



HOPETREK

ESS-LB16-W01

Low-Voltage Energy Storage Battery System

User Manual



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1 Disclaimer and Safety Warnings

1.1 Disclaimer

Copyright Statement

No part of this manual may be copied, reproduced, translated or distributed in any form or by any means without prior consent in writing from our company (referred to as us hereafter).

About This Manual

- This manual is intended for multiple product models, and the photos, illustrations, descriptions, etc., in this manual may be different from the actual appearances, functions, features, etc., of the product.
- Despite our best efforts, technical or typographical errors may exist in this manual. Our company cannot be held responsible for any such errors and reserves the right to change the manual without prior notice.
- Users are fully responsible for the damages and losses that arise due to improper operation.
- Our company reserves the right to change any information in this manual without any prior notice or indication. Due to such reasons as product version upgrade or regulatory requirement of relevant regions, this manual will be periodically updated.

EU Authorised Representative

UNV Technology EUROPE B.V. Treubstraat 1, 2288 EG, Rijswijk, The Netherlands.

Disclaimer of Liability

- Before installing, operating, or maintaining the device, please read the manual and follow all safety precautions indicated on the device and in the manual.
- This device should be used in an environment that meets the design specifications; otherwise, it may cause malfunctions, leading to device failure, personal injury, or property damage, which are not covered under the product warranty.
- Our company does not warrant that its software is free from defects or that customers will not encounter any issues or interruptions when using the software.
- Our company, as well as its partners or suppliers, shall not be liable under the warranty terms for any data loss and any direct or indirect financial losses caused by the product's inability to function or business interruptions.
- Under no circumstances (including where explicitly agreed upon through contracts or other forms), shall the maximum compensation payable by our company and its partners or suppliers for losses incurred by the customer due to their liability exceed the amount paid by the customer for the purchase of the product.
- Our company has the final authority to interpret the warranty policy and can make necessary changes to the warranty information, product performance, or policy specifications without notifying the customers.

LVD/EMC Directive



This product complies with Low Voltage Directive 2014/35/EU, EMC Directive 2014/30/EU and RoHS Directive 2011/65/EU and (EU) 2015/863. CE.

WEEE Directive-2012/19/EU



The product this manual refers to is covered by the Waste Electrical & Electronic Equipment (WEEE) Directive and must be disposed of in a responsible manner.

Battery Regulation- (EU) 2023/1542



Battery in the product complies with the European Battery Regulation (EU) 2023/1542. For proper recycling, return the battery to your supplier or to a designated collection point.

1.2 Safety Warnings

1.2.1 General Safety Requirements

- When transporting, installing, or maintaining the device, comply with the laws, regulations, and relevant standards of the region.
- Any signs of damage found during transportation, installation, or use should be repaired promptly; do not leave the damaged part exposed to the outdoor environment for an extended period.
- Follow the warning labels on the device and implement appropriate protective measures. Do not alter, cover, or damage the labels and markers on the device.
- Install and operate the device indoors or outdoors based on the product specifications. If outdoor installation or operation is required, do not proceed during severe weather conditions such as thunderstorms, rain, snow, or strong winds.
- Keep the device away from children and animals.
- Use tools properly to avoid personal injury and device damage. Use proper personal protective equipment during the installation.
- Measure the voltage at contact points before touching any conductors or terminals; do not perform installation, wiring, or maintenance operations while the device is powered.
- After completing installation, clean the installation area and dispose of the packaging materials properly. It is forbidden to place flammable and explosive materials near the device.
- Do not touch the casing during operation or malfunction. The high temperature of the casing may cause burns.
- Do not clean the device with water.
- When transporting the battery system, place it flat and avoid tilting or inverting it. To prevent sliding inside the vehicle, use restraints to secure it.

1.2.2 Operator Requirements

- Operators responsible for the installation and maintenance of this device must undergo rigorous training and master the correct operating methods.
- Operators should be thoroughly familiar with the entire photovoltaic grid-connected power generation system, its working principles, and relevant standards in the region.
- When operating the device, operators must use insulated tools and wear personal protective equipment to ensure safety. When handling electronic components, operators should wear anti-static gloves, anti-static wristbands, and anti-static clothing to protect the device from static damage.

1.2.3 Electrical Safety

Grounding Safety Requirements

- When wiring the device, complete the grounding operation first; when disconnecting, remove the ground wire last.
- Verify that the protective ground wire is reliably connected. Failure to connect or a loose connection may result in the risk of electric shock.
- It is recommended to apply silicone or paint on the exterior of the grounding terminal after the protective ground wire is installed for protection.
- The device must maintain its grounding status after installation, regardless of whether it is powered on.

Inverter Safety Requirements

- As inverters are high-voltage products that can be life-threatening, every operation must be performed with extreme caution.
- All operations for electrical connections and the specifications of the cables used must comply with local laws and regulations.
- Do not close the AC circuit breaker before completing the electrical connections.
- Before making electrical connections, ensure that the inverter switch and all switches connected to the inverter are set to "OFF" to ensure personal safety.
- During wiring, ensure the phase sequence of the AC cables matches the AC terminals. Incorrect wiring will cause equipment damage.
- It is forbidden to connect any load between the inverter and the AC switch directly connected to the inverter.
- Do not connect any loads between the inverter and the battery.

Photovoltaic Safety Requirements

- Operators must wear appropriate personal protective equipment during electrical connections.
- Ensure that the module frames and mounting system are properly grounded.
- Use only the PV connectors supplied with the inverter. If other models of PV connectors are used, mismatching may cause terminal overheating, severe fire, and consequently, a fire incident. Any equipment damage or losses caused by such fires shall not be covered by the manufacturer.
- During the installation and operation of the inverter, ensure that the positive or negative terminals of the PV strings are not short-circuited to the ground. Otherwise, an AC or DC short circuit may occur and damage the device. Damages resulting from this are excluded from the warranty coverage.
- Use a multimeter to measure the DC cable's positive and negative terminals, ensuring correct polarity and that the voltage is within the inverter's allowable range.
- Do not connect the same PV string to multiple inverters, as this may damage the inverter.

Battery Safety Requirements

- Operators must wear appropriate personal protective equipment during electrical connections.
- Batteries used with the inverter must pass the compatibility test conducted by the inverter manufacturer.
- Disconnect the battery from all power sources and ensure it is turned off before performing any operations on it.
- Use a multimeter to measure the DC cable's positive and negative terminals, ensuring correct polarity and that the voltage is within the inverter's allowable range.
- Avoid impacts, tilting, standing, or sitting on the battery.
- Do not connect the same battery pack to multiple inverters, as this may damage the inverter.
- Lethal voltage is present at the battery terminals and inverter cables. Contact with exposed metal parts of cables or terminals inside the inverter will result in severe injury or death.
- If the battery system fails to start or malfunctions, contact the after-sales service center as soon as possible. Otherwise, the battery may sustain permanent damage.

1.2.4 Emergency Measures

Battery electrolyte leakage

If any part of your body accidentally comes into contact with electrolyte, seek immediate medical assistance.

Fire

- Carbon dioxide fire extinguishers should be equipped near the device in case of fire.
- Do not use dry powder fire extinguishers.

1.2.5 Battery Recycling

Used batteries may contain contaminants that can harm the environment and your health if stored or disposed of improperly. Do not dispose of batteries from the energy storage system as household waste! You are legally obligated to return used batteries.

1.2.6 Warning Labels and Signs

Label	Description
	High voltage warning. This product must be handled carefully only by qualified professionals.
	Be cautious of electrolyte leakage. The electrolyte is corrosive.
	Do not step on this product. It will cause device damage.
	Keep the product away from fire.
	Be sure to wear protective gloves when handling or installing the product.
	Please read the user manual carefully before operation.

2 Product Introduction

2.1 Product Introduction

Introduction

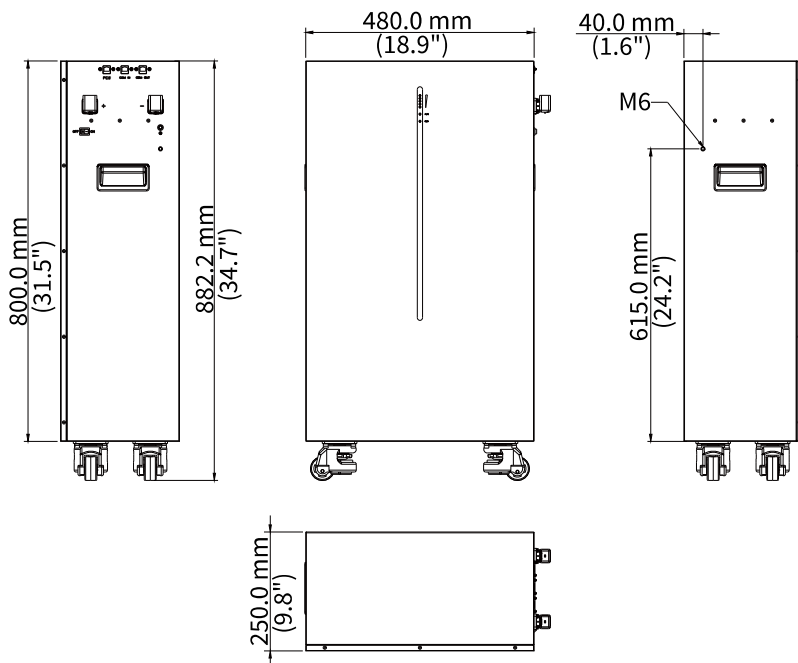
This product is a low-voltage energy storage battery system for energy storage and management to achieve higher energy utilization efficiency. This product adopts a modular design and supports up to 16 batteries connected in parallel, with each battery having a capacity of 16.08kWh.

Applicable Models

This manual is applicable to battery model ESS-LB16-W01.

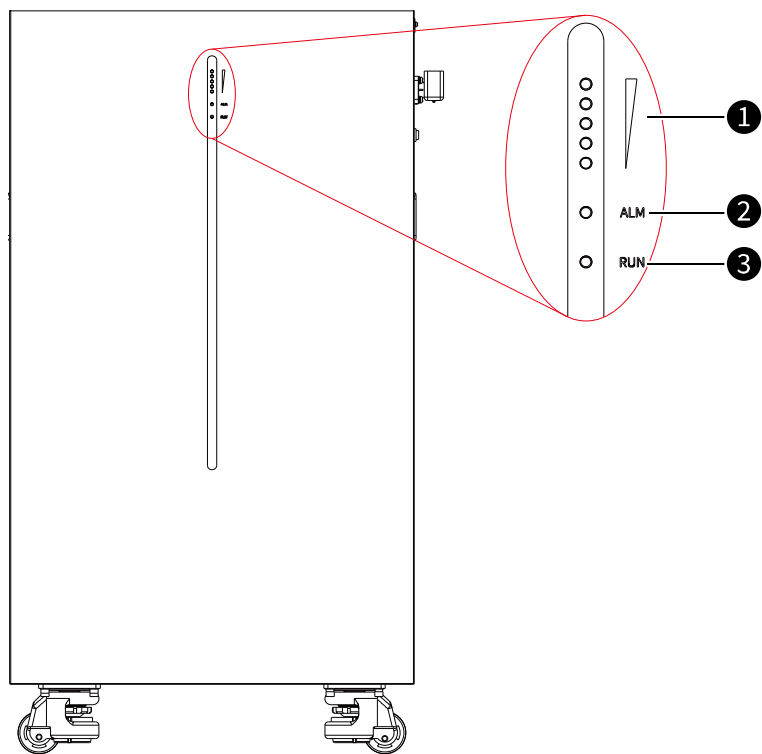
2.2 Product Overview

2.2.1 Dimensions



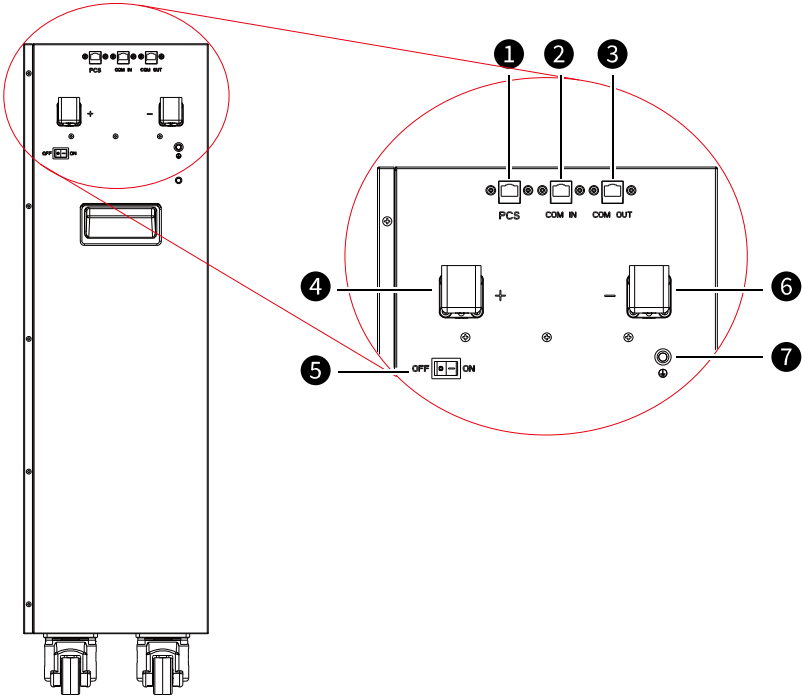
2.2.2 Interfaces and Indicator Lights

Figure 2-1 Indicator Lights



No.	Indicator	Description
❶	SOC	Power indicator
❷	ALM	Alarm indicator
❸	RUN	Status indicator

Figure 2-2 Interfaces



No.	Interface	Description
1	PCS	Connects to the BMS communication interface on the inverter.
2	COM IN	Connects to the COM OUT interface on the previous battery pack for communication
3	COM OUT	Connects to the COM IN interface on the next battery pack for communication
4	BAT+	Battery positive terminal
5	Power button	On/off switch of the battery system
6	BAT-	Battery negative terminal
7	Grounding	For grounding

Definitions of Communication Interfaces

PCS		COM IN		COM OUT	
1	485_B_PCS	1	ADD_IN_COM	1	ADD_OUT_COM
2	485_A_PCS	2	AGND	2	AGND
3	-	3	232_TX	3	-
4	CAN_H	4	AGND	4	-
5	CAN_L	5	-	5	-
6	-	6	232_RX	6	-
7	485_A_PCS	7	485_A_COM	7	485_A_COM
8	485_B_PCS	8	485_B_COM	8	485_B_COM

Indicator Light Status

Usage	System Status	Indicator Light Status
Status display	Standby	RUN indicator off, ALM indicator off, SOC indicator on
	Charging	RUN indicator on, ALM indicator off, last SOC indicator blinking
	Discharging	RUN indicator on, ALM indicator off, SOC indicator on
	Protection	RUN indicator off, ALM indicator on, SOC indicator on
	Low battery	RUN indicator blinking, other indicators follow standby, charging, discharging, or protection states
Battery level display	Charging	SOC indicator: 1 blinking: $0\% \leq \text{SOC} \leq 20\%$ battery 1 steady on, 1 blinking: $20\% < \text{SOC} \leq 40\%$ 2 steady on, 1 blinking: $40\% < \text{SOC} \leq 60\%$ 3 steady on, 1 blinking: $60\% < \text{SOC} \leq 80\%$ 4 steady on, 1 blinking: $80\% < \text{SOC} \leq 100\%$ 5 steady on: 100% battery
	Discharging, standby, alarm	SOC indicator: Off: 0% battery 1 steady on: $0\% < \text{SOC} \leq 20\%$ 2 steady on: $20\% < \text{SOC} \leq 40\%$ 3 steady on: $40\% < \text{SOC} \leq 60\%$ 4 steady on: $60\% < \text{SOC} \leq 80\%$ 5 steady on: $80\% < \text{SOC} \leq 100\%$
	Sleep	The light board stops supplying power, and the five SOC indicators are off.

3 Device Inspection and Storage

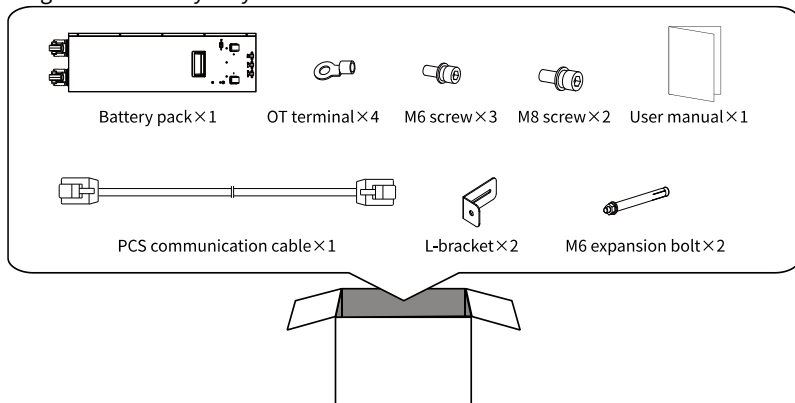
3.1 Delivery Inspection

After receiving the product, please carefully check the following items. If any issues are found, please contact customer service in a timely manner:

- Check the outer packaging of the product for any damage, including compression, deformation, cracks, holes, etc., as these could potentially affect the device inside.
- Ensure that the product model matches the order model. If there is a discrepancy, do not open the packaging.
- Check if the types and quantities of accessories inside the packaging match the contents listed on the packing list, and check for any damage.

3.2 Packing List

The package contents may vary with device model and version.



CAUTION!

- The battery pack is heavy. Use caution when removing it from its packaging.
- The cable package for the inverter and battery packs is not supplied. Please purchase separately as needed.

3.3 Device Storage



WARNING!

Before storing the device, ensure that the battery system is powered off, and the power button is in the off position.

If the system will not be used temporarily or will be stored for a long time, follow these requirements for storage:

- When storing the battery packs, place them according to the labels on the packaging box. Do not put the batteries upside down or randomly.

- When stacking cartons, please follow the instructions on the outer packaging.
- Handle the battery packs with care to avoid damage.
- If the batteries have been unpacked but not installed, put the battery packs back into the packaging box.
- The device should be stored in a cool place and avoid direct sunlight.
- Keep the device away from flammable and explosive materials.
- If the system will not be used for an extended period, you need to charge the power to 50% every six months. Recommended storage conditions: temperature 0°C to 35°C, relative humidity ≤ 60%.

3.4 Equipment Moving

Improper moving may cause personal injury or property damage. Please select an appropriate moving method based on the equipment weight.

Weight	Moving Method	Recommendation
< 18 kg	Manual moving	1 person
18 kg ~ 32 kg	Manual moving	2 people
32 kg ~ 55 kg	Manual moving	3 people
55 kg ~ 68 kg	Manual moving	4 people
> 68 kg	Material handling equipment	Forklift, etc.

3.5 Device Transportation



WARNING!

Improper transportation can lead to personal injury. Please strictly adhere to the following guidelines.

- Comply with the relevant national road regulations when transporting.
- Do not smoke during vehicle transportation or loading/unloading processes. In accordance with the regulations for the road transportation of dangerous goods, two compliant carbon dioxide fire extinguishers must be equipped in the vehicle.
- When transporting the battery system, place it flat and avoid tilting or inverting it. To prevent sliding inside the vehicle, use restraints to secure it.
- Avoid unpacking the transportation packaging before reaching the destination.
- Due to the heavy weight of the battery pack, it may crush accessories during transportation. When loading/unloading, please wear protective gloves and shoes to avoid injury.

4 Device Installation

4.1 Installation Preparation

Environment Requirements

- This device has an IP20 rating. It must be installed indoors and kept away from direct exposure to water or moisture.
- Do not install the device in easily accessible areas or near children's activity zones.
- Flammables and explosives must be kept away from the device; independent fire alarm devices must be provided.
- Do not expose the battery pack to sunlight or install near any heat sources.
- The device should be installed in a place with sufficient load-bearing capacity and levelness, and should not be tilted, laid down, or placed upside down.
- The optimal operating condition of the device is at an ambient temperature of around 25°C. Operation in high temperatures should be avoided.
- The installation altitude of the device should not exceed 4000m.
- Sufficient space should be left around the device for efficient ventilation and heat dissipation.

Tools



Safety gloves



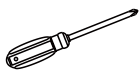
Safety goggles



Safety shoes



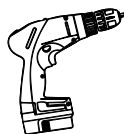
Dust mask



Phillips screwdriver



Marker



Hammer drill



Hex key

4.2 Device Installation



CAUTION!

When moving the device, apply force from the side. Pushing from the front or back creates a risk of tipping.

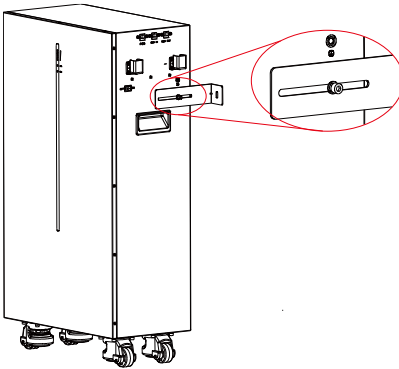
Use L-brackets to secure the device.

1. Use flat washers, spring washers, and M6 screws to install the brackets on both sides of the battery pack.

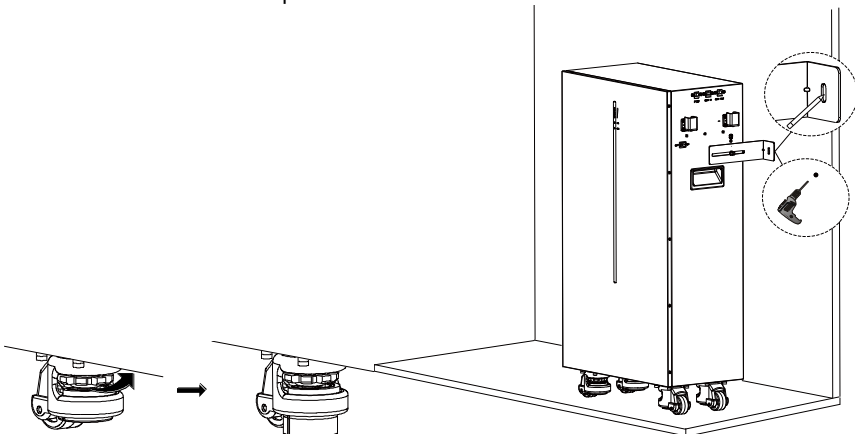


NOTE!

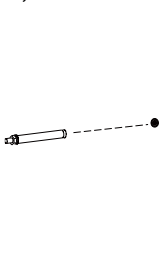
It is recommended not to tighten the screws completely, allowing the brackets to slide horizontally for ease in subsequent installation steps.



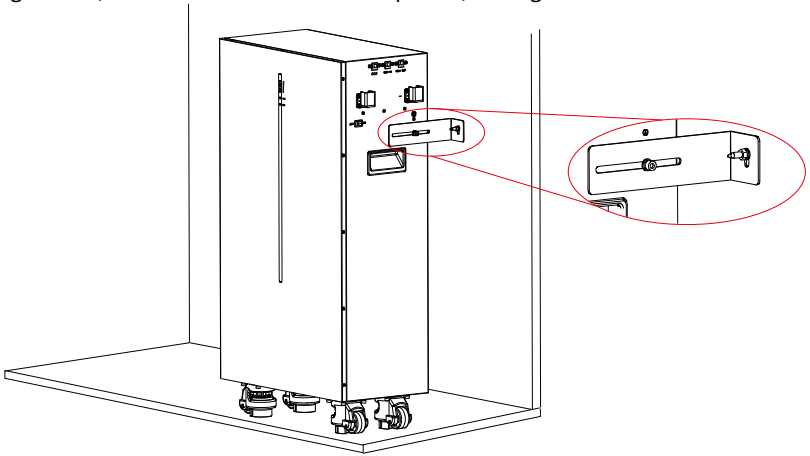
2. Move the battery pack with brackets close to the wall to determine the distance from the wall. Rotate the thumbwheel of the wheel to lower the support feet until they touch the ground (the wheels will now be off the ground), then mark the positions of the two mounting holes on the brackets. Rotate the thumbwheel again to lower the wheels and retract the support feet. Move the battery pack away and drill two holes in the wall at the marked positions.



3. Insert the M6 expansion bolts into the holes in the wall. Then remove the nut, spring washer, and flat washer from each bolt.



4. Move the battery pack back. Align the bracket holes horizontally with the bolts. Rotate the thumbwheel to lower the support feet until they touch the ground. Adjust the brackets so the bolts pass through the bracket holes. Then install the flat washer, spring washer, and nut onto each bolt in sequence, and tighten them.



5 Electrical Connection

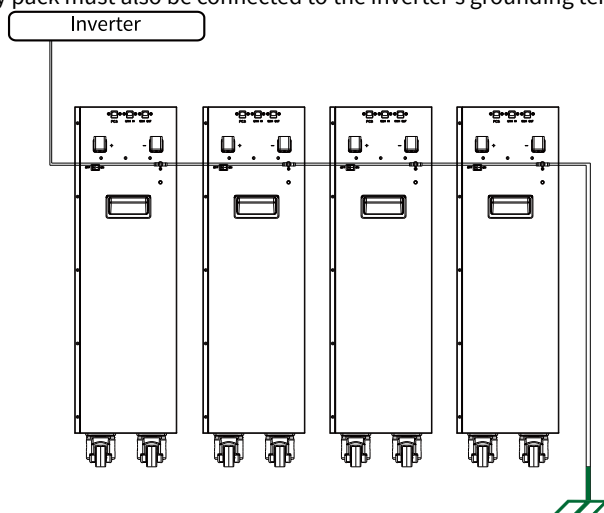


CAUTION!

- Choose the appropriate wiring method based on the actual condition.
- Before making electrical connections, ensure that this product is intact. Any damage may pose a risk of danger.
- Before making electrical connections, ensure that all battery switches and all switches connected to the inverter are in the OFF position. Failure to do so may result in electrical shock.
- All operations for electrical connections and the specifications of the cables used must comply with local laws and regulations.
- Improper actions during the wiring process can cause fatal injury to the operator or irreversible damage to this product. Contact a professional for wiring operations.
- Cables must not be intertwined with each other or arranged in a crisscross pattern.

5.1 Connect the Grounding Cable

Use a ground cable to connect to the grounding terminal of each battery pack. The first battery pack must also be connected to the inverter's grounding terminal.

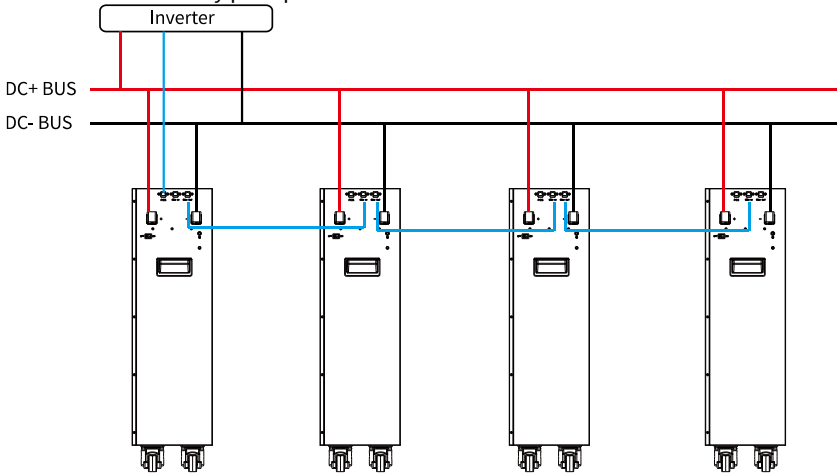


NOTE!

When connecting the ground cable, it is recommended to use a cable with a cross-section of 10 AWG.

5.2 Connect Power Cable and Communication Cable

1. Slide the protective covers for the battery pack's positive and negative terminals in the direction opposite the cover's opening to remove them.
2. Connect the power cables. It is recommended to use 1 AWG cable. Secure the cables to the terminal blocks using the provided M8 screws. If using bare wire, crimp it with the provided OT terminals.
3. Connect the communication cables.
4. Reinstall all battery pack protective covers.



6 System Commissioning

6.1 Pre-Power-On Inspection

Before powering on the system, ensure the following items have been checked:

- The device is properly installed, and the site meets the environment requirements.
- The cables are organized properly and meet the requirements.
- The cables ties are fastened neatly and evenly distributed, with no sharp edges at the cutting end.
- The ground, power, and communication cables are properly and securely connected.
- The power button is in the OFF state.

6.2 System Power-On

Turn on the power switches of all battery packs that are **not connected** to the inverter's communication port, then turn on the power switch of the battery pack that **is connected** to the inverter's communication interface.

6.3 System Power-Off

Turn off the power switches of all battery packs.

7 System Maintenance

When one or more battery packs within the system become unusable, the faulty battery pack(s) must be removed from the system. The remaining battery packs can be reconnected for normal operation.

7.1 Routine Maintenance



NOTE!

It is recommended to fully charge the battery at least once per month.

To ensure the long-term stable operation of the system, it is recommended to perform a routine maintenance every six months.

- Check for obstacles, dust, dirt, or debris on the battery pack; clean them immediately if found.
- Clean with a dry cloth to avoid moisture contact with the battery pack.
- Check if the battery pack is loosely installed.
- Check the exterior of the battery pack for any deformation or damage.
- During the operation of the battery pack, check for any abnormal noises.
- Check that all operation parameters for the battery pack are set correctly.
- Check that all terminals are securely connected.
- Check the exposed wires for signs of wear.
- Check that the grounding is secure.

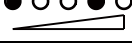
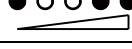
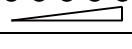
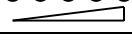
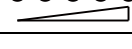
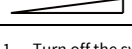
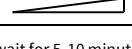
7.2 Troubleshooting

The fault information can be viewed via the SOC indicator sequence. During a fault, the ALM and SOC indicators will be steady on. If multiple faults exist simultaneously, the SOC indicator will cycle through them.



CAUTION!

If there is a malfunction with the battery system, please contact customer service for assistance. It is not recommended that you attempt to handle it yourself.

Error	Low battery voltage 	Abnormal cell voltage difference 	Low system voltage 
	High charge current 	High discharge current 	Internal communication error 
	Pre-charge error 	Battery temperature error 	AFE error 
	Battery voltage error 	Charging MOS error 	Discharging MOS error 
	High MOS temperature 	Overcurrent lockout 	MOS temperature error 
	Battery deeply discharged 	Short circuit protection 	
Solution	- Turn off the system power and wait for 5-10 minutes. - Check the battery pack and cables for any damage. - Check that the system wiring is correct. - After the above items are checked correct, turn on the system power. - If the alarm persists, please contact technical support.		

Error	High battery discharge temperature 	Low battery discharge temperature 	High battery charge temperature 
	Low battery charge temperature 	Abnormal cell temperature difference 	
Solution	- Check whether the ambient temperature at the installation site is within the permissible operating temperature range for the device. - If there is no ventilation or the ambient temperature is too high, enhance ventilation and cooling; if the ambient temperature is too low, increase the ambient temperature or change the installation location. - If the ambient temperature is normal, please contact technical support.		

7.3 After-sales Service

We provide comprehensive technical support and after-sales service to our customers. The free warranty period is subject to the contract provisions.

The following situations are not covered by our free warranty:

- Failure to operate according to the instructions and caused system damage or malfunction.
- Failure to connect and power the system according to relevant electrical safety regulations, or damage or malfunction due to poor site environment.
- System damage or malfunction caused by unauthorized modifications by the user.
- System damage or malfunction caused by force majeure events such as typhoons, earthquakes, floods, fires, or adverse environmental conditions (such as high temperature, low temperature, high humidity, acid rain, etc.).
- After a fault occurred, the user failed to maintain the initial fault status and proceeded to handle the fault without promptly notifying the manufacturer, resulting in the inability to identify the original fault.
- Power loss or device damage caused by failure to store in accordance with the instructions.

8 Technical Specifications

Model	ESS-LB16-W01
System rated power (KWh)	16.08
Cell type	LFP(LiFePO ₄)
Rated voltage (V)	51.2
Operating voltage (V)	43.2~58.4
Rated charge/discharge current (A)	160/160
Max. charge/discharge current (A)	160/200
Charge temperature (°C)	0~55
Discharge temperature (°C)	-30~55
Storage temperature (°C)	-20~60
Operating humidity (RH)	20%~90% RH, non-condensing
Storage humidity (RH)	5%~95% RH, non-condensing
Altitude (m)	≤ 4000
PCS communication method	CAN, RS485
Cooling	Passive cooling
Ingress protection	IP20
Protection level (electrical)	I
Mount	Ground standing mount
Dimensions (W*D*H, mm)	480*250*800 (excluding casters)
Weight (kg)	112
Certification	UN38.3, MSDS

Company: Zhejiang Uniview Technologies Co., Ltd.

Manufacturing Company: HopeTrek Innovations Co., Ltd.

Add: Room 57,3/F, Block A, East Sun Industrial Centre, 16 Shing Yip Street, Kwun Tong,
Kowloon, Hong Kong.

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Email: info@hopetrek.com

WEB www.hopetrek.com