A (to Inverter, reserved) |
| Pin 3 | NC |
| Pin 4 | CANH (to Inverter) |
| Pin 5 | CANL (to Inverter) |
| Pin 6 | GND |

### 2.2.4 RS232 Port

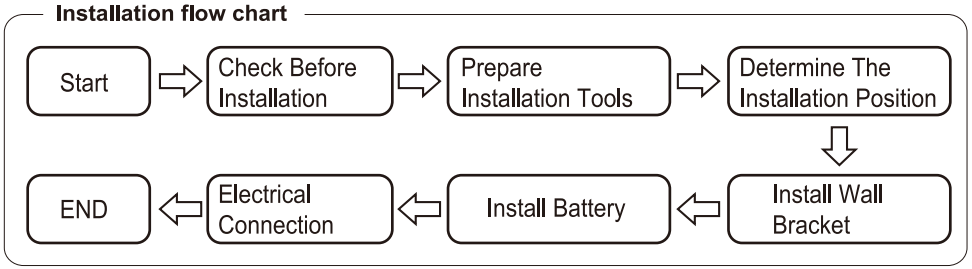
RS232 Communication Terminal (RJ45 port) follows RS232 protocol, for manufacturers or professional engineers to debug or service.

| PIN | Definition |
|---|---|
| Pin 1, Pin 8 | GND |
| Pin 2, Pin 7 | RS232_TX |
| Pin 3, Pin 6 | RS232 _RX |
| Pin 4, Pin 5 | NC |





# 03 INSTALLATION GUIDE



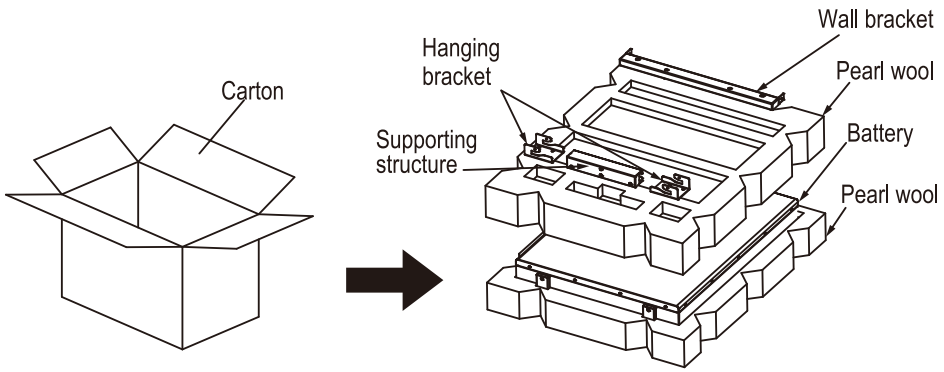

## 3.1 Checking Before Installation

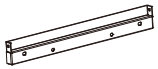
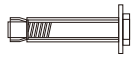
### 3.1.1 Checking Outer Packing Materials

Packing materials and components may be damaged during transportation. Therefore, check the outer packing materials before installing the battery. Checking the surface of packing materials for damage, such as holes and cracks. If any damage is found, do not unpack the battery and contact the dealer as soon as possible. You are advised to remove the packing materials within 24 hours before installing the battery.

### 3.1.2 Checking Deliverables

After unpacking the battery, check whether deliverables are intact and complete. If any damage is found or any component is missed, contact the dealer.
The below table shows the components and mechanical parts that should be delivered.




| NO. | Pictures | Quantity | Description |
|---|---|---|---|
| 1 |  | 1PCS | Battery |
| 2 |  | 1PCS | Wall bracket |
| 3 |  | 2PCS | Hanging bracket |
| 4 |  | 1PCS | Supporting structure |
| 5 |  | 4PCS | M10*80 |
| 6 |  | 12PCS | M6*16 |
| 7 |  | 2PCS | M4*20 |
| 8 |  | 1PCS | Test report |
| 9 |  | 1PCS | QA certificate |





## 3.2 Tools

| Model | Tools | | |
|---|---|---|---|
| Installation | Knife  | Measuring tape  | Socket wrench (10/16mm)  |
| | Rubber mallet  | Cross screwdriver  | Hammer drill (12mm)  |
| Protection | ESD gloves  | Safety goggles  | Anti-dust respirator  |
| | Safety shoes  | | |

## 3.3 Installation Requirements

### 3.3.1 Installation Environment Requirements

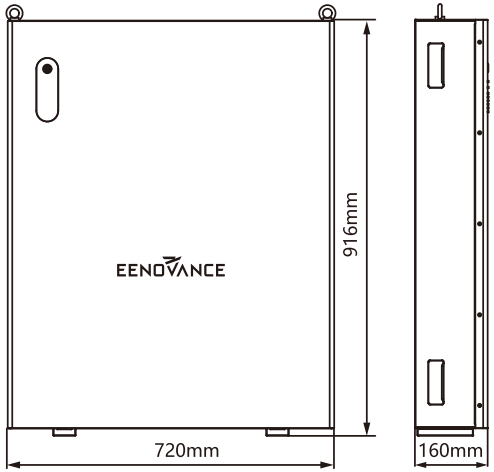
- Install the battery in the indoor environment.
- Place battery in secure location away from children and animals.
- Do not place the battery near any heat sources and avoid sparks.
- Do not expose the battery to moisture or liquids.
- Do not expose the battery to direct sunlight.

### 3.3.2 Installation Carrier Requirements

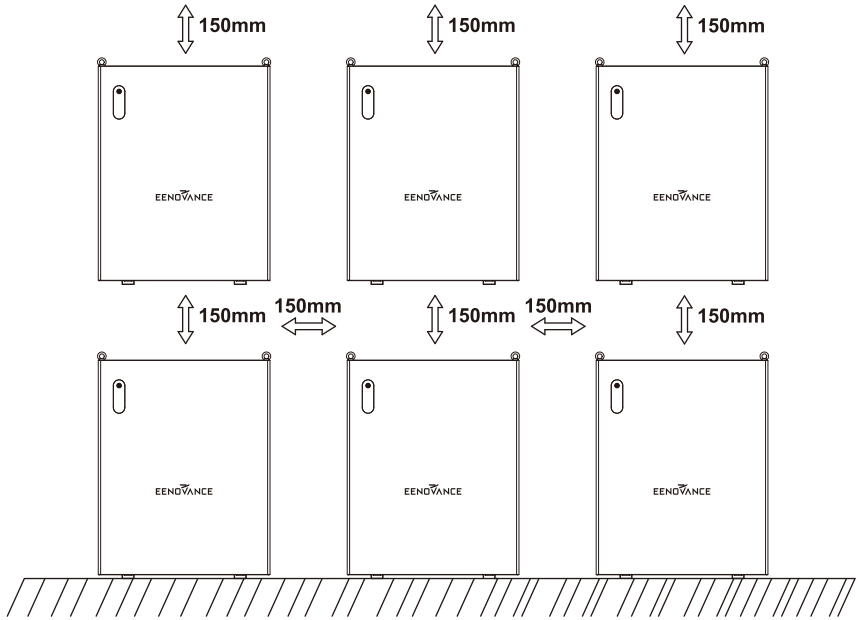
- Only mount battery on fire resistant building. Do not install batteries on flammable buildings.
- Battery is quite heavy, make sure the wall/ground can meet the load bearing requirements.

## 3.4 Installation Instructions

### 3.4.1 Dimensions




Minimum mounting distance between battery pack and equipment:



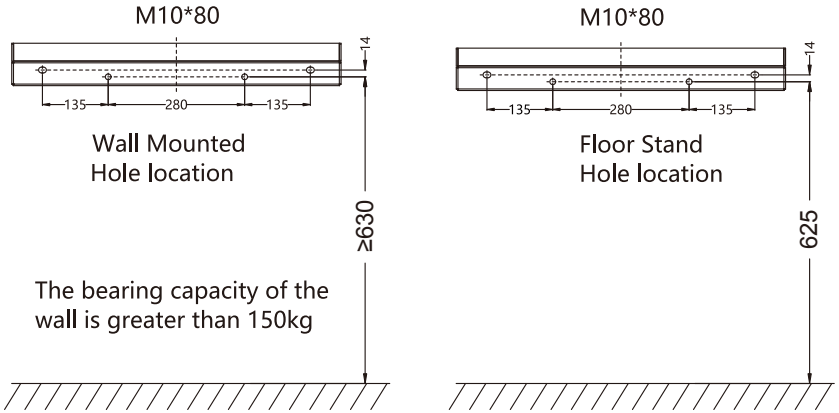





### 3.4.2 Installation Procedure

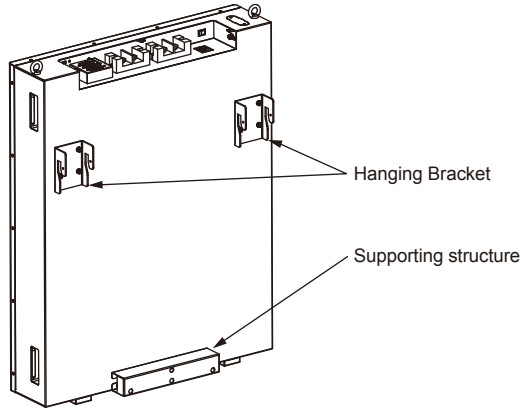
#### STEP 1

Drill the hole with an 12mm drill bit as follows and fix the wall bracket to the wall.



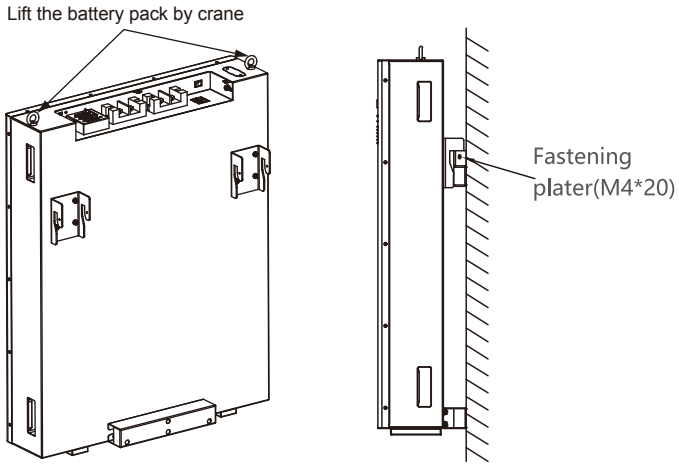

#### STEP 2

Install the hanging bracket and support plate.



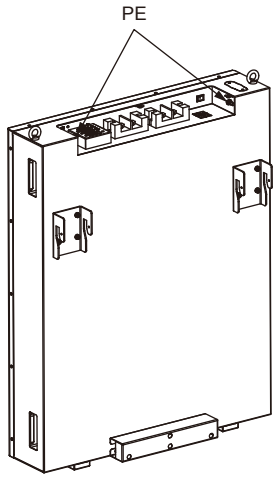
## STEP 3

Use a crane to lift the ring on the battery pack and attach it to the wall bracket.




## STEP 4

Connect to ground.

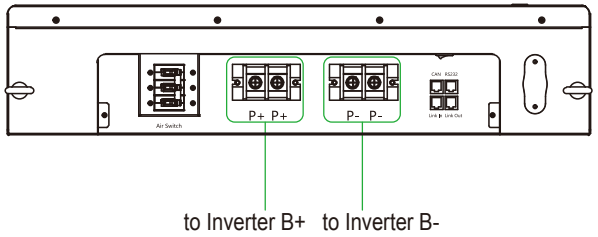






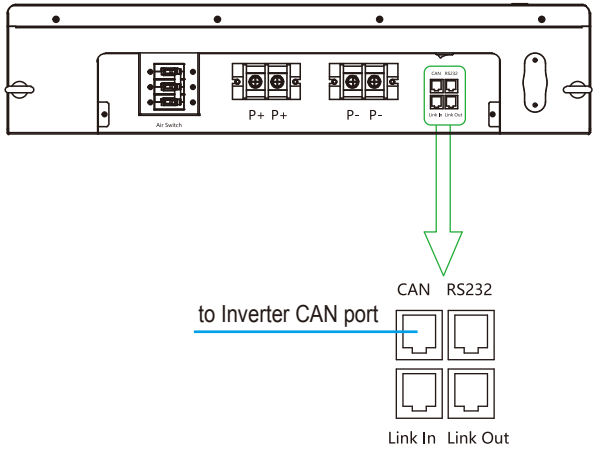

## STEP 5

Connect power cable.




## STEP 6

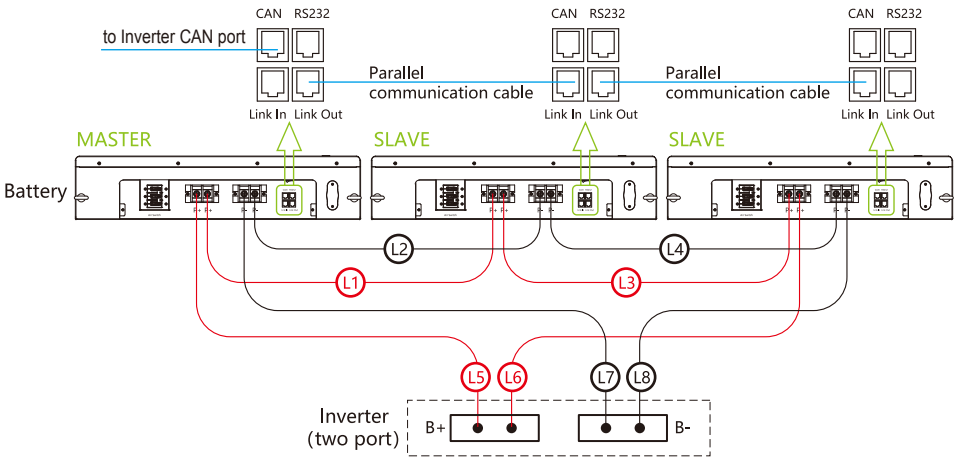
Connect communication cable.



### STEP 7

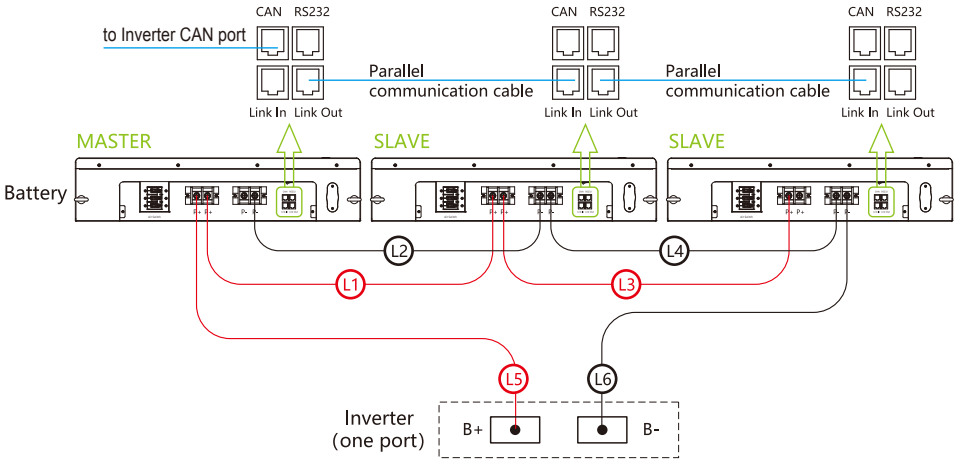
When multiple batteries are connected in parallel, follow the following wiring mode.
Parallel Cables length 1000mm;Power Cables length 1500mm.

SCHEME ONE




Parallel Cables:L1=L2=L3=L4=1000mm:70mm² EV Cable
Power Cables:L5=L6=L7=L8=1500mm:35mm² EV Cable

SCHEME TWO




Parallel Cables:L1=L2=L3=L4=1000mm:70mm² EV Cable
Power Cables:L5=L6=1500mm:70mm² EV Cable





# 04 MAINTENANCE

## 4.1 Recharge Requirements During Normal Storage

Battery should be stored in an environment with temperature range between -10°C ~ +45°C, and maintained regularly according to following table with 0.5C (150A) current till 40% SOC after long storage time.

**Recharge Conditions When In Storage**

| Storage Environment Temperature | Relative Humidity of Storage Environment | Storage Time | SOC |
|---|---|---|---|
| Below -10℃ | / | Prohibit | / |
| -10~25℃ | 5%~70% | ≤12 months | 30%≤SOC≤60% |
| 25~35℃ | 5%~70% | ≤6 months | 30%≤SOC≤60% |
| 35~45℃ | 5%~70% | ≤3 months | 30%≤SOC≤60% |
| Above 45℃ | / | Prohibit | / |

## 4.2 Recharge Requirements When Over Discharged

Over discharged (90% DOD) battery should be recharged according to following table, otherwise over discharged battery will be damaged.

**Recharge conditions when battery is over discharged**

| Storage Environment Temperature | Storage Time | Note |
|---|---|---|
| -10~25℃ | ≤15 days | Battery Pack disconnected from Inverter |
| 25~35℃ | ≤7 days | |
| -10~45℃ | <12 hours | Battery Pack connected to Inverter |

# 05 DISPOSAL OF THE BATTERY SYSTEM

Disposal of the battery must comply with the local applicable disposal regulations for electronic waste and used batteries.

·Do not dispose of the battery system with your household waste.
·Avoid exposing the batteries to high temperatures or direct sunlight.
·Avoid exposing the batteries to high humidity or corrosive atmospheres.