



BSL NEW ENERGY TECHNOLOGY CO., LTD

User Manual

PowerLine-5 Series

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LiFePO4 Battery System for Households

.1. About This Manual

1.1 Purpose

This manual describes the introduction, installation, operation and emergency situations of the battery bank. Please read this manual carefully before installations and operations. Keep this manual for future reference.

1.2 Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

1.3 Safety Instructions

Warning: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

1. Before using the unit, read all instructions and cautionary markings on the unit, the batteries and all appropriate sections of this manual.

2. CAUTION---To reduce risk of injury, damage, even burst. Please use it following using manual. In case of causing personal.

3. Do not disassemble the battery. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of fire.

4. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.

5. CAUTION-Only qualified personnel can install this device with inverter.

6. For optimum operation of this battery, please follow required spec to select appropriate cable size.

7. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion or fire.

8. Please strictly follow installation procedure.

9. To support full output load, at least 2 sets of PowerLine-5 for inverter larger than 5KVA in parallel connection.

1.4 Grounding Instructions

This System should be connected to a permanent grounded wiring system. Be sure to comply with local requirements.

1. NEVER cause AC output and DC input short circuited. Do not connect to the mains when DC input short circuits.

2. Warning!! Only qualified service persons are able to service this device.

3. Battery should be installed indoor and kept away from water, high temperature mechanical force and flames.

4. Do not install the battery in any environment of temperature below 0°C or over 55°C, and humidity over 80%.

5. Do not put any heavy objects on the battery.

1.5 Can be connected in parallel

1. The batteries can be connected in parallel. Series connection is not allowed. Use in upright position only.

2. The batteries are not allowed to be connected with PWM controller for charging.

Special Attention: Due to the built-in protection board of the lithium battery pack is with over-discharge protection function, it is strongly recommended to stop using the load when the battery pack is over-discharged. The battery pack cannot be repeatedly activated for discharge. Or the battery may be failed to be activated by the AC or PV activation cable (It requires a special charging activation method), so cannot be charged. Therefore, when the battery pack is low power, please charge the battery as soon as possible when main power or solar energy is available.

LiFePO4 Battery System for Households

2. Introduction

2.1 Product Overview

PowerLine-5 is an ultra-thin wall-mounted battery that can be installed directly on the wall through a simple installation method quick installation. Exquisite designed, compact size can fit into any small space in the home. The battery pack used in this product is 100Ah lithium iron phosphate battery pack. This product can be used in conjunction with an inverter to adjust the way electricity is used. It also supports various application methods such as self-generation and self-consumption of solar power, achieving the goal of green electricity for households.

2.2 Product Appearance

PowerLine-5:

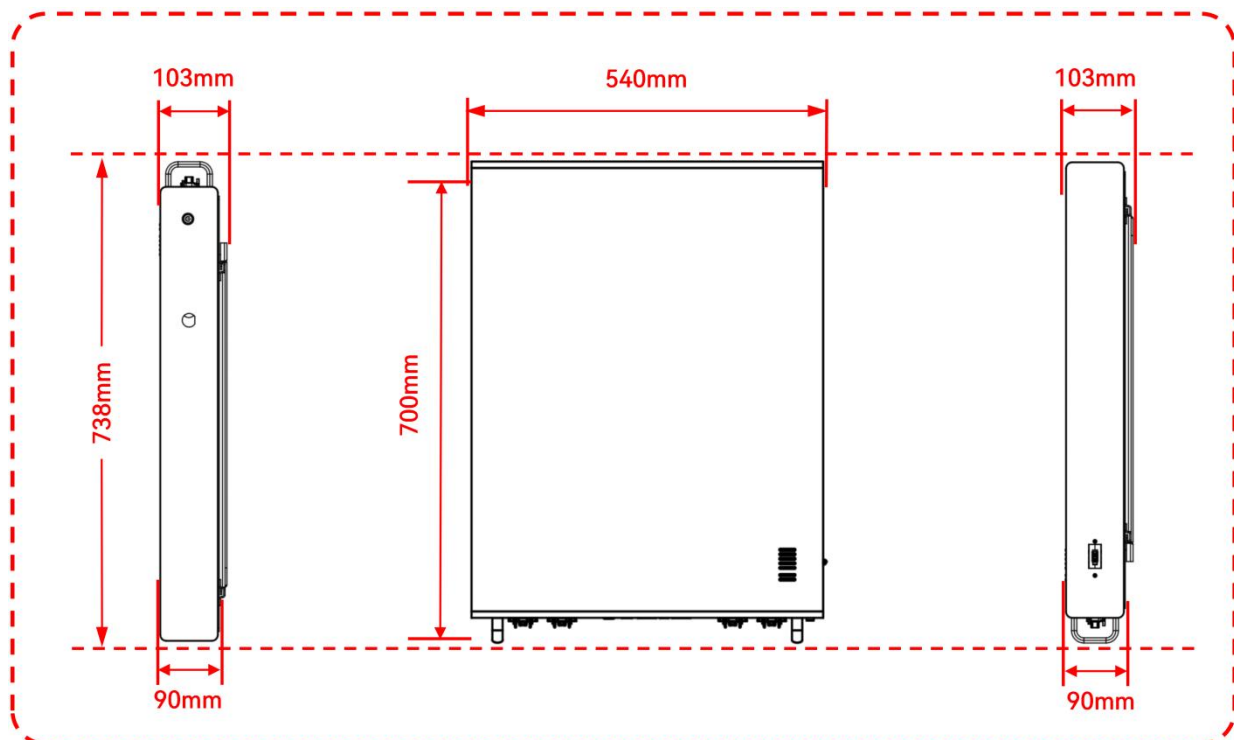


Figure 2.2

Note: The actual height may vary slightly, please take the actual installation height as the standard;

2.3 Product Specification

Model		PowerLine-5
Nominal Energy		LiFePO4
Nominal Voltage(V)		51.2
Nominal Capacity(wh)		5120
Usable Capacity(wh)		4864
Cell & Method		16S1P
Dimension(mm,W*H*D)		700*540*90(±3)
Weight(Kg)		53(±1%)
Discharge Voltage(V)		48
Charge Voltage(V)		55
Charge	Rate.Current/Power	50A/2.56kW
	Max.Current/Power	100A/5.12kW
Discharging	Rate.Current/Power	50A/2.56kW
	Max.Current/Power	100A/5.12kW
Communication		RS232,RS485,CAN,WIFI(Optional),Bluetooth(Optional)
Depth Of Discharge(%)		90%
Expansion		Up to 32 units in parallel
Working Temperature	Charge	0~55°C
	Discharge	-20°C~55°C
Storage Temperature		0~35°C
Short Circuit Current/Duration Time		350A,Delay time 500μs
Cooling Type		Nature
Protection Level		IP20
Monthly Self-discharge		≤ 3%/month
Humidity		≤ 60%ROH
Altitude(m)		< 4000
Cycle Life		> 6000 cycles,25°C

Note: It is not recommended to operate the battery at maximum charge/discharge current for a long period of time; the charge/discharge current and power will change according to the temperature and the SOC of the battery.

LiFePO4 Battery System for Households

2.4 Configuration List

Name	Qty	Remarks
Battery Pack	1 set	Includes wall-mounted bracket
User's Manual	1 copy	Electronic version
Matching accessories	1 set	Includes power cable and communication cable
Expansion screw M6	1 set	4 pieces in total

2.5 Interface Description

PowerLine-5:

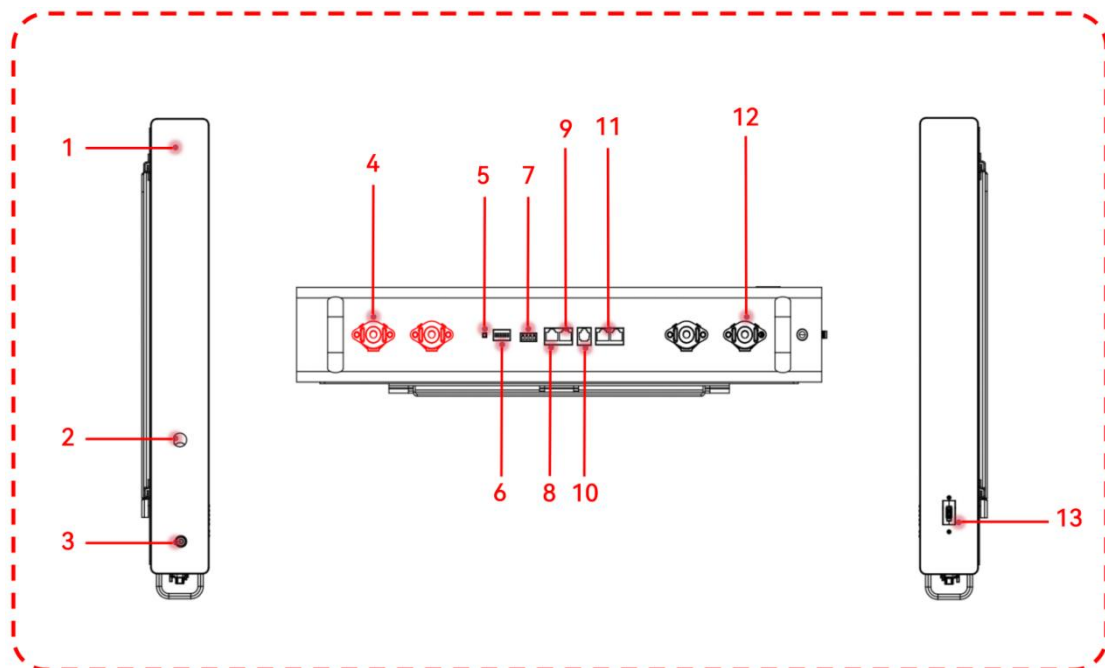


Figure 2.5

No.	Illustration	Silk-screen	Remark
1	Battery Pack	/	Battery pack assembly
2	Wi-Fi interface	WIFI	For real-time upload of battery parameters to the cloud
3	BMS Switch Button	ON/OFF	Button activation BMS
4	Battery Positive Terminal post	+	Positive output
5	Reset Button	Retest	Reset Battery
6	Dial Switch	DIP	Address settings (range 1 to 63)
7	Dry Connection Point	I/O	Dry Contact 1 - PIN1 to PIN2: Normally open, closes during fault or protection. Dry Contact 2 - PIN3 to PIN4: Normally open, closes for low battery alarm.

8	RS485 Interface	RS485	Communication port for the monitoring equipment
9	CAN Bus Interface	CAN	The communication port connected to the inverter
10	RS232 Port	RS232	RS232 Communication port
11	RS485-1/2 port	RS485-1/ RS485-2	RS485 paralleling communication port
12	Battery Negative Terminal Post	-	Negative output
13	Breaker	ON/OFF	Battery string output enable switch

Table 2.5

2.6 Product Applications

Lithium battery pack is not same as lead-acid battery, so for the devices which you connect with the battery pack for charging or discharging, such as inverters, MPPT charger controllers or UPS, please implement pre-settings as recommended settings as below before you launched them.

Setting	PowerLine-5
Max.Charging Voltage	57.6V
Floating charging Voltage	55V
Max.Charging Current	100A
Cut-off voltage	48V

Table 2.6

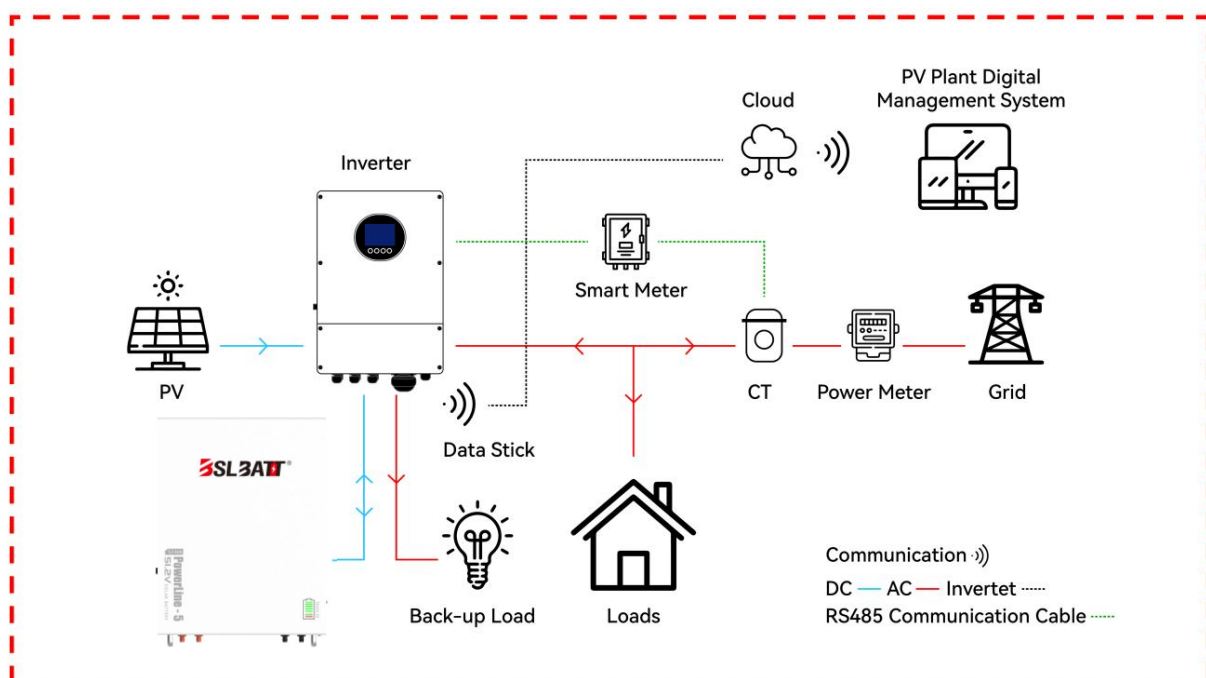


Table 2.6

LiFePO₄ Battery System for Households

1.PV Self-use Surplus Power to Grid

Under the condition of good illumination in the daytime, the DC power from PV panel is changed into AC through inverter to supply power for household load. If the household load cannot run out of photovoltaic power, the remaining power will be stored in the battery. If the battery is full, photovoltaic power will be supplied to the grid. In the night or rainy days, photovoltaic cannot generate electricity. The battery supplies power to the home load through an inverter. If the battery SOC is low, the household load will take power from the grid.

2.Peak Shaving and Valley Filling

In some countries and regions where peak valley time of use price is implemented, if the difference between peak price and low price is large, the application mode of peak shaving and valley filling can be adopted in energy storage system. In the low electricity price period, the energy storage system is charged; in the peak period of electricity price, the energy storage system supplies power to the household load. It can avoid users using too much power grid when the electricity price is high and save energy expenditure.

3.Standby Power Supply

In some extreme weather (such as tornadoes, typhoons, hail), or substation operation failure, power supply will be interrupted. If the energy storage system is installed, the user can still enjoy sufficient power guarantee under this situation.

3. Installation

3.1 Pre-installation Inspection

1. **Outer package check:** Verify whether the outer package is intact and undamaged, including whether there are deformation, open holes, cracks or other traces that may lead to damage of the inner equipment.
2. **Equipment Model and Deliverables Inspection:** Verify whether the equipment model matches the order; confirm whether the type and quantity of deliverables are correct, and check whether the appearance is damaged.

3.2 Installation Environment

1. **Installation environment requirements:** Equipment shall not be installed in a flammable, explosive, corrosive environment; and the installation location should be to avoid contact with children, and should choose a location that is not easy to accidentally touch; at the same time, pay attention to the surface of the equipment may produce high temperature when running, to prevent scalding.
2. **Installation location notes:** Avoid installing near water pipes, cables, etc. Inside the wall to prevent damage to the battery. The installation environment should avoid direct sunlight, rain, and snow. It is recommended to install it in a well-ventilated place indoors. If necessary, install an air-cooled air conditioner.

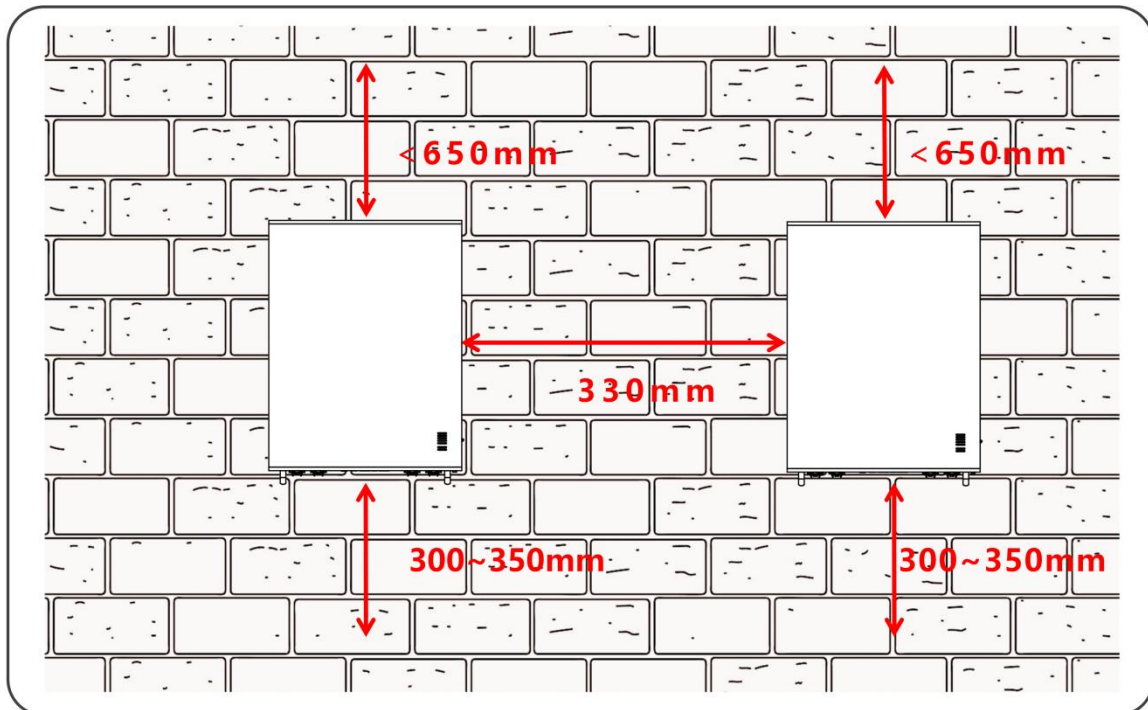


Figure 3.2

LiFePO4 Battery System for Households

3. **Installation space and environmental conditions:** Ensure that the installation space meets the ventilation and heat dissipation of the equipment and operating space requirements; the protection level of the equipment is suitable for indoor installation, and the temperature and humidity of the installation environment should be kept within the appropriate range.
4. **Equipment installation height and protection:** Equipment installation height should be easy to operate and maintain, to ensure that the indicator lights, labels are clearly visible, easy to operate the terminals; equipment installed at an altitude of not more than 2000 meters.
5. **Electromagnetic interference protection:** The installation location should be away from strong magnetic fields to avoid interference; if the installation location near the radio station or wireless communication equipment below 30MHz, the distance between the battery and these devices should be greater than 30 meters.
6. **Installation carrier requirements:** The use of non-flammable materials (such as concrete, masonry or fire treatment of wood metal); carrier needs to be strong, can withstand the weight of the equipment; battery system to be installed against the wall, and add anti-tipping bracket.
7. **Installation angle requirements:** Equipment must be installed horizontally, avoid tilting or inverted.

3.3 Connection for Parallel Mode

PowerLine-5 battery support to be connected in parallel for expansion. If you need one more battery bank work in parallel mode, connect the battery as shown in Figure 3.3-2; For a single inverter, we only recommend the use of the PowerLine-5 model for parallel connection, and no more than 32 devices.

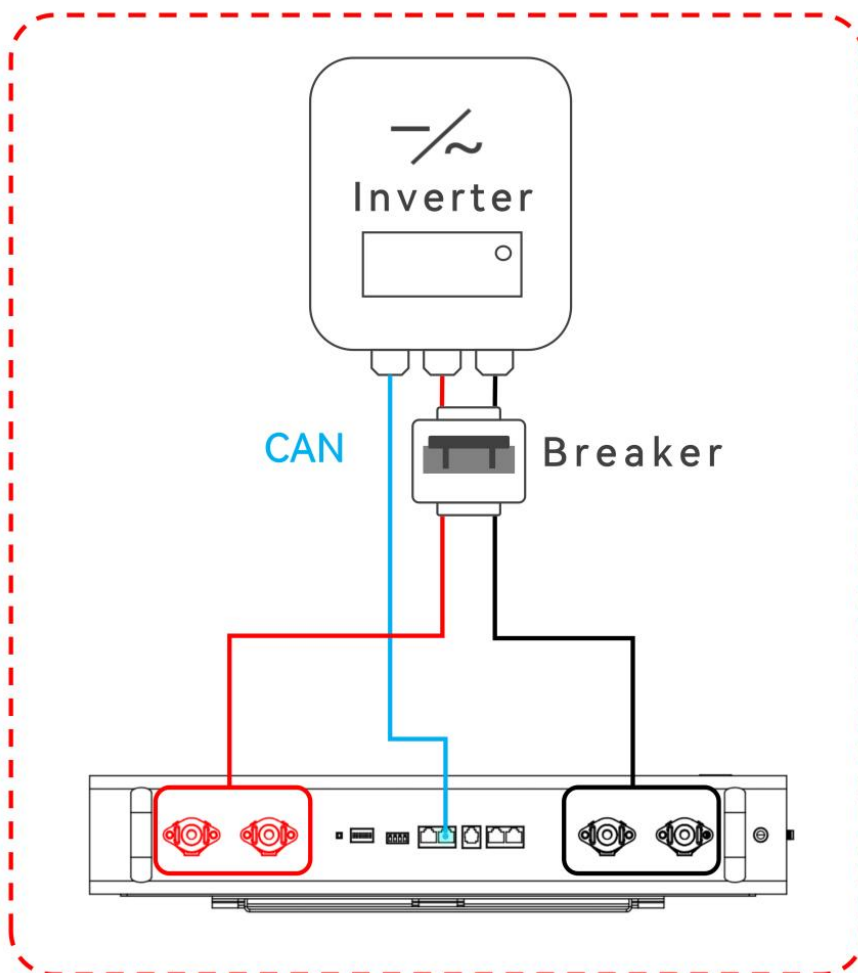


Figure 3.3-1

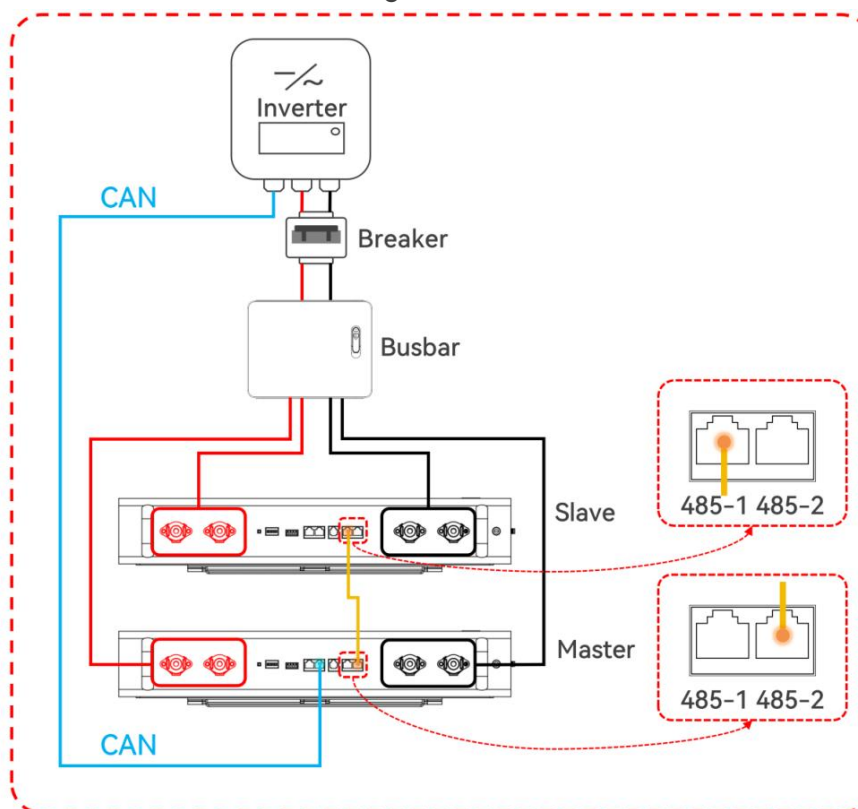


Figure 3.3-2

LiFePO4 Battery System for Households

Notes:

when a single unit is used, the inverter uses the battery as the main machine to communicate; when multiple batteries are used in parallel, the batteries inside are connected in parallel through the RS485-1/2 hardware interface, RS485/CANBUS communicates with the inverter.

Connection schematic between the inverter and the battery; as shown in Figure 3.3-3 below.

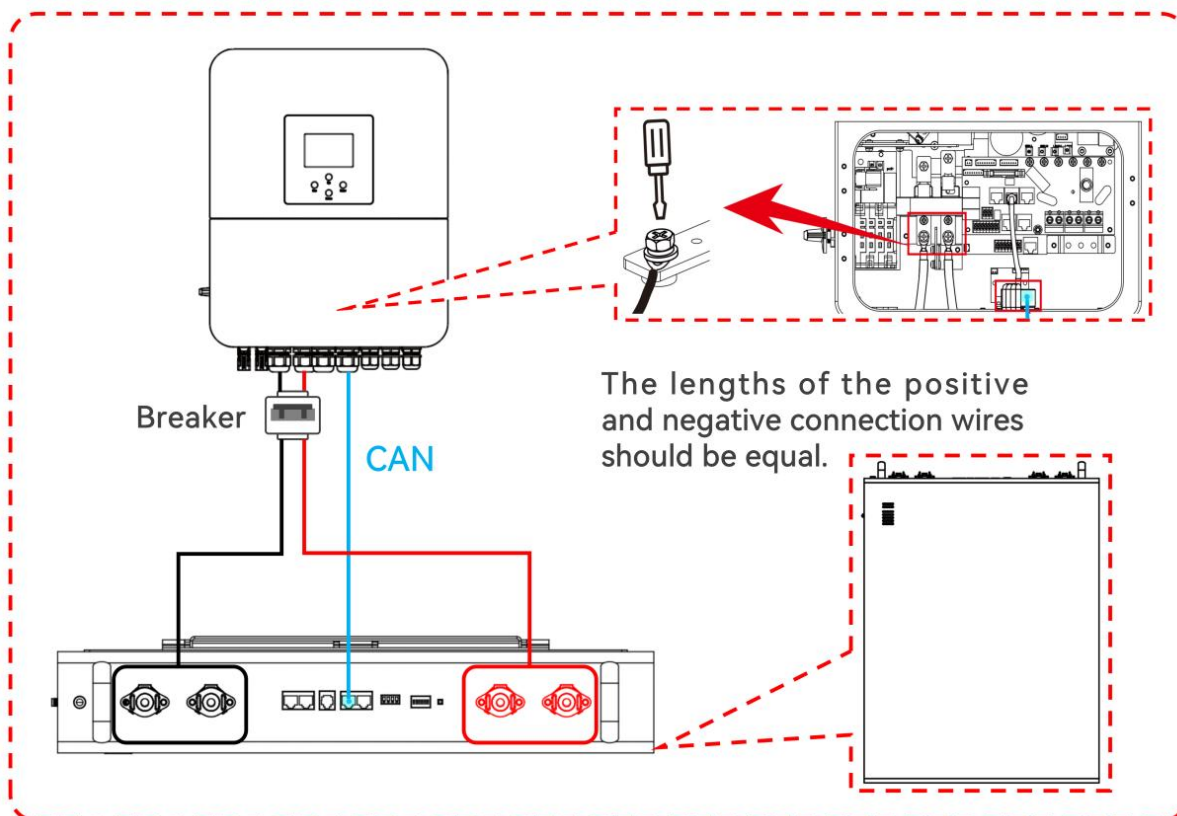


Figure 3.3-3

Note: After completing the above steps, arbitrarily select the positive and negative poles of one of the battery packs to output. After confirming the correct connection of the inverter, controller and battery, you can turn on any of the switches and use the battery group happily.

For pure off grid system, the PV awake wire need to be connected with MPPT charge controller if the battery pack is charged by solar panels only.

4. Operation

4.1 Switch On/Off

Step 1: Use a multimeter to confirm grid voltage is within the predetermined range;

Step 2: Close the circuit breaker between the inverter and battery;

Step 3: Switching the the air circuit breaker and press the switch to activate the BMS;

Step 4: Follow the inverter's user manual to perform energization and start the system inverter.

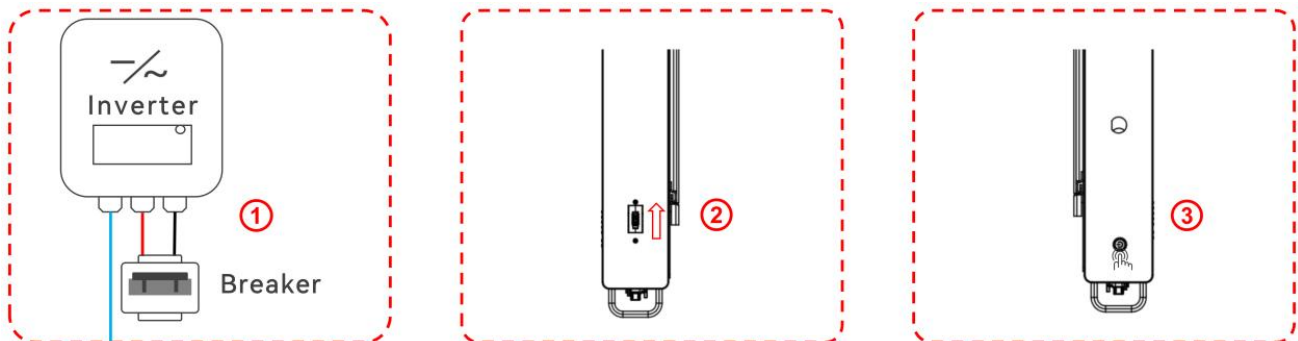


Figure 4.1

4.2 Battery Display Screen

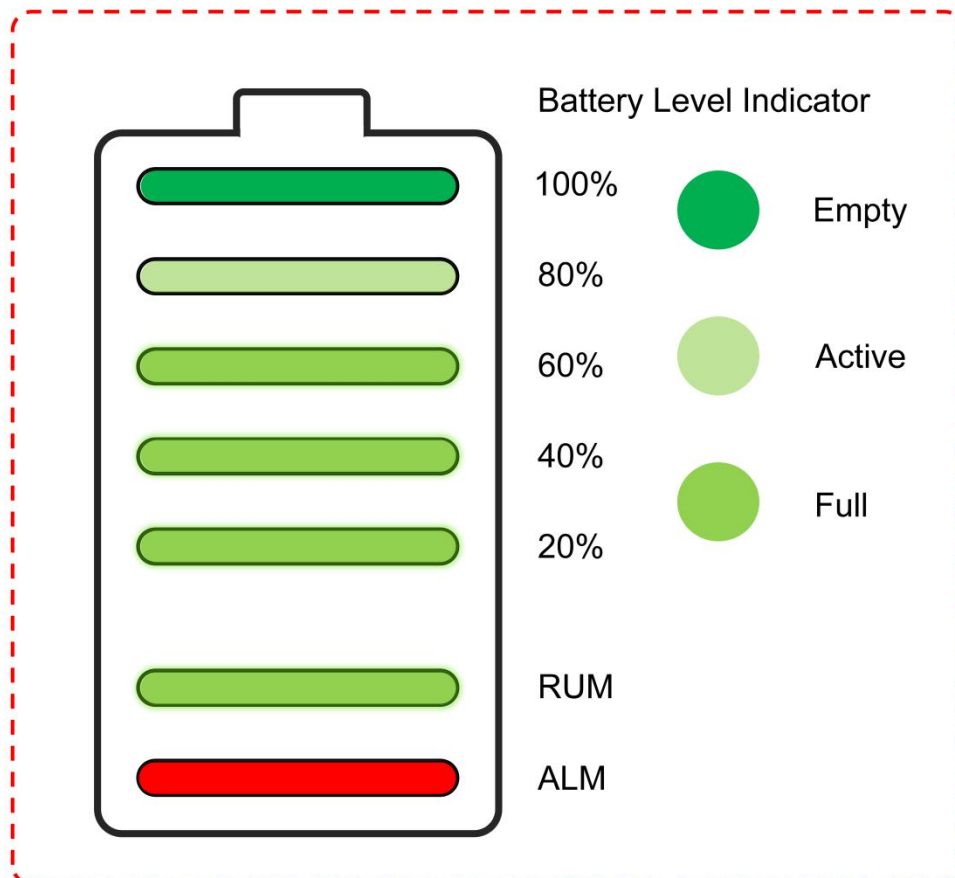


Figure 4.2

LiFePO4 Battery System for Households

4.3 Description for Communication port

Caution :

1.Users should decide whether to use the communication cable provided with the inverter according to installation requirements, and refer to the user manual for cable specifications and connection methods.

2.For communication cables purchased by users themselves or provided by the manufacturer, it is recommended to use standard Ethernet cables with RJ45 crystal connectors as the connection solution.

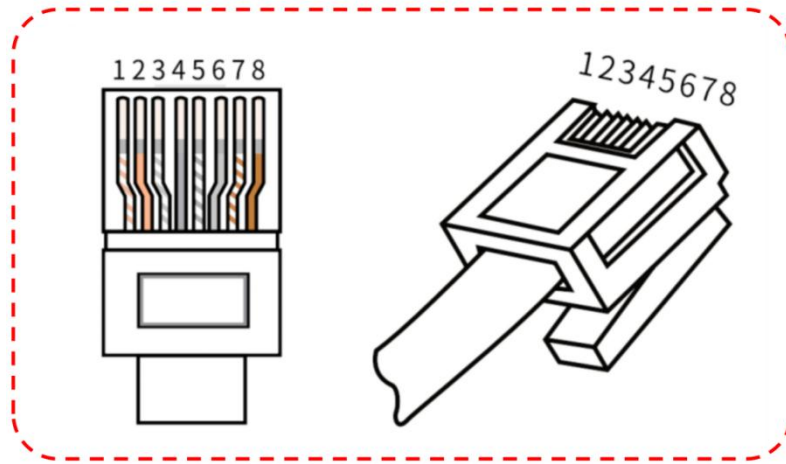


Figure 4.3

RS232 Communication: The BMS communicates with host computers via RS232 interface, enabling monitoring of battery parameters including voltage, current, temperature, status, and manufacturing data. Default baud rate: 9600bps.

CAN Communication: Default baud rate 500K. This interface connects to inverters. When configured as master, it aggregates slave data for inverter communication.

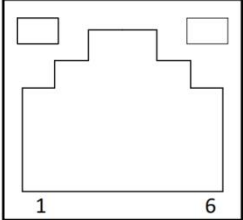
Parallel RS485 Communication: Default baud rate 9600bps. For battery parallel clusters, the master unit uses RS485 for inter-PACK communication, polling data via DIP switch addresses to monitor battery status.

Independent RS485 Communication: Default baud rate 9600bps. Interfaces with inverters. In master configuration, aggregates slave data for inverter communication.

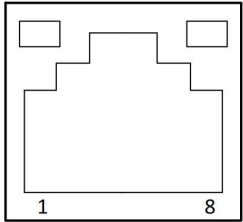
WiFi Communication : The BMS connects to cloud platforms via WIF module, enabling remote monitoring of voltage, current, temperature, status, SOC, SOH, and manufacturing data. Default baud rate: 9600bps.

DIP Switch Settings :During parallel cluster operation, BMS automatically assigns addresses via DIP switches. Master units receive primary addresses; slaves get sequential addresses. All addresses are dynamically allocated by BMS without manual configuration.

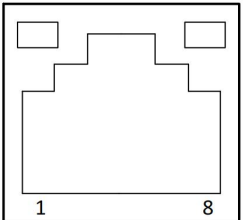
RS232:

Picture	PIN	Description
	1	NC
	2	NC
	3	TX
	4	RX
	5	GND
	6	NC

CAN:

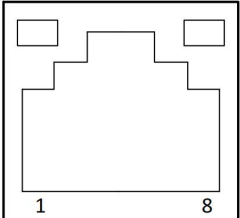
Picture	PIN	Description
	1	NC
	2	GND
	3	NC
	4	CAN-H
	5	CAN-L
	6	NC
	7	NC
	8	NC

RS485:

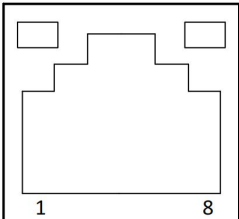
Picture	PIN	Description
	1	RS485B1
	2	RS485A1
	3	GND
	4	NC
	5	NC
	6	GND
	7	RS485A1
	8	RS485B1

LiFePO4 Battery System for Households

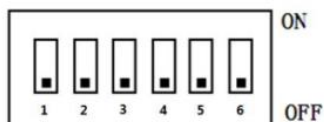
RS485-1:

Picture	PIN	Description
	1	RS485-B
	2	RS485-A
	3	GND
	4	GND
	5	DN_OP+
	6	GND
	7	RS485-A
	8	RS485-B

RS485-2:

Picture	PIN	Description
	9	RS485-B
	10	RS485-A
	11	GND
	12	GND
	13	UP_IN
	14	GND
	15	RS485-A
	16	RS485-B

4.4 DIP switch Description



Address	Dial switch position						Remark
	#1	#2	#3	#4	#5	#6	
0	OFF	OFF	OFF	OFF	OFF	OFF	Stepless connection, Single use
1	ON	OFF	OFF	OFF	OFF	OFF	Set as main Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	Set as subordinate Pack2

3	ON	ON	OFF	OFF	OFF	OFF	Set as subordinate Pack3
4	OFF	OFF	ON	OFF	OFF	OFF	Set as subordinate Pack4
5	ON	OFF	ON	OFF	OFF	OFF	Set as subordinate Pack5
6	OFF	ON	ON	OFF	OFF	OFF	Set as subordinate Pack6
7	ON	ON	ON	OFF	OFF	OFF	Set as subordinate Pack7
8	OFF	OFF	OFF	ON	OFF	OFF	Set as subordinate Pack8
9	ON	OFF	OFF	ON	OFF	OFF	Set as subordinate Pack9
10	OFF	ON	OFF	ON	OFF	OFF	Set as subordinate Pack10
11	ON	ON	OFF	ON	OFF	OFF	Set as subordinate Pack11
12	OFF	OFF	ON	ON	OFF	OFF	Set as subordinate Pack12
13	ON	OFF	ON	ON	OFF	OFF	Set as subordinate Pack13
14	OFF	ON	ON	ON	OFF	OFF	Set as subordinate Pack14
15	ON	ON	ON	ON	OFF	OFF	Set as subordinate Pack15
16	OFF	OFF	OFF	OFF	ON	OFF	Set as subordinate Pack16
17	ON	OFF	OFF	OFF	ON	OFF	Set as subordinate Pack17
18	OFF	ON	OFF	OFF	ON	OFF	Set as subordinate Pack18
19	ON	ON	OFF	OFF	ON	OFF	Set as subordinate Pack19

LiFePO4 Battery System for Households

20	OFF	OFF	ON	OFF	ON	OFF	Set as subordinate Pack20
21	ON	OFF	ON	OFF	ON	OFF	Set as subordinate Pack21
22	OFF	ON	ON	OFF	ON	OFF	Set as subordinate Pack22
23	ON	ON	ON	OFF	ON	OFF	Set as subordinate Pack23
24	OFF	OFF	OFF	ON	ON	OFF	Set as subordinate Pack24
25	ON	OFF	OFF	ON	ON	OFF	Set as subordinate Pack25
26	OFF	ON	OFF	ON	ON	OFF	Set as subordinate Pack26
27	ON	ON	OFF	ON	ON	OFF	Set as subordinate Pack27
28	OFF	OFF	ON	ON	ON	OFF	Set as subordinate Pack28
29	ON	OFF	ON	ON	ON	OFF	Set as subordinate Pack29
30	OFF	ON	ON	ON	ON	OFF	Set as subordinate Pack30
31	ON	ON	ON	ON	ON	OFF	Set as subordinate Pack31
32	OFF	OFF	OFF	OFF	OFF	ON	Set as subordinate Pack32
33	ON	OFF	OFF	OFF	OFF	ON	Set as subordinate Pack33
34	OFF	ON	OFF	OFF	OFF	ON	Set as subordinate Pack34
35	ON	ON	OFF	OFF	OFF	ON	Set as subordinate Pack35
36	OFF	OFF	ON	OFF	OFF	ON	Set as subordinate Pack36

37	ON	OFF	ON	OFF	OFF	ON	Set as subordinate Pack37
38	OFF	ON	ON	OFF	OFF	ON	Set as subordinate Pack38
39	ON	ON	ON	OFF	OFF	ON	Set as subordinate Pack39
40	OFF	OFF	OFF	ON	OFF	ON	Set as subordinate Pack40
41	ON	OFF	OFF	ON	OFF	ON	Set as subordinate Pack41
42	OFF	ON	OFF	ON	OFF	ON	Set as subordinate Pack42
43	ON	ON	OFF	ON	OFF	ON	Set as subordinate Pack43
44	OFF	OFF	ON	ON	OFF	ON	Set as subordinate Pack44
45	ON	OFF	ON	ON	OFF	ON	Set as subordinate Pack45
46	OFF	ON	ON	ON	OFF	ON	Set as subordinate Pack46
47	ON	ON	ON	ON	OFF	ON	Set as subordinate Pack47
48	OFF	OFF	OFF	OFF	ON	ON	Set as subordinate Pack48
49	ON	OFF	OFF	OFF	ON	ON	Set as subordinate Pack49
50	OFF	ON	OFF	OFF	ON	ON	Set as subordinate Pack50
51	ON	ON	OFF	OFF	ON	ON	Set as subordinate Pack51
52	OFF	OFF	ON	OFF	ON	ON	Set as subordinate Pack52
53	ON	OFF	ON	OFF	ON	ON	Set as subordinate Pack53

LiFePO4 Battery System for Households

54	OFF	ON	ON	OFF	ON	ON	Set as subordinate Pack54
55	ON	ON	ON	OFF	ON	ON	Set as subordinate Pack55
56	OFF	OFF	OFF	ON	ON	ON	Set as subordinate Pack56
57	ON	OFF	OFF	ON	ON	ON	Set as subordinate Pack57
58	OFF	ON	OFF	ON	ON	ON	Set as subordinate Pack58
59	ON	ON	OFF	ON	ON	ON	Set as subordinate Pack59
60	OFF	OFF	ON	ON	ON	ON	Set as subordinate Pack60
61	ON	OFF	ON	ON	ON	ON	Set as subordinate Pack61
62	OFF	ON	ON	ON	ON	ON	Set as subordinate Pack62
63	ON	ON	ON	ON	ON	ON	Set as subordinate Pack63

5. Emergency Situations

5.1 Fire

In case of fires, make sure that the following equipment is available near the system.

- SCBA (self -contained breathing apparatus) and protective gear in compliance with the Directive on Personal Protective Equipment 89/686/EEC.
- NOVEC 1230, FM-200, or dioxide extinguisher

Batteries may explode when heated above 150°C. KEEP FAR AWAY from the battery if it catches fire.

5.2 Leaking Batteries

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas .If one is exposed the leaked substance, immediately perform the actions described below.

- Inhalation: Evacuate the contaminated area, and seek medical attention.
- Contact with eyes: Rinse eyes with running water for 5 minutes, and seek medical attention.
- Contact with skin: Wash the affected area thoroughly with soap and water, and seek medical attention.
- Ingestion: Induce vomiting, and seek medical attention.

5.3 Wet Batteries

If the battery pack is wet or submerged in water, do not let people access it, and contact your supplier for help.

Damaged batteries are not fit for use and are dangerous and must be handled with the utmost care. It may leak electrolyte or produce flammable gas. If the battery pack seems to be damaged, pack it in its original container, and then return it to your supplier.

LiFePO4 Battery System for Households

6. Warranty Service

6.1 Warranty Period

In case of correct use of the product, the warranty period agreed in the commercial contract shall prevail.

6.2 Warranty Scope

During the warranty period, if the product is caused by quality problems, our company will repair or replace the product for free. Customers should reserve a reasonable response time for our company's repair, and the replaced product will be handled by our company. Customers need to show relevant proof of purchase of the product and ensure that the product trademark is clearly visible, otherwise our company has the right to not provide warranty guarantee.

6.3 Disclaimer

In the following situations, our company has the right not to provide quality assurance, but can still provide paid maintenance services.

1. The warranty period has expired;
2. Failure to provide relevant proof of product purchase;
3. Damage caused during transportation, loading and unloading;
4. Damage caused by improper installation, modification or dismantling by unauthorized personnel;
5. Damage caused by operation under abnormal conditions or environment;
6. Machine failure or damage caused by using non-Natong parts or software;
7. Failure caused by force majeure such as fire, earthquake, flood, etc.



User Manual

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