



VANGUARD XL 3-PHASE UPS (80-200KVA)
User Manual

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Foreword

Summaries

Thank you for choosing this UPS!

This document provides a description of the Vanguard XL series UPS (80K-200K) (hereinafter referred to as "UPS"), including its features, performance, appearance, structure, working principles, installation, operation, and maintenance, etc.

Please save the manual after reading, for future reference.



NOTE

The figures in this manual are just for illustration, details please take the actual product as standard.

Target Audience

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

Suitable Model

- NPU80.0-HO-N(480), NPU100.0-HO-N(480)
- NPU135.0-HO-N(480), NPU160.0-HO-N(480), NPU200.0-HO-N(480)

Symbol Conventions

This manual uses the following safety symbols to prompt users to comply with safety precautions during installation, operation, and maintenance.

The symbols are defined as follows:

Symbol	Description
	Alerts you to a high-risk hazard that, if not avoided, will result in serious injury or death.
	Alerts you to a medium- or low-risk hazard that, if not avoided, could result in moderate or minor injury.
	Alerts you to a low-risk hazard that, if not avoided, could result in minor injury.
	Warns of electric shock risk; use caution.
	Alerts you to the risk of electric shock; use caution.
	Provides a helpful tip to solve a problem or save time.
	Offers additional information to clarify or emphasize key points in the text.

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1 Safety Description

1.1 General Instructions



CAUTION

- Before operating the equipment, please read the safety notices and operating instructions in this section carefully to prevent accidents.
- The alerts in the user manual, such as "DANGER," "WARNING," and "CAUTION," do not include all safety instructions. They are only supplementary to the main safety guidelines provided for operation.



NOTE

Any damage to the device resulting from non-compliance with general safety operation requirements or applicable safety standards in design, production, or usage shall be excluded from NXT Power's warranty coverage.

NXT Power assumes no responsibility in the following cases:

- Damage resulting from force majeure events, including but not limited to earthquakes, floods, volcanic eruptions, mudslides, lightning, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, extreme weather, or other natural disasters.
- Operation of the equipment outside the usage conditions specified in this manual.
- Installation or usage environments that do not comply with applicable international, national, or regional standards.
- Installation or operation performed by unqualified personnel.
- Failure to follow the operational instructions and safety warnings provided in the product and its documentation.

- Unauthorized disassembly, modification of the product, or alteration of its software code or firmware.
- Damage incurred during transportation arranged by the customer.
- Damage resulting from storage conditions that do not conform to the requirements outlined in the product documentation.
- Use of materials or tools supplied by the customer that fail to meet applicable laws, regulations, and relevant standards.
- Damage caused by negligence, gross negligence, willful misconduct, improper operation, or any cause not attributable to NXT Power.

1.2 Personal Safety



Installation or removal of cables while the device is energized is strictly prohibited. Contact between cable cores and conductors may result in arcing or electrical discharge, which could cause fire, equipment damage, or personal injury.



During device operation, the wearing of conductive items—including but not limited to watches, bracelets, bangles, rings, and necklaces—is strictly prohibited, as it may result in electric shock or thermal burns.



During device operation, only specialized insulated tools shall be used to prevent electric shock or short-circuit hazards. The insulation properties and voltage resistance levels of such tools must comply with all applicable local laws, regulations, standards, and industry norms.

! WARNING

During device operation, appropriate personal protective equipment (PPE) must be used, including but not limited to protective clothing, insulated footwear, helmets, insulated gloves.

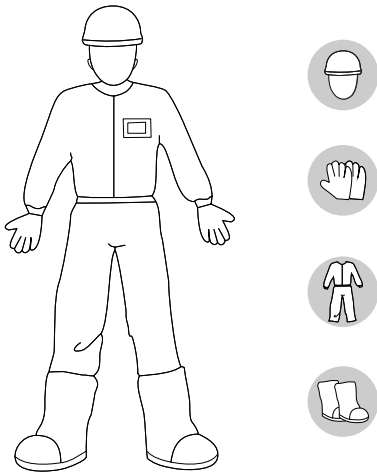


Figure1-1 Protective device

- Device must be installed, operated, and maintained by qualified professionals. Professionals must have basic electrical knowledge, be familiar with the device's principles and structure, possess installation and operational experience, have received safety training, and be capable of identifying hazards and taking correct actions.
- Do not disable the device's protective devices or ignore warnings, cautions, and preventive measures outlined in the manual and on the device.
- Do not directly touch or allow other conductors to make contact or indirectly touch the power supply device through wet objects. Before touching any conductor surface or terminal, check the voltage at the contact point to ensure there is no risk of electric shock.
- Do not insert fingers or tools into operating fans in order to prevent damage to the device or injury to the operator.
- In the event of a fire, immediately evacuate the building or device area, press the fire alarm, and then call the fire emergency number.

1.3 Device Safety

1.3.1 UPS Safety

**NOTE**

FCC CLASS A UPS is used in all commercial, light industrial, and industrial zones connected to low-voltage power systems that are not directly supplying power to residential buildings. Installation restrictions or additional measures may be required to suppress interference.

- For power supply systems that are critical to major economic interests or the order of public places, such as data centers, national computing centers, emergency command centers, railway signaling systems and control centers, civil aviation control centers and airport command centers, financial clearing centers, and trading centers, a TIER4 or TIER3 power supply architecture as specified by TIA942 must be used, meaning dual power supply paths for the load.
- UPS should avoid operating in non-enclosed environments near the ocean 0–2.3mi (0–3.7km), areas with uncontrolled temperature and humidity, or semi-enclosed environments. For example: simple computer rooms, residential buildings, garages, corridors, direct ventilation cabinets, houses with only a roof, train station platforms, gyms, aquariums, etc., near the ocean.
- After removing the UPS packaging, it is recommended to power it up and run it as soon as possible.
- UPS can be used for resistive, capacitive, and slightly inductive loads, but should not be used for purely capacitive, purely inductive, or half-wave rectifying loads, such as air conditioners, blowers, starters, drills, motors, fluorescent lamps, etc. It is not suitable for energy feedback loads or reverse current loads.
- The UPS front-end distribution must meet the requirements of UL1778 for electric shock protection.
- It is not recommended to install circuit breakers with leakage protection functions.
- If the effective voltage of the mains exceeds 600VAC, the UPS may be damaged.
- Manual inverter shutdown, adjustment of UPS output voltage mode, or output frequency may affect the power supply to the load.

1.3.2 Battery Safety



DANGER

Battery operation should only be performed by qualified personnel familiar with battery handling, and must be done with caution. Unauthorized personnel are prohibited from operating the batteries.



CAUTION

Always follow the battery manufacturer's instructions, especially when handling wiring.

- If the battery packaging is damaged, or if the terminals are dirty, corroded, rusty, or if the battery casing is cracked, deformed, or leaking, the battery must not be used.
- Only use batteries of the same brand, model, and quantity.
- Do not expose batteries to high temperatures, direct sunlight, high humidity, corrosive environments, or heat-emitting devices.
- Do not subject batteries to mechanical vibration, drops, collisions, puncturing, or pressure impacts to avoid damage or fire.
- Do not disassemble, modify, or damage the battery to prevent leakage, release of flammable gases, fire, or explosion.
- When handling or installing batteries, avoid pulling on the battery terminals to prevent damaging the connection.
- Lead-acid batteries release flammable gases during operation, so ensure the battery installation area is well-ventilated and has fire prevention measures to avoid fire hazards.
- Battery connections must be secure and reliably fastened. Tighten the terminal screws according to the provided torque and regularly check for tightness. Loose terminals may cause poor connections, arcing, or heat accumulation, which could lead to fire.
- After the battery has been discharged, it should be promptly recharged. Otherwise, the battery may become damaged due to over-discharge.
- Check if the battery is grounded. If so, remove the grounding. Touching any part of a grounded battery may lead to electric shock.

- Ensure the UPS charging voltage matches the battery voltage. If unsure, consult customer service.
- Do not short-circuit the positive and negative terminals of a single battery or battery pack, as this will cause a short circuit. Avoid simultaneously touching any two terminals or the exposed ends of battery cables to prevent damage or injury. When installing or maintaining batteries, cover the exposed terminal ends with insulating tape.
- Prevent electrolyte spillage from lead-acid batteries.
 - Electrolyte is corrosive and can corrode metal objects and circuit boards, causing short circuits.
 - Electrolytes may cause skin irritation or chemical burns. If contact occurs, immediately rinse with plenty of water and seek medical treatment.
 - If electrolyte spillage is discovered, immediately contact customer service for assistance. Professionals should wear goggles, rubber gloves, gas masks, protective clothing, and follow the manufacturer's guidelines, or use sodium bicarbonate (NaHCO_3) or sodium carbonate (Na_2CO_3) to neutralize and absorb the electrolyte.

**NOTE**

When the battery temperature exceeds 140°F (60°C), check for electrolyte spillage. If spillage occurs, handle it promptly.

- At the end of the battery's lifespan, internal faults such as short circuits, electrolyte depletion, or corrosion of the positive plate grid may occur, which can lead to thermal runaway, swelling, or leakage. Replace the battery promptly.
- When installing and commissioning the battery, ensure fire safety device such as fire sand or CO_2 extinguishers is provided as per construction standards. Once the battery is in use, ensure the battery room has a fire protection system compliant with local laws and regulations, and is in automatic or manual control mode.
- Dispose of used batteries according to local laws and regulations. Do not dispose of batteries as household waste.

1.4 Mechanical Safety

DANGER

Work at height shall be carried out while wearing a helmet and using a safety belt or waist rope fastened to a firm and stable structural part. It is strictly prohibited to attach to moving or unstable objects, or to metal surfaces with sharp edges or corners, to prevent hook slippage and falls.

WARNING

Tools must be prepared and certified by professional organizations. Do not use tools that are damaged, have failed inspection, or are beyond their inspection validity period, to ensure they are not overloaded.

WARNING

Before installing the device into the cabinet, first ensure that the cabinet is securely fixed to prevent tipping due to an unstable center of gravity, which could result in injury to installation personnel and damage to the device.

WARNING

When pulling device out of the rack, be cautious of any unstable or heavy device inside the cabinet to avoid being crushed or injured.

WARNING

Do not drill holes in the device. Drilling will damage the sealing, electromagnetic shielding, internal components and cables of the device, and metal shavings from drilling will enter the device and cause a short circuit on the circuit board.

- Paint scratches during transport and installation of the device must be repaired in time, and long-term exposure of the scratched part is strictly prohibited.
-

- Arc welding, cutting and other operations on the device are prohibited without evaluation by our company.
- Installation of other devices on top of the device is prohibited without evaluation by our company.
- When working in the space above the top of the device, additional protection should be added to the top of the device to avoid device damage.
- Please use the correct tools and master the correct usage of the tools.

1.4.1 Heavy Lifting Safety

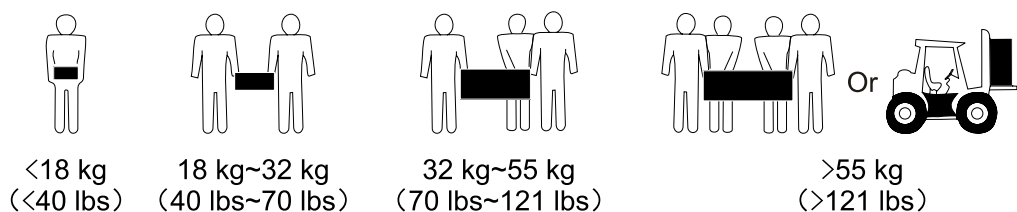


Figure1-2 Heavy lifting

- When lifting devices unassisted, lift objects slowly and smoothly. Sudden jerking or twisting of the torso is strictly prohibited.
- When moving or lifting devices, hold the handle of the device or support the bottom edge of the device.
- The handling of heavy objects must be balanced and steady. The moving speed should be slow and consistent. Positioning should be smooth and controlled, avoiding any impact or falls that may scratch the device surface or damage internal components and cables.
- When carrying heavy objects, special care should be taken on workbenches, slopes, staircases and in areas where slipping and falling are likely. When moving heavy objects through doorways ensure the door is wide enough to for the device to pass through to avoid bumping or injuring fingers.
- When transporting a large device, if a freight elevator is not available, the device must be kept upright (inclination angle $\alpha \leq 15^\circ$); horizontal placement is prohibited. Professional personnel should be contacted promptly to determine an appropriate handling method.

1.4.2 Height Work Safety

**NOTE**

Work carried out more than 78.7in (2m) above the ground is considered work at height.

- Work at heights must be suspended when steel pipes are wet from rain or in other potentially hazardous conditions. Once these conditions have cleared, the safety officer and relevant technicians must inspect all operating equipment and confirm that it is safe before resuming work.
- At height work sites, a danger zone must be clearly marked with visible signs, and entry by unauthorized personnel is strictly prohibited.
- Guardrails and warning signs must be placed around openings and holes to prevent falls.
- On the ground below height work areas, it is strictly prohibited to store scaffolding, planks, or other debris. Ground personnel are strictly prohibited from standing or passing directly beneath the height work area.
- It is strictly prohibited for personnel working at height to throw objects down. Likewise, objects must not be thrown upward; instead, use slings, hoists, elevated platforms, or cranes to move items.
- Avoid simultaneous operations on upper and lower floors. If unavoidable, a protective shelter must be installed between floors, or other safety measures must be taken. Tools and materials must not be stacked on upper floors.
- Workers operating at height must strictly follow all applicable safety regulations. The company shall not be held responsible for accidents resulting from violations of height safety rules.
- Playing, horseplay, or resting in high-altitude work areas is strictly prohibited.

1.4.3 Ladder Safety

**NOTE**

Wooden ladders or insulated ladders should be used when operating at heights involving electricity.

- Platform ladders with guardrails should be used as the first choice; the use of straight ladders is not recommended.
- Before using a ladder, ensure that it is in good condition, that its load capacity meets requirements, and that overweight use is strictly prohibited.
- The ladder must be placed on a stable surface, and someone must hold it during use.

- When climbing the ladder, maintain balance and ensure that your center of gravity does not shift beyond the edge of the ladder frame to ensure personal safety.
- When using a herringbone ladder, the pull rope must be securely fastened.
- If using a straight ladder, the angle of inclination should be 75° , which can be measured using an angle ruler.

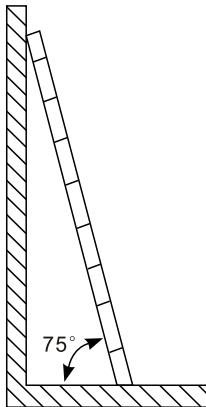


Figure1-3 Requirements for the use of straight ladder

- If a straight ladder is used, the wide foot of the ladder should face down or be protected at the base of the ladder to prevent slipping.
- If a straight ladder is used, the maximum height at which the feet can stand should not exceed the fourth step of the ladder counting down from the top.
- If a straight ladder is used to climb onto a platform, the vertical height of the ladder above the platform should be at least 3.3ft (1m).

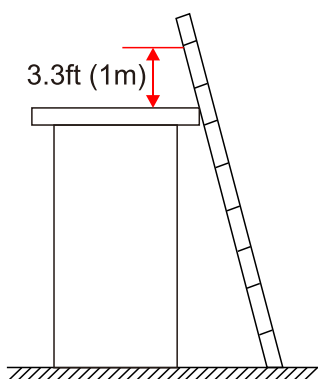


Figure1-4 Requirements for the use of straight ladder

1.4.4 Lifting Safety

Personnel carrying out lifting operations are required to undergo relevant training and be qualified before they are allowed to work.

- The lifting area needs to be isolated by erecting temporary warning signs or fences.
- The foundation on which the lifting operation is to be carried out must meet the load-bearing requirements of the crane work.
- Before lifting, ensure that the lifting tool is securely fixed to a load-bearing standard fixture or wall.
- During the lifting process, it is strictly prohibited to walk underneath the lifting arm or the object being lifted.
- During the lifting process, it is prohibited to drag steel wire ropes or lifting devices, and it is forbidden to use hard objects to impact them.
- During the lifting process, ensure that the angle between the two cables does not exceed 90°.

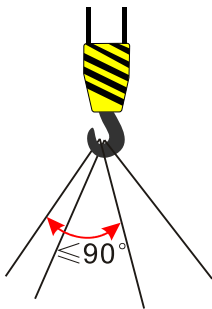


Figure1-5 Lifting requirements

1.5 Electrical Safety



Before making electrical connections, ensure that the device is not damaged, as damage may result in electric shock or fire.

**WARNING**

- Do not connect the ground wire to the neutral wire or the live wire to the neutral wire in reverse, as this may cause an electrical short circuit!
 - The grounding should be good, and the neutral-to-grounding voltage should not be higher than 5V.
-
- Set up warning signs or safety barriers in the operation area to prevent personal injury or device damage.
 - Installation, operation, and maintenance must be carried out according to the steps and sequence outlined in the manual. Do not modify, add, or change the device, and do not alter the installation sequence without authorization.
 - Before installing and removing the power cables, the device itself and its upstream and downstream switches must be disconnected.
 - Incorrect electrical connections may result in device damage and the resulting damage is not covered by the device warranty.
 - Even if all external power is disconnected, the capacitors inside the UPS may still retain charge, and there may still be high voltage on the output copper bus that could pose a safety risk. Therefore, the UPS must be left idle for enough time (≥ 20 minutes) to allow the charge to dissipate before opening the UPS casing.
 - All electrical connections must comply with the electrical connection standards of the battery/region where the project is located.

**NOTE**

Changing the system configuration, structure, or components may affect UPS's performance. If changes are required, please consult customer service in advance.

1.5.1 Grounding Requirements

**WARNING**

Before making electrical connections, the device must be properly grounded. The grounding terminal must be securely connected to the earth ground.

- When installing the device, the device must be grounded first. When dismantling the device, the grounding wire must be removed at last.
- Don't damage the grounding conductor.
- The device must be connected to protection grounding permanently. Before operation, check the electrical connection to ensure the device is grounded reliably.

1.5.2 Wiring Requirements

- Wire selection, racking, and routing must follow local laws, regulations, and codes.
- Choose flame-retardant cables.
- All wires must be securely connected, well insulated, and of appropriate specifications.
- Wires used in high-temperature environments may cause the insulation layer aging or damage. The distance between the wire and the heating devices or heat source area should be at least 1.2in (30mm).
- Wires of the same type should be tied together, while wires of the different types should be placed at least 1.2in (30mm). apart. It is forbidden to twist or cross each other.
- The outer wires of a large bundle of cables should be arranged neatly to eliminate any avoidable crossings. When bundling the wires, prevent them from tangling with each other. The cable bundle should remain straight, and the height of the cable tie bundling positions for horizontal bundles should be the same.
- When a bundle of wires turns a corner, cable ties should be applied on both sides of the corner.
- When the cables are introduced into the rack from the outside, they should make a U-shaped bend outside the rack before entering the rack.
- When the temperature is too low, violent shocks and vibrations may cause brittle cracking of the cable's plastic sheath. To ensure construction safety, the following requirements should be followed:
 - All cables should be laid and installed above 32°F (0°C). When transporting cables, especially when constructing in a low temperature environment, they should be handled gently.
 - If the storage environment temperature of the cable is below 32°F (0°C), before laying the cable, the cable must be moved to room to store for more than 24 hours.

1.5.3 Anti-static Requirements

CAUTION

In order to prevent the static electricity generated by the human body from damaging the static-sensitive components on the PCB, it is necessary to wear anti-static gloves or anti-static wrist strap before touching the static-sensitive components (such as plug-in boards, circuit boards, IC chips, etc.), and the other end of the anti-static wrist straps should be well grounded.

- When holding the PCB, you must hold the edge of the board that does not contain components. It is forbidden to touch the components.
- The disassembled PCB must be packaged with anti-static materials for storage or transport.

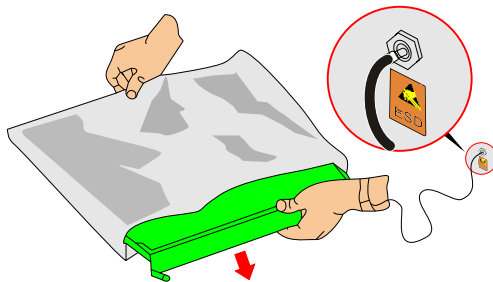


Figure1-6 PCB disassembling diagram

1.6 Operational Safety

DANGER

High voltage is present in the device. Accidental contact may result in electric shock. Do not touch any terminal or components of the device during operation, as it may pose a risk of electric shock.

1.7 Maintenance Safety

CAUTION

Improper maintenance of the device may lead to personal injury or device damage!

- Set up warning signs or safety warning tapes in the operation area to prevent unrelated personnel from entering the maintenance site.
- Place warning signs at the upstream and downstream switch positions of the device to prevent accidents caused by mistaken closing.
- Before performing maintenance operations, ensure that there is no voltage or current on the UPS input and output, and wear protective equipment before operating on the UPS.
- The device should only be restarted after troubleshooting faults that affect its safety performance.
- After the device is turned off, there is still a risk of burns. Wait for the device to cool down, and wear protective gloves before performing any operations.
- Do not replace internal UPS components without authorization. The company will not be responsible for any warranty or liability for damages caused by unauthorized replacement.
- Electric shock hazard! Do not touch the electrical grid or the internal contacts, terminals, etc., connected to it.

1.8 Transportation Requirements

- The packaged products shall not be loaded in open cabins or carriages during long-distance transportation, and shall not be stored in open-air warehouses during intermediate transportation. It is not allowed to be transported in the same vehicle (or other transportation vehicles) as flammable, explosive, or corrosive items during transportation, and the products shall not be exposed to rain, snow, or liquid substances or mechanical damage.
- Suitable for transportation by car, train, ship, and plane. During transportation, the product must be well-packaged to avoid moisture, dust, vibration, and chemical corrosion.
- Stacking during transportation is strictly prohibited.

1.9 Storage Requirements

- When storing the device, it should be kept in its original packaging. The storage environment temperature should be between -13°F (-25°C) and 131°F (55°C), and the relative humidity should be between 0%RH and 95%RH. In the warehouse, poisonous gases, flammable and explosive objects, and corrosive chemicals are prohibited. The device should not be subjected to excessive mechanical shaking, impact, or strong magnetic fields.

- There should be a 3.9in (10cm) gap between the carton and the ground, and at least a 19.7in (50cm) clearance from the carton to walls, heat sources, cold sources, windows, or air inlets. If the packaging box shows signs of insect or rodent damage or if the packaging is damaged, please replace it promptly.
- The packing box should not be tilted or inverted.
- If no other specific regulations are provided, the storage period should be six months. If stored for more than six months, a batch inspection should be performed. For long-term storage, the battery should be charged every three months.



Figure1-7 Storage environment requirements



Please store the device according to the storage requirements. If the device is damaged due to non-compliance with storage conditions, it will not be covered under warranty.

2 Overview

2.1 Product Intro

The VANGUARD XL series (80K-200K) product is an online double-conversion uninterruptible power supply (UPS) system, consisting of a UPS cabinet, power module, bypass module, system control box, and distribution components. The entire system is designed with a modular approach, allowing users to easily add, remove, or replace power modules online without worrying about affecting the normal operation of the system. The system is a high-performance sine wave UPS specifically designed for critical loads and precision instruments.

2.1.1 Typical Configuration

Table2-1 UPS typical configuration

Configuration	Application scenario
Single device	Supplies power to common loads, with multi-module redundancy and high reliability.
Parallel	Supplies power to large-scale data centers or important loads, with high reliability and strong transient overload resistance capability.
BSC system	● Supplies power to important loads, such as medium and large computer rooms, data centers, etc., with higher reliability than the parallel system, but the configuration is more complex. ● BSC systems include dual bus mode and multi-bus mode.

Single device

In single mode, different numbers of power modules can be selected according to load capacity. Uniform load sharing between modules ensures that failure in one power module does not affect the normal operation of others. A multi-module redundant configuration allows the UPS to maintain high reliability in single-device mode.

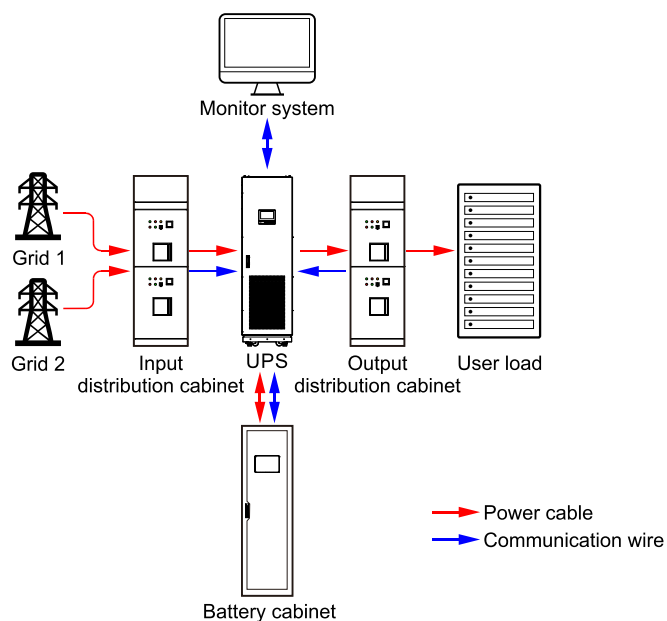


Figure2-1 Typical application scenario in the single UPS mode

Parallel device

In parallel mode, the mains input, bypass input, and AC output of each UPS cabinet are connected in parallel, and then the CCM (Central Control Module) of each UPS cabinet is connected together through parallel wires to keep the outputs of each cabinet synchronized and supply power to the load together. When a UPS cabinet malfunctions, other UPS systems will continue to supply power to the load to ensure its normal operation, demonstrating the high reliability of the parallel mode.

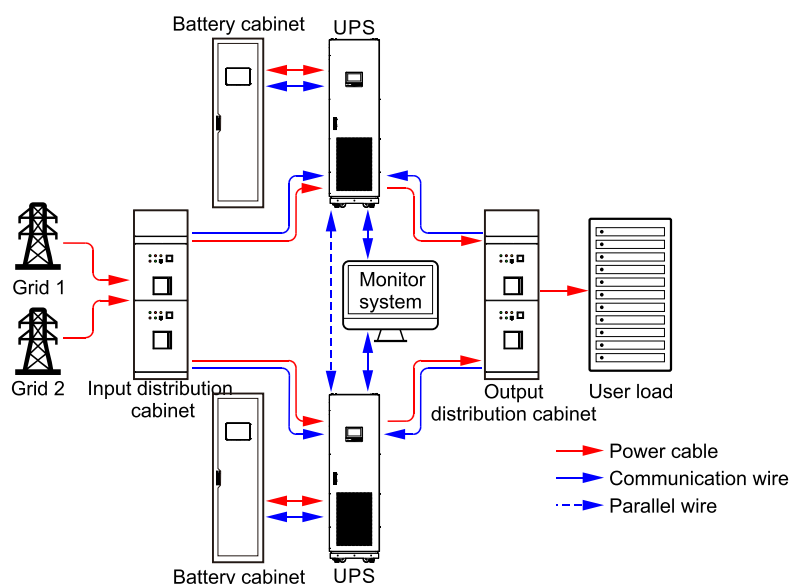


Figure2-2 Typical application scenario in the parallel UPS mode

BSC system

The BSC system (Bus Sync Controller) refers to a bus synchronization control system, which uses software control to ensure the output synchronization of multiple power sources under different bus inputs, thereby ensuring the continuity of load input in the event of a UPS failure. According to different application scenarios, BSC systems are divided into dual bus mode and multi bus mode, with the multi bus mode supporting three bus numbers.

- Dual-bus system

A dual-bus system consists of two independent UPS systems. Each UPS system consists of a UPS in the single UPS mode. For single-power loads, a static transfer switch (STS) can be configured to ensure the power switch when the bus fails, which greatly improves the system reliability.

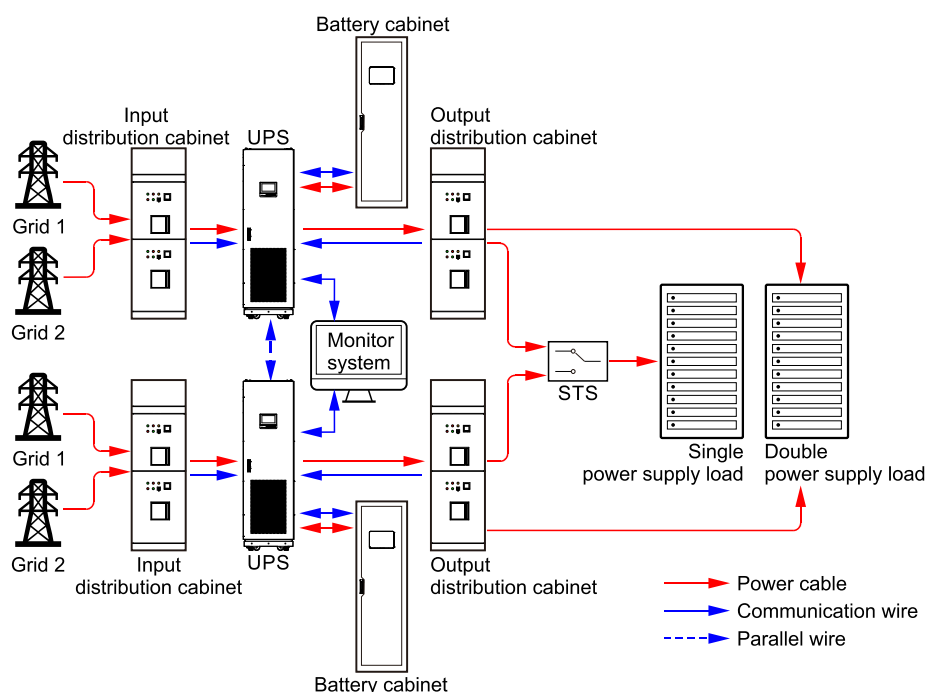


Figure2-3 Typical application scenario in the dual-bus system mode

- Multi-bus system

A multi-bus system consists of multi independent UPS systems. Each UPS system consists of a UPS in single mode. The multi-bus system is suitable for dual-power load. For single-power load, a static transfer switch (STS) can be configured to ensure the power switch when the bus fails. Multi-bus system has higher reliability than single-bus system, but less reliable than dual-bus system.

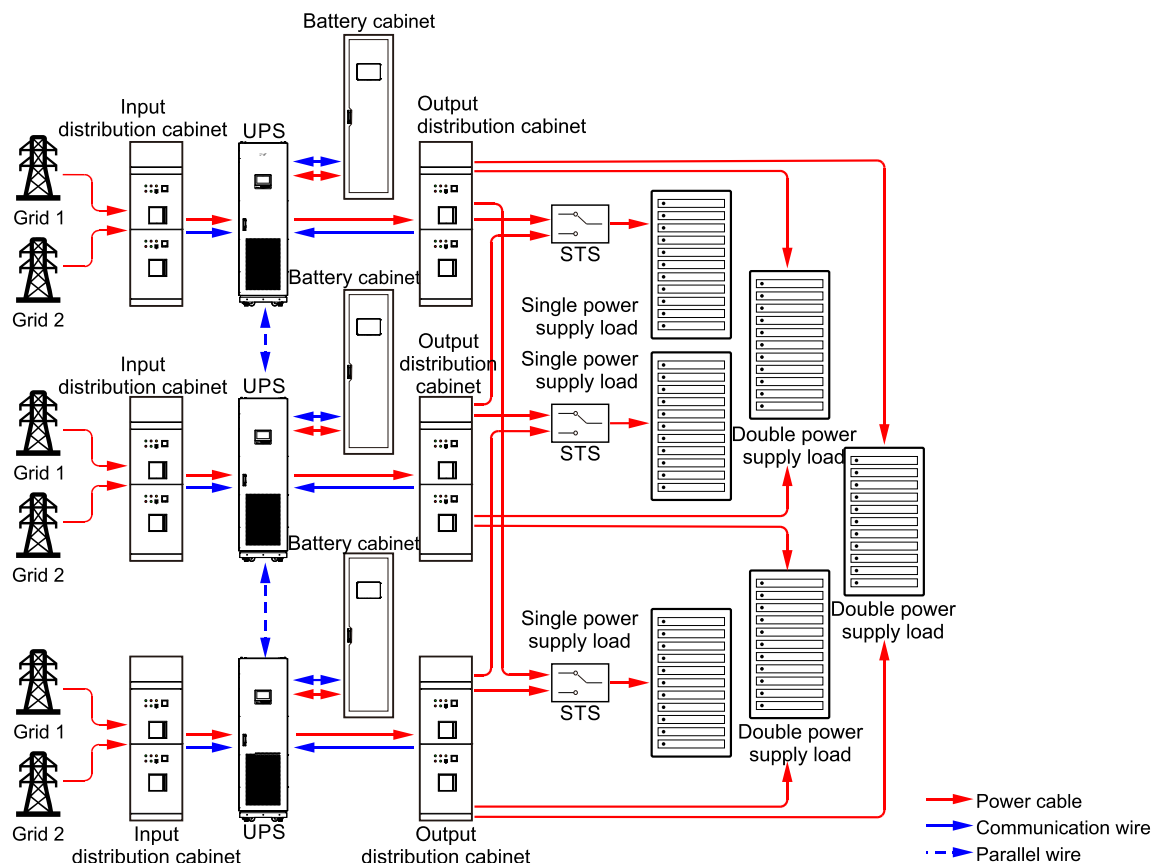


Figure2-4 Typical application scenario in multi-bus system mode



NOTE

Both single system and parallel system can operate multi bus systems.

2.1.2 Product Features

Module hot plugging

The system power module adopts master-slave parallel control technology, where each power module is independent and does not require strict matching. Power modules can be hot-swapped. This allows for simultaneous construction and operation, offering higher adaptability, availability, scalability, and lower maintenance costs..

Three-level inverter technology

Adopts three-level inverter technology, offering better output voltage waveform quality and higher overall efficiency.

Fully digital DSP control

The inversion control, phase synchronization, output current balancing, and logic control of the power modules are all managed by DSP-based digital control, providing high precision, fast speed, and excellent overall system performance.

Energy-efficient

Uses advanced PFC control technology with an input power factor greater than 0.99, significantly improving energy utilization, reducing grid load, and saving distribution costs. The system is compact, lightweight, and generates minimal heat, increasing environmental efficiency and reducing investment costs.

Intelligent fan speed control

The fan speed adjusts automatically based on the load. When the load is small, the fan speed slows down, and when the load increases, the fan speed increases. The intelligent speed control design greatly extends the fan's lifespan and reduces overall operating noise.

Intelligent ECO energy-saving mode

The ECO energy-saving mode is designed to improve efficiency. When the power quality of the user's grid is good, the UPS operates in this mode, with the bypass output prioritized and achieving an efficiency of up to 99%. If the power quality deteriorates, the system automatically activates the intelligent ECO mode, quickly compensating for harmonics, reducing input current harmonics, and improving the grid quality. If the bypass voltage or frequency deviates from the normal range and cannot meet the user's power supply needs, the system switches to inverter output, ensuring reliable power supply while saving energy.

Reliable electromagnetic compatibility (EMC)

The system has passed authoritative institutions and professional electromagnetic compatibility testing, including specialized content such as conducted interference, radiated interference, conducted immunity, radiated immunity, power drop, group pulse, electrostatic discharge, surge, etc. Excellent electromagnetic compatibility characteristics can not only completely filter out various power grid interferences, but also effectively reduce and eliminate the interference generated by UPS itself.

7-inch touch screen display

The system features a 7-inch touch screen for easy operation, daily management, and maintenance. It displays real-time operation parameters and status of the UPS system and each power module,

recording historical events and alarm information. The information storage capacity reaches up to 10,000 entries.

2.2 Appearance

The appearance of the VANGUARD XL series (80K-200K) UPS is shown in Figure2-6.

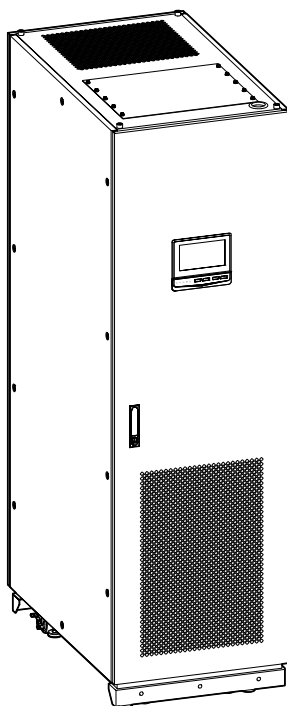


Figure2-5 Appearance

2.2.2 Operating Interface

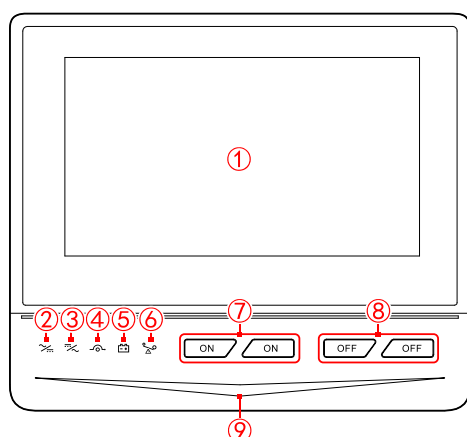


Figure2-6 Operation panel

Table2-2 Operation panel description

No.	Mark	Name	Description
①	-	Touch screen	Display the running parameters (e.g. voltage, current, load capacity, etc.) and state.
②		AC/DC indicator	● On (green): Rectifier works normally. ● On (red): Rectifier works abnormally.
③		DC/AC indicator	● On (green): Inverter works normally. ● On (red): Inverter works abnormally.
④		Bypass indicator	● On (green): Bypass outputs normally. ● On (red): Bypass is abnormal.
⑤		Battery indicator	● On (green): Battery output. ● On (red): Battery low-voltage.
⑥		Load indicator	● On (green): Output normal. ● On (red): Output overload
⑦	ON	ON combination button	Press the two buttons for 3s to power on UPS.
⑧	OFF	OFF combination button	Press the two buttons for 3s to power off UPS.
⑨	-	Status LED	● On (blue): UPS works normally. ● Flashing (blue): Battery output. ● On (yellow): UPS is abnormal but does not affect the working. ● On (red): UPS is abnormal and does not work.

2.2.3 Symbol on the Device

Table2-3 The instructions of the labels on the inverter

Symbol	Meaning
	No trampling
	High leakage hazard
	Beware of electric shock
	Please refer to the user manual of the product when using.



All safety symbols, warning labels, and nameplates on UPS must be clearly visible and cannot be removed or covered.

2.3 Structure Layout

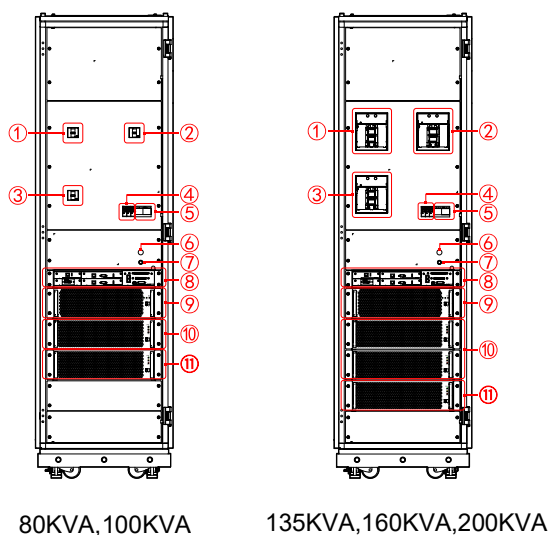


Figure2-7 Structure layout diagram (open front door panel)

Table2-4 Structure layout description

No.	Name	No.	Name
①	Bypass switch	⑦	Battery cold star button
②	Output switch	⑧	System control box
③	Input switch	⑨	Bypass module
④	SPD (optional)	⑩	Power module (standard)
⑤	SPD circuit breaker (optional)	⑪	Power module (redundant)
⑥	EPO key switch	-	-

NOTE

For the 80KVA and 100KVA, the number of power module is 1 as standard, with the option to add 1 more module for redundancy. For the 135KVA, 160KVA, and 200KVA, the number of power modules is 2 as standard, with the option to add 1 more module for redundancy.

The power rating of bypass switch, output switch, and input switch of the 80KVA and 100KVA are different from 135KVA, 160KVA, and 200KVA. Unless otherwise stated, the 200KVA will be used as an example for illustration in the following descriptions.

2.3.1 Power Module

Power module mainly consists of rectifier, inverter and DC/DC converter, which is to convert the mains input and battery input into a stable DC bus through the rectifier and DC/DC converter, and then convert the DC bus into a sine wave output through the inverter.

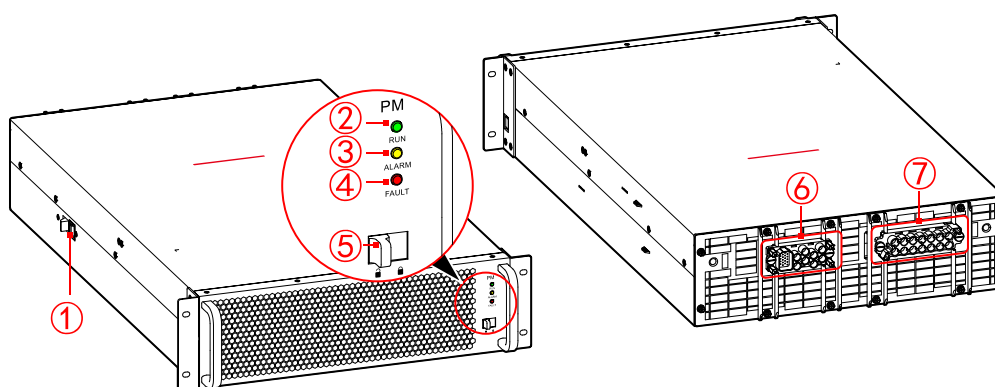


Figure2-8 Appearance

Table2-5 Power module description

No.	Mark	Name	Color	Description
①	-	Positioning lock	-	When pulling out the power module, the positioning lock must be pressed to ensure the power module can be removed smoothly.
②	RUN	Run indicator	Green	● On: Power module is in the inverter state. ● Fast flashing: The power module is in step-up mode. ● Slow flashing: The power module is in ready mode. ● Off: Power module is not in inverter state.
③	ALARM	Alarm indicator	Yellow	● On: Power module has an alarm. ● Off: Power module has no alarm.
④	FAULT	Fault indicator	Red	● On: Power module is faulty. ● Off: Power module has no faults.
⑤	-	Ready switch	-	● Place the ready switch in "🔓" state, the indication color is green, the power module is not locked with the cabinet, at this time, the power module can be dismantled. ● Place the ready switch in "🔒" state, the indication color is red, the power module is locked with the cabinet, at this time, the power module cannot be dismantled.
⑥	-	Output connector	-	Rectangular connector, used for module power input.
⑦	-	Input connector	-	Rectangular connector, used for module power output and signal connection.

2.3.2 Bypass Module

The bypass module consists of a static switch and a filtering device. When abnormal conditions such as overload, over-temperature, etc., occur in the power module or when the system is abnormal, the

static switch automatically transfers the load to the bypass power supply. Additionally, when the UPS operates in ECO/WECO mode and the bypass voltage is within the set range, the bypass supplies power to the load.

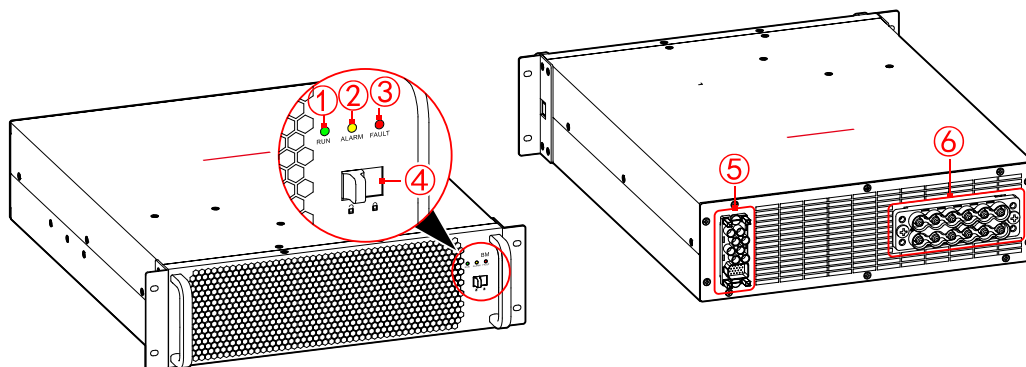


Figure2-9 Appearance

Table2-6 Bypass module description

No.	Mark	Name	Color	Description
①	RUN	Run indicator	Green	● On: Bypass module is in a normal output state. ● Flashing: Bypass module is in standby state. ● Off: Bypass module is in off-line or fault state.
②	ALARM	Alarm indicator light	Yellow	Reserved
③	FAULT	Fault indicator	Red	● On: Bypass module is faulty. ● Off: Bypass module is working properly.
④	-	Ready switch	-	● Place the ready switch in "🔓" state, the indication color is green, the bypass module is not locked with the cabinet, at this time, the bypass module can be dismantled. ● Place the ready switch in "🔒" state, the indication color is red, the bypass module is locked with the cabinet, at this time, the bypass module cannot be dismantled.
⑤	-	Signal	-	Rectangular connector, used for bypass module

No.	Mark	Name	Color	Description
		connector		signal connection.
⑥	-	Power connector	-	Rectangular connector, used for bypass module power connection.

2.3.3 System Control Box

System control box contains the expansion card (optional), SNMP card (optional), system control card 1, system control card 2, and system monitoring card. All types of cards are hot-swappable.

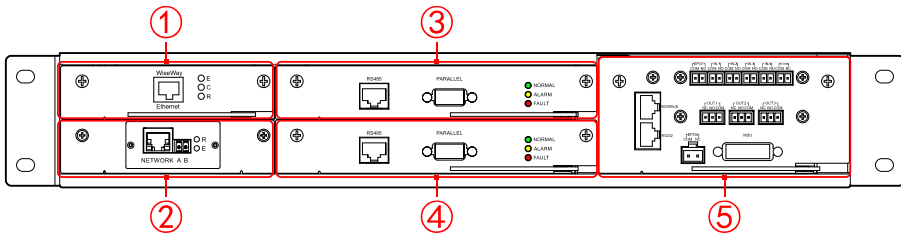


Figure2-10 Appearance

Table2-7 Layout description

No.	Description	No.	Description
①	Expansion card (optional)	④	System control card 2
②	SNMP card (optional)	⑤	System monitoring card
③	System control card 1	-	-

NOTE

The expansion card can optionally be installed with a BMS or dry contact expansion card. For more details, see section **2.5 Optional Components**.

System control card 2 is identical to system control card 1.

System control card

The system control card centrally controls the machine's operating logic and fault monitoring, acting as the brain of the entire system. Through in-cabinet CAN communication and inter-cabinet CAN communication, it manages the synchronization and equalized current of all modules within and between cabinets, ensuring synchronized output from all power modules and an even distribution of load. It also provides the monitoring system with the operating status and fault information of the cabinets. The two system cards serve as backup redundancy for each other.

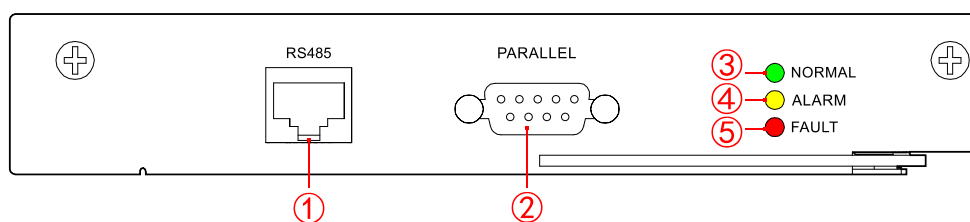


Figure2-11 Appearance

Table2-8 System control card description

No.	Mark	Name	Color	Description
①	RS485	RS485 port	-	Used for one machine to monitor the running information of other parallel systems. The RS485 port is connected by an RJ45 plug, and its pin definition is shown in Figure2-13. When the system is used in parallel, connect the RS485 ports together to enable intelligent display functions, as shown in Figure2-14 and Figure2-15.
②	PARALLEL	Parallel/BSC port	-	Inter-cabinet parallel /BSC signal port
③	NORMAL	Run indicator	Green	On: The system controller card is in the primary card state. Flashing: The system controller card is being initialized. Off: The system controller card is faulty.
④	ALARM	Alarm indicator	Yellow	On: The system controller card has an alarm signal. Flashing: The system controller card is in the secondary card state. Off: The system controller card has no alarm.
⑤	FAULT	Fault indicator	Red	On: The system controller card is faulty. Off: The system controller card works properly.

**NOTE**

[1] If integrated display is not required, there is no need to connect RS485 port.

After connecting the RS485 cable according to the circular connection method in Figure 2-14 or Figure 2-15, tap the touch screen → Device manage → Communication setting → next page to open the Smart integrated display function. After configuring the corresponding address based on the UPS ID, communication between the touch screens of each UPS can be achieved. Users can view basic information on other UPS touch screens on the pre-set intelligent display host, achieving centralized display of information and improving the efficiency of information retrieval.

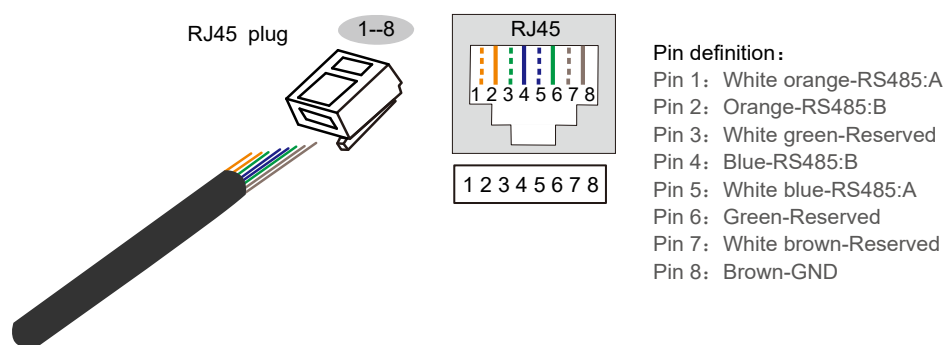


Figure2-12 Pin definition of RS485 port

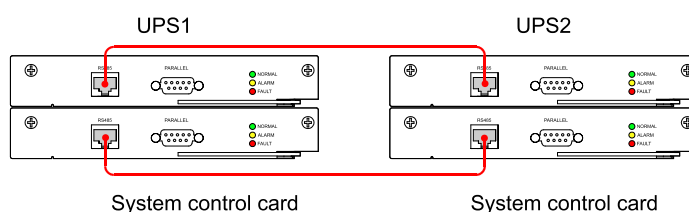


Figure2-13 RS485 port connection (two UPSs)

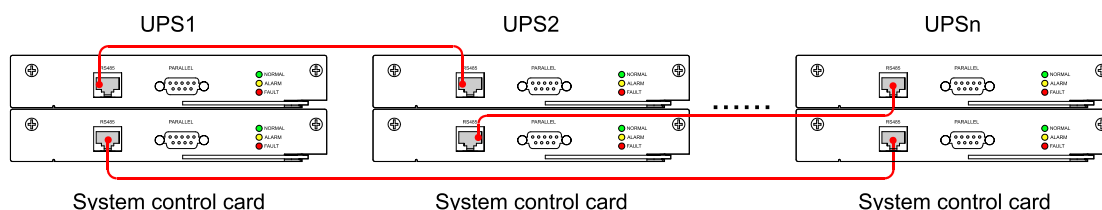


Figure2-14 RS485 port connection (multiple UPSs)

System monitoring card

The system monitoring card is a communication transfer module for system monitoring, providing external communication ports, dry contact control, battery temperature sampling and other functions. The system monitoring card panel includes one MODBUS port, one RS232 port, one EPO1 port, four input dry contact signal ports, one battery temperature collection port, one EPO2 port, three output dry contact signal ports, and one HMI port.

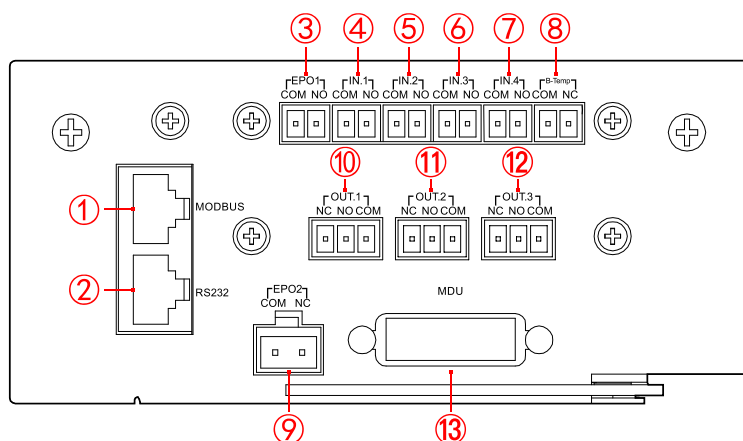
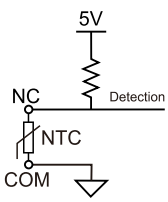
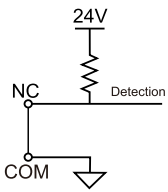


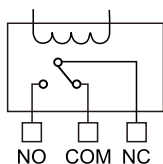
Figure2-15 Appearance

Table2-9 System monitoring card description

No.	Mark		Principle	Name	Description
①	MODBUS		-	MODBUS port	Used for MODBUS serial communication to realize the MODBUS communication function with the upper computer.
②	RS232		-	RS232 port	Used for RS232 serial communication to realize the communication function of the external SNMP card.
③	EPO1	NO		Internal EPO normally open input port	This signal is connected to the UPS internal EPO key switch. The EPO key switch operates through this dry contact. The signal is preset and isn't settable.
		COM		Enhanced insulated ground	
④	IN.1	NO		External switch normally open input port	- When NO and COM short-circuit, the signal is effective. - The four IN ports can be set according to user requirements in the ten dry contact definitions in Table2-10.
		COM		Enhanced insulated ground	
⑤	IN.2	NO		External switch normally open	

No.	Mark		Principle	Name	Description
⑥	IN.3			input port	
		COM		Enhanced insulated ground	
		NO		External switch normally open input port	
		COM		Enhanced insulated ground	
⑦	IN.4	NO		External switch normally open input port	
		COM		Enhanced insulated ground	
⑧	B-Temp	NC		Battery temperature sampling resistance port	External temperature sampling wire. The signal is preset and isn't settable.
		COM		Enhanced insulated ground	
⑨	EPO2	NC		External EPO normally closed input port	Trigger EPO2 operation: ● Short-circuit the CN8 of the system monitoring card with a 2P short cap, as shown in Error! Reference source not found.. ● Short-circuit NC and COM to make the system work normally. (If not operated, the touch screen displays "EPO abnormal" alarm.) ● Disconnect NC and COM, the
		COM		Enhanced insulated ground	

No.	Mark	Principle	Name	Description
				signal is effective. The signal is preset and isn't settable.
⑩	OUT.1	NC	OUT.1 normally closed output port	In the dry contact definition, OUT1 is set as the battery trip dry contact, using the NC (normally closed) interface. It must be used with a battery circuit breaker configured with a shunt trip mechanism. When the battery trip signal is active, the battery circuit breaker will trip and disconnect.
		NO	NO OUT.1 normally open output port	
		COM	Enhanced insulated ground	
⑪	OUT.2	NC	OUT.2 normally closed output port	In the dry contact definition, OUT2 is set as the bypass reverse current dry contact, using the NC (normally closed) interface. It must be used with a bypass circuit breaker configured with a shunt trip mechanism. When the bypass trip signal is active, the bypass circuit breaker will trip and disconnect.
		NO	NO OUT.2 normally open output port	
		COM	Enhanced insulated ground	
⑫	OUT.3	NC	OUT.3 normally closed output port	The maximum voltage and current of the external power supply for the dry contact are 30VDC/2A. When the signal is active, COM and NO are closed, and NC is disconnected. The three OUT ports can be configured according to user requirements from the 18 dry contact definitions in Table2-11.
		NO	NO OUT.3 normally open output port	
		COM	Enhanced insulated ground	
⑬	MDU	-	HMI port	Used for HMI communication.



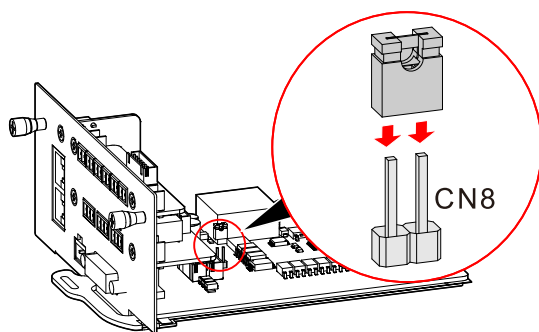


Figure2-16 System monitoring card , short CN8 for EPO remote control.

Table2-10 Input dry contact definition

No.	Dry contact definition	Description
1	Battery abnormal	When a battery abnormal signal is received, the UPS alarms and records the event, and the charging function is turned off.
2	Battery grounding abnormal	When a battery grounding abnormal signal is received, the UPS alarms and records the event (does not affect charging and discharging functions).
3	Battery switch open	When a battery switch open signal is received, the UPS alarms and records the event, and the battery circuit breaker auxiliary contact indicates that the UPS has been notified of the battery switch being open.
4	Bypass switch open	When a bypass switch open signal is received, the UPS alarms and records the event, and the bypass circuit breaker auxiliary contact indicates that the UPS has been notified of the bypass switch being open.
5	Generator mode	When a generator start signal is received, the UPS records the event and switches to generator mode. When the generator mode is enabled, the cabinet's charging of the battery is affected by the generator's power, resulting in charging power derating. You can set whether to charge and the derating ratio according to the generator's power.
6	SPD abnormal	When an input Surge protection device abnormal signal is

No.	Dry contact definition	Description
		received, the UPS records the event.
7	Maintenance bypass enabled	When a maintenance bypass open signal is received, the UPS alarms, notifies of maintenance bypass opening, and stops inversion. The load is powered by the external maintenance bypass.
8	Mains switch open	When a mains switch open signal is received, the UPS alarms and records the event, and the mains circuit breaker auxiliary contact indicates that the UPS has been notified of the utility switch being open.
9	Environmental smog abnormal	When the smog sensor detects an anomaly, the UPS records the event. If smog abnormal shutdown enable is turned on, the UPS will shut down after the delay time is reached.
10	Light band switch open	This feature is no longer in use.
11	Output switch open	When an output switch open signal is received, the UPS alarms and records the event, and the output switch circuit breaker auxiliary contact indicates that the UPS has been notified of the output switch being open.
12	Battery charging disabled	When this dry contact signal is received, the charging function is turned off.
13	Battery discharge disabled	When this dry contact signal is received, the discharging function is turned off.

Table2-11 Output dry contact definition

No.	Dry contact definition	Description
1	Inverter mode	This dry contact is ON when the UPS is in inverter output mode.
2	Bypass power supply	This dry contact is ON when the UPS is in bypass output mode.

No.	Dry contact definition	Description
3	Battery trip	When an abnormality occurs at the battery terminal and the battery circuit breaker needs to be disconnected, the dry contact will be ON, triggering the battery trip device to disconnect the battery circuit breaker.
4	Battery power supply	This dry contact is ON when the UPS is in battery power supply output mode.
5	Battery under-voltage alarm	This dry contact is ON when the UPS battery discharges to the low voltage alarm state.
6	Battery under-voltage protection	This dry contact is ON when the battery discharges to the low voltage protection state.
7	Output overload	This dry contact is ON when the UPS is in overload state.
8	UPS abnormal	This dry contact is ON when the UPS is in an abnormal state.
9	Bypass abnormal	This dry contact is ON when the bypass is abnormal or unable to track the bypass.
10	Mains abnormal	This dry contact is ON when there is an abnormality in the utility input power.
11	Generator start	This dry contact is ON when the generator is started.
12	ECO mode	This dry contact is ON when the UPS is in ECO output mode.
13	Inverter abnormal	This dry contact is ON when the UPS is in inverter abnormal state.
14	SCR short-circuit	This dry contact is ON when the UPS detects a bypass SCR short-circuit, and the cabinet disconnects the bypass switch.
15	Parallel bypass backfeed	The SCR short circuit already includes this dry contact, and the setting of this dry contact is invalid.
16	UPS power-on	This dry contact is ON when the UPS is in the power-on state.
17	Fan abnormal	This dry contact is ON when the UPS fan is abnormal.

No.	Dry contact definition	Description
18	UPS alarm	This dry contact is ON for any alarm from the UPS cabinet pre-alarm, cabinet alarm, component failure alarm, communication abnormality, or intelligent mode alarm.

**NOTE**

The output dry contact provides users with a switchable dry contact signal, and users can flexibly configure and use the dry contact signal.

2.4 Working Principles and Modes

2.4.1 Working Principle

UPS is an online product that uses modular technology, making it easy to maintain and expand. Module adopts smart control. Power module consists of a rectifier, an inverter and a DC/DC converter, which converts the input into pure, high-quality sine wave output through high-frequency switching technology.

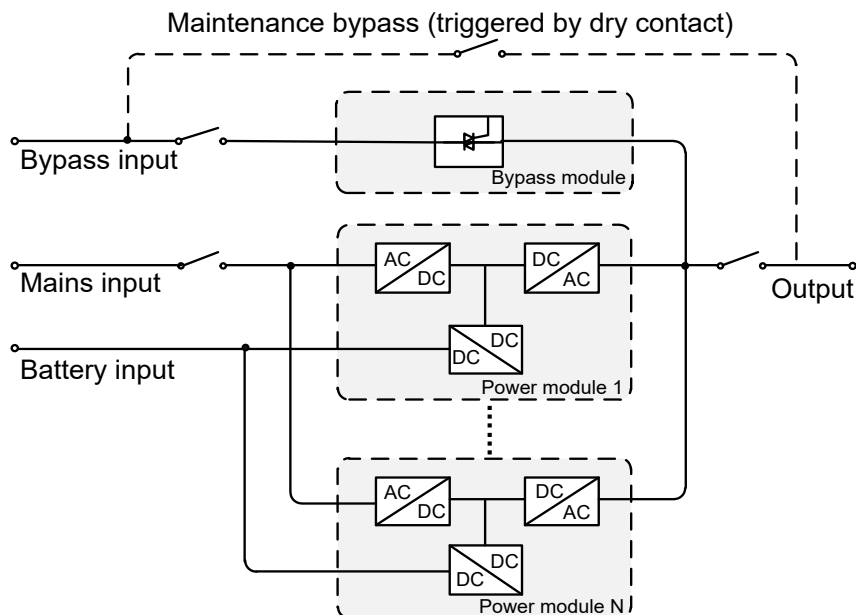


Figure2-17 Working principle diagram

2.4.2 Work Mode

Mains mode

The mains input is converted from AC to DC voltage by the rectifier, and then from DC to AC output by the inverter. After the two-stage conversion, the output voltage has improved accuracy and quality, which can prevent input harmonics, burrs, voltage transients and other interference from affecting the load. At the same time, the rectified bus charges the battery through the DC/DC converter.

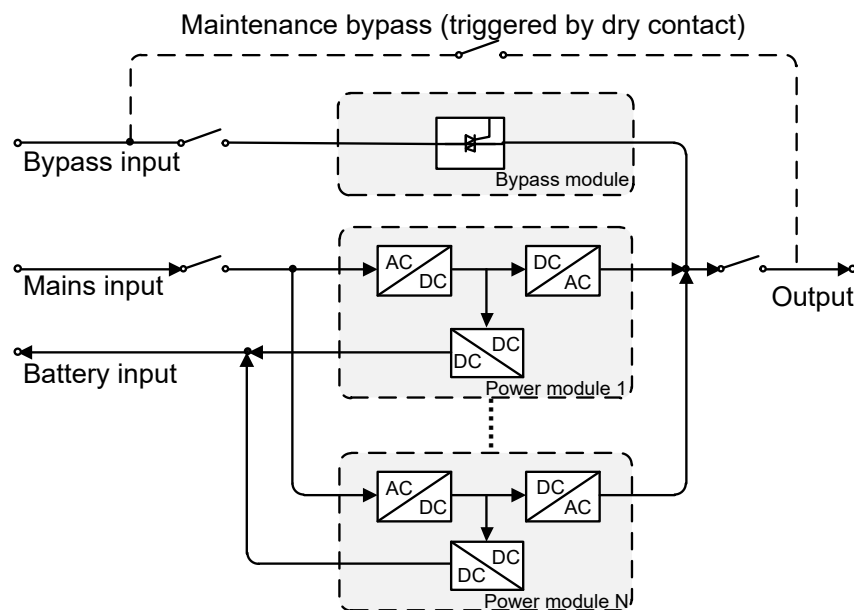


Figure2-18 Mains mode

Battery mode

When the AC input voltage or frequency of the rectifier becomes abnormal, the UPS switches to battery mode. The power modules draw energy from the battery, and the battery input is boosted by a DC/DC converter, then converted into AC voltage by the inverter for output. If the mains power returns to normal before the battery discharge is terminated, the rectifier switches back to mains input and simultaneously charges the battery. During the transition between grid power and battery power, the inverter output remains uninterrupted without any power loss. However, if the mains power fails to return to normal and the battery energy is nearly depleted, the UPS will trigger an audible and visual alarm, halt the inverter operation at the battery discharge lower limit, and emit a continuous warning beep. At this point, there is a risk of power loss to the user's load.

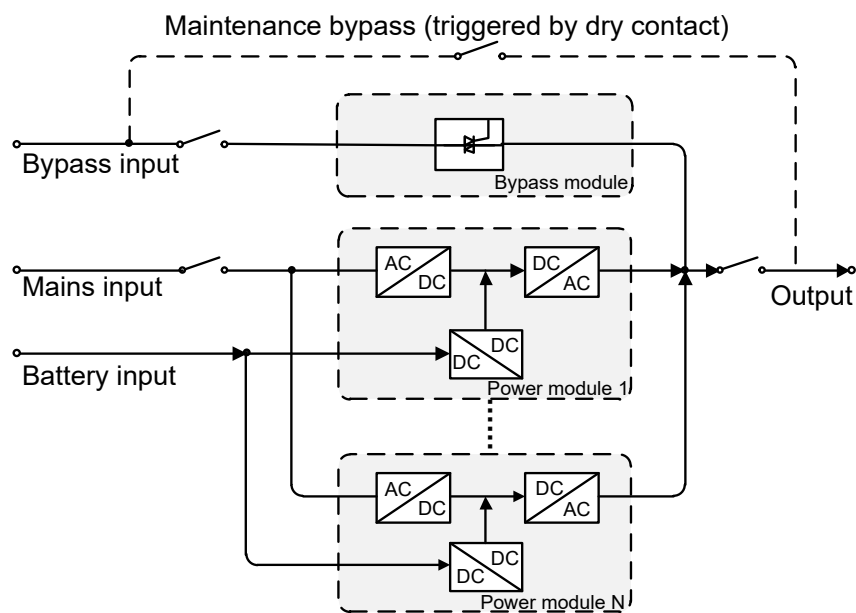


Figure2-19 Battery mode

Bypass mode

When the system encounters abnormal conditions such as overheating, short circuit, abnormal output voltage, or overload, and these conditions exceed the tolerable range of the inverter, the inverter will automatically shut down to prevent damage. If the input remains normal during this time, the bypass module will transfer the load power supply to the bypass power source. Simultaneously, the rectifier will continue to operate normally and charge the battery via the DC/DC converter. During the bypass power supply phase, if the fault or overload is resolved, the UPS will resume inversion and switch back to inverter power supply. In bypass mode, the quality of the power supplied to the load is not protected by the UPS and may be affected by factors such as power outages, abnormal mains voltage, or irregular input frequency.

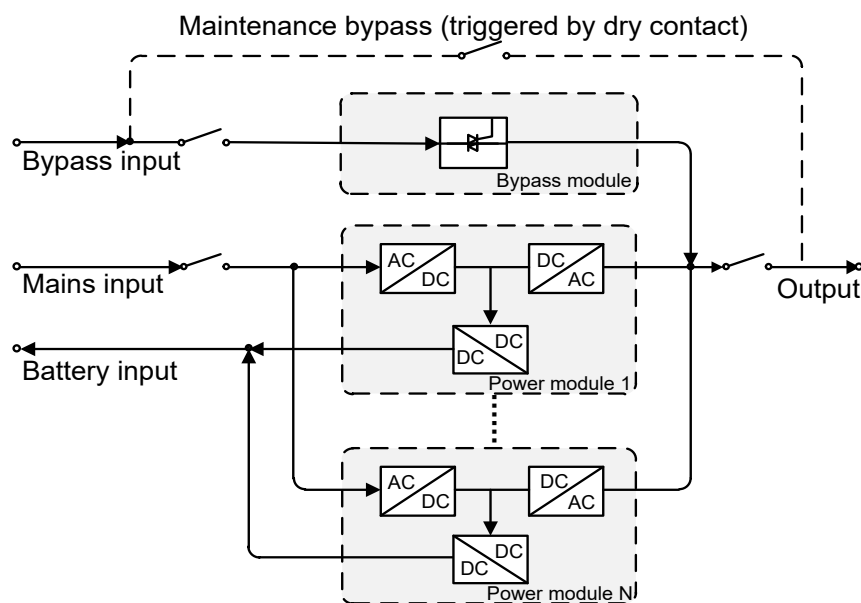


Figure2-20 Bypass mode

ECO mode

In ECO mode, when the AC input is normal, the UPS supplies power to the loads through the static bypass. If the AC input is abnormal, the UPS switches to inverter output mode. ECO mode can be manually configured via the touchscreen. When the bypass source voltage and frequency are within the ECO range, the static bypass switch conducts, allowing power to be supplied via bypass while the inverter remains in standby mode. If the bypass source voltage or frequency falls outside the ECO range, the load will switch from bypass output to inverter output. Regardless of whether the power is supplied by the bypass or the inverter, the rectifier remains active and continues to charge the battery through the DC/DC converter. ECO mode ensures reliable power delivery, improves efficiency, and saves energy, thereby reducing costs.

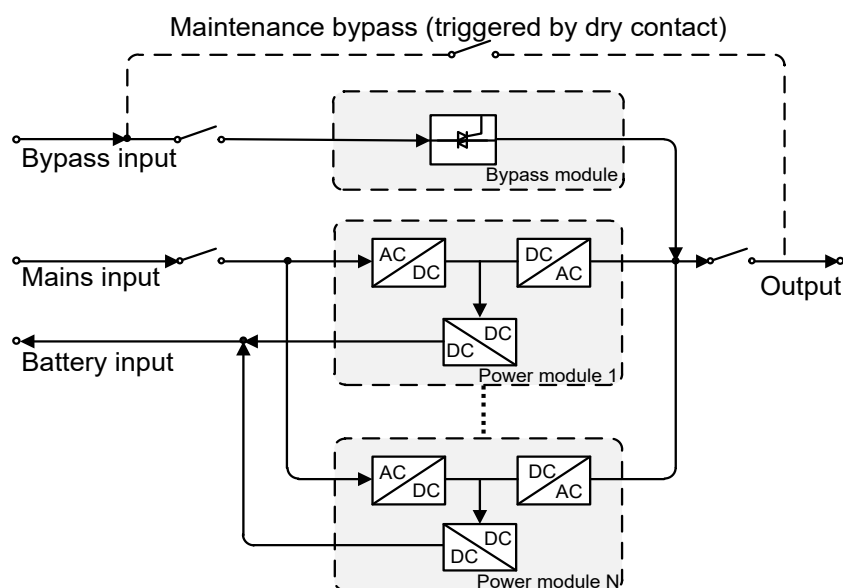


Figure2-21 ECO mode

WECO mode

In WECO mode, the inverter operates in a grid-tied manner based on ECO mode, thereby reducing the harmonic components of the input current and enhancing power grid quality. This mode can be manually configured via the touchscreen. When the bypass source voltage and frequency are within the defined WECO range, the static bypass switch conducts, enabling the bypass to supply power while the power modules perform harmonic compensation on the bypass current. This increases the power factor (PF) of the bypass current and reduces the input total harmonic distortion (THDi) of the input. If the bypass source voltage or frequency falls outside the WECO range, the load will switch from bypass to inverter power supply. Regardless of whether the power is supplied by the bypass or the inverter, the rectifier remains active and charges the battery through the DC/DC converter. WECO mode not only ensures higher efficiency but also minimizes grid damage.

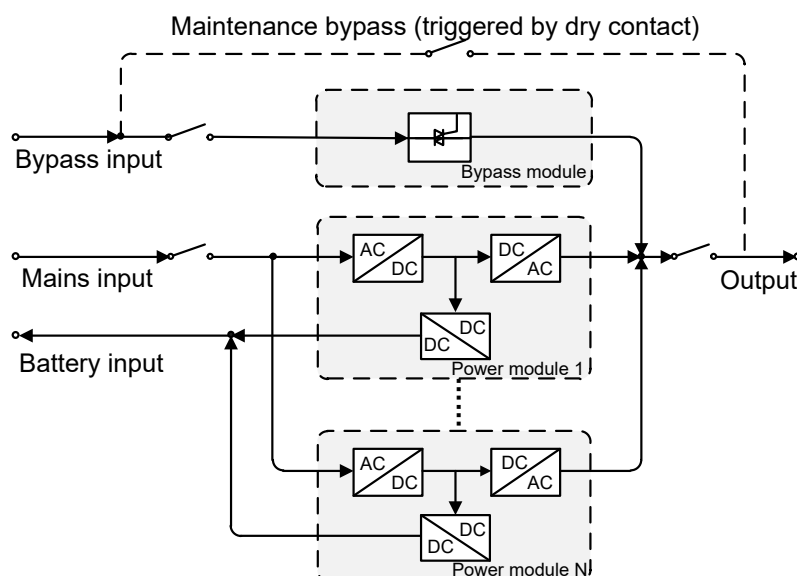


Figure2-22 WECO mode

Maintenance bypass power supply mode (triggered by dry contact)

When the UPS needs to be repaired after a fault occurs and the load power supply cannot be interrupted, if the bypass input is normal, the maintenance personnel can turn on the maintenance bypass switch when the mains switch, bypass switch, and output switch are off- to place the UPS into maintenance bypass power supply state. In this case, the UPS is fully powered down, ensuring uninterrupted power to the output load.

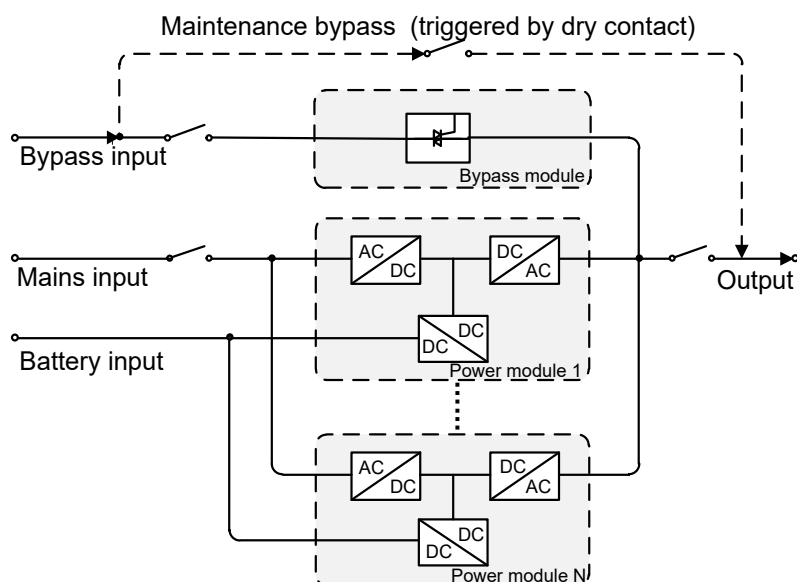


Figure2-23 Maintenance bypass mode

2.5 Optional Components

The VANGUARD XL series (80K-200K) UPS can be configured with the following accessories as needed.

Table2-12 Optional Components List

No.	Name	Model	No.	Name	Model
1	SNMP card	NT-SNMP	5	Battery temperature compensation kit	NM-TC
2	Dry contact expansion card	NT-RELAY	6	Surge protection facility	NP-SPD
3	BMS expansion card	NT-BMS	7	Single power source kit	NL-MBC
4	Parallel/BSC kit	NL-PA (10m or 15m)	8	Seismic option	NQ-GR

2.5.1 SNMP Card

The SNMP card is used to remotely manage the UPS via the network and supports the BACNET communication protocol. For SNMP card installation, please refer to section 3.6.2 SNMP Card Installation.

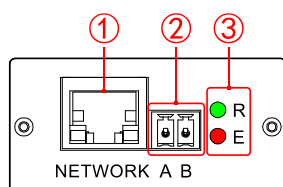


Figure2-24 Appearance

Table2-13 SNMP card description

No.	Mark	Name	Color	Description
①	NETWORK	Ethernet port	-	Used for Ethernet serial communication to realize the remote monitoring communication function. The Ethernet interface is connected using an RJ45 plug, and its pin definitions are shown in Figure2-26.
	COM1 A	COM1port	-	Supports monitoring of up to 1 UPS, and

No.	Mark		Name	Color	Description
②		B			enables remote control of UPS discharge, power on/off, and other functions.
③	R		Run indicator	Green	● R is on, E is on: System starts. ● R flashes, E is in any state: System is running.
	E			Red	● R is on/off, E is in any state: System crashes, keep the last state. ● R is in any state, E is off: System has no alarm. ● R is in any state, R flashes: System has an alarm.

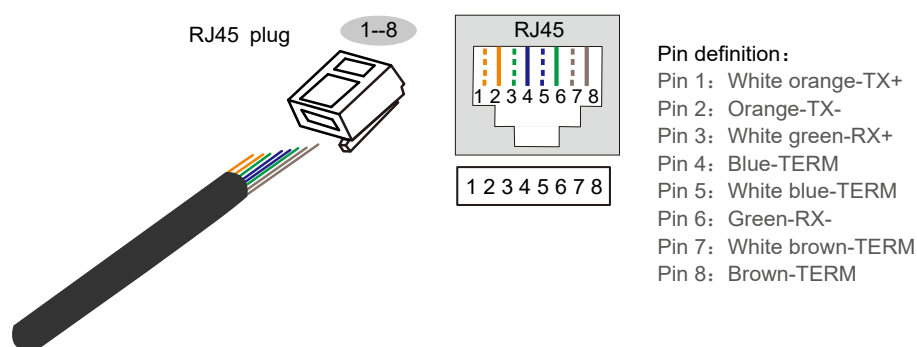


Figure2-25 Definition of NETWORK interface pins

SNMP card software

NOTE

- It is suitable but not only for the following browsers (The old version operating system may not be good in compatibility): Chrome56+ browser, IE11+ browser. The login interface is different in different browser.
- Please scan the QR code on the UPS nameplate and enter the UPS S/N to get the WiseWay monitoring software user manual and its software.

CAUTION

Please ensure that the setting IP address is in the same network segment with user's computer IP address.

After the SNMP card is installed and connected, configure the software in the following order.

- Step 1 Open a browser and enter the IP address of the WiseWay built-in card (KC502) (The default IP address is 192.168.0.100).



NOTE

When the IP address of the SNMP built-in card (KC502) changes or multiple SNMP cards are used at the same time, the corresponding IP address can be obtained through WiseFind software.

- Step 2 Enter the user name and password in the login page and click "Login" to enter the monitoring page.



Figure2-26 Login page



NOTE

Default administrator user name is admin, password is KHadmin0592.

----End

2.5.2 Dry Contact Expansion Card

The dry contact expansion card is mainly used for signal acquisition and detection. The dry contact expansion card includes 3 input dry contact signal ports and 2 output dry contact signal ports. The definitions of input and output dry contacts are shown in Table2-10 and Table2-11. For the installation of dry contact expansion cards, please refer to section 3.6.3 **Expansion Card Installation**.

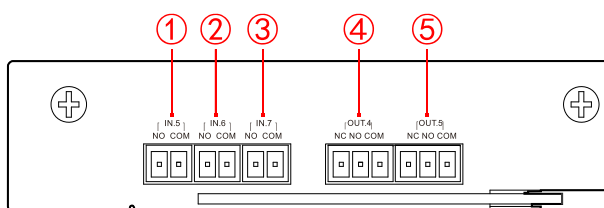
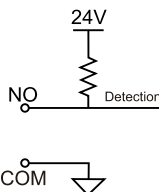
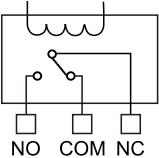


Figure2-27 Appearance

Table2-14 Description of dry contact expansion card

No.	Mark			Name	Description
①	IN.5	NO		External switch normally open input port	When NO and COM short-circuit, the signal is effective. The signal is settable.
		COM		Enhanced insulated ground	
②	IN.6	NO		External switch normally open input port	
		COM		Enhanced insulated ground	
③	IN.7	NO		External switch normally open input port	
		COM		Enhanced insulated ground	
④	OUT.4	NC		OUT.4 normally closed output port	- The max. voltage and current of the external power are 30VDC/2A. - When the signal is effective, COM short-circuit NO, and disconnect from NC. The signal is settable.
		COM		Enhanced insulated ground	
		NO		OUT.4 normally open output port	
⑤	OUT.5	NC		OUT.5 normally closed output port	
		COM		Enhanced insulated ground	
		NO		OUT.5 normally open output port	

2.5.3 BMS Expansion Card

The BMS expansion card is mainly used for lithium battery communication. The BMS expansion card includes one BMS interface, two input dry contact signal numbers, and one output dry contact signal number. For the installation of BMS expansion card, please refer to **3.6.3 Expansion Card Installation**.

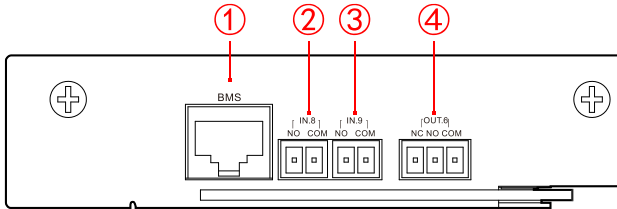
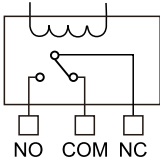


Figure2-28 Appearance

Table2-15 BMS expansion card description

No.	Mark		Principle	Name	Description
①	BMS		-	BMS port	Used to achieve communication function with lithium battery BMS. The BMS interface is connected using RJ45 plugs, and its pin definitions are shown in Figure2-30.
②	IN.8	NO		External switch normally open input port	When NO and COM short-circuit, the signal is effective. The signal can be set to prohibit charge.
		COM		Enhanced insulated ground	
③	IN.9	NO		External switch normally open input port	When NO and COM short-circuit, the signal is effective. The signal can be set to prohibit discharge.
		COM		Enhanced insulated ground	
④	OUT.6	NC		OUT.6 normally closed output port	The max. voltage and current of the

No.	Mark		Principle	Name	Description
		NO		OUT.6 normally open output port	external power are 30VDC/2A.
		COM		Enhanced insulated ground	When the signal is effective, COM short-circuit NO, and disconnect from NC. The signal is reserved.

NOTE

To ensure the reliability of the Li-battery, contact NXT Power or your local office if the Li-battery is used together.

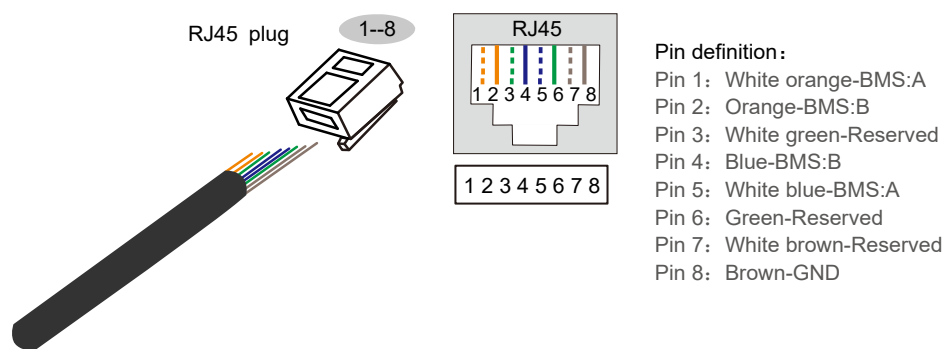


Figure2-29 Pin definition of BMS port

2.5.4 Parallel/BSC Kit

Parallel/BSC kit is used to connect the parallel/BSC signal ports between cabinets in the parallel system. For the installation of parallel/BSC kit, please refer to section **3.6.4 Parallel/BSC Kit Installation**.

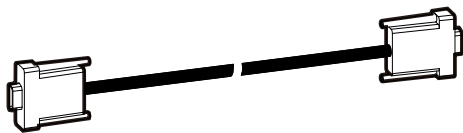


Figure2-30 Appearance

- When multiple UPS are connected in parallel, it is necessary to use parallel control cables to connect the parallel interface of each UPS in a circular manner. Connecting N UPS requires N parallel control cables to ensure that each UPS has at least two parallel control cables connected, thereby improving the reliability of parallel operation.

- Synchronous BSC output dual bus control is used in dual bus systems to synchronize the output frequency and phase of each system in the dual bus system, ensuring that the two buses can switch to each other.

NOTE

When UPS leaves the factory, the order comes with a 22.97ft (7m) parallel cable as standard. When shipped, the parallel cable is shipped with the UPS machine. If the 22.97ft (7m) parallel wire does not meet the on-site requirements, please consult customer service personnel separately.

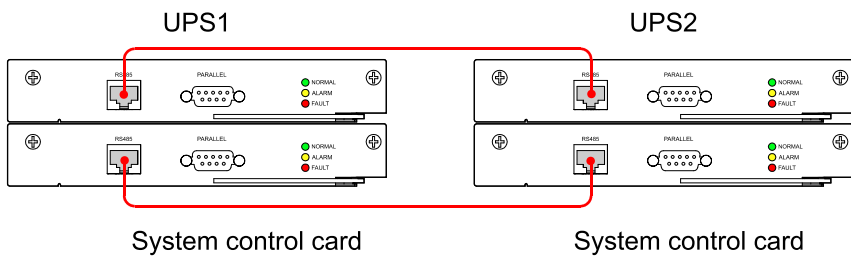


Figure2-31 Parallel port connection (two UPS)

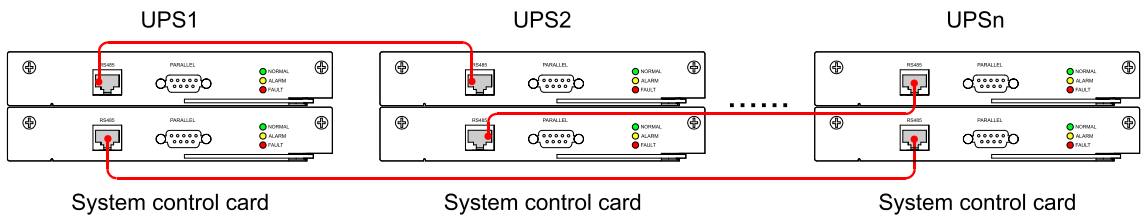


Figure2-32 Parallel port connection (multiple UPS)

2.5.5 Battery Temperature Compensation Kit

The battery temperature compensation kit is used to compensate for the battery temperature. This function is used to monitor the battery temperature and realize the temperature compensation of battery charging and discharging. For the installation of the battery temperature compensation kit, please refer to section **3.6.5 Battery Temperature Compensation Kit Installation**.

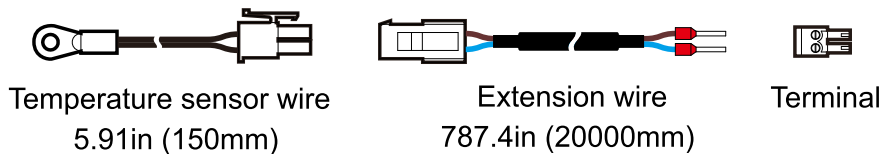


Figure2-33 Appearance

NOTE

The temperature sensor wire must be fixed in the area where the battery temperature is high.

2.5.6 Surge Protection Facility

In areas with frequent lightning strikes, a multi-level surge protection system should be installed at the incoming line of the municipal power supply to ensure the safe operation of the equipment. This series of UPS can be optionally equipped with a Class C surge protection device and surge protection circuit breaker. For the installation of surge protection facilities, please refer to section **3.6.6 Surge Protection Facility Installation**.

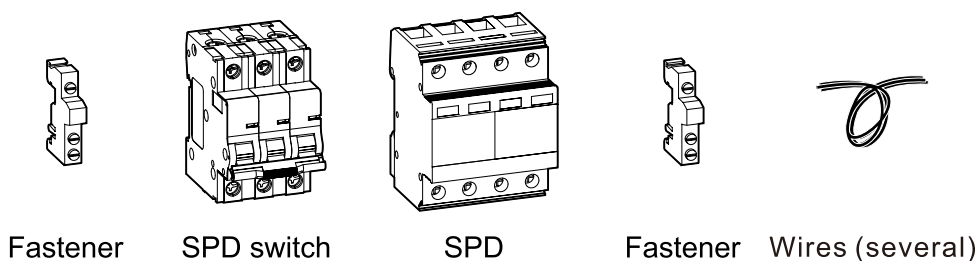


Figure2-34 Appearance



NOTE

When UPS is equipped with the surge protection facility, install it after the UPS is powered off for power cable safety consideration. Please specify this requirement in the order and install the surge protection facility in factory before delivery.

2.5.7 Single Power Source Kit

Single power source kit is used to connect the mains input copper bar with bypass copper bar so that the mains input and bypass input of the UPS are supplied by the same power.

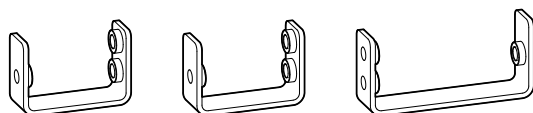


Figure2-35 Appearance



NOTE

Please refer to section **3.6.7 Single Power Source Kit Installation** for detailed installation.

2.5.8 Seismic Options

Seismic options are used in earthquake prone areas with high stability requirements, and the product is designed according to North American OSPHD.

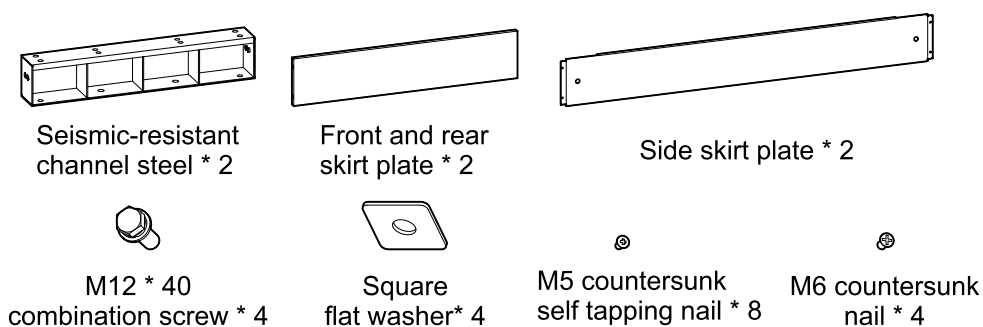


Figure2-36 Seismic options

**NOTE**Please refer to section **3.6.1 Seismic Option Installation**.

2.6 Alarm protection function

Once UPS is abnormal, it will send sound & light alarm.

Table2-16 Alarm protection function

Fault	Fault information	Protection status	Alarm status
Mains fault	Mains fault	Mains power supply is not allowed.	● Buzzer beeps slowly. ● "⚡" rectifier indicator on the operation panel turns red. ● "📶" mains icon on the touch screen turns red. ● The yellow ambient lamp is on.
	Mains overvoltage		
	Mains under-voltage		
	Mains unbalance		
	Mains overfrequency		
	Mains underfrequency		
	Mains power down		
	Mains phase loss		
	Mains phase sequence abnormal		
	Large mains harmonic component		
	Mains flash drop		
	Mains PFC overload protection		

Fault	Fault information	Protection status	Alarm status
	Large mains DC component		
Battery fault	Battery fault	Battery power supply is not allowed.	● Buzzer beeps rapidly. ● "  " battery indicator on the operation panel turns red. ● "  " battery icon on the touch screen turns red. ● The yellow ambient lamp is on.
	Battery reverse connection		
	Battery overvoltage		
	Charger overcurrent		
	Battery circuit abnormal		
	Battery under-voltage protection		
	Battery overload		
Bypass fault	Bypass fault	Bypass output is not allowed.	● Buzzer beeps slowly. ● "  " bypass indicator on the operation panel turns red. ● "  " bypass icon on the touch screen turns red. ● The yellow ambient lamp is on.
	Bypass overvoltage		
	Bypass under-voltage		
	Bypass unbalance		
	Bypass overfrequency		
	Bypass underfrequency		
	Bypass power down		
	Bypass phase loss		
	Bypass phase sequence abnormal		
	Large bypass harmonic components		
	ECO power down fast detection	ECO output is not allowed.	● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	ECO overvoltage		
	ECO under-voltage		
	ECO overfrequency		
	ECO underfrequency		

Fault	Fault information	Protection status	Alarm status
	WECO under-voltage	WECO output is not allowed.	
Output fault	Inverter output fault	Inverter output is not allowed.	● Buzzer keeps beeping. ● "⚡" inverter indicator on the operation panel turns red. ● "🔌" output icon on the touch screen turns red. ● The red ambient lamp is on.
	Output short circuit		
	Inverter overvoltage		
	Inverter under-voltage		
	Low output PF value		
	Large output current DC component		
	Output circuit abnormal	None	● Buzzer beeps slowly. ● "⚡" inverter indicator on the operation panel turns red. ● "🔌" output icon on the touch screen turns red. ● The red ambient lamp is on.
System fault	System fault	None	● Buzzer keeps beeping. ● The red ambient lamp is on.
	System EPO on	Bypass output and inverter output are not allowed.	
	System bypass fault	None	
	System inverter fault	None	
	EPO on	Bypass output and inverter output are not allowed.	
	Bypass SCR abnormal	Bypass output is not allowed.	● Buzzer keeps beeping. ● "🔄" bypass indicator on the operation panel turns red. ● "🔌" bypass icon on

Fault	Fault information	Protection status	Alarm status
			the touch screen turns red. ● The red ambient lamp is on.
	Bypass overload protection	Bypass output and inverter output are not allowed.	● Buzzer keeps beeping. ● "  " load indicator on the operation panel turns red.
	Inverter overload protection	Inverter output is not allowed.	● "  " output icon on the touch screen turns red. ● The red ambient lamp is on.
	Parallel cable abnormal	Inverter output is not allowed.	● Buzzer keeps beeping. ● The red ambient lamp is on.
	Parallel system master permissions fault	None	
	External maintenance bypass enabled	Inverter output is not allowed.	
	System battery charge disabled enable	None	● Buzzer beeps rapidly. ● "  " battery indicator on the operation panel turns red. ● "  " battery icon on the touch screen turns red. ● The red ambient lamp is on.
	System battery discharge disabled enable	None	
Cabinet fault	Cabinet fault	None	● Buzzer keeps beeping. ● The red ambient lamp is on.
	Bypass overtemperature	Judge whether to bypass output based on the bypass overtemperature	● Buzzer keeps beeping. ● "  " bypass indicator on the operation panel turns red.

Fault	Fault information	Protection status	Alarm status
		setting	● " " bypass icon on the touch screen turns red. ● The red ambient lamp is on.
	Inverter output overcurrent	None	● Buzzer keeps beeping. ● The red ambient lamp is on.
	Rectifier fault self-locking	None	
	Inverter fault self-locking	None	
	Battery overload protection	None	
	Battery discharge protection	None	
	UPS fault	None	
Cabinet prealarm	Cabinet prealarm	None	● Buzzer beeps rapidly. ● The yellow ambient lamp is on.
	Cabinet overtemperature alarm	None	
	Battery high temperature alarm	None	
	Battery low temperature alarm	None	
	Battery under-voltage alarm	None	
	Backup time insufficient	None	
	Output overload alarm	None	● Buzzer beeps rapidly. ● " " load indicator on the operation panel turns red. ● " " output icon on the touch screen turns red. ● The yellow ambient lamp

Fault	Fault information	Protection status	Alarm status
			is on.
	Output frequency out of range	None	● Buzzer beeps rapidly. ● The yellow ambient lamp is on.
	Bypass auxiliary power abnormal	None	
	Bypass overtemperature alarm	None	
	Partial power module PFC abnormal	None	
	Battery power-on auto start disabled	None	
Cabinet alarm	Cabinet fault	None	● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	Battery not connected alarm	None	
	Auxiliary power abnormal	None	
	Bypass installation not ready	Bypass output is not allowed.	● Buzzer beeps slowly. ● "⚡" bypass indicator on the operation panel turns red. ● "⚡" bypass icon on the touch screen turns red. ● The yellow ambient lamp is on.
	Setting parameter mismatch	None	● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	Battery parameter mismatch	None	
	Module quantity mismatch	None	
	Cabinet count mismatch	None	

Fault	Fault information	Protection status	Alarm status
	System card n_installation not ready	None	
	System card n_Flash abnormal	None	
	System card n_card slot address repeat	None	
	System card n_on/off status not synchronized with master card	None	
	Current mode is bypass output	None	
	System card n_master/backup card parameters out of sync	None	
	System card n_output state out of sync	None	
	Fan dedusting	None	
Power-on failure alarm	Power-on failure alarm	Static startup is not allowed to work.	● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	Reserved		
	Load too large to invert output		
	Load unknown waiting for common inversion		
	PFC software version inconsistent		
	INV software version inconsistent		
	CCM software version inconsistent		
	Module hardware version inconsistent		

Fault	Fault information	Protection status	Alarm status
	Key parameter mismatch		
	Parallel cabinet address conflict		
	Module version inconsistent		
Component failure alarm	Component failure	None	● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	Bypass 1 NTC failure		
	Bypass 2 NTC failure		
	Cabinet NTC failure		
	System card NTC failure		
	Bypass fan abnormal		
	Cabinet fan abnormal		
	Parallel cable 1 alarm		
	Parallel cable 2 alarm		
	Bypass 1 installation not ready		
	Bypass 2 installation not ready		
	Monitoring card installation not ready		
	Bypass module offline	Bypass output is not allowed.	● Buzzer beeps slowly. ● "⚡" bypass indicator on the operation panel turns red. ● "⚡" bypass icon on the touch screen turns red.
	Dry contact expansion card offline	None	● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	Bypass NTC failure		
Communication	Communication		

Fault	Fault information	Protection status	Alarm status
abnormal alarm	abnormal	None	● Buzzer beeps rapidly. ● The yellow ambient lamp is on.
	Inner sync CAN abnormal		
	Inner equalized-current CAN abnormal		
	BMS communication fault		
	Inner display CAN abnormal		
	Inter-cabinet sync CAN abnormal		
	Inter-cabinet equalized-current CAN abnormal		
	Internal SCI communication abnormal		
Smart mode alarm	Smart mode alarm	None	● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	Generator mode enable		
	Generator charge prohibited		
	Only one BSC system detected		
	System current load exceeds the set safety load		
	Power module no redundancy		
	Power module redundancy insufficient		
	Cabinet no redundancy		
	Cabinet redundancy		

Fault	Fault information	Protection status	Alarm status
	insufficient System card no redundancy Self-load circuit breaker abnormal Self-load timeout alarm Inverter and bypass out of sync		
Input dry contact state	Input dry contact alarm	None	● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	Battery abnormal		● Buzzer beeps rapidly. ●  "battery indicator on the operation panel turns red. ●  "battery icon on the touch screen turns red. ● The yellow ambient lamp is on.
	Battery grounding abnormal		
	Battery switch off		● Buzzer beeps slowly. ●  "bypass indicator on the operation panel turns red. ●  "bypass icon on the touch screen turns red. ● The yellow ambient lamp is on.
	Bypass switch disconnected		
	Output switch disconnected		● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	Battery discharge disabled (enabled)		● Buzzer beeps rapidly. ●  "battery indicator

Fault	Fault information	Protection status	Alarm status
			on the operation panel turns red. ● "  " battery icon on the touch screen turns red. ● The yellow ambient lamp is on.
	Battery charge disabled (enabled)		● Buzzer beeps rapidly. ● "  " battery indicator on the operation panel turns red. ● "  " battery icon on the touch screen turns red. ● The yellow ambient lamp is on.
	Generator mode		● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	SPD abnormal		
	External maintenance bypass enabled		
	Environmental smog abnormal		
	Mains abnormal		
Offline alarm state	Power module 1 offline	None	● Buzzer beeps slowly. ● The yellow ambient lamp is on.
	Power module 2 offline		
	Power module 3 offline		
	System card 1 offline		
	System card 2 offline		

**CAUTION**

After the battery under-voltage protection is triggered, UPS will restart and recharge battery pack when the mains restores to normal supply.

3 Installation

3.1 Installation Process

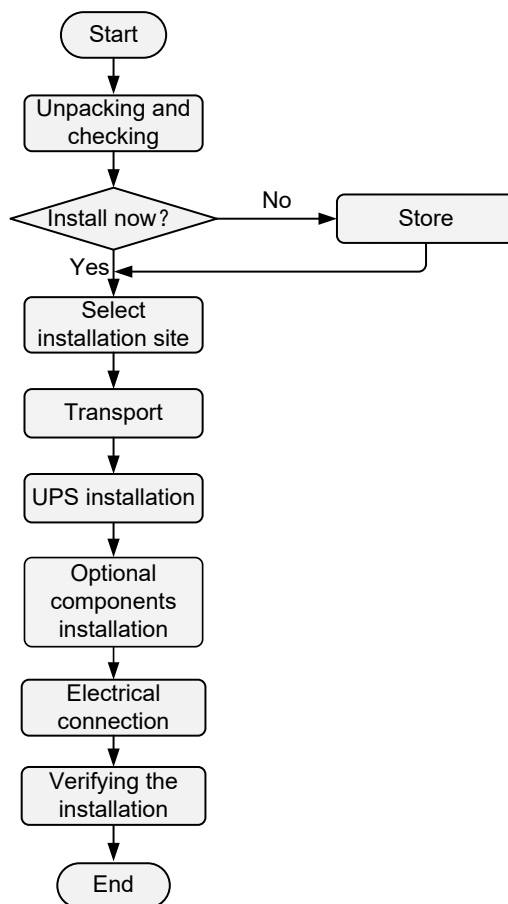


Figure3-1 Installation process

3.2 Unpacking and Checking



NOTE

Due to the large size of the box, it is necessary to choose the unpacking location in advance. In principle, the unpacking location should be as close as possible to the installation location.

3.2.1 Check Outer Packaging

The device has been fully tested and inspected before delivery, but damage may still occur during transportation. Please check the outer package for visible damage, such as holes, cracks or other signs that may cause internal damage, and check the device model before unpacking. If there is any abnormal packaging or device model discrepancy, do not unpack it and contact your dealer as soon as possible.



NOTE

- Device model and gravity center marking can be identified on the packing box.
- When using a forklift truck to transport device, the forklift arm should align with the "Forklift arm position" icon on the packing box.

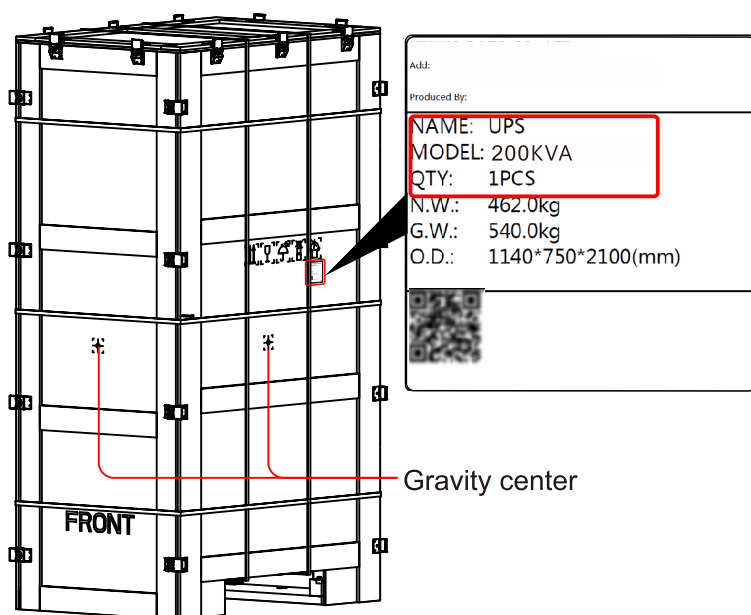


Figure3-2 Device model and gravity center marking location

3.2.2 Check Deliverables

Check if the random attachments are complete and correct, and if there are any obvious external damages. If any damage is found to the random attachments, please make on-site records in a timely manner and contact the manufacturer immediately.



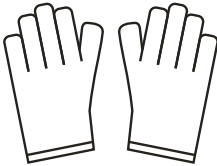
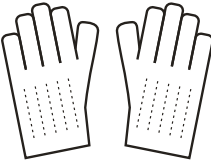
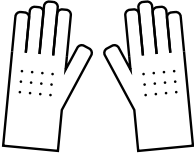
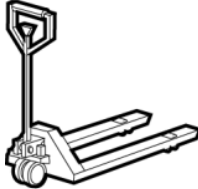
NOTE

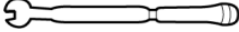
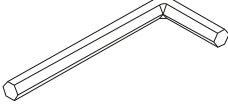
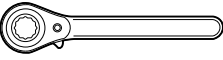
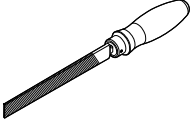
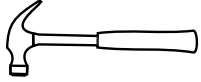
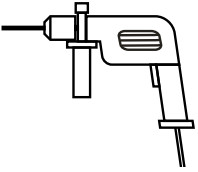
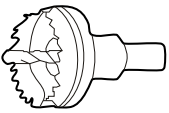
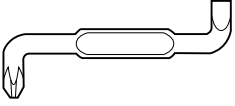
If the device is not immediately put into use, it should be repackaged in its original packaging. The internal plastic packaging bag should be sealed, and the internal desiccant (if any) should be retained to ensure that the original internal packaging is intact. It should be sealed with tape and stored according to the storage requirements in section **1.9 Storage Requirements**.

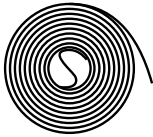
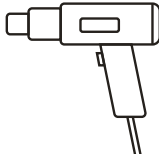
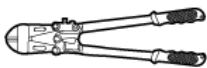
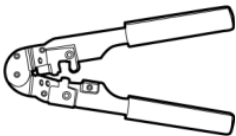
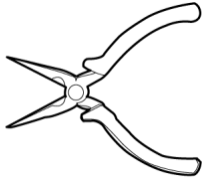
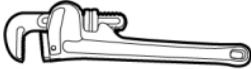
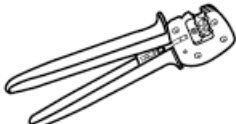
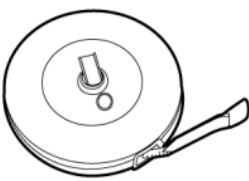
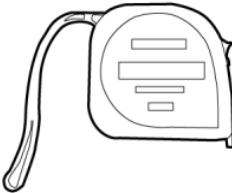
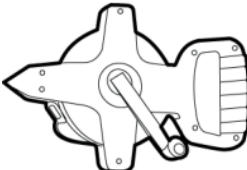
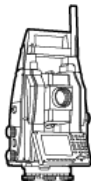
3.3 Installation Preparation

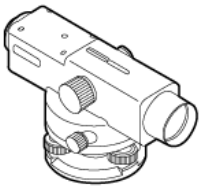
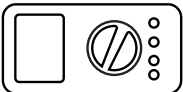
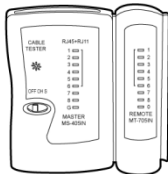
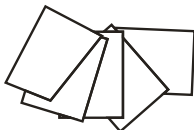
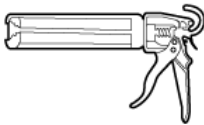
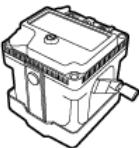
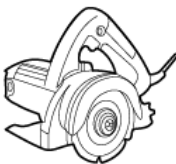
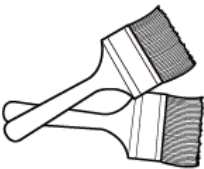
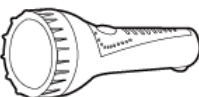
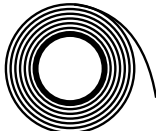
3.3.1 Installation Tool

Operators can adjust the tools used as needed based on the specific construction situation.

Protective tool			
			
Safety helmet	Protective glasses	Labor insurance shoes	Reflective jacket
			
Dust mask	Labor insurance gloves	Antistatic gloves	Insulated gloves
	-	-	-
Safety belt	-	-	-
Handling tools			
			-
Lift truck	Manual forklift truck	Forklift	-

Device installation tool			
 	 		
Flat insulated torque screwdriver	Cross insulated torque screwdriver	Insulated torque socket spanners (include extension sockets)	Adjustable wrench
			
Torque wrench	Allen wrench	Ratchet	Rasp
			
Rubber hammer	Claw hammer	Hammer drill	Marker
  			
Torque screwdriver	Hole opener	Elbow screwdriver	Electric screwdriver
	-	-	-
Step ladder	-	-	-
Cable installation tool			
			

Diagonal pliers	Wire stripper	Crimper	Hydraulic clamp
			
Electrician's knife	Heat shrink tubing	Heat gun	Label paper
			
Zip ties	Wire cutter	RJ45 crimping pliers	Needle-nose pliers
			
Pilers	Wire plier	Pipe Clamps	Hydraulic pliers
		-	-
Open wrench	Crimper	-	-
Measuring tool			
			
Level	Steel ruler	Angle ruler	Long tape measure
			

Tape rule	Long roll steel rule	Height meter	Laser locator
			
Thermometer	Level	Phase sequence table	Voltage resistance meter
			
Clamp ammeter	Multi-meter	Network cable tester	Electric pen
Cleaning tools			
			-
Vacuum cleaner	Cotton	Brush	-
Other tools			
			
Cable coil	Sealant, sealant gun	Insulation shake meter	Small cutter
			
Paintbrush	Flashlight	Sandpaper	Insulation tape



The installation tools must be with insulation protection to prevent electric shock.

3.3.2 Select Installation Site

Installation Environment

The protection grade of UPS is IP20, which is intended for in indoor installation. The installation environment requirements are as follows.

- Ambient temperature: 32°F (0°C)~ 104°F (40°C).

NOTE

The optimal operating temperature range for the battery is 68°F~86°F(20°C~30°C). Extended operation above 86°F (30°C) will reduce battery lifespan, while operation below 68°F (20°C) will decrease backup time.

- Relative humidity: 0%RH to 95%RH, non-condensing.
- Not more than 6,562ft (2000m). For altitudes exceeding 6,562ft (2000m), derating must be applied according to IEC 62040-3 standard, up to 13,123ft (4000m).
- Verticality: No vibration. The vertical inclination does not exceed 5°.
- Good ventilation around the device.
- Do not place the device near water sources, heat sources, or inflammable and explosive materials.
- Do not install the device in an environment with direct sunlight, dust, smog, volatile gases, corrosive substances, infrared, ultraviolet and other radiation, organic solvents, or high salt content.
- Do not install the device in a working environment with metal conductive dust.
- Do not install the device in areas with strong vibrations, strong noise sources, and strong electromagnetic fields.
- The installation ground is solid, there is no bad geology such as rubber soil, soft soil or easy subsidence. It is strictly prohibited to choose low-lying areas such as easy water and snow. The water level of the site should be higher than the highest water level in the history of area.
- Add a rodent-proof baffle at the door of the device room to prevent rodents and insects from entering.

- Power supply requirements:
 - Grounding preparation: The grounding terminal is ready.
 - Before installing the UPS system, please confirm that the provided AC input voltage and mains load capacity can meet the requirements of the device, and consider whether the current carrying capacity has decreased due to wire aging.
 - The mains input voltage range of UPS is 334-555VAC. The mains capacity should be greater than the max. input power of UPS.
 - Air switches with leakage current protection shall not be selected.

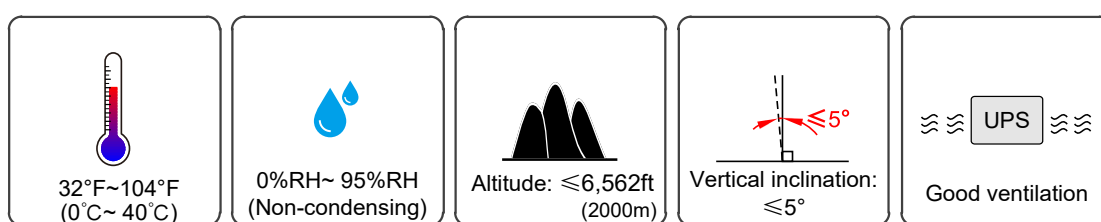


Figure3-3 Installation environment

CAUTION

For safety reasons, please ensure that a three-pole disconnect switch is installed on the external DC distribution line.

Installation Space

Reserve enough space around UPS for operation and ventilation.

- When UPS units are installed in parallel cabinets, the space reserved around the entire combined device should meet the installation space requirements specified in Figure3-4 and Table3-1.

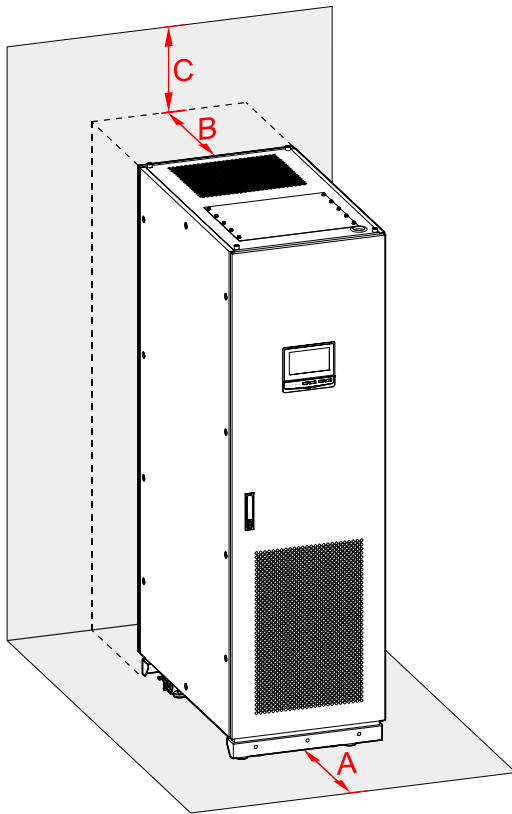


Figure3-4 Installation spacing requirements (unit: inch)

Table3-1 Installation spacing instructions

Model	A	B	C
80-200 kVA	$\geq 31.5\text{in (800mm)}$	≥ 0	$\geq 19.7\text{in (500mm)}$

CAUTION

Do not cover the ventilation holes of UPS, so as not to affect the heat dissipation of UPS, resulting in an increase in the internal temperature of UPS and affect the UPS service life.

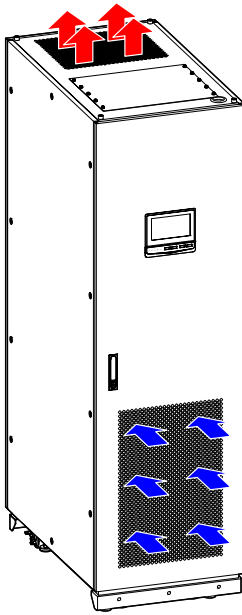


Figure3-5 Heat dissipation diagram

Table3-2 Heat Dissipation (BTU/hr) for 200KVA UPS

200KVA	Normal operation	ECO mode
Voltage (V)	480	480
100% load	18425	6824

Table3-3 Ventilation requirement (m³/h)

Model	80KVA	100KVA	135KVA	160KVA	200KVA
Min. ventilation rate	1650	1650	2350	2350	2350

3.4 Transporting

When handling equipment, lifting or forklift handling can be selected according to the on-site situation.

3.4.1 Forklift Handling

To avoid tipping the equipment, when using a forklift to move the UPS, the forklift arms must be inserted from the side of the equipment and fully extend through the bottom of the equipment, as shown in Figure3-6.

 CAUTION

- The device must be handled by trained professionals. Select an appropriate freight elevator based on the device's weight and arrange for the required number of personnel for transportation. Transport personnel must wear protective equipment such as safety shoes, gloves, and other protective gear. If the device's weight exceeds the elevator's weight capacity, contact a professional to provide a suitable transportation method.
 - When using a forklift to lift the device, ensure that the device's center of gravity is positioned between the two forks. Keep the transportation process slow, smooth, and balanced. Before moving, secure the device to the forklift with a rope. During transportation, a designated person must supervise the process.
 - To prevent the UPS from tipping over during transportation, ensure that the end of the forklift arm extends beyond the wooden pallet when using either an electric or manual forklift.
 - During transportation, always pay attention to the device's center of gravity to avoid impact or the device falling.
 - Keep the device vertical during transportation, with the tilt angle $\alpha \leq 15^\circ$. Do not lower or lift it suddenly.
-

 NOTE

The forklift arms must be inserted from the side of the device.

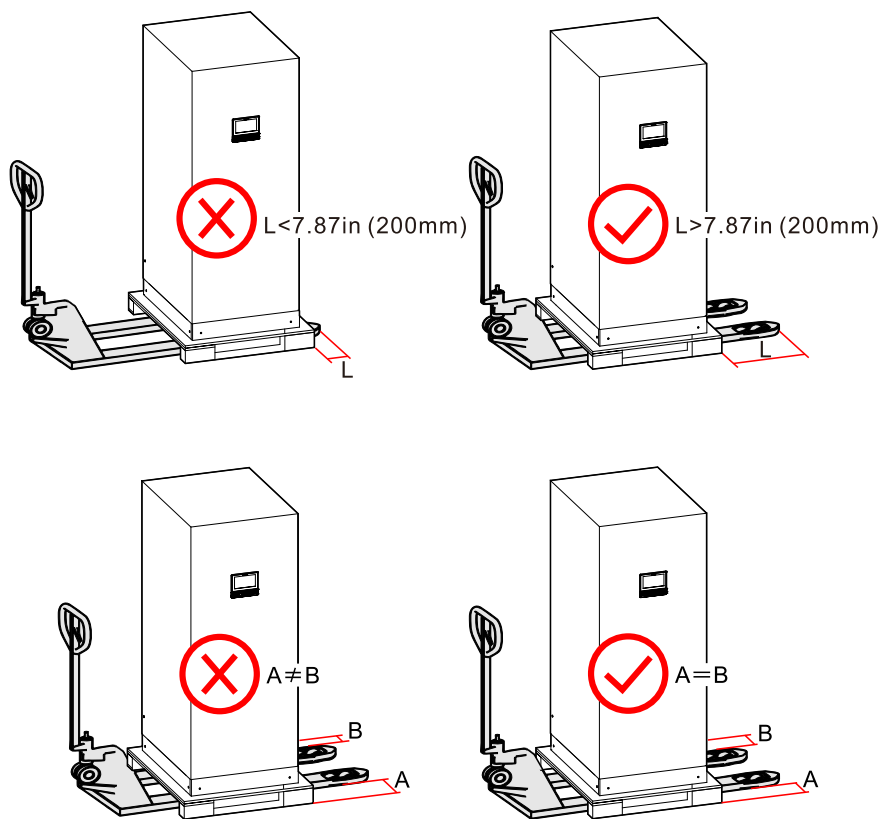


Figure3-6 Forklift truck transportation diagram

3.4.2 Lifting and Handling

This UPS can also be lifted and transported by installing top eye bolts. The lifting and handling steps are as follows.

Step 1 Remove the top screw.

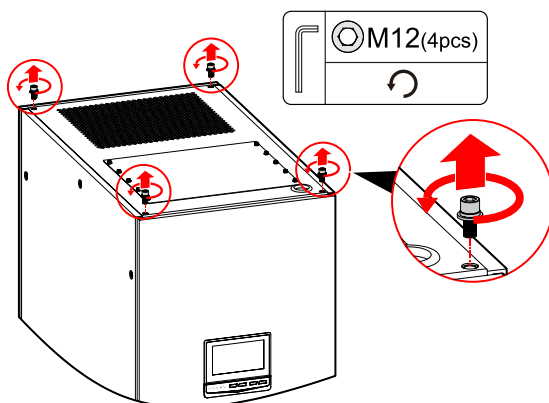


Figure3-7 Removing the top screw

Step 2 Take out the configured M12 eye bolts and install them onto the top of the UPS.

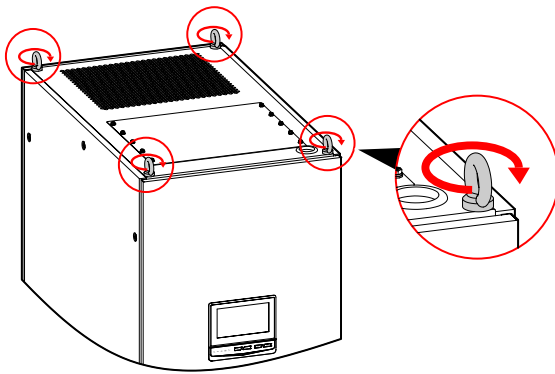


Figure3-8 Installing the top eye bolts

Step 3 Lifting and handling.

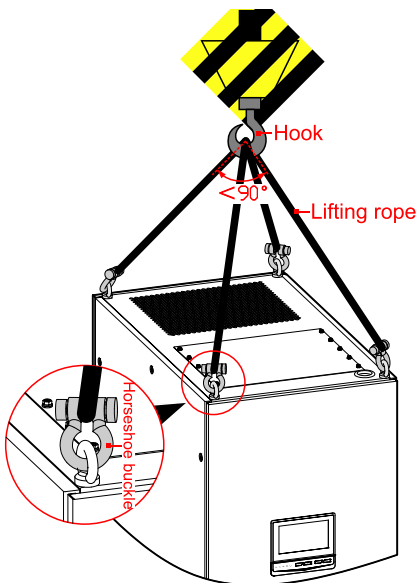


Figure3-9 Schematic diagram of lifting and handling

⚠ CAUTION

UPS must be lifted by professionally trained personnel.

During lifting, it is prohibited to use ropes to bind the equipment, as this may cause damage or slipping.

**WARNING**

During the lifting process, it is forbidden to tilt or lay the equipment down, as this can place excessive stress on internal components, potentially causing damage and affecting performance.

It is strictly prohibited to swing the lifting device in a way that causes the UPS to land outside the vertical drop point.

---End

3.5 UPS Installation

- Step 1 Select and plan the installation location according to the external dimensions of the UPS and the installation space.

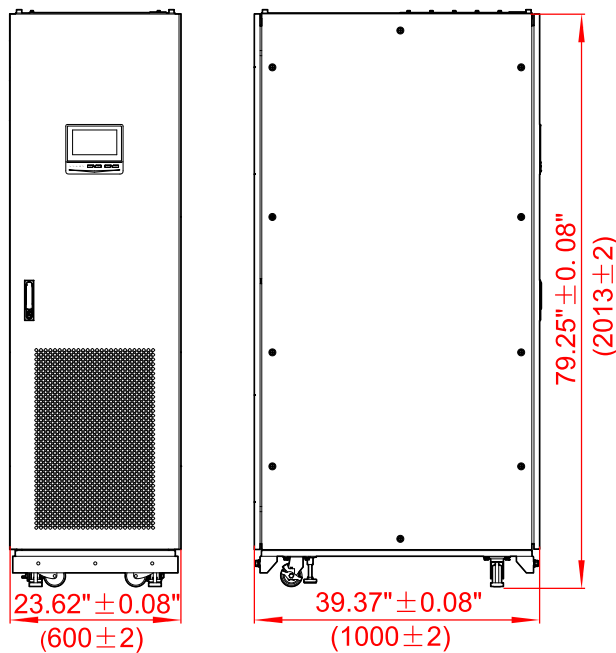


Figure3-10 Size (unit: inch)

- Step 2 Sequentially remove the front and rear L-shaped steel locking screws (M12*5*2), and remove the L-shaped steel.

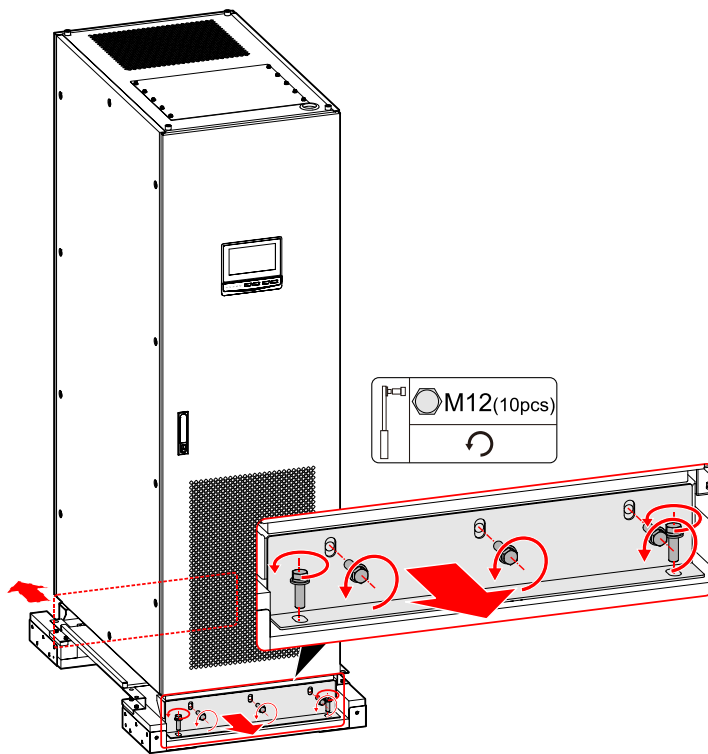


Figure3-11 Removing front and rear L-angle steel

Step 3 Remove the locking screws (M6*30*4) securing the metal crossbeam on the left side of the flat pallet.

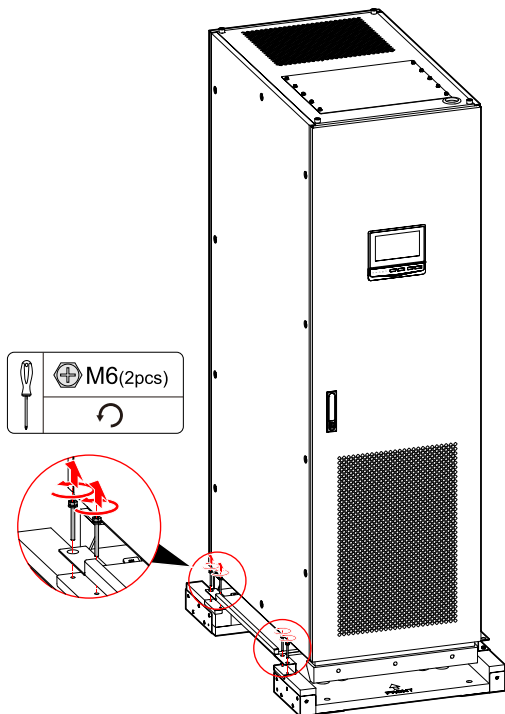


Figure3-12 Removing the locking screws of the crossbeam

Step 4 Remove the plate on the left side of the flat pallet and pull out the wooden cushion from the flat pallet.

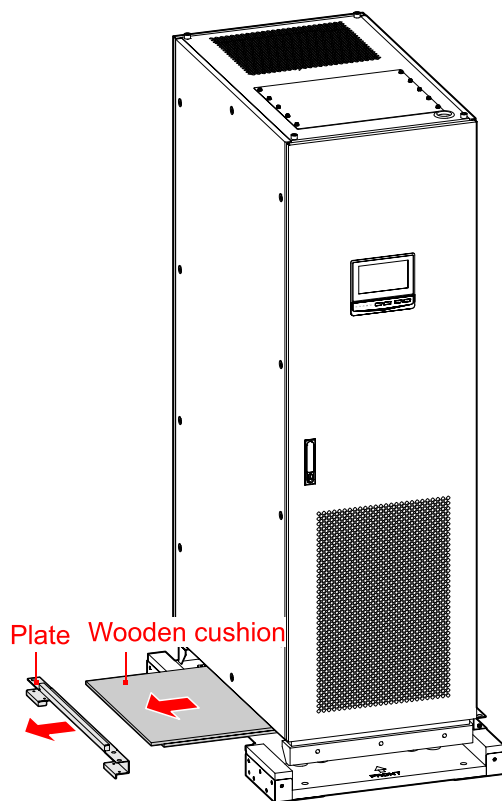


Figure3-13 Removing plate and pulling out wooden cushion

- Step 5 Push the UPS from front to back according to the direction indicated by the arrow on the bottom of the flat pallet until both the front and rear wheels are off the flat pallet.

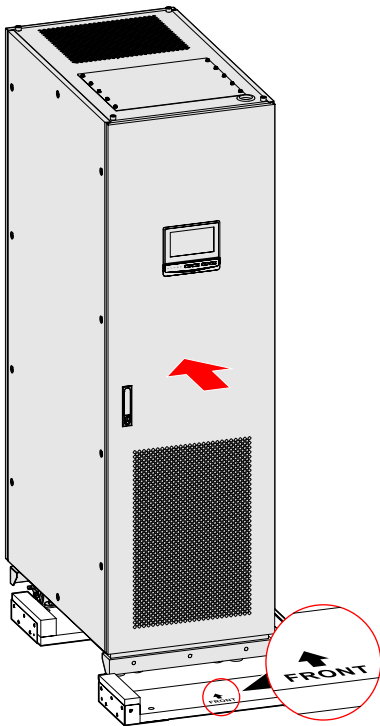


Figure3-14 Pushing UPS in the indicated direction

- Step 6 Pull out the other parts of the flat pallet from the right side to completely detach the pallet from the machine.

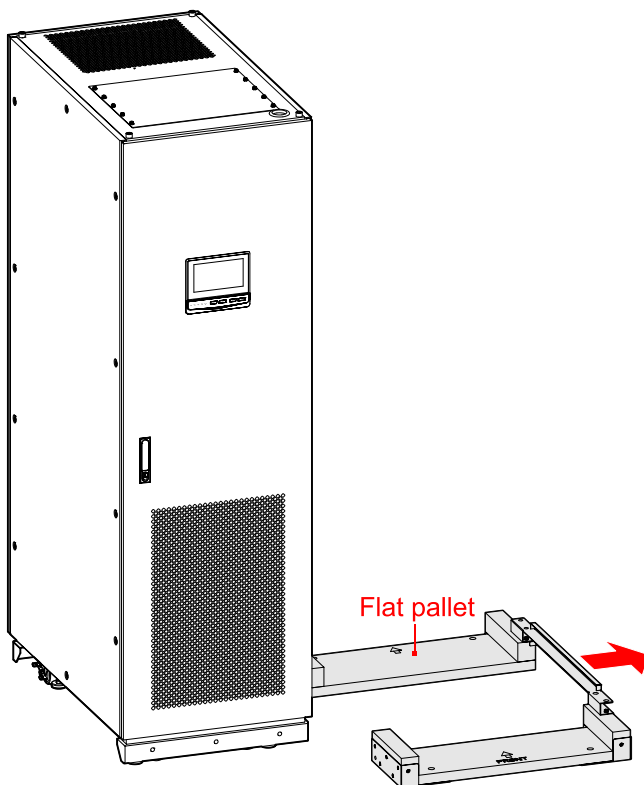


Figure3-15 Removing flat pallet

- Step 7 Move the machine by pushing it via the bottom rollers to the designated installation location. Set the brake on the rollers to OFF and lock it, then adjust the support feet down to level with the ground.

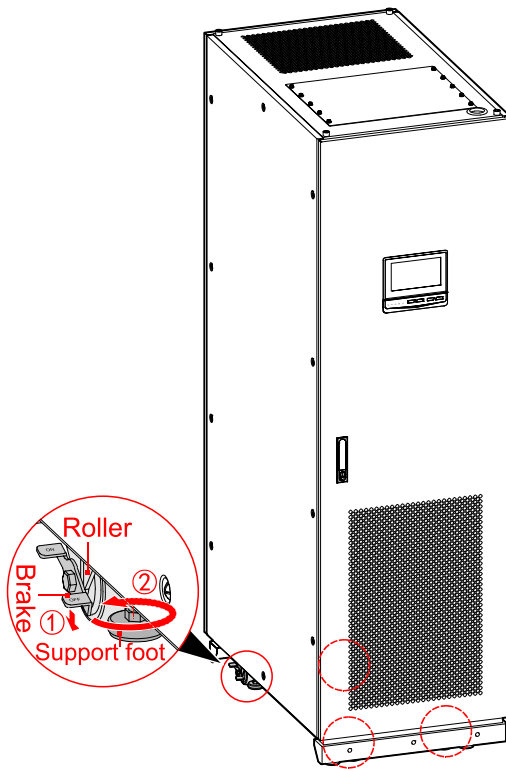


Figure3-16 Securing the UPS to the installation location

---End

3.6 Optional Components Installation



NOTE

Components removed from the device, such as screws, plates, etc., need to be stored properly for further use.

3.6.1 Seismic Option Installation

When selecting seismic options, the following steps should be performed after installing the UPS (see section 3.5 UPS Installation).



CAUTION

The installation location for the seismic options should be the final position of the UPS.

- Step 1 Follow Step 1 to Step 6 in the section **3.5 UPS Installation** to move the UPS from the pallet to the ground.
- Step 2 Mark the positions of mounting holes on the ground.

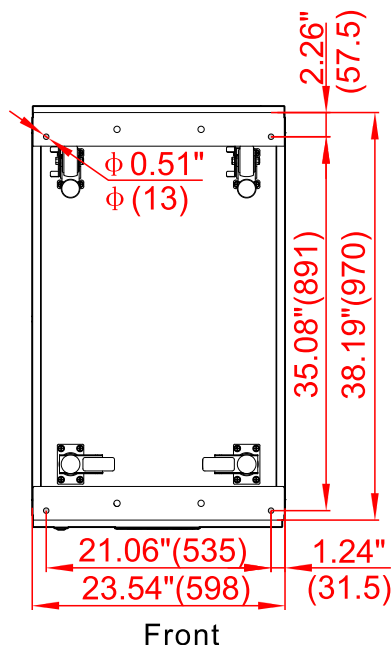


Figure3-17 Hole position (Unit: inch)

- Step 3 Install the expansion tubes of the M12 expansion bolts.
1. Drill 4× $\phi 14$ mm holes on the ground by hammer drill.
 2. Tighten the expansion bolt slightly and place it vertically in the hole. Tap the expansion bolt with a rubber hammer until the expansion pipe is fully inserted into the hole.
 3. Tighten the expansion bolt.
 4. Unscrew nut and remove flat washer and spring washer.



The depth of the expansion bolt should be as deep as the expansion pipe is in the hole. The expansion pipe must not be higher than the ground. Otherwise, UPS installation may be affected.

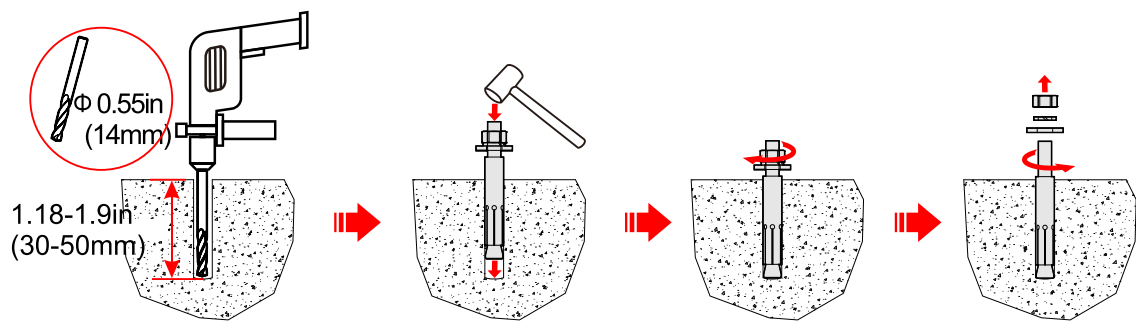


Figure3-18 Install the expansion tubes

Step 4 Install the seismic channel steel.

1. Use a forklift to lift the UPS off the ground.

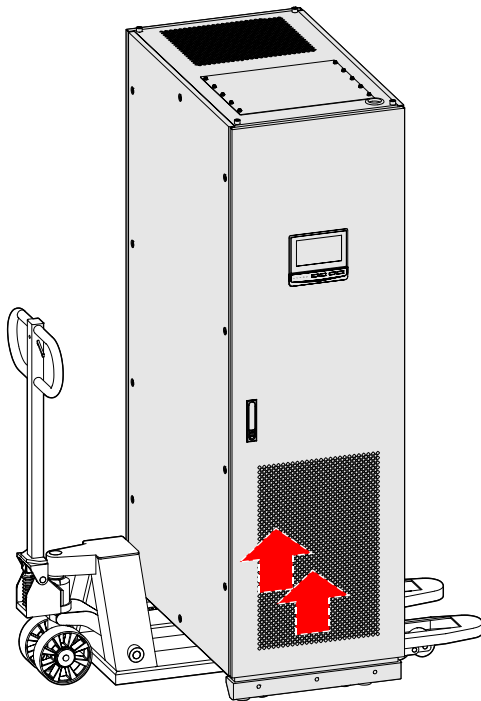


Figure3-19 Lifting the UPS

2. Remove the locking screws from the front and rear angle steel of the UPS and remove the angle steel.

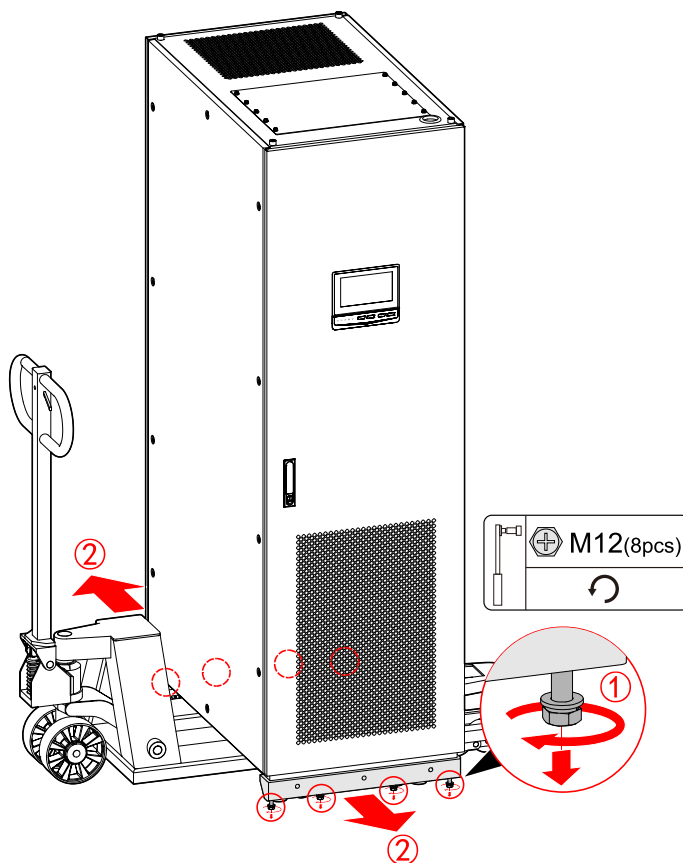


Figure3-20 Removing the front and rear angle steel

3. Align the seismic channel steel with the expansion bolts on the ground, adjust the UPS position so that the fixing holes of the seismic channel steel align with the UPS, and use the removed angle steel locking screws to fix the UPS.



NOTE

It is recommended to lift the UPS at least 7.87in (20cm) to facilitate screw fastening.

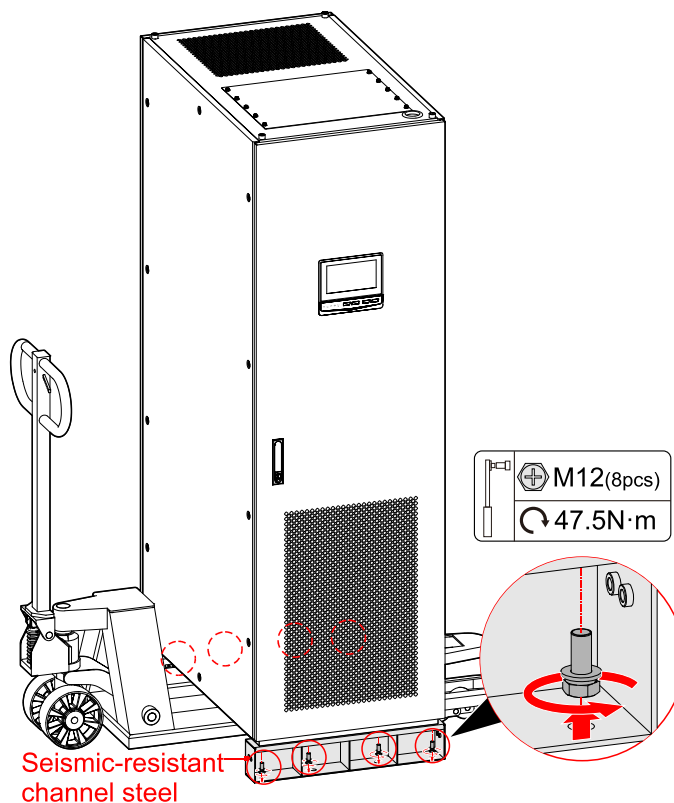


Figure3-21 Fixing the seismic channel steel

- Step 5 Lower the UPS, move the forklift away, and install the M12 nuts (including spring washers and large square washers) on all four corners to secure the UPS.

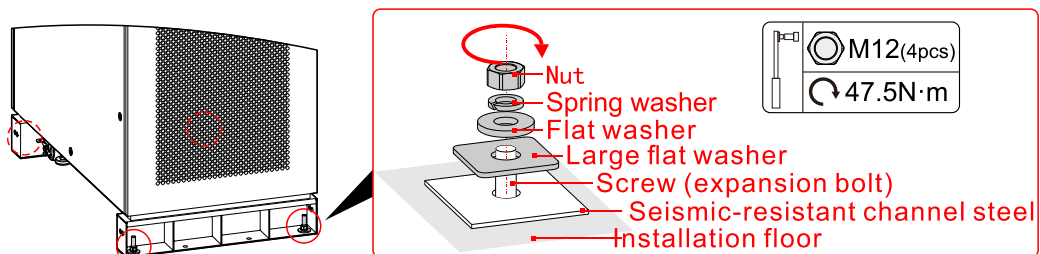


Figure3-22 Fix UPS

- Step 6 Install the bottom plates.

1. Insert the rear skirt panel from the side, then install the left and right skirt panels in sequence, securing them to the seismic base with M6 *12 *4 black countersunk screws.
2. Lock the rear skirt panel to the left and right skirt panels with M5 *10 *4 screws.
3. Lock the front skirt panel to the left and right skirt panels with M5 *10 *4 screws.

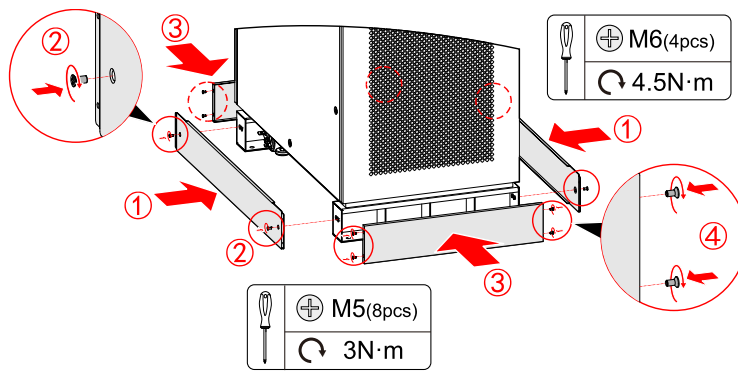


Figure3-23 Installing the bottom skirt panels

**NOTE**

When the UPS is installed against a wall, insert the rear skirt panel first, then install the two side skirt panels.

---End

3.6.2 SNMP Card Installation

Step 1 Remove the SNMP card bracket.

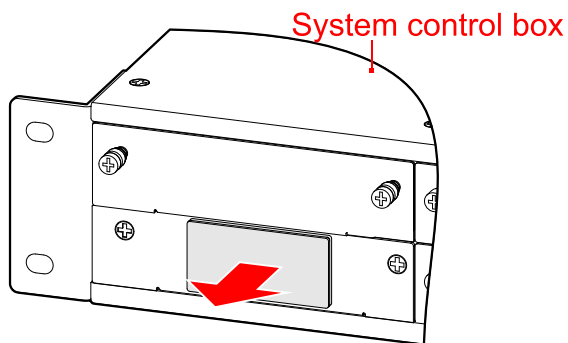


Figure3-24 Remove SNMP card bracket

Step 2 Remove the SNMP card and install it in the corresponding position on the system control box.

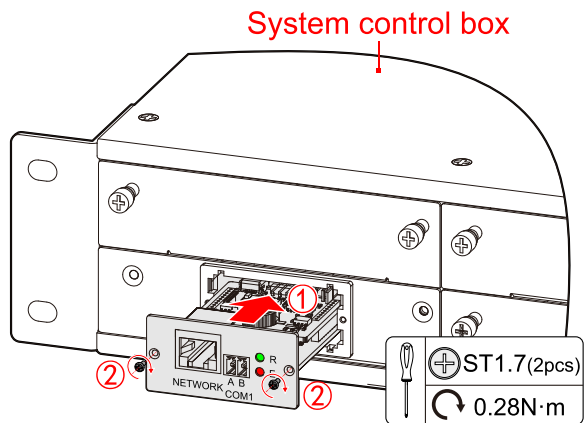


Figure3-25 Installing the SNMP card

----End

3.6.3 Expansion Card Installation

Expansion cards include dry contact expansion cards and BMS expansion cards. Their installation methods and positions are the same. This section uses the dry contact expansion card as an example.

- Step 1 Unscrew the screws of the dry contact expansion card plate on the system control box, and remove the dry contact expansion card plate.

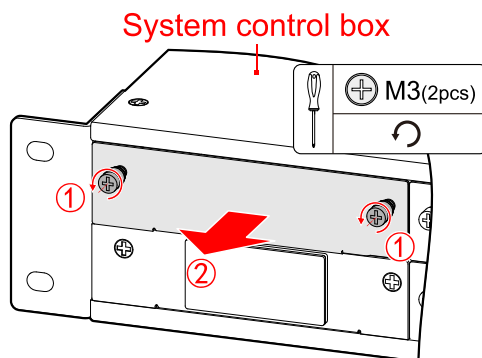


Figure3-26 Remove dry contact expansion card cover plate

- Step 2 Remove the dry contact expansion card and install it in the corresponding position on the system control box.

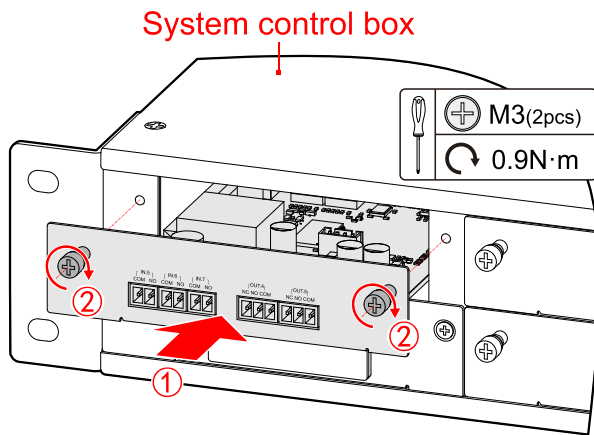


Figure3-27 Installing dry contact expansion card

---End

3.6.4 Parallel/BSC Kit Installation

Connect all the parallel/BSC interfaces of each UPS in the parallel system using the parallel/BSC kit, and tighten the corresponding screws of the parallel/BSC interfaces.

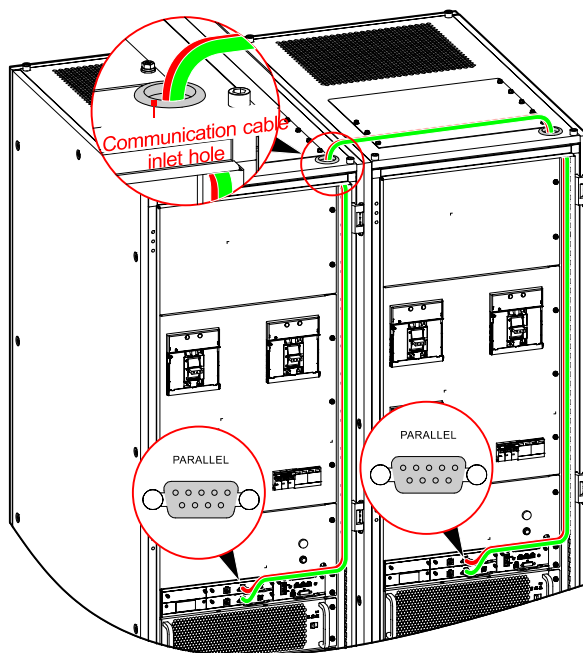


Figure3-28 Parallel/BSC kit installation diagram



NOTE

In the above figure, the cable colors are used only to distinguish between different wiring ports. Please refer to the actual cable colors.

3.6.5 Battery Temperature Compensation Kit Installation

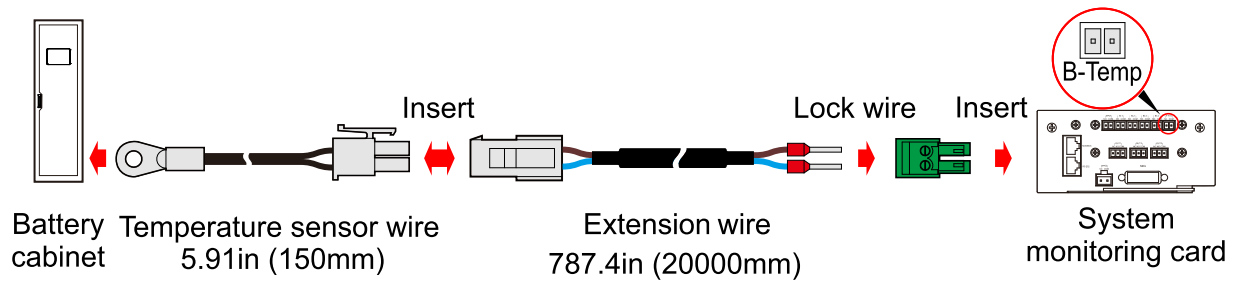


Figure3-29 Battery temperature compensation kit installation diagram



NOTE

Lock the temperature control wires in the battery cabinet at the location where the temperature needs to be measured.

3.6.6 Surge Protection Facility Installation



DANGER

Before installing the surge protection facility onsite, power off UPS completely.

Step 1 Open the front door of UPS, unscrew screws on the front plate and remove the front plate.

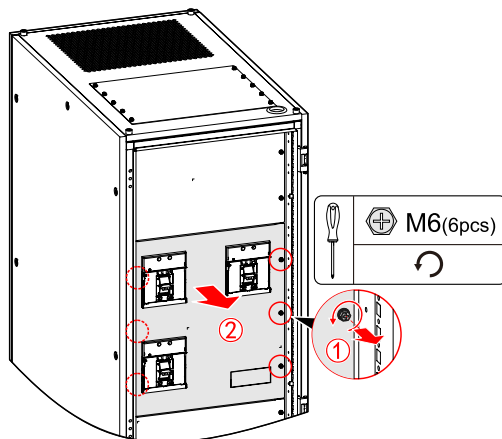


Figure3-30 Dismantle the wiring cover plate

Step 2 Install the surge protection accessory onto the fixed plate.

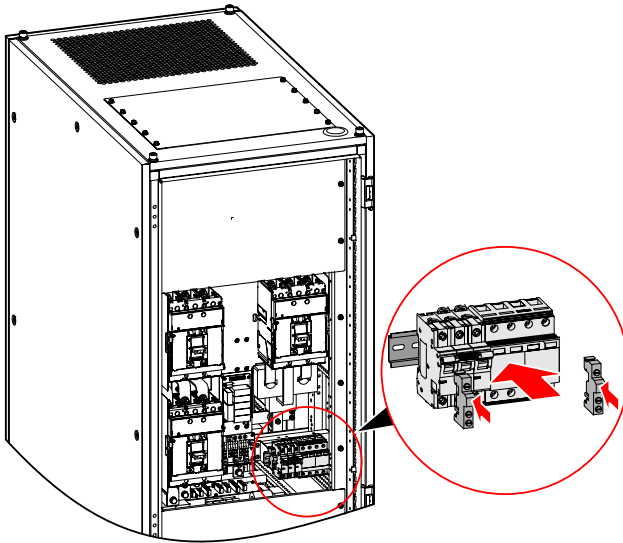


Figure3-31 Install surge protection accessory

Step 3 Connect the wires of SPD and SPD switch to the corresponding copper bar.

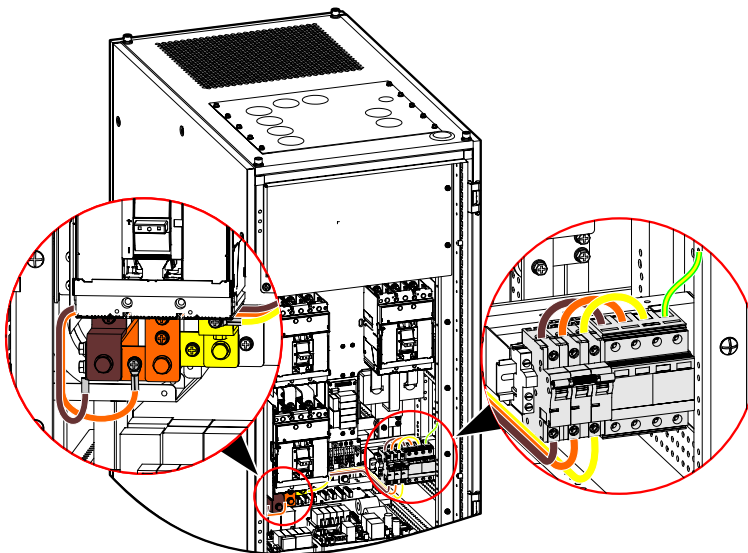


Figure3-32 Surge protection facility wiring diagram

Step 4 Knock off the plate where the surge protection facility installs, and then use a file to smooth out the broken edges.

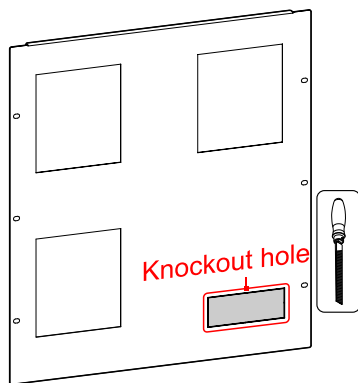


Figure3-33 Knockout hole position

Step 5 Install the front plate, and close the front door.

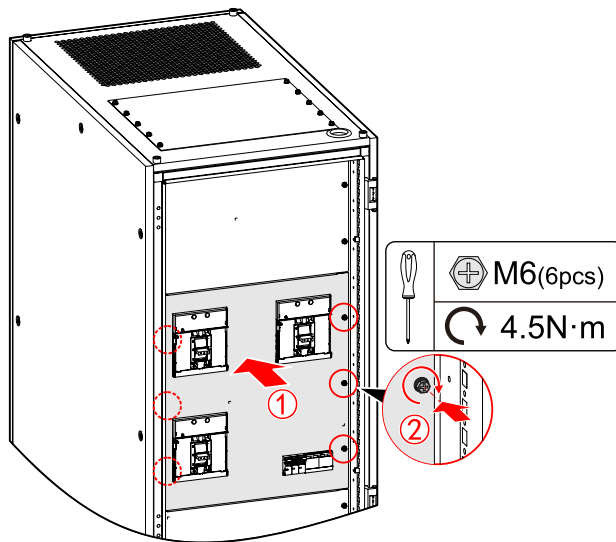


Figure3-34 Install the front plate

----End

3.6.7 Single Power Source Kit Installation



Before installing the single power source kit onsite, power off UPS completely.

Step 1 Open the front door of UPS, unscrew screws on the front plate and remove the front plate.

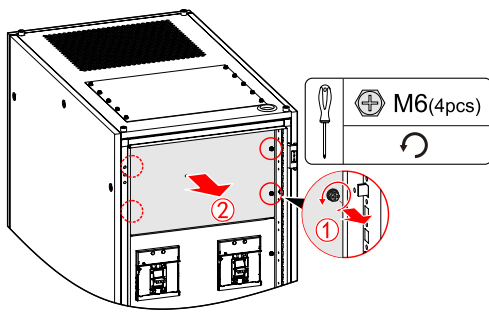


Figure3-35 Dismantle the wiring cover plate

Step 2 Install the single power source kit to mains copper bars and bypass copper bars respectively.

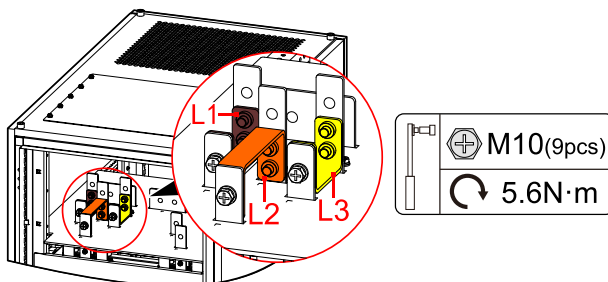


Figure3-36 Install the single power source kit

NOTE

After installing the single power source kit, connect the cables as required (see 3.7.2 UPS Connection).
The screw specifications for securing the single power source kit for 80KVA and 100KVA are: M101, M62.

Step 3 Install the front plate and close the front door.

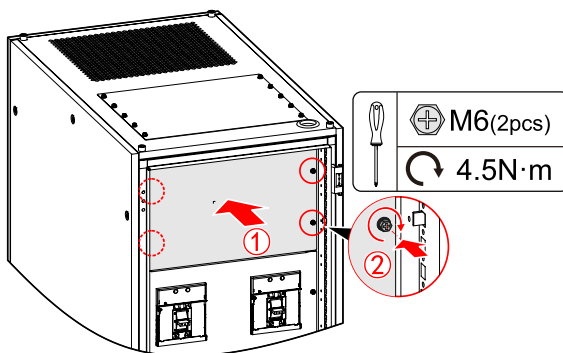


Figure3-37 Install the wiring cover plate

----End

3.7 Electrical Connection



DANGER

Before performing electrical connection, ensure that the mains switch, output switch, bypass switch, maintenance bypass switch, and external battery switch are off.



CAUTION

- When making cables, keep away from the equipment to prevent debris from accidentally entering the equipment, which may cause arcing and lead to damage to the equipment and personal injury.
 - To prevent poor cable connection caused by excessive tension, it is recommended to reserve extra space for the cable before connecting it to the corresponding port.
-



NOTE

The cable colors shown in all electrical connection diagrams in this manual are for reference only. The selection of cables should comply with local cable standards (the yellow and green cable can only be used for protective grounding).

3.7.1 Electrical Connection Preparation

Wire preparation

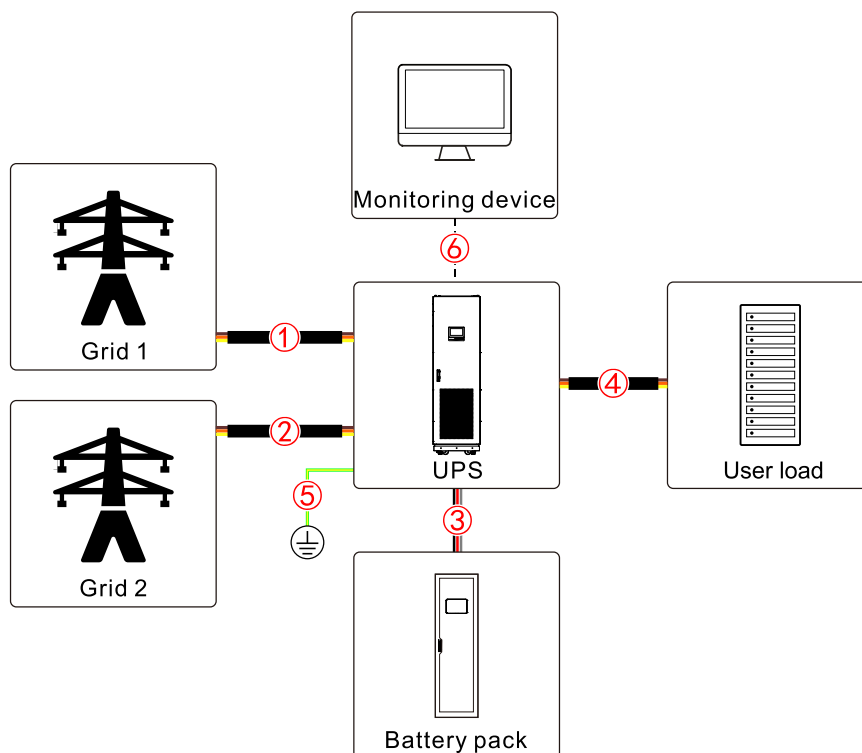


Figure3-38 Electrical connection overview diagram

Table3-4 Recommended requirements for wires, terminals and bolts

No.	Items		80KVA	100 KVA	135KVA	160KVA	200KVA
①	Mains input(L1/L2/L3)	Current (A)	112	137	193	224	274
		Recommended wire specification (mm ²)	1*AWG1 /0(194°F /90°C)	1*AWG2 /0(194°F /90°C)	2*AWG1 (194°F /90°C)	2*AWG1 /0(194°F /90°C)	2*AWG2 /0((194°F /90°C)
		Terminal model	DT-70	DT-70	DT-50	DT-50	DT-70
		Bolt specification	M10	M10	M10	M10	M10
②	Bypass input(L1/L2/L3)	Current (A)	96	120	162	193	241
		Recommended wire specification (mm ²)	1*AWG2 (90°C /194°F)	1*AWG1 (90°C /194°F)	2*AWG2 (194°F /90°C)	2*AWG2 (90°C /194°F)	2*AWG1 (90°C /194°F)

No.	Items		80KVA	100 KVA	135KVA	160KVA	200KVA
③		Terminal model	DT-35	DT-50	DT-35	DT-35	DT-50
		Bolt specification	M10	M10	M10	M10	M10
	Battery input (with 40 pieces of 12V lead-acid batteries)	Nominal discharge current (A)	174	217	293	347	434
		Maximum discharge current (A)	198	248	335	397	496
		Recommended wire specification (mm ²)	1*AWG3 /0(194°F /90°C)	1*AWG4 /0(194°F /90°C)	2*AWG2 /0(194°F /90°C)	2*AWG3 /0(194°F /90°C)	2*AWG4 /0(194°F /90°C)
		Terminal model	DT-95	DT-95	DT-70	DT-95	DT-95
		Bolt specification	M10	M10	M10	M10	M10
	Battery input (with 30 pieces of 12V lead-acid batteries)	Nominal discharge current (A)	185	231	312	370	463
		Maximum discharge current (A)	211	264	356	423	529
		Recommended wire specification (mm ²)	1*AWG3 /0(194°F /90°C)	1*AWG4 /0(194°F /90°C)	2*AWG3 /0(194°F /90°C)	2*AWG3 /0(194°F /90°C)	2*AWG2 50KCMIL
		Terminal model	DT-95	DT-95	DT-95	DT-95	DT-120
		Bolt specification	M10	M10	M10	M10	M10
	Output (L1/L2/L3)	Current (A)	96	120	162	193	241
		Recommended wire specification (mm ²)	1*AWG3 (194°F /90°C)	1*AWG1 (194°F /90°C)	2*AWG2 (194°F /90°C)	2*AWG2 (194°F /90°C)	2*AWG1 (194°F /90°C)

No.	Items		80KVA	100 KVA	135KVA	160KVA	200KVA
		Terminal model	DT-35	DT-50	DT-35	DT-35	DT-50
		Bolt specification	M10	M10	M10	M10	M10
⑤	Ground wire (PE)	Recommended wire specification (mm ²)	1*AWG2 (194°F /90°C)	1*AWG2 (194°F /90°C)	2*AWG1	1*AWG1 /0(194°F /90°C)	1*AWG2 /0(194°F /90°C)
		Terminal model	DT-35	DT-35	DT-50	DT-70	DT-70
		Bolt specification	M10	M10	M10	M10	M10
⑥	Dry contact communication wire	Recommended wire specification (mm ²)	AWG20				
		Terminal model	E7508				
	RS485 communication wire	Recommended wire specification (mm ²)	8*24AWG network cable				
		Terminal model	RJ45				

NOTE

- The selection of cables should be based on the site survey data, and the recommended cables are for reference only.
- The selection, installation, and routing of cables should comply with local regulations and standards.
- When installation methods or environmental conditions such as temperature change, verification should be carried out according to NFPA 70-2023 or local relevant standards.
- The nominal discharge current of the lead-acid battery refers to the current value at 480V (without neutral line) when 40 pieces of 12V lead-acid batteries are configured. The maximum discharge current of the lead-acid battery refers to the current value when a single 12V battery is discharged to 10.5V. The battery cable specification is based on the default selection of 40 batteries, compatible with applications ranging from 30 to 50 batteries.
- When the system is configured with lithium batteries, the recommended specifications for battery input cables should refer to NFPA 70-2023 and the S³ Lithium-ion Battery System User Manual.
- When mains and bypass with the same power, the input wire specifications are the same as the mains input wire specifications.
- The recommended wire in the above table are only applicable to the following conditions:
 - Laying method: Wires are laid in a single layer (NFPA 70-2023). The distance between wires is greater than twice the cross-sectional area of wire.
 - AC voltage loss is less than 3%, and DC voltage loss is less than 1%.
 - Cable type: It is recommended to use copper conductor flexible cables with a maximum working temperature of 194°F(90°C) to avoid poor terminal contact due to bending stress.

- It is recommended that the length of AC cables should not exceed 30 meters, and the length of DC cables should not exceed 164.04ft (50m).
- In parallel operation, the length and specifications of each unit's power cables should be as consistent as possible, including bypass input cables and UPS output cables, so that equal current distribution can be achieved in bypass mode.

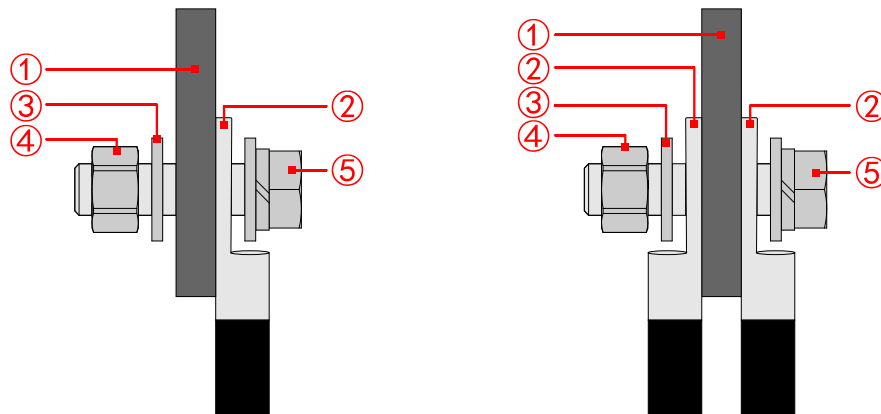
**WARNING**

Overloading of cables is strictly prohibited!

Wire connection requirements

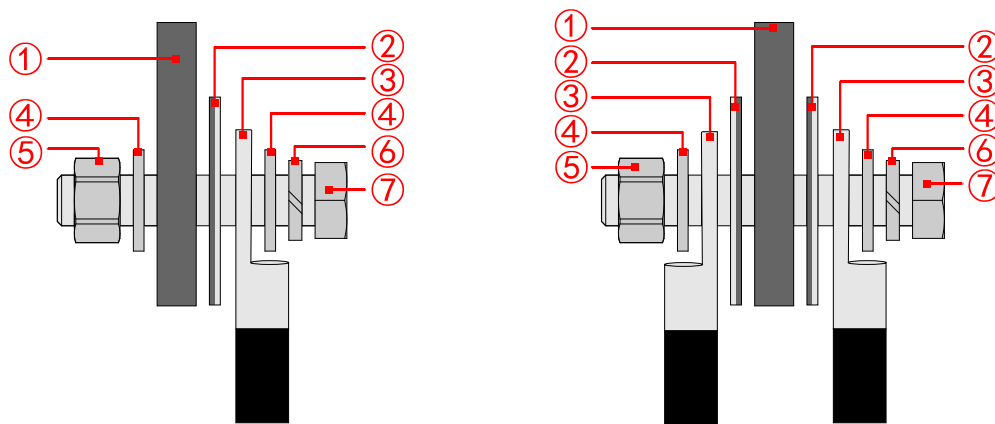
**WARNING**

- Incorrect wiring sequence may lead to fire and combustion. Please pay attention to the connection sequence of the wiring components.
- When connecting, ensure that the connector is tight. The poor connection or contact surface oxidation will cause excessive heat, which may cause a fire.



① Cooper bar ② Copper terminal block ③ Flat washer ④ Nut ⑤ Combined bolt

Figure3-39 Copper wire terminal connection diagram



- ① Cooper bar ② Copper-aluminum transition plate ③ Aluminum terminal block
 ④ Flat washer ⑤ Nut ⑥ Spring washer ⑦ Screw

Figure3-40 Aluminum wire terminal connection diagram

CAUTION

- When using a copper-aluminum plate, pay attention to the front and back sides to ensure that the aluminum surface of plate is in contact with the aluminum terminal, and the copper surface is in contact with copper bar.
- If a busbar has multiple adjacent terminals that need to be connected, an entire copper-aluminum plate can be used.



Figure3-41 Copper-aluminum plate connection direction

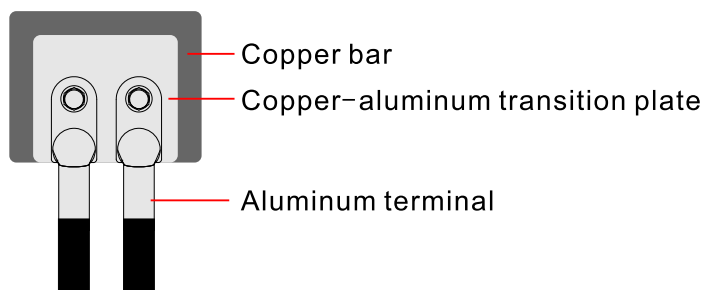


Figure3-42 Copper-aluminum plate connection diagram

Circuit breaker preparation

The external configuration of independent circuit breakers on the UPS AC side can better protect the load. When an accident occurs on the UPS or mains side, the circuit breaker can be disconnected in the first time, achieving selective protection by safely disconnecting the circuit connection.



WARNING

- No loads may be connected between UPS and breaker.
- Multiple UPSs may not share an AC breaker.

Table3-5 Recommended input front-end/output back-end breaker specifications

Model Type	80KVA	100KVA	135KVA	160KVA	200KVA
Mains input breaker	200A/500Vac	200A/500Vac	400A/500Vac	400A/500Vac	400A/500Vac
Bypass input breaker	200A/500Vac	200A/500Vac	400A/500Vac	400A/500Vac	400A/500Vac
Battery input circuit breaker	250A/Voltage withstand 600Vdc and above	250A/Voltage withstand 600Vdc and above	500A/Voltage withstand 600Vdc and above	500A/Voltage withstand 600Vdc and above	500A/Voltage withstand 600Vdc and above
Output back-end circuit breaker	200A/500Vac	200A/500Vac	400A/500Vac	400A/500Vac	400A/500Vac
External maintenance bypass circuit breaker	200A/500Vac	200A/500Vac	400A/500Vac	400A/500Vac	400A/500Vac



NOTE

- The recommended circuit breaker specifications are only applicable when the short-circuit current at the device's location is less than 65kA.

- The recommended circuit breaker specifications for the mains input are for reference only.
- The circuit breakers at the bypass input and output ends should be selected based on the UPS's rated current. If the UPS is to be used for overload, the circuit breaker specifications should be adjusted according to the current after the overload.
- The external maintenance bypass circuit breaker should be selected based on the UPS single-unit scenario, and for parallel scenarios, the total current should be considered when adjusting the circuit breaker specifications.
- Circuit breakers with leakage protection are not recommended to prevent mis-operation caused by leakage currents generated by the UPS.
- When there are multiple circuit breakers at the output end, ensure that the specifications of each circuit breaker do not exceed the recommended circuit breaker specifications.
- When an external transformer is connected, the cabinet should first use the power module output, followed by enabling the bypass module. It is recommended to avoid directly using the bypass module output.

3.7.2 UPS Connection



When wiring, ensure that the contact between wire and terminal is firm. Do not allow poor connections or reverse wiring.

Step 1 Use a key to open the front door of UPS.

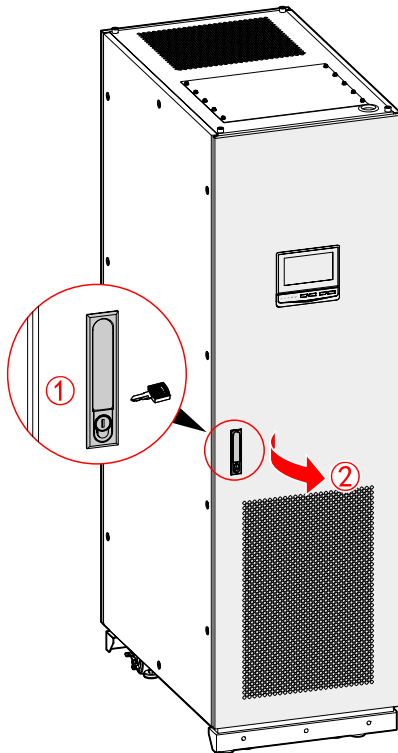


Figure3-43 Open the front door panel

Step 2 Remove the top and front wiring cover plates.



Before connecting the cables, make sure the input switch, output switch, and bypass switch of the UPS are all in the off position.

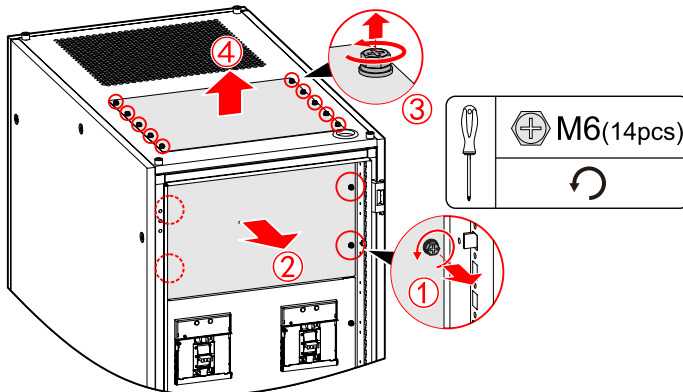


Figure3-44 Remove the wiring cover plate

Step 3 According to the cable specifications and wiring layout, drill a hole at an appropriate position on the top cover plate.

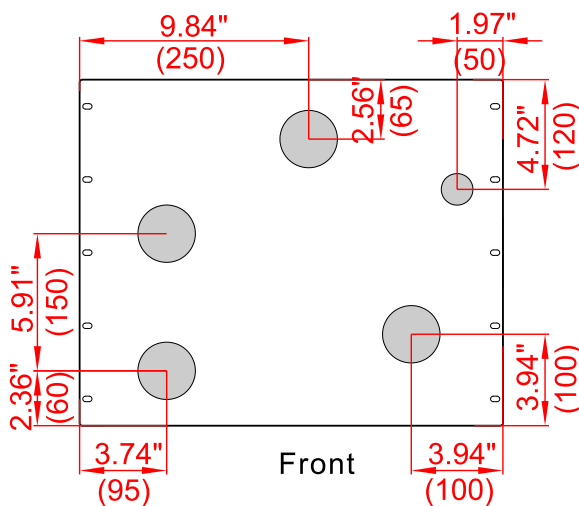


Figure3-45 Recommended hole drilling diagram for the top cover plate of 80KVA and 100KVA for cable entry

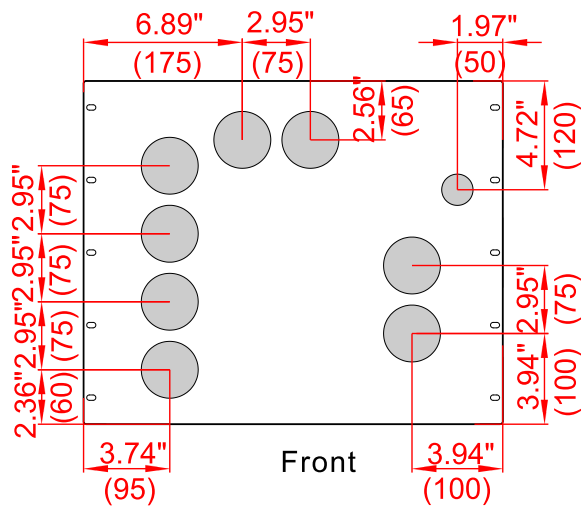


Figure3-46 Recommended hole drilling diagram for the top cover plate of 135KVA, 160KVA, and 200KVA for cable entry

- Step 4 Install the drilled top wiring cover plate onto the cabinet, insert the conduit, and pass the input, output, bypass, and battery positive and negative wires through the corresponding cable entry holes in the top wiring cover plate.

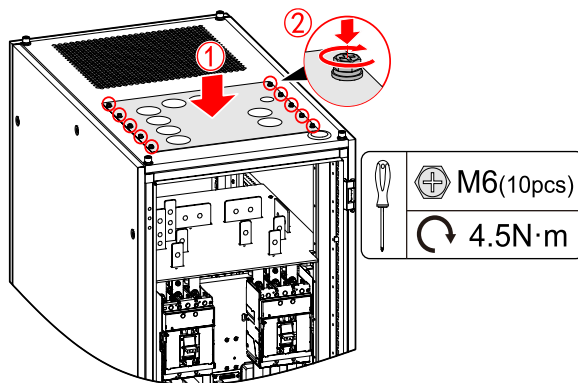


Figure3-47 Install the top wiring cover plate

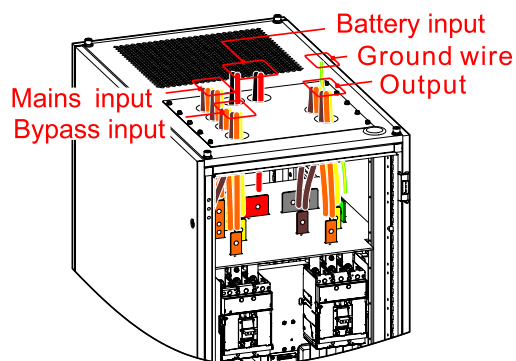


Figure3-48 Draw wire through the wiring hole

NOTE

For 80 and 100KVA, the Mains input, Bypass input, battery input, and output each connect to one group of cables; for 135, 160, and 200KVA, the Mains input, Bypass input, battery input, and output each connect to two groups of cables, with each group passing through one cable entry hole. The diagram above uses 135, 160 and 200KVA as examples to illustrate the cable routing process.

Step 5 Crimp the input, output, bypass, and battery positive and negative wires onto the corresponding terminal blocks.

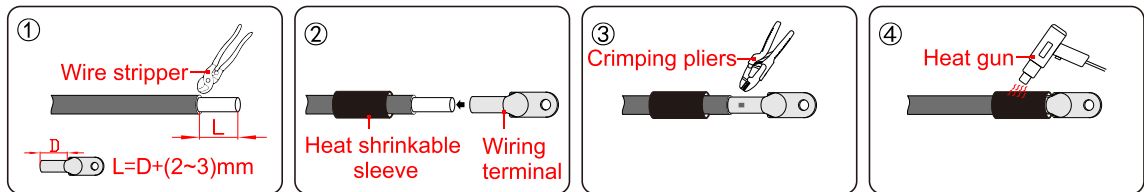


Figure3-49 Cable crimping diagram

NOTE

The crimping process for each cable is the same, and the diagram above illustrates the crimping process for a single cable.

CAUTION

When stripping the wire, it is necessary to pull the wire out of the outside of the cabinet, to avoid the leakage of the wire skin, metal core, etc., inside the cabinet, affecting the normal operation of the device, as shown in below.

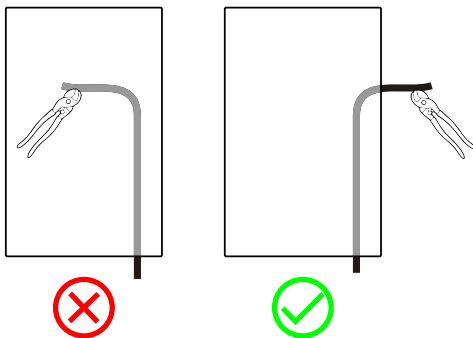


Figure3-50 Stripping operation requirements

Step 6 Connect the crimped cables to the corresponding terminal block of the UPS (as shown in Figure3-52) and tighten the bolts. The wiring diagram is shown in Figure3-54.

CAUTION

All UPS cabinets must be connected to the user's ground.

The customer terminal block must be vertically locked (as shown in Figure3-51) to prevent insulation breakdown, which could lead to a short circuit.

WARNING

Do not reverse connect grounding wire and neutral wire, live wire and neutral wire, which may cause electrical short circuit!

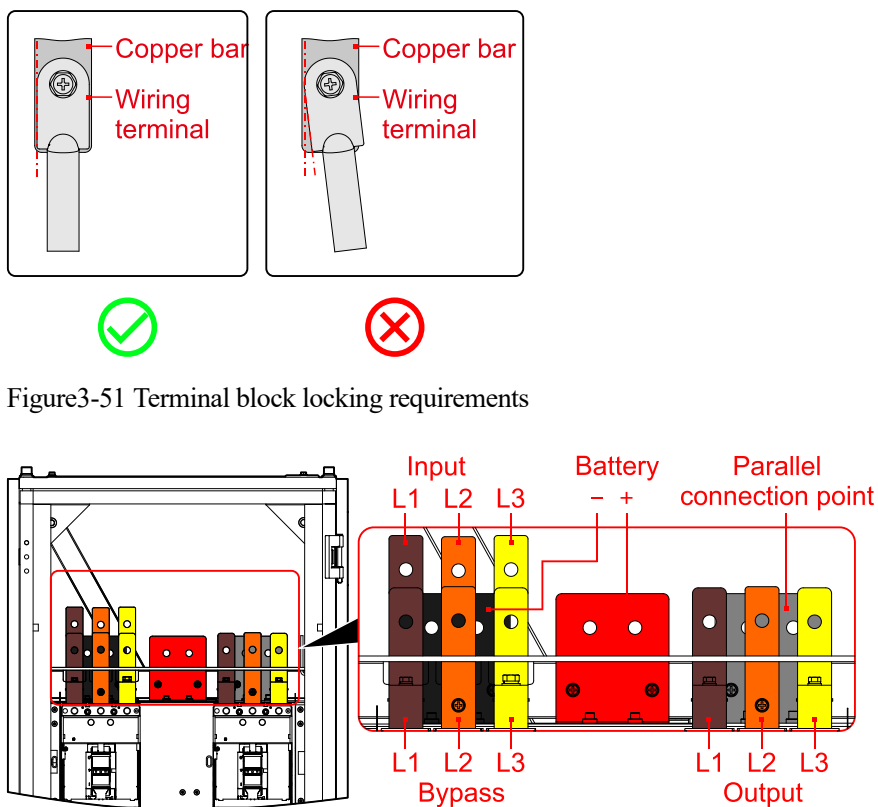


Figure3-52 Terminal block explanation

CAUTION

The UPS in this series is factory configured for dual input by default. When the UPS input is the same for both mains and bypass, the optional same power kit can be installed (refer to section **3.6.7 Single Power Source Kit Installation**). When the main and bypass share a common power source, the grid L1 phase cable should be connected to the mains L1 copper bar, the grid L2 phase cable to the mains L2 copper bar, and the grid L3 phase cable to the mains L3 copper bar. There is no need to connect cables to the bypass L1, L2, and L3 copper bar. For other connection scenarios, please refer to the wiring method for separate power sources for main and bypass.

Ensure that the battery positive and negative cables are correctly connected and that the terminals are securely fastened.

A DC switch is required for DC battery input, and the specific wiring configuration is illustrated in Figure3-53.

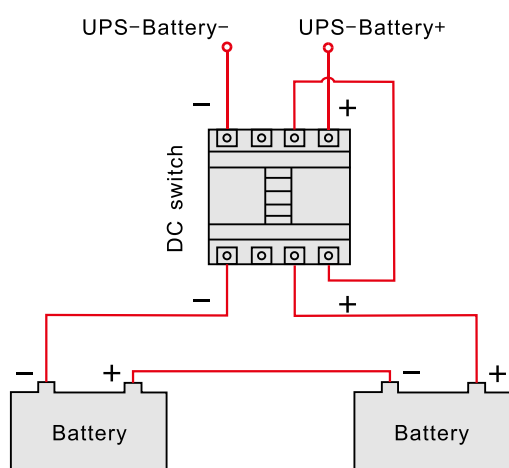


Figure3-53 Battery wiring diagram

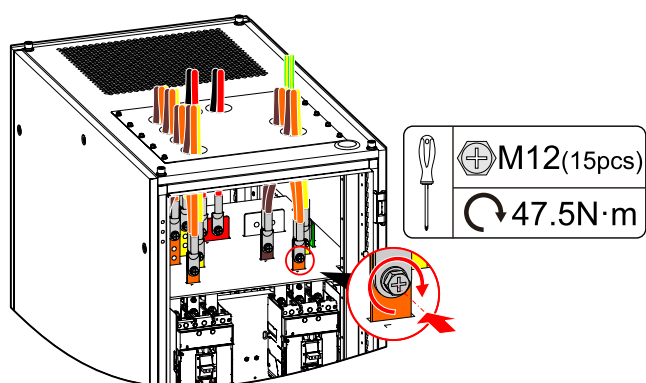


Figure3-54 Wiring diagram

**NOTE**

The above diagram illustrates the wiring process using NPU135.0, NPU160.0, and NPU200.0 as examples.

Step 7 Connect communication wires.

1. Crimp the corresponding communication wires based on the communication method.

**NOTE**

Dry contact communication uses tubular terminals, and the corresponding crimping is shown in Figure3-55.

Ethernet, RS485, RS232, BMS, and MODBUS communications use RJ45 connectors for connection, with the corresponding crimping shown in Figure3-56. Pin definitions for each interface are provided in the table below.

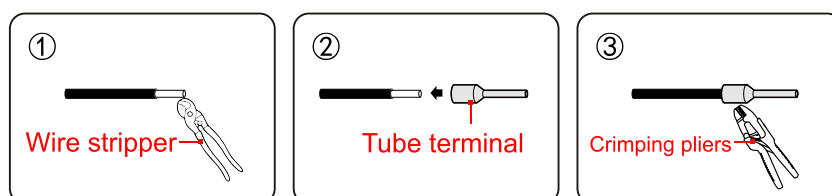


Figure3-55 Dry Contact communication wire crimping

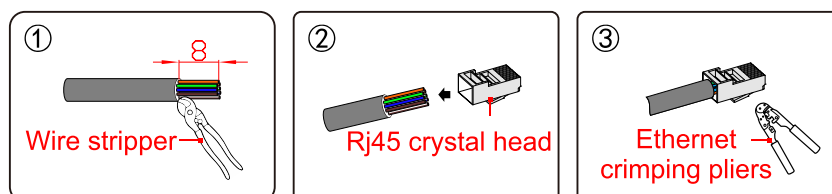


Figure3-56 Ethernet, RS485, RS232, BMS, MODBUS cable crimping

Table3-6 Battery Extension wire pin definitions for each interface

PIN	Ethernet	MODBUS	RS232	RS485	BMS
1 (white-orange)	TX+	A	TX	A	A
2 (orange)	TX-	B	RX	B	B
3 (white-green)	RX+	Reserved	Reserved	Reserved	Reserved
4 (blue)	TERM	B	TX	B	B
5 (white-blue)	TERM	A	RX	A	A
6 (green)	RX	Reserved	Reserved	Reserved	Reserved
7 (white-brown)	TERM	5V power	5V power	Reserved	Reserved

PIN	Ethernet	MODBUS	RS232	RS485	BMS
8 (brown)	TERM	GND	GND	GND	GND

2. Insert the crimped communication wires into the corresponding communication interfaces as needed. The positions and descriptions of each interface are detailed in section **2.3.3 System Control Box**.

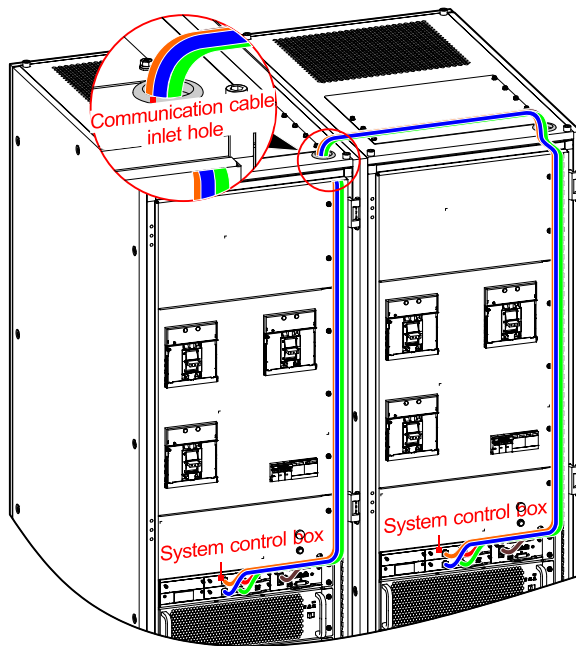


Figure3-57 Communication wire routing diagram

NOTE

The cable colors in the above diagram are for illustration purposes only to show the routing path of each communication interface. The actual cable colors should be based on the real setup.

- Step 8 After completing the wiring, reinstall the front wiring cover plate and close the front door.

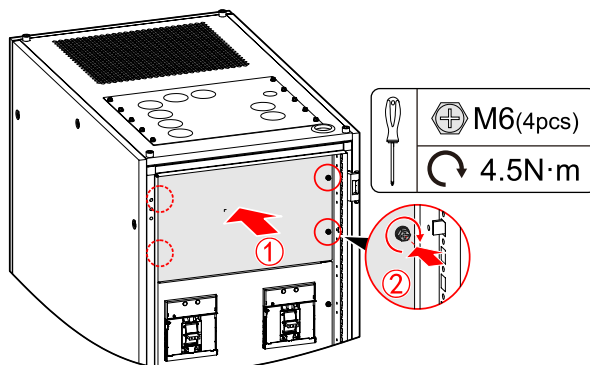


Figure3-58 Installing the front wiring cover plate

---End

3.7.3 Parallel System Connection

Install the battery pack and UPS in the parallel system independently, and then connect the parallel communication kit.

CAUTION

The mains input phase sequence cannot be connected reversely, otherwise, the UPS will not operate properly.

The AC input connection method and phase sequence of UPS in the parallel system should be strictly consistent to ensure that the bypass power supply of the parallel system is in the same phase.

Before powering on each UPS, check that the phases of the input three phases of UPS correspond one to one.

- Step 1 Follow steps 1, 2, and 3 in **3.7.2 UPS Connection** to perform the operation.
- Step 2 Connect the mains input of each UPS to the same grid.
- Step 3 Connect the bypass input of each UPS to the same grid.
- Step 4 Connect the output of each UPS to load or output distribution cabinet.

CAUTION

The length of bypass/output wires of parallel system to different machines should be basically symmetrical.

- Step 5 Connect the battery input of each UPS to the corresponding battery pack.
- Step 6 Short-circuit the parallel connection points of each UPS.

CAUTION

All parallel connection points of the UPS units need to be short-circuited together; otherwise, it may affect the normal operation of the parallel system.

- Step 7 Use parallel cables to connect the parallel interfaces of each UPS in the system and tighten the corresponding parallel interface screws. For details, refer to section **3.6.4 Parallel/BSC Kit Installation**.

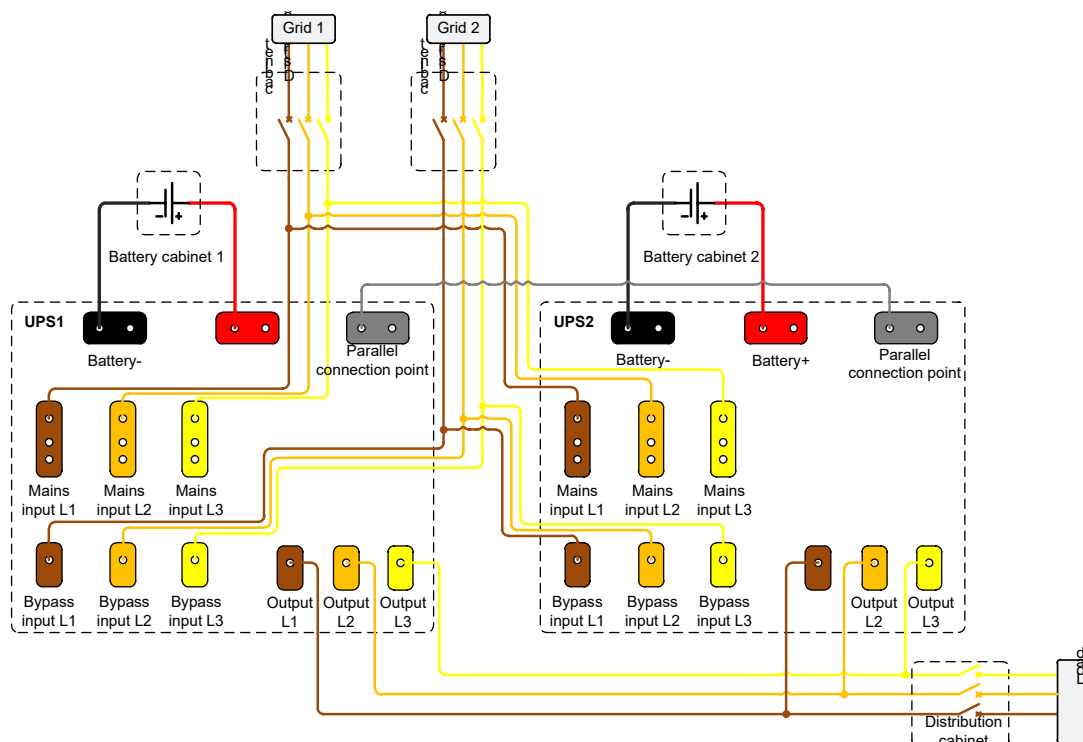


Figure3-59 Parallel system wiring diagram

----End

3.7.4 Battery Trip Wiring

When the customer site requires an external connection for the battery trip function, the reserved interface on the top of the UPS should be connected to the customer's on-site battery circuit breaker trip unit. The battery trip kit can perform voltage reversal through dry contact control, meeting the configuration requirements for the site's shunt release trip unit.



NOTE

The output of the battery tripper control kit is 24VDC, so it only meets the rated 24VDC release power supply requirements.



DANGER

Before connecting the battery trip control kit on site, the UPS must be completely powered off.

The battery input breaker configured by the customer must meet the maximum discharge current requirements in Table3-4.

- Step 1 Loosen the screws of the front upper cover plate and remove the upper cover plate.

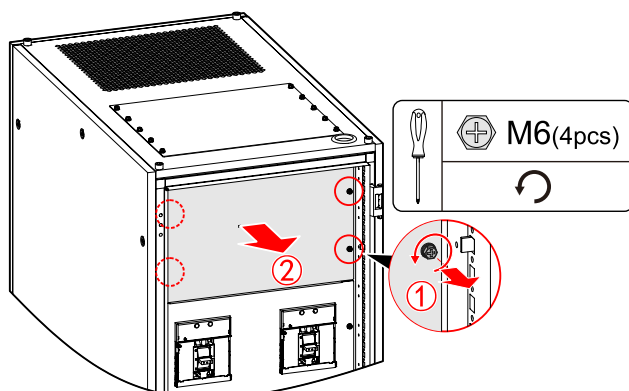


Figure3-60 Removing the wiring cover plate

- Step 2 Take the battery trip extension cable and pass it through the wire hole, connecting it to the reserved port on the top of the UPS.

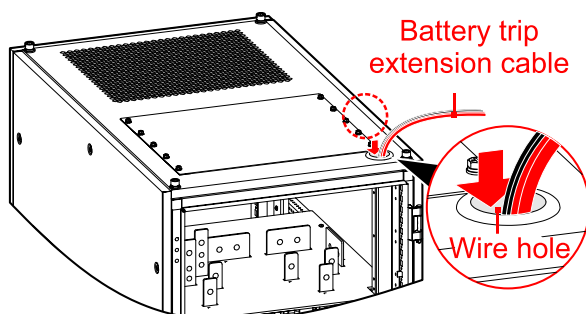


Figure3-61 Schematic of the reserved position for battery trip wiring



NOTE

The battery trip wiring is reserved on the right side of the top beam of the UPS, as indicated by the dashed circle in Figure3-61.

- Step 3 Connect the extension cable (as shown in Figure3-62) to the client's battery trip unit according to the wire number tube markings.



NOTE

The battery trip extension cable provided by our company is 20 meters in length, and it can be extended or shortened according to the actual situation.

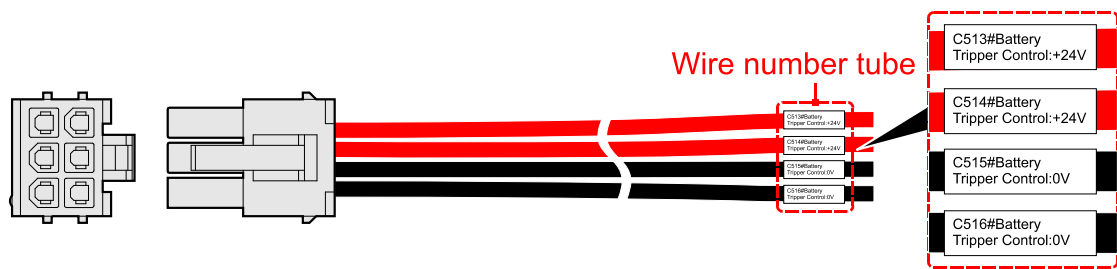


Figure3-62 Schematic of battery trip extension cable

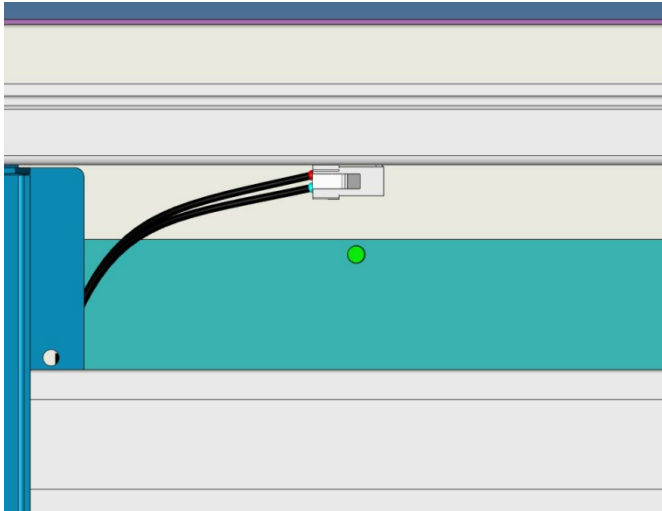


Figure3-63 Schematic of port location

**NOTE**

The port is located at the top of the cabinet.

**CAUTION**

When the battery trip extension cable is connected to the client's battery trip unit, two red wires should be soldered to the 24V port, and two black wires should be soldered to the 0V port to reduce current loss during long-distance transmission.

Step 4 Reinstall the upper cover plate back into its original position.

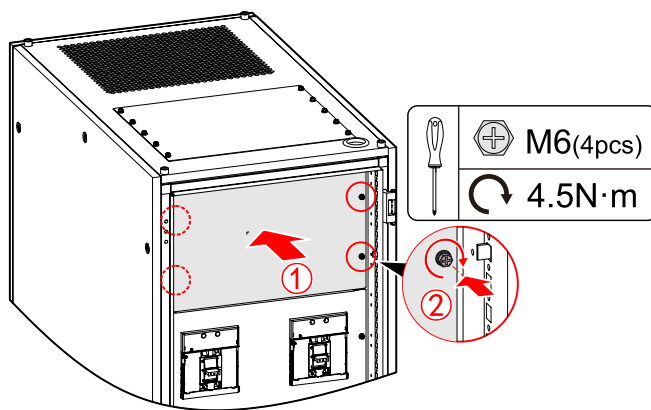


Figure3-64 Installing the upper cover plate

---End

3.7.5 External Maintenance Bypass Status Detection Wiring

When the customer needs to detect the status of the external maintenance bypass switch, the external maintenance bypass status detection wire reserved on the top of the UPS can be connected to the auxiliary contacts of the external maintenance bypass switch.



Before connecting the external maintenance bypass status detection wire on-site, the UPS must be completely powered off.

Step 1 Loosen the screws of the front upper cover plate and remove the upper cover plate.

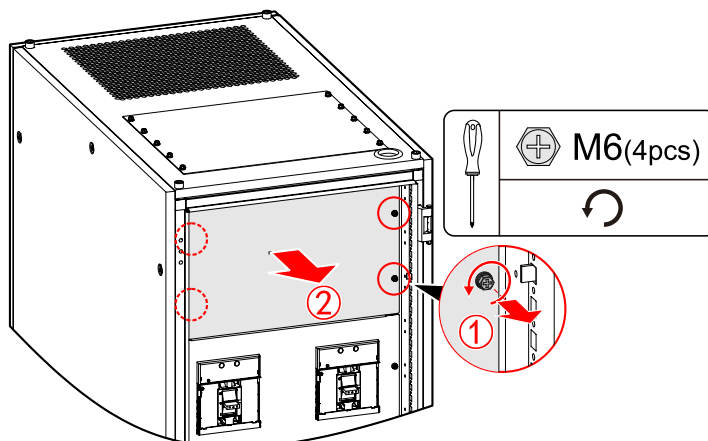


Figure3-65 Removing the wiring cover plate

- Step 2 Take the external maintenance bypass status detection wire, pass it through the top cable entry hole, and connect it to the reserved interface on the top of the UPS.

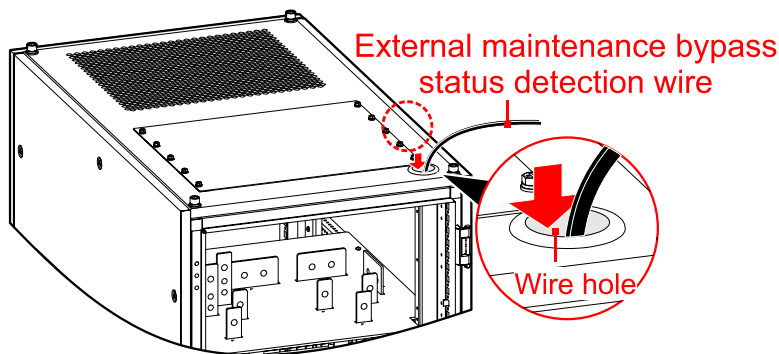


Figure3-66 Schematic of the reserved position for external maintenance bypass status detection wire



NOTE

The external maintenance bypass status detection wire is reserved on the right side of the top beam of the UPS, as indicated by the dashed circle in Figure3-66.

- Step 3 Connect the external maintenance bypass status detection wire (as shown in Figure3-62) to the auxiliary contact of the maintenance bypass switch on the client's site, according to the wire number tube markings.

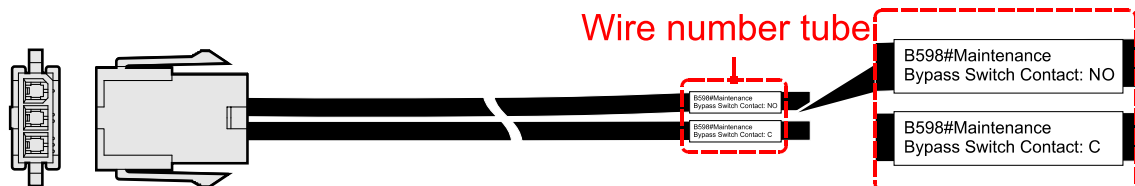


Figure3-67 Schematic of external maintenance bypass status detection wire

- Step 4 Reinstall the upper cover plate back into its original position.

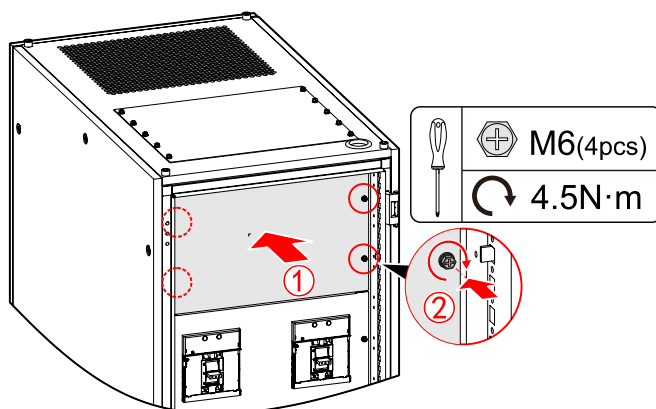


Figure3-68 Installing the upper cover plate

---End

3.8 Installation Inspection

No.	Check item	Check result
1	Check if the color of AC wires is in accordance with the specification.	Yes ☐ No ☐
2	Check if the UPS wiring is not loose.	Yes ☐ No ☐
3	Check if wires are stably connected.	Yes ☐ No ☐
4	Check if the cabinet grounding is good.	Yes ☐ No ☐
5	Check if the polarity and sequence of battery wires are correct.	Yes ☐ No ☐
6	Check if the labels on wires are correct.	Yes ☐ No ☐
7	Check if the wiring is neat and if the wiring binding is in accordance with the technical specifications	Yes ☐ No ☐
8	Check if the installation and wiring of the device are conducive to future system renovation, expansion, and maintenance.	Yes ☐ No ☐
9	Check if there are foreign bodies in the cabinet, such as behind the module, on the top of the cabinet, terminals, and switches.	Yes ☐ No ☐
10	Check if the cabinet is installed stably and firmly.	Yes ☐ No ☐

4 Operation Guide

4.1 Single UPS Operation

4.1.1 Check Before Power-On

Table4-1 Check before power-on

No.	Check item	Check result
1	The UPS's mains switch, bypass switch, and output switch are all in the off position, and the external battery switch is in the off position.	☐ Normal ☐ Abnormal
2	Check the load type, state and capacity. ● Ensure that the load is non-inductive load. The UPS output cannot be connected with inductive load, such as motor, fan, air-conditioner, which is directly powered by grid. ● Ensure that the load is switched off. At the same time, the load capacity should not exceed the rated output capacity of UPS, otherwise it will cause the system overload protection.	☐ Normal ☐ Abnormal
3	There is no short circuit between the live wire and the neutral wire, or between the live wire and the grounding wire in the UPS input. Ensure that there is no short circuit in the UPS output.	☐ Normal ☐ Abnormal
4	Use a multimeter to check the AC voltage at the UPS mains input terminals. The line voltage should be within the range of 336V to 552V; otherwise, the UPS can only be started using the battery.	☐ Normal ☐ Abnormal
5	Use a multimeter to check the frequency at the UPS mains input terminals. The frequency should be within the range of 40Hz to 70Hz; otherwise, the UPS can only be started using the battery.	☐ Normal ☐ Abnormal

No.	Check item	Check result
6	Use a multimeter to check the DC voltage at the UPS battery input terminals. The battery's positive and negative voltage should be greater than 11.5 times the number of battery cells. Also, pay attention to the battery polarity to prevent incorrect battery connections.	☐ Normal ☐ Abnormal
7	The battery switch auxiliary contact has been connected to one of the input dry contacts of the system monitoring card as required, and the "Input dry contact" item has been set in "Setting manage > Dry Contact > Input" on the touch screen.	☐ Normal ☐ Abnormal

4.1.2 Start UPS

Step 1 Set the ready switches of the bypass module and all power modules to the " " state.

Step 2 Close the bypass switch, mains switch, and external battery switch in sequence. The UPS will output via bypass. (If it is a battery cold start, only close the external battery switch in this step, then press and hold the battery slow-start button on the UPS for more than 3 seconds to establish UPS power.)

After the UPS is powered on, the touchscreen will start running. Enter the startup password, and the system will enter the main interface.

Step 3 Tap the " " icon on the main interface of the touchscreen to check if there are any fault alarms in the system. If there are, pause the operation and contact customer service for on-site support until all fault alarms are resolved.

Step 4 Start the inverter.

Wait until the operation indicators of all power modules turn green and flash slowly, then perform the inverter startup operation.

- Startup method 1: control panel combination key

Press and hold the "ON" combination key on the control panel for 3 seconds.

- Startup method 2: touchscreen

On the main interface, tap the " " icon to enter the inverter startup page. For a single-unit power supply system, tap the "Single ON" button to start the system in single-unit mode. For a parallel power supply system, tap the "Parallel ON" button to start the system in parallel mode.

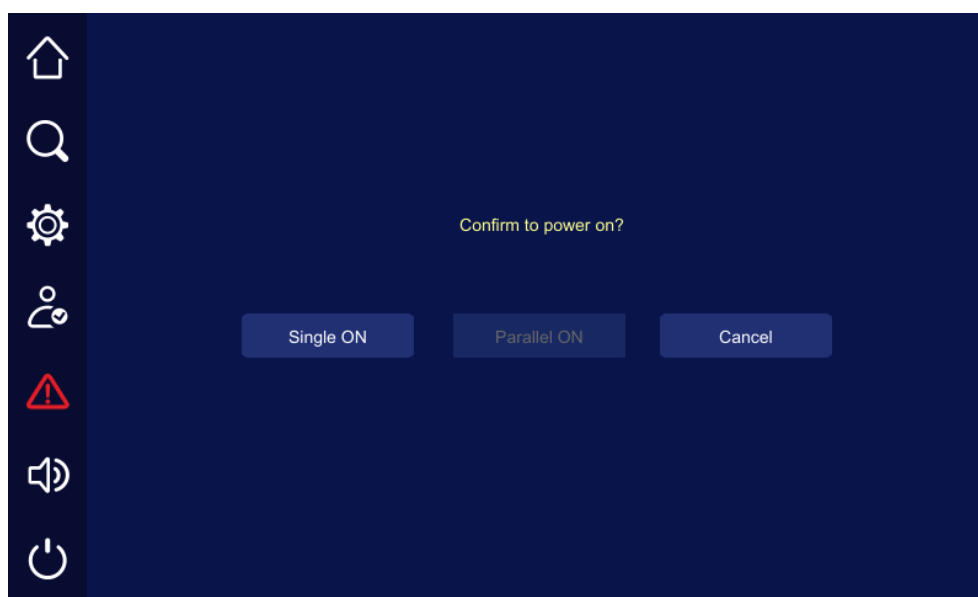


Figure4-1 Inverter startup page

The " $\sim$ " inverter indicator on the control panel will light up green. After about 10 seconds, the inverter startup is complete, and the " $\text{---}\bigcirc\text{---}$ " bypass indicator on the control panel will turn off. The system will switch from bypass output mode to inverter output mode.

- Step 5 After the inverter is started, check the main interface of the touchscreen to confirm whether the system has switched to inverter output mode. During professional debugging, tap the " $\text{---}\bigcirc\text{---}$ " icon on the main interface of the touchscreen to confirm whether the output voltage and frequency between L1, L2, and L3 of the UPS are normal.
- Step 6 Close the output switch and use a multimeter to test the voltage between output L1, L2, and L3. Confirm that the inverter output voltage (output voltage = system voltage $\pm$ 2V) and inverter output frequency (output frequency = system frequency $\pm$ 0.1Hz) are normal before use.
- Step 7 Connect user equipment loads. Generally, start high-power equipment loads first, followed by low-power equipment loads.

----End

4.1.3 Power Off the UPS

CAUTION

If the system bypass is functioning normally, the system will enter bypass power supply mode after the inverter is shut down. If the system bypass is abnormal, the system will enter no-output mode after the inverter is shut down, resulting in a power outage at the system output. Before performing the inverter shutdown operation, ensure that the load has been turned off and can withstand a power outage at any time.

Step 1 Turn off the user-side equipment load.

Step 2 Power off the inverter.

- **Power-off method 1:** control panel combination key

Press and hold the "OFF" combination key on the control panel for 3 seconds.

- **Power-off method 2:** touchscreen power-off

On the main interface, tap the "" icon to enter the inverter shutdown page. For a single-unit power supply system, tap the "Single OFF" button to power off the system in single-unit mode. For a parallel power supply system, tap the "Parallel OFF" button to power off the system in parallel mode.

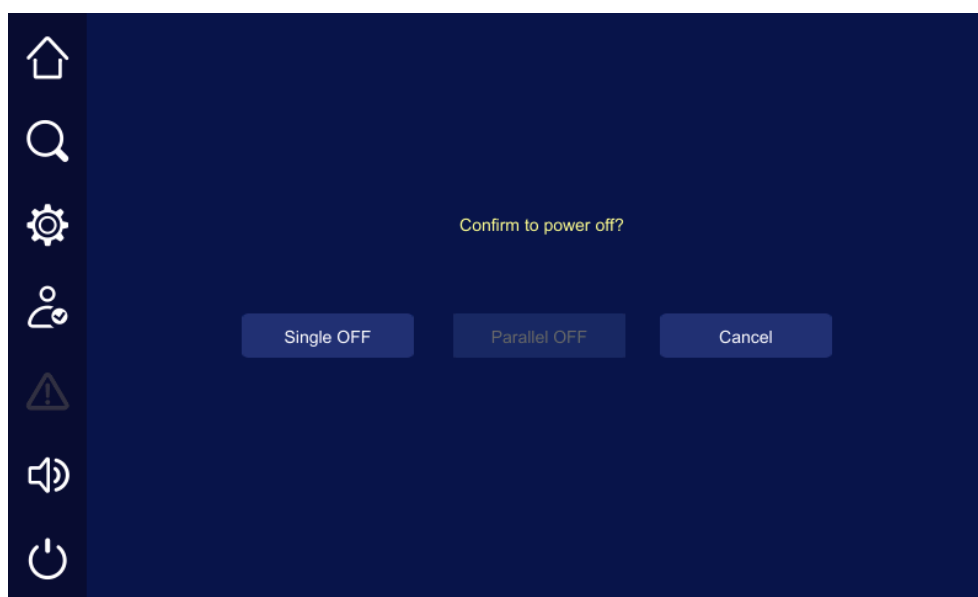


Figure4-2 Inverter shutdown page

The "  " inverter indicator on the control panel will turn off, and the "  " bypass indicator will light up green. The system will switch from inverter output mode to bypass output mode.

- Step 3 After the inverter is powered off, if the system bypass is functioning normally, the system will enter bypass power supply mode. If the system bypass is abnormal, the system will enter no-output mode, causing a power outage to the load.
- Step 4 Disconnect the external battery switch, mains switch, bypass switch, and output switch in sequence.
- Step 5 Wait until the touchscreen and LED indicators on the control panel are completely off, indicating that the UPS is fully powered off.

----End

4.1.4 Emergency Power Off



Do not perform EPO operation unless it is an emergency.

When using the emergency shutdown function, turn the key switch of EPO1 from EPO OFF to EPO ON, or disconnect the NO and COM of EPO2 (for details on triggering EPO2, refer to Table2-9). Either of these two operations can be selected to trigger the system's EPO, and the UPS will enter the emergency shutdown state. At this point, the touchscreen will display "EPO protection," and the buzzer will sound continuously.



After triggering the EPO, the UPS will have no output, and the load will experience a power outage.

4.1.5 Clear the EPO State

- Step 1 Check if the dry contact EPO1/EPO2 on the system monitoring card is in a non-emergency power off state.
- Step 2 Switch off the external battery switch, mains switch, bypass switch and output switch of UPS one by one. Wait until the touch screen and LED indicators on the operation panel are off, and UPS shuts down completely.

Step 3 Refer to section **4.1.2 Start UPS** to restart the UPS and remove the EPO.

----End

4.2 Parallel System Operation

4.2.1 Check Before Power-On

Table4-2 Check before power-on

No.	Check item	Check result
1	The mains switch, bypass switch, and output switch of each UPS are all in the disconnected state, and all external battery switches are in the disconnected state.	☐ Normal ☐ Abnormal
2	Check the load type, state and capacity. ● Ensure that the load is non-inductive load. Each UPS output cannot be connected with inductive loads, such as motor, fan, air-conditioner, which is directly powered by grid. ● Ensure that the load is switched off (i.e. the external load total output switch is off). At the same time, the load capacity should not exceed the rated output capacity of each UPS, otherwise it will cause the system overload protection.	☐ Normal ☐ Abnormal
3	There should be no short circuits between the live wires or between the live wires and the ground wires in the input of each UPS. Additionally, ensure that there are no short circuits in the output of each UPS.	☐ Normal ☐ Abnormal
4	Measure the AC voltage on the mains input terminals of each UPS via a multimeter. The voltage must be in the range of 336V to 552V, otherwise each UPS can only be started by battery.	☐ Normal ☐ Abnormal
5	Measure the frequency on the mains input terminals of each UPS via a multimeter. The frequency is required to be within the range of 40Hz~70Hz, otherwise only batteries can be used to start each UPS.	☐ Normal ☐ Abnormal

No.	Check item	Check result
6	Use a multimeter to measure the DC voltage at the external battery switch of each UPS. The positive battery voltage must be greater than a certain value, and the voltage between the positive and negative terminals of the battery must be greater than 11.5 times the number of battery cells. Pay attention to the battery polarity to prevent incorrect battery wiring. If there are multiple battery groups, use a multimeter to measure the voltage at each battery group switch, and then measure the voltage at the main switch between the battery groups and the UPS.	☐ Normal ☐ Abnormal
7	The battery switch auxiliary contact has been connected to one of the input dry contacts of the system monitoring card of each UPS as required, and the "Input dry contact" item has been set in "Setting manage > Dry Contact > Input" on the touch screen. The auxiliary contacts of the battery circuit breaker have been connected to one of the input dry contacts of the system monitoring card of each UPS as required, and the corresponding settings have been completed in the "Input dry contact" option under "Setting manage > Dry contact > Input" on the touch screen.	☐ Normal ☐ Abnormal

4.2.2 Start Parallel System

Step 1 Confirm that the parallel/BSC kit has been installed and connected with the parallel cable according to section **3.6.4 Parallel/BSC Kit Installation**.

Step 2 Place the ready switches of the bypass module and all power modules in the "🔒" state. Switch on the mains switch and bypass switch of each UPS one by one.

After each UPS is powered on, the touch screen starts to run. After entering the power-on password, the main page is displayed.

Step 3 Confirm the parallel configuration parameters on the touchscreen.



Tap the "⚙️" icon in the main page of the touch screen. Confirm that the "Parallel mode" in the "Cabinet setting > Mode manage" of each UPS is set to "Parallel." Also, confirm that the "Parallel address" of each UPS is set to a different address (e.g., one UPS has the "Parallel address" set to "1," another UPS has the "Parallel address" set to "2," and so on). Ensure that each UPS participating in the parallel setup has a unique number, and that the numbers do not repeat.

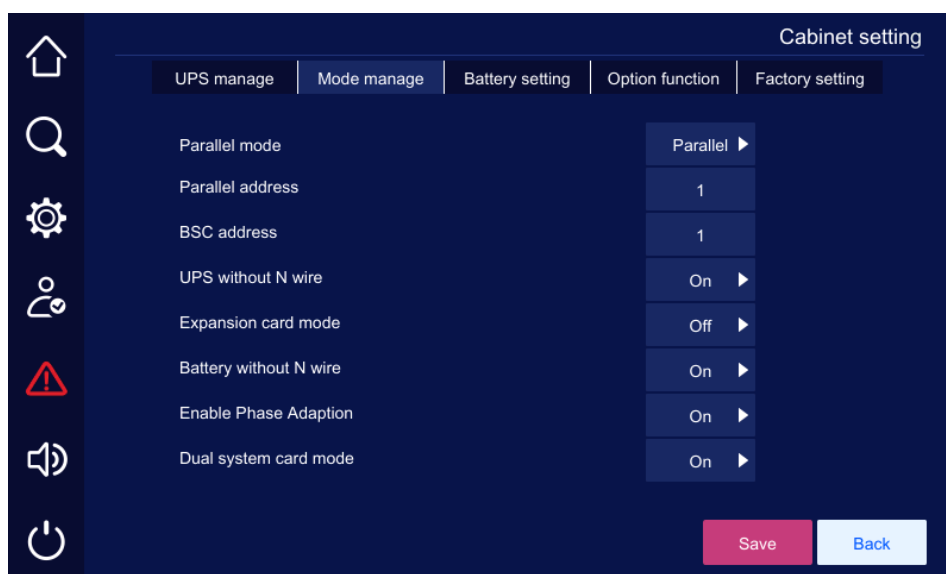


Figure4-3 Parallel mode and parallel address confirmation

Step 4 Close the external battery switch of each UPS (if there are multiple battery groups, first close the switch of each battery group, and then close the main switch between the battery group and the UPS). Confirm that the battery connection is normal (within 2 minutes, the "Battery circuit abnormal" alarm on the main page of all touchscreens will disappear).

Step 5 Tap the " " icon in the main page of the touch screen of each UPS to check if there are any fault alarms on the system. If yes, stop the operation and contact customer service personnel for on-site support until all fault alarms are removed.

Step 6 Power on the inverters of each UPS.

After confirming that all UPS units are in bypass output mode and that there are no abnormal alarms, proceed to start the inverters of all UPS units (for details, refer to Step 4 in section **4.1.2 Start UPS**). All UPS units will transition from bypass output mode to inverter output mode.



Do not directly close the output switches of each UPS. Maintain all output switches in the open position and follow the steps below to continue the operation. This precaution is necessary to prevent circulating currents caused by output voltage deviations, which could damage the equipment.

Step 7 Measure the output voltage and frequency of each UPS.

- After the inverters of each UPS are powered on, check if the system switches to the inverter mode in the main page of the touch panel. During professional testing, the output voltage and frequency between L1, L2, and L3 of each UPS can be confirmed by tapping the " " icon on the main page of the touchscreen.
- Use a multimeter to test the voltage between L1, L2, and L3 and confirm that the inverter output voltage (output voltage = system voltage $\pm$ 2V) and inverter output frequency (output frequency = system frequency $\pm$ 0.1Hz) are normal before use. Also, record the RMS voltage between L1, L2, and L3 of each UPS as tested with the multimeter.

Step 8 Compare the output voltages of each UPS. Confirm that the effective voltage difference between L1, L2, and L3 of any two UPS units is less than 5V before allowing parallel operation. If this condition is not met, the UPS with a significant voltage deviation cannot be integrated into the system and must undergo single-unit retesting (consult customer service personnel for assistance).

Step 9 Power off the inverters of each UPS (refer to Step 2 in section **4.1.3 Power Off the UPS**). Each UPS will switch from inverter output mode to bypass output mode.

Step 10 Check the bypass phase sequence.

1. Close the output switch of the UPS with parallel address 1, while keeping the output switches of other UPS units in the open state (ensure that the main output switch for external loads is in the open state; otherwise, closing the output switch of the UPS with parallel address 1 will supply power to the load).
2. Set the multimeter to AC voltage mode. Connect one probe to the front-end L1 phase of the output switch of the UPS at parallel address 2, and the other probe to the rear-end L1 phase of the output switch of the same UPS. Test the voltage difference between the front and rear ends of the output switch of the UPS at parallel address 2. Use the same method to test the voltage differences for L2 and L3 phases. If the phase sequence is correct, the voltage difference for each phase should be less than 5V; if the phase sequence is incorrect, at least one phase will have a voltage difference greater than 5V.
3. Use the above method to sequentially check whether the bypass phase sequence of each UPS to be integrated into the parallel system is correct (when testing the phase sequence of other UPS units, there is no need to operate the switches; keep the output switch of the UPS with parallel address 1 closed and the output switches of other UPS units open).
4. If the bypass phase sequence of all UPS units is correct, proceed to the next step. If the phase sequence of any UPS unit is incorrect, power down the system and check whether the bypass input and output wiring of each UPS is correct.

Step 11 Close the output switches of each UPS.

After confirming that there are no abnormal alarms on each UPS, sequentially close the output switches of each UPS to ensure that the output status of all UPS units is in parallel mode.

Step 12 Start the inverters of each UPS.

After confirming that each UPS is in bypass output mode and there are no abnormal alarms, start the inverters of each UPS (refer to step 4 of section **4.1.2 Start UPS** for details). Each UPS will switch from bypass output mode to inverter output mode.

Step 13 Shut down the inverters of each UPS.

(Refer to step 2 of section **4.1.3 Power Off the UPS** for details) After shutting down the inverters, each UPS will switch from inverter output mode to bypass output mode.

Step 14 Close the external total load output switch.

After the system switches to bypass power supply mode, close the external total load output switch, and the system will provide power to the load via bypass.

Step 15 Start the inverters of each UPS.

After confirming that each UPS is in bypass output mode and there are no abnormal alarms, start the inverters of each UPS (refer to step 4 of section **4.1.2 Start UPS** for details). Each UPS will switch from bypass output mode to inverter output mode.

----End

4.2.3 Shut Down the Parallel UPS System



If the bypass is normal, the system will turn to the bypass mode after the inverter powers off. If the bypass is abnormal, system will have no output after the inverter powers off. Before powering off inverter, please ensure that the load is switched off and can withstand the power failure at any time.

Step 1 Turn off all loads in the parallel system to allow the system to run with no load for a while to dissipate internal heat.

Step 2 Shut down the inverters of each UPS. (Refer to step 2 of section **4.1.3 Power Off the UPS** for details) Each UPS will switch from inverter output mode to bypass output mode.

- Step 3 Sequentially disconnect the external battery switch, mains power switch, bypass switch, external total load output switch, and output switches of each UPS.
- Step 4 Wait for the touchscreen on the operation panel and LED indicators to go completely off, indicating that the parallel system is fully shut down.

**NOTE**

- If only inverter shutdown is required and the system switches to bypass power supply without interrupting the load, only step 2 is needed.
- If the entire UPS system needs to be completely powered down, the complete operation steps mentioned above must be followed.
- If you need to exit parallel mode, first perform inverter shutdown, switch the system to bypass power supply, and then disconnect the parallel connection cable.

----End

4.2.4 Emergency Power Off

**CAUTION**

Do not perform EPO operation unless it is an emergency.

For detailed instructions on the Emergency Power Off (EPO) trigger method, please refer to section **4.1.4 Emergency Power Off**.

**NOTE**

Set "EPO linkage" in "Setting manage > Smart mode > Other modes" on the touch screen. When the "EPO linkage" is set to "On", if any UPS EPO is triggered, the parallel system will be shut down and all outputs will be turned off. When the "EPO linkage" is set to "Off", if any UPS EPO is triggered, only the output of this UPS will be turned off. This function is set by customer service personnel.

4.2.5 Clear the EPO State

- Step 1 Check if the dry contacts EPO1/EPO2 on all system monitoring cards of parallel system are in a non-emergency power off state.
- Step 2 Sequentially disconnect the external battery switch, mains power switch, bypass switch, and output switch of each UPS, until the touchscreen and LED indicators on all operation panels are completely off, indicating that all UPS units are fully powered down.
- Step 3 Refer to section **4.2.2 Start Parallel System** to restart the parallel system and remove EPO.

----End

4.3 BSC System Operation

The BSC system operation and parallel mode operation are basically the same except for the BSC system settings, as detailed in section **4.2 Parallel System Operation**.

NOTE

BSC system settings: On the touch screen main page, tap the  icon and confirm that the "Parallel mode" in the "Cabinet setting> Mode manage" of each UPS has been set to "BSC". Confirm whether the "BSC address" of each UPS is set to the correct matching address, such as: for example, the BSC address of the UPS in bus 1 is set to 1, the address in bus 2 is set to 2, and so on. The bus assignment of each UPS must match the settings.

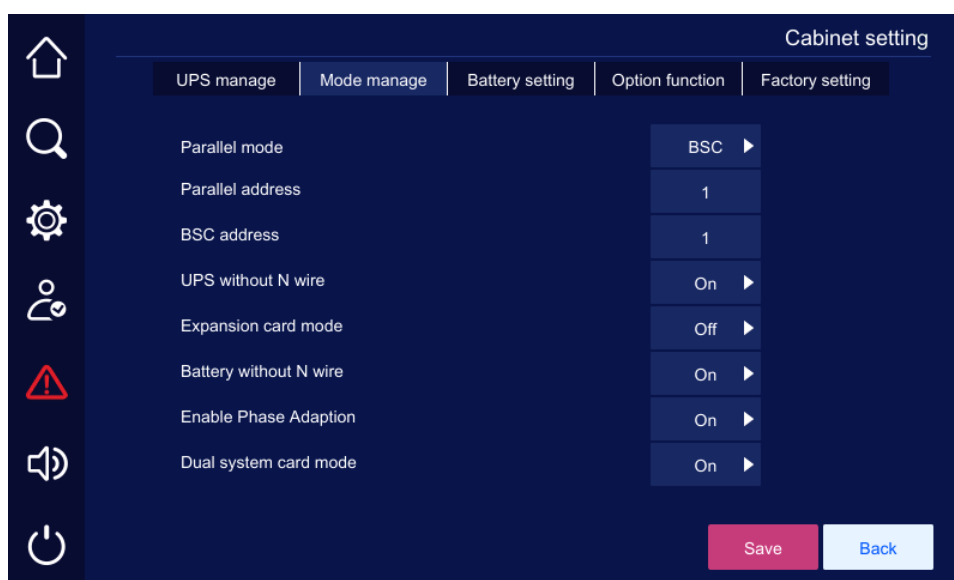


Figure4-4 Confirmation of BSC system setting parameters

5 Touch Screen Operation



NOTE

The parameter values and other details in the pictures in this chapter are for illustration only. The actual parameters are subject to the touch screen display of the received product.

5.1 Menu Structure Tree

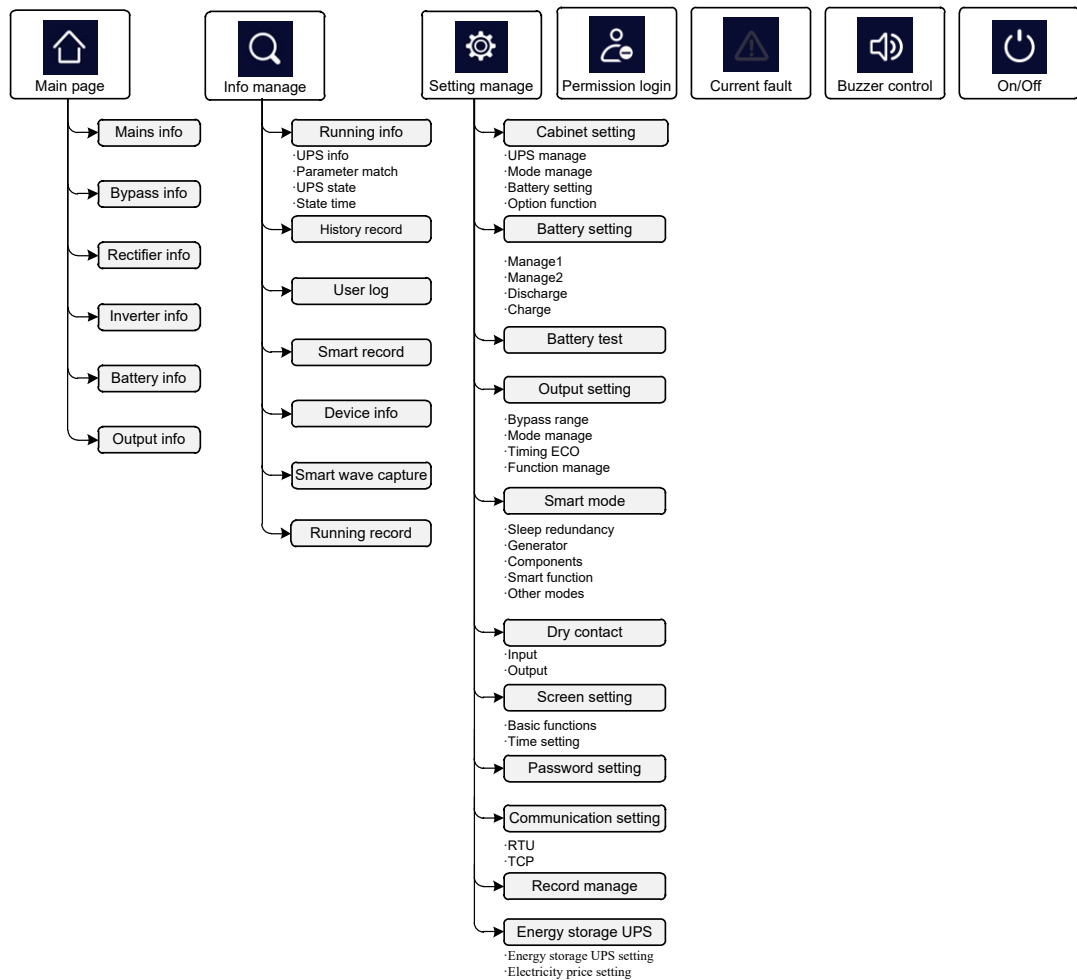


Figure5-1 Touch screen menu structure

⚠ WARNING

The touch screen contains parameters related to device operation. All parameter modifications should be performed by authorized professionals. For parameters that are not clear, please refer to this manual or consult the customer service personnel, and do not modify them without permission.

5.2 System Home Page

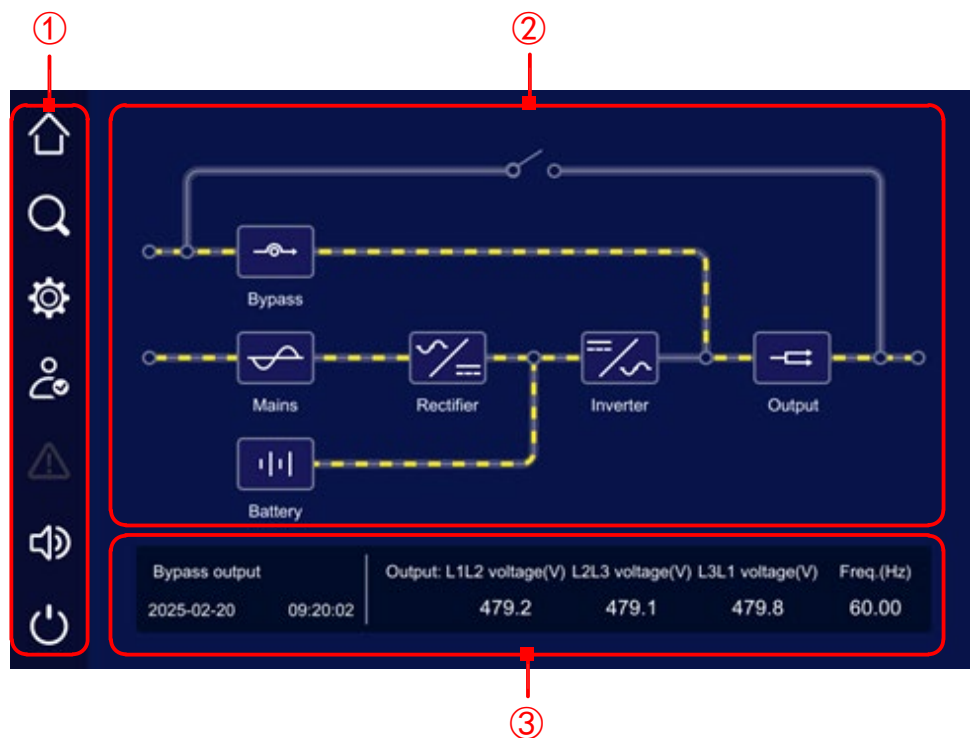


Figure5-2 System home page

Table5-1 Functional area illustration

No.	Area	Description
①	Menu bar	Include main page, info manage, setting manage and current fault, etc.
②	Main page	Display UPS current running state and info.
③	State bar	Include UPS state, date and time, output info, etc.

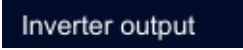
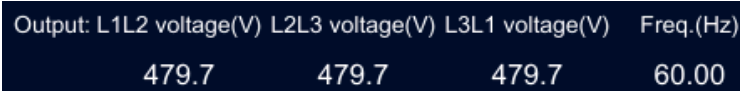
Table5-2 Menu bar icon description

Icon	Meaning
	System home page
	Info manage
	Device management
	Login
	Current fault
	Buzzer switch
	Inverter ON/OFF

Table5-3 Main page icon description

Icon	Meaning	Description
	Bypass information	When the bypass input is abnormal, this icon flashes and displays as  .
	Mains info	When the mains input is abnormal, this icon flashes and displays as  .
	Rectifier information	Tap it to view the rectifier information of each module.
	Inverter information	Tap it to view the inverter information of each module.
	Battery information	When the battery is abnormal, this icon flashes and displays as  .
	Output information	When output is abnormal, this icon flashes and displays as  .

Table5-4 State bar icon description

Icon	Description
	Display the current UPS state.
	Display the date and time.
	Display output info.

5.3 System Operation Status

The system working state includes fault protection, OFF, bypass output, inverter output, grid-tied self-load mode, ECO output, WECO output, frequency converter output, and maintenance bypass output.

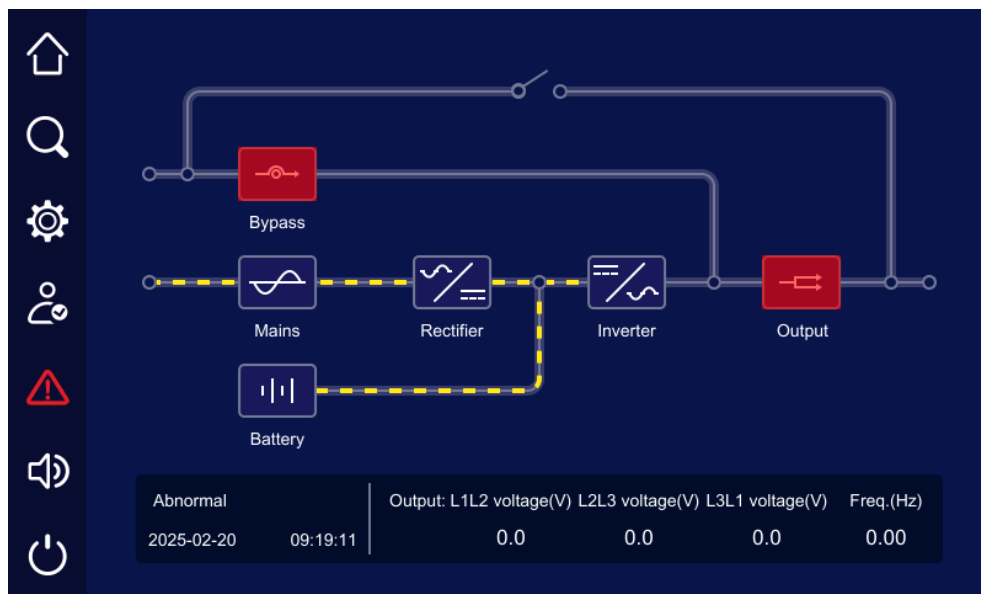


Figure5-3 Fault protection, no output

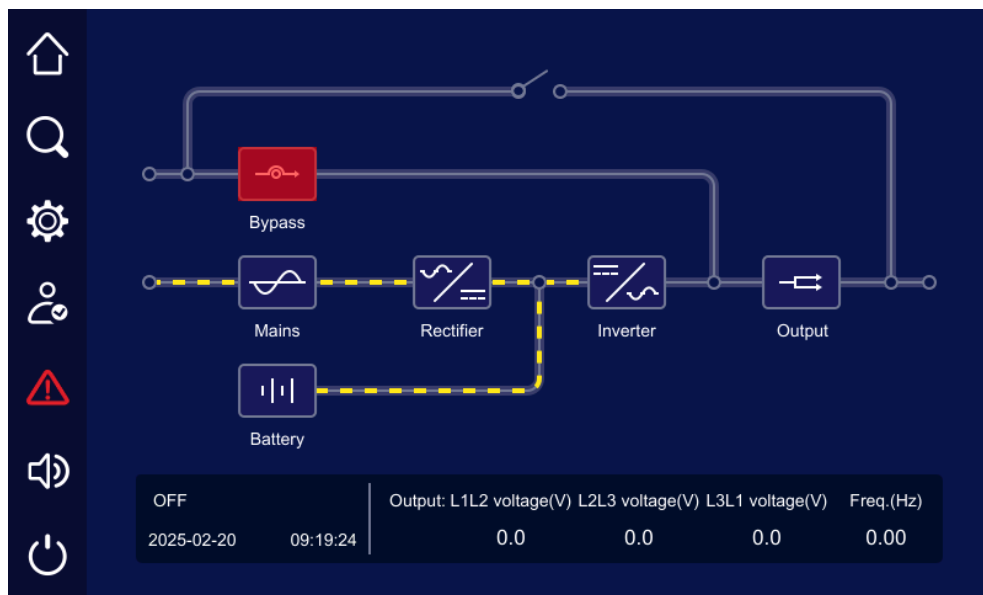


Figure5-4 Shut down

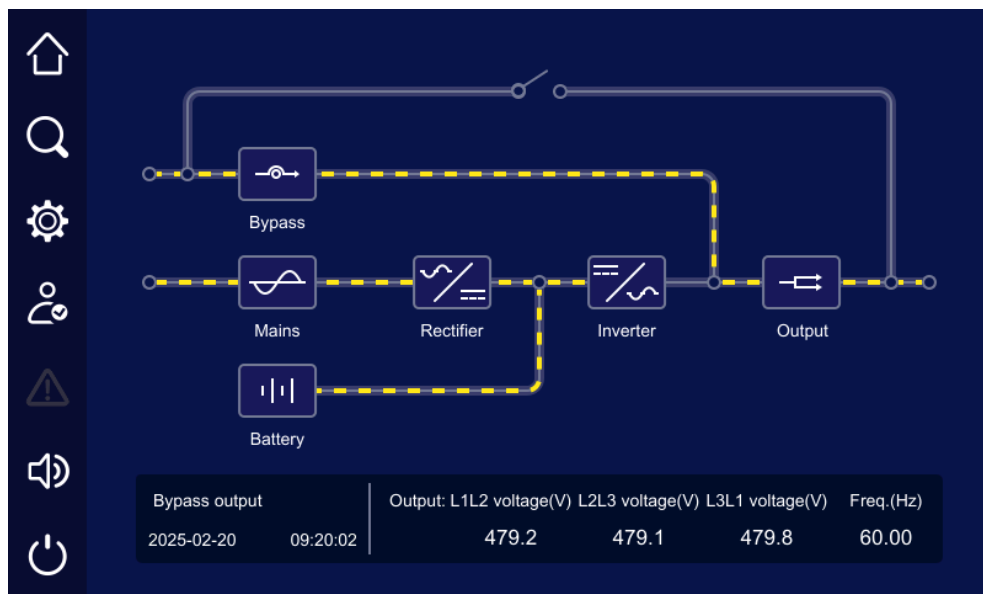


Figure5-5 Bypass output

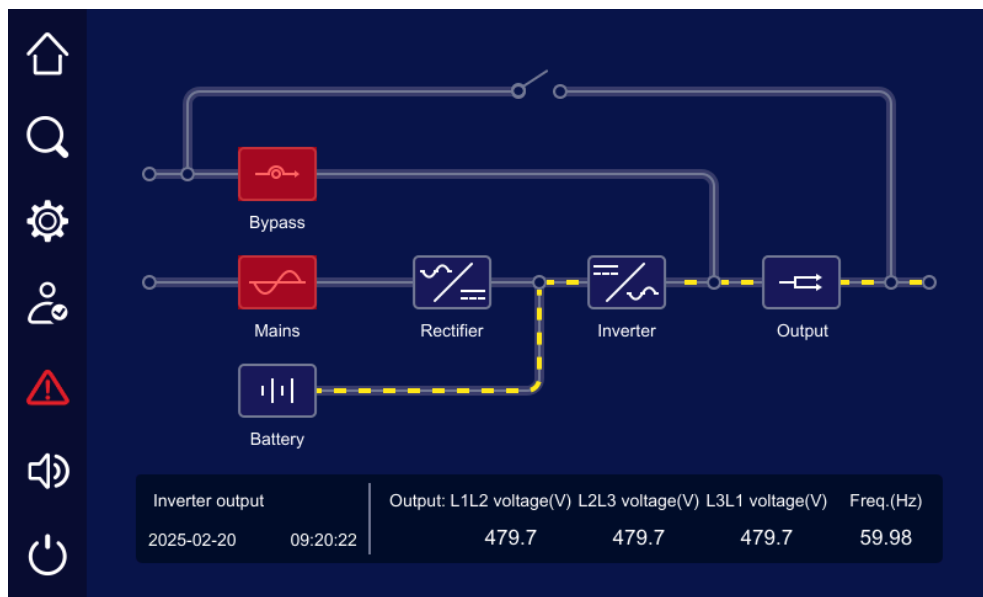


Figure5-6 Battery inverter output

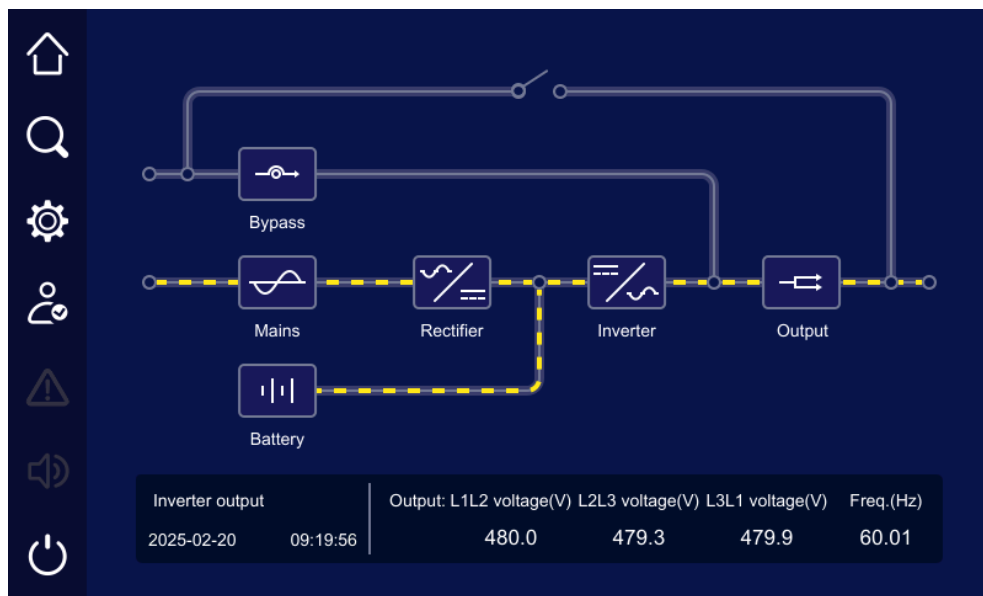


Figure5-7 Mains inverter output

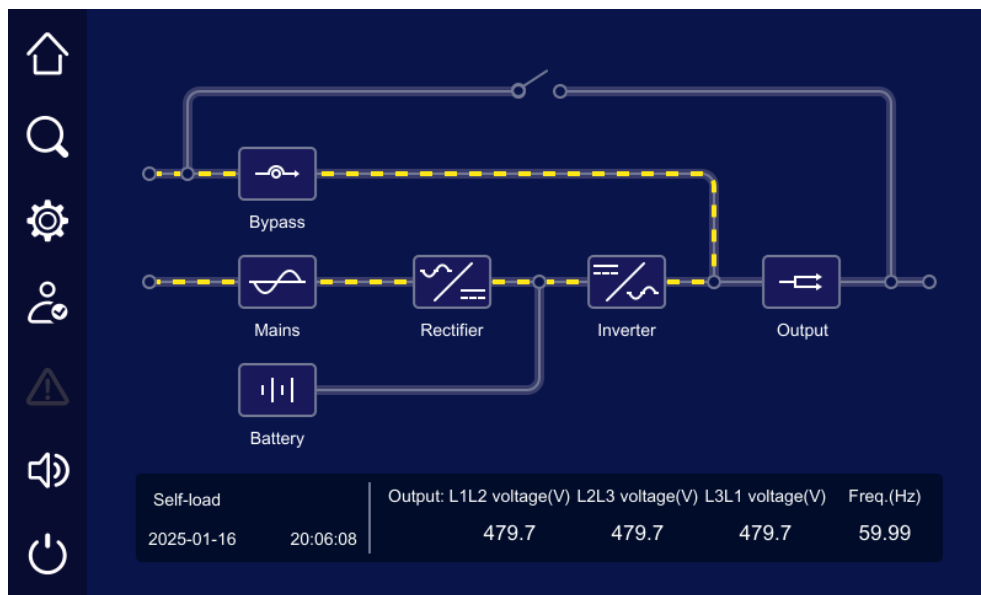


Figure5-8 Grid-tied self-load mode

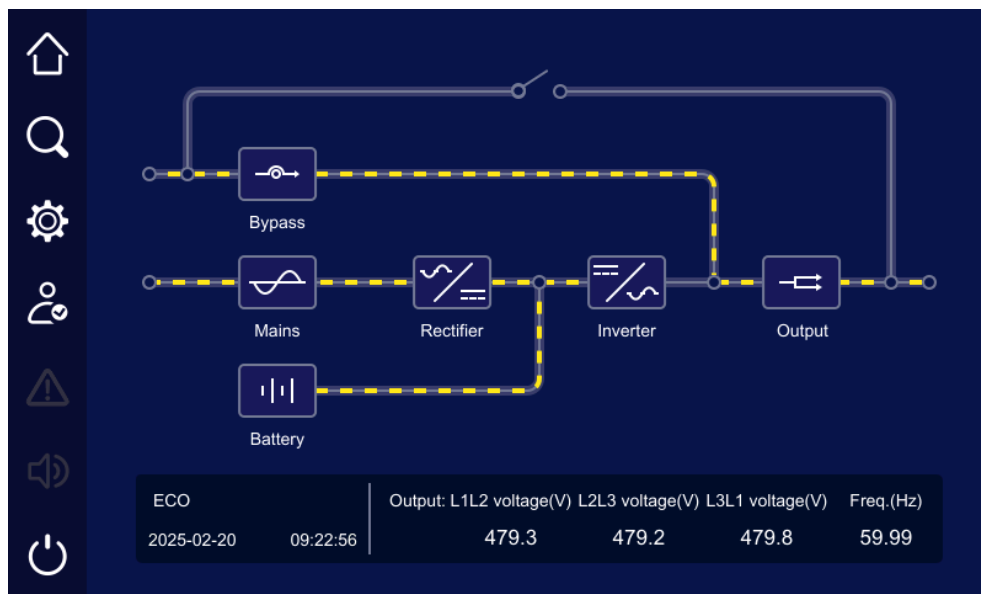


Figure5-9 ECO output

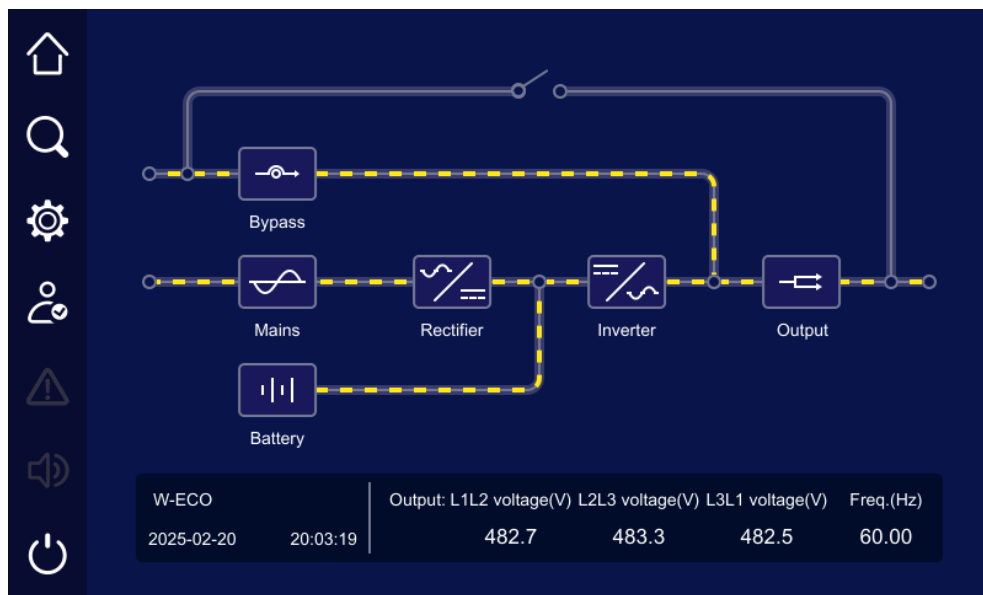


Figure5-10 WECC output

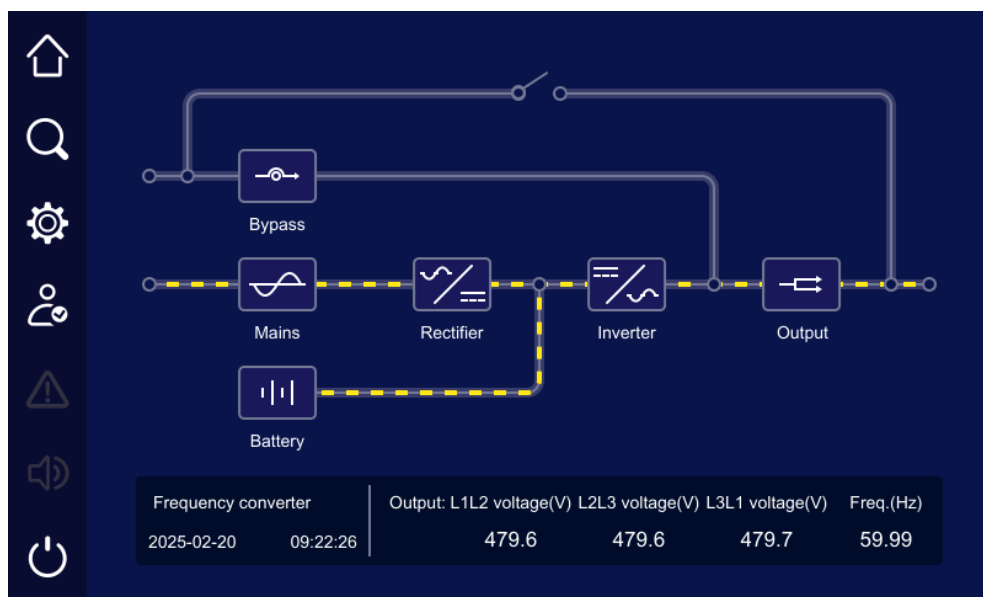


Figure5-11 Frequency converter output

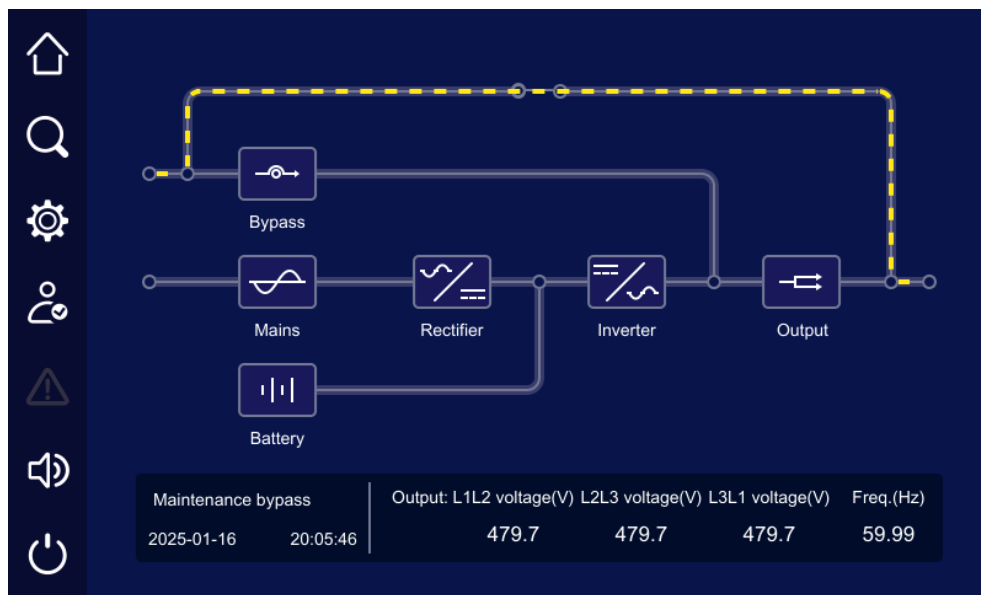


Figure5-12 Maintenance bypass output

When a module or system encounters an abnormal condition, the menu bar displays the "



Figure5-13 Current abnormal information

5.4 Buzzer Control

When an abnormal condition occurs in the module or system, system generates a buzzer alarm. Tap the "

 NOTE

When the buzzer beeps for a long time, it cannot be turned off by tapping the "" icon in the main menu bar. The buzzer will only cancel the long beep after the cause of the fault is eliminated. The corresponding cause of the long beep of the buzzer is detailed in section **2.6 Alarm protection function**.

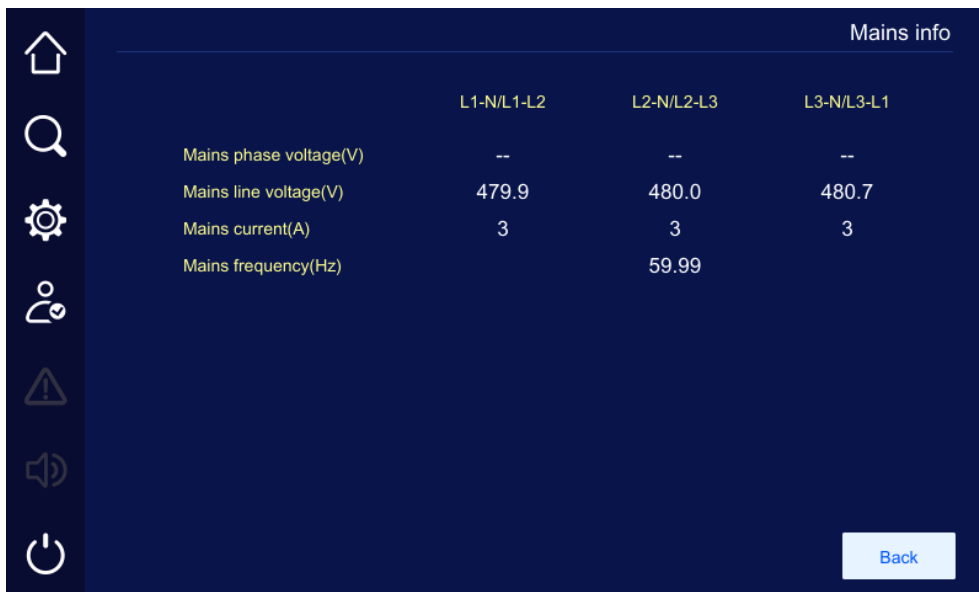
5.5 Main Page

 NOTE

Before conducting system information queries or system function settings, please log in to the corresponding account. Tap the "" icon in the menu bar of the main interface, enter the correct account and password, and then proceed with the operation.

5.5.1 Mains Info

On the main page, tap the "" icon to enter the mains information page. The mains info page displays the mains phase voltage, mains line voltage, mains current and mains frequency.

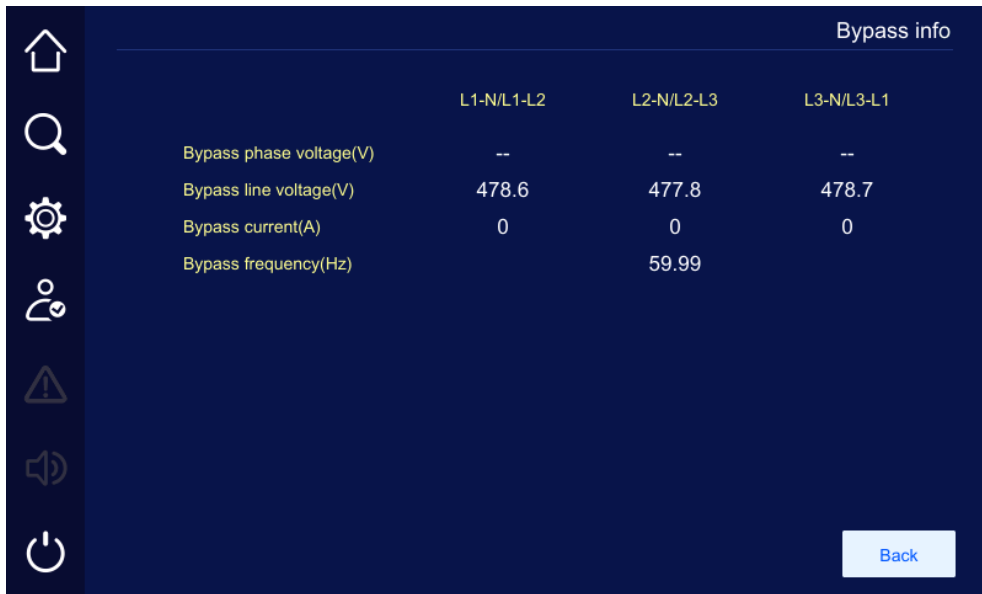


	L1-N/L1-L2	L2-N/L2-L3	L3-N/L3-L1
Mains phase voltage(V)	--	--	--
Mains line voltage(V)	479.9	480.0	480.7
Mains current(A)	3	3	3
Mains frequency(Hz)		59.99	

Figure5-14 Mains info page

5.5.2 Bypass Info

On the main page, tap the "" icon to enter the bypass information page. The bypass info page displays the bypass phase voltage, bypass line voltage, bypass current and bypass frequency.



	L1-N/L1-L2	L2-N/L2-L3	L3-N/L3-L1
Bypass phase voltage(V)	--	--	--
Bypass line voltage(V)	478.6	477.8	478.7
Bypass current(A)	0	0	0
Bypass frequency(Hz)	--	59.99	--

Figure5-15 Bypass info page

5.5.3 Battery Info

On the main page, tap the " " icon to enter the battery information page. The battery info page displays the battery voltage, battery discharge current, battery charge current, battery remaining capacity, battery remaining time, battery temperature and battery state.

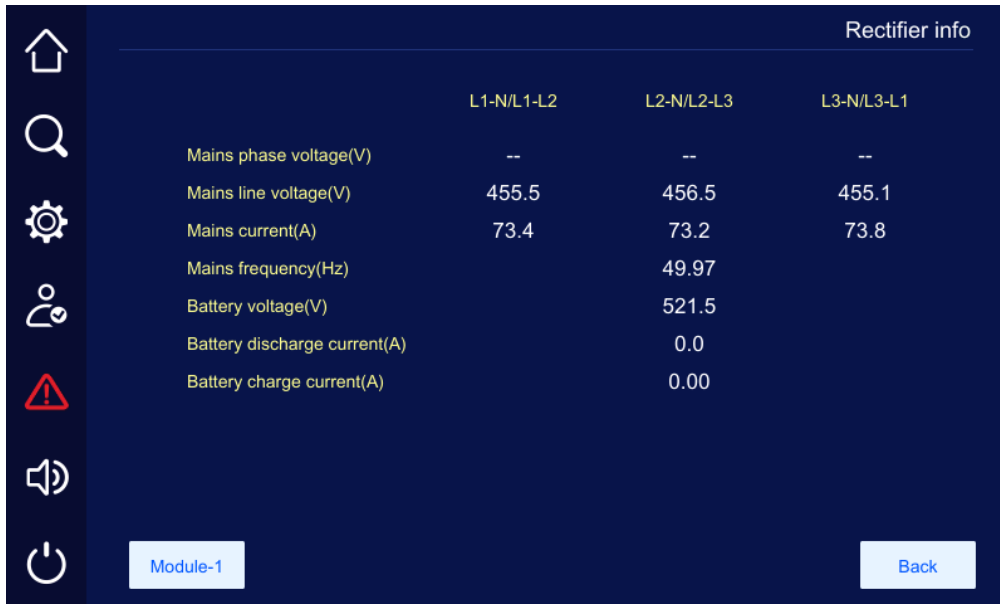


Battery voltage(V)	545.8
Battery discharge current(A)	0
Battery charge current(A)	0.0
Battery remaining capacity(%)	35
Battery remaining time(min)	772
Battery temperature (°F)	--
Battery status	Floating charge

Figure5-16 Battery info page

5.5.4 Rectifier Info

In the main page, tap the " " icon to enter the rectifier info page. In the rectifier info page, tap the " " icon to view the info of each power module.

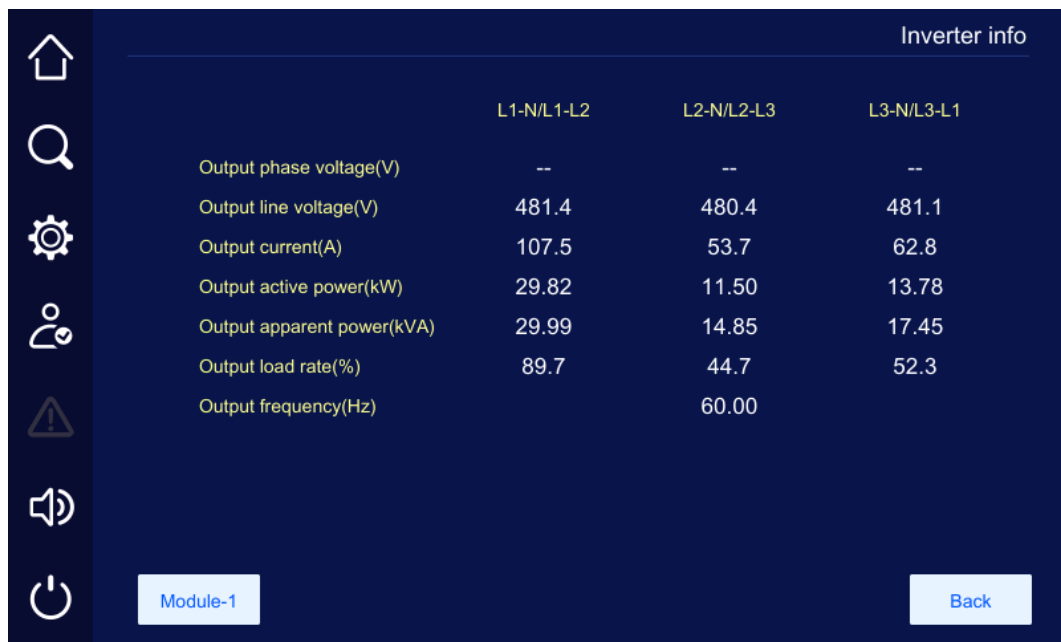


	L1-N/L1-L2	L2-N/L2-L3	L3-N/L3-L1
Mains phase voltage(V)	--	--	--
Mains line voltage(V)	455.5	456.5	455.1
Mains current(A)	73.4	73.2	73.8
Mains frequency(Hz)		49.97	
Battery voltage(V)		521.5	
Battery discharge current(A)		0.0	
Battery charge current(A)		0.00	

Figure5-17 Rectifier info page

5.5.5 Inverter Info

In the main page, tap the " " icon to enter the inverter info page. In the inverter info page, tap the " " icon to view the info of each power module.



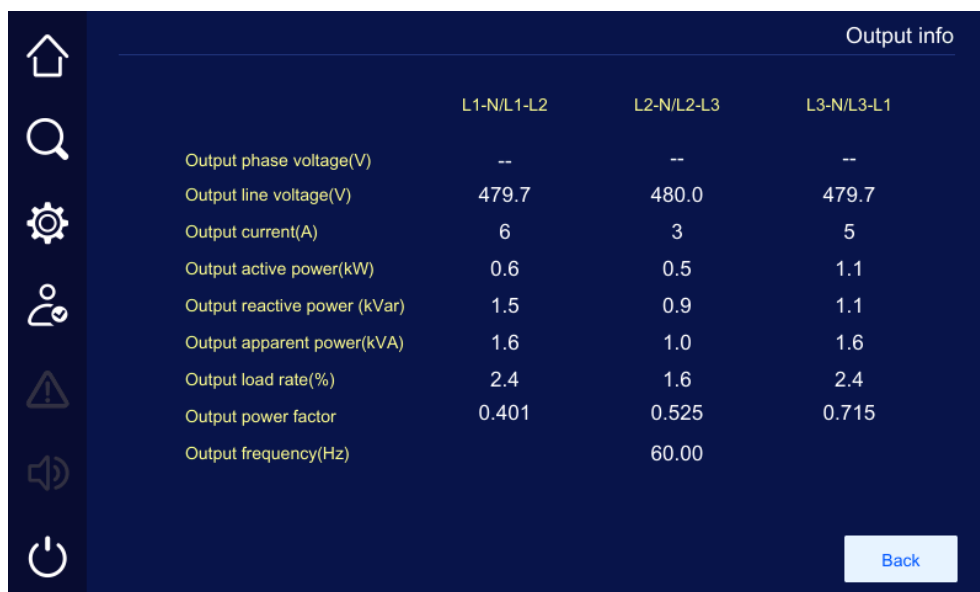
	L1-N/L1-L2	L2-N/L2-L3	L3-N/L3-L1
Output phase voltage(V)	--	--	--
Output line voltage(V)	481.4	480.4	481.1
Output current(A)	107.5	53.7	62.8
Output active power(kW)	29.82	11.50	13.78
Output apparent power(kVA)	29.99	14.85	17.45
Output load rate(%)	89.7	44.7	52.3
Output frequency(Hz)		60.00	

Module-1 Back

Figure5-18 Inverter info page

5.5.6 Output Info

In the main page, tap the " " icon to enter the output info page. The output info page displays the output phase voltage, output line voltage, output current, output active power, output reactive power, output apparent power, output load rate, output power factor and output frequency.



	L1-N/L1-L2	L2-N/L2-L3	L3-N/L3-L1
Output phase voltage(V)	--	--	--
Output line voltage(V)	479.7	480.0	479.7
Output current(A)	6	3	5
Output active power(kW)	0.6	0.5	1.1
Output reactive power (kVar)	1.5	0.9	1.1
Output apparent power(kVA)	1.6	1.0	1.6
Output load rate(%)	2.4	1.6	2.4
Output power factor	0.401	0.525	0.715
Output frequency(Hz)		60.00	

Back

Figure5-19 Output info page

5.6 Information Management



In the menu bar, tap the " " icon to enter the info manage page. The info manage page displays running info, history record, user log, smart record, device info, smart wave capture, and running record.

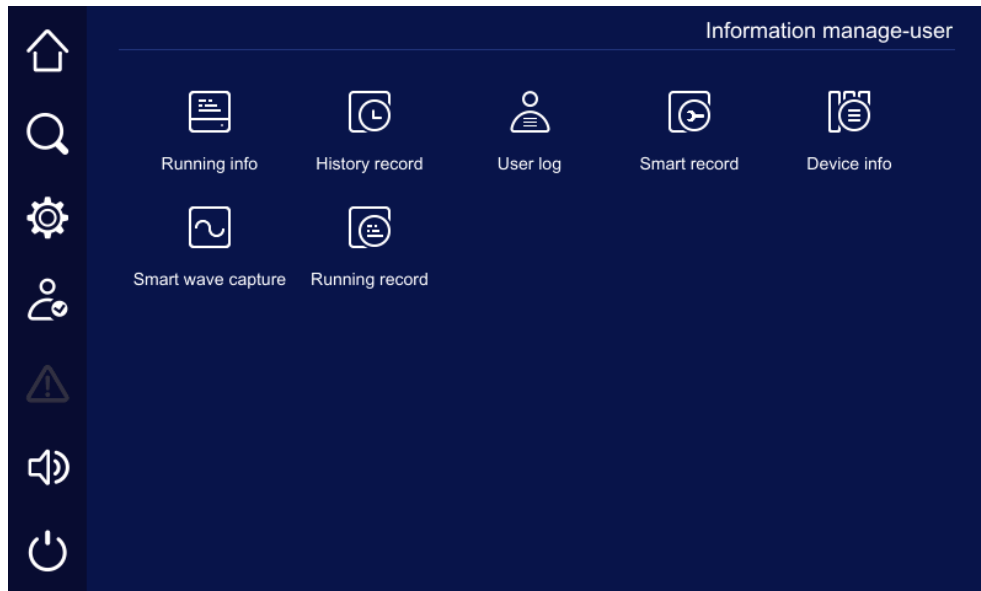


Figure5-20 Info manage page

CAUTION

Up to 10000 records can be recorded. When the number of alarm records exceeds 10,000, the earliest record will be overwritten by the new record. All records are arranged in reverse chronological order.

5.6.1 General Info



In the info manage page, tap the " " icon to enter the running info page. The running info page displays the system card sampling info.

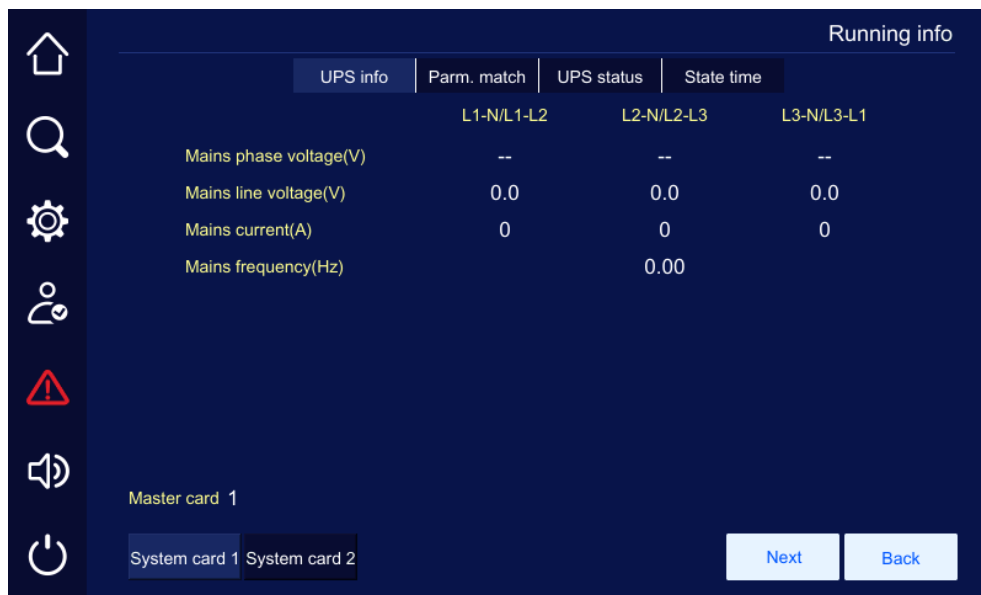


Figure5-21 Running info page

5.6.2 History Record



In the info manage page, tap the " History record " icon to enter the history record page. The history record page displays the history fault and alarm info of the system and modules.



Figure5-22 History record page

5.6.3 User Log



On the info manage page, tap the "  " icon to enter the user log page. The user log page displays the user parameter change records.

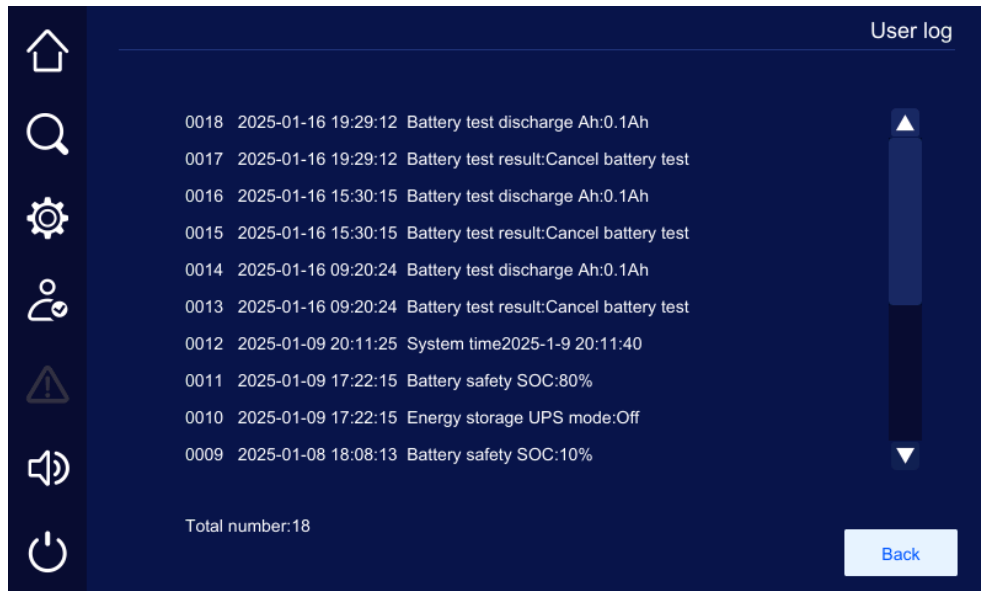


Figure5-23 User log page

5.6.4 Smart Record



In the info manage page, tap the "  " icon to enter the smart record page. The smart record page displays the maintenance personnel repair and replacement records.

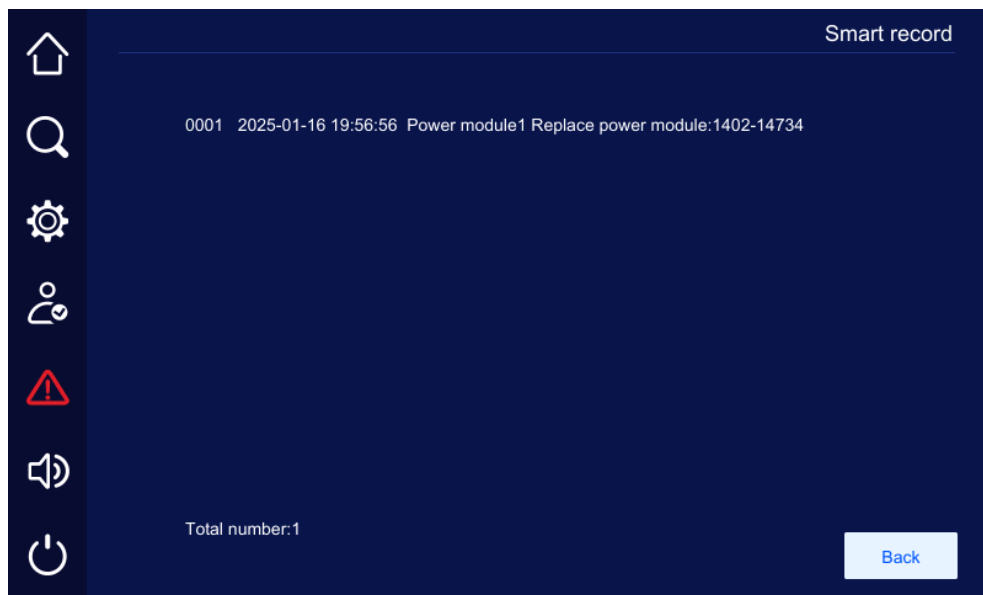


Figure5-24 Smart record page

5.6.5 Device Info



In the info manage page, tap the "  " icon to enter the device info page. The device info page displays the product name, model, S/N and protocol version, etc.

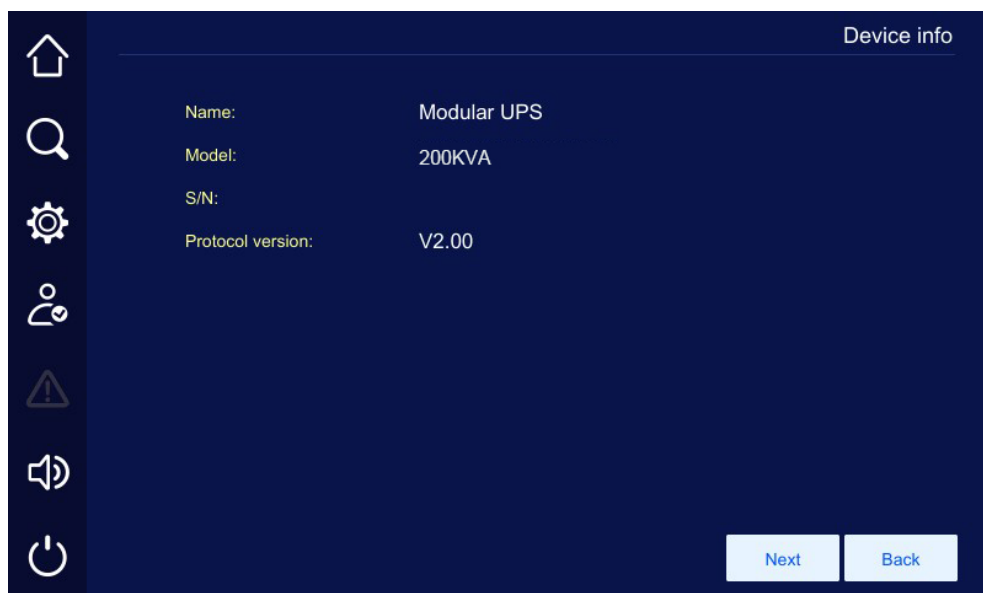


Figure5-25 Device info page 1



Figure5-26 Device info page 2

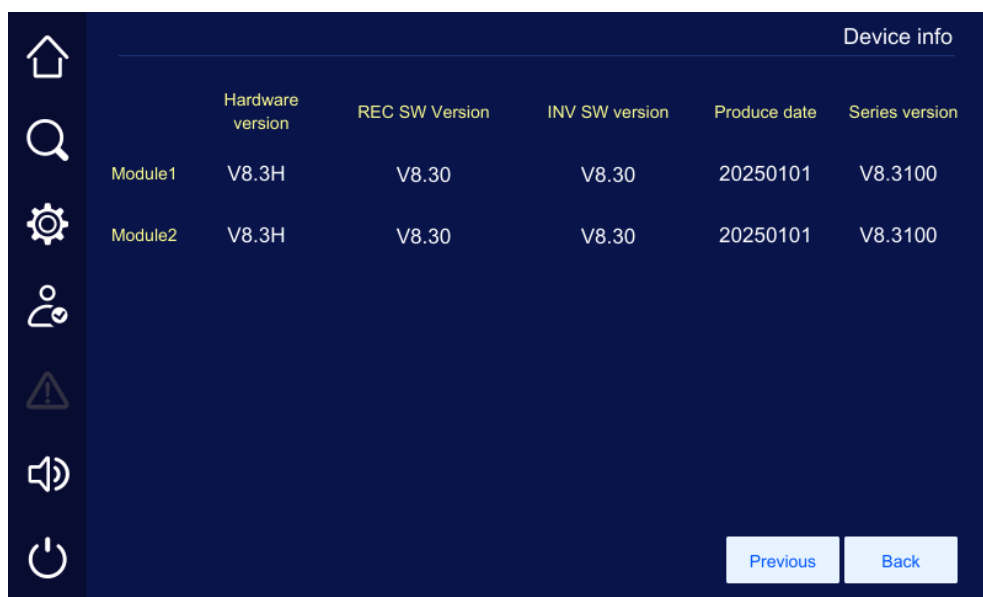


Figure5-27 Device info page 3

5.6.6 Smart Wave Capture



In the info manage page, tap the " Smart wave capture " icon to enter the smart wave capture page. The smart wave capture page displays the product name, model, S/N and protocol version, etc.

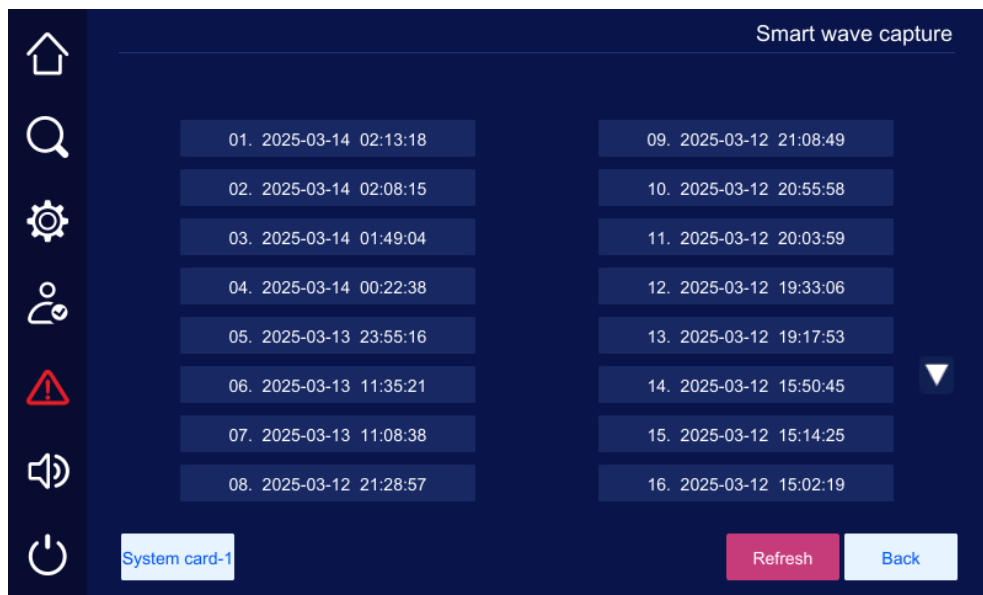


Figure5-28 Smart wave capture page

5.6.7 Running Record



On the info manage page, tap the "Running record" icon to enter the running record page. The running record page displays the input and output voltage and current information.



Figure5-29 Running record page

5.7 Setting Management



In the menu bar, tap the "  " icon to enter the setting manage page. The setting manage page displays the cabinet setting, battery setting, battery test, output setting, smart mode, dry contact, screen setting, password setting, communication setting, record manage and Energy storage UPS.

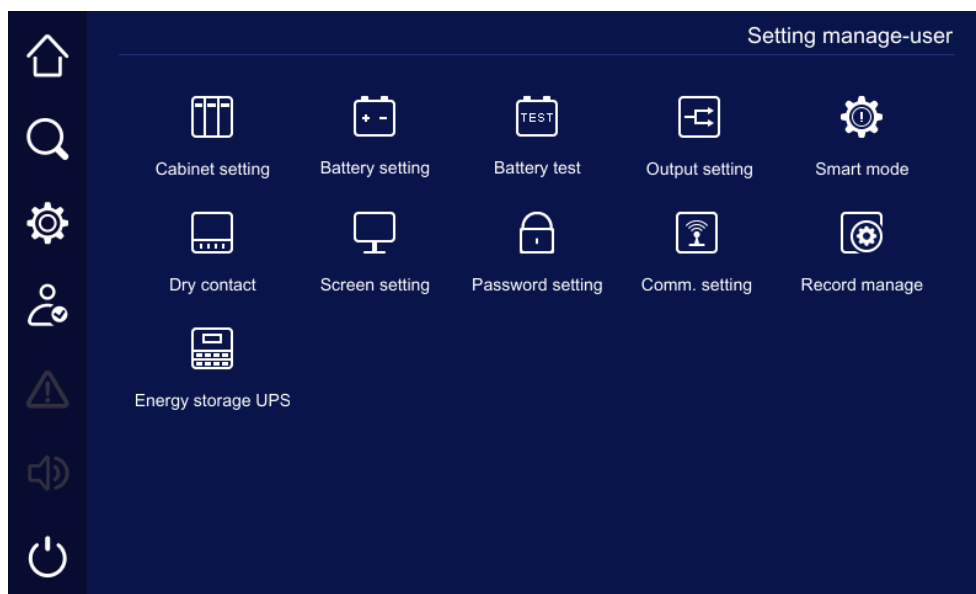


Figure5-30 Setting manage page



NOTE

When the setting item is grey, it cannot be set.

5.7.1 Cabinet Setting



In the setting manage page, tap the "  " icon to enter the cabinet setting page. This page allows you to view the basic cabinet parameter settings for UPS.



NOTE

The parameters on the cabinet setting page are view-only and cannot be modified by users.

UPS manage



Figure5-31 Cabinet setting-UPS manage page

 NOTE

The parameters on the UPS manage page are view-only and cannot be modified by users.

Table5-5 Description of UPS management settings

No.	Items	Description
1	UPS voltage	Rated output voltage of the UPS
2	UPS frequency	Rated output frequency of the UPS
3	Output PF	Power factor (PF) of the UPS output
4	Output voltage fine-tuning	Fine-tuning of the UPS output voltage

Mode management

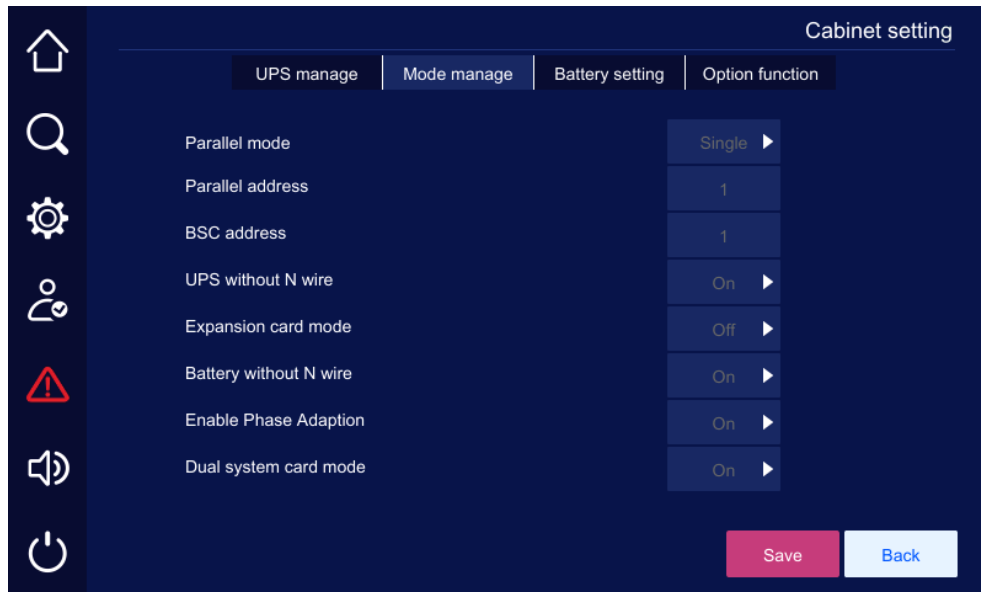


Figure5-32 Cabinet settings - mode manage page



NOTE

The parameters on the mode manage page can only be viewed by the user and cannot be modified.

Table5-6 Mode management settings description

No.	Items	Description
1	Parallel mode	The system's parallel operation mode
2	Parallel address	The address of this cabinet when the parallel mode is enabled
3	BSC address	The address of this cabinet when the BSC mode is enabled
4	UPS without N wire	A setting that needs to be enabled when there is no neutral line (N) in the mains input. The system can only operate without the neutral line when enabled
5	Expansion card mode	A setting that needs to be enabled when an expansion card is installed. After enabling, it allows the expansion of the corresponding interfaces
6	Battery without N wire	A setting that needs to be enabled when there is no neutral line (N) in the battery connection. The system can only operate without the neutral line in the battery connection when enabled

No.	Items	Description
7	Enable phase adaptation	When enabled, the system can still output normally even if the phase sequence of the mains input is reversed. However, the bypass will not function properly if the phase is reversed.
8	Dual system card mode	Enable it when the UPS uses two system cards, allowing for the detection of redundancy in the system cards.

Battery setting

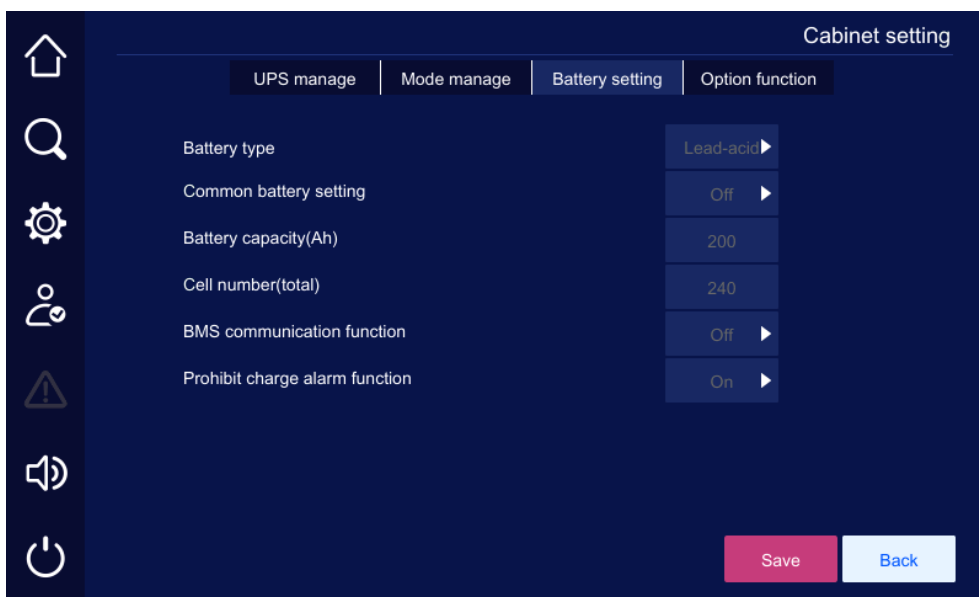


Figure5-33 Cabinet setting - battery setting page

NOTE

The parameters on the battery setting page are for viewing only and cannot be modified by the user.

Table5-7 Battery setting explanation

No.	Items	Description
1	Battery type	Must match the actual battery type connected.
2	Common battery setting	Enabled when different cabinets share the same battery pack in parallel mode.
3	Battery capacity	The capacity of the connected battery, which must match the actual battery capacity.

No.	Items	Description
4	Cell number	The number of battery cells connected, which must match the actual number of cells.
5	BMS communication function	Enable this function when the expansion card is a BMS communication card.
6	Prohibit charge alarm function	When charging is prohibited for the battery, the fault information will display the corresponding charging prohibition alarm.

Optional function

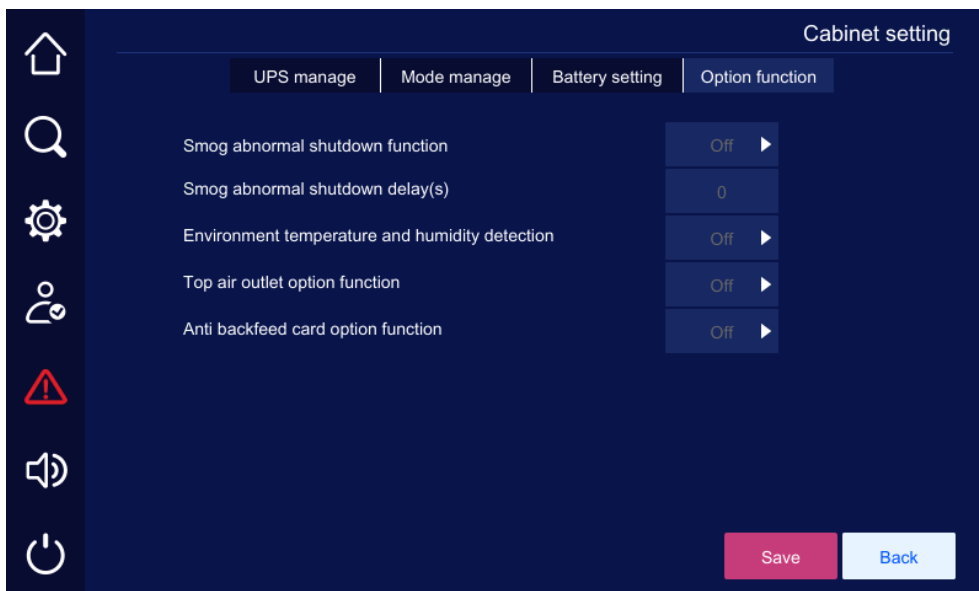


Figure5-34 Cabinet settings - optional accessories function page

NOTE

The parameters on the option function page are for viewing only and cannot be modified by the user.

Table5-8 Optional accessories function description

No.	Item	Description
1	Smog abnormal shutdown function	When this function is enabled, if the smog detection option detects abnormal smog in the environment, a shutdown command will be issued.

No.	Item	Description
2	Smog abnormal shutdown delay	If the smog sensor detects an abnormal condition, the UPS will shut down after the set delay time is reached.
3	Environmental temperature and humidity detection	When this function is enabled and combined with the environmental temperature detection option, it can monitor the ambient temperature and humidity.
4	Top air outlet option function	No top air outlet option.
5	Anti backfeed card option function	No anti-backfeed card option.

5.7.2 Battery Setting

S³ lithium battery connection

The positive and negative terminals of the S³ lithium iron battery need to be connected to the positive and negative copper bar of the cabinet.

Step 1 Insert the customer-selected BMS card into the cabinet according to the Section **3.6.3 Expansion Card Installation**.

Step 2 Use an RJ45 connector, one end to the BMS card and the other end to the RJ45 port of the S³ lithium iron battery cabinet.

Step 3 Tap the setting button “” on the touchscreen, then tap the cabinet settings option “”, and finally, tap on “Mode manage”.

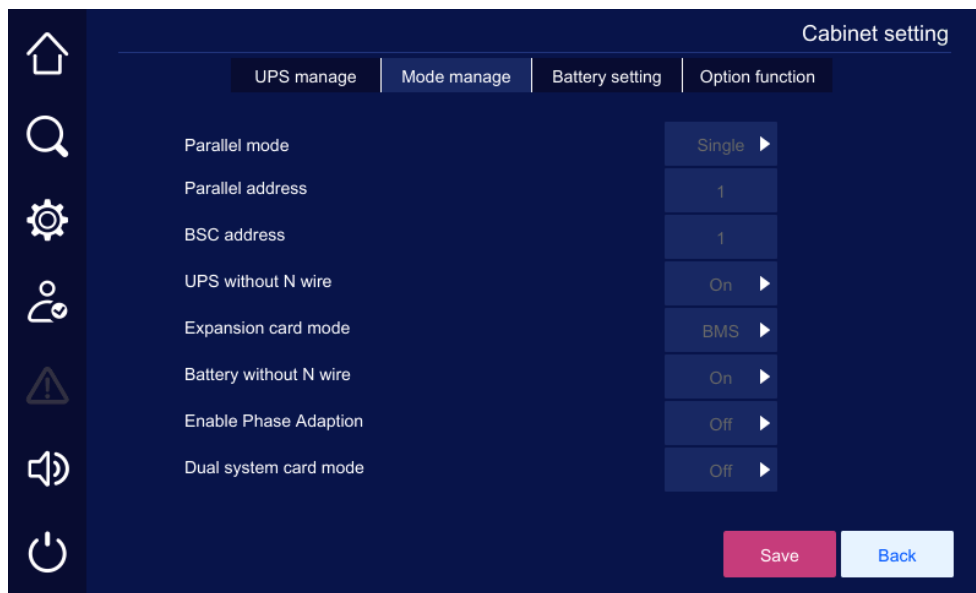


Figure5-35 Mode manage page

- Step 4 Select BMS in the expansion card mode and save. Then tap on "Battery setting," set the battery type to S³ Li-ion, and enable the BMS communication function. The communication connection will then be completed.

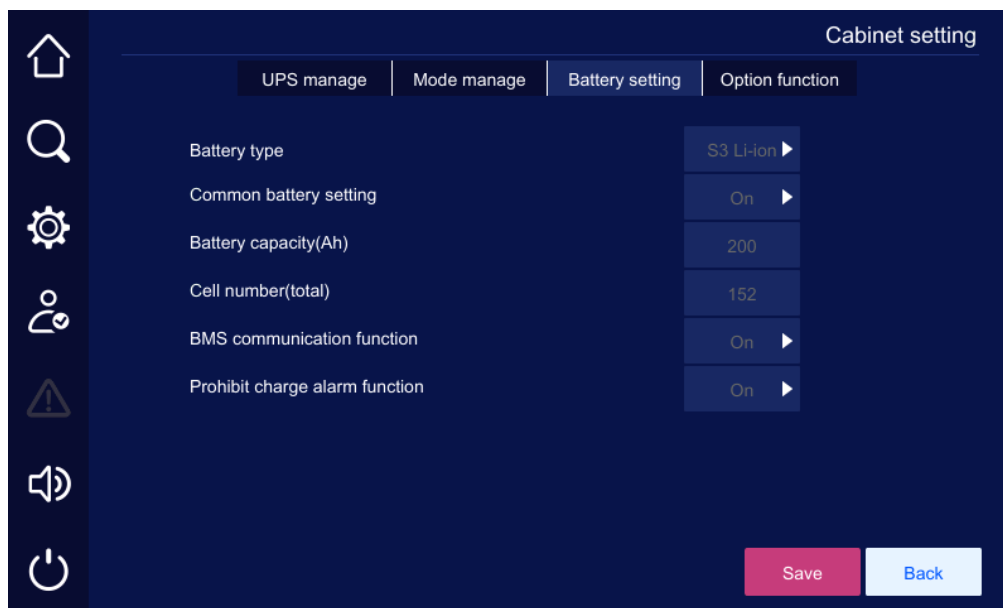


Figure5-36 Battery settings page.

- Step 5 Connect the positive and negative terminals of the lead-acid battery and lithium iron battery to the positive and negative copper bars of the cabinet.

- Step 6 Tap the setting button “” on the touchscreen, then tap the cabinet settings option “”, and finally, tap on “Battery setting”.

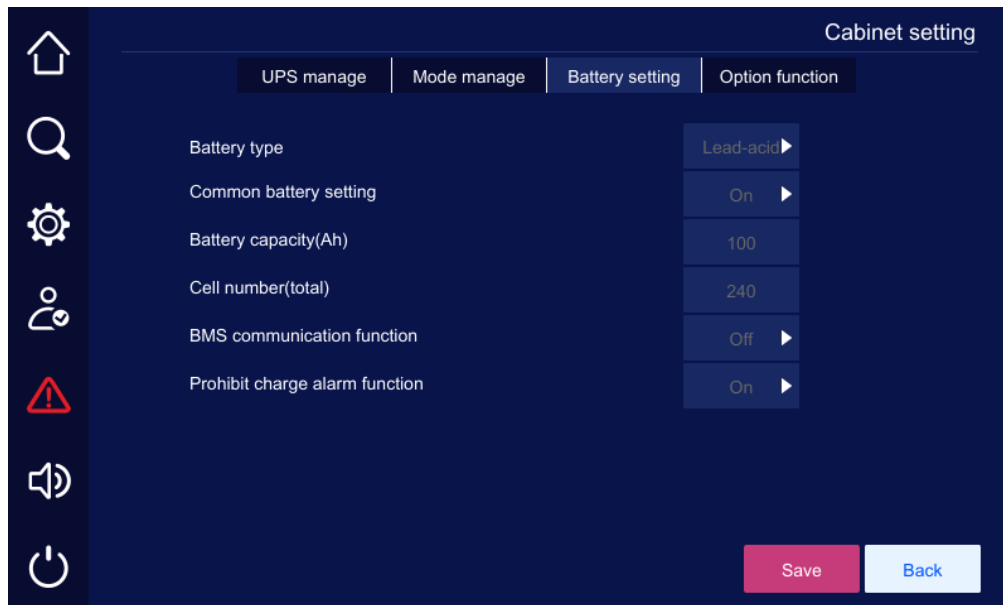


Figure5-37 Battery setting page.

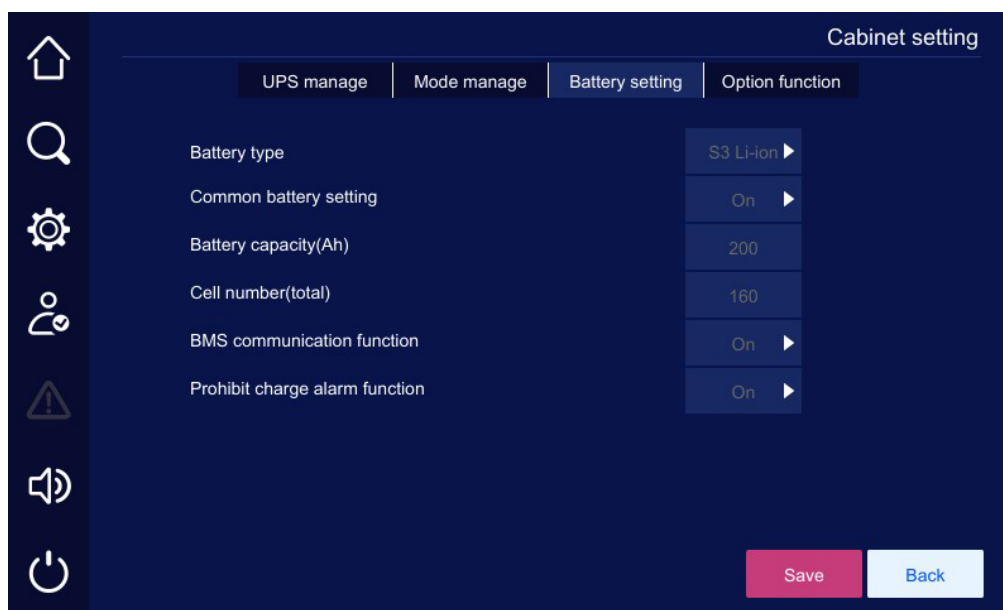


Figure5-38 Battery setting page.

- Step 7 Select the battery type as either lead-acid or S³ Li-ion.

The BMS communication function does not need to be enabled. Set other parameters according to the battery configuration with the following reference settings.

Battery management 1



In the setting manage page, tap the "Battery setting" icon to enter the battery setting page.

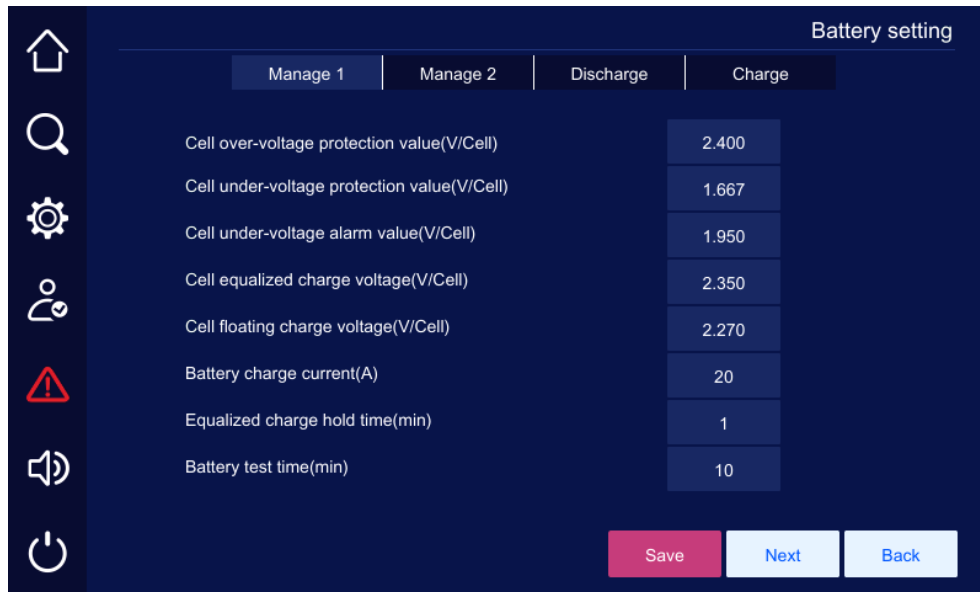


Figure5-39 Battery setting page

Table5-9 Battery manage 1 setting description

No.	Items	Description	Parameter setting
1	Cell over-voltage protection value	The max. voltage that the cell can withstand, exceeding the set value will trigger the battery protection function.	It can be set from 2.300V/cell to 2.450V/cell.
2	Cell under-voltage protection value	The min. voltage that the cell can withstand, lower than the set value will trigger the battery protection function.	It can be set from 2.300V/cell to 1.833V/cell.
3	Cell under-voltage alarm value	Cell enters the under-voltage state, an alarm is triggered to inform the user that the battery is going to run out. If the battery continues to discharge, the battery protection may be taken.	It can be set from 2.300V/cell to 2.000V/cell.
4	Cell equalized charge voltage	Cell charge voltage in the equalized charge state	It can be set from 2.300V/cell to 2.400V/cell.

No.	Items	Description	Parameter setting
5	Cell floating charge voltage	Cell charge voltage in the floating charge state	It can be set from 2.300V/cell to 2.300V/cell.
6	Battery charge current	The max. battery charging current	It can be set from 5A to 750A. Default is 20A, but does not exceed the charging capacity.
7	Equalized charge hold time	The max. hold time in equalized charge state	It can be set from 1min to 720min. Default is 30min.
8	Battery test time	Battery standard test time	It can be set from 1min to 240min. Default is 10min.

Battery management 2

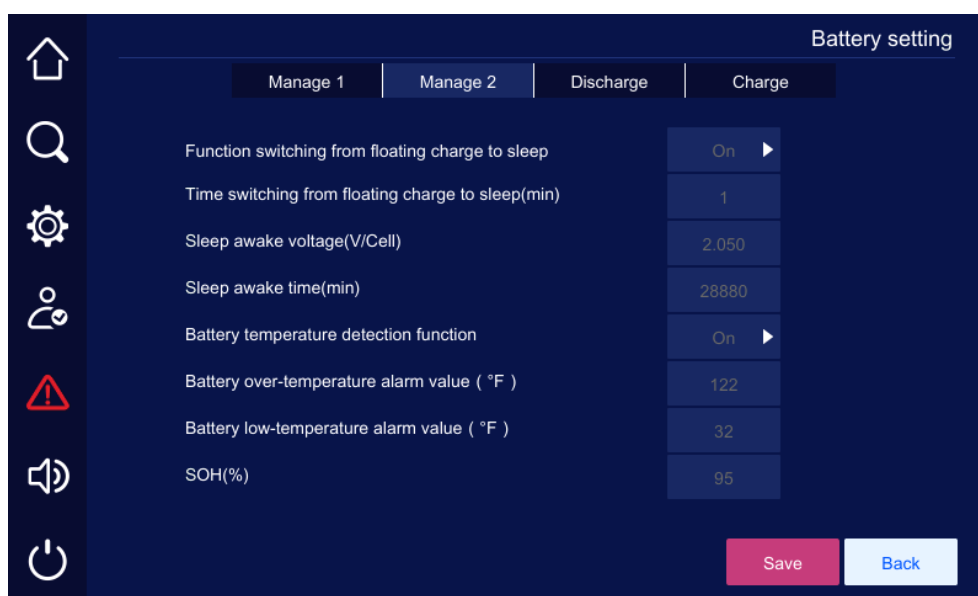


Figure5-40 Battery settings - battery manage 2 page

NOTE

The parameters on the Battery manage 2 page are for viewing only and cannot be modified by the user.

Table5-10 Battery manage 2 setting description

No.	Item	Description
1	Function switching form float charge to sleep	When enabled, the battery will transition from float charge to sleep mode after reaching the set float charge to sleep time.
2	Time switching from floating charge to sleep	The duration for the battery to remain in float charge mode before transitioning to sleep mode.
3	Sleep awake voltage	When the battery is in sleep mode, if the voltage drops below this setting, the battery will wake up.
4	Sleep awake time	When the battery is in sleep mode, it will wake up after the set sleep wake-up time is reached.
5	Battery temperature detection function	When enabled, in combination with the temperature sampling module, the battery temperature can be sampled.
6	Battery over-temperature alarm value	When the battery temperature exceeds the overtemperature alarm threshold, an overtemperature warning will be triggered.
7	Battery low-temperature alarm value	When the battery temperature falls below the low temperature alarm threshold, a low temperature warning will be triggered.
8	SOH	The health status of the battery.

Discharge management

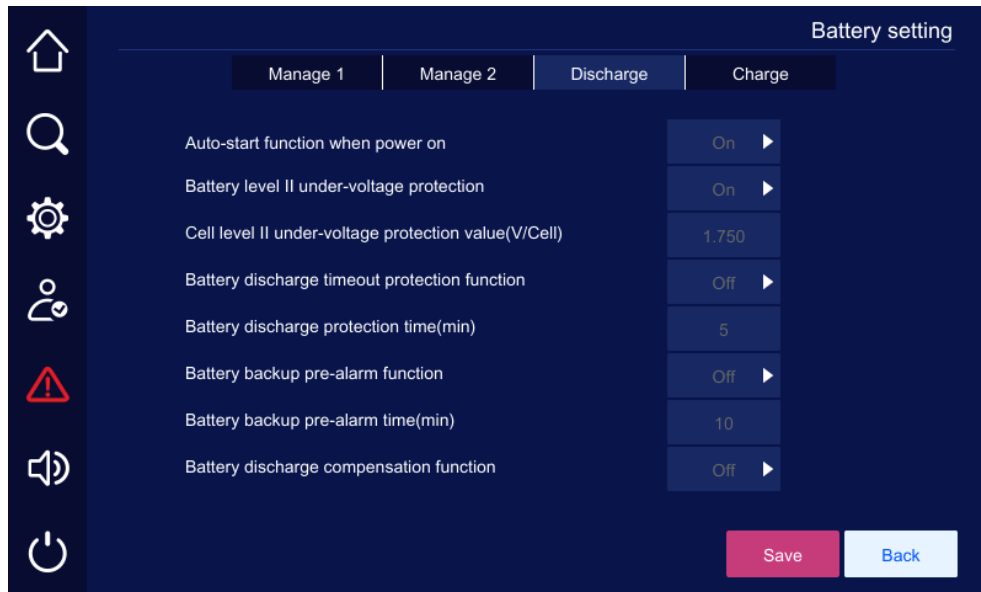


Figure5-41 Discharge management page



NOTE

The parameters on the discharge management page can only be viewed by users and cannot be changed.

Table5-11 Discharge management setting description

No.	Item	Description
1	Auto-start function when power on	When enabled, if the machine is in an inverse state and powers off, it can automatically start up and resume inversion the next time power is restored.
2	Battery level II under-voltage protection	When the battery voltage drops below the secondary under-voltage protection point, the system will automatically shut down.
3	Cell level II under-voltage protection value	The protection point for the battery's secondary under-voltage.
4	Battery discharge timeout protection function	When enabled, the battery will be protected if the discharge time exceeds the set value.

No.	Item	Description
5	Battery discharge protection time	The duration for the battery discharge timeout protection.
6	Battery backup pre-alarm function	When the remaining discharge time of the battery is less than the set value, a warning will appear on the screen to notify that the backup time is insufficient.
7	Battery backup pre-alarm time	The time threshold for the backup insufficient warning.
8	Battery discharge compensation function	Compensates the battery's under-voltage protection point based on different discharge rates.

Charge management

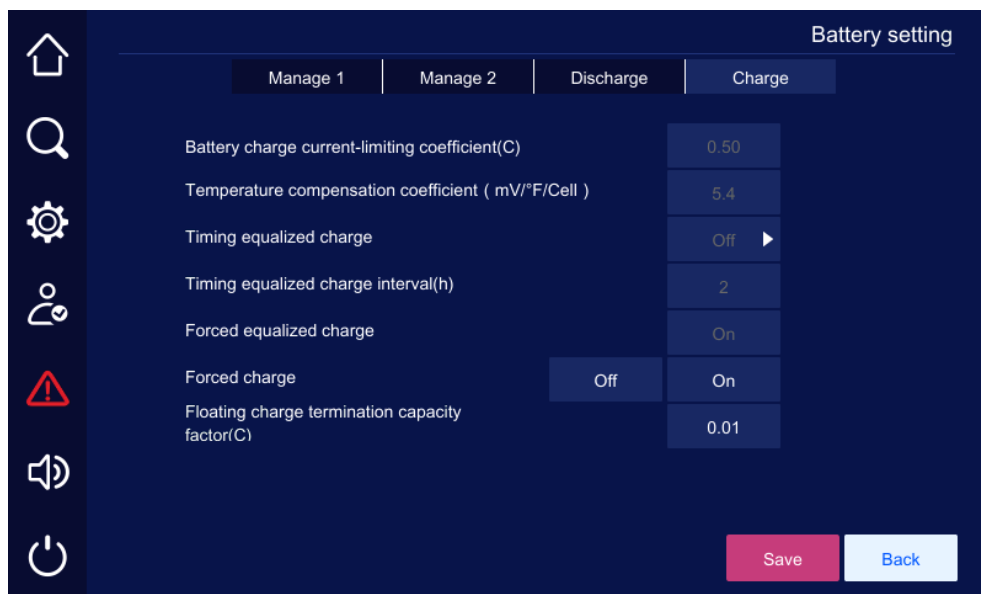


Figure5-42 Battery setting-charge page

NOTE

The charge page only allows the "Forced charge" parameter to be set, while other parameters can only be viewed by users and cannot be changed.

Table5-12 Charge setting description

No.	Items	Description
1	Battery charge current-limiting coefficient	When charging the battery, the charging current will not exceed the battery charging current limiting coefficient * battery amp-hour rating.
2	Temperature compensation coefficient	Compensates the battery charging voltage based on the current battery temperature.
3	Timed equalized charge	When enabled, after the set interval time, the battery state will switch from float charge to equalized charge.
4	Timed equalized charge interval	The interval time for timed equalized charge.
5	Forced equalized charge	Forces the battery, in float charge or sleep mode, to enter the equalized charge state.
6	Forced charge	Forces the battery side to enter the equalized charge state and maintain for up to 10 minutes. Can be set to on or off, default is off.
7	Forced charge termination capacity factor	During float charge, if the discharged energy is less than the float charge termination capacity coefficient * battery amp-hour rating, the battery will be allowed to return to float charge mode after charging is resumed.

5.7.3 Battery Test



In the setting manage page, tap the "Battery test" icon to enter the battery test page.

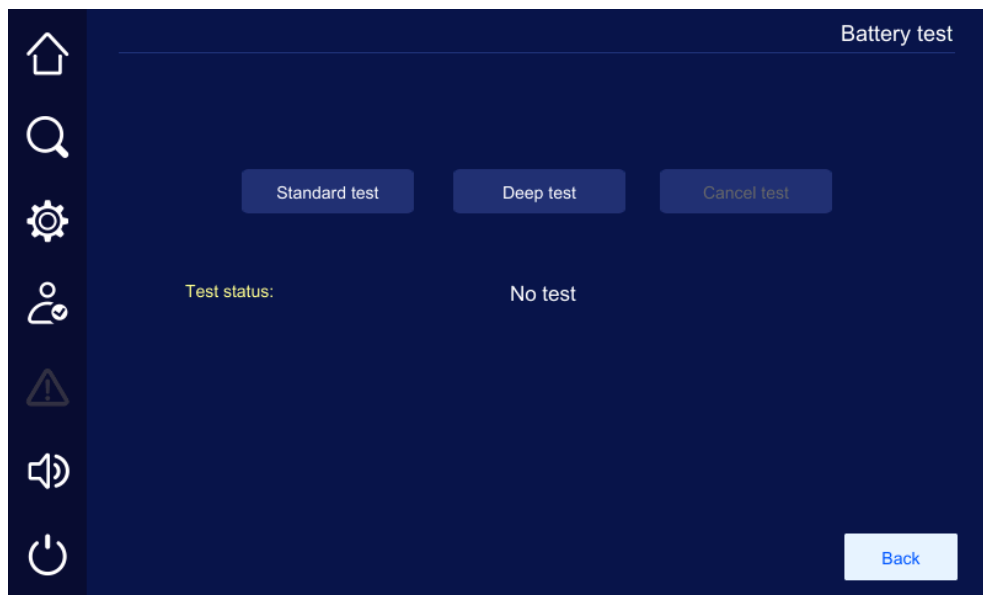


Figure5-43 Battery test page

Table5-13 Battery test setting description

No.	Items	Description
1	Standard test	Shallow discharge the battery. The battery cannot be used when it is not running for a long time. To verify the health of battery, perform a discharge test on the battery without mains power failure.
2	Deep test	Depth discharge the battery. Discharge battery to the under-voltage alarm point. You can learn more about the battery performance and the battery health via depth discharge.
3	Cancel test	Manually cancel the standard test state and the depth test state.

5.7.4 Output Setting



In the setting manage page, tap the "Output setting" icon to enter the output settings page.

Bypass range

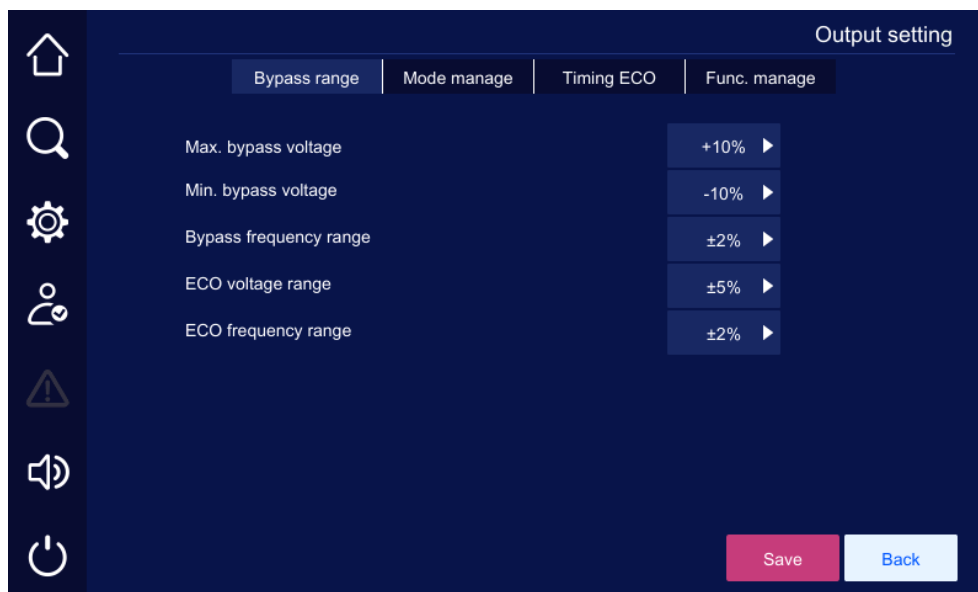


Figure5-44 Output setting - bypass range page

Table5-14 Bypass range description

No.	Items	Description	Parameter setting
1	Max. bypass voltage	When the deviation of the bypass voltage from the rated voltage is greater than the set value, the system displays the "Bypass overvoltage" alarm, and the bypass is not available.	It can be set as +10%, +15%, +20% or +25%. Default is +15%.
2	Min. bypass voltage	When the deviation of the bypass voltage from the rated voltage is smaller than the set value, the system displays the "Bypass under-voltage" alarm, and the bypass is unavailable.	It can be set as -10%, -15%, -20% and -30%. Default is -20%.
3	Bypass frequency range	When the deviation of the bypass frequency from the rated frequency is greater than the set value, the system displays the "Bypass overfrequency" or "Bypass underfrequency" alarm, and the bypass is not available.	It can be set as ±2%, ±4%, ±6%, ±8%, ±10% and ±20%. Default is ±10%.

No.	Items	Description	Parameter setting
4	ECO voltage range	When the deviation of the bypass voltage from the rated voltage in ECO mode is greater than the set value, the system displays the "ECO overvoltage" or "ECO under-voltage" alarm, and ECO mode switches to inverter mode.	It can be set as $\pm 5\%$, $\pm 10\%$ or $\pm 15\%$. Default is $\pm 15\%$.
5	ECO frequency range	When the deviation of the bypass frequency from the rated frequency in ECO mode is greater than the set value, the system displays the "ECO overfrequency" or "ECO underfrequency" alarm, and ECO mode switches to inverter mode.	It can be set as $\pm 2\%$ or $\pm 4\%$. Default is $\pm 2\%$.

Mode management

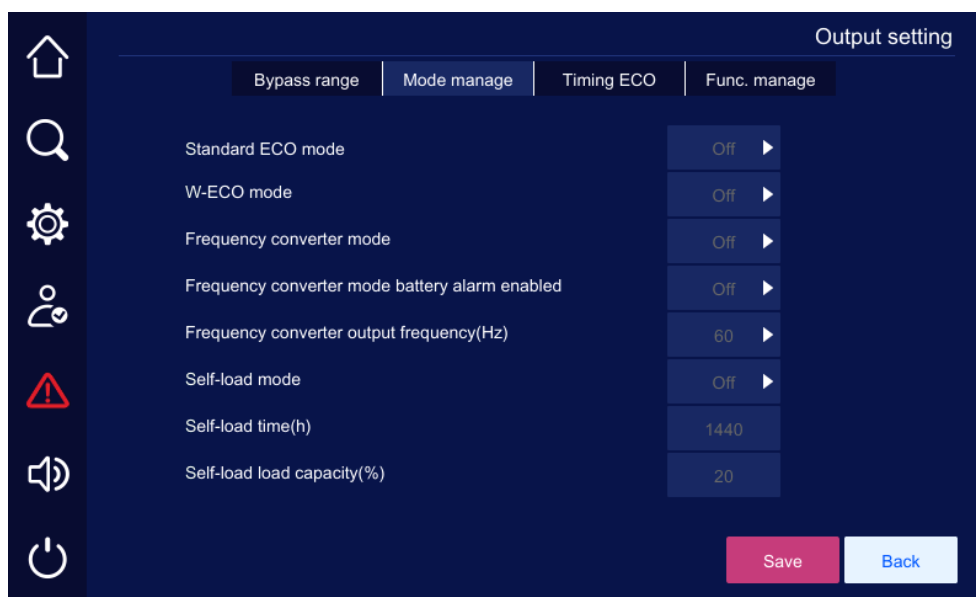


Figure5-45 Output setting - mode manage page

NOTE

The parameters on the Mode manage page are for viewing only and cannot be modified by the user.

Table5-15 Mode management description

No.	Items	Description
1	Standard ECO mode	When enabled, the machine operates in ECO mode, with power supplied through bypass, and the inverter is always ready.
2	W-ECO mode	When enabled, the machine operates in ECO mode, with main power supplied through bypass, and the inverter compensates for harmonics.
3	Frequency converter mode	When enabled, the machine outputs at the set frequency.
4	Frequency converter mode battery alarm enabled	Allows suppression of battery-related alarms in inverter mode.
5	Frequency converter output frequency	The rated frequency output in inverter mode.
6	Self-load mode	Enables feedback output to the front-end power grid, achieving minimal loss for machine aging.
7	Self-load time	Allows setting the running time for self-load mode.
8	Self-load load capacity	Allows setting the load amount in self- load mode.

Timed ECO

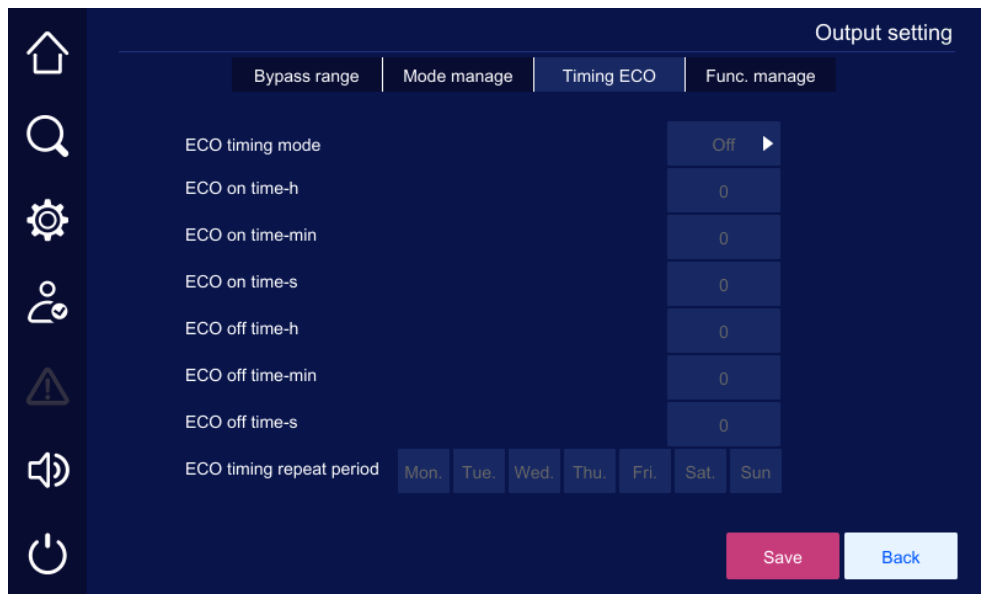


Figure5-46 Output setting - timed ECO page

NOTE

The parameters on the Timed ECO page are for viewing only and cannot be modified by the user.

Table5-16 Mode management description

No.	Items	Description
1	ECO timing mode	When enabled, the machine will automatically activate the ECO function within the specified time period.
2	ECO on/off	The opening and closing time of the timed ECO can be set. Including hours/minutes/seconds.
3	ECO timing repeat period	Allows selecting the repeat cycle for the ECO function within a week.

Function management



Figure5-47 Output setting - function manage page

**NOTE**

The parameters on the Function manage page are for viewing only and cannot be modified by the user.

Table5-17 Mode management description

No.	Item	Description
1	Inverter and bypass out of sync alarm function	When enabled, an alarm will be triggered if the inverter output is not synchronized with the bypass output.
2	Max. time switching from bypass to inverter out of sync	The maximum time for switching from bypass to inverter when asynchronous.
3	Max. time switching from inverter to bypass out of sync	The maximum time for switching from inverter to bypass when asynchronous.
4	Output frequency tracking rate	The rate at which the inverter output frequency follows the bypass frequency when the bypass frequency changes within the tracking range.
5	Output frequency tracking range	The range within which the inverter output frequency phase will track the bypass input.

No.	Item	Description
6	Bypass output allowed function when over-temperature	When enabled, the bypass will still supply power even after detecting over-temperature.
7	Short circuit protection time	The detection time for short circuit protection. If the short circuit persists for the set duration, short circuit protection will be triggered.
8	Bypass current sharing function	When enabled, in a parallel bypass output operation, each cabinet's bypass will share the load evenly.

5.7.5 Smart Mode



In the setting manage page, tap the "Smart mode" icon to enter the smart mode page.

Sleep redundancy mode

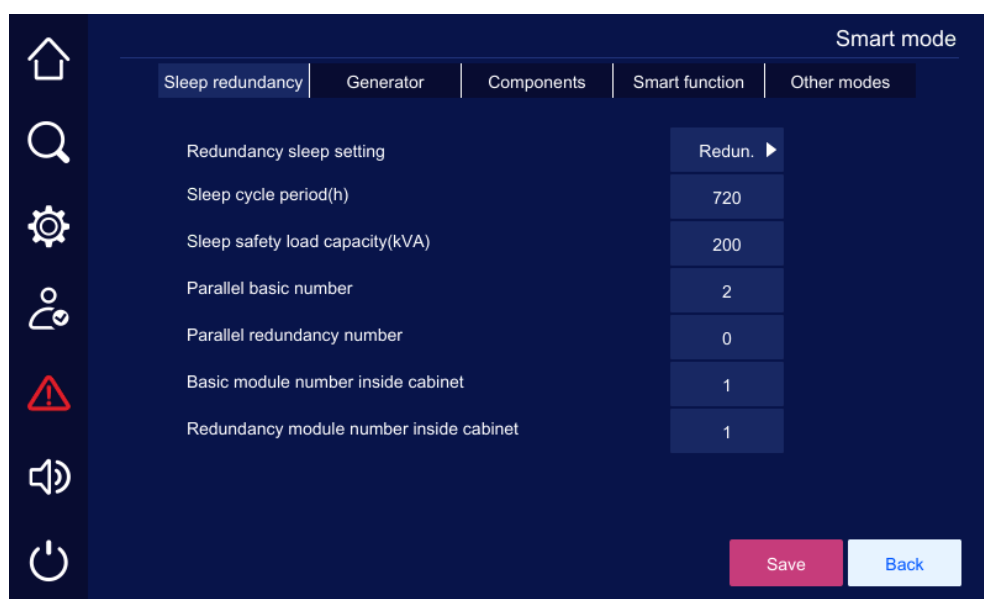


Figure5-48 Smart mode - sleep redundancy page

For the basic module number inside the cabinet, this section uses the 100K cabinet as an example. A standard 100K cabinet comes with one 100K module, and the customer needs to select one additional 100K module in order to set the redundancy mode.

Step 1 Select "Redun." mode in the redundancy sleep setting option.

Step 2 Set the basic module number inside cabinet to 1.

Step 3 Set the redundancy module number inside cabinet to 1, and tap save.

The redundancy mode function setup is complete.

NOTE

For a 200K cabinet, set the basic module number inside the cabinet to 2. The remaining operations are the same as for the 100K cabinet.

Generator mode

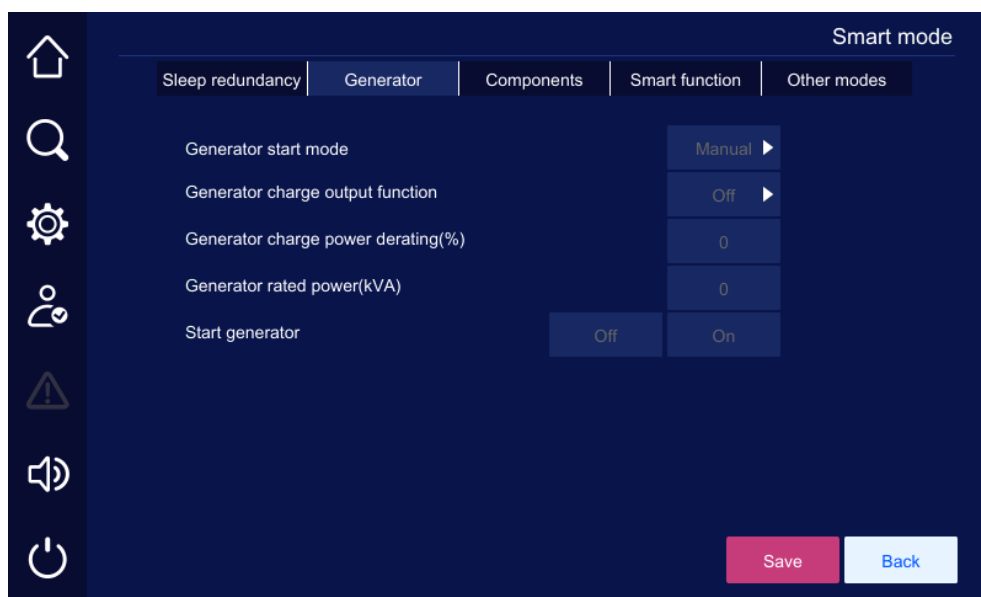


Figure5-49 Smart mode - generator page

NOTE

The parameters on the generator page are for viewing only and cannot be modified by the user.

Table5-18 Generator mode description

No.	Items	Description
1	Generator start mode	Allows setting the generator start mode. In automatic mode, the generator starts automatically. In manual mode, it is started using the "Start generator" option.
2	Generator charge output function	Allows setting whether charging is permitted in generator mode.

No.	Items	Description
3	Generator charge power derating	Allows setting the derating of charging power during generator operation. The charging power will be reduced according to the set ratio.
4	Generator rated power	The rated power of the connected generator. If the load exceeds the rated power, power will be supplied by the battery.
5	Start generator	Allows manual selection to start the generator.

Consumable components

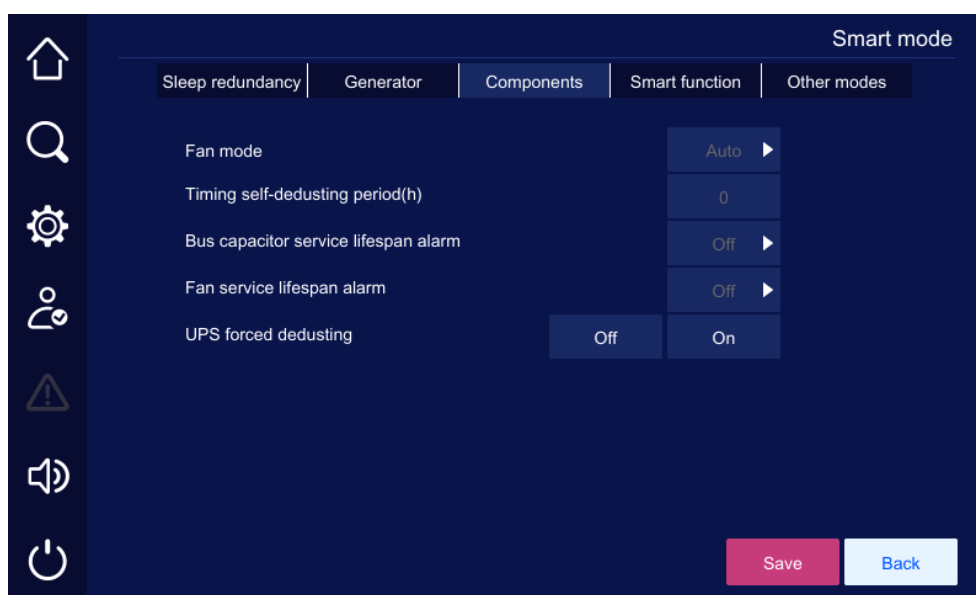


Figure5-50 Smart mode - components page

NOTE

On the Components page, only the "UPS forced dedusting" parameter can be set by the user. Other parameters are for viewing only and cannot be modified.

Table5-19 Consumable component page description

No.	Items	Description
1	Fan mode	Allows setting the fan operation mode. In automatic mode, the fan speed is automatically calculated based on load rate, temperature, etc. In manual mode, the fan speed is controlled according to the set value. Periodic dust removal is performed according to the set cycle.
2	Timing self-dedusting period	Allows setting the cycle for periodic self-dust removal.
3	Bus capacitor service lifespan alarm	When this function is enabled, an alarm will be triggered when the bus capacitor reaches the end of its service life.
4	Fan service lifespan alarm	When this function is enabled, an alarm will be triggered when the fan reaches the end of its service life.
5	UPS forced dedusting	The fan enters forced dust removal mode and spins at maximum speed to expel accumulated dust from the module. This can be set to either on or off.

Smart function

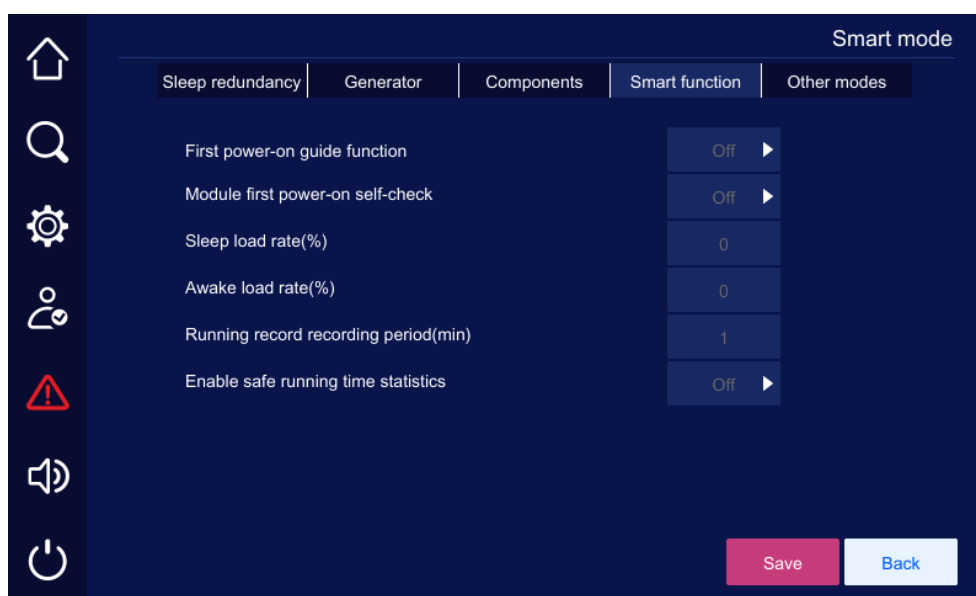


Figure5-51 Smart mode - smart function page

NOTE

The parameters on the Smart function page can only be viewed by the user and cannot be modified.

Table5-20 Smart function description

No.	Item	Description
1	First power-on guide function	When powered on for the first time, a special startup interface guides the user to set basic parameters.
2	Module first power-on self-check	After the first power-on, a self-test function can be performed on the module to detect any abnormalities.
3	Sleep load rate	The load rate that can be set for sleep mode. After reaching the sleep load rate, the module can enter sleep mode as set.
4	Awake load rate	The load rate that can be set for awake mode. After reaching the awake load rate, the module can be awakened from sleep mode as set.
5	Running record recording period	The interval at which operating records are recorded, which can be set to a specific time.
6	Enable safe running time statistics	When enabled, it can track the running time in both mains inverter and battery inverter states.

Other modes

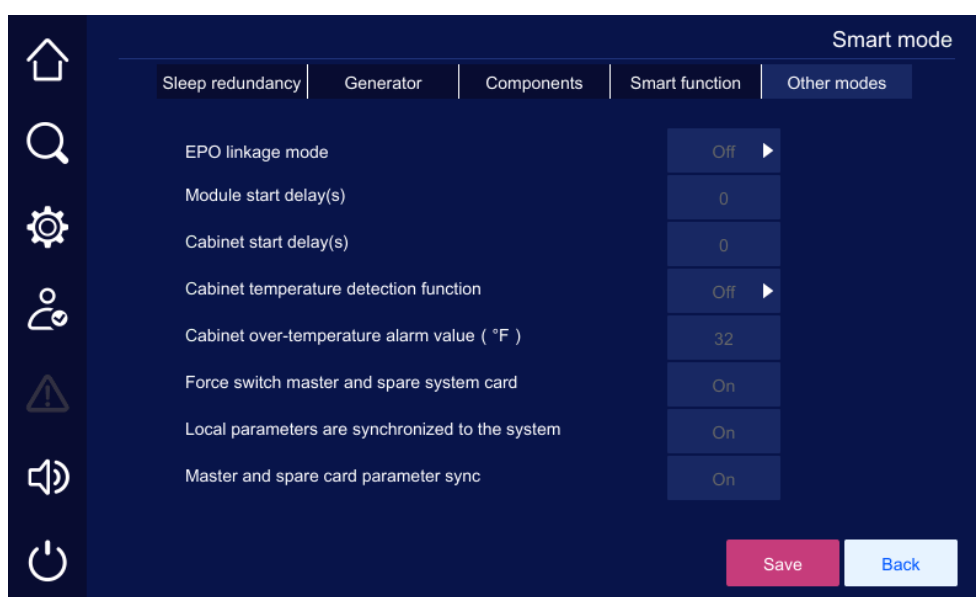


Figure5-52 Smart mode - other modes page

**NOTE**

The parameters on the other modes page can only be viewed by users and cannot be changed.

Table5-21 Other modes description

No.	Item	Description
1	EPO linkage mode	When enabled, if one machine in the parallel system triggers EPO, the linked cabinet will also trigger EPO.
2	Module start delay	After setting the delay time, the module will start according to the delay time * module address.
3	Cabinet start delay	After setting the delay time, the parallel cabinet will start according to the delay time * cabinet address.
4	Cabinet temperature detection function	When enabled, the cabinet's temperature can be monitored.
5	Cabinet over-temperature alarm value	When the cabinet temperature exceeds the set value, an overtemperature alarm will be triggered.
6	Force switch master and spare system card	Allows forced switching of the current master and backup cards, turning the master card into the backup card and vice versa.
7	Local parameters are synchronized to the system	During parallel operation, the local parameters can be synchronized to other machines in the system, eliminating the need for repetitive settings on other machines.
8	Master and spare card parameter sync	Synchronizes the parameters of the master card to the backup card.

5.7.6 Dry Contact

Input dry contact



In the setting manage page, tap the "Dry contact" icon to enter the dry contact page.

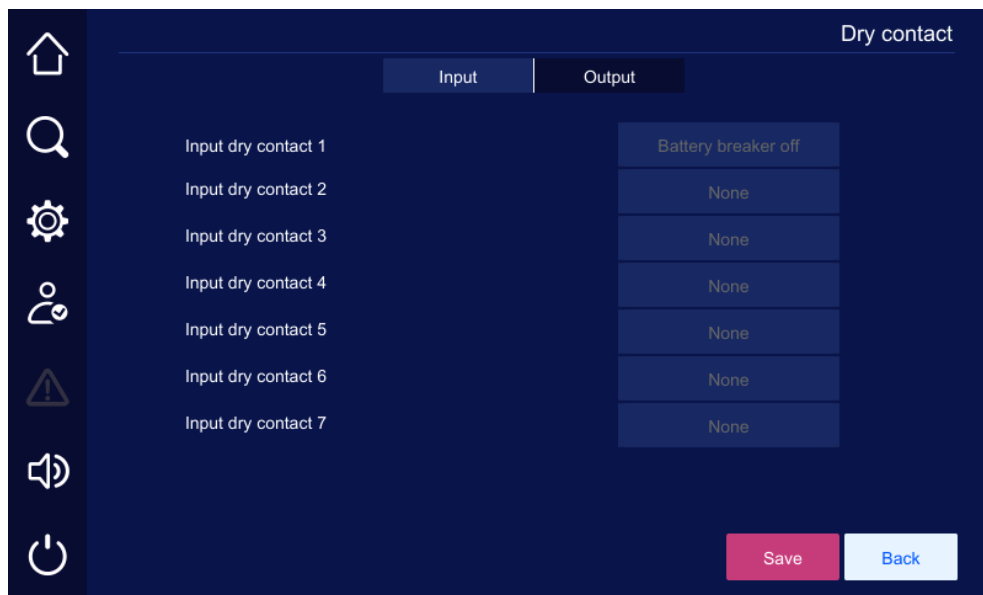


Figure5-53 Input dry contact page

 NOTE

The definition of input dry contacts is detailed in Figure2-10. If you need to set it up, please contact the manufacturer.

Output dry contact

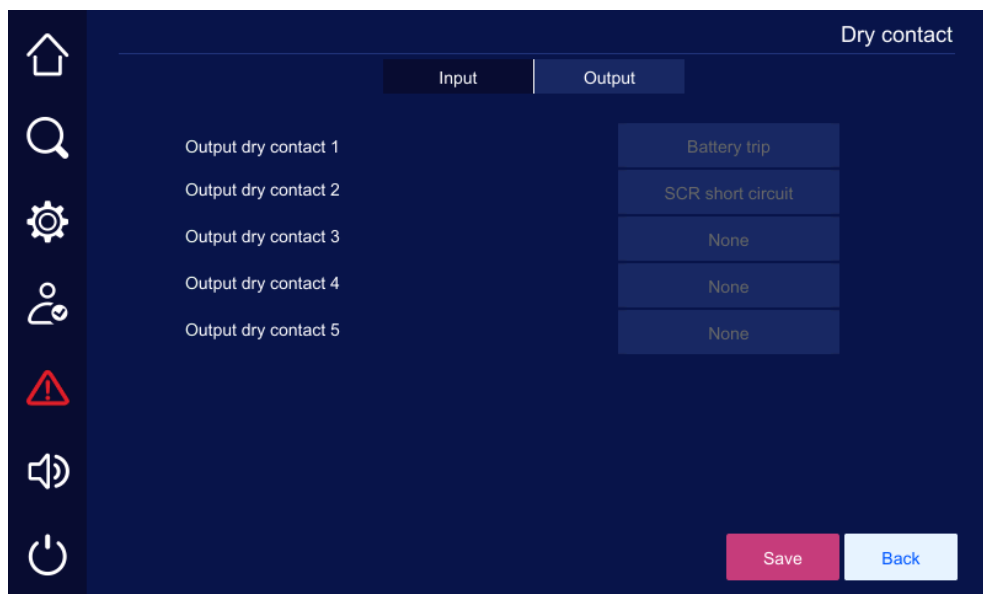


Figure5-54 Output dry contact page

 NOTE

The definition of output dry contacts is detailed in Figure2-11. If you need to set it up, please contact the manufacturer.

5.7.7 Communication Setting



In the setting manage page, tap the "Comm. setting" icon to enter the communication setting page.

RTU

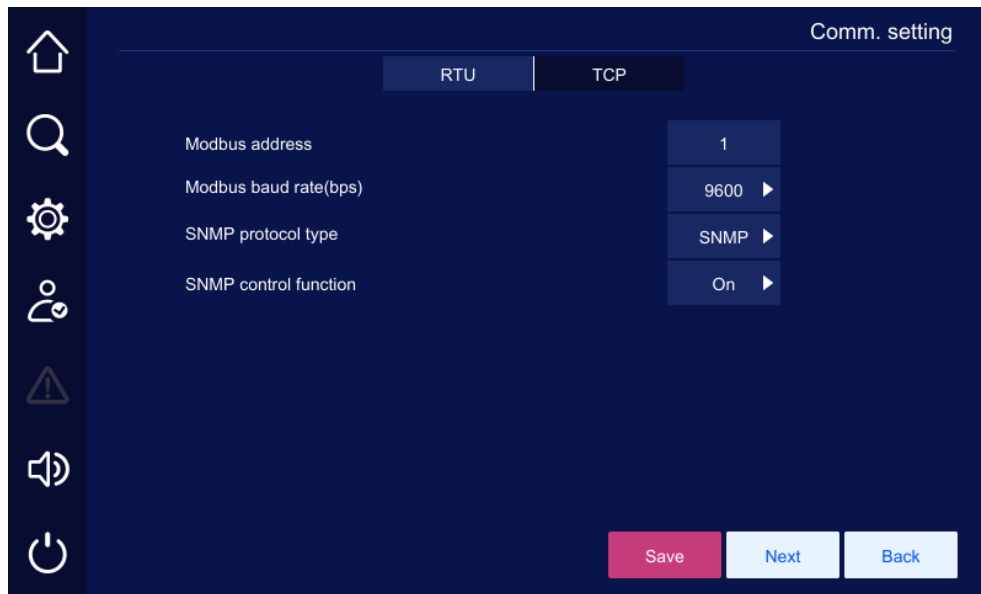


Figure5-55 Communication setting page

Table5-22 Communication setting description

No.	Item	Description	Parameter setting
1	Modbus address	Serial port address for communication	It can be set from 1 to 247. Default is 1.
2	Modbus baud rate	Parameters for matching on-site network conditions during communication	It can be set as 2400, 4800, 9600 or 19200. Default is 9600.
3	SNMP protocol type	Protocol for SNMP card to interact with the upper computer	It can be set as SNMP or Modbus. Default is SNMP.

No.	Item	Description	Parameter setting
4	SNMP control function	After selecting the SNMP card, it can be turned on to enable communication between the SNMP card and the upper computer	It can be set as on or off.

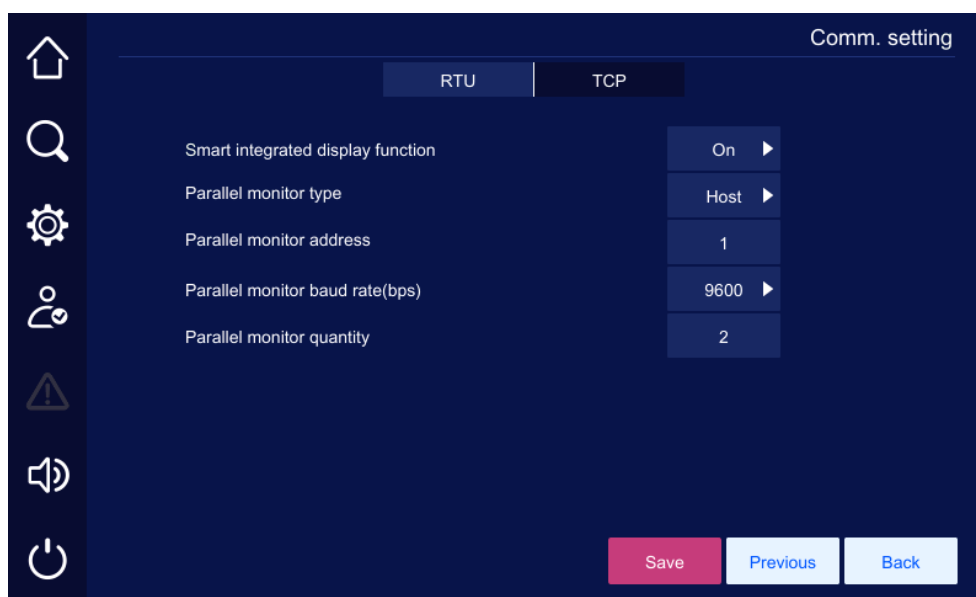


Figure5-56 Communication settings - smart integrated display function page

NOTE

If you need to use the smart integrated display function, please refer to the RS485 interface description of the "System Control Card" in section **2.3.3 System Control Box** for wiring and touchscreen settings.

Table5-23 Communication settings - smart integrated display function explanation

No.	Items	Description	Parameter range
1	Smart integrated display function	When enabled, it allows for smart integrated display communication between parallel machines, enabling the host to view information from other display screens.	On or off, default is off.
2	Parallel monitor type	The current machine can be selected as either the host or the slave for the smart integrated display.	Host or slave.

No.	Items	Description	Parameter range
3	Parallel monitor address	The address for the current parallel smart integrated display can be set.	Parameter range 1~8, can be set.
4	Parallel monitor baud rate	The communication baud rate for the parallel smart integrated display can be set.	2400/4800/9600/19200, default is 9600.
5	Parallel monitor quantity	The number of cabinets for the current parallel smart integrated display can be set.	Parameter range 2~8, default is 2.

TCP

Figure5-57 Communication setting - TCP page

Table5-24 Communication setting - TCP page description

No.	Item	Description
1	IP address	Set the IP address of the current device
2	Subnet mask	Set the subnet mask of the current device
3	Gateway	Set the gateway of the current device
4	MAC	Display the MAC address of this current device

5.7.8 Screen Setting



On the setting manage page, tap the "Screen setting" icon to enter the screen setting page.

Basic setting

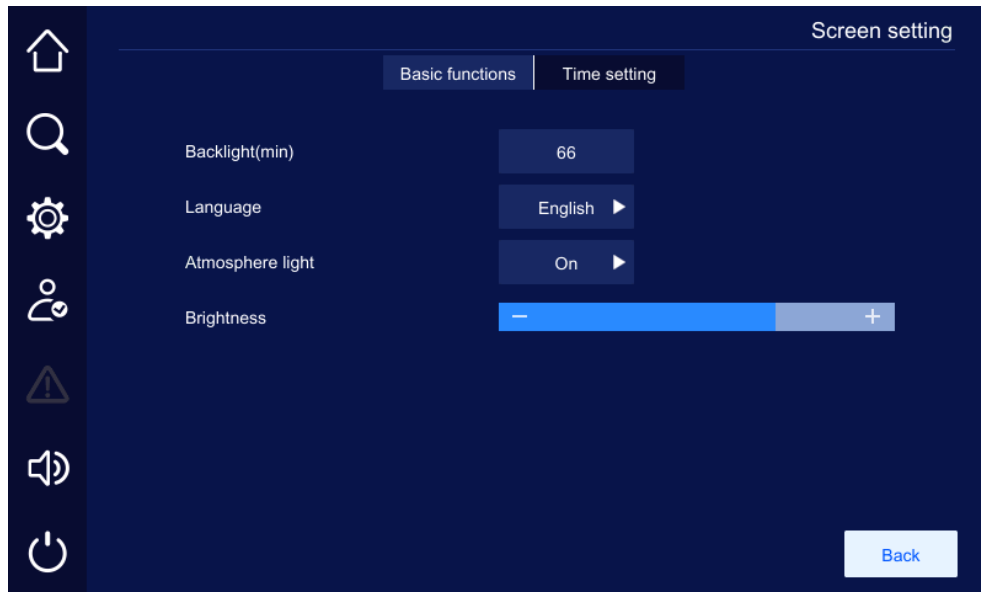


Figure5-58 Screen setting page

Table5-25 Screen settings description

No.	Items	Description	Parameter range
1	Backlight	After reaching the backlight time, the screen will turn off	1 min ~ 999min can be set
2	Language	Select screen language	Chinese/English can be set
3	Atmosphere light	After turning on, when the backlight time of the screen is reached and the screen is turned off, the "V" shaped light on the screen will display the color of the corresponding prompt information according to the current status	On or off
4	Brightness	Adjust the brightness of the touch screen	--

Time setting

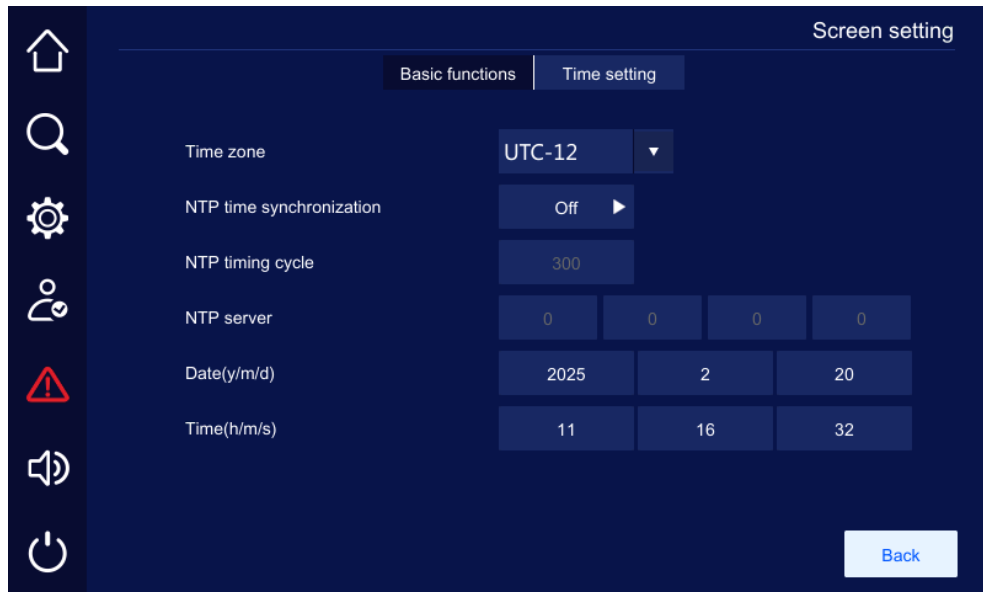


Figure5-59 Time settings page

Table5-26 Time setting description

No.	Item	Description	Parameter range
1	Time zone	Select the current time zone	UTC-12 ~ UTC+12 can be set
2	NTP time synchronization	Enable the NTP auto time synchronization feature	On or off
3	Date	Set the specific date	--
4	Time	Set the specific time	--

5.7.9 Password Setting



In the setting manage page, tap the "Password setting" icon to enter the password setting page.

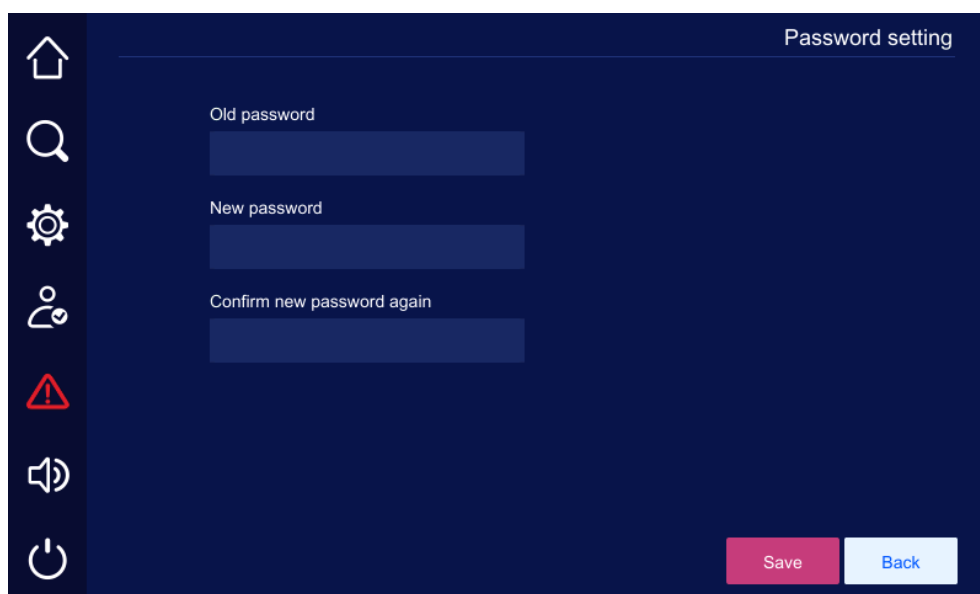


Figure5-60 Password setting page

 NOTE

User initial password is 111.

5.7.10 Record Management



In the setting manage page, tap the "Record manage" icon to enter the record manage page.

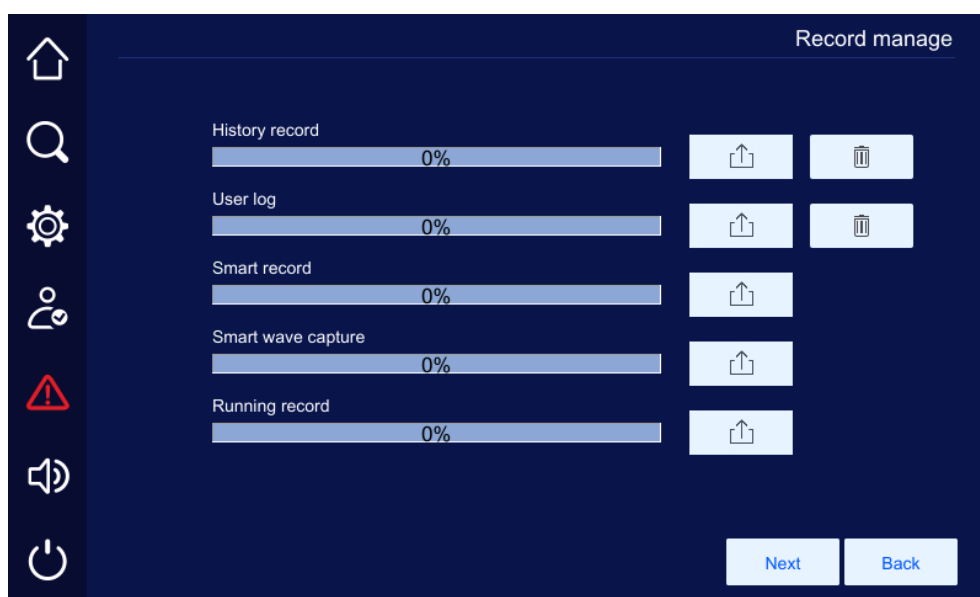


Figure5-61 Record manage page

5.7.11 Energy Storage UPS



On the setting manage page, tap the "Energy storage UPS" icon to enter the Energy storage UPS page.



Figure5-62 Energy storage UPS page

Table5-27 Energy storage UPS description

No.	Items	Description	Parameter setting
1	Energy storage UPS mode	Choose to enable the energy storage UPS mode, which automatically discharges at a specified time to achieve time of use, compensating for electricity prices	Off/Plan curve /EMS scheduling can be set
2	Plan curve instruction	When the energy storage UPS mode is set to plan curve mode, this setting can be used to allow the machine to discharge at a constant power or constant current	Power mode/Current mode can be set
3	Battery safety SOC	During discharge, if the SOC is lower than the set safety SOC, discharge will stop	1 ~ 99 can be set
4	Period number	Set the number of different time periods	0 ~ 8 can be set

In addition, electricity prices can be set for different time periods to calculate the electricity savings of energy storage UPS.

5.8 Inverter ON/OFF

On the main page, tap the "  " icon to enter the inverter switch page. When the system is in the inverter shutdown state, tap the "  " icon to enter the inverter startup page. If it is a single system, tap the "Single On" button to perform inverter startup; If it is a parallel system, click the "Parallel On" button to perform inverter power on.

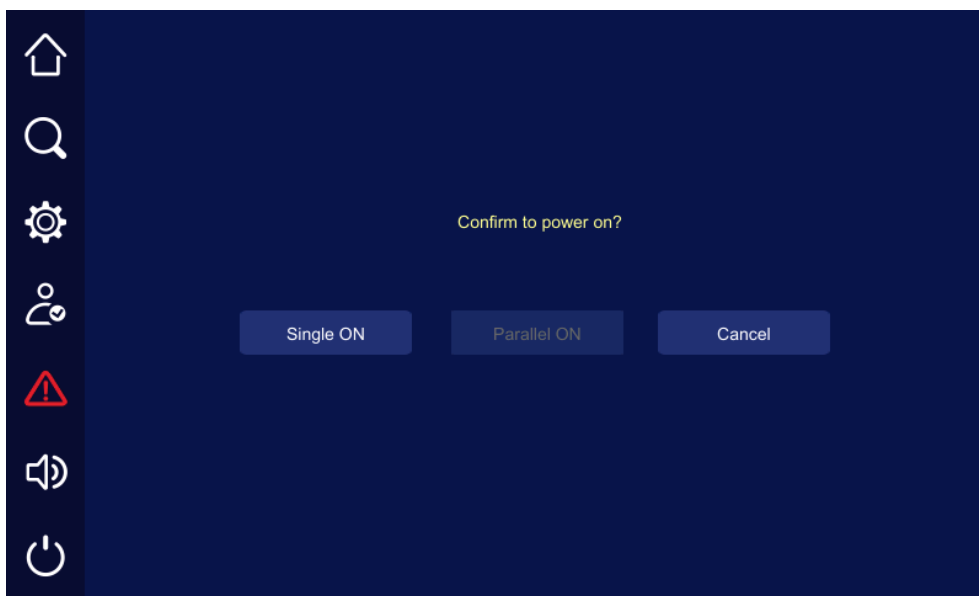


Figure5-63 Inverter startup page (single system)

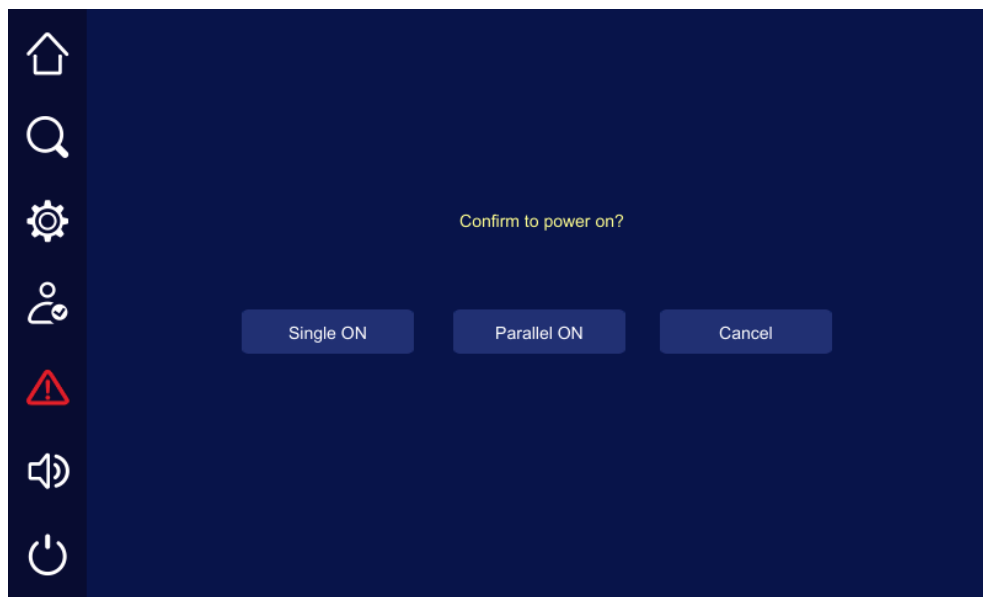


Figure5-64 Inverter startup page (parallel system)

6 Maintenance and Troubleshooting

6.1 Manual Maintenance Operation

When it is necessary to maintain the load without losing power, the following instructions should be followed.

CAUTION

Only qualified professionals may perform the following operations. The manufacturer assumes no responsibility for any issues caused by unauthorized personnel.

6.1.1 Switching from Inverter State to External Maintenance Bypass State

CAUTION

If the system bypass is functioning normally, the system will enter bypass power supply mode after the inverter is shut down. If the system bypass is abnormal, the system will enter a no-output mode after the inverter is shut down, resulting in a power outage at the system output. Before performing the inverter shutdown operation, please ensure that the load has been turned off and can withstand a power outage at any time.

Step 1 Power off inverter.

- Power-off method 1: "OFF" combination button on the operation panel

Press the "OFF" combination button on the operation panel for 3s.

- Power-off method 2: Touch screen shutdown.

- On the main page, tap the "" icon to enter the inverter shutdown page. Tap the "Single OFF" button to perform the inverter shutdown (if it is a parallel system, tap the "Parallel OFF" button).

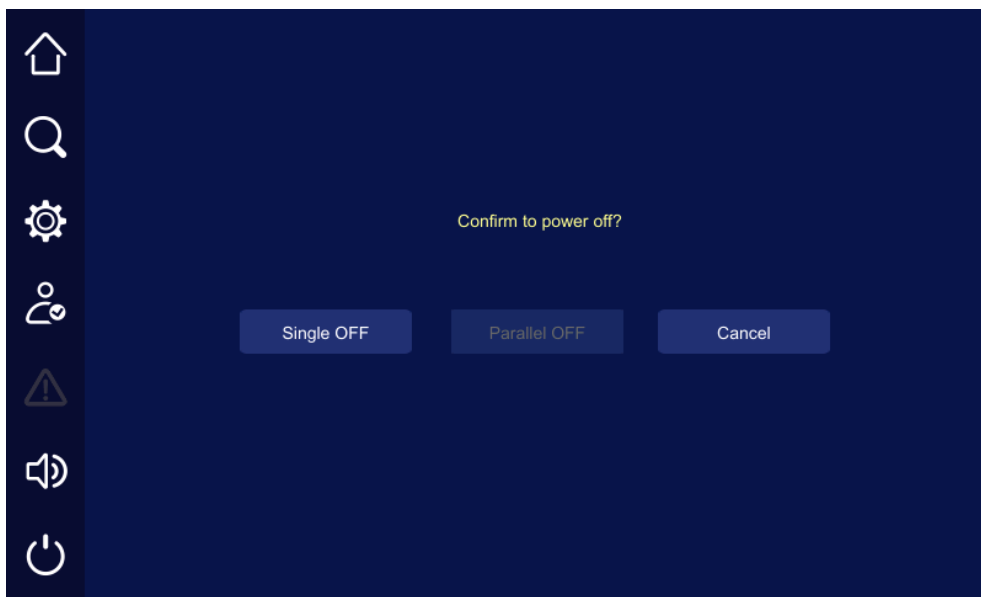


Figure6-1 Inverter power-off page

The " $\sim$ " inverter indicator on the operation panel is off, and the " $\bigcirc$ " bypass indicator on the operation panel is green on, and the system switches from inverter mode to bypass mode.

- Step 2 Ensure that the inverter is powered off again, and then switch on the maintenance bypass switch. At this time, the touch screen displays "Maintenance bypass open".
- Step 3 Switch off the external battery switch, mains switch, bypass switch and output switch of UPS one by one.
- Step 4 Wait until the touch screen and LED indicators on the operation panel are off. About 15 minutes, it can perform maintenance.

CAUTION

- When the UPS is in external maintenance bypass state, it is strictly forbidden to close the output switch.
- When the UPS is in external maintenance bypass state, the external maintenance bypass is a separate power source. If the external maintenance bypass is connected to the output, there may be high voltage. Accidental contact could result in a fatal electric shock hazard.

---End

6.1.2 Switching from External Maintenance Bypass State to Inverter State



Before restoring the external maintenance bypass power supply to the inverter power supply operation, it is necessary to confirm that the system bypass input is normal.

- Step 1 Close the bypass switch and the mains switch in sequence.
- Step 2 Set the ready switch of the bypass module to the "🔒" state and close the external battery switch (Before switching on the switch, ensure there is no alarm of "Not allow to connect battery" on the touch screen.).
- Step 3 Close the output switch, and the output information  icon on the touch screen main page will display as ".
- Step 4 When the bypass indicator light  on the operation panel turns green, disconnect the external maintenance bypass switch. The "Maintenance bypass on" prompt on the touch screen disappears, and the system stops beeping.
- Step 5 Set the ready switches of all power modules to the "🔒" state.
- Step 6 Inverter startup.

Wait for the running indicator lights of all power modules to turn green and flash slowly before performing the inverter startup operation.

- Power-on method 1: "ON" combination button on the operation panel

Press the "ON" combination button on the operation panel for 3s.

- Power-on method 2: Touch screen



On the main page, tap the "" icon to enter the inverter power-on page, then tap the "Single OFF" button (if it is a parallel system, tap the "Parallel OFF" button).

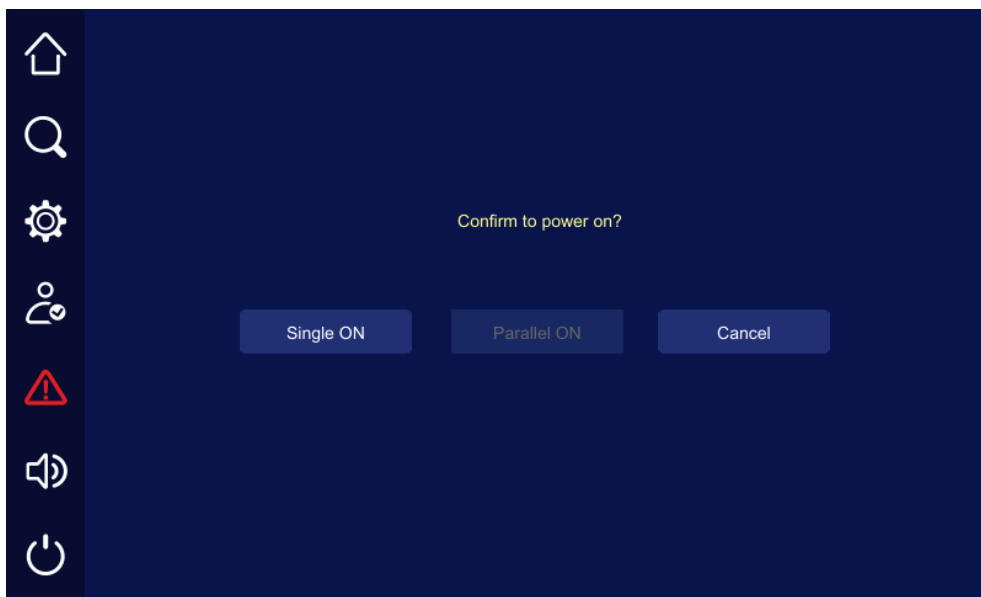


Figure6-2 Inverter power-on page

The "" inverter indicator on the operation panel is green on. About 10s later, the inverter startup is completed, the "" bypass indicator on the operation panel is off, and the system switches from bypass mode to inverter mode.

----End

6.2 Replacing Power Module/Bypass Module

NOTE

The replacement procedure for the bypass module is the same as for the power module. This section will explain the replacement procedure using the power module replacement as an example.

CAUTION

- Three installers can move the power module together or use appropriate moving tools (such as a lift truck).
- Prevent foreign objects from entering the connectors of the power module and cabinet.
- The power module and cabinet are plugged and unplugged through connectors. During the process of pushing in the power module, it is necessary to maintain a slow and uniform speed, and it is strictly prohibited to push forcefully, otherwise it may cause deformation of the connector, leading to poor connection and other faults.

- After the power module is pushed into place, it is forbidden to quickly pull it out and quickly push it in again.
- When using a lift truck, it is necessary to ensure that the wheels of the lift truck are locked and there are no objects on the workbench.
- The lift truck can only transport power modules for short distances on solid and flat ground. It is prohibited to use the lift truck as a module transportation and handling tool on slopes, potholes, and other poor surfaces.

Step 1 Open the front door of UPS with a key.

Step 2 Dismantle the power module to be replaced.

1. Place the ready switch of the power module in "🔓" state.
2. Dismantle the screws between power module and cabinet.
3. Raise the lifting truck to the position of the power module that needs to be replaced, slowly pull out the power module through the handle, and when you see the red silk screen line, press the left positioning lock to smoothly pull out the power module. Gently lift the power module onto the lifting truck.

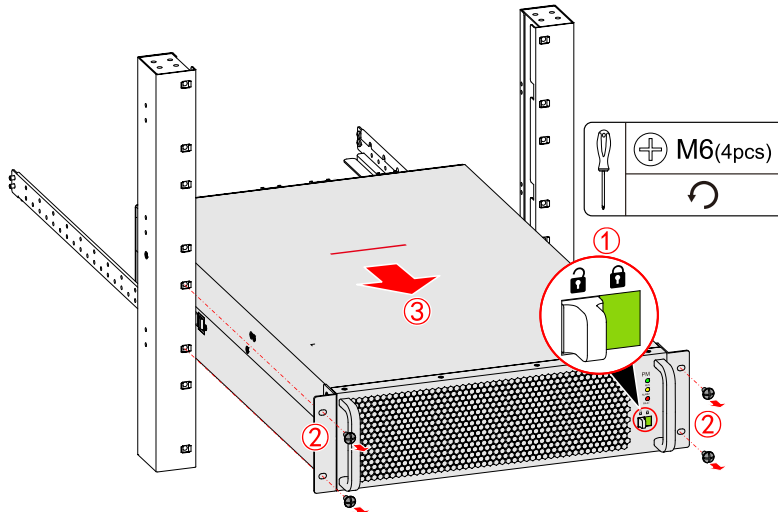


Figure6-3 Dismantle power module

Step 3 Install a new power module.

1. Unpack the power module.
2. Place the ready switch of the power module in "🔓" state.

3. Lift the power module onto the lift truck, then lift the lift truck to the position of the power module to be replaced, and push power module into cabinet slowly. When the power module is in contact with the cabinet connector, gently push the power module into the cabinet.
4. Fasten the screws between power module and cabinet.
5. Place the ready switch of the power module in "🔒" state.

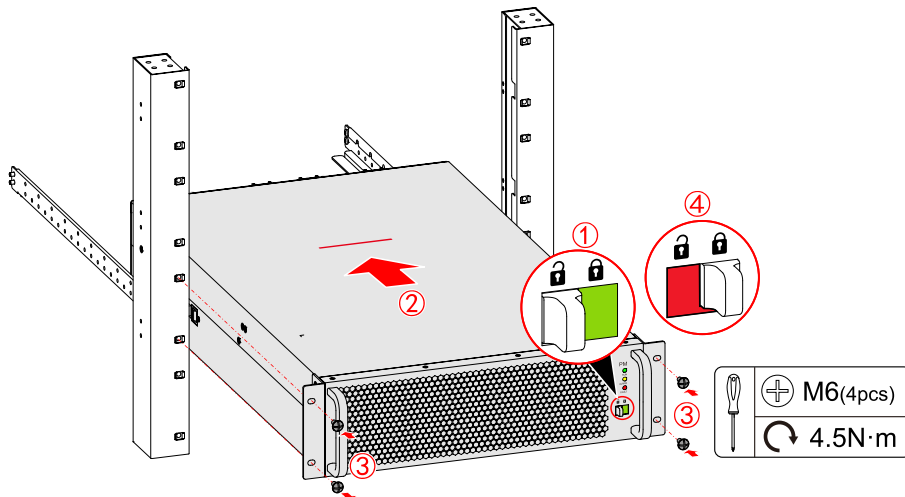


Figure6-4 Install power module

Step 4 Close the front door of UPS.

----End

6.3 Replacing Monitoring Card

When the monitoring card needs maintenance or replacement, please follow the steps below.

- Step 1 Loosen the screws of the monitoring card and remove the monitoring card that needs to be replaced.

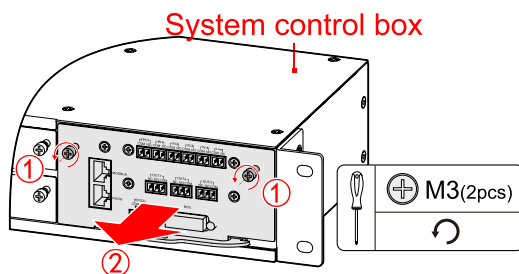


Figure6-5 Removing the monitoring card to be repaired or replaced.

- Step 2 Take out the new monitoring card and install it into the corresponding position on the system control box.

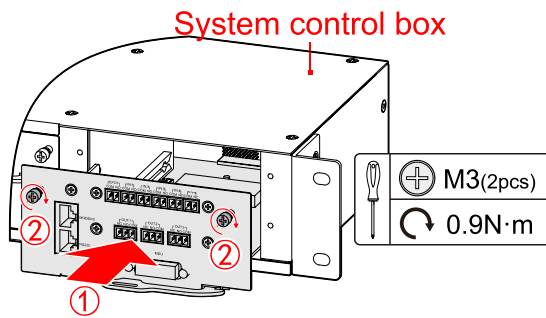


Figure6-6 Installing the new monitoring card.

----End

6.4 Replacing the Touchscreen

When the touchscreen needs to be replaced due to a fault, please follow the steps below:

- Step 1 Open the front door panel of the UPS and disconnect the wiring between the touchscreen and the system control box.
- Step 2 Remove the four M4 screws that secure the touchscreen.
- Step 3 Remove the hooks by moving them up and down.
- Step 4 Gently push the touchscreen outward to remove it.

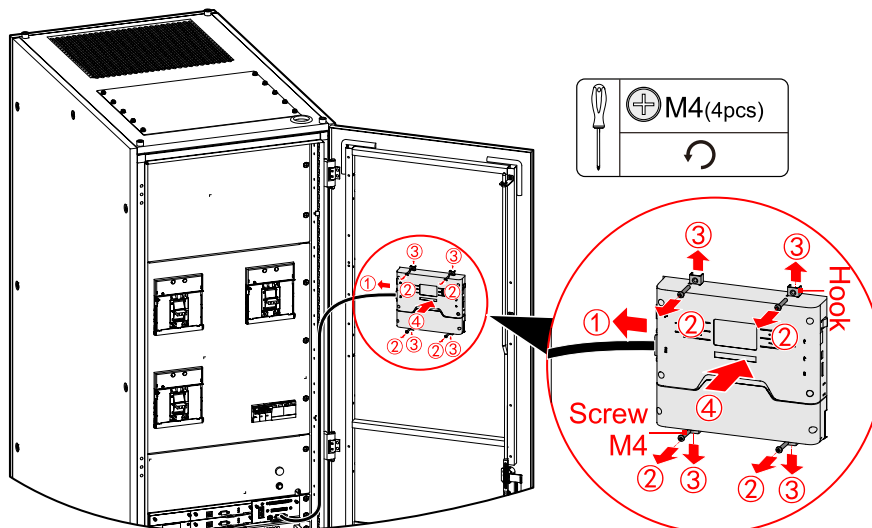


Figure6-7 Removing the touchscreen.

- Step 5 Install the new touchscreen in the reverse order, and reconnect the wiring.

----End

6.5 Maintenance Guide

6.5.1 UPS Maintenance

Working environment checklist

No.	Items	Standard requirements	Solution	Inspection cycle
1	Device room environment	● The fireproof door of the device room remains closed, and the air conditioner works normally without interruption. ● The device room is airtight, and the device is not in a direct ventilation environment. ● There is no dust or flammable sundries in the device room.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
2	Rodent-proof	Rodent-proof measures are taken in the device room, such as rat guard and rat trap.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
3	Heat dissipation space	The distance between the device and surrounding objects meets the space requirements.	● Check method: Visual inspection (using a measuring tape) ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly

No.	Items	Standard requirements	Solution	Inspection cycle
4	Installation position	There is no air outlet or refrigerant copper pipe of the air conditioner placed above the device, and no other water leakage risks exist.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
5	Environment temperature	Measured temperature: _____°F (Normal range: 23°F to 104°F)	● Check method: Visual inspection (using a hygrothermograph) ● Troubleshooting: Check that the air conditioner runs properly.	Monthly
6	Environment humidity	Measured humidity: _____% RH (Range: 0% RH to 95% RH, without condensation)	● Check method: Visual inspection (using a hygrothermograph) ● Troubleshooting: Check that the air conditioner runs properly.	Monthly

Component checklist

No.	Items	Standard requirements	Solution	Inspection cycle
1	Installation Inspection	The device is installed properly and arranged neatly, and screws are tightened.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly

No.	Items	Standard requirements	Solution	Inspection cycle
2	Appearance	- Wipe the device surface using a white paper and the paper does not turn black. - The device is not rusty or deformed.	- Inspection method: Visual inspection. - Troubleshooting: Rectify the fault based on the acceptance criteria. Clean up the dust on the air filter or replace the air filter during dust removal.	Quarterly
3	Cabinet wire hole protection	The cable routing holes in the cabinet have been completely sealed using the factory-standard epoxy boards, ensuring that rodent prevention measures are fully in place.	- Inspection method: Visual inspection. - Troubleshooting: Rectify the fault based on the acceptance criteria.	Quarterly
4	Air outlet	The air outlet is not blocked.	- Inspection method: Visual inspection. - Troubleshooting: Rectify the fault based on the acceptance criteria.	Quarterly
5	Metal scraps in the cabinet	There is no copper scrap or other foreign matter in the cabinet.	- Inspection method: Visual inspection. - Troubleshooting: Rectify the fault based on the acceptance criteria.	Quarterly
6	Grounding wire	The grounding wire is reliably connected to the	Inspection method: Visual inspection.	Yearly

No.	Items	Standard requirements	Solution	Inspection cycle
		grounding bar in the device room, and the screws are tightened.	● Troubleshooting: Tighten the screws.	
7	Current-carrying capacity check	The switches and cables meet the load requirements, and the cable's current-carrying capacity is greater than the switch specifications.	● Inspection method: Visual inspection. ● Troubleshooting: After the device is powered off, replace the switches or cables.	Yearly
9	Power cable	● The cable is intact, and the insulation layer is free of damage. ● The cable connection screws are properly tightened, and the tightening marking on the screws shows no displacement. ● No blackening or burn marks are present at the cable connection points.	● Inspection method: Visual inspection. ● Troubleshooting: After the device is powered off, replace the wires or fasten the screws.	Yearly
10	Signal wire	● The cable is intact, and the insulation layer is free of damage. ● The signal cable terminals are properly tightened.	Inspection method: Visual inspection. Troubleshooting: Replace the wires.	Yearly

Running state checklist

No.	Items	Standard requirements	Solution	Inspection cycle
1	Grid	● Input voltage: 480VAC (line voltage) ● Output voltage: 480VAC (line voltage) ● Input frequency: 40Hz~70Hz	● Check method: Visual inspection (View the running information on the touch screen.) ● Troubleshooting: When the input voltage is abnormal, verify the power grid situation or correct the input wiring; When the output voltage is abnormal, check the alarm information on the touch screen and handle it.	Monthly
2	Work status	All graphic display devices on the touch screen are in normal operation, and the operating parameters of all power supplies are within the normal range. There are no faults or alarm messages in the displayed records	● Check method: Visual inspection (Check the system state on the touch screen.) ● Troubleshooting: Check the alarm information on the touch screen and handle it.	Monthly
3	Parameter setting	Check the output voltage level, frequency, number of battery cells, battery capacity, etc	● Inspection method: Visual inspection. ● Troubleshooting: Correct the	Quarterly

No.	Items	Standard requirements	Solution	Inspection cycle
			parameter settings.	
4	State record	The three-phase load rate and output power factor are recorded.	● Check method: Visual inspection (Check the system state on the touch screen.) ● Troubleshooting: Equalize the three-phase loads.	Quarterly

6.5.2 Lead-Acid Battery Maintenance

Working environment checklist

No.	Items	Standard requirements	Solution	Inspection cycle
1	Device room environment	● The fireproof door of the device room remains closed, and the air conditioner works normally without interruption. ● There is no dust or flammable sundries in the device room.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
2	Rodent-proof	Rodent-proof measures are taken in the device room, such as rat guard and rat trap.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
3	Installation	There is no air	● Inspection method:	Monthly

No.	Items	Standard requirements	Solution	Inspection cycle
	position	conditioning outlet above the equipment, no copper pipe for air conditioning refrigerant, and no other risk of water leakage	Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	
4	Environment temperature	Measured temperature: _____°F/°C (Normal range: 68°F ~ 86°F (20°C~30°C))	● Check method: Visual inspection (using a hygrothermograph) ● Troubleshooting: Check that the air conditioner runs properly.	Monthly
5	Environment humidity	Measured humidity: _____% RH (Range: 30% RH to 80% RH, without condensation)	● Check method: Visual inspection (using a hygrothermograph) ● Troubleshooting: Check that the air conditioner runs properly.	Monthly

Component checklist

No.	Items	Standard requirements	Solution	Inspection cycle
1	Installation inspection	The device is installed properly and arranged neatly, and screws are tightened.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly

No.	Items	Standard requirements	Solution	Inspection cycle
2	Appearance of the battery rack or cabinet	The appearance is free from dust accumulation, rust, deformation, and other phenomena.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
3	Battery appearance	● Batteries are clean and free from stains. ● Battery wiring terminals are intact. ● Batteries are intact and free of damage, deformation, bulges, and cracks. ● Batteries have no acid or electrolyte leakage. (If electrolyte leakage occurs, there will be a pungent smell.)	● Inspection method: Visual inspection. ● Troubleshooting: Contact customer service personnel	Monthly
4	Metal scrap	There is no copper scrap or other conductive foreign matter.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
5	Grounding wire of the battery rack or cabinet	The grounding wire is reliably connected to the grounding bar in the device room, and the screws are tightened.	● Inspection method: Visual inspection. ● Troubleshooting: Tighten the screws.	Yearly
6	Battery	● The wires and	● Inspection method:	Quarterly

No.	Items	Standard requirements	Solution	Inspection cycle
	wires	insulation layer are intact. ● The screws at the wire connection points are tightened, and the tightening marks on the screws do not deviate. ● The wire connections are free from black marks and noticeable sparks.	Visual inspection. ● Troubleshooting: After the device is powered off, replace the wires or fasten the screws.	
7	Battery connection reliability	● After the device is powered off, check the reliability of each connection point from positive terminals to negative terminals. All points are connected reliably. ● In copper bar check, use a torque wrench to check the tightening torque for each battery screw. The torque meets the requirements of the battery manufacturer. After checking that the battery screws meet the requirements, mark the screws for later	● Check method: 1) Visual inspection 2) Verify (After the device is powered off, use an insulated torque wrench to verify the torque of screws.) ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Yearly

No.	Items	Standard requirements	Solution	Inspection cycle
		check.		

Running state checklist

No.	Items	Standard requirements	Solution	Inspection cycle
1	Work status	The touch screen shows that all batteries are running properly, battery running parameters are within their normal ranges, and no battery fault or alarm information is displayed.	● Check method: Visual inspection (Check the system state on the touch screen.) ● Troubleshooting: View the alarm information on the touch screen and handle the alarm.	Monthly
2	Battery management parameters	Battery management parameter settings and battery charge and discharge conditions meet the requirements of the battery manufacturer. The battery operating temperature is lower than the ambient temperature plus 68°F (20°C).	● Check method: Visual inspection (Check the parameters displayed on the touch screen.) ● Troubleshooting: Correct the parameter settings or rectify battery operating temperature abnormality.	Quarterly
4	Positive/negative voltage of battery	● Battery equalized charge voltage = Cell floating charge voltage (2.35V/cell $\pm$ 0.02V/cell) $\times$ 6 $\times$ number of battery	● Check method: (1) Visual inspection (Check the parameters displayed on the touch screen.)	Quarterly

No.	Items	Standard requirements	Solution	Inspection cycle
		cells Battery floating charge voltage = Cell floating charge voltage $(2.35\text{V/cell} \pm 0.02\text{V/cell}) \times 6 \times$ number of battery cells	(2) Measure (Use a multimeter to measure the output voltage of the battery pack) Troubleshooting: Correct the equalized charge voltage and floating charge voltage of UPS. If the difference between the battery pack voltage displayed on the touch screen and the measured value is greater than 1%, contact customer service personnel.	
5	Standard test (suggestion)	During standard test, no fault or alarm is displayed on the touch screen.	- Check method: Perform a standard test and view the alarm information on the touch screen. - Troubleshooting: View the alarm information on the touch screen and handle the alarm.	Quarterly
6	Deep test (suggestion)	During depth test, no fault or alarm is displayed on the touch screen.	Check method: Perform a depth test and view the alarm information on the	Yearly

No.	Items	Standard requirements	Solution	Inspection cycle
			touch screen. ● Troubleshooting: View the alarm information on the touch screen and handle the alarm.	

6.5.3 Li-battery Maintenance

Working environment checklist

No.	Items	Standard requirements	Solution	Inspection cycle
1	Device room environment	● The fireproof door of the device room remains closed, and the air conditioner works normally without interruption. ● There is no dust or flammable sundries in the device room.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
2	Rodent-proof	Rodent-proof measures are taken in the device room, such as rat guard and rat trap.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
3	Installation position	There is no air outlet or refrigerant copper pipe of the air conditioner placed above the device, and no other water leakage risks exist.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly

No.	Items	Standard requirements	Solution	Inspection cycle
4	Environment temperature	Measured temperature: _____°C (Normal range: 68°F ~ 86°F (20°C~30°C))	● Check method: Visual inspection (using a hygrothermograph) ● Troubleshooting: Check that the air conditioner runs properly.	Monthly
5	Environment humidity	Measured humidity: _____ % RH (Range: 30% RH to 80% RH, without condensation)	● Check method: Visual inspection (using a hygrothermograph) ● Troubleshooting: Check that the air conditioner runs properly.	Monthly

Component checklist

No.	Items	Standard requirements	Solution	Inspection cycle
1	Installation Inspection	The device is installed properly and arranged neatly, and screws are tightened.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
2	Appearance of the battery rack or cabinet	No dust, rust, or deformation exists.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly

No.	Items	Standard requirements	Solution	Inspection cycle
3	Battery appearance	● Batteries are clean and free from stains. ● Battery wiring terminals are intact. ● Batteries are intact and free of damage, deformation, bulges, and cracks.	● Inspection method: Visual inspection. ● Troubleshooting: Contact customer service personnel	Monthly
4	Metal scrap	There is no copper scrap or other conductive foreign matter.	● Inspection method: Visual inspection. ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Monthly
5	Grounding wire of the battery rack or cabinet	The grounding wire is reliably connected to the grounding bar in the device room, and the screws are tightened.	● Inspection method: Visual inspection. ● Troubleshooting: Tighten the screws.	Yearly
6	Battery wires	● The wires and insulation layer are intact. ● The screws at the wire connection points are tightened, and the tightening marks on the screws do not deviate. ● The wire connections are free from black marks and noticeable sparks.	● Inspection method: Visual inspection. ● Troubleshooting: After the device is powered off, replace the wires or fasten the screws.	Quarterly

No.	Items	Standard requirements	Solution	Inspection cycle
7	Battery connection reliability	● After the device is powered off, check the reliability of each connection point from positive terminals to negative terminals. All points are connected reliably. ● In copper bar check, a torque wrench should be used to individually check the torque of each battery screw to ensure it meets the manufacturer's requirements. After the battery screws pass the torque check, a marking line should be made on the screw to facilitate subsequent inspections.	● Check method: ■ Visual inspection ■ Verify (After the device is powered off, use an insulated torque wrench to verify the torque of screws.) ● Troubleshooting: Rectify the fault based on the acceptance criteria.	Yearly

Running state checklist

No.	Items	Standard requirements	Solution	Inspection cycle
1	Work status	The touch screen shows that all batteries are running properly, battery running parameters are within their normal ranges, and no battery	● Check method: Visual inspection (Check the system state on the touch screen.)	Monthly

No.	Items	Standard requirements	Solution	Inspection cycle
		fault or alarm information is displayed.	● Troubleshooting: View the alarm information on the touch screen and handle the alarm.	
2	Battery management parameters	Battery management parameter settings and battery charge and discharge conditions meet the requirements of the battery manufacturer. The battery operating temperature is lower than the ambient temperature plus 68°F (20°C).	● Check method: Visual inspection (Check the parameters displayed on the touch screen.) ● Troubleshooting: Correct the parameter settings or rectify battery operating temperature abnormality.	Quarterly
4	Positive/negative voltage of battery	Battery equalized charge voltage = Cell equalized charge voltage (3.50V/cell $\pm$ 0.02V/cell) $\times$ number of battery cells	● Check method: (1) Visual inspection (Check the parameters displayed on the touch screen.) (2) Measure (Use a multimeter to measure the output voltage of the battery pack) ● Troubleshooting: Correct the equalized charge voltage of UPS. If the difference	Quarterly

No.	Items	Standard requirements	Solution	Inspection cycle
			between the battery pack voltage displayed on the touch screen and the measured value is greater than 1%, contact customer service personnel.	
5	Standard test (suggestion)	During standard test, no fault or alarm is displayed on the touch screen.	● Check method: Perform a standard test and view the alarm information on the touch screen. ● Troubleshooting: View the alarm information on the touch screen and handle the alarm.	Quarterly
6	Deep test (suggestion)	During depth test, no fault or alarm is displayed on the touch screen.	● Check method: Perform a depth test and view the alarm information on the touch screen. ● Troubleshooting: View the alarm information on the touch screen and handle the alarm.	Yearly

6.6 Battery test

6.6.1 Standard Test

Perform a shallow discharge on the batteries. Batteries that have not been in operation for an extended period may become unusable. To verify the health of the batteries, a discharge test should be conducted without interrupting the mains power supply.

 NOTE

Before performing the standard test, please ensure:

- UPS mains input is normal.
- Battery is connected properly.
- Battery is in floating charge state.
- Load ratio is not less than 5%.

Step 1 Tap the "" icon in the main page of the touch screen, set "Battery test time" in "Battery setting>" "Manage 1" to "10".

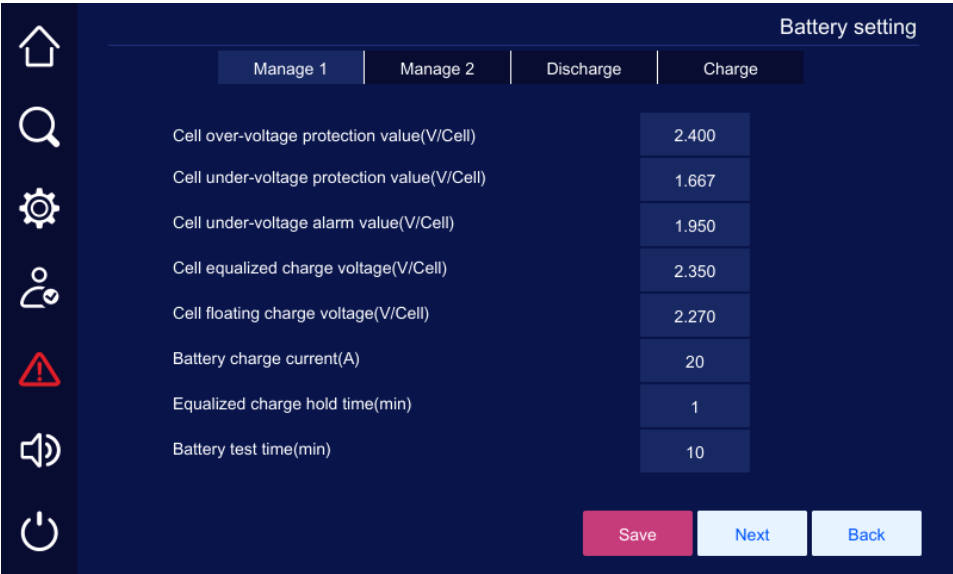


Figure6-8 Battery test time setting

Step 2 Tap the "" icon in the main page of the touch screen, tap "Battery test>Standard test" to start test.

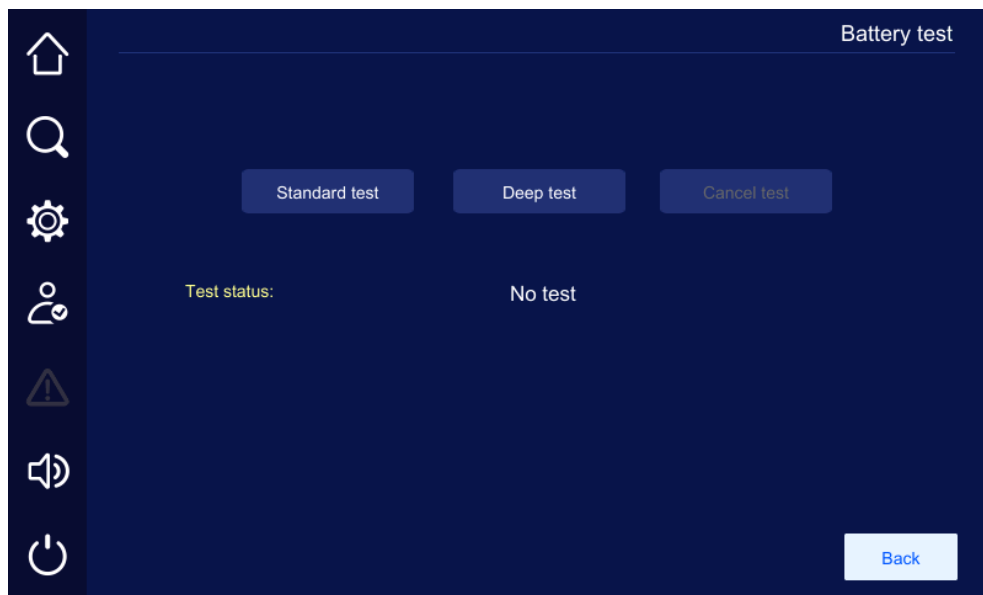


Figure6-9 Standard test

**NOTE**

When the battery test meets the following conditions, the standard test will be exited automatically.

- Battery voltage is lower than the battery voltage alarm point.
- Mains voltage is lower than the rated mains voltage * 0.9.
- No output or output overload.
- There has an abnormal alarm.

----End

6.6.2 Deep Test

Perform a deep discharge on the batteries. Discharge the batteries until the low-voltage alarm point is reached. This deep discharge method allows for a more accurate assessment of battery performance, providing insights into the overall health of the batteries.

**NOTE**

Before performing the depth test, please ensure:

- UPS mains input is normal.
- Battery is connected properly.
- Battery is in floating charge state.
- Load ratio is not less than 5%.



Tap the " " icon in the main page of the touch screen, tap " Battery test>Deep test " to start test.

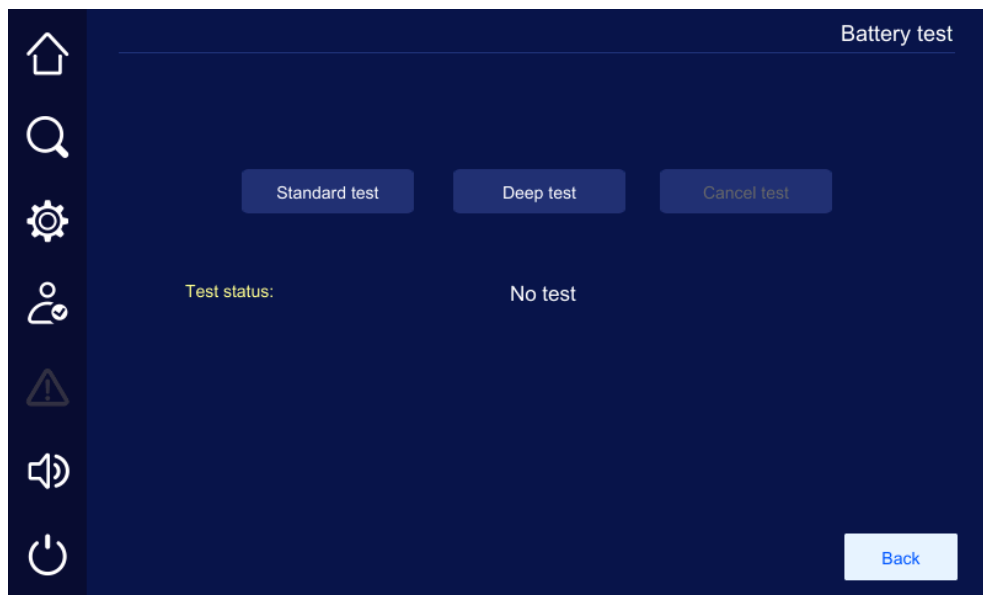


Figure6-10 Deep test

**NOTE**

When the battery test meets the following conditions, the depth test will be exited automatically.

- Battery voltage is lower than the battery voltage alarm point.
- Mains voltage is lower than the rated mains voltage * 0.9.
- No output or output overload.
- There has an abnormal alarm.

6.6.3 Battery Cycle Test

Perform periodic automatic discharge tests on the batteries. This allows for standard or deep discharge tests to be conducted automatically at the set time without requiring on-site personnel intervention.

**NOTE**

Before setting up the battery cycle test, please confirm:

- The battery cycle testing function can be toggled on or off.
- The type of scheduled test can be chosen between standard or deep.
- The test interval can be set between 30 and 360 days.



On the touchscreen main page, tap the "  " icon, then tap "Battery setting > Battery manage > next page" to configure the battery cycle test function, including enabling/disabling the test, selecting the type, and setting the test interval.

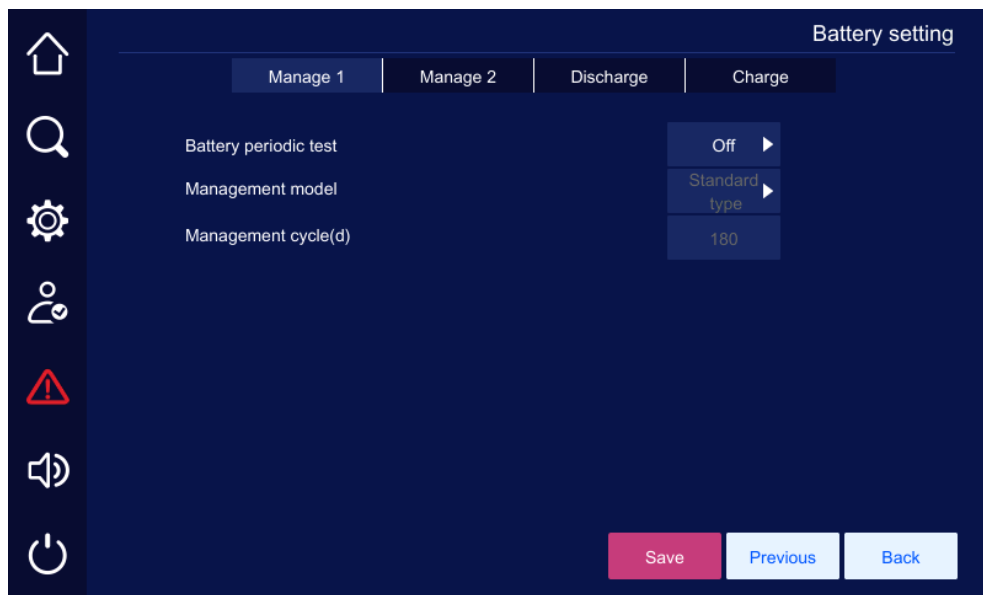


Figure6-11 Battery cycle testing

**NOTE**

When the battery test meets the following conditions, the deep test will be exited automatically.

- After setting the battery cycle test, it will prompt whether to perform the battery test, using this time as the starting point for the countdown.
- If you need to set a scheduled cycle, please refer to the instructions in sections 6.6.1 or 6.6.2 to check whether the battery meets the corresponding conditions.
- During the test, if the exit conditions mentioned in sections 6.6.1 or 6.6.2 are met, the test will automatically exit.

6.7 Troubleshooting list

6.7.1 UPS Fault Diagnosis

**CAUTION**

- When the UPS encounters a fault, corresponding alarm information will be displayed on the touchscreen interface. Emergency alarms must be resolved before the UPS can be powered on again; otherwise, it may lead to further faults or equipment damage.
- It is prohibited to clear alarms by unplugging and reinserting modules.
- Confirm that the faulty module requires replacement before removing it. Once removed, the module must not be reinserted.

Table6-1 Common fault handling

No.	Fault phenomenon	Possible cause
1	Mains is normal, but UPS works in battery inverter state, the buzzer beeps intermittently.	The contacts and sockets of grid circuit connected to UPS are not in good contact, resulting in poor AC power input.
2	After the UPS is installed, closing the mains switch or power switch may cause the fuse to blow or the circuit breaker to trip.	The UPS input three-wire or output three-wire is incorrectly connected, such as the live wire being reversed with the ground wire (chassis).
3	UPS outputs 480V AC power after startup, but UPS works in bypass state.	● The connected load capacity exceeds the rated output capacity of UPS. Reduce load or use a UPS with a larger output capacity. ● If the temporary bypass is caused by the load boot impact and automatically recovers, it is still normal.
4	UPS output is normal after startup, but UPS stops output immediately after the load is started.	● If the UPS is severely overloaded or there is a short circuit in the output circuit, reduce the load to an appropriate level or identify the cause of the short circuit. Common causes include short circuits in output adapter sockets or input short circuits caused by damaged equipment. ● If the load is not started in the order of "large power load→small power load", UPS should be restarted. After UPS runs stably, start loads in the order of "large power load→small power load".

No.	Fault phenomenon	Possible cause
5	UPS works normally after startup, UPS automatically shuts down after a period of time.	In the battery power supply state, the battery under-voltage protection occurs when the battery runs out, system automatically shuts down. This phenomenon is normal. When mains recovers, system will automatically start and charge battery. Warning: If the battery stays in under-voltage state for a long time, it will influence the battery service life. After taking battery under-voltage protection, if mains cannot restore for a long time, please switch off the battery switch to protect battery, and restart UPS and fully charge the battery once mains recovers.
6	UPS works normally after startup for a long time, the buzzer keeps beeping and the touch screen displays the battery under-voltage.	Due to the low voltage of the power grid, the UPS operates in battery inversion mode, ultimately resulting in battery under-voltage protection action
7	UPS outputs normally when mains is available. UPS has no output when mains is not available.	● Battery fault or battery pack has been seriously damaged. ● Charger fault. Usually, the battery cannot be charged, resulting in insufficient battery power. ● Battery wire is not well connected or the contact of wire terminal is poor. ● Battery switch is not switched off. ● After a severe overload occurred, the UPS was not restarted, causing it to remain in a bypass output state.
8	Buzzer keep beeping, UPS switches to bypass power supply.	See the fault information on the touch screen.
9	There is mains, but buzzer beeps intermittently.	The mains voltage or frequency exceeds the allowable range of UPS.

No.	Fault phenomenon	Possible cause
10	In the mains state, UPS works normally. However, after the mains power failure, UPS works normally but the user device stops working.	Poor grounding engineering, resulting in the floating voltage between the neutral wire and grounding wire is too high.
11	Fault indicator on a power module is on.	The power module is faulty. Replace the power module.

6.7.2 Emergency Measures for Malfunctions

- Emergency measures for system faults

When a system fault occurs, perform an inverter shutdown. If necessary, turn off the user load and disconnect the UPS input/output switches to prevent further damage to the UPS. Notify engineering technicians for repair.

- Emergency measures for power module faults

When a power module fails, it will automatically isolate itself from the system, which generally does not affect the normal operation of the system but reduces the redundancy of the power modules. In this case, set the ready switch of the faulty power module to the "🔒" state, remove it from the cabinet, and notify customer service personnel for repair.



After removing the power module, high voltage remains inside the module and on the connector pins of its rear cover. Wait for a sufficient period (≥ 20 minutes) before opening the cover for repair.

7 Removal and Disposal of UPS

7.1 Removing UPS

 CAUTION

After UPS is shut down for 20 minutes, check with a multimeter and clamp ammeter to ensure that there is no voltage or current before wearing protective equipment to operate the UPS.

 NOTE

Before removing UPS, power off both AC and DC.

- Step 1 Refer to section **3.7.2 UPS Connection** and follow the reverse steps to disconnect all electrical connections of the UPS.
- Step 2 If the UPS is to be used again in the future, proper storage must be ensured. Follow the storage requirements outlined in section **1.9 Storage Requirements**.

----End

7.2 Discarding UPS

Users are responsible for properly handling UPS.

 WARNING

Discard UPS in accordance with local regulations and standards to avoid property damage or personal injury.

 CAUTION

Some components of the UPS may be hazardous to the environment. Discard the UPS in compliance with electrical waste disposal regulations at the installation site.

A Technical Parameters

A.1 UPS Technical Specifications

A.1.1 Physical and Electrical Parameters

Physical parameters

Model Items	80KVA	100KVA	135KVA	160KVA	200KVA
Wiring configuration	Top cable entry				
Single power source	Support single power source				
Size (width×depth×height) (in/mm)	23.62" (±0.08") × 39.37" (±0.08") × 81.42" (±0.12") /600 (±2) ×1000 (±2) ×2068 (±3) (Including eye bolts and caster feet)				
Weight (UPS without power module) (lb)	635	635	787	787	787
Operating temperature °F(°C)	32°F~104°F (0°C~40°C)				
Storage temperature °F(°C)	-13°F~131°F (-25°C~55°C)				
Relative humidity of operation (%)	0~95				
Altitude (ft/m)	6,562ft (2000m). For operation above 6,562 ft (2000m), derating must be applied per IEC 62040-3 standard, up to 13,123ft. (4000m)				

System parameters

Items	Description
System efficiency	- Rated mains voltage 30% resistive load $\geq 96.8\%$ 50% resistive load $\geq 97.0\%$ 100% resistive load $\geq 96.4\%$ - Rated battery discharge voltage 30% resistive load $\geq 96.1\%$ 50% resistive load $\geq 96.7\%$ 100% resistive load $\geq 95.8\%$
External isolation transformer function	Capable of connecting to an external 1:1 output isolation transformer.
Anti-backfeed function	Bypass anti-backfeed: When the UPS operates in inverter mode and detects abnormal bypass SCR, it controls the trip board power signal through dry contacts to activate the bypass circuit breaker's trip device, thereby disconnecting the bypass circuit breaker and preventing the output voltage from feeding back into the bypass. Mains anti-backfeed: Achieves anti-backfeed by disconnecting the main relay when the mains power fails.
Power distribution system	3W+PE
Communication function	Support RS232 communication function; Support SNMP communication function, SNMP supports Bacnet communication; Support ModBUS-RTU and MODBUS-TCP/IP communication functions; Support BMS communication function; Support dry contact communication function;
Electromagnetic compatibility	Complies with FCC Part15 CLASS A
Cooling mode	Air-cooled with top exhaust.

Items	Description
Noise (dB)	● Mains inverter mode 100KVA model: Noise <60dB at half load, noise <65dB at full load; 200KVA model: Noise <65dB at half load, noise <68.5dB at full load; 100KVA model: Noise <60dB at 30% load, noise <62dB at half load, noise <65dB at full load; 200KVA model: Noise <62dB at 30% load, noise <65dB at half load, noise <68.5dB at full load.
	● Bypass mode 100KVA model: Noise <60dB at 30% load, noise <62dB at half load, noise <65dB at full load; 200KVA model: Noise <62dB at 30% load, noise <65dB at half load, noise <68.5dB at full load.
Protection grade (IP)	IP20
Pollution degree	II

Mains input specifications

Items	Description
Power supply system	3W+PE
Rated input voltage (VAC)	480 (line voltage)
Input voltage range (VAC)	334~552V
Rated input frequency (Hz)	60Hz
Input frequency range (Hz)	39.8~70.2Hz±0.1Hz
Input PF	30% Nonlinear Load: ≥ 0.98 50% Nonlinear Load: ≥ 0.99 100% Nonlinear Load: ≥ 0.99

Items	Description
Input THDi	30% Nonlinear Load: <8% 50% Nonlinear Load: <5% 100% Nonlinear Load: <3%

Bypass input specifications

Items	Description
Power supply system	3W+PE
Bypass input voltage (VAC)	Rated voltage: 480VAC Upper limit: +10% / +15% (default is +15%), hysteresis 17.3V Lower limit: -10% / -15% / -20% / -30% (default is -20%), hysteresis 17.3V
Bypass synchronization tracking range (Hz)	Rated frequency: 60Hz $\pm 2\%$ / $\pm 4\%$ / $\pm 6\%$ / $\pm 8\%$ / $\pm 10\%$ / $\pm 20\%$ (default is $\pm 10\%$), bypass output is not allowed when exceeding limits, and the error is $\pm 0.1\text{Hz}$

Battery input specifications

Items		Description
Battery type		Lead-acid, Lithium-ion, S ³ Lithium-ion
Lead-acid battery	Rated battery voltage (VDC)	480
	Battery voltage (VDC)	360~600
	Number of battery cells	30 cells ~ 50 cells (For 40 cells and above, UPS power is not derated)
	Cell equalized charge voltage	2.3-2.470V/cell can be set, default is 2.350V/cell
	Cell floating charge voltage	2.167-2.300V/cell can be set, default is 2.270V/cell
Li-battery	Rated battery voltage (VDC)	512

Items		Description
	Battery voltage (VDC)	384~640
	Number of battery cells	80 cells
	Cell equalized charge voltage	3.40~3.55V/cell can be set, default is 3.50V/cell
Charge limit coefficient		Configurable from 0.05C to 0.5C (default is 0.20C).
Charge current (A)		Minimum charging current settable by the system: 5A. Maximum charging current settable by the system: (UPS capacity / power module capacity) * 100A. Default: 20A (0.1C), but not exceeding charging capability.
Shared battery pack mode		Equipped
Battery cold start function		Equipped

Output specifications

Items	Description
System	3W+PE
Voltage (VAC)	480Vac The rated voltage range of -5V to 5V can be set, with a default value of 0V (after fine-tuning the system output voltage, the maximum output voltage limit is 485V) and a step size of 1V
Frequency (Hz)	Default 60Hz
Output voltage stability accuracy	$\leq 1\%$
Output voltage phase deviation	Three-phase with balanced resistive load: $\leq 1^\circ$ Three-phase with unbalanced resistive load: $\leq 2^\circ$
Waveform distortion (THDv)	Resistive full load: $\leq 1\%$ Non-linear full load (PF ≥ 0.9): $\leq 3\%$

Items	Description
Bypass inverter transfer time (ms)	Maximum interruption time: Default is 1ms (in sync state). Inverter to bypass time: 1ms to 15ms, default is 2ms (in out-of-sync state). Inverter to bypass, impact/short-circuit, and other fault failure conditions: maximum interruption time $\leq 20\text{ms}$.
Mains battery transfer time	0ms
Inverter overload capacity	PF ≥ 0.95: ● Load rate $\leq 105\%$: long-term operation. ● $105\% < \text{Load rate} \leq 110\%$: 60min. ● $110\% < \text{Load rate} \leq 125\%$: 10min. ● $125\% < \text{Load rate} \leq 150\%$: 1min. ● Load rate $> 150\%$: immediate (300ms). RCD non-linear load: ● PF < 0.85: Load $> 105\%$, immediate protection (300ms). ● $0.85 \leq \text{PF} < 0.9$: Load $> 110\%$, immediate protection (300ms). ● $0.9 \leq \text{PF} < 0.95$: Load $> 115\%$, immediate protection (300ms). Note: The interval between two consecutive overloads must be greater than 30s. If the overload time is less than 30s, the overload time will decrease linearly.
Bypass overload capability	$\leq 135\%$: long-term operation. $136\% < \text{Load rate} \leq 150\%$: $\geq 5\text{min}$. $151\% < \text{Load rate} \leq 200\%$: $\geq 1\text{s}$. $200\% < \text{Load rate} \leq 300\%$: $\geq 100\text{ms}$. Load rate $> 300\%$: immediate. Note: The interval between two consecutive overloads must be greater than 30s. If the overload time is less than 30s, the overload time will decrease linearly. When the line voltage is less than 480Vac, overload is assessed based on current.

Items	Description
Inter-module equalized current accuracy	$\leq 3\%$
Output DC component	-100mV~+100mV
Dynamic voltage transient range	$\leq \pm 5\%$ valid value $\leq \pm 5\%$ peak-to-peak
Voltage transient recovery time	$\leq 20\text{ms}$ recovery to $\leq \pm 2\%$, valid value $\leq 20\text{ms}$ recovery to $\leq \pm 2\%$, peak-to-peak
Output power factor	It can be set from 0.8 to 1.0.
Load unbalance capability	$\leq 1\%$
Impact resistance capability	Resistance to tungsten lamp impact (single-phase): Non-linear full load within 45% of single-phase, bypass transfer is not allowed.

A.1.2 Parallel Parameters

Items	Description
Max. parallel UPS number (unit)	8
Parallel current imbalance	$\leq 3\%$
Parallel ECO linkage function	Equipped

A.1.3 Protection Parameter

Items	Description
Input overvoltage protection	Available
Input undervoltage protection	Available
Output short circuit protection	Available
Output overvoltage protection	Available
Output undervoltage protection	Available
Output overload protection	Available

Items	Description
Output overtemperature protection	Available
Battery low voltage protection	Available

A.1.4 Standard Parameters

Items	Description
Product standard	UL1778-2024
Safety standard	UL1778-2024
EMC standard	FCC CLASS A
Test standard	UL1778-2024

A.2 Component Technical Specifications

A.2.1 Power Module Technical Specifications

Model Items	80KVA	100KVA	135KVA	160KVA	200KVA
Rated capacity (KW)	100				
Size (width×depth×height) (in/mm)	17.32" (±0.04") × 29.53" (±0.04") × 5.12" (±0.04")/440 (±1) × 750 (±1) × 130 (±1) (excluding mounting ears, handles, protruding connectors, and reinforcement ribs) Packaging size: 34.96" × 23.50" × 9.02"/887×596×229				
Net weight (lb)	119.05				
Gross weight (lb)	125.66				

A.2.2 Bypass Module Technical Specifications

Model Items	80KVA	100KVA	135KVA	160KVA	200KVA
Rated capacity (KVA)	100		200		

Items	Model	80KVA	100KVA	135KVA	160KVA	200KVA
Size (width×depth×height) (in/mm)		17.32" (±0.04") × 22.64" (±0.04") × 5.12" (±0.04")/440 (±1) × 575 (±1) × 130 (±1) Packaging size: 34.92" × 26.73" × 9.80"/887×679×249				
Net weight (lb)		34.17				
Gross weight (lb)		44.75				

A.2.3 System Control Box Technical Specifications

Items	Model	80KVA	100KVA	135KVA	160KVA	200KVA
Size (width×depth×height) (in/mm)		17.32" × 6.89" × 2.95"/440×175×75				
Weight (lb)		11				

- Specifications are subject to change without prior notice.

B Quality Assurance

If the PCS fault in guarantee period, NXT Power will maintenance it free or replace new product.

Evidence

During the warranty period, our company requires customers to present the invoice for the purchased product. Additionally, the trademark on the product must be clearly visible, otherwise, we reserve the right to refuse quality assurance.

Condition

- The replaced product must be returned to NXT Power to dispose.
- Reasonable time should be reserved for NXT Power to maintain the fault device.

Disclaimer

If any situation below occurs, NXT Power have right to refuse the quality assurance.

- Beyond the free quality assurance period.
- Damaged by transportation.
- Improper installation, transformation or use.
- Used in the harsh environment that not allowed in the User Manual.
- Damaged by installation, maintenance, transformation or dismantling of other company server.
- Damaged by using component or software of non-standard or other company except NXT Power.
- Beyond the installation and use range of related national standard.
- Damage caused by abnormal nature environment.

If the fault is caused by above situation and user requires to maintain it, we can provide paid maintenance service after our service organization decided.

To improve users' satisfaction continuously, our product and User Manual is upgrading. If the User Manual has difference with product, it may be caused by the version difference, please take the actual product as standard. If any question, please contact our company.

Software authorization

- It is prohibited to use part or whole data of the hardware or software of NXT Power in any way for commercial purpose.
- It is prohibited to decompile, decrypt or destroy the original program design of the software developed by NXT Power.

C Acronyms and Abbreviations

D

DSP Digital Signal Processor

E

ECO Energy Control Operation

EPO Emergency Power Off

L

LCD Liquid Crystal Display

LED Light-emitting Diode

P

PE Protective Earthing

R

RS485 Recommend Standard485

S

SNMP Simple Network Management Protocol

T

THDi Total Harmonic Current Distortion

THDv Total Harmonic Voltage Distortion

U

UPS Uninterruptible Power System

General Warranty

All NXT POWER products (hereafter referred to as “Product”) are warranted to be free from defects in material and or workmanship. This warranty is limited to repairing, replacing, or refurbishing at NXT POWER’s option, any defective component or module within the Product. Complete NXT POWER warranty provisions for each product are as follows:

Vanguard Series Three Phase 80– 200 kVA Products

Vanguard Series Three Phase 80 – 200 kVA products (hereafter referred to as “Product”) are warranted to be free from defects in material and workmanship for **twenty four (24) months** from date of shipment from NXT POWER, on the chassis & electronic components and **twenty four (24) months** from date of shipment from NXT POWER on the batteries. This warranty will include, at NXT POWER’s sole discretion, On-site Repair Service or NXT POWER Depot Exchange Service. For locations other than those specified herein, this warranty is limited to NXT POWER Depot Exchange Service. Start-up services directed by NXT Power are required on this product within 3 months of shipping from NXT Power. See the Limitations of Warranty section for additional limitations & exclusions.

LIMITATIONS OF WARRANTY

This limited warranty is applicable to the original end user of the Product and is non-transferrable unless advanced written approval is otherwise provided by NXT POWER. This warranty does not cover damage or loss from improper installation, improper application, inappropriate environment, abuse, neglect; damages or loss incurred in shipment to or from the point of use; or unauthorized tampering, modifications, adjustments, and/or repair of the Product. Additionally, any costs related to installation or de-installation of the Product for the purpose of replacement or servicing will be the sole responsibility of the Customer. NXT POWER makes no expressed or implied statements of fitness for a particular use of the Product. NXT POWER is not liable for incidental or consequential damages, monetary loss, loss of sales, or loss of business resulting from the failure or malfunction of the Product.

Any batteries supplied by NXT Power must be put into service and under charge within 90 days of shipment from NXT Power. Disconnecting the battery from its power source for an extended period of time will result in loss of battery charge. To avoid battery depletion and to maximize the life of the batteries, they must be fully charged prior to disconnecting them for storage. Stored batteries or Product containing batteries must be recharged within 120 days of the previous charge cycle and should never be stored in an ambient temperature above 77°F or below 32°F (0-25°C). Additionally, the batteries associated with Product used in applications where AC power is intentionally disconnected from its AC source on frequent intervals, are subject to discharge/charge cycles that may exceed the design parameters of the battery.

Products used in such applications will experience substantially reduced battery life; therefore, the standard NXT POWER warranty on batteries is supplanted by a 90 day warranty. Battery warranty claims are subject to exclusive review and validation testing by NXT POWER. Batteries that are subject to conditions exceeding those listed herein may be excluded from warranty at the sole discretion of NXT Power.

For products requiring Start-up service, such service must be performed within 90 days of shipment from NXT Power and prior to Product being placed into service. NXT Power is not liable for damage to Product, or for failure of Product to perform its intended function where required Start-up services are not performed by NXT Power.

Warranty services are performed during normal, non-holiday business hours (Monday through Friday, 8:00 AM – 5:00 PM CST). Services requirements outside of normal business hours are subject to NXT POWER prevailing labor rates.

PROCEDURES

The following procedures have been established by NXT POWER for Customers to use in obtaining assistance for technical support, Return Material Authorization numbers for Product returns, on-site support, advanced Product replacements, or replacement battery packs. Customers in need of Product repair services should first contact NXT POWER Technical Support to determine warranty status and repair location (NXT POWER depot services or On-Site Services).

Technical Support

For technical assistance on NXT POWER Products, the Customer may contact NXT POWER Technical Support at the following telephone numbers:

24 Hour Technical Support Call Center:

Phone: (877) NXT-POWER (877-698-7679)

Email: service@nxtpower.com

Other:

Contact local NXT POWER authorized Distributor or Reseller

The Customer should have the following information ready when calling Phone:

- Part number of the NXT POWER Product located on the back of the unit.
- Serial number of the NXT POWER Product (same location as the part number).

A detailed description of the problem including any power or environmental circumstances that may have precipitated the problem.

On-site Service

NXT POWER may offer at its discretion, or Customers may request on-site service for the repair of defective Product. In the course of performing on-site service, NXT POWER may require that the Customer de-energize the Product and its associated critical load for the purpose of safety. NXT POWER requires that a Customer representative be on hand throughout all phases of on-site service.

Procedure

The Customer should call NXT POWER Technical Support with the part number and serial number of the unit as well as a fault description. If the Technical Support Representative cannot solve the problem over the telephone, the on-site service process will be initiated. For units within the warranty period, the Customer will be provided a case number. For units outside of the warranty period, the Customer will be advised of the potential service fees. The Customer must first provide an approved method of payment such as a purchase order or credit card before a case number will be issued. NXT POWER will then dispatch its authorized service representative as well as any parts it deems necessary to successfully perform the repairs, to the location (site) of the Product in accordance with the Customers schedule of availability. Customer will be responsible for the security of any parts sent in advance of the arrival of the service technician.

Upon arrival at the site, and pending Customer approval to begin work, the NXT POWER service representative will perform diagnostics and then repair services on the defective Product. For a variety of reasons including the need for additional parts or other resources, it may be necessary for the NXT POWER service representative to return to the site more than once to complete all necessary repairs.

At the conclusion of the service, NXT POWER will close the case and provide the Customer with a written report detailing the nature of the service as well as any corrective actions taken. In the case of non-warranty service, the Customer will be invoiced by NXT POWER in accordance with its time & material rates for the services provided.



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