



Installation Manual

R-EC060030A1-US/R-EC060060A1-US

ECube 60AP



2025 5th EDITION

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CONTENTS

1. Safety Precautions	- 1 -
1.1. General Statement	- 1 -
1.2. Security Statement	- 1 -
2. Product Profile	- 2 -
2.1. Size	- 2 -
2.2. Surface	- 2 -
2.3. Introduction to Key Components	- 3 -
2.3.1. Battery Module	- 3 -
2.3.2. Main Control Box	- 4 -
3. Install	- 4 -
3.1. Spacing requirements for installation	- 4 -
3.2. Base requirements for installation	- 5 -
3.3. Lifting Operation	- 6 -
3.4. Secure the Cabinet	- 7 -
3.5. Install Enclosure Panels	- 7 -
3.6. Install Inverter	- 8 -
3.7. Electrical connection	- 8 -
3.7.1. Pre-Wiring Preparation	- 9 -
3.7.2. Protective Earth Wire Connection	- 9 -
3.7.3. Auxiliary Power Supply Wire Connection	- 9 -
3.7.4. DC Wire Connection	- 10 -
3.7.5. Communication Wire Connection	- 10 -
3.7.6. Standard Inverter Wiring Diagram	- 11 -
3.7.7. Wire Connection between BESS (Optional)	- 12 -
3.7.8. Wire Connection between Inverters (Optional)	- 13 -
4. Test Operation of Equipment	- 14 -
4.1. Check Before Charging	- 14 -
4.2. Battery Cabinet Activation	- 14 -
4.3. Battery Cabinet Deactivation	- 15 -
4.4. Emergency Stop	- 15 -
5. User Interface	- 16 -
5.1. Local Touchscreen	- 16 -
5.1.1. Overview Interface	- 16 -
5.1.2. Alarm Interface	- 16 -
5.2. Cloud Interface	- 17 -
6. Emergency Response Measures for Critical Situations	- 19 -
6.1. Electrolyte Leakage from Batteries	- 19 -
6.2. Fire Incident	- 19 -
7. Revision Table	- 20 -



1. Safety Precautions

1.1. General Statement

- Due to the product version upgrade or other reasons, the document content will be updated irregularly. Without special agreement, the document content cannot replace the safety precautions in the product label or user manual. All descriptions in the documentation serve as use guides only.
- Please read the quick installation instructions carefully before installation.
- All operations of the equipment must be carried out by professional and qualified electrical technicians, who shall be familiar with the relevant standards and safety specifications in the location of the project.
- Before installation, verify the equipment model matches the order, all quantities are complete, and there is no visible damage. If any issues are found, contact the after-sales service center.
- When operating the equipment, use insulation tools and wear personal protective equipment to ensure personal safety.
- Equipment damage or personnel injury caused by the failure to install, use or configure the equipment according to the requirements of this document or the corresponding user manual is not within the scope of responsibility of the equipment manufacturer.

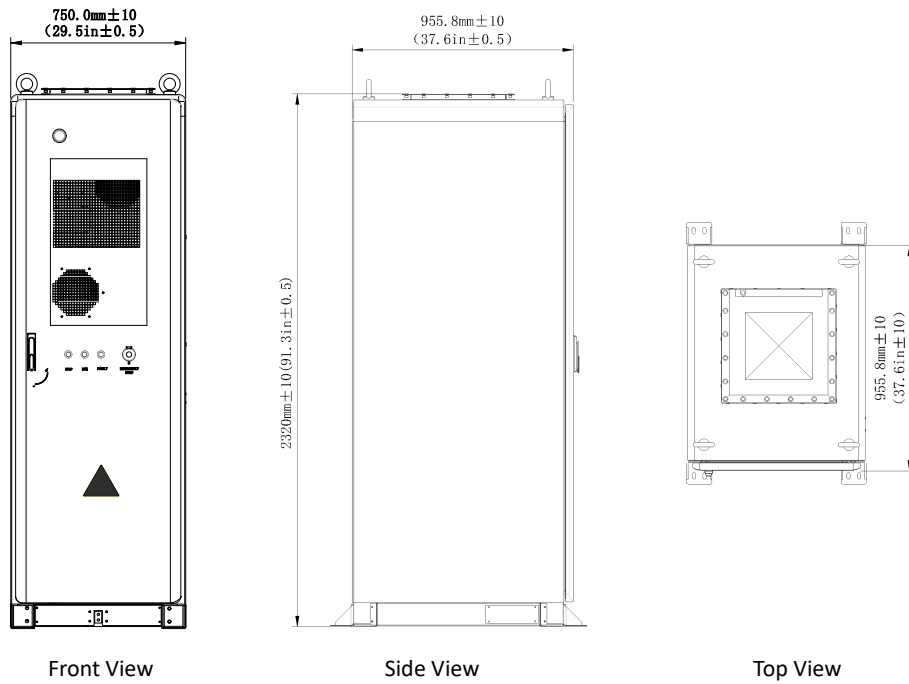
1.2. Security Statement

- When operating the equipment, please observe the safety precautions listed in this manual and other relevant documents of the equipment and the safety marks on the product.
- To protect the equipment from damage during transportation, ensure that the transport personnel are professionally trained. Record the operation steps during transportation and keep the equipment balanced to avoid the equipment drop.
- The energy storage system is heavy equipment, please use appropriate equipment and tools and take protective measures during installation and maintenance. Improper operation can cause personal injury or product damage.
- Equipment shall be installed on a concrete or other non-combustible surface base.
- Before installation, ensure that the base is horizontal, firm, smooth, dry, with sufficient bearing force, and prohibit depression or tilt.
- Do not place the equipment in a high temperature environment to ensure that there is no heat source near the equipment.
- After the installation of the equipment, ensure that the labels and warning signs on the box must be clearly visible, and shielding, alteration and damage are prohibited.
- There is a fatal high voltage inside the equipment, there is an electric shock danger, do not touch at will.
- Before operating the equipment, ensure that the system is grounded reliably, and take relevant protective measures. Otherwise, there may be a danger of electric shock.
- When operating the equipment, ensure that the equipment is in no damage, without failure, otherwise there may be a risk of electric shock and fire.
- Ensure that all switches of the equipment are disconnected before installation, wiring or maintenance.
- Do not open the equipment cabinet door during the equipment operation and touch any wiring terminals or components. Otherwise, there will be a danger of electric shock.
- Non-professionals should not open the cabinet door to touch the cabinet parts without permission, otherwise there may be a risk of electric shock.
- Do not disassemble or modify any part of the equipment without the official authorization of the equipment manufacturer. The damage caused is not within the responsibility of the equipment manufacturer.

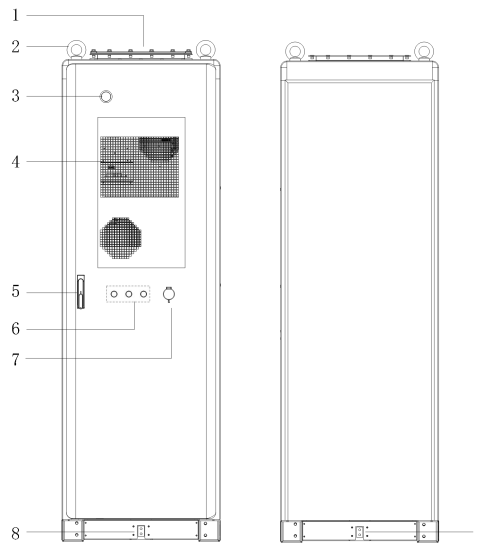


2. Product Profile

2.1. Size



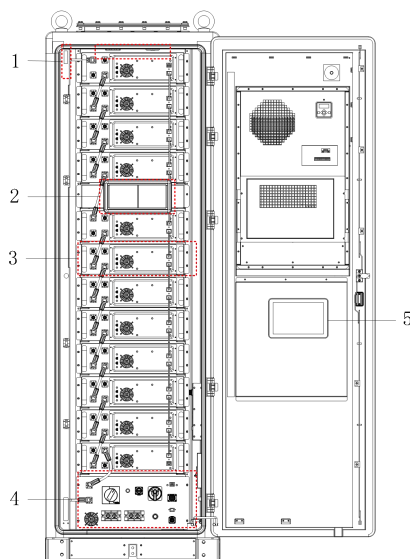
2.2. Surface



No.	Name	No.	Name
1	Explosion Vent Panel	5	Door Lock
2	Lifting Ring	6	Indicator Light
3	Wi-Fi	7	Emergency Stop Button
4	Air Conditioner	8	Grounding Terminal

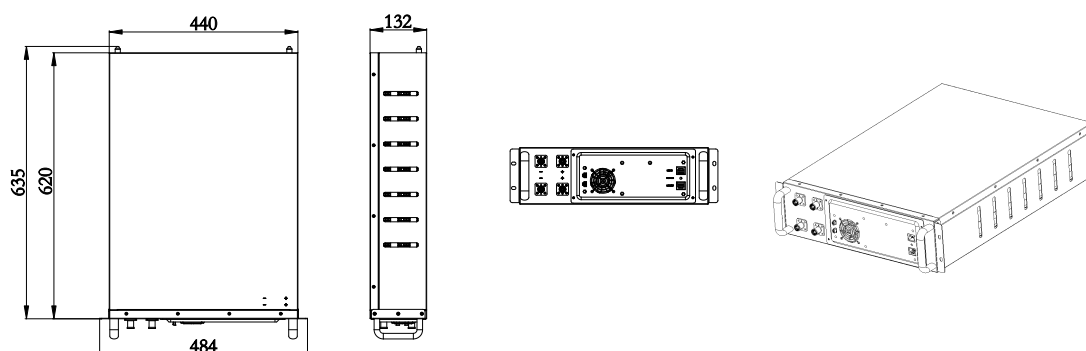


2.3. Introduction to Key Components



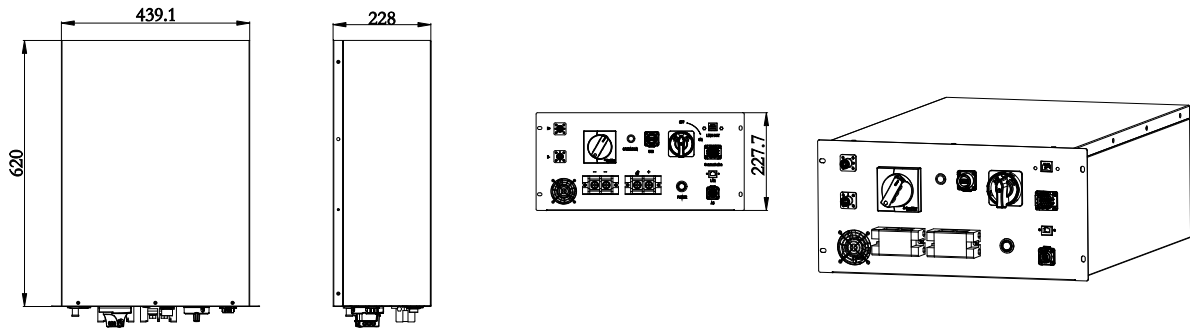
No.	Name	Remarks
1	Fire Protection System	Temperature Sensor、Smoke Sensor and Aerosol
2	Air Duct	
3	Battery Module	
4	Main Control Box	
5	Cabinet-level EMS	Energy Management System

2.3.1. Battery Module



No.	Project	Parameters	Remarks
1	Configuration	1P16S	
2	Rated Energy	5.12kWh(100Ah)	
3	Rated Voltage	51.2V	
4	Allowable voltage range	40V~57.6V	For cell 2.5V~3.6V
5	Dimension	440mm*132mm*620mm (17.32 in × 5.20 in × 24.41 in)	
6	Weight	46.5kg(102.5lb)	

2.3.2. Main Control Box

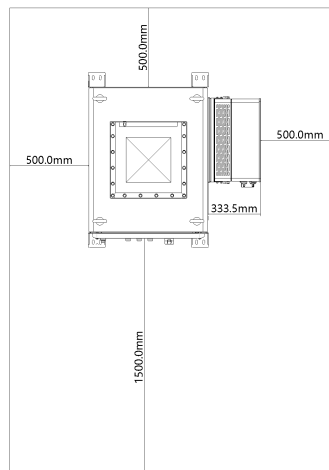


Size	439.1mm × 620mm × 228mm (17.29 in × 24.41 in × 8.98 in)	Operating Voltage Range	6S2P:259.2-345.6V 12S1P:518.4-691.2V
Weight	30kg	Current	100A

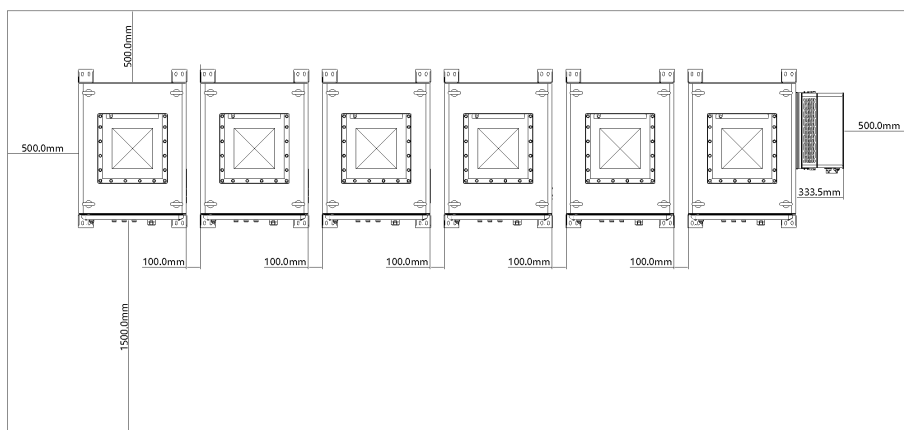
3. Install

3.1. Spacing requirements for installation

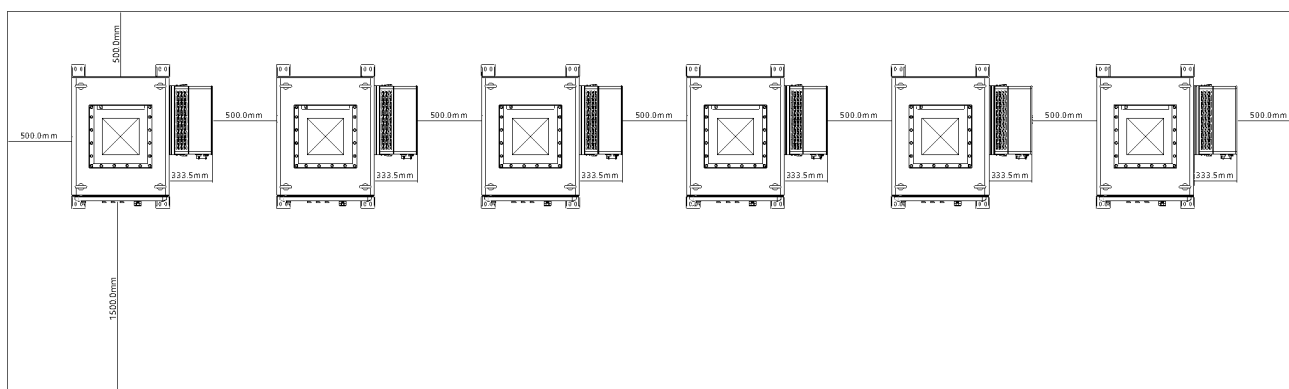
To ensure better airflow, it is recommended to reserve sufficient space around the cabinet's installation location. The following illustrations demonstrate the minimum space requirements under different configuration scenarios.



✓ Single Cabinet



✓ N battery cabinets + 1 inverter (N ≤ 6)

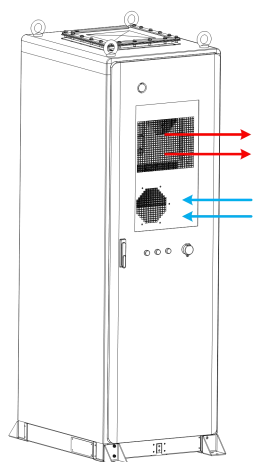


✓ N Sets of Battery Cabinet-Inverter Pair Configuration (N ≤ 6)

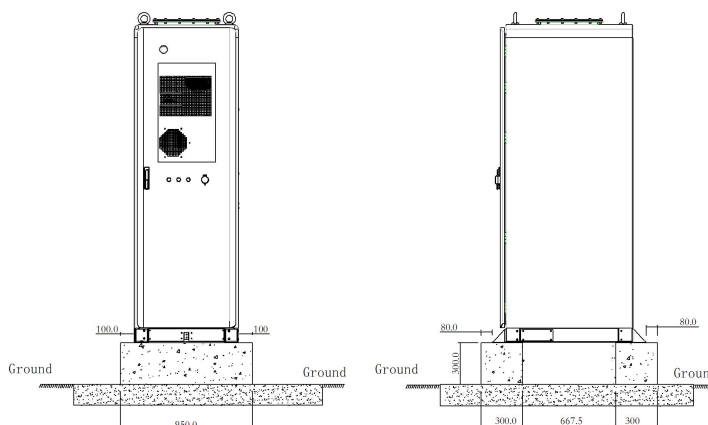
3.2. Base requirements for installation

The base of the battery cabinet can be constructed using either concrete or channel steel. The attached diagrams and table specify the requirements for concrete base, including but not limited to: soil compaction standard, materials, surface tolerance, and load-bearing capacity (2646±3%lb/1200±3%kg). If steel channel brackets are selected as an alternative solution, they must meet equivalent key performance criteria.

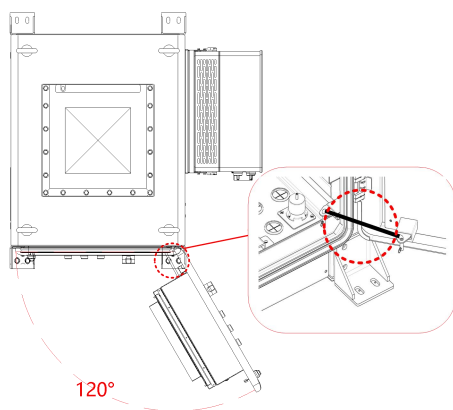
Notice			
1	Excavation & Soil Compaction	➤	During base excavation, the base soil must be compacted (mechanically stabilized).
		➤	Loose, wet, or organic soils require ground improvement (e.g., soil replacement or stabilization).
		➤	The base site shall be located at the highest elevation of the surrounding area to prevent water accumulation.
2	Materials	➤	Subgrade: 7.9in (200mm) thick C15 lean concrete (subgrade support).
		➤	Main Structure: C30 structural concrete, minimum bearing capacity of 5.688psi(4000kg/m²).
3	Surface Tolerance	➤	The base surface must be leveled with a spirit level, ensuring flatness within 3mm deviation.
4	Load-Bearing Capacity	➤	The concrete pedestal shall be horizontally leveled and evenly textured to distribute the product's total weight 2646lb/1200kg(±3%) uniformly.
5	General Notes	➤	This drawing is a schematic guide for product positioning. Final base design must comply with local codes and site-specific geotechnical conditions.
		➤	Anchor Bolts: Use stainless steel M12×150 expansion anchors to secure the energy storage cabinet.
		➤	Fireproofing: After installation, seal all cable penetrations with fire-rated duct sealant (Fireproof putty).
		➤	Disclaimer: This base plan is for reference only. Final design adjustments may be required based on soil reports and local regulations.



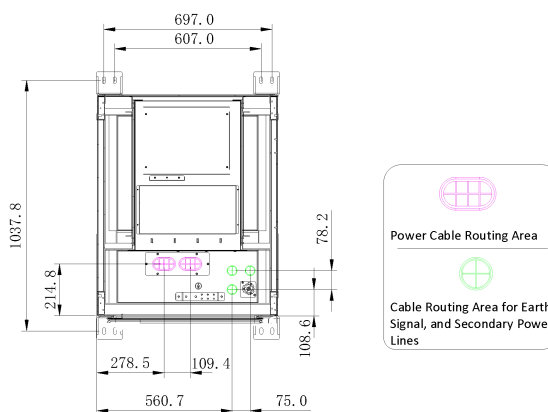
✓ System Airflow Inlet and Outlet Illustration



✓ Recommended Requirements for Base Height



✓ Recommended Door Opening Angle



✓ Bottom Cable Entry and Exit Diagram Description

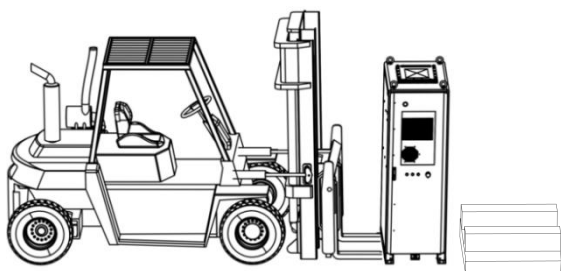
3.3. Lifting Operation

Notice

- Throughout the entire process of lifting the Battery Energy Storage System (BESS), it is essential to strictly adhere to the safety operating procedures of the crane.
- No personnel are allowed to stand within a 5-meter to 10-meter radius of the operating area. In particular, standing under the lifting boom or beneath the machine being lifted or moved is strictly prohibited to avoid any risk of injury or fatalities.
- In the event of adverse weather conditions, such as heavy rain, dense fog, or strong winds, lifting operations must be suspended.
- It is suggested that the battery cabinet body is stably installed on the foundation, and then assemble the inverter.

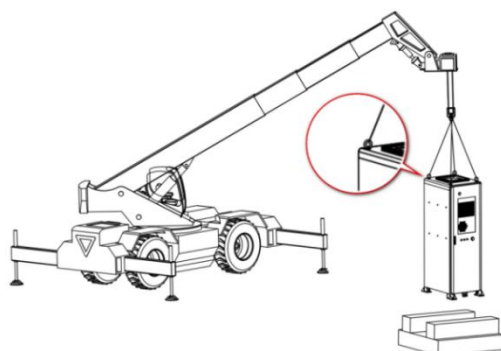


3.3.1. Forklift Transport



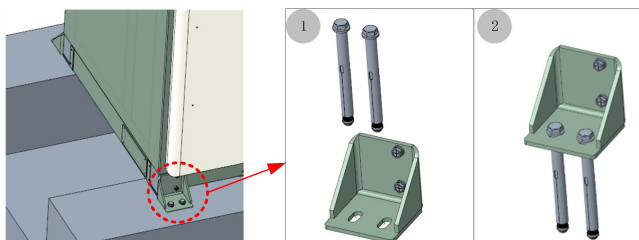
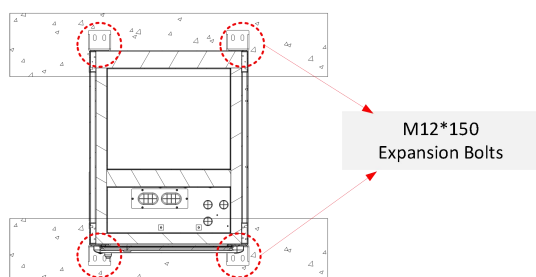
- **Forklift Selection:** Choose a forklift based on the installation area's space constraints. It is recommended to use an internal combustion engine-driven forklift with a rated load capacity exceeding 3307lb(1500 kg).
- **Fork Arm Requirements:** The fork arms must be longer than 39in (1000mm). The width between the fork arms should be ≤ 27.6 in (700mm).
- **Forklift Angle:** Lift from the side of the battery cabinet, not the front/back of the cabinet (as shown in the diagram on the left).
- **Prohibition of forklift movement after cable connection.**

3.3.2. Crane Transport

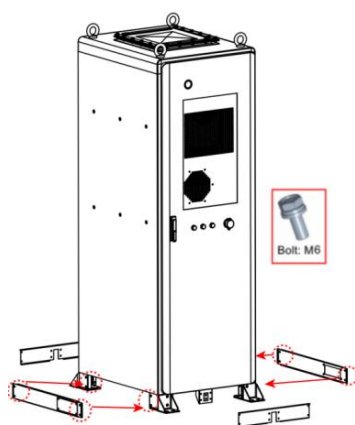


- Please be sure to install the lifting ring during hoisting.
- Select a crane with a load capacity of ≥ 3307 lb (1500 kg).
- Use four lifting slings, with each sling having a recommended load capacity of ≥ 1323 lb (600 kg).
- Use the four standard lifting lugs located on the top of the cabinet as lifting points.
- Attach each lifting strap between a lifting lug and the crane hook.

3.4. Secure the Cabinet



3.5. Install Enclosure Panels



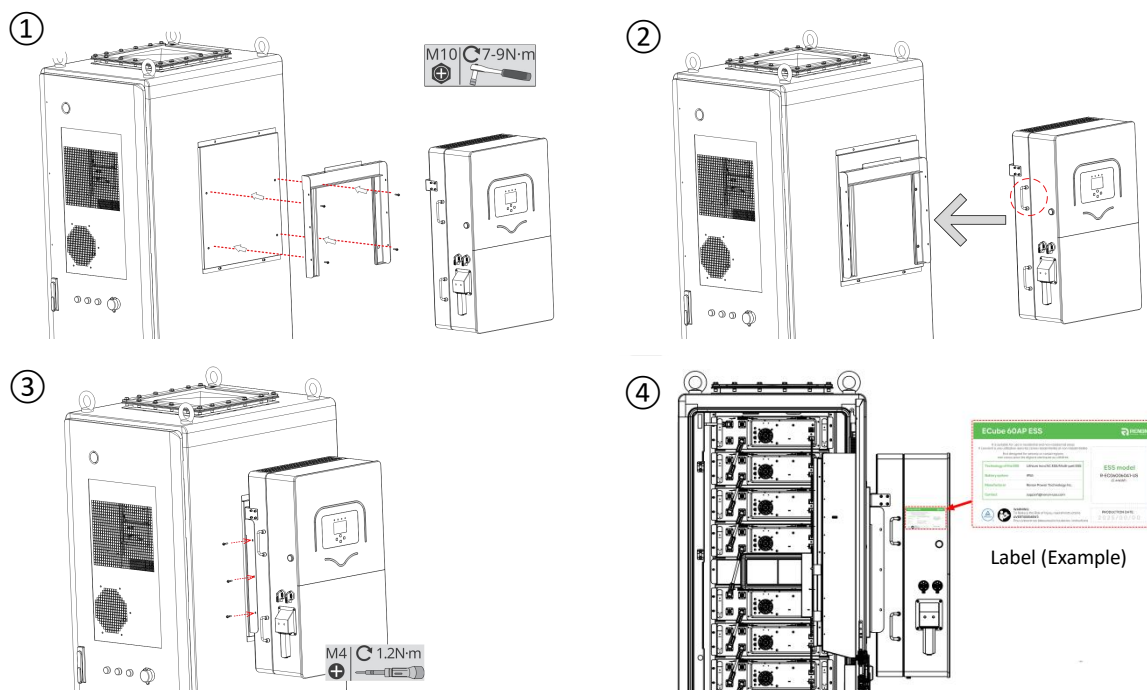
Secure the left and right side panels using M6 bolts.



Secure the front and rear side panels using M5 bolts.



3.6. Install Inverter



- (1) Firmly secure the inverter mounting plate to the designated inverter installation position on the side of the BESS.
- (2) Hang the inverter on the pre-installed inverter mounting rack. Ensure the inverter is properly aligned and fully fitted to the mounting rack.
- (3) Use appropriate screws to tighten the screws on the side of the inverter, ensuring the inverter is securely and safely mounted on the rack.
- (4) Attach the product label (included as an accessory with the cabinet) to the inverter.

3.7. Electrical connection

Danger

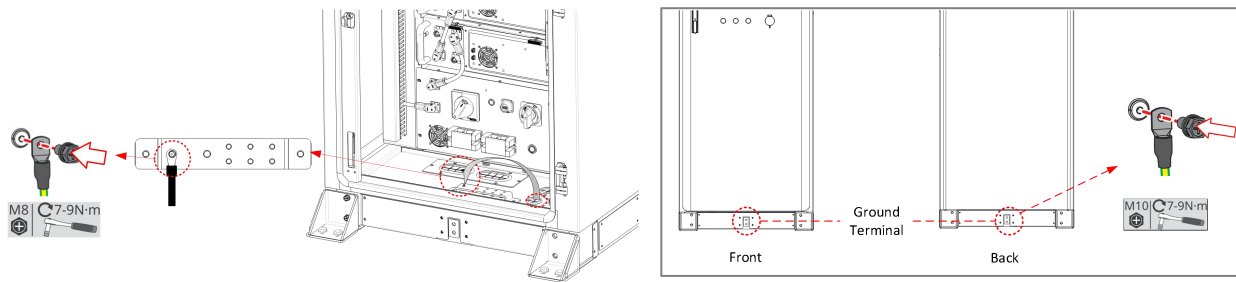
- Do not touch live parts.
- Before wiring, ensure the polarity of all input cables is correct for each circuit.
- Never pull cables or wires forcefully to prevent insulation damage.
- Ensure all cables/wires have sufficient bending space/flexibility to avoid strain.
- Use strain relief measures (e.g., ties) to minimize mechanical stress on cables.
- After each wiring step, inspect connections to ensure they are secure and correctly installed.
- All electrical connections must be performed only when the equipment is completely de-energized (no power supply).



3.7.1. Pre-Wiring Preparation

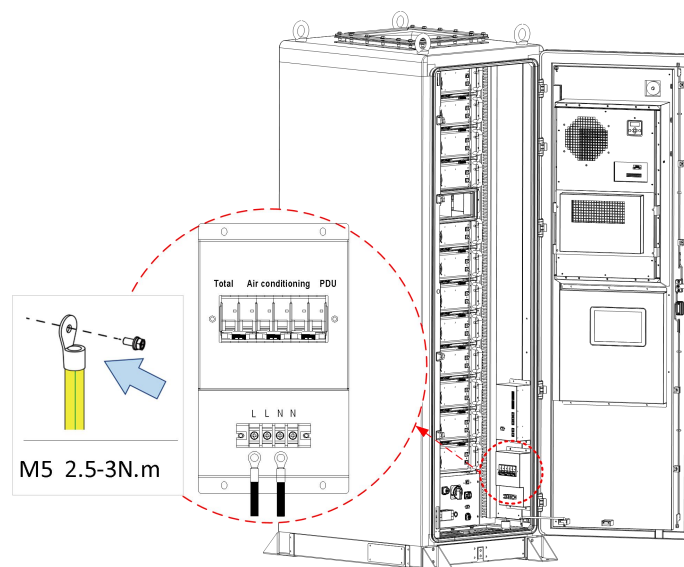


3.7.2. Protective Earth Wire Connection



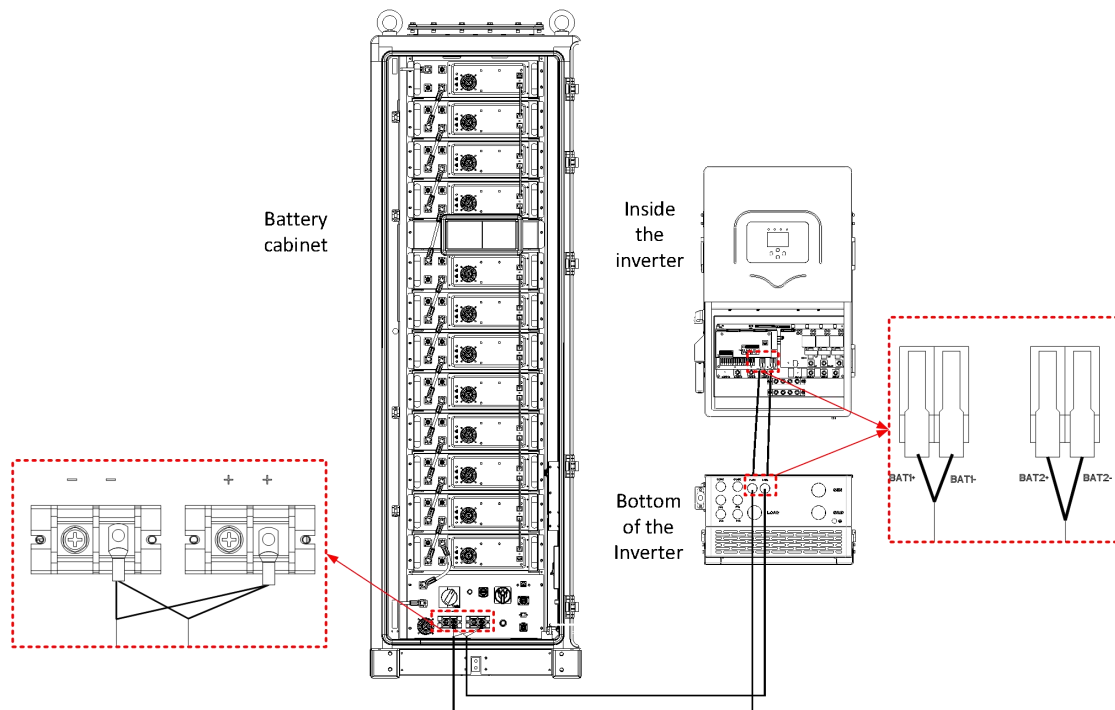
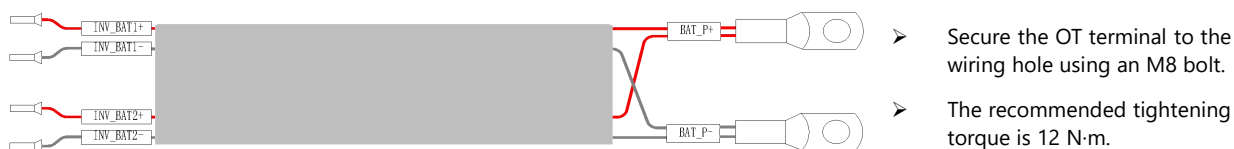
3.7.3. Auxiliary Power Supply Wire Connection

Connect the auxiliary power supply to the port located on the inner side of each battery cabinet.

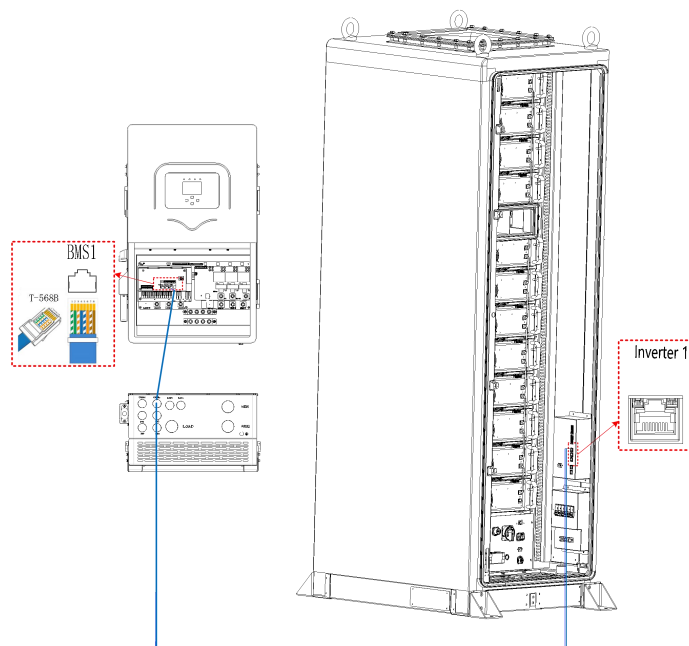




3.7.4. DC Wire Connection



3.7.5. Communication Wire Connection

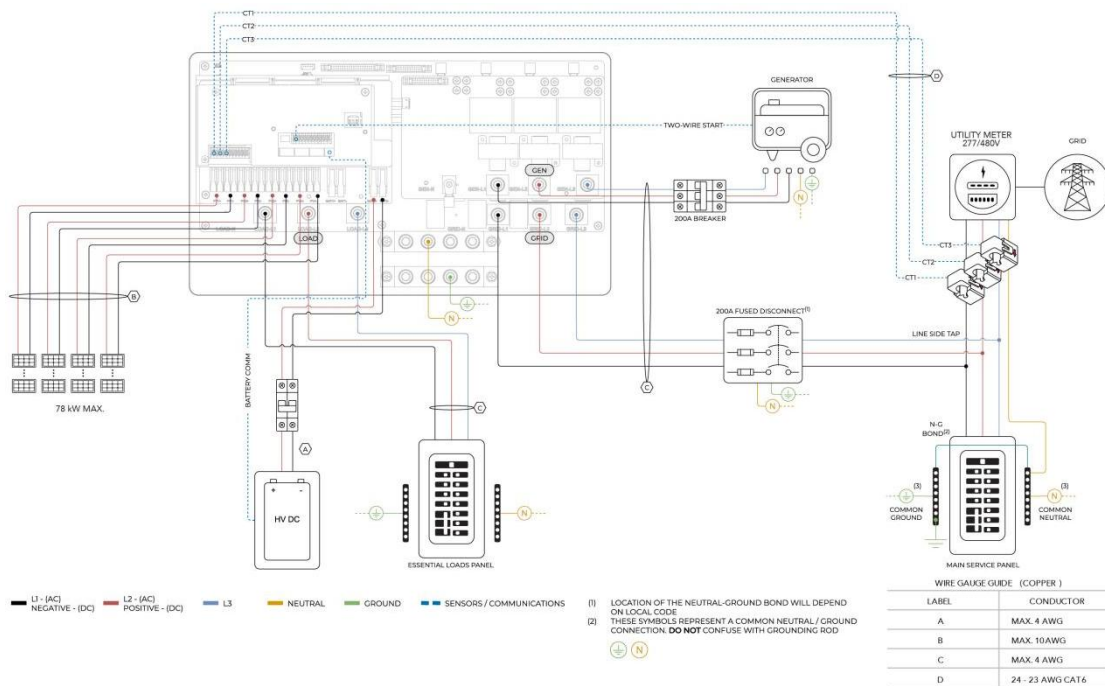




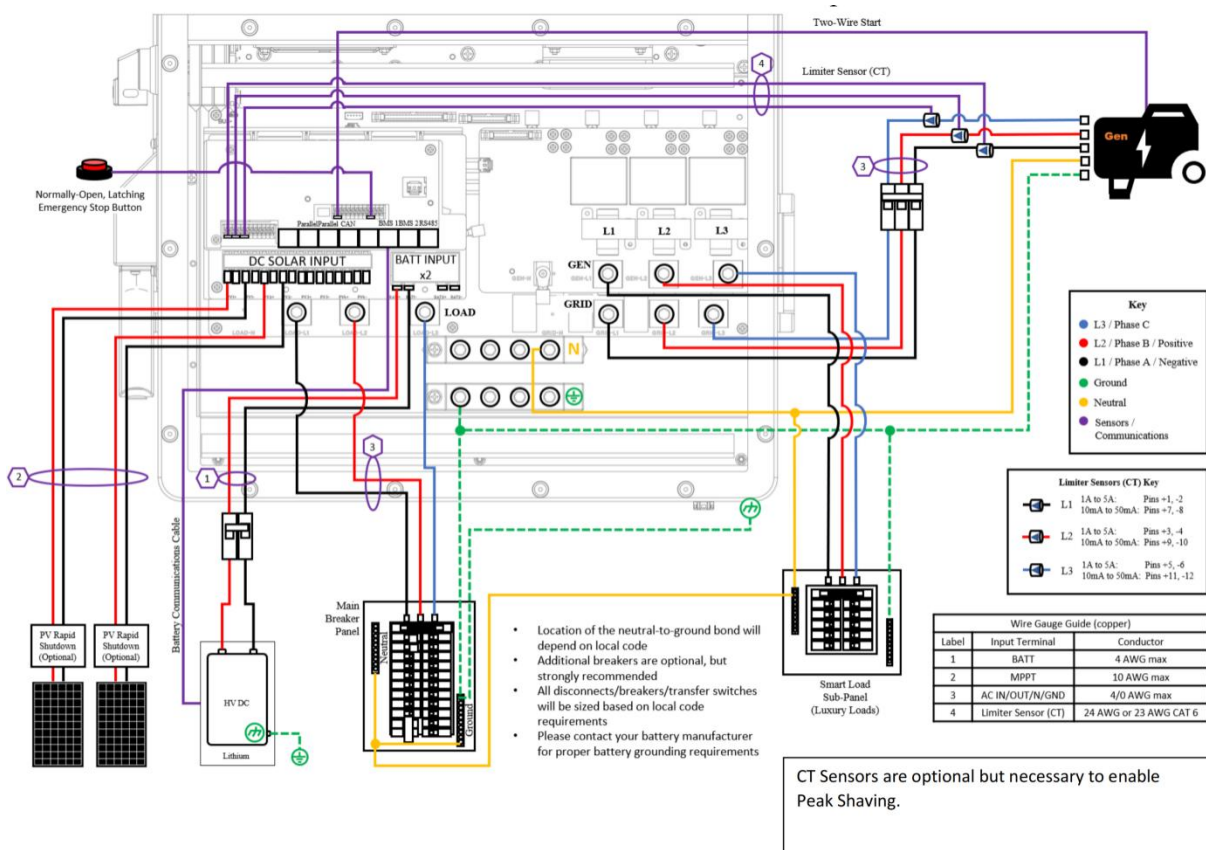
3.7.6. Standard Inverter Wiring Diagram

For more details, please refer to the inverter's specification sheet.

(1) Sol-Ark 60K-3P-480V



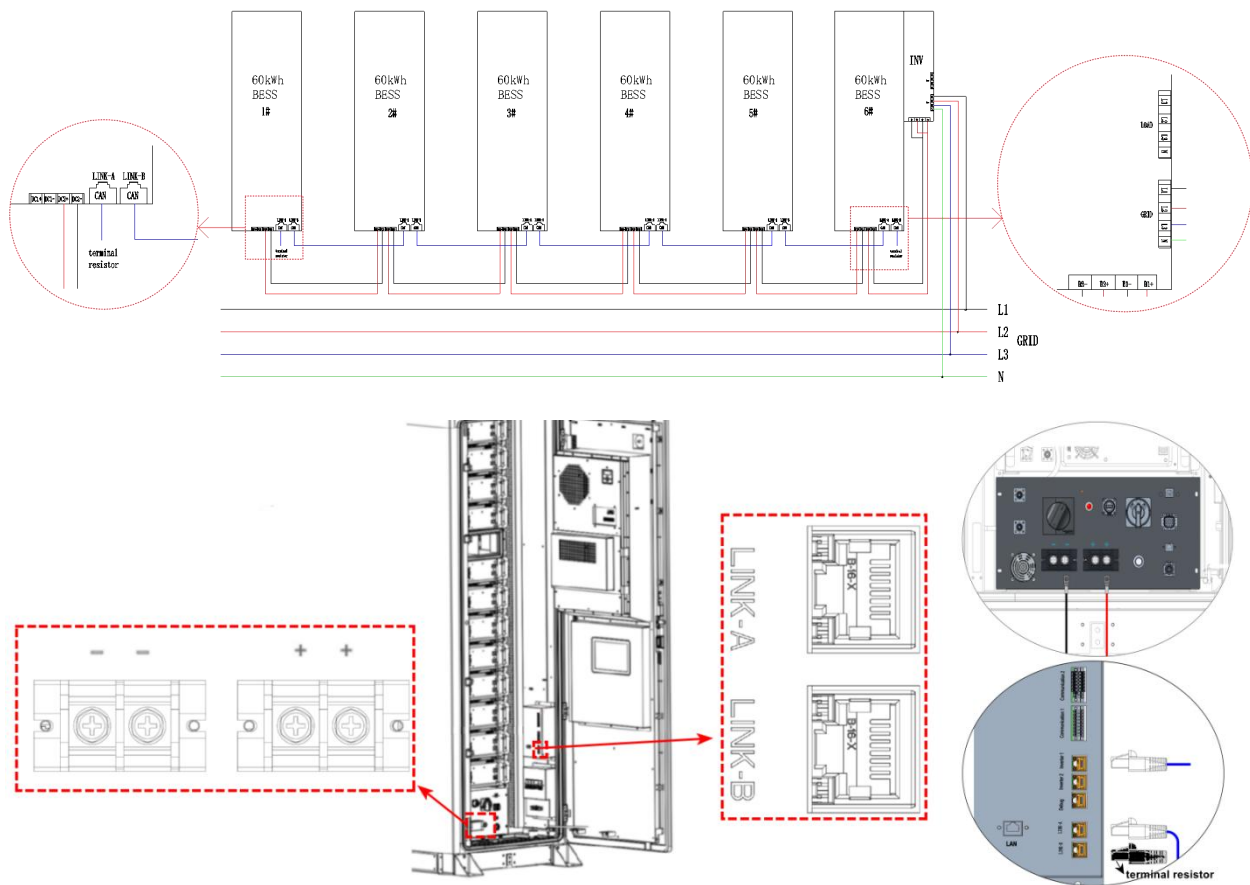
(2) Sol-Ark 30K-3P-208V





3.7.7. Wire Connection between BESS (Optional)

A single inverter supports the parallel connection of up to 6 battery cabinets, with a maximum of 6 inverters allowed in parallel for both on-grid and off-grid operation. Below illustrates the wiring configuration when multiple battery cabinets are connected in parallel to a single inverter.

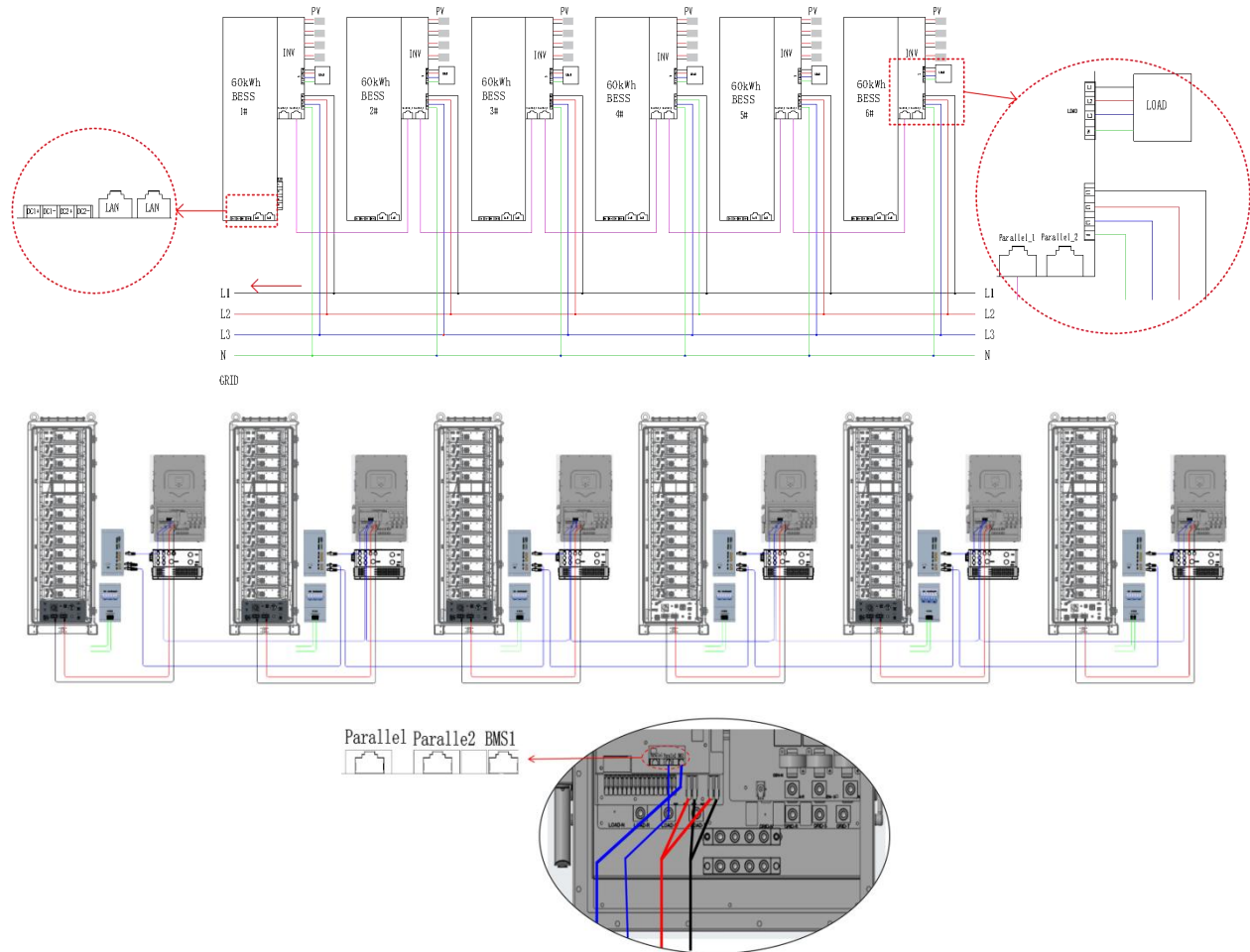


1. Connect the P+ terminal of BESS 1# main control box to the P+ terminal of BESS 2# main control box. Connect the P-terminal of BESS 1# main control box to the P- terminal of BESS 2# main control box. Depending on the actual number of units in parallel, connect to the last BESS.
2. Connect BESS 1# LINK-B to BESS 2# LINK-A using an Ethernet cable. Depending on the actual number of units in parallel, connect to the last BESS.
3. Install terminal resistors into BESS 1# "LINK-A" and BESS 6# "LINK-B". Purpose: Ensures communication stability.
4. Connect the power cables and communication cables between the last battery cabinet and the inverter, as specified in Section 3.7.4 (DC Wire Connection) and Section 3.7.5 (Communication Wire Connection).



3.7.8. Wire Connection between Inverters (Optional)

A single inverter supports the parallel connection of up to 6 battery cabinets, with a maximum of 6 inverters allowed in parallel for both on-grid and off-grid operation. Below illustrates the wiring configuration between multiple inverters after completing the wiring between the battery cabinets and the inverters.



1. Connect "Parallel2" on BESS 1# inverter to "Paralle1" on BESS 2# inverter using a communication cable. Depending on the actual number of units in parallel, connect to the last inverter. Shielded twisted pair cable S/UTP 20-22AWG can be used.



4. Test Operation of Equipment

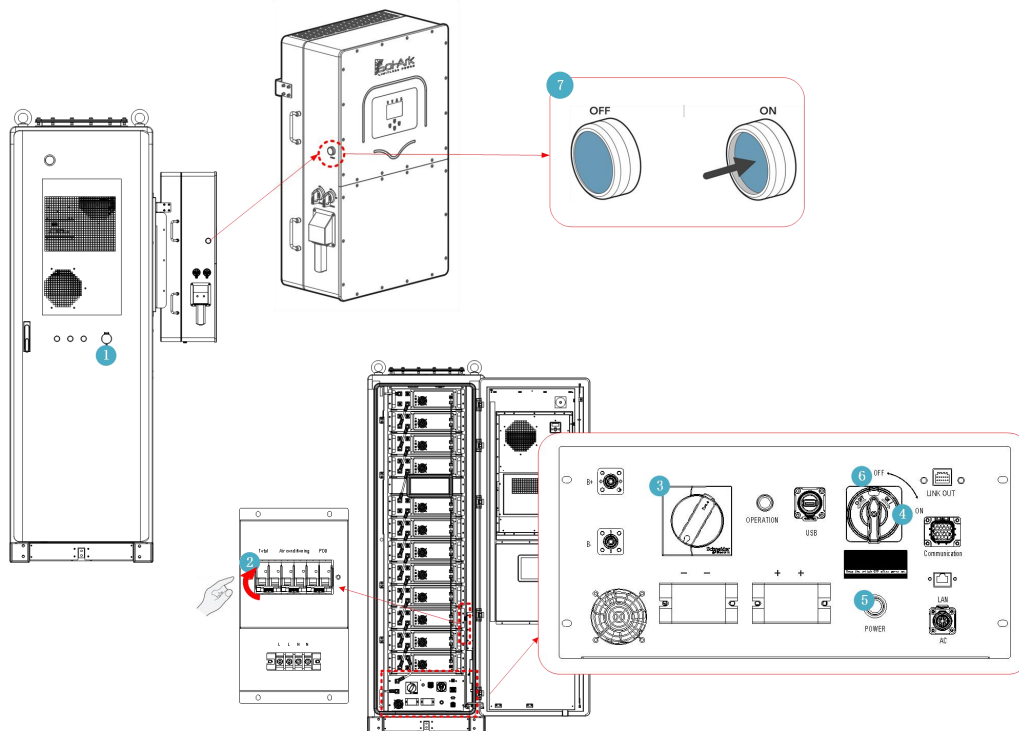
4.1. Check Before Charging

No.	Check items
1	The equipment is installed firmly installed, the installation position is convenient for operation and maintenance, the installation space is convenient for ventilation and heat dissipation, and the installation environment is clean and tidy.
2	Protective earth cable, AC cable and communication cable are correctly and firmly connected.
3	Cable binding meets the wiring requirements, reasonable distribution and no damage.
4	Battery cluster switch, AC switch and DC power switch have been disconnected.
5	The voltage and frequency of the on-grid access point of the battery racks meet the on-grid requirements.

4.2. Battery Cabinet Activation

Steps:

- (1) Verify the emergency stop button, and ensure it's release.
- (2) Close the circuit breakers (i.e., push the circuit breaker upward). Close the "Total", "Air Conditioning", and "PDU" switches in sequence.
- (3) Turn the DC switch to the ON position.
- (4) Turn the DC isolation switch to the ON position.
- (5) Press down the power button.
- (6) Turn the DC isolation switch to the OFF position.
- (7) Press down the inverter's power button to the ON position. Wait for the "Normal" LED indicator to turn on.



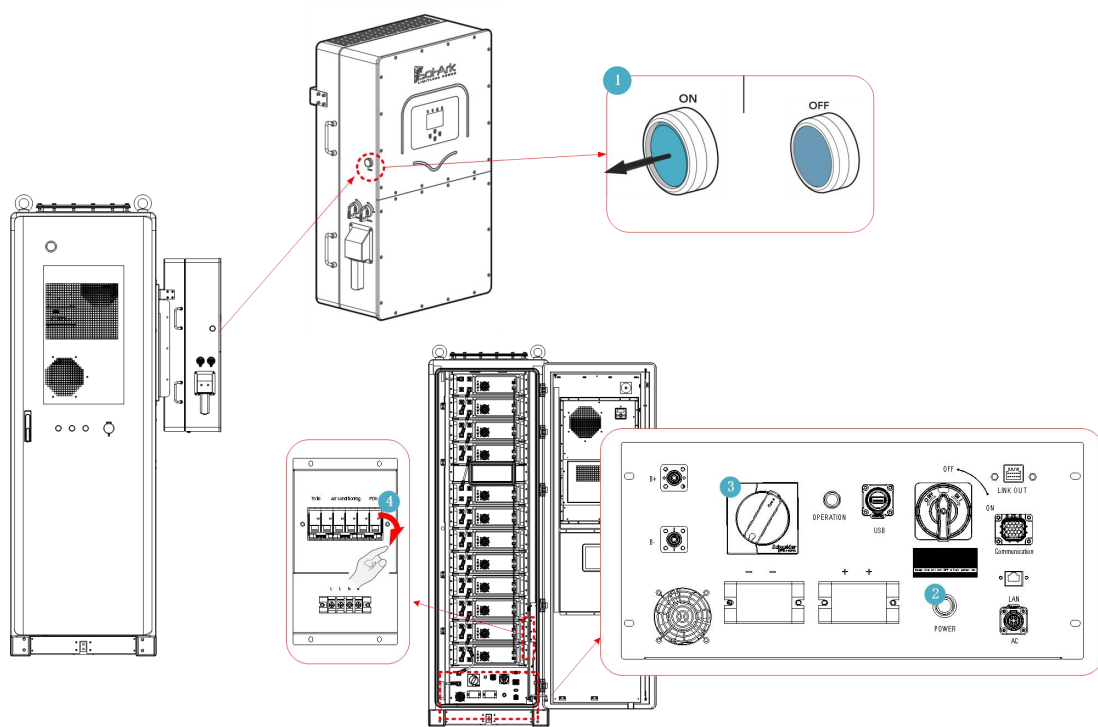
- After the battery racks is powered on, if there is no abnormal situation and fault alarm, please close the battery racks door and keep the key properly.



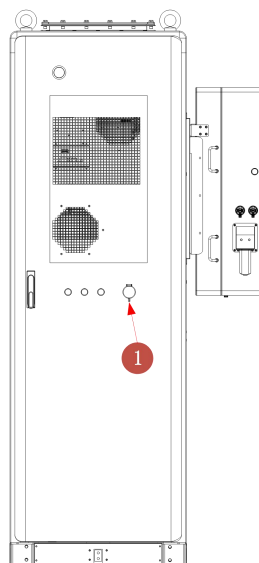
4.3. Battery Cabinet Deactivation

Steps:

- (1) Press up the inverter's power button.
- (2) Press the power button to turn it off.
- (3) Turn the DC switch to the OFF position.
- (4) Open the circuit breakers (i.e., push it downward). Turn off the "PDU" 、 "Air Conditioning" and "Total" circuit breaker in sequence.



4.4. Emergency Stop



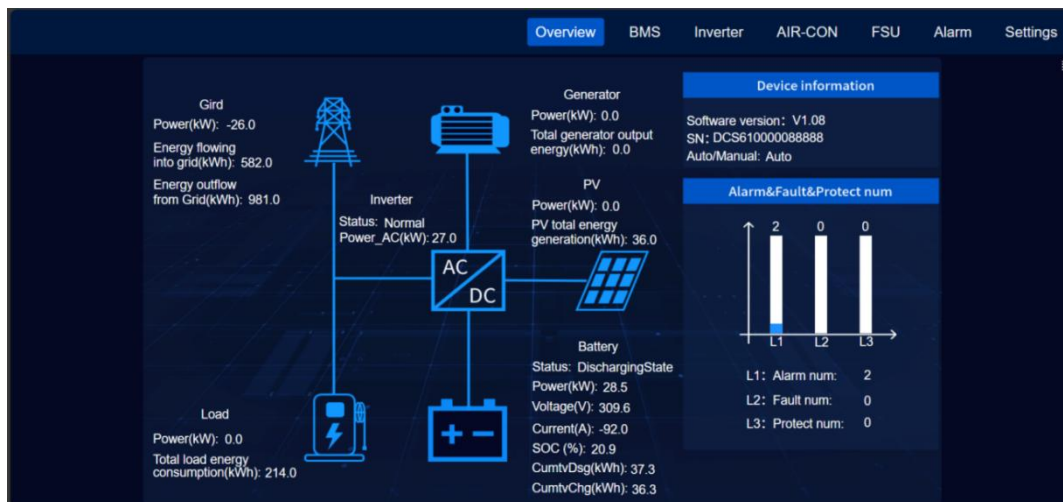


5. User Interface

5.1. Local Touchscreen

5.1.1. Overview Interface

The Overview interface is the home page of the energy storage system EMS, providing a quick overview of the system's overall status, including operating mode, component connections, key performance parameters, software version, device SN, and operating mode (Auto/Manual). It also displays the number of alarms and faults, as well as the topology relationships between the inverter, battery pack, PV components, and load, enabling easy monitoring and troubleshooting.



5.1.2. Alarm Interface

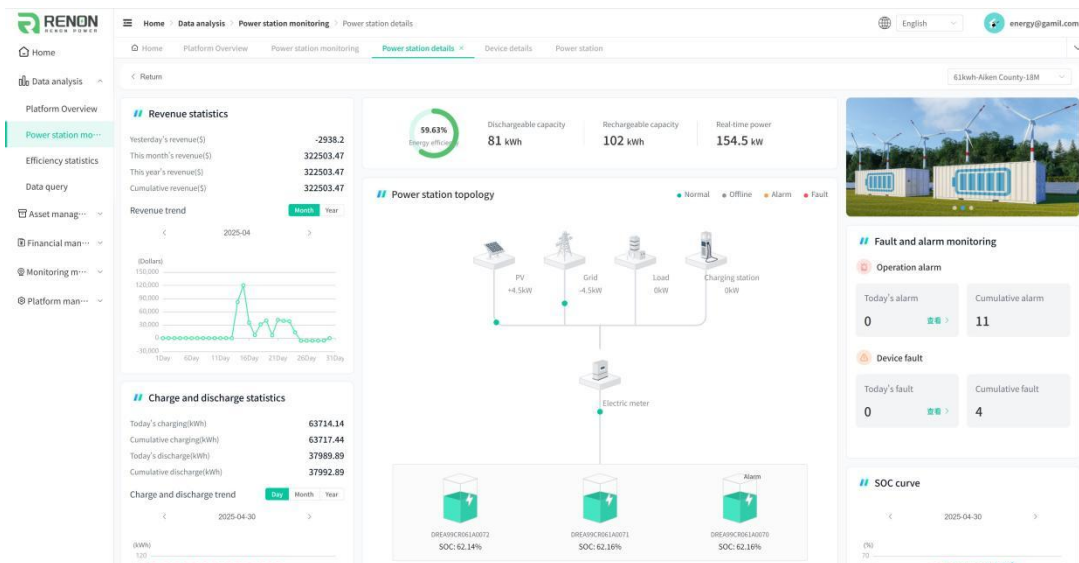
The alarm interface of the energy storage system can display the alarm information of each device during operation, including the specific date and time of the alarm, detailed alarm content, alarm status (occurrence or recovery), alarm level and confirmation status, as shown in the figure below. The interface carries out real-time monitoring and overrun judgment on the collected parameters such as voltage, current, power, air-conditioning temperature, etc., and sends out alarm signals as soon as an abnormality is found, and at the same time, it continuously monitors the positional status information of switches, knife gates and other equipment, as well as integrates the display of fire alarm signals, etc., so as to ensure that abnormalities in operation can be detected and dealt with in a timely manner.

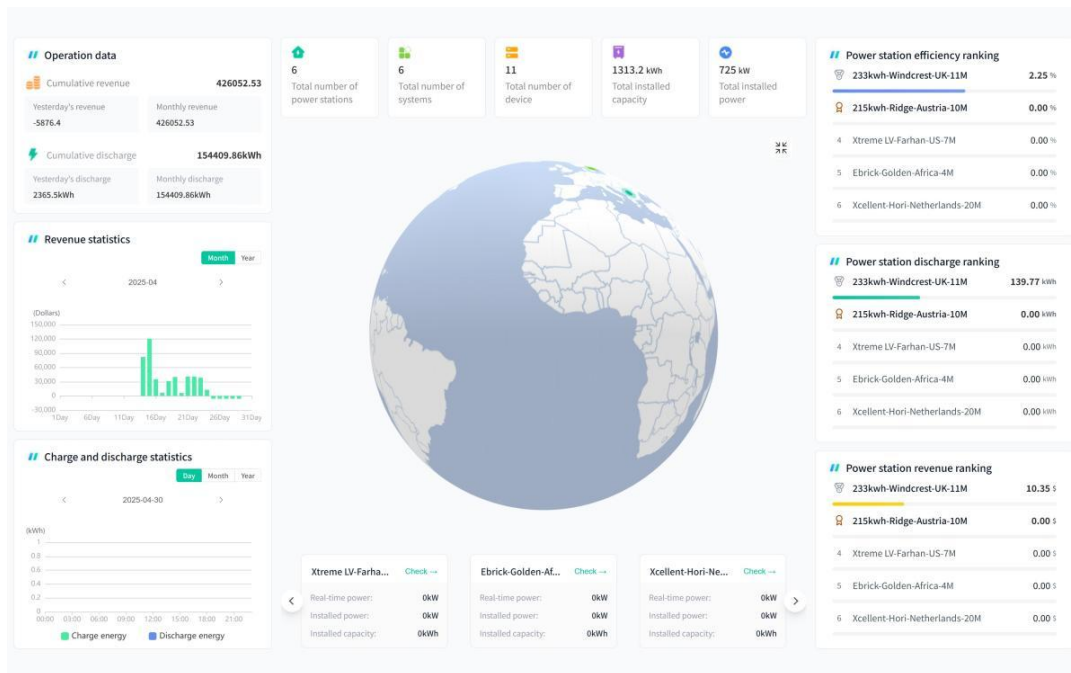


	System	BMS	PCS	LCU	FSU	Alarm	Settings
All Events							
Date and Time	Channel	Description	Severity	Ack			
15/05/2025 09:02:02	master01 - Mtr_TmprotectFlg[10]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_TmprotectFlg[11]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_TmprotectFlg[12]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_TmprotectFlg[13]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_TmprotectFlg[14]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_TmprotectFlg[15]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[0]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[1]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[2]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[3]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[5]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[6]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[7]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[8]	Defined, Off	i				
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15/05/2025 09:02:02	master01 - Mtr_SysFlt2[12]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[13]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[14]	Defined, Off	i				
15/05/2025 09:02:02	master01 - Mtr_SysFlt2[15]	Defined, Off	i				
15/05/2025 09:02:15	ACU Envicool - Lcl_u16highAlarmLevel	Defined, 0.000					

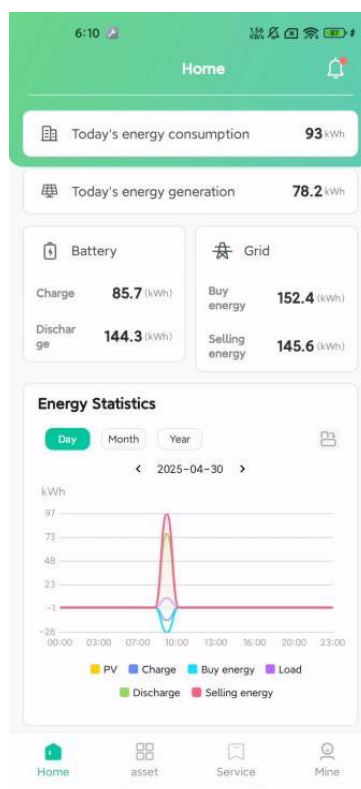
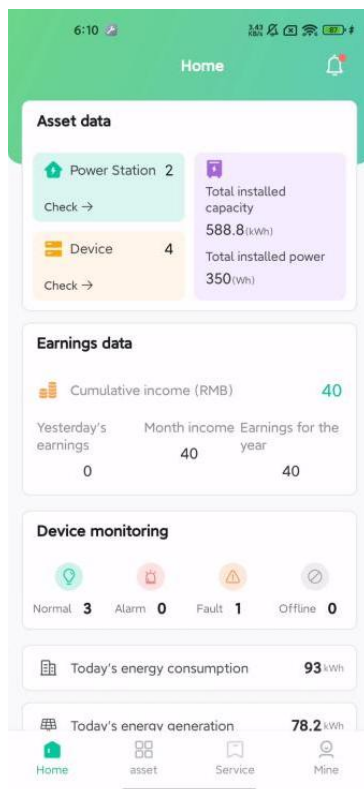
5.2. Cloud Interface

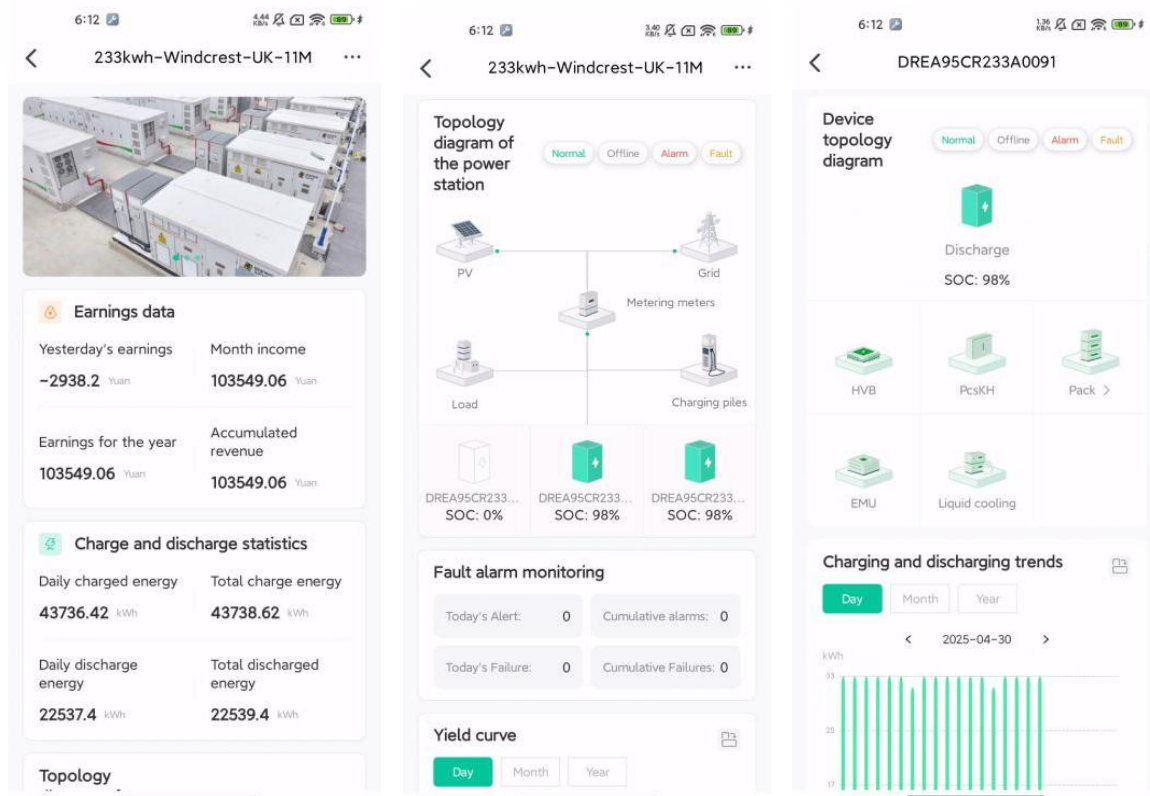
The cloud platform offers functions such as platform overview, data monitoring (displayed through charts, curves, and other formats), parameter settings, alarm logs, firmware upgrades, VPP configuration, report management, operation logs, and device and station management. These features aim to intuitively present equipment operating status, assist in decision-making, and enhance the system's operational convenience and management efficiency.





Cloud Interface





App Interface

6. Emergency Response Measures for Critical Situations

6.1. Electrolyte Leakage from Batteries

If electrolyte leakage occurs, avoid contact with the leaked liquid or gases. Electrolyte is corrosive and may cause skin irritation or chemical burns upon exposure. If accidental contact occurs, take the following actions:

Inhalation: Evacuate the contaminated area immediately and seek medical assistance.

Eye Contact: Flush eyes with clean water for a minimum of 15 minutes and seek immediate medical attention.

Skin Contact: Thoroughly wash the affected area with soap and water, then seek medical assistance promptly.

Ingestion: Induce vomiting and seek emergency medical care immediately.

6.2. Fire Incident

Battery fires may release toxic and hazardous gases.

In the event of a fire, immediately contact the fire department, inform emergency responders, and provide product-specific details.

If safe to do so, disconnect upstream and downstream equipment switches to isolate the system.

7. Revision Table

The document revision history is tracked in the following table:

Revision Number	Date (MM/DD/YYYY)	Description
1.0	May 10, 2025	Initial version
2.0	July 4, 2025	Added the Introduction of the Alarm Interface.
3.0	July 22, 2025	Updated the battery cabinet rendering.
4.0	Aug 25, 2025	Added posting instruction for the product label.
5.0	Sep 10, 2025	Updated the company logo.

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