LiFePO4 battery pack

User Manual

（BEAR-48G1）

1 Summary

The Elephant-48628 is a low-voltage, high-capacity lithium iron phosphate battery pack designed for backup power in households, communication devices, and outdoor performances.

1. Product Features

*The positive electrode of the cell is made of lithium iron phosphate material, safe and reliable;

*The battery management system (BMS) features intelligent protection against overcharging, over-discharging, overcurrent, short circuits, and extreme temperatures.

*Flexible configuration and large capacity allow multiple modules to be used in parallel to increase service time and power.

*Built-in mainstream inverter communication protocols (e.g., Panneng, Gurewatt, Deye) enable effortless smart management.

* Passive heat dissipation mode, no noise.

1.2 Service environment

Environmental requirements

The battery pack should be operated in an environment without corrosive, flammable and explosive gases or objects, and should be far away from conductive dust and heat sources.

Environmental temperature, humidity, and pressure range

Discharge ambient temperature: -15℃~60℃;

Storage temperature: 10℃~35℃;

Relative humidity range: ≤95% (45℃±2℃);

Relative humidity range for storage and transportation: ≤95% (45℃± 2℃);

Atmospheric pressure range: 70~106k Pa.

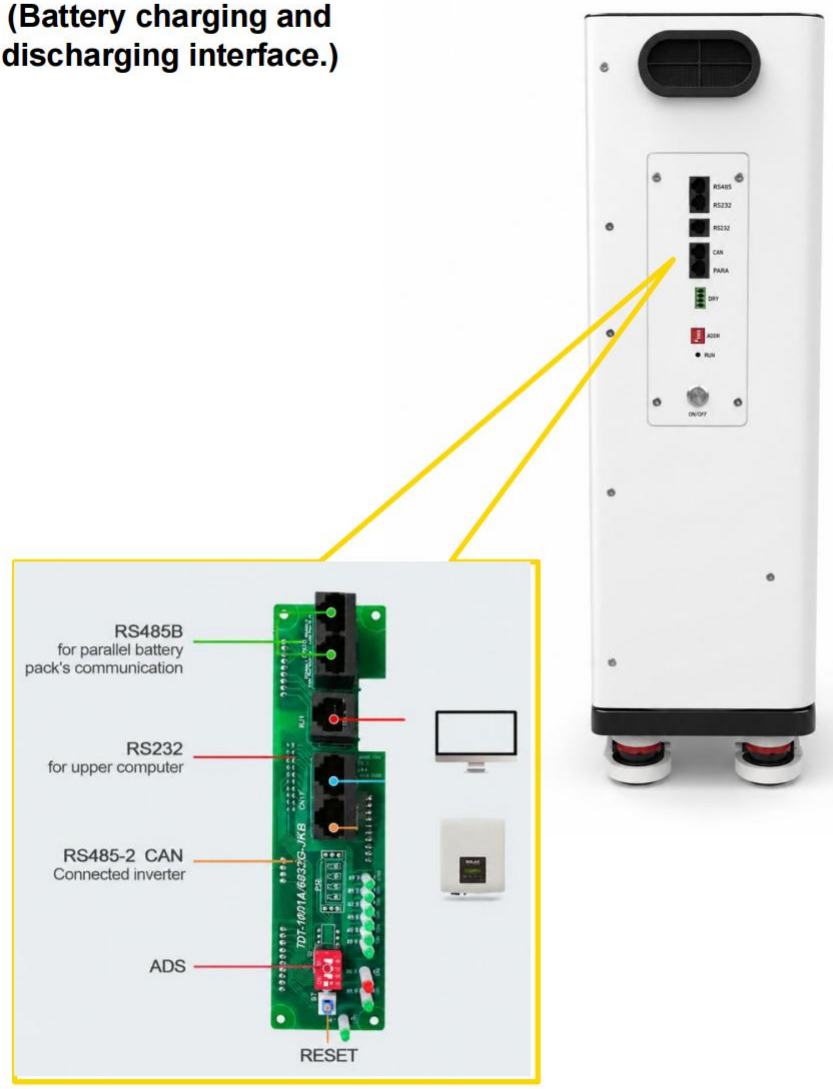
2 Product description

1. Key technical specifications

Specification Name	BEAR-48G1
Battery type	LiFePO4(LFP)
Rated voltage	51.2V
Rated capacity	400Ah
Rated energy	20.48kWh
Charge termination voltage	58.4V
Discharge cutoff voltage	44.8V
Recommended charging current (Per Port)	150Ah*2
Maximum continuous charging current (Per Port)	150A*2
Maximum continuous discharge current (Per Port)	150A*2
Cycle life	8000
Contact method	CAN\RS485
Size	42.91*25.75*7.13in
Weight	150kg/330lbs

2.2 Panel interface diagram and description

(Battery charging and discharging interface.)



2.3 LED instructions

State	Normal / alarm / protection	POWER	RUN	ALM	SOC (power indicator LED)						Instruction
		●	●	●	●	●	●	●	●	●	
Shut down	Sleep	off	off	off	off	off	off	off	off	off	All off
Standby	Normal	normally on	Flash1	off	According to battery indicator						Standby state
	Alarm	normally on	Flash1	flash3							Module of low voltage
Charging	Normal	normally on	normally on	off	According to battery indicator (battery indicator maximum LED flash 2)						Maximum power LED flash (2), ALM does not flash when the overcharge alarm is generated
	Alarm	normally on	normally on	flash3	According to battery indicator (battery indicator maximum LED flash 2)						
Overcharge protection		normally on	normally on	off	normally on	normally on	normally on	normally on	normally on	normally on	If there is no mains supply, the indicator is in standby state
Discharging	Normal	normally on	Flash3	off	According to battery indicator						Stop discharging
	Temperature, over current, short-circuit, reverse connection, fail-safe protection	normally on	off	normally on	off	off	off	off	off	off	Stop discharging
	Under-voltage protection	normally on	off	off	off	off	off	off	off	off	Stop discharging
Failure		off	off	normally on	off	off	off	off	off	off	Stop charging and discharging
	Temperature, over-current, fail-safe protection (Temperature, over current, fail-safe protection)	normally on	off	normally on	off	off	off	off	off	off	Stop charging

2.3 LED instructions

Discharging	Normal	normally on	flash3	off	According to battery indicator						
	Alarm	normally on	flash3	flash3	According to battery indicator						
	Under-voltage protection	normally on	off	off	off	off	off	off	off	off	Stop discharging
	Temperature, over-current, short-circuit, reverse connection, fail-safe protection	normally on	off	normally on	off	off	off	off	off	off	Stop discharging
Failure	off	off	normally on	off	off	off	off	off	off	off	Stop charging and discharging

Capacity indications

State		Charge 6 LED						Discharge 6 LED					
Capacity indicator		L1 ●	L2 ●	L3 ●	L4 ●	L5 ●	L6 ●	L1 ●	L2 ●	L3 ●	L4 ●	L5 ●	L6 ●
Power (%)	0~17%	Flash	Off	Off	Off	Off	Off	On	Off	Off	Off	Off	Off
	18~33%	On	Flash	Off	Off	Off	Off	On	On	Off	Off	Off	Off
	34~50%	On	On	Flash	Off	Off	Off	On	On	On	Off	Off	Off
	51~66%	On	On	On	Flash	Off	Off	On	On	On	On	Off	Off
	67~83.0%	On	On	On	On	Flash	Off	On	On	On	On	On	Off
	84.0~100%	On	On	On	On	On	Flash	On	On	On	On	On	On

LED flashing instructions

Flashing mode	On	Off
Flash1	0.25S	2.75S
Flash2	0.25S	0.75S
Flash3	0.25S	1.75S

2.4DIP switch settings

When PACKs are used in parallel, different PACKs can be distinguished by setting the address through the DIP switch on the BMS. Avoid setting the same address. Refer to the table below for the BMS DIP switch definition.

Address No.	DIP switch display	DIP switch position			
		#1	#2	#3	#4
1		ON	OFF	OFF	OFF
2		OFF	ON	OFF	OFF
3		ON	ON	OFF	OFF
4		OFF	OFF	ON	OFF
5		ON	OFF	ON	OFF
6		OFF	ON	ON	OFF
7		ON	ON	ON	OFF
8		OFF	OFF	OFF	ON

Address No.	DIP switch display	DIP switch position			
		#1	#2	#3	#4
9		ON	OFF	OFF	ON
10		OFF	ON	OFF	ON
11		ON	ON	OFF	ON
12		OFF	OFF	ON	ON
13		ON	OFF	ON	ON
14		OFF	ON	ON	ON
15		ON	ON	ON	ON

2.5The instruction of dry contact and reset switch

	Reset switch	When the BMS is in the active state, press the button (3~6 s) and release it; the protection board enters sleep mode (no charging), and the LED indicators light up one by one from the lowest power indicator for 0.5 seconds.
		When the BMS is in the active state, press the button (6~10 s) and release it; the protection board is reset, and all LED lights turn on simultaneously until the reset is complete.
		After the BMS is reset, the parameters and functions set through the upper computer are still retained. If the initial parameters need to be restored, this can be achieved by using "Restore Default Values" on the upper computer, but the related operating records and stored data remain unchanged (such as power, cycle times, protection records, etc.).

2.6 Automatic dial

	Automatic dial switch	All parallel BMS DIP switches should be in the "OFF" state, as shown in the figure.

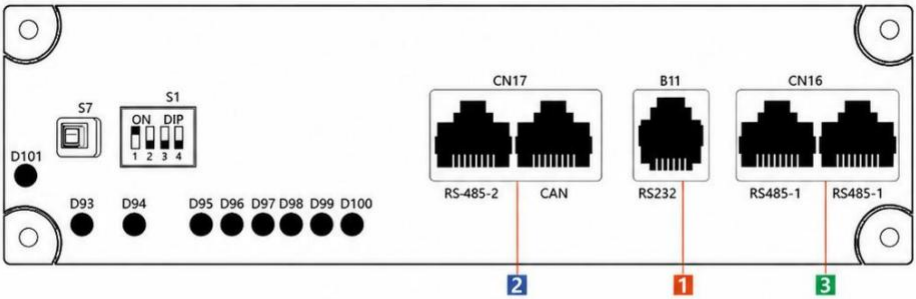
11.5.1. Connect the RS485 parallel connection correctly. Connect one end of the main BMS network cable to the Link Port OUT network port and the other end to the Link Port IN network port of the second parallel unit. Connect one end of the second parallel unit network cable to the Link Port OUT network port and the other end to the Link Port IN network port of the third parallel unit. Connect the parallel communication cables one by one. Do not connect the cable to the wrong position; otherwise, address assignment fails.

11.5.2. After connecting all BMS, turn all BMS on. Then turn off the on/off switch of the main BMS. If the parallel line is connected normally, all the BMS will be turned off. Turn on the on/off switch of the main BMS, and then all other BMS will turn on together. All the lights on the LED boards of all the BMS will start flashing. Wait for about 20 seconds, the main BMS will display the average SOC of all battery packs, and only the running lights of the slave BMS will flash. If you find that there are abnormal flashing lights, please check whether the parallel communication line is OK or not. Then follow the above steps.

11.5.3. After using the automatic DIP switch, if the manual DIP switch is used on the master BMS, the manual DIP switch can be used on other slaves. When the DIP switches of both the master BMS and slaves are OFF, the BMS address returns to the address where the automatic DIP switch is successful.

11.5.4. Redundancy can be used to monitor whether the number of parallel battery packs matches the actual number.

3.The diagram of RS485, CAN, RS232 and its definition description



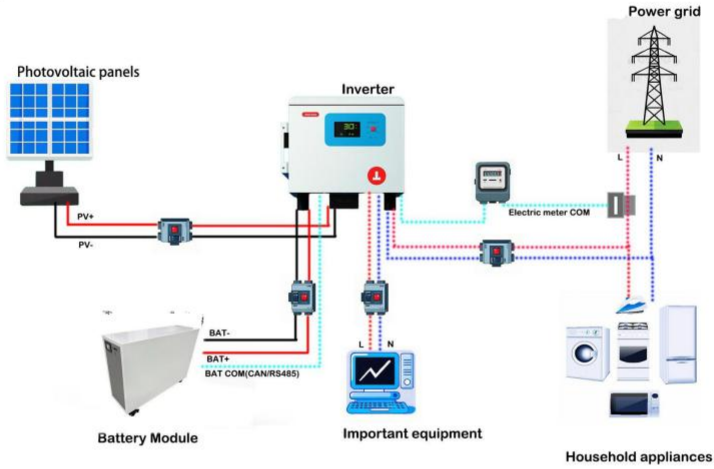
1 RS232 -- using 6P6C vertical RJ11 sockets	
RJ11 pin	Definition Description
2	NC
3	TX single board
4	RX single board
5	GND

2 RS485 -- using 8P8C vertical RJ45 sockets		CAN -- using 8P8C vertical RJ45 sockets	
RJ45 pin	Definition Description	RJ45 pin	Definition Description
1, 8	RS485-B1	1, 2, 3, 6, 8	NC
2, 7	RS485-A1	4	CANH
3, 6	GND	5	CANL
4, 5	NC	7	GND

3 RS485 -- using 8P8C vertical RJ45 sockets		RS485 -- using 8P8C vertical RJ45 sockets	
RJ45 pin	Definition Description	RJ45 pin	Definition Description
1, 8	RS485-B	1, 8	RS485-B
2, 7	RS485-A	2, 7	RS485-A
3, 6	GND	3, 6	GND
4, 5	NC	4, 5	NC

4 System Architecture

The system operates as shown in the diagram, consisting of four main components: solar panels, an inverter, a battery pack, and the power grid. Solar or generated electricity is first converted into battery charge through MPPT (Maximum Power Point Tracking) or the inverter. During nighttime, power outages, or high electricity prices, the stored energy from the battery powers electrical devices, achieving uninterrupted operation and load balancing.



5 Installation Guide

1. Installation Notes

(1)The product shall be installed in accordance with local laws and regulations;
(2)The personnel responsible for installation and maintenance must first undergo strict training, master the correct operation methods and safety precautions, and then can work on installation, operation or maintenance;
(3)During the installation process, insulation protection should be done, and it is strictly prohibited to operate with power;
(4) Avoid battery impact and fall during installation;
(5)Do not disassemble battery components without authorization. Battery maintenance must be performed by professional maintenance engineers.
(6)Keep the installation environment clean, without debris or inflammable items stacked;
(7)The installation environment shall be equipped with corresponding fire fighting equipment;
(8) Ensure that the installation ground is flat and firm;
(9) Avoid rain or direct sunlight.

5.2 Installation Setup

Check the outer box for damage. After opening the box, inspect the battery pack for water ingress, deformation, rust, or other abnormalities, and verify if any parts are missing. If any issues are found, contact the sales representative immediately and document them with photos or videos. If no abnormalities are detected, sign for the package as usual.

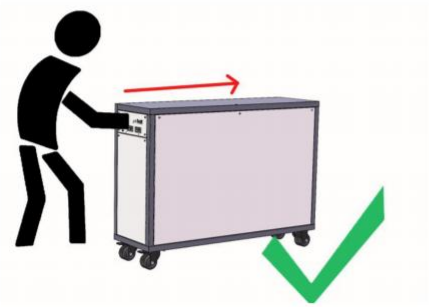
tool

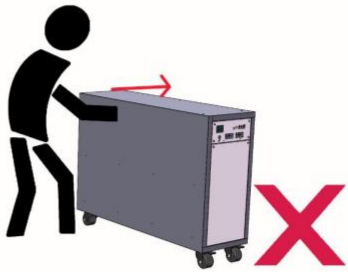
NO.	name	specifications	remarks
1	electric screwdriver	/	Equipped with M4-M8 sleeves
2	spanner	M8	screwed connection
3	bolt driver	Phillips screwdriver	/

4	art knife	/	/
5	sleeve	M8	Positive and negative terminal cables
6	multimeter	/	measure
7	wire stripping pliers	/	Wiring Harness Connections
8	diagonal pliers	/	/
9	USB-RS485 communication cable	/	Battery Monitoring
10	notebook PC	/	Battery Monitoring
11	insulating gloves	/	safety protection
12	Insulated safety shoes	/	safety protection

5.3 Installation

Step 1: Move the battery pack to the required installation position. Use appropriate tools such as forklifts during the process. When pushing manually, apply force from the narrow side to avoid tipping risks caused by wide-side pressure. After securing the battery, press the wheel brake.





Step 2: Connect the wiring to the inverter battery input port first, then plug the wiring plug into the battery pack plug, and connect the communication line. Ensure that the other components are connected and then start the machine for verification.

Parallel Usage Instructions
When using multiple battery packs in parallel, prepare a junction box with a circuit breaker to connect them in parallel before connecting to the inverter.

6 Maintenance and disposal

1. Maintenance instructions

1. Please store the battery in a dry and well-ventilated environment. Storage temperatures that are too high or too low will affect the battery's self-discharge rate and accelerate its natural aging. The recommended storage temperature range is 20~45°C, and keep it away from water sources, heat sources, as well as other metal objects.
2 .If the battery is not used for a long time, it is recommended to store it properly with the battery in a semi-charged state (60% SOC). It is advisable to discharge the battery to 30% every three months and then recharge it to 60%.
3 .For safety reasons, do not store this battery in environments above 45° C or below 20°C for extended periods; to prolong battery lifespan, it is recommended to use this battery within an ambient temperature range of 20°C to 45°C.
4.If the battery level is below 1% after use, please charge it to 60% before storage. If left unused for an extended period with critically low power, irreversible damage to the battery cell may occur, shortening the overall lifespan of this battery;
5. If the battery power is critically low and left idle for an extended period, the battery will enter deep sleep mode. It must be recharged before reuse to restore functionality.

6.2 Abandonment

1.If conditions permit, please ensure to completely discharge this battery before placing it in the designated battery recycling bin. This battery contains hazardous chemicals and is strictly prohibited from being discarded in regular trash bins. For relevant details, please comply with local laws and regulations regarding battery recycling and disposal.
2.If the battery fails to complete a full discharge due to its own malfunction, do not discard it directly into the battery recycling bin. Instead, contact a professional battery recycling company for further handling.
3.Over-discharged batteries will fail to activate. Please dispose of them in accordance with local laws and regulations on battery recycling and disposal.

7 Frequently Asked Questions

1.After connecting the battery pack to the inverter, the inverter fails to power on. What could be the reason?
Answer: The inverter has a relatively large capacitive load. The battery pack switch should be turned on first, followed by the inverter switch, to allow the BMS pre-charging function to operate.
2. Does the battery pack experience SOC jumps after usage?
Answer: The battery pack SOC requires calibration. After disconnecting communication, follow the parameter table to complete the charge-discharge process for calibration.
3.When battery packs are connected in parallel, is there inconsistency in power and SOC between the battery packs?
Answer: Due to the resistance differences between individual battery harnesses and battery packs, those with lower resistance will be prioritized for charging or discharging, which is a normal phenomenon and does not affect actual usage.
4. Frequent power outages in the battery pack?
Answer: Check whether the load power is too high, whether the wiring harness connection is secure, and whether environmental conditions such as temperature meet the battery pack parameters.

Thank you for observing this user manual. If you have any doubts, please contact the after-sales technicians. Thank you!