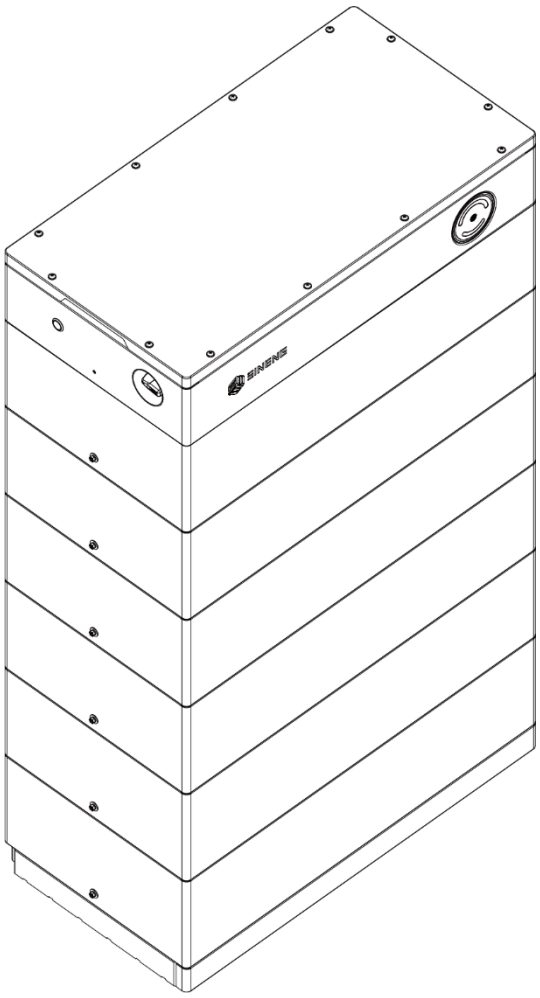
High-Voltage Stacked Battery System

User Manual



Date: 2026-01-05

Version: A00

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Contact Method

Website: https://www.si-neng.com/

Preface

Thank you for choosing the product from Sineng Electric Co., Limited. (hereinafter referred to as Sineng). This manual describes instructions on proper use of the product. Please read this manual carefully before using the product. Please keep this manual properly for future reference.

Overview

This document describes the energy storage system (also referred to as product, device, or battery) in terms of its overview, application scenarios, installation, commissioning, system maintenance, and technical specifications.

Intended Audience

- Technical support engineers
- Commissioning engineers
- Maintenance engineers
- Hardware installation engineers

Sign Conventions

The following symbols are used in the description of safety or critical information in this manual. Please pay attention or abide by the information marked with the following signs.

Symbol	Description
 **Danger**	Indicates that a seriously dangerous situation may occur, which, if not avoided, may result in serious personal injuries or casualties.
 **Warning**	Indicates that a potentially dangerous situation may occur, which, if not avoided, may result in personal injuries, equipment damage, etc.
 **Caution**	Indicates that an unpredictable situation may occur, which, if not avoided, may result in equipment damage, performance deterioration, data loss, etc.
 **Note**	Indicates key information elaboration and operational tips.

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Contents

Preface I
Contents 1
Chapter 1 Safety Precautions 3
1.1 Declaration 3
1.2 Personal Safety 4
1.2.1 General Requirements 4
1.2.2 Personnel Requirements 5
1.3 Electrical Safety 6
1.3.1 General Requirements 6
1.3.2 Ground Requirements 7
1.3.3 Wiring Requirements 7
1.3.4 ESD 8
1.4 Environment Requirements 8
1.5 Machinery Safety 11
1.5.1 General Requirements 11
1.5.2 Carrying Heavy Objects 11
1.5.3 Ladder Use Safety 13
1.5.4 Drilling Holes 14
1.5.5 Lifting Safety 14
1.6 Battery Safety 14
Chapter 2 Transportation and Storage 18
Chapter 3 Product Overview 20
3.1 Product Model Description 20
3.2 Product Appearance 21
3.3 Battery Capacity Description 25
3.4 Working Mode 25
Chapter 4 Inspection Before Installation 27
4.1 Outer Packaging Inspection 27
4.2 Delivery Inspection 27

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Chapter 5 Product Installation 29
5.1 Requirements for installation tool 29
5.2 Requirements for installation environment 30
5.3 Installation Space Requirements 31
5.4 Installation of product 31
Chapter 6 Installing the Cables 36
6.1 Installing an Internal Ground Cable 37
6.2 Install Battery Cables 37
6.3 Install Communication Cables (Single) 39
6.4 Install Communication Cables (Parallel) 40
Chapter 7 Check after Installation 42
Chapter 8 Power-On/Off 43
8.1 Power-On 43
8.2 Power-Off 44
Chapter 9 Product Maintenance 46
9.1 Daily Inspection of Product 46
9.2 Storage with Low SOC 47
Appendix A System Specifications 48
Appendix B After-sales Service Information 51

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Chapter 1 Safety Precautions

1.1 Declaration

Before transporting, storing, installing, operating, using or/and maintaining the equipment, please read this manual, operate in strict accordance with the instructions, and follow all safety precautions marked on the equipment and in the manual. In this manual, "equipment" refers to the products, software, components, spare parts and/or services related to this manual. The "company" refers to the manufacturer (producer), seller and/or service provider of the equipment. "You" refers to the person who transports, stores, installs, operates, uses and/or maintains the equipment.

The "Danger", "Warning", "Caution", and "Tips" in this manual do not cover all safety precautions that should be observed. You must also comply with relevant international, national or regional standards and industry practices. Sineng does not assume any liability caused by violation of safe operation requirements or violation of safety standards for the design, production and use of equipment.

This equipment should be used in an environment in line with the design specifications. Otherwise, equipment failure, equipment malfunction or component damage that may be caused will not be covered by the equipment warranty. Sineng will not be liable for compensation for related personal injuries and property losses, etc.

All operations such as transportation, storage, installation, operation, use and maintenance should comply with applicable laws, regulations, standards and specifications.

Reverse engineering, decompilation, disassembly, adaptation, implantation and other derivative operations on the equipment software are prohibited. It is not allowed to study the internal implementation logic of the equipment, obtain the source code of the equipment software, or infringe on intellectual property rights in any way, nor disclose the results of any equipment software performance test.

Sineng will not be liable for any of the following situations or their consequences:

- Equipment damage is caused by earthquakes, floods, volcanic eruptions, mudslides, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, extreme weather, and force majeure;
- The equipment is not operated in the service conditions specified in this manual;
- The installation and application environment does not comply with relevant international, national or regional standards;
- The equipment is installed and used by unqualified personnel;

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- Failure to operate the equipment according to the operating instructions and safety warnings in the product and manual;
- The equipment is disassembled or modified or software code is modified without authorization;
- Equipment damage is caused by transportation by the customer or third-party shipping company;
- Equipment damage is caused by storage conditions that do not meet the requirements described in the manual;
- The materials and tools prepared by the customer do not meet the requirements of local laws, regulations and relevant standards;
- Equipment damage is caused by customer or third party's negligence, intentionality, gross negligence, improper operation, or non-Sineng reasons.

1.2 Personal Safety



Danger

- It is prohibited to perform live operations during installation. It is prohibited to install or remove cables while the power is on. Arcing or sparks may occur at the moment when a cable core contacts a conductor, which may cause fire or personal injuries.
- When the equipment is energized, non-standard or incorrect operations may cause fire, electric shock or explosion, resulting in casualties or property loss.
- It is prohibited to wear watches, bracelets, rings, necklaces and other conductive accessories during the operation to avoid being burned by electric shock.
- Special insulating tools must be used during the operation to avoid electric shock injuries or short-circuit faults. The insulation withstand voltage must meet local laws, regulations, standards and specifications.



Warning

- Special protective equipment must be used during the operation, such as protective clothing, ESD shoes, goggles, hard hats, and ESD gloves.

1.2.1 General Requirements

- Do not deactivate equipment protection devices or ignore warnings, cautions and prevent measures in the manual and equipment.
- During the operating of the equipment, if a fault that may cause personal injuries or

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equipment damage is discovered, immediately terminate the operation and report to the responsible personnel. Then, take effective protective measures.

- Do not power on the equipment before it has been installed or confirmed by professionals.
- It is prohibited to contact the power supply equipment directly, using other conductors, or indirectly through wet objects. Before contacting any conductor surface or terminal, measure the voltage of the contact point to confirm that there is no risk of electric shock.
- When the equipment is operating, the enclosure temperature is high and there is a risk of burns. Please do not touch the enclosure.
- It is prohibited to let your fingers, parts, screws, tools or boards come into contact with the running fan to avoid injuries to your hands or damage to the equipment.
- If fire occurs, evacuate the building or equipment area immediately and press the fire alarm or call the fire emergency hotline. Under no circumstances should you re-enter the burning building or equipment area.

1.2.2 Personnel Requirements

- Personnel operating the equipment include professionals and trained personnel.
  - Professionals: People who are familiar with the principles and structure of equipment, have experience in training or operating the equipment, and understand the potential sources and magnitudes of hazards during equipment installation, operation, and maintenance.
  - Trained personnel: People who have undergone appropriate technical and safety training, can be aware of the hazards that may arise when performing an operation, and can take steps to minimize the risk to themselves or other persons.
- Personnel who install and maintain the equipment must undergo strict training, master correct operation methods, and understand various safety precautions and relevant standards of the country/region where the equipment is located.
- Only qualified professionals or trained personnel are allowed to install, operate and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and service equipment.
- Personnel operating in special scenarios such as electrical operations, climbing operations, and special equipment operations must have the special operation qualifications required by the local country/region.
- Replacement of equipment or parts (including software) must be implemented by authorized professionals.

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- Except for those who operate the equipment, other personnel are prohibited to approach the equipment.

1.3 Electrical Safety



Danger

- Before making electrical connections, ensure that the equipment is not damaged. Otherwise, it may cause electric shock or fire.
- Improper and incorrect operations may cause accidents such as fire or electric shock.
- During the operation, prevent foreign objects from entering the equipment. Otherwise, it may cause short circuit or damage to the equipment, derating or power outage of the load, as well as personal injuries.
- When installing equipment that needs to be grounded, the protective ground cable must be installed first. When dismantling the equipment, the protective ground cable must be removed last.

1.3.1 General Requirements

- Installation, operation and maintenance must be carried out in accordance with the procedures in the manual. Do not modify, install or change equipment without authorization, and do not change the installation sequence without authorization.
- Grid-connected operating requires the permissions from the power department of the country or region where the equipment is located.
- Comply with power station safety regulations, such as operation ticket and job ticket systems.
- Set up temporary fences or warning ropes in the working area and hang "No Entry" signs to prevent unrelated persons from entering the working area.
- Before installing or removing the power cables, disconnect the equipment and its upper-level and lower-level switches.
- Before operating the equipment, carefully check that the tools are qualified and registered. After the operation is completed, take the tools back according to the claimed quantity to prevent them from being left inside the equipment.
- Before installing power cables, confirm that the cable labels are correct and the cable terminals are insulated.
- When installing the equipment, use a torque tool with an appropriate range to tighten the screws. When using a wrench to tighten, ensure that the wrench is not skewed and the error

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of torque does not exceed 10% of the specified value.

- Use a torque tool to secure the bolts and double check using the red and blue markings. After confirming that a bolt is tightened, paint a blue mark on the bolt. After the inspector confirms that the bolt is tightened, paint a red mark (the line mark must span the edge of the bolt).
- If the equipment has multiple inputs, all inputs of the equipment should be disconnected, and the equipment can only be operated after it is completely powered off.
- When maintaining the lower-level power consumption or power distribution equipment of the power supply equipment, it is necessary to disconnect the corresponding output switch of the power supply equipment.
- During equipment maintenance, hang a "No closing" sign on the upper-level and lower-level switches or circuit breakers, and post warning signs to prevent accidental connections. The equipment can only be powered on after the fault is rectified.
- Regularly check the equipment connection terminal screws to make sure they are tightened properly.
- If a cable is damaged, it must be replaced by a professional to avoid risks.
- It is prohibited to alter, damage or cover the signs and nameplates on the equipment, and promptly replace unclear signs that have been used for a long time.
- It is prohibited to clean the internal and external electrical parts of the equipment with solvents such as water, alcohol or oil.

1.3.2 Ground Requirements

- The equipment ground impedance should meet the requirements of local electrical standards.
- The equipment must be the connected to the protection ground. Before operating the equipment, check the electrical connection of the equipment to ensure that the equipment is reliably grounded.
- It is prohibited to operate the equipment when the grounding conductor is not installed.
- It is prohibited to destroy the grounding conductor.

1.3.3 Wiring Requirements

- The selection, installation, and routing of cables must comply with local laws, regulations, and specifications.
- Looping and twisting of cables are prohibited. If the length of the power cable is not long

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enough, replace the power cable. It is prohibited to make joints or solder joints in the power cable.

- All cables must be securely connected, well insulated, and of appropriate size.
- Cable troughs and cable holes should have no sharp edges. Cable tubes or cable holes must be protected to prevent cables from being damaged by sharp edges, burrs, etc.
- Cables of the same type should be tied together, with a straight and neat appearance and no skin damage. Cables of different types should be laid out separately, and cables must not entangle or cross each other.
- Buried cables need to be reliably secured using cable supports and cable clamps. The cables in the backfilled soil area must be closely attached to the ground to prevent the cables from being deformed or damaged due to force exerted when the soil is backfilled.
- When external conditions (such as laying methods or ambient temperature) change, verify cable selection by referring to IEC-60364-5-52 or local regulations and specifications, such as whether the current carrying capacity meets the requirements.
- The insulation layer of cables may be aged or damaged if the cables are used in high-temperature environments. The distance between the cable and the heating device or the periphery of the heat source area must be at least 30 mm.
- After the power cables are installed, tie them to the supports.
- Cable routing should avoid the line cutting position of the platform.

1.3.4 ESD

- When touching the equipment and handling boards, modules with exposed circuit boards, or application-specific integrated circuits (ASICs), observe ESD protection regulations and wear ESD clothing and ESD gloves or a well-grounded ESD wrist strap.
- When holding a board or a module with exposed circuit boards, hold its edge without touching any components. Do not touch the components with bare hands.
- Package boards or modules with ESD packaging materials before storing or transporting them.

1.4 Environment Requirements

Danger

- It is prohibited to place the equipment in an environment with flammable or explosive gases or smoke, or perform any operation on the equipment in such environment.
- It is prohibited to store flammable and explosive items in the equipment area.

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- It is prohibited to place the equipment close to heat or fire sources, such as fireworks, candles, heaters, or other heating devices. The heating may cause damage to the equipment or cause a fire.

Warning

- When the equipment is operating, do not block the air outlets and cooling system, or cover it with other objects to prevent equipment damage or fire due to high temperature.
- The equipment should be installed in an area away from liquids. It is prohibited to install the equipment under water pipes, air outlets and other places where condensation is likely to occur. It is prohibited to install the equipment under air conditioners, vents and other places that are prone to water leakage to prevent liquid from entering the equipment and causing equipment failure or short circuit.

- The installation and usage environment must meet relevant international, national, and local standards for lithium batteries, and are in accordance with the local laws and regulations. The user is obliged to protect the ESS against fire or other hazards.
- Keep the ESS 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, study, game room, home theater, sunroom, toilet, bathroom, laundry, and attic.
- When installing the ESS in a garage, keep it clear of the drive path.
- Do not install the ESS in places that are enclosed, unventilated, without proper fire fighting facilities, or difficult for firefighters to access. Do not place flammable or explosive materials around the ESS.
- Install the ESS in a sheltered place or install an awning over it to avoid direct sunlight or rain.
- For areas prone to natural disasters such as floods, debris flows, earthquakes, and typhoons, take corresponding precautions for installation.
- Do not install the ESS in an easily accessible position because the temperature of the enclosure and heat sink is high when the ESS is running.
- Do not install the ESS on a moving object, such as ship, train, or car.
- Ensure that the equipment is stored in a clean, dry, and well ventilated area with proper temperature and humidity and is protected from dust and condensation.
- Keep the installation and operating environments of the equipment within the allowed ranges. Otherwise, its performance and safety will be compromised.

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- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, performing outdoor installation, and opening doors) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Do not install the equipment in an environment with direct sunlight, dust, smoke, volatile or corrosive gases, infrared and other radiations, organic solvents, or salty air.
- Do not install the equipment in an environment with conductive metal or magnetic dust.
- Do not install the equipment in an area conducive to the growth of microorganisms such as fungus or mildew.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference.
- Ensure that the site complies with local laws, regulations, and related standards.
- Ensure that the ground in the installation environment is solid, free from spongy or soft soil, and not prone to subsidence. The site must not be located in a low-lying land prone to water or snow accumulation, and the horizontal level of the site must be above the highest water level of that area in history.
- Do not install the equipment in a position that may be submerged in water.
- If the equipment is installed in a place with abundant vegetation, in addition to routine weeding, harden the ground underneath the equipment using cement or gravel.
- Do not install the equipment outdoors in salt-affected areas because it may be corroded. A salt-affected area refers to the region within 500 m of the coast or prone to sea breeze. Regions prone to sea breeze vary with weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).
- Before installation, operation, and maintenance, clean up any water, ice, snow, or other foreign objects on the top of the equipment.
- When installing the equipment, ensure that the installation surface is solid enough to bear the weight of the equipment.
- After installing the equipment, remove the packing materials such as cartons, foam, plastics, and cable ties from the equipment area.
- Store the equipment according to the storage requirements. Equipment damage caused by unqualified storage conditions is not covered under the warranty.
- This product is suitable for corrosion environment category C3 (moderate corrosion environment). Its outdoor applications include urban and industrial areas, while its indoor

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applications include high-humidity areas.

1.5 Machinery Safety

Warning

- Tools must be fully prepared and have passed inspection by professional institutions. It is prohibited to use tools that are damaged or have failed the inspections or have exceeded the validity period. Ensure that the tools are firm and non-overloaded.
- It is prohibited to drill holes in the equipment. Drilling will destroy the sealing, electromagnetic shielding performance, internal components and cables of the equipment. Metal shavings generated by drilling will enter the equipment, which will cause a short circuit on the circuit board.

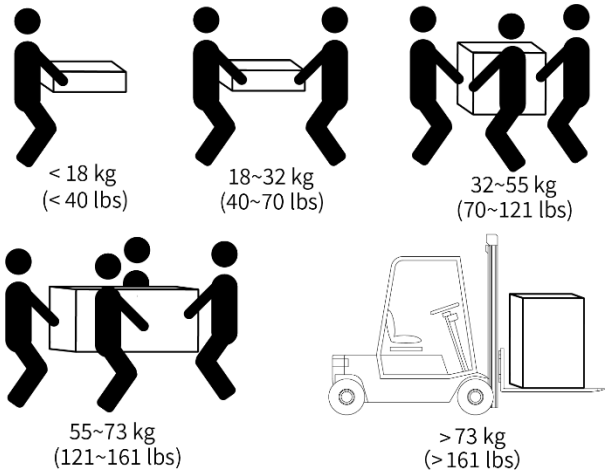
1.5.1 General Requirements

- Paint scratches that occur during equipment transportation and installation must be repaired in a timely manner. It is prohibited to expose the scratched part for a long time.
- Arc welding, cutting and other operations on the equipment are prohibited without evaluation by Sineng.
- It is prohibited to install other devices on the top of the equipment without evaluation by Sineng.
- When working in the space above the top of the equipment, add protection on the top of the equipment to avoid damage to the equipment.
- Please use correct tools and master correct use methods.

1.5.2 Carrying Heavy Objects

- When carrying heavy objects, prepare to bear the weight to avoid being crushed or sprained by the heavy objects.

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- When multiple people are carrying heavy objects together, height and other conditions must be considered. Reasonably arrange the people and work to ensure balanced weight distribution.
- When two or more people are carrying heavy objects together, one person should direct them to lift or put down the equipment at the same time to ensure uniform steps.
- When handling equipment by hand, wear protective gloves, protective shoes and other safety equipment to avoid injuries.
- When handling equipment by hand, approach the object, squat down, and use the power of straightening your legs instead of your back to lift the object slowly and steadily. It is prohibited to suddenly lift the object or twist your trunk.
- Do not quickly lift the heavy object above waist. Place the heavy object on a workbench at half waist height or a suitable place, adjust the position of your palms, and then lift it up.
- Handle the heavy object with balanced and steady force. Move or place it stably and slowly to avoid any impact or drop from scratching the surface of the equipment or damaging the components and cables of the equipment.
- When handling the heavy object, exercise caution at workbenches, slopes, stairs and other places where there are slippery. When carrying the heavy object through the doorsill, make sure the door is wide enough to allow the equipment to pass through, so as to prevent injuries or scratches on your fingers.
- When transferring the heavy object, move your feet rather than twisting your waist. When you need to lift and transfer the heavy object at the same time, point your feet in the direction to move, and then carry the heavy object.
- When using a forklift to handle the equipment, ensure that the forklift is in the middle position to prevent it from tipping over. Before moving the equipment, fasten the equipment to the forklift using ropes. When moving the equipment, special personnel are

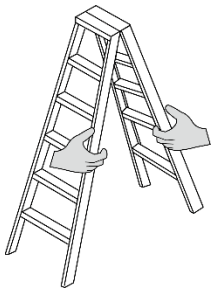
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required to supervise the process.

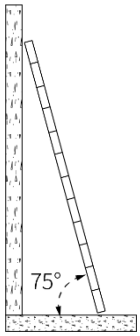
- Transport the equipment by sea, highway with good road conditions, or air. Railway transportation is not supported. Bumps and tilts should be minimized during transportation.

1.5.3 Ladder Use Safety

- When performing live operations at heights, use wooden ladders or insulated ladders.
- It is preferred to use platform ladders with guardrails. Trestle ladders are not recommended.
- Before using the ladder, ensure that it is in good conditions and meets the load-bearing requirements. It is prohibited to use it in the overloaded state.
- The ladder must be placed in a stable place and someone must hold the ladder when you are working on the ladder.



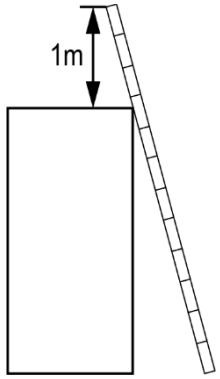
- When climbing a ladder, keep your body steady and ensure that your body's center of gravity does not deviate from the edge of the ladder frame to ensure your safety.
- The drawstring must be secure when using a ladder.
- If a trestle ladder is used, the inclination of the ladder should be 75°, which can be measured using a steel square, as shown in the following figure.



- If a trestle ladder is used, place the wide ladder legs downward or use protective measures at the bottom of the ladder to prevent slipping.
- If a trestle ladder is used, the maximum height of the feet should not exceed the fourth step from the top to the bottom of the ladder.
- If a trestle ladder is used to climb up to the platform, the vertical height of the ladder

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beyond the platform must be at least 1 meter.



1.5.4 Drilling Holes

- Obtain consent from the customer and contractor before drilling holes.
- Wear protective equipment such as safety goggles and protective gloves when drilling holes.
- To avoid short circuits or other risks, do not drill holes into buried pipes or cables.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings.

1.5.5 **Lifting Safety**

- Personnel performing lifting operations must undergo relevant training and be qualified before taking up their posts.
- Temporary warning signs or fences must be set up in the lifting area to isolate the area.
- The foundation for lifting operations must meet the load-bearing requirements of the crane.
- Before lifting, ensure that the lifting tools are placed on the ground meeting load-bearing requirements, and lock the rollers.
- During lifting, it is prohibited to walk under the boom or lifted object.
- During lifting, it is prohibited to drag the wire rope or lifting tools, or use hard objects to hit.
- During lifting, ensure that the angle between the two cables is no greater than 90°, as shown in the figure below.

1.6 Battery Safety

Danger

- Do not connect the positive and negative poles of a battery together. Otherwise, the battery may be short-circuited. Battery short circuits can generate high instantaneous

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current and releases a large amount of energy, which will cause battery leakage, smoke, flammable gas release, thermal runaway, fire, or explosion. To avoid battery short circuits, do not maintain batteries with power on.

- Do not expose batteries at high temperatures or around heat sources, such as scorching sunlight, fire sources, transformers, and heaters. Battery overheating may cause leakage, smoke, flammable gas release, thermal runaway, fire, or explosion.
- Protect batteries from mechanical vibration, falling, collision, punctures, and strong impact. Otherwise, the batteries may be damaged or catch fire.
- To avoid leakage, smoke, flammable gas release, thermal runaway, fire, or explosion, do not disassemble, alter, or damage batteries, for example, insert foreign objects into batteries, squeeze batteries, or immerse batteries in water or other liquids.
- Do not touch battery terminals with other metal objects, which may cause heat or electrolyte leakage.
- There is a risk of fire or explosion if the model of the battery in use or used for replacement is incorrect. Use a battery of the model recommended by the manufacturer.
- Battery electrolyte is toxic and volatile. Do not get contact with leaked liquids or inhale gases in the case of battery leakage or odor. In such cases, stay away from the battery and contact professionals immediately. Professionals must wear safety goggles, rubber gloves, gas masks, and protective clothing, power off the equipment, remove the battery, and contact technical engineers.
- A battery is an enclosed system and will not release any gases under normal operations. If a battery is improperly treated, for example, burnt, needle-pricked, squeezed, struck by lightning, overcharged, or subject to other adverse conditions that may cause battery thermal runaway, the battery may be damaged or an abnormal chemical reaction may occur inside the battery, resulting in electrolyte leakage or production of gases such as CO and H2. To prevent fire or device corrosion, ensure that flammable gas is properly exhausted.
- The gas generated by a burning battery may irritate your eyes, skin, and throat. Take protective measures promptly.



Warning

- Install batteries in a dry area. Do not install them under areas prone to water leakage, such as air conditioner vents, ventilation vents, feeder windows of the equipment room, or water pipes. Ensure that no liquid enters the equipment to prevent faults or short circuits.

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- Before unpacking, storage, and transportation, ensure that the packing cases are intact and the batteries are correctly placed according to the labels on the packing cases. Do not place a battery upside down or vertically, lay it on one side, or tilt it. Stack the batteries according to the stacking requirements on the packing cases. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.
- After unpacking batteries, place them in the required direction. Do not place a battery upside down or vertically, lay it on one side, tilt it, or stack it. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.
- Tighten the screws on copper bars or cables to the torque specified in this document. Periodically confirm whether the screws are tightened, check for rust, corrosion, or other foreign objects, and clean them up if any. Loose screw connections will result in excessive voltage drops and batteries may catch fire when the current is high.
- After batteries are discharged, charge them in time to avoid damage due to overdischarge.

- Do not perform welding or grinding work around batteries to prevent fire caused by electric sparks or arcs.
- If batteries are left unused for a long period of time, store and charge them according to the battery requirements.
- Do not charge or discharge batteries by using a device that does not comply with local laws and regulations.
- Keep the battery loop disconnected during installation and maintenance.
- Monitor damaged batteries during storage for signs of smoke, flame, electrolyte leakage, or heat.
- If a battery is faulty, its surface temperature may be high. Do not touch the battery to avoid scalds.
- Do not stand on, lean on, or sit on the top of the equipment.
- In backup power scenarios, do not use the batteries for the following situations:
  - Medical devices substantially important to human life
  - Control equipment such as trains and elevators, as this may cause personal injury
  - Computer systems of social and public importance
  - Locations near medical devices
  - Other devices similar to those described above

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Short-Circuit Protection

- When installing and maintaining batteries, wrap the exposed cable terminals on the batteries with insulation tape.
- Avoid foreign objects (such as conductive objects, screws, and liquids) from entering a battery, as this may cause short circuits.

Recycling

- Dispose of waste batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste. Improper disposal of batteries may result in environmental pollution or an explosion.
- If a battery leaks or is damaged, contact technical support or a battery recycling company for disposal.
- If batteries are out of service life, contact a battery recycling company for disposal.
- Do not expose waste batteries to high temperatures or direct sunlight.
- Do not place waste batteries in environments with high humidity or corrosive substances.
- Do not use faulty batteries. Contact a battery recycling company to scrap them as soon as possible to avoid environmental pollution.

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Chapter 2 Transportation and Storage

Transportation Requirements

- Ensure that the product packaging is intact and undamaged before handling! If the packaging is damaged, please stop subsequent operations! In such a case, please contact Sineng or shipping company.
- Choose the appropriate transportation tool based on the dimensions and weight of the equipment.
- It is strictly forbidden for machines without packaging transportation.
- During transportation, collisions and severe vibrations are prohibited.
- The equipment must be transported in compliance with relevant local regulations and standards.
- Store batteries in a separate area away from heat sources. Protect batteries from moisture, water, and rain. Stack batteries according to the labels on the packing case. Do not stack batteries more than the allowed stacking layers. Do not place batteries on one side or upside down.
- Before transporting a faulty battery (with scorch, leakage, bulge, or water intrusion), insulate its positive and negative terminals, pack it, and place it in an insulated explosion-proof box as soon as possible. Record information such as the site name, address, time, and fault symptom on the box.
- When transporting faulty batteries, avoid approaching flammable material storage areas, residential areas, or other densely populated places, such as mass transit facilities or elevators.



Warning

- Do not move a battery by holding its terminals, bolts, or cables. Otherwise, the battery may be damaged.
- Keep batteries in the correct direction during transportation. They must not be placed upside down or tilted, and must be protected against falling down, mechanical impact, rains, snows, and falling into water during transportation.

Storage Requirements

If the equipment is not put into use immediately, ensure that the following storage conditions are met:

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- If a battery has been stored for longer than the allowed period, it must be checked and tested by professionals before use.
- Storage ambient temperature: -20°C to +45°C; storage ambient relative humidity: 0 to 95% (non-condensing).
- Do not store the equipment in places with chemical corrosive substances and mice.
- The equipment should be stored in a dry, clean and ventilated indoor environment. Avoid direct sunlight and exposure to the sun, rain, humidity and acid mist.
- Place batteries correctly according to the signs on the packing case during storage. Do not place batteries upside down, lay them on one side, or tilt them. Stack batteries in accordance with the stacking requirements on the packing cases.



Warning

- Ensure that batteries are stored in a dry, clean, and ventilated indoor environment that is free from sources of strong infrared or other radiations, organic solvents, corrosive gases, and conductive metal dust. Do not expose batteries to direct sunlight or rain and keep them far away from sources of heat and ignition.
- If a battery is faulty (with scorch, leakage, bulge, or water intrusion), move it to a dangerous goods warehouse for separate storage. The distance between the battery and any combustible materials must be at least 3 m. The battery must be scrapped as soon as possible.
- Store batteries in a separate place. Do not store batteries together with other devices. If a large number of batteries are stored onsite, it is recommended that the site be equipped with qualified fire fighting facilities, such as fire sand and fire extinguishers.
- It is recommended to commission the device for the first time within one week after on-site deployment. In case of prolonged inactivity, it needs to be charged periodically; otherwise, it may be damaged.

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Chapter 3 Product Overview

The EB-10.24KWH-HA battery consists of a high voltage box and pack. It can store and release electric energy based on the requirements of the product management system. The input and output ports of the EB-10.24KWH-HA battery are high-voltage direct current (HVDC) ports.

- The High Voltage Box is connected to the PCS (BAT+ and BAT–). Under the control of the equipment, the High Voltage Box charges the batteries and stores the excess PV energy in the batteries.
- PACK discharge: When the PV energy is insufficient to supply power to the loads, the system controls the batteries to supply power to the loads. The battery energy is output to the loads through the product.

3.1 Product Model Description

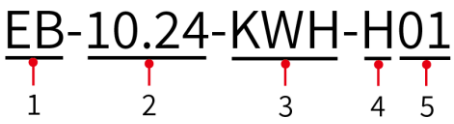


Figure 3-1 Product Model (PACK)

Table 3-1 Product Model Description

Sign	Meaning	Value
1	Brand code	Energy Storage System Application Scenario: Household It is recommended to charge and discharge once a day
2	Energy	Rated output energy
3	Unit	Output power unit
4	Voltage level	H: High Voltage; L: Low Voltage
5	Design code	Increases from 01 to 99 to distinguish models

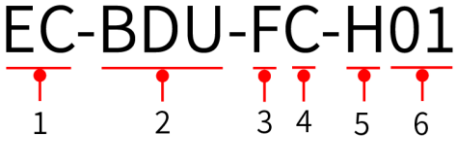


Figure 3-2 Product Model (High voltage box)

Table 3-2 Product Model Description

Sign	Meaning	Value
1	Brand code	High voltage box
2	BDU	Battery distribution protection unit

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3	Maximum Voltage	F: 600V *Note: A: 48V, B: 51.2V, C: 300V, D: 400V, E: 500V, F: 600V, G: 700V, H: 800V, I: 900V, J: 1000V*
4	Rated Current	C: 50A *Note: A: 25A, B: 30A, C: 50A, D: 70A, E: 100A, F: 150A*
5	Voltage level	H: High Voltage; L: Low Voltage
6	Design code	Increases from 01 to 99 to distinguish models

3.2 Product Appearance

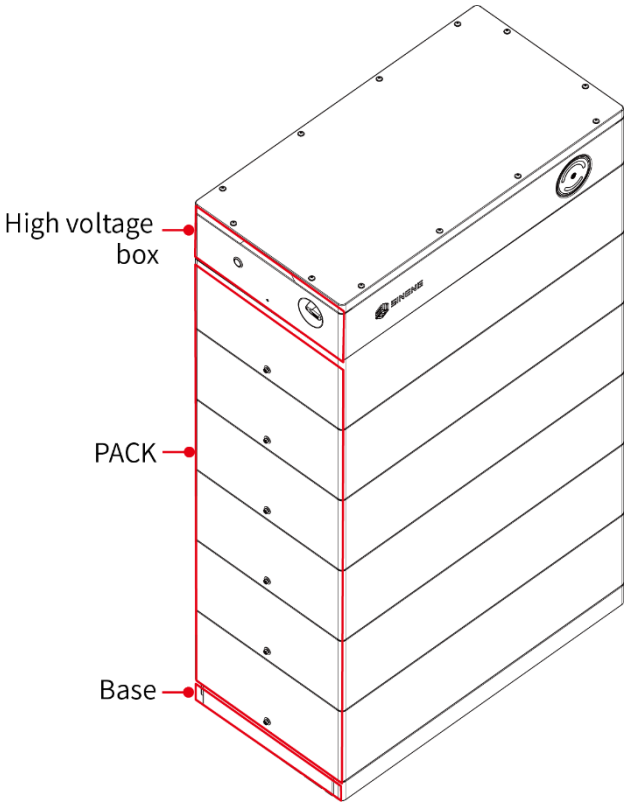


Figure 3-3 Appearance and dimensions

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High voltage box

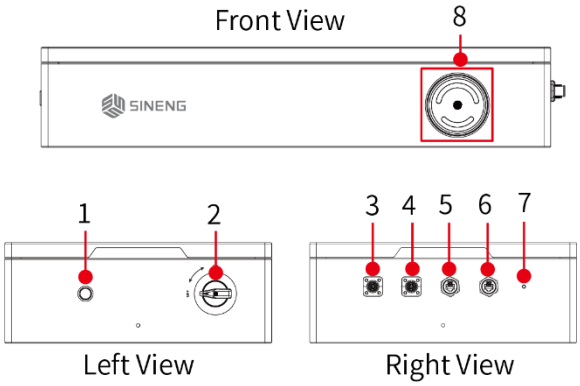


Figure 3-4 High voltage box

1	Start Button	2	DC Switch	3	BAT+
4	BAT-	5	COM IN	6	COM OUT
7	Ground point	8	LED-indicator		

Nameplate

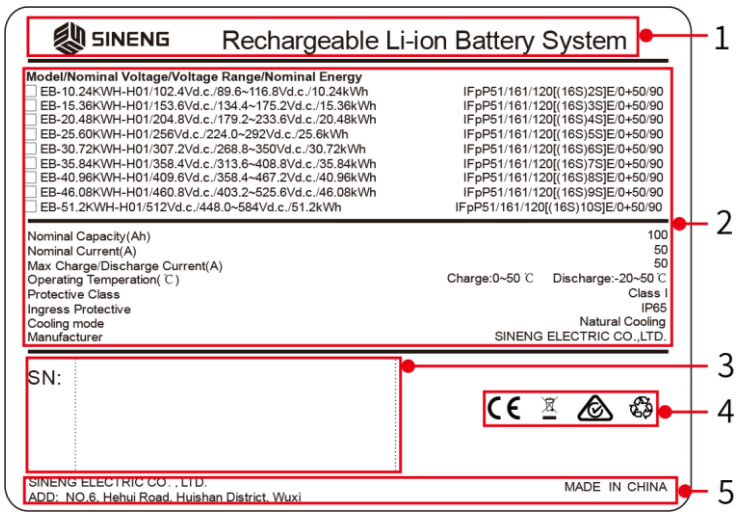


Figure 3-5 System nameplate

1	Trademark and product name	2	Product specifications	3	Product Barcode
4	Certification Information	5	Manufacturer		

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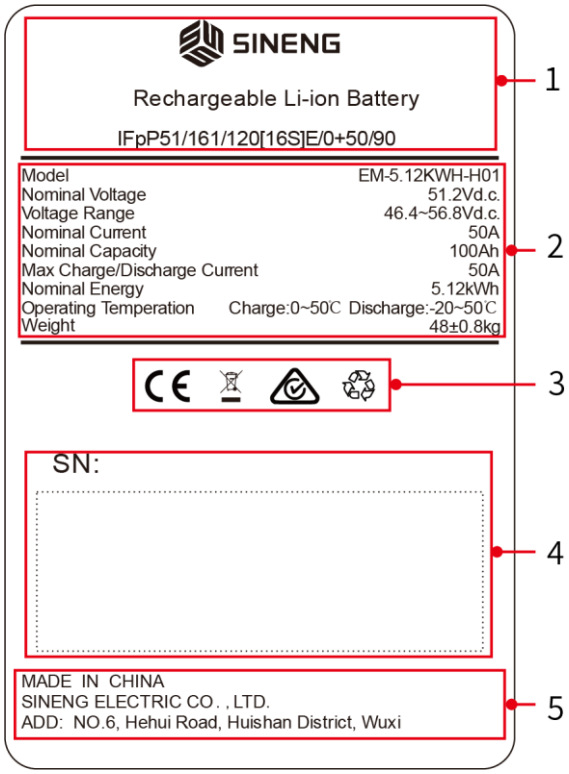


Figure 3-6 PACK nameplate

1 Trademark and product name 2 Product specifications 3 Certification Information

4 Product Barcode 5 Manufacturer

Product Sign Description

Table 3-3 Product Sign Description

Sign	Description
	This sign indicates that it shall be noted.
	This sign indicates that there is high voltage inside the equipment. Touching the equipment may cause electric shock.
	This sign indicates that the temperature here is beyond the acceptable range of the human body. Please do not touch it to avoid personal injuries.
	It is strictly prohibited to have fire sources (in this area).
	Keep Children Away
	Do not place near open flame or flammable materials

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	Professionals should refer to the user manual when installing or maintaining the product.
	If the user intends to discard this product, it must be sent to an appropriate place for recovery and recycling, which cannot be disposed of as domestic waste.
	RCM Certification, the Australian product compliance mark, complies with safety and electromagnetic compatibility (EMC) standards.
	The equipment is recyclable and must not be discarded at will.
	This product complies with CE certification.
	This sign indicates the protective earth terminal, which needs to be reliably grounded to ensure the safety of operators.

LED-indicator

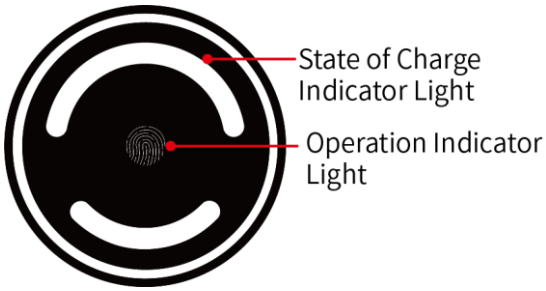


Figure 3-7 LED-indicator

Table 3-4 Indicator description

Symbol	State	Meaning
	Red	Fault
	Blue	Operating
	Blink	Battery is charging,and SOC>75%
	ON	Battery is discharging,and SOC >75%
	Blink	Battery is charging,and SOC>50%
	ON	Battery is discharging.and SOC >50%
	Blink	Battery is charging.and SOC >25%
	ON	Battery is discharging,and SOC > 25%
	Blink	Battery is charging,and SOC >10%
	ON	Battery is discharging.and SOC>10%

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	OFF	Battery SOC ⩽10%

3.3 Battery Capacity Description

The system supports parallel connection and capacity expansion, with a maximum of 10 PACK sets expandable.

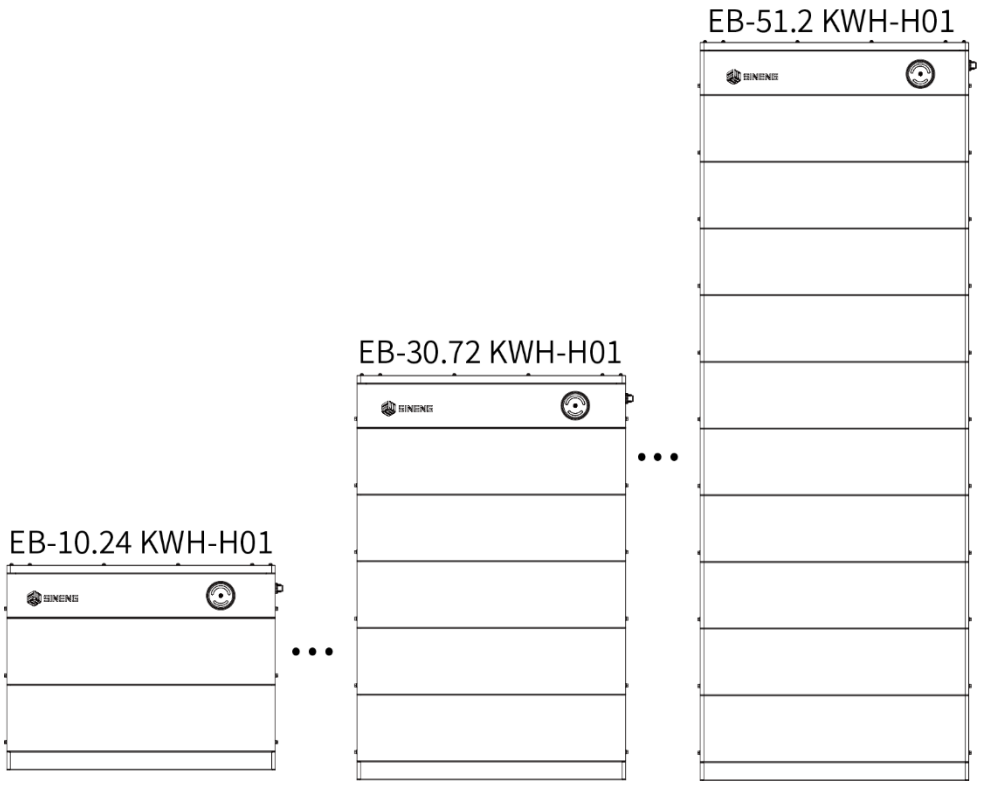


Figure 3-8 System capacity description

3.4 Working Mode

The main function of the system is to increase the voltage through the series connection of multiple cells, then output externally via the DC switch; meanwhile, it monitors each cell in the system in real time, is equipped with overcurrent, overvoltage, overtemperature and other protection functions, estimates SOC/SOH through a specific algorithm, and is used in conjunction with the inverter.

The system has three operational modes in total: Sleep Mode, Standby Mode, and Operation Mode.

Sleep Command: The system's internal auxiliary power supply (when the isolating switch is open, the internal auxiliary power supply is shut down; if the isolating switch is closed, the internal auxiliary power supply operates under no-load condition); neither the BCU nor BMU module operates, and there is no external output.

Standby Mode: The internal auxiliary power supply, BCU/BMU of the energy storage system,

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operates, and there is no external output.

Operation Mode: The BCU/BMU of the internal auxiliary power supply in the energy storage system operates, with normal output (operating in charging or discharging mode).

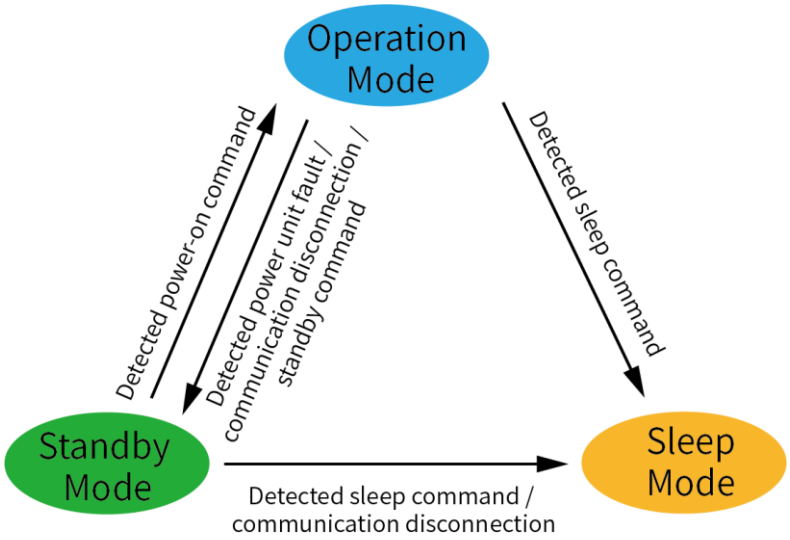


Figure 3-9 Working Mode

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Chapter 4 Inspection Before Installation

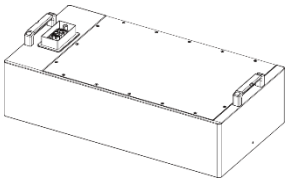
4.1 Outer Packaging Inspection

Before unpacking the product, check the outer packaging for visible damage, such as holes, cracks, or other signs of possible internal damage, and check the product model number. If there is any anomaly in the packaging or the product model number does not match, do not open it and contact your dealer as soon as possible.

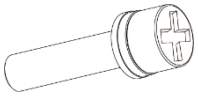
It is strictly prohibited to use products with deformed appearance or those that have fallen during transportation, handling, installation, etc.

4.2 Delivery Inspection

Table 4-1 PACK delivery list



PACK*1

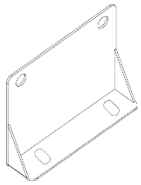


M5 screw*2

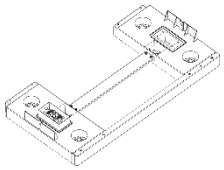


Factory Inspection Report*1

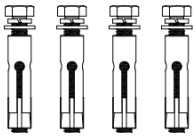
Table 4-2 High voltage box



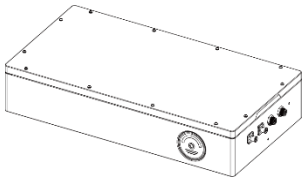
L-shaped structural member*1



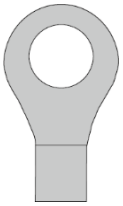
Base*1



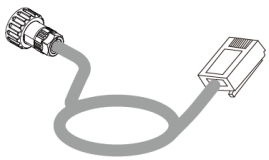
M8 expansion screw*4



High voltage box*1

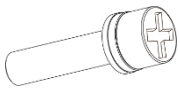


Ground OT Terminal*1

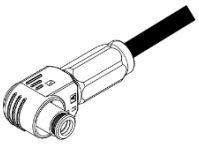


RJ45 cable*2

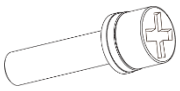
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M5 screw*2



Battery cable*2



M6 screw*1



Inspection Report*1



Quick guide*1

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Chapter 5 Product Installation

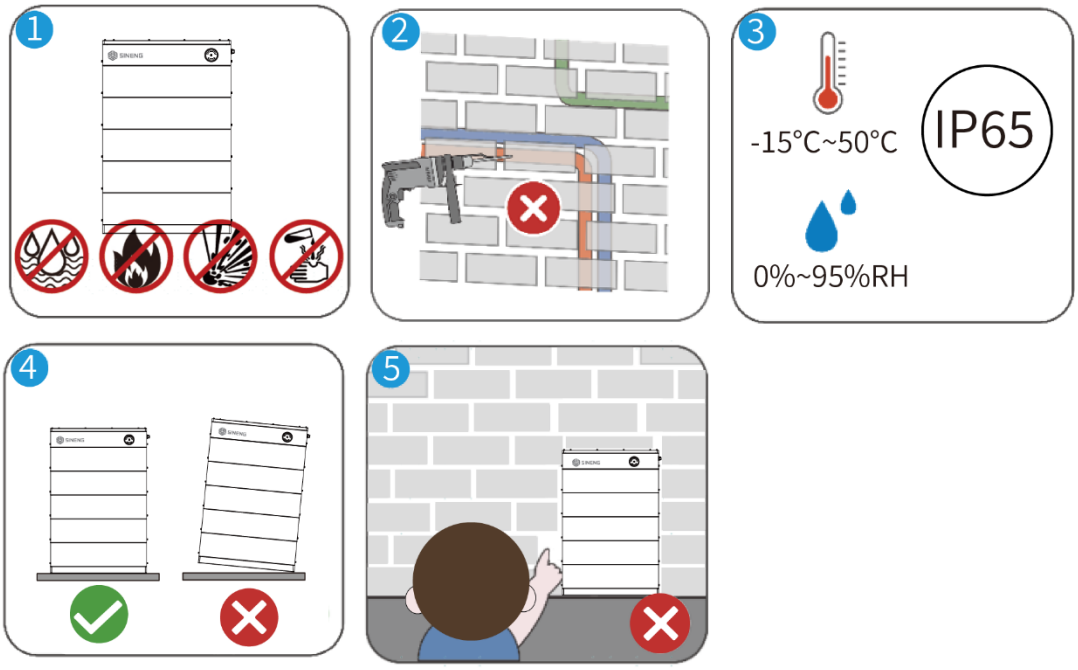
5.1 Requirements for installation tool



Figure 5-1 Tools recommended for installation

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5.2 Requirements for installation environment



- The equipment cannot be installed in flammable, explosive, corrosive or other alike environments.
- Please avoid the water pipes and cables in the wall to avoid danger when drilling holes for installation.
- The equipment protection level meets the requirements for indoor and outdoor installation, and the temperature and humidity of the installation environment must be within the appropriate range.
- The product must be installed away from direct sunlight, rain, snow, and other similar environments.
- The installed equipment should be out of reach for children, and should not be in places that are easy to touch. The surface of the equipment may be hot when it is in operation, take caution to avoid burns.
- Do not install the battery at forward tilted, back tilted, side tilted, horizontal, or upside down positions.
- The product should be installed in a well-ventilated place to prevent its performance from being affected by poor heat dissipation.
- The installation area of the product should be far away from flammable and explosive materials, and there should be no equipment that generates strong electric interference.
- This product is suitable for **corrosion environment category C3 (moderate corrosion environment)**. Its outdoor applications include urban and industrial areas, while its

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indoor applications include high-humidity areas.

5.3 Installation Space Requirements

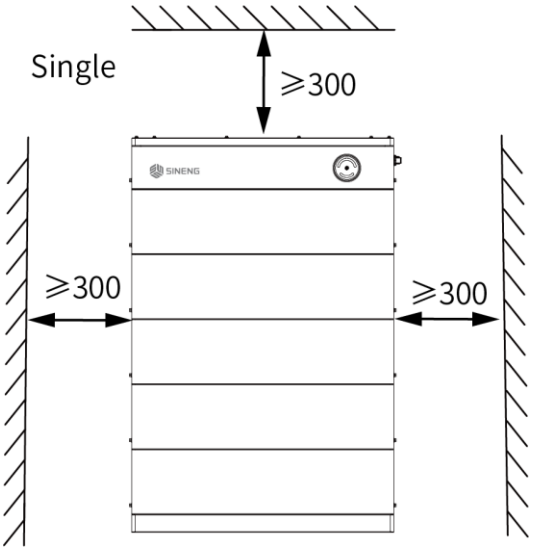


Figure 5-2 Single-unit installation space (Unit: mm)

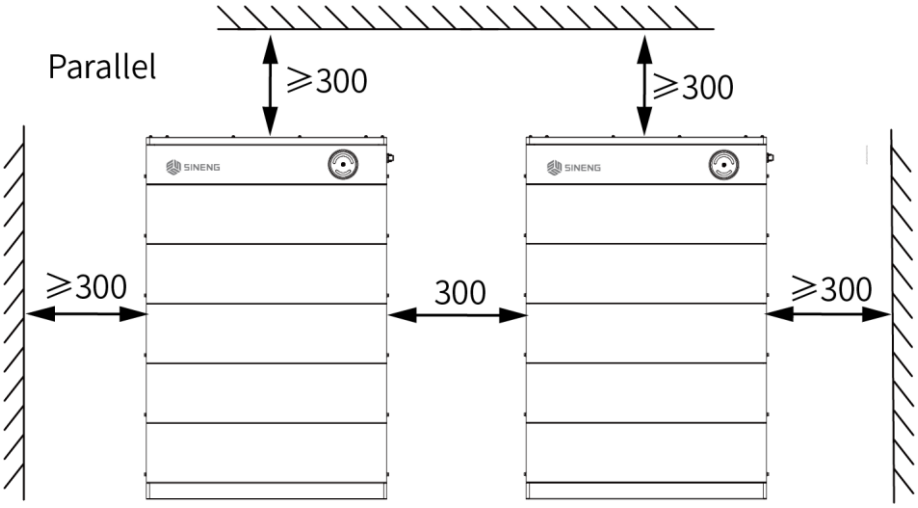


Figure 5-3 Parallel-unit installation space (Unit: mm)

5.4 Installation of product

Caution

- Please avoid the water pipes, cables, etc. in the wall to prevent danger when drilling holes.
- When drilling holes, please wear goggles and a dust mask to prevent dust from being inhaled or falling into your eyes.

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Procedure

Step 1 Place the base at the installation position and mark the drilling positions in accordance with the dimension marks.

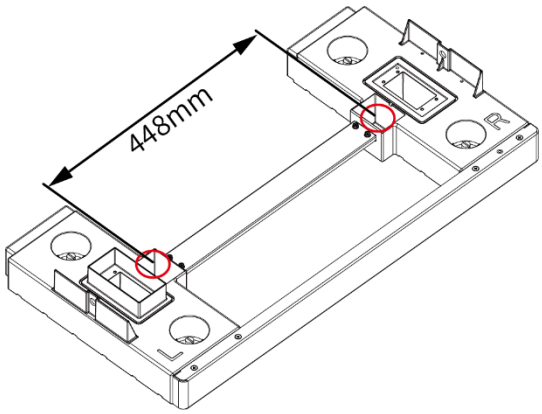


Figure 5-4 Drilling dimensions

Caution

- A 20mm distance shall be left between the base and the wall.

Step 2 Unscrew the screws on both sides, separate the base from the high-voltage box, and remove the base.

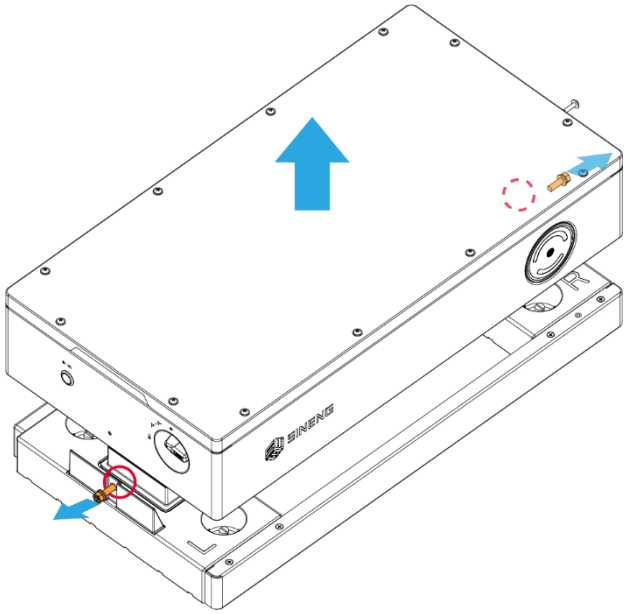


Figure 5-5 Separate the base from the high-pressure box

Step 3 Drill holes with a hammer drill and install the base expansion bolts.

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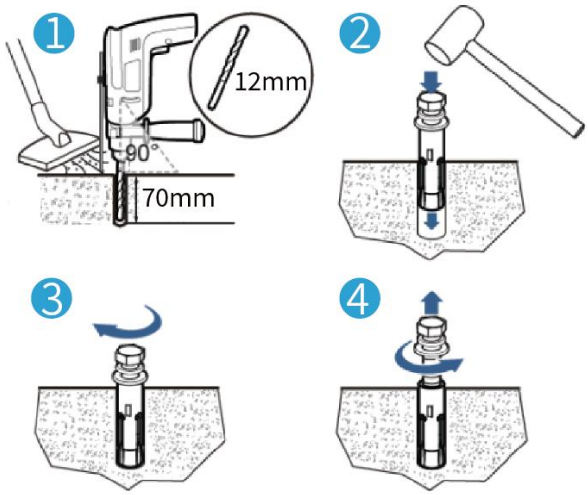


Figure 5-6 Installation of the Expansion Bolts

Step 4 Place the base at the installation position, and after leveling it, secure it with the previously installed expansion bolts.

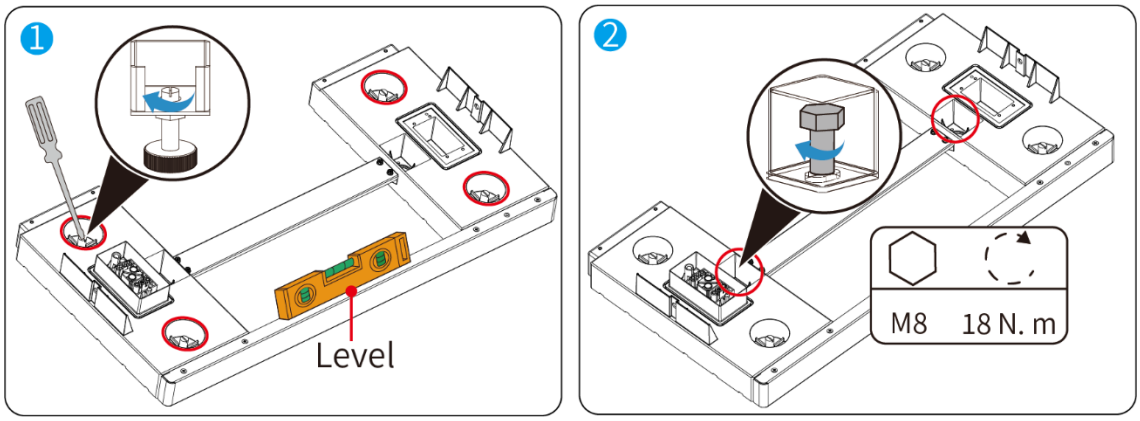


Figure 5-7 Leveling and Securing

Step 5 Install the PACK.

Caution

- The installation method for the PACK is consistent; take the installation of 5 sets of PACKs as an example to illustrate.
- The PACK is relatively heavy; a minimum of 2 personnel is required during handling and installation.

1. Using lifting bars, move the first section of the PACK onto the base.
2. Please install the first 5 sections of the PACK according to the method shown in the diagram.

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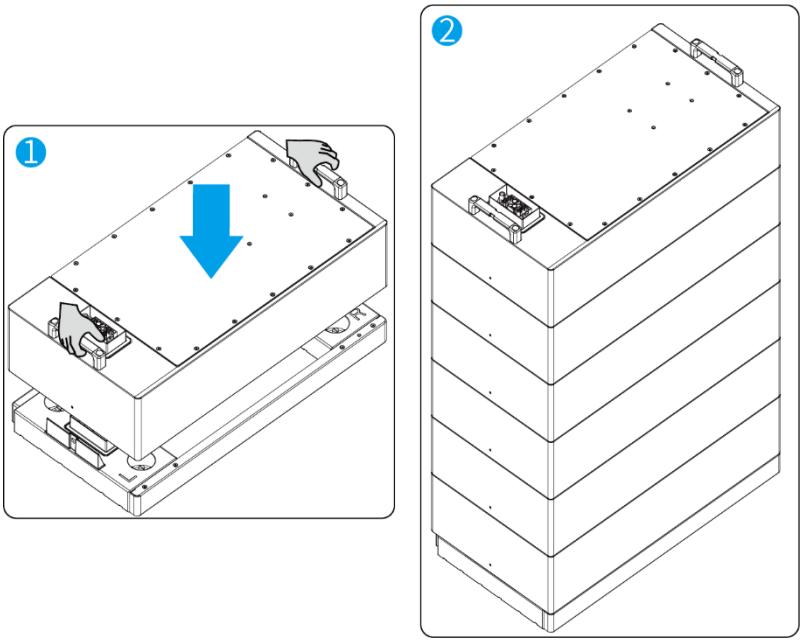


Figure 5-8 Install PACK

3. Tighten the crosshead screws on the left and right sides of the PACK.

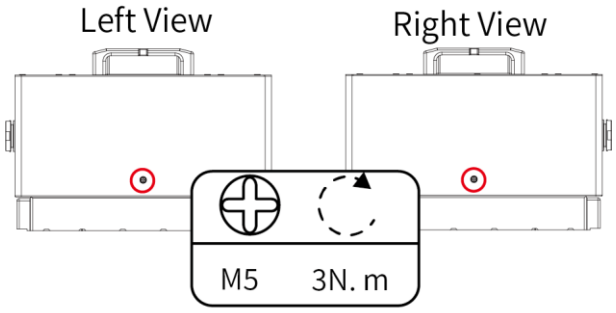


Figure 5-9 Install PACK

Step 6 Install the L-shaped structural part.

1. Place the L-shaped structural part at the installation position and mark the mounting holes.
2. Drill the holes and install the expansion screws.
3. Tighten the L-shaped structural member to the PACK and the wall surface.

Caution

- According to the wall spacing, adjust the L-shaped structural member and tighten the screws.
- Before drilling, cover the surface of the PACK with a dust-proof cloth to prevent dust contamination.

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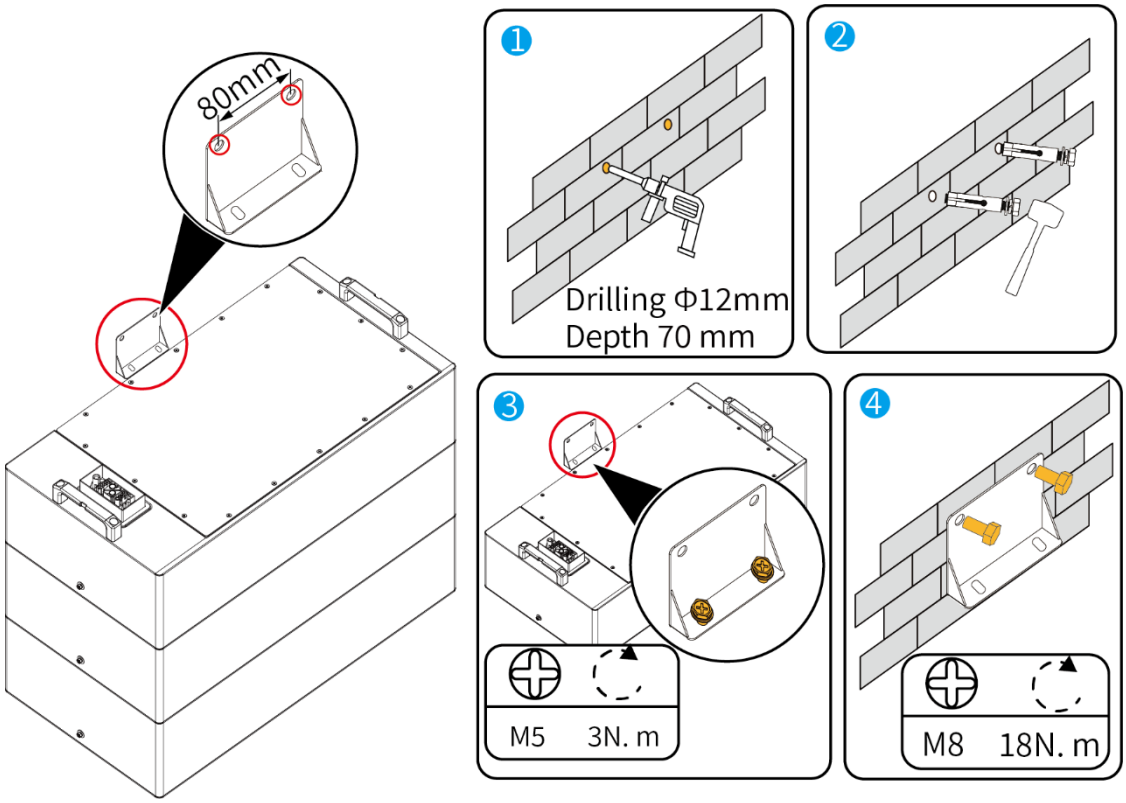


Figure 5-10 Install the L-shaped structural part

Step 7 Install the high voltage box.

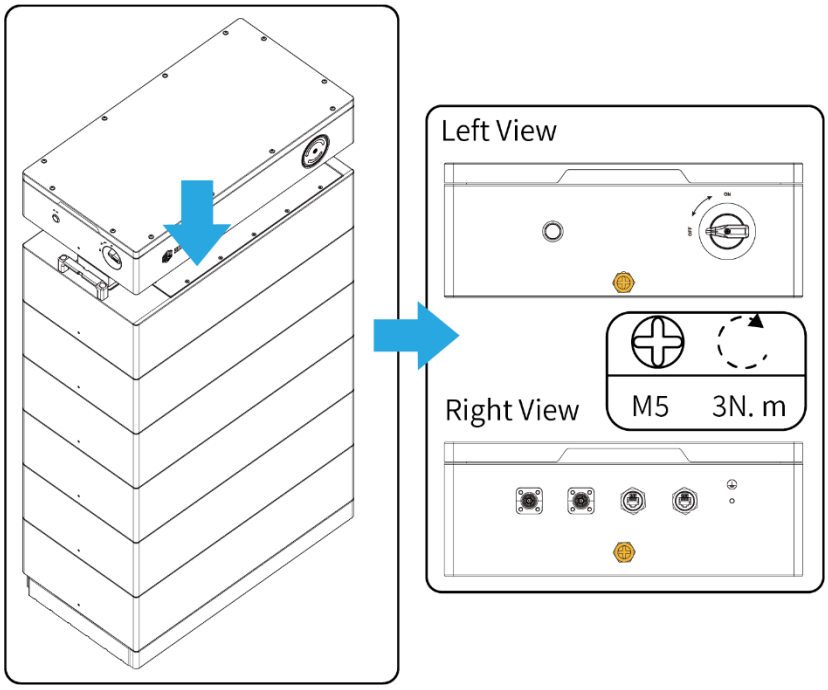


Figure 5-11 Install the high voltage box

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Chapter 6 Installing the Cables

Warning

- The insulation layer of the power cable must be intact and free from damages and scratches. Otherwise, it may cause short circuit and fire!
- The DC switch of the product must be in the "OFF" position!
- Strictly follow the indications on the labels inside the product to connect the cables. Otherwise, it will cause damage to the equipment.
- The cable connections of the product must be safe and reliable. Cable selection and tightening torque must comply with the requirements of this manual. Otherwise, it may cause fire and damage to the product.
- Do not smoke or have an open flame around batteries.
- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- The equipment damage caused by incorrect cable connections is not covered under any warranty.
- Only certified electricians are allowed to connect cables.
- Operation personnel must wear proper PPE when connecting cables.

Table 6-1 Cable Specifications

Scenario	Type	Copper Wire (mm^2)	Fastening Bolt	Torque (N.m)
Grounding cable	Copper core cable	6	M5 (OT terminal)	3
DC cable	Copper core cable Meet the standard for 1000V	10	Direct cable terminal	\
Communication cable	\	\	RJ45 cable terminal	\
If the cables are placed outdoors, please use dedicated UV-resistant cables.				

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6.1 Installing an Internal Ground Cable

Warning

- The product must be grounded reliably. Otherwise, it may cause personal injury or abnormal operation of the product!
- The product should be grounded at the nearest ground point. For multiple products connected in parallel in the same system, the protective ground cables of all products must be connected to the same ground busbar.

Procedure

Step 1 Crimping terminals.

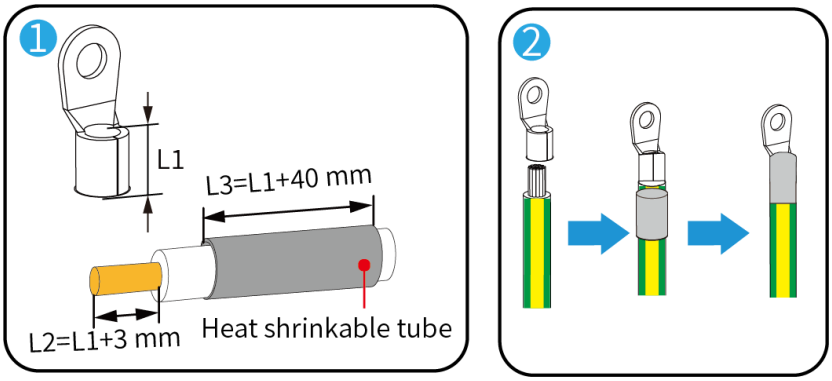


Figure 6-2 Crimping terminals (Unit: mm)

Step 2 Use a Phillips screwdriver to install the grounding cable onto the grounding point of the High Voltage Box, and mount the other end of the cable to the main grounding busbar.

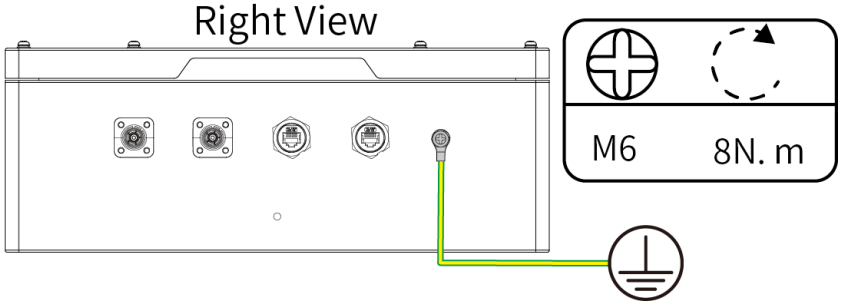


Figure 6-3 Installing an Internal Ground Cable

Step 3 After the ground terminal is tightened, apply silicone or outdoor paint on the outside of the terminal.

6.2 Install Battery Cables

Warning

- Please use the company-issued screws for power cable or busbar connections. Failure to

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do so may cause connection abnormalities and affect the normal operation of the power conversion system.

Procedure

Step 1 Insert the cable into the equipment; a "click" sound indicates the cable is securely installed.

Note

- The battery plug's positive terminal is orange, and the negative terminal is black.

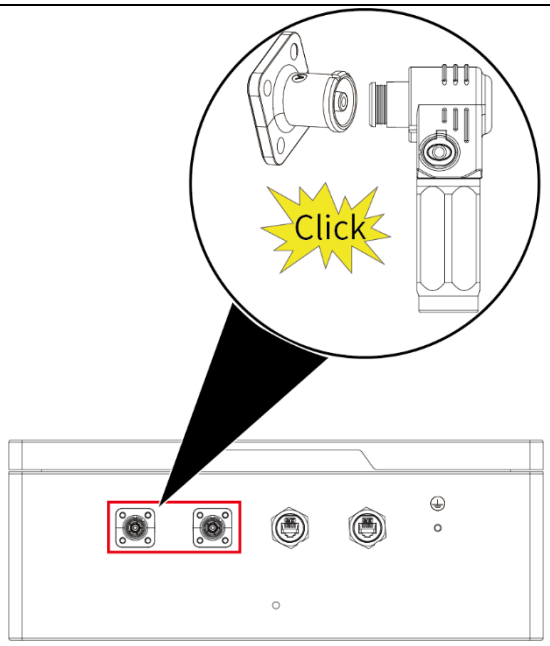


Figure 6-4 Battery Cable Installation (Single)

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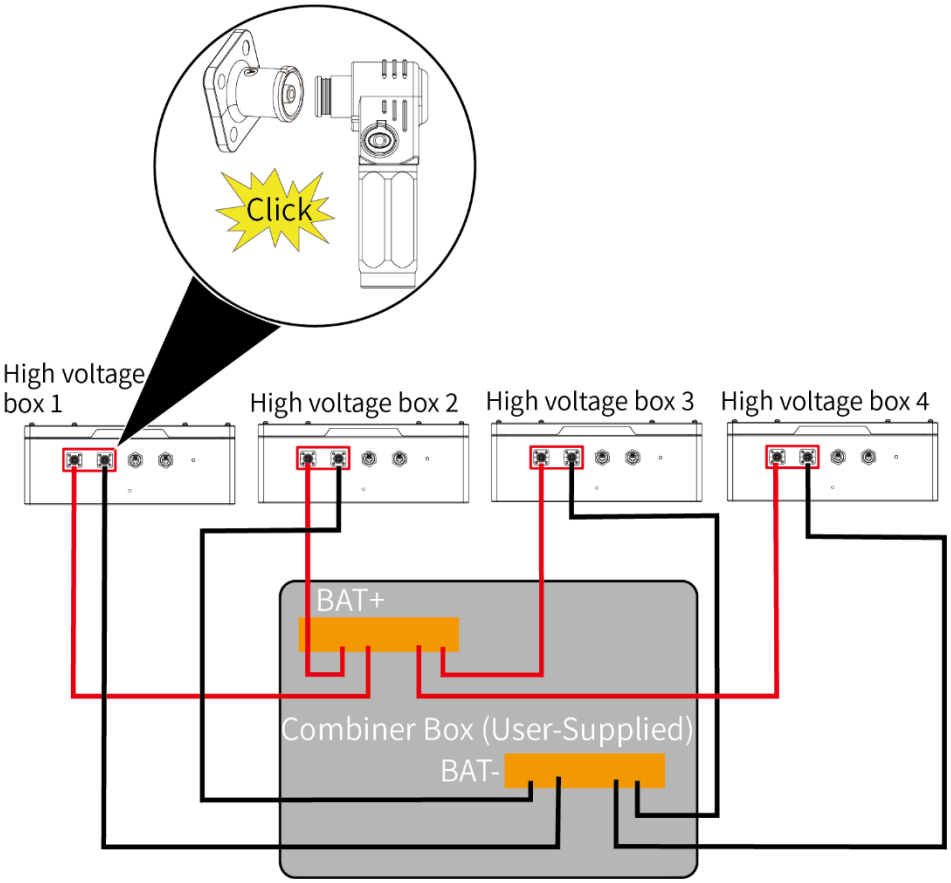


Figure 6-5 Battery Cable Installation (Parallel)

Step 2 (Single) Install the other end of the cable to the inverter.

Step 3 (Parallel) Connect Combiner Box to inverter with cables.

6.3 Install Communication Cables (Single)

Procedure

Step 1 Install one end of the cable to the COM IN port, and the other end to the inverter.

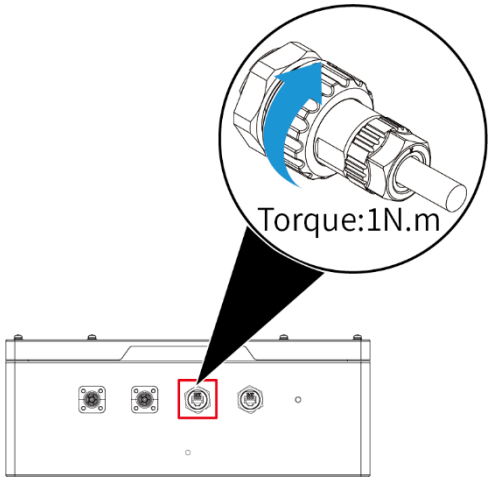


Figure 6-6 Install the communication cable

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6.4 Install Communication Cables (Parallel)

Procedure

Step 1 Install one end of the cable to the COM IN port, and the other end to the inverter.

Note

- The high-voltage box connected to the inverter serves as the master unit.

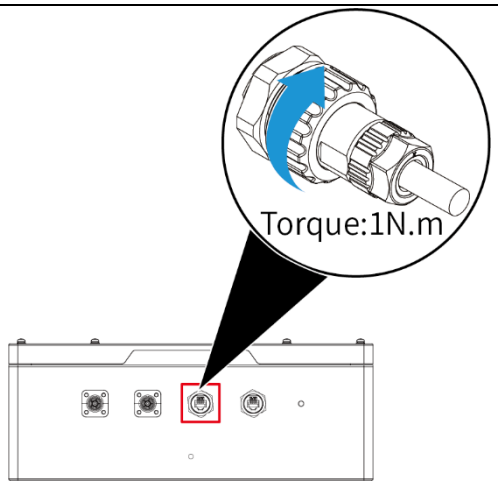


Table 6-2 Install the communication cable

Step 2 Make Parallel Unit Communication Cable

1. Insert one end of the network cable into the connector.

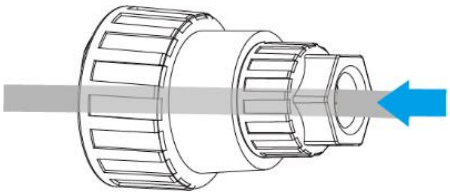


Figure 6-7 Making cable 1

2. Crimp cable.

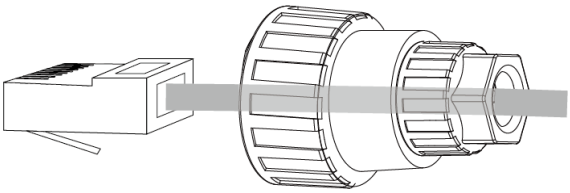
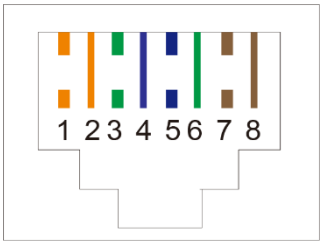


Figure 6-8 Making cable 2

Table 6-3 line sequence

Port	PIN	Color	Description	Function
	1	White-orange	BCU_ADDR_DI+	Parallel communication
	2	Orange	BCU_ADDR_DI-	
	3	White-green	NC	\

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	4	Blue	NC	\
	5	White-blue	NC	
	6	Green	NC	\
	7	White-brown	CAN2_H	Parallel communication
	8	Brown	CAN2_H	\

Step 3 Push the connector head into the slot of the connector, and use a wrench to tighten the cable locking nut.

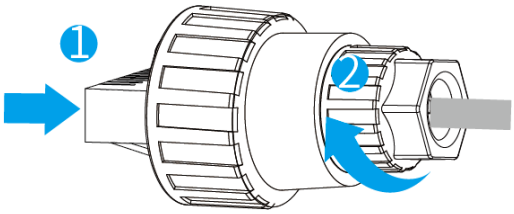


Figure 6-9 Making cable 3

Step 4 Install the parallel communication cables.

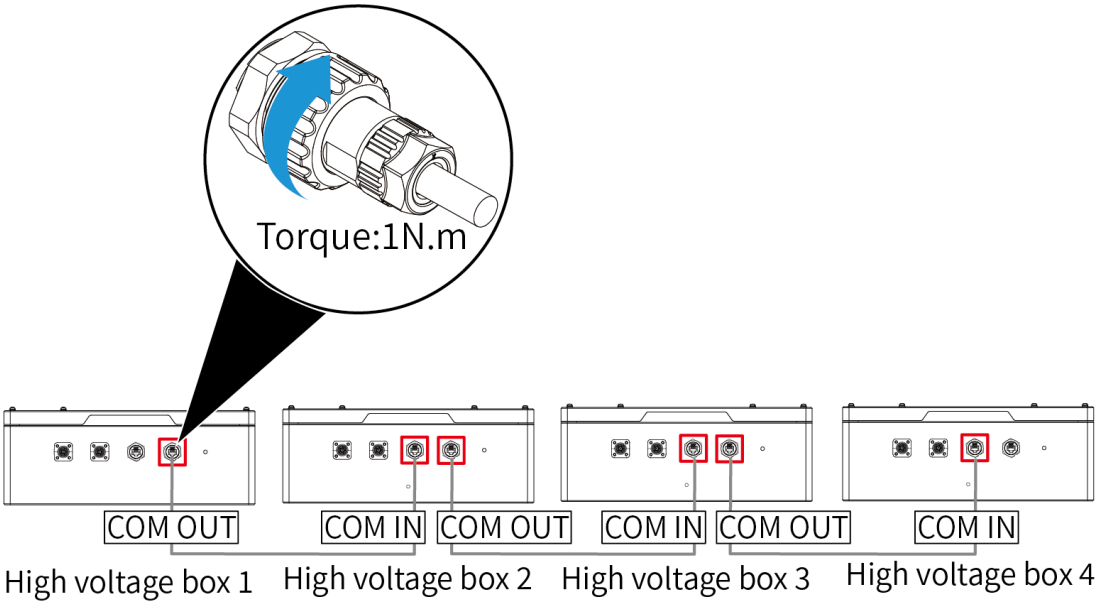


Figure 6-10 Install Parallel Communication Cables

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Chapter 7 Check after Installation

Table 7-1 Check items

SN	Check Item	Acceptance Criteria	Check Result (Yes √/No ×)
1	Battery installation	The installation is correct and reliable.	□
2	Cables routing	Cables are routed properly as required by the customer.	□
3	Cable tie	Cable ties are evenly distributed and no burr exists.	□
4	Grounding	The PE cable is connected correctly, securely, and reliably.	□
5	Switch	All switches connected to the battery are OFF.	□
6	Cable connection	The output power cable, input power cable, battery cable, and signal cable are connected correctly, securely, and reliably.	□
7	Unused terminal and port	Unused terminals and ports are locked by watertight caps.	□
8	Installation environment	The installation space is proper, and the installation environment is clean and tidy.	□

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Chapter 8 Power-On/Off

Warning

- For the product that has been shut down for a long time, comprehensively and carefully inspect the equipment before starting it up to ensure that all indicators meet the requirements.
- Only professional personnel are allowed to operate the product. Others cannot operate it without authorization.
- When the system is in operation, the PCS shall be set with at least 10% reserve power to ensure the normal operation of the system.

8.1 Power-On

Procedure

Step 1 Turn on the DC switch on the high voltage box.

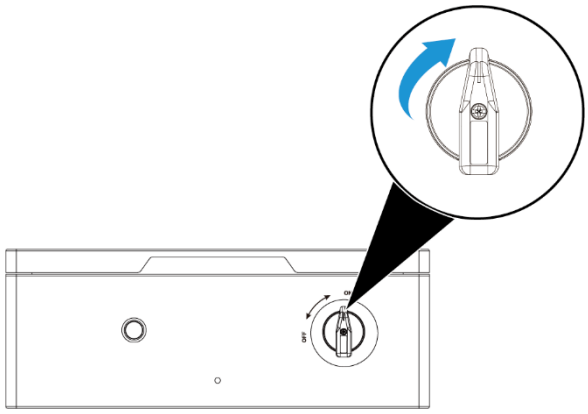


Figure 8-1 Close the DC Switch

Step 2 Press and hold the power button, the device powers on, and the indicator lights enter the running light mode. After the battery is installed and powered on for the first time, Observe the indicator to check the running status.

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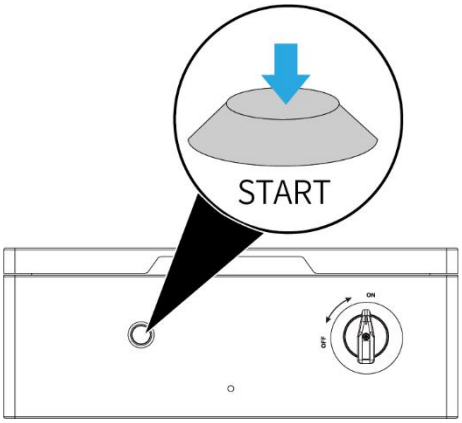


Figure 8-2 Close the Start Button

8.2 Power-Off

Warning

- For the product that has been shut down for a long time, comprehensively and carefully inspect the equipment before starting it up to ensure that all indicators meet the requirements.
- After the system powers off, the remaining electricity and heat may still cause electric shocks and body burns. Therefore, wear protective gloves 5 minutes after the system is powered off before performing any operation on the battery. You can maintain the battery only when all indicators on the battery are off.
- When the ESS is running, you can only turn off the DC switch of the battery, but cannot power off the ESS completely. In this case, you cannot maintain the battery.

Procedure

Step 1 Press and hold the power button for 3 seconds, then release it, and the device will power off.

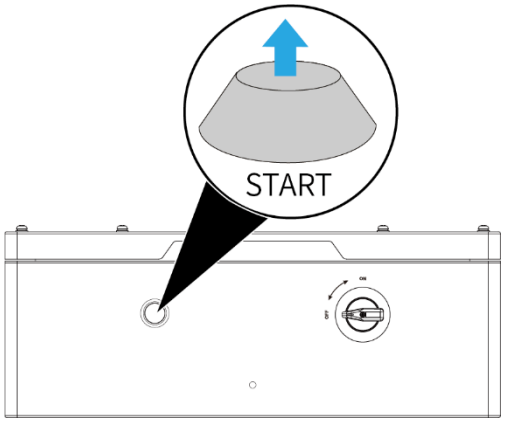


Figure 8-3 Open the Start Button

Step 2 Turn off the DC switch on the high voltage box.

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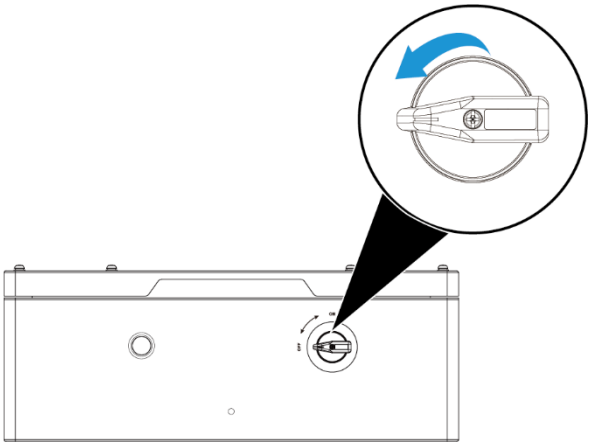


Figure 8-4 Open the DC Switch

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Chapter 9 Product Maintenance

Warning

- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- Do not smoke or have an open flame around batteries.
- Do not use wet cloth to clean exposed copper bars or other conductive parts.
- Do not use water or any solvent to clean batteries.
- Do not maintain system with power on. To power off the system before performing operations such as checking screw torque and tightening screws, explain the risks to the customer, obtain the customer's written consent, and take effective preventive measures.
- After batteries are discharged, charge them in time to avoid damage due to overdischarge.
- Before moving or reconnecting the equipment, disconnect the mains and batteries and wait for five minutes until the equipment powers off. Before maintaining the equipment, check that no hazardous voltages remain in the DC bus or components to be maintained by using a multimeter.

9.1 Daily Inspection of Product

Table 9-1 Daily inspection items (Once every 6 months)

Maintenance Item	Inspection Method
Appearance	Check for abnormal phenomena such as damage, deformation, corrosion, cracks, foreign objects, dust, water stains and other pollutants, and dangerous signs such as odor, smoke, and sparks.
Operating status	Check the operating status of the product. Check for abnormal sounds, vibrations, temperatures, etc., and for faults such as overload, overvoltage, undervoltage, overcurrent, and short circuit.
Electrical inspection	Check whether the input and output voltage, current, power, frequency, power factor and other product parameters are within the specified range, whether they are stable and reliable, and whether they have fluctuations, deviations, harmonics and other problems.

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Maintenance Item	Inspection Method
Cable connection	Check whether the grounding, wiring, connection and other parts of the product are loose, broken, worn, and oxidized, and whether there are potential dangers such as poor contact, leakage, and arcing. Check that unused DC input terminals, battery terminals, and COM ports are locked by watertight caps.

9.2 Storage with Low SOC

After the ESS is powered off, static power consumption and self-discharge loss may occur in pack. Therefore, charge pack in a timely manner and do not store the ESS in low state of charge (SOC). Otherwise, the ESS may be damaged due to overdischarge, and pack need to be replaced.
If the device is to be out of use for a long term, it must be powered off. Before powering off, ensure that the SOC (State of Charge) is ⩾40%, and the downtime shall not exceed 6 months.
Storing the ESS with low SOC may occur in the following scenarios:

- DC SWITCH on the high voltage box is OFF.
- The ESS power cables or signal cables are not connected.
- The ESS cannot be charged due to a system fault after discharge.
- The ESS cannot be charged due to incorrect configurations in the system.
- The ESS cannot be charged due to no PV input and long-term mains failure.

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Appendix A System Specifications

Table A-1 Regular parameter

Item	EB-10.24 KWH-H01	EB-15.36 KWH-H01	EB-20.48 KWH-H01
Battery Type	LFP		
Rated Capacity (kWh)	10.24	15.36	20.48
PACK quantity	2	3	4
Rated voltage (V)	102.4	153.6	204.8
Voltage range (V)	89.6~116.8	134.4~175.2	179.2~233.6
Rated Charge-Discharge Current (A)	50		
Max. Charge-Discharge Current (A)	100 (60s)		
Depth of Discharge (%)	< 95		
Communication Method	CAN		
Display Method	LED		
Installation Type	Ground		
Fire Protection	Built-in Fire Protection Module		
Operating Temperature (°C)	Charging State: 0~50; Discharging State: -20~50		
Storage Temperature (°C)	0~35		
Humidity (%)	5~95 (Non-condensing)		
Altitude (m)	3000		
Heat Dissipation	Natural Heat Dissipation		
Dimensions (mm) /Width *Height*Depth	725*560*380	725*740*380	725*920*380
Weight (kg)	116	164	212
IP Rating	IP65		
Parallel Quantity	4		

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Table A-2 Regular parameter

Item	EB-25.6 KWH-H01	EB-30.72 KWH-H01	EB-35.84 KWH-H01
Battery Type	LFP		
Rated Capacity (kWh)	25.6	30.72	35.84
PACK quantity	5	6	7
Rated voltage (V)	256	307.2	358.4
Voltage range (V)	224~292	268.8~350.4	313.6~408.8
Rated Charge-Discharge Current (A)	50		
Max. Charge-Discharge Current (A)	100 (60s)		
Depth of Discharge (%)	< 95		
Communication Method	CAN		
Display Method	LED		
Installation Type	Ground		
Fire Protection	Built-in Fire Protection Module		
Operating Temperature (°C)	Charging State: 0~50; Discharging State: -20~50		
Storage Temperature (°C)	0~35		
Humidity (%)	5~95 (Non-condensing)		
Altitude (m)	3000		
Heat Dissipation	Natural Heat Dissipation		
Dimensions (mm) /Width *Height*Depth	725*1100*380	725*1280*380	725*1460*380
Weight (kg)	260	308	356
IP Rating	IP65		
Parallel Quantity	4		

Table A-3 Regular parameter

Item	EB-40.96 KWH-H01	EB-46.08 KWH-H01	EB-51.2 KWH-H01
Battery Type	LFP		
Rated Capacity (kWh)	40.96	46.08	51.2
PACK quantity	8	9	10
Rated voltage (V)	409.6	460.8	512
Voltage range (V)	358.4~467.2	403.2~525.6	448~525.6

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Rated Charge-Discharge Current (A)	50		
Max. Charge-Discharge Current (A)	100 (60s)		
Depth of Discharge (%)	< 95		
Communication Method	CAN		
Display Method	LED		
Installation Type	Ground		
Fire Protection	Built-in Fire Protection Module		
Operating Temperature (°C)	Charging State: 0~50; Discharging State: -20~50		
Storage Temperature (°C)	0~35		
Humidity (%)	5~95 (Non-condensing)		
Altitude (m)	3000		
Heat Dissipation	Natural Heat Dissipation		
Dimensions (mm) /Width*Height* Depth	725*1570*380	725*1820*380	725*2000*380
Weight (kg)	404	452	500
IP Rating	IP65		
Parallel Quantity	4		

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Appendix B After-sales Service Information

Sineng Electric Co., Limited. provides a full range of technical support services for customers. Customers can contact the nearest Sineng local office or customer service center, or directly contact the HQ.

Sineng Electric Co., Limited.
Address: No.6, Hehui Road, Huishan Economic Development Zone, Wuxi, China
Postal code: 214174

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