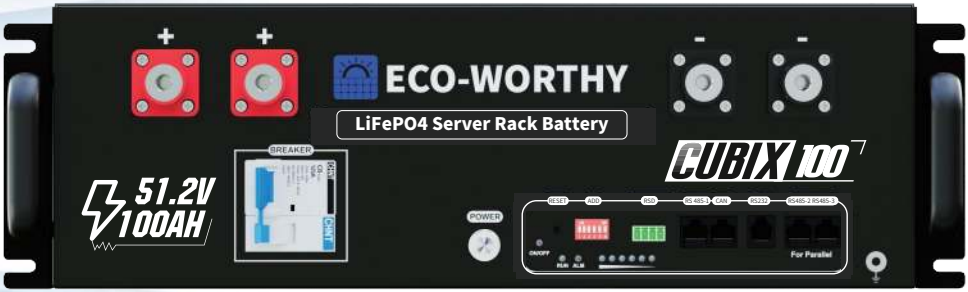
ECO-WORTHY

Manual Version: 4.0.0

LiFePO4

Cubix 100 Manual

Operation and Maintenance



（**Model**: **ECO-LFP4810002**）

SUPPORT

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

·Call:+1 866-939-8222(US&CA)
+49 6175-6514-999(DE)
+44 7553-406-988(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.

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I. Information

1.1 Validity

This document is valid for: ECO-LFP4810002

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

Symbols	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.
	The UL1973 certificate label for Safety by Intertek
	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-LFP4810002 rechargeable lithium iron phosphate battery pack including cells, BMS and enclosure etc.
Battery system/ cluster	Multiple ECO-LFP4810002 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 UL, IEC, 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.

2.2.1 Safety gear

It is required to wear the following safety gear when installing and handling the battery pack.



Insulated gloves



Safety Glasses



Safety Shoes

2.2.2 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.

2.2.3 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.

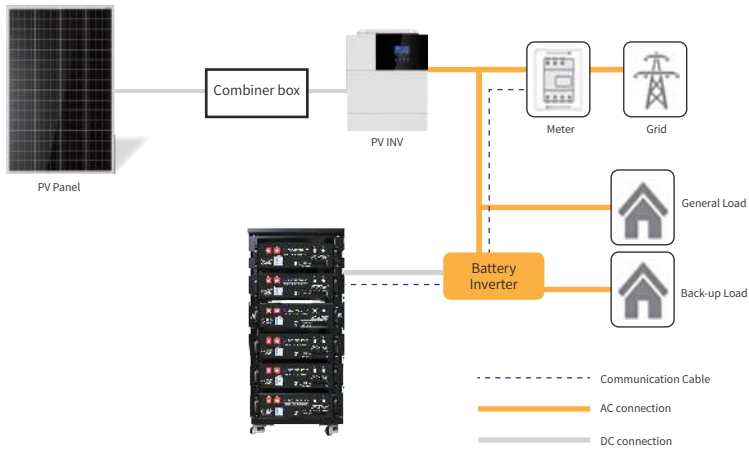
• Please ensure that the electric parameters of these devices are compatible mutually before connecting the battery to other devices.

• 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 ECO-LFP4810002 battery is designed for residential application and works as a storage unit in the photovoltaic system. It is a 48V Li-ion battery storage system, with BMS inside itself. It could be operated in both on-grid, back-up and off-grid modes with compatible inverters. Below is the general schematic of an ac-coupled system.



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.

3.2 Features

• Equipped with shunt release, the safety performance is improved to a higher level.

• With highest safety, battery is made from LiFePO4 chemistry and complies with highest international safety and transport standard.

• Modular and flexible, it can support up to 32 batteries connected together to expand the system energy.

• Built-in pre-charge circuit to avoid rush current when connecting with different inverters/chargers.

• Automatic dynamic addressing function when connecting multiple batteries together.

• It can support a maximum of 96% DOD under off-grid and back-up application.

• Built-in BMS provides warning and protection functions including over-discharging, over-charging, over- current, short-circuit and high/low temperature.

• LiFePO4 is equipped with automatic balancing function to meet long cycle life. New batteries need to go through multiple charge - cycles (approximately 10 times) to reach their maximum capacity.

• Compact size and light weight for easy installation and maintenance.

• CAN/RS485 port for external communication.

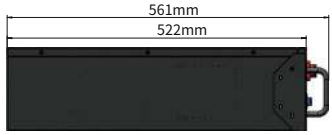
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3.3 Specification

3.3.1 Dimension









3.3.2 Parameters

Items	ECO-LFP4810002
Rated voltage	51.2V
Max. voltage range	40~58.4V
Charge voltage	58.4V
Low voltage cut-off	40.0V
Nominal energy	5.12KWh
Usable energy	5.12KWh
Nominal capacity	100Ah

Dimension	22.09*19.02*5.63in/56.1*48.3*14.3cm	
Weight	103lbs/47kg	
Standard charge current	≤50A	
Max. charge current	100A	
Standard discharge current	≤50A	
Max. discharge current	100A(initial temp. ⩽35℃)	
Communication port	RS485 /CAN/RS232	
Max. parallel number	32pcs	
Operating temperature	Charge: 0~55℃	Discharge: -20~55℃
Storage temperature	-20~25℃	Less than 1 year
	20~40℃	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
Charge Over Current 1	120A	2000mS	
Charge Over Current 2	130A	500mS	
Temperature Protection	＜32°F/0°C or ＞149°F/65°C	/	＞41°F/5°C or ＜122°F/50°C

Discharge	Spec	Delay	Recovery
Cell Voltage Protection	2500mV	3000mS	3000mV
Module Voltage Protection	40.0V	3000mS	48.0V
Discharge Over Current 1	120A	2000mS	
Discharge Over Current 2	140A	200mS	
Short Circuit	1200A	400uS	
Temperature Protection	＜-4°F/-20°C or ＞149°F/65°C	/	＞-4°F/-20°C or ＜14°F/-10°C

BMS	Parameter		Condition
PCB Temperature Protection	＞221°F/105°C		
Cell Balance	60mV charging equalization		
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		

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.

3.3.3 Panel Interface



NO.	Items	Usage description	Remark
A	Handles	For handling,intallation and disasembly of battery	4 open holes for fixing battery on the rack
B	Positive terminal	Used to connect the inverter/charger	
C	Negative terminal	Used to connect the inverter/charger	
D	125A breaker & shunt release	Over-current protection & BMS Second level of protection	Connected in series to the positive busbar
E	Power switch	Used to Power on/off BMS	
F	Reset	Used to reset the BMS	
G	ADD	Used to set the address of the battery in the battery pack	
H	RSD	The two interfaces on the left are connected to the emergency stop switch. When the emergency stop switch is closed, the air switch is disconnected.	
I	RS485-1	Connect to host computer/inverter	Baud rate 9600
J	CAN	Connect to inverter	Baud rate 9600
K	RS232	Connect to host computer/inverter	
L	RS485-2 RS485-3	For communicaton between batteries	Baud rate 19200
M	ON/OFF indicator	Indicates whether the battery is turned on or off	
N	RUN	Used to show battery is in running status when lighting or flashing	
O	ALM	Used to show battery Alarm/ Protection status	
P	SOC	Used to show battery real-time SOC	
Q	Grounding	Used to connect battery with ground	

3.3.3.1 : ADD



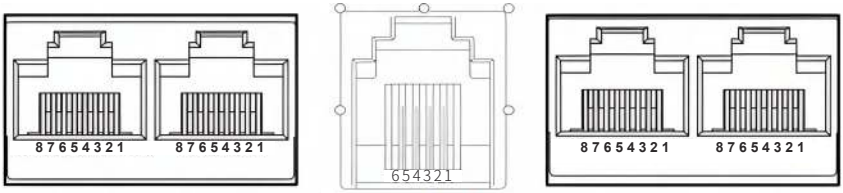
By setting the address through the dip switch on the BMS to distinguish different PACKs, it is necessary to avoid setting the address to be the same. The definition of the BMS dip switch refers to the table below, and the system supports a maximum of 32 parallel machines.

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.

3.3.3.2 Communication Interface Pin Diagram



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	

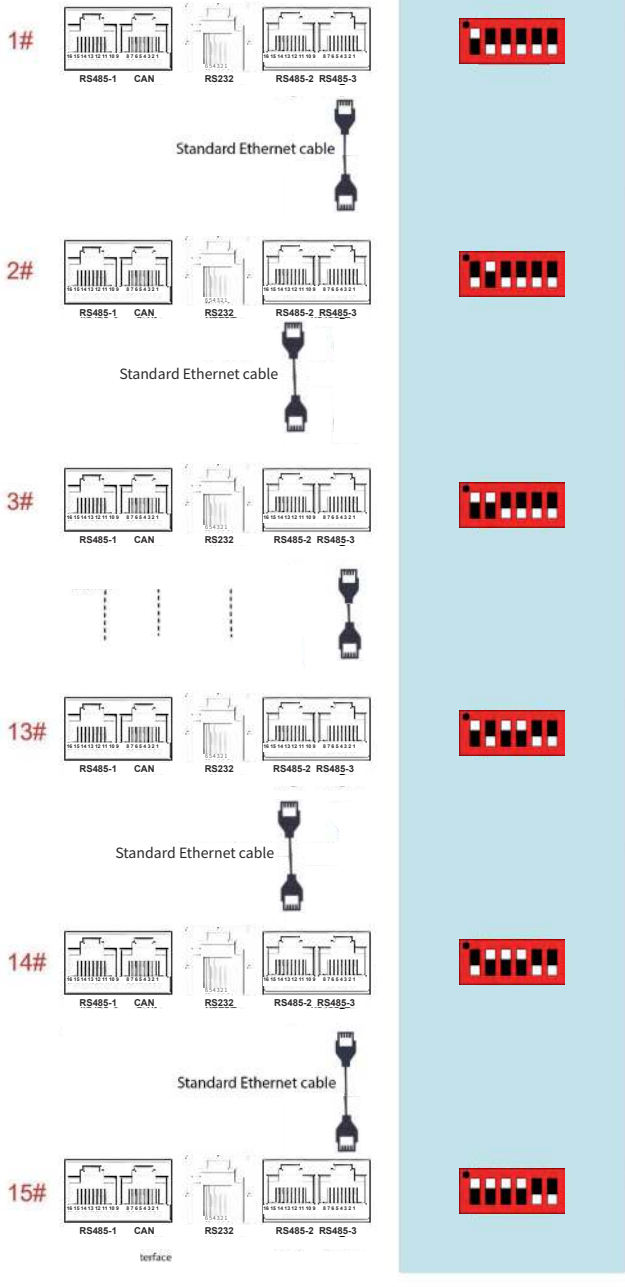
3.3.3.3 Reset

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

3.3.3.4 Parallel Wiring Instructions

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



3.3.3.5 LED Description

LED Indicator Light Colors

Name	ON/OFF	RUN	ALM	SOC(LED1~6)					
				LED1	LED2	LED3	LED4	LED5	LED6
Color	Green	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%	Off	Off	Off	Off	Off	Fast Flash	Off	Off	Off	Off	Off	On
	16.6~33.2%	Off	Off	Off	Off	Fast Flash	On	Off	Off	Off	Off	On	On
	33.2~49.8%	Off	Off	Off	Fast Flash	On	On	Off	Off	Off	On	On	On
	49.8~66.4%	Off	Off	Fast Flash	On	On	On	Off	Off	On	On	On	On
	66.4~83.0%	Off	Fast Flash	On	On	On	On	Off	On	On	On	On	On
	83.0~100%	Fast Flash	On	On	On	On	On	On	On	On	On	On	On
RUN		On						Medium Flash					

LED Indicator Light Description

System Status	Event	ON/ OFF	RUN	ALM	SOC(LED1~6)						Description
					LED1	LED2	LED3	LED4	LED5	LED6	
Shutdown State	Sleep	Off	Off	Off	Off	Off	Off	Off	Off	Off	Indicator lights are all off
Standby State	Normal	On	Slow Flash	Off	Indicate according to SOC status						/
	Warning	On	Slow Flash	Medium Flash							/
Charging State	Normal	On	On	Off	Indicate according to SOC status						/
	Warning	On	On	Medium Flash							/
	Over-voltage protection	On	On	Off	On	On	On	On	On	On	Stop charging
	Over-current, High/Low temperature	On	Off	On	Off	Off	Off	Off	Off	Off	Stop charging
Discharging State	Normal	On	Medium Flash	Off	Indicate according to SOC status						/
	Warning	On	Medium Flash	Medium Flash							/
	Under-voltage Protection	On	Off	Off	Off	Off	Off	Off	Off	Off	Stop charging
	Over-current, Short-circuit, High/Low temperature	On	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	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.

3.4 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.

IV. Installation

4.1 Preparation

4.1.1 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.

4.1.2 Environment

The operating environment shall meet the following requirements:

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.

4.1.3 Tools

Tools	
Screwdriver (slot, cross)	Multi-meter
Wrench	Clamp meters
Diagonal pliers	Insulating tape
Needle nose pliers	Thermometer (observe the installation environment)
Clamping pliers	Anti-static bracelet
Wire stripper	Cable ties

4.2 Inspection

4.2.1 Unpack precautions

* Please load and unload it in accordance with the specified requirements to prevent sun and rain when you receive the equip ment.

* Please check and confirm the goods (such as quantity, appear ance, etc.) according to the "scope of delivery " before unpack ing.

* 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 inner packing is damaged after unpacking.

General materials		
 Battery Pack *1pcs	 Manual *1pcs	 BMS & APP Quick Start*1PCS

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Cables		
Type	**Details**	**Qty.**
Battery to Battery Communica-tion Cable		1PCS
Parallel Cables	A: Battery to Battery positive cable(2AWG 150mm RED) 	1PCS
	B: Battery to Battery negetive cable(2AWG 150mm BLACK) 	1PCS
Grounding Cable		1PCS

4.2.2 External cable

Cables connected to inverter or junction box belong to External Cable kits. It is NOT included in battery carton. Customers need buy it separately, and the information are as below.

Type	Detail	Qty.
Cables	C: Battery to Inverter positive cable(2/0AWG 2000mm RED) 	1PCS
	D: Battery to Inverter negetive cable(2/0AWG 2000mm BLACK) 	1PCS

NOTICE
Keep the unused cable pins NULL to avoid affecting the closed loop communication.

NOTICE
A ground connection of communication cable may be required from some inverters. Please follow the rules from inverter manufacure.

4.3 Start Installation

⚠ Qualified person

4.3.1 Remainder

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

* Check if there' s enough space for installation, and if the load-bearing capacity of the bracket or cabinet meets the weight requirements;

* Check whether the power cable pair(s) used meets the maximum current requirement for operation;

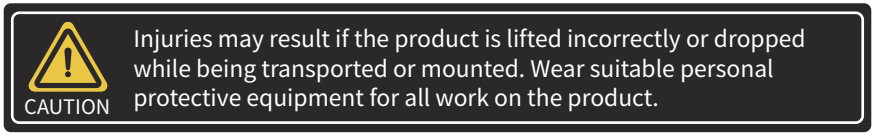
* Check whether the overall layout of power supply equipment and batteries at the construction site is reasonable;

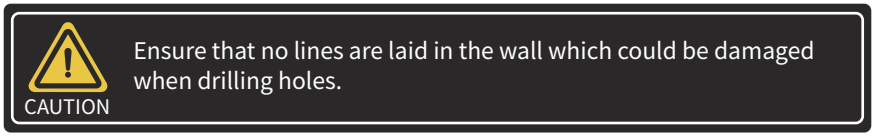
* Check whether the installer is wearing anti-static wristband;

* Check whether there' re two people on the construction site for installation work;

* Check if there' s potential risks at location of installation site, e.g flooding, sun exposure, corrosion,and salt spray.

4.3.2 Procedures





4.3.2.1 Install the Battery

1 **Insert the Battery into the Rack Slot**





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.

2 Connect the batteries in parallel

Warning
First, ensure that the circuit breaker is in the off position on the left, and the POWER switch is off.

① Use the grounding wire included in the packaging to connect the casings of all batteries in series.



② Use the 2AWG 200mm battery parallel wires included in the packaging to connect the batteries in parallel.





③ 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

4.3.2.2 Set the inverter communication protocol

1 Turn on the battery

① Turn on the 125A Circuit Breaker

② Press the POWER button



2 Use the mobile app to set the communication protocol

① Scan the QR code to download the software

② Open the software and search for nearby devices (please turn on Bluetooth on your phone and grant Bluetooth permissions)

③ Modify the Inverter Protocol on the Parameter page(For more detailed information, please refer to APP-Quick Start)

4.3.2.3 Connect the battery to the inverter

This battery integrates multiple inverter communication protocols (see page 13 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 connection

Note: Please turn off the POWER button and the breaker before connecting the cables. Use the cables required by the inverter to connect the battery pack to the BAT input terminal of the inverter.

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.





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.

V. Caution

CAUTION:
Never position the battery upside down or face down!





Best



Acceptable



Acceptable



VI. 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.

VII. 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°C .

* 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.

VIII. 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.

IX. 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 9:00 AM - 5:00 PM(CET)

4) Official website address:

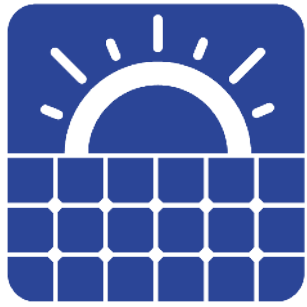
Web: https://www.eco-worthy.com/

5) Official social media:

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

Youtube: @ecoworthy

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



ECO-WORTHY