

# KH-ES5KPW POWER CABINETS

Owner's Manual

SOLARVXTIO.®



Version 1.0

KH strongly advises to take due care in following the owner's manual

A warranty claim is invalid if damage is caused by human error, inconsistent

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# 1. Safety Precautions

- It is very important and necessary to read the user manual carefully before installing or using the battery. Failure to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, death, or may damage the battery and the whole system.
- If the battery is stored for a prolonged time, it is requirement that they are charged every three to six months, and the SOC should be no less than 80%.
- The battery needs to be recharged within 12 hours, after fully discharging.
- Do not expose cable outside.
- All battery terminals must be disconnected before maintenance.
- Do not use cleaning solvents to clean the battery.
- Do not expose the battery to flammable or harsh chemicals or vapors.
- Do not paint any part of the battery, include any internal or external components.
- Do not connect battery with PV solar wiring directly.
- Any foreign object is prohibited to be inserted into any part of the battery.
- Any warranty claims are excluded for direct or indirect damage due to items above.

## 1.1. Before Connecting

- After unpacking, please check the battery and packing list first, if the battery is damaged or spare parts are missing, Please contact the dealer.
- Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode;
- Wiring must be correct, do not mix-connect the positive and negative cables, and ensure no short circuit with the external device;
- It is prohibited to connect the battery with AC power directly;
- The embedded BMS in the battery is designed for 48VDC, please DO NOT connect battery in series;
- It is prohibited to connect the battery with different type of battery;
- Please ensure the electrical parameters of battery system are compatible to inverter;
- Keep the battery away from fire or water.

## 1.2. During operation

- If the battery system needs to be moved or repaired, the power must be cut off first and the battery is completely shutdown;
- It is prohibited to connect the battery with different type of battery;
- It is prohibited to put the batteries working with faulty or incompatible inverter;
- In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited;
- Please do not open, repair or disassemble the battery. We do not undertake any consequences or related responsibility due to violation of safety operation or violating of design, production and equipment safety standards.

## 2. Battery Specifications

Battery Specifications			
Model No	KH-ES48100/15S	KH-ES48150/15S	KH-ES48200/15S
<i>Nominal Parameters</i>			
Voltage	48 V	48 V	48 V
Capacity	100Ah	150Ah	200Ah
Energy	4.8 KwH	7.2 KwH	9.6 KwH
Dimensions (L x W x H)	680 x480 x180(220)mm	680 x480 x180(220)mm	680x480x180(220)mm
Weight	58.5kg	75.0 kg	96.5kg
<i>Basic Parameters</i>			
Life time(25°C)	20 years		
Life cycles(80% DOD, 25°C)	6000 Cycles		
Storage time / temperature	5 months @ 25°C; 3 months @ 35°C; 1 month @ 45°C		
Operation temperature	-20°C to 60°C @60+/-25% Relative Humidity		
Storage temperature	0°C to 45°C @60+/-25% Relative Humidity		
Lithium Battery Standard	IEC62619,UN38.3,ROHS,CE-EMC,UL1642,MSDS		
Enclosure protection rating	IP21		
<i>Electrical Parameters</i>			
Operation voltage	48 Vdc	48 Vdc	48 Vdc
Max. charging voltage	54 Vdc	54 Vdc	54 Vdc
Cut-off Discharge Voltage	42 Vdc	42 Vdc	42 Vdc
Max. charging and discharging current	100A(4800W)	120A(5760W)	120A(5760W)

### Battery Specifications

Model No	KH-ES48100/16S	KH-ES48150/16S	KH-ES48200/16S
<i>Nominal Parameters</i>			
Voltage	51.2V	51.2V	51.2V
Capacity	100Ah	150Ah	200Ah
Energy	5.12KwH	7.68KwH	10.24KwH
Dimensions (L x W x H)	680 x480 x180(220)mm	680 x480 x180(220)mm	680x480x180(220)mm
Weight	60.50kg	78.0 kg	105.5kg
<i>Basic Parameters</i>			
Life time(25°C)	20 years		
Life cycles(80% DOD, 25°C)	6000 Cycles		
Storage time / temperature	5 months @ 25°C; 3 months @ 35°C; 1 month @ 45°C		
Operation temperature	-20°C to 60°C @60+/-25% Relative Humidity		
Storage temperature	0°C to 45°C @60+/-25% Relative Humidity		
Lithium Battery Standard	IEC62619,UN38.3,ROHS,CE-EMC,UL1642,MSDS		
Enclosure protection rating	IP21		
<i>Electrical Parameters</i>			
Operation voltage	51.2 Vdc	51.2 Vdc	51.2 Vdc
Max. charging voltage	58 Vdc	58 Vdc	58 Vdc
Cut-off Discharge Voltage	44 Vdc	44 V dc	44 Vdc
Max. charging and discharging current	100A(5120W)	120A(6144W)	120A(6144W)

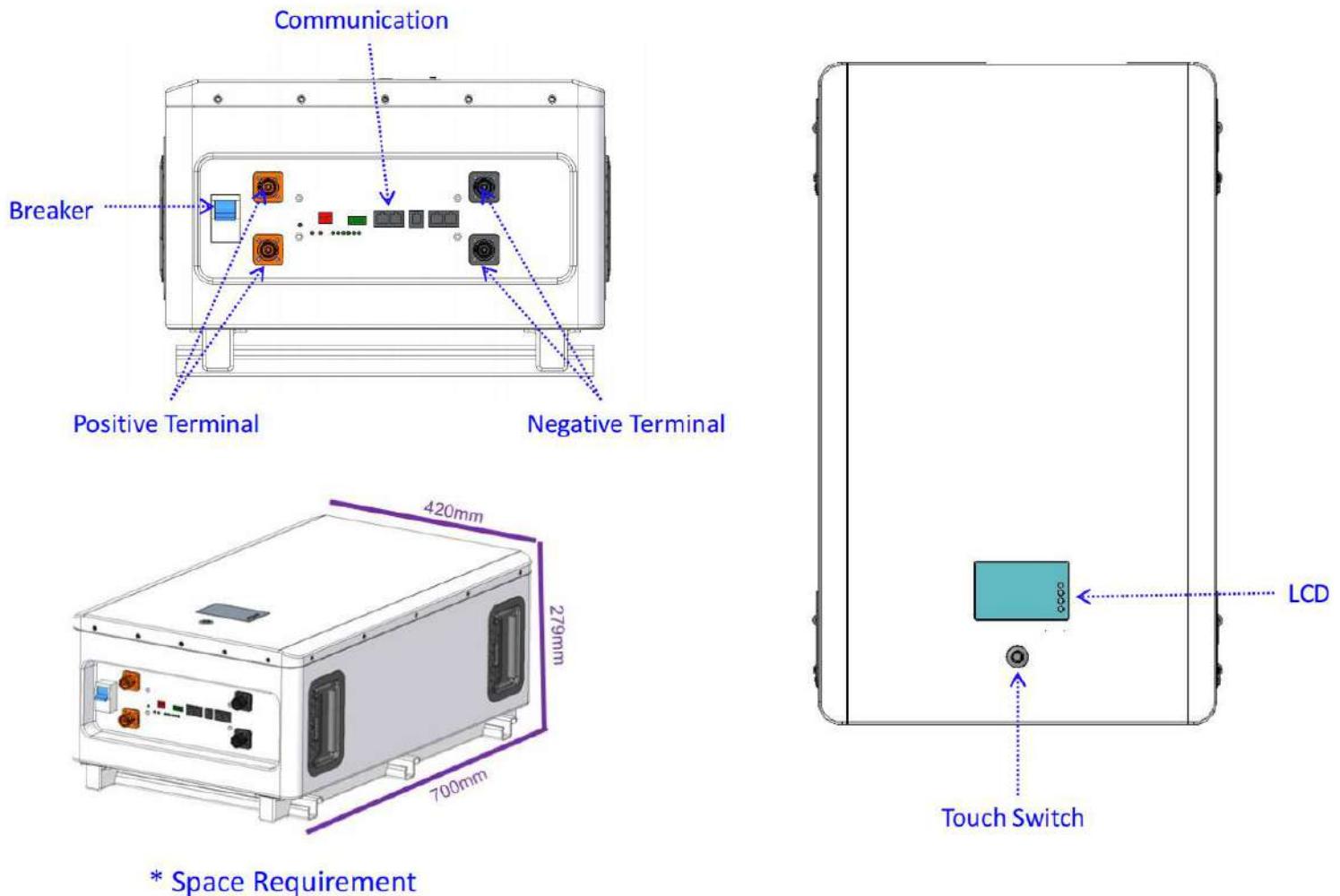
### 3. Introduction to the battery

#### 3.1. Key Features

- LiFePO4 composition - provides exceptional safety and longevity
- High safety and reliability
- 6,000cycles/20 year service life
- Consistent performance over wide temperature range
- Wall-mounted, convenient installation
- Integrated state-of-the-art BMS to manage and monitor battery information including voltage, current and temperature as well as balance cell charging/discharging rates
- 5-10years warranty

#### 3.2. Interface Introduction

- This section details the interface functions of front and back panel..
- Front interface:



- Description	- Silk-screen	- Remark
- UES0600	- P+ P+	- Output terminal
- UES0600	- P- P-	- Output terminal
- Dial switch	- ADS	- Set the address

- Canbus	- Canbus	- Canbus communication port
- RS485 port	- RS485	- RS485 communication port
- port Reset button	- RST	- For reset the batter
- Battery Switch	- On/Off	- Turn On/Off
- LED	- CAPACITY	- Capacity indicator
- LED	- ALM	- Alarm indicator
- LED	- RUN	- Operation indicator
- LCD	-	-
- LCD Key	-	-
- Handle	-	-
- Bracket	-	-

### 3.3. SOC Indicator & Status Indicator Guides

#### - Chart 1: Battery Status

Status	Normal/ Warning/ Protection	RUN	ALM	Capacity LED				Description
Shut Down	Shut down	OFF	OFF	OFF	OFF	OFF	OFF	All OFF
Standby	Normal	Flash	OFF	OFF	OFF	OFF	OFF	Standby
Charge	Normal	ON	OFF	Based on capacity				
	Warning	ON	Flash					
	Protection	ON	ON					
Discharge	Normal	ON	OFF	Based on capacity				
	Warning	ON	Flash					
	Protection	OFF	ON	OFF	OFF	OFF	OFF	UVP, OCP...
Fault	Protection	OFF	ON	OFF	OFF	OFF	OFF	Stop charging or discharging

#### - Chart 2: Battery Capacity

Status		Charging				Discharging			
Capacity LED Indicator		L4	L3	L2	L1	L4	L3	L2	L1
Capacity	0 ~ 25%	OFF	OFF	OFF	Flash	OFF	OFF	OFF	NO
	25 ~ 50%	OFF	OFF	Flash	ON	OFF	OFF	NO	NO
	50 ~ 75%	OFF	Flash	ON	ON	OFF	NO	NO	NO
	75 ~ 100%	Flash	ON	ON	ON	NO	NO	NO	NO
RUN Status		NO				Flash			

### 3.4. Connectors

Charge / Discharge connectors: to connect the positive pole (+) and negative pole (-) from the battery to the inverter via DC isolator.

Canbus/ RS485: Active communication portal between battery and inverter.

USB To RS232: to get dynamic monitoring data of the battery from upper computer. Address: Reserved Address portal for multiple parallel connections.

### 3.5. Wake Up button

- Battery On: When battery is shut down, press this RST button for 3 seconds. It is activated when the LED lights flicker from RUN light to the lowest capacity indicator.
- Battery off: When battery is activated, press this button for 3 seconds. It will be shut down when the LED lights flicker from lowest capacity indicator to RUN light.

### 3.6. Display function instruction

#### 3.6.1. Reference of real figure



### 3.6.2. Screen Display



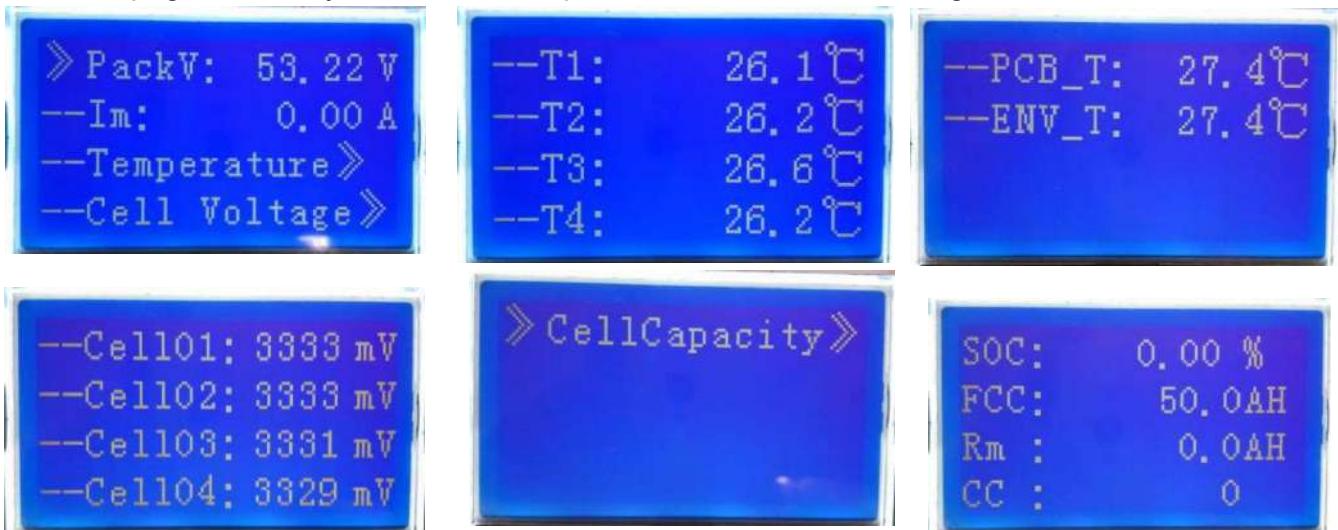
### 3.6.3. Functional Specifications

- Interface introduction
- Main menu page
- Electricity/dormancy activated, will show the welcome screen, press the MENU button to enter the main menu page. As shown in the figure below:



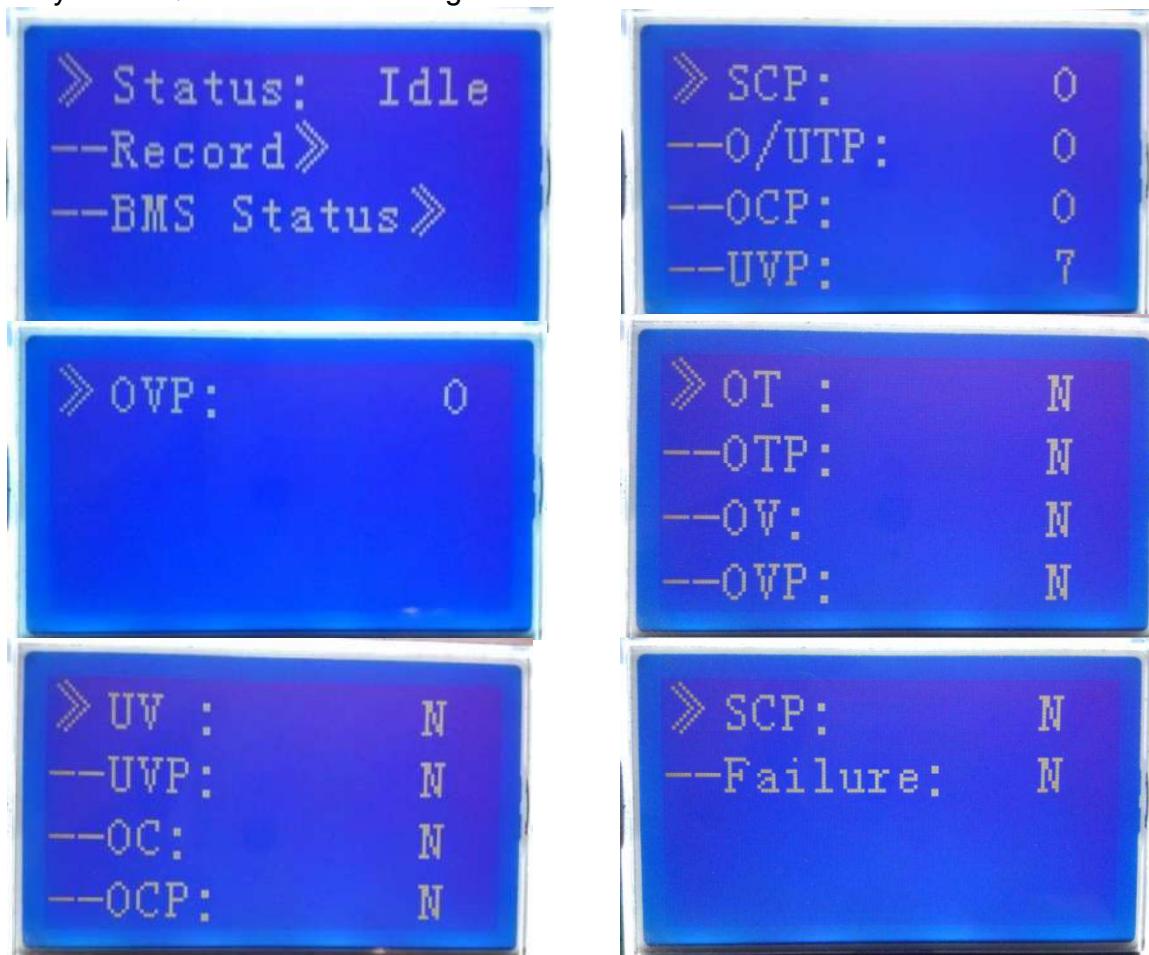
- Battery parameters collection page

When the cursor“» ”is point to “Battery Parameters Acquisition”, press ENTER key will enter into the page of“Battery Parameters Acquisition”, As shown in the figure below:



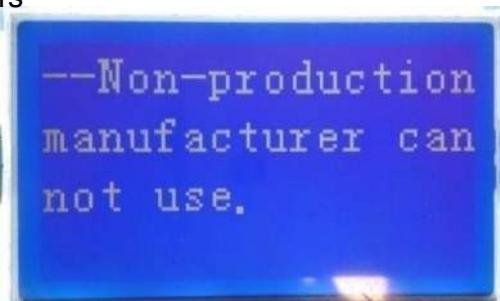
- Battery status page

When the cursor “» ” is point to “Battery Status”, press ENTER key will enter into the page of “Battery Status”, As shown in the figure below:



- Parameter Settings

Screen can not set up parameters



- System Settings Page

Baud Rate: 9600 do not set



- Key description

- 1) SW1---NEMU, SW2---ENTER, SW3---UP, SW4---DOWN, SW5--- ESC.
- 2) Each item is "»" or "--" as a beginning, among them "»" shows the current cursor position, press UP or DOWN key can move the cursor position; with "»" end of the project, the content of the said project has not shown, press ENTER key can enter the corresponding page.
- 3) Press ESC key can be returned at the next higher level directory; In any position, press NEMU key can return to the main menu page.
- 4) In a dormant state, press any key, can activate the screen.

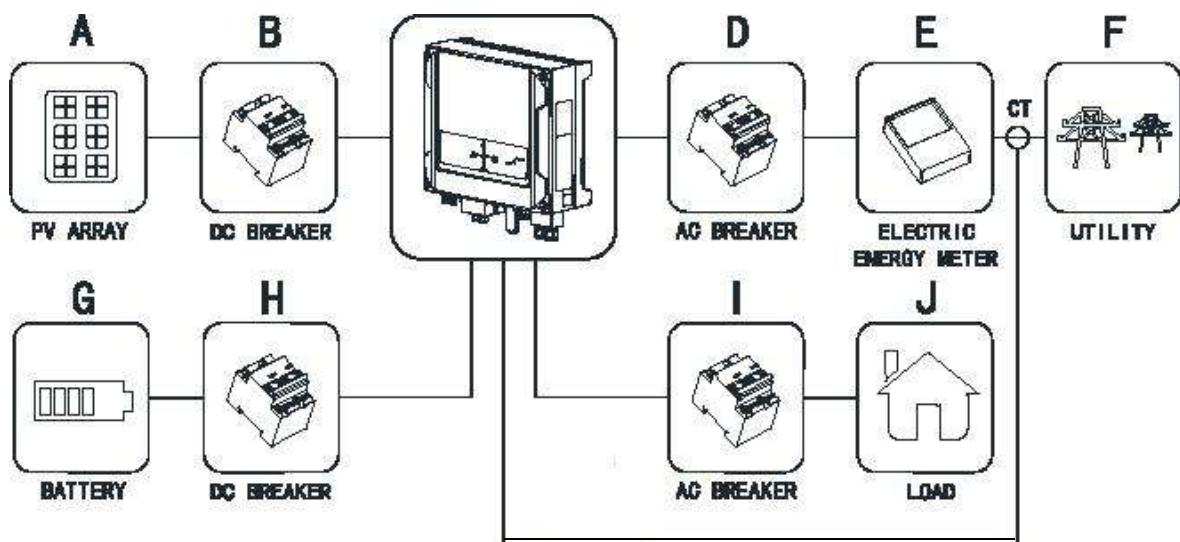
- Dormancy/shutdown

Under normal operation condition, with no keystrokes 1 minutes later, system will enter a state of dormancy/shutdown.

Shutdown/dormancy state, press any key, screen can be activated.

## 4. Safe handling guide

### 4.1. System Diagram



### 4.2. Tools

The following tools are required to install the battery pack:

- Wire cutter
- Crimping Modular Plier
- Screw Driver

#### NOTE

- Use properly insulated tools to prevent accidental electric shock or short circuits.
- If insulated tools are not available, cover the entire exposed metal surfaces of the available tools, except their tips, with electrical tape.

#### 4.3. Safety Gear

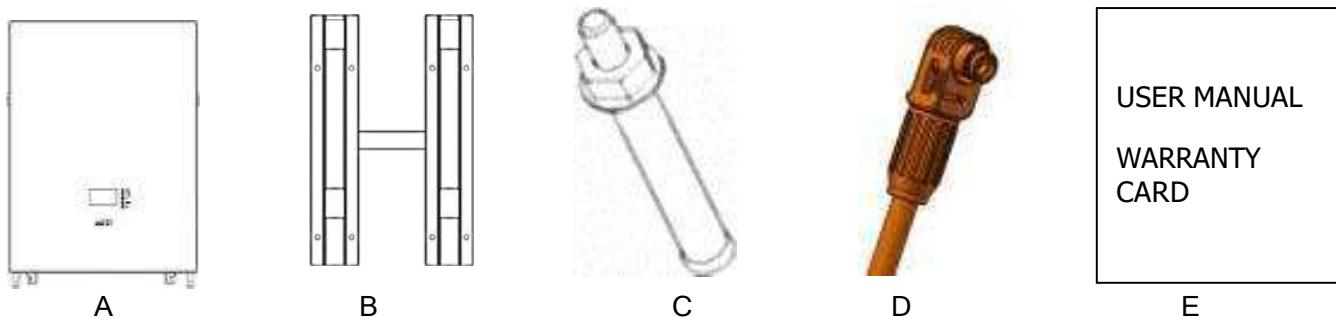
It is recommended to wear the following safety gear when dealing with the battery pack:

- Insulated gloves
- Safety goggles
- Safety shoes

### 5. Installation

#### 5.1. Inventory of items

Thoroughly inspect the packaging upon receipt of goods. If there is any item missing or if there is any damage to the external packaging or to the unit itself upon unpacking, please contact us immediately.

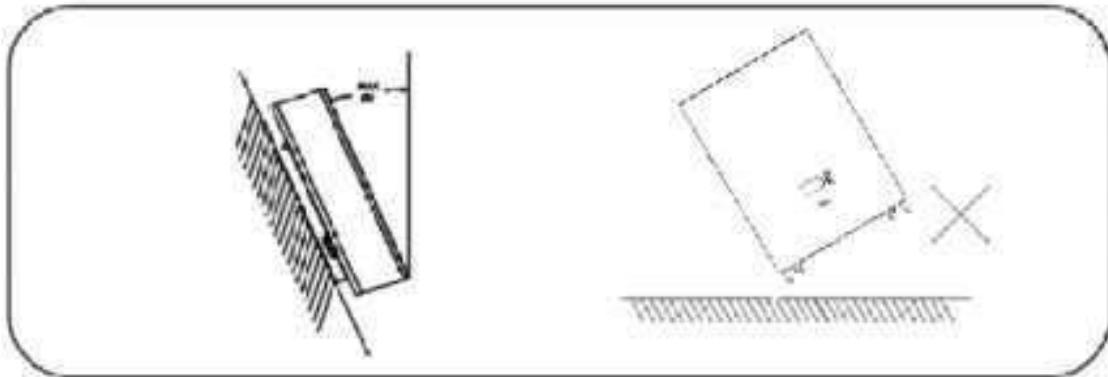


NO.	Item	Quantity	Specification
A	Battery Pack	1	4.8/7.2 / 9.6 KWh
B	Mounting frame	1	SPCC
C	Mounting frame screw	12	M8*60mm
D	Power Cable( 1.0 M )	2	25M2 Wire - M6 125A/1000V
E	Instruction manual/Warranty Card	1	This document
Option	Parallel Power cable (1.0 M)	2	125A/1000V
Option	Parallel com cable (1.0 M )	1	RJ45

#### 5.2. Installation Location

Make sure that the installation location meets the following conditions:

- The installation site must be suitable for the size and weight of the battery.
- Must be installed on a firm surface to sustain the weight of battery.
- The area is water proof.
- There are no flammable or explosive materials in proximity
- The ambient temperature is within the range from 0°C to 45°C.
- The temperature and humidity is maintained at a constant level.
- There is minimal dust and dirt in the area.
- Installation must be vertical or tilted backwards by maximum 15° - avoid forward or sidewaystilt.



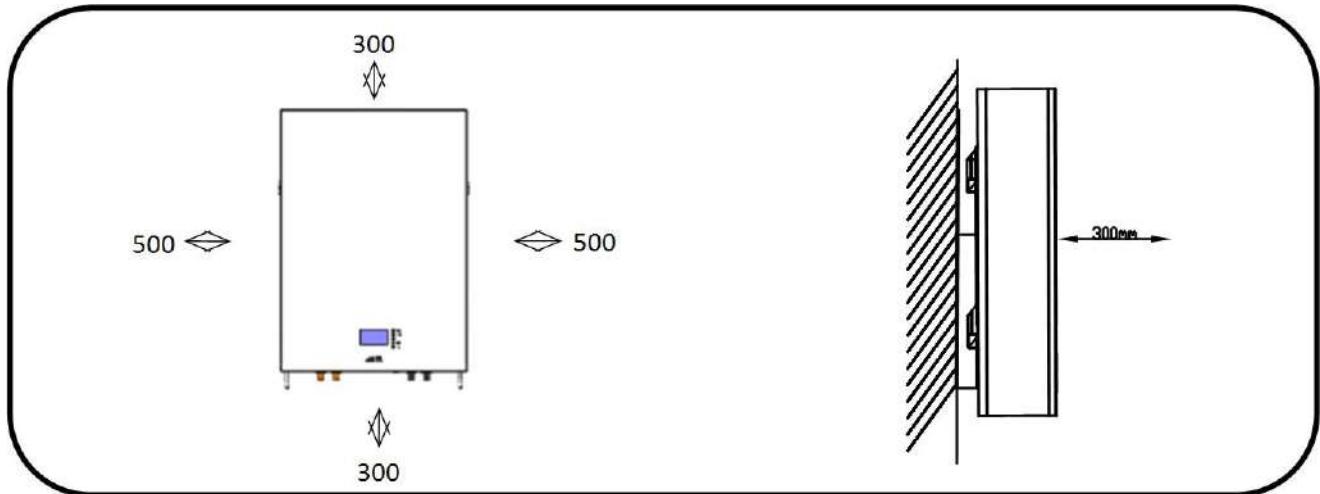
### CAUTION

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 45°C. Frequent exposure to harsh temperatures may deteriorate the performance and life of the battery pack.

#### 5.2.1. Minimum clearances

Observe the minimum clearances to walls, other batteries or objects as shown in the diagram and picture below in order to guarantee sufficient heat dissipation

Direction	Minimum clearance (mm)
Above	300
Below	300
Sides	500
Front	300



## 5.3. Installing the Battery Pack

### 5.3.1. Mounting to a wall

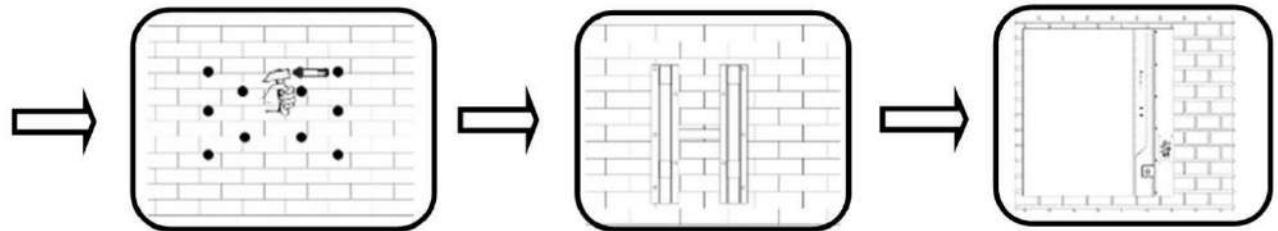
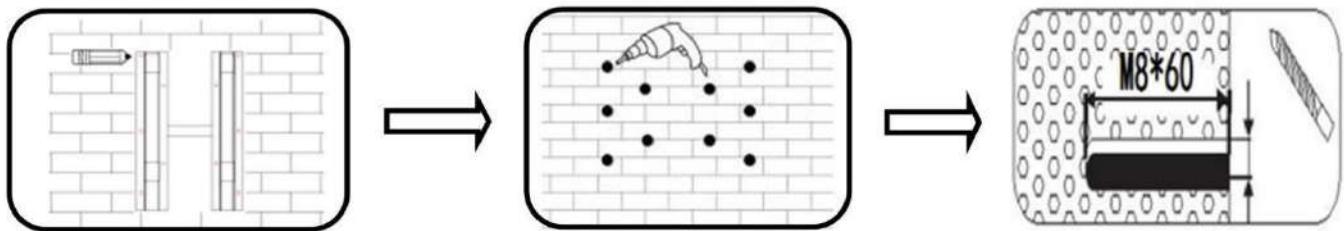


#### WARNING

In order to avoid electrical shock or other injury, inspect existing electronic or plumbing installations before drilling holes.

The battery is heavy, please handle with care to avoid damage to the product or injury to the installer.

1. Choose suitable firm wall with thickness greater than 80mm.
2. Use the mounting frame as a template, mark the hole position.
3. Drill 8 holes according to the hole position, it is  $\varnothing 10$  with depth 60mm.
4. Hammer the M8 screws to the above holes, and screw the nut. Note: Do not position screws flush to the wall - leave 10 to 20 mm exposed.
5. Fix the mounting frame to the 8 screws.
6. Raise the battery a little higher than the mounting frame whilst maintaining the balance of the battery. Hang the battery on the frame through the match hooks.



#### WARNING

Falling equipment can cause serious or even fatal injury: never mount the inverter on the bracket unless you are sure that the mounting frame is firmly mounted on the wall after thorough checking.

## 5.4. Parallel use of battery

### 5.4.1. Parallel use of battery ( All off grid solar inverters )

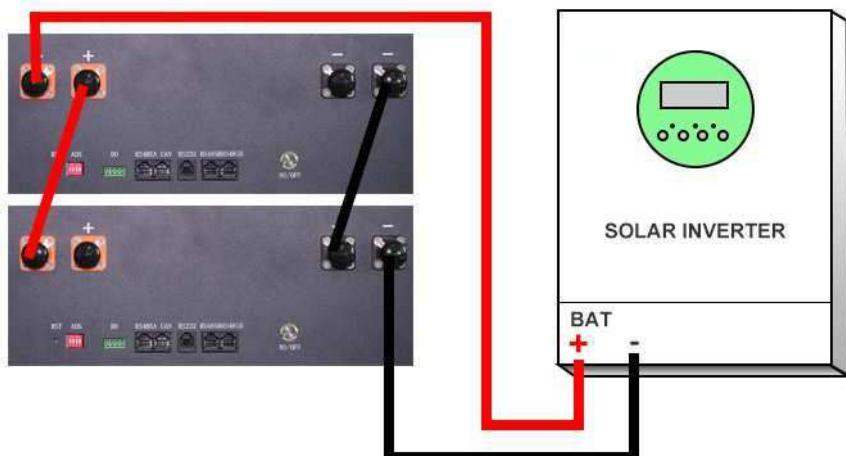
Keheng ENERGY powerwall battery is a smart battery to match all off grid solar inverter ( 48VDC ) types. When the battery needs to be used in parallel, the maximum connection is 14 units, but we recommend 2-4 units according to application. When connecting with off grid 48VDC solar inverters, it does not need to add Canbus/RS485 communication cables with inverters, if inverter brand factory does not have Canbus/RS485 port, just plug and play use.

**NOTE: Parallel power cable standard is 1 meter. This is not standard cable in battery package.**

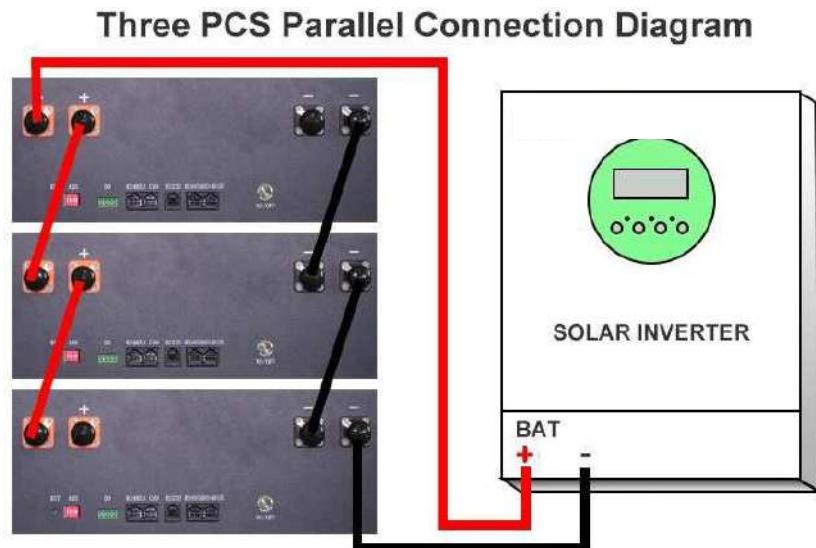
**For parallel cable quantity needed, please consult with Keheng ENERGY sales manager for proper use and related quantity.**

Two pcs connect diagram

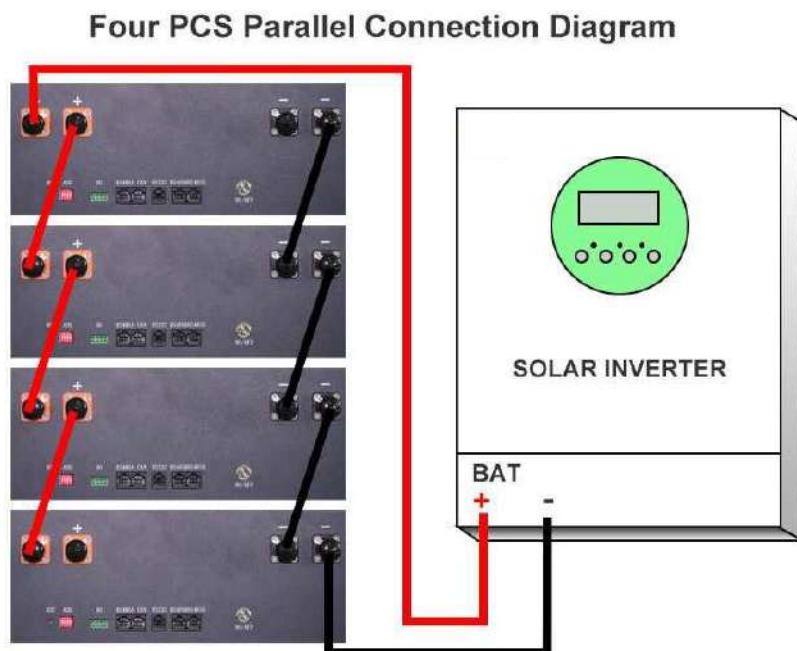
**Two PCS Parallel Connection Diagram**



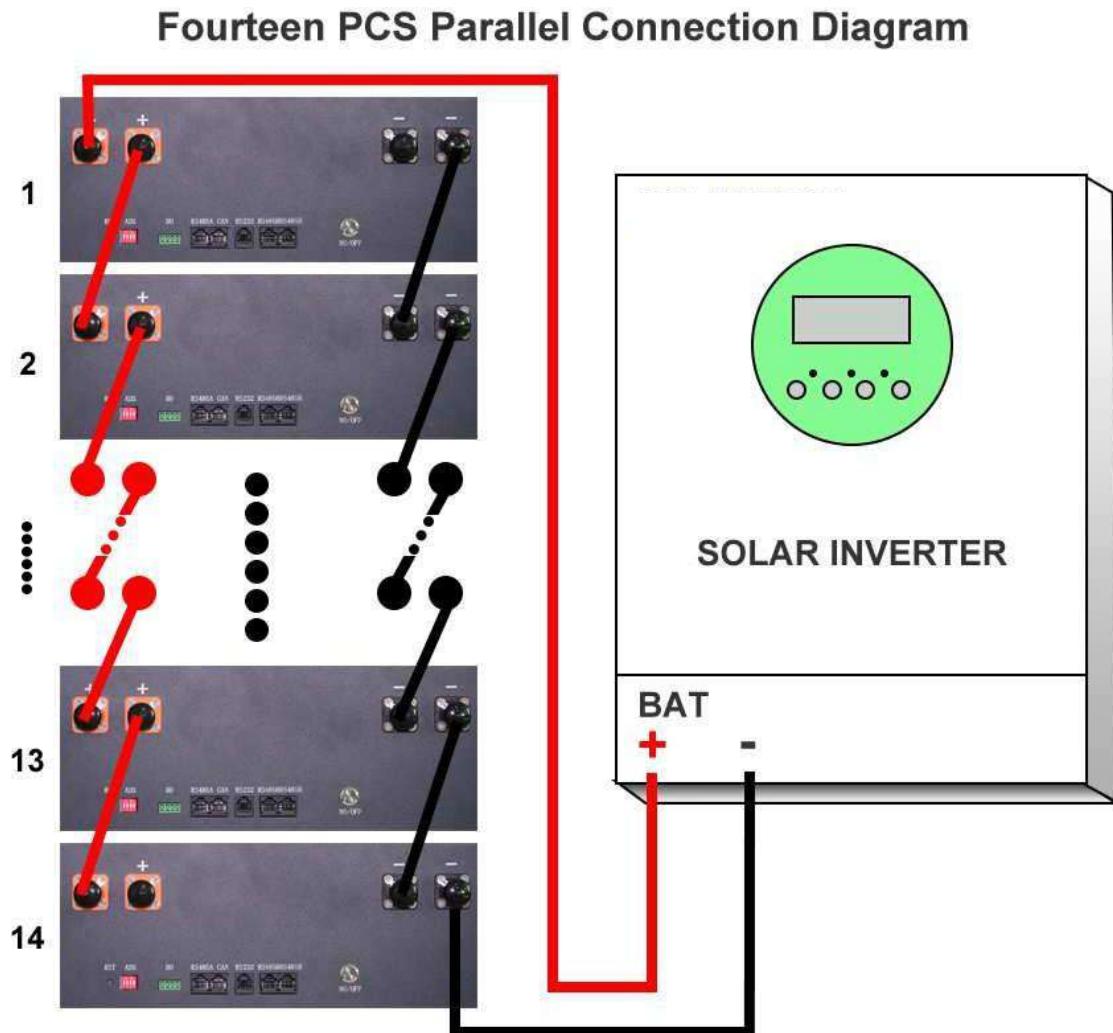
Three pcs connect diagram



Four pcs connect diagram



## Fourteen pcs connect diagram



### 5.4.2. Parallel use of Keheng battery on Canbus /RS485( All hybrid on-offgrid solar inverters)

When the battery needs to be used in parallel, the maximum connection is 15 units(Canbus), 14units ( RS485 ) with Keheng hybrid solar inverter, but we recommend to use 2-4 units according to application. The application needs power and communication connections as below, choose suitable parallel power cables and related connectors.

**NOTE: Parallel power standard is 1 meter. This is not standard cable in battery package.**

**For parallel cable issue, please consult related factory sales manager for proper use and related quantity.**

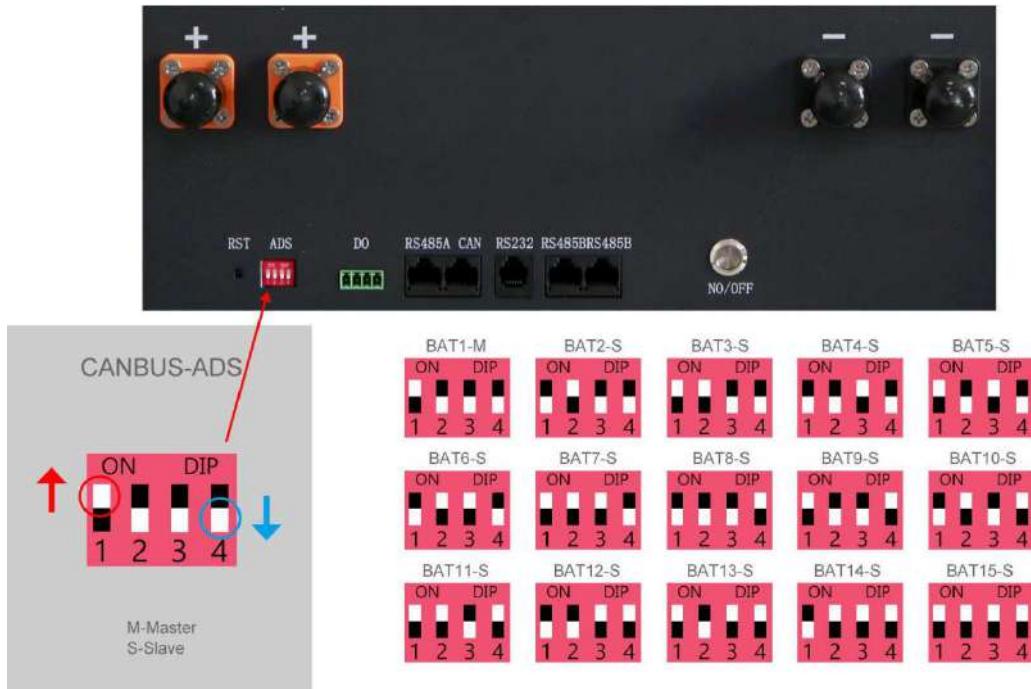
### Canbus/RS485 Matched Hybrid Inverter brands

Brand	Model No	Com Port	Cable Supply	Application	Installation
DEYE	Sun series 3.6K,5K,7.6K,8K	RS485	RJ45	On/off-Grid	Wall-mounted
LUXPOWER	LXP3.6K/4.6K/5K Hybrid LXP 3600 ACS series	RS485	RJ45	On/off-Grid	Wall-mounted
GROWATT	SPF3000/SPA/SPH3000 3600/4000/4600/5000/6000	CAN	RJ45	On/off-Grid	Wall-mounted
SOFAR	HYD3000-ES	CAN	RJ45	On/off-Grid	Wall-mounted
GOODWE	GW3648D-ES/GW5048D-ES/BP/SBP/EM	CAN	RJ45	On/off-Grid	Wall-mounted
GMDE	Powervortex4600/5200TL	CAN	RJ45	On/off-Grid	Wall-mounted
SOLIS	RHI-3K/3.6K/5K-48ES	CAN	RJ45	On/off-Grid	Wall-mounted
VICTRON	Multiplus/Quattro 48	CAN	RJ45	On/off-Grid	Wall-mounted
IMEON	IMEON3.6/9.12	CAN	RJ45	On/off-Grid	Wall-mounted
INFINI/Voltronic/Axpert	Infinisolar series 48V/Axpert series 48V	CAN	RJ45	On/off-Grid	Wall-mounted
SMA	Sunny Island4.4M/6.0H/8.0H	CAN	RJ45	On/off-Grid	Wall-mounted
SAJ ELECTRIC	Sunfree 4K,5K series, ACS3600	RS485	RJ45	On/off-Grid	Wall-mounted
To be continued.....					

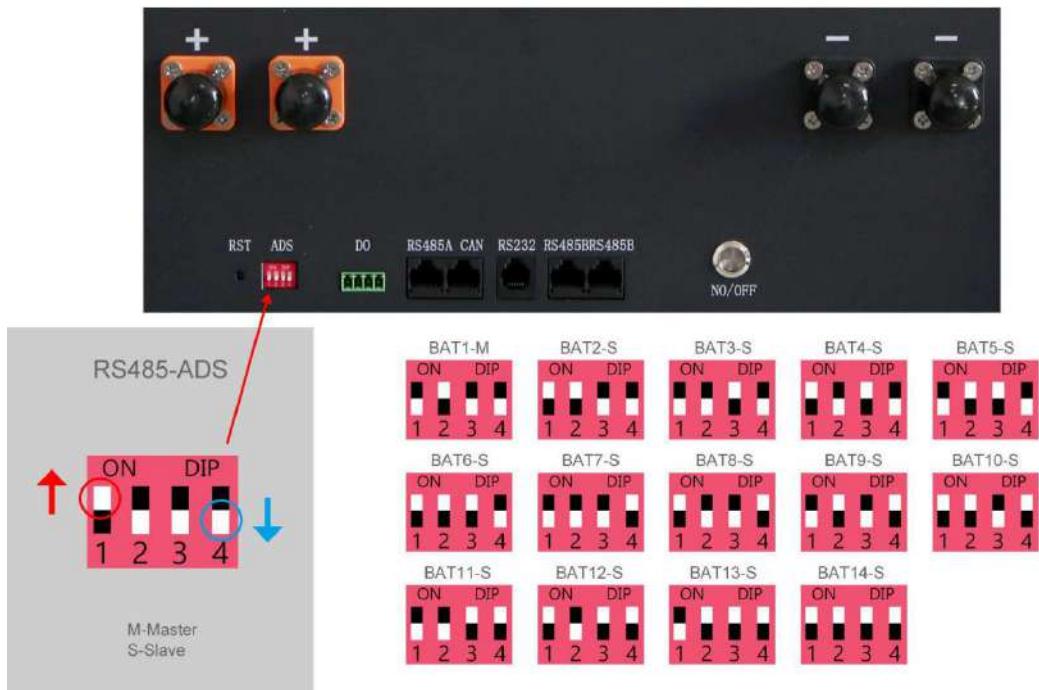
#### 5.4.3. ADS guide Line

If you start to connect Keheng hybrid inverter, make sure you should consult with Keheng sales manager before connection. If the hybrid inverter is not from Keheng factory brand, please specify related hybrid on-off grid inverter brand with Keheng sales managers.

## Canbus Version -Max 15 PCS



## RS485 Version -Max 14 pcs



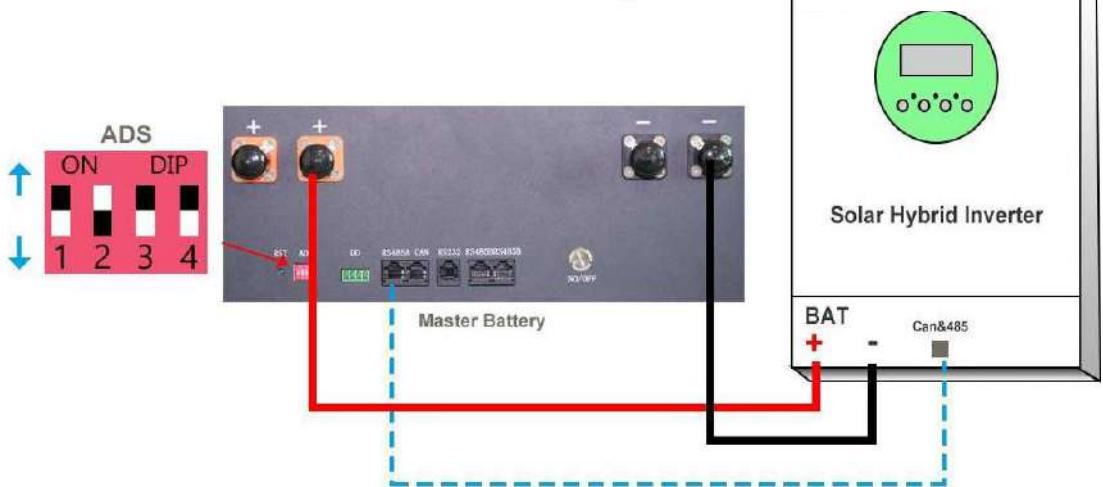
## One pcs connect diagram

One PCS Parallel Connection Diagram



Canbus Connection

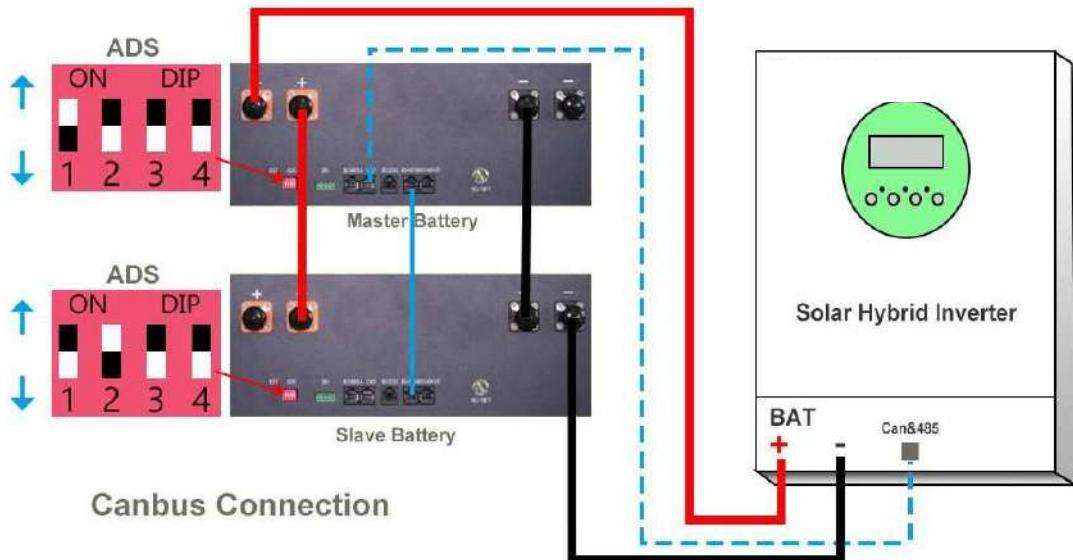
One PCS Parallel Connection Diagram



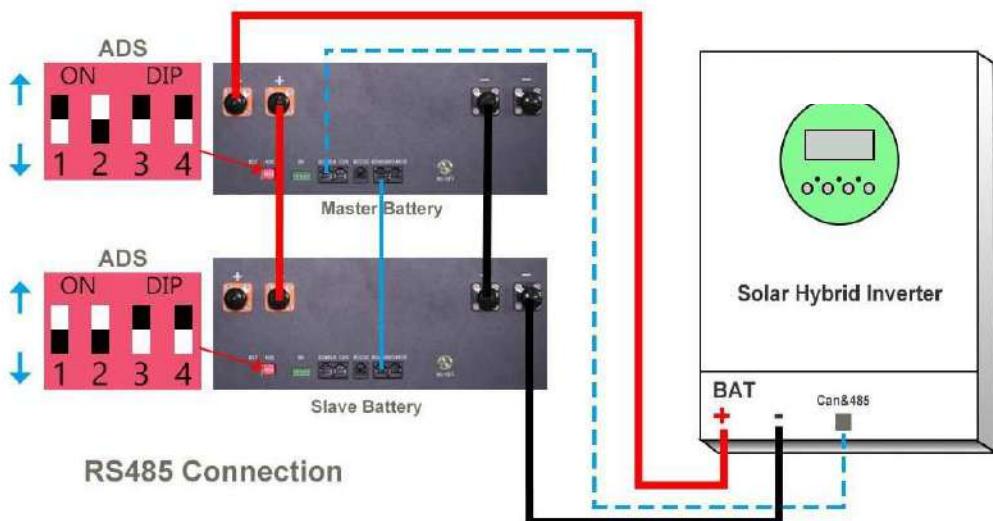
RS485 Connection

Two pcs connect diagram

Two PCS Parallel Connection Diagram

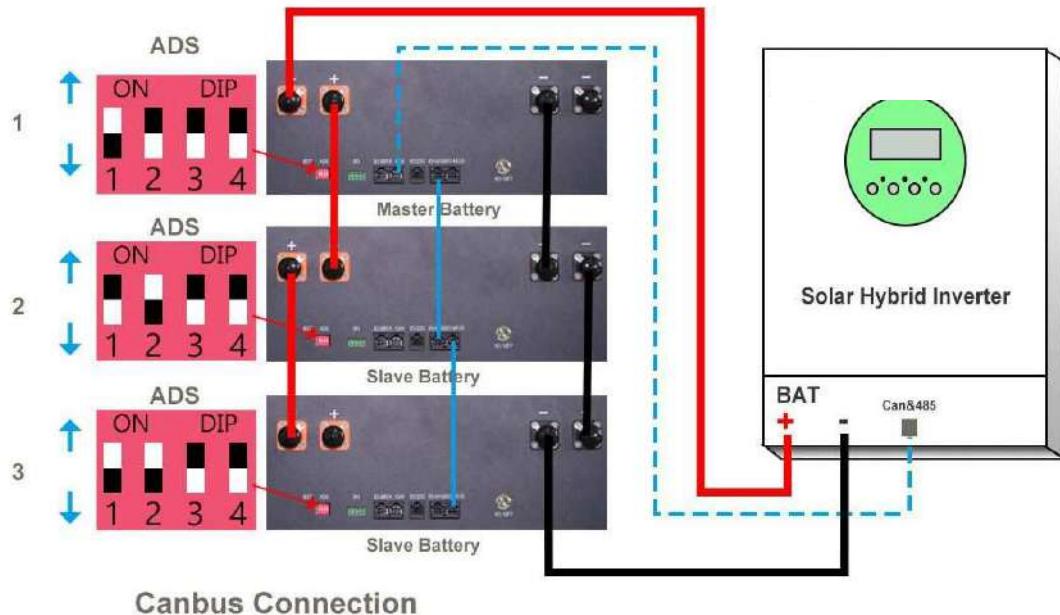


Two PCS Parallel Connection Diagram

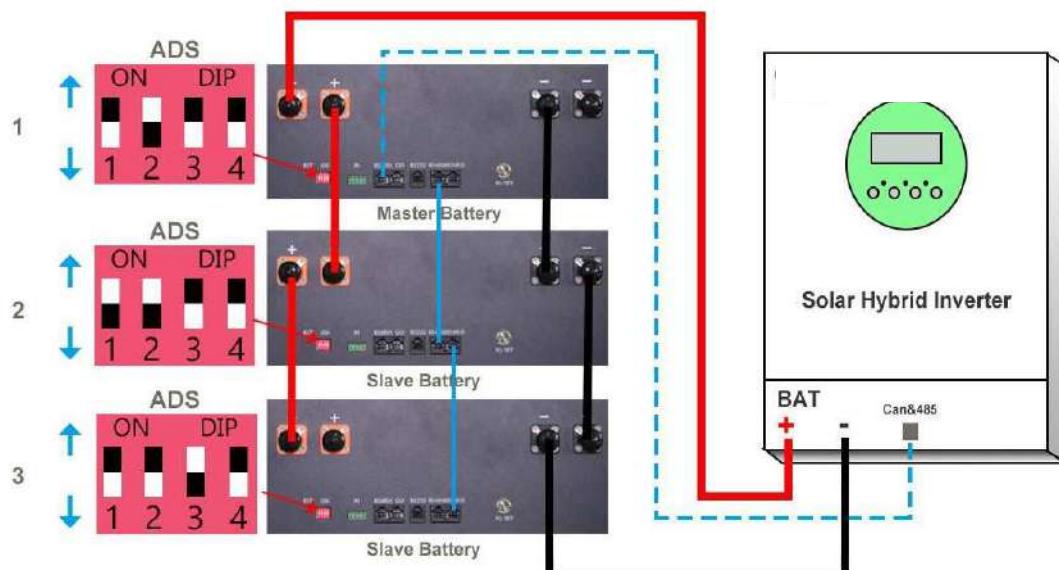


## Three pcs connect diagram

Three PCS Parallel Connection Diagram

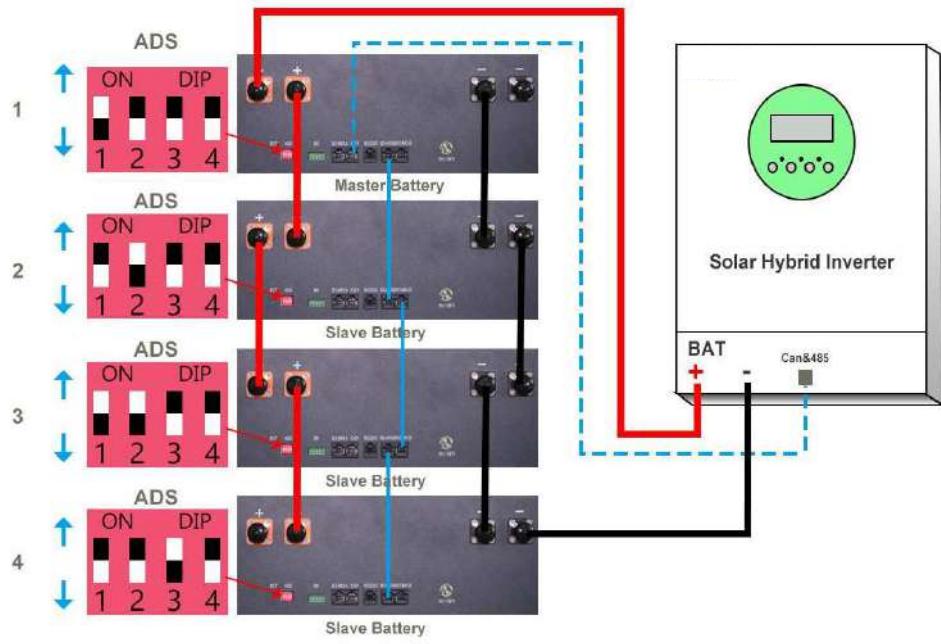


Three PCS Parallel Connection Diagram

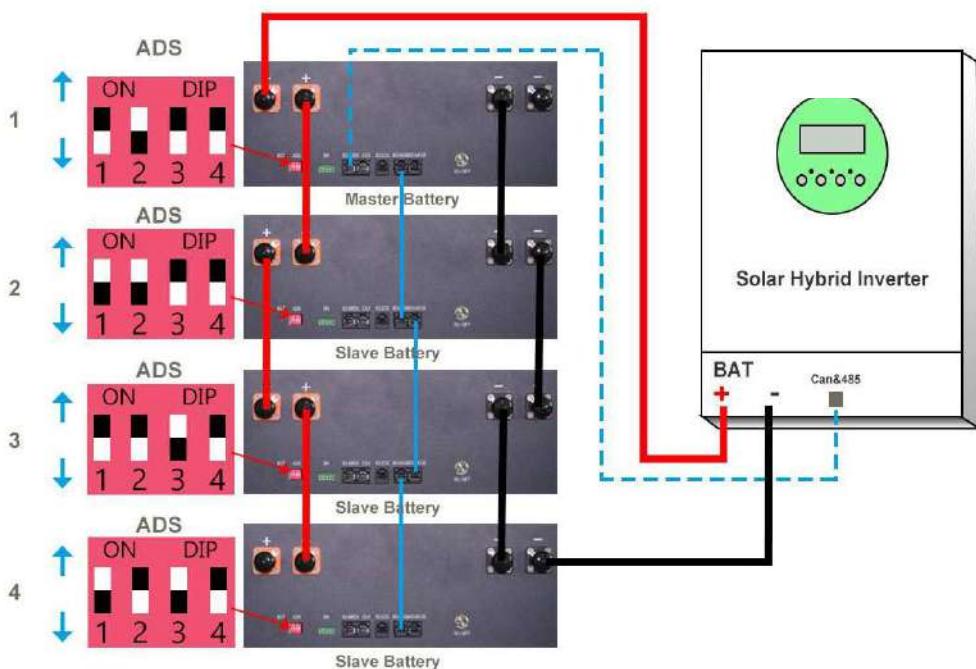


## Four pcs connect diagram

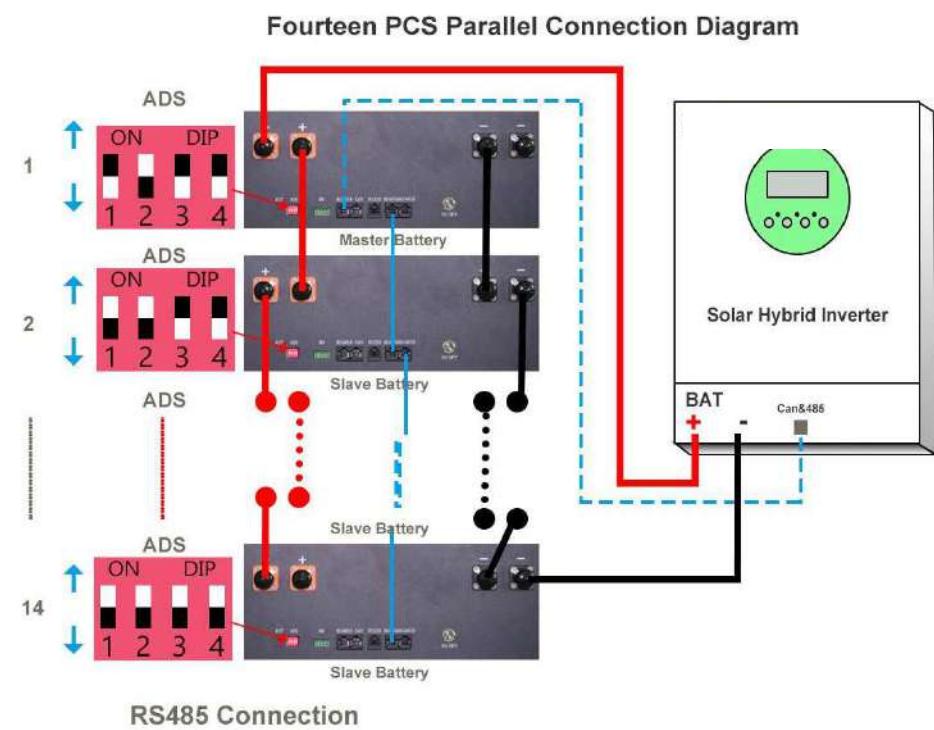
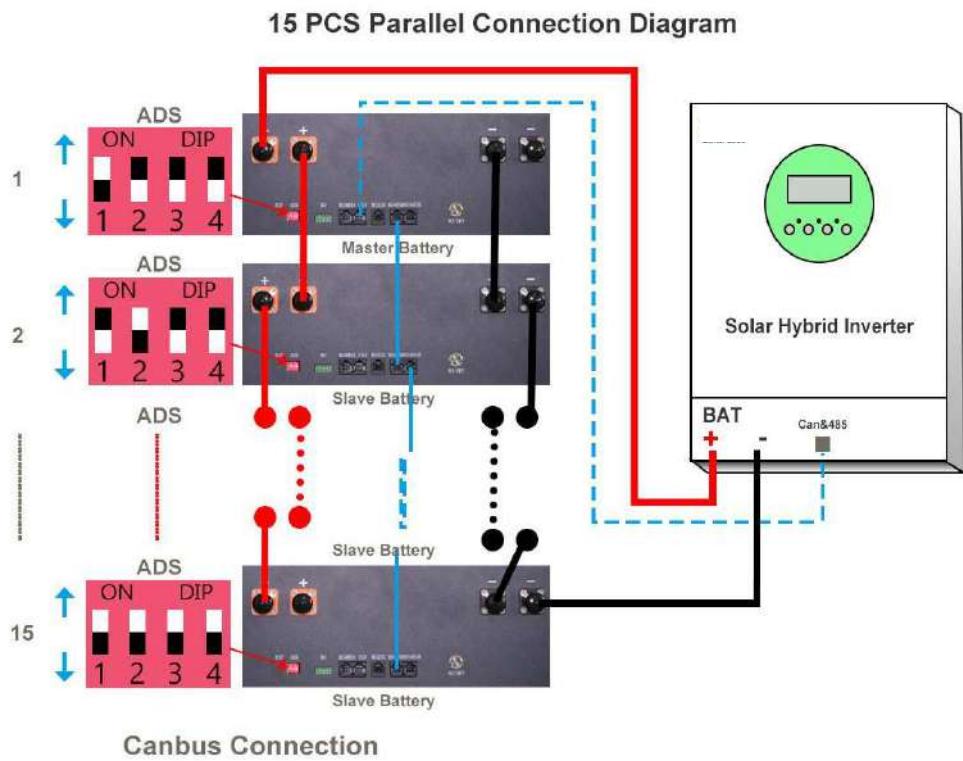
Four PCS Parallel Connection Diagram



Four PCS Parallel Connection Diagram



## 15/14 pcs connect diagram



## 6. Product Warranty

- 6.1. If you have purchased this product from factory, you should be aware that this warranty is provided in addition to other rights and remedies held by a consumer at law.
- 6.2. 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.
- 6.3. For the above mentioned products, you receive the factory warranty valid for 5-10 years from the date of delivery from factory. The factory warranty covers any costs for repair or spare parts during the agreed period beginning on the date of delivery of the device, subject to the following conditions.

### 6.4. 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.

### 6.5. 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 or
- Battery repair at on-site, or
- 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, and
- 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 :

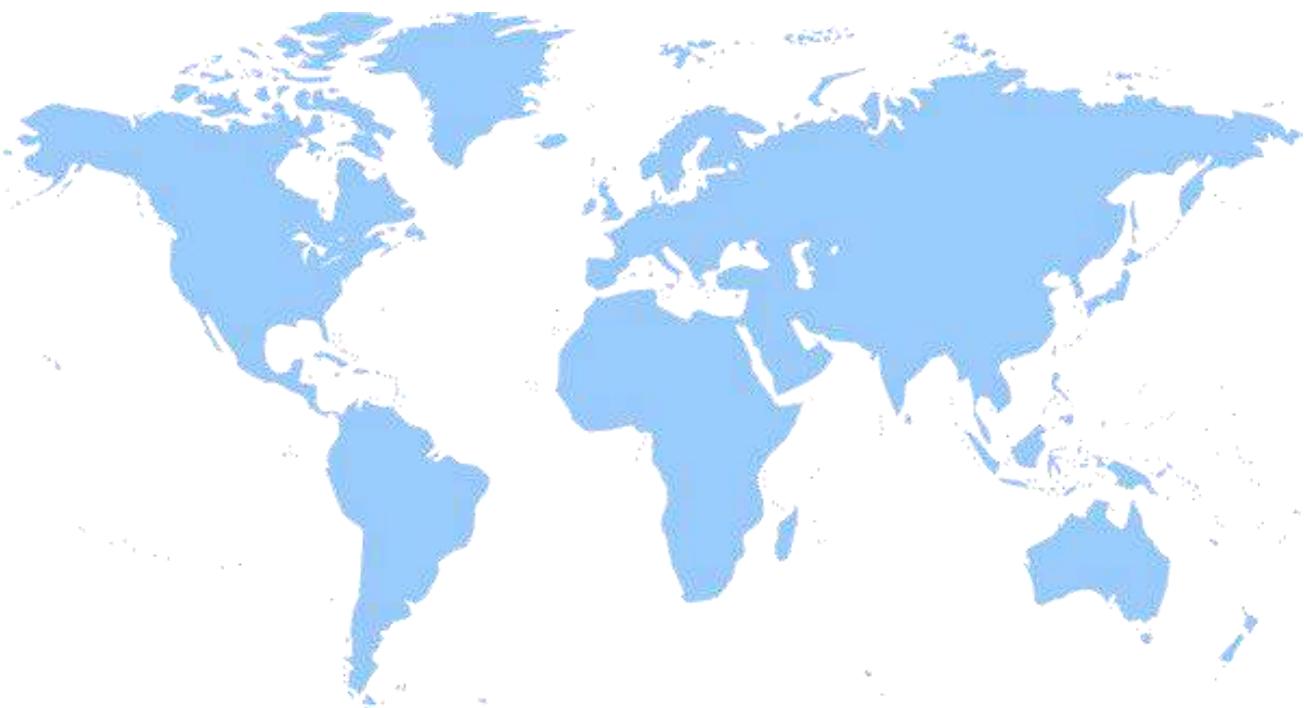
Invoice Number :

Purchase Date :

Dealer :

Commission date :

Fault/Error Description:



**Keheng New Energy Technology (shenzhen) Co.,Ltd**

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