LUNA2000-(5-30)-NHS0

User Manual

Issue 09

Date 2023-01-16

HUAWEI

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About This Document

Purpose

This document describes the LUNA2000 battery (also referred to as product, equipment or energy storage) in terms of its overview, application scenarios, installation and commissioning, system maintenance, and technical specifications. The LUNA2000 battery consists of a LUNA2000-5KW-NHC0 power control module and LUNA2000-5-NHE0 battery expansion modules.

Intended Audience

This document is intended for:

- Sales engineers
- System engineers
- Technical support engineers
- End users

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Symbol	Description
NOTICE	Indicates warning information about device or environment security which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue 09 (2023-01-16)

Updated **1 Safety Precautions**.

Issue 08 (2022-09-30)

Updated **6.2 System Power-On**.

Issue 07 (2022-06-30)

- Updated **1.6 Transportation Requirements**.
- Updated **7.3 Troubleshooting**.
- Add **7.5 Storage with Low SOC**.
- Add **9.4 How Do I Recycle Used Batteries?**.

Issue 06 (2022-03-01)

Updated **3 Application Scenarios and Settings**.

Issue 05 (2022-01-20)

- Updated **1 Safety Precautions**.
- Updated **4.3 Determining the Installation Position**.

Issue 04 (2021-08-17)

- Updated **1.1 General Safety**.
- Updated **8.2 LUNA2000 battery system specifications**.

Issue 03 (2021-07-10)

- Updated **4.4.1 Floor-Mounted Installation**.
- Updated **7.2 Routine Maintenance**.
- Updated **8.2 LUNA2000 battery system specifications**.

Issue 02 (2021-05-30)

- Updated **1.1 General Safety**.
- Updated **5.3 External Electrical Connections of the Battery**.

Issue 01 (2021-03-04)

This issue is the first official release.

Contents

1 Safety Precautions

1.1 General Safety

Declaration

Before installing, operating, and maintaining the equipment, read this document and observe all the safety instructions on the equipment and in this document.

The "NOTICE", "WARNING", and "DANGER" statements in this document do not cover all the safety instructions. They are only supplements to the safety instructions. Huawei will not be liable for any consequence caused by the violation of general safety requirements or design, production, and usage safety standards.

Ensure that the equipment is used in environments that meet its design specifications. Otherwise, the equipment may become faulty, and the resulting malfunction, component damage, personal injuries, or property damage are not covered under the warranty.

Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

Huawei will not be liable for any consequences of the following circumstances:

- Operation beyond the conditions specified in this document
- Installation or use in environments that cannot meet relevant international, national, or local standards
- Unauthorized modifications to the product or software code or removal of the product
- Failure to follow the operation instructions and safety precautions on the product and in this document
- Equipment damage due to force majeure, such as earthquakes, fire, storms, floods and debris flows
- Damage caused during transportation by the customer
- Damage caused by storage conditions that do not meet the requirements specified in related documents

- Damage to the hardware or data of the equipment due to customer's negligence, improper operation, or intentional damage
- System damage caused by improper operations of a third party or customer, including those in transportation, installation, and adjustment, alteration, or removal of identification marks

General Requirements

DANGER

Improper operations on high-voltage equipment may cause an electric shock or fire, which could result in death, serious injury, or serious property damage. Perform standard operations as follows:

- 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, and performing outdoor installation) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Observe the operation procedures and safety precautions provided in this manual and other related documents.
- Observe the safety precautions specified in the warning signs and protection labels on the equipment.
- Use correct tools properly as required in this manual.
- Do not perform installation, cable connection, maintenance, or replacement when the equipment is energized.
- Do not clean the equipment with water.
- Do not open the host panel of the equipment.
- Check that the equipment is not damaged. For example, check that the battery is not dropped, bumped, or dented on the enclosure.
- Before handling a conductor surface or terminal, measure the contact point voltage and ensure that there is no risk of electric shock.
- Repaint any paint scratches caused during equipment transportation or installation in a timely manner. Equipment with scratches cannot be exposed to an outdoor environment for a long period of time.
- Ensure that battery terminal components are not affected during transportation. Do not hoist or move batteries by using battery terminals.
- Without prior consent from the manufacturer, do not alter the internal structure or installation procedure of the equipment.
- In the case of a fire, immediately leave the building or the equipment area, and turn on the fire alarm bell or make an emergency call. Do not enter the building on fire in any case.

NOTICE

- During transportation, turnover, installation, cable connection, and maintenance, comply with the national and local laws, regulations, and relevant standards.
- The materials and tools prepared by the customer must comply with the national and local laws, regulations, and relevant standards.
- Obtain approval from the national and local electric utility company before connecting the equipment to the grid.
- Understand the components and functioning of a grid-tied PV power system and relevant local standards.

NOTE

You shall not reverse engineer, decompile, disassemble, adapt, add code to the device software or alter the device software in any other way, research the internal implementation of the device, obtain the device software source code, infringe on Huawei's intellectual property, or disclose any device software performance test results.

1.2 Personnel Requirements

- Personnel who plan to install or maintain Huawei equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- 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 inspect the equipment.
- Personnel who will operate the equipment, including operators, trained personnel, and professionals, should possess the local national required qualifications in special operations such as high-voltage operations, working at heights, and operations of special equipment.
- Only professionals or authorized personnel are allowed to replace the equipment or components (including software).

  NOTE

  - Professionals: personnel who are trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, and maintenance
  - Trained personnel: personnel who are technically trained, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
  - Operators: operation personnel who may come in contact with the equipment, except trained personnel and professionals

1.3 Electrical Safety

Grounding Requirements

- For the equipment that needs to be grounded, install the protective earthing (PE) cable first when installing the equipment and remove the PE cable last when removing the equipment.
- Do not damage the ground conductor.
- Do not operate the equipment in the absence of a properly installed ground conductor.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check the electrical connection to ensure that it is securely grounded.

General Requirements

DANGER

Before connecting cables, ensure that the equipment is intact. Otherwise, electric shocks or fire may occur.

- Ensure that all electrical connections comply with local electrical standards.
- Obtain approval from the local electric utility company before using the equipment in grid-tied mode.
- Ensure that the cables you prepared meet local regulations.
- Use dedicated insulated tools when performing high-voltage operations.

DC Operation

DANGER

Do not connect or disconnect power cables with power-on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.

- Before connecting cables, switch off the disconnector on the upstream equipment to cut off the power supply if people may contact energized components.
- Before connecting a power cable, check that the label on the power cable is correct.
- If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.

Cabling Requirements

- When routing cables, ensure that a distance of at least 30 mm exists between the cables and heat-generating components or areas. This prevents damage to the insulation layer of the cables.
- Bind cables of the same type together. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- Ensure that the cables used in a grid-tied PV power system are properly connected and insulated and meet specifications.
- The positions where cables are routed through pipes or holes must be protected to prevent the cables from being damaged by sharp edges or burrs.
- When the temperature is low, violent impact or vibration may damage the plastic cable sheathing. To ensure safety, comply with the following requirements:
  - Cables can be laid or installed only when the temperature is higher than 0°C. Handle cables with caution, especially at a low temperature.
  - Cables stored at subzero temperatures must be stored at room temperature for at least 24 hours before they are laid out.

ESD

NOTICE

The static electricity generated by human bodies may damage the electrostatic-sensitive components on boards, for example, the large-scale integrated (LSI) circuits.

- Wear ESD gloves when handling the equipment. Do not wear clothes prone to static electricity.

1.4 Battery Safety

Declaration

The Company shall not be liable for equipment functional abnormality, component damage, personal safety accident, property loss, or other damage caused by the following reasons:

- The batteries are not charged as required during storage, resulting in capacity loss or irreversible damage to the batteries.
- A battery is damaged, falls, or leaks due to improper operations or incorrect connection.
- After being installed and connected to the system, the batteries are not powered on in time, which causes damage to the batteries due to overdischarge.
- Battery running parameters are incorrectly set.
- The customer or a third party uses the batteries beyond the scenarios specified by the Company. For example, connect extra loads, or use with other

batteries, including but not limited to batteries of other brands or batteries of different rated capacities.

- Damage is caused to batteries because the battery operating environment or external power parameters do not meet environment requirements. The actual operating temperature of batteries is too high or too low, or the power grid is unstable and experiences outages frequently.
- Batteries are frequently overdischarged due to improper maintenance, capacity is incorrectly expanded, or the batteries have not been fully charged for a long time.
- Batteries are not maintained based on the operation guide, such as failure to check battery terminals regularly.
- Batteries are stolen.
- The warranty period of batteries has expired.

Basic Requirements

DANGER

- Do not expose batteries at high temperatures or around heat-generating sources, such as sunlight, fire sources, transformers, and heaters. The battery may cause a fire if overheated.
- To avoid leakage, overheating, or fire, do not disassemble, alter, or damage batteries. For example, do not insert foreign objects into batteries or place batteries in water or other liquids.
- The fire hazard of the lithium-ion/sodium-ion battery energy storage system is high. Consider the following safety risks before handling batteries:
  - Battery electrolyte is combustible, toxic, and volatile.
  - Battery thermal runaway can generate flammable gas and harmful gas such as CO and HF.
  - The concentration of flammable gas generated from battery thermal runaway may cause deflagration and explosion.
- Obvious battery abnormalities, such as electrolyte leakage and structural deformation, indicate potential safety risks. Contact your installer or professional O&M personnel to remove and replace the battery.

- The batteries must be stored separately inside the packaging. Do not store batteries together with other materials or in the open air. Do not stack batteries too high.
- Do not use batteries beyond the warranty period.
- Do not remove the battery packaging before use. Batteries should be charged during storage by professionals as required. Put batteries back to their packaging after charge during storage.
- Move batteries in the correct direction. Do not place a battery upside down or tilt it.
- Protect batteries from impact.
- Do not perform welding or grinding work around batteries to prevent fire caused by electric sparks or arcs.

- Use batteries within the temperature range specified in this manual.
- Do not use damaged batteries (such as damage caused when a battery is dropped, bumped, or dented on the enclosure). Damaged batteries may release flammable gases. Do not store damaged batteries near undamaged products.
- Do not place damaged batteries in close proximity to flammable materials. Do not approach the damaged batteries unless you are a professional.
- Monitor damaged batteries during storage for signs of smoke, flame, electrolyte leakage, or heat.

Personal Safety

- Wear proper personal protective equipment (PPE) during operation. If there is a probability of personal injury or equipment damage, immediately stop the operations, report the case to the supervisor, and take feasible protective measures.
- Use tools correctly to avoid hurting people or damaging the equipment.
- Do not touch the energized equipment, as the enclosure is hot.
- To ensure personal safety and normal use of the equipment, the equipment must be reliably grounded before use.
- When a battery is faulty, the temperature may exceed the burn threshold of the touchable surface. Therefore, avoid touching the battery.
- Do not disassemble or damage the battery. The released electrolyte is harmful to your skin and eyes. Avoid contact with the electrolyte.
- Do not place irrelevant objects on the top of the equipment or insert them into any position of the equipment.
- Do not place inflammables around the equipment.
- To prevent explosions and body injury, do not place batteries in a fire.
- Do not place the battery module in water or other liquids.
- Do not short-circuit wiring terminals of batteries. Short circuits can cause a fire.
- Batteries may cause electric shocks and high short-circuit currents. When using the battery, pay attention to the following points:

  (a) Remove any metal objects from yourself, such as watches and rings.

  (b) Use tools with insulated handles.

  (c) Wear rubber gloves and boots.

  (d) Do not place tools or metal parts on top of batteries.

  (e) Before connecting or disconnecting battery terminals, disconnect the charging power supply.

  (f) Check whether batteries are accidentally grounded. If it is accidentally grounded, remove the power supply from the ground. Touching any part of a grounded battery can cause an electric shock. If these grounding points are removed during installation and maintenance, the possibility of electric shocks can be reduced.
- Do not use water to clean electrical components inside or outside of a cabinet.

- Do not stand on, lean on, or sit on the top of the equipment.
- Do not damage the modules of the equipment.

Battery Installation Requirements

- Before installing batteries, check whether the packaging is intact. Do not use batteries with damaged packaging.
- During installation, ensure that the positive and negative electrodes of a battery are not short-circuited.
- During installation, ensure that the screws are tightened properly using a torque wrench and check them regularly.
- After installing the equipment, remove idle packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

Hazardous and Toxicity Class

DANGER

- Hazard: It may cause heat generation or electrolyte leakage if battery terminals contact with other metals. Electrolyte is flammable. In case of electrolyte leakage, move the battery from fire immediately.
- Toxicity: Vapor generated from burning batteries, may make eyes, skin, and throat irritate.

Battery Emergency Measures

DANGER

- Avoid contact with leaked liquids or gases in the case of battery leakage or abnormal odor. Do not approach the battery. Contact professionals immediately. Professionals must wear safety goggles, rubber gloves, gas masks, and protective clothing.
- Electrolyte is corrosive and can cause irritation and chemical burns. Should you come into direct contact with the battery electrolyte, do as follows:

  Inhalation: Evacuate contaminated areas, get fresh air immediately, and seek immediate medical attention.

  Eye contact: Immediately flush your eyes with water for at least 15 minutes, do not rub your eyes, and seek medical attention immediately.

  Skin contact: Wash the affected areas immediately with soap and water and seek medical attention immediately.

  Ingestion: Seek immediate medical attention.

Fire Emergency Measures

DANGER

- If a fire occurs, power off the system if it is safe to do so.
- Extinguish the fire with carbon dioxide, FM-200 or ABC dry powder fire extinguishers.
- Ask firefighters to avoid contact with high-voltage components during fire fighting to prevent the risk of electric shock.
- Overheating may cause batteries to deform and leak corrosive electrolyte or toxic gas. Keep away from the batteries to avoid skin irritation and chemical burns.

Flood Emergency Measures

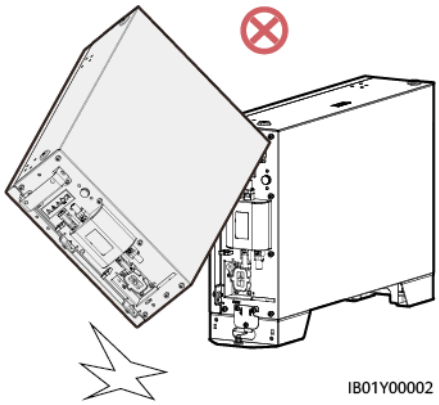
DANGER

- Power off the system if it is safe to do so.
- If any part of the batteries is submerged in water, do not touch the batteries to avoid electric shock.
- Do not use batteries that have been soaked in water. Contact a battery recycling company for disposal.

Dropped Battery Emergency Measures

DANGER

- If a battery pack is dropped or violently impacted during installation, internal damage may occur. Do not use such battery packs; otherwise, safety risks such as cell leakage and electric shock may arise.
- If a dropped battery has obvious damage or abnormal odor, smoke, or fire occurs, evacuate the personnel immediately, call emergency services, and contact the professionals. The professionals can use fire extinguishing facilities to extinguish the fire under safety protection.
- If a dropped battery has no obvious deformation or damage and no abnormal odor, smoke, or fire occurs, contact the professionals to transfer the battery to an open and safe place, or contact a recycling company for disposal.



Battery Recycling

- Dispose of used batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste.
- If the batteries leak or are damaged, contact technical support or a battery recycling company for disposal.
- If the batteries are out of service life, contact a battery recycling company for disposal.
- Do not expose batteries to high temperatures or direct sunlight.
- Do not expose batteries to high humidity or corrosive environments.

1.5 Storage Requirements

General Requirements

NOTE

- Record storage data such as temperature, humidity, and storage environment in compliance with the storage requirements in this manual.
- Do not store batteries for extended periods. Storing lithium batteries for extended periods may cause capacity loss. Generally, the irreversible capacity loss is 3% to 10% after lithium batteries are stored at the recommended storage temperature range for 12 months.

- The storage environment must comply with local regulations and standards.
- If a battery has been stored for longer than the allowed period, it must be checked and tested by professionals before use.
- Place batteries according to the signs on the packing case during storage. Do not put batteries upside down or sidelong.
- Stack battery packing cases in compliance with the stacking requirements on the external package.
- Handle batteries with caution to avoid damage.

The storage environment requirements are as follows:

- Ambient temperature: -10–55°C; recommended storage temperature: 20–30°C
- Relative humidity: 5% to 80%

- The batteries must be stored in a clean, dry, and well-ventilated place and be protected from dust and water vapor corrosion. The batteries must be protected against rain and water.
- Relative humidity: 5% to 80%
- Keep batteries away from direct sunlight.

1.6 Transportation Requirements

NOTICE

The product passes the certifications of the *UN38.3 (UN38.3: Section 38.3 of the sixth Revised Edition of the Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria)* and *SN/T 0370.2-2009 (Part 2: Performance Test of the Rules for the Inspection of Packaging for Exporting Dangerous Goods)*. This product belongs to Class 9 dangerous goods.

Loading and unloading:

Load and unload the batteries in compliance with local laws, regulations, and industry standards. Reckless handling may cause short circuits or damage to batteries in the container, which may result in battery leakage, rupture, explosion, or fire.

Before transportation:

- Check that the batteries are intact and there is no obvious odor, smoke, or fire. Otherwise, the batteries cannot be transported.

NOTE

The product can be delivered to the site directly and transported by land and water. The packing case must be secured for transportation. Handle the product with care during loading, unloading, and transportation with moisture-proof measures in place. The actual capacity may vary depending on the environment conditions, such as temperature, transportation conditions, and storage conditions.

During transportation:

- The batteries cannot be transported by rail or air.
- Maritime transport must comply with the *International Maritime Dangerous Goods Code* (IMDG Code).
- Road transport must comply with the *International Carriage of Dangerous Goods by Road* (ADR) or JT T617.
- Comply with the requirements of the transportation regulatory authorities in the countries of departure, route, and destination.

Comply with the international regulations on the transport of dangerous goods and the requirements of the transport regulatory authorities of the respective countries.

Protect the packing case with the product from the following situations:

- Being dampened by rains, snows, or falling into water

- Falling or mechanical impact
- Being upside-down or tilted

NOTE

If any of the preceding exceptions occurs, take the emergency measures.

1.7 Installation Environment Requirements

- The installation and use environment must meet relevant international, national, and local standards for lithium batteries, and are in accordance with the local laws and regulations.
- Ensure that the battery is not accessible to 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, attic, and basement.
- When installing the battery in a garage, keep it away from the drive way. It is recommended that the battery be mounted on the wall higher than the bumper to prevent collision.
- Install the battery in a dry and well-ventilated environment. Secure the battery on a solid and flat surface.
- Install the battery in a sheltered place or install an awning over it to avoid direct sunlight or rain.
- Install the battery in a clean environment that is free from sources of strong infrared radiation, organic solvents, and corrosive gases.
- For areas prone to natural disasters such as floods, debris flows, earthquakes, and typhoons/hurricanes, take corresponding precautions for installation.
- Keep the battery away from fire sources. Do not place any flammable or explosive materials around the battery.
- Keep the battery away from water sources such as taps, sewer pipes, and sprinklers to prevent water seepage.
- Do not install the battery in a position where it is easy to touch as the temperature of the chassis and heat sink is high when the battery is running.
- To prevent fire due to high temperature, ensure that the vents and the cooling system are not blocked when the battery is running.
- Do not expose the battery to flammable or explosive gas or smoke. Do not perform any operation on the battery in such environments.
- Do not install the battery on a moving object, such as ship, train, or car.
- In backup power scenarios, do not use the battery for the following situations.

  a. Medical devices substantially important to human life.

  b. Control equipment such as trains and elevators, which may cause personal injury.

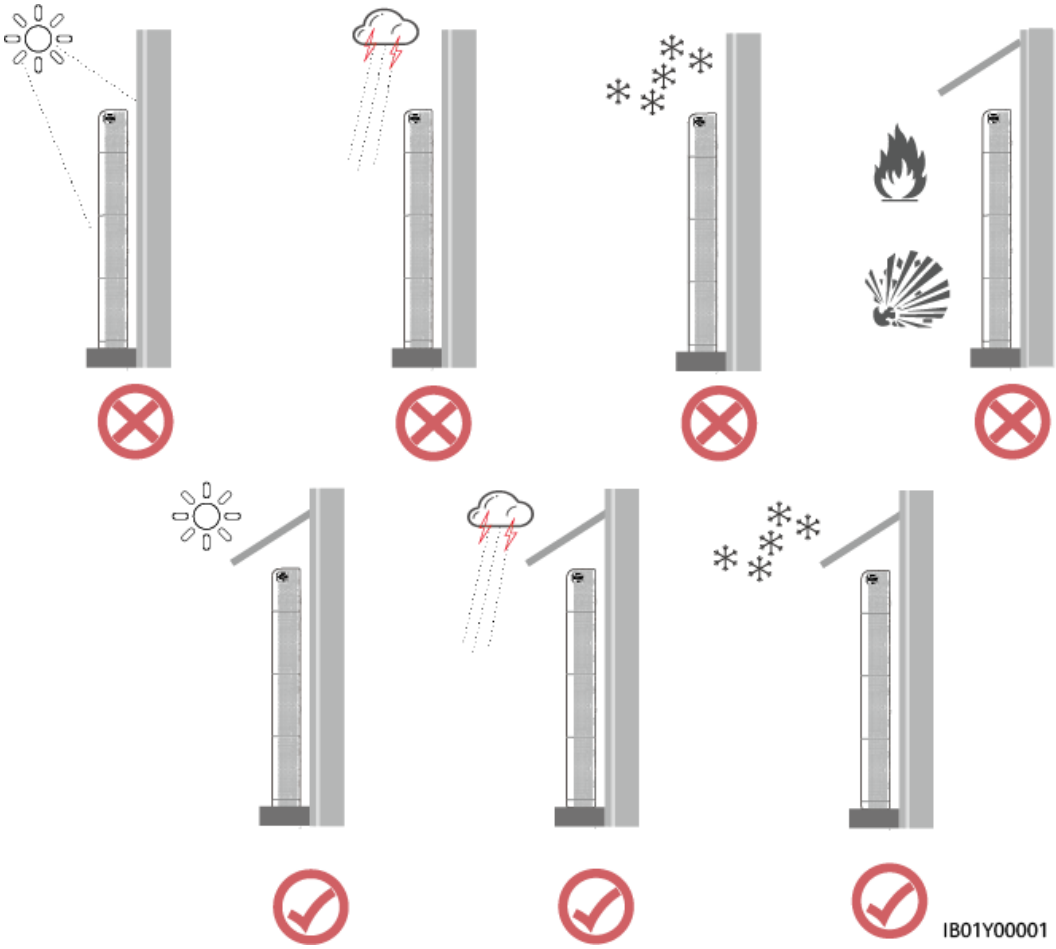
  c. Computer systems of social and public importance.

  d. Locations near medical devices.

  e. Other devices similar to those described above.
- Do not install the battery outdoors in salt-affected areas because it may corrode. A salt-affected area refers to the region within 500 meters from the

coast or prone to sea breeze. The regions prone to sea breeze vary with weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).

Figure 1-1 Installation environment



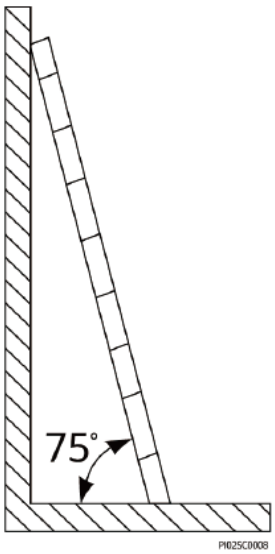
NOTE

- The operation and service life of the battery depend on the operating temperature. Install the battery at a temperature equal to the ambient temperature or in a better environment.
- The operating temperature of the LUNA2000 ranges from –20°C to +55°C. If the LUNA2000 is installed in a cold environment, the built-in thermal control system starts to heat the battery to achieve better performance. The heating process consumes rechargeable power, which reduces the system energy efficiency in cold weather.
- If the LUNA2000 is stored in a cold environment (for example, 0°C) before installation, the LUNA2000 needs some time (< 2 h) to heat up before it can be charged. You are advised to place the LUNA2000 in a warm place before installation to facilitate commissioning.
- When the ambient temperature of the LUNA2000 is higher than +45°C or lower than –10°C, the battery charge and discharge power will be derated.

1.8 Mechanical Safety

Using Ladders

- Use wooden or fiberglass ladders when you need to perform live working at heights.
- When a step ladder is used, ensure that the pull ropes are secured and the ladder is held firm.
- Before using a ladder, check that it is intact and confirm its load bearing capacity. Do not overload it.
- Ensure that the wider end of the ladder is at the bottom, or protective measures have been taken at the bottom to prevent the ladder from sliding.
- Ensure that the ladder is securely positioned. The recommended angle for a ladder against the floor is 75 degrees, as shown in the following figure. An angle rule can be used to measure the angle.



- When climbing a ladder, take the following precautions to reduce risks and ensure safety:
  - Keep your body steady.
  - Do not climb higher than the fourth rung of the ladder from the top.
  - Ensure that your body's center of gravity does not shift outside the legs of the ladder.

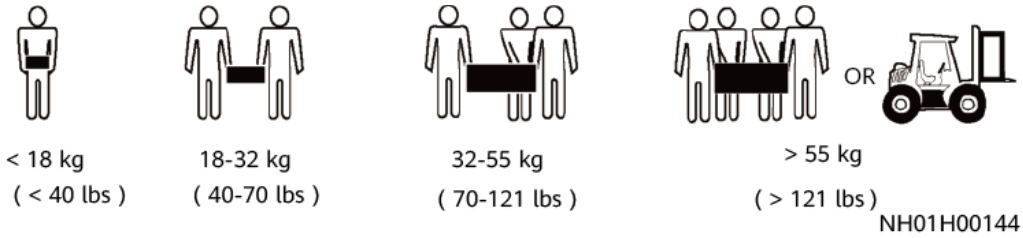
Drilling Holes

When drilling holes into a wall or floor, observe the following safety precautions:

- Wear goggles and protective gloves when drilling holes.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings that have accumulated inside or outside the equipment.

Moving Heavy Objects

- Be cautious to avoid injury when moving heavy objects.



- When moving the equipment by hand, wear protective gloves to prevent injuries.

1.9 Commissioning

When the equipment is powered on for the first time, ensure that professional personnel set parameters correctly. Incorrect settings may result in inconsistency with local certification and affect the normal operation of the equipment.

1.10 Maintenance and Replacement

DANGER

High voltage generated by the equipment during operation may cause an electric shock, which could result in death, serious injury, or serious property damage. Prior to maintenance, power off the equipment and strictly comply with the safety precautions in this document and relevant documents.

- Maintain the equipment with sufficient knowledge of this document and using proper tools and testing equipment.
- Before maintaining the equipment, power it off and follow the instructions on the delayed discharge label to ensure that the equipment is powered off.
- Place temporary warning signs or erect fences to prevent unauthorized access to the maintenance site.
- If the equipment is faulty, contact your dealer.
- The equipment can be powered on only after all faults are rectified. Failing to do so may escalate faults or damage the equipment.
- Do not open the cover without authorization. Otherwise, electric shocks may occur, and the resulting faults are beyond warranty scope.
- Installation personnel, maintenance personnel, and technical support personnel must be trained to operate and maintain the equipment safely and correctly, take comprehensive precautionary measures, and be equipped with protective instruments.
- 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 dangerous voltages remain in the DC bus or components to be maintained by using a multimeter.

- Battery maintenance should be carried out or supervised by personnel who are familiar with batteries and the precautions required.
- When replacing batteries, replace them with batteries or battery strings of the same type.
- Take out all tools and parts from the equipment after maintenance is complete.
- If the equipment is not used for a long time, store and recharge batteries according to this document.

2 Product Introduction

2.1 Overview

Function

The LUNA2000 battery consists of a power control module and battery expansion modules. It can store and release electric energy based on the requirements of the inverter management system. The input and output ports of the LUNA2000 battery are high-voltage direct current (HVDC) ports.

- Battery charge: The power control module connects to the battery terminals (BAT+ and BAT–) of the inverter. Under the control of the inverter, the power control module charges the batteries and stores excessive PV energy in batteries.
- Battery 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 inverter.

Model

- Model of the power control module in the LUNA2000 battery: LUNA2000-5KW-NHC0

Figure 2-1 Model number

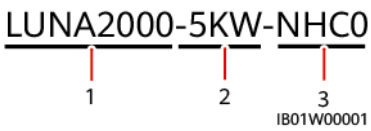


Table 2-1 Model description

No.	Meaning	Value
1	Product	LUNA2000: LUNA2000 battery
2	Power level	5KW: The power level is 5 kW.

No.	Meaning	Value
3	Design code	NHC0: product series of the power control module

- Model of battery expansion modules in the LUNA2000 battery: LUNA2000-5-NHE0

Figure 2-2 Model number

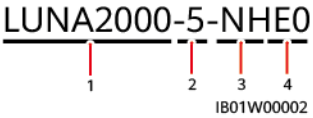


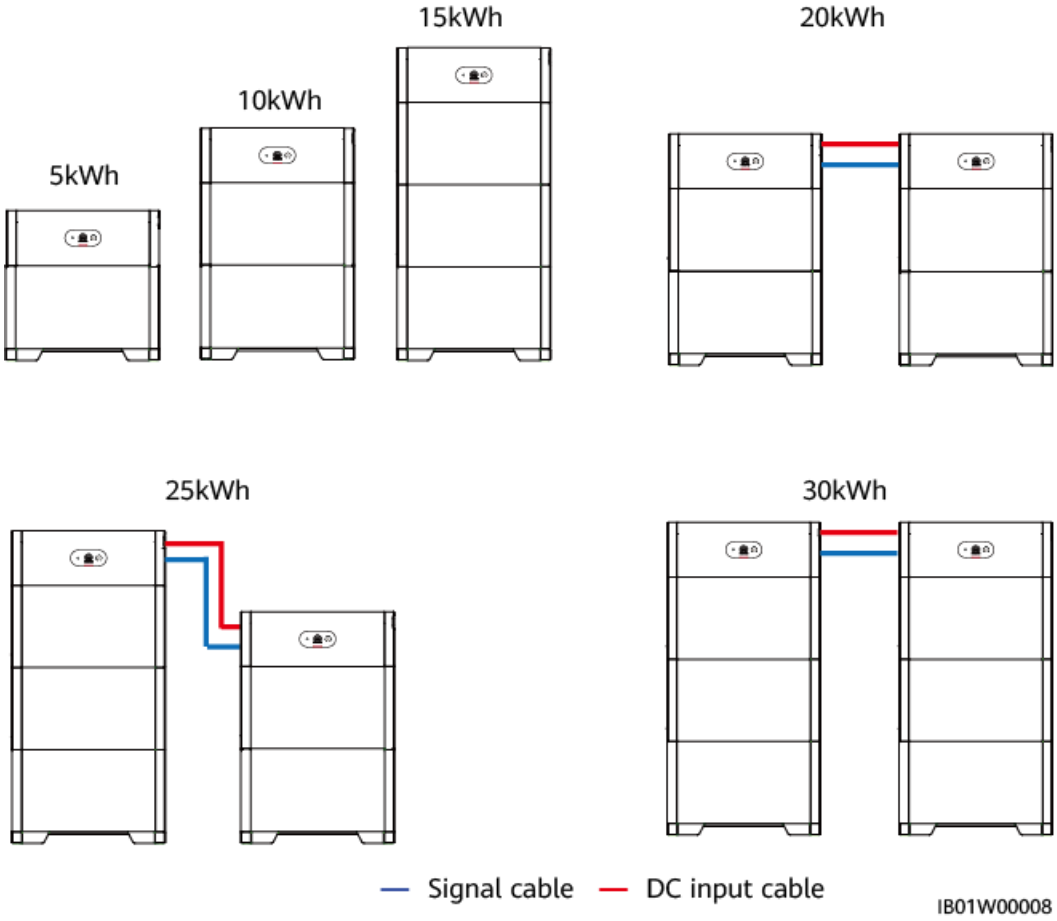
Table 2-2 Model description

No.	Meaning	Value
1	Product	LUNA2000: residential battery
2	Energy level	5: The energy level is 5 kWh.
3	Design code	NHE0: battery pack module

Battery Capacity Description

The battery supports power and capacity expansion. Two power control modules can be connected in parallel. One power control module supports a maximum of three battery expansion modules.

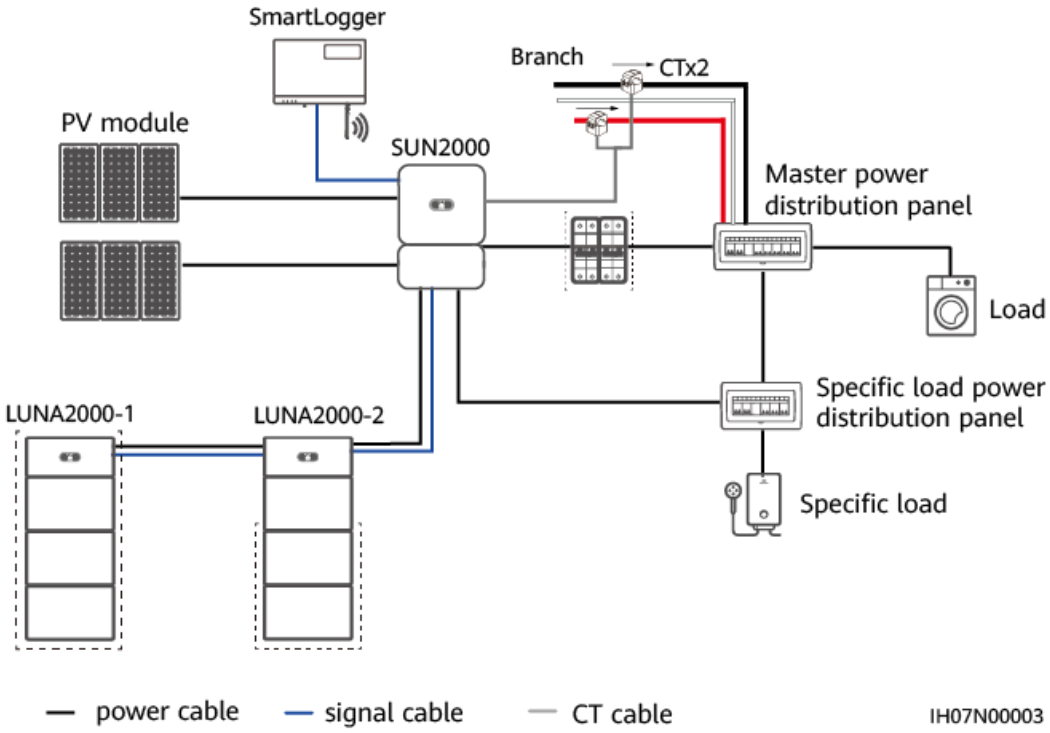
Figure 2-3 Battery capacity description



Networking Application

The LUNA2000 battery is applicable to the grid-tied systems of residential rooftop PV plants. Typically, a grid-tied system consists of PV strings, LUNA2000 batteries, an inverter, an AC switch, and a power distribution box (PDB).

Figure 2-4 Networking (dashed boxes indicate optional components)



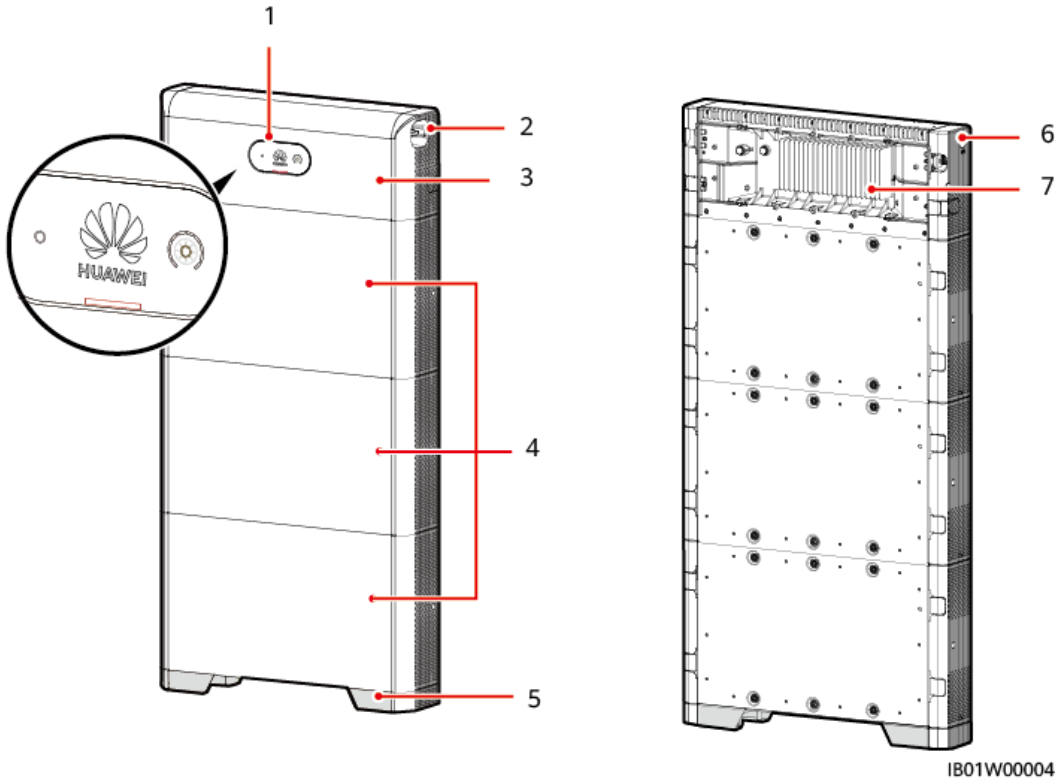
- The input and output ports of the LUNA2000 battery are connected to the battery ports of the inverter.
- The following communication modes are supported by the LUNA2000 battery:
  - Connect the LUNA2000 battery to the inverter over the RS485 port and Enable port to implement communication and control between the inverter and the LUNA2000 battery.
  - Connect the battery to the SmartLogger through the mobile phone app to manage and maintain the LUNA2000 energy storage system.
  - Connect the inverter to the public network through the Smart Dongle to manage and maintain the LUNA2000 battery through the management system.

2.2 Appearance

Battery

This topic describes the battery appearance.

Figure 2-5 Battery appearance



(1) LED indicator

(2) DC switch (DC SWITCH)

(3) Power control module

(4) Battery expansion modules

(5) Installation base

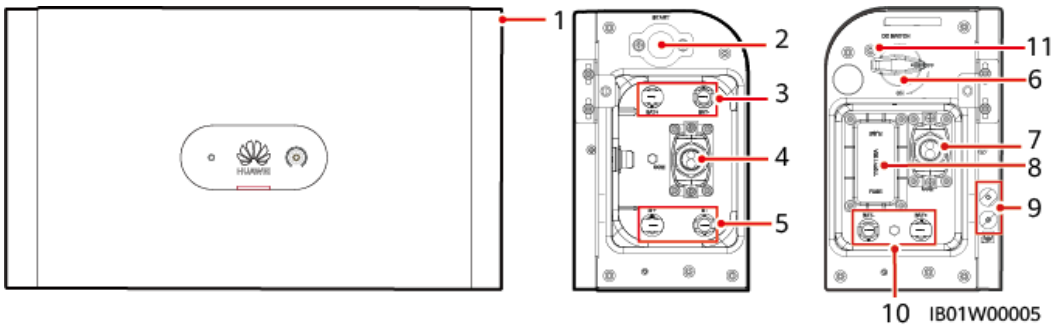
(6) Black start switch

(7) Heat sink

Power Control Module

The power of the power control module is 5 kW.

Figure 2-6 Power control module



(1) Power control module	(2) Black start switch	(3) Battery terminals (BAT+/ BAT–)
(4) COM port	(5) Battery cascading terminals (B+/B–)	(6) DC switch (DC SWITCH)
(7) COM port	(8) Fuse	(9) Ground point
(10) Battery terminals (BAT-/BAT +)	(11) Locking screw hole for the DC switch (M4)[a]	

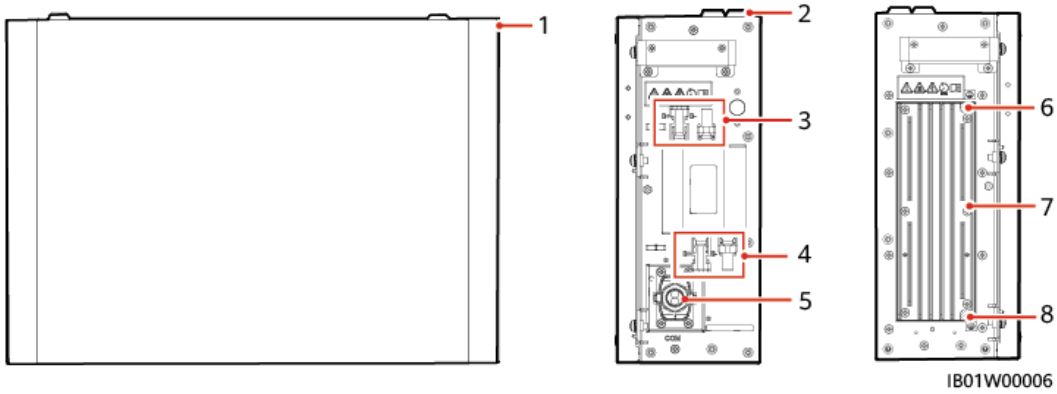
NOTE

Note a: (Optional) Remove the plastic cap and install a locking screw for the DC switch to prevent misoperations.

Battery Expansion Module

The standard capacity of a battery expansion module is 5 kWh.

Figure 2-7 Battery expansion module



(1) Battery expansion module	(2) Boss for alignment	(3) Battery cascading terminals (B+/B–)
(4) Battery cascading terminals (B+/B–)	(5) COM port	(6) Ground point
(7) Heat sink	(8) Ground point	

2.3 Label Description

Enclosure Labels

Table 2-3 Enclosure label description

Icon	Name	Meaning
	Burn warning	Do not touch the product, as the shell is hot when it is running.
	Delayed discharge	• High voltage exists after the battery is powered off. It takes 5 minutes for the battery to discharge to the safe voltage.
	Operator	• High voltage exists after the battery is powered on. Only qualified and trained electrical technicians are allowed to install and operate the battery. • Ground the battery before powering it on.
	Refer to documentation	Reminds operators to refer to the documentation provided with the equipment.
	Grounding	Indicates the position for connecting the PE cable.

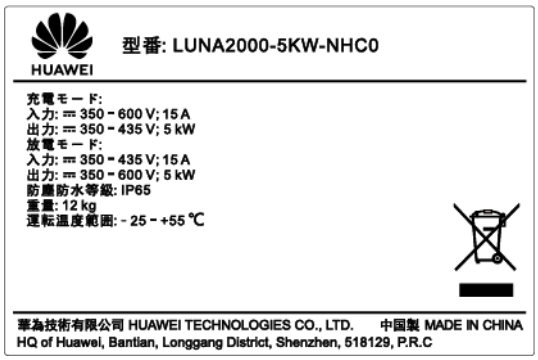
NOTE

The labels are for reference only.

Nameplate

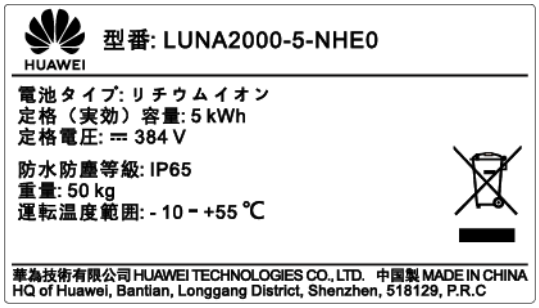
Nameplate of a power control module

Figure 2-8 Nameplate (power control module)



Nameplate of a battery expansion module

Figure 2-9 Nameplate (battery expansion module)



2.4 Features

Multi-Scenario and Multi-Working Mode

- Supports multiple working modes such as grid-tied/off-grid mode switching, self-consumption, TOU (time-of-use), and full fed to the grid modes.
- Allows users to query the total discharge capacity in the product life cycle in real time.

Intelligent and Simple Operation

Works with the inverter, supports plug-and-play, and integrates the mobile phone app and management system.

Easy Installation and Replacement

- Standard battery DC terminals are used for system connection.
- Modular design is adopted for batteries.
- The installation or replacement can be performed by two persons.

Flexible Scalability

The battery supports power expansion, battery capacity expansion, and hybrid use of old and new batteries.

Intelligent O&M

- The factory defaults meet the requirements of target markets and the battery can be started by pressing only one button and supports black startup.
- The LED indicator shows the status. You can also use the mobile phone app to perform local and remote operations.
- The cloud data management system is used to manage the battery anytime and anywhere.

Low Investment

- Only common installation tools are required.
- The battery features high efficiency and power density, which saves installation space.
- The battery features easy O&M.

2.5 Working Mode

The LUNA2000 converts HVDC generated by PV strings into low-voltage direct current (LVDC) through DC-to-DC conversion and stores the power in batteries. It can also convert LVDC into HVDC and feed the power into the power grid through the inverter.

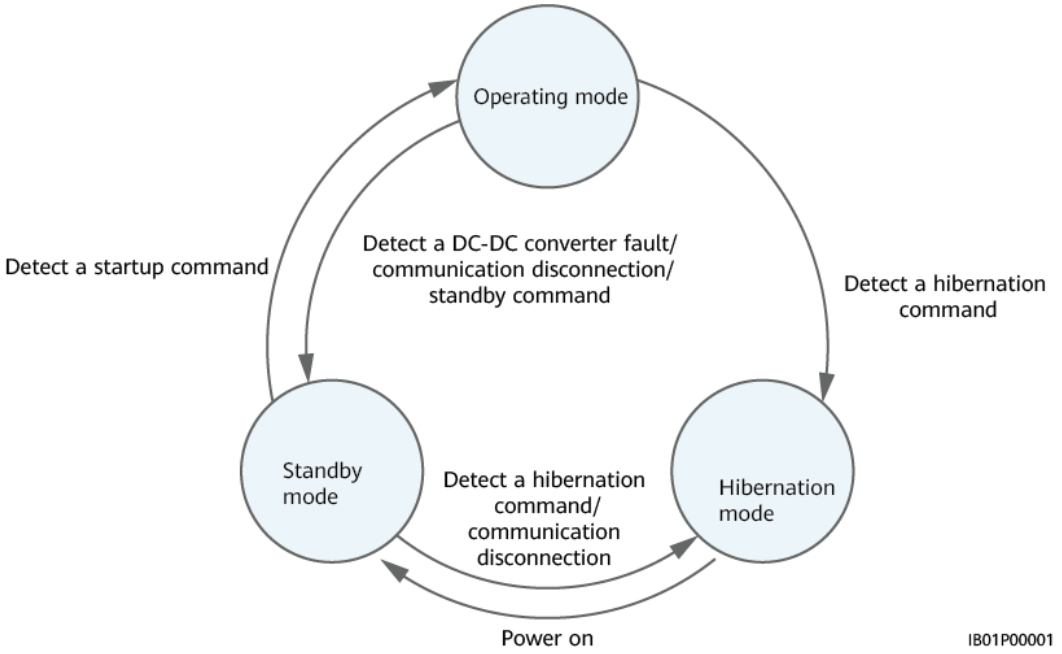
Working Mode

The LUNA2000 battery can work in hibernation, standby, or operating mode.

Table 2-4 Working mode

Working Mode	Description
Hibernation mode	The internal auxiliary power source and DC-DC converter of the battery do not work.
Standby mode	The auxiliary power source inside the battery works, and the DC-DC converter does not work.
Operating mode	The internal auxiliary power source of the battery works, and the DC-DC converter charges or discharges.

Figure 2-10 Switchover among working modes



3 Application Scenarios and Settings

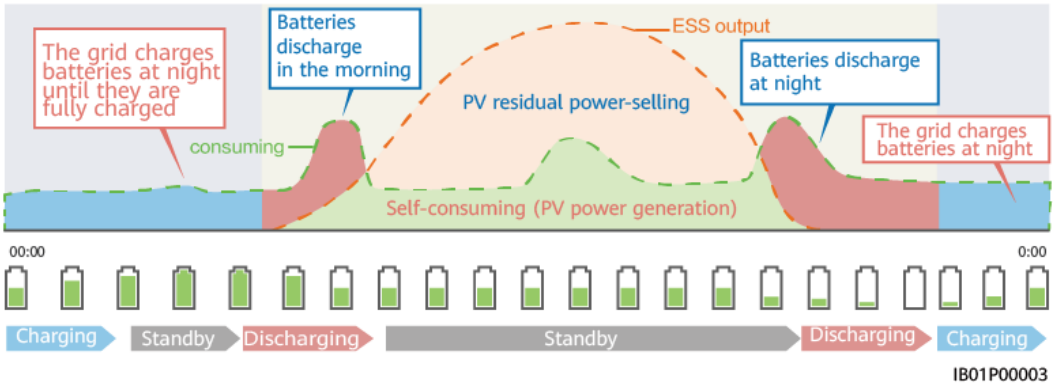
NOTE

If no PV module is installed in the system, only the TOU mode is supported.

3.1 TOU (Time of Use) Mode

In the daytime, the surplus PV power can be sold to the grid or used to charge batteries. At night, batteries are charged from the grid when the electricity price is low. Batteries discharge in the morning or at night when the electricity price is high. In the TOU mode, you need to set the battery charge and discharge periods.

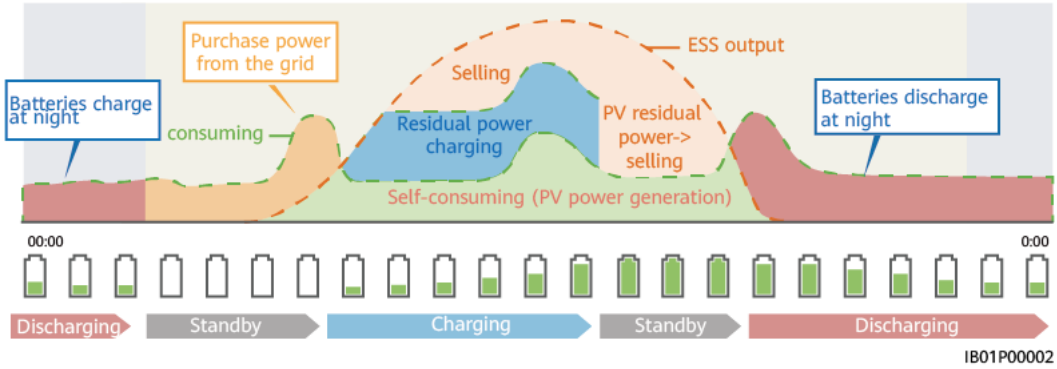
Figure 3-1 TOU mode



3.2 Green Mode

In the daytime, the surplus PV energy is used to charge batteries. When the batteries are fully charged or reach the maximum charge power, the surplus energy is sold to the grid. (The batteries cannot be charged from the grid at night.)

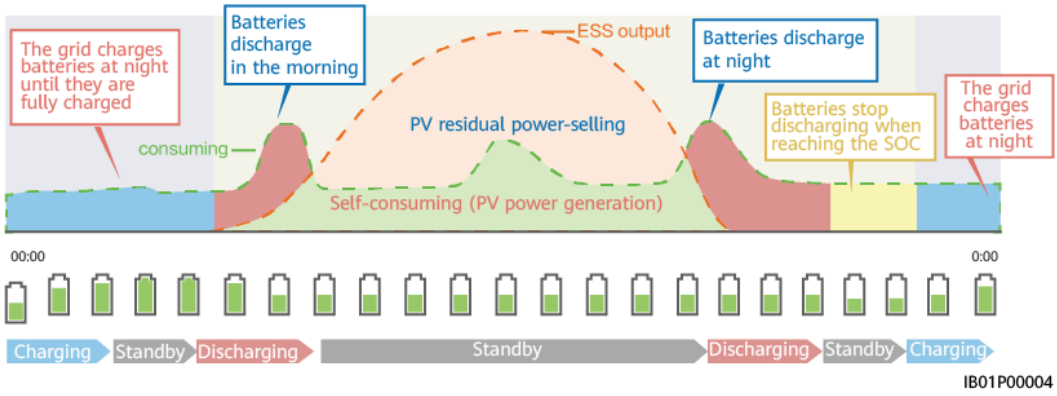
Figure 3-2 Green Mode



3.3 Disaster Prevention Measures (Battery Settings)

You can set the backup power SOC in case of power failures such as battery faults. Example: The backup power SOC is set in the TOU mode.

Figure 3-3 Disaster Prevention Measures (Battery Settings)



4 System Installation

4.1 Checking Before the Installation

NOTE

- Check the appearance of the product before unpacking. If the body of the product is damaged, contact your dealer and do not install the device.
- Cosmetic damages such as dents and scratches that occur after installation are not covered by the warranty.

Checking the Outer Packing

Before unpacking the battery, check the outer packing for damage, such as holes and cracks, and check the battery model. If any damage is found or the battery model is not what you requested, do not unpack the product and contact your dealer as soon as possible.

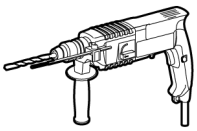
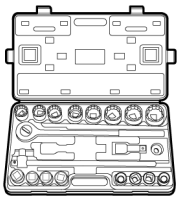
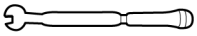
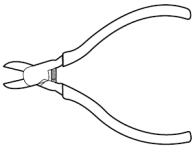
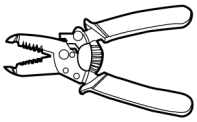
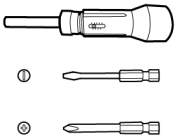
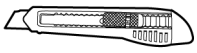
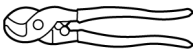
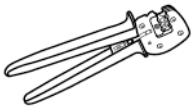
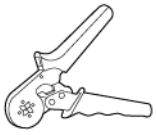
Checking Deliverables

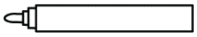
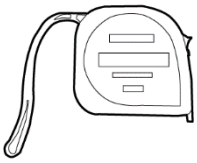
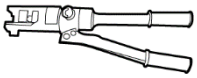
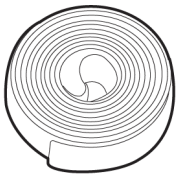
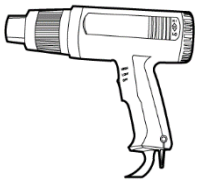
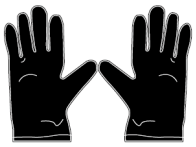
After unpacking the battery, check that the deliverables are intact and complete, and free from any obvious damage. If any item is missing or damaged, contact your dealer.

NOTE

For details about the number of deliverables delivered with the battery, see the *Packing List* in the packing case.

4.2 Preparing Tools and Instruments

Type	Tools and Instruments		
Installation	 Hammer drill (with a drill bit of 8 mm)	 Torque socket wrench	 Torque wrench
	 Diagonal pliers	 Wire strippers	 Torque screwdriver
	 Rubber mallet	 Utility knife	 Cable cutter
	 Crimping tool (recommended model: PV-CZM-19100 or other crimping tools that meet the requirements)	 Cord end terminal crimping tool	 Disassembly tool (model: PV-MS-HZ open-end wrench)
	 Cable tie	 Vacuum cleaner	 Multimeter (DC voltage measurement range ≥ 600 V DC)

Type	Tools and Instruments		
	 Marker	 Steel measuring tape	 Level
	 Hydraulic pliers	 Heat-shrink tubing	 Heat gun
Personal protective equipment (PPE)	 Safety gloves	 Safety goggles	 Dust mask
	 Safety boots	-	-

4.3 Determining the Installation Position

Installation Angle Requirement

The battery can be floor-mounted and wall-mounted. The installation angle requirement is as follows:

- Do not install the battery at forward tilted, back tilted, side tilted, horizontal, or upside down positions.

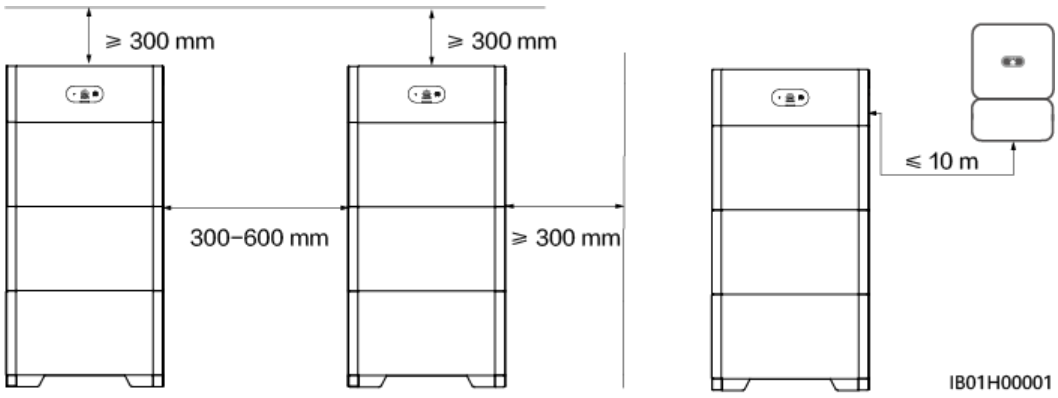
Installation Position Requirements

Install the battery on a solid brick-concrete structure or concrete wall or floor. If other types of walls and floors are used, they must be made of fire-retardant materials and meet the load-bearing requirements of the equipment.

Installation Space Requirements

- During installation, ensure that there is no other devices (except related Huawei devices and awnings) or flammable or explosive materials around the batteries. Reserve adequate space for heat dissipation and safety isolation.
- When the battery is mounted on a wall, do not place any objects under the battery.

Figure 4-1 Installation space



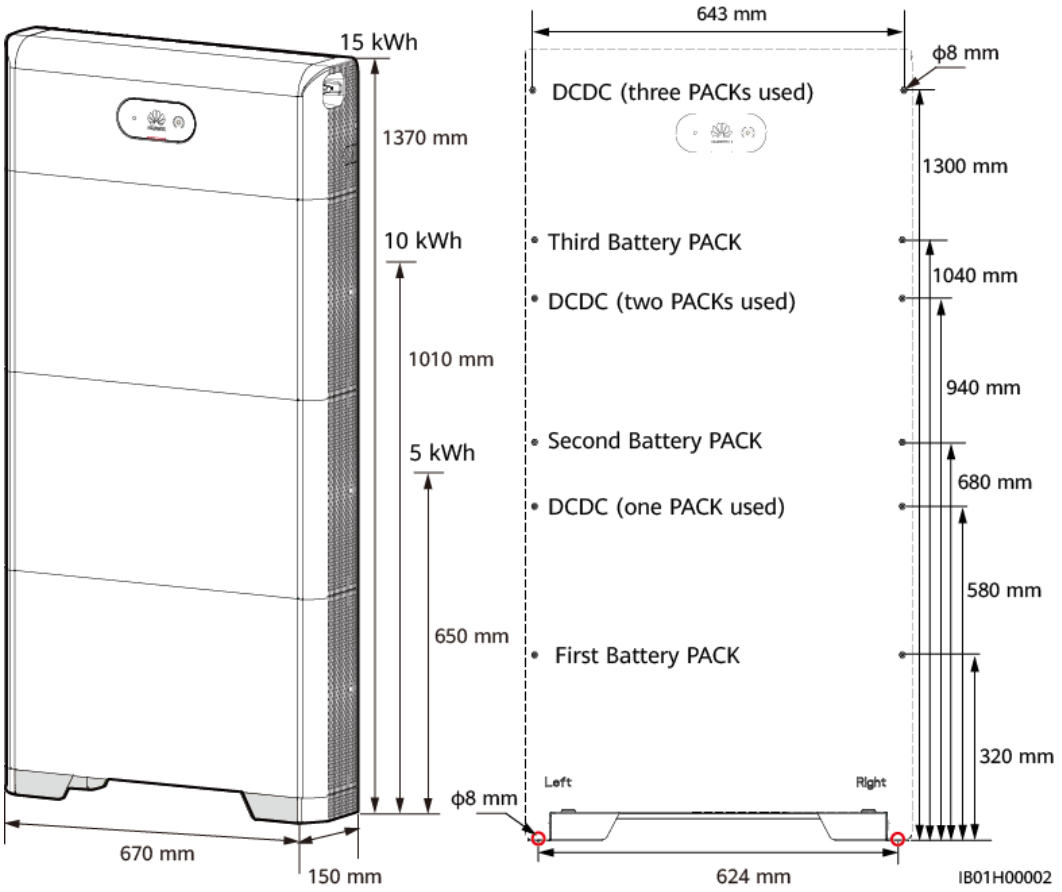
4.4 Equipment Installation

4.4.1 Floor-Mounted Installation

Installation Precautions

Figure 4-2 shows the dimensions of mounting holes for a battery.

Figure 4-2 Floor-mounted installation dimensions



Procedure

Step 1 Align the floor support with the wall surface and keep the support 10 mm to 15 mm away from the wall surface. Level the hole positions using a level, and mark the hole positions for installing the floor support using a marker. Align the marking-off template with the surface of the floor mounting kit, determine the drilling hole positions on the wall for securing the power control module, and mark the positions using a marker.

Step 2 Install the floor support.

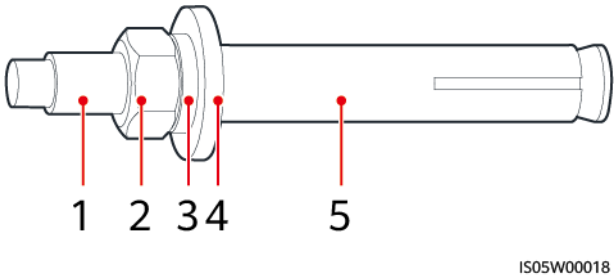
DANGER

When drilling holes, avoid the water pipes and power cables buried in the wall.

NOTE

M6x60 expansion bolts delivered with the battery are used to install the floor support and power control module. If the length and quantity of the bolts do not meet installation requirements, prepare M6 stainless steel expansion bolts by yourself.

Figure 4-3 M6 expansion bolt structure diagram



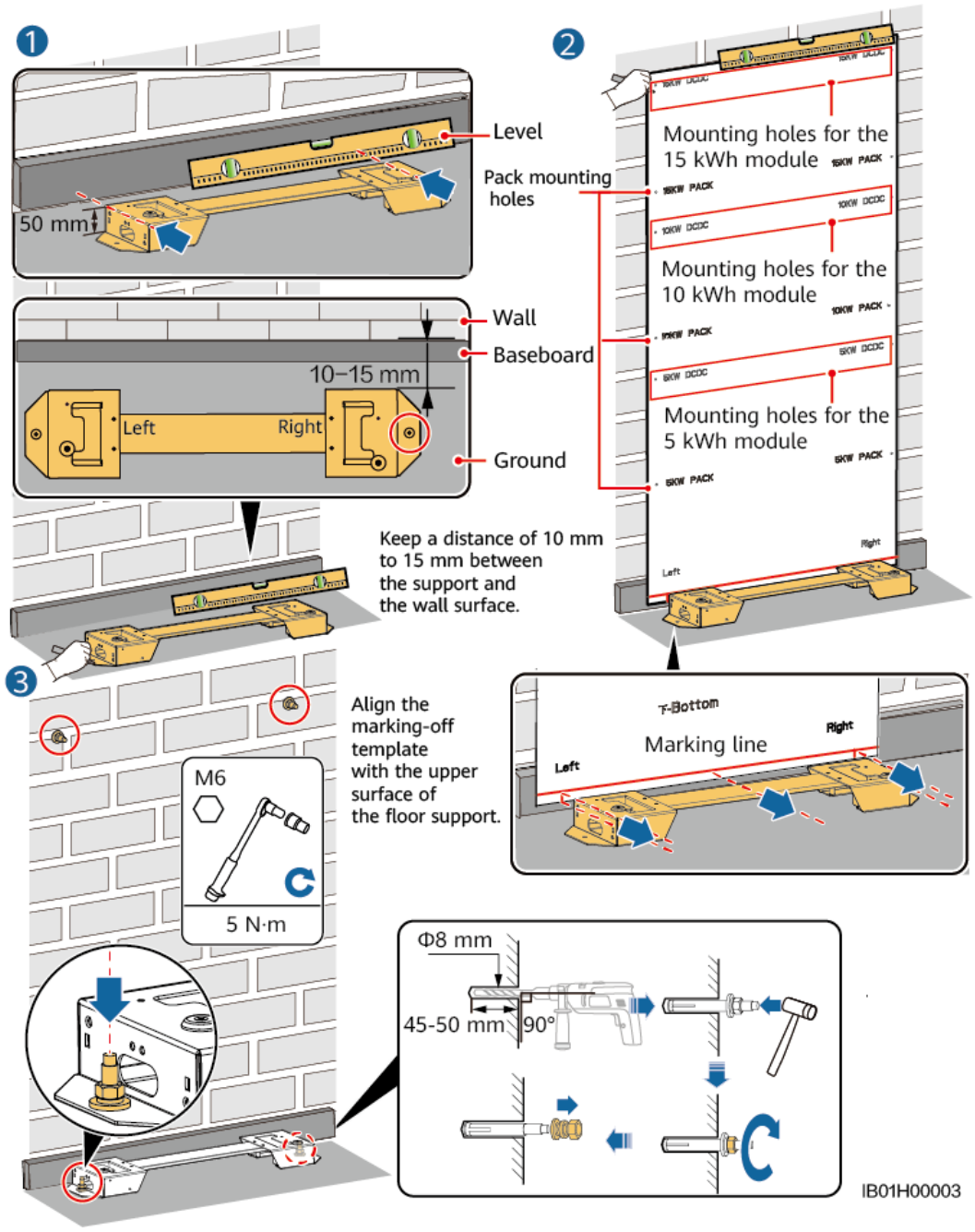
(1) Bolt (2) Nut (3) Spring washer

(4) Flat washer (5) Expansion sleeve

NOTICE

- To prevent dust inhalation or contact with eyes, wear safety goggles and a dust mask when drilling holes.
- Wipe away any dust in or around the holes and measure the hole distances. If the holes are inaccurately positioned, drill holes again.
- Level the head of the expansion sleeve with the concrete wall or floor after removing the nut, spring washer, and flat washer. Otherwise, the mounting kit will not be securely installed on the wall or ground.
- Loosen the nut, spring washer, and flat washer of the expansion bolt at the bottom.

Figure 4-4 Installing expansion bolts



NOTE

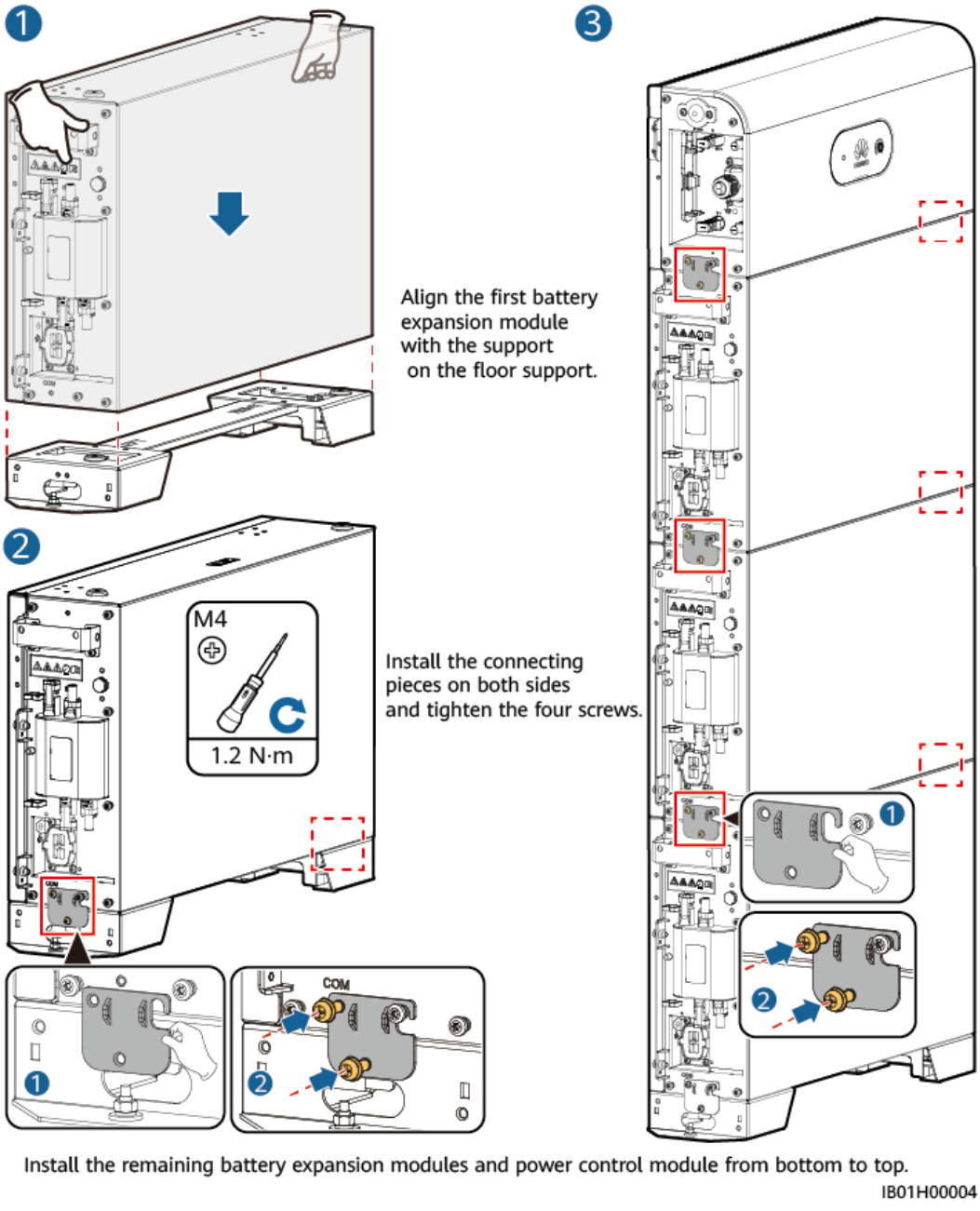
- The mounting holes of the floor-mounted support are designed for M6 screws by default. If the holes in foundation are for M12 screws, you can expand the mounting holes or drill holes based on the mounting holes on the foundation.
- If the battery is secured to a wooden wall, use tapping screws to secure the battery. Ensure that the battery meets the load-bearing requirements (a battery module weighs 50 kg).

Step 3 Place the first battery expansion module on the floor support, install the connecting pieces on both sides, and tighten the four screws. Install the remaining battery expansion modules and power control module from bottom to top.

WARNING

After installing a module, install and tighten the connecting pieces and screws on the left and right sides of the module, and then install the next module.

Figure 4-5 Installing the battery expansion modules and power control module



Step 4 Secure the power control module and battery expansion modules to the wall.

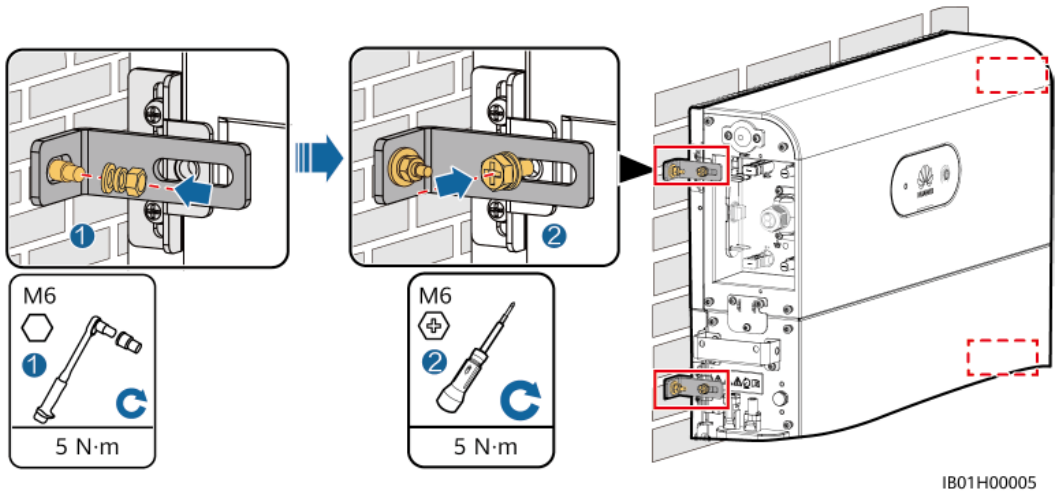
WARNING

The power control module and battery expansion modules must be fixed on the wall to prevent them from falling down.

NOTE

If the wall has a raised waterproof trough and the distance between the battery and the wall increases, the fasteners delivered with the container may not fit. In this case, you can purchase L-shaped fasteners for the installation. When selecting L-shaped fasteners from other vendors, ensure that they meet the load-bearing requirements (a battery module weighs 50 kg).

Figure 4-6 Fixing the power control module



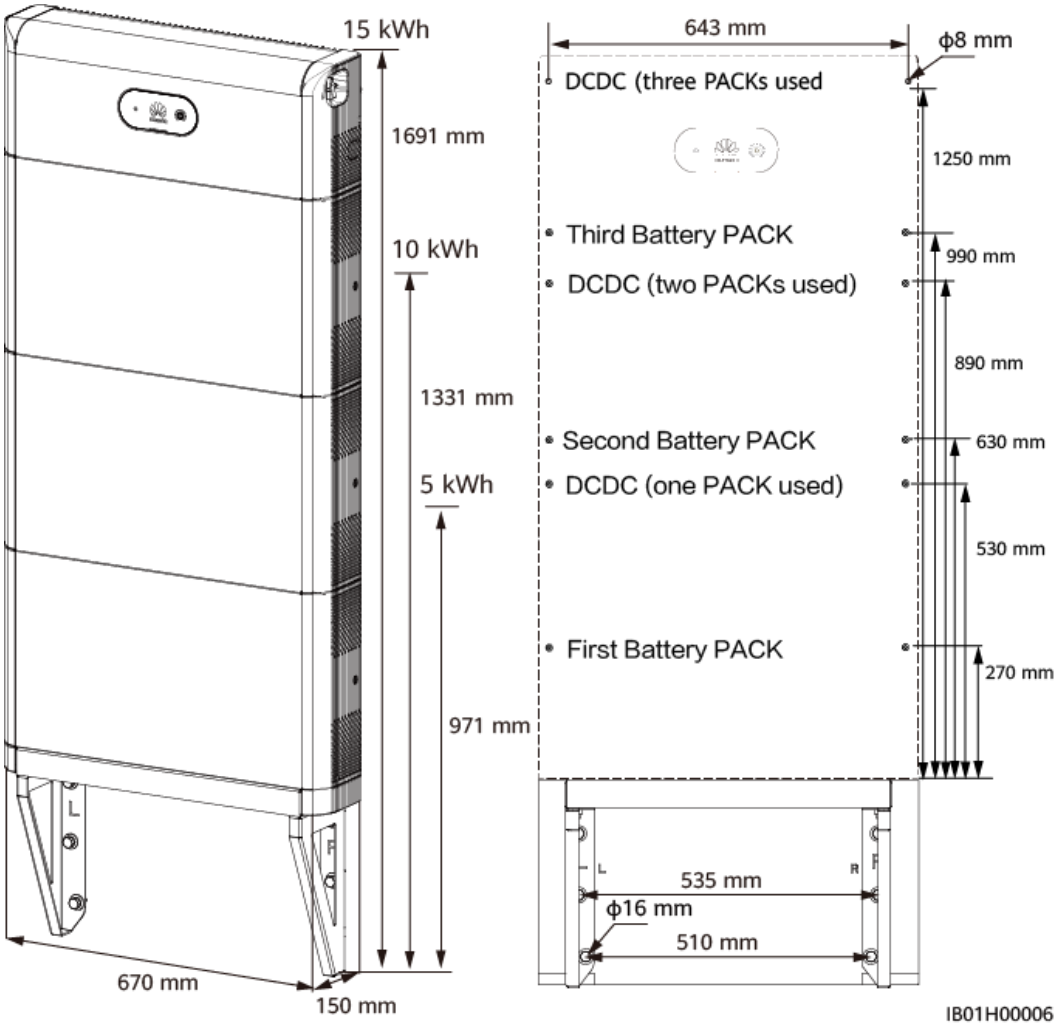
----End

4.4.2 Wall-Mounted Installation

Installation Precautions

Figure 4-7 shows the dimensions of mounting holes for the battery on the wall.

Figure 4-7 Wall-mounted installation dimensions



Procedure

Step 1 Determine the positions for drilling holes using the marking-off template. Level the positions of mounting holes using a level, and mark the positions with a marker.

Step 2 Install the mounting kit.

DANGER

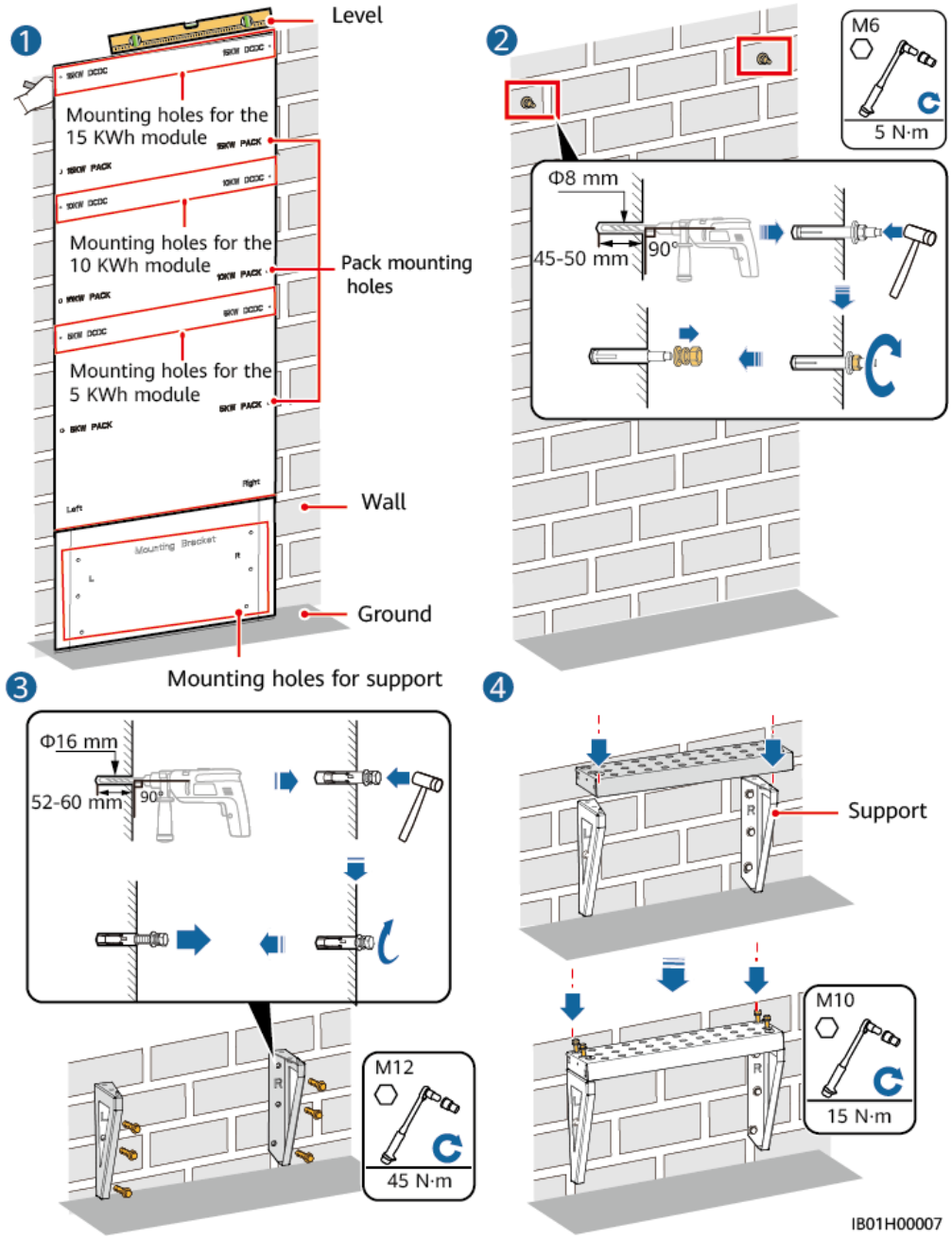
When drilling holes, avoid the water pipes and power cables buried in the wall.

NOTE

M12x60 expansion bolts delivered with the battery are used to fix the wall mounting support. If the length and quantity of the bolts do not meet installation requirements, prepare M12 stainless steel expansion bolts by yourself.

M6x60 expansion bolts delivered with the battery are used to fix the power control module. If the length and quantity of the bolts do not meet installation requirements, prepare M6 stainless steel expansion bolts by yourself.

Figure 4-8 Wall-mounted installation



Step 3 Place the first battery expansion module on the wall-mounted support, install the left and right connective pieces, and install the second battery expansion module, third battery expansion module, and power control module from bottom to top.

WARNING

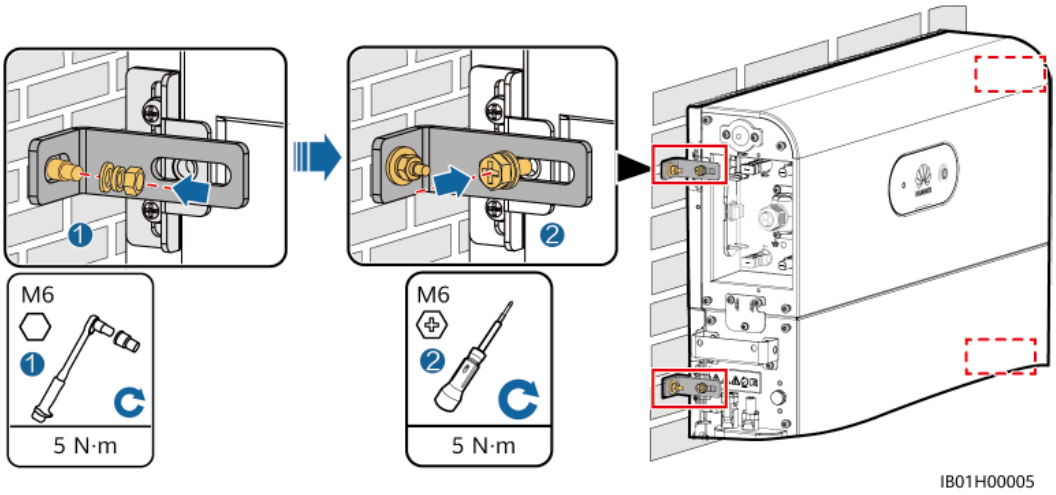
After installing a module, install and tighten the connecting pieces and screws on the left and right sides of the module, and then install the next module.

Step 4 Secure the power control module and battery expansion modules to the wall.

WARNING

The power control module and battery expansion modules must be fixed on the wall to prevent them from falling down.

Figure 4-9 Fixing power control module



----End

5 Electrical Connection

Precautions

DANGER

Before connecting cables, ensure that the DC switch on the battery and all the switches connected to the battery are set to OFF. Otherwise, the high voltage of the battery may result in electric shocks.

WARNING

- 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.

NOTE

The cable colors shown in the electrical connection diagrams provided in this chapter are for reference only. Select cables in accordance with local cable specifications (green-and-yellow cables are only used for PE).

5.1 Preparing Cables

Figure 5-1 Battery cable connections

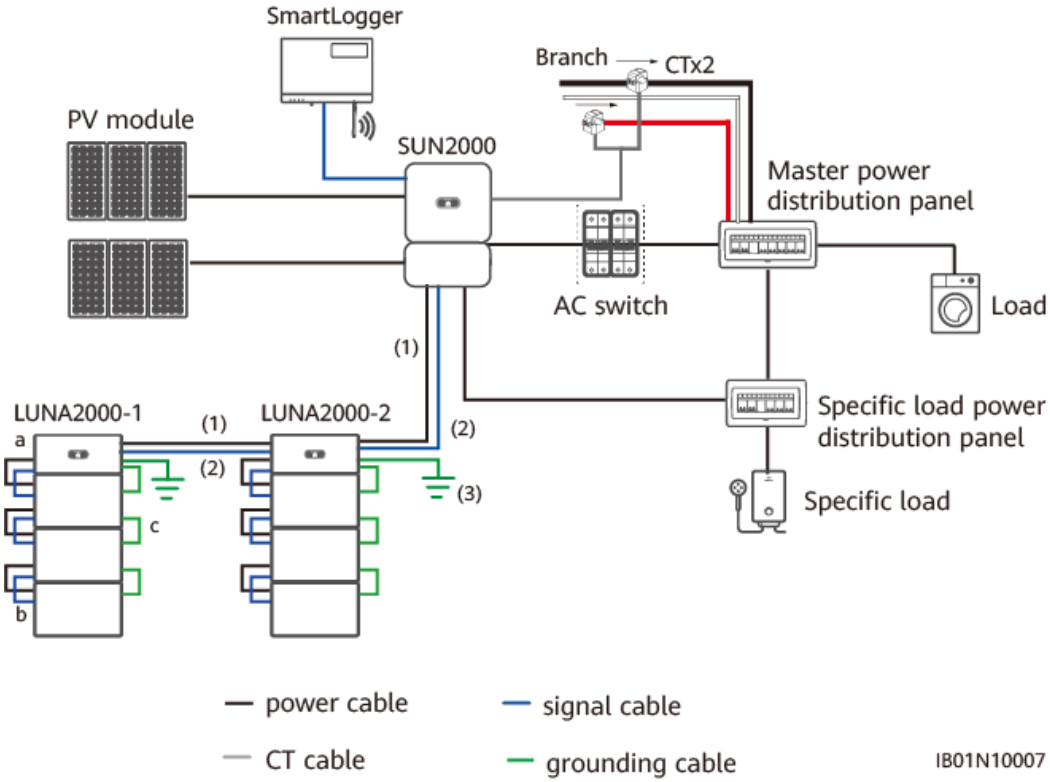


Table 5-1 Cables prepared by the customer

No.	Cable	Type	Recommended Specifications	Source
1	DC input power cable (inverter to battery and battery to battery)	Common outdoor PV cable in the industry	• Conductor cross-sectional area: 3.5–5.5 mm^2 • Cable outer diameter: 5.5–9 mm	Prepared by the customer
2	Signal cable (inverter to battery and battery to battery)	Outdoor shielded twisted pair cable (8 cores)	• Conductor cross-sectional area: 0.20–1 mm^2 • Cable outer diameter: 6.2–7 mm	Prepared by the customer

No.	Cable	Type	Recommended Specifications	Source
3	Ground cable	Single-core outdoor copper cable	• 8 mm^2	Prepared by the customer

Table 5-2 Cables delivered with the battery

No.	Cable	Type	Source
a	DC input power cable (power control module to battery expansion module)	Common outdoor PV cable in the industry	Delivered with the product
b	Signal cable (power control module to battery expansion module)	Outdoor shielded twisted pair cable	Delivered with the product
c	Ground cable (between the power control module and battery expansion modules)	Single-core outdoor copper cable	Delivered with the product

NOTE

- The minimum cable diameter must comply with local cable standards.
- The factors that affect cable selection include the rated current, cable type, routing mode, ambient temperature, and maximum expected line loss.

5.2 Internal Electrical Connections of the Battery

NOTE

Internal cables are delivered with the battery. For details, see the *Packing List* in the packing case.

5.2.1 Installing an Internal Ground Cable

Precautions

DANGER

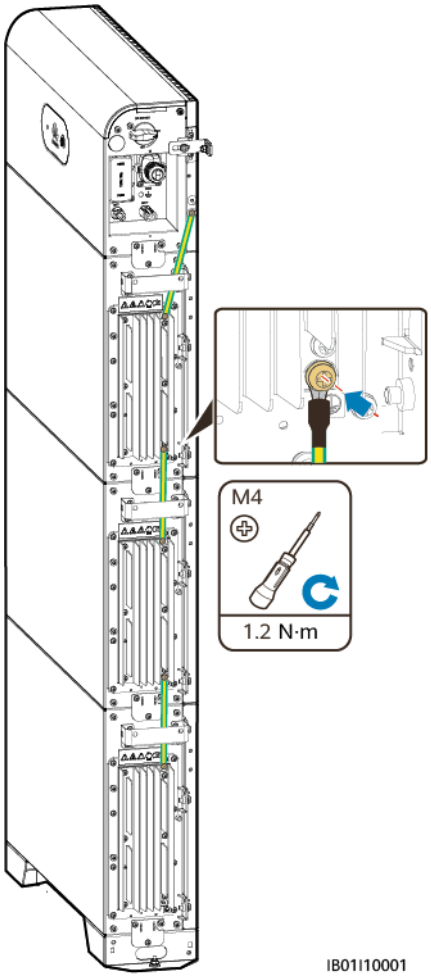
Ensure that the PE cable is securely connected. Otherwise, electric shocks may occur.

NOTE

It is recommended that silica gel or paint be used around the ground terminal after the PE cable is connected.

Step 1 Connect the PE cable to the battery power control modules and battery expansion modules.

Figure 5-2 Connecting the internal PE cable

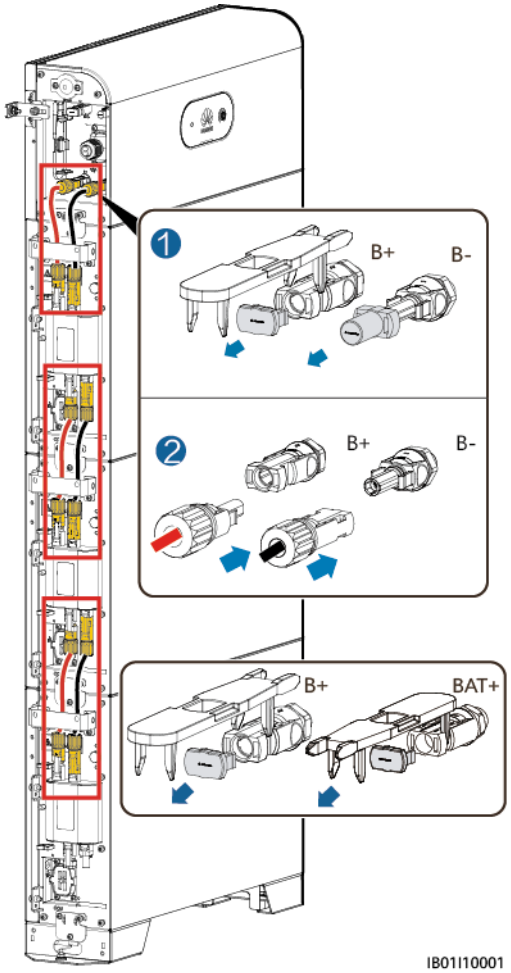


----End

5.2.2 Installing Internal DC Terminals

Step 1 Insert the positive and negative connectors delivered with the battery into the positive and negative battery cascading terminals (B+ and B–).

Figure 5-3 DC power cable connection inside the battery



NOTE

The DC terminals between the power control module and the battery expansion modules use the DC connection cable (Amphenol terminal) delivered with the battery.

NOTICE

After the positive and negative connectors snap into place, pull the DC input power cables back to ensure that they are connected securely.

----End

5.2.3 Connecting Internal Signal Cables

Connecting Signal Cables Between the Power Control Module and Battery Expansion Modules

NOTE

- The protective housing of the communications terminal delivered with the device can be fastened with clips or screws based on the actual diagram.
- Connect the communications terminals of the power control module and battery expansion modules in sequence and secure them using cable clips. Install the internal signal cables described in this section using the three signal cables with a diameter of 5 mm and rubber plugs delivered with the DCDC. Do not use signal cables with a diameter of 7 mm. Do not install a cable with a diameter of 5 mm into a Φ7 mm rubber plug, the 7 mm hole is used to connect to an inverter or cascaded battery.

Figure 5-4 Securing With Clips

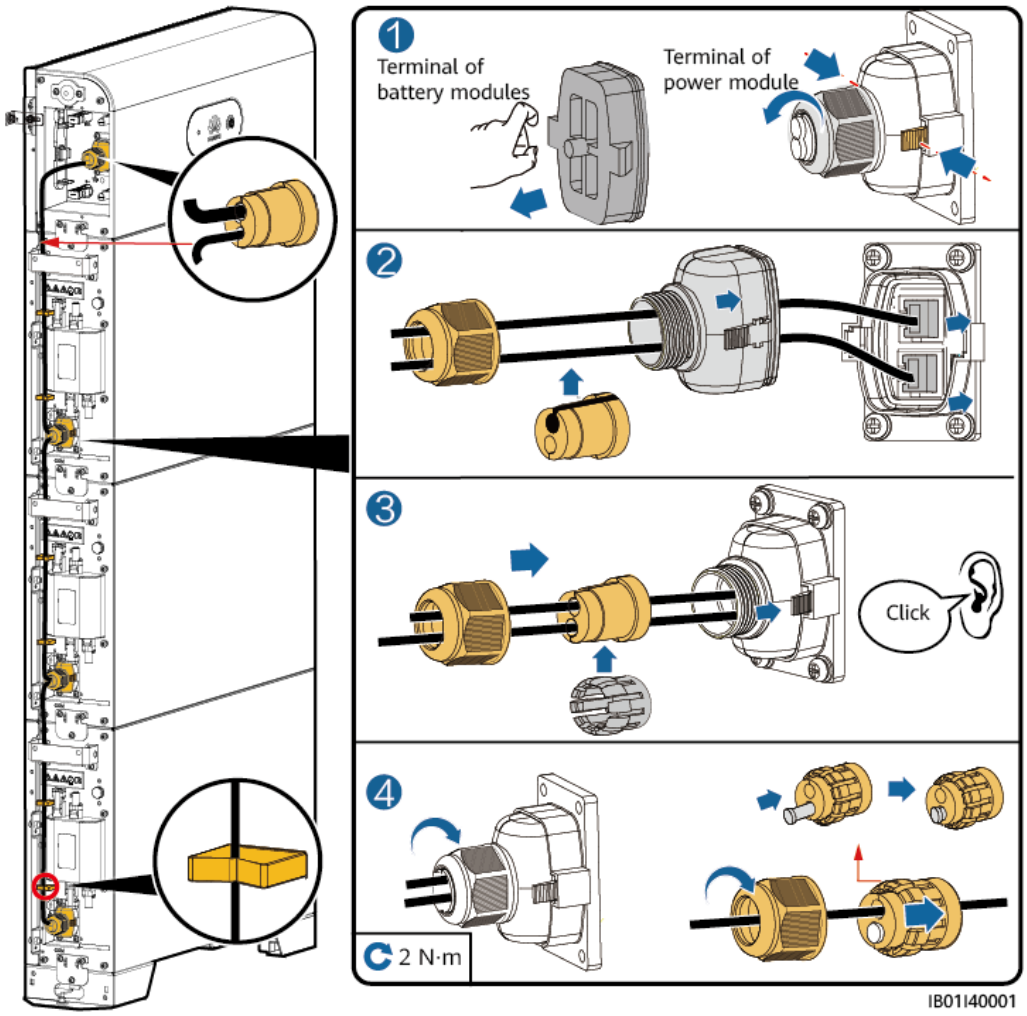
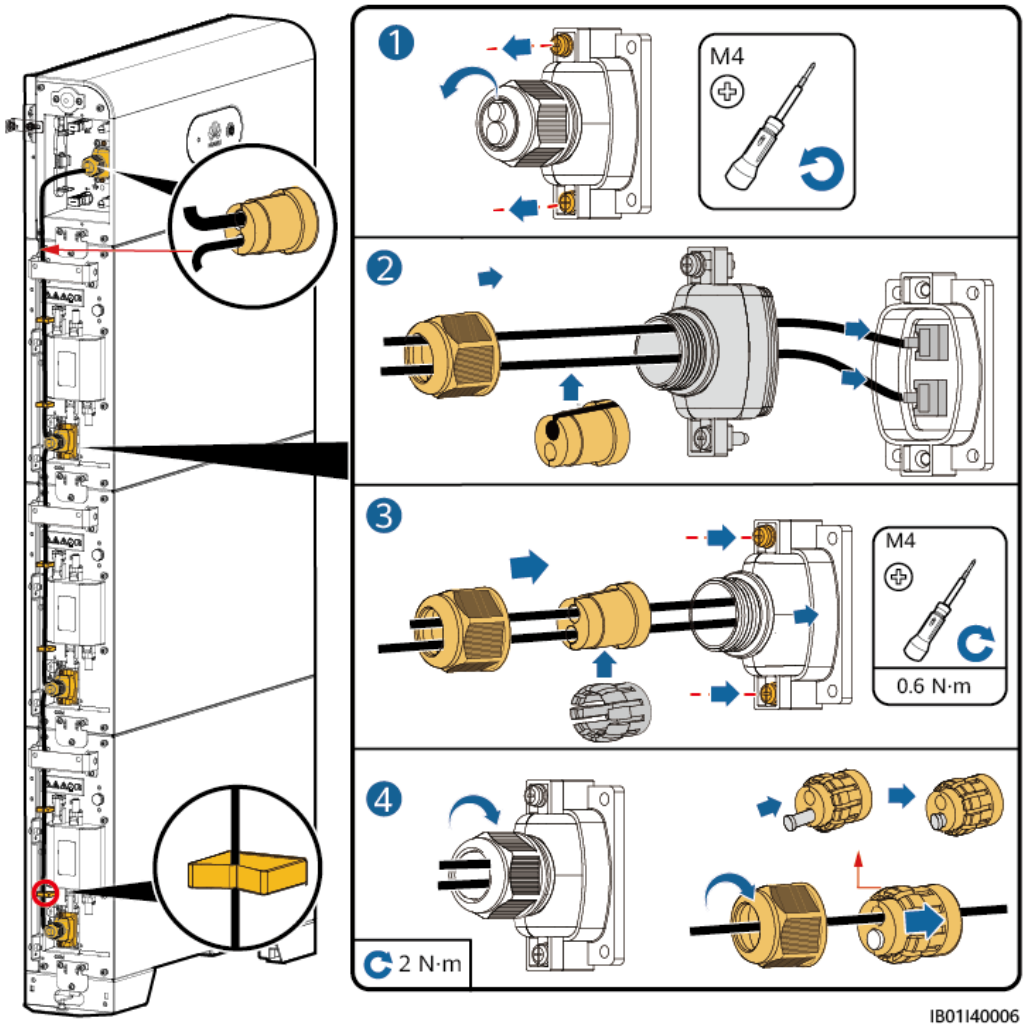


Figure 5-5 Securing With Screws



NOTE

- When a communications terminal is connected to a single network cable, a waterproof rubber plug must be installed. Do not install a cable with a diameter of 5 mm into a Φ7 mm rubber plug.
- After inserting the terminal shell into the COM port, shake the terminal shell left and right and pull it back to ensure that it is securely installed, and tighten the nut (ensure that the rubber plug is tightly compressed). Otherwise, the waterproof performance is affected.

5.3 External Electrical Connections of the Battery

Connection Diagram (Inverter + One Battery)

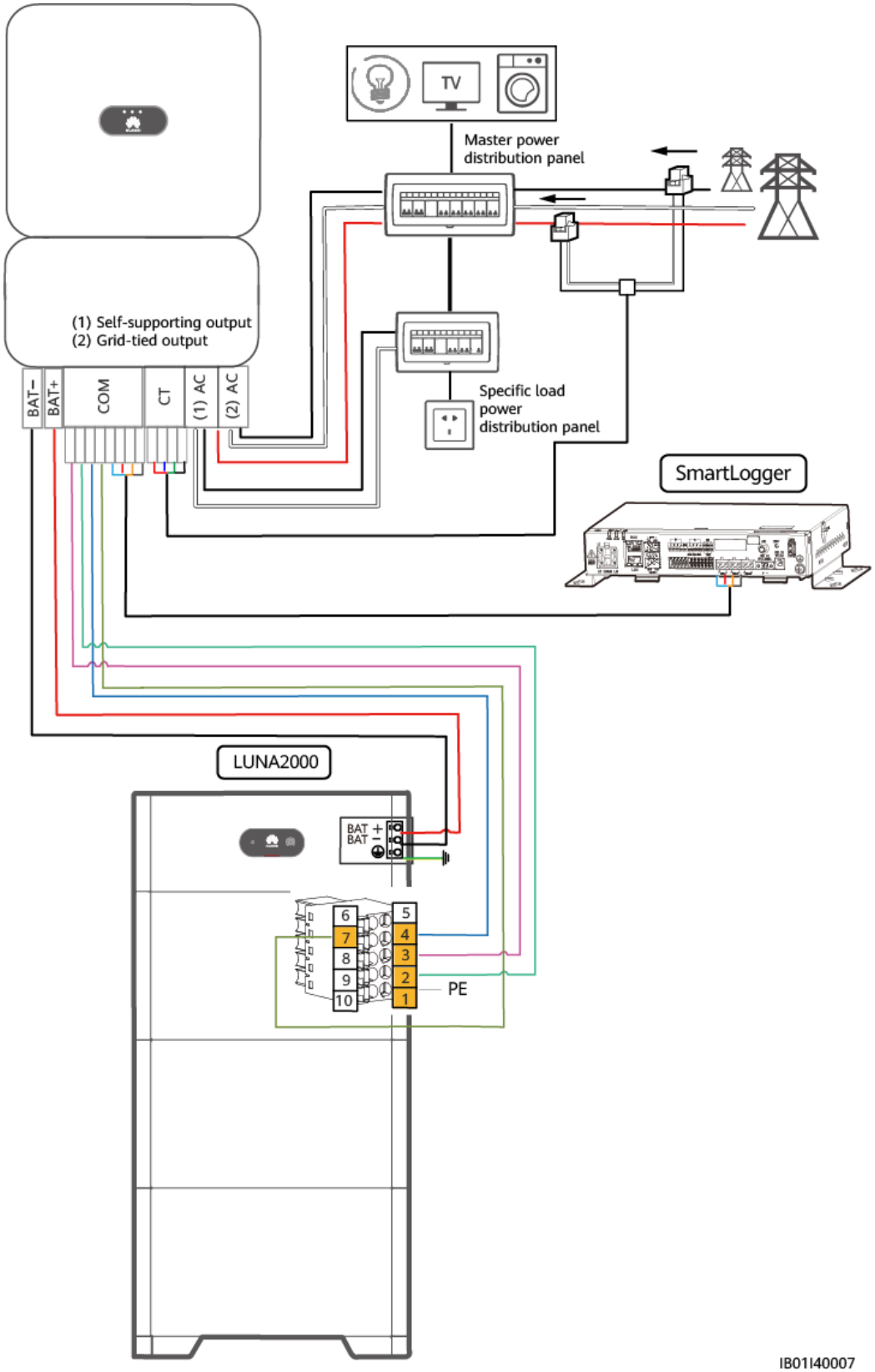
NOTE

The DC-DC converter has a COM port on both sides. The communication cable of the inverter can connect to the COM port on either side. You can choose a COM port based on the installation position. The COM port on the right side is recommended.

NOTICE

The COM ports on the two sides of the DC-DC converter are symmetrical and in different directions. Insert the cables to the COM ports in the directions shown in the figure.

Figure 5-6 Connection Diagram (Inverter + One Battery)



Connection Diagram (Inverter + Two Batteries)

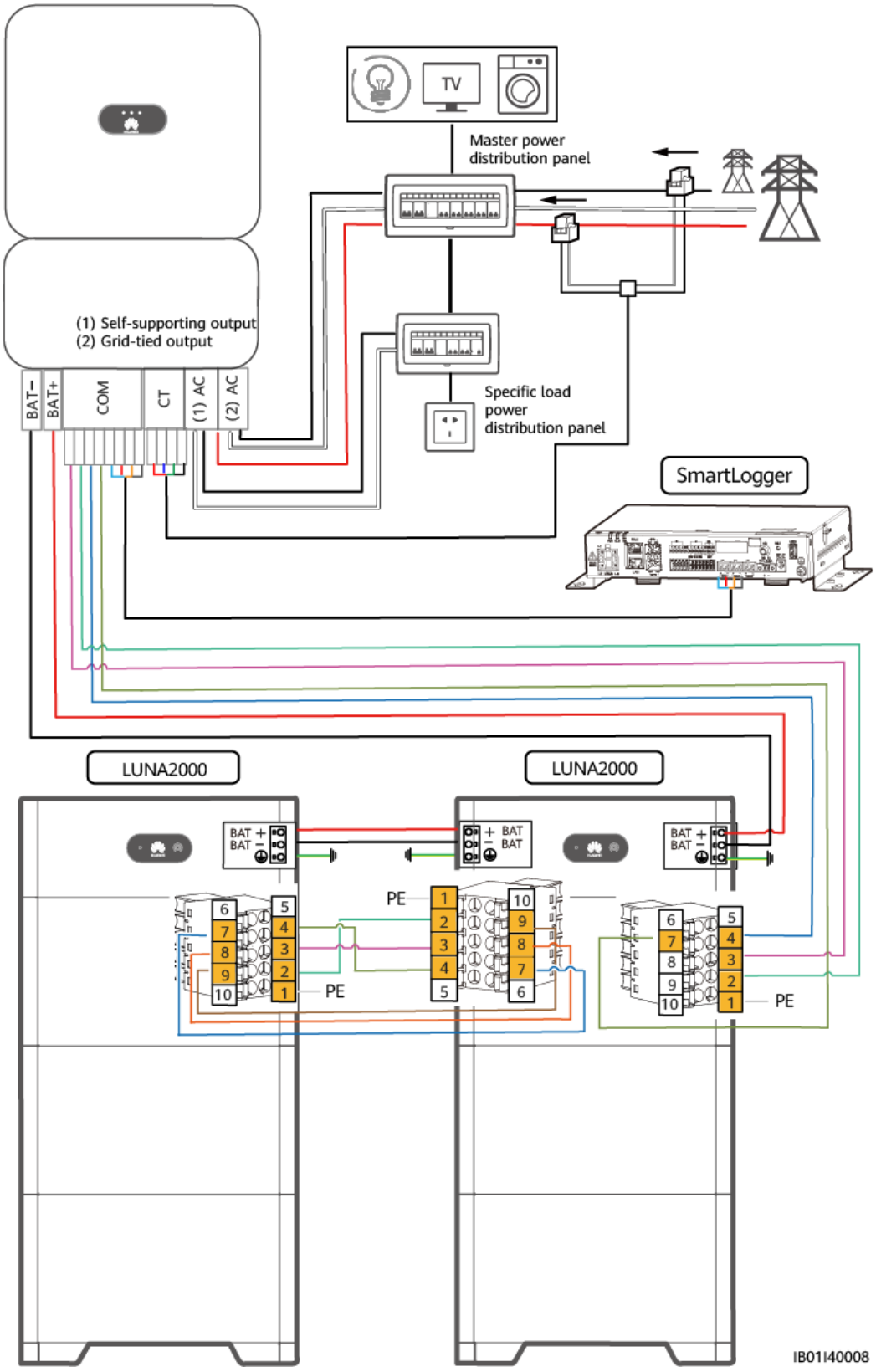
NOTE

The DC-DC converter has a COM port on both sides. When batteries are connected in parallel, you are advised to connect the inverter to the COM port on the right side and connect the cascaded batteries to the COM port on the left side.

WARNING

The COM ports on the two sides of the DC-DC converter are symmetrical and in different directions. Insert the cables to the COM ports in the directions shown in the figure.

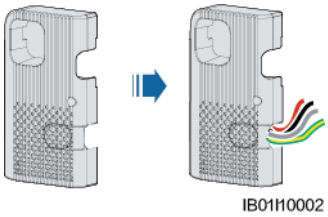
Figure 5-7 Connection Diagram (Inverter + Two Batteries)



Routing Cables Out of the Cable Hole

Cut a cable hole based on the cabling mode, and route external cables through the cable hole.

Figure 5-8 Routing cables out of the cable hole



NOTICE

Before connecting external cables, route the cables through the cable hole to avoid disconnecting after installation.

5.3.1 Installing a PE Cable

Precautions

DANGER

Ensure that the PE cable is securely connected. Otherwise, electric shocks may occur.

NOTE

It is recommended that silica gel or paint be used around the ground terminal after the PE cable is connected.

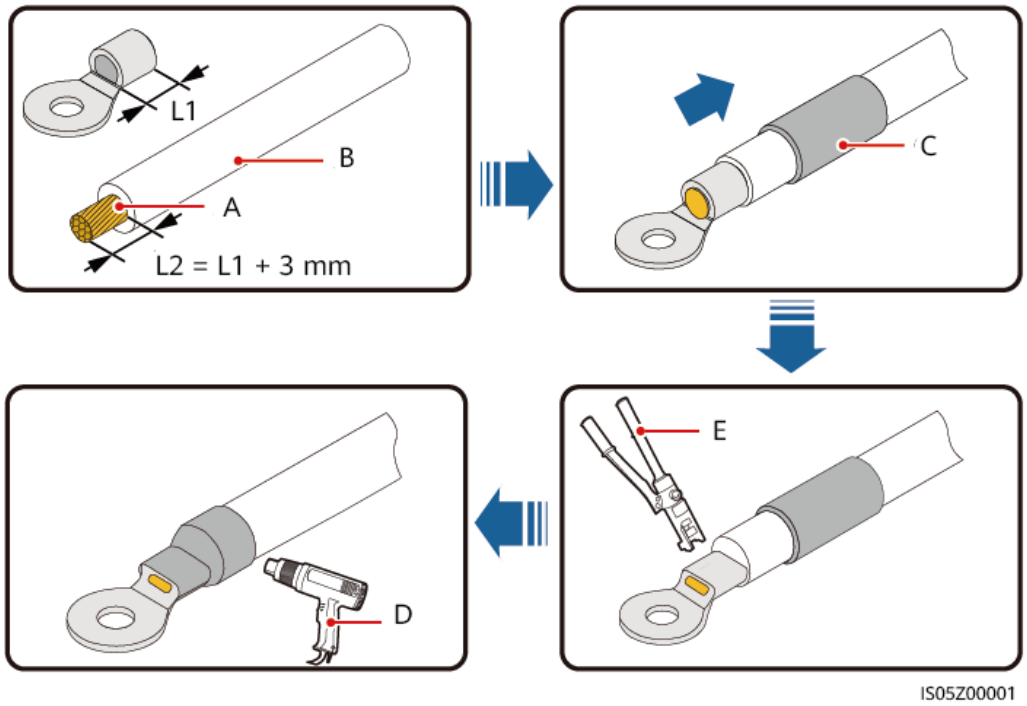
Procedure

Step 1 Crimp an OT terminal.

NOTICE

- Avoid scratching the core wire when stripping a cable.
- The cavity formed after the conductor crimp strip of the OT terminal is crimped must wrap the core wires completely. The core wires must contact the OT terminal closely.
- Wrap the wire crimping area with heat shrink tubing or insulation tape. The heat shrink tubing is used as an example.
- When using a heat gun, protect the equipment from being scorched.

Figure 5-9 Crimping an OT terminal

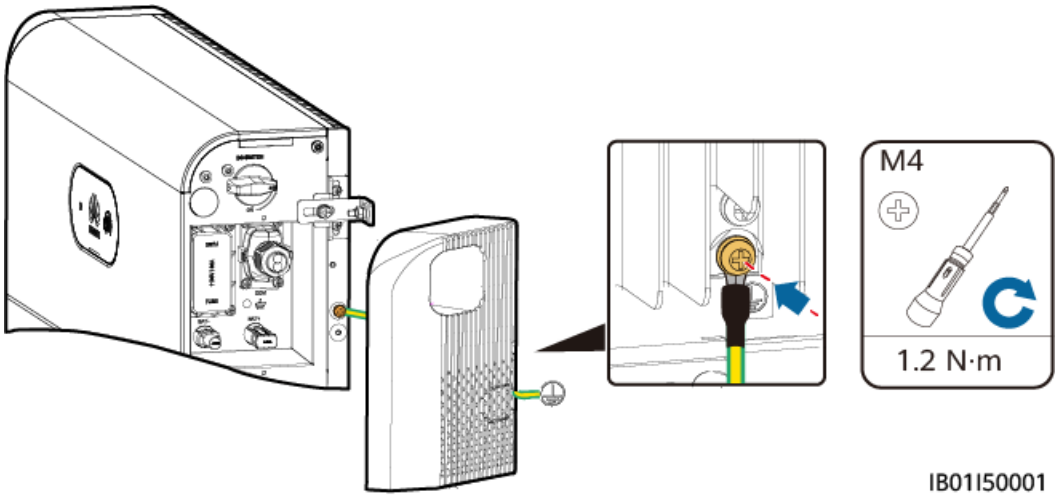


(A) Core wire (B) Insulation layer (C) Heat shrink tubing

(D) Heat gun (E) Hydraulic pliers

Step 2 Connect the ground point of the power control module to the external ground point.

Figure 5-10 Grounding the PE cable



NOTE

It is recommended that silica gel or paint be used around the ground terminal after the PE cable is connected.

----End

5.3.2 Installing DC Input Power Cables

Connect DC input power cables to the inverter

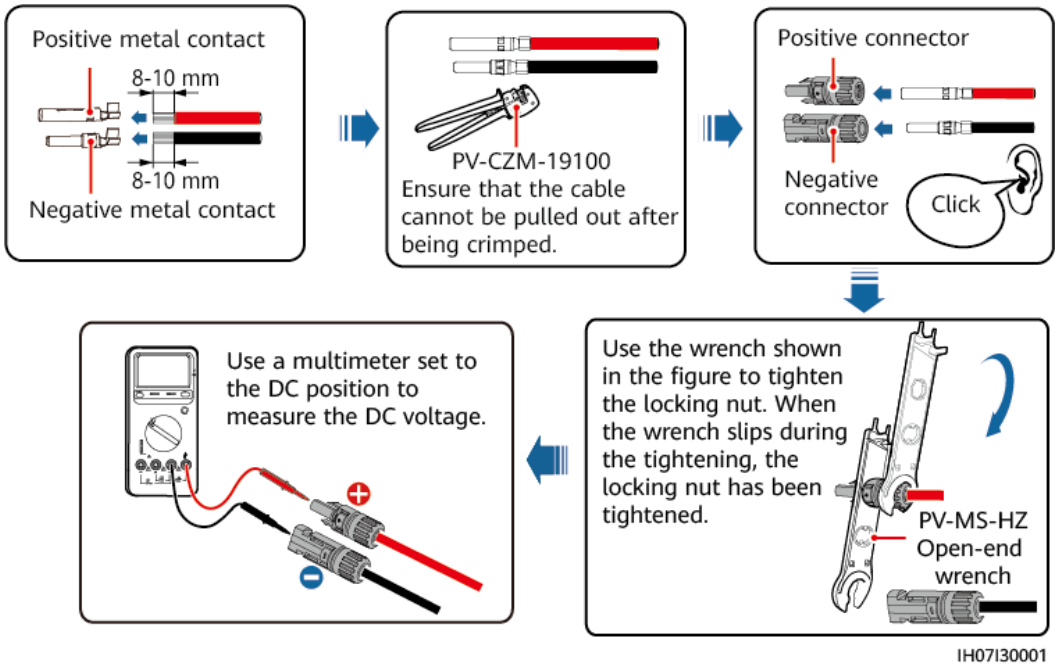
Insert the positive and negative battery connectors (Staubli) into the corresponding DC input terminals (BAT+ and BAT–).

NOTE

The DC input terminals (BAT+ and BAT–) on the left and right sides of the battery are the same.

Step 1 Assemble DC connectors.

Figure 5-11 Assembling DC connectors



CAUTION

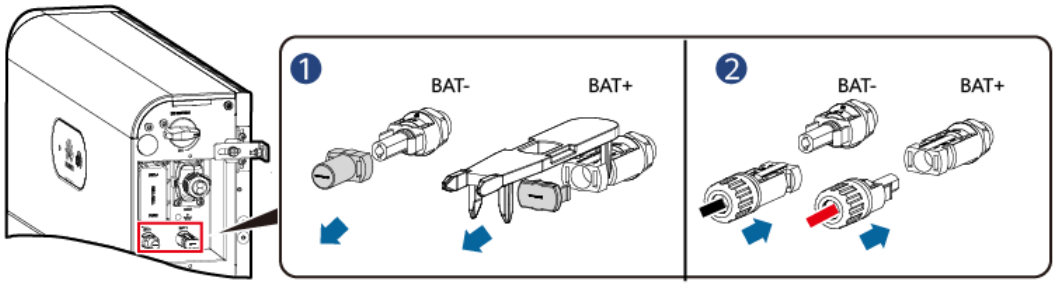
- For battery terminals, use the delivered Staubli MC4 positive and negative metal terminals and DC connectors. Using incompatible positive and negative metal terminals and DC connectors may burn the cables or damage the module. The resulting device damage will not be covered under warranty.
- You are advised to use the PV-CZM-19100 crimping pliers or other crimping pliers with the same specifications.

NOTICE

- Keep the DC input BAT+ cable and BAT– cable close to each other.
- Cables with high rigidity, such as armored cables, are not recommended as DC input power cables to avoid cable folding.
- Before assembling DC connectors, label the cable polarities correctly to ensure correct cable connections.
- After crimping the positive and negative metal terminals, pull the DC input power cables back to ensure that they are connected securely.
- Insert the crimped metal terminals of the positive and negative power cables into the appropriate positive and negative connectors. Then pull back the DC input power cables to ensure that they are connected securely.

Step 2 Insert the positive and negative connectors into the battery terminals (BAT+ and BAT-) on the switch and connect the other end to the cascaded battery.

Figure 5-12 Connecting battery cables



----End

5.3.3 Installing a Signal Cable

Connecting the Signal Cable between the Power Control Module and the Inverter

NOTICE

When laying out a signal cable, separate it from power cables and keep it away from strong interference sources to prevent communication interruption.

The COM port definitions on both sides of the power control module are the same. It is recommended that the COM port on the switch side be connected to the inverter and the COM port on the other side be connected to the cascaded battery.

Figure 5-13 Signal cable ports

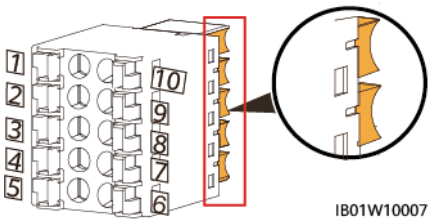


Table 5-3 COM port definition

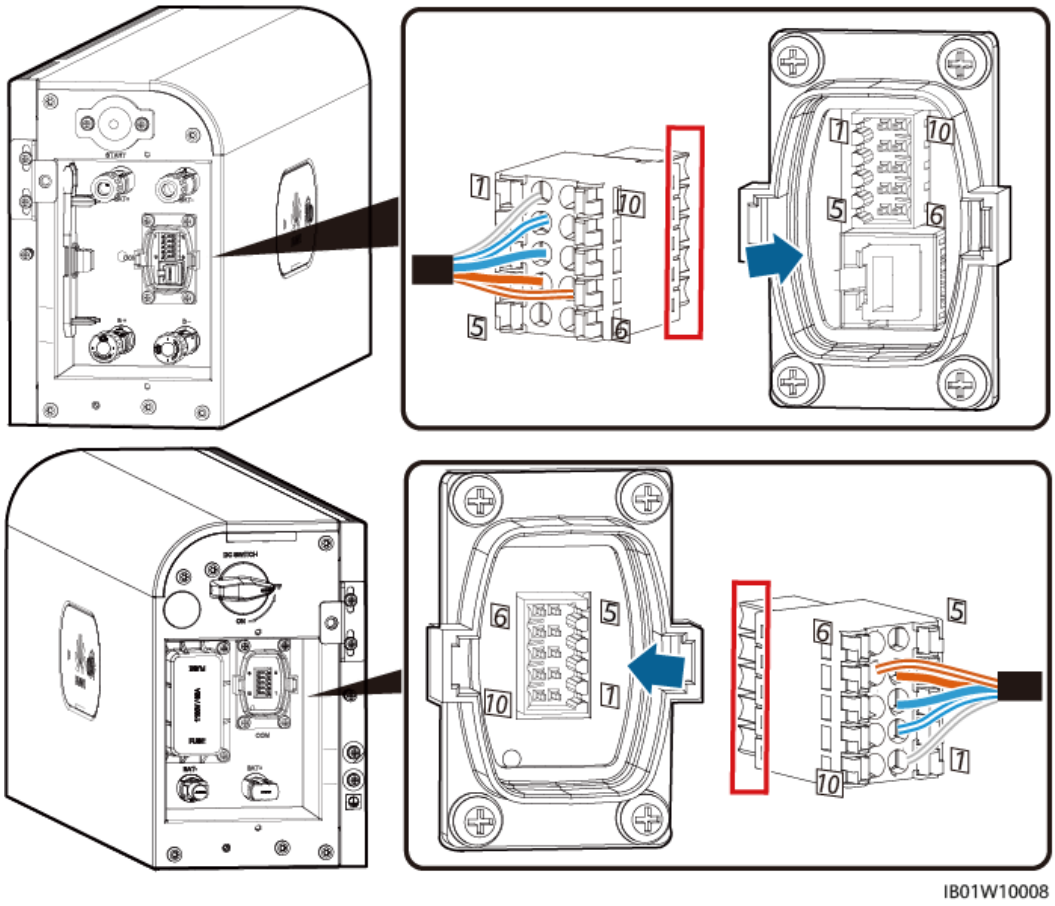
No.	Label	Definition	Description
1	PE	Shield layer grounding	Shield layer grounding
2	Enable-	Enable signal GND	Connects to the enable signal GND of the inverter.
3	Enable+	Enable signal+	Connects to the positive enable signal of the inverter.
4	485A1	RS485A, RS485 differential signal+	Connects to the RS485 signal port + of the inverter or cascaded battery.
5	485A2	RS485A, RS485 differential signal+	Reserved
6	485B2	RS485B, RS485 differential signal–	Reserved
7	485B1	RS485B, RS485 differential signal–	Connects to the RS485 signal port - of the inverter or cascaded battery.
8	CANL	Extended CAN bus port	Used for signal cable cascading in battery cascading scenarios.
9	CANH	Extended CAN bus port	Used for signal cable cascading in battery cascading scenarios.
10	PE	Shield layer grounding	Shield layer grounding

Terminals

NOTE

Identify the signal terminal pins according to the following figures, and connect cables according to **Table 5-3**. When you insert the communications terminal of the power control module, the silk screens on the two sides of the communications port are different. Insert the communications terminal according to the following figures.

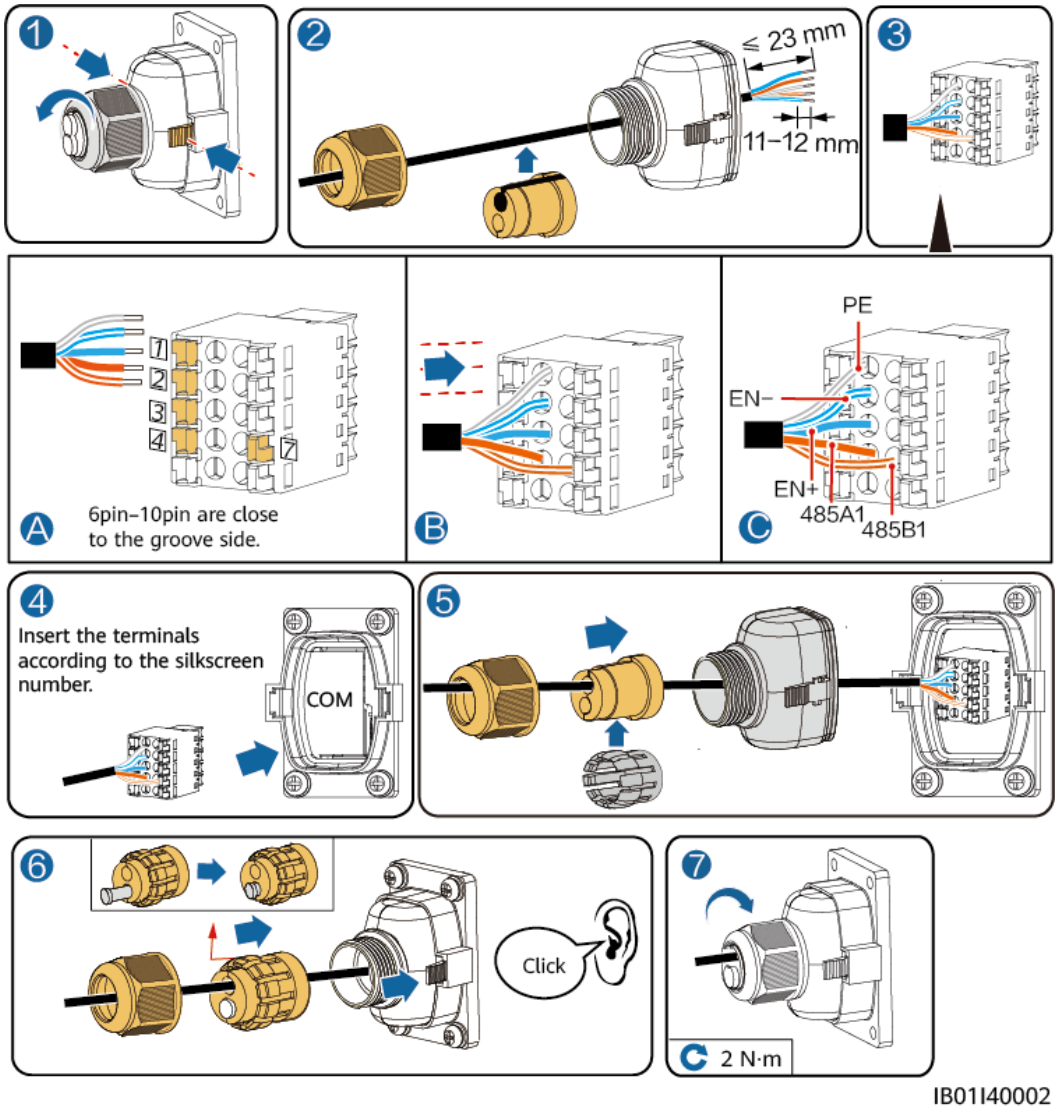
Figure 5-14 Inserting the terminal



Connecting a Signal Cable

Prepare signal cable terminals for connecting to the inverter.

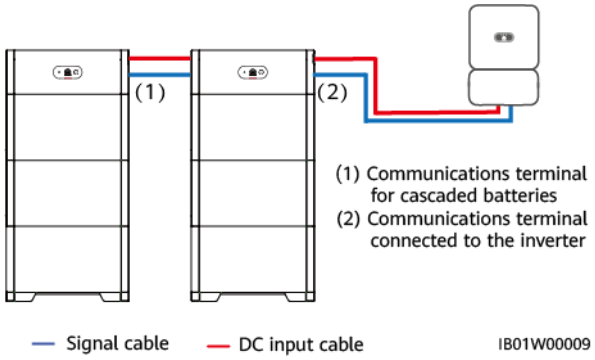
Figure 5-15 Connecting inverter terminals



5.4 (Optional) Cascading Batteries

Battery Cascading Cable Connection

Figure 5-16 Battery cascading cable connection



Connecting Cascading DC Input Power Cables (Cascading)

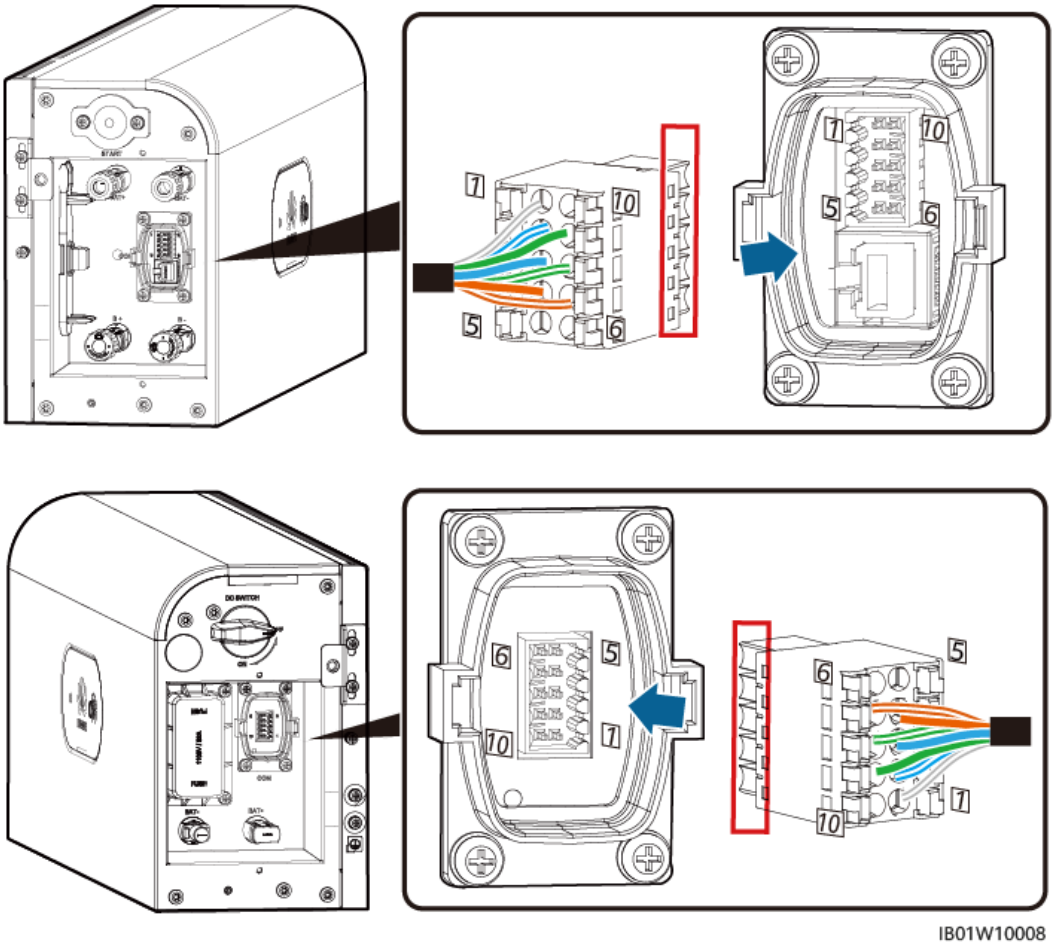
Connect the DC input terminals (BAT+ and BAT–) between the power control module by referring to **5.3.2 Installing DC Input Power Cables**.

Terminals

NOTE

Identify the signal terminal pins according to the following figures, and connect cables according to **Table 5-3**. When you insert the communications terminal of the power control module, the silk screens on the two sides of the communications port are different. Insert the communications terminal according to the following figures.

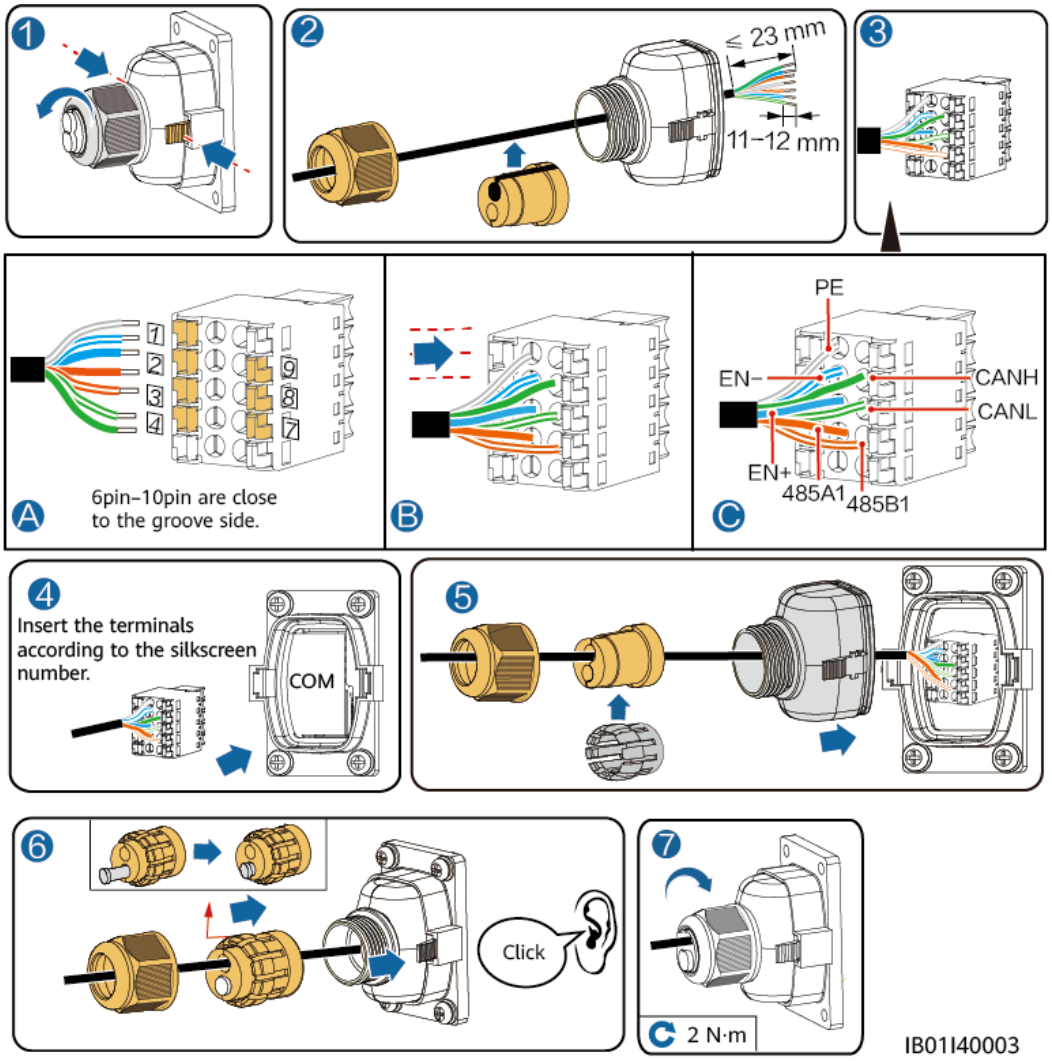
Figure 5-17 Inserting the terminal



Connecting a Signal Cable (Cascading)

Prepare a signal cable terminal for connecting the power control module.

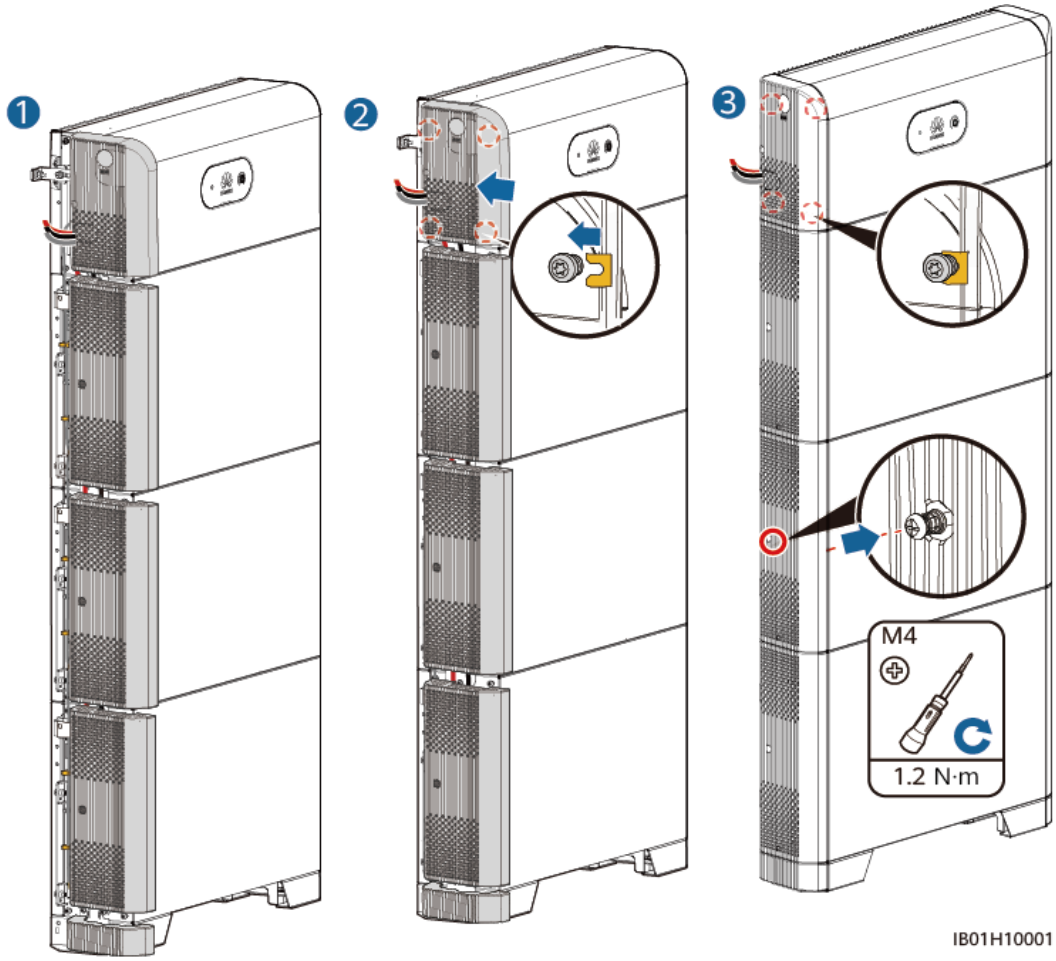
Figure 5-18 Cascading communication terminal



5.5 Installing the Cover

After electrical connections are complete, check that cables are correctly and securely connected, install the external protective cover, and secure it using screws.

Figure 5-19 Installing the cover



6 System Commissioning

6.1 Verification Before Power-On

Table 6-1 Check items and acceptance criteria

No.	Check Item	Acceptance Criteria
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	The DC switch and all switches connected to the battery are OFF.
6	Cable connection	The AC output power cable, DC 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.

6.2 System Power-On

NOTICE

- To prevent the device from being exposed to high humidity in the power-off state, you are advised to power on the LUNA2000 within 24 hours after unpacking it. The period for which the device remains powered-off during maintenance must not exceed 24 hours. Otherwise, condensation may cause damage to the device.
- After turning on the battery switch, power on the inverter. For details about how to power on the inverter, see the quick guide for the corresponding inverter model.

NOTE

If no PV module is configured, press the black start button first.

Turn on the DC switch on the battery. After the battery is installed and powered on for the first time, the ring LED blinks for three circles. Observe the battery indicator to check the running status.

LED Indicators

Table 6-2 LED indicators

Category	Status (Blinking at Long Intervals: On for 1s and then Off for 1s; Blinking at Short Intervals: On for 0.2s and then Off for 0.2s)		Description
Running indicator			N/A
	Steady green	Steady green	Operating mode
	Blinking green slowly	Blinking green slowly	Standby mode
	Off	Off	Hibernation mode
	Blinking red fast	N/A	Power control module environment alarm
	N/A	Blinking red fast	Battery expansion module environment alarm
	Steady red	N/A	The power control module is faulty.
	N/A	Steady red	The battery expansion module is faulty.

Category	Status (Blinking at Long Intervals: On for 1s and then Off for 1s; Blinking at Short Intervals: On for 0.2s and then Off for 0.2s)		Description
	Steady red	Steady red	Faulty
Battery system indicator			N/A
	Green		Battery level. Each bar indicates 10%.
	Steady red		The first three bars indicate the number of faulty battery expansion modules.

6.3 Battery Commissioning

NOTE

- You can set parameters on the FusionSolar app (recommended) or SmartLogger WebUI (not recommended) as required.
- Install the FusionSolar app (5.7.001 or later).
- Mobile phone operating system: Android 5.0, iOS 11.0, or later versions are supported. You are recommended to use mobile phones of Android 8.0 to 10.0 or iOS 13.0 to 14.8. Use mobile phones that support web browsers and can access the Internet.

6.3.1 Device Commissioning (FusionSolar App) (Recommended)

NOTE

- During system deployment, if the communications cables Enable+/Enable– are correctly connected, the SUN2000 enables the battery and the indicator is on. Do not press the black start button to enable the battery. Otherwise, the communications cable connection between the SUN2000 and the battery cannot be verified.
- If no PV modules are installed or the system has not detected sunlight for at least 24 hours, the minimum end of discharge SOC is 15%.

For details about how to use the site deployment wizard, see **Residential PV Energy Storage System Setting App Guide**. During the FusionSolar app upgrade, scan the QR code to download the quick guide.

Figure 6-1 Residential PV energy storage system setting app guide


After the construction is complete, check the installation by referring to the **Checklist for the Construction of Residential PV Energy Storage System**.

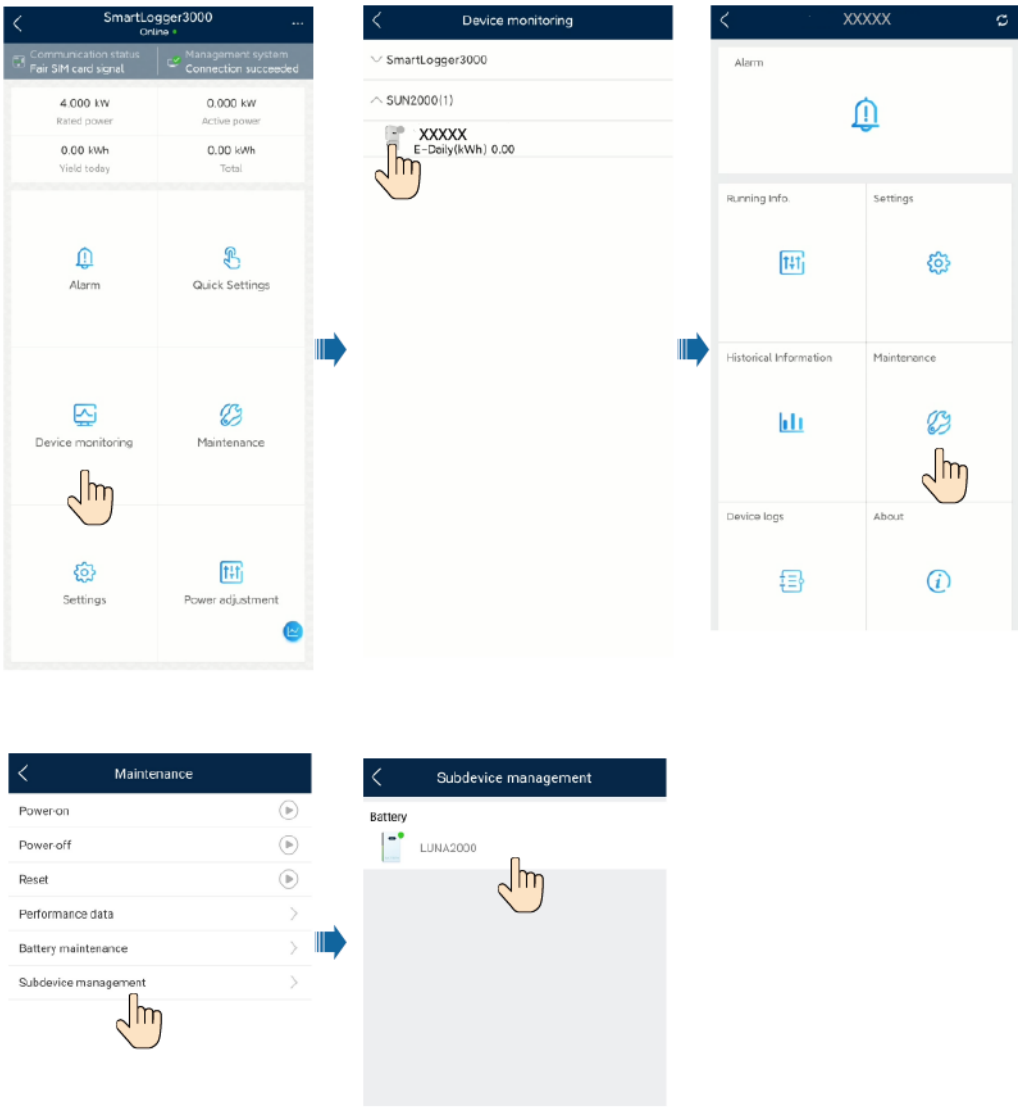
Figure 6-2 Checklist for the construction of the residential PV energy storage system

6.3.2 Battery Maintenance and Upgrade

Querying the Battery Status

On the home screen, tap **Device monitoring** > **Maintenance** > **Subdevice management** on the home screen to view the running status, level, power, and charge and discharge status of the battery.

Figure 6-3 Device monitoring



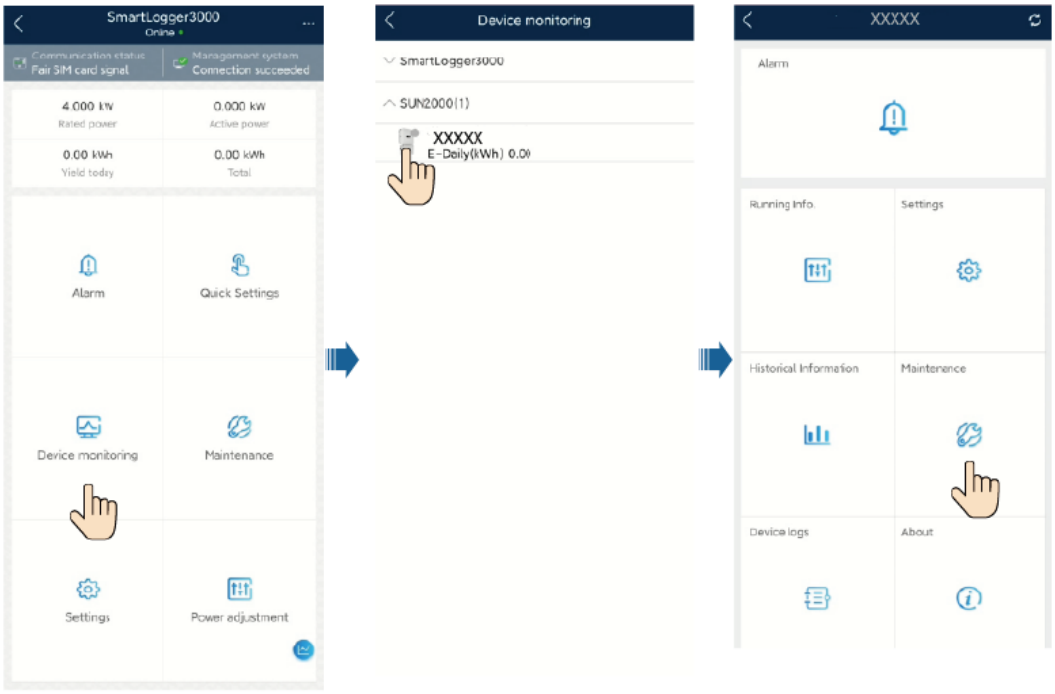
Forced Charge and Discharge

NOTE

If the inverter is upgraded or reset, or the battery is upgraded or goes offline, forced charge and discharge will stop.

Step 1 On the home screen, tap **Device monitoring**, and tap the corresponding inverter to access the device setting screen.

Figure 6-4 Device setting screen



Step 2 On the screen opened in step 1, choose **Maintenance** > **Battery maintenance** > **Forced charge and discharge**, set forced charged and discharged parameters, and tap **Submit**.

Figure 6-5 Forced Charge and Discharge

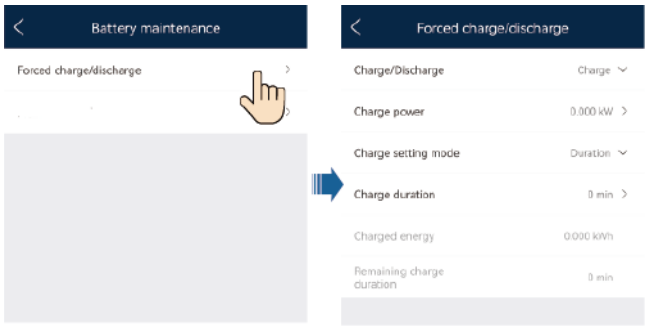


Table 6-3 Description of forced charge/discharge parameters

Parameter	Description	Value Range
Charge/Discharge	Specifies whether to charge or discharge the battery.	• Stop • Charge • Discharge
Charge/Discharge power (kW)	Specifies the forced charge/discharge power.	• Charge: [0, Maximum charge power] • Discharge: [0, Maximum discharge power]

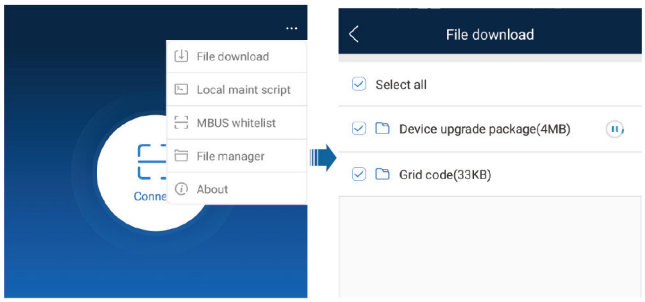
Parameter	Description	Value Range
Charge/Discharge setting mode	Specifies the charge and discharge mode.	• Duration • Charged/Discharged energy
Charge/Discharge duration (min)	Specifies the charge and discharge duration.	[0, 1440]
Remaining charge/ discharge duration (min)	Specifies the remaining charge and discharge duration. This parameter cannot be set.	-
Charged/Discharged energy (kWh)	Specifies the charged or discharged battery level. This parameter cannot be set.	-
Charged/Discharged duration (min)	Specifies the charged and discharged duration. This parameter cannot be set.	-

----End

Downloading an Upgrade Package

Step 1 When your phone is connected to a network, on the connection screen, tap ••• in the upper right corner, and then choose **File download**.

Figure 6-6 Downloading a file



Step 2 Download the device upgrade package and grid code when an update is detected.

Step 3 On the screen for downloading the upgrade package, tap **Download**.

----End

7 System Maintenance

7.1 System Power-Off

Precautions

WARNING

- 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.

Powering Off the System

Step 1 Turn off the AC switch between the inverter and the power grid.

Step 2 Turn off the DC switch at the bottom of the inverter.

Step 3 Turn off the DC switch between the PV string and the inverter if there is any.

Step 4 Turn off the DC switch on the battery.

----End

7.2 Routine Maintenance

To ensure that the battery can operate properly for a long term, you are advised to perform routine maintenance on it as described in this chapter.

CAUTION

Before cleaning the system, connecting cables, and ensuring the grounding reliability, power off the system.

Table 7-1 Maintenance checklist

Check Item	Check Method	Maintenance Interval
System cleanliness	Check periodically that the heat sinks are free from obstacles and dust.	Once every 6 to 12 months
System running status	• Check that the battery is not damaged or deformed. • Check that the battery does not generate abnormal sound when it is in operation. • Check that the battery parameters are correctly set when the battery is running.	Once every 6 months
Electrical Connection	• Check that cables are secured. • Check that cables are intact, and that in particular, the parts touching the metallic surface are not scratched. • Check that unused DC input terminals, battery terminals, and COM ports are locked by watertight caps.	The first inspection is 6 months after the initial commissioning. From then on, the interval can be 6 to 12 months.
Grounding reliability	Check that ground cables are securely connected.	The first inspection is 6 months after the initial commissioning. From then on, the interval can be 6 to 12 months.

Battery recycling

This product has a built-in lithium ion battery. For battery product handling, please contact the dealer from which you purchased the product or our contact center.

About SII Subsidies

When you receive a SII subsidy, you will need to obtain SII's approval in advance if you need to dispose of the battery within the statutory disposal limitation period

(6 years). (Environmental Co-Creation Initiative of the Association of SII General Corporations)

7.3 Troubleshooting

Alarm severities are defined as follows:

- Major: The battery shuts down or some functions are abnormal due to a fault.
- Minor: Some components of the battery are faulty but the battery can still work.

Table 7-2 Common alarms and troubleshooting measures

Alarm ID	Alarm Name	Alarm Severity	Possible Cause	Troubleshooting
3000	Low battery DC input bus voltage	Major	1. The DC bus voltage of the battery is low. 2. The battery DC switch is OFF. 3. The battery cables are not correctly connected.	1. Turn off the inverter AC output switch, inverter DC input switch, and battery DC switch, and wait for 5 minutes. 2. Check the cable connections to the [Battery-1/2] power control module by referring to the quick installation guide. 3. After checking that the battery power cables are correctly connected, turn on the battery DC switch, AC output switch, and inverter DC input switch in sequence. 4. If the alarm persists, contact your dealer or Huawei technical support.
3001	Abnormal battery power control module	Major	A major fault has occurred on the internal circuit of the battery power control module.	1. Turn off the inverter AC output switch, inverter DC input switch, and battery DC switch, and wait for 5 minutes. 2. Turn on the battery DC switch, inverter AC output switch, and DC input switch. 3. If the alarm persists on the [Battery-1/2] power control module (the battery fault indicator is steady on), contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Alarm Severity	Possible Cause	Troubleshooting
3002	Battery power control module overtemperature	Minor	1. The installation position of the battery power control module is not well ventilated. 2. The ambient temperature is excessively high. 3. The battery power control module is abnormal.	1. Check the ventilation and whether the ambient temperature of the [Battery-1/2] power control module exceeds the upper threshold. 2. If the ventilation is poor or the ambient temperature is excessively high, improve the ventilation and heat dissipation. 3. If the ventilation and ambient temperature are normal, contact your dealer or Huawei technical support.
3003	Battery power control module fuse blown	Major	The fuse of the battery power control module is blown.	1. Turn off the inverter AC output switch, inverter DC input switch, and battery DC switch, and wait for 5 minutes. 2. Replace the fuse of the [Battery-1/2] power control module. 3. Turn on the battery DC switch, inverter AC output switch, and inverter DC input switch in sequence. If the alarm persists, contact your dealer or Huawei technical support.
3004	Battery power control module reversely connected	Major	The positive and negative terminals are reversely connected when the battery power control module connects to the inverter.	1. Turn off the inverter AC output switch, inverter DC input switch, and battery DC switch, and wait for 5 minutes. 2. Check the cable connections to the [Battery-1/2] power control module by referring to the quick installation guide. 3. After checking that the battery power cables are correctly connected, turn on the battery DC switch, AC output switch, and inverter DC input switch in sequence. 4. If the alarm persists, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Alarm Severity	Possible Cause	Troubleshooting
3005	Battery power control module DC switch OFF	Warning	1. The DC switch of the battery power control module is OFF. 2. The DC bus cable to the battery power control module is disconnected.	1. Turn off the inverter AC output switch, inverter DC input switch, and battery DC switch, and wait for 5 minutes. 2. Check the cable connections to the [Battery-1/2] power control module by referring to the quick guide. 3. After checking that the battery power cables are correctly connected, turn on the battery DC switch, AC output switch, and inverter DC input switch in sequence. 4. If the alarm persists, contact your dealer or Huawei technical support.
3006	Abnormal battery expansion module	Major	A major fault has occurred on the internal circuit of the battery expansion module.	1. Check that the power cables and communications cables are correctly connected to the [Battery-1/2 battery expansion module-1/2/3] battery expansion modules. 2. Send a shutdown command on the app, turn off the inverter AC output switch, inverter DC input switch, and battery DC switch, and wait for 5 minutes. 3. Turn on the battery DC switch, inverter AC output switch, and DC input switch. 4. If the alarm persists, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Alarm Severity	Possible Cause	Troubleshooting
3007	Battery expansion module cable disconnected	Major	1. A battery expansion module cable is disconnected. 2. A battery expansion module is abnormal.	1. Turn off the inverter AC output switch, inverter DC input switch, and battery DC switch, and wait for 5 minutes. 2. Check whether the power cable is securely connected to the [Battery-1/2 battery expansion module-1/2/3] battery expansion modules (the terminal is loose or disconnected, or the cable is disconnected). For details, see the quick installation guide. 3. After checking that the cables are correctly connected, turn on the battery DC switch, AC output switch, and inverter DC input switch in sequence. 4. If the alarm persists, contact your dealer or Huawei technical support.
3008	Battery expansion module overtemperature	Minor	1. The battery installation position is not well ventilated. 2. The ambient temperature is excessively high. 3. The battery power control module is abnormal.	1. Check the ventilation and whether the ambient temperature of the [Battery-1/2 battery expansion module-1/2/3] battery expansion modules exceeds the upper threshold. 2. If the ventilation is poor or the ambient temperature is excessively high, improve the ventilation and heat dissipation. 3. If the ventilation and ambient temperature are normal, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Alarm Severity	Possible Cause	Troubleshooting
3009	Battery expansion module low temperature	Minor	1. The ambient temperature is excessively low. 2. A battery expansion module is abnormal.	1. Check whether the ambient temperature in the installation positions of the [Battery-1/2 battery expansion module-1/2/3] battery expansion modules is lower than the lower threshold. 2. If the ambient temperature is excessively low, improve the installation environment. 3. If the alarm persists after the ambient temperature becomes normal, contact your dealer or Huawei technical support.
3010	Battery expansion module short circuit	Major	1. A battery expansion module is short-circuited. 2. A battery expansion module is abnormal.	1. Turn off the inverter AC output switch, inverter DC input switch, and battery DC switch, and wait for 5 minutes. 2. Check the power cable connection to the [Battery-1/2 battery expansion module-1/2/3] battery expansion modules by referring to the quick installation guide. If the cable is damaged or short-circuited, replace it. 3. After checking that the cables are correctly connected, turn on the battery DC switch, AC output switch, and inverter DC input switch in sequence. 4. If the alarm persists, contact your dealer or Huawei technical support.
3011	Battery expansion module undervoltage	Warning	The voltage of a battery expansion module is low.	If the sunlight is sufficient or AC reverse charging is allowed, the [Battery-1/2 battery expansion module-1/2/3] battery expansion modules can be charged when the inverter is running.

Alarm ID	Alarm Name	Alarm Severity	Possible Cause	Troubleshooting
3012	Abnormal battery power control module parallel communication	Major	The battery power control modules of the parallel system fail to communicate with each other.	1. Send a shutdown command on the app, turn off the inverter AC output switch, inverter DC input switch, and battery DC switch, and wait for 5 minutes. 2. Check that the communications cable is correctly connected between the [Battery-1/2] battery power control modules of the parallel system. 3. After checking that the cables are correctly connected, turn on the battery DC switch, AC output switch, and inverter DC input switch in sequence. 4. If the alarm persists, contact your dealer or Huawei technical support.
3013	Abnormal battery expansion module communication	Major	The battery power control module fails to communicate with the battery expansion modules.	1. Turn off the battery DC switch. 2. Check that the power cables and communications cables are correctly connected to the [Battery-1/2 battery expansion module-1/2/3] battery expansion modules. 3. After checking that cables are correctly connected, turn on the battery DC switch. 4. If the alarm persists, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Alarm Severity	Possible Cause	Troubleshooting
3047	Battery Pack Undervoltage	Major	1. The voltage of the battery pack or its cell is too low. 2. The battery pack has been stored for a long period of time. 3. The battery pack has been idle for a long time after grid connection.	1. The 3047-1 (battery pack undervoltage protection) and 3047-2 (cell undervoltage protection) alarms do not affect the running of other battery packs. 2. Connect to the power grid and charge batteries in a timely manner. 3. If the alarm persists after the battery has been charged for one hour, contact your dealer or technical support.
3049	Inconsistent Battery Power Control Module Versions	Warning	1. The versions of the power control modules in the parallel system are inconsistent. 2. The update failed.	1. The version of the power control modules in [Battery-CabinetNo] is inconsistent with that of other power control modules in the parallel system and needs to be updated. 2. If the update fails multiple times, contact your dealer or technical support.
3050	Inconsistent ESS Versions	Warning	1. The version of the battery power control modules is inconsistent with that of the battery packs. 2. The update failed.	1. The version of the power control modules in [Battery-CabinetNo] is inconsistent with that of the battery packs and needs to be updated. 2. If the update fails multiple times, contact your dealer or technical support.
3051	ESS Version Mismatch	Major	1. The version of the battery power control modules does not match that of the battery packs, which affects the normal operation. 2. The update failed.	1. The version of the power control modules in [Battery-CabinetNo] does not match that of the battery packs and needs to be updated. 2. If the update fails multiple times, contact your dealer or technical support.
3061	Battery Pack Lifespan Reached	Major	The battery has reached its lifespan.	The battery has reached the end of its lifespan. Contact the local recycling agency to dispose of it in compliance with local laws and regulations as well as applicable standards.

7.4 Battery Storage and Recharge

Battery Acceptance Inspection

A battery recharge label must be put on the battery packing case. The recharge label should contain the latest charge time and the next recharge time.

Battery Storage Requirements

1. Place batteries according to the signs on the packing case during storage. Do not put batteries upside down or sidelong.
2. Stack battery packing cases by complying with the stacking requirements on the external package.
3. Handle batteries with caution to avoid damage.
4. The storage environment requirements are as follows:
   - Ambient temperature: –10°C–+55°C; recommended storage temperature: 20°C–30°C
   - Relative humidity: 5% to 80%
   - Place batteries in a dry and clean place with proper ventilation.
   - Place batteries in a place that is away from corrosive organic solvents and gases.
   - Keep batteries away from direct sunlight.
   - Keep batteries at least 2 meters away from heat sources.
5. The batteries in storage must be disconnected from external devices. The indicators (if any) on the batteries should be off.
6. AC mains input voltage requirements in the charging places: 202 V
7. The warehouse keeper should collect battery storage information every month and periodically report the battery inventory information to the planning department. The batteries that have been stored for nearly 15 months (–10°C–+25°C), 9 months (25°C–35°C), or 6 months (35°C–55°C) should be recharged in a timely manner.
8. Batteries should be delivered based on the "first in, first out" rule.
9. After the battery production test is complete and before the batteries are stored, the batteries must be recharged to at least 50% of the SOC.

Conditions for Judging Overdue Storage

It is recommended that batteries not be stored for a long period. They should be used soon after being deployed onsite. The batteries should be handled according to the following requirements.

Required Storage Temperature	Actual Storage Temperature	Recharge Interval	Remarks
–10℃ < T ≤ 55℃	T ≤ –10℃	Not allowed	Not reaching the time for recharge: Use the batteries as soon as possible. Reaching the time for recharge: Recharge the batteries. The total storage duration should not exceed the warranty period.
	–10℃ < T ≤ +25℃	15 months	
	25℃ < T ≤ 35℃	9 months	
	35℃ < T ≤ 55℃	6 months	
	55℃ < T	Not allowed	

1. Dispose of deformed, damaged, or leaking batteries directly irrespective of how long they have been stored.
2. The storage duration starts from the latest charge time labeled on the battery package. If a battery is qualified after recharge, update the latest charge time and the next recharge time (next recharge time = latest charge time + recharge interval) on the label.
3. The maximum power storage period of a lithium battery is three years. A lithium battery can be recharged at most for three times within the three years. For example, it can be recharged every 9 months or every 12 months. It is recommended that batteries be scrapped if the maximum allowable storage period and recharging times are exceeded.
4. If a lithium battery is stored for a long time, capacity loss may occur. After a lithium battery is stored for 12 months in the recommended storage temperature, the irreversible capacity loss rate is 3%–10%. If customers perform the discharge test according to the specifications, they may fail to pass the test if the storage capacity of the battery is not 100% of the rated capacity.

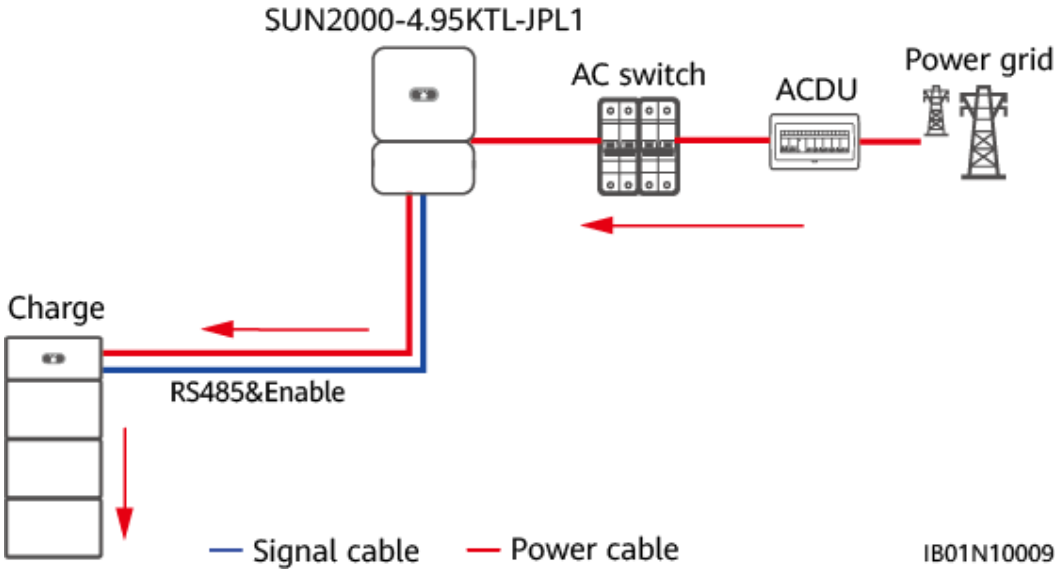
Inspection Before Recharge

1. Before recharging a battery, you need to check its appearance. Recharge the battery if it is qualified or dispose of it if not.
2. The battery is qualified if it is free from the following symptoms:
   - Deformation
   - Shell damage
   - Leakage

Battery Recharging Scenarios

The SUN2000-4.95KTL-JPL1 provides 5 kW power to charge batteries. It allows one charge unit (three battery packs) to be charged at the same time.

Figure 7-1 Networking diagram for single-phase power supply scenario



Battery Recharging Cable Connection

WARNING

Use standard cables provided by Huawei to connect the power control module and battery expansion modules. Do not use non-standard cables (such as extension cables and interconnection cables). If B+ or B– battery cables are reversely connected, the device will be damaged.

Connect cables to the system by referring to **5 Electrical Connection**.

Battery Power-On and Commissioning

NOTICE

- Ensure that the charge process is supervised to prevent any abnormality.
- If a battery experiences an abnormality such as bulging or smoking, stop charging immediately and dispose of it.
- Ensure that only trained professionals perform recharge operations.
- After turning on the battery switch, power on the inverter. For details about how to power on the inverter, see the quick guide for the corresponding inverter model.

Step 1 Connect power cables and communications cables correctly.

Step 2 Turn on the battery power pack switch by turning the DC switch to ON.

Step 3 Turn on the AC switch between the inverter and the grid.

Step 4 Check that LED1 is steady green, LED2 is steady green, and LED3 is blinking green slowly.

Step 5 Hold down the black start button for 5s to activate the battery. The power control module LED blinks three times and then the green indicator is steady on. The battery comprehensive LED blinks three times and then the green indicator is steady on. The ring LED blinks three circles.

Step 6 Log in to the FusionSolar app. Choose **Maintenance** > **Battery maintenance** > **Recharge**, start battery recharge, and monitor the charge status of the lithium battery in real time until the recharge is complete.

Step 7 Confirm that the recharge is complete if five indicators of the ring LED are on and the comprehensive LED of the battery expansion modules is steady green.

Step 8 After the battery is charged, switch off the inverter input AC circuit breaker and then the battery input circuit breaker. If other batteries need to be charged, repeat the preceding steps.

----End

7.5 Storage with Low SOC

After the ESS is powered off, static power consumption and self-discharge loss may occur in battery modules. Therefore, charge battery modules 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 battery modules need to be replaced.

Storing the ESS with low SOC may occur in the following scenarios:

- DC SWITCH on the power control module 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.

Regardless of scenarios, the ESS must be charged within the maximum interval corresponding to the SOC when the ESS is powered off. If the ESS is not charged beyond the maximum interval, it may be damaged due to overdischarge.

Power-Off SOC Before Storage	Maximum Charge Interval
SOC ≥ 5%	30 days
0% ≤ SOC < 5%	7 days

NOTE

When the SOC of the ESS decreases to 0%, charge the ESS within seven days. Any permanent battery damage due to customer's failure to charge the ESS properly is not covered under warranty.

8 Technical Specifications

8.1 LUNA2000-5KW-NHC0

Technical Specifications	LUNA2000-5KW-NHC0
Rated charge and discharge power	5 kW
Rated voltage	385 V
Maximum input/output voltage	560 V
Voltage range	350 V–560 V
Dimensions (W x H x D)	670 mm x 240 mm x 150 mm
Weight	12 kg
Cooling mode	Free cooling
IP rating	IP65
Communications	RS485 and CAN (for cascading)
Operating temperature	–25°C to +55°C
Operating humidity	5%–95% RH
Maximum operating altitude	4000 m

8.2 LUNA2000 battery system specifications

Battery system model	LUNA2000-4.95-5	LUNA2000-4.95-10	LUNA2000-4.95-15
Capacity[a]	5 kWh	10 kWh	15 kWh
Battery Type	Lithium iron phosphate (LiFe battery)		
Output (DC)			
Rated voltage	385 V		
Maximum input/output voltage	560 V		
Voltage range	350 V–560 V		
Input/Output Rated Power	1.5 kW	3 kW	4.5 kW
Maximum input/output current	4.5 A	9 A	13.5 A
Usage Time			
Rated power usage time	(self-supporting output) 120 points (Grid-tied output) 60 points	(self-supporting output) 240 points (Grid-tied output) 120 points	(self-supporting output) 360 points (Grid-tied output) 180 points
Display·Communications			
Display	SOC Charging status indicator (LED), FusionSolar APP		
Communications	RS485, CAN		
Other			
Dimensions (W x H x D)	670 mm x 600 mm x 150 mm	670 mm x 960 x mm x 150 mm	670 mm x 1320 mm x 150 mm
Weight of the battery (Including Floor Mounting Base)	63.8 kg	113.8 kg	163.8 kg
DCDC Dimensions	670 mm x 240 mm x 150 mm		

Battery system model	LUNA2000-4.95-5	LUNA2000-4.95-10	LUNA2000-4.95-15
Weight of DCDC	12 kg		
Battery module Dimensions	670 mm x 360 mm x 150 mm		
Weight of the battery module	50 kg		
Service life	20 years		
Warranty	10 years (free) 15 years (paid)		
Charge/ discharge cycle	15 years (charge/discharge cycle test)		
Cooling mode	Free cooling		
IP rating	IP65		
Operating temperature	–20°C to +55°C		
Maximum operating altitude	5%–95% RH		
Maximum operating altitude	4000 m		
Note a: The initial capacity (design capacity) of the battery modules is 5 kWh. The actual capacity may vary depending on the environment conditions, such as temperature, transportation conditions, and storage conditions.			

9 FAQ

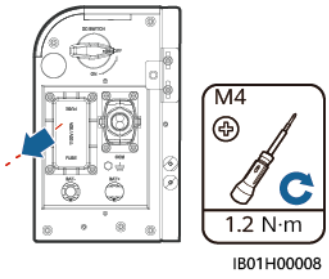
9.1 How Do I Replace a Fuse?

Step 1 Power off the system. For details, see **7.1 System Power-Off**.

> **WARNING**
>
> After the system is powered off, the remaining electricity and heat still exist in the chassis, which may cause electric shocks or burns. Therefore, you need to wear protective gloves and perform operations 5 minutes after the system is powered off.

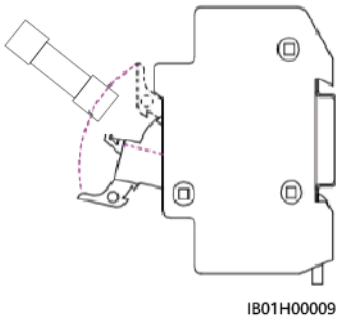
Step 2 Loosen the screws on the fuse shell.

Figure 9-1 Removing the screw shell



Step 3 Lift the fuse box opening, remove the fuse, insert a new fuse into the slot, and close the fuse box. If you hear a click sound and the bulge on the side is inside the box, the fuse box is properly installed.

Figure 9-2 Replacing a fuse



----End

Fuse Specifications

Table 9-1 Fuse specifications

Fuse	Required Specifications		
Type	Lower Limit	Typical Value	Upper Limit
Component type	-	Fuse	-
Fuse type	-	Fast blow fuse	-
Rated voltage (V AC&V DC)	1100 V DC	-	-
Rated current	32 A	-	-
Breaking capacity	10 kA	-	-
Nominal fusing heat I2T	600	-	1000
Cold resistance value	-	-	0.005 Ω
Package dimensions (the dimension tolerance should be specified in the specifications provided by the supplier)	-	14 mm x 51 mm	-

9.2 SOC Change Description

1. How does the SOC change from 99% to 100% when the battery is about to be fully charged?

When the SOC is greater than 99%, the battery switches to float charging and the charging current decreases gradually. Finally, the SOC reaches 100%.

2. When the battery temperature is low, the charging power is displayed as about 300 W, but the SOC does not change. Why?

When the internal temperature of the battery module is low, the internal heating component starts to heat the battery. The heating power is 300 W (typical value). When the heating component is working, the battery is not charged and the SOC does not change. Battery heating helps to keep the cell at a proper operating temperature and prolong the service life of the product.

9.3 Checking Cable Connection when the Battery Fails to Be Upgraded

If the battery fails to be upgraded, check the cable connections by referring to **5 Electrical Connection**. If the upgrade fails, reconnect the cables correctly and perform the upgrade again.

9.4 How Do I Recycle Used Batteries?

NOTICE

- The Company does not recycle batteries. Contact local recycling agencies to handle batteries.
- If there are no such agencies in your area, you can contact the nearest foreign recycling agencies.

Step 1 Contact the nearest recycling agency.

Step 2 Recycling agencies assess the costs.

Step 3 Recycling agencies carry out recycling, which can be done in two ways:

- Onsite recycling: Recycling agencies can visit your sites to recycle lithium batteries, but the price depends on actual conditions such as the distance and transportation expenses.
- Centralized recycling: You can collect all lithium batteries to be recycled in one place for the recycling agencies to handle.

NOTE

You need to cover the related transportation expenses.

Step 4 Recycling companies handle recycling. The recycled lithium batteries are at the disposal of the recycling companies.

----End

A After-sales Service

Table A-1 Services

Repair (Replacement) Service		
Type	**Service Description**	**Response Time**
Remote support	Query Toll-free 0120-258-367 Email solarsupportjp@huawei.com	8 am–8 pm
	Remote technical support (via phone)	8 am–8 pm (Respond within 30 minutes)
	Online technical support (via email and website)	N/A
Hardware replacement	Hardware replacement (spare parts delivery)	After the replacement application is confirmed, the spare parts will be delivered within two working days, unless delayed by force majeure duration transportation.

B Acronyms and Abbreviations

A	
APP	application
B	
BMS	battery management system
D	
DC	direct current
F	
FIT	feed-in tariff
E	
EMI	electromagnetic interference
P	
PV	photovoltaic
V	
VPP	virtual power plant

