

User Manual



Product Name: 48Vdc 100Ah LiFePO4 RackBattery

Product Model : ZN-P48100ESA1

Date : 05/11/2022

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1. Products Information

1.1 Introduction



The **ZN-P48100ESA1** 48V 100Ah (4.8kwh) lithium ion phosphate battery energy storage system can be combined in 16pcs (to max 76.8kwh) parallel to provide green power supply for solar home storage system via connecting with different 48Vdc solar hybrid on-off storage inverters.

Under smart 48vdc hybrid storage inverter connection, the battery can not only store extra electricity from photovoltaic power generation system in daytime and supply stable power to user's equipment as power backup at nighttime or any time when needed, it can also improve the efficiency of photovoltaic power generation and increase the electric power efficiency by peak load shifting.

The **ZN-P48100ESA1** 48V 100Ah lifepo4 battery has smart built-in battery management system (BMS), which can manage and monitor cells information including voltage, current and temperature.

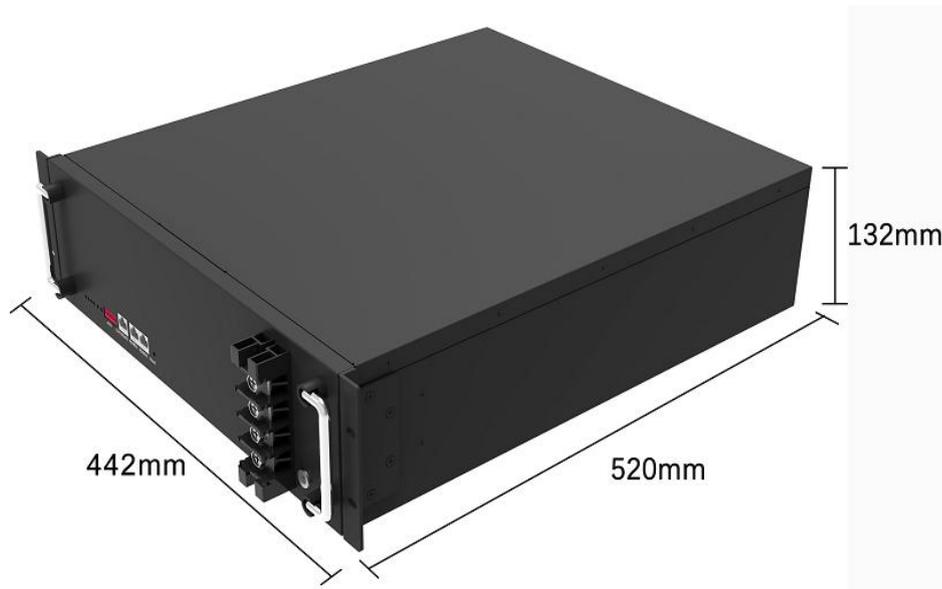
1.2 Features

- No-toxic, non-pollution and environmentally friendly
- Cathode material is made from Lifepo4 with safety performance and long cycle life
- BMS has protection functions including over-discharge, over-charge, over-current and high/low temperature, etc
- Automatically manage charge and discharge state and balance voltage of each cell
- Support 16pcs parallel connection for expanding capacity and power
- No memory effects so that battery can be charged and discharged shallowly

48VDC Lifepo4 Battery - ZN-P48100ESA1

- Less battery self-discharge, then recharging period can be up to 10 months during storage
- Self ventilation with lower system noise
- Small size (3U) and light wight(43.5kgs) , standard 19-inch rack designed module for fast installation and maintenance.

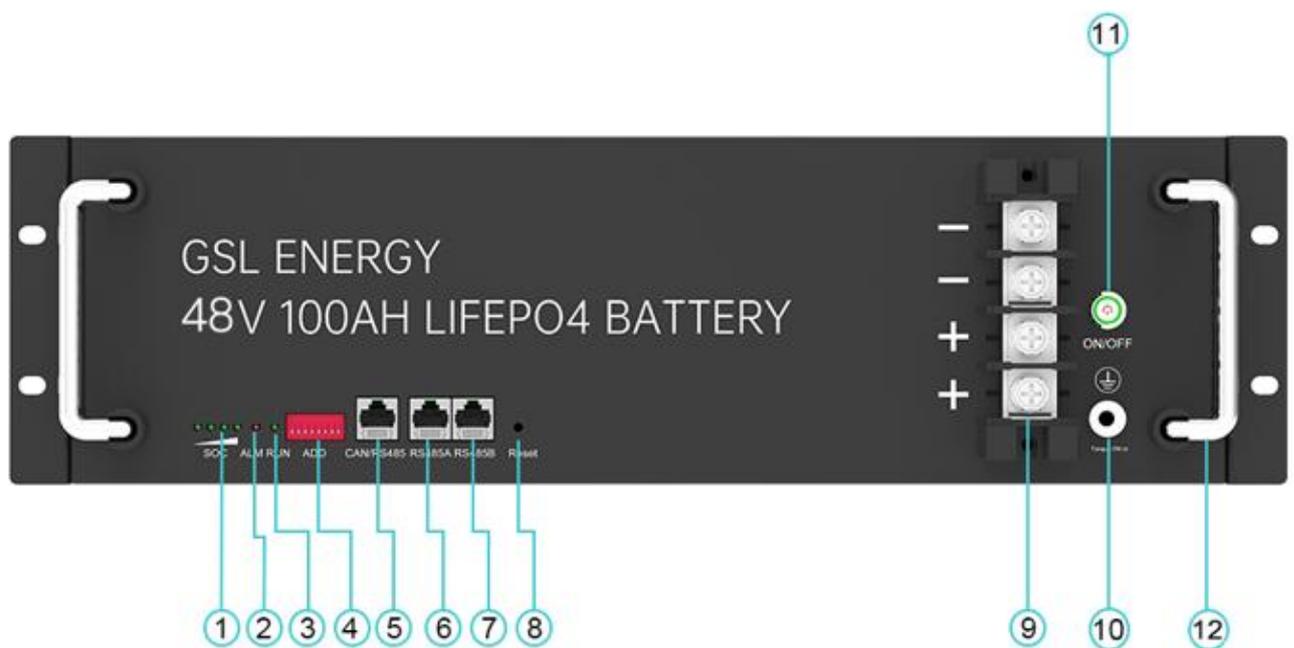
1.3 Specification



No.	Basic Parameters	ZN-P48100ESA1
1	Type of battery	LFP
2	Cell Connection	1P15S
3	Rated voltage	48V (25°C±2°C)
4	Rated energy	4.8kWh
5	Standard charging current	50A
6	Maximum continuous charging current	100A
7	Standard discharge current	50A
8	Maximum continuous discharging current	100A
9	Battery self-discharge rate	≤3%/month (25°C, 50%SOC)
10	Cycle life	≥6,500times (0.5C/0.5C, 80%DOD)
11	Maximum Number of Parallel-connected Battery	16 PCS
12	Protection & Alarm	Protection or alarm against over over-temperature, over over-current, over over-charge, over over-discharge, short circuit, etc.
13	Network Port	CAN/RS485
14	Factory SOC state	50-60%

15	Cooling	Natural Cooling
16	Withstand voltage level	1500V DC
17	Insulation resistance	>100MΩ
18	Ingress protection	IP20
19	Altitude	<2000m
20	Range of working temperature	Charge: 0°C~55°C/ Discharge: -20°C~55°C
21	Storage temperature	-10°C~30°C
22	Relative humidity	5%~95%, RH
23	Weight	About 43.50kg
24	Dimensions (W*D*H)	442mm* 520mm* 132.5mm
25	Installation location	Indoor

1.4 Interface



No.	Name	Label	Function Description
1	SOC indicator		
2	Warning indicator	ALM	Alarm in case of battery failure
3	Operation indicator	RUN	Flashing during battery charging and discharging
4	DIP	ADD	Set up master and slave battery
5	CAN/RS485	CAN/RS485	Master battery connects with hybrid inverters with CAN/RS485 port support.

6	RS485A	RS485A	Battery parallel communication
7	RS485B	RS485B	Battery parallel communication
8	Reset switch	RST	BMS restart when battery is dead
9	Negative terminal	-	Battery negative output
	Positive terminal	-	Battery negative output
10	Grounding hole		
11	Power Switch	ON/OFF	
12	Stainless Handle		Easy to handle battery box

1.5 SOC Indicator & Status Indicator Guides

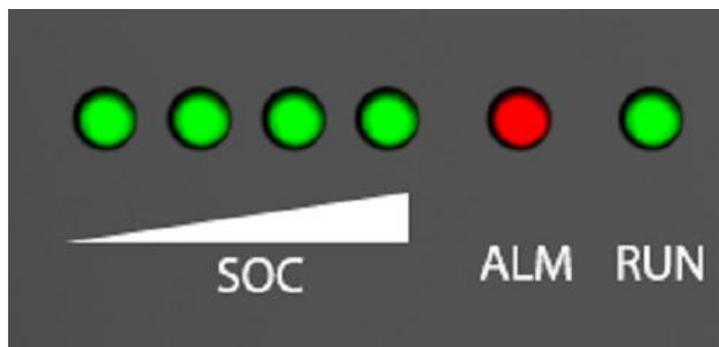


Chart 1: Battery Status

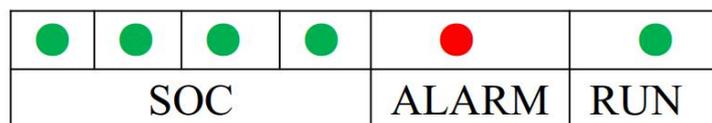


Chart 2: Battery Capacity

Capacity LED Indicator		● L1	● L2	● L3	● L4
SOC	0~25%	Flash	ON	ON	ON
	25~50%	OFF	Flash	ON	ON
	50~75%	OFF	OFF	Flash	ON
	75~100%	OFF	OFF	OFF	Flash
RUN Status ●		ON			

Chart 3: Battery status

Status	Normal	RUN	ALM	Capacity LED				Description
	Warning Protection	●	●	●	●	●	●	
Shut Down	Shut Down	OFF	OFF	OFF	OFF	OFF	OFF	All OFF
Standby	Normal	Flash	OFF	OFF	OFF	OFF	OFF	Standby
Charge	Normal	Flash	OFF	Charge				
	Warning	ON	Flash					
	Protection	OFF	ON					
Discharge	Normal	Flash	OFF	Charge				
	Warning	ON	Flash					
	Protection	OFF	ON					
Fault		OFF	ON	OFF	OFF	OFF	OFF	Stop Charging or Discharging

2. Packaging Transportation and Storage

2.1. Package list

The packaging diagram and delivery list of the entire battery pack are shown in Figure 1 and Table 1 respectively.

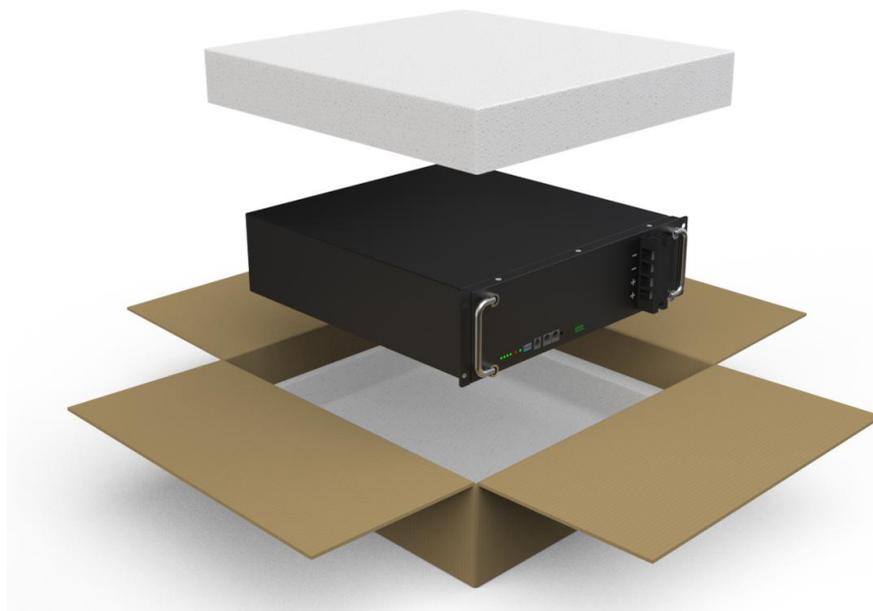


Figure 1. product packaging diagram

Table1.packing list

S.N.	Name	Legend	Specifications	Amount	Standard /Optional
1	Battery box		ZN-P48100ESA 1	1	Standard
2	Positive power cable		1m,25mm ² , red	1	Standard
3	Negative power cable		1m,25mm ² , black	1	Standard
4	Battery Parallel network cable		0.5m, blue	1	Standard
5	Communication network cable		1.5m, Orange	1	Standard
6	User manual	/	/	1	Standard

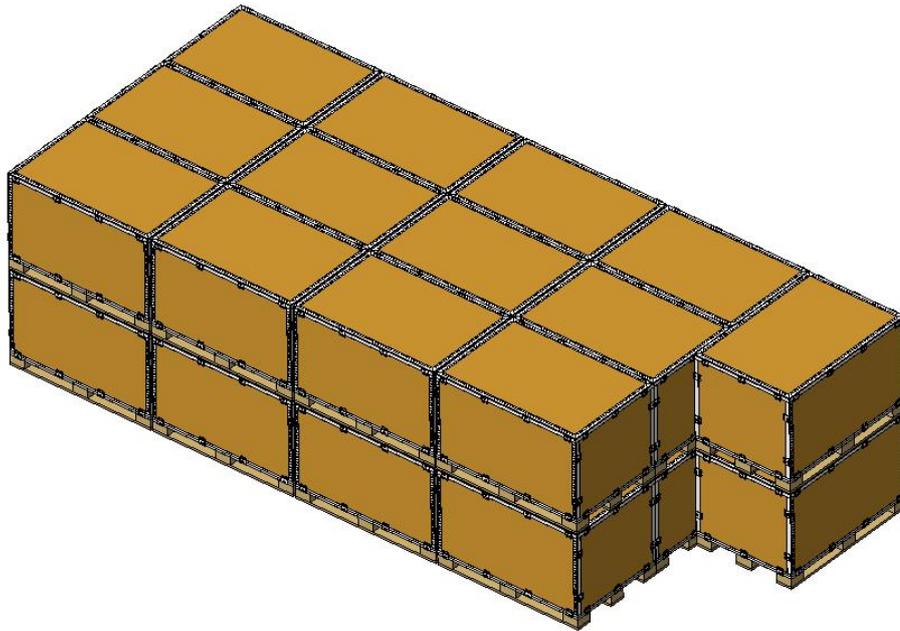
2.2. Transport Requirement

During transportation, the battery packing box must be placed properly and avoid strong vibration, impact and heavy pressure.

Standard Shipping Package – 8PCS /Pallet



Standard Shipping Package – 208PCS /20ft container



2.3. Storage Requirements

Products should be stored in a place free from rain, humidity and sun. During storage, the power of the product shall not be less than 60%.

3. Attention guidelines before installation

3.1. Notes-identification Definition

This product is made of lithium iron phosphate battery, which has the characteristics of good safety, long life, low internal resistance, and high charge and discharge efficiency. Identification Definition

	Danger of electric shock
	Ignoring safety warnings or improper operation may result in minor injury or slight or moderate damage to equipment or property
	Do not short-circuit
	Do not disconnect or disassemble by non-professionals
	Do not place near flammable materials
	Do not place the battery near fire

	<p>Please read the product manual before installation and use</p>
	<p>Keep out of reach of children, animals or insects</p>
	<p>Recyclable</p>
	<p>Do not dispose of this product with domestic waste</p>
	<p>This battery meets European EMC standard</p>
	<p>Dangerous goods warning label on the top of the battery module</p>

3.2 Operational Safety

For safety reasons, it is the installer's responsibility to be familiar with the contents of this document and all warnings before performing the installation.

- (1) When operating and maintaining this product, please follow the operation regulations of high voltage DC power supply, and take good personal protection measures;
- (2) Keep away from children;
- (3) Avoid touching exposed metal parts before touching the battery;
- (4) In order to prevent the accumulation of static electricity, the maintenance personnel should release the static electricity from the human body before operating the battery;
- (5) Do not place tools or metal parts on the top of the battery;
- (6) Do not step on or sit on the battery;
- (7) Do not short circuit the positive and negative electrodes of the battery directly;
- (8) It is forbidden to change the battery without authorization;
- (9) It is forbidden to cover the battery during charging and discharging;
- (10) It is forbidden to charge or discharge the battery module directly without BMS or other charging and discharging protection measures.

3.3 Responding to Emergencies

- (1) Electrolyte Leakage

In case of electrolyte leakage, immediately follow the following instructions;

Inhalation: evacuate the contaminated area and seek medical advice immediately;

Eye contact: Rinse eyes with running water for 15 minutes and seek medical advice immediately;

Skin contact: wash the affected area thoroughly with soap and water and seek medical advice immediately;

Ingestion: cause vomiting and seek medical advice immediately.

(2) Battery Soaking

If the battery is immersed in water, do not continue to use.

(3) Battery Damage

If the battery is damaged, please contact us directly.

4. Installation

4.1. Tools and Safety Protection Appliance

The following tools are required to install this product.



Wrench



Electric screw driver



Insulated gloves



Goggles



Safety shoes

When installing, moving and placing batteries, always follow the instructions in the manual, otherwise there may be safety hazards.

4.2 Installation location

Make sure that the installation location meets the following conditions:

- 1) The area is completely waterproof
- 2) The floor is flat and level.
- 3) There are no flammable or explosive materials.
- 4) The ambient temperature is within the range from 0°C to 50°C.
- 5) The temperature and humidity are maintained at a constant level.
- 6) There is minimal dust and dirt in the area.
- 7) The distance from heat source is more than 2 meters.
- 8) The distance from air outlet of inverter is more than 0.5 meters.
- 9) The installation areas shall avoid of direct sunlight.
- 10) There is no mandatory ventilation requirements for battery module, but please avoid of installation in confined area. The aeration shall avoid of high salinity, humidity or temperature.

Caution

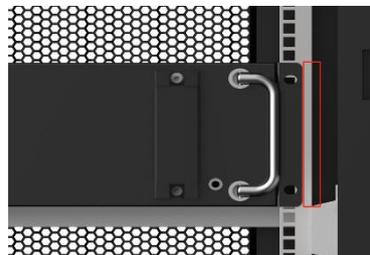
If the ambient temperature is outside the operating range, the battery pack stops operating to protect itself. The optimal temperature range for the battery pack to operate is 0°C to 50°C. Frequent exposure to harsh temperatures may deteriorate the performance and life of the battery pack.

4.3 Grounding

Grounding cables shall be 10AWG or higher yellow-green cables. After connection, the resistance from battery grounding point to Ground connection point of room or installed place shall smaller than 0.1Ω.

1) based on metal directly touch between the module's surface and rack's surface. If using painted rack the corresponding place shall remove the painting.

2) Install a grounding cable to the grounding point of the modules.



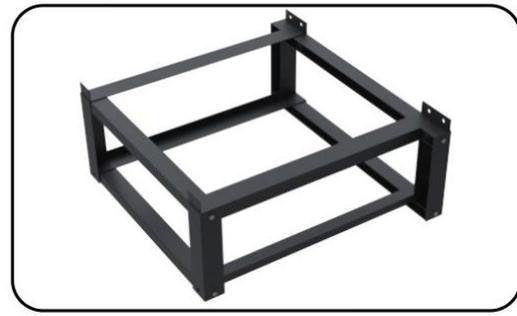
4.4 Structure installation

ZN-P48100ESA1 48vdc lifepo4 battery supports horizontal stacking, as shown in Figure.

Figure 6. horizontal stacking installation diagram



Step1:Set the main supporter, connect and fix the front connecting bracket with screws from the side.



Step2:Connect and fix the rear connection bracket with screws from the side.



Step3:Align the gap between the brackets to stack.



Step4:Fix the bracket with bolts.



Step5:Fix the bracket with bolts.



Step6:Put the battery into the holder.



Step7:Bolt the battery.



Step8:Finish

Figure 7. installation & fix method

When installing, fix the mounting ears on both sides of the front panel of the battery box to the bracket or other box with M6 screws.

5. How to connect all 48Vdc hybrid storage inverter (on-off grid or pure off grid)

5.1 48VDC hybrid storage inverters matched (40-60vdc type on batteries) :

When paralleling use of 48vdc lifepo4 battery on Canbus (hybrid on-off grid solar inverters), the battery needs to be used in parallel, the maximum connection is **16 units** (Canbus/RS485) with hybrid solar inverter, but we recommend to use 2-6 units according to application. The application needs power and communication connections as below, choose suitable parallel power cables and related connectors.

Matched Inverter brands for reference as below :



TO BE CONTINUED.....

NOTE: PLEASE CONSULT WITH SALES MANAGER BEFORE SHIPPING, TO CONFIRM DIFFERENT INVERTER BRAND PROTOCOL AT CANBUS OR RS485 TYPE. MAKE SURE ASK FACTORY SALES MANAGER TO SET UP RELATED SUITABLE CANBUS/RS485 PROTOCOL INSIDE TO MATCH RELATED 48VDC HYBRID INVERTERS BRANDS IN THE WORLD.

5.2 ADS guide Line

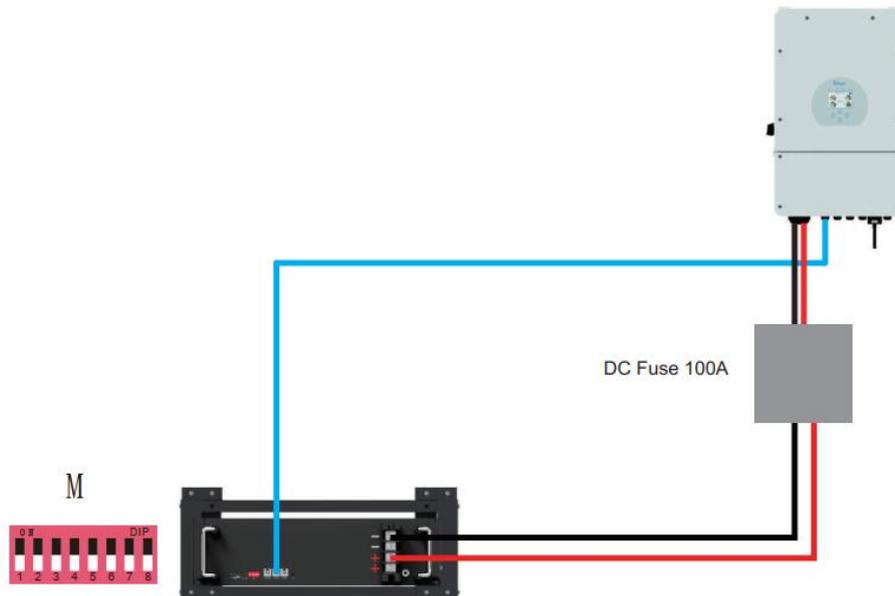
If you start to connect hybrid inverter, make sure you should consult with related inverter brand sales manager before connection.

48VDC Lifepo4 Battery - ZN-P48100ESA1

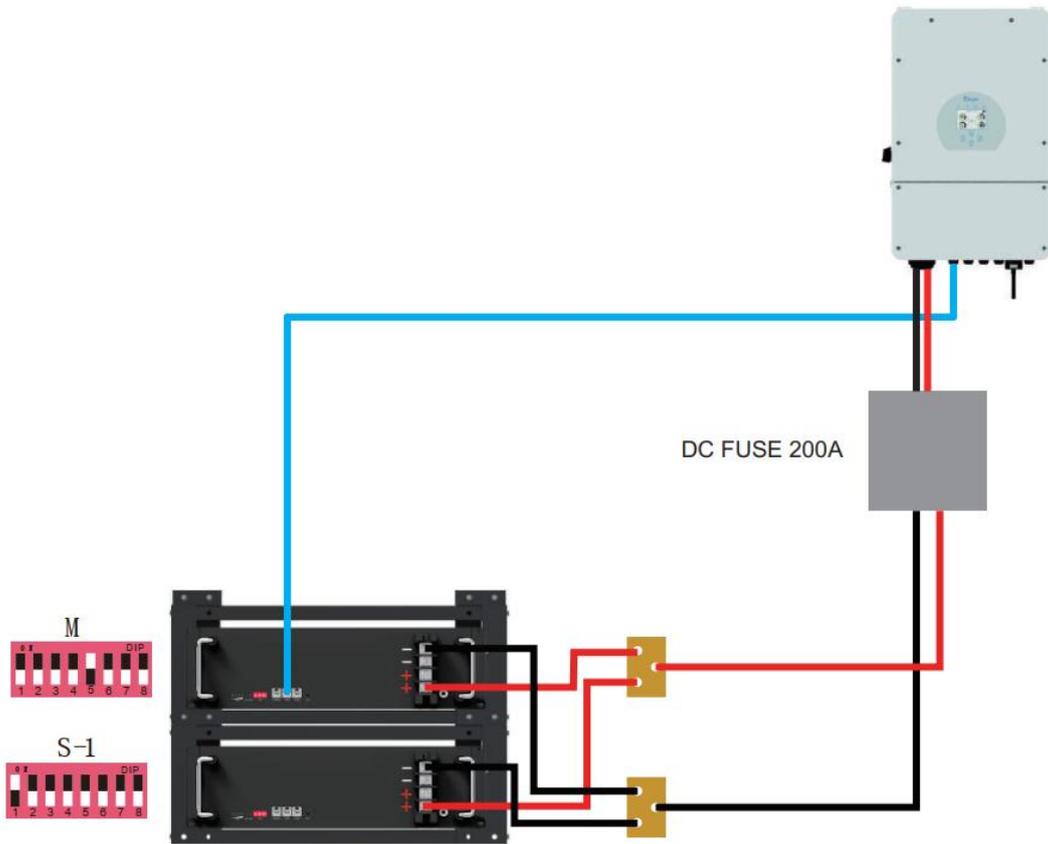


5.3 4.8kwh to 28.8kw wiring diagram guideline

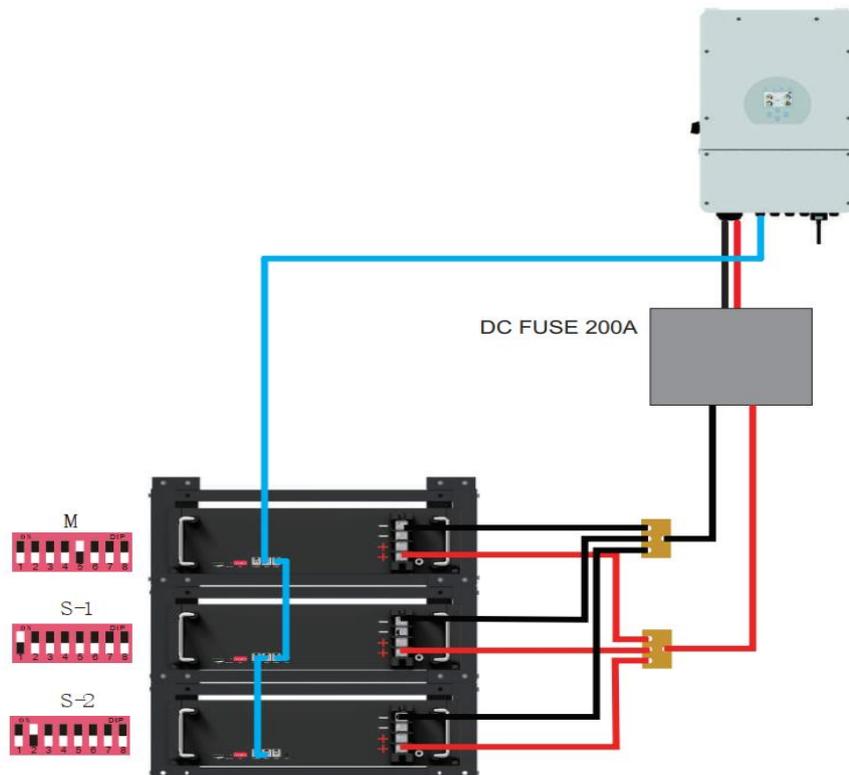
One pcs connect diagram



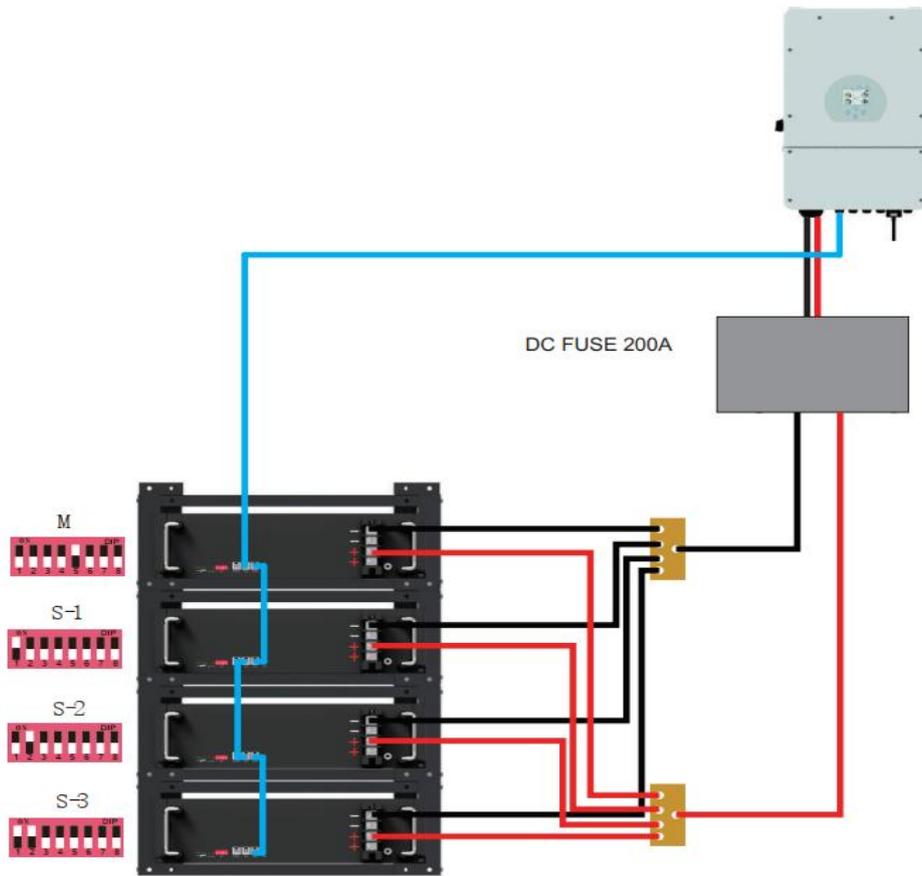
Two pcs connect diagram



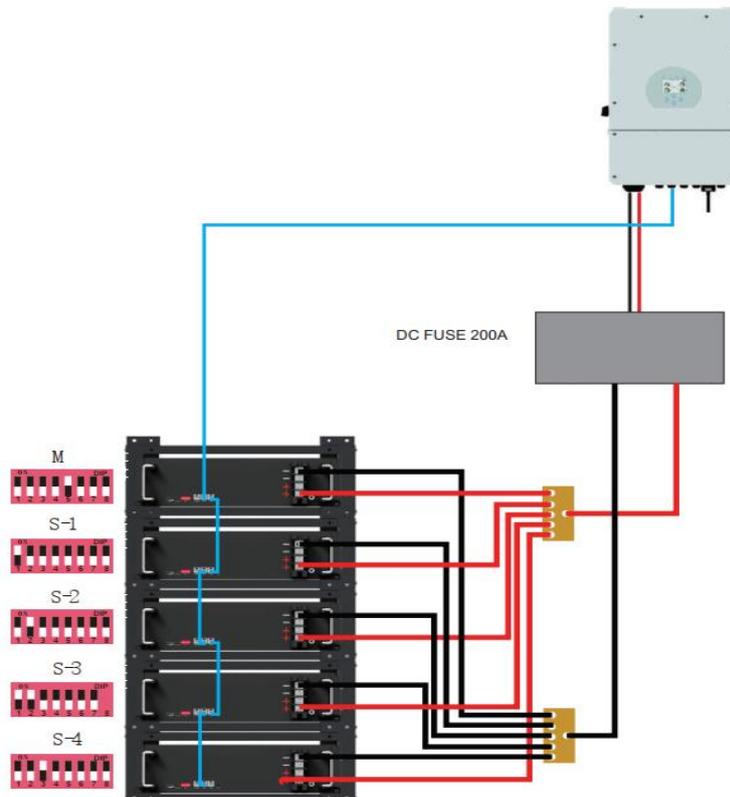
Three pcs connect diagram



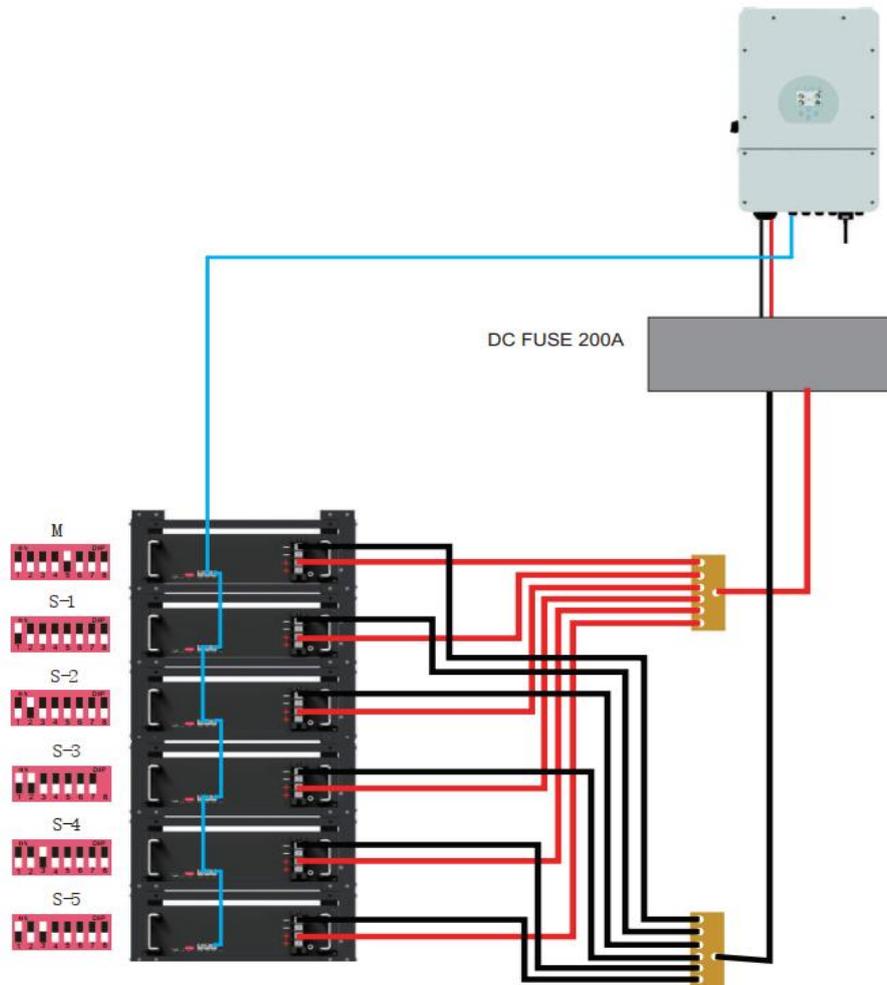
Four pcs connect diagram



Five pcs connect diagram



Six pcs connect diagram



NOTE : IF YOU NEED MORE PARALLEL GUIDELINE DETAILS, PLEASE CONSULT WITH RELATED SALES MANAGER ASAP.

6. Operating

6.1. Power on

Before powering on, make sure that battery positive and negative cables are correctly connected.

Press and hold the battery RST switch for 3 seconds, and all indicators on the panel flash once, indicating that the power on is successful.;



5.5 Shut down

Before disconnecting the cable from the battery, make sure the battery is turned off.

Shut down steps:

- Press and hold the battery RST switch for 3 seconds, and all indicators on the panel flash once and turn off, indicating that the shutdown is successful.;



7. Maintenance

- Battery maintenance must be performed by qualified authorized personnel;
- If the battery has been stored continuously for more than three months, it must be fully charged once;
- Every three months, check whether the connections of battery communication and power cables are

8. Product Warranty

If you have purchased this product from our factory, you should be aware that this warranty is provided in addition to other rights and remedies held by a consumer at law.

You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

For the above mentioned products, you receive our factory warranty valid for 20 years from the date of delivery from factory. Factory warranty covers main costs for repair or spare parts during the agreed period beginning on the date of delivery of the device, subject to the following conditions.

Factory Warranty Scope

The factory warranty does not cover damages caused by following reasons:

- Breaking the product seal (opening the casing)
- Transport damage
- Incorrect installation or commissioning
- Failure to observe the user manual, quick installation instructions
- Incorrect usage or inappropriate operation
- Insufficient ventilation of the device
- Failure to observe the applicable safety regulations
- Force majeure

Neither does it cover cosmetic defects which do not influence the energy production.

Warranty conditions

If the battery becomes defective during the agreed factory warranty period and, unless this should be impossible or disproportionate, one of the following options will be selected at the discretion of factory:

- Battery repair
- Battery repair at on-site
- Exchange for a replacement device of equivalent value with regard to model and age.

In the latter case, the remainder of the warranty entitlement will be transferred to the replacement device and your entitlement will be documented at factory.

Excessiveness in the meaning above exists in particular if the cost the measures for factor will be unreasonable.

- In view of the value that the device would have without the defect
- Taking in account of the significance of the defect
- After consideration of alternative work around possibilities at factory customers could revert to without significant inconvenience.

Please fill the required information in and send this page to factory when you need to apply warranty service support

Warranty Card

User Information

Company / User Name:

Address:

Telephone:

Email:

Project installation location:

Product Information

Battery Model:

Serial No :

Invoice Number :

Purchase Date :

Dealer :

Commission date :

Fault/Error Description:

MADE IN CHINA