

ELFBULB ECO Series Lithium Battery
25.6V200Ah 51.2V100Ah

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USER MANUAL



ELFBULB ECO Standard Model Series
Lithium Ion Battery 25.6V200Ah & 51.2V100Ah Series

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Warning

► Lightning has great destructive power. If buildings are not equipped with lightning protection devices, lightning can directly damage the buildings and their indoor electronic and electrical equipment, including batteries. To prevent lightning damage to batteries, ensure that lightning protection devices are installed at the AC and DC terminals outside the battery.

► Important Note:

- 1.Before using the battery for the first time, please perform one complete cycle of full discharge and charge to ensure the State of Charge (SOC) is displayed correctly.
- 2.If this step is skipped and issues occur with the SOC, perform a full cycle of complete discharge and charge to resolve the issue.

► Troubleshooting steps:

- 1.This is a common and typical occurrence.
- 2.Even the slightest disparities in internal cell voltages, state of charge, cell resistance, BMS resistance, and even the voltage drop of the mos fets can result in the two separate battery strings carrying different amounts of current.

However, in real-world situations, this should not pose a problem as long as proper planning is in place. When current is drawn, one battery may supply more power initially. This causes that battery to discharge slightly faster, eventually leading to a drop in its internal voltage. At that point, the other battery will begin to carry more of the load. Once this process starts, the cells will self-balance.

With lithium iron phosphate (LFP) cells, voltage changes occur gradually, so it may take some time for the balance to be fully achieved.

Our products undergo strict testing and inspection before leaving the factory. If you detect any abnormalities in the equipment, please contact the provider immediately.

Special instructions

► This manual uses a 5.12kWh battery system as an example to introduce our product. This particular model is equipped with a 3.5-inch button screen, breaker, and 100A battery management system (BMS). All illustrations and descriptions are based on this configuration.

► Please note that this product is available in a variety of different configuration options. Terminal quantity, touchscreen, and breaker are all optional.

► This manual is for reference and guidance only. Due to the numerous configuration options, the actual product you purchase may differ in appearance and some functions from the description in this manual. Please refer to the specific specifications of the product you purchased for accurate information.

1 Basic information

1.1 Product overview and features

Our products undergo strict testing and inspection before leaving the factory. If you detect any abnormalities in the equipment, please contact the provider immediately.

The ECO Series is an advanced energy storage solution designed for use in photovoltaic solar systems.

Product Features:

- **Premium Components:** Built with high-quality lithium iron phosphate aluminum shell cells, a high-efficiency Battery Management System (BMS), and an anti-static metal shell.
- **Enhanced Stability:** Square aluminum shell cells provide excellent stability and rapid heat dissipation.
- **Reliable BMS:** The BMS ensures effective management of overcharge, over-discharge, short circuits, and over-temperature conditions, enhancing safety and performance.
- **Robust Protection:** The thickened metal shell offers superior durability and protection against external elements.

System Features:

- A continuous 100A discharge and charging capacity.
- Supports 6,000 cycles at 80% Depth of Discharge (DOD), ensuring long-lasting reliability.
- Capable of parallel connection to create larger capacity battery packs, meeting long-term power supply requirements.
- Incorporates a closed-line design to prevent dust and insects from obstructing the interface, increasing operational safety and ease of use.

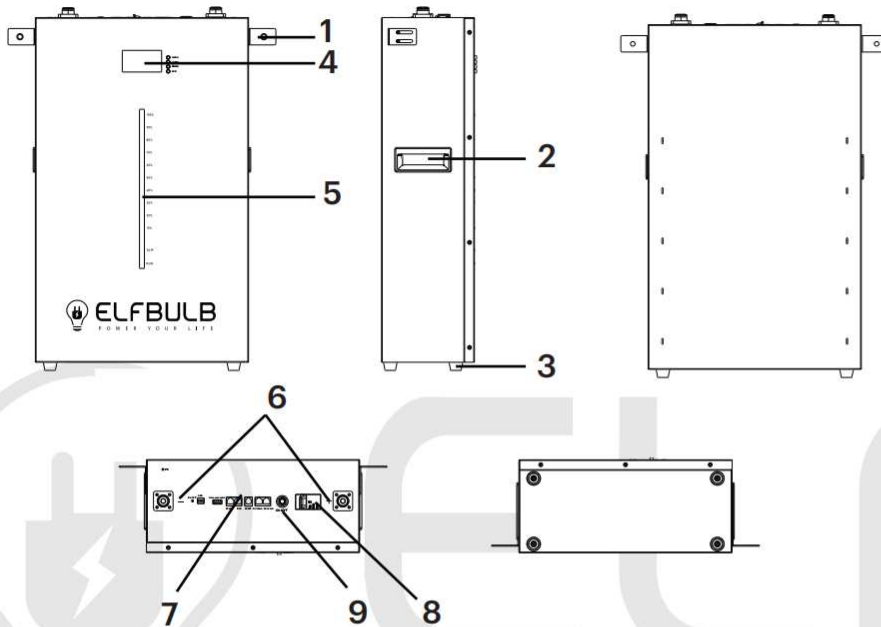
Product series display



1.2 Basic parameters

MODEL	25.6V200Ah	51.2V100Ah
Total Energy(kWh)	5.12	5.12
Rated Capacity(Ah)	200	100
Usable Capacity(Ah)	25.6	51.2
Nominal Voltage(V)	28	56
Float Voltage(V)	28.8	57.6
Equalization Voltage(V)	22.4	44.8
Discharge Cutting Voltage(V)	100	100
MAX.Charge & Discharge Current(A)	100	100
Product Size(mm)	≈630*390*170	≈630*390*170
Net Weight(kg)	≈47.2	≈47
Gross Weight(kg)	≈50.3	≈50.1
Scalable	1-15 in parallel	
Communication Ports	CAN,RS485,RS232	
Communicated Inverter	Goodwe/Victron/Sofar/Deye/Voltronic /Pylon /Luxpower Afore/Must/Sako/Sorotec/ Sma/ Solis / Phocos /Kstar / Mpp Solar /Growatt/Megarevo/Sme	
Charging Temp Range(°C)	0-55	
Disharging Temp Range(°C)	-10-55	
Cycle Lifes	≥6000 cycles @80%DOD at 25°C	
Warranty	5 years	
Certifications	CE,UN38.3,MSDS	
Function	Breaker, LED String Light. 3.5 inch Button Screen.	

1.3 Product function introduction



NO.	Name	Function
1	Battery holders	Secure the battery to the wall to prevent it from moving
2	Handle	Easy to move battery
3	Foothold	Prevent the battery from directly touching the ground and damaging the surface
4	LCD Screen	Button screen for easy operation
5	Indicator light	Battery status indicator
6	Output terminal	Positive and negative output
7	Communication interface	CAN, RS485, RS232 communication ports
8	Breaker	Circuit breaker protection
9	Power switch	Power On/Off

2 Installation instructions

2.1 Installation preparation

- **Safety Requirements:** This system must be installed only by personnel trained in power systems who have sufficient knowledge of such systems. During installation, always adhere to the safety regulations outlined below as well as local safety standards.
- Ensure that all devices are powered off before beginning any operation, and use devices or accessories compatible with the battery parameters.
- Power distribution cables must be routed in a safe and organized manner with protective measures in place to prevent accidental contact during operation.
- Wear appropriate personal protective equipment, such as goggles, gloves, and installation attire.
- Prepare the necessary installation tools:

Drill	Hammer	Wrench	Screw	Wire strippers
Insulating tape	Electric pencil	Multi meter	Pliers	Measuring ruler

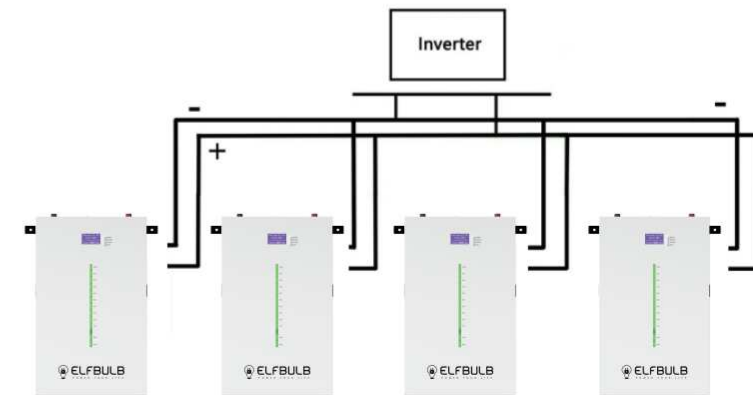
2.2 Engineering coordination

Before construction begins, consider the following:

- **Power Line Specifications:** Ensure the power line specifications meet the requirements of the maximum discharge current for each product.
- **Mounting Space and Load Capacity:** Confirm that there is sufficient space for battery installation and that the rack or bracket can support the load.
- **Power Line and Grounding:** Ensure proper routing of power and grounding lines to prevent short circuits, water exposure, and corrosion.

2.3 Parallel connection

When connecting multiple lithium batteries in parallel (e.g., 2 or 3 units) with a 1 inverter, it is essential to install a distribution box for safe and efficient operation.



2.4 Electrical interface check

Devices connected directly to the batteries can include user equipment, power supplies, or other power sources

- ▶ Ensure the user's PV power generation equipment, power supply, or other power source has a DC output interface, and verify that its voltage meets the inverter requirements.
- ▶ Confirm that the maximum discharge current capability of the DC power interface from the PV system, power supply, or other source exceeds the maximum charging current of the batteries.

2.5 Electrical installation

Before connecting power cables, use a multi meter to check for cable continuity, short circuits, and confirm the polarity. Accurately label the cables.

Measuring Methods:

- ▶ **Cable Availability:** Set the multi meter to buzzer mode and use the probe to test both ends of the same-colored cable. If the buzzer sounds, the cable is good.
- ▶ **Short Circuit Judgment:** Set the multi meter to resistance mode and probe the positive and negative ends. If the resistance reads infinity, the cable is good.
- ▶ After visually confirming proper cable connections, connect the positive and negative terminals of the batteries to the corresponding terminals of the opposite side.

It is recommended to install a circuit breaker between the inverter and battery system. The circuit breaker specifications should be:

Voltage: $U > 60V$

Current: $I = \frac{\text{Inverter Power}}{43V}$

2.6 Use, maintenance and troubleshooting

Battery System Usage and Operation Instructions

After completing the electrical installation, follow these steps to start the battery system:

- 1.Refer to section 1.3. Press the self-locking switch to the "ON" position. The display screen and indicator will light up.
- 2.After the indicator self-test, the "RUN" indicator will light, and the SOC (State of Charge) indicator will turn on.

Notes:

- 1.If the battery status indicator on the front panel remains red after pressing the power button, please refer to "3.5 Alarm Description and Processing." If the issue cannot be resolved, contact the dealer promptly.
 - 2.Use a voltmeter to check if the voltage at the circuit breaker battery access terminal is greater than 43V. Ensure the voltage polarity matches the inverter's input polarity. If the terminal shows a voltage greater than 43V, the battery has started normal operation.
 - 3.After confirming that the battery output voltage and polarity are correct, turn on the inverter and close the circuit breaker.
- Check if the communication indicator and battery access status indicator of both the inverter and battery connection are normal. If they are functioning correctly, the connection between the battery and inverter is complete. If any indicator shows an abnormal status, refer to the inverter manual for troubleshooting or contact the dealer.

3 Operating mode

3.1 Ambient temperature alarm protection

Ambient Temperature Warning	Ambient Low-Temperature Warning	-15°C
	Ambient Low-Temperature Protection	-20°C
	Ambient Low-Temperature Protection Release	-15°C
	Ambient High-Temperature Warning	65°C
	Ambient High-Temperature Protection	75°C
	Environmental High-Temperature Protection Contact Temperature	65°C

3.2 Other protection features

- ▶ Short Circuit Protection

1)The system activates short circuit protection when a short circuit occurs.

2)Protection will automatically release once the load is removed or a charging source is connected.

- ▶ Self-Shutdown

If there are no external loads, power supply, or communication for over 24 hours, the device will automatically enter dormant standby mode to conserve energy.

3.3 Key description and buzzer action description

Key Functions

1.Activate the BMS

- ▶ When the BMS is in sleep mode, press the button for 3–6 seconds and release.

- ▶ The protection board activates, and the LED indicators light up sequentially for 0.5 seconds starting from "RUN."

2.Enter Sleep Mode

- ▶ When the BMS is active, press the button for 3–6 seconds and release.

- ▶ The protection board enters sleep mode, and the LED indicators light up for 0.5 seconds starting from the lowest battery light.

3.Reset the BMS

- ▶ When the BMS is active, press the button for 6–10 seconds and release.

- ▶ The protection board resets, and all LED lights illuminate simultaneously for 1.5 seconds.

4.Restore Initial Parameters

- ▶ After resetting, the system retains the parameters and functions set by the host computer.

- ▶ To restore default settings, use the "Restore Default Value" option on the host computer. Operating records (e.g., power, cycle count, protection logs) remain unchanged.

Buzzer Functions

1.Fault Indicator

- ▶ Beeps for 0.25 seconds every 1 second.

2.Protection Mode

- ▶ Beeps for 0.25 seconds every 2 seconds (excluding over-voltage protection).

3.Alarm Mode

- ▶ Beeps for 0.25 seconds every 3 seconds (excluding over-voltage alarms).

Note:

- ▶ The buzzer function can be enabled or disabled via the host computer.

- ▶ The factory default setting for the buzzer is disabled.

3.4 Working status of the indicator light

State	Normal /Alarm /Protection	ON/ OFF	RUN	ALM	SOC Indication LEDs								Instructions
		•	•	•	•	•	•	•	•	•	•	•	
Power Off	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All LEDs are off.
Standby	Normal	ON	Flash1	OFF	Indication by SOC								The battery is on standby with no alarms.
	Alarm	ON	Flash1	Flash3									Alarm due to low cell voltage.
Charge	Normal	ON	ON	OFF	Indication by SOC (The top SOC Led Flash 2)								Description for Charge (Normal): Maximum power LED flashes (Flash ²). ALM does not flash for overcharge warning.
	Overcharge alarm	ON	ON	Flash3									Description for Charge (Alarm): Overcharge alarm.
	Over Charge Protection	ON	ON	OFF	ON	ON	ON	ON	ON	ON	ON	ON	If no mains supply, LED as standby
	Temperature, Over-current Fault Protection	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Close charge
Discharge	Normal	ON	Flash3	OFF	Indication by SOC								Close
	Alarm	ON	Flash3	Flash3									
	Under	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Close discharge
	Temperature, Over-current, Short Circuit Fault Protection	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Close charge Close discharge
Fault		OFF	OFF	LED working status indication	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Close charge Close discharge

State		Charge						Discharge					
Capacity indicator light		L6	L5	L4	L3	L2	L1	L6	L5	L4	L3	L2	L1
Electricity (%)	0 ~ 16.6%	OFF	OFF	OFF	OFF	OFF	flash2	OFF	OFF	OFF	OFF	OFF	ON
	16.6 ~ 33.2%	OFF	OFF	OFF	OFF	flash2	ON	OFF	OFF	OFF	OFF	ON	ON
	33.2 ~ 49.8%	OFF	OFF	OFF	flash 2	ON	ON	OFF	OFF	OFF	ON	ON	ON
	49.8 ~ 66.4%	OFF	OFF	flash2	ON	ON	ON	OFF	OFF	ON	ON	ON	ON
	66.4 ~ 83%	OFF	flash2	ON	ON	ON	ON	OFF	ON	ON	ON	ON	ON
	83.0-100%	flash2	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Running light •		ON						flash(flash 3)					

4 Communication description

4.1 RS232 communication

- Function: Allows communication between the BMS and a host computer.
- Information Monitored: battery voltage, current, temperature, status, production information
- Default Baud Rate: 9600 bps

4.2 CAN communication

- Function: Supports Controller Area Network (CAN) communication for efficient data exchange.
- Default Communication Rate: 500 Kbps

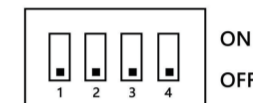
4.3 RS485 communication

- Function: Features dual RS485 interfaces for system monitoring and interaction.
- oEnables viewing of individual PACK information.
- oAllows communication with monitoring devices acting as hosts.
- oHosts poll data according to the address of each PACK.
- Default Baud Rate: 9600 bps

4.4 DIP switch address setting

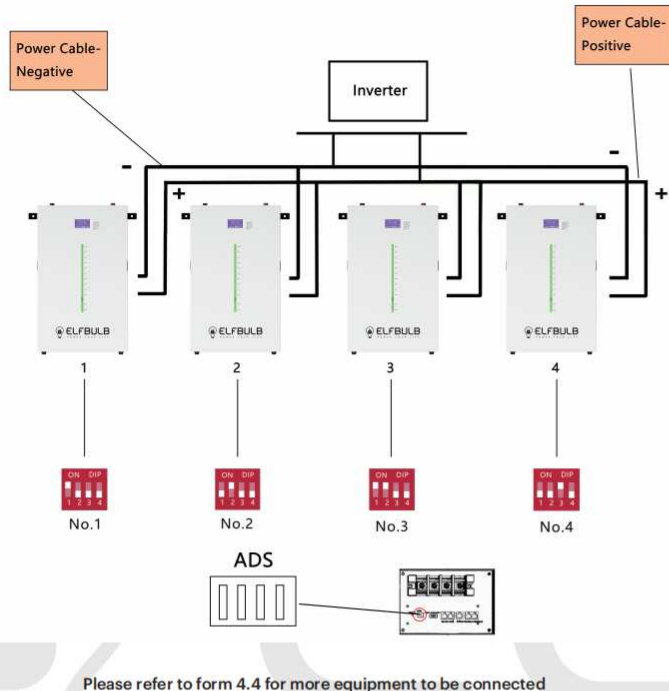
- Purpose: Distinguishes between battery packs when used in parallel by setting unique addresses via the DIP switch on the BMS.

- Important Note: Ensure that no two packs have the same address to avoid communication conflicts.

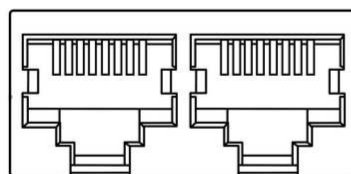


Address	Dial code switch position			
	#1	#2	#3	#4
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

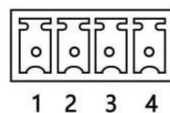
Demonstration of DIP switch for 4 unit batteries in parallel



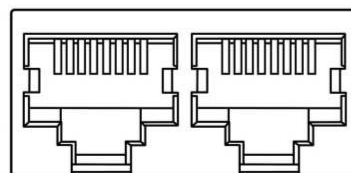
4.5 Communication interface definition as shown below



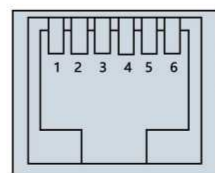
CAN and RS485 interface



Dry contact



Parallel communication port



RS232 communication port

4.6 Electrical interface definition

RS232--Adopt 6P6C vertical RJ11 socket	
RJ11 pin	Definition description
2	NC
3	TX (veneer)
4	RX (veneer)
5	GND

CAN-- adopts 8P8C vertical RJ45 socket		RS485-- 8P8C vertical RJ45 socket	
RJ45 pin	specifies	RJ45 pin	specifies
1, 2, 3, 6, 8	NC	9, 16	RS485-B1
5	CANL	10, 15	RS485-A1
4	CANH	11, 14	GND
7	GND	12, 13	NC

CAN and RS485 interface

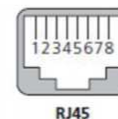
RS485-- 8P8C vertical RJ45 socket		RS485-- 8P8C vertical RJ45 socket	
RJ45 pin	specifies	RJ45 pin	specifies
1, 8	RS485-B	9, 16	RS485-B
2, 7	RS485-A	10, 15	RS485-A
3, 6	GND	11, 14	GND
4, 5	NC	12, 13	NC

Parallel communication port

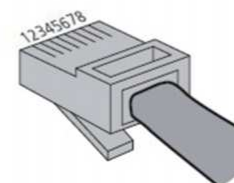
Interface	Definition			
B+	The positive pole of the battery PACK is used to supply power to the BMS; the positive power P+ is directly connected to the positive pole of the battery			
B-	Battery PACK negative pole			
P-	The negative electrode of the battery PACK, that is, both the negative electrode for charging and the negative electrode for discharging (the same port for charging and discharging)			
	J2-1	NTC1	J4-1	NTC2
	J2-2	NTC	J4-2	NTC
	J2-3	CELL1-	J4-3	CELL5+
	J2-4	CELL1+	J4-4	CELL6+
	J2-5	CELL2+	J4-5	CELL7+
	J2-6	CELL3+	J4-6	CELL8+
	J2-7	CELL4+		
	J5-1	NTC3	J6-1	NTC4
	J5-2	NTC	J6-2	NTC
	J5-3	NC	J6-3	CELL13+
	J5-4	CELL9+	J6-4	CELL14+
	J5-5	CELL10+	J6-5	CELL15+
	J5-6	CELL11+	J6-6	CELL16+
	J5-7	CELL12+		



RJ11



RJ45



4.7 Compatible to brand inverter

NO.	Brand of inverter
1	Deye
2	Pylontech
3	Growatt
4	Sofar
5	Luxpower
6	Voltronic power
7	Sunsynk
8	Goodwe
9	Megarevo
10	Solis
11	Must
12	Srne
13	Schneider
14	Phocos
15	Victron energy
16	Sorotec
17	SMA
18	Aoguan
19	Invrt
20	Sako
21	Solark
22	Afore
23	Mppsolar

5 Storage and use environment requirements

- ▶ Working temperature: -20℃~+55℃
- ▶ The charging temperature range: 0℃~+55℃
- ▶ Discharge temperature range: -20℃~+55℃
- ▶ Storage temperature: -10℃~+35℃
- ▶ Relative humidity: 5% ~ 85%RH
- ▶ Altitude: no more than 4000m
- ▶ During storage, recharge once every 6 months to 60%-80%DOD
- ▶ Working environment: indoor installation, the site is protected from the sun, no wind, no conductive dust and corrosive gas

6 Accessories

- ▶ Lithium battery * 1 unit
- ▶ Tinnedcopper Corewire * 2
- ▶ Communication line * 2
- ▶ Screws
- ▶ Battery holders * 2
- ▶ Manual * 1

Pay attention to check before unpacking

- ▶ Loading and unloading should be carried out in accordance with the rules and regulations to prevent the sun and rain.
- ▶ The total number of packages should be indicated on the shipping manifest accompanying each package and checked for completeness.
- ▶ During the unpacking process, handle with care to protect the surface coating of the object.
- ▶ When opening the package, the installer should read the technical documents, verify the list, and ensure that the items are complete and complete according to the configuration sheet and packing list. If the internal package is damaged, the shipper should be contacted in time

Please read this instruction manual carefully. This manual provides technical information on the product's composition, performance, and features, with the aid of illustrations and text descriptions. This manual may still contain errors and is subject to change without notice. If you have any questions or suggestions regarding the use of this manual, please contact us. We will do our best to help you solve your problems in a timely manner and sincerely appreciate your suggestions.

Thank you for choosing ELFBULB lithium battery.