User Manual

Version: 1.0

LiFePO4 Battery 51.2V 280Ah 14.34kWh

Model No.: GSL051280A-B-GBP2



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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 required that they are charged every three to six months.
- The battery needs to be recharged within 12hours, after being fully discharged.
- 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 51.2VDC, please DO NOT connect battery in series;
- It is prohibited to connect the battery with different type of battery;
- Please make sure battery SOC and Voltage should be the same level before paralleling two more batteries together.
- 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 must be completely shut down;
- 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, use a Class C (electrical) fire extinguisher, such as dry powder or CO2. Water or liquid-based 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 Details

2.1 Battery Product Label

Solar Lithium Battery Energy Storage System

Battery Type	LiFePO4 Battery
Battery Model	GSL051280A-B-GBP2
Battery Power	14.34KWh
Battery Voltage	51.2V
Capacity of Battery	280Ah
Charge Voltage	56V
Discharge Voltage	46V
Max Charge Current	≤150A
Max Discharge Current	≤150A
Short Circuit Protection Current	1652A (106mS)
Depth of Discharge	80% DOD
Display	LCD/LED
Communication	CANBUS/RS485
Degree of Protection	IP20

Manufacturing Date: YYYY/MM/DD

Battery Designation:
IFpP/71/173/204[16S1P]E/-20+50/90

UL9540A TEST REPORT PROVIDED

This battery product meets US/CA directive requirements

This battery product meets European directive requirements

Read the user manual before using

After the battery life is terminated, the battery can continue to be used after it recycled by the professional recycling organization and do not discard it at all

The scrapped battery cannot be put into the garbage can and must be professionally recycled

No watering to put out fire
Be careful fire

2.2 Dangerous Label



2.3 Battery Specifications

Battery Specifications	
Model No	**GSL051280A-B-GBP2**
Nominal Parameters	
Nominal Voltage	51.2V
Rated Capacity	280Ah
Energy	14.34kWh
Dimensions (L x W x D)	900*675*200mm / 35.4*26.6*7.8in
Weight	128.5kg
Electrical Parameters	
Max. discharge voltage of battery	56VDC
End of discharge voltage of battery	46VDC

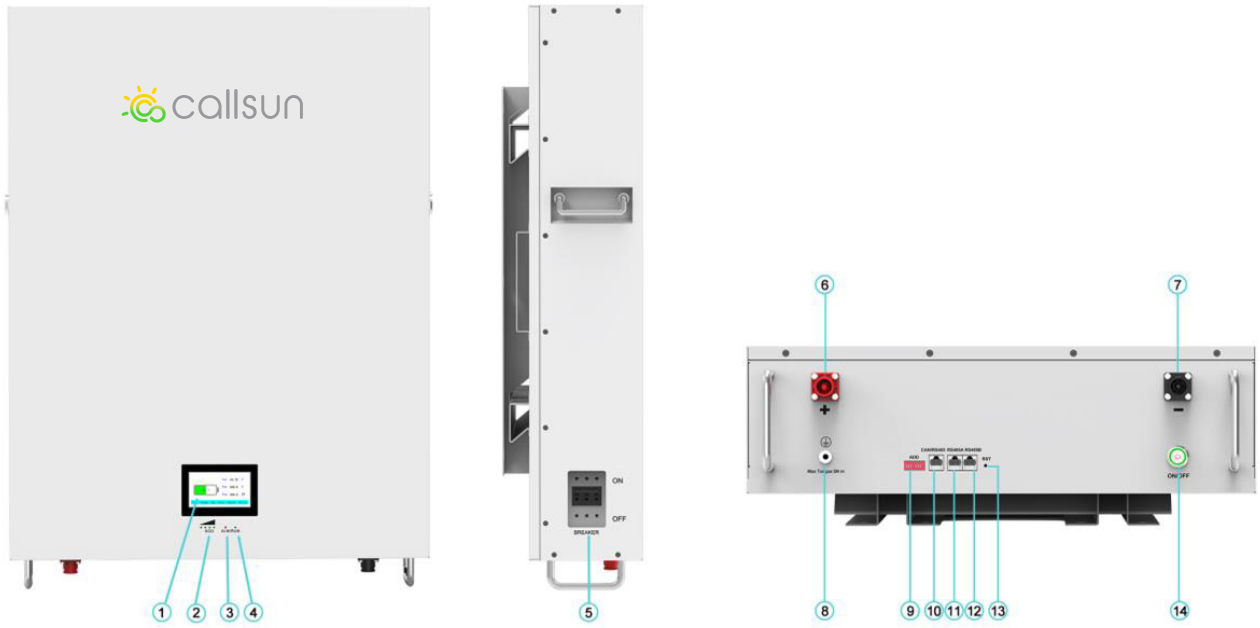
Maximum charge current of battery	150A
Maximum discharge current of battery	150A
Charging temperature range of battery	0-55℃
Discharge temperature range of battery	-20- 55℃
Number of cells in battery pack	16S1P
Lithium Battery Standard	UL1973, UL9540A, UL9540, CB-IEC62619, CE-EMC, UN38.3, MSDS
Enclosure protection rating	IP20

3.Introduction to The Battery

3.1 Key Features

- LiFePO4 composition – provides exceptional safety and longevity
- High safety and reliability
- Over 8,500cycles
- 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
- 15 years' warranty

3.2 Interface Introduction

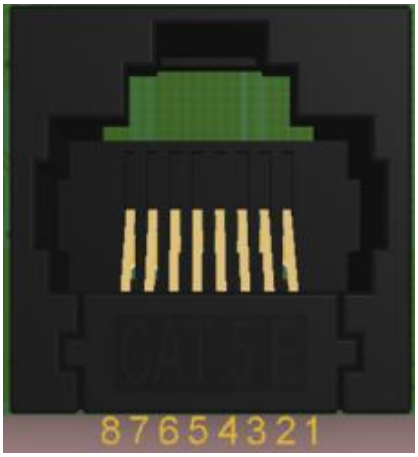


No.	Description	Silk-screen	Remark
1	Display screen	/	Battery working state
2	LED indicator	SOC	Running State
3	LED indicator	ALM	
4	LED indicator	RUN	Running State
5	DC Breaker	ON/OFF	200A Breaker
6	Battery Positive	+	
7	Battery Negative	-	
8	Ground Connection		
9	DIP ADDRESS	ADD	8 PINS Number
10	CAN/RS485	CAN/RS485	Connecting battery to Inverter
11	RS485A/485B	RS485A/RS485B	Parallel function or connecting smart BMS software with
12	RS485A/485B	RS485A/RS485B	Parallel function or connecting smart BMS software with computer

13	RESET	RST	Restart function
14	Power Switch	ON/OFF	

3.2.1 Communication interface





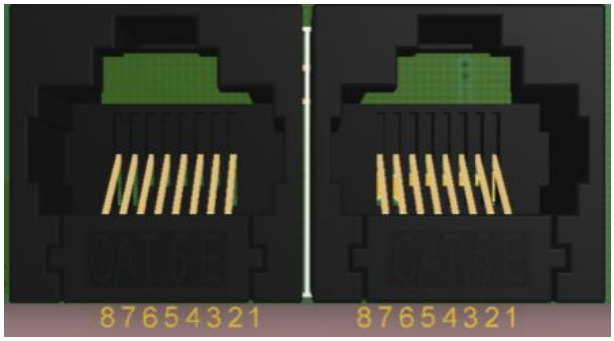
CAN&RS485

BMS and inverter communication connection

CAN - with 8P8C vertical RJ45 socket		RS485- with 8P8C vertical RJ45 socket	
RJ45Pins	Definition notes	RJ45Pins	Definition notes
4,	CANH	1、8,	RS485-B2
5,	CANL	2、7,	RS485-A2

		3、6,	GND

3.2.2 BMS internal grid connection & monitoring

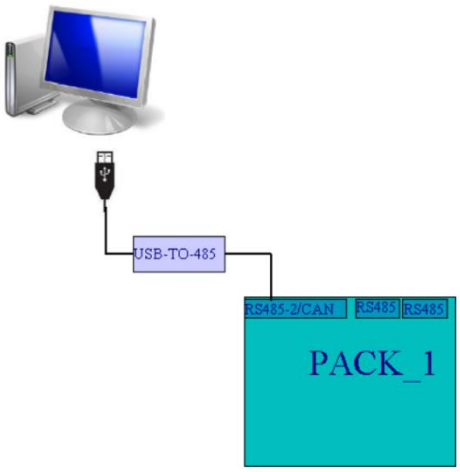


RS485-A/RS485-B

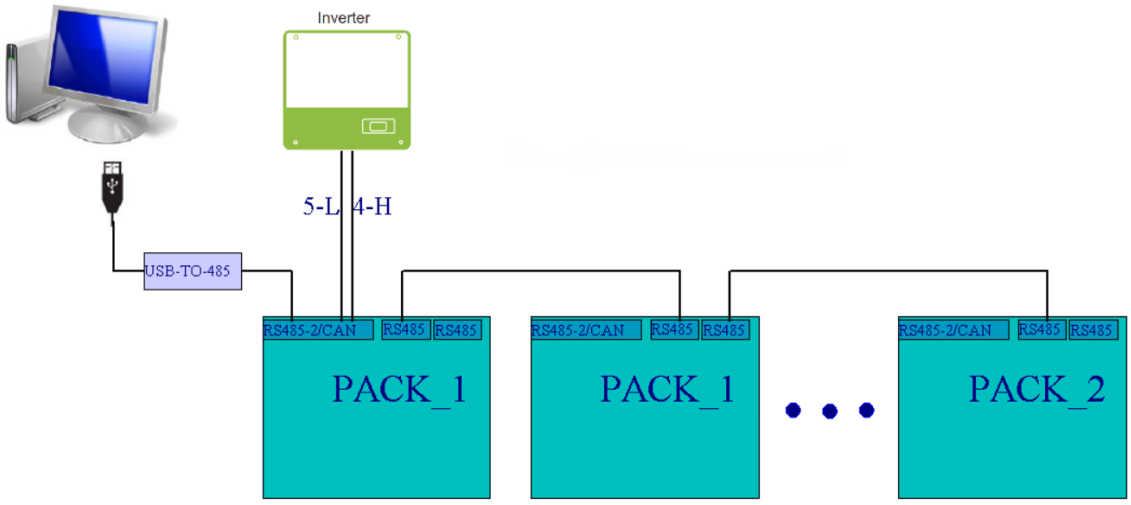
RS485_A/B - with 8P8C vertical RJ45 socket		**RS485_A/B - with 8P8C vertical RJ45 socket**	
RJ45 Pins	**Definition notes**	**RJ45 Pins**	**Definition notes**
1、8、	RS485-B1	1、8、	RS485-B1
2、7、	RS485-A1	2、7、	RS485-A1
3、6、	GND	3、6、	GND
4、5、	NC	4、5、	NC

3.2.3 Communication applications

- RS485 Stand-alone mode connection



- RS485-A/B As master, CAN with inverter, 485-A/B as slave mode parallel communication



Note

- Monitoring of battery system performance is achieved via inverter monitoring portal/app.

3.3 SOC Indicator & Status Indicator Guides

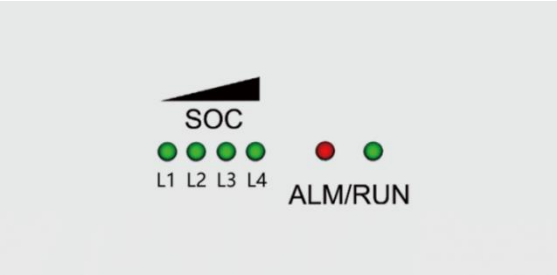


Chart 1 Battery Status

SOC	ALARM	RUN

Chart 2 Battery Capacity

Capacity LED Indicator		L1	L2	L3	L4
SOC	0~25%	ON	OFF	OFF	OFF
	26~50%	ON	ON	OFF	OFF
	51~75%	ON	ON	ON	OFF
	76~100%	ON	ON	ON	ON
RUN Status		ON			

Chart 3 Battery Status

Status	RUN	ALM	Capacity LED			
Normal	Flash	Off	0-25%	26-50%	51-75%	76-100%
warning	Flash	Flash	0-25%	26-50%	51-75%	76-100%
Fault	Off	On	Display fault type			
Protection	Flash	On	Display protection type			

3.4 Connectors



A. Charge / Discharge connectors: to connect the positive pole (+) and negative pole (-) from the battery to the inverter via DC isolator.
B. Canbus /485 active communication port between battery and inverter.
C. USB to RS485: to get dynamic monitoring data of the battery from upper computer.
D. Address: Reserved Address portal for multiple parallel connections.

3.5 RST

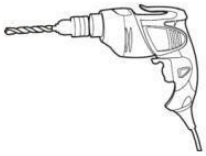
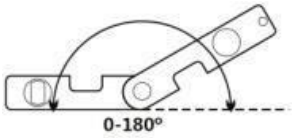
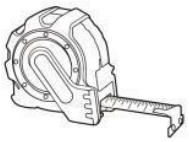
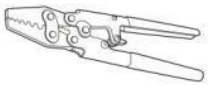
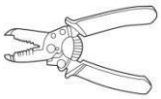
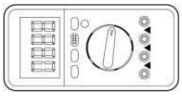
- Battery On: When battery is shut down, press this RST button for 3 seconds. It is activated when the LED lights flicker from RUN light to the lowest capacity indicator.
- Battery off: When battery is activated, press this button for 3 seconds. It will be shut down when the LED lights flicker from lowest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



4. Safe Handling of LiFePO4 Battery Guide

4.1 Tools

The following tools are required to install the battery pack:

		
Hammer drill	Level	Tape measure
		
Pen	Crimping tool	Wire stripper
		
Multi-meter	Cross screwdriver	Hammer

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.

4.2 Preparation for Installation

This system can only be installed by personnel who have been trained in the power supply system and have sufficient knowledge of the power system.

The safety regulations and local safety regulations listed below should always be followed during the installation.

- All circuits connected to this power system with an external voltage of less than 48V must meet the SELV requirements defined in the IEC60950 standard.
- If operating within the power system cabinet, make sure the power system is not charged. Battery devices should also be switched off.

- Distribution cable wiring should be reasonable and has the protective measures to avoid touching these cables while operating power equipment.
- when installing the battery system, must wear the protective items below:

		
The isolation gloves	Safety goggles	Safety shoes

5.Installation

5.1 Standard Package List 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.

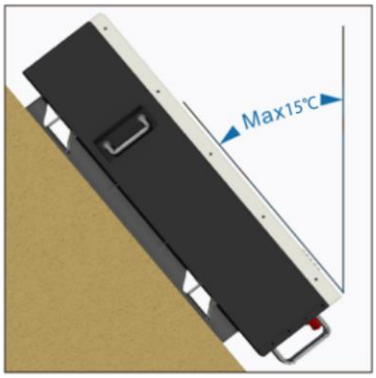
Name	Item	Specification
Battery pack		14.34kWh
Wall mounted Bracket and Screws		One Bracket and 8pcs screws

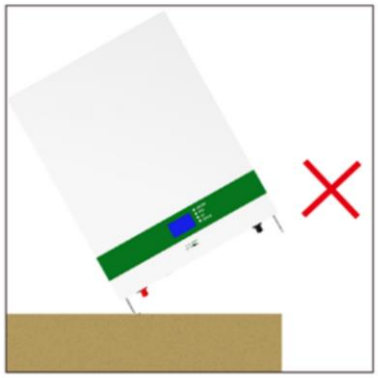
Power cable		35mm² (2AWG) Black, Red Push-In Standard+ M10 Terminal L: 2.0 meter
Communication line		Battery can bus port to Inverter can bus port L: 2.0 meter
Communication line		Battery com port to Battery com port for parallel 16pcs at max L: 1.0 meter
Ground cable		Connect to the grounding point of the modules

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.





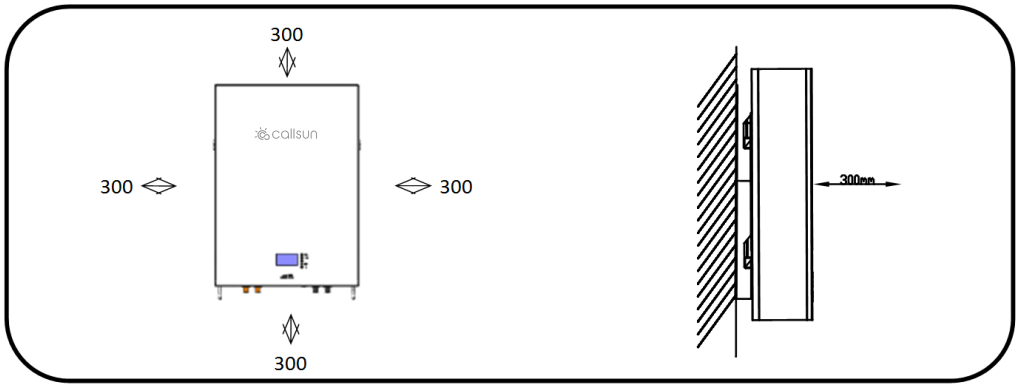
Caution

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℃ to 55℃. 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	300
Front	300



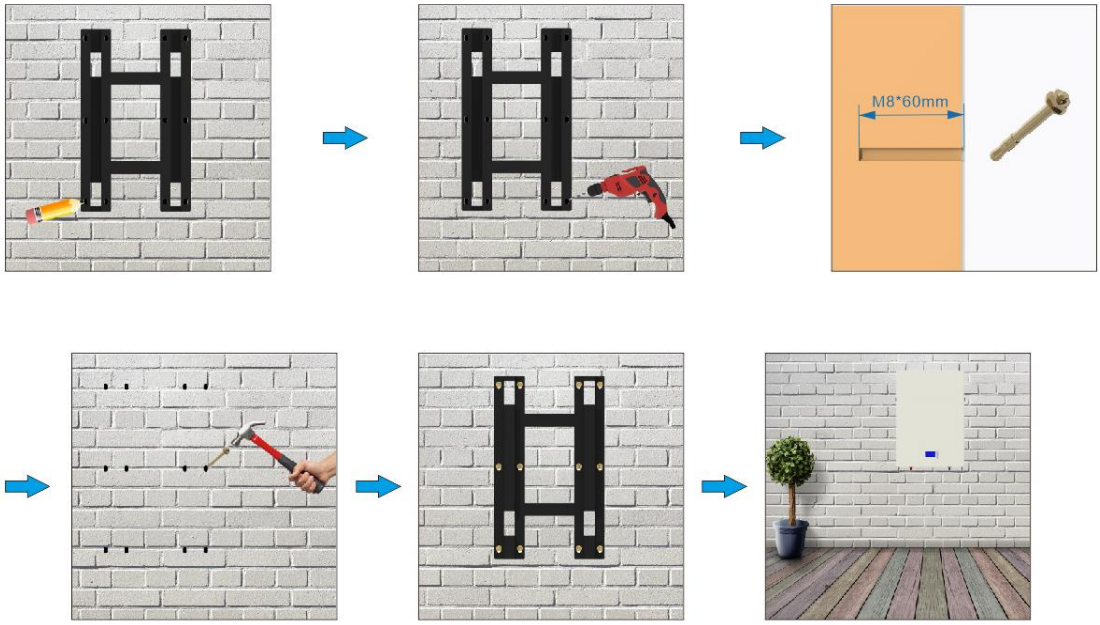
5.3 Installing the Battery Pack

5.3.1 Mechanical installation-mounting to the 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 ø10 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.



Note

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.

5.3.2 Electrical installation

1. Before connecting the power cables, using multi-meter to measure cable continuity, short circuit, confirm positive and negative, and accurately mark the cable labels.

2. Measuring method:

a. Power cable check: select the buzzer mode of multi-meter and detect the both ends of the same color cable. If the buzzer calls, it means the cable is in good condition.

b. Short circuit judgment: choose multi-meter resistor file, probe the same end of positive and negative pole, if the resistor shows infinity, means that the cable is available.

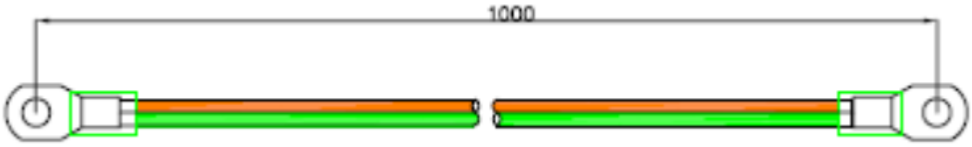
c. After visual testing of power line is connection, the positive and negative poles of the battery shall be connected respectively to the positive and negative poles of the opposite terminal.

5.3.3 Connect the battery to the ground cable

The Ground cable has been provided by factory manufacturer. The bolt locking torque is 5 NM.
Install a grounding cable to the grounding point of the modules.



Grounding cable:



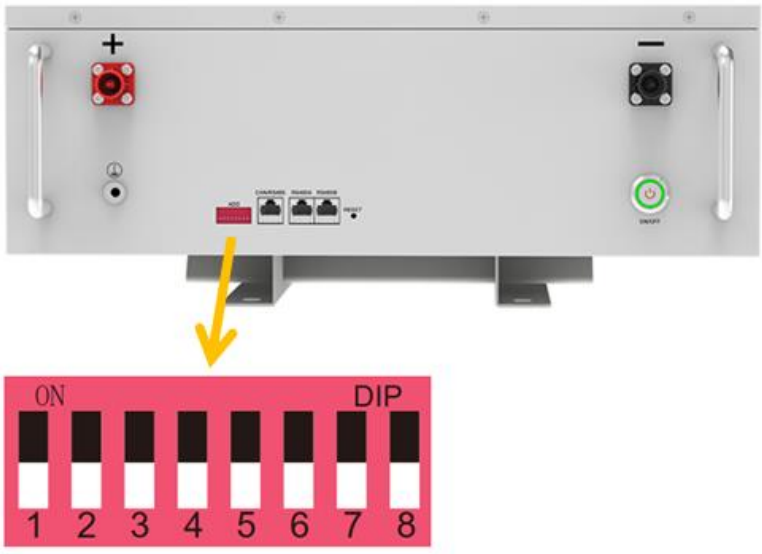
5.3.4 Inverter connection

DIP ADDRESS SETUP

When the system is used independently:

Note: Before installation, please confirm whether the DIP switch mode of the master module in battery is correct according to use's inverter communication specification. Except for the inverter specified by the customer's special requirements, the factory default DIP switch mode of master module is DIP Switch mode 1 (ADD: 00000000).

Note: Before installation, please confirm whether the DIP switch mode of the master module in battery is correct according to use's inverter communication specification.



Before opening the cover to operate, you must contact supplier and inform the ID of the product. Supplier records this battery ID and authorizes the opening operation. Except changing the DIP switch mode, no other operations can be done.

5.3.5 How to connect Inverter

The battery is connected to the inverter, and it is required to use the dedicated power cable and communication cable (as accessories shipped with the cargo, the standard communication cable is a standard network cable. The applicable inverter is marked on

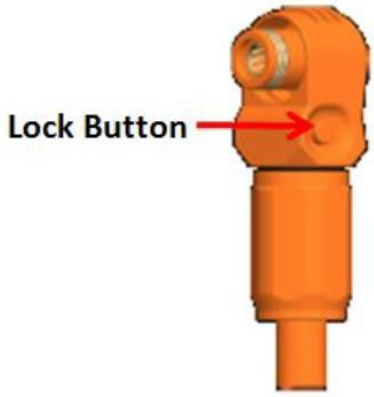
the label of the network cable. If the inverter used by the customer is not covered by the standard communication cable, please contact supplier for the correct PIN Sequence) as follows:

--Keep the battery system at power off state, connect the power cable to the interface on the input side of the inverter first, and then connect the power cable to the interface on the battery side.

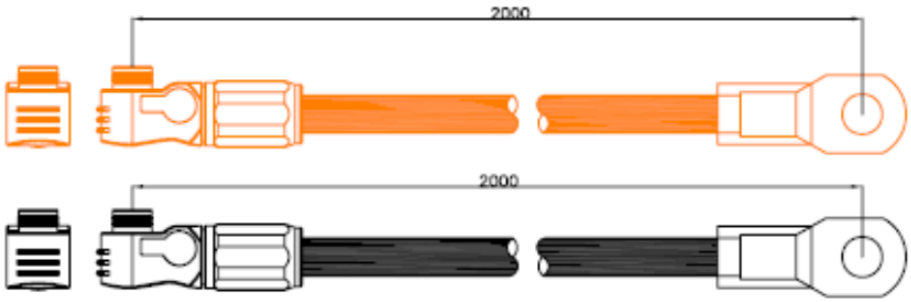
--The battery output interface is a quick connector, and the power cable (positive, negative) plug can be directly inserted into the battery socket. The power cable cross section is 35 mm2*2.

Power Terminals

- Power cable terminals: there are two pair of terminals with same function, one connects to equipment, the other one paralleling to other battery module for capacity expanding.
- For power cables uses water-proofed connectors.
- Must keep pressing this Lock Button while pulling out the power plug.



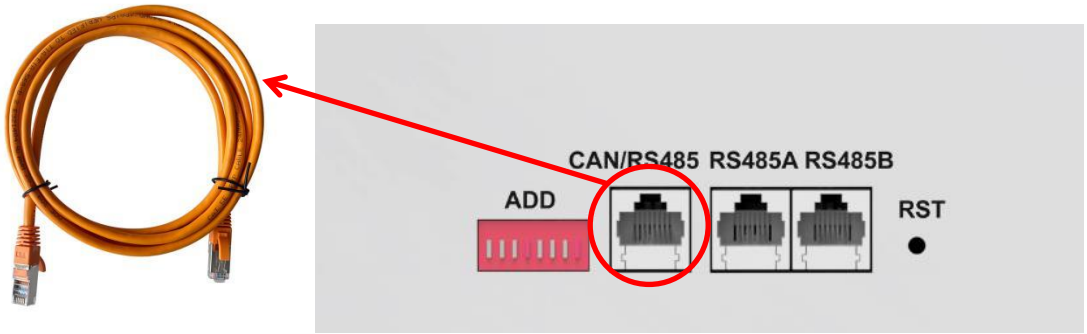
Power cables sets :

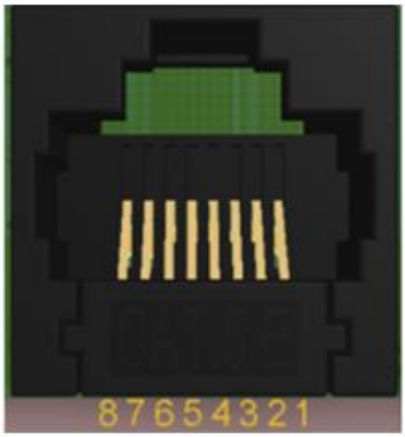


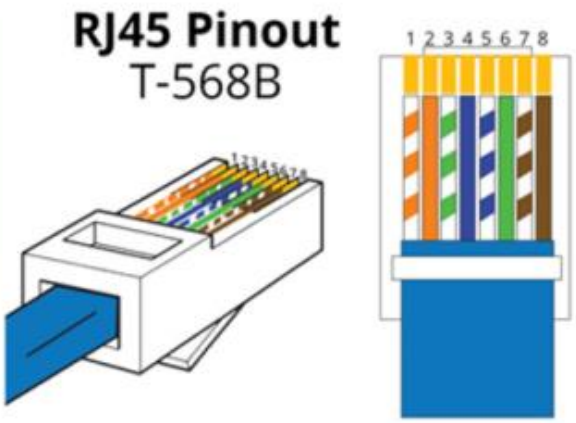


5.3.6 Connection of communication interface

Connect the CAN inport of the battery to the CAN or RS485 communication interface of the inverter using the RJ45 cable.

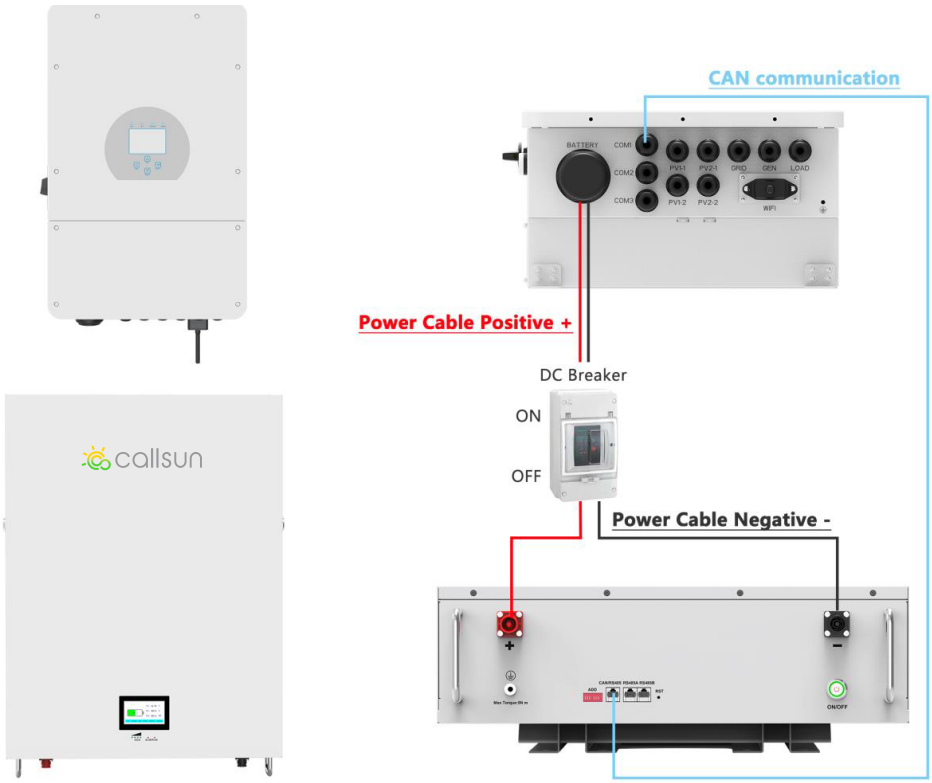






PIN Definition

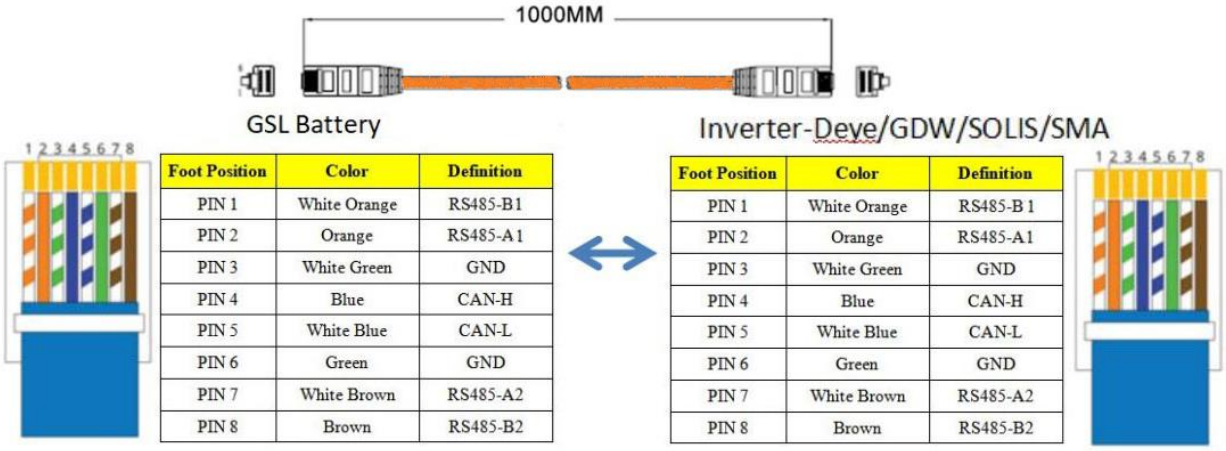
	Pin	Wire Color	interface definition	Description
RJ45 Connector Definition (Type B Crimping Method)	1	White Orange	A1	
	2	Orange	B1	
	3	White Green	/	/
	4	Blue	CAN-H	CAN communication
	5	White Blue	CAN-L	
	6	Green		
	7	White Brown		
	8	Brown		



PINOUT of System Parallel communication cable

PINOUT of Battery-Battery communication cable diagram shown as below:

Communication cable for battery and inverter

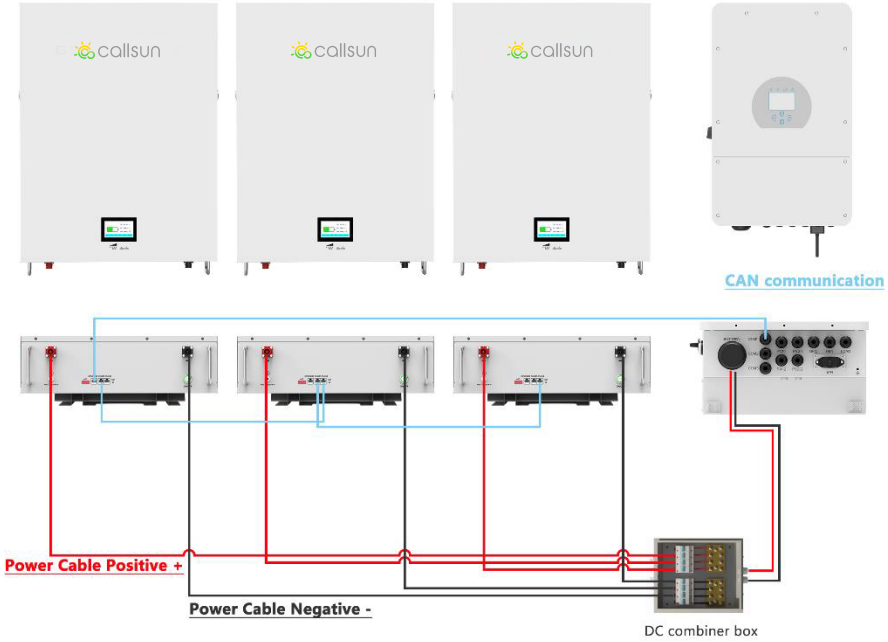


Foot Position	Color	Definition
PIN 1	White Orange	RS485-B1
PIN 2	Orange	RS485-A1
PIN 3	White Green	GND
PIN 4	Blue	CAN-H
PIN 5	White Blue	CAN-L
PIN 6	Green	GND
PIN 7	White Brown	RS485-A2
PIN 8	Brown	RS485-B2

Foot Position	Color	Definition
PIN 1	White Orange	RS485-B 1
PIN 2	Orange	RS485-A1
PIN 3	White Green	GND
PIN 4	Blue	CAN-H
PIN 5	White Blue	CAN-L
PIN 6	Green	GND
PIN 7	White Brown	RS485-A2
PIN 8	Brown	RS485-B2

5.3.7 Parallel use of battery

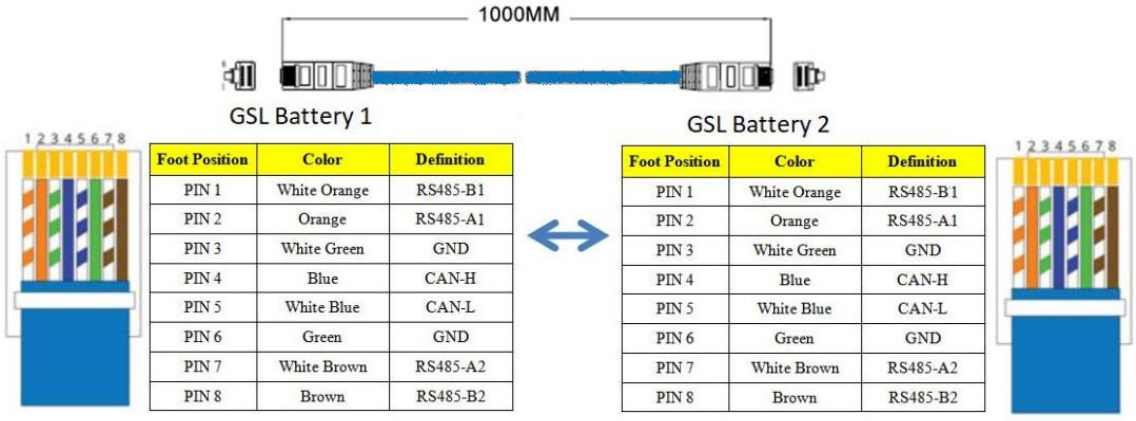
When the system is used in parallel, it supports up to 16pcs wall batteries in parallel. According to the number of parallel system **(Take 3 batteries in parallel as an example), it needs to use: Power cable × 3 pairs, Battery-Inverter communication cable × 1PCS, Battery-Battery communication cable × 2PCS, Distribution box × 1PCS)**. The over-current capacity of the distribution box should be much higher than the maximum nominal current value when the load is running.



PINOUT of System Parallel communication cable

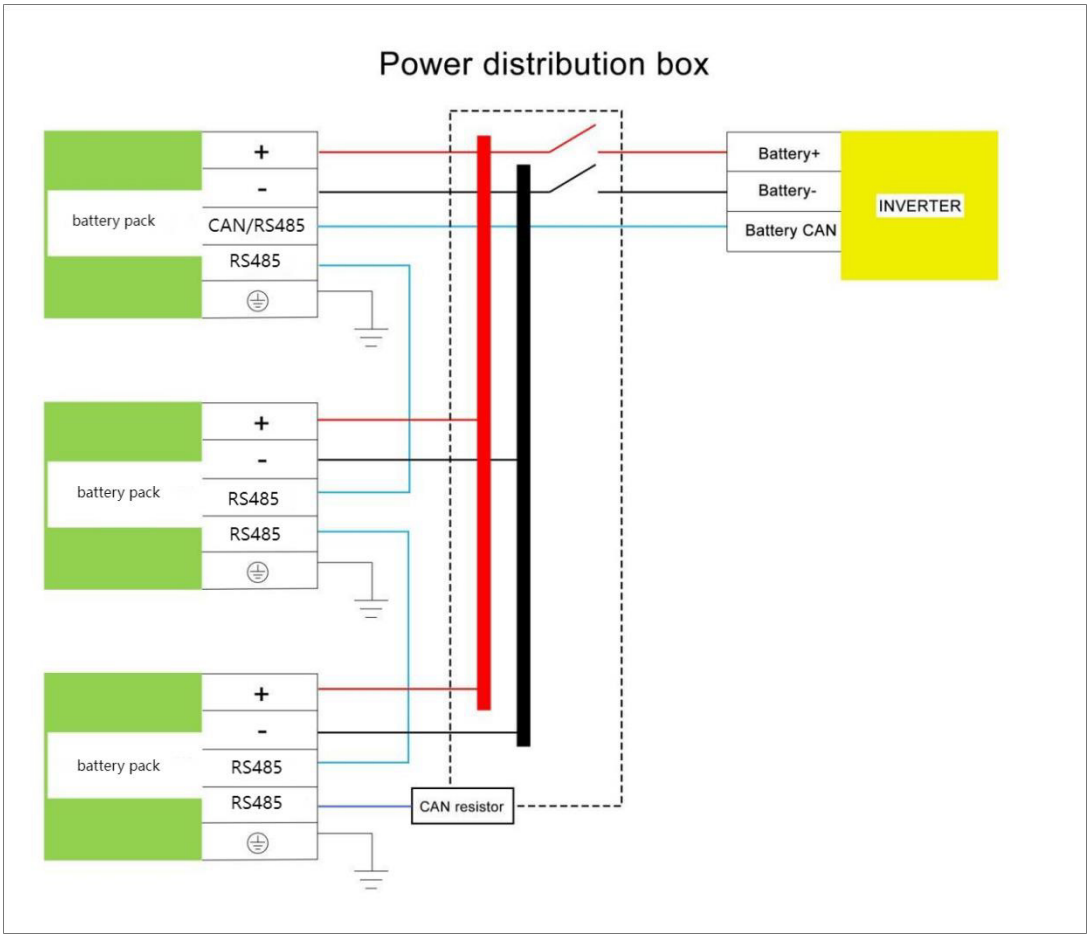
PINOUT of Battery-Battery communication cable diagram shown as below:

Communication cable for battery parallel connection



Foot Position	Color	Definition
PIN 1	White Orange	RS485-B1
PIN 2	Orange	RS485-A1
PIN 3	White Green	GND
PIN 4	Blue	CAN-H
PIN 5	White Blue	CAN-L
PIN 6	Green	GND
PIN 7	White Brown	RS485-A2
PIN 8	Brown	RS485-B2

Foot Position	Color	Definition
PIN 1	White Orange	RS485-B1
PIN 2	Orange	RS485-A1
PIN 3	White Green	GND
PIN 4	Blue	CAN-H
PIN 5	White Blue	CAN-L
PIN 6	Green	GND
PIN 7	White Brown	RS485-A2
PIN 8	Brown	RS485-B2



An over-current protection and isolation device that operates both positive and negative conductors simultaneously is required between parallel batteries and between the inverter and battery system.

The installation of an over-current protection and isolation device between parallel batteries, which may require modification to the power cables, will not void the product warranty.

5.3.8 Battery module DIP switch definition and description

DIP Switch Definition

DIP switch position (master communication protocol and baud rate selection)

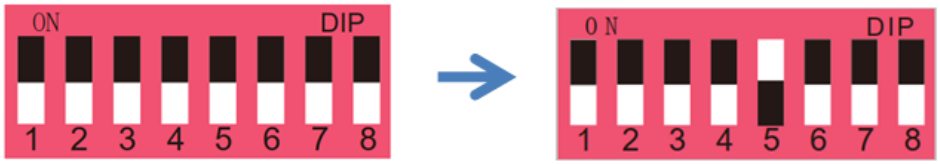
# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8
Distinguish between master and slave				Baud rate selection OFF: CAN:500K, 485: 9600	No definition	No definition	No definition

	ON: CAN 250K, 485:115200			

When the batteries are connected in parallel, the master communicates with the slaves through the RS 485 interface. The master summarizes the information of the entire battery system and communicates with the inverter through CAN or 485.

For all different inverter models based on CAN or 485, you just need to set different DIP mode:

1) When battery works with GOODWE, SOLIS, LUX POWER, SOFAR, DEYE, VICTRON, GROWATT SPF, SCHNEIDER Connect series, before connecting you need confirm that the DIP switch mode of the master module in battery module is 000010000("# 5" to "ON")



2) Slave Battery setting from 2 pcs to 16pcs batteries as below:



Mark: M- master Battery S-Slave Battery

Caution

- Before connection, the positive and negative pole of the inverter input interface and the battery output interface should be confirmed.
- The red power line is connected to the positive pole and the black power line is connected to the negative pole.
- Before connection, it is necessary to confirm the charge and discharge parameters of the inverter interface.
- Voltage and current should meet the requirements of Table 2-2 battery performance parameters.

Note: For more information of matching inverter brands, please subject to the latest document

- How to judge that the communication between the product is normal:

1) If there is communication between the inverter and battery system, it can be judged by the maximum charge and discharge current value on the inverter sent by the battery.

$$\frac{\text{(The maximum charge and discharge current value display on the inverter)}}{\text{(The maximum charge and discharge current value of one battery module)}} = \text{number of modules}$$

A. If the equation holds after calculation, it means communication between the battery is normal.

B. If the Battery light board shows three different colors flash alternately, it means the communication between battery is fault.

Table3-5 Suggestions for battery charging and discharging current

Equipment Use	Charging a) The battery's long-term continuous charging current should be ≤0.5C b) If the battery remaining capacity is empty, please charge it within 48 hours after the battery is empty.
	Discharging c) The long-term continuous discharge current of the battery should be ≤0.5C d) The recommend maximum depth of discharge (DOD)of Battery PACK is no more than 85%.

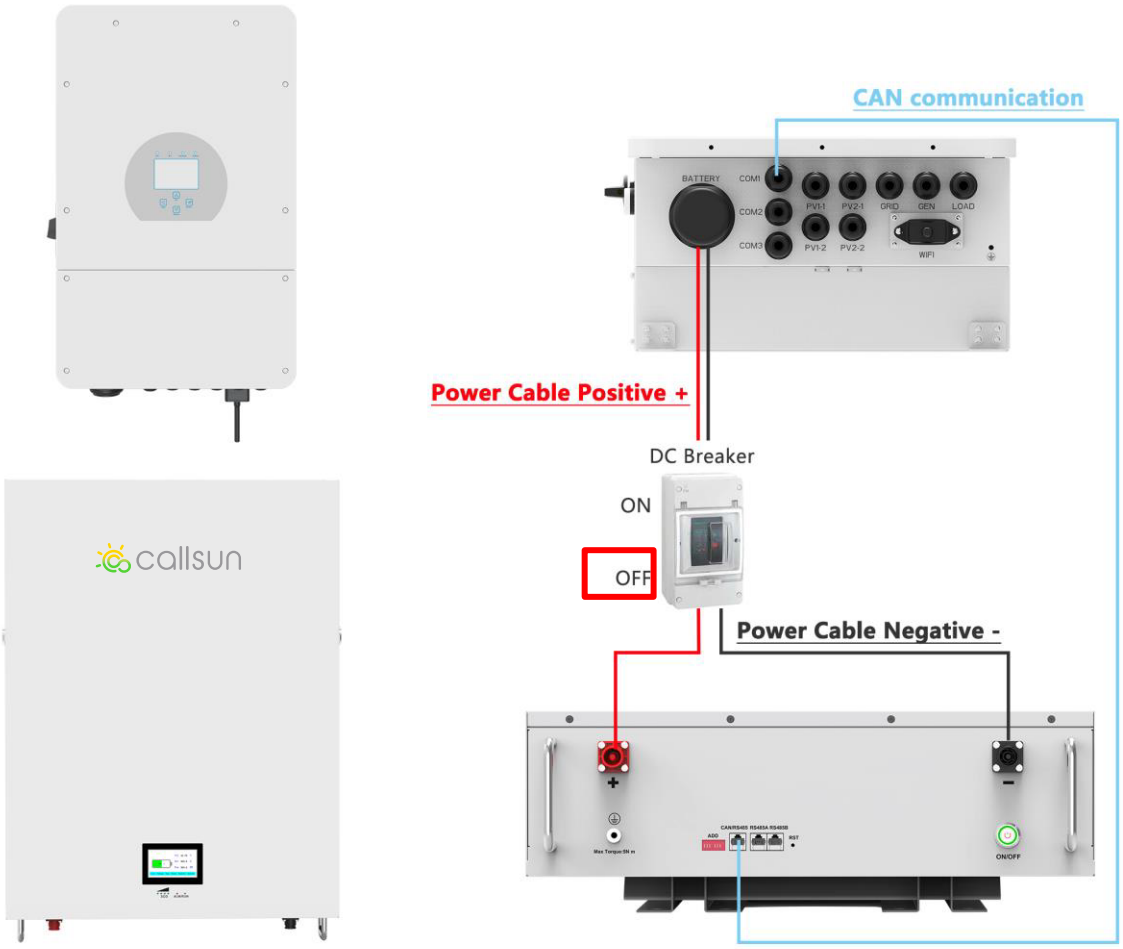
6.Use, Maintenance and Troubleshooting

6.1 Battery System Usage and Operation Instructions

After completing the electrical installation, follow the instruction below to start the battery system.

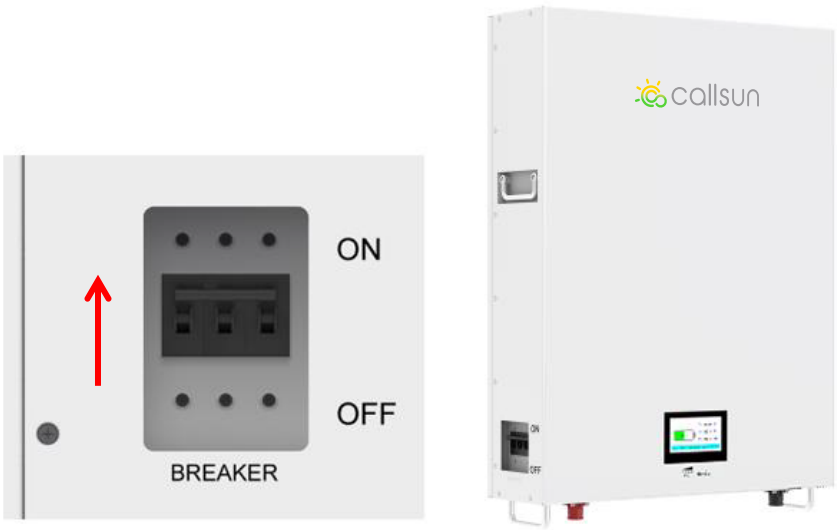
1) Power on

Step 1. Before turning on the battery, please make sure the DC breaker between battery and inverter is on ”OFF” position.



- Make sure battery positive and negative connect DC breaker +/- port.
- Red cable is for positive side; Black cable is for negative side.
- Make sure Coms cable connects inverter CAN port correctly.
- Make sure all the installation and operation must follow up local electric standard.

Step 2. Pull Battery DC breaker up to “ON” position. Battery positive and negative will be active then.

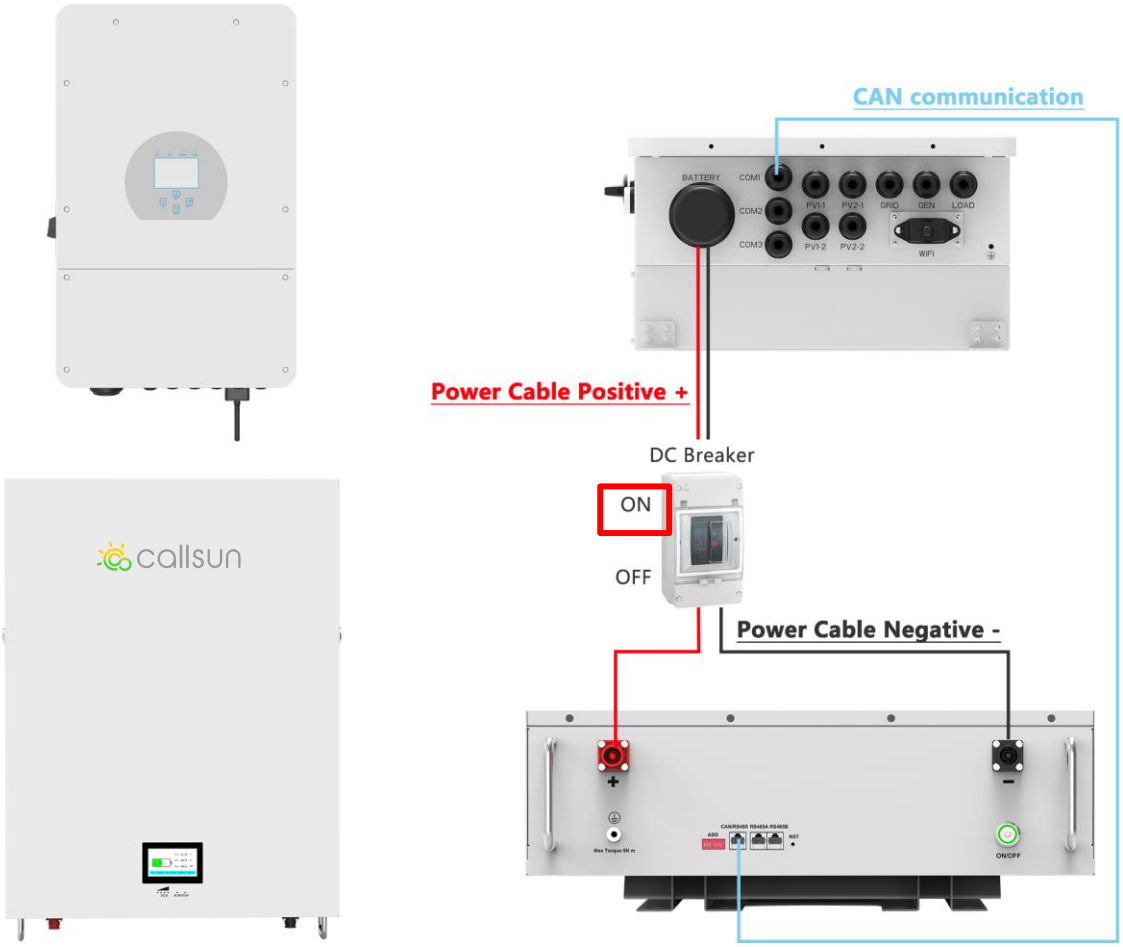


Step 3. Turn on Battery DC Switch, then LCD and LED will be flash at once, BMS is activated.

Customer can check battery SOC, Voltage state on LCD.

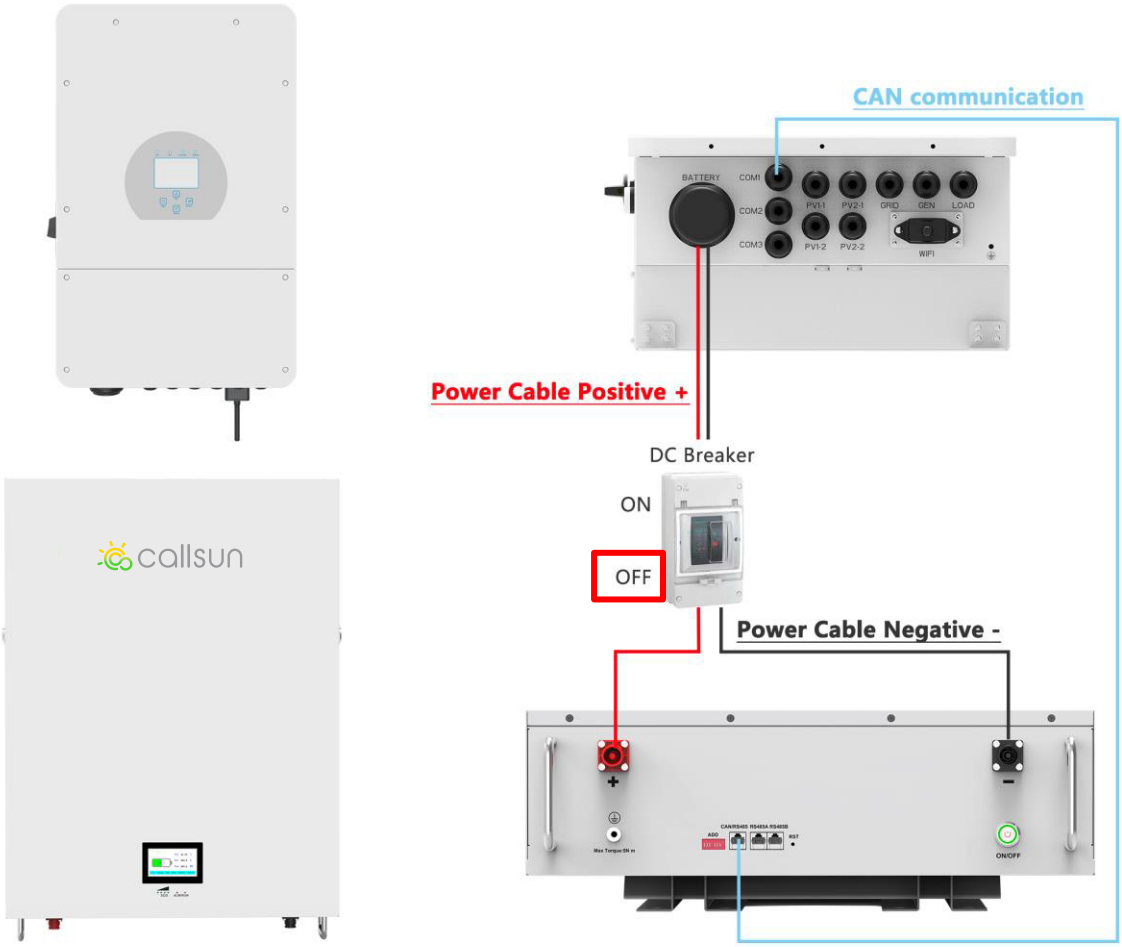


Step 4. Pull DC breaker to “ON” position on battery and outside DC breaker, then system can begin to work.



2) Power off

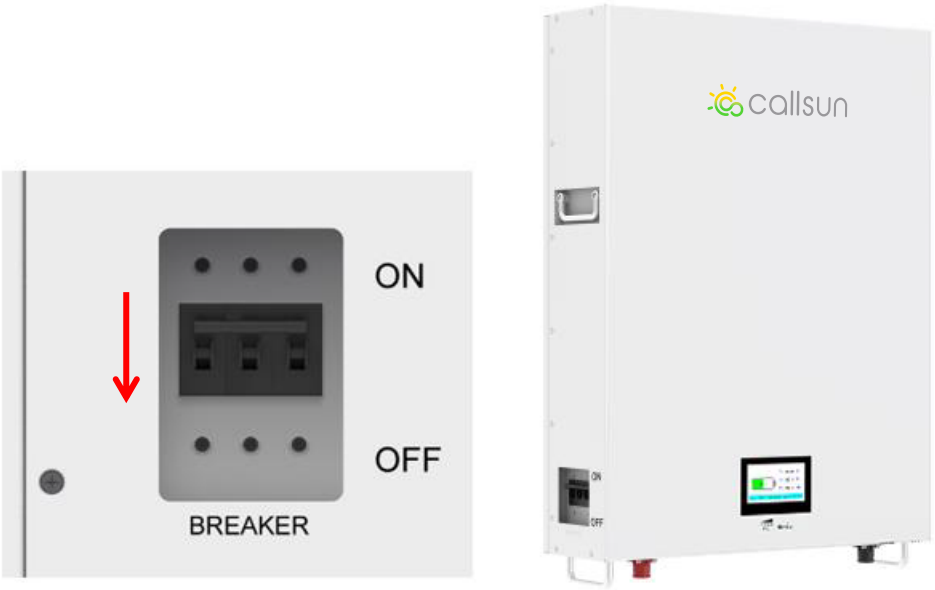
Step 1. Pull down DC breaker switch on “OFF” position.



Step 2. Turn off Power switch to shut down BMS, LCD, LED finally.



Step 3. Pull battery DC breaker at “OFF” position. Cut off battery positive and negative output.



Caution

- After pressing the power button, if the battery status indicator lights shows abnormally, please refer to the "6.2 Alarm description and processing". If the failure cannot be eliminated, please contact the retailer timely.
- After pressing the power button, if the battery status indicator continues to be red, please referto the "6.2 Alarm description and processing". If the failure cannot be eliminated, please contact the retailer timely.
- Use a voltmeter to measure whether the voltage across the BAT + / BAT- terminals of the inverter is higher than 44.8V, and check whether the voltage polarity is consistent with the input polarity of the inverter. If the voltage across the terminals BAT + / BAT- of the inverter is higher than 44.8V, which means the battery has begun to work normally.
- After confirm the battery output voltage and polarity are correct, turn on the inverter, then turn on the circuit breaker switch.
- Check whether the indicator light for the inverter and the battery connection (the communication indicator and the battery access status indicator) is in normal condition. If normal, the connection between the battery and the inverter is completed. If the indicator light shows abnormal, please check the inverter manual or contact the local dealer.

6.2 Alarm Description and Processing

When protection mode is activated or system failure occurred, the LED indicator on the front panel will alarm, through net management can query specific alarm class and take appropriate action.

6.2.1 Alarm and countermeasure for affecting system output

If there are any abnormalities affecting the output, such as battery cell in the battery module occurs over-current protection during charge/discharge, under-voltage protection, and temperature protection, in the system, please deal with them according to Table 6-1.

Table 6-1 Main alarm and Protection

State	Alarm category	Alarm indication	Processing
Charge state	Over-current when charging	RED light flashing	Reduce the charging current below the rated value.
	High temp protection	RED light flashing	Stop charging and find out the cause of the trouble.
Discharge State	Over-current protection when discharge	RED light flashing	Stop discharge and reduce discharge current below rated value.
	High temp protection when discharge	RED light Flash in	Stop discharging and find out the cause of the trouble.
	Over-discharged protection	RED light flashing	Start charging.
	Low voltage alarm	Yellow light on	Start charging.

6.2.2 Alarm and countermeasure for non-affecting system output

If a low SOC alarm occurs, the battery system also issues a corresponding alarm signal.

Maintainer should check the equipment according to the prompt information, determine the type and location of the fault, and take corresponding countermeasures to ensure that the system is in the best working condition to avoid affecting the system output. The phenomena and countermeasures are shown in Table 6-2.

Table 6-2 Minor alarm

Alert category	Alarm indication	Countermeasure
0<SOC<10%	System working status: RED light is always on	Stop discharge, and charge the battery system in time

6.2.3 Analysis and treatment of common faults

Table 6-3

Item	Fault phenomenon	Reason analysis	Solution
1	The indicator does not respond after power on the system	Make sure press and hold the power switch (Reset switch) for 3s.	Check the power switch
2	No DC output after power on the system	Check if the DC breaker is turned on	Check the status of the DC circuit breaker on the side of cabinet
3	No DC output and red light is	Battery voltage is too low	Charging the battery system
4	The battery cannot be fully charged	Charging voltage is too low	Adjust charging voltage within 57.1V~57.6V range
5	The power cable sparks once power on and ALM indicated Red light on	Power connection short-circuit	Turn off the battery, check the cause of the short circuit
6	Regulations vary for different countries. Dispose of in accordance with local regulations		

If you need any technical help or have any questions, please contact the dealer in time.

7. Warranty Policy

We provide a 10-year warranty service for materials and workmanship on this product. Within 10 years from the date of purchase, if the product experiences faults under normal usage, please apply for warranty with the purchase receipt.

The following situations are not covered by the warranty:

1. Cosmetic flaws caused during use.
2. Product malfunctions resulting from self-disassembly, repairs, or human-induced causes.
3. Damages caused by uncontrollable factors such as natural disasters, thunderstorms, accidents, and the like.

Warranty Application Process:

1. Please contact our customer service team, providing the purchase receipt and a detailed description of the issue.
2. Our customer service team will assist you in submitting the necessary information and documents.
3. After confirmation, we will provide you with an appropriate warranty solution.

If you have any questions or need assistance, please feel free to reach out to us via the following email: ***callsun-service@outlook.com***

Specifications are subject to change without notice!

Shenzhen Guangchuxinneng Technology Co., Ltd.

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