ECO-WORTHY
ENERGY FOR INDEPENDENCE

Manual Version: 1.0.0

LiFePO4

51.2V 100AH LIFEPO4 WALLMOUNT INDOOR BATTERY

USER MANUAL

Operation and Maintenance

(Model: ECO-LFP48100WM01)

SUPPORT
If you are experiencing technical problems and cannot find a solution in this manual,please contact ECO-WORTHY for further assistance.

·Call:+1 417 462 0067(US/CA)
+49 6175-6514-999(DE)
+44 161 564 9562(UK)

·Web://www.eco-worthy.com/

·E-mail: essvipsupport@eco-worthy.com.cn

Description

This manual describes in detail the requirements and procedures for safe installation and operation of ECO-WORTHY lithium battery pack. Please read this manual carefully. Only qualified persons are allowed to install, operate and maintain the system, otherwise it may cause product damage or personal safety risks.

Any actions against safety operation, or do not follow rules of this manual and limited warranty letter, will void warranty and qualification of this product. Meanwhile, the manufacturer will be not responsible for the product damage, property damage, personal injury or even death.

The information contained in this manual is accurate when it's issued. **ECO-WORTHY reserves right to change specification (such as optimization, upgrade or other operations)** without prior notice.

In addition, please noted that the diagrams/schematics in this document are used to help understand system configuration and installation instructions, which may be different from the actual items in the installation.

Contents

I. Information

1.1 Validity

This document is valid for: ECO-LFP48100WM01.

1.2 Target Group

This document is intended for qualified persons and operators. Only qualified persons are allowed to perform activities marked with a warning symbol and the caption “Qualified person” in this document. Qualified persons must have the following skills:

• Knowledge of how lithium iron phosphate batteries work and are operated.

• Knowledge of how an energy storage system (including PV/battery/hybrid inverter, MPPT, Meter, Distribution box etc.) works and is operated.

• Knowledge of local applicable connection requirements, standards, and directives.

• Training in the installation and commissioning of electrical devices and batteries.

• Training in how to deal with the dangers and risks associated with installing, repairing and using electrical devices and batteries.

1.3 Levels of warning messages

The following levels of warning messages may occur when handling the product.

DANGER
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury or product permanent damage.

NOTICE
Indicates a situation which, if not avoided, can result in property damage or product not working or accelerated product damage.

1.4 Symbol Description

SYMBOL	DEFINITION
	Indicates the danger of electric shock. If not avoided, it would cause casualities.
	Indicates a potentially dangerous condition which could result in injury or death.
	Indicates important information or warnings related to concepts talked about in the text.
	Indicates more information is available in other documents relating to the subject and reader.
	Indicates important steps or tips for optimal performance.
	Do not place the battery within children/pet touchable area.
	Do not place the battery near heat source and flammable material.
	Do not expose the battery to direct sunlight, rain and snow.
	Do not short circuit the battery.
	Recycle label
	WEEE designation
LABEL	**DEFINITION**
	Indicates activities that can only be performed by qualified persons.
	Grounding point

1.5 Abbreviation Description

ABBREVIATION	DEFINITION
Battery/battery pack/battery module	Single ECO-LFP48100WM01 rechargeable lithium iron phosphate battery pack including cells, BMS and enclosure etc.
Battery system/ cluster	Multiple ECO-LFP48100WM01 battery pack connected in parallel with power, communication and grounding cables and installation auxiliaries.
BMS	**Battery management system** Electronical Unit to ensure lithium cells' safety and display information or control the operation of the battery.
SOC	**State of charge** The battery state of charge refers to the percentage of the remaining capacity and rated capacity of the battery.
SOH	**State of health** The battery health status refers to the percentage between the full charged capacity and the rated capacity of the battery.
DIP switch	Used to set the address of the battery in the battery pack.

II. Safety

2.1 Safety precautions

DANGER

- Do not impact the battery with heavy objects.
- Do not squeeze or pierce the battery pack.
- Do not throw the battery pack into the fire.
- Do not connect the battery in series.

WARNING

Fire risk

- Do not expose the battery pack to the condition over 80°C.
- Do not put the battery near a heat source, such as a fireplace.
- Do not expose the battery pack to direct sunlight or raining.

WARNING

Electric shock risk

- Do not allow non-qualified person to disassemble the battery pack.
- Do not touch the battery pack with wet hands.
- Do not expose the battery pack to moisture or liquid environment.

NOTICE

Damage risk

- Do not short-circuit or reverse connect the battery.
- Do not use chargers or charging devices unapproved by the manufacturer to charge the battery.
- Do not mix batteries from different manufacturers or different kinds, types or brands.
- For safety, it is not recommended to use the battery near the ocean.

2.2 Safety instructions

The battery has been designed and tested in accordance with international (such as UN38.3 etc.) safety requirements. However, due to various factors during the whole lifetime process, ECO-WORTHY cannot guarantee absolute safety, in order to prevent personal and property damage and ensure long-term operation of the battery. Please do read and follow the section below carefully to operate the battery and handle emergency situations.

2.3 Safety gear

Please wear the following safety equipment for battery handling and installation.

Insulated gloves

Safety Glasses

Safety Shoes

2.4 Emergency safety measures

• Water Invasion
Please cut off the AC power supply of the system first and then disconnect all switches under the premise of ensuring safety.

• Electrolyte or Gas Leakage
If the battery pack leaks electrolyte, avoid contacting with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below.

• Gas Inhalation
Evacuate the people from the contaminated area and seek medical aid immediately.

• Eye Contact
Flush your eye with clean and flowing water for 15 min, and then seek medical aid immediately.

• Skin Contact
Thoroughly rinse the exposed area with soap and water to be sure no chemical or soap is left on them, and seek medical aid immediately.

• Ingestion: Induce vomiting, and seek medical help immediately.

WARNING
In case of fire situations, please use carbon dioxide fire extinguisher rather than liquid to put out fires.

2.5 Other Tips

• All the product are strictly inspected before shipment.
Please contact us for replacement if you notice there are any defectives such as swelling etc.

• Do not disassemble batteries and components, otherwise the manufacturer will not be responsible for any damage caused by unauthorized disassembly or repair.

• Enable the battery to be safely grounded before use to make sure the system in safe and normal operation.

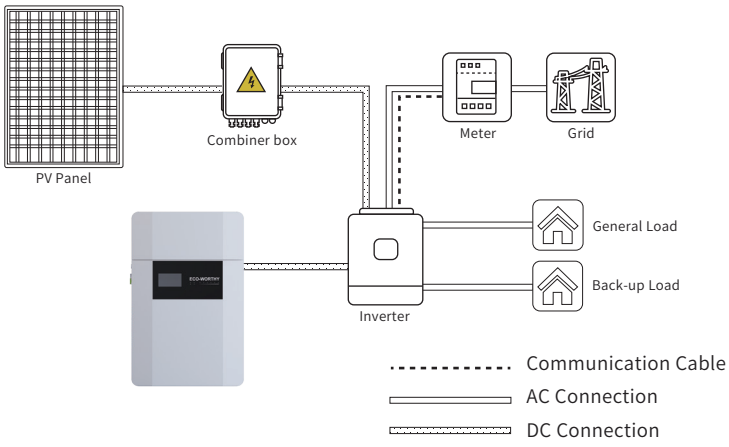
• Please ensure that the electric parameters of these devices are compatible mutually before connecting the battery to other devices.

• Please take the environmental factors into careful considerations to ensure that the system can work in a suitable condition as the environment and storage methods have a certain impact on the service life and reliability of this product.

III. Product Overview

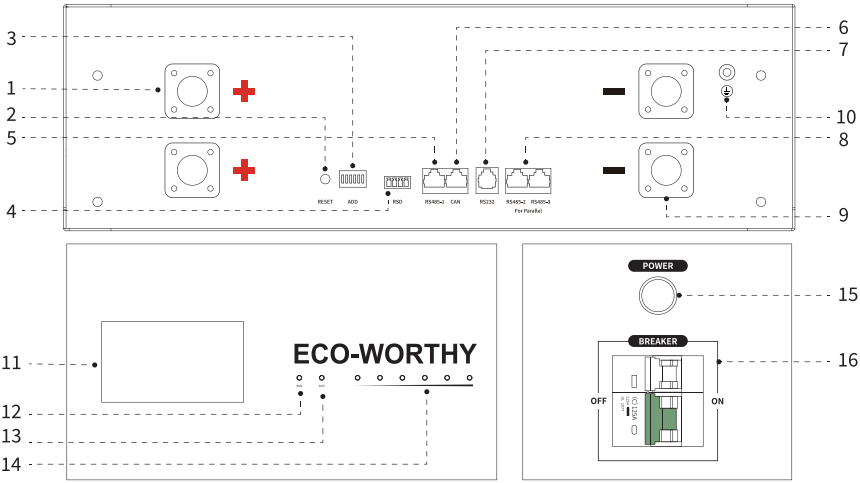
3.1 Introduction

The wall-mounted battery is a 51.2 V lithium-ion energy-storage unit designed for residential photovoltaic systems. It features an integrated BMS and a detachable cable-management box for an organized installation. Compatible with hybrid inverters, it supports off-grid, backup, and on-grid operation, delivering flexible, space-saving, and user-friendly home energy storage.



CAUTION

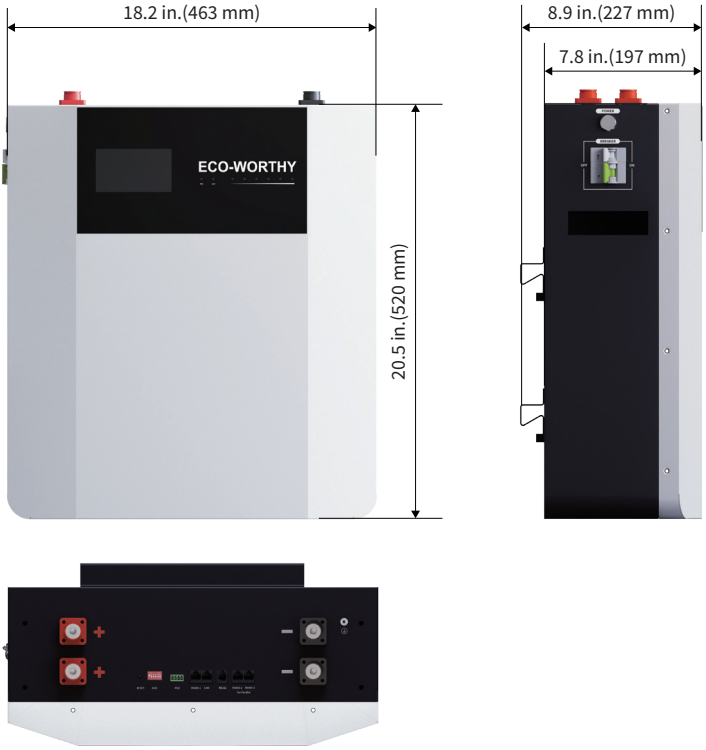
This electrical connection in this diagram is only for illustration. Please follow the manual suggestions of related devices and operate in accordance with locally applicable connection requirements, standards, and directives.



NO.	Item	Description	Remark
1	Positive Terminal	M8 high-current terminals x 2	200A current rating
2	Reset	Reset the BMS	
3	ADD	Set battery address in pack	
4	RSD	For wired rapid shutdown switch	
5	RS485-1	Closed-loop comms with inverter	
6	CAN	Closed-loop comms with inverter	
7	RS232	Connect to host computer/inverter	
8	RS485-2 & RS485-3	For battery to battery comms	
9	Negative Terminal	M8 high-current terminals x 2	200A current rating
10	GND	Equipment grounding conductor	
11	Screen	LCD Touchscreen	4.3 in.
12	RUN	RUN LED display	Green
13	ALM	ALM LED display	Red
14	SOC	Show battery real-time SOC	Green
15	Power Switch	Turn BMS on/off	
16	Breaker & Shut release	Over-current & Short Circuit protection & Out put switch	Max.125A

3.2 Specification

3.2.1 Dimension



3.2.2 Parameters

Item	ECO-LFP48100WM01
Rated Voltage	51.2V
Rated capacity	100Ah (0.5C, 77°F)
Max.charging voltage	58.4V
Low voltage cut-off	40.0V
Nominal energy	5.12KWh
Dimension	18.23*8.93*20.47in/46.3*22.7*52cm
Weight	50kg

Standard charge current	⩽50A	
Max. charge current	100A	
Standard discharge current	⩽50A	
Max. discharge current	100A(initial temp. ⩽35°C)	
Communication port	RS485 /CAN/RS232	
Max. moduels in parallel	32pcs	
Operating temperature	Charge: -20~55°C	Discharge: -20~55°C
Storage temperature	-20~25°C	Less than 1 year
	-20~40°C	less than 3 months
	Environment at the shipment state	60±25%R.H.

BMS Parameters			
Charge	**Spec**	**Delay**	**Recovery**
Cell Voltage Protection	3650mV	3000mS	3400mV
Module Voltage Protection	58.4V	3000mS	54.4V
Over Charging Current 1	120A	2000mS	
Over Charging Current 2	130A	500mS	
Temperature Protection	＜-4°F/-20°C or ＞131°F/55°C	/	＞5°F/-15°C or ＜122°F/50°C
Discharge	**Spec**	**Delay**	**Recovery**
Cell Voltage Protection	2500mV	3000mS	3000mV
Module Voltage Protection	40.0V	3000mS	48.0V
Over Discharging Current 1	120A	2000mS	
Over Discharging Current 2	140A	200mS	
Short Circuit	1200A	400uS	
Temperature Protection	＜-4°F/-20°C or ＞131°F/55°C	/	＞5°F/-15°C or ＜122°F/50°C

BMS	Parameter		Condition
PCB Temperature Protection	＞221°F/105°C		
Cell Balance	50mA (Passive Balance)		Cell Voltage Difference >30mV
Temperature Accuracy	±3°C		
Cell Voltage Accuracy	±10mV		For Cells
Current Accuracy	±2%		
SOC	5%		
Power Consumption	Off Mode	⩽20uA	Storage/Transport
	Sleep Mode	⩽200uA	Sleeping
	Operating Mode	⩽50mA	Charging/Discharging
Communication Ports	RS485、CAN、RS232		
Bluetooth&Wifi Signal Distance	⩾49 feet/15m		

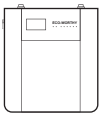
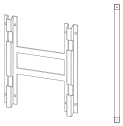
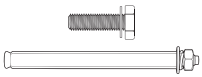
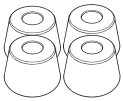
Fire Extinguishing Aerosol	
Total Mass	67g ±10g
Agent Mass	12g ±1g
Dimensions	88.5*84.8*8 mm
Activation Temperature	170°C ±10°C
Operating Temperature Range	-40°C ~ +85°C
Protected Volume	⩽0.12 m^3
Extinguishing Agent Concentration	100 g/m^3

NOTICE
The optimum operating temperature range is from 15°C to 30°C. Frequent exposure to the harsh temperatures may worsen the performance of the battery pack and its cycle life.

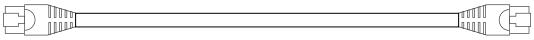
3.3 Packing List

The following items are included with your shipment:

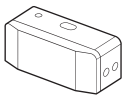
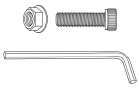
Package 1

General materials		
 Battery Pack (x1)	 User Manual (x1) BMS & APP Quick Start (x1)	 Drill template (x1)
 Mounting Bracket (x1) Fixing clip (x1)	 Screw and Bolt Phillips Head Hex Screws (x9) Expansion Bolt (x10)	 Feet pad (x4)

Cables

Type	Details	Qty.
Battery to Battery Communica-tion Cable	 39.4 in. (1000mm)	1PCS
Parallel Cables	A: Battery to Battery positive cable(2AWG 1000mm RED)  SC50-8 39.4 in. (1000mm) SC50-8	1PCS
	B: Battery to Battery negetive cable(2AWG 1000mm BLACK)  SC50-8 39.4 in. (1000mm) SC50-8	1PCS
Ground Cable	 5mm 39.4 in. (1000mm)	1PCS

Package 2

General materials		
 Conduit Box (x1)	 User Manual (x1)	 Nut (x4) Hex Socket Screws (x4) Hex key (x1)

Unpack precautions

- Please load and unload it in accordance with the specified requirements to prevent sun and rain when you receive the equipment.
- Please check and confirm the goods (such as quantity, appearance, etc.) according to the “scope of delivery” before unpacking.
- Do light take and put during unpacking process to protect the surface coating of the object.
- Please record and contact to the manufacturer if the innerpacking is damaged after unpacking.

3.4 Features

Structure & Design

- Wall-mounted compact design saves space and allows for easy installation and maintenance.
- Internal soft copper busbars ensure neat, safe wiring.
- Removable cable management box keeps wiring organized and tidy.
- Lightweight construction enables easy handling and operation.

Safety & Protection

- LiFePO4 chemistry complies with the highest international safety and transportation standards.
- Built-in BMS (Battery Management System) offers protection against over-discharge, overcharge, overcurrent, short circuit, and high and low temperatures.
- Internal aerosol fire suppression system activates automatically in the event of an internal fire.
- Low-temperature cells enable reliable operation across a wide range of environments.
- Built-in pre-charge circuit prevents inrush current when connected to inverters or chargers.

Functional Features

- Modular and expandable: accommodates up to 32 batteries connected in parallel for increased system capacity.
- After manually setting the address, the battery achieves seamless multi-device interconnection through communication auto-addressing.
- High Depth of Discharge (DOD): delivers up to 96% DOD for off-grid and backup applications.
- New batteries typically require approximately 10 charge-discharge cycles to achieve full capacity.

Communication & Interfaces

- CAN/RS485 ports support external monitoring and communication.
- Seamlessly integrates with compatible inverters and energy management systems.

IV. Screen Operation

4.1 Main Page

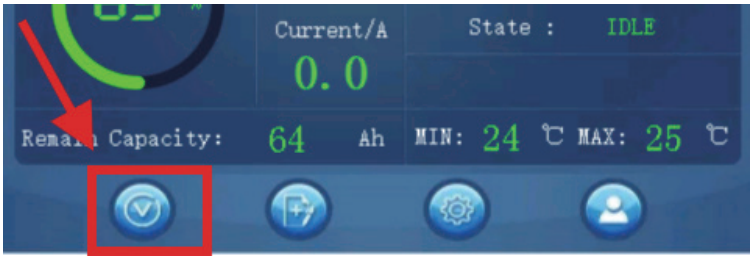
The main interface primarily displays statistical information of the battery system, such as average SOC, highest and lowest cell voltages, highest and lowest cell temperatures, average battery voltage, and total system current, remaining capacity, operating power, charging and discharging MOS status, and other data.

4.2 Language Switching

On the Home page, tap the Settings button (as shown in the figure) to enter the Settings interface. In this interface, you can switch the language, change the temperature unit, view the firmware version of the connected battery and the ESM itself, and enable or disable the screensaver.

4.3 View Pack Iinformation

To view battery pack information on the display, click the bottom-left button (as shown in the figure) on the main page to enter the battery-pack selection page and select the corresponding battery pack to view. (Note: Green indicates the slave unit is online, white indicates it is offline, and only online slave units can be selected for viewing.)

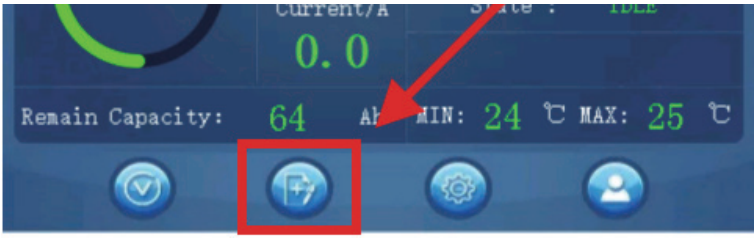


Upon entering the slave unit page,as shown in the following figure: “PACK #01” indicates this is the first battery pack. Charge MOS: The green indicator light is on, indicating charging. Discharge MOS: The green indicator light is on, indicating discharging. T1 to T4 represent the temperatures of four temperature sensors at different locations within the battery pack. “ENVT: 26°C” indicates the ambient temperature. “MOST: 24°C” indicates the temperature of The hottest battery module at 24°C. The last two lines are the cell temperatures, in millivolts.

When the cells are balancing, the indicator lights up green. The figure below shows the effect.

4.4 View Communication Protocol

To view the communication protocol of the battery pack on the display, click the protocol button on the main page to switch to the battery communication protocol interface.



Click the “Read” button on the battery communication protocol interface to retrieve the currently used protocol.

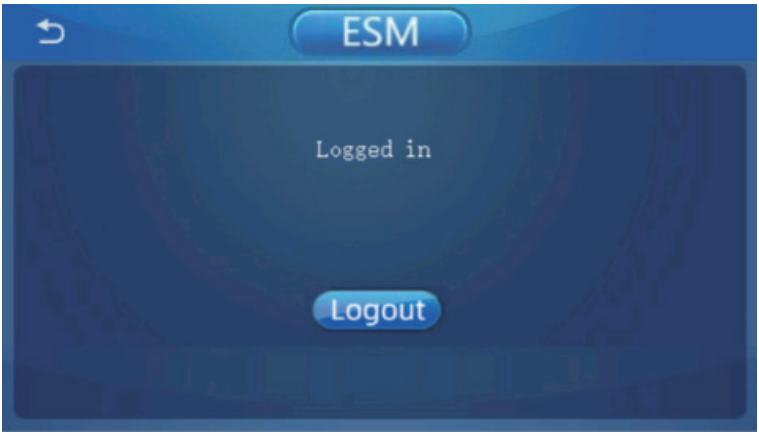
4.5 Inverter-Related Settings

To modify the protocol and parameters,you need to log in to the system first. The steps are as follows:

Click the user button at the bottom right to enter the user login interface, enter the login password “111111”, and after successful login, return to the main interface and click the protocol button.

If you are an experienced solar energy DIY enthusiast, you can try “666888” to unlock more functions.

WARNING
Modifying BMS parameters with the LCD touch screen requires authorisation from ECO-WORTHY. Otherwise, it will be considered an illegal modification and will result in the loss of warranty eligibility.



Enter the protocol and parameter settings interface, where you can change the protocol and corresponding parameters according to your needs.

V. Battery Operation

5.1 ADD

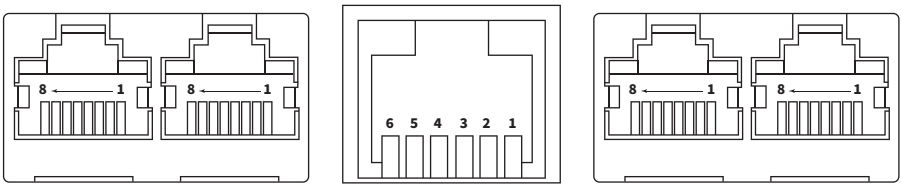
By setting the address through the dip switch on the BMS to distinguish different PACKs, it is necessary to avoid setting the address to be the same. The definition of the BMS dip switch refers to the table below, and the system supports a maximum of 32 parallel machines.

Battery ID	ADD Settings						Explain
	1	2	3	4	5	6	
1	ON	OFF	OFF	OFF	OFF	OFF	SET TO PACK1 (Master)
2	OFF	ON	OFF	OFF	OFF	OFF	SET TO PACK2
3	ON	ON	OFF	OFF	OFF	OFF	SET TO PACK3
4	OFF	OFF	ON	OFF	OFF	OFF	SET TO PACK4
5	ON	OFF	ON	OFF	OFF	OFF	SET TO PACK5
6	0FF	ON	ON	OFF	OFF	OFF	SET TO PACK6
7	ON	ON	ON	OFF	OFF	OFF	SET TO PACK7
8	OFF	OFF	OFF	ON	OFF	OFF	SET TO PACK8
9	ON	OFF	OFF	ON	OFF	OFF	SET TO PACK9
10	OFF	ON	OFF	ON	OFF	OFF	SET TO PACK10
11	ON	ON	OFF	ON	OFF	OFF	SET TO PACK11
12	OFF	OFF	ON	ON	OFF	OFF	SET TO PACK12
13	ON	OFF	ON	ON	OFF	OFF	SET TO PACK13
14	OFF	ON	ON	ON	OFF	OFF	SET TO PACK14
15	ON	ON	ON	ON	OFF	OFF	SET TO PACK15
16	OFF	OFF	OFF	OFF	ON	OFF	SET TO PACK16
17	ON	OFF	OFF	OFF	ON	OFF	SET TO PACK17
18	OFF	ON	OFF	OFF	ON	OFF	SET TO PACK18
19	ON	ON	OFF	OFF	ON	OFF	SET TO PACK19
20	OFF	OFF	ON	OFF	ON	OFF	SET TO PACK20
21	ON	OFF	ON	OFF	ON	OFF	SET TO PACK21
22	OFF	ON	ON	OFF	ON	OFF	SET TO PACK22
23	ON	ON	ON	OFF	ON	OFF	SET TO PACK23
24	OFF	OFF	OFF	ON	ON	OFF	SET TO PACK24
25	ON	OFF	OFF	ON	ON	OFF	SET TO PACK25
26	OFF	ON	OFF	ON	ON	OFF	SET TO PACK26
27	ON	ON	OFF	ON	ON	OFF	SET TO PACK27
28	OFF	OFF	ON	ON	ON	OFF	SET TO PACK28
29	ON	OFF	ON	ON	ON	OFF	SET TO PACK29
30	OFF	ON	ON	ON	ON	OFF	SET TO PACK30
31	ON	ON	ON	ON	ON	OFF	SET TO PACK31
32	OFF	OFF	OFF	OFF	OFF	ON	SET TO PACK32

NOTICE

Failure to follow the DIP switch setting will cause the communication fault between battery and inverter. For detailed settings with different inverter/charger, please contact your supplier or ECO-WORTHY for consultation.

5.2 Communication Interface Pin Diagram



RS485-1 CAN RS232 RS485-2 RS485-3

Communication Port	RS485-1		CAN		RS232		RS485-2 RS485-3	
Functional Description	Connect to host computer/inverter		Connect to host computer/inverter		Connect to host computer		Parallel communication	
Pin Description	PIN	Description	PIN	Description	PIN	Description	PIN	Description
	1,8	RS485-B1	1,8	NC	1,2	NC	1,8	RS485-B2
	2,7	RS485-A1	2,7	NC	3	TX	2,7	RS485-A2
	4	NC	4	CANH1	4	RX	4,5	NC
	5	NC	5	CANL1	5	GND	3	RSD
	3,6	GND	3,6	GND	6	14V	6	GND

The communication protocols/devices/software supported by each ports

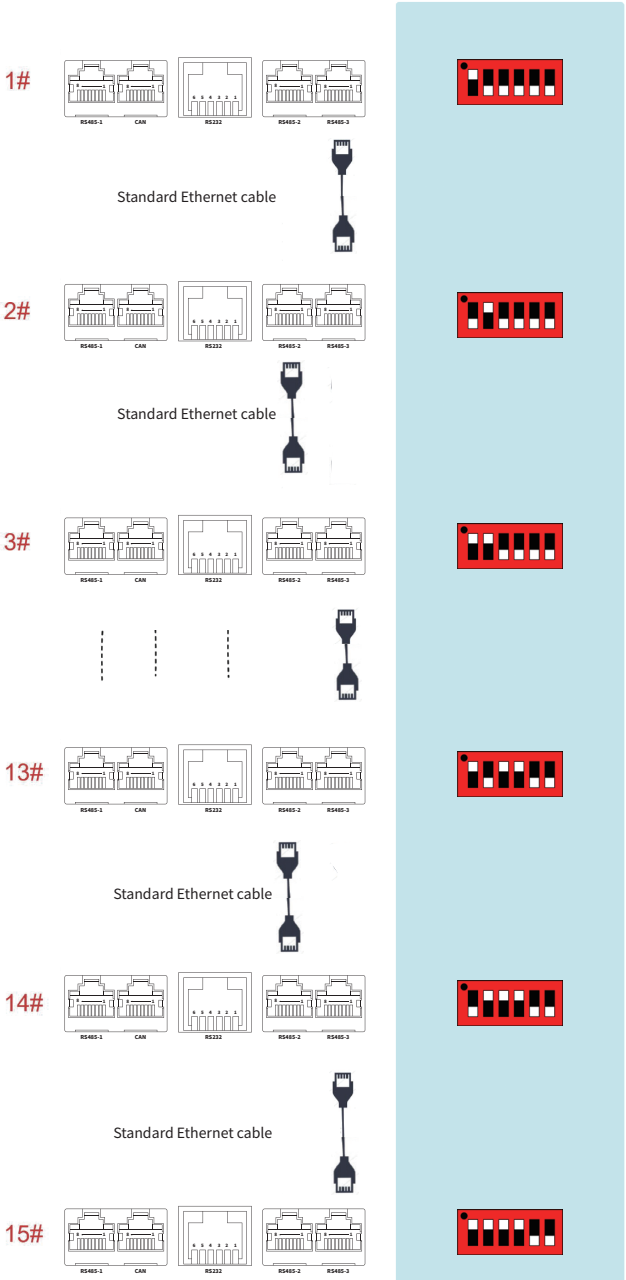
PORT	RS485-1	CAN	RS232
USAGE	Connect to the inverter or upper computer	Connect to the inverter	Connect to the upper computer
SUPPORT	PYLON-LV RS485 V3.5 2019/ 08/07 (9600)-(Default)	Pylon CAN bus protocol V2.0.6_220510-(Default)	JBD-UP
	Growatt Low voltage battery BMS V1.09(1) -20201022	Growatt BMS CAN-Bus-protocol-low-voltage-V1.04	Solar Assistant
	VOLTRONIC-485-V1.0.3-200325	Goodwe-CAN-V1.7-220228	Overkill
	LXP-485-V1.0.0-210625	Sofar-CAN-V1.00-211117-Rev6	
	Deye-485 Modbus Protocol(4)-deye-V1.30-20160801	Victron-CAN-V1.00-210107	
	SRNE_WOW_PACE_BMS_Modbus_Protocol_for_RS485_V1.3(2020-11-24)	Luxpowertek Battery CAN Protocol-V1.0-20200211	
	Lithium Battery Protocol GT Version December 22 Version 1.0	Deye-Low voltage battery CAN -V1.0-20220402	
	SAKO-485 Inverter and BMS communication Protocol(2022-01-07)	Ginlong-Low voltage battery CAN Protocol	
		SMA-CAN_V1.0.0-210630-FSS-ConnectingBat-TI-en-20W	
		VMII-Low voltage battery CAN Protocol-V1.4	
		SRNE_WOW_BMS_Modbus_Protocol_for_CAN_V1.0	
		INVT-BMS and PCS CAN Protocol V1.00	

5.3 Reset

BMS Status	Operation	LED indicator	System
Sleep mode	Press button(1 second) and then release	The LED indicators light up in sequence: SOC1 -> SOC6 -> ALM -> RUN -> MOS, each indicator lights up for 0.5 seconds	Protection board activated
Active mode	Press the button(3~6 seconds) and release	The LED indicators light up first, then turn off in sequence: MOS -> RUN -> ALM -> SOC6 -> SOC1	System entered sleep mode
Active mode	Press the button(6~10 seconds) and release	The LED indicators display according to the current power level	Protection board reset

Connect RS485-2 to the RS485-2 port of the next battery. Connect RS485-3 to the RS485-3 port of the next battery.

Example of parallel dialing method



5.4 LED Description

LED Indicator Light Colors

Name	RUN	ALM	SOC(LED1~6)					
			LED1	LED2	LED3	LED4	LED5	LED6
Color	Green	Red	Green	Green	Green	Green	Green	Green

LED Indicator Light Status Display

Status	Description
On	The light stays on continuously.
Off	The light stays off continuously.
Slow Flash	The indicator turns on for 0.25S and off for 3.75S.
Fast Flash	The indicator turns on for 0.5S and off for 0.5S.
Medium Flash	The Indicator turns on for 0.5S and off for 1.5S.

SOC Indicator Status (Battery Level)

Charging State		Charging State Indicator Logic						Discharging State Indicator Logic					
LED		LED1	LED2	LED3	LED4	LED5	LED6	LED1	LED2	LED3	LED4	LED5	LED6
SOC	0~16.6%	Fast Flash	Off	Off	Off	Off	Off	On	Off	Off	Off	Off	Off
	16.6~33.2%	On	Fast Flash	Off	Off	Off	Off	On	On	Off	Off	Off	Off
	33.2~49.8%	On	On	Fast Flash	Off	Off	Off	On	On	On	Off	Off	Off
	49.8~66.4%	On	On	On	Fast Flash	Off	Off	On	On	On	On	Off	Off
	66.4~83.0%	On	On	On	On	Fast Flash	Off	On	On	On	On	On	Off
	83.0~100%	On	On	On	On	On	Fast Flash	On	On	On	On	On	On
RUN		On						Medium Flash					

LED Indicator Light Description

System Status	Event	RUN	ALM	SOC(LED1~6)						Description
				LED1	LED2	LED3	LED4	LED5	LED6	
Shutdown State	Sleep	Off	Off	Off	Off	Off	Off	Off	Off	Indicator lights are all off
Standby State	Normal	Slow Flash	Off	Indicate according to SOC status						/
	Warning	Slow Flash	Medium Flash							/
Charging State	Normal	On	Off	Indicate according to SOC status						/
	Warning	On	Medium Flash							/
	Over-voltage protection	On	Off	On	On	On	On	On	On	Stop charging
	Over-current, High/Low temperature	Off	On	Off	Off	Off	Off	Off	Off	Stop charging
Discharging State	Normal	Medium Flash	Off	Indicate according to SOC status						/
	Warning	Medium Flash	Medium Flash							/
	Under-voltage Protection	Off	Off	Off	Off	Off	Off	Off	Off	Stop charging
	Over-current, Short-circuit, High/Low temperature	Off	On	Off	Off	Off	Off	Off	Off	Stop charging
Failure State	Single cell disconnect, Temperature probe disconnect, AFE sampling failure, Discharge MOS failure	Off	On	Off	Off	Off	Off	Off	Off	Stop charging

Important Notes:

1. Alarm: The ALM light alerts you to issues that may limit the inverter's charging or discharging current.

2. Standby Warning: The warning state in standby mode is triggered first by an alarm, then the device enters standby mode.

5.5 Protection

Items	Description	Remark
Charge End Cell/ PACK high-voltage	The BMS will stop charging if any cell or PACK voltage reaches the protection value and it will be auto-released only when both Pack and cell voltage back to the release voltage range or there is efficient discharge current.	
Discharge End Cell/ PACK low-voltage	The BMS will stop discharging if any cell or PACK voltage is under the protection value and it will be released only when all the cell voltage back to the release voltage range or there is efficient charge current.	It can automatically recover. Please charge timely, otherwise it may be in Low-power mode to be over-discharged.
High temperature	The BMS will halt charging, discharging, or both if any cell, environment, or MOSFET temperature falls outside the acceptable range.	Automatic recovery
Low temperature	The BMS will stop charging or discharging or both if any cell/environment/MOS temperature is under the range.	Automatic recovery
Charge over-current	The BMS will stop charging when the charging current is higher than the protection value. And it will release from the protection when the system delays time is met.	It can automatically recover. If locked after three consecutive times, manual intervention is required.
Discharge over- current/ Overload	The BMS will stop discharging when the discharging current is higher than the protection value. And it will release from the protection when the system delays time is met.	Automatic recovery. If locked after three consecutive times, manual intervention is required.
Short-circuit/ Reversed	Short-circuit and Reversed polarity protection happened	Charge to release Manual reset
Temperature, Voltage, Current sensor failure	When entering the failure mode, manual intervention is required; no charging and discharging.	Manual intervention
Dormancy mode	After reaching a certain condition, it will be in the dormancy mode.	Recoverable

CAUTION
Please re-charge the battery via solar, grid/generator or other energy source within 24h if the battery is over-discharged.

NOTICE
Manually short-circuiting and reversing the battery will void the warranty.

VI. Installation

6.1 Preparation

Safety Compliance

The system installation must be finished by qualified person(s). During the whole installation process, please strictly follow the local safety regulations and related operating procedures.

Environment

The operating environment shall meet the following require.

Category	Description
Working temperature	-20°C-55°C(maximum operating range) 15°C-30°C (optimal temperature)
Relative humidity	5%~90%, No condensation
Altitude	<3000m
Safety requirement	• Do not expose the battery to direct sunlight, rain and snow. • Do not place the battery within children/pet touchable area. • Do not place the battery near heat source and flammable material. • Do not place the battery in a closed place where the ventilation is not available. • Do not drop, deform, impact, cut or spearing with a sharp object. • Do not put heavy things on battery. • Do not disassemble the battery without Manufacturer's permission. • No conductive dust and water or other liquid to contact battery. • Follow the emergency measure if there is water invasion or electrolyte and gas leakage. • Contact your supplier within 24 hours if any product failure happens.
Area restriction	This product is not suitable for use near the ocean.

Recommended Tools

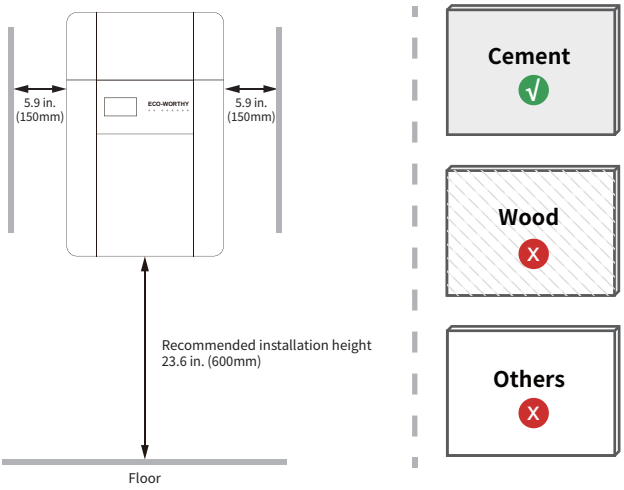
Tools		
Screwdriver (slot, cross)	Multimeter	Level
Wrench	Clamp meters	Dielectric Shoes
Diagonal pliers	Insulating tape	Gloves
Needle nose pliers	Tape measure	Safety goggles
Clamping pliers	Anti-static bracelet	Drill
Wire stripper	Cable ties	

6.2 Wall-mounted Installation

WARNING
Batteries are not waterproof. Therefore, please install batteries indoors.

CAUTION
Ensure that no lines are laid in the wall which could be damaged when drilling holes.

CAUTION
Injuries may result if the product is lifted incorrectly or dropped while being transported or mounted.

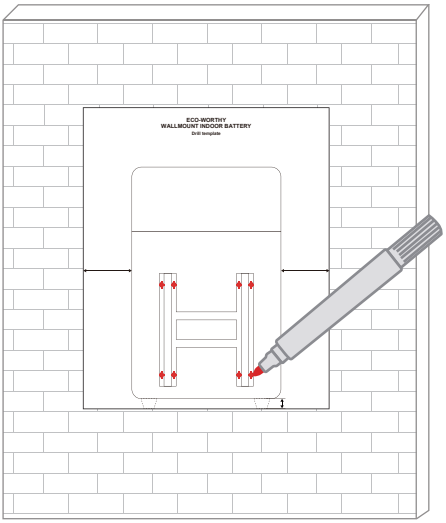


- Keep the battery away from water.
- Minimum clearance for each battery: 5.9 in. (150mm) for each side clearance.
- Recommended installation height: 23.6 in. (60 cm) from the floor for optimal user interaction.
- Ensure the battery is mounted upright.

1 Determine the drill hole locations

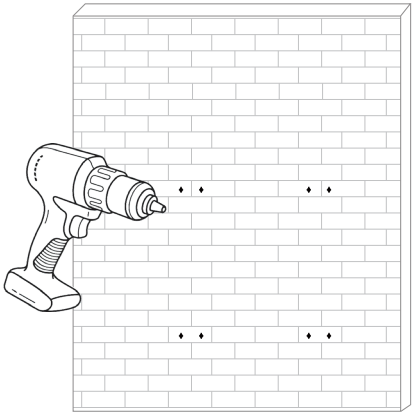
- Recommend using the mounting template to ensure there is sufficient space on the wall for battery installation.
- Recommend using a level to ensure the batteries remain level.

The required drill hole positions for Wall-Mounted installation are marked in red.



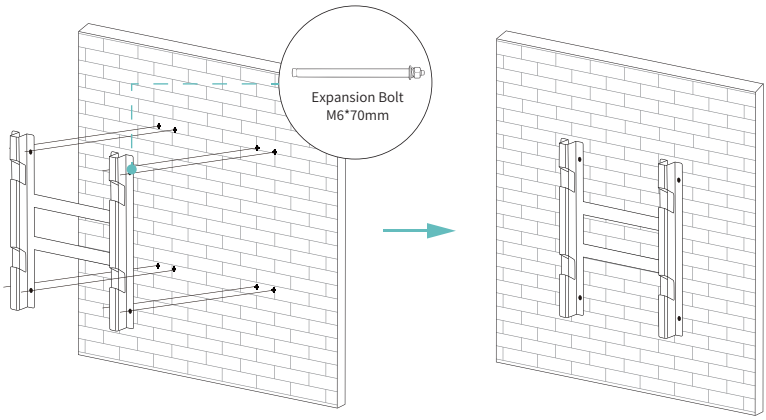
2 Drill holes

- Drill depth: 70 mm.
- Drill diameter: 6 mm.



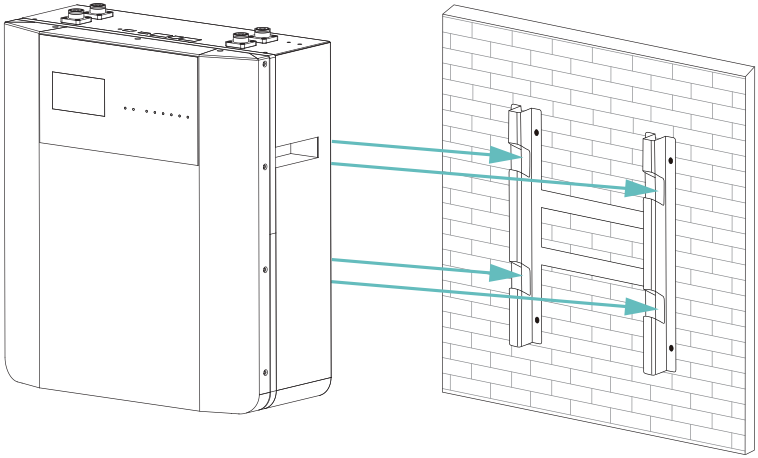
3 Install wall mount brancket

Install the wall mount bracket to concrete or brick using the included expansion bolts.



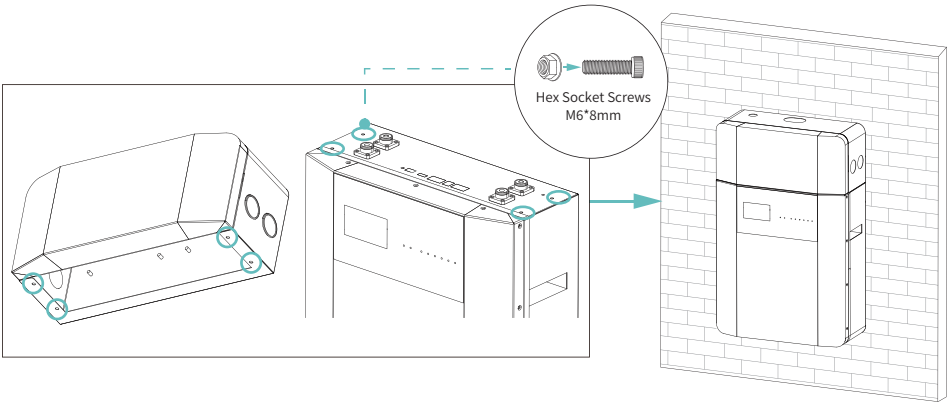
4 Install battery

Lift the battery (two people recommended for installation) and slide the hooks on the battery's rear bracket into the wall bracket.



5 Install conduit box

- Identify the four screw positions on the conduit box that align with the screw holes on the battery top.
- Place the conduit box on top of the battery and fasten it to the battery top using the provided hex socket screws and hex key.



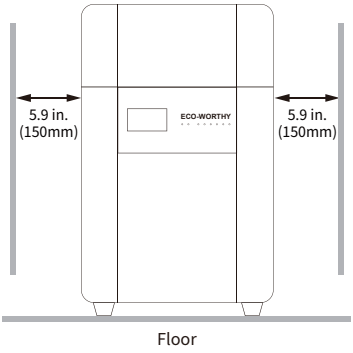
6.3 Floor-mounted installation

WARNING
Batteries are not waterproof. Therefore, please install batteries indoors.

CAUTION
Ensure that no lines are laid in the wall which could be damaged when drilling holes.

CAUTION
Injuries may result if the product is lifted incorrectly or dropped while being transported or mounted.

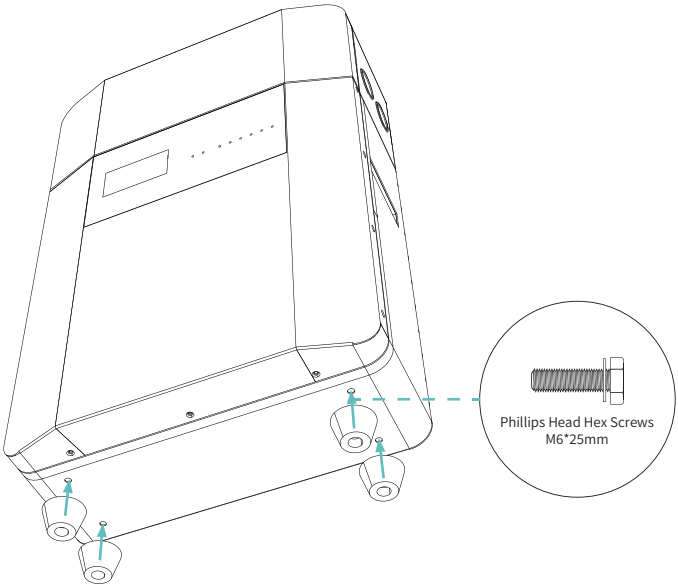
NOTICE
For any other installations, please avoid the battery directly contacting the ground and avoid of high salinity, humidity to prevent the product from rusting and corrosion.



- Keep the battery away from water.
- Minimum clearance for each battery: 5.9 in. (150mm) for each side clearance.
- Ensure the battery is mounted upright.

1 Attach feet pads

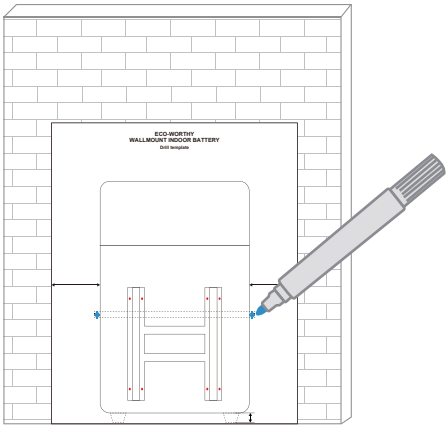
Use the provided screws to securely attach the support feet to the bottom of the battery.



2 Determine the drill hole locations

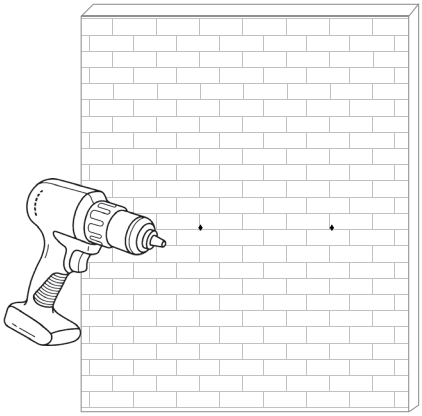
- Recommend using the mounting template to ensure there is sufficient space on the wall for battery installation.
- Recommend using a level to ensure the batteries remain level.

The required drill hole positions for Floor-Mounted installation are marked in blue.



3 Drill holes

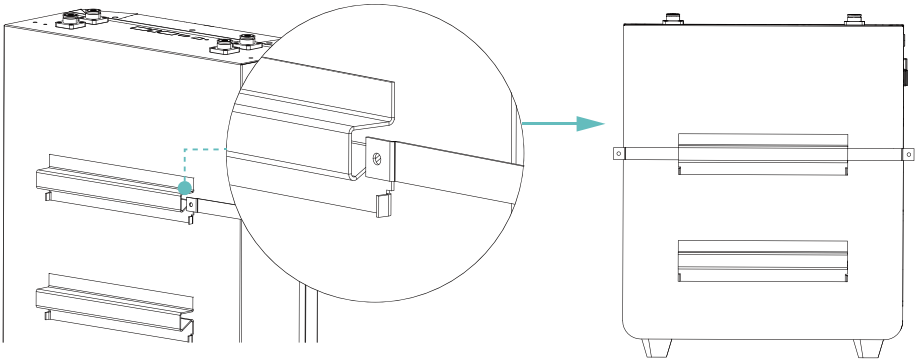
- Drill depth: 70 mm.
- Drill diameter: 6 mm.

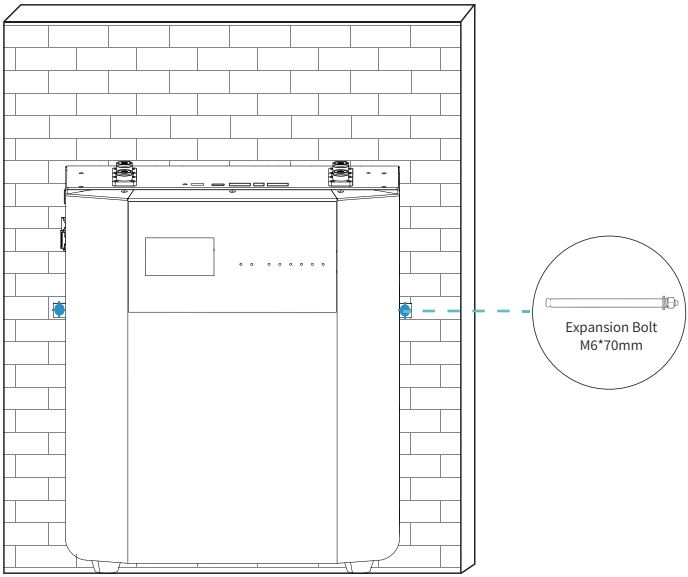


4 Insert and install the wall fixing clip

To prevent the battery from tipping over when placed on the floor, secure it to the wall using the included wall fixing clip. Follow these steps:

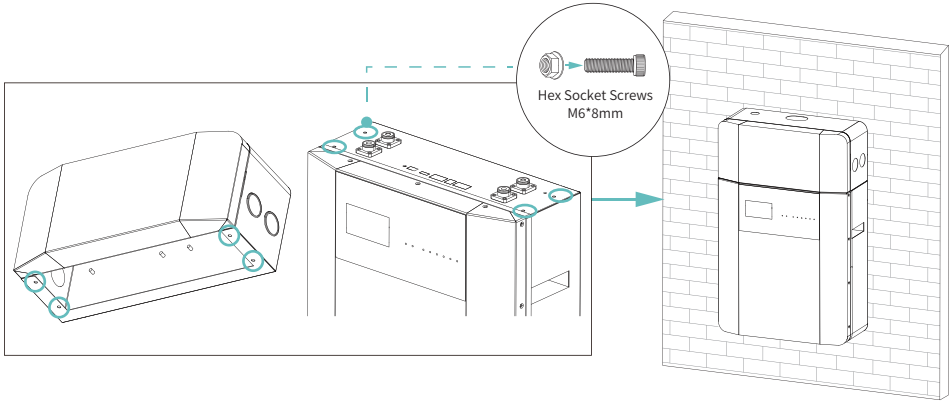
- Insert the wall fixing clips into the upper bracket on the back of the battery. Note: The protruding side of the wall fixing clips must face the wall.
- Secure the battery to the wall using the included screws.





5 Install conduit box

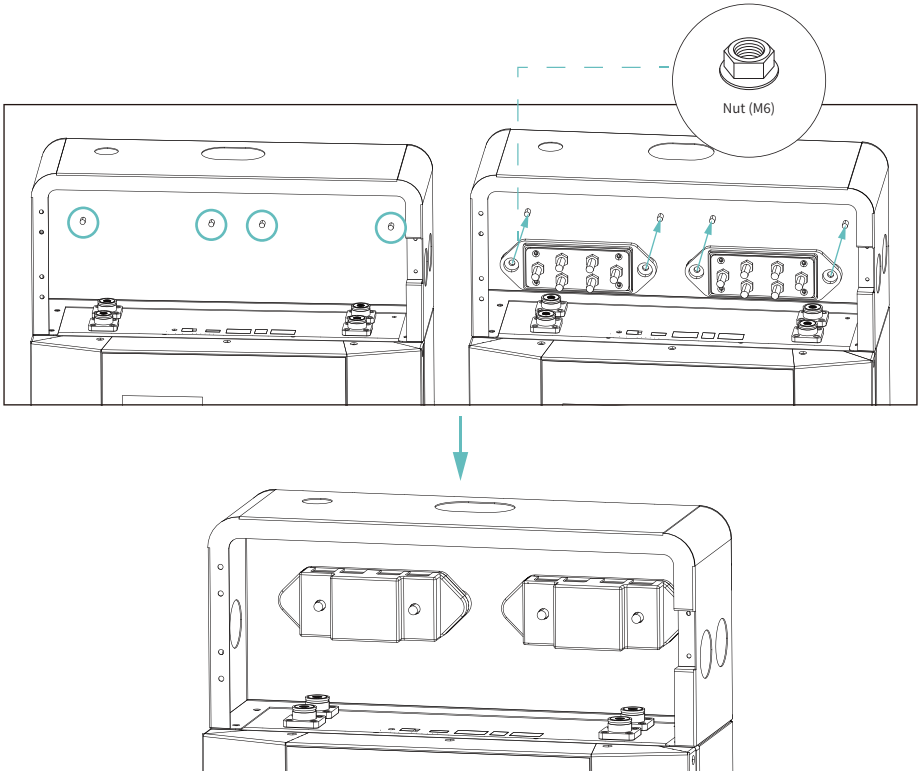
- Identify the four screw positions on the conduit box that align with the screw holes on the battery top.
- Place the conduit box on top of the battery and fasten it to the battery top using the provided hex socket screws and hex key.



6.4 Install bus bar (sold separately)

If installing the battery with the optional bus bar, follow the steps below.

- Identify the four protruding bolts on the conduit box and the two screw locations on each bus bar.
- Align the screw locations on the bus bar with the protruding bolts on the conduit box.
- Use the provided hex nuts to attach the bus bar securely to the conduit box.



VII. Connection

7.1 Connect the batteries in parallel

Qualified person

7.1.1 Remainder

Please check again whether the following conditions or equipment meet the requirements before installation:

- Check if there' s enough space for installation;
- Check whether the power cable pair(s) used meets the maximum current requirement for operation;
- Check whether the overall layout of power supply equipment and batteries at the construction site is reasonable;
- Check whether the installer is wearing anti-static wristband;
- Check whether there' re two people on the construction site for installation work;
- Check the installation site for the presence of water;
- Check if there' s potential risks at location of installation site, e.g flooding, sun exposure, corrosion,and salt spray.

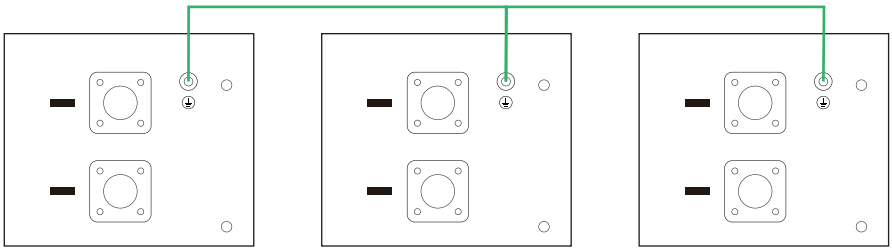
7.1.2 Procedures

Warning
First, ensure that the circuit breaker is in the OFF position on the left, and the power switch is oFF.

CAUTION
Wear suitable personal protective equipment for all work on the product.

1 Ground cable connection

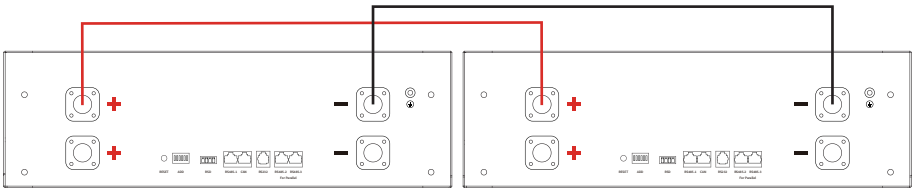
Use the grounding wire included in the packaging to connect the casings of all batteries in series. And secure them with the included M5×10 mm Phillips Head Hex Screws.



2 Power cable connection

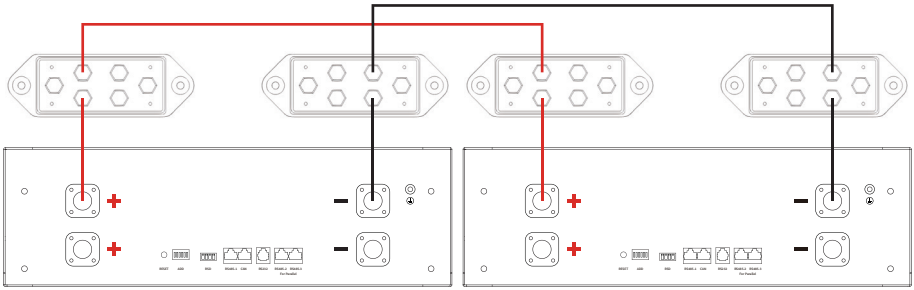
Without Bus Bar

Use the 2AWG 1000mm power cable included in the packaging to connect the batteries in parallel. And secure them with the included M8×14 mm Phillips Head Hex Screws.



With Bus Bar

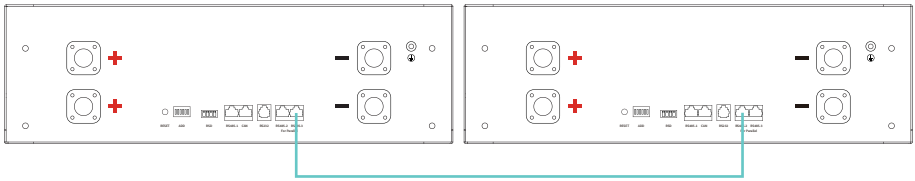
- Use the included 2AWG 1000mm power cable to connect the batteries and busbar as shown in the diagram.
- Secure the power cable to the batteries with the included M8×14 mm Phillips Head Hex Screws, and to the busbar with M8 nuts (sold seperately).



CAUTION
Once the power cord is connected, immediately secure the bus bar cover—otherwise, electric shock, short circuits, or fire may occur.

3 Communication cable connection

- Connect the batteries with the battery communication wires.
- Note: Connect RS485-2 port to RS485-2 port or RS485-3 port to RS485-3 port between batteries.



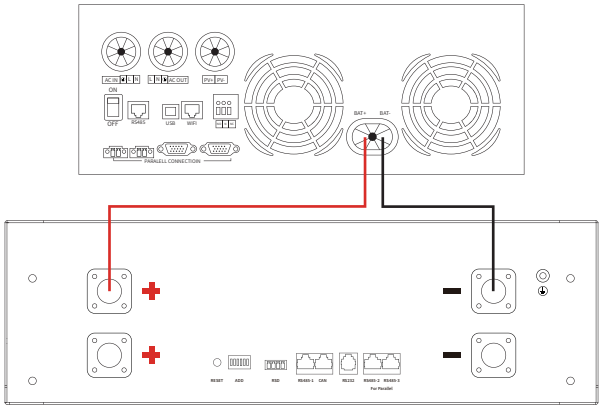
7.2 Connect the battery to the inverter

This battery integrates multiple inverter communication protocols (see page 19 for details). The default communication protocol is PYLON, which is compatible with most brands of inverters. The supported mainstream brands are: SRNE, VICTRON, DEYE, LUXPOWER, GOODWE.....

1 Battery-inverter power cable connection

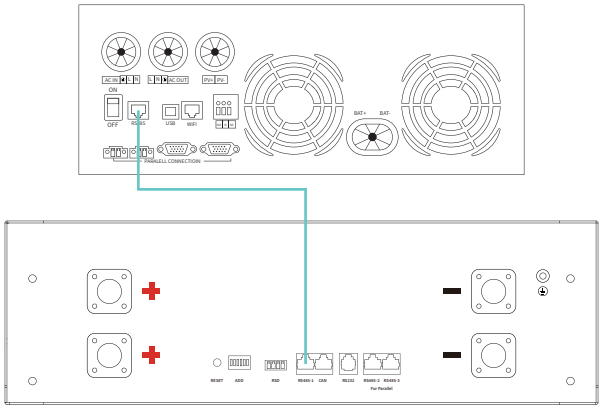
Warning
Please turn off the POWER button and the breaker before connecting the cables.

Connect the battery' s OUTPUT (+) to the inverter' s battery INPUT (+) and the battery' s OUTPUT (-) to the inverter' s battery INPUT (-). Install an external disconnect breaker between the battery system and the inverter for safe operation. Choose the corresponding power cable pair and wire them correctly.



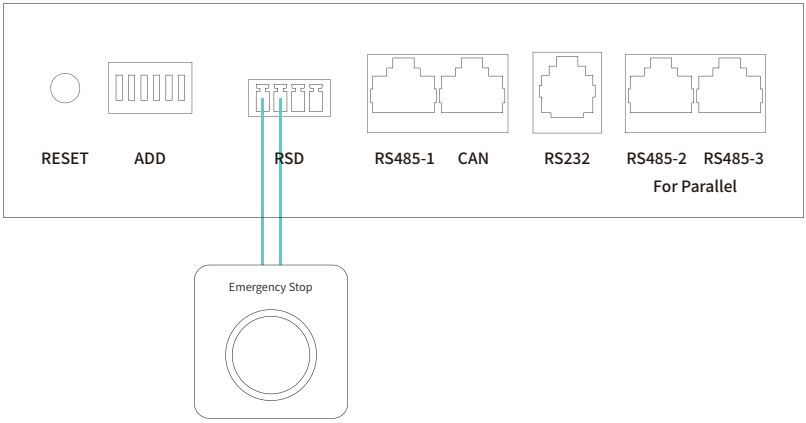
2 Battery-inverter communication connection

Use a standard Ethernet cable to connect the battery's RS485-1 or CAN port to the BMS communication port of the inverter.



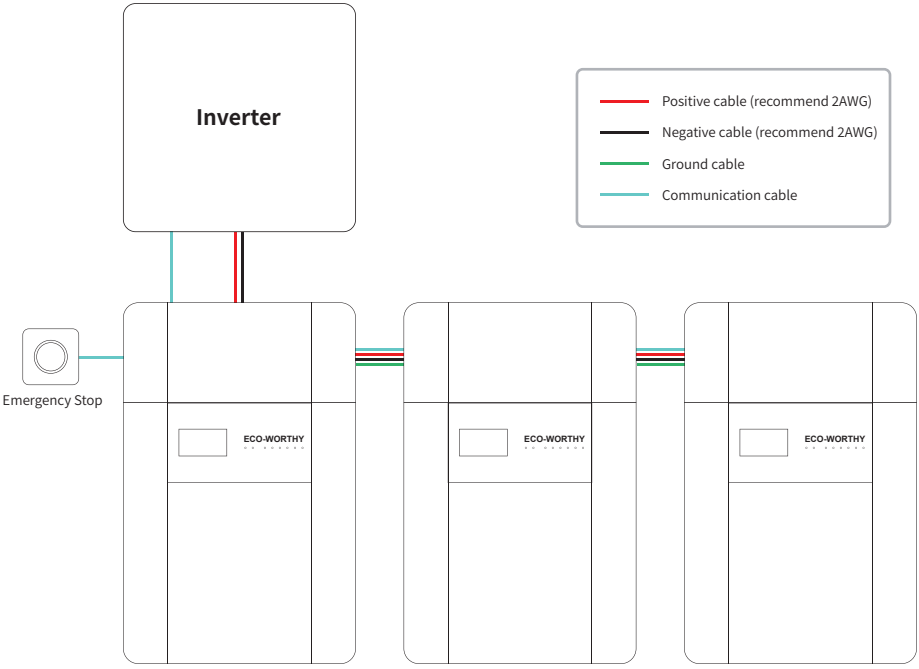
7.3 Emergency stop cabling connection (RSD/ESS disconnect)

The RSD port on the battery is designed for connecting to the ESS Disconnect. Connect the ESS button to pins 1 and 2 of the RSD interface (see the figure below). This allows you to transmit an emergency stop signal to the batteries by pressing the button, thereby shutting down all batteries and the inverter (if equipped). When multiple batteries are connected in parallel, the ESS Disconnect only needs to be connected to the master battery.



7.4 Connection coverlook

The connection overview diagram between the battery and other devices is shown below.



CAUTION
Confirm inverter AC input and PV input are disconnected before wiring connection, and the DC/signal switch of inverter/charger is in off status.

NOTE
Choose the suitable breaker considering the inverter power/current, rated voltage, and tripping characteristic etc.

NOTICE
The maximum communication cable length is required to be less than 15m between inverter/charger and battery.
The maximum power cable length is suggested to be less than 10m between inverter/charger and battery.

CAUTION
The maximum tolerance current of each power cable and terminal is 125A, and 100A for continuously is suggested. Please use corresponding number of power cable pairs according to the field configuration and local connection requirements, standards, and directives.

7.5 Set the inverter communication protocol

1 Turn on the battery

- Turn on the 125A Circuit Breaker.
- Press the POWER button.

2 Use the mobile app to set the communication protocol

- Scan the QR code to download the software.
- Open the software and search for nearby devices. (please turn on Bluetooth on your phone and grant Bluetooth permissions.)
- Modify the Inverter Protocol on the Parameter page. (For more detailed information, please refer to APP-Quick Start.)

It's also more convenient to set it up through the screen.

VIII. Troubleshooting

Items	Solution	Measure
Unable to start	1. Switch on battery and press RESET for 6s to observe whether the battery can be started. 2. Charge the battery with a charge or inverter to provide 54~57.6V voltage and observe whether it can be started.	If the abnormal status is still alive after these steps, please contact your supplier. If there is any other situation(s) excluding in this table, turn off the faulty battery, and contact your supplier.
Unable to charge	1. Check whether the cable connection between the battery and the inverter/charger is correct. 2. Check whether the inverter/charger setting is correct. 3. Check whether the battery is in charge protection mode; if yes, try to discharge the battery.	
Unable to discharge	1. Check whether the cable connection between the battery and the inverter/charger is correct. 2. Check whether the battery occurs short circuit, reverse connection, pre-charge failure during connection inverter etc. 3. Check whether the battery is in discharge protection mode; if yes, try to charge the battery.	
High/Low temperature	1. Stop the battery system for a while, and check whether the installation location temperature meets the requirement. 2. Avoid continuous full charging and discharging.	
High current	Check whether the configuration and parameters setting on the inverter/charger is correct.	
ALM ON	Turn off all the batteries, and remove the fault battery from the system.	
Communica-tion fail	1. Check whether the communication cable type is correct and is contacted well. 2. Check whether the DIP switch setting is correct. 3. Check whether the inverter protocol related setting is correct. 4. Check whether both battery and inverter are working properly.	
ALM and RUN indicator lights flash continuously	There is a problem with the battery software and the firmware needs to be updated. Please contact the supplier to obtain the update method.	
The BMS cannot communicate	There is a problem with the battery software and the firmware needs to be updated. Please contact the supplier to obtain the update method.	
The ON/OFF indicator does not light up	Please contact the supplier for repair documentation.	

NOTICE
Please restart after software is upgraded.

IX. Transport and Storage

* Do not violently shake, impact or squeeze, and prevent sun and rain during the transportation.

* Do light take and put and strictly prevent falling, rolling, and heavy pressure during loading and unloading.

* The battery should be placed in a dry, clean, dark, and well-ventilated indoor environment for long-term storage, and the recommended storage temperature range is 15~30℃ .

* No harmful gases, flammable and explosive products and corrosive chemical substances in the storage location.

* The batteries should be stored and transported in close to 50% SOC, and do not store over 80% SOC for long time.

* The battery needs to be charged every 6 months if it is not used for a long time.

* No fall down, no pile up over 6 layers, and keep face up.

X. Disposal of battery

Disposal of battery must comply with the local applicable disposal regulations for electronic waste and used batteries. Please review your local battery recycling or management regulations or contact ECO-WORTHY for more information.

XI. Technical Support

1) Customer service email:

E-mail: essvipsupport@eco-worthy.com.cn

2) Company address: USA/Germany

Address(US): 4411 East State Hwy D Suite C Springfield, Missouri 65809

Address(DE): ECO-Worthy Europe GmbH Otto-Hahn-Str. 20 61381 Friedrichsdorf - Köppern Germany

3) Customer service telephone numbers:

Tel(DE): +49 6175-6514-999

Tel(US&CA): +1 866-939-8222

Tel(UK): +44 7553-406-988

Note:
Customer Service Hours:

US: Mon-Fri 8:30 AM - 6:00 PM(CST)

UK: Mon-Fri 9:00 AM - 5:00 PM(GMT)

DE: Mon-Fri 8:00 AM - 12:00 PM(UTC+1)

4) Official website address:

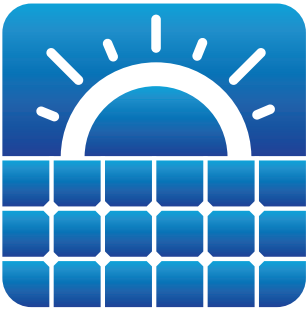
Web: https://www.eco-worthy.com/

5) Official social media:

Facebook: https://www.facebook.com/ecoworthy.store/

Youtube: @ecoworthy

Tiktok: https://www.tiktok.com/@eco_worthy



ECO-WORTHY

ENERGY FOR INDEPENDENCE