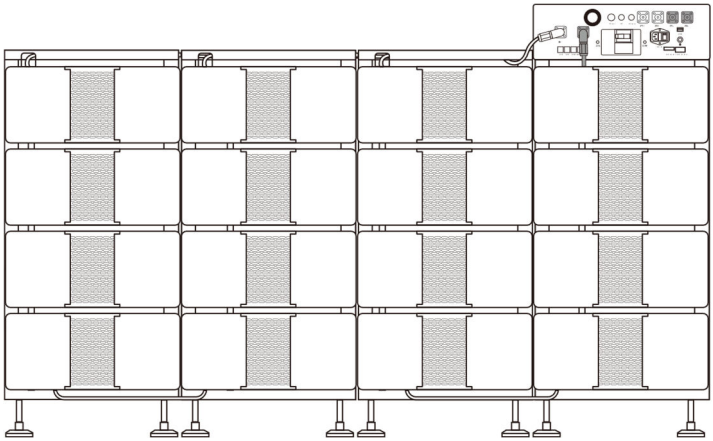
User Manual

Lithium-ion Rechargeable Battery System

BOS-B Pro-A3



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Preface

This manual provides information on safety, installation, electrical connection, operation, maintenance, and other relevant aspects of the product.

In this manual, the terms “equipment”, “device”, and “product” refer to the product or its components; the terms “manufacturer”, “producer”, and “the Company” refer to NINGBO DEYE ESS TECHNOLOGY CO., LTD. or its authorized agents.

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The Company assumes no liability for any losses arising outside the scope of the warranty policy.

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Technical Assistance

NINGBO DEYE ESS TECHNOLOGY CO., LTD

Add.: 6F No.8 building, No.568 Rixian South Road, Cixi Binhai Economic Development Zone, Zhejiang, P. R. China.

Tel.: 0086 0574-63702591

E-mail: service-ess@deye.com.cn

Website: www.deyeess.com

NINGBO DEYE ESS TECHNOLOGY CO., LTD. hereby confirms that the products described in this document comply with the fundamental requirements and other relevant provisions of the applicable EU directives.

Vulnerability Reporting & Security Advisories

To report a potential cybersecurity vulnerability, or to view official security advisories, vulnerability disclosures and update notices, please visit our security response center at: https://sec.deyecloud.com/

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1 Safety

1.1 Symbols

Symbols	Description
	Connect an earth terminal to the ground.
	Warning; Electricity.
	Warning; Hot surface.
	Warning; Explosive material.
	Do not step on the product.
	Do not touch with your hands. This is usually due to being electrified, hot, or being delicate and prone to damage.
	Do not place the equipment near open flames or burn it. Do not use this equipment near heaters or high-temperature sources.
	No chasing.
	The product / packaging is not resistant to compression. Handle with care to prevent internal damage.
5 min	5 min remaining before operation.
ESD	ESD protection area.
	To indicate that the marked item or its material is part of a recovery or recycling process.
	Symbol for separate collection of batteries.
	Refer to instruction manual/booklet.
	Operator's manual.

	The package shall be kept upright during transportation and storage.
	The package contains fragile objects and shall be handled with care.
	The package shall be protected against rain, and rainproof measures shall be taken during transportation and storage.
	The package shall not be rolled during transportation.
	Stacking limit by number
	Lithium-ion battery transport falls under UN3480, Class 9 Miscellaneous Dangerous Goods. For sea, land and air transportation, the battery is classified into Packaging Group PI965 Section I. Class 9 Miscellaneous Dangerous Goods labels and UN identification labels must be affixed during transportation, and all operations shall be carried out in accordance with relevant transport documents.
	CE mark of conformity

1.2 Safety Precautions

This manual uses the following signal words to indicate imminently or potentially hazardous situations. Observe all safety instructions to avoid personal injury, property damage, or equipment malfunction.

Symbols	Description
DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTE	Indicates supplementary explanation, clarification, or emphasis on a particular content for better understanding.

Personal safety

DANGER

- Operators must carefully read and comply with all safety information in this manual and relevant document. Improper operation may cause casualties.
- Keep the product out of reach of children and animals.
- No one except DEYE staff or authorized personnel is allowed to open, repair or disassemble the battery.
- Only qualified professionals or trained personnel are permitted to install and operate the equipment.
- Only qualified professionals are permitted to remove safety facilities and inspect the equipment.

WARNING

- Personnel performing wiring operations on the equipment shall possess knowledge of electronics, electrical wiring and mechanical expertise, and be familiar with the electrical and mechanical schematics of this equipment.
- In case of electrolyte contact with eyes or skin, flush thoroughly with clean water for at least 10 minutes and seek immediate medical attention.
- Only qualified personnel are permitted to service the battery. Unauthorized operations void all liability.

CAUTION

- Personnel operating this equipment shall understand and comply with the requirements of this manual and other applicable documents.
- Components may become extremely hot in case of malfunction; touching is prohibited to prevent scalding.
- Personnel planning to install and operate the equipment must master all necessary safety precautions and local relevant standards.
- This manual does not cover all conceivable scenarios; applicable standards and relevant occupational health and safety regulations shall take precedence during operation.

NOTE

- Qualified professionals: Personnel who are familiar with the working principles and structure of the equipment, have received training or have experience in equipment operation, and are clear about the sources and degrees of various potential hazards in equipment installation.
- Trained personnel: Personnel who have received technical and safety training, have

the required experience, are aware of potential hazards to themselves during certain operations, and can take protective measures to minimize hazards to themselves and others.

Electrical Safety

DANGER

- Lethal voltages exist inside the product. Touching the power grid and contact points/terminals of equipment may cause electric shock.
- Direct connection to AC power or PV solar wiring is strictly prohibited.

WARNING

- Prior to installation, disconnect grid power and ensure the equipment is fully powered off.
- The battery may still be charged after power disconnection. Wait for 10 minutes and use a standard voltmeter to confirm no voltage before operation.
- The battery system must be well grounded with a grounding resistance of less than 1Ω.
- Use insulated tools and gloves during operation, and remove metal accessories such as watches and rings.
- Prevent terminals from contacting exposed wires or metal objects.
- Do not place any tools or metal parts on the battery module or PDU.
- Adjacent live parts shall be covered or shielded.

CAUTION

- Ensure correct wiring. Distinguish positive and negative poles strictly to prevent short circuits with external devices.
- Do not use faulty or incompatible power conversion unit.
- Verify that battery system parameters are fully compatible with connected equipment.

Mechanical Safety

DANGER

- Installation or operation of the battery system in explosive or high-humidity areas is strictly prohibited.

WARNING

- Do not insert foreign objects into any part of the battery.
- Place necessary warning signs or barriers near the product to prevent accidents caused by misuse or unrelated persons.

CAUTION

- Do not expose cables outside the designated routing.

NOTE

- Unpack and inspect immediately. Contact your vendor if damaged or parts are missing.
- Maintain a State of Charge (SOC) above 5% during use. Recharge within 48 hours after full discharge to avoid over-discharging.
- Contact the supplier within 24 hours if any abnormality occurs to the battery.

Maintenance Safety

DANGER

- Disassembling, modifying, or opening the battery is strictly prohibited.

WARNING

- Power off the battery completely before moving or performing any maintenance.
- All battery terminals and circuit connectors must be disconnected during maintenance.
- Maintenance shall follow the principles: power off, prevent restart, verify no voltage, grounding and short-circuit protection, shield adjacent live parts.
- Residual safety risks may arise from failure to observe warnings, improper installation, or construction by untrained personnel.

NOTE

- Do not paint any internal or external components of the battery.
- Do not clean batteries with cleaning solvents.
- Commissioning of the battery energy storage system shall be completed no later than six months after delivery.

Environmental Safety

DANGER

- Do not expose the battery to fire, heaters, high-temperature sources, or open flames.
- In case of fire, use only dry chemical fire extinguishers. Liquid extinguishers are

forbidden.

- Damaged or failed batteries may leak electrolyte, producing hydrofluoric acid and other substances, causing chemical burns.

WARNING

- Do not expose the battery to flammable substances, harsh chemicals, or their vapors.
- Do not submerge the battery in water or expose it to moisture when incomplete. (The product's protection rating is valid exclusively when the product is in its complete, fully assembled configuration.)

Disposal Safety

WARNING

- Immediately cease use of damaged, swollen, or leaking batteries.
- Do not attempt to repair or disassemble damaged batteries. Contact your installer, sales partner, or a qualified recycling service provider for safe handling and disposal.
- Ensure damaged batteries are stored in a dry, cool environment, protected from moisture and direct sunlight.

CAUTION

- Waste batteries may contain hazardous pollutants and heavy metals. Improper storage, handling, or disposal can:
  Pose risks to human health.
  Cause environmental pollution (soil, water, and air contamination)
  In severe cases (e.g., damaged lithium-ion batteries), lead to leakage, fire, or explosion.

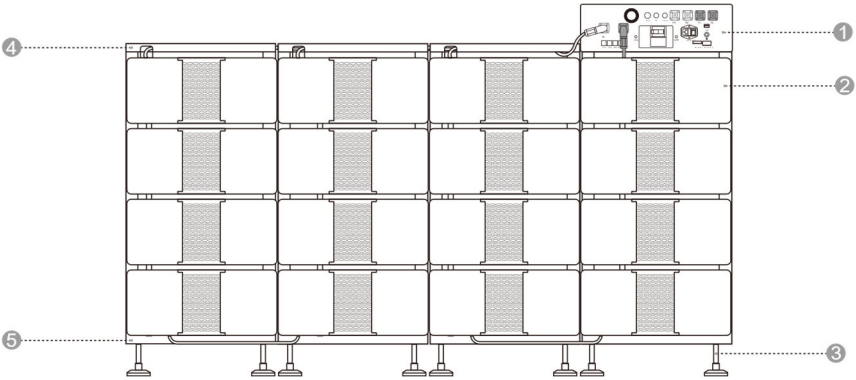
NOTE

- Used batteries must not be disposed of as household or domestic waste. You are legally obligated to:
  Remove any privacy-related information from the product before disposal.
  Return used batteries and rechargeable batteries to designated or authorized collection/recovery points in compliance with local regulations and standards for waste battery management.
  Batteries contain valuable raw materials (e.g., lithium, iron, cobalt, nickel) that can be recycled and reused. Proper disposal supports resource conservation and circular economy goals.

2 Product Introduction

The Deye BOS-B Pro-A3 is a high-voltage energy storage system designed for small commercial and industrial energy storage scenarios. It covers a capacity range of 80–257 kWh, meeting power and capacity requirements for a wide range of application scenarios. In this system, the first three digits of the battery pack SN code are 261, and the first three digits of the PDU SN code are 293.

2.1 Product Overview



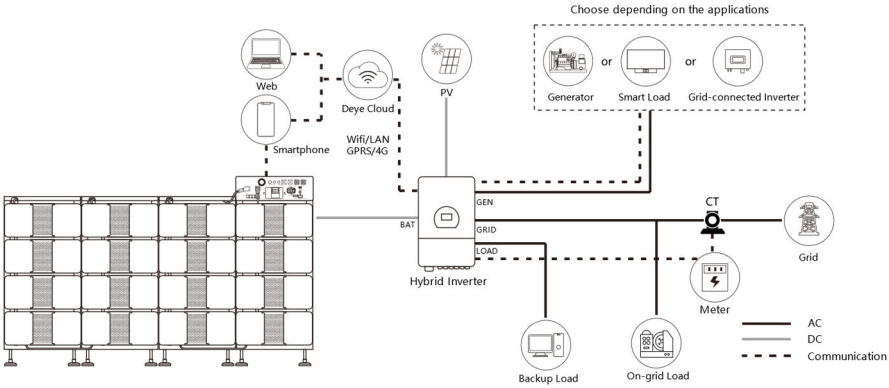
No.	Item
1	PDU (Power Distribution Unit)
2	Battery Pack (Optional: 5~16 pcs)
3	Leveling Foot
4	Top Cover
5	Base

2.2 Application Scenarios

The following illustration shows basic application of this battery system. It also includes following devices to have a complete running system:

- Generator or Utility;
- PV modules;
- Power Conversion Unit (Charge & Discharge).

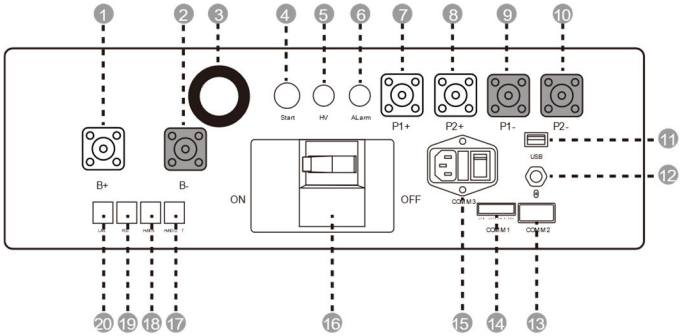
Consult with your system integrator for other possible system architectures depending on your requirements.



The picture is only a reference picture, please refer to the actual product, the final interpretation right belongs to DEYE.

2.3 Product Appearance

PDU: BOS-B-PDU-2-A



Front View

No.	Icon	Item	Description
1	B+	Positive Terminal	Positive connection terminal for battery.
2	B-	Negative Terminal	Negative connection terminal for battery.
3	/	Display Screen	Displays system SOC values and fault codes.
4	Start	Start Button	12 VDC internal power start switch for the PDU
5	HV	HV indicator	High-voltage hazard indicator (Yellow)
6	Alarm	Alarm indicator	Battery system alarm indicator (Red)
7	P1+	Positive Terminal 1	Terminal for the first Power Conversion Unit positive connection
8	P2+	Positive Terminal 2	Terminal for the second Power Conversion

			Unit positive connection
9	P1-	Negative Terminal 1	Terminal for the first Power Conversion Unit negative connection
10	P2-	Negative Terminal 2	Terminal for the second Power Conversion Unit negative connection
11	USB	USB Port	BMS upgrade port and storage expansion port
12		Bluetooth	Wireless connection port for mobile APP
13	COMM2	Communication port	Communication port for the first battery module; provides 12 VDC power supply to the first battery module
14	COMM1	RS485 communication interface	RS485 communication interface & emergency power-off trigger interface According to its definition, users can connect the Emergency Power-off Interface and external emergency stop switch to terminal 3 and terminal 4 of this interface to achieve emergency power-off of the system.
15	COMM3	Multi-function interface	COMM3 is a multi-function interface integrating power input, fuse protection, and a power switch. It features a 10A/250V~ standard power socket, a 250V-only fuse holder for overcurrent protection, and a slide switch to control power supply. This port must be connected to the power supply of 3A, 50-60Hz, 200~240V when this equipment is in use, otherwise the fan cannot rotate normally.
16	ON/OFF	DC circuit breaker	Manual switch for connecting / disconnecting the battery stack and external devices.
17	HVBOUT	OUT COM	Communication output port for connection with the next BOS-B-PDU-2-A communication input.
18	HVBIN	IN COM	Communication input port for connection with the previous BOS-B-PDU-2-A

			communication output.
19	PCS	PCS COM	PCS battery communication terminal; used to transmit battery data to the Power Conversion Unit.
20	LAN	Ethernet	Standard RJ45 Ethernet port. Customizable for different needs.

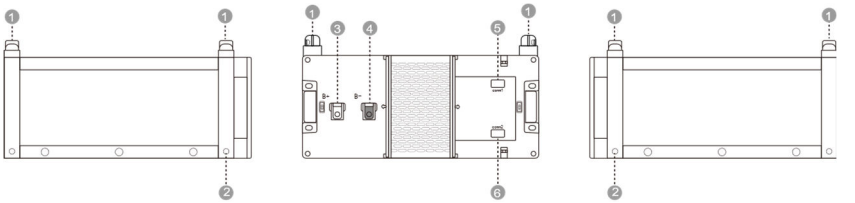
PDU: Display Screen

For the detailed fault codes, refer to **Appendix I Troubleshooting**.

PDU: Definition of External Interfaces

PCS COM		IN COM		OUT COM		COMM1		COMM2	
1	/	1	BMS_CANL	1	BMS_CANL	1	485A	1	BMU_CANL
2	/	2	BMS_CANH	2	BMS_CANH	2	485B	2	DO-
3	/	3	DI+	3	DO+	3	SWB	3	DI-
4	PCANH	4	DI-	4	DO-	4	SWA	4	BMU_L-
5	PCANL	5	/	5	/			5	FAN-
6	/	6	/	6	/			6	BMU_CANH
7	/	7	/	7	/			7	DO+
8	/	8	/	8	/			8	DI+
								9	BMU_L+
								10	FAN+

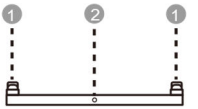
Battery Pack: BOS-B-Pack16-AX (X=1, 3, 4...)



Left View Front View Right View

No.	Icon	Item	Description
1	/	Guide Block	Aligning the upper assembly with this battery module.
2	/	Mounting Hole	/
3	B+	Positive Terminal	Battery module positive terminal
4	B-	Negative Terminal	Battery module positive terminal
5	COMM1	Low-voltage Communication Port	Battery module communication and power supply input/output interface
6	COMM2		Battery module communication and power supply input/output interface

Base



Front View

No.	Item	Description
1	Guide Block	Aligning the upper assembly with this base.
2	Protective Grounding	Safety grounding terminal, ensuring reliable grounding of the metal enclosure to prevent electric shock risks

3 Transportation

3.1 Transportation Precautions

DANGER

- Transportation of end-of-life, damaged or recalled batteries may be prohibited in some regions. Confirm local regulations before transportation; illegal transportation is strictly prohibited.
- It is strictly prohibited to mix dangerous goods with food, medicine, animal feed and their additives in the same vehicle or container, and to transport with sharp objects in the same vehicle or container.

WARNING

- Lithium-ion battery products are classified as Class 9 miscellaneous dangerous goods. During transportation, the applicable UN number, packaging requirements, dangerous goods labels, and other required marks shall be determined based on the actual shipping configuration, mode of transport, and applicable dangerous goods regulations.
- Transportation and storage service providers must hold the dangerous goods operation certification required by local laws and standards; no relevant business shall be undertaken without corresponding qualifications.
- Sea transportation shall comply with the requirements of the International Maritime Dangerous Goods Code (IMDG Code), and land transportation shall meet ADR or JT/T 617 transport standards; illegal selection of transport modes is strictly prohibited.
- If the battery has peculiar smell, leakage, smoke, fire or any other abnormalities before transportation, transportation is strictly prohibited.
- Obtain MSDS certification before sea transportation, seal the external gaps of containers and affix marks certified by the classification society; equip the outer packaging with rainproof canvas covers to avoid paint film scratches.
- Remove obstacles along the transport route, confirm that transport vehicles/containers meet dangerous goods transport standards, and ensure dangerous goods transport vehicles are equipped with two tested CO_2 fire extinguishers.
- Before removing the transport protector, check whether the packaging is damaged and whether the impact indicator on the outer packaging of the battery converter is triggered; if triggered, the risk of transport damage cannot be ruled out.

- When transporting faulty batteries, avoid flammable and explosive material storage areas, residential areas, mass transit facilities, elevators and other densely populated places.

CAUTION

- During the whole transportation process, strictly prevent severe vibration, impact and extrusion, avoid direct sunlight, rain and moisture, and take rainproof, moisture-proof and sun-protection measures.
- Smoking is strictly prohibited in transportation, loading and unloading areas. Freight personnel are not allowed to open the outer packaging of battery packs without permission; handle with care during moving to prevent bumping.
- Transport operators must wear protective gloves and toe-cap safety shoes for personal protection, and pay special attention to avoiding scratches by sharp metal panels and crushing injuries by heavy objects.

NOTE

- All operations must be completed by professionally trained personnel, and unauthorized operation by non-professionals is strictly prohibited.
- Complete compliant and accurate declaration before transportation, and carefully check whether the battery packaging, labels and markings are intact.
- Transport vehicles/containers must meet dangerous goods transport standards to ensure the product is firmly fixed throughout the transportation process.
- Do not remove the product transport packaging before arrival at the installation site; remove it after arrival.

3.2 Transportation Methods

3.2.1 Handling

DANGER

- A single battery pack is heavy; forcible single-person handling is strictly prohibited.
- Battery packs/stacks are top-heavy; side placement, upside-down placement and unfixed transportation are strictly prohibited; measures must be taken to prevent tipping during vertical transportation.

Before handling:

- Confirm that all personnel are in good physical condition before handling, wear anti-slip gloves, anti-slip shoes and necessary waist protection equipment to avoid injuries.
- Clean the handling path in advance to ensure a safe ground; slow down on slopes with special personnel assistance, and reserve sufficient operating space in narrow areas.

- When assigning carriers, the number of personnel shall be reasonably determined in accordance with the "Recommended Limits for Single Lifts by Healthy Adult Workers" specified in ISO 11228-1:2003 (25kg for males, 15kg for females), combined with the requirements for handling stability, load distribution and safety redundancy.

Example (for a 100kg product):

Short-distance handling on flat ground: at least 4 personnel working in coordination;

Long-distance handling, moving up/down slopes, operating in narrow spaces or lifting/lowering: no less than 5 personnel are recommended.

Wear personal protective equipment such as protective gloves and safety shoes when manually moving the equipment.

When handling:

- When manually lifting an object, move close to it, squat down, and lift smoothly and steadily using leg strength instead of back strength. Do not jerk or twist your body during lifting.
- Move or lift the equipment only by its designated handles or lower edges. Do not hold the handles of modules installed inside the equipment.
- Do not rapidly lift heavy objects above waist height. Place the object on a waist-height workbench or other suitable surface, reposition your hands, and then continue lifting.
- Move heavy objects smoothly, with balanced force and at a slow, constant speed. Lower the object gently and steadily to avoid collisions, drops, scratches, or damage to components and cables.
- When moving heavy objects, pay attention to workbenches, slopes, stairs, and slippery areas. When moving through a doorway, ensure the opening is sufficiently wide to prevent impact or injury.
- When carrying heavy objects, turn by moving your feet instead of twisting your waist. When lifting and carrying, keep your feet pointing toward the intended direction of movement.

After handling:

- After handling, confirm that the load is placed stably to avoid injury caused by tipping.

3.2.2 Forklift

DANGER

- During forklift operation, unrelated personnel must keep at least a 2m safe distance; standing or riding on the forklift or cargo is strictly prohibited.
- Overloading and lifting loads too high are strictly prohibited to avoid forklift instability and rollover risks.
- Only certified professional forklift operators may perform operations; unauthorized operation by non-professionals is forbidden. Strictly follow all clauses; violators bear full responsibility for equipment damage and personal accidents.

Equipment Parameter Requirements:

Item	Requirements
Rated load capacity	more than 2 times of product weight
Fork length	no less than product width
Fork width	80mm~160mm
Fork thickness	25mm~70mm
Forklift lifting height	Subject to actual on-site installation

Driving & Steering:

- Driving speed shall be strictly controlled below 3 miles per hour (3mph). Sharp turns are strictly prohibited to avoid cargo shaking and imbalance.
- Before reversing, the forklift operator must carefully check the rear area and confirm safety before reversing. When reversing in confined spaces, a special commander must be arranged to guide the operator throughout the process.
- Operating forklifts on slopes with a gradient ≥5° is strictly prohibited. Slow down and operate carefully when lifting loads on uneven roads.
- Tilting or inverting the product is strictly prohibited during the whole transfer process. If tilting or inversion is necessary under special circumstances, restore the product to upright position as soon as possible, and leave it standing for 2 hours before power-on.

4 Installation

DANGER

- There is a risk of static overload during the entire installation process, which may cause damage to building structures. Be sure to verify the site bearing capacity and anti-static measures in advance.

CAUTION

- Only qualified professionals or trained personnel are permitted to install the equipment.
- Personnel planning to install the equipment must master all necessary safety precautions and local relevant standards.
- Only qualified professionals are permitted to remove safety facilities and inspect the equipment.
- Personnel installing this equipment shall understand and comply with the requirements of this manual and other applicable documents.

WARNING

- Product assembly must be carried out in strict accordance with the design scheme, process requirements, relevant regulations and national standards; unauthorized changes to assembly procedures and technical parameters are strictly prohibited.

4.1 Pre-Installation Preparation

4.1.1 Site Requirements

DANGER

- Do not expose the equipment to flammable or explosive gases, smoke, or heat/fire sources, and do not operate the equipment in such environments. Do not store any flammable or explosive materials around the equipment, and do not cover or wrap the battery. Otherwise, it may cause serious safety accidents such as fire, explosion, or equipment damage.
- The product should in principle be installed at least 15 ft (4.57 m) away from heat sources. This distance may be reduced by 100 cm if a fire barrier or other equivalent protective measure is provided.
- Each battery pack requires ventilation of 112.6 m^3/h. Total ventilation demand = 112.6 × number of packs. The installation space shall achieve minimum one air change

per minute or the calculated total ventilation volume, whichever is larger.

WARNING

- Install the equipment in an area far away from liquids. Do not install it in areas prone to condensation, such as under water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.
- To prevent damage or fire due to high temperature, ensure that the ventilation vents or heat dissipation systems are not obstructed or covered by other objects while the equipment is running, so as to ensure unobstructed heat dissipation.
- The product poses a risk of burns. Do not touch hot surfaces to avoid personal injury.
- Keep away from the air outlet of the product to prevent personal injury caused by high-temperature air flow.

NOTE

- The installation and usage environment must meet the requirements of relevant international standards and local laws and regulations. The user is obliged to take measures to protect the equipment against fire or other hazards.
- Confirm that the installation site has sufficient bearing capacity in advance according to the total weight of the battery storage system; installation in areas with unqualified bearing capacity is strictly prohibited.
- When selecting the installation site, plan a reasonable equipment transportation route in advance, remove obstacles, debris and dust on the site to ensure a spacious and unobstructed working space.
- Keep the equipment out of the reach of children and away from daily working or living areas, including but not limited to the following areas: studio, bedroom, lounge, living room, music room, kitchen, game room, home theater, sunroom, toilet, bathroom, laundry room, and attic.
- Do not install the equipment in enclosed, poorly ventilated areas without proper fire-fighting facilities, or in areas difficult for firefighters to access, to prevent failure to dispose of fires in a timely manner.
- Do not install the equipment on a moving object, such as a ship, train, or car, to avoid damage or potential safety hazards caused by jolting and shaking of the equipment.
- Ensure that the equipment is installed in a clean, dry and well-ventilated area with proper temperature, humidity and altitude range. For more data, please check the "Technical Specifications" section. It is recommended that the installation site have an altitude no higher than 3000 meters (an increase in altitude will reduce the

battery output power)

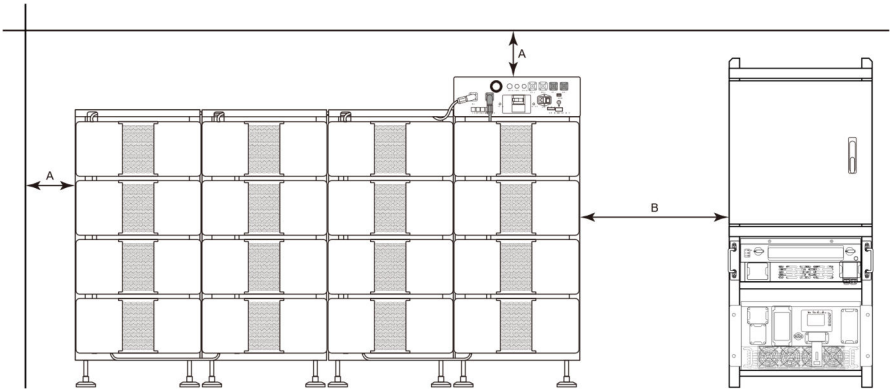
- Do not install the equipment in an environment with magnetic dust, volatile or corrosive gases, infrared and other radiations, organic solvents, conductive metals, or salty air, so as to avoid damaging equipment components. (This product, with Anti-Corrosion Level C3, is only suitable for installation beyond **5 km** from the coastline.)
- Do not install the equipment in an area conducive to the growth of microorganisms such as fungi or mildew, to prevent microorganisms from eroding the equipment and affecting its normal operation and service life.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference, to avoid affecting the operational stability and safety of the equipment.
- Do not install the equipment in a position that may be submerged in water, to prevent short circuits, damage or safety accidents caused by water entering the equipment.
- The floor and wall at the installation location shall be fully waterproof with a flat and level surface, to avoid affecting the installation and operation of the equipment due to uneven ground or water leakage.
- The equipment should be placed on a surface with sufficient load-bearing capacity.
- The installation site shall adopt solid brick-concrete structures, concrete walls and floors. If other types of walls or floors are used, they must be constructed of flame-retardant materials and meet the load-bearing requirements of the equipment.
- Before installing and powering up the system, dust and iron filings must be removed to keep the environment clean. The system cannot be installed in desert areas without a shell to protect against sand.
- The product shall be installed at a location where the impact of its noise is minimized.
- This product may be installed indoors.

Recommended Clearance

During product installation, the following clearance requirements shall be met between the product and surrounding buildings and objects:

* When this battery system is paired with PCS, maintain a minimum clearance of 300 mm between the battery system and PCS.

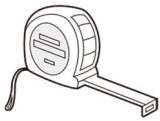
* The battery system may be placed against a wall. No obstacles shall be placed within 1 m in front of the battery system.



Item	Distance (mm)
A	100
B	300

4.1.2 Tool Requirements

These tools are required to install the device.

		
Hammer	Drill	Tape measure
Hexagon socket wrench	Phillips screwdriver	Hex screwdriver
Marker	Precision Level	Torque wrench

It is recommended to wear the following safety gear when installing the device.

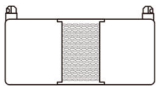
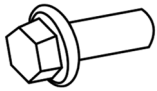
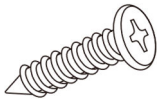
Insulated gloves	Safety shoes	Safety goggles

4.2 Unpacking and Inspection

- If possible, do not remove the transport packaging until the equipment arrives at the installation site.
- After preparing the equipment for installation, unpack it carefully to avoid scratching the equipment.
- This product is mostly packaged with shock-resistant and easy-to-disassemble EPE foam, which can be unpacked with tools such as cutters or knives.
- Keep the equipment stable during unpacking.
- If the installation environment is not conducive to equipment protection, take measures to prevent internal battery failure caused by condensation or dust corrosion (e.g., cover with woven cloth or dust cover).
- After unpacking the equipment, check that the deliverable contents are intact and complete, and free from any damage. If any items listed in the Packing List is missing or damaged, contact your dealer or our after-sales service team.
- All components shall be thoroughly cleaned prior to assembly to ensure surfaces are free of dirt and impurities.
- During component handling and storage, collision and scratch are strictly prohibited. Take moisture-proof and rust-proof measures to avoid appearance damage and performance failure of components.
- This product is heavy. Handle it with care when taking it out of the packaging box; rough handling is strictly prohibited to avoid personnel injuries and equipment falling damage.
- When connecting to Power Conversion Units or operating in parallel mode, only standard cables included in the unpacking list must be used. If other cables are required under special circumstances, ensure they meet relevant standards.

Packing List

Battery pack box

		
Battery Pack *1	Documents	Copper bar *1
		
M5*14 Bolt *4	M3*6 Bolt *4	Communication Cable *1

PDU box

PDU *1	Documents	

Base box

The **Base box** includes standard parts and inverter-specific parts for connection with different inverter/PCS models.

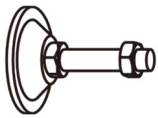
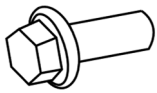
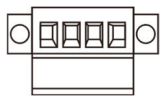
Accessory Kit:

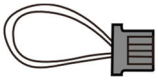
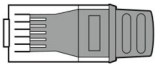
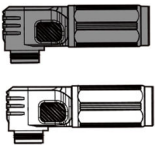
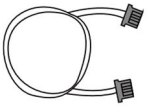
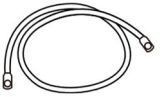
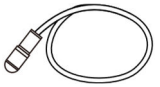
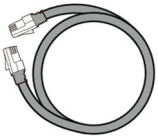
- **BOS-B-AP-A:** Packing List 1 + Packing List 2
- **BOS-B-AP-B:** Packing List 1 + Packing List 3

NOTE

BOS-B-AP-A is compatible with 100/125KW Power Conversion Unit (SUN-100K-PCS01HP3, SUN-125K-PCS01HP3), while BOS-B-AP-B is compatible with 80KW Power Conversion Unit (SUN-80K-SG02HP3-EU-EM6).

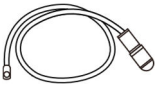
Packing list 1

		
Base *4	Leveling Foot *16	Top Cover *3
		
M5*14 Bolt *24	4G External Antenna *1	Emergency Power-off

		Interface *1
		
Terminal resistor A *1	Terminal resistor B *1	ESS Connector ×1 set
		
Communication Cable *3 (For Battery Stacks Connection)	Power Cable *3 (For Battery Stacks Connection)	Communication Cable *1 (For Connecting PDU to Battery Pack)
		
Negative Power Cable *1 (For Connecting PDU to Battery Pack)	Positive Power Cable *1 (For Connecting PDU to Battery Pack)	Ground Wire *4
		
Communication Cable *1 (For Connecting PDU to Power Conversion Unit)	Auxiliary Power Supply Cable *1	

Packing list 2

For 100/125KW Power Conversion Unit (SUN-100K-PCS01HP3, SUN-125K-PCS01HP3)

	
Negative Power Cable *1 (For Connecting PDU to Power Conversion Unit)	Negative Power Cable *1 (For Connecting PDU to Power Conversion Unit)

Packing list 3

For 80KW Power Conversion Unit (SUN-80K-SG02HP3-EU-EM6)

Negative Power Cable *2 (For Connecting PDU to Power Conversion Unit)	Positive Power Cable *2 (For Connecting PDU to Power Conversion Unit)

Recommended Torque

Applicable for: sheet metal parts (Battery pack cabinet assembly / Sheet metal fixing / Bracket connection/...)

Note: ① Strictly follow the recommended torque, avoid over-tightening/under-tightening ② Unit: N·m (Newton meters)

Bolt Specification	Recommended Torque	Unit
M3	0.7～0.9	N·m
M4	1.6～2.2	N·m
M5	3.2～4.4	N·m
M6	5.3～7.4	N·m
M8	12～19	N·m
M10	25～38	N·m
M12	44～65	N·m
M14	54～108	N·m
M16	110～165	N·m
M18	150～240	N·m
M20	216～335	N·m

Supplementary Instructions

① The torque value is for reference only for standard bolts during normal assembly; adjust appropriately for special working conditions (high vibration/harsh environment).

② Use a calibrated torque wrench for installation to ensure torque accuracy.

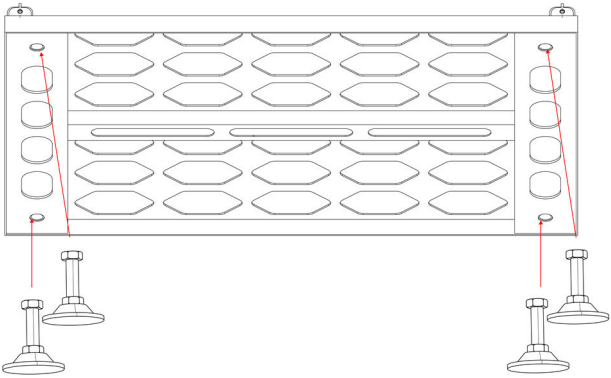
4.3 Installation Procedures

NOTE

- Before installation, be sure to turn the manual switch of the components of the product to the OFF position; live operation is strictly prohibited.
- This product is heavy. If a forklift is used for handling and installation, ensure cooperative operation by multiple personnel to prevent tipping or falling.
- All screws and expansion bolts must be tightened to ensure firm connection.

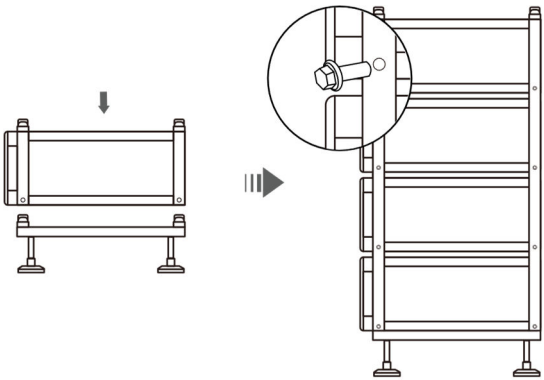
Step 1:

- Take out the 4 bases, screw the 4 leveling feet into each base clockwise, and rotate them for preliminary height adjustment.
- Then check and fine-tune the levelness of the assembly with a precision level. After confirming the surface is horizontal, fix the leveling feet in place.
- Place the bases on a level and solid surface.



Step 2:

- Install the battery packs one by one in a stacked manner.
- After stacking, fasten the battery pack with 4 M5*14 Bolt (2 on each side). Recommended torque: 3.2～4.4 N·m.

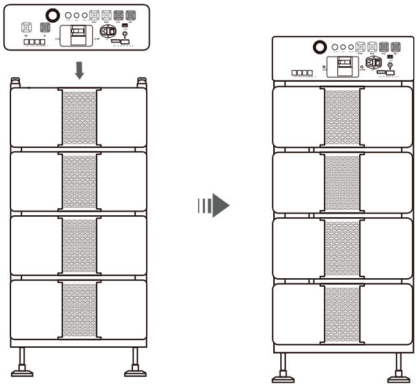


NOTE

- The 2 or 3 or 4 battery stacks can only be arranged successively on the left side of the first stack.

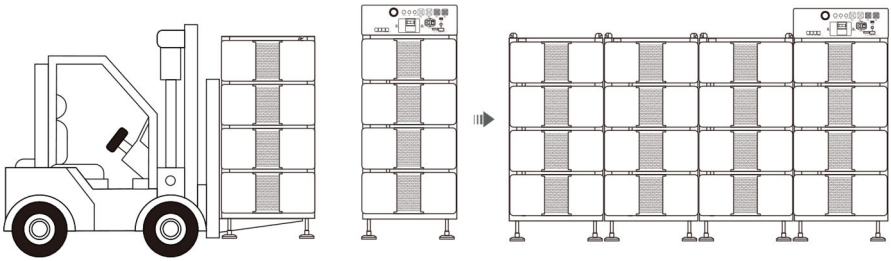
Step 3:

- Mount the PDU on the top battery pack of the first stack using 4 M5*14 Bolt (2 on each side). Recommended torque: 3.2～4.4 N·m.



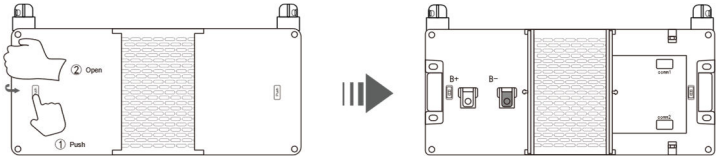
Step 4:

- Use a forklift to move the 2nd, 3rd, and 4th stacks to the left of the first stack.



Step 5:

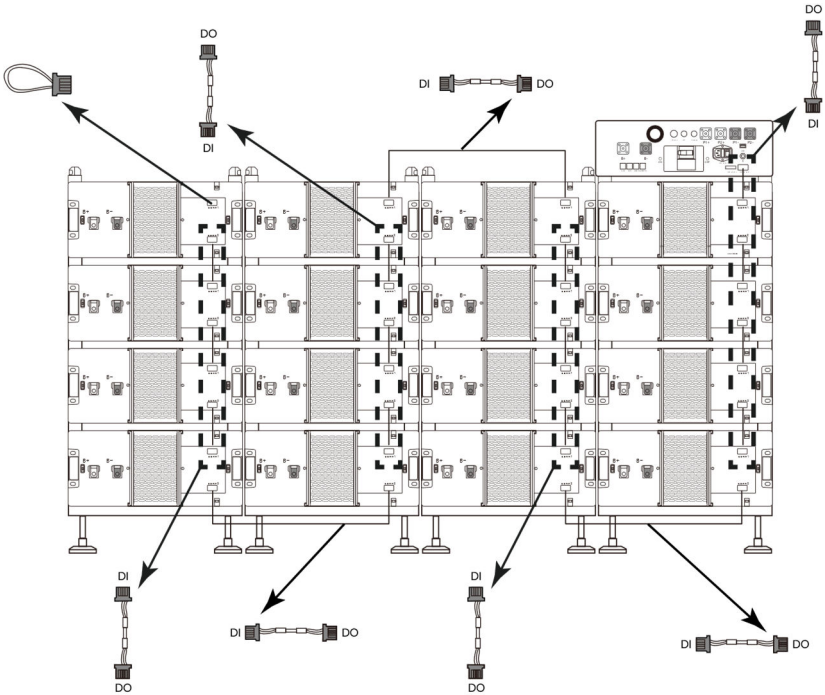
- Apply force to the front panel by pressing the "PUSH" until its edges lift up. Grip the edge of the front panel and pull it open to the desired angle as needed.
- Open the front panel on the right side of the battery pack using the same method.



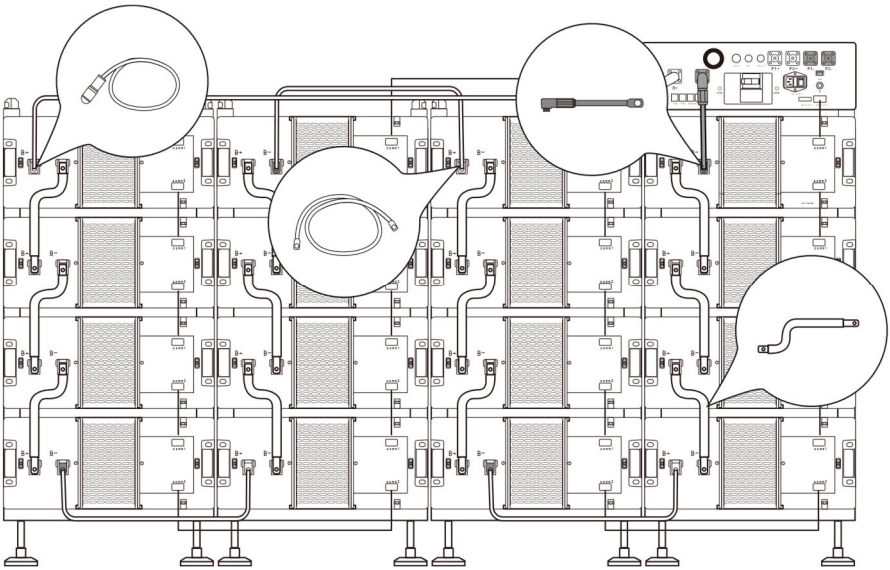
Step 6:

⚠ **CAUTION: PAY ATTENTION TO THE DIRECTION OF THE CABLES**

- Perform **communication cable** connection. (Insert Terminal resistor A into the comm1 port of the last battery pack.)



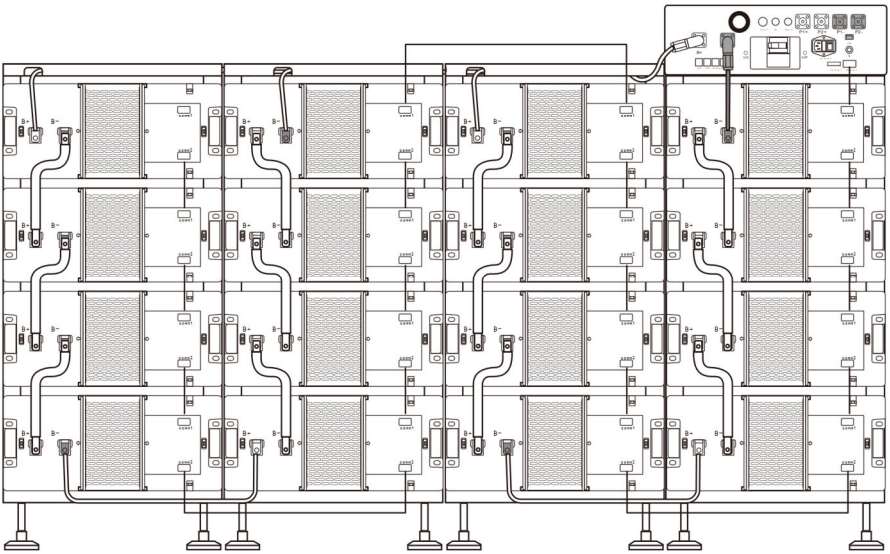
- Perform **power cable** connection and **copper bar** connection



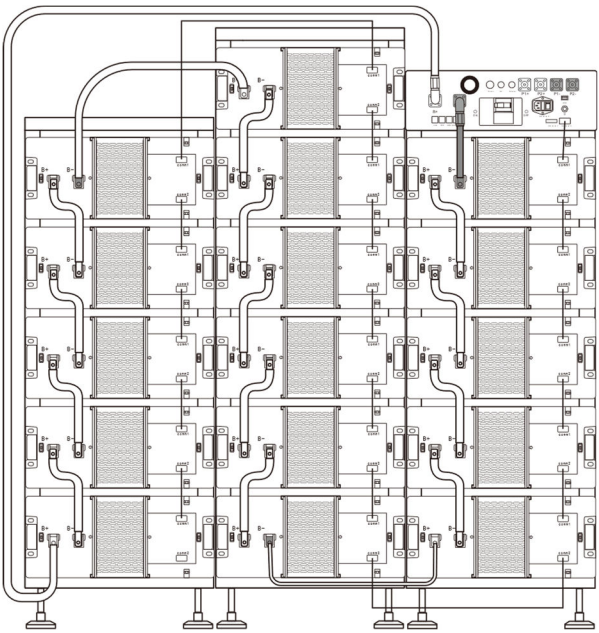
- After wiring, the battery system is in the following status. Multiple stacking modes are

supported; only three are shown. **Consult after-sales for other installation layouts.**

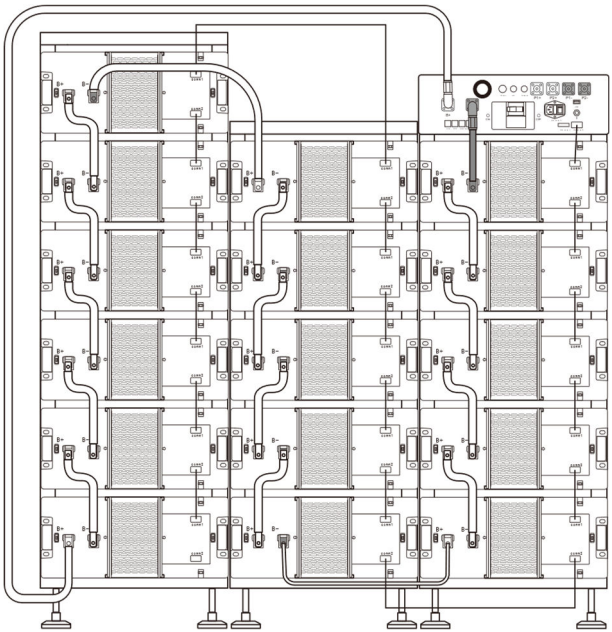
Mode 1:



Mode 2:



Mode 3:

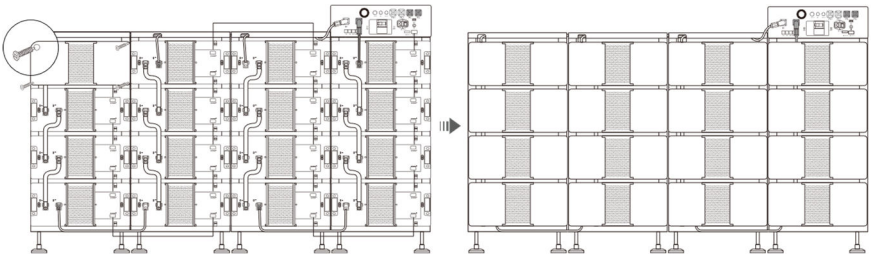


Step 7:

- Put the top cover on the top battery pack of the 2nd, 3rd, and 4th stacks.
- Lock the outermost top cover with 2 M5*14 Bolts on the outer side. Recommended torque: 3.2～4.4 N·m.

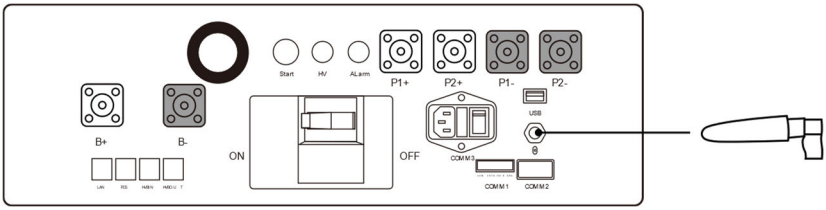
Step 8:

- Secure the front panel of every battery pack using 4 M3*6 Bolts. Recommended torque: 0.7 ~ 0.9 N·m.



Step 9:

- Screw the 4G External Antenna from the **Base box** clockwise into the position shown in the diagram and tighten firmly to ensure it does not come loose.



4.4 Post-Installation Inspection

Item	Inspection Criteria
The system/battery pack	Intact without deformation, collision or scratch.
Base protective cover	Intact and effective.
Bracket, base and bolts	Tightened and firmly installed.
Grounding marking	Clear
Air outlet	Not be blocked.
Fire-fighting equipment	Be in place and meet on-site requirements.
Equipment warning signs and parameter nameplates	Complete and clear.
Passage in installation area	Unobstructed without flammable and explosive materials.

5 Electrical Connection

5.1 Safety Precautions

WARNING

- Only qualified electrical professionals may install and operate the product.
- The product can only be used in situations equipped with overvoltage protection devices.
- Do not place the equipment on a flammable surface.
- Do not perform electrical connections during sandstorms or when the relative humidity of the surrounding environment is greater than 95%.
- Do not contact live parts directly without protection
- Before installation, ensure that there is no voltage on the AC side and DC side.
- Only allow connection of "+" to "+" and "−" to "−".
- This system must be used in conjunction with compatible hybrid inverter models. It needs to establish communication with the inverter to activate the lithium battery mode, ensuring optimal battery performance.
- When connecting to inverters or operating in parallel mode, please use the cables provided in the accessory pack. If other cables must be used under special circumstances, ensure they comply with relevant standards.
- Before connecting cables, check that the polarity of all input cables is correct. Do not pull wires and cables forcibly during electrical installation; otherwise, the insulation performance may be affected. Ensure all cables have sufficient bending space and take necessary auxiliary measures to reduce cable stress.
- After each connection is complete, carefully check whether the connection is correct and secure.

5.2 Preparation

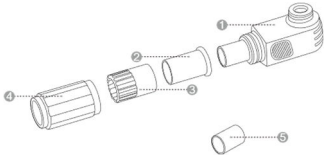
5.2.1 Cable Preparation

Cable Type	Use	Quantity	Whether Needs Modification	Provision Status
Ground Wire	Grounding	4	No	In the **Base box**
Positive Cable	Connecting PDU to Power Conversion Unit	1 or 2	No, for single system; Yes, for parallel systems	
Negative Cable		1 or 2		
Communication Cable		1	No	
Auxiliary Power Supply Cable	Power Supply for Fan	1	No	

How to modify the cable for parallel systems?

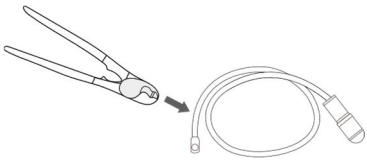
Step 1

- Dissemble the ESS Connector as follows.



No.	Name
1	Angled Plug
2	Cable Clamping Ring / Cable Gland Silicone Seal
3	Cable Clamping Jaw / Cable Retainer
4	Cable Gland Nut
5	Crimping Sleeve

- Use the cable cutter to cut the cable harness at the appropriate position



NOTE

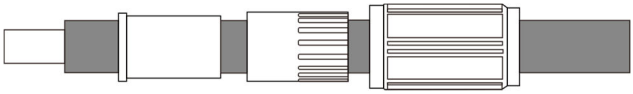
- The cut position shall be close to the end with the OT terminal of the positive or negative power cable.

Step 2

- Strip the insulation from the end of the cable. Recommended Stripping Length: **20 mm**

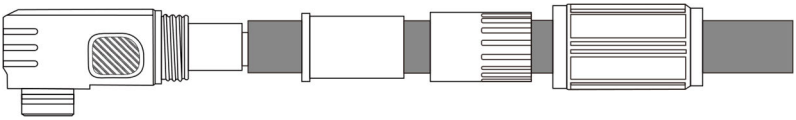
Step 3

- Route the cable through the Cable Gland Nut first, then through the Cable Clamping Jaw, finally through the Cable Clamping Ring.



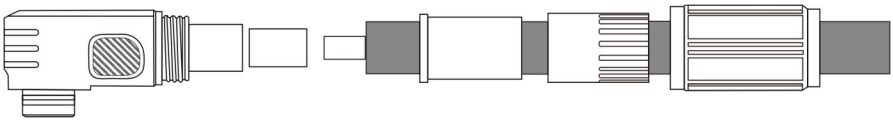
Step 4

- Insert the stripped cable conductor into the cavity of the Angled Plug.

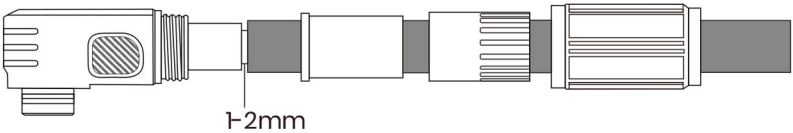


CAUTION

- When the customer provides self-prepared cable harness, the contact area between the stripped conductor and the Angled Plug cavity may be insufficient. Slide the Crimping Sleeve over the stripped cable first, then insert it into the Angled Plug cavity.

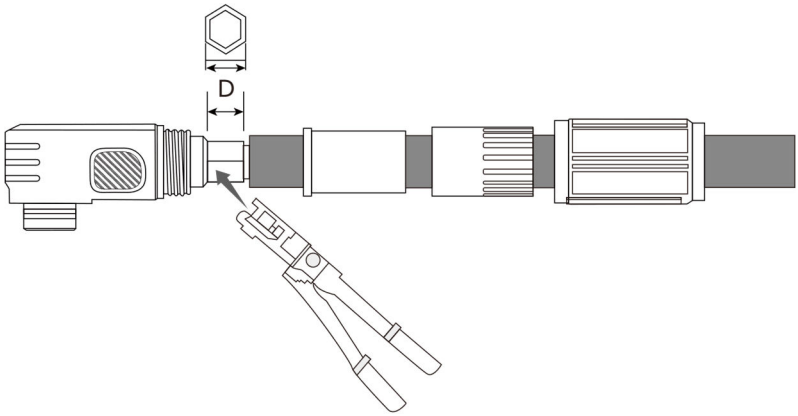


- Reserve a gap of 1-2 mm during insertion into the Angled Plug cavity



Step 5

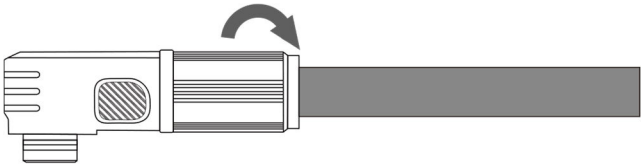
- Use crimping die and tool with matching specification, and crimp at the specified terminal position.



Item	Diameter
D	8.55 mm ±0.15

Step 6

- Push the Cable Gland Nut forward to butt with the Angled Plug, then tighten the Cable Gland Nut clockwise. Recommended tightening torque: 0.81 N·m.



- Cable modification is completed.

5.2.2 Over-current Protection and Isolation Device

For the Australian Market, an over-current protection and isolation device that isolates both positive and negative conductors simultaneously is required between the battery system and Power Conversion Unit. The circuit breaker (over-current protection and isolation device) selection requirements are as follows:

Type: DC Circuit Breaker

Pole Number: 2P (Recommended)

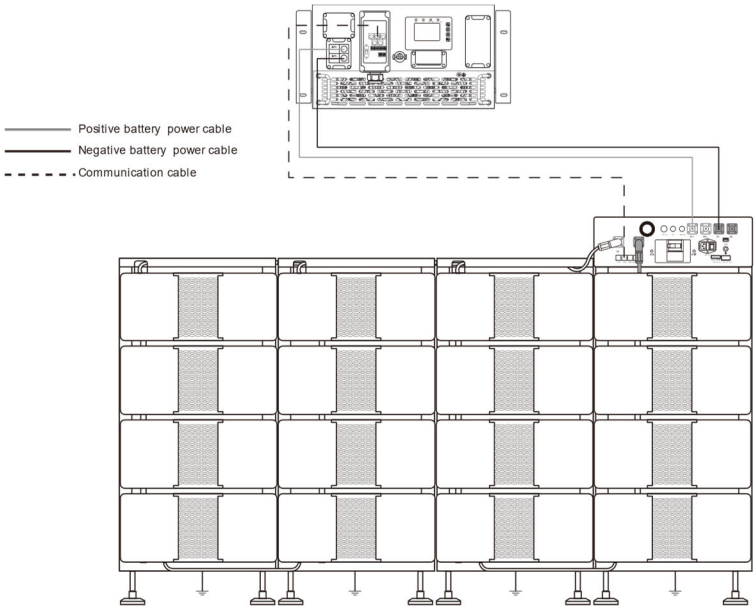
Rated Voltage: 1000V (Recommended)

Rated Current: 200A (Recommended)

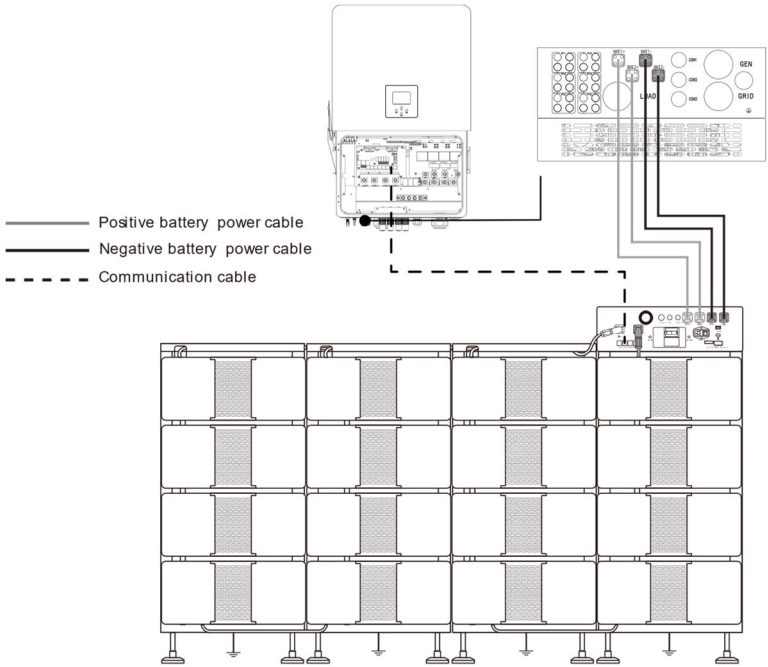
5.3 Cable Connection

Cable connection overview

Connection between PDU and PCS:



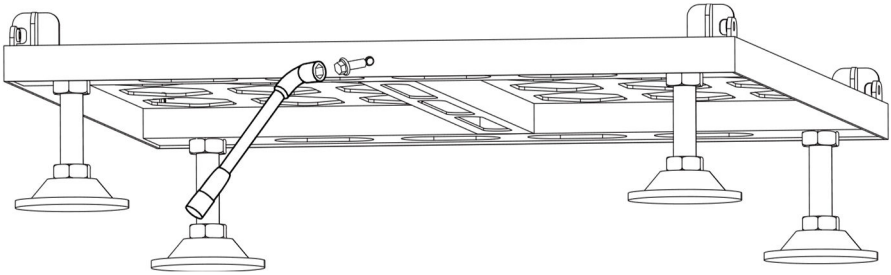
Connection between PDU and inverter:



5.3.1 Grounding

EACH BATTERY STACK MUST BE GROUNDED.

Connect one end of the ground cable to the base with a M5*14 Bolt and the other end to the ground bar at the installation site using a wrench. Recommended torque: 3.2～4.4 N·m.



5.3.2 Power Cable

- **For 100/125KW Power Conversion Unit (SUN-100K-PCS01HP3, SUN-125K-PCS01HP3):**

Power Cable and Terminal Configuration

Connection Point	Terminal Model	Cable Specification	Quantity
Attach to PCS BAT+	SC50-10	42mm²	1
Attach to PCS BAT-	SC50-10	42mm²	1

- **For 80KW Power Conversion Unit (SUN-80K-SG02HP3-EU-EM6):**

Power Cable and Terminal Configuration

Connection Point	Terminal Model	Cable Specification	Quantity
Attach to PCS BAT+	SC25-6	26mm²	2
Attach to PCS BAT-	SC25-6	26mm²	2

Connect the quick-plug end of the negative and positive Cable (For Connecting PDU to Power Conversion Unit) to the P+/P- interface of the PDU, and connect the other end to the positive and negative interfaces of the power conversion unit correspondingly.

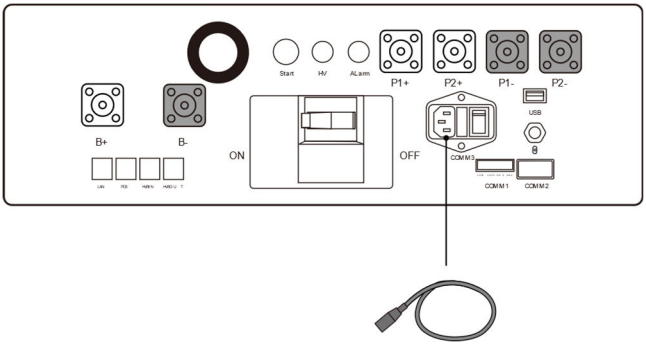
5.3.3 Communication Cable

Insert one end of the communication cable (For Connecting PDU to Power Conversion Unit) into the PCS terminal of the PDU, and connect the other end to the communication interface of the power conversion unit.

NOTE

The length of the communication line between the Power Conversion Unit and the PDU should not exceed 30m.

5.3.4 Auxiliary Power Cable



This port must be connected to the power supply of 3A, 50-60Hz, 200~240V when this equipment is in use, otherwise the fan cannot rotate normally.

5.4 Multi-System Connection

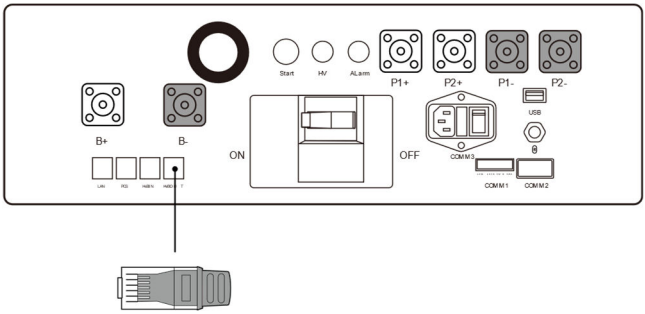
Power cable:

Connect PDU to PDU using the modified power cables.

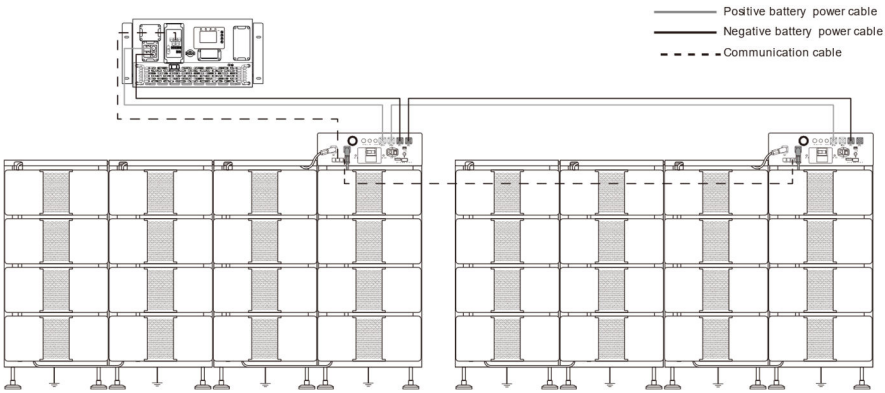
Communication cable:

Master PDU: HVBOUT connects to the next slave PDU' s HVBIN in daisy chain.

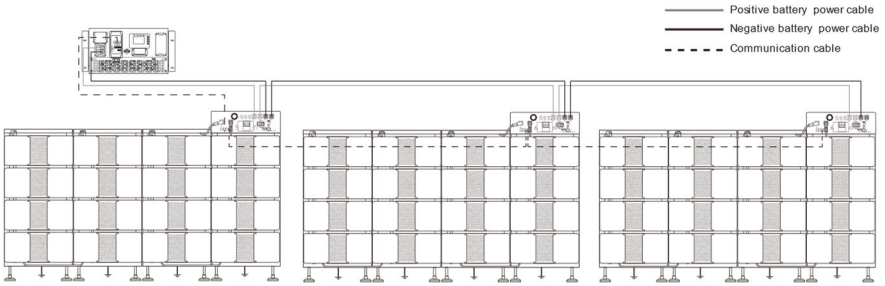
Slave PDU: HVBIN connects to the preceding PDU' s HVBOUT; HVBOUT may connect to the next PDU or be inserted the Terminal resistor B.



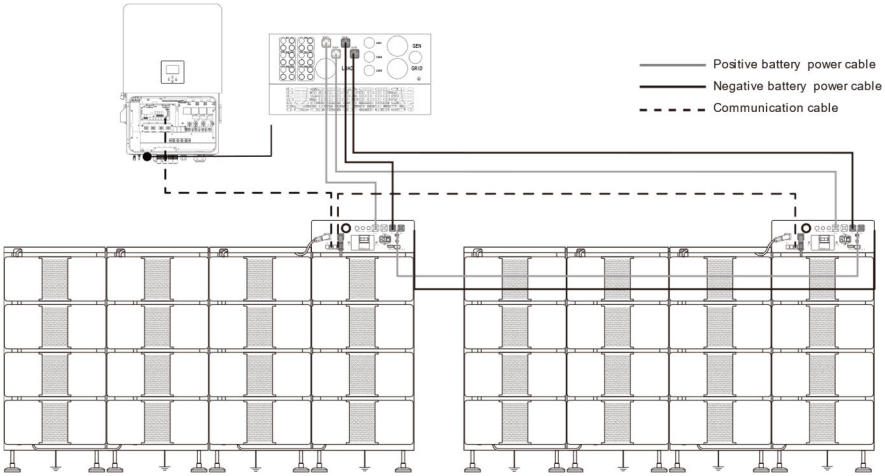
Connection between PDUs and PCS:



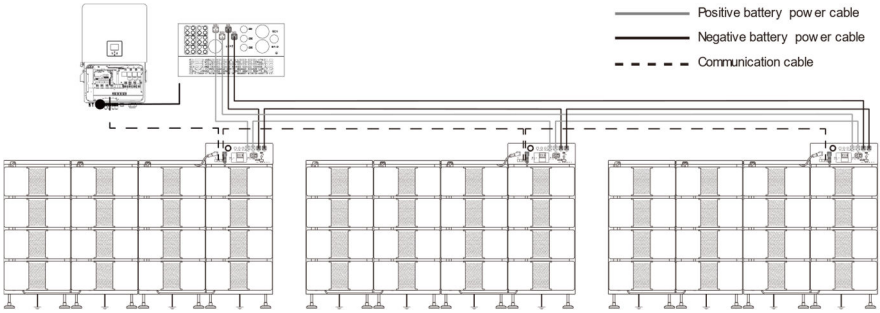
Or



Connection between PDUs and inverter:



Or



5.5 Post-Connection Inspection

After connecting the battery, verify the following items:

- Correct polarity of positive and negative cable connections;
- Secure and reliable connection of positive and negative terminals;
- All bolts are tightened to the specified torque values (refer to the installation torque table);
- Proper cable fastening and intact cable appearance.

6 Operation

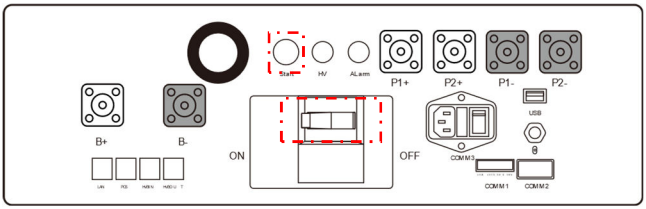
6.1 Check Before Power-On

- All cables are wired correctly and firmly connected, with no looseness or poor contact.
- All fasteners including bolts and screws are fully tightened, with no looseness or loss.
- Clear the equipment working area, and strictly prohibit unrelated personnel and animals from entering the operation range.
- Keep foreign objects, especially metal debris, away from the battery area to avoid short circuit risks.

6.2 Power-On

① Turn the circuit breaker handle from "OFF" to "ON" position on the PDU.

② Press the start button on the PDU.



③ Wait for the system to initialize. The start-up sequence is completed when the yellow HV indicator lights up.

④ Then close the circuit breaker between the Power Conversion Unit and the battery.

⑤ Turn on the Power Conversion Unit.

⚠ **NOTE: PLEASE REFER TO THE INVERTER MANUAL FOR SPECIFIC OPERATION STEPS.**

6.3 Power-Off

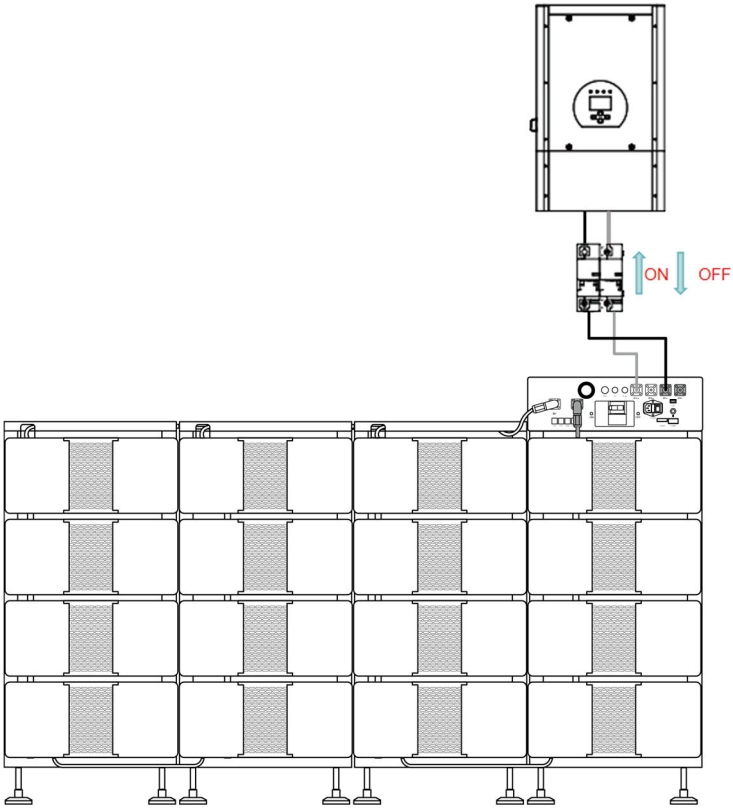
① Turn off the inverter.

⚠ **NOTE: PLEASE REFER TO THE INVERTER MANUAL FOR SPECIFIC OPERATION STEPS.**

② Press the start button again.

③ Wait for the yellow HV indicator to go off (about 3 seconds), after which you can turn the circuit breaker handle from "ON" to "OFF" position.

④ Then open the circuit breaker between the Power Conversion Unit and the battery.


ON
OFF

7 Product Monitoring

NOTE

- When the battery system is equipped with a Bluetooth module, the Deye Cloud APP can be used to monitor the battery status; when the battery is equipped with a Data Collector Stick or used with a Deye inverter with WiFi function, the Deye Cloud Website can be used for remote monitoring.

7.1 DEYE Cloud Website

1. Log in to the Deye Cloud with your account and password.
2. After logging in to the Deye Cloud, enter the SN code of the inverter collector in the search bar (marked by the red box). The detailed information corresponding to the device will be displayed in the table below. Click the device's SN code in the table (marked by the green box) to access the **Device Details Page**.
3. On the **Device Details Page**, click **Architecture** to navigate to the **Inverter Architecture Page**.
4. Then, click **Battery Module** to view the corresponding battery data.

7.2 DEYE Cloud APP

The device can connect to the Deye Cloud App via Bluetooth. After successful login and registration, you can view information about individual battery packs or the entire system.

Download the Deye Cloud App

Scan the correct code to download the app.

For Android

For iOS

For more detailed instructions on using the Deye Cloud App, refer to the operation manual by scanning the provided QR code. (scan QR code -search "APP" – select and download)

8 Maintenance and Storage

8.1 Safety Precautions

DANGER

- Maintenance shall be performed or supervised by qualified professional personnel.
- Wear personal protective equipment (PPE) and use dedicated insulated tools to avoid electric shocks or short circuits.
- Do not smoke or have open flames in the vicinity of batteries.
- Do not wear jewelry, watches or other metallic accessories during servicing.
- Disconnect the Li-ion battery from all loads and chargers before cleaning and maintenance, and fit protective caps over the terminals.
- All battery terminals must be disconnected for maintenance.
- It is forbidden to dismantle, dissect or open the battery; no serviceable parts are contained inside the battery.
- Electrolyte released from a damaged battery is harmful to skin and eyes and may be toxic; do not touch it.

WARNING

- **Never maintain energized batteries.** Disconnect mains power and batteries before moving or reconnecting the equipment, and wait 5 minutes until the equipment powers off. Verify no hazardous voltage remains with a multimeter before maintenance.
- Improper decommissioning may cause damage to equipment and/or battery inverters. Ensure the product is decommissioned in accordance with relevant provisions before maintenance.

CAUTION

- Place a warning sign indicating "DO NOT SWITCH ON" at the switch location.
- Use an electroscope of the proper voltage level to verify the equipment is completely de-energized.
- Before maintenance or repair, securely connect the loop to be repaired to the main ground loop; remove the grounding connection upon completion.
- Insert and remove cables in accordance with regulations; violent or forced operations are prohibited.
- Clean tools and materials promptly after maintenance, and check for any metallic

objects left inside or on top of the product.

- When replacing batteries, use spare parts of the same type and specification.
- Contact the supplier within 24 hours if any abnormality occurs.
- Contact the customer service center for any operation and maintenance queries; unauthorized operation is prohibited.

8.2 Maintenance Schedule

Maintenance Item	Frequency	Description
Environment & Safety	6 months	Ensure no flammable or explosive materials around the product.
		Ambient temperature and humidity within operating ranges.
	12 months	Check heat dissipation modules and vents; clean with a vacuum cleaner if necessary.
	24 months	Ensure air inlets and outlets are not blocked.
Appearance & Structure	1 day	Check that status indicators are in normal condition.
		Ensure no foreign objects wrap or cover the product exterior.
	3 months	Visual inspection of the product: no obvious paint peeling or rust, no dust at vents, no vermin, fasteners secured, parameter settings normal
	12 months	Check screws for no loss or rust
		Warning labels and marks legible and intact; replace if stained or damaged
	24 months	No oxidation or rust
		No damage or deformation
Electrical & Connections	6 months	Cables: securely connected, undamaged, no water ingress, intact insulation tape at terminals, proper routing
	12 months	Check and retighten electrical connections to specified torque
		Check grounding and equipotential bonding; grounding resistance ≤ 0.4 Ω
	24 months	Verify correct wiring
Battery Pack	3 months	good appearance, proper ambient

		temperature/humidity, normal operating voltage and current
	6 months	no rust or foreign objects, fan operates properly, BMS free of alarms
Protection & Safety Devices	3 months	Verify normal function of equipment switches
System Operation	1 day	Log in to the management platform (WEB/EMS/APP, etc.) to check system alarms.
	12 months	Check battery module SoC, SoH, voltage, and temperature via monitoring software.
		Perform one system shutdown and restart.
	24 months	Check for abnormal noise during equipment operation.

⚠ **CAUTION: THE FOLLOWING REPLACEMENT SUGGESTIONS ARE PROVIDED BY OUR PROFESSIONAL AFTER-SALES PERSONNEL.**

- Battery replacement is recommended if any of the following is met:
  - Battery runtime drops below 70% of the original runtime
  - Battery charging time decreases significantly

8.3 Post-Maintenance Requirements

After completing maintenance operations, follows the steps below to retore the site and archive the maintenance records:

Step	Operation
1. Cleaning & Restoration	Remove all temporary measures (e.g., grounding and warning signs) and wiring is restored to original condition. Prevent foreign objects from being left behind or personnel from inadvertently entering.
2. Power-up & Verification	Restore system power step by step per the power-up procedure. Verify that the system has no alarms and operating parameters are normal.
3. Recording & Archiving	Create traceable maintenance records, including the time, personnel and equipment status, and archive the records.

8.4 Storage Precautions

DANGER

- Keep the product far away from high-temperature heat sources, open flames, flammable and explosive areas, and all ignition sources.
- Do not expose the product to direct sunlight or rain.
- During storage, ensure the product is completely disconnected from external equipment, with all operation indicators off.
- Batteries shall be stored in a separate area away from heat sources, stacked in accordance with the marks on the packing case, and over-limit stacking is strictly prohibited.

WARNING

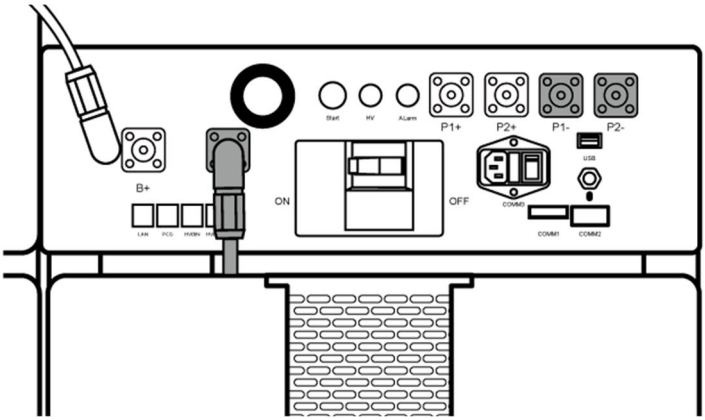
- Store the product in a dry, clean, well-ventilated indoor area, away from strong infrared radiation, radiation sources, organic solvents, corrosive gases, and conductive metal dust.
- Handle with care. Dropping, collision, overturning, side placement, or tilting are strictly prohibited.
- Do not stack or roll the product improperly. Follow all outer packaging markings.
- The storage ground must be flat and solid.
- The storage area must be equipped with qualified fire-fighting facilities, including fire sand and special fire extinguishers.
- Only trained and qualified personnel may operate the product. Wear insulated gloves and use dedicated insulated tools during operation.

Battery Storage

- The optimal storage temperature is 0℃~35℃, and the maximum storage period at normal room temperature is 6 months. During charge and discharge in lead-acid mode, the temperature shall be controlled at 5℃~45℃, and the charge/discharge current shall be kept at 0.2C.
- For long-term battery storage, keep the SOC no less than 50%, complete at least one charge-discharge cycle every 6 months, charge timely and calibrate the SOC to 50%. Low SOC storage is strictly prohibited to avoid battery damage caused by over-discharge.
- Check the battery voltage monthly if stored for more than 6 months. Storage can be continued if the voltage is higher than 51.2V; charge immediately in accordance with

the specified charging strategy if the voltage is lower than 51.2V.

- Long-term storage of lithium batteries will cause capacity attenuation, so overdue storage shall be avoided as much as possible.
- Batteries shall be stored in separate zones, not mixed with other equipment, and ultra-high stacking is prohibited. If any abnormality such as bulging or smoking occurs during storage, stop operation immediately, isolate the battery and dispose of it as per specifications.
- Long-term idle storage is strictly prohibited. Regular maintenance and inspection shall be carried out. Report to the person in charge immediately if the allowable storage period is exceeded, and do not start use without inspection.
- To minimize self-discharge in a long storage period, cut off the connection between the HVB and batteries by disconnecting one end of the positive HVB power cord as the picture shows. This will interrupt the use of the 12 V power supply installed in the HVB and prevent the battery from self-discharging.



9 Product Specifications

Model	System energy (kWh)	Rated DC power (kW)	Depth of Discharge	Composition
BOS-B80 Pro-A3	80.3	40.19	90%	BOS-B-Pack16-AX*5+BOS-B-PDU-2-A *1
BOS-B96 Pro-A3	96.4	48.23	90%	BOS-B-Pack16-AX*6+BOS-B-PDU-2-A *1
BOS-B112 Pro-A3	112.5	56.26	90%	BOS-B-Pack16-AX*7+BOS-B-PDU-2-A *1
BOS-B128 Pro-A3	128.6	64.30	90%	BOS-B-Pack16-AX*8+BOS-B-PDU-2-A *1
BOS-B144 Pro-A3	144.6	72.34	90%	BOS-B-Pack16-AX*9+BOS-B-PDU-2-A *1
BOS-B160 Pro-A3	160.7	80.38	90%	BOS-B-Pack16-AX*10+BOS-B-PDU-2-A *1
BOS-B176 Pro-A3	176.8	88.42	90%	BOS-B-Pack16-AX*11+BOS-B-PDU-2-A *1
BOS-B192 Pro-A3	192.9	96.46	90%	BOS-B-Pack16-AX*12+BOS-B-PDU-2-A *1
BOS-B208 Pro-A3	208.9	104.49	90%	BOS-B-Pack16-AX*13+BOS-B-PDU-2-A *1
BOS-B224 Pro-A3	225.0	112.53	90%	BOS-B-Pack16-AX*14+BOS-B-PDU-2-A *1
BOS-B240 Pro-A3	241.1	120.57	90%	BOS-B-Pack16-AX*15+BOS-B-PDU-2-A *1
BOS-B256 Pro-A3	257.2	128.61	90%	BOS-B-Pack16-AX*16+BOS-B-PDU-2-A *1

*BOS-B-Pack16-AX (X=1, 3, 4...)

Cell Chemistry	$LiFePO_4$			
Battery Module Energy (kWh)	16.08			
Battery Module Nominal Voltage (V)	51.2			
Battery Module Capacity (Ah)	314			
Battery Module Number	BOS-B80 Pro-A3	BOS-B128 Pro-A3	BOS-B208 Pro-A3	BOS-B256 Pro-A3
Battery Module Qty in Series (Optional)	5 (Min)	8	13	16 (Max)
System Nominal Voltage (V)	256	409.6	665.6	819.2
System Operating Voltage (V)	208-292	332.8-467.2	540.8-759.2	665.6-934.4
System Energy (kWh)	80.38	128.61	209.00	257.23
System Usable Energy (kWh)	72.27	115.74	188.01	231.48
Max. DC Power(kW)	46.08	73.73	119.81	147.46
Max. Charge/Discharge Current (A)*1	180			
Short-Circuit Current (A) / Time (ms)	2800 A / 130 ms			
Working Temperature (℃)	Charge：0 ~ 55 Discharge：-20 ~ 55			
Status Indicator	Yellow：Battery High Voltage Power On Red：Battery System Alarm			
Communication Port	TCP / RS485 / CAN			
Humidity	5% ~ 85%			

Altitude	≤ 3000m
IP Rating of Enclosure	IP20
Dimension (W×D×H, mm)	2150 × 1136 × 800
Installation	Rack Mounted
Storage Temperature (℃)	0 ~ 35
Recommend Depth of Discharge	90%
Cycle Life	25±2°C, 0.5C / 0.5C, EOL70%≥6000
Certification	CE / IEC62619 / IEC62040 / UN38.3

1.The current is affected by temperature and SOC.

2.Made in China.

Appendix I Troubleshooting

➢ Screen displays the logic

1. After startup, the screen is on for 20 seconds and then off. Each time the touch screen is lit behind the scenes for 20 seconds, and then turned off until the next touch.
2. The first 2s of boot, the screen shows all.
3. The fault code starts from F001 in ascending order.
4. Each fault is displayed for 5s, and then switch to the next fault.
5. If all faults are rectified, keep the previous fault on the screen for 5 seconds and clear the screen.

F001	ALARM_ID_SUM_OVER_VOLT_LEV_2	Overvoltage
F002	ALARM_ID_SUM_LOW_VOLT_LEV_2	The total voltage is too low
F003	ALARM_ID_CHG_OVER_TEMP_LEV_2	Charging temperature is too high
F004	ALARM_ID_DSG_OVER_TEMP_LEV_2	High discharge temperature
F005	ALARM_ID_CHG_LOW_TEMP_LEV_2	The charging temperature is too low
F006	ALARM_ID_DSG_LOW_TEMP_LEV_2	The discharge temperature is too low
F007	ALARM_ID_OVER_DIFF_VOLT_LEV_2	Excessive voltage difference
F008	ALARM_ID_OVER_DIFF_TEMP_LEV_2	Excessive temperature differentials
F009	ALARM_ID_CELL_OVER_VOLT_LEV_2	Cell overvoltage
F010	ALARM_ID_CELL_LOW_VOLT_LEV_2	Cell undervoltage
F011	ALARM_ID_PRE_CHG_RES_OVER_TEMP_LEV_2	The temperature of the precharge resistance is too high
F012	ALARM_ID_NORTH_CONNECTOR_OVER_TEMP_LEV_2	The temperature of the BMS connector is too high
F013	ALARM_ID_SOUTH_CONNECTOR_OVER_TEMP_LEV_2	The BMU connector temperature is too high.
F014	ALARM_ID_CHG_OVER_CUR_LEV_2	Charging current fault

F015	ALARM_ID_DSG_OVER_CUR_LEV_2	Discharge current fault
F016	ALARM_ID_SOC_OVER_LEV_2	High SOC fault
F017	ALARM_ID_INSULATION_FAILURE_TWO	Insulation fault
F018	ALARM_ID_HEAT_OVER_TEMP_LEV_2	The heating film is too high
F019	ALARM_ID_SOC_LOW_LEV_2	The SOC is too low
F020	ALARM_ID_DSG_RELAY_ADHESION	Discharge relay adhesion
F021	ALARM_ID_POS_RELAY_ADHESION	Total positive relay bonding
F022	ALARM_ID_CHG_RELAY_ADHESION	The charging relay is glued
F023	ALARM_ID_HEAT_RELAY_ADHESION	The heating relay is glued
F024	ALARM_ID_ULTIMATE_PROTECTION	Ultimate protection
F025	ALARM_ID_POWER_SUPPLY_FAULT	Abnormal supply voltage
F026	ALARM_ID_FUSE_BLOWN	Blown fuse
F027	ALARM_ID_BMU_ADDR_REPEAT	The BMU repeatedly fails
F028	ALARM_ID_BMS_ADDR_REPEAT	The BMS is faulty repeatedly
F029	ALARM_ID_INTERNAL_COMM_ERROR	The internal CAN communication fails
F030	ALARM_ID_PCS_CAN_COMM_FAIL	The PCS CAN communication fails
F031	MBMS_SAM_SIG_ID_PCS_ERROR_STATE	The PCS RS485 communication fails
F032	ALARM_ID_PCS_RS485_COMM_ERROR	The PCS RS485 communication is abnormal
F033	ALARM_ID_FUSE_VOLT_SAMP_ERROR	The FUSE total voltage collection is abnormal
F034	ALARM_ID_BAT_VOLT_SAMP_ERROR	The internal total voltage collection is abnormal
F035	ALARM_ID_MOT_VOLT_SAMP_ERROR	The Mot total voltage collection is abnormal

F036	ALARM_ID_HTP_VOLT_SAMP_ERROR	The total heating voltage collection is abnormal
F037	ALARM_ID_CELL_VOLT_SAMPLE_ERROR	Voltage collection fault
F038	ALARM_ID_TEMP_SAMPLE_ERROR	Temperature acquisition fault
F039	ALARM_ID_CURRENT_SAMPLE_ERROR	Current acquisition fault
F040	ALARM_ID_CURRENT_MODULE_FAULT	Current module fault
F041	ALARM_ID_POS_RELAY_DRIVE_FAULT	Total positive relay drive failure
F042	ALARM_ID_CHG_RELAY_DRIVE_FAULT	Charging relay drive failure
F043	ALARM_ID_DSG_RELAY_DRIVE_FAULT	Discharge relay drive failure
F044	ALARM_ID_HEAT_RELAY_DRIVE_FAULT	Heating relay drive failure
F045	ALARM_ID_EEPROM_ERROR	The EEPROM storage is faulty
F046	ALARM_ID_PRECHAGE_ERROR	The precharge failed
F047	ALARM_ID_CHG_VOLT_LOW	The charging voltage is too low
F048	ALARM_ID_BMU_COMM_ERROR	The BMU communication is faulty
F049	ALARM_ID_BMU_NUMBER_ERROR	The number of BMUs is abnormal
F050	ALARM_ID_MBMS_NTC_BREAKLINE_ERROR	Temperature collection of the BMS connector is abnormal
F051	ALARM_ID_BMU_NTC_BREAKLINE_ERROR	The temperature collection of the BMU connector is abnormal
F052	ALARM_ID_PACK_THERMAL_RUNAWAY	PACK thermal runaway fault
F053	ALARM_ID_PACK_FIRE_FAULT	PACK fire failure
F054	ALARM_ID_TCP_CONNECT_FAIL	TCP connection failure
F055	ALARM_ID_W5500_SPI_COMM_FAIL	The W5500SPI communication fails

F056	ALARM_ID_LC_COMM_LOST	LC communication loss
F057	ALARM_ID_PACK_AFE_COMM_ERROR,	BMU AFE communication fails
F058	ALARM_ID_BLE_INIT_FAULT	Description Bluetooth initialization failed
F059	ALARM_ID_CELL_TYPE_MISMATCH_ERROR	The battery type does not match
F060	ALARM_ID_SINGLE_CLUSTER_POWER_DOWN	Single cluster emergency power-off

➢ Different types of faults are below:

	Fault types	Trigger conditions
	Charge over-current alarm	/
	Charge over-current protection	Charging current exceeds 176A for 2 minutes; or exceeds 210A for 5 seconds; or exceeds 235A for 0.5 seconds.
	Discharge over-current alarm	/
	Discharge over-current protection	Discharge current exceeds 176A for 2 minutes; or exceeds 210A for 5 seconds; or exceeds 235A for 0.5 seconds.
System faults	Charge overtemperature alarm	Exceeding the parameter set value and set time (Maximum cell temperature >50°C, 5s)
	Charge overtemperature protection	Exceeding the parameter set value and set time (Maximum cell temperature >55°C, 2s)
	Discharge overtemperature alarm	Exceeding the parameter set value and set time (Maximum cell temperature >50°C, 5s)
	Discharge overtemperature protection	Exceeding the parameter set value and set time (Maximum cell temperature >55°C, 2s)
	Charge under temperature alarm	Exceeding the parameter set value and set time (Minimum cell temperature <5°C, 5s)

	Charge under temperature protection	Exceeding the parameter set value and set time (Minimum cell temperature <0°C, 2s)	
	Discharge under temperature alarm	Exceeding the parameter set value and set time (Minimum cell temperature <-10°C, 5s)	
	Discharge under temperature protection	Exceeding the parameter set value and set time (Minimum cell temperature <-20°C, 2s)	
	Excessive differential voltage alarm	Exceeding the parameter set value and set time (Voltage difference >500mV, 2s)	
	Excessive differential voltage protection	Exceeding the parameter set value and set time (Voltage difference >800mV, 2s)	
	Excessive differential temperature alarm	Exceeding the parameter set value and set time (Temperature difference between highest and lowest >10°C, 2s)	
	Excessive differential temperature protection	Exceeding the parameter set value and set time (Temperature difference between highest and lowest >15°C, 2s)	
	SOC too high	/	
	Cell overvoltage alarm	Exceeding the parameter set value and set time (Maximum cell voltage >3.62V, 1s)	To maintain consistency, cut off the charging immediately when the full charge calibration rated voltage of 3.6V is reached. When the voltage drops to 3.35V, restart it with the turned-off red light indicator. All protective red light indicators are always on!
	Cell overvoltage protection	Exceeding the parameter set value and set time (Maximum cell voltage >3.65V, 1s)	
	Cell undervoltage alarm	Exceeding the parameter set value and set time (Minimum cell voltage <2.7V, 2s)	
	Cell undervoltage protection	Exceeding the parameter set value and set time (Minimum cell voltage <2.5V, 2s)	

	Pre-charge resistor overtemperature alarm	Exceeding the parameter set value and set time (Precharge resistor temperature >55°C, 2s)
	Pre-charge resistor overtemperature protection	Exceeding the parameter set value and set time (Precharge resistor temperature >85°C, 2s)
	Insulation level 1	Exceeding the parameter set value and set time (Insulation resistance <500MΩ, 3 times)
	Insulation level 2	Exceeding the parameter set value and set time (Insulation resistance <100MΩ, 3 times)
	Heating film overtemperature alarm	/
	Heating film overtemperature protection	/
	BMS connector overtemperature alarm	Exceeding the parameter set value and set time (Maximum temperature of BMS connector >75°C, 2s)
	BMS connector overtemperature protection	Exceeding the parameter set value and set time (Maximum temperature of BMS connector >85°C, 2s)
	BMU connector overtemperature alarm	Exceeding the parameter set value and set time (Maximum temperature of BMU connector >75°C, 2s)
	BMU connector overtemperature protection	Exceeding the parameter set value and set time (Maximum temperature of BMU connector >85°C, 2s)
	Power loop overtemperature alarm	/
	Power loop overtemperature protection	/
	SOC too low	Exceeding the parameter set value and set time (SOC is 0%)
	Total voltage too high alarm	Exceeding the parameter set value and set time (Total voltage >57.6V*N (N=current system PACK count), 1s)
	Total voltage too high protection	Exceeding the parameter set value and set time (Total voltage >58.4V*N

		(N=current system PACK count), 1s)
	Total voltage too low alarm	Exceeding the parameter set value and set time (Total voltage <44.8V*N (N=current system PACK count), 2s)
	Total voltage too low protection	Exceeding the parameter set value and set time (Total voltage <41.6V*N (N=current system PACK count), 2s)
	Discharge relay adhesion	Discharge relay control command open, but actual feedback indicates discharge relay closed, 3s
	Charge relay adhesion	Charge relay control command open, but actual feedback indicates charge relay closed, 3s
	Heating relay adhesion	Heating circuit voltage high detected after heating relay disconnection, 3s
	Limit protection	Exceeding the parameter set value and set time (Condition 1: Maximum cell voltage ≥3.8V) Condition 2: (Minimum cell voltage ≤1.5V and no voltage acquisition fault) or (Maximum cell temperature ≥65°C) or (Minimum cell temperature ≤-30°C and no temperature sensor disconnection fault) or (Connector temperature ≥90°C) lasting 2s Extreme protection triggered if either Condition 1 or Condition 2 is met
	Abnormal power supply voltage	Exceeding the parameter set value and set time (Supply voltage >14V or supply voltage <10V, 5s)
	Master positive relay adhesion	Main positive relay has no close command, but actual feedback indicates main positive relay closed, 3s
	Fuse Blown	No high voltage detected after loop relay closure, 5s
	Repeated BMU address fault	BMU with the same number
	Repeated BMS address fault	BMS with the same number

	INTER-CAN BUS communication failure	Loss of communication between BMS
	PCS-CAN BUS communication failure	The heartbeat message of the Power Conversion Unit is not received for a long time
	RS485 communication failure	/
	RS485 communication abnormal	/
	External（FUSE） total voltage acquisition fault	/
	Internal total voltage acquisition fault	The difference between the acquired internal total voltage and the accumulated internal total voltage exceeding the set value（10V，5s）
	SCHG total voltage acquisition fault	/
	Cell voltage acquisition fault	Battery voltage sampling disconnection
	Temperature acquisition failure	BMS NTC sampling disconnection or BMU NTC sampling disconnection or battery temperature sampling disconnection
	Current acquisition fault	Exceeding the parameter set value and set time (Acquired charging current >500A or discharging current >500A, 3s)
	Current module fault	Current module reverse connection (charging current and voltage drop, or discharging current and voltage rise, 60s) or current module not configured (shunt sampling type configured incorrectly)
	Main positive relay drive failure fault	Control main positive relay close, but actual feedback indicates open, 5s
	Charging relay drive failure fault	Control charging relay close, but actual feedback indicates open, 5s
	Discharging relay drive failure fault	Control discharging relay close, but actual feedback indicates open, 5s
	Heating relay drive failure fault	Heating circuit low voltage detected after heating relay connection, 5s

	EEPROM storage failure	EEPROM write failure during self-test
	RTC clock fault	The external RTC failed to enable the charging function
	Pre-charge failure	Pre-charge timeout，4s
	Charging voltage too low	The minimum cell voltage is lower than the set value
	BMU lost	BMU message not received for a long time，10s
	Abnormal number of BMU	The difference between the acquired internal total voltage and the accumulated internal total voltage exceeding the set value(27.2V,5s)
	Mot total pressure acquisition abnormal	DC circuit is closed, but MOT total voltage <10V, 5s
	BMS connector temperature acquisition abnormal	BMS connector north positive terminal temperature, BMS connector south positive terminal temperature, BMS connector south negative terminal temperature, BMS connector north negative terminal temperature, precharge resistor temperature reads 0 for 20s (BMS NTC acquisition disconnected)
	BMU connector temperature acquisition abnormal	BMU connector minimum temperature reads 0 for 20s (BMU NTC acquisition disconnected)
	PACK fan fault	Fan detected not rotating during startup
	PACK thermal runaway fault	Condition 1: Maximum cell temperature exceeds 65°C Condition 2: Voltage drop rate exceeding 25%/s or temperature rise rate exceeding 1°C/s occurs continuously more than 30 times Both Condition 1 and Condition 2 must be met for thermal runaway to occur
	PACK fire protection fault	Battery pack detects aerosol discharge

	TCP connection failure	/
	W5500 SPI communication failure	/
	LC communication loss	/
	BMU software version discrepancy fault	BMU software version mismatch
	BMU AFE communication failure	BMU and AFE acquisition chip communication failure
	BMU cell type mismatch fault	Battery type filled in battery pack does not match battery type filled in high-voltage box during system power-on self-test
	Single cluster emergency power-off fault	Emergency power-off signal read from DI is at low level, 2s
	Bluetooth initialization failure fault	Bluetooth initialization failed 10 times
	Environmental controller communication loss	/
	Air conditioning communication loss	/
	Air conditioning alarm	/
	Lightning protection	/
	Exhaust valve alarm	/
	Lead-acid battery fault	/
	Cabin-level combustible gas fault	/
	Battery compartment door open fault	/
	Aerosol feedback fault	/
	Environmental control board smoke sensor fault	/

	Environmental control board temperature sensor fault	/
	Environmental control board emergency stop fault	/
	Environmental control board water immersion fault	/

Appendix II Emergency Handling

DANGER

- In the event of natural disasters (earthquake, typhoon, flood, wildfire, etc.): Prioritize personnel safety, cut off power and stop the ESS immediately.
- Do NOT operate damaged equipment without professional inspection and qualified testing after the disaster.
- Keep away from waterlogged or fire-damaged units and contact our service engineers for professional handling.

WARNING

- When the air intake/exhaust system is operating, do NOT face the exhaust vents under any circumstance.
- Refer to the user manual/product manual for product information. Do NOT ACCESS the product if safety cannot be guaranteed.

➢ **Fire/Explosion Hazards**

- Evacuate immediately to at least 50 meters away from the site and call the fire department.
- Wear respiratory protection. Disconnect the upstream power supply only when safe.
- Isolate the accident area only when safe to keep unauthorized personnel away.
- Post-incident maintenance must be performed by professionals or our after-sales engineers.

➢ **Electric Shock**

- Ensure personal safety, then disconnect the power supply immediately to avoid secondary electric shock.
- Use an insulated object to separate the victim from the power source and perform first aid such as cardiopulmonary resuscitation (CPR).
- Call the emergency medical number immediately to obtain professional medical treatment.
- Protect the accident scene for investigation and evidence preservation.
- Contact professionals to conduct a comprehensive inspection of the ESS. The system may only be put back into use after repair or replacement and passing qualified testing.

- **Chemical Hazards**
  - In case of electrolyte leakage, evacuate personnel from the affected area and notify the relevant personnel immediately. Professionals shall conduct safe collection and proper disposal of leaked substances.
  - Toxic gases may be released during battery combustion or damage; evacuate personnel to a safe area immediately. If personnel are exposed or injured, call the emergency medical number for professional treatment. Respiratory protection, protective clothing and other safety equipment must be worn during hazard handling.

- **Mechanical Injury**
  - In the event of equipment tipping, battery pack dropping or component detachment, disconnect power and stop ESS operation immediately.
  - In case of personnel injury, administer first aid (hemostasis, bandaging, etc.) and call the emergency medical number immediately.
  - If obvious odor, damage, smoke or fire is detected, evacuate personnel immediately, call the fire department, and allow professionals to handle firefighting and subsequent treatment.
  - If any abnormalities are observed, professionals shall use move the battery pack to an open, safe area, let it stand for 1 hour while monitoring temperature, and contact the engineers.
  - Contact professionals to repair or replace damaged components. The system may only be returned to service after passing inspection and testing.

- **Natural Disasters**
  - In the event of natural disasters including earthquake, typhoon, flood, wildfire, etc., disconnect the power supply and stop ESS operation immediately.
  - If the ESS is submerged or flooded, do not touch the equipment and keep clear of the waterlogged area.
  - Do not use water-soaked batteries under any circumstances. Contact a qualified battery recycling service for proper disposal and scrapping.
  - Before a wildfire approaches, establish a firebreak around the ESS and prepare adequate fire-fighting equipment such as fire extinguishers, fire sand, fire hoses, etc.

After the disaster, contact professionals to fully inspect the support structure, electrical connections, etc. The system may only be reused after repair/replacement and qualified testing.