HTC Energy Storage System

User Manual

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Contact Method

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

Preface

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

Overview

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

Intended Audience

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

Sign Conventions

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

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

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Chapter 1 Safety Precautions

1.1 Declaration

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

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

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

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

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

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

- Equipment damage is caused by earthquakes, floods, volcanic eruptions, mudslides, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, extreme weather, and force majeure;
- The equipment is not operated in the service conditions specified in this manual;
- The installation and application environment does not comply with relevant international, national or regional standards;
- The equipment is installed and used by unqualified personnel;
- Failure to operate the equipment according to the operating instructions and safety warnings in the product and manual;
- The equipment is disassembled or modified or software code is modified without authorization;
- Equipment damage is caused by transportation by the customer or third-party shipping company;
- Equipment damage is caused by storage conditions that do not meet the requirements described in the manual;
- The materials and tools prepared by the customer do not meet the requirements of local laws, regulations and relevant standards;
- Equipment damage is caused by customer or third party's negligence, intentionality, gross negligence, improper operation, or non-Sineng reasons.

1.2 Personal Safety

Danger

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

Warning

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

1.2.1 General Requirements

- Do not deactivate equipment protection devices or ignore warnings, cautions and prevent measures in the manual and equipment.
- During the operating of the equipment, if a fault that may cause personal injuries or equipment damage is discovered, immediately terminate the operation and report to the responsible personnel. Then, take effective protective measures.
- Do not power on the equipment before it has been installed or confirmed by professionals.
- It is prohibited to contact the power supply equipment directly, using other conductors, or indirectly through wet objects. Before contacting any conductor surface or terminal, measure the voltage of the contact point to confirm that there is no risk of electric shock.
- When the equipment is operating, the enclosure temperature is high and there is a risk of burns. Please do not touch the enclosure.
- It is prohibited to let your fingers, parts, screws, tools or boards come into contact with the running fan to avoid injuries to your hands or damage to the equipment.
- If fire occurs, evacuate the building or equipment area immediately and press the fire alarm or call the fire emergency hotline. Under no circumstances should you re-enter the burning building or equipment area.

1.2.2 Personnel Requirements

- Personnel operating the equipment include professionals and trained personnel.
  - Professionals: People who are familiar with the principles and structure of equipment, have experience in training or operating the equipment, and understand the potential sources and magnitudes of hazards during equipment installation, operation, and maintenance.

- Trained personnel: People who have undergone appropriate technical and safety training, can be aware of the hazards that may arise when performing an operation, and can take steps to minimize the risk to themselves or other persons.

- Personnel who install and maintain the equipment must undergo strict training, master correct operation methods, and understand various safety precautions and relevant standards of the country/region where the equipment is located.
- Only qualified professionals or trained personnel are allowed to install, operate and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and service equipment.
- Personnel operating in special scenarios such as electrical operations, climbing operations, and special equipment operations must have the special operation qualifications required by the local country/region.
- Replacement of equipment or parts (including software) must be implemented by authorized professionals.
- Except for those who operate the equipment, other personnel are prohibited to approach the equipment.

1.3 Electrical Safety

Danger

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

1.3.1 General Requirements

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

- Before installing power cables, confirm that the cable labels are correct and the cable terminals are insulated.
- When installing the equipment, use a torque tool with an appropriate range to tighten the screws. When using a wrench to tighten, ensure that the wrench is not skewed and the error of torque does not exceed 10% of the specified value.
- Use a torque tool to secure the bolts and double check using the red and blue markings. After confirming that a bolt is tightened, paint a blue mark on the bolt. After the inspector confirms that the bolt is tightened, paint a red mark (the line mark must span the edge of the bolt).
- If the equipment has multiple inputs, all inputs of the equipment should be disconnected, and the equipment can only be operated after it is completely powered off.
- When maintaining the lower-level power consumption or power distribution equipment of the power supply equipment, it is necessary to disconnect the corresponding output switch of the power supply equipment.
- During equipment maintenance, hang a "No closing" sign on the upper-level and lower-level switches or circuit breakers, and post warning signs to prevent accidental connections. The equipment can only be powered on after the fault is rectified.
- Regularly check the equipment connection terminal screws to make sure they are tightened properly.
- If a cable is damaged, it must be replaced by a professional to avoid risks.
- It is prohibited to alter, damage or cover the signs and nameplates on the equipment, and promptly replace unclear signs that have been used for a long time.
- It is prohibited to clean the internal and external electrical parts of the equipment with solvents such as water, alcohol or oil.

1.3.2 Ground Requirements

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

1.3.3 Wiring Requirements

- The selection, installation, and routing of cables must comply with local laws, regulations, and specifications.
- Looping and twisting of cables are prohibited. If the length of the power cable is not long enough, replace the power cable. It is prohibited to make joints or solder joints in the power cable.
- All cables must be securely connected, well insulated, and of appropriate size.
- Cable troughs and cable holes should have no sharp edges. Cable tubes or cable holes must be protected to prevent cables from being damaged by sharp edges, burrs, etc.
- Cables of the same type should be tied together, with a straight and neat appearance and no skin damage. Cables of different types should be laid out separately, and cables must not entangle or cross each other.

- Buried cables need to be reliably secured using cable supports and cable clamps. The cables in the backfilled soil area must be closely attached to the ground to prevent the cables from being deformed or damaged due to force exerted when the soil is backfilled.
- When external conditions (such as laying methods or ambient temperature) change, verify cable selection by referring to IEC-60364-5-52 or local regulations and specifications, such as whether the current carrying capacity meets the requirements.
- The insulation layer of cables may be aged or damaged if the cables are used in high-temperature environments. The distance between the cable and the heating device or the periphery of the heat source area must be at least 30 mm.
- The torsion angle between the plane of the OT terminal of the power cable and the plane of the input copper bar should not exceed 15 degrees.
- After the power cables are installed, tie them to the supports.
- Cable routing should avoid the line cutting position of the platform.

1.3.4 ESD

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

1.4 Environment Requirements

Danger

- It is prohibited to place the equipment in an environment with flammable or explosive gases or smoke, or perform any operation on the equipment in such environment.
- It is prohibited to store flammable and explosive items in the equipment area.
- It is prohibited to place the equipment close to heat or fire sources, such as fireworks, candles, heaters, or other heating devices. The heating may cause damage to the equipment or cause a fire.

Warning

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

- The installation and usage environment must meet relevant international, national, and local standards for lithium batteries, and are in accordance with the local laws

and regulations. The user is obliged to protect the ESS against fire or other hazards.

- Keep the ESS out of the reach of children and away from daily working or living areas, including but not limited to the following areas: studio, bedroom, lounge, living room, music room, kitchen, study, game room, home theater, sunroom, toilet, bathroom, laundry, and attic.
- When installing the ESS in a garage, keep it clear of the drive path.
- Do not install the ESS in places that are enclosed, unventilated, without proper fire fighting facilities, or difficult for firefighters to access. Do not place flammable or explosive materials around the ESS.
- Install the ESS in a sheltered place or install an awning over it to avoid direct sunlight or rain.
- For areas prone to natural disasters such as floods, debris flows, earthquakes, and typhoons, take corresponding precautions for installation.
- Do not install the ESS in an easily accessible position because the temperature of the enclosure and heat sink is high when the ESS is running.
- Do not install the ESS on a moving object, such as ship, train, or car.
- Ensure that the equipment is stored in a clean, dry, and well ventilated area with proper temperature and humidity and is protected from dust and condensation.
- Keep the installation and operating environments of the equipment within the allowed ranges. Otherwise, its performance and safety will be compromised.
- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, performing outdoor installation, and opening doors) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Do not install the equipment in an environment with direct sunlight, dust, smoke, volatile or corrosive gases, infrared and other radiations, organic solvents, or salty air.
- Do not install the equipment in an environment with conductive metal or magnetic dust.
- Do not install the equipment in an area conducive to the growth of microorganisms such as fungus or mildew.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference.
- Ensure that the site complies with local laws, regulations, and related standards.
- Ensure that the ground in the installation environment is solid, free from spongy or soft soil, and not prone to subsidence. The site must not be located in a low-lying land prone to water or snow accumulation, and the horizontal level of the site must be above the highest water level of that area in history.
- Do not install the equipment in a position that may be submerged in water.
- If the equipment is installed in a place with abundant vegetation, in addition to routine weeding, harden the ground underneath the equipment using cement or gravel.
- Do not install the equipment outdoors in salt-affected areas because it may be corroded. A salt-affected area refers to the region within 500 m of the coast or prone to sea breeze. Regions prone to sea breeze vary with weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).

- Before installation, operation, and maintenance, clean up any water, ice, snow, or other foreign objects on the top of the equipment.
- When installing the equipment, ensure that the installation surface is solid enough to bear the weight of the equipment.
- After installing the equipment, remove the packing materials such as cartons, foam, plastics, and cable ties from the equipment area.
- Store the equipment according to the storage requirements. Equipment damage caused by unqualified storage conditions is not covered under the warranty.

1.5 Machinery Safety

Warning

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

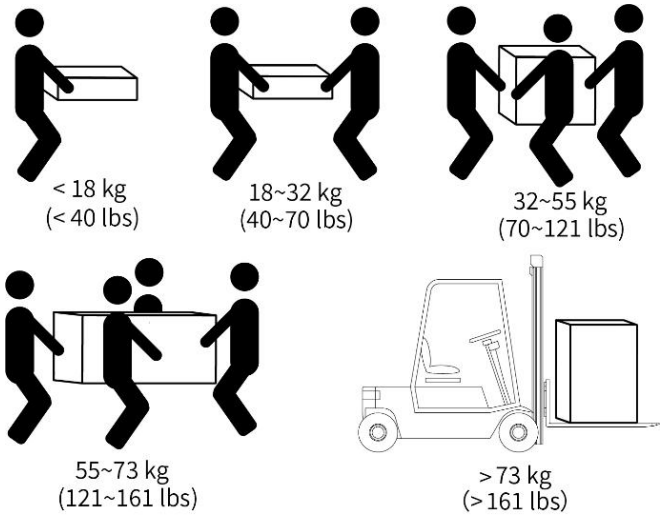
1.5.1 General Requirements

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

1.5.2 Carrying Heavy Objects

- When multiple people are carrying heavy objects together, height and other conditions must be considered. Reasonably arrange the people and work to ensure balanced weight distribution.
- When two or more people are carrying heavy objects together, one person should direct them to lift or put down the equipment at the same time to ensure uniform steps.
- When handling equipment by hand, wear protective gloves, protective shoes and other safety equipment to avoid injuries.
- When handling equipment by hand, approach the object, squat down, and use the power of straightening your legs instead of your back to lift the object slowly and steadily. It is prohibited to suddenly lift the object or twist your trunk.
- Do not quickly lift the heavy object above waist. Place the heavy object on a workbench at half waist height or a suitable place, adjust the position of your palms, and then lift it up.

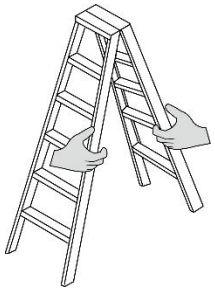
- Handle the heavy object with balanced and steady force. Move or place it stably and slowly to avoid any impact or drop from scratching the surface of the equipment or damaging the components and cables of the equipment.
- When handling the heavy object, exercise caution at workbenches, slopes, stairs and other places where there are slippery. When carrying the heavy object through the door sill, make sure the door is wide enough to allow the equipment to pass through, so as to prevent injuries or scratches on your fingers.
- When carrying heavy objects, prepare to bear the weight to avoid being crushed or sprained by the heavy objects.



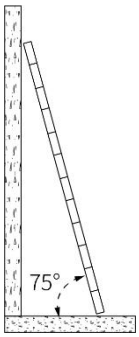
- When transferring the heavy object, move your feet rather than twisting your waist. When you need to lift and transfer the heavy object at the same time, point your feet in the direction to move, and then carry the heavy object.
- When using a forklift to handle the equipment, ensure that the forklift is in the middle position to prevent it from tipping over. Before moving the equipment, fasten the equipment to the forklift using ropes. When moving the equipment, special personnel are required to supervise the process.
- Transport the equipment by sea, highway with good road conditions, or air. Railway transportation is not supported. Bumps and tilts should be minimized during transportation.

1.5.3 Ladder Use Safety

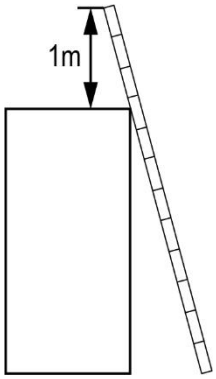
- When performing live operations at heights, use wooden ladders or insulated ladders.
- It is preferred to use platform ladders with guardrails. Trestle ladders are not recommended.
- Before using the ladder, ensure that it is in good conditions and meets the load-bearing requirements. It is prohibited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



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



- If a trestle ladder is used, place the wide ladder legs downward or use protective measures at the bottom of the ladder to prevent slipping.
- If a trestle ladder is used, the maximum height of the feet should not exceed the fourth step from the top to the bottom of the ladder.
- If a trestle ladder is used to climb up to the platform, the vertical height of the ladder beyond the platform must be at least 1 meter.



1.5.4 Drilling Holes

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

1.5.5 Lifting Safety

- Personnel performing lifting operations must undergo relevant training and be qualified before taking up their posts.
- Temporary warning signs or fences must be set up in the lifting area to isolate the area.
- The foundation for lifting operations must meet the load-bearing requirements of the crane.
- Before lifting, ensure that the lifting tools are placed on the ground meeting load-bearing requirements, and lock the rollers.
- During lifting, it is prohibited to walk under the boom or lifted object.
- During lifting, it is prohibited to drag the wire rope or lifting tools, or use hard objects to hit.

1.6 Battery Safety

Danger

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

Take protective measures promptly.

Warning

- Install batteries in a dry area. Do not install them under areas prone to water leakage, such as air conditioner vents, ventilation vents, feeder windows of the equipment room, or water pipes. Ensure that no liquid enters the equipment to prevent faults or short circuits.
- Before unpacking, storage, and transportation, ensure that the packing cases are intact and the batteries are correctly placed according to the labels on the packing cases. Do not place a battery upside down or vertically, lay it on one side, or tilt it. Stack the batteries according to the stacking requirements on the packing cases. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.
- After unpacking batteries, place them in the required direction. Do not place a battery upside down or vertically, lay it on one side, tilt it, or stack it. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.
- Tighten the screws on copper bars or cables to the torque specified in this document. Periodically confirm whether the screws are tightened, check for rust, corrosion, or other foreign objects, and clean them up if any. Loose screw connections will result in excessive voltage drops and batteries may catch fire when the current is high.
- After batteries are discharged, charge them in time to avoid damage due to overdischarge.

General Requirements

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

Short-Circuit Protection

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

Recycling

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

Chapter 2 Transportation and Storage

Transportation Requirements

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

Warning

- Rough handling of batteries is strictly prohibited, as it may cause internal short circuits, structural damage (including electrolyte leakage or casing rupture), and potentially fire or explosion hazards.
- Do not move a battery by holding its terminals, bolts, or cables. Otherwise, the battery may be damaged.
- Keep batteries in the correct direction during transportation. They must not be placed upside down or tilted, and must be protected against falling down, mechanical impact, rains, snows, and falling into water during transportation.

Storage Requirements

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

- Do not remove the outer packaging of the inverter.
- Storage temperature shall be maintained within the range of -40° C to +70° C; relative humidity shall be maintained within 5% RH to 95% RH.
- Store in a clean and dry area, and protect against dust and moisture ingress. The warehouse shall not contain harmful gases, flammable and explosive products, or corrosive chemicals, and shall be free from strong mechanical vibration, shock, and strong magnetic field effects.
- Maximum stacking height is 6 layers. When stacking, handle the inverter with care to prevent personal injury or equipment damage caused by tipping.

- During storage, periodic inspections are required (recommended once every three months). If insect infestation, rodent damage, or packaging damage is detected, the packaging materials must be replaced promptly.
- The packaging boxes shall be raised at least 20cm above the ground and kept at least 50cm away from walls, heat sources, windows, or air inlets.
- If stored for two years or longer, the inverter shall be inspected and tested by qualified personnel before being put into service.

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

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

Warning

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

Chapter 3 Product Overview

The stored energy system (including the power module and battery module) may control and optimize energy flow in the PV system through an integrated energy management system. The electricity generated in the PV system can be used by the load, stored in the battery, and transferred to the power grid.

The following types of HTC series are applicable:

- SN15HTC-6.4/12.8/19.2/25.7
- SN12HTC-6.4/12.8/19.2/25.7
- SN10HTC-6.4/12.8/19.2/25.7
- SN8.0HTC-6.4/12.8/19.2/25.7
- SN6.0HTC-6.4/12.8/19.2/25.7
- SN5.0HTC-6.4/12.8/19.2/25.7

3.1 Product Model Description

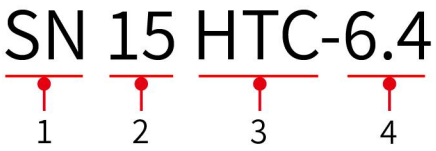


Figure 3-1 HTC Energy Storage System Model

Table 3-1 HTC Energy Storage System Model Description

Sign	Meaning	Value
1	Brand code	SN: Sineng Electric
2	Rated output power	15: Rated output power at 15kW
3	System classification	HTC: three phase all-in-one hybrid system
4	Energy	Rated output energy

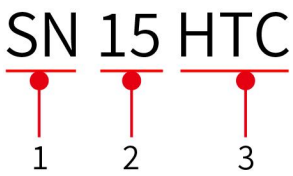


Figure 3-2 Inverter Model

Table 3-2 Inverter Model Description

Sign	Meaning	Value
1	Brand code	SN: Sineng Electric
2	Rated output power	15: Rated output power at 15kW
3	System classification	HTC: three phase all-in-one hybrid system

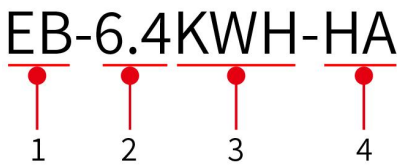


Figure 3-3 Battery Model

Table 3-3 Battery Model Description

Sign	Meaning	Value

1	Brand code	Energy storage system Application Scenario: Household It is recommended to charge and discharge once a day.
2	Energy	Rated output energy
3	Capacity unit	kWh
4	Voltage level	H: High Voltage L: Low Voltage
	Design code	Increases from A to Z to distinguish models.

3.2 System scheme

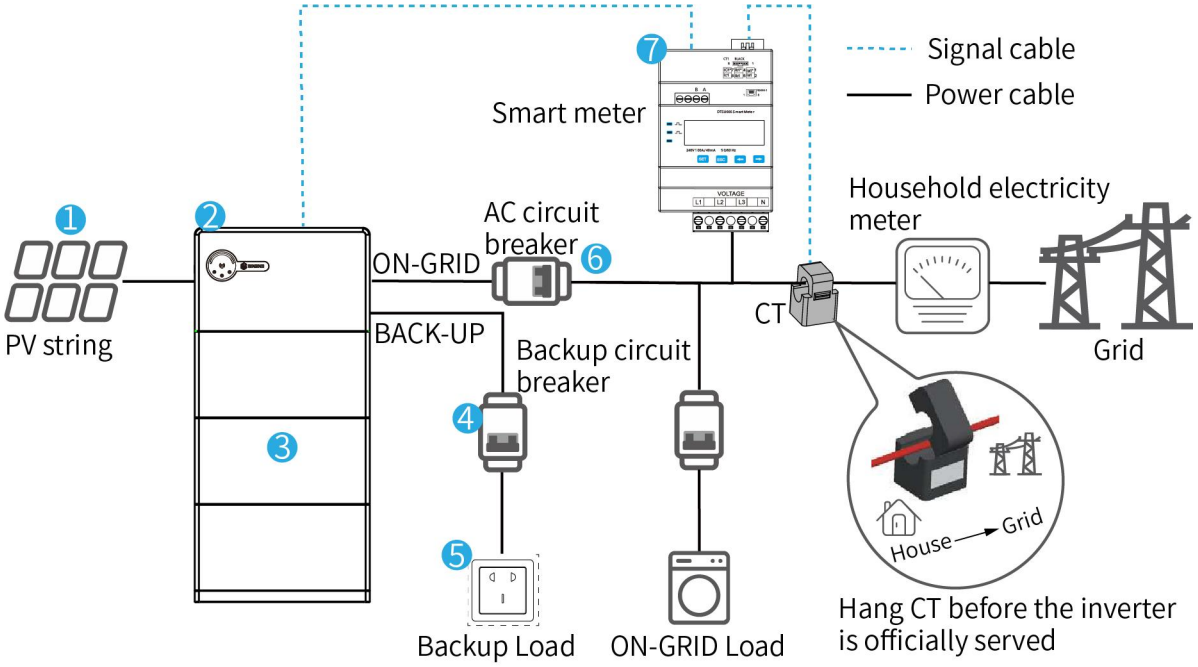


Figure 3-4 System scheme

Table 3-4 System scheme

Sign	Parts	Description
1	PV string	PV string consists of PV modules
2	Inverter	Applicable inverters: SN15HTC/SN12HTC/SN10HTC/SN8.0HTC/SN6.0HTC/SN5.0HTC series.
3	Battery	Select EB series batteries that match the inverter. The number of battery modules can be selected according to requirements, and future expansion is supported.
4	Backup circuit breaker	To be specified in conjunction with the actual load.
5	Backup load	Support connection of standby loads, such as other important loads.
6	AC circuit breaker	Recommended rated current≥50A
7	Smart meter	To be purchased from the product manufacturer, recommended model: AC smart meter-DTSU666.

3.3 Operating Mode

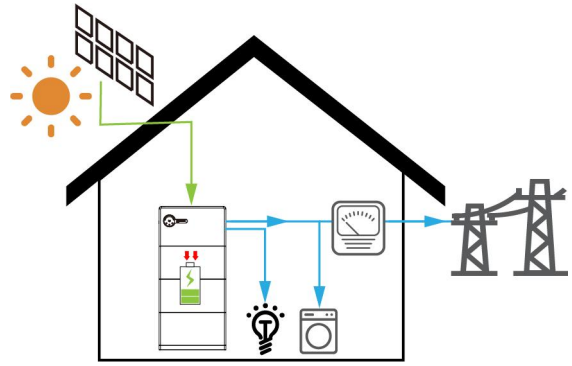
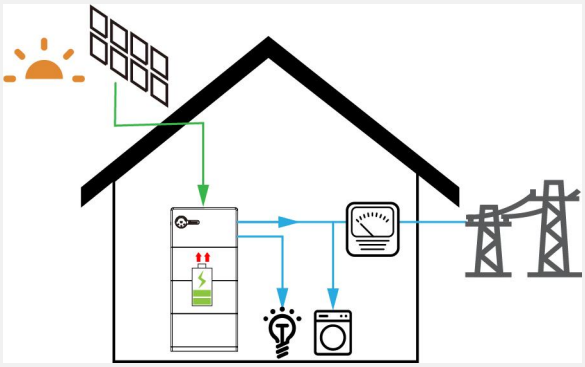
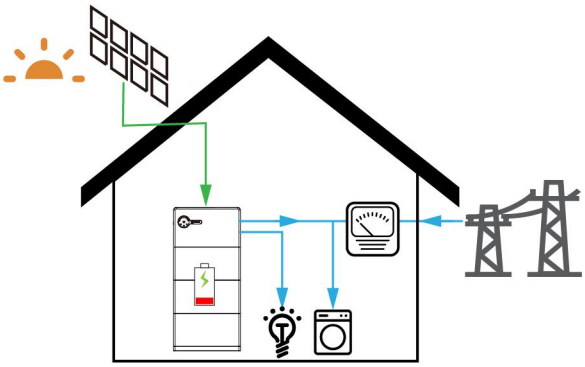
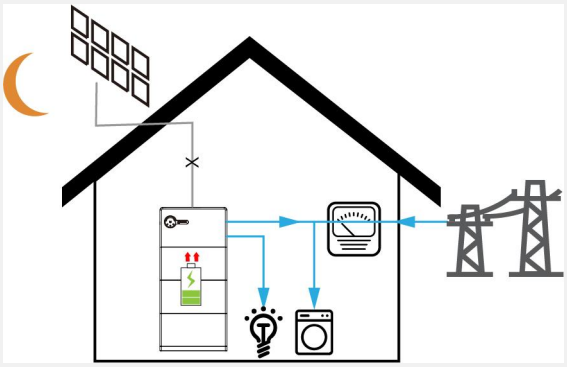
3.3.1 System Operating mode

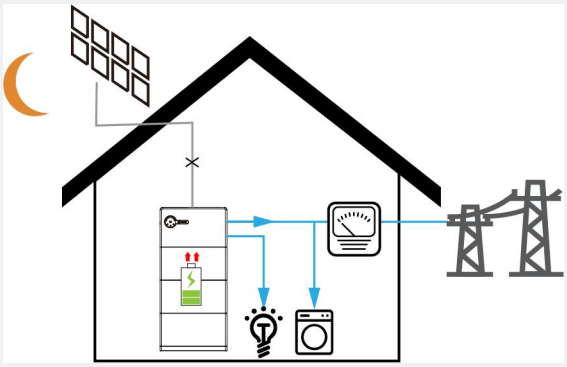
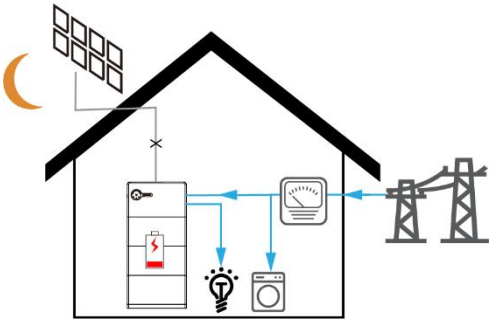
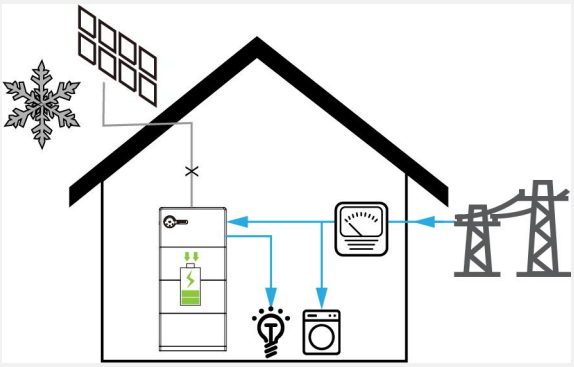
3.3.1.1 Self-use mode

The HTC series products default to self-use mode, which can adjust the power of PV generation, battery, and power grid based on the meter power. When the power meter is enabled and communication is normal, the energy flow will be adjusted according to the meter power, If the smart meter is not available, adjustment will work according to EPS. In case of grid cut-off, the machine will automatically switch to off-grid mode.

In self-use mode, the device prioritizes supplying power generated by the PV array to the load. The remaining electrical energy is allocated in the following order: first, it is used to charge the battery, and any surplus is then fed into the grid. If PV power is insufficient, the system will prioritize discharging power from the battery (discharging is only allowed when the battery State of Charge (SOC) reaches the minimum threshold for grid-connected discharge; this threshold can be customized by the user, with a system minimum of 8%—it will no longer operate when below this value. The recommended setting is 10%, and subsequent explanations will use this value as an example). If battery discharge still cannot meet the load demand, supplementary power will be drawn from the grid.

In order to avoid excessive energy consumption and battery abnormalities and to reserve more power for emergency use, a special design called “charging plan” is made for the high SOC power charging option. There are two time periods. When this option is selected, the battery is forced to charge according to the charge power within the time period all settings, until the set SOC value reached.

	When the power of PV is sufficient PV≥Load, PV→Load→Battery→Grid: The electricity generated by PVs, if sufficient, is supplied to the load in priority while the surplus is used to charge the battery. And any remaining electricity, if any, will be sent to the grid.
	When the power of PV is insufficient, Battery SOC%>10% PV<Load, PV+Battery≥Load, PV+Battery→Load: When the electricity generated by PVs is insufficient to supply the load, but the PV and battery can support the loads, the PV and battery will supply the loads.
	When the power of PV is insufficient, Battery SOC%≤10% PV<Load, PV+Grid→Load: When the battery SOC%≤10%, the battery will stop discharge, at this time PV and grid will supply power to the load together.
	Without of PV power, Battery SOC%>10% PV=0, Battery<Load, Battery+Grid→Load: When the battery is insufficient to supply the loads, battery and grid will supply the loads together. PV=0, Battery ≥ Load, Battery → Load: When the battery is sufficient to supply the loads, battery will supply the loads.

	
	Without of PV power, Battery SOC%≤10% **PV=0, Grid→Load:** When the battery SOC%≤ 10%, the battery will stop discharge and the grid will supply power to the load independently.
	charging plan **PV, Grid→Battery and Load:** To prevent excessive energy consumption, battery abnormalities (typically in winter), and reserve more energy for emergency situations, a charging plan is designed. This option includes two time periods. If this plan is selected, the machine will force-charge the battery according to the set charging power within the set time period until the set SOC value is reached.

3.3.1.2 TOU mode

We can set specific days of the week or specific times of the day to charge or discharge the battery, and improve economic efficiency by selling electricity during peak hours and purchasing electricity during off-peak hours.

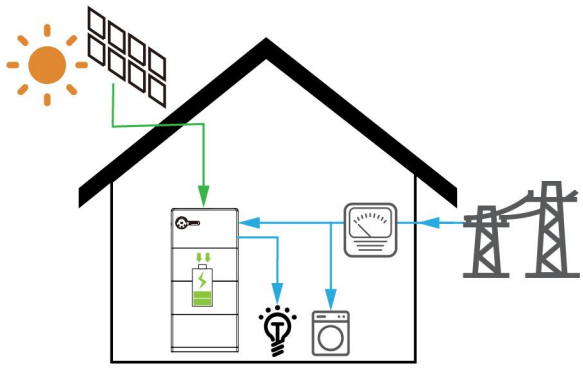
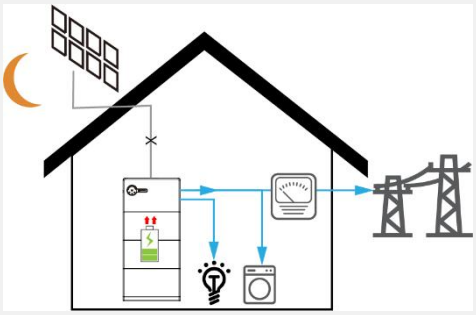
When the current SOC is greater than the minimum SOC for grid connection, the battery will be charged and discharged as usual.

Discharging will stop when the current SOC is less than or equal to the minimum SOC for grid connection. Furthermore, forced-charging is also controlled by the battery command (forced-charging is prioritized when required by the battery).

Here we considered some special situations as follows:

When the battery is under abnormal condition, charging or discharging will be stopped.

When the grid is cut off, the machine will automatically switch to the off-grid mode.

	Battery charging (Battery SOC<100%) ● When the power of PV is sufficient PV≥Battery, PV→Battery→Load↔Grid: When PV power is sufficient, the battery charge at set rates, with surplus power going to loads or the grid. If surplus power is insufficient for loads, the grid covers the shortfall. ● When the power of PV is insufficient PV<Battery, PV+Grid→Battery+Load: When PV power falls short of the set charging power, both PV and the grid supply energy to the battery and load. ● Without of PV power PV=0, Grid→Battery+Load: In the absence of PV, the grid solely supplies energy to both the battery and the load.
	Battery discharging (Battery SOC>10%) ● With of PV power PV>0, PV+Battery→Load→Grid ● Without of PV power PV=0, Battery→Load→Grid

3.3.1.3 Backup mode

The battery can only be discharged when the main power is abnormal and can be used as an emergency power source.

When the power grid is cut off, the machine will automatically switch to the off-grid mode. Maintain the battery's current SOC above the minimum grid-connected SOC.

When the current SOC is less than the minimum grid-connected SOC, it will be charged to the hysteresis point of the minimum grid-connected (minimum SOC+2%).

Given the current SOC at 95% - 100%, in order to reduce the waste of electricity caused by taking power from the power grid, priority will be given to ensuring the EPS power supply, and excess energy will be fed to charge to the battery.

When the Minimum On-Grid SOC% is≥95%:

- If the Battery SOC%≤95%:
  - If PV is sufficient, PV→Battery.
  - If PV is insufficient, PV+Grid→Battery.
- If the Battery SOC%>95%:
  - PV→Battery.
  - In the absence of PV, the battery is idle.

When the Minimum On-Grid SOC%<95%:

- If the Battery SOC%<Minimum On-Grid SOC%:
  - If PV is sufficient, PV→Battery.
  - If PV is insufficient, PV+Grid→Battery, charging the battery to Grid SOC + 2%.

- If the Battery SOC%≥Minimum On-Grid SOC%:
  - If PV is sufficient, PV→Battery.
  - In the absence of PV, the battery is idle.

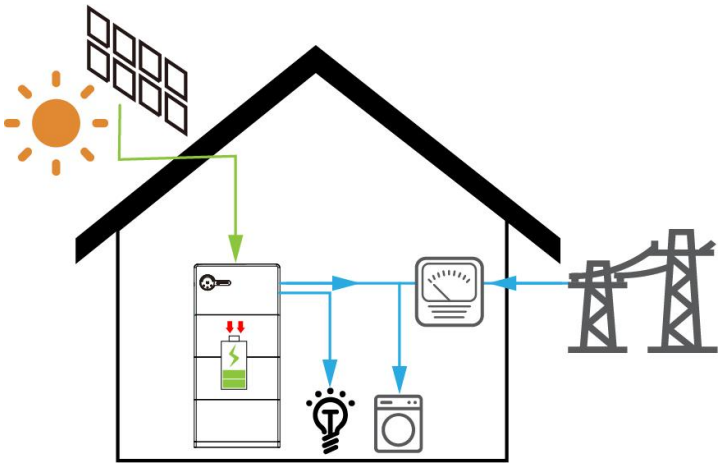


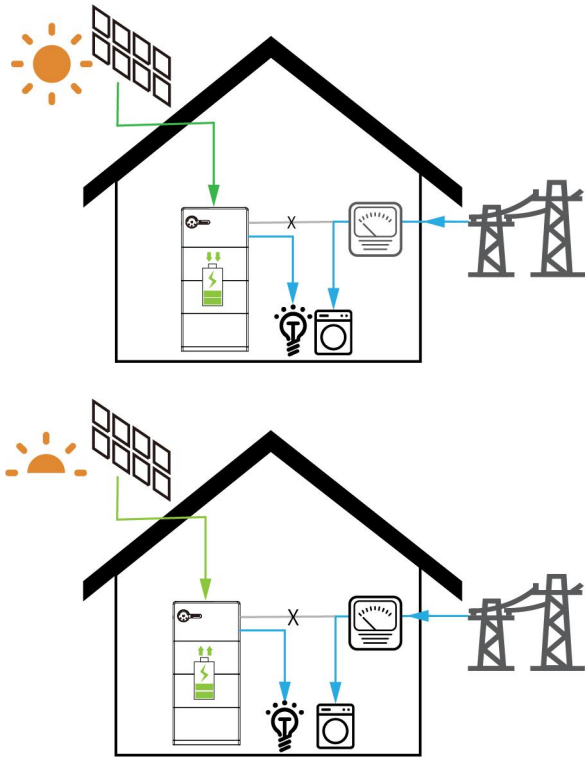
Figure 3-5 Backup mode

3.3.1.4 Forced off-grid mode

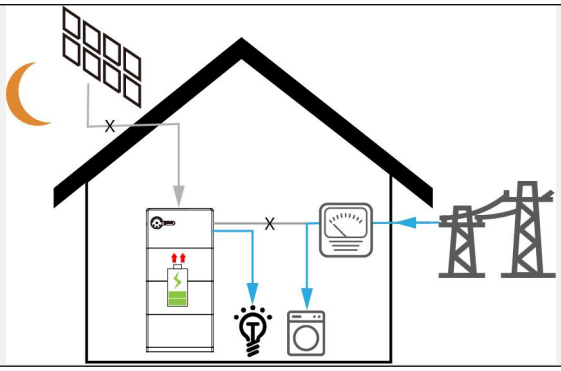
A pure off-grid system consisting of PV, batteries, and loads is suitable for areas without grids.

In this mode, the machine can be forced to disconnect from the grid and runs in the off-grid mode. Under such circumstances, the machine can neither send power to the grid or take power from the grid.

Battery charging and discharging are not controlled by this in off-grid mode (including no mains supply).



- When the power of PV is sufficient PV≥Load, PV→Load→Battery: PV will power the loads firstly, and surplus power will charge to the battery.
- When the power of PV is insufficient PV＜Load, PV+Battery→Load: The remaining power will be taken from the battery.

	● Without of PV power PV=0, Battery→Load: The battery will support emergency loads until it reaches its min SOC, after which the machine will enter idle mode.
Note: When the battery's SOC% is below the minimum off-grid SOC%, disconnect the load and charge the battery at full capacity using PV.	

The Compatibility for Backup under off-grid Scenario

In off-grid scenarios, before enabling the product's backup mode, please refer to the following instructions: When the PV voltage exceeds 900V, the backup side will operate at a reduced rate.

Main electrical panel

The data of the compatibility for backup of SN15HTC/ SN12HTC/ SN10HTC/ SN8.0HTC/ SN6.0HTC/ SN5.0HTC are based on the test with batteries (SOC/Temperature). For the actual application, please refer to the maximum output capacity of the battery.

3.3.2 Machine Run Mode

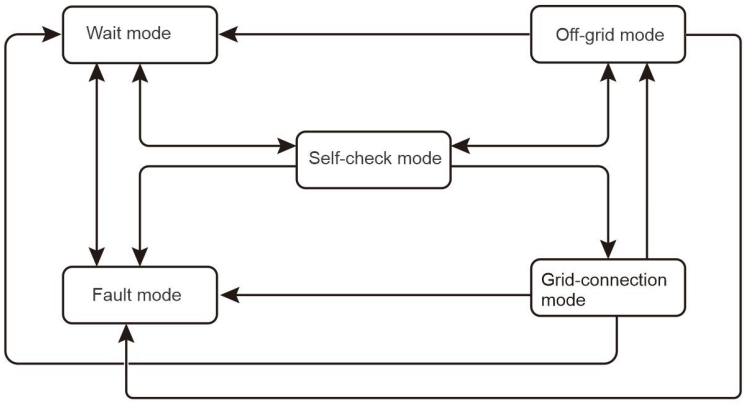


Figure 3-6 machine run mode

Table 3-5 machine run mode

Sign	Parts	Description
1	Wait mode	Wait stage when the machine is powered on ● Enter the self-check mode when conditions are met. ● In case of fault, the machine is switched to the fault mode.
2	Self-check mode	The machine, before startup, shall continuously perform self-check, initialization, etc. ● When conditions are met, enter the grid-connection mode so that the machine starts grid-connected operation. ● If no grid is detected, enter the off-grid mode so that the machine starts off-grid operation. Given the machine is lack of off-grid function, enter the wait mode. ● If self-check fails, enter the fault mode.

3	Grid-connection mode	The machine performs the grid-connection operation as usual. ● If detection shows grid absence, enter the off-grid working mode. ● If fault is detected, enter the fault mode. ● If it is detected that the grid condition does not meet the grid-connection requirements, and no off-grid output function is activated, enter the wait mode.
4	Off-grid mode	In case of grid power failure, the machine will switch to off-grid mode so as to continuously supply power to the loads. ● If fault is detected, enter the fault mode. ● If it is detected that the grid condition does not meet the grid-connection requirements, and no off-grid output function is activated, enter the wait mode. ● If it is detected that the grid conditions meet the grid-connection requirements, and off-grid output function is activated, enter the self-check mode.
5	Fault mode	If fault is detected, the machine enters the fault mode, and enters the wait mode after fault clearance.

3.4 Function characteristics

Power derating

For safe operation, HTC series product will automatically reduce the output power under the non-optimum condition. The following factors may cause power derating, please try to avoid them during use.

- Unfavorable environmental condition, such as direct exposure to sunshine, high temperature, etc.
- Machine's output power percentage has been set.
- Load shedding due to over frequency.
- The input voltage is too high or too low.
- The input current is high.
- The charging and discharging power of the battery is restricted due to high or low ambient temperatures.
- The battery's charging and discharging power is limited by its inherent capacity constraints.

AFCI (By default, this function is closed)

Causes of electric arc:

- Inadequate connector connection in the PV system or battery system.
- Cable connection is incorrect or damaged.
- Connector, cable are aging.

Electric arc detection method

- Machine integrated AFCI function.
- When the Machine detects an electric arc, an indication of the time and phenomenon of the fault can be displayed through the App.
- If the Machine trips less than 5 times within 24h, the alarm can be automatically

cleared. The Machine will be shut down for protection on the 5th arc fault trip. The Machine may not resume operation until the fault is cleared.

- If the number of arc faults occurring in HTC series products is less than 5 within 24 hours, the alarm will be automatically cleared. After the 5th arc fault occurs, the product will trigger shutdown protection, and normal operation can only be resumed after the fault is eliminated.

RSD (Optional)

The Machine is equipped with a built-in signal transmitter that can communicate with an external unit module-level disconnector. In case of the emergency, the transmitter can be disabled by enabling the external emergency switch to shut down the module.

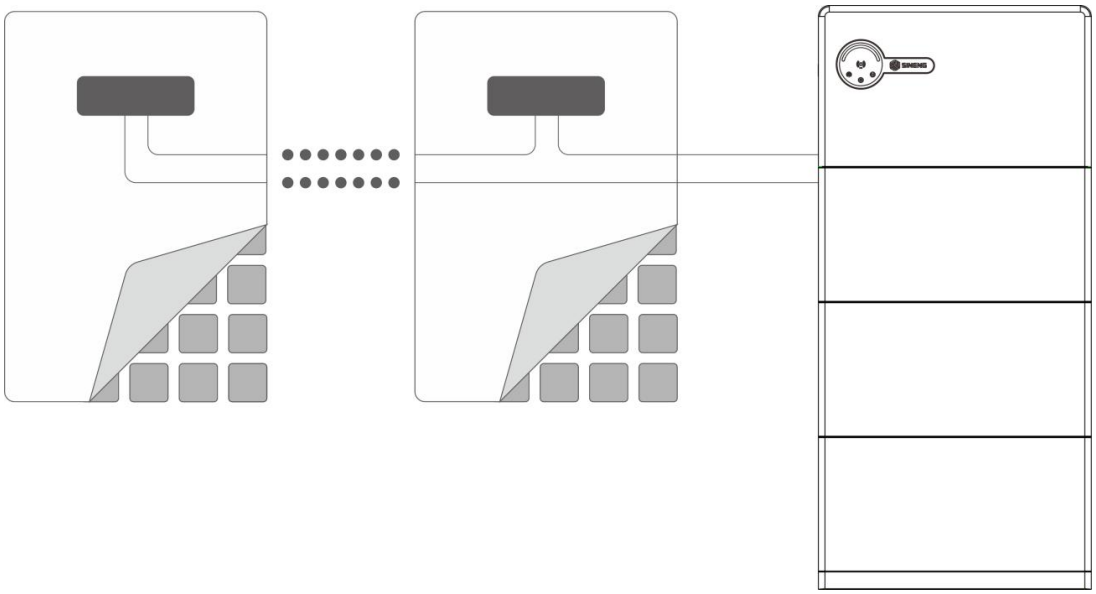


Figure 3-7 RSD function

Earth Fault Alarm

The Machine is equipped with the reserved port used for earth fault alarm.
In case of earth fault, the LED fault light of the Machine will be on.

3.5 Product Appearance

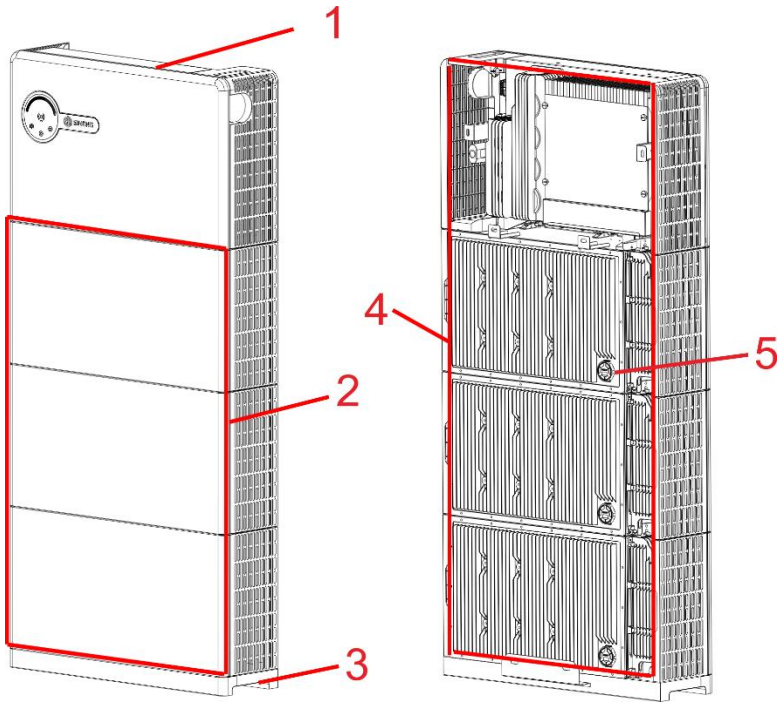


Figure 3-8 Appearance and dimensions

1	Inverter	2	Battery	3	Installation base
4	Heat sink	5	Safety valve		

Inverter

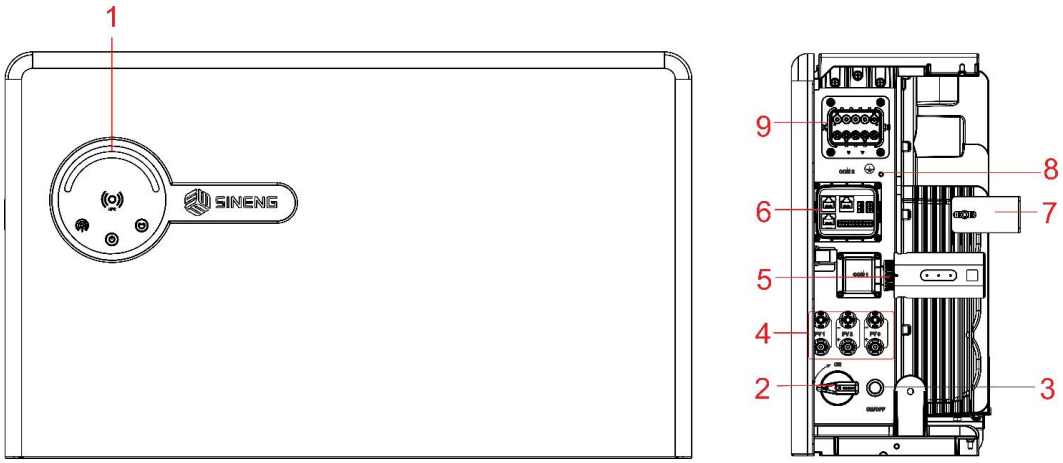


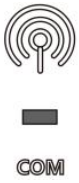
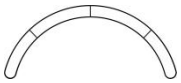
Figure 3-9 Inverter

Table 3-6 Appearance of the inverter

Sign	Content	Description
1	Indicator light	Indicate the inverter's operation state.
2	DC switch*	Control DC input On/Off
3	Battery switch button	Controls the battery switch
4	PV input port	To connect PV module DC input cable
5	Communication module interface (WIFI/Bluetooth)	To connect external APP and cloud platform
6	Communication port	To connect external communication and monitoring
7	Wall bracket	To fix the inverter
8	Protective ground terminal	Connect protective ground wire
9	Grid-connected/ Off-grid terminal	To connect AC grid cables/To connect the AC critical load cable
** DC switch ratings:* *SN15HTC/SN12HTC/SN10HTC/SN8.0HTC: Ui: 1500V; Uimp:8kV; -40℃ to +85℃; 6 polarity; DC-PV2, Ue/Ie:1200V/25A; 1000V/32A; I(make)/Ic(break): 4xIe; Icw: 1.5KA, 1s; Icm:2.0kA; Suitability for isolation.* *SN5.0HTC/SN6.0HTC: Ui: 1500V; Uimp:8kV; -40℃ to +85℃; 3 polarity; DC-PV2, Ue/Ie:1000V/50A; 1500V/16A; I(make)/Ic(break): 4xIe; Icw: 1.5KA, 1s; Icm:2.0kA; Suitability for isolation.*		

Description of Panel Indicators

Table 3-7 Description of indicators

Category	Symbol	Status	Definition
Status light		Red light - On	Fault, shutdown, or ARM-to-DSP communication fault
		Yellow light - On	Alarm, no shutdown
		Blue light - On	Normal operation
		Blink	Wait
Communication light		Blue light - flash	Data interaction with RS485 or USB port
		Blue light - Off	No data interaction with RS485 or USB port
EPS light		Blue light - On	Grid connection, Bypass relay closes
		Blue light - flash	Off-grid mode, EPS working
		Blue light - Off	EPS not working
Battery light - charging/discharging		Blue light 4 - flash	Charging SOC>75%
		Blue light 4 - On	Discharge/Idle SOC >75%
		Blue light 3 - flash	Charging SOC>50%
		Blue light 3 - On	Discharge/Idle SOC >50%
		Blue light 2 - flash	Charging SOC>25%
		Blue light 2 - On	Discharge/Idle SOC >25%
		Blue light 1 - flash	Charging SOC>10%
		Blue light 1 - On	Discharge/Idle SOC >10%
		Blue light - all off	SOC<10% or communication failure
Remarks: Battery indicators (4 in total, blue) are arranged from left to right (corresponding to SOC 25%-100%). The Status light remains on, while the other indicators will turn off after 5 minutes. When the status light is touched, all indicators will resume display.			

Nameplate

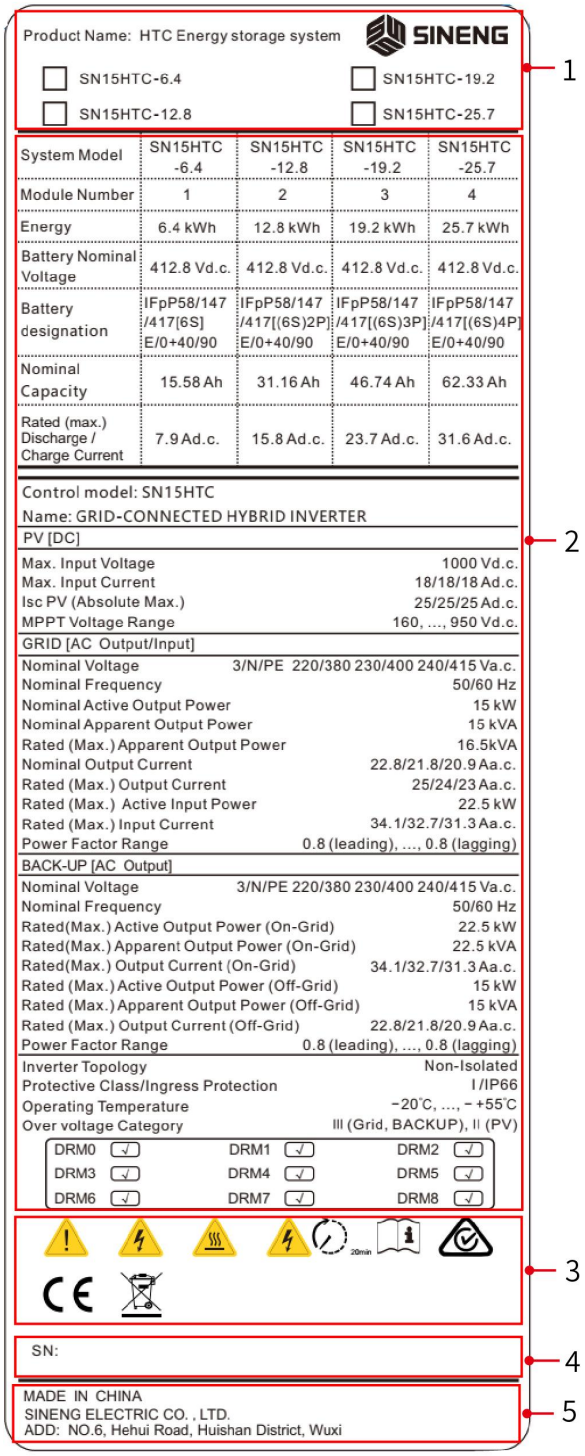


Figure 3-10 HTC Energy Storage System Nameplate and Label

1	Trademark and product name	2	Product specifications	3	Product safety symbols and certification marks
4	Serial number	5	Manufacturer		

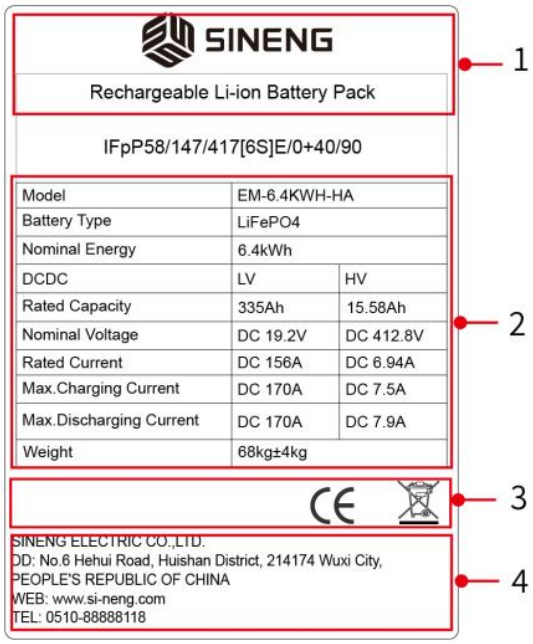


Figure 3-11 Battery Nameplate and Label

1	Trademark and product model	2	Product specifications	3	Product safety symbols and certification marks
4	Serial number				

Table 3-8 Product Sign Description

Sign	Description
	This sign indicates that it shall be noted.
	This sign indicates that there is high voltage inside the equipment. Touching the equipment may cause electric shock.
	This sign indicates that the temperature here is beyond the acceptable range of the human body. Please do not touch it to avoid personal injuries.
	The machine can discharge to a safe voltage 20 minutes after it is completely powered off, only then can the professionals operate it.
	Professionals should refer to the user manual when installing or maintaining the machine.
	If the user intends to discard this product, it must be sent to an appropriate place for recovery and recycling, which cannot be disposed of as domestic waste.
	This product complies with CE certification.
	This product complies with TUV certification.

	This product complies with RCM certification.
DRM0 DRM1 DRM2 DRM3 DRM4 DRM5 DRM6 DRM7 DRM8	This product complies with DRM certification.

3.6 Battery Capacity Description

HTC series products support flexible selection of battery quantity and subsequent capacity expansion, with a maximum of four batteries that can be connected. For different power models, the recommended matching schemes are as follows: 5/6kW inverters are recommended to be configured with 2 batteries, 8/10kW models with 3 batteries, and 12/15kW models with 4 batteries.

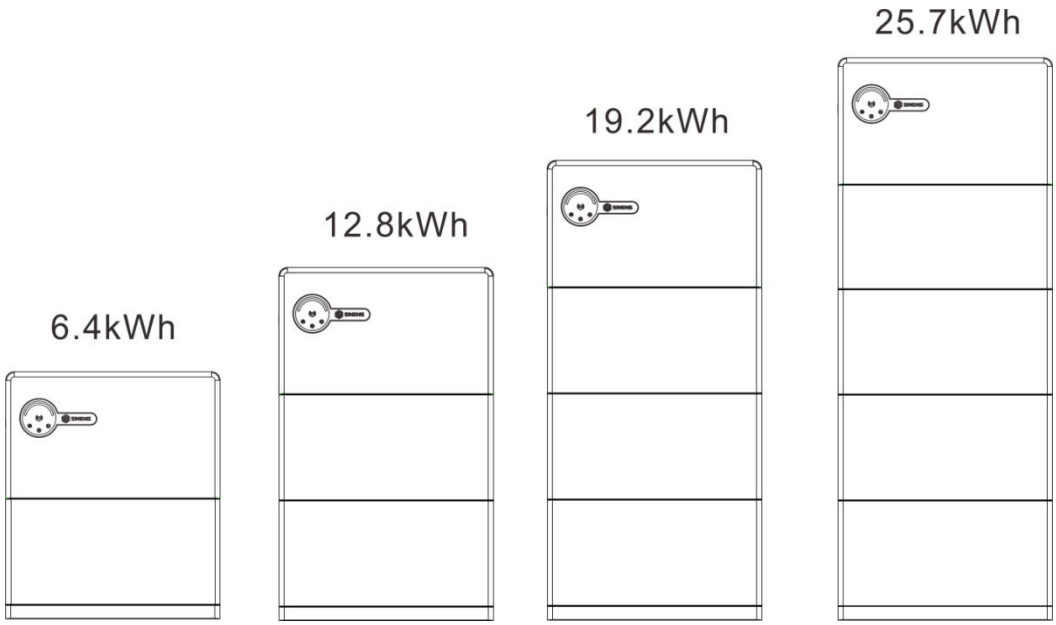


Figure 3-12 Battery capacity description

Chapter 4 Inspection Before Installation

4.1 Outer Packaging Inspection

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

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

4.2 Delivery Inspection

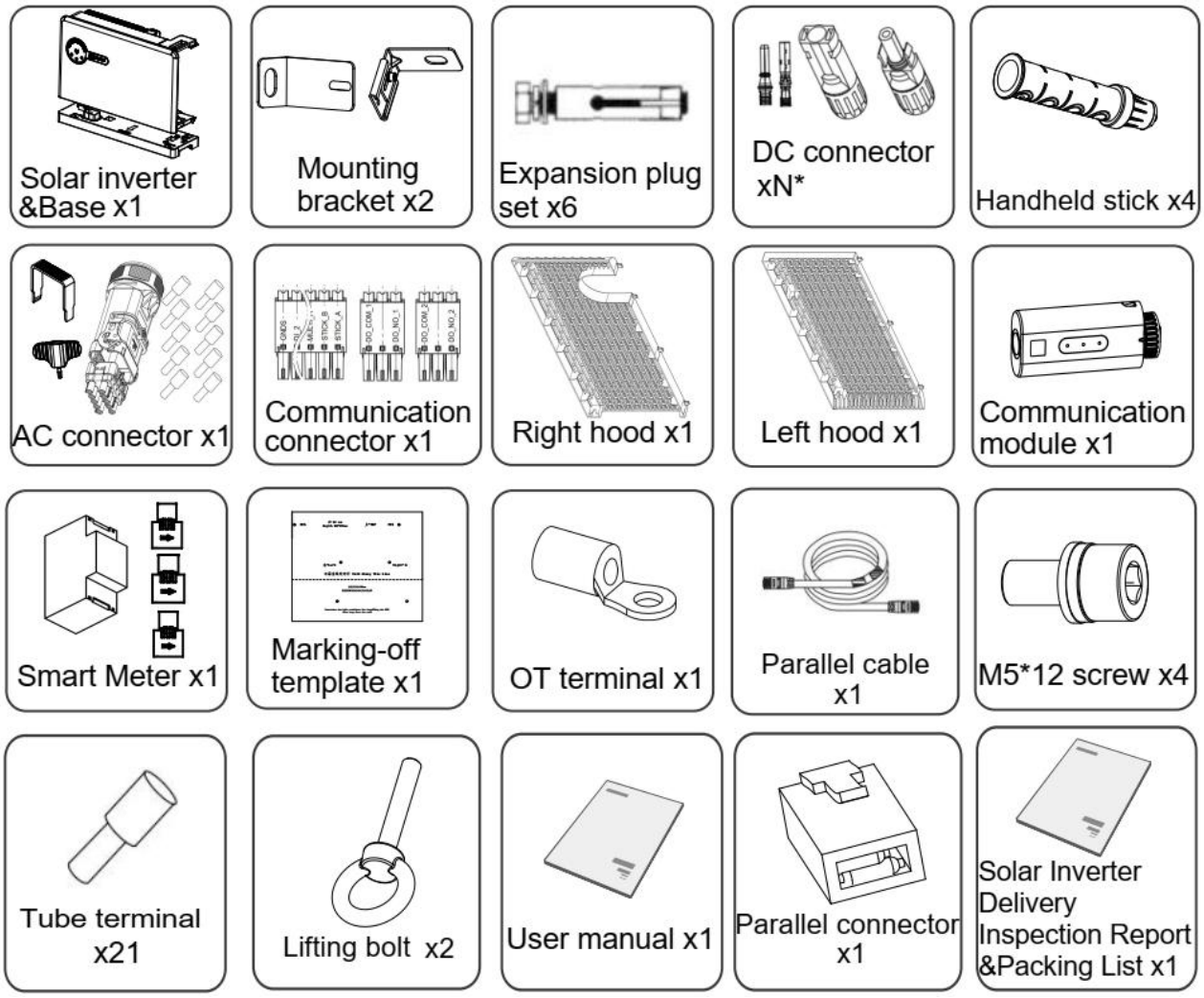


Figure 4-1 Delivery list

*The number of the DC connectors of SN5HTC/SN6HTC is 2.

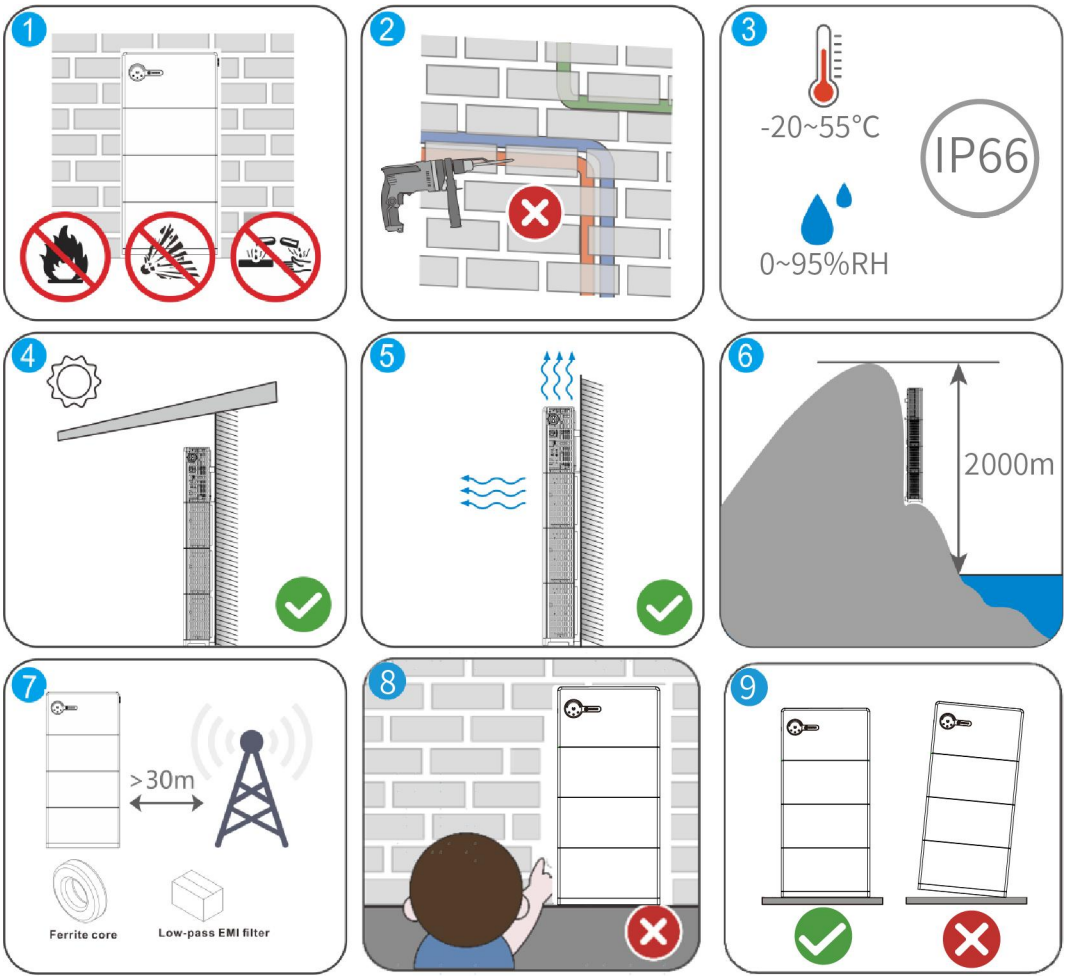
*The number of the DC connectors of SN8HTC/SN10HTC/SN12HTC/SN15HTC is 3.

Chapter 5 Machine Installation

5.1 Requirements for installation tool

Figure 5-1 Tools recommended for installation

5.2 Requirements for installation environment



- The equipment cannot be installed in flammable, explosive, corrosive or other alike environments.
- The installation height of the equipment should be convenient for operation and maintenance. Ensure that the indicators and all labels of the equipment are easy to check, and the terminal blocks are easy to operate.
- Please avoid the water pipes and cables in the wall to avoid danger when drilling holes for installation.
- The equipment protection level meets the requirements for indoor and outdoor installation, and the temperature and humidity of the installation environment must be within the appropriate range.
- The machine needs to be installed away from sunshine, rain, snow, and other alike environments. It is recommended to install it in a sheltered location. If necessary, a sunshade can be built.
- The installation space must meet the requirements for ventilation, heat dissipation and operation.
- The installed equipment should be out of reach for children, and should not be in places that are easy to touch. The surface of the equipment may be hot when it is in operation, take caution to avoid burns.
- The product installation altitude should be less than 2000m (the maximum working altitude).
- Keep away from strong magnetic field to avoid electromagnetic interference. If there

are radio stations or wireless communication equipment below 30MHz nearby, please install the equipment according to the following requirements:

- Add a ferrite core with multi-turn windings at the DC input line or AC output line of the machine, or add a low-pass EMI filter.
- The distance between the machine and the wireless electromagnetic interference equipment exceeds 30m.
- Do not install the battery at forward tilted, back tilted, side tilted, horizontal, or upside down positions.

Note: The battery may not work at -20~-15 ℃ and 50~55 ℃.

5.3 Installation Space Requirements

5.3.1 Installation of single machine

When installing a single machine, reserve enough space around it for the installation, maintenance and heat dissipation. It is recommended to leave a space of 600 mm or more on the left, right, and above the machine. The installation space of a single machine is shown in the figure below.

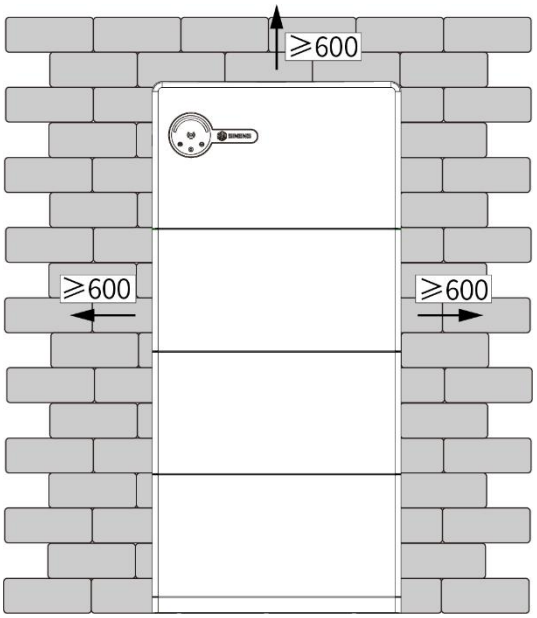


Figure 5-2 Installation space requirements (Unit: mm)

5.3.2 Installation of multiple machines

To ensure good heat dissipation of the machine and easy maintenance, when multiple machines installed, leave an appropriate distance between them. Generally, single-row side-by-side installation is recommended. The specific installation requirements are as follows:

When the machines are installed side by side in a single row, the distance between the machines is not less than 600mm. And the distance between the machines and the upper, left, and right solid objects (such as walls) should meet the spatial requirements for the installation of a single machine, please refer to the following diagram.

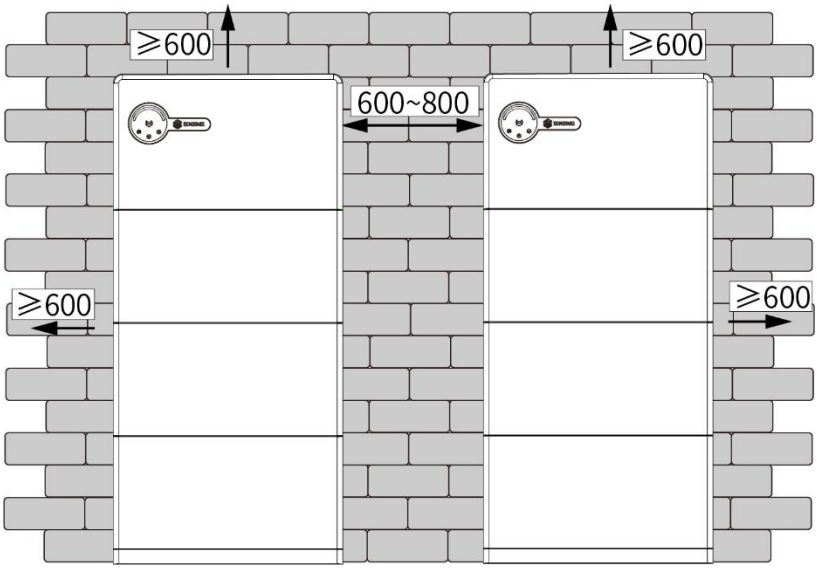


Figure 5-3 Single-row side-by-side installation (Unit: mm)

5.4 Installation of product

Caution

- Before installation, the machine needs to be transported to the installation site. To avoid personal injury or equipment damage during the transportation, please pay attention to the following:
  - Please arrange personnel according to the weight of the equipment to prevent the equipment from exceeding the weight that the human body can carry and even hurting people.
  - Wear safety gloves to avoid injury.
  - Please ensure that the equipment is balanced during transportation to avoid falling.
- Please avoid the water pipes, cables, etc. in the wall to prevent danger when drilling holes.
- When drilling holes, please wear goggles and a dust mask to prevent dust from being inhaled or falling into your eyes.
- Please prepare your own DC switch lock.

Procedure

Step 1 Determine the punching position according to the product installation dimensions drawing shown in Figure 5-4.

Caution

- Fold the perforated paper along the dotted line and lay it flat on the ground.

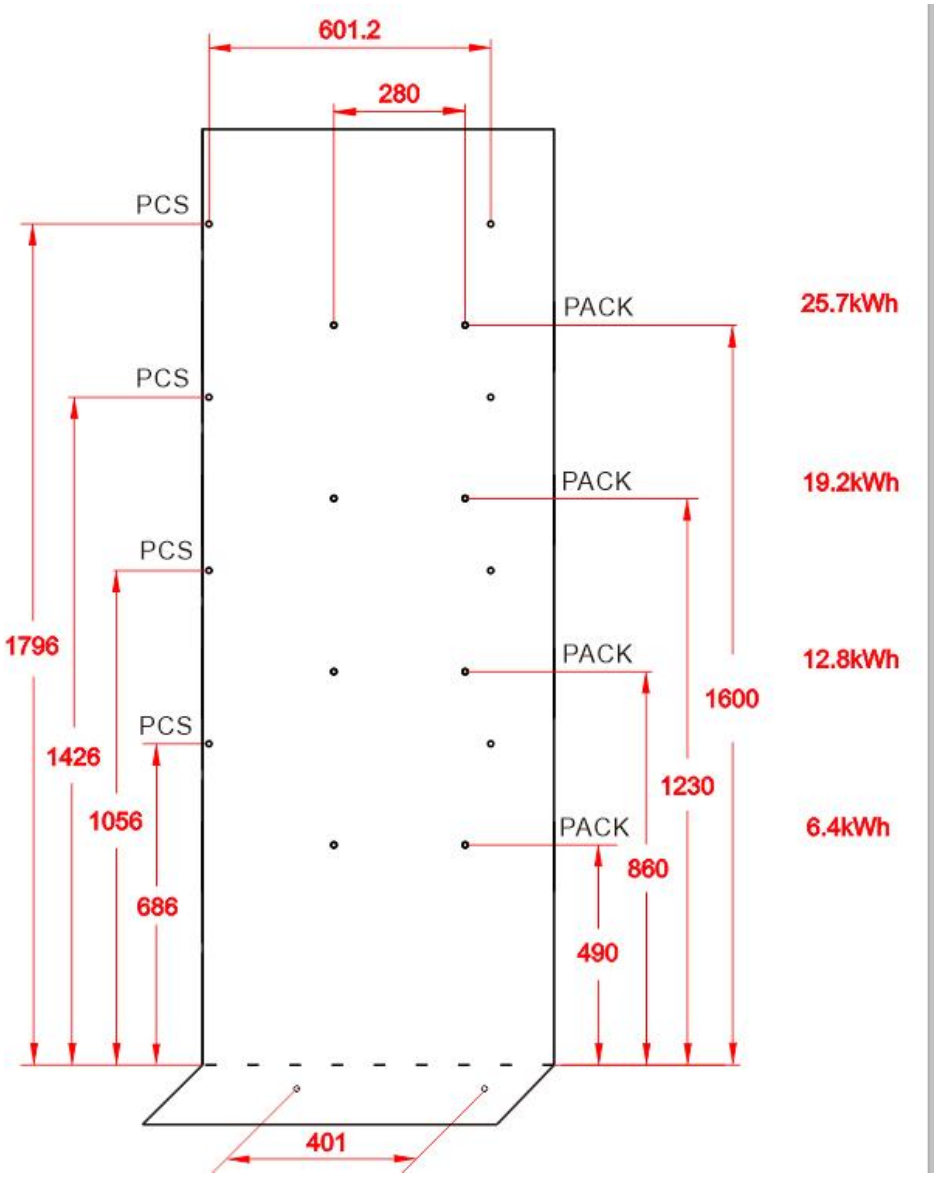


Figure 5-4 Drilling dimensions (Unit: mm)

Step 2 Unscrew the screws on both sides, separate the base from the inverter, and remove the base.

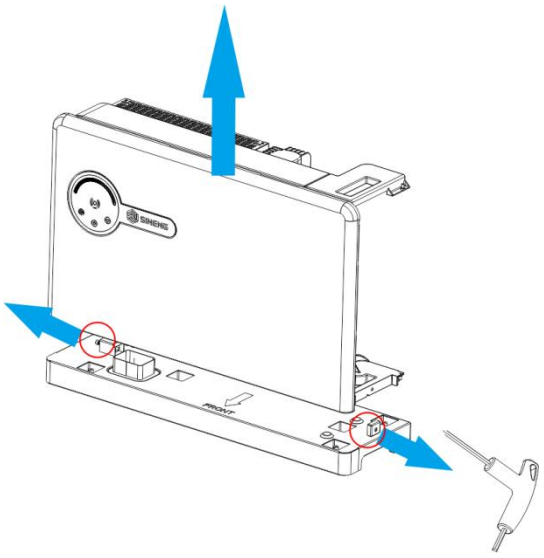


Figure 5-5 Separate the base from the inverter

Step 3 Use a percussion drill with the drill bit diameter of 12mm to drill holes and ensure that the depth of the hole is about 65mm.

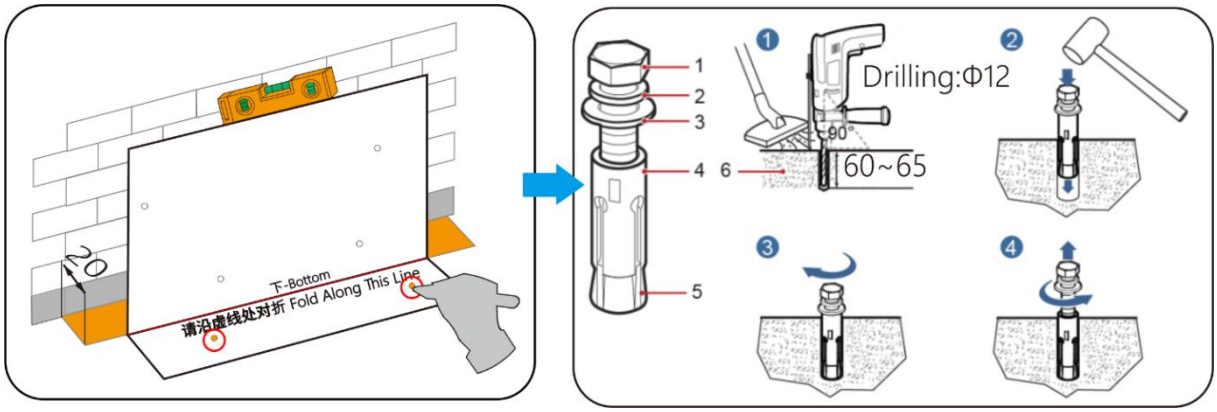


Figure 5-6 Install expansion tubes (Unit: mm)

1 M8 bolt 2 Spring washer 3 Washer

4 Expansion tube 5 Expansion nut 6 Foundation

Step 4 Rotate the leveling screws, level the base using a level, then secure it with expansion bolts.

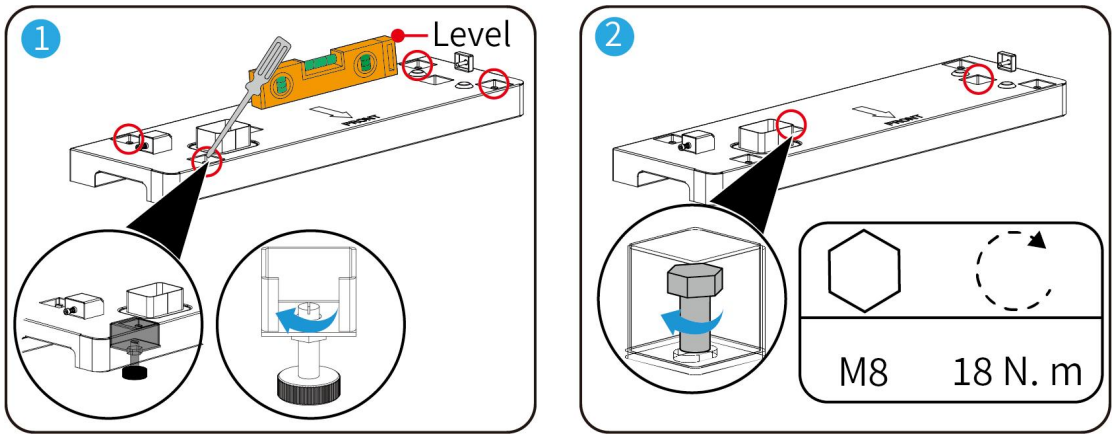


Figure 5-7 Install the base

Step 5 Use the lifting rod to install the PACK one by one from bottom to top, and tighten the socket head cap screws on both sides.

Caution

- After installing PACK, install and tighten the screws on the left and right sides of the PACK, and then install the next PACK.
- Use a lifting tool to install the 4th PACK and tighten the screws on both sides.

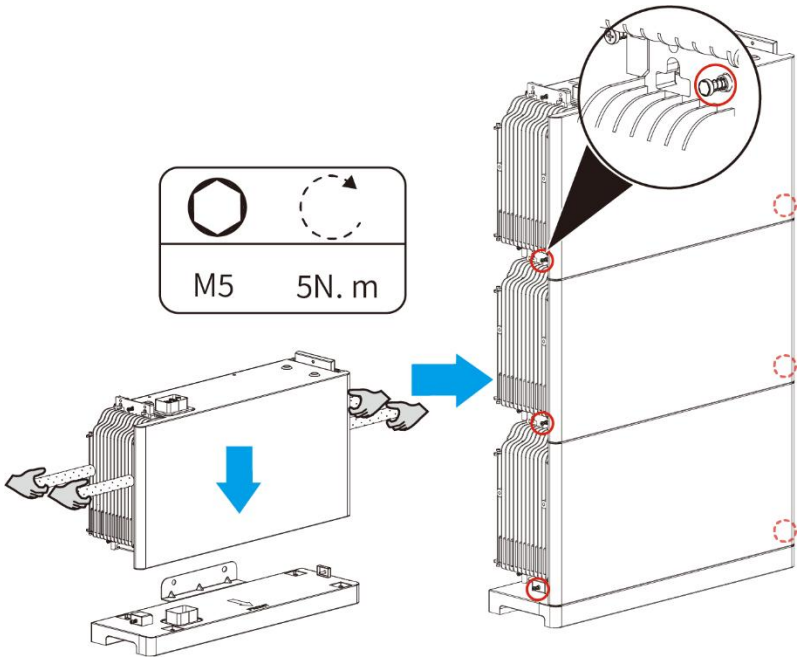


Figure 5-8 Install PACK

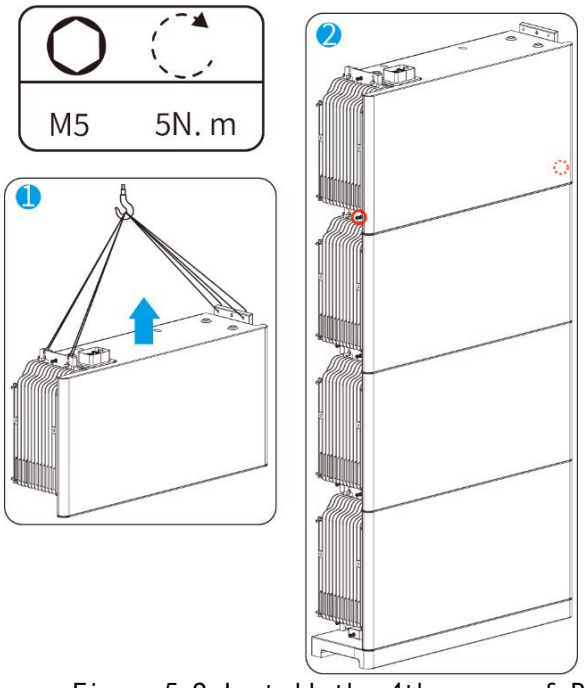


Figure 5-9 Install the 4th group of PACKs

Step 6 Use a percussion drill with the drill bit diameter of 10mm to drill holes and ensure that the depth of the hole is about 65mm.

Caution

- When drilling holes, place a soft blanket on the battery so that dust can fall on

the blanket. The battery port must be covered to prevent dust from entering.

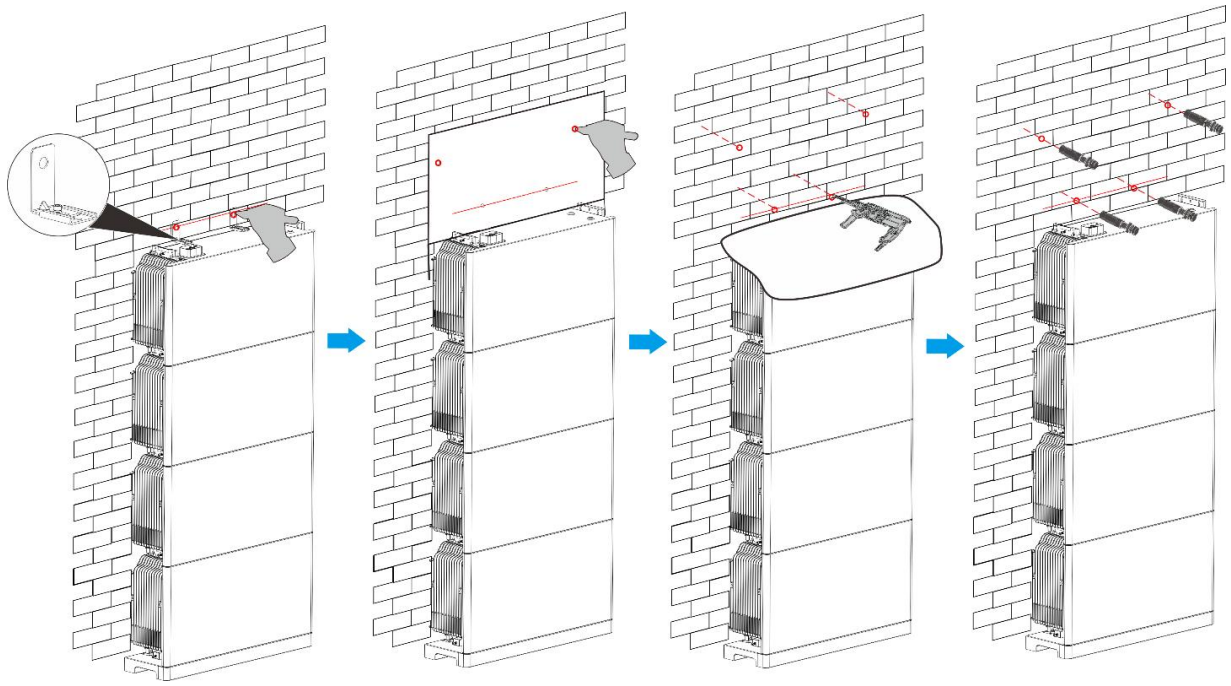


Figure 5-10 Drill holes

Step 7 Install the Installation board.

Caution

- According to the wall spacing, loosen the hexagon socket screws to adjust the Installation board.

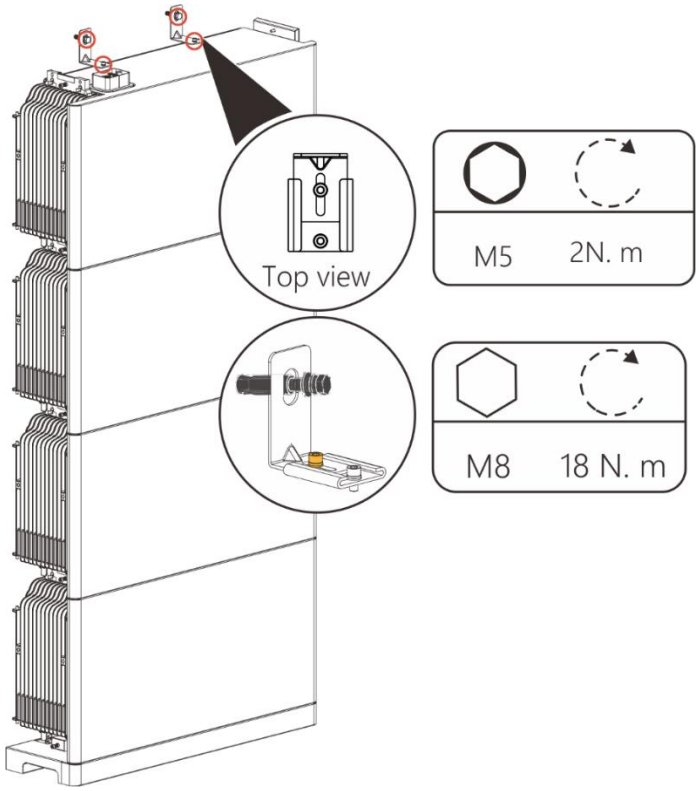


Figure 5-11 Install the Installation board

Step 8 Use the lifting rod or a lifting tool to install the inverter.

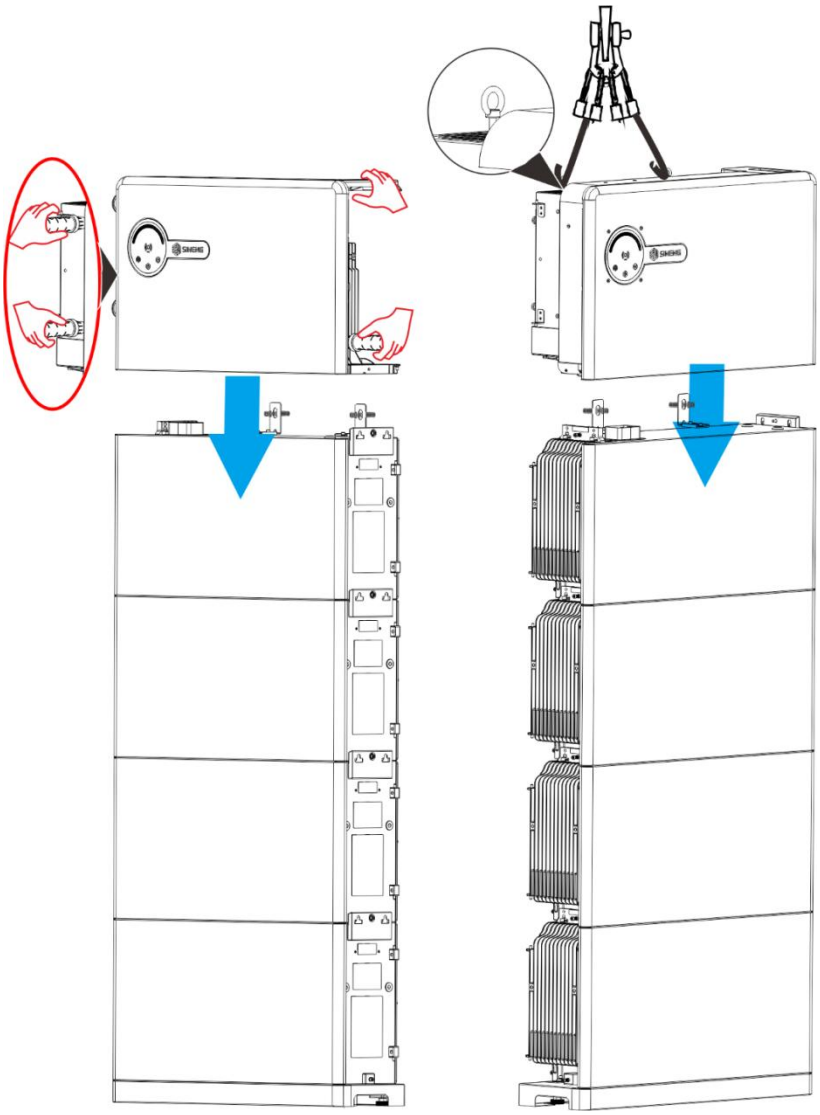


Figure 5-12 Install the invertor

Step 9 Install the L-shaped structural part of the inverter and tighten the screws.

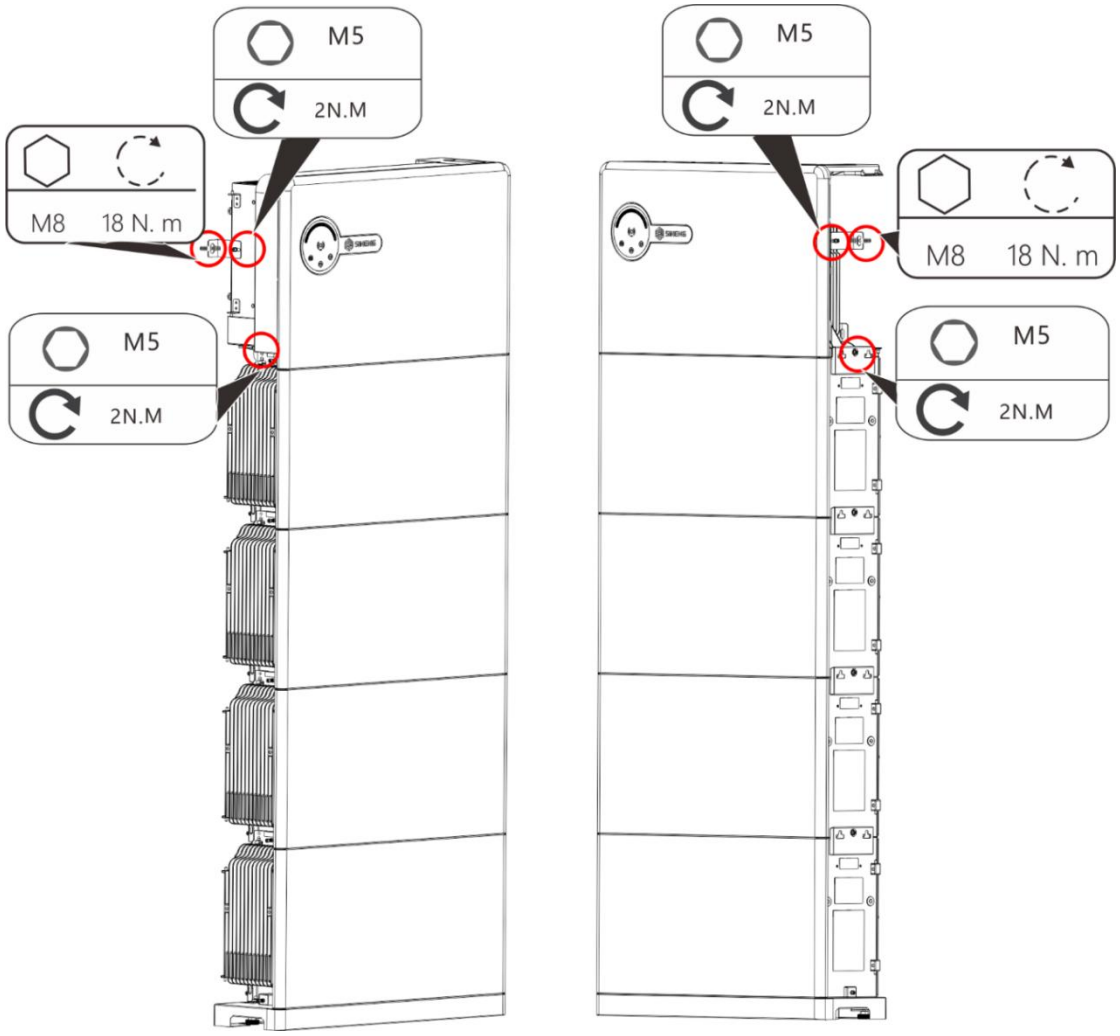


Figure 5-13 Install the L-shaped structural part

Step 10 Install the side trim plate of the PACK (There are buckles on the side wall of the PACK. The trim plate needs to be aligned with the hole positions, and it can be fixed by pushing it to the buckle positions.)

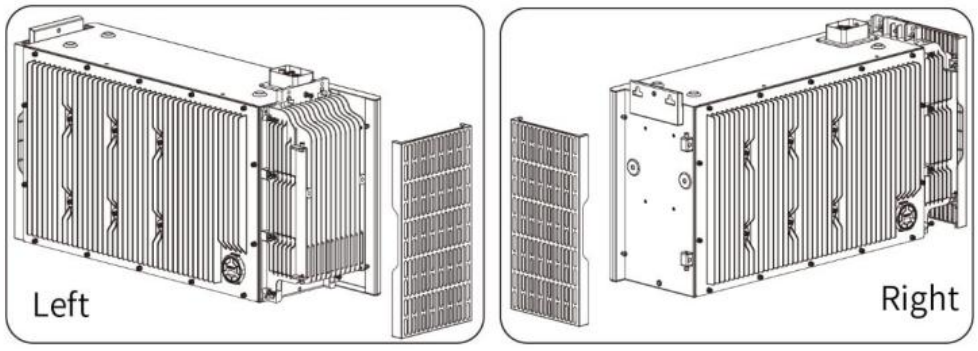


Figure 5-14 Install the trim plate of the PACK

5.5 Install the Communication module

Warning

- Please install the communication module in strict accordance with the user manual!
- When installing the communication module, the three indicator lights should face

outward.

- When installing the communication module, it is forbidden to rotate the WIFI module, which may result in loose terminals on the panel end and cause water to enter the inverter.
- To install the communication module, please tighten the plastic nut clockwise, otherwise there will be a risk of abnormal communication or water ingress.

Procedure

Step 1 Unscrew the dust-proof cover of the aviation plug, insert the communication module into the data acquisition stick terminal, and tighten the plastic nut clockwise.

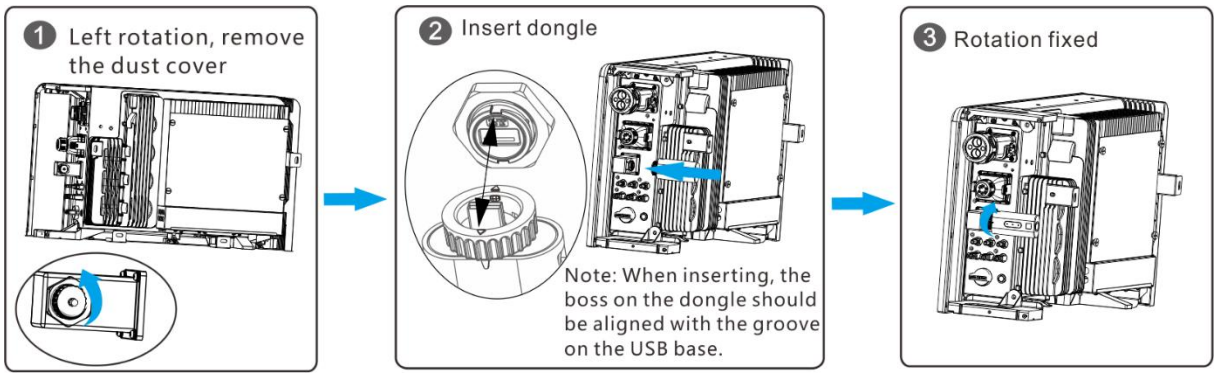


Figure 5-15 Install the Communication module

Chapter 6 Installing the Cables

Warning

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

Table 6-1 Cable Specifications

Scenario	Type	Copper Wire (mm^2)	Fastening Bolt	Torque (N.m)
Grounding cable	Outdoor copper core cable	6	M5(OT terminal)	4.5
AC cable (On-grid)	Outdoor copper core cable (5-core)	6	\	2
AC cable (Off-grid)	Outdoor aluminum core cable (5-core)	6	\	2
DC cable	Meet the standard for 1000V	4～6	\	\
Communication cable	\	\	RJ48 cable terminal	\

6.1 Installing an External Ground Cable

Warning

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

Procedure

Step 1 Use a wire stripper to strip a piece of bare copper core from the grounding cable of the corresponding specification, and the length of the bare copper core should be 3mm longer than the wiring end of the OT terminal.

Step 2 Use crimping pliers to crimp the OT terminal to the bare copper core.

Step 3 Put a heat-shrinkable sleeve of suitable size on the wiring end of the OT terminal, and the length of the heat-shrinkable sleeve (withstanding voltage ≥ 1000V) is generally recommended to be 1.5--2 times longer than that of the wiring end.

Step 4 Use a heat gun to blow the heat-shrinkable sleeve, making the sleeve wrap the terminal and cable tightly to complete the preparation of cable (the process is shown in the steps in the figure below①).

Step 5 Fasten the OT terminal of the grounding cable to the grounding port with an M5 screw, and the tightening torque is 1.4~1.6N.m (refer to the steps in the figure below for details).

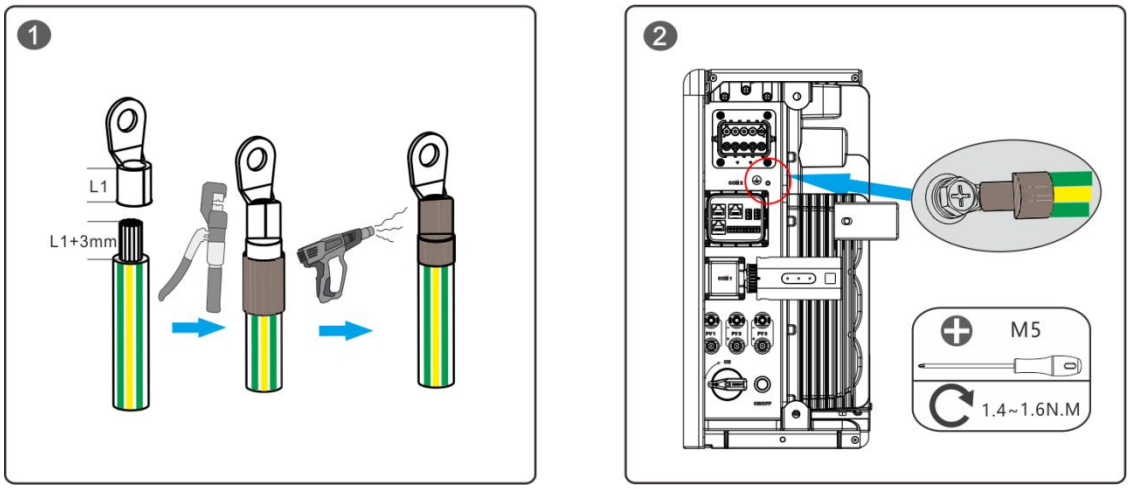


Figure 6-2 Crimping terminals (Unit: mm)

Step 6 After the ground terminal is tightened, apply silicone or outdoor paint on the outside of the terminal.

6.2 Connect AC cable(on-grid) and AC cable(off-grid)

Warning

- An AC circuit breaker matching the power of the machine must be connected between the inverter output and the grid, and each machine corresponds to an independent circuit breaker!
- The on-grid and off-grid cable locks and fixing screws must be tightened, otherwise

there is a risk of machine damage or fire!

- When connecting on-grid and off-grid cables, make sure that the AC circuit breaker is disconnected!
- Machines and AC circuit breakers are prohibited from connecting to loads!

Electrical system wiring diagram

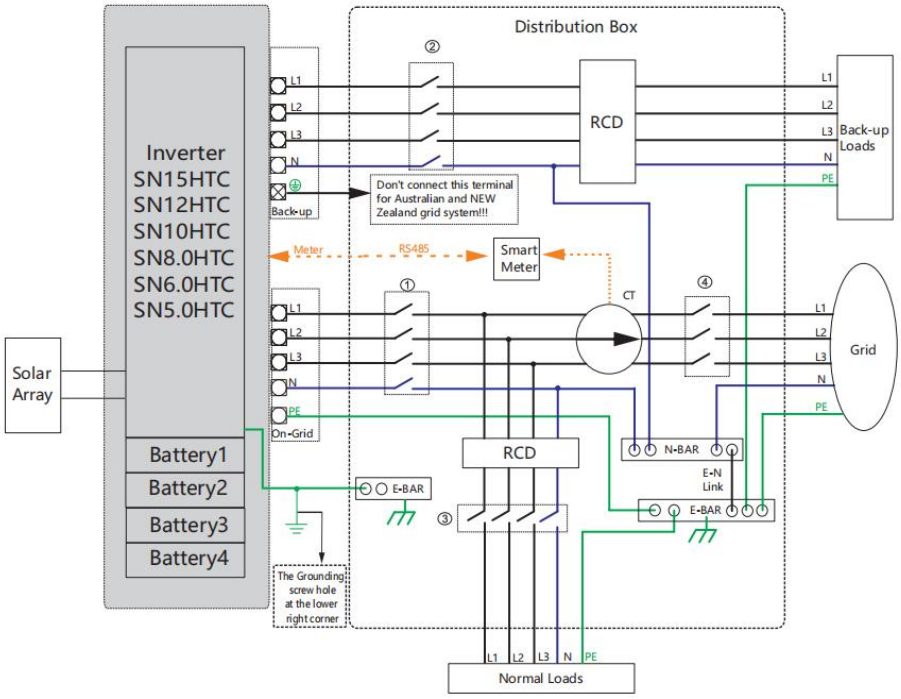


Figure 6-3 Electrical system wiring diagram

This diagram is an example for an application that neutral connects with the PE in a distribution box.

For countries such as Australia, New Zealand, South Africa, etc., please follow local wiring regulations!

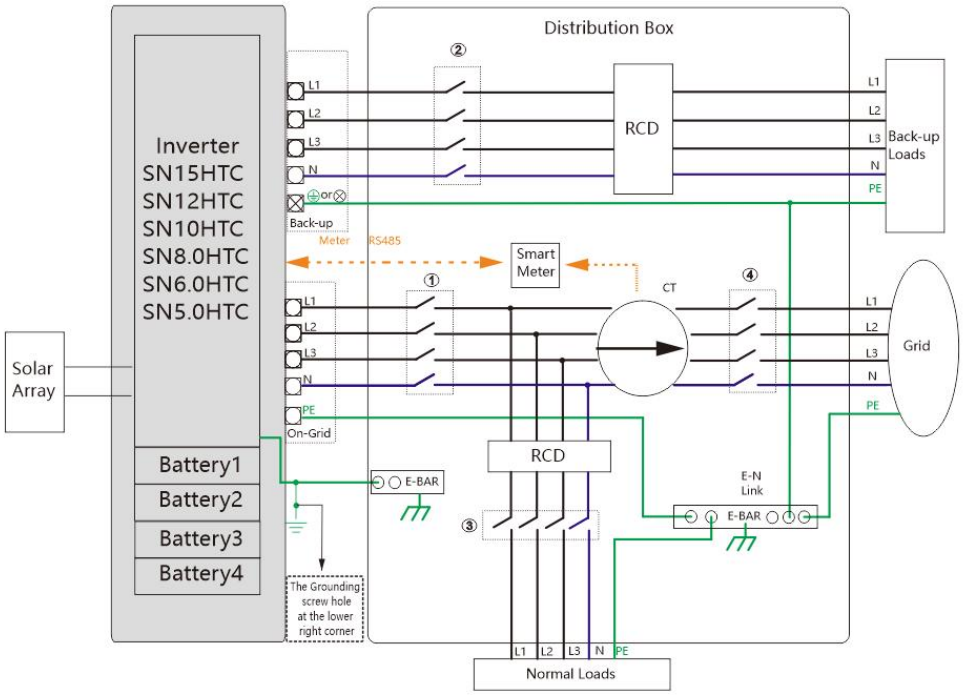


Figure 6-4 Electrical system wiring diagram

This diagram is an example for an application in which neutral is separated from the PE in the distribution box.

For countries such as China, Germany, the Czech Republic, Italy, etc., please follow local wiring regulations.

To ensure that the HTC series machine is normally disconnected from the grid under abnormal conditions, please select a suitable AC circuit breaker. The recommended specifications are as follows:

NO.	SN15HTC/ SN12HTC/ SN10HTC/ SN8.0HTC/ SN6.0HTC/ SN5.0HTC
①	Recommended rated current≥50A
②	To be specified in conjunction with the actual load.
③	Depends on loads.
④	Depends on household loads and machine capacity. (Optional)

The HTC series machine integrates a leakage protection circuit. If the leakage current is greater than the protection threshold value required by safety regulations, the machine will automatically disconnect from the power grid.

If the AC circuit breaker is furnished with leakage current detection function, please select the appropriate device according to the table below.

Inverter model	Leakage current trigger value
SN15HTC	300mA
SN12HTC	
SN10HTC	
SN8.0HTC	
SN6.0HTC	
SN5.0HTC	

Note: Recommendation for the Installation of Type B RCDs.

Procedure

Step 1 Prepare on-grid and back-up cables, and strip the cables as shown in the following figure①.

Step 2 Disassemble the AC connector, then insert the on-grid cables into the on-grid output terminal, and insert the back-up cables into the back-up output terminal.

Step 3 Use a hex wrench to fix the AC cables. Connect the AC output terminal and the machine.

Caution

- Please do not open all the hole, if the back-up cable is not connected.
- Before connecting the cables, disconnect the circuit breaker between the power grid and the machines.
- Make sure that the protective layer of the cable is inside the connector, otherwise it will lower the sealing level at the terminal.
- When fixing the cables, ensure that the cores are fully inserted into the wiring holes without exposure.

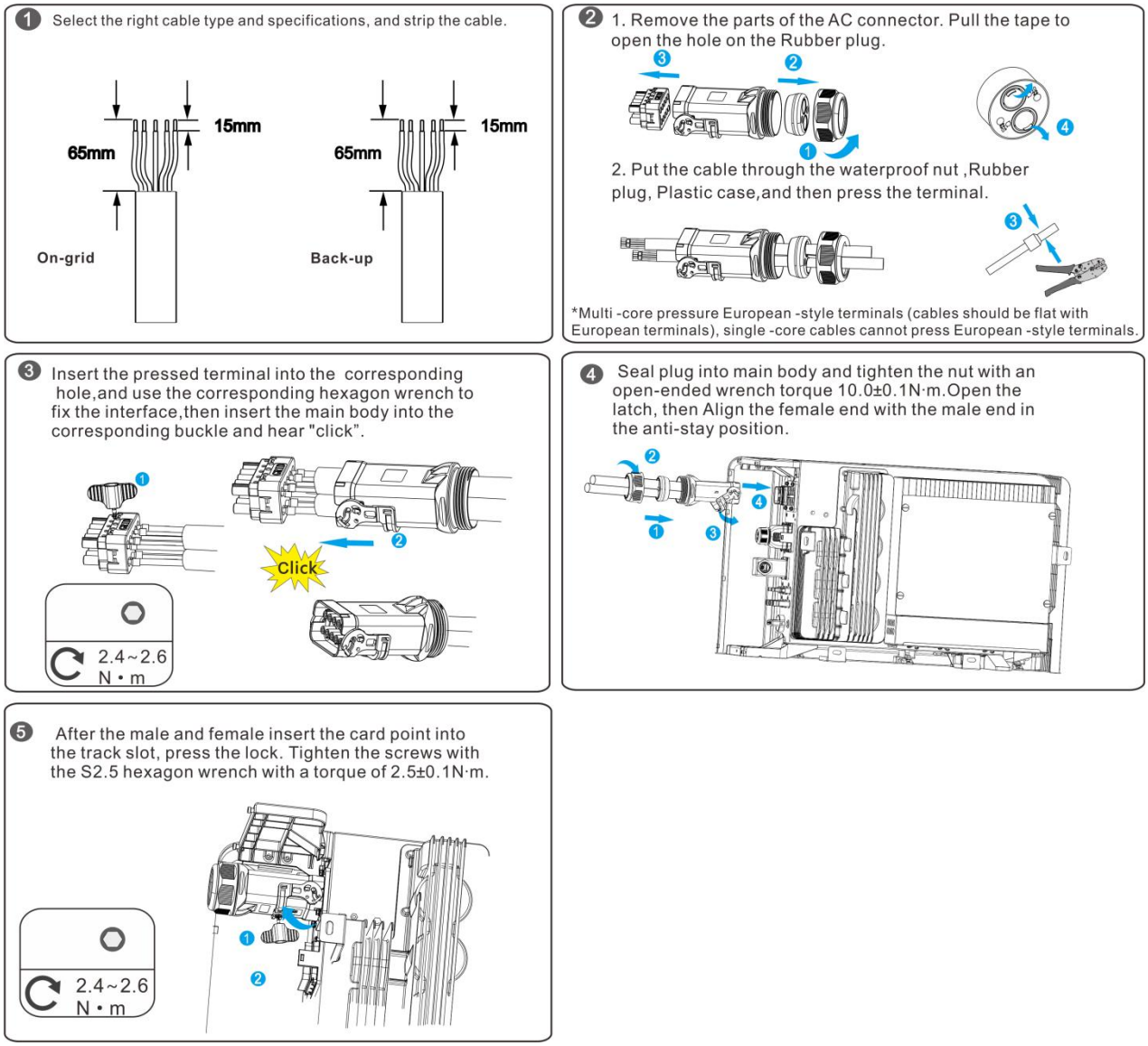


Figure 6-5 Connect AC cable(on-grid) and AC cable(off-grid)

6.3 Connect the DC input cable

Warning

- If PV modules are exposed to light, the photovoltaic panel may endanger the life of the operator with high voltage output!
- Before wiring, make sure that the side of the photovoltaic panel is completely covered with an opaque cloth before the operation.
- The DC switch of the machine must be in the "OFF" position!
- The parameter configuration of the battery string should match the DC input parameters of the inverter.
- If the machine is directly connected to the grid, the positive and negative poles of the photovoltaic panel cannot be directly grounded.
- If multiple machines are connected in parallel to the grid through a transformer, the positive and negative poles of the photovoltaic panel cannot be directly grounded.

- It is forbidden to use DC terminals with specifications, models, and brands other than those provided by us!
- Before connecting the photovoltaic strings to the machine, ensure that the photovoltaic strings are well insulated from the ground!
- To increase the power generation capacity of the system, it is recommended that each string be connected with the photovoltaic strings with the same number, specifications, and direction!

Procedure

Step 1 Pass the cables through the decorative cover.

Step 2 Strip the cable insulation skin to a suitable length using a wire stripper, put it into the corresponding metallic terminal, and use crimp it tightly using a special crimping tool.

Step 3 Insert the crimped positive and negative cables into the corresponding insulation housing respectively.

Step 4 Insert the cable until you hear a "click", indicating that the cable is clamped into place.

Step 5 Turn to tighten the plastic nuts at the end of the insulation housing of the positive and negative connectors.

Step 6 Remove the dust-proof plug from the DC input terminal, and insert the positive and negative connectors into the positive and negative electrodes of the SYS terminal of the high voltage box until you hear a "click", indicating that the connectors are installed in place.

Step 7 Connect other SYS strings according to the above steps.

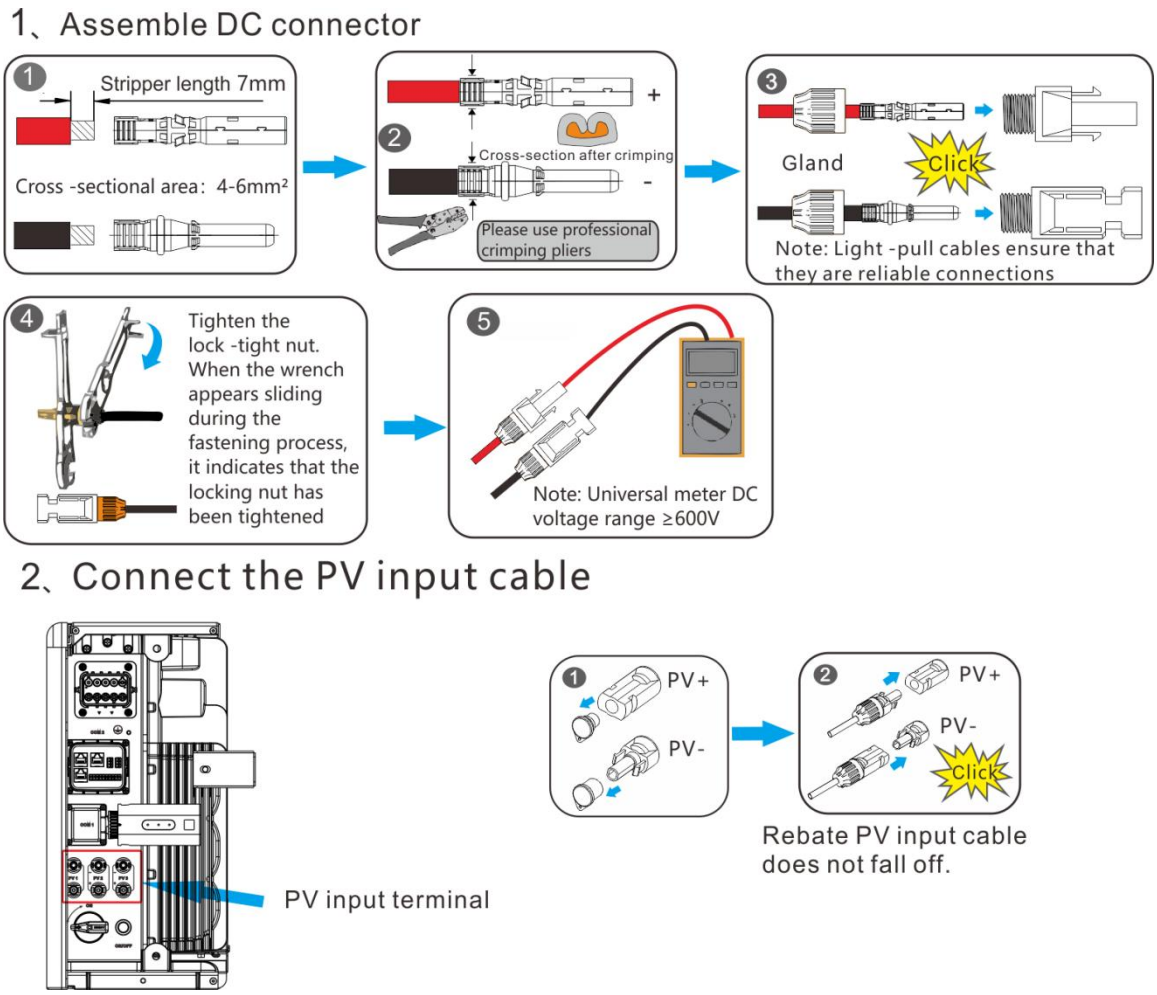
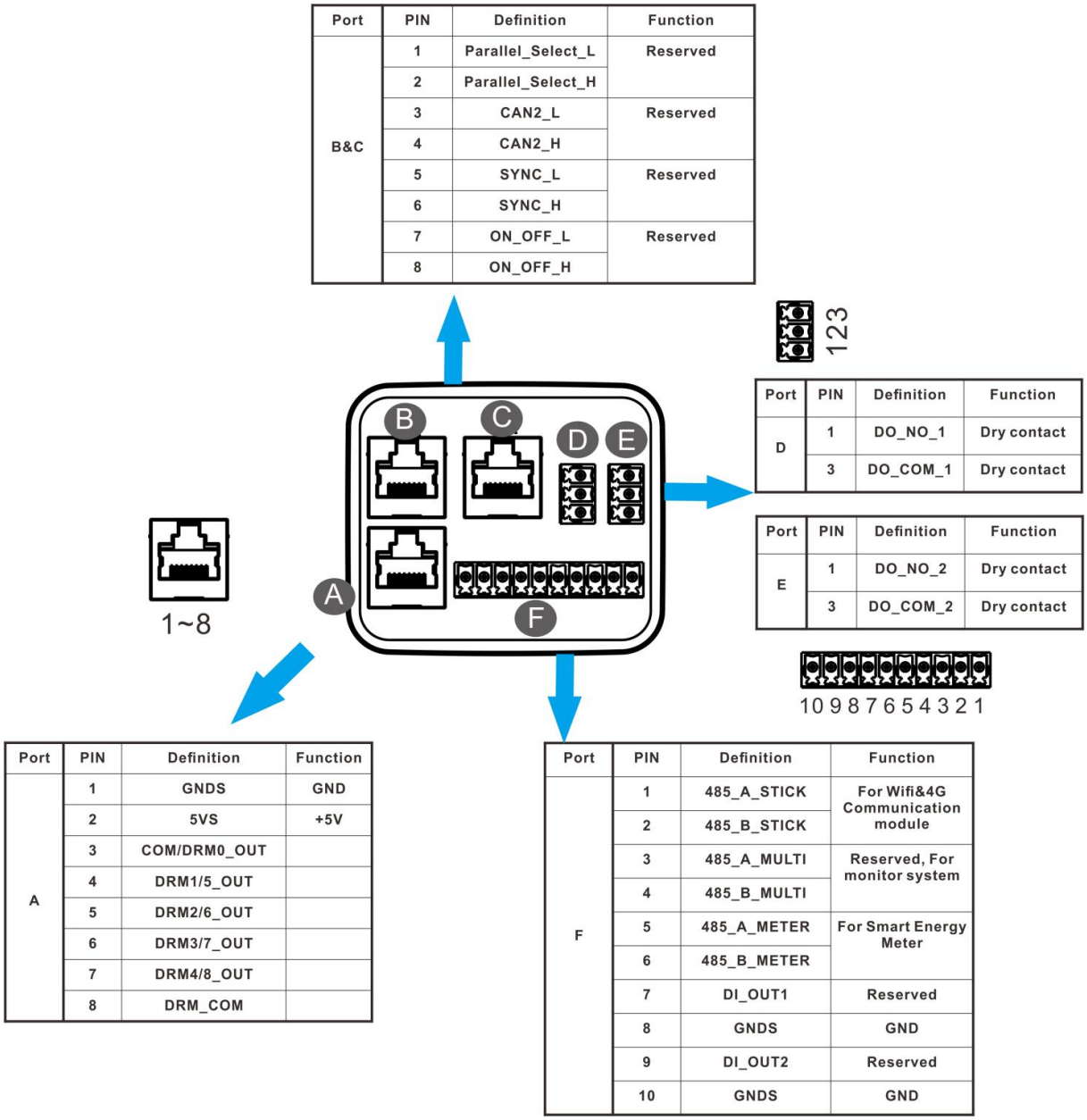


Figure 6-6 Connecting the DC Power Cable

6.4 Install the Communication cable

Caution

- Please connect the inverter communication cable in strict accordance with the inverter communication port label!
- Make sure that the protective layer of the communication cable is inside the connector, otherwise it will lower the sealing level at the communication terminal.
- When fixing the communication cables, ensure that the cores are fully inserted into the communication wiring holes without exposure, and fasten with the specified torque.



Port	PIN	Definition	Function
B&C	1	Parallel_Select_L	Reserved
	2	Parallel_Select_H	
	3	CAN2_L	Reserved
	4	CAN2_H	
	5	SYNC_L	Reserved
	6	SYNC_H	
	7	ON_OFF_L	Reserved
	8	ON_OFF_H	

Port	PIN	Definition	Function
D	1	DO_NO_1	Dry contact
	3	DO_COM_1	Dry contact

Port	PIN	Definition	Function
E	1	DO_NO_2	Dry contact
	3	DO_COM_2	Dry contact

Port	PIN	Definition	Function
A	1	GNDS	GND
	2	5VS	+5V
	3	COM/DRM0_OUT	
	4	DRM1/5_OUT	
	5	DRM2/6_OUT	
	6	DRM3/7_OUT	
	7	DRM4/8_OUT	
	8	DRM_COM	

Port	PIN	Definition	Function
F	1	485_A_STICK	For Wifi&4G Communication module
	2	485_B_STICK	
	3	485_A_MULTI	Reserved, For monitor system
	4	485_B_MULTI	
	5	485_A_METER	For Smart Energy Meter
	6	485_B_METER	
	7	DI_OUT1	Reserved
	8	GNDS	GND
	9	DI_OUT2	Reserved
	10	GNDS	GND

Figure 6-7 Port

Procedure

Step 1 Pass the cables through the decorative cover.

Step 2 Making cable.

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

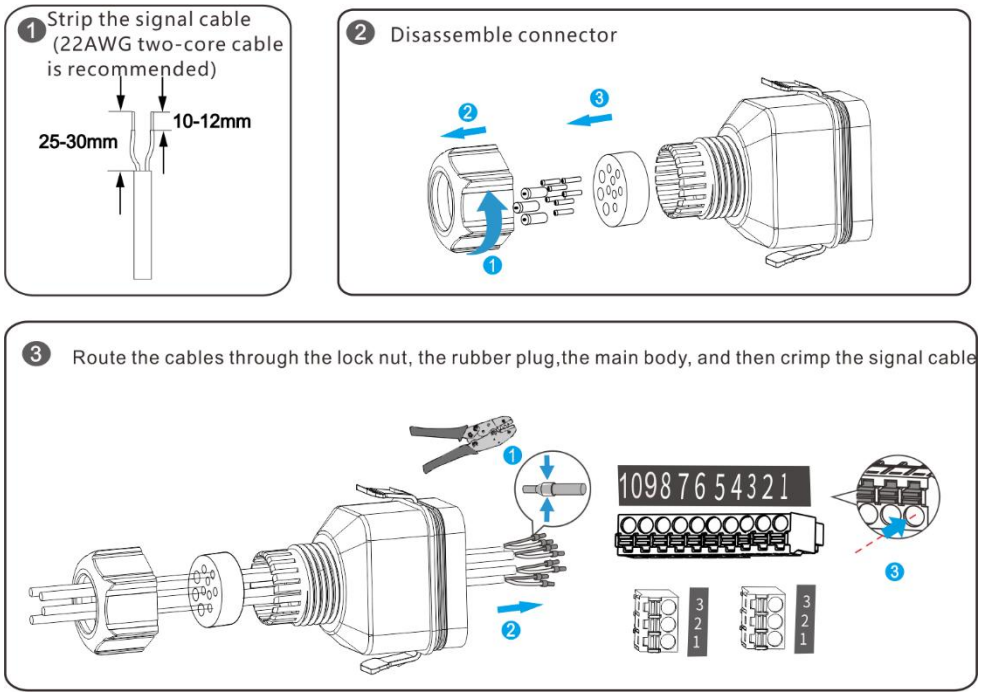


Figure 6-8 Making cable

Step 4 Insert the cable into the 485 port and tighten the connector nut.

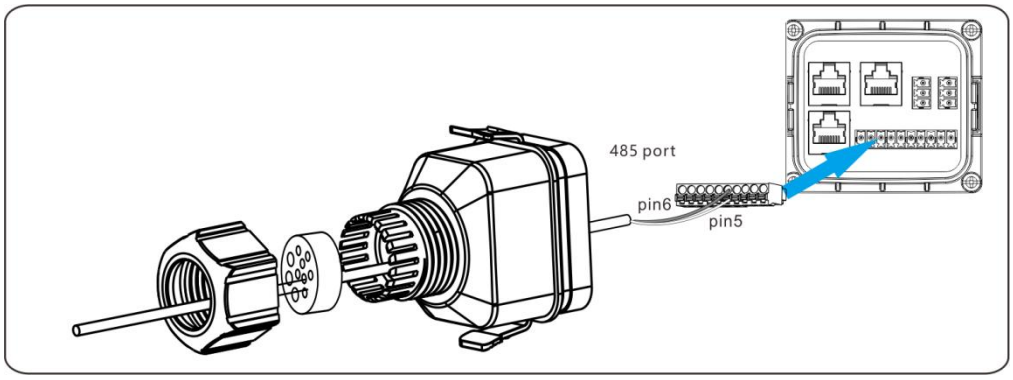


Figure 6-9 Install the communication cable

Label	Description
RS_485_STICK	For WIFI&4G Communication module
RS_485_MULTI	Reserved, For monitor system
RS_485_Meter	For Smart Energy Meter
DI_OUT/GNDS	Digital Input

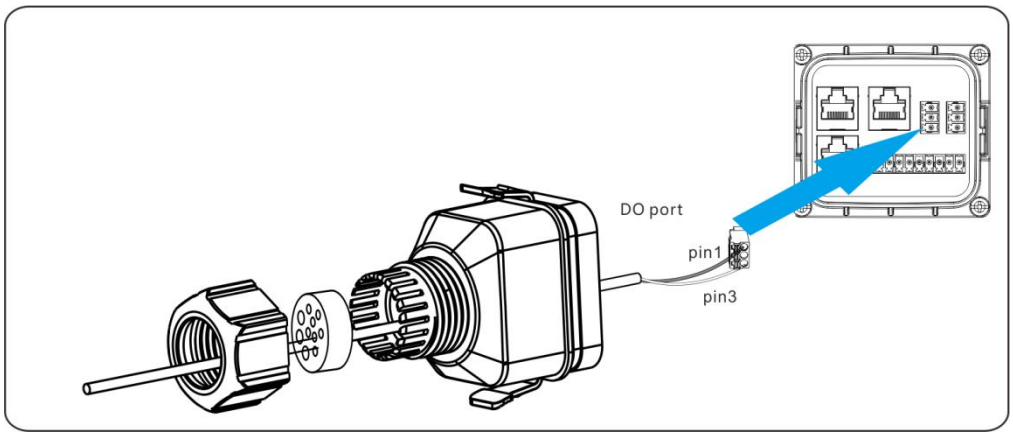


Figure 6-10 Install the communication cable

Label	Description
DI/DO	Digital Output

Step 5 Connect the communication cable. (DRM terminal connection)

PIN	Colour	Definition
1	Orange/White	GNDS
2	Orange	5VS
3	Green/White	COM/DRM0_OUT
4	Blue	DRM1/5_OUT
5	Blue/White	DRM2/6_OUT
6	Green	DRM3/7_OUT
7	Brown/White	DRM4/8_OUT
8	Brown	DRM_COM

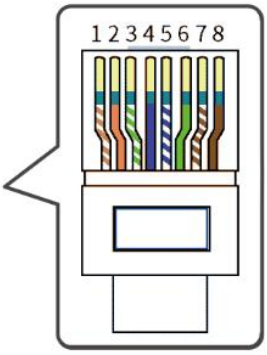


Figure 6-11 Port

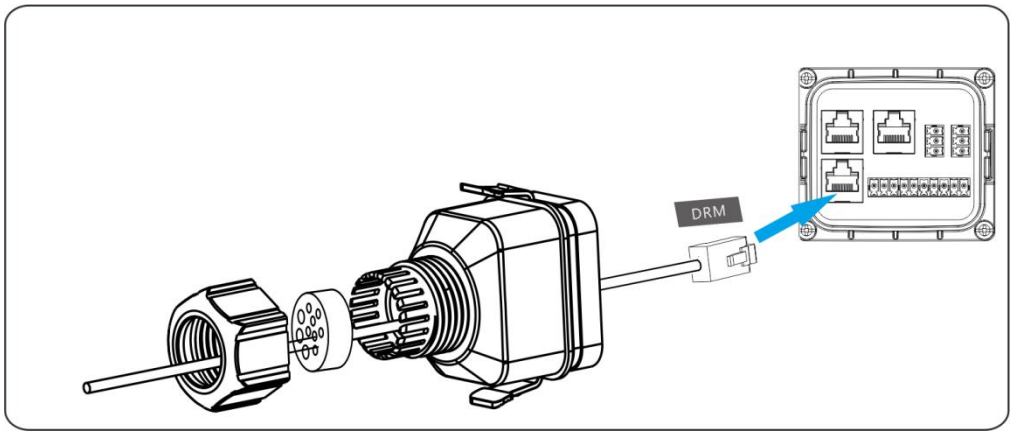


Figure 6-12 Install the communication cable

Label	Description
DRM	"AU"/"NZ": Demand response enabling device (DRED)

Step 6 Parallel system connection.

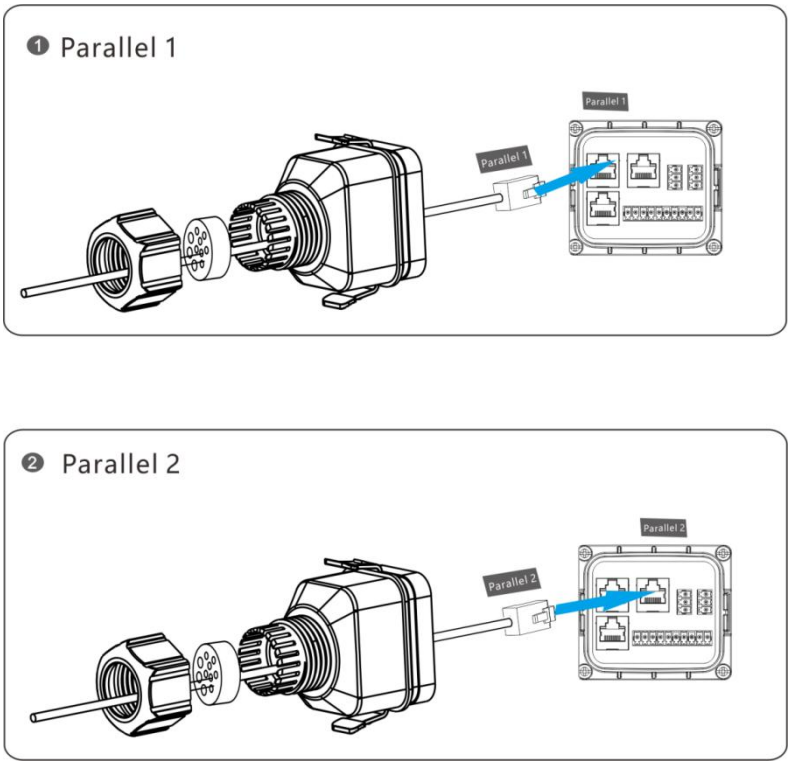


Figure 6-13 Install the communication cable 1

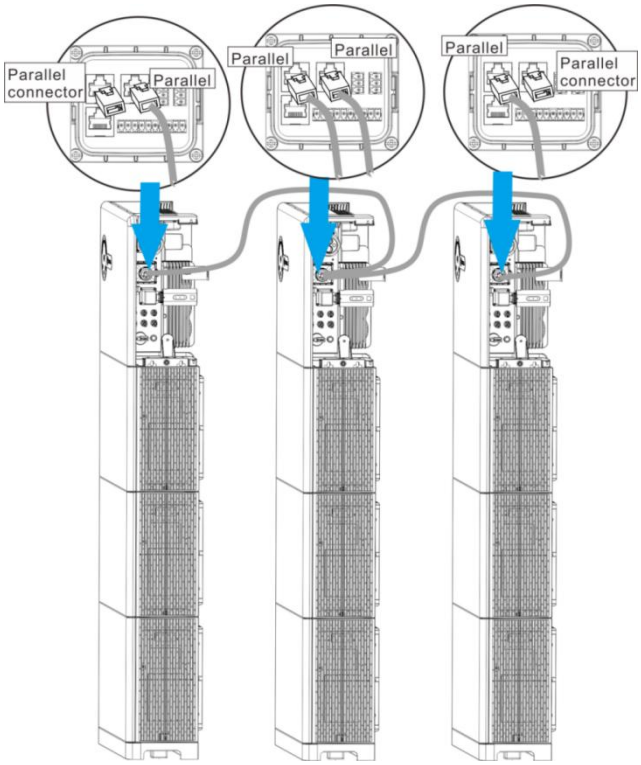
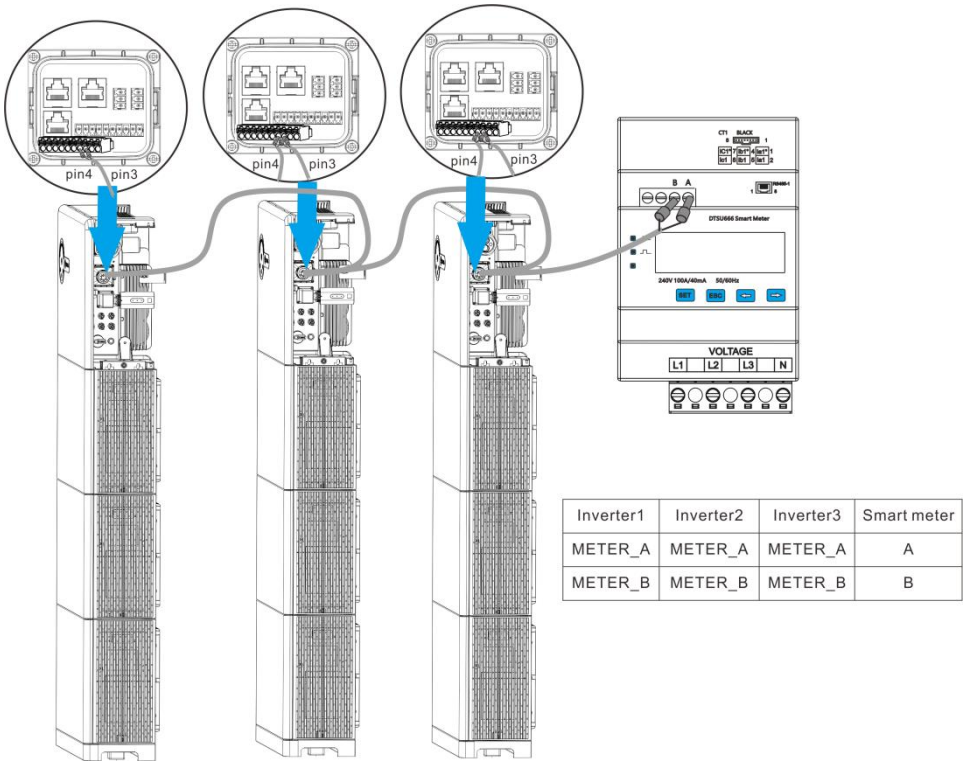


Figure 6-14 Three-machine parallel cable connection

Label	Description
PARALLELL_SELECT_L	Parallel Operation Signal L
PARALLELL_SELECT_H	Parallel Operation Signal H

CAN2_H	Parallel Communication CAN_H
SYNC_H	Parallel Synchronization Signal H
CAN2_L	Parallel Communication CAN_L
SYNC_L	Parallel Synchronization Signal L
ON_OFF_H	Switch Signal H
ON_OFF_L	Switch Signal L



Inverter1	Inverter2	Inverter3	Smart meter
METER_A	METER_A	METER_A	A
METER_B	METER_B	METER_B	B

Figure 6-15 Three-machine parallel meter cable connection

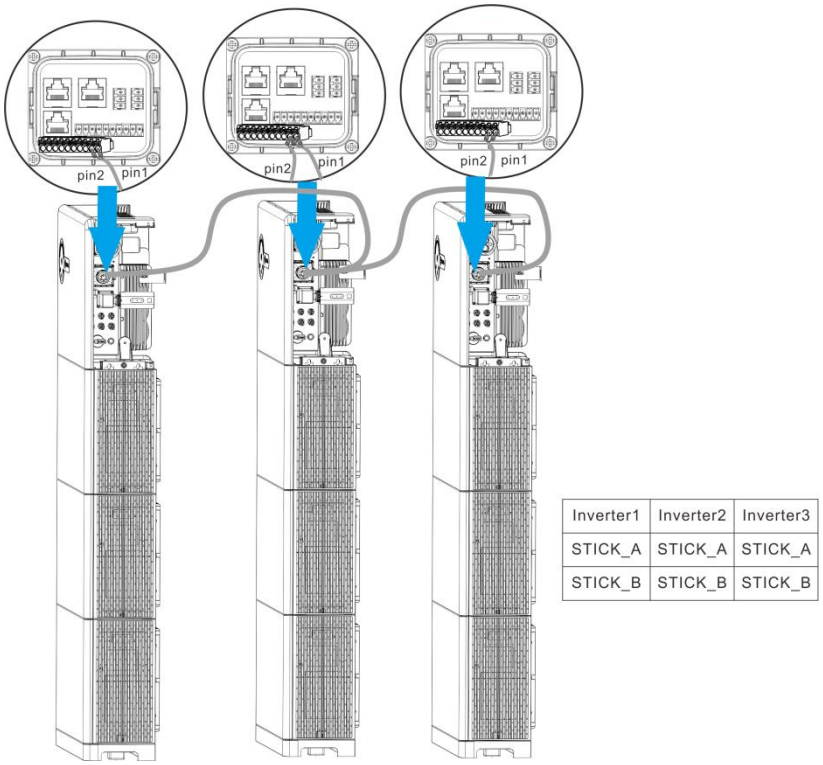


Figure 6-16 Three-machine parallel data stick cable connection

Note: Taking three machines in the parallel system as an example.

Step 7 Confirm that the cable connections at the terminals have been securely fastened.

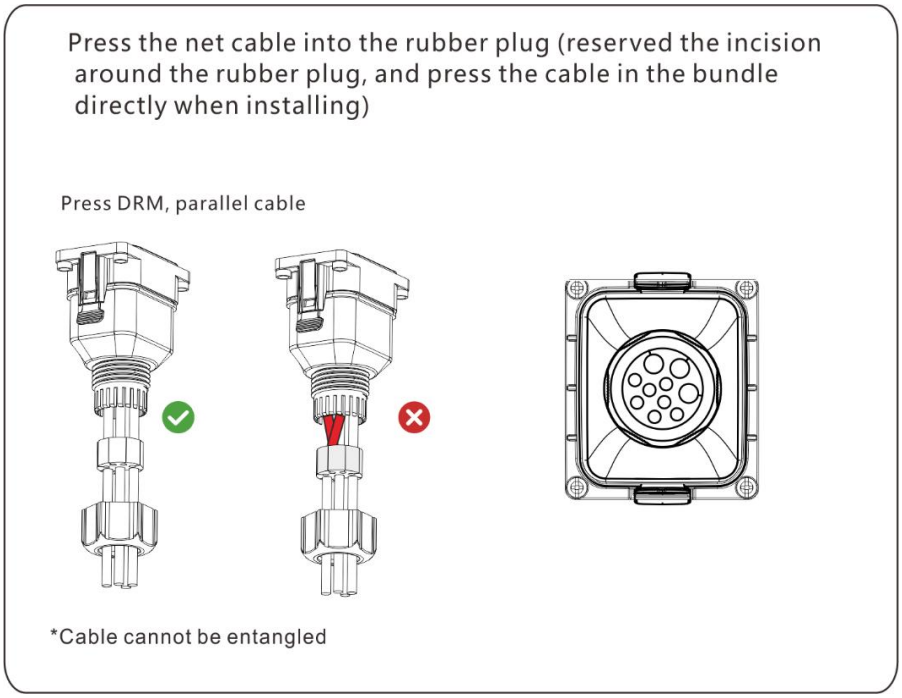


Figure 6-17 Check the cable connections

Step 8 Install and tighten the communication cable terminal nuts.

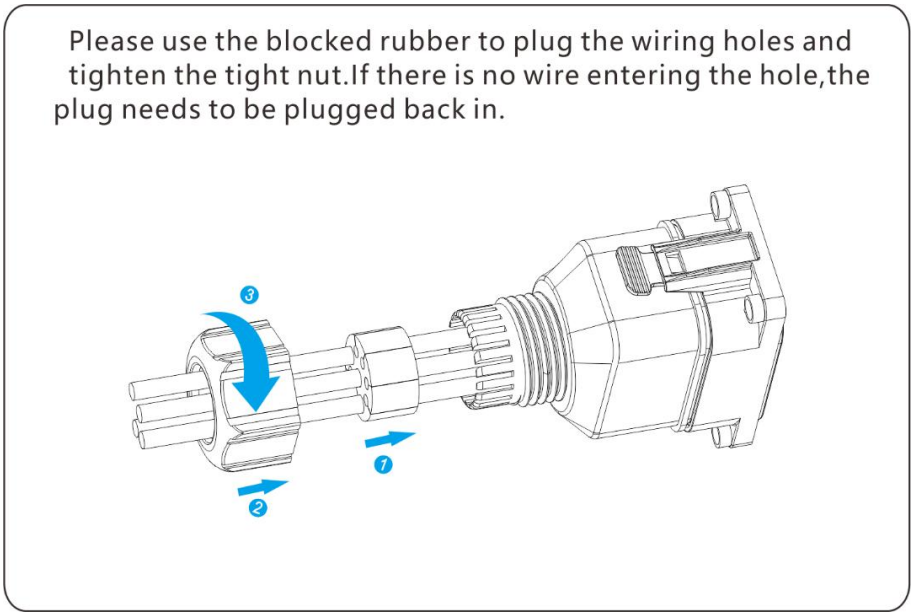


Figure 6-18 Install the communication cable terminal nuts

Step 9 Install the side trim plate of the Inverter (There are buckles on the side wall of the inverter. The trim plate needs to be aligned with the hole positions, and it can be fixed by pushing it to the buckle positions.)

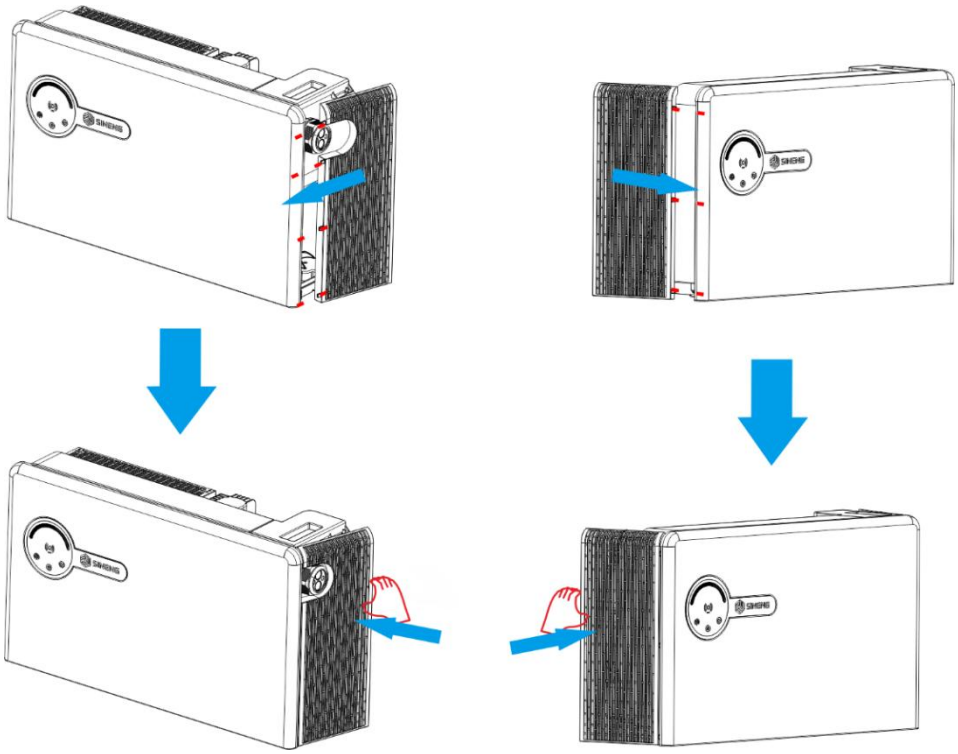


Figure 6-19 Install the trim plate of the inverter

6.5 Smart Meter and CT Connection

The Smart Meter with CT in the SN product box is compulsory for the system installation and it is used to detect grid voltage, current direction, and magnitude, as well as to instruct the operation condition of machine via RS485 communication.

Pay attention to the direction of the power flow when connecting the smart meter. The power is negative when drawing power from the grid, and positive when sending power to the grid.

To keep the machine in normal operating condition, there are specific requirements for the connection method of the smart meter, and the smart meter certified or supplied by us should be used.

Caution

- Make sure AC cable is totally isolated from AC power before connecting Smart Meter & CT.
- The Smart Meter and CT is well configured, please do not change any setting on Smart Meter.
- For more detailed instructions, please refer to the user manual included with the smart meter.
- Please use the Smart Meter with CT in the SN product box;
- CT cable is 3m as default, which could be extended to 5m at maximum;

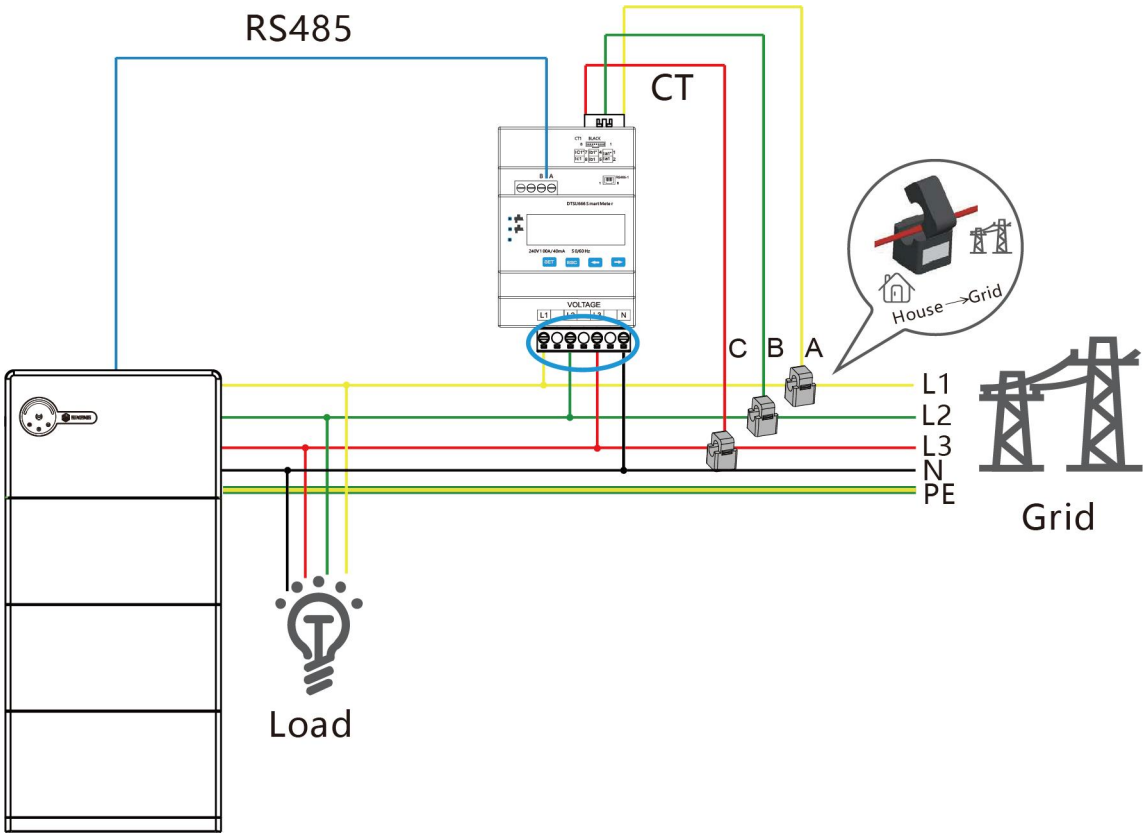


Figure 6-20 Wiring diagram 1 (The Three-phase four-wire connection)

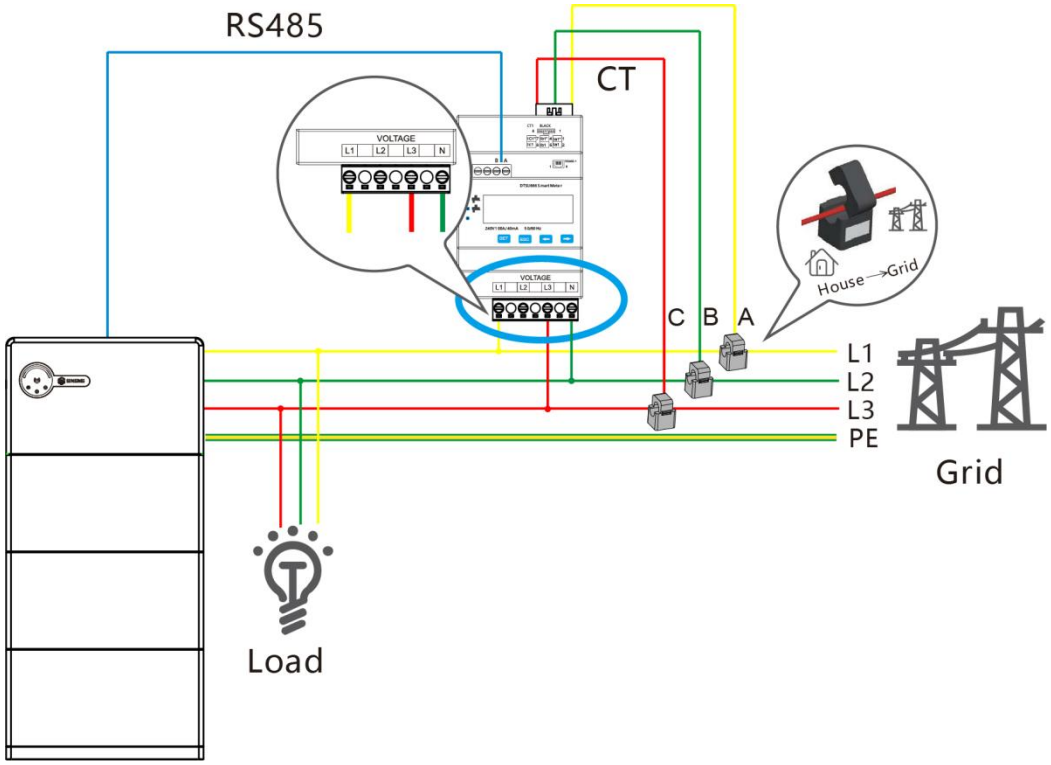
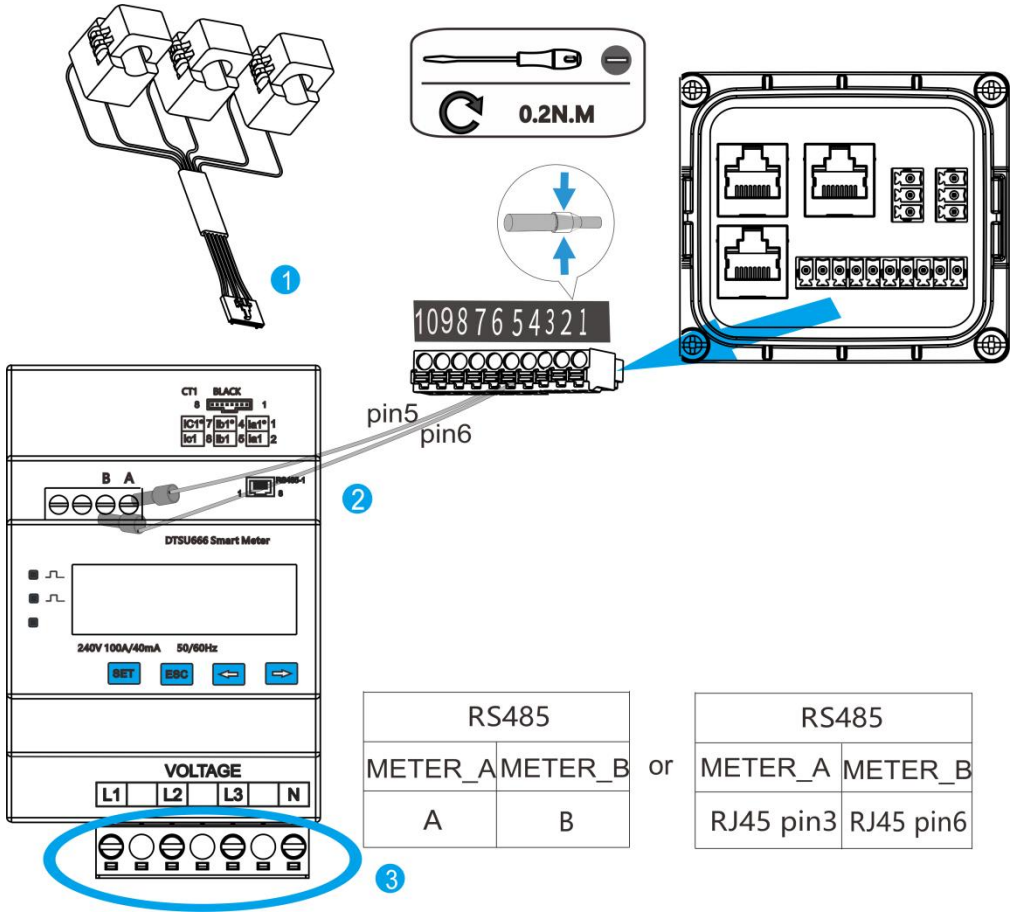


Figure 6-21 Wiring diagram 2 (The Three-phase three-wire connection)



RS485	
METER_A	METER_B
A	B

or

RS485	
METER_A	METER_B
RJ45 pin3	RJ45 pin6

Figure 6-22 Wiring diagram 3

Taking the CHINT: DTSU-666 smart meter as an example.

Label	Description
PIN3/PIN6/PIN9/PIN10	Connected Gird L1/L2/L3/N

RS485_24/25	Connected Inverter RS_485_Meter
CT_13/14 16/17 19/21	Connected Gird L1/L2/L3/N (as shown in the figure)

Chapter 7 Check after Installation

Table 7-1 Check items

SN	Acceptance Criteria	Check Result (Yes √/No ×)
1	Check whether the DC switch of the machine is in the "OFF" position.	☐
2	Check whether the machine installation is firm and reliable.	☐
3	Check whether the connection of the external grounding cable is correct, whether the terminal is tight, whether the grounding is reliable, and ensure that there is no open circuit or short circuit.	☐
4	Check whether the AC output cables are connected correctly, whether the terminals are fastened, and ensure that there is no open circuit or short circuit.	☐
5	Check whether the polarity of the DC input cable is correct, whether the connector insertion is firm, and ensure that there is no open circuit or short circuit.	☐
6	Check whether the connection of the communication cable is correct, whether the terminal is tight, and ensure that there is no open circuit or short circuit.	☐
7	Check whether the plastic nut on AC side and those at the end of the communication cable lock are tightened.	☐
8	Check whether the unused ports are fitted with dust plugs.	☐
9	Check whether the data acquisition stick module is installed correctly (only for products with optional data acquisition stick).	☐

Note:

- It is recommended that after one week of operation, in an environment with sufficient light, the on-site operation and maintenance personnel use an infrared detector to measure the temperature of the direct connection terminal. If everything is normal, it means that the connection of the DC terminal is reliable.
- If everything is normal for the temperature of the direct connection terminal, it means that the connection of the DC terminal is reliable.
- Multi-point grounding in the matrix is prohibited!

Chapter 8 Power-On/Off

Warning

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

8.1 Power-On

Procedure

Step 1 Check electrical connection.

Step 2 Connect the connection between the PV side and the PV panels via the breaker,

Step 3 Open the DC switch.

Step 4 Connect the connection between the device's AC side and the grid via the breaker.

Step 5 Power on the battery side. (Press the battery button for 3 seconds).

Reminder: When the machine is powered on for the first time, it is necessary to use the APP to configure the factory settings of the machine; refer to Chapter 9. The above steps apply to grid-connected mode (requires PV modules). Please adjust according to the following scenarios during actual operation:

In grid-connected mode: If no PV modules are installed, step 2 and step 3 can be directly ignored;

In off-grid mode: Ignore step 4; if PV modules are not installed, step 2 and step 3 must also be additionally ignored. **In cases without PV, the battery switch button needs to be pressed for about 40 seconds to power on.**

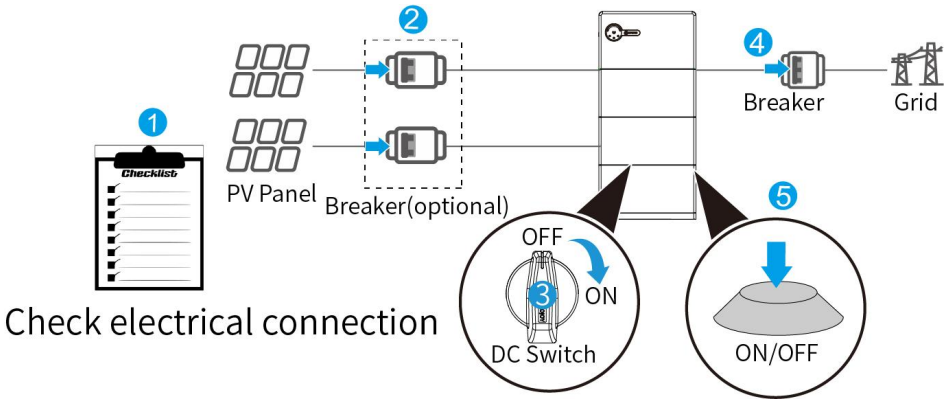


Figure 8-1 Power-On

Power-up Status Check: After the battery is installed and powered on for the first time, Observe the indicator to check the running status.

Figure 8-2 Power on

When either the PV, battery, or grid is powered: if communication is normal, LED1 blinks; if communication fails, LED1 remains off. The following conditions are all tested under the condition of normal communication.

Scenario 1: No PV input, no battery connected, only grid power available

LED Status: LED 1 and 2: Blinking; LED 3: Steady on; LED 4: Off

Scenario 2: Battery-connected grid-tied operation

LED Status: LED 1: Blinking; LED 2, 3, and 4: Steady on

Scenario 3: Off-grid mode with both battery and PV connected

LED Status: LED 1: Blinking; LED 2: Steady on; LED 3: Blinking; LED 4: Steady on

Scenario 4: PV input only

LED Status: LED 1 and 2: Blinking; LED 3 and 4: Off

Scenario 5: Battery only (not in off-grid mode)

LED Status: LED 1 and 2: Blinking; LED 3: Off; LED 4: Steady on

Scenario 6: Battery only (after entering off-grid mode)

LED Status: LED 1 and 3: Blinking; LED 2 and 4: Steady on

For example: In Self-use mode, when the photovoltaic panels, battery, and mains power are all energized and connected to the grid, Light 1 flashes, while Lights 2, 3, and 4 remain on.

8.2 Power-Off

Warning

- When performing operations such as maintenance, inspection, or other operations requiring opening the cover or moving the equipment, the system must first be completely powered off; if the power is not completely off, it is strictly prohibited to perform any operations on the equipment. After the power-off operation is completed, the extinguishing of the indicator lights on the light panel shall be taken as the sign of successful power-off. Wait 20 minutes before performing operations to prevent personal injury caused by residual electricity or heat; protective gloves must be worn during operation.

Procedure

Step 1 (Optional)Send a shutdown command to the device via the terminal.

Step 2 Close the DC switch.

Step 3 Disconnect the connection between the device's AC side and the grid via the breaker.

Step 4 Disconnect the connection between the PV side and the PV panels via the breaker.

Step 5 Press and hold the battery switch button for three seconds to turn off the battery.

Step 6 Observe the indicator lights on the light panel to confirm if they are completely extinguished; after the indicator lights are completely extinguished, wait for thirty minutes before performing safe operations.

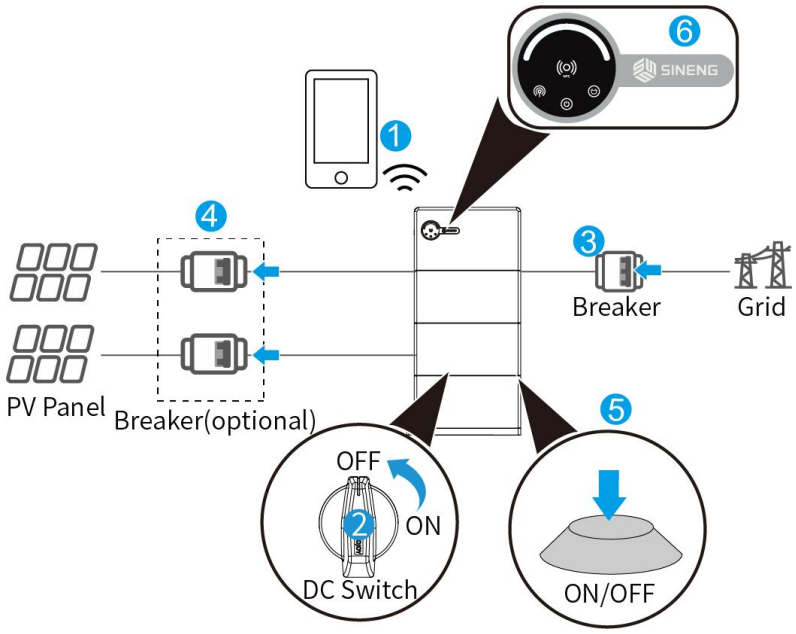


Figure 8-3 Power-Off

Chapter 9 APP User Guide

To better manage and monitor your energy system, please visit your mobile app store (Apple App Store or Google Play). To download and search for the following two applications:

9.1 Downloading the App

- China: The app is available in Huawei, Xiaomi, OPPO, VIVO, 360 and Apple App Stores.
- Other regions and countries: The app is available in Google Play and App Store.
- The app supports Android 6.0 and later versions or iOS 12 and later versions.

Figure 9-1 **EnjoySolar** (Online monitoring).

Figure 9-2 **PowerInsight** (Local configuration)

9.2 APP System Setting

9.2.1 With Wi-Fi at the installation site

When there is WiFi at the installation site, users can operate using the EnjoySolar application. Through this APP, users can configure the entire system, making it simple and efficient.

Procedure

Step 1 Enter the "Initialization of energy storage for households function" and scan the QR code on the Logger or Dongle* included with the machine.

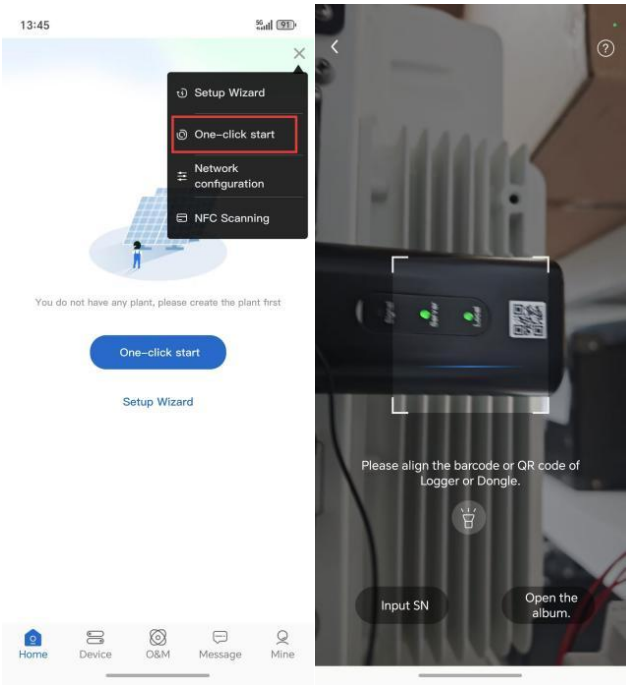


Figure 9-3 App Login

Step 2 Please wait for the scanning of Dongle to be completed. During this process, the APP may switch between Wi-Fi and data connections multiple times and may display pop-up notifications. After the scan is completed, you can see the identified number of devices* and the current settings in the system.

Note

- If the scan number is not consistent with the actual situation, please re-check the hardware cable connection between the devices and go back to **Step1** to try again.
- The setting of this interface requires the same parameters of all equipment (including but not limited to the same safety regulations, the same parallel configuration, the same battery model, etc.). When the setting of all equipment is confirmed, go to the next step.
- In the case of parallel operation, downstream devices may not be detected initially. The user needs to manually click to assign device addresses, then reconnect, and multiple downstream devices will be displayed.

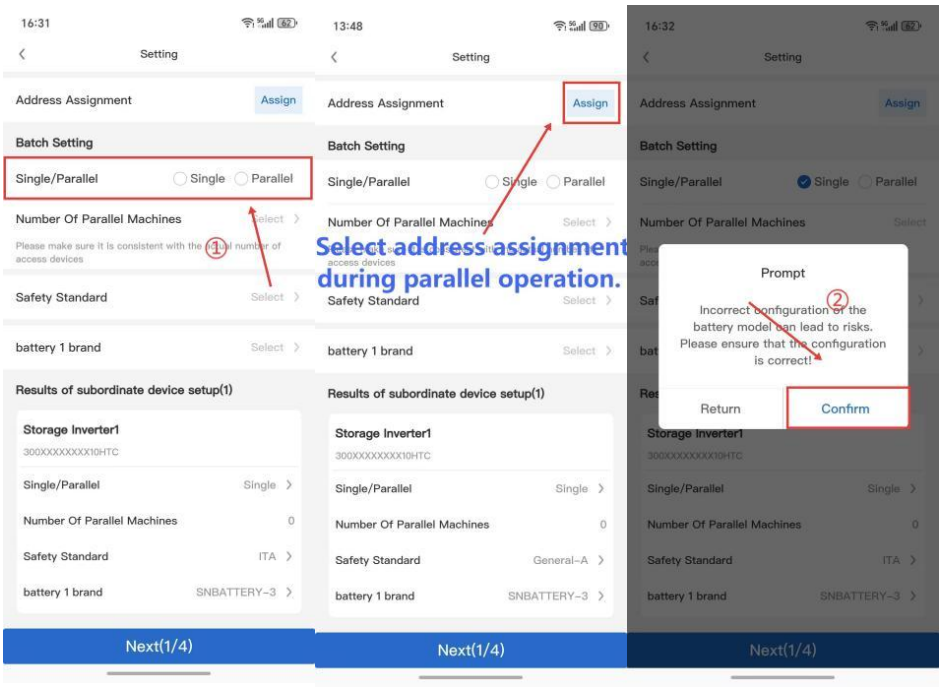


Figure 9-4 Quick website building

Step 3 Connect to the Internet for the device. Wait for the device to scan the available WiFi nearby, click and connect to the network, the device will update the configuration file for the current device, wait a moment, wait for the prompt configuration to succeed. And then proceed to the next step.

Note

- If the popup prompts to reconnect during this period, observe that the indicator of the data collector / Dongle is not in the state of the lamp / Fluent Flash and click reconnect; If multiple attempts fail, contact the service provider.

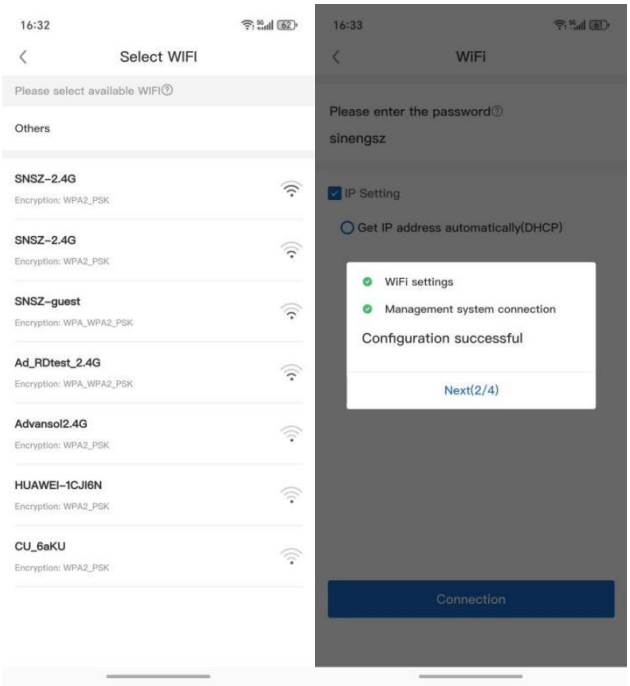


Figure 9-5 Connect to the network

Step 4 Create a Power Station. At this step, you can create a new power station for the system and also support binding it to an existing power station.

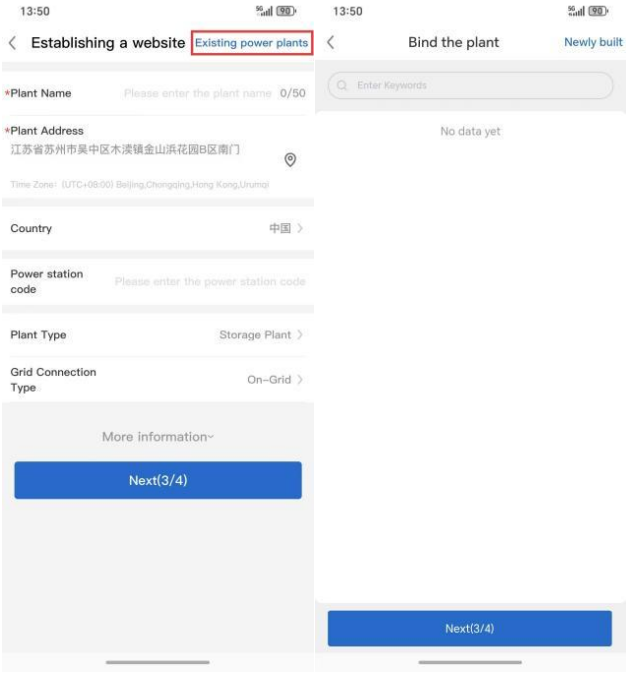


Figure 9-6 Create a Power Station

Step 5 Wait for the remote system to check the availability of the system. If the meter or battery is not connected correctly, check the hardware connection of the corresponding device.

Step 6 Use the meter's self-test function to check the progress and results of the self-test to ensure that the hardware connections of the system's meters are correct; otherwise, there may be anomalies in the energy dispatch of the system.

Step 7 When all checks pass, click complete to finish the initial configuration of the system.

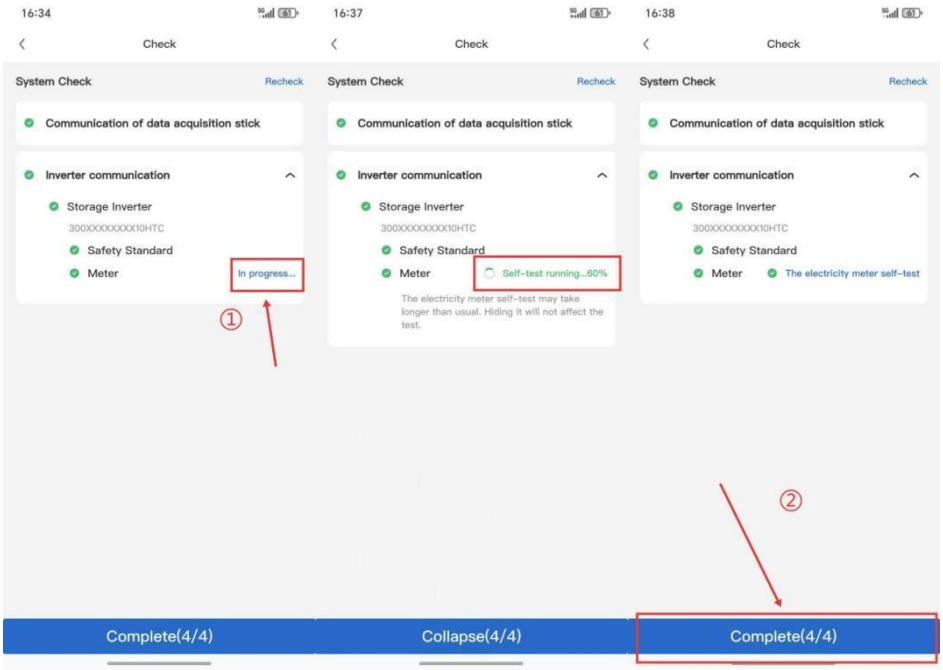


Figure 9-7 Check the connection

Step 8 Please confirm that the number of devices in the system is correct, and that both the master unit and the slave units are operating normally.

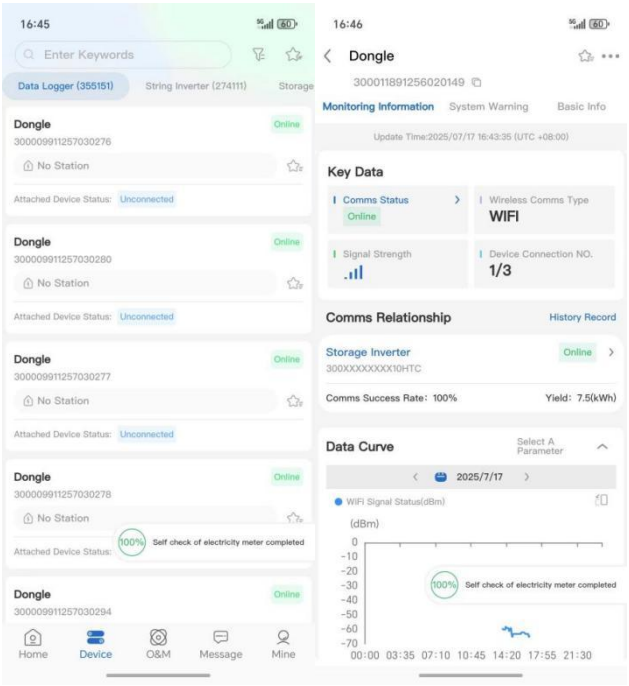


Figure 9-8 Check settings

Note

- After the initialization setup of the parallel system is completed, the system will automatically determine one master unit and other slave units. Through the data Dongle, you can access different data from different devices.
- If the parameters of the machines cannot be kept consistent, please set the parameters of each machine individually by connecting to the machine Dongle;
- Only the master unit can access the meter data of the paralleled system, and the data displayed by the meter represents the paralleled system as a whole, not an individual device.

9.2.2 Without Wi-Fi at the installation site

In the absence of a local Wi-Fi network, the PowerInsight2 app allows you to monitor the machine's status and configure its operating mode. After opening the PowerInsight2 app, users can scan the QR Code on the Dongle using the scanning Code button at the lower right corner of the interface. User can check whether the machine is connected successfully on the device list screen. Then click the machine you want to operate to enter the specific operation interface.

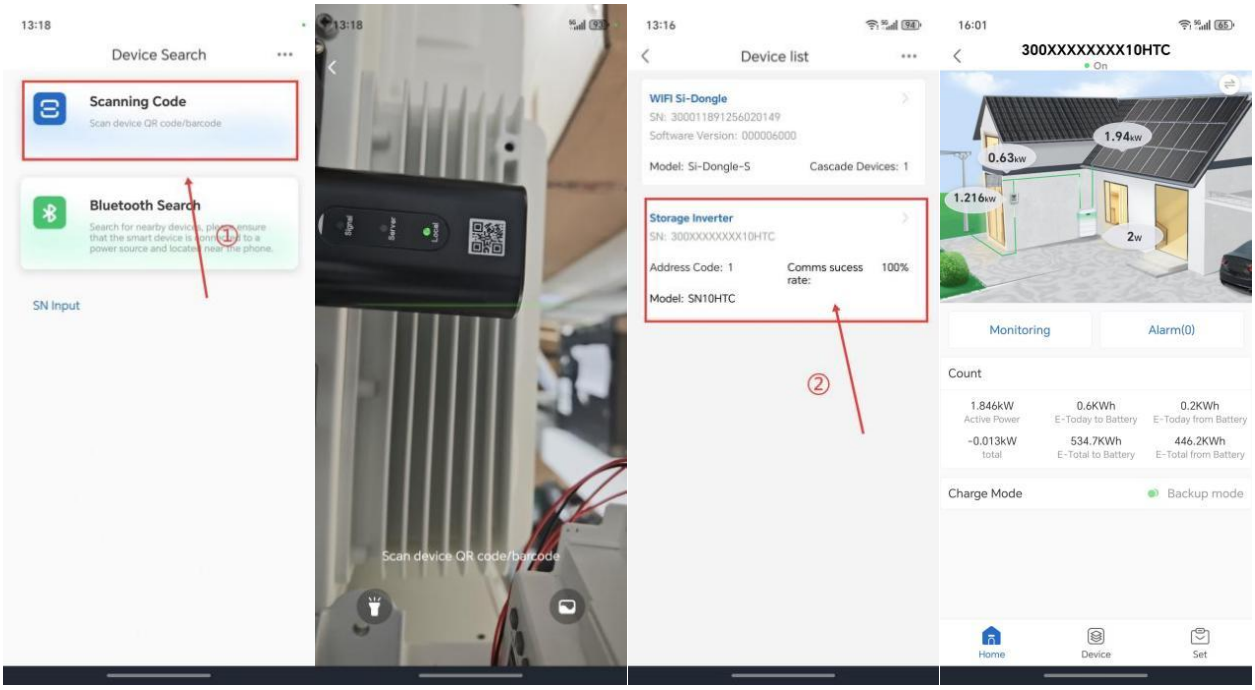


Figure 9-9 App Login

Note

- The working mode switchover in the parallel system can only be delivered by the host, The user can determine whether this machine is a host by viewing the Master or Slave Mark identifier.
- Other functions are detailed in the SN5.0~15HT User Manual.

Steps for setting the parallel mode using the power insight 2 app

Step 1 Click the **Set button** in the lower right corner of the home page

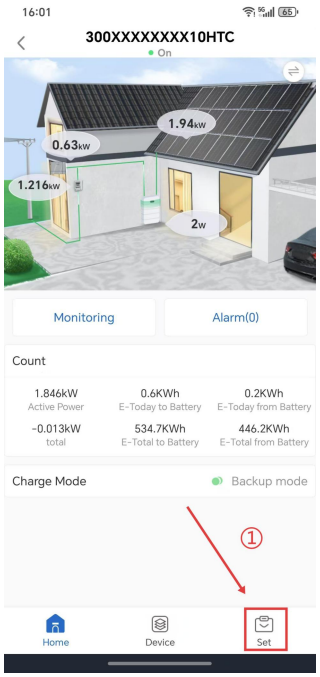


Figure 9-10 Parameter Settings 1

Step 1 Click the Basic Settings Options.

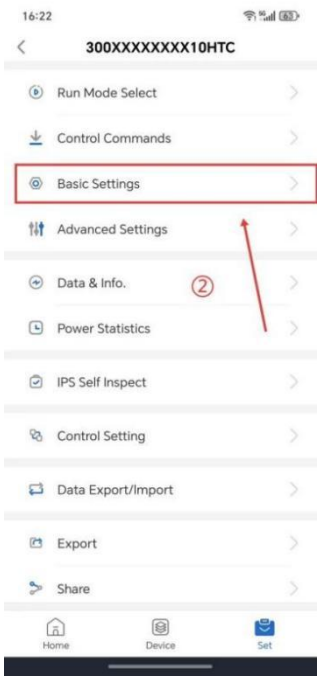


Figure 9-11 Parameter Settings 2

Step 2 Click the Independence/Parallel button to switch between parallel and standalone operating modes

Step 3 Click the Parallel Number Set button to select number of machines that need to be parallel. (Currently, only a maximum of three machines are supported)

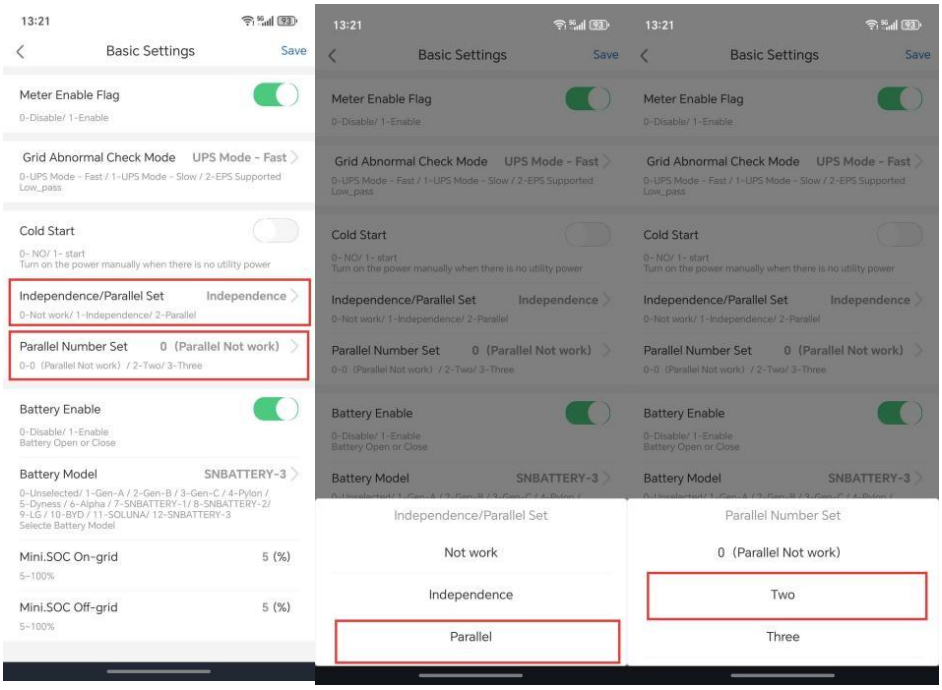


Figure 9-12 Parameter Settings 3

Step 4 Create a Power Station. At this step, you can create a new power station for the parallel system and also support binding it to an existing power station.

Note

- If you use the power insight 2 app to set the parallel mode, you need to set

parallel parameters for each machine separately and ensure that the parameter Settings are consistent.

9.3 Running mode

Step 1 Tap the 【Set】 icon at the bottom right corner of the APP main interface;

Step 2 Select the 【Run Mode Select】 option to enter the mode configuration interface;

Step 3 The system provides four operating modes, and users can choose according to actual needs (see mode description below for details).

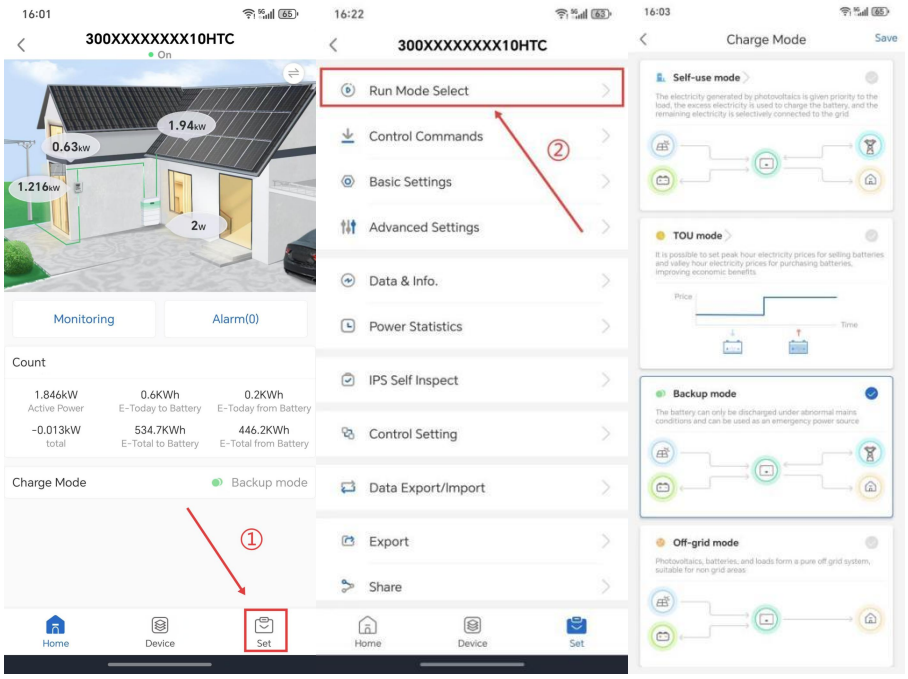


Figure 9-13 Running mode

9.3.1 Self-use mode

Self-use mode can be used to adjust the power of PV, battery, and grid according to the power of the energy meter or EPS load power. If the energy meter turns on when communication is normal, the energy flow will adjust according to the power of the energy meter. If the energy meter is off or the energy meter is on with communication being abnormal, the energy flow will adjust according to the EPS load power.

The grid can switch to off-grid mode automatically in the event of a power failure.

9.3.1.1 Prioritized order of energy self-use

PV priority: The PV-generated electricity is supplied to the load first while the surplus is supplied to charge the battery, and any remaining electricity, if any, is sent selectively to the grid.

The PV-generated electricity, if sufficient, is supplied to the load as a priority while the surplus is supplied to charge the battery, and any remaining electricity, if any, is supplied to the grid.

If the PV-generated electricity is insufficient enough to sustain the load power, but the PV+ battery can sustain the loads, the PV+ battery will electrically supply the loads.

If the PV+battery is insufficient to support the loads, PV+battery+grid electrically will support the loads.

When the battery is discharging:

- On-grid min. SOC setting range: 10-100%.
- Normal charging and discharging is allowed at SOC cur* > SOC min. The battery stops discharging until SOC cur<SOC min.
- Force charge the battery when the SOC cur is below 9% until the SOC rises to 14%.

Note: Current SOC*

Figure 9-14 Charge Mode

9.3.1.2 Winter forced charging option

In winter, in order to avoid excessive energy consumption and battery abnormalities and to reserve more power for emergency use, a special design is made for the winter high power charging option. There are two time periods. When the winter option is selected, the battery is forced to charge according to the set charge power within the set time period, until the set SOC value is reached.

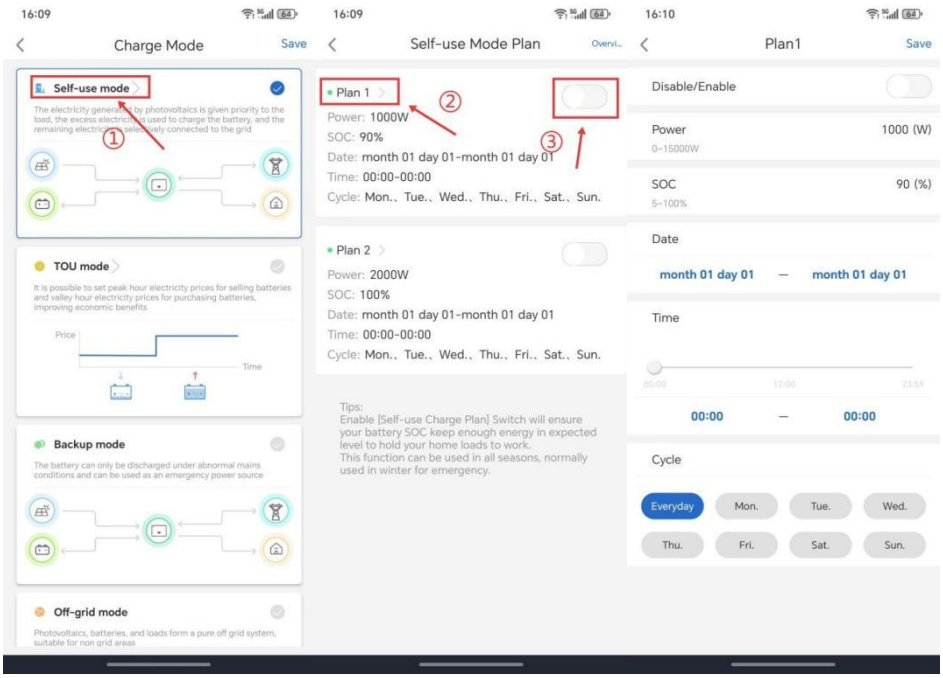


Figure 9-15 Self-use Mode Plan

Parameter	Description
Forced charging function enabled	Enabled: Enable this function Disabled: Disable this function.
Start date and time	The date and time when the forced charging function starts.
End date and time	The date and time when the forced charge ends. Note: If the end date is later than the start date, they are considered to be in the same year. If the end date is earlier than the start date, the date is considered to span the year, counting first from the start date to 31 December, then from 1 January to the end date.
Time	It must not span days, and the end time must be later than the start time. Otherwise, the setting will fail.
Power	The power for forced charging of the battery
SOC	Charge to a value where SOC stops charging.
Week function	Set the day of the week on which the battery is to be intensively charged.

9.3.2 TOU mode

We can set a peak power price to sell power from batteries and buy power for batteries at an off-peak power price, which can improve the economic benefits.

The equipment can automatically switch to off-grid mode, when the power grid fails.

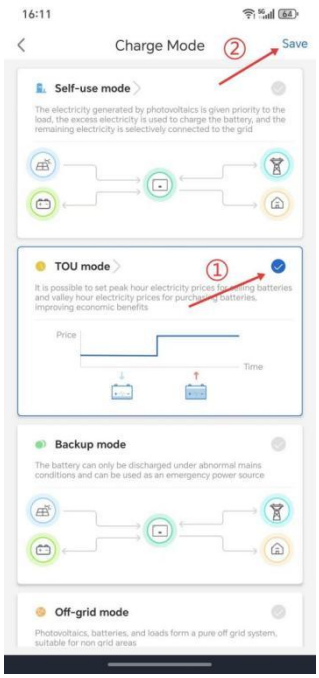


Figure 9-16 Run mode select

9.3.2.1 Date/time setting

There are three settings of timed charging and timed discharging.

Time: If the regular charging and discharging is not used, all periods should be set to 00:00 with the start time and end times controlled between 00:00 and 23:59, where the end time must be later than the start time, and the time cannot cover a day. When setting, all time periods must not overlap, otherwise the setting will not be successful.

Power: The power for forced charging of the battery.

Among them, the charging and discharging power of the battery changes with the change of SOC, and the charging power is the minimum value among the PV, the rated power of the model, and the charging and discharging limit of the battery.

Note

- The actual charge power is affected by the PV, the rated power based on the model, the battery charge, and discharge limit value and whether the battery is allowed to be charged the battery from the grid.

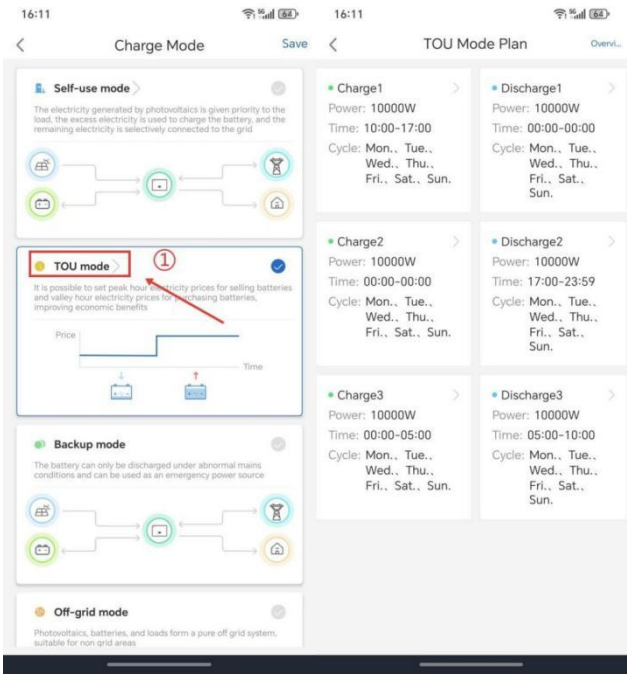


Figure 9-17 Date/time setting

9.3.2.2 Week setting

Week function: Set which day of the week the battery is charged or discharged.

If the current SOC is greater than the minimum on-grid SOC, it can be charged and discharged normally; the battery will stop discharging until the current SOC is less than or equal to the minimum on-grid SOC.

If the current SOC is less than 9%, the battery is forced to charge until the SOC reaches 14%. Whether or not forced charging will be applied to the battery during actual use is also controlled by the command of the battery (if the battery requests forced charging, it will give priority to the forced charging of the battery).

In the event of a battery fault, stop battery charging or discharging.

In the event of a grid power failure, the equipment can be automatically switched to the off-grid mode.

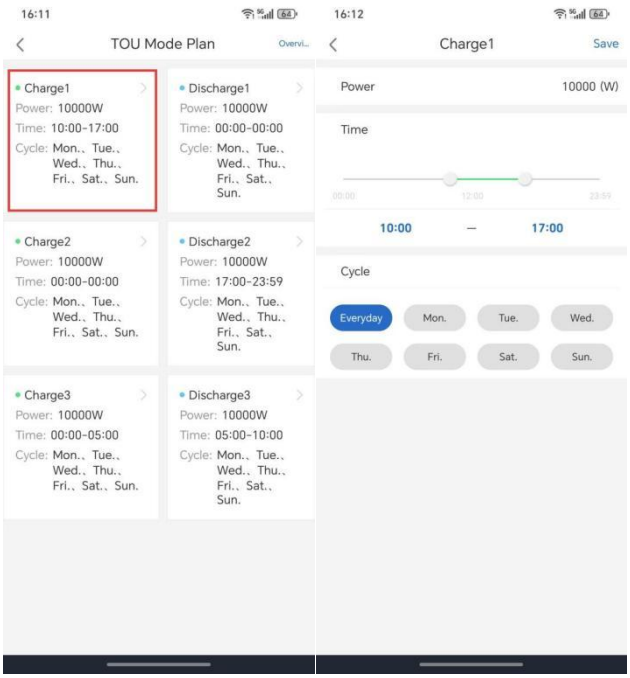


Figure 9-18 Week setting

9.3.3 Backup mode

The battery can only be discharged under abnormal mains supply conditions and can be used as an emergency power source.

If the mains supply is lost, the unit will automatically enter the off-grid mode.

The current SOC of the battery must be maintained above the minimum SOC (set in On-grid minimum SOC).

If the current SOC is less than the minimum SOC set in On-grid, the battery will be charged to the SOC+2% hysteresis points of minimum SOC (On-grid).

When the current SOC is between 95% and 100%, in order to reduce the energy wasted by drawing power from the grid, at this time, the power supply to the EPS is guaranteed at this time according to the priority and the excess energy will be used to recharge the battery.

In this mode, we should pay more attention to the problem of phase unbalanced. Ac output power will be divided according to the loads connected with each phase. At the same time, the power of each phase cannot exceed the maximum power of the single phase, such as the rated power of the machine is 12kW, and the single-phase load power cannot exceed 4kW.

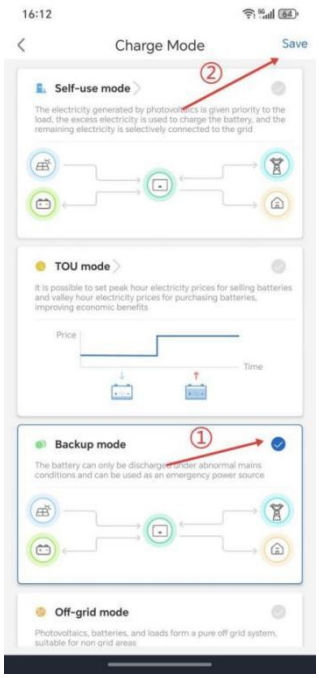


Figure 9-19 Backup mode

9.3.4 Off-grid mode (Active setting)

A pure off-grid system consisting of PV, Batteries, and Loads suitable for off-grid areas. In this mode, you can force the machine to disconnect from the grid to allow off-grid operation. Under this condition, it is impossible to send power to the grid or receive power from Grid.

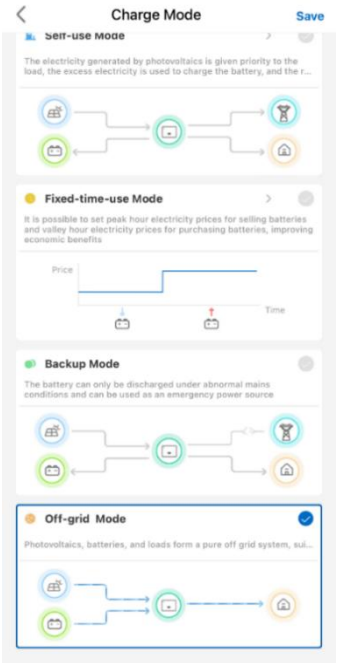


Figure 9-20 Off-grid mode

9.4 Function and parameter settings

9.4.1 Battery Settings

Function: energy store and power supply.

Battery Enable: The battery must be enabled during normal operation. If the battery

communication is abnormal or the battery fails and stops after being enabled, the machine will stop.
If you need to use the battery function, please enable the battery enable flag first.
Battery Disable: If the battery fails, if the machine is still required to operate normally as a On-grid device, or if it is only required to be used as a On-grid machine without a battery, the battery can be disabled, so that the energy storage inverter can be used as a On-grid inverter to supply power to the grid.

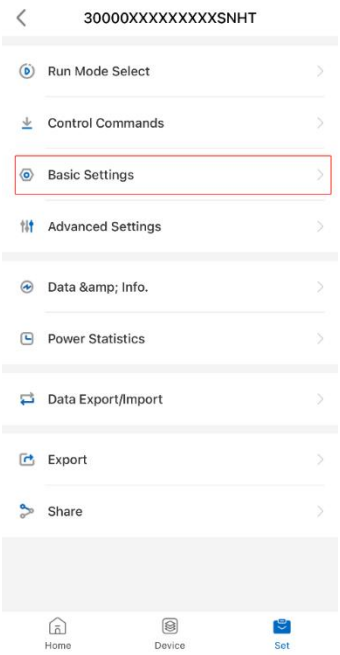


Figure 9-21 Basic Settings

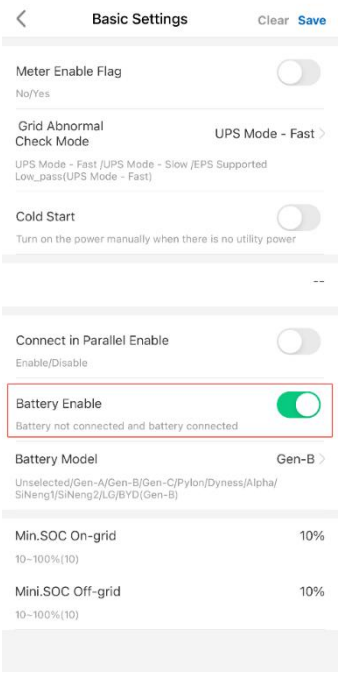


Figure 9-22 Battery Enable

9.4.2 Smart meter

Function:

1. Used for export limit.

2. Adjust the machine power according to the power of the energy meter under the self-use mode with the power generated and in the back-up mode.

Smart meter enabling: It can achieve the export limit function, adjust the machine output power according to the power of the energy meter under the self-use mode with the power generated and back-up mode, and read real-time grid power, voltage, current and other parameters.

Smart meter disabling: Can not achieve export limit function, adjust the machine output power according to the power of the ESP load under self-use mode with the power generated and back-up mode.

Smart meter model: Factory default setting.

Smart meter installation position: By default, the energy meter is installed on the grid side.

The factory default parameters of the energy meter communication are correct, please do not change them to avoid abnormal communication between the energy meter and the machine.

Caution: If the energy meter and the machine are connected to the three-phase grid, please ensure that the output of the energy meter and the machine are in the same phase, otherwise the energy meter function will be disabled.

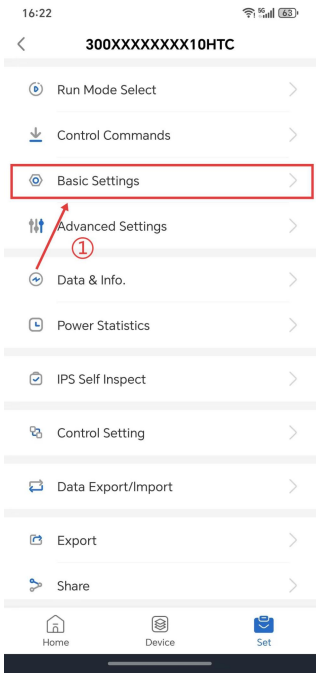


Figure 9-23 Basic Settings

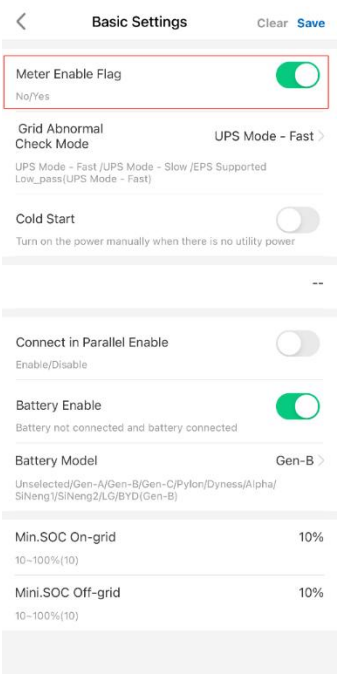


Figure 9-24 Meter Enable Flag

9.4.3 On-grid minimum SOC

Function: In on-grid mode, the lowest SOC of the battery will all use this SOC.
In self-use mode with respect to the power generated, the battery will no longer be discharged when its real-time state of charge is less than this value.
In regular charge/discharge mode, when the real-time SOC of the battery is less than this value, it will no longer be discharged.
In standby mode, the battery is charged when the real-time charge state of the battery is less than this value, and the battery is not discharged when it is greater than this value.

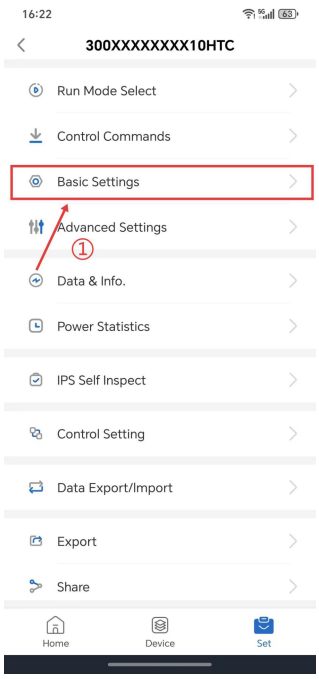


Figure 9-25 Basic Settings

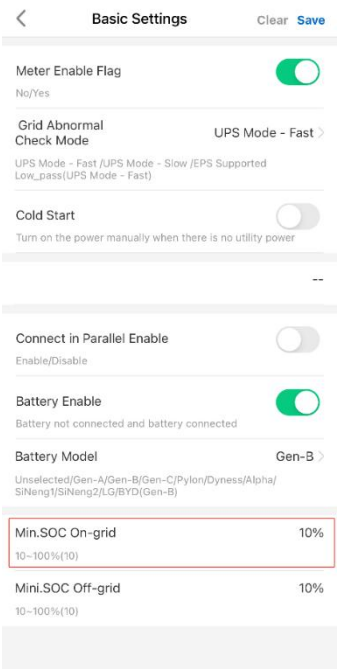


Figure 9-26 Min SOC On-grid

9.4.4 Off-grid minimum SOC

Function: The minimum SOC of the battery set in the off-grid mode or other mode without On-grid-in conditions, system will all use this SOC limitation parameters, with the range set as 10%~100%.

In both cases, when the battery SOC is greater than this value, it can be discharged, and when it is lower than this value, the battery can be charged according to the PV situation.

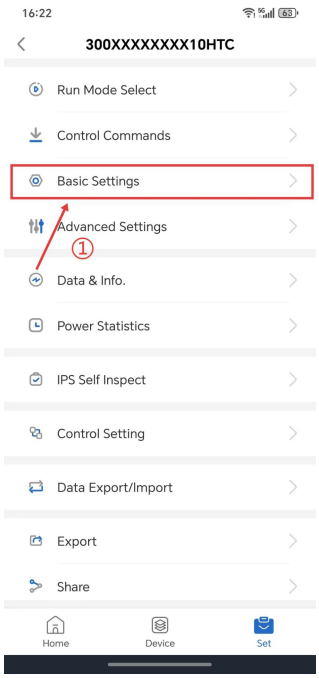


Figure 9-27 Basic Settings

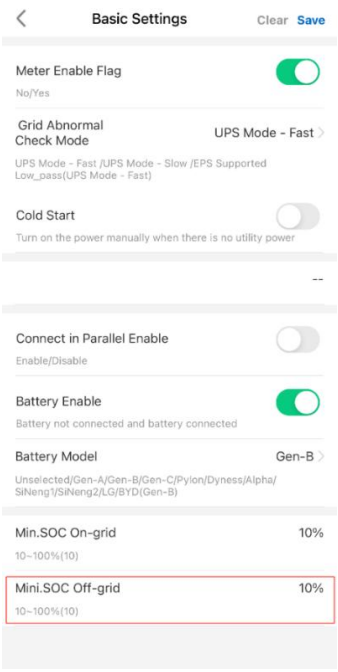


Figure 9-28 Mini SOC Off-grid

9.4.5 Low Battery SOC Protection

During the actual operation of the system, the battery may discharge to a state of low SOC. Prolonged or repeated charging and discharging of the battery will affect its BMS system, cause resource waste, and even endanger system safety. Our device is equipped with this function to protect the battery and ensure the safe and stable operation of the system.

When the battery is in a continuous discharge state, the system will protect the battery for the first time according to the "minimum SOC for On-grid " set by the user, and stop continuing to discharge.

When the battery is worn down for a long time, the SOC will further decrease. When the battery BMS "forced charging" command is triggered, the system will charge the battery under conditional charging situations until the "forced charging" command of the battery BMS disappears (there may be differences in the SOC values of different battery BMS in forced-charging and stopping-forced-charging. The system will automatically recognize them without any user action).

When the battery BMS "forced charging" command is triggered, in order to prevent the battery from still discharging at low battery level and repeatedly charging / discharging in a short period of time, the system will protect the battery from discharging for a certain period of time. The more times the BMS "forced charging" command is triggered, the longer the time delay will be.

When battery BMS "forced charging" command triggered 3 or more times, the system will no longer allow the battery to discharge until the battery meets the charging conditions.

After the battery BMS triggers the "forced charging" command and disappears, when charging reaches the SOC+3% hysteresis point, the battery charging or discharging will no longer be restricted by this function protection.

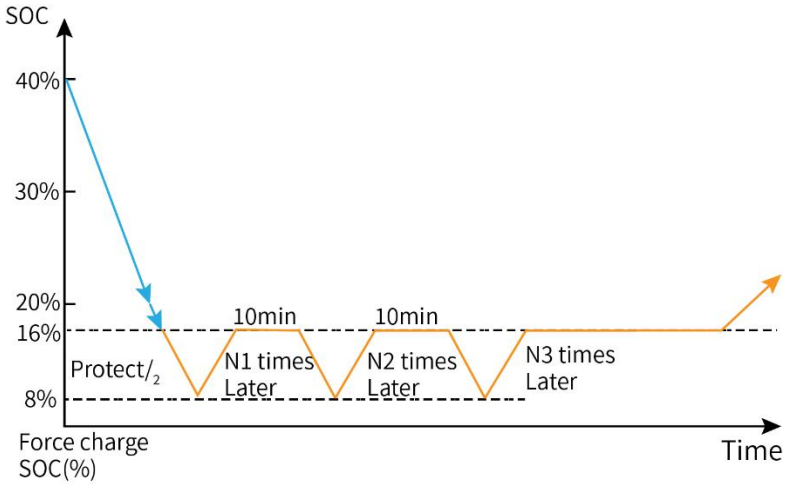


Figure 9-29 Low Battery SOC Protection

9.4.6 Forced charging

This occurs mainly when the battery power is low. To prevent the battery from being damaged due to the lack of battery power, there are two main situations:

1. When the battery SOC is below9%, it is charged to 14% by the forced charging.
2. The battery will request a forced charge until the sign for forced charge request symbol disappears. The duration of the forced charge is different for each battery, if it is still less than 9%, it will continue to be charged to 14%.

9.4.7 Automatic forced SOC calibration

During prolonged operation, the battery may not consistently meet the SOC calibration conditions, which can lead to inaccuracies in SOC readings. To assist with SOC calibration for the battery, the machine will, after running for a certain period (which may vary depending on the battery type), charge the battery to 100% capacity at full power when the system has charging conditions and the battery is in a charging state. This process helps the Battery Management System (BMS) to complete a calibration of the battery's charge levels.

9.4.8 Three-phase Imbalance

Function: This function can separately control the power of each phase of the machine sent to the grid.

The three-phase imbalance function will be activated when the machine is connected to the battery, communicates normally with the electricity meter, and both the smart meter dispatch and three-phase imbalance are enabled.

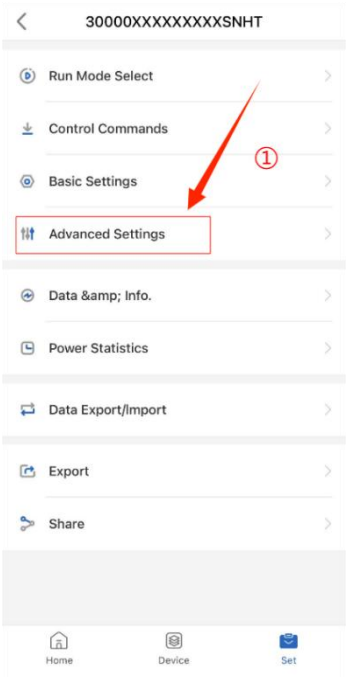


Figure 9-30 Advanced Settings 1

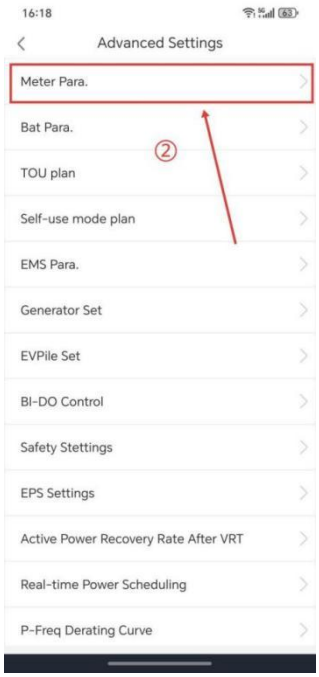


Figure 9-31 Advanced Settings 2

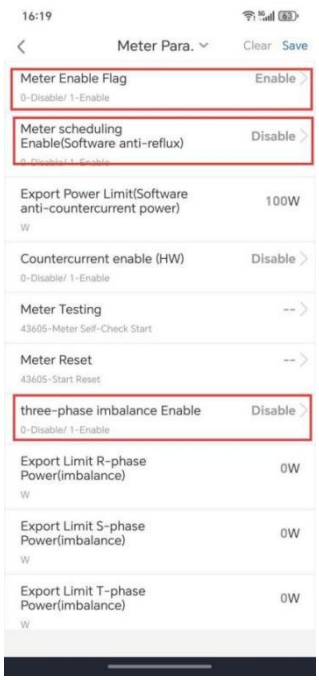


Figure 9-32 Meter Para.

In the three-phase imbalance export limit function, the power limits according to the meter and the power output percentage limits for the machine are introduced respectively.

- The power sent to the grid by any individual phase of the machine can be limited by configuring the output power values for the R/S/T phases.

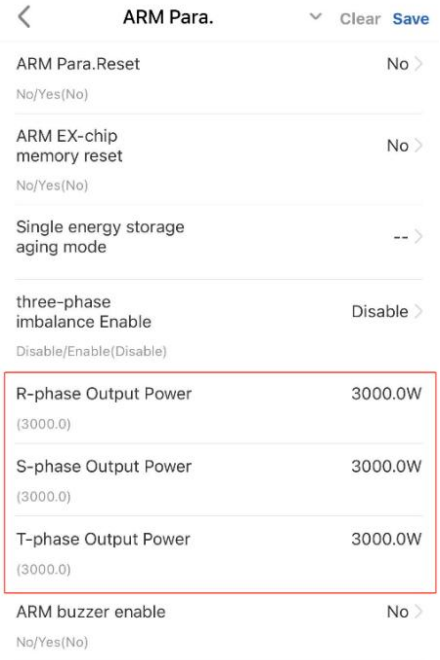


Figure 9-33 ARM Para.

- R/S/T Phase Active Power Percentage Limitation.

By setting the active power percentages for the R/S/T phases, the power output of any individual phase of the machine can be restricted (note that the active power percentages for the R/S/T phases are not saved in real-time; they will revert to the initial value of 115% upon re-energization).

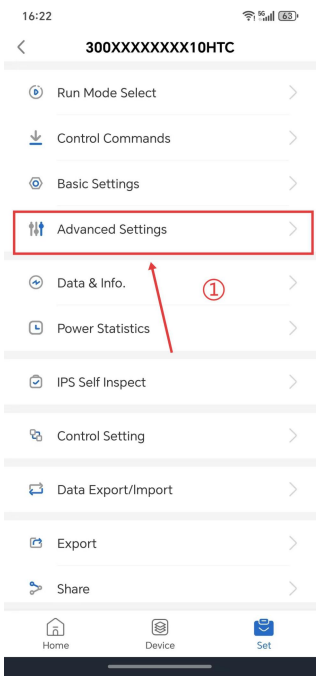


Figure 9-34 Advanced Settings

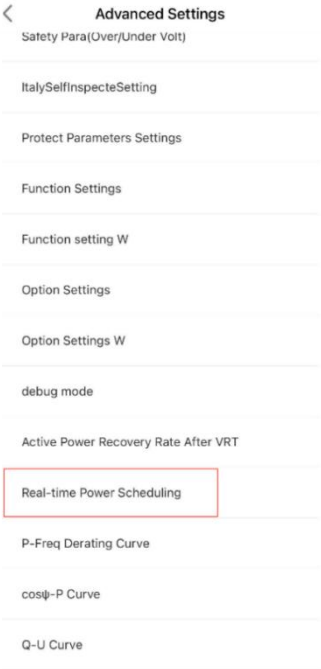


Figure 9-35 Real-time Power Scheduling 1

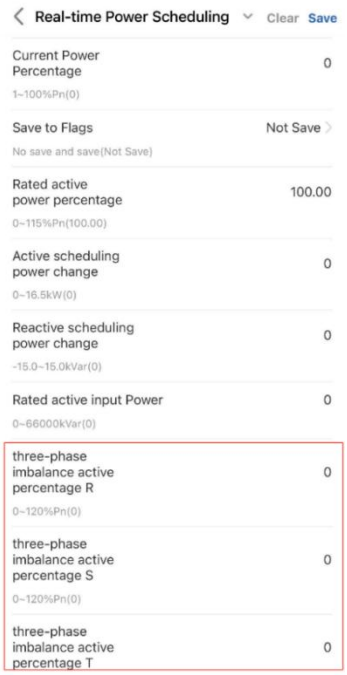


Figure 9-36 Real-time Power Scheduling 2

Note: When setting both the R/S/T phase output power values and the R/S/T phase active power percentages, the machine will limit the power output based on the lower of the two values.

9.4.9 Export limit

Function: This function can control the power sent by the machine to the grid.

The export limit function will be activated when the machine is connected to the battery and the communication with the energy meter is correct.

In this introduction to the export limit function, software export limit function and hardware export limit function will be introduced separately. The settings also need to be set separately as export limit (software) / Export limit (hardware). When the safety regulations and standards in different countries are inconsistent, the system will automatically execute software, hardware, or software/hardware export limit functions that comply local safety regulations with user settings.

- Soft Limit, export limit (software)

It is necessary to activate the export limit function (also called Soft limit) and set the power sales limit, which controls the value of the power output to the grid.

- Hard Limit, export limit (hardware)
- Soft & Hard Limit, export limit (software and hardware)

When both export limit (software) and export limit (hardware) functions are turned on, the system will first use software export limit scheduling. If the software export limit adjustment still cannot achieve the purpose of preventing backflow, hardware export limit will be enabled.

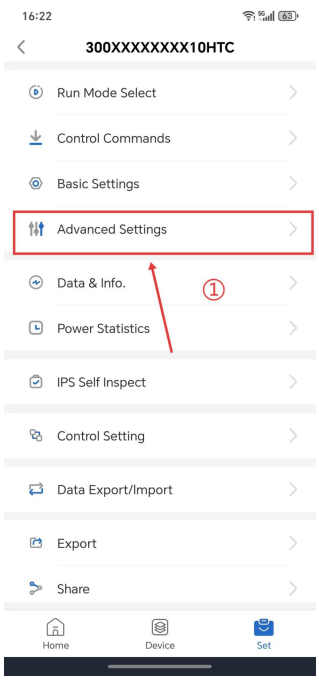


Figure 9-37 Advanced Settings

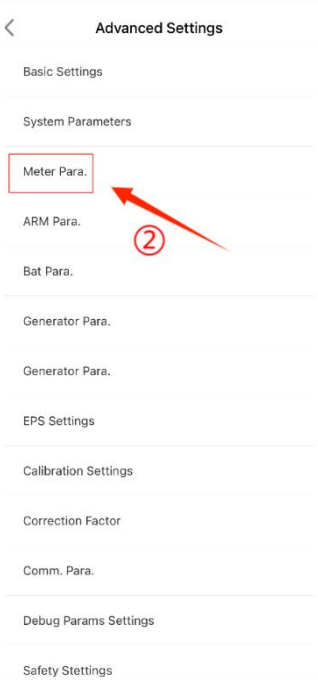


Figure 9-38 Advanced Settings

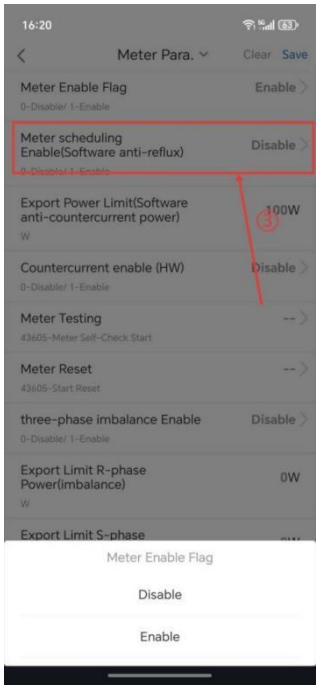


Figure 9-39 Meter scheduling Enable

9.4.10 DRM function

Function: This function can control the power taken from the grid and the power sent to the grid in real time.

DRM activation: Once enabled, the DRM function specified in the Australian safety regulations can be realized, and must work in conjunction with the DRM device to work. If DRM is enabled, but the machine does not detect the DRM device, the machine will consider that the DRM function to be abnormal, and the power harvesting and power generation are no longer be controlled by the DRM device.

It can send 100% power to the grid, and also take power with 100% power from the grid to charge the battery.

If this function is enabled, and the DRMs tool is also connected, but the detected state is invalid (multiple states exist at the same time), it can also send power to the mains at 100% power and take power from the grid with 100% power to charge the battery. For other states, see the description of DRMs.

DRM deactivation: Power consumption and power generation power are no longer controlled by DRM devices.

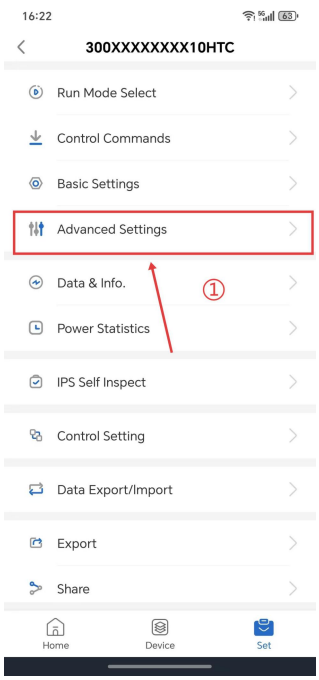


Figure 9-40 Advanced Settings

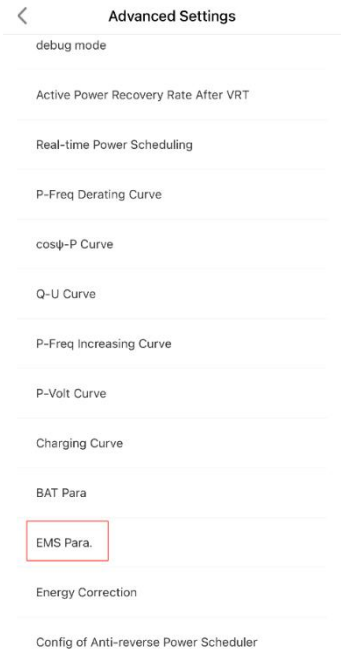


Figure 9-41 EMS Para.

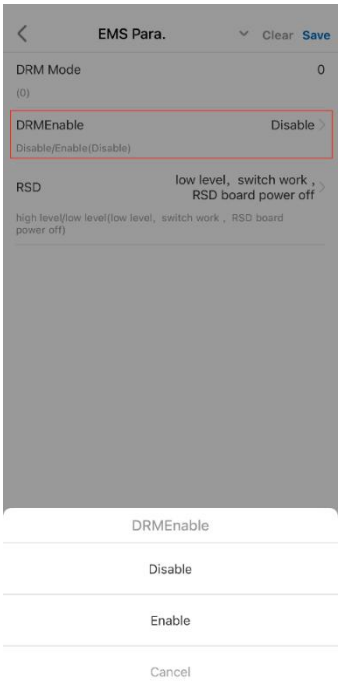


Figure 9-42 DRM Enable

9.4.11 IPS Self Inspect (For Italy CEI0-21 Grid Only)

Function: The Italy CEI0-21 grid code requires an IPS check for the SN5.0/6.0/8.0/10/10-X/12/15HT. During the self-inspect, the machine checks the protection threshold and protection time of the maximum voltage over 10 min (59.S1), maximum overvoltage (59.S2), minimum undervoltage (27.S1), minimum undervoltage (27.S2), maximum over frequency (81.S1), maximum over frequency (81.S2), minimum underfrequency (81.S), and minimum underfrequency (81.S2).

Procedure: On the home screen, Advanced Settings >ITA > IPS Self Inspect > Italy IPS setting > Start >Tap Start to start an IPS test.

After the IPS test is complete, IPS State is displayed as Check completed.

Figure 9-43 IPS Self Inspect 1

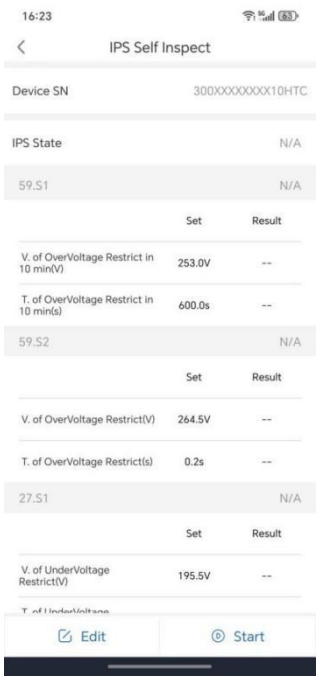


Figure 9-44 IPS Self Inspect 2

IPS Test Type	Description
Maximum voltage over 10 min (59.S1)	The default maximum voltage over 10 min protection threshold is 253 V (1.10 Vn), and the default protection time threshold is 3s.
Maximum overvoltage (59.S2)	The default overvoltage protection threshold is 264.5 V (1.15 Vn), and the default protection time threshold is 0.2s.
Minimum undervoltage (27.S1)	The default undervoltage protection threshold is 195.5 V (0.85 Vn), and the default protection time threshold is 1.5s.
Minimum undervoltage (27.S2)	The default undervoltage protection threshold is 34.5 V (0.15 Vn), and the default protection time threshold is 0.2s.
Maximum overfrequency (81.S1)	The default overfrequency protection threshold is 50.2 Hz, and the default protection time threshold is 0.1s.
Maximum overfrequency (81.S2)	The default overfrequency protection threshold is 51.5 Hz, and the default protection time threshold is 0.1s.
Minimum underfrequency (81.S1)	The default underfrequency protection threshold is 49.8 Hz, and the default protection time threshold is 0.1s.
Minimum underfrequency (81.S2)	The default underfrequency protection threshold is 47.5 Hz, and the default protection time threshold is 0.1s.

9.4.12 NFC function

This product supports NFC functionality. Users can use the NFC scanning feature of the powerinsight2 software, align it with the NFC position on the light panel to view device information, and the specific operation steps are as follows.

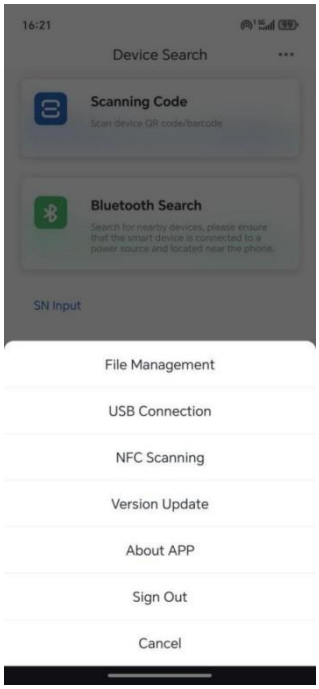


Figure 9-45 NFC function 1

Figure 9-46 NFC function 2

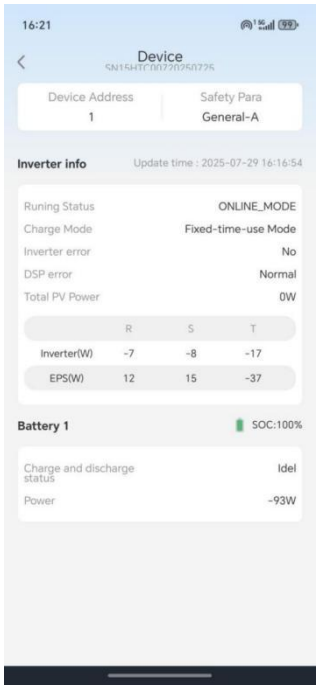


Figure 9-47 NFC function 3

9.4.13 Firmware and Software Version Query

Users can view the firmware version and software version of the device via the PowerInsight; the operation method is as follows.

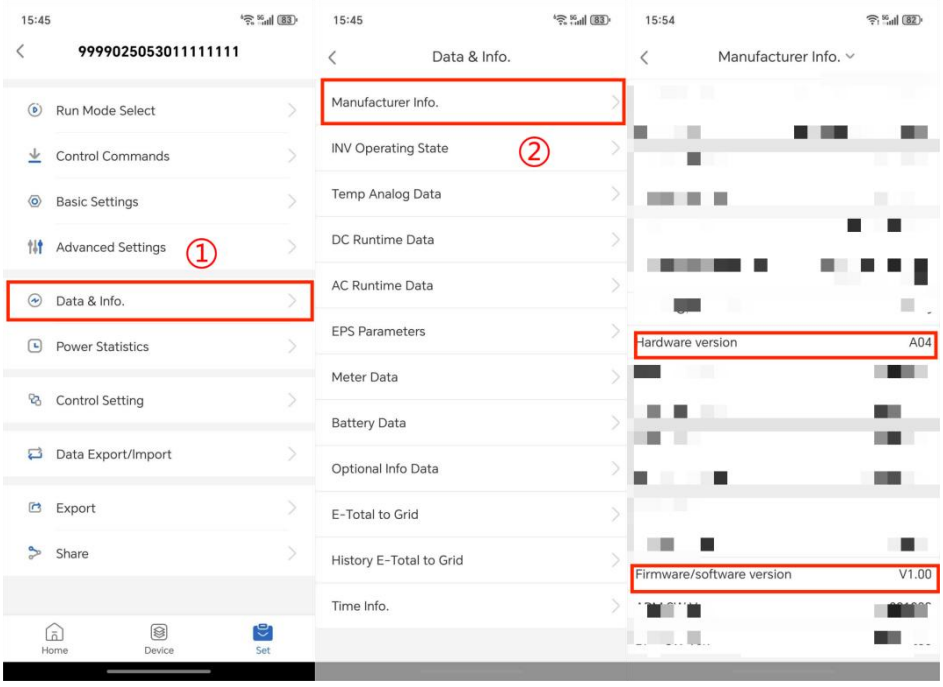


Figure 9-48 Firmware and software version query

9.5 Charging Pile Function

This product supports charging pile functions and provides Green Mode, Timed Mode, and Priority Charging Mode, which users can select according to their needs. (This function only supports charging pile products compatible with our company)

Green Mode: Only uses photovoltaic energy to power the charging pile, with battery

charging taking priority over charging pile power supply.
Timed Mode: Powers the charging pile according to the set power, time, and cycle.
Priority Charging Mode: Powers the charging pile at maximum power. the specific operation steps are as follows.

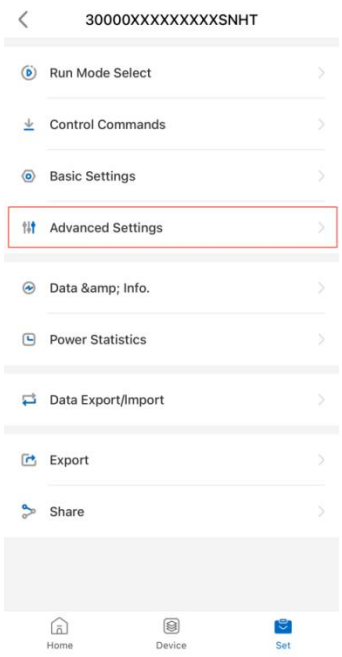


Figure 9-49 Charging pile function 1

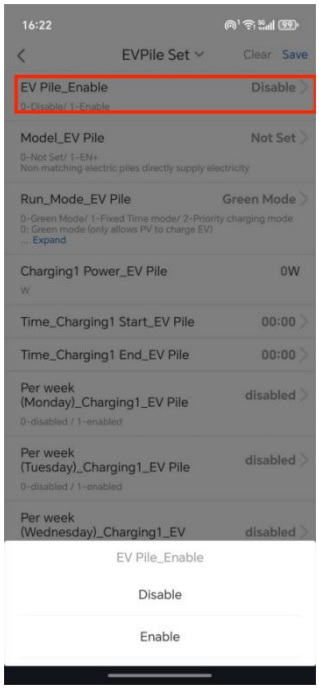


Figure 9-50 Charging pile function 2

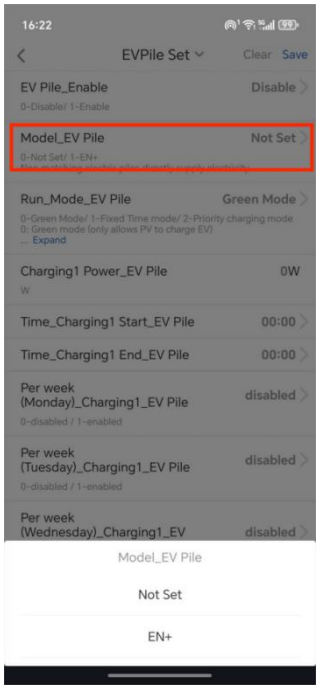


Figure 9-51 Charging pile function 3

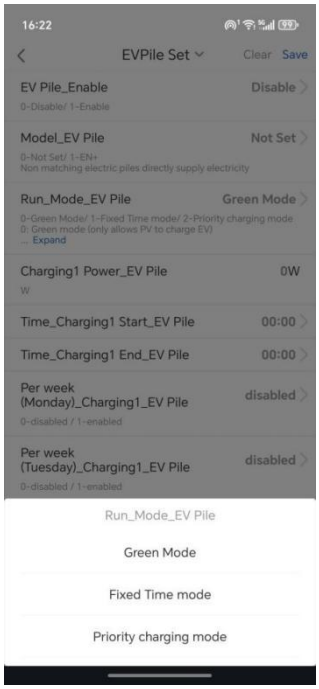


Figure 9-52 Charging pile function 4

Chapter 10 Product Maintenance

Warning

- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- Do not smoke or have an open flame around batteries.
- Do not use wet cloth to clean exposed copper bars or other conductive parts.
- Do not use water or any solvent to clean batteries.
- Do not maintain system with power on. To power off the system before performing operations such as checking screw torque and tightening screws, explain the risks to the customer, obtain the customer's written consent, and take effective preventive measures.
- After batteries are discharged, charge them in time to avoid damage due to overdischarge.
- Before moving or reconnecting the equipment, disconnect the mains and batteries and wait for 20 minutes until the equipment powers off. Before maintaining the equipment, check that no hazardous voltages remain in the DC bus or components to be maintained by using a multimeter.

10.1 Daily Inspection of Product

Table 10-1 Daily inspection items

Inspection content	Method	Inspection cycle
System cleaning	Check that there are no foreign objects on the heat sink	Once a year or when an anomaly is detected
Visual inspection	Check for abnormal phenomena such as damage, deformation, corrosion, cracks, foreign objects, dust, water stains and other pollutants, and dangerous signs such as odor, smoke, and sparks.	Once every 6 months
Cable connection	Check whether the grounding, wiring, connection and other parts of the product are loose, broken, worn, and oxidized, and whether there are potential dangers such as poor contact, leakage, and arcing. Check that unused DC input terminals, battery terminals, and COM ports are locked by watertight caps.	Once every 6 months
Tightness	Check that all terminals and connections are well sealed	Once a year
Operating status	Check the operating status of the product. Check for abnormal sounds, vibrations, temperatures, etc., and for faults such as overload, overvoltage, undervoltage, overcurrent, and short circuit.	Once every 6 months
Electrical inspection	Check whether the input and output voltage, current, power, frequency, power factor and	Once every 6 months

Inspection content	Method	Inspection cycle
	other product parameters are within the specified range, whether they are stable and reliable, and whether they have fluctuations, deviations, harmonics and other problems.	

10.2 Storage with Low SOC

After the battery is powered off, static power consumption and self-discharge loss may occur. Therefore, it is necessary to charge the battery in a timely manner, and do not store the battery in a low state of charge (SOC). Otherwise, the battery may be damaged due to overdischarge.

If the device is to be out of use for a long term, it must be powered off. Before powering off, ensure that the SOC (State of Charge) is ≥40%, and the downtime shall not exceed 6 months.

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

- The battery power cables or signal cables are not connected.
- The battery cannot be charged due to a system fault after discharge.
- The battery cannot be charged due to incorrect configurations in the system.
- The battery cannot be charged due to no PV input and long-term mains failure.

Chapter 11 Fault treatment

Warning

- Non-professionals cannot deal with HTC Series machine alarms or faults!
- When dealing with machine events, strictly follow the relevant instructions in this manual!

When the machine is running, if it encounters an abnormal state of the power grid, PV panel, or inverter, it will make an intelligent judgment and display the fault on the display or mobile APP. The following table lists the fault alarms, interpretations, and recommended handling procedures.

11.1 Inverter alarm information

Table 11-1 Inverter alarm information

Alarm ID	Alarm description	Event handling
1	Grid Volt Abnormal	1. Check that the AC output side voltage of the machine meets the grid requirements. 2. Check that the phase sequence of the AC line is connected correctly and that the wiring sequence of the N line and PE is correct and fixed. If not fixed, please connect the Sineng customer service center.
4	Grid Freq abnormal	1. Check that the AC output frequency of the machine meets the grid standards. 2. Check that the phase sequence of the AC is connected correctly and that the wiring sequence of the N line and PE is correct and fixed. 3. Check the frequency of the fault. If it occurs occasionally, it may be caused by the instantaneous change in the mains frequency and no action is required. If not fixed, please connect the Sineng customer service center.
5	No Grid Volt	The machine will resume operation when the grid returns to normal. Otherwise: 1. Check whether the AC switch of the machine is on. 2. Confirm that the phase sequence of the AC line is connected correctly and that the wiring sequence of the N line and PE is correct.
6	Grid Sequence Reverse	1. Check that the phase sequence of the AC line is correctly connected. 2. If phase sequence detection is not required, enable the phase sequence adaptive function. If not fixed, please connect the Sineng customer service center.
7	GFCI Fault	Wait for the machine until it returns to normal. Otherwise: 1. A humid environment or poor lighting will cause this fault, and the machine will return to operation when the environment improves.

		2. If the environment is normal, check whether the insulation of the DC and AC cables is normal. 3. Confirm that the cause is not one of the above and if the fault still exists, please contact the Sineng customer service center.
8	ISO Fault	Wait for the machine to return to normal. Otherwise: 1. Check the impedance of the strings and the DC cables to the earth. If there is a short circuit or if the cable insulation is damaged, please take corrective action. 2. If the cable is normal and the fault occurs on a rainy day (or in the morning with dew), check when the weather improves. 3. If it is confirmed that the cause is not one of the above, but the fault still exists, please contact the Sineng customer service center.
9	DCI Fault	Check that the phase sequence of the AC line is correct, and the that the wiring sequence of the N line and PE is correct. If not fixed, please connect the Sineng customer service center.
10	NPE Volt Fault	Measure if the voltage of the grid N-line to earth is higher than 30V. If not fixed, please connect the Sineng customer service center.
12	EPS Overload	The output load power is too high. Check whether the power of the output load is greater than the rated power of the machine. If so, it must be disconnected. Use a load that is less than or equal to the rated power of the machine and restart the machine. If the fault information remains, contact the Sineng customer service center.
13	AC Port Reversed	Reverse the wiring of the EPS terminal and the mains terminal. Reverse the wiring terminal of EPS and that of the utility power, then restart the machine, if the fault information remains, please contact the Sineng customer service center.
14	Load NPE Fault	Measure if the voltage of the Load N-line to earth is higher than 30V. If not fixed, please connect the Sineng customer service center.
16	Neutral Disconnected (EPS_Grid)	Eps_N is not connected to grid N Disconnect the AC side switch, the DC side switch, and the battery switch. Check whether the Eps_N is connected to the N wire of the mains. If not, connect the Eps_N to the N wire of the mains, and the machine will operate normally. If the fault information remains, please contact the Sineng customer service center.
21	Device Fault	1. Wait for the machine returns to normal. 2. Turn off the AC &DC switch, wait for 15 minutes and then restart the machine. If not fixed, please connect the Sineng customer service center.
22	INV Soft-Start Error	Restart the machine and if the fault information is still present, please contact the Sineng customer service center.

23	Temp High	1. Ensure that the installation environment and space of the machine meet the heat dissipation requirements. 2. Check that the fan is not blocked by foreign objects and confirm that the fan can operate normally. 3. Check that the ambient temperature of the machine is not too high. If not fixed, please connect the Sineng customer service center.
24	M-DSP Version Fault	DSP version issue, please contact the Sineng customer service center.
25	Communication Error (DSP-ARM)	1.Wait for the machine to return to normal. 2.If faults occur frequently please contact the Sineng customer service center.
26	Communication Error (Master-Slave)	1.Wait for the machine to return to normal. 2.If failures occur frequently please get in touch with the after-sales service center.
28	Logical Interface Enabled	1. Under this mode, the machine can be shut down by the logical interface. 2.If failures occur frequently without logical interface being enabled, please get in touch with the after-sales service center.
29	Device Model Mismatch	Please connect the Sineng customer service center.
33	BUS Volt High	1. Restart the machine and check that it is operating normally. 2. Check that the PV string voltage meets the maximum input voltage requirements of the machine. If not fixed, please connect the Sineng customer service center.
39	AFCI Fault	1. Check the DC side for damaged cables, loose terminals, poor contact, and scorch marks on components; if so, replace any abnormal cables, terminals, or other components. 2. Clear the error message. If not fixed, please connect the Sineng customer service center.
40	PV Volt High	1. Check that the PV string input voltage matches the machine display. 2. Check that the PV string voltage meets the maximum input voltage requirements of the machine. If not fixed, please connect the Sineng customer service center.
41	PV reverse	1. Check whether the string corresponding to the alarm is reserved. If so, it is recommended to turn off the DC switch and reserve the string polarity when the solar irradiance decreases and the string current drops below 0.5A. 2. Confirm that the cause is not one of the above and the fault still exists, please contact the Sineng customer service center.
42	PV More Panels	1. Check that the PV string input voltage matches the machine display. 2. Check that the PV string voltage meets the maximum input voltage requirements of the machine. If not fixed, please

		connect the Sineng customer service center.
43	BOOST Module Error	Restart the machine and if the fault information is still present, please contact the Sineng customer service center.
44	Series Temperature High	1. Confirm that the installation environment and the space around the machine meet the heat dissipation requirements. 2. Check that the fan is not blocked by other objects and confirm that the fan can operate normally. 3. Check that the ambient temperature of the machine is not too high. 4. Once the fault has been cleared manually, restart the machine; if the fault occurs frequently, please contact the Sineng customer service center.
48	Battery Volt Out Range	Check the battery voltage. If the battery voltage exceeds the allowable range, the machine will operate normally when the voltage returns to normal. If the battery voltage is within the allowed range, and the fault information remains, please contact the Sineng customer service center.
49	Bat Volt Low (INV)	Restart the machine and if the fault information is still present, please contact the Sineng customer service center.
50	EPS Volt Out Range	Restart the machine and if the fault information is still present, please contact the Sineng customer service center.
54	EPS Freq Out Range	Please repair.
55	EPS over current	The output load current is too high. Check whether the power of the output load is greater than the rated power of the machine. If so, it must be disconnected. Use a load that is less than or equal to the rated power of the machine and restart the machine. If the fault information remains, contact the Sineng customer service center.
65	Relay Fault	1. Restart the machine and check that it is operating normally. 2.Check that the wiring of the machine is correct (Neutral & PE). If this happens frequently, please contact the Sineng customer service center.
66	HCT Error	Restart the machine and if the fault information is still present, please contact the Sineng customer service center.
67	Reference Voltage Error	Restart the machine and if the fault information is still present, please contact the Sineng customer service center.
70	12V Power Surce Error	Restart the machine and if the fault information is still present, please contact the Sineng customer service center.
79	Internal Fan Fault	If this happens frequently, please contact the Sineng customer service center.
80	External Fan Fault	If this happens frequently, please contact the Sineng customer service center.
84	Parallel Settings Fault	Check each machine and consistent settings are required.
85	Parallel Sync Comm Fault	Make sure the parallel connection is stable.

201	AC Curr High	The machine monitors the external operating conditions in real time, and the machine will resume normal operation after the fault disappears, no manual intervention is required. If this alarm occurs frequently, check that there is no short circuit in the external output circuit; if the problem cannot be solved, please contact the Sineng customer service center.
202	AC Curr Hardware Protect	The machine monitors the internal operating conditions in real time, and resumes normal operation when the fault is cleared, without the need for manual intervention. If this alarm occurs frequently, check that there is no short circuit in the external output circuit; if the problem cannot be solved, please contact the Sineng customer service center.
203	HVRT	If it occurs accidentally, it may be caused by a short-term abnormality of the grid The machine will resume normal operation when it detects that the grid has recovered, no manual intervention is required. If it occurs frequently, please check that the grid voltage is within the allowable range, If not fixed, please connect the Sineng customer service center.
204	LVRT	If it occurs accidentally, it may be caused by a short-term abnormality of the grid. The machine will resume normal operation when it detects that the grid has recovered, no manual intervention is required. If it occurs frequently, please check that the grid voltage is within the allowable range, If not fixed, please connect the Sineng customer service center.
205	PV-PE Volt High	Wait for the machine to recover. If the machine cannot be restored for a long time, disconnect the switch on the AC side switch and DC side switch, wait for 5 minutes, and then close the AC and DC switches in turn. Restart the machine, if the fault information still exists, contact Sineng customer service center.
206	Island	If it occurs accidentally, it may be caused by a short-term abnormality of the grid The machine will resume normal operation when it detects that the grid has recovered, no manual intervention is required. If it occurs frequently, please check that the grid frequency is within the acceptable range, If not fixed, please connect the Sineng customer service center.
207	DSP EEPROM fault	1. Restart the machine and check that it is operating normally. 2. If this happens frequently, please contact the Sineng customer service center.
208	RTC Fault	1. Restart the machine and check that it is operating normally. 2. If this happens frequently, please contact the Sineng customer service center.
209	MCU_Register Fault	1. Restart the machine and check that it is operating normally. 2. If this happens frequently, please contact the Sineng

		customer service center.
210	MCU_RAM Fault	1. Restart the machine and check that it is operating normally. 2. If this happens frequently, please contact the Sineng customer service center.
211	MCU_ROM Fault	Please contact the Sineng customer service center.
212	DSP FLASH Fault	Please contact the Sineng customer service center.
213	ARM FLASH Fault	Please contact the Sineng customer service center.
214	Temp Low	Wait for the ambient temperature to return to the specified range, and then the machine will start up automatically. If not fixed, please connect the Sineng customer service center.
219	MPPT overcurrent	Wait for the machine to recover. If the machine cannot be restored for a long time, disconnect the switch on the AC side switch and DC side switch, wait for 5 minutes and close the AC and DC switches in turn. Restart the machine, if the fault information still exists, contact the Sineng customer service center.
220	MPPT overcurrent (Hardware)	Restart the machine, if the fault information is still present, please contact the Sineng customer service center.
221	MPPT Start Volt Out Range	Check the series configuration of the photovoltaic panels to ensure that the open-circuit voltage of each string is lower than the maximum operating voltage of the machine. After the configuration is correct, the machine will automatically start. If not fixed, please connect the Sineng customer service center.
223	Boost1 current limiting	The machine monitors the internal operating conditions in real time, and resumes normal operation when the fault is cleared, without the need for manual intervention. If this alarm occurs frequently and the problem cannot be solved, please contact the Sineng customer service center.
224	Boost2 current limiting	The machine monitors the internal operating conditions in real time, and resumes normal operation when the fault is cleared, without the need for manual intervention. If this alarm occurs frequently and the problem cannot be solved, please contact the Sineng customer service center.
225	Boost3 current limiting	The machine monitors the internal operating conditions in real time, and resumes normal operation when the fault is cleared, without the need for manual intervention. If this alarm occurs frequently and the problem cannot be solved, please contact the Sineng customer service center.
229	AC current limiting	The machine monitors the internal operating conditions in real time, and resumes normal operation when the fault is cleared, without the need for manual intervention. If this alarm occurs frequently and the problem cannot be solved, please contact the Sineng customer service center.

230	Inverter PWM abnormality	The machine monitors the internal operating conditions in real time, and resumes normal operation when the fault is cleared, without the need for manual intervention. If this alarm occurs frequently and the problem cannot be solved, please contact the Sineng customer service center.
239	BUS Voltage Low.	Restart the machine and if the fault information is still present, please contact the Sineng customer service center.
241	BuckBoost Overcurrent (Hardware)	Restart the machine and if the fault information is still present, please contact the Sineng customer service center.
245	BuckBoost overcurrent	Restart the machine and if the fault information is still present, please contact the Sineng customer service center.
246	Single/Parallel system Mode Not Set	Check each machine Single/Parallel system set, and consistent settings are required.
247	Balance Bridge Overurrent (Hardware)	The output half wave load power is too high. Check whether the half wave load power of the output load is greater than the sixth rated power of the machine. If so, it must be disconnected. Use a load that is less than or equal to the sixth rated power of the machine and restart the machine. If the fault information remains, contact the Sineng customer service center.

11.2 Battery safety reminder

Table 11-2 Battery safety reminder

SN.	Prompt Type	Event Content
1	Fault	Battery cell error
2	Fault	NTC Short Circuit
3	Fault	Input transposition Error
4	Fault	Input Over Voltage Error
5	Fault	Internal Communication Error
6	Fault	Temperature Sensor Error
7	Fault	Voltage Sensor Error
8	Fault	Bus undervoltage fault
9	Fault	Current sampling fault
10	Fault	Charging Mos damage fault
11	Fault	Discharge MOS damage fault
12	Fault	Heating fault
13	Fault	Heating pad control MOS tube shutdown fault
14	Fault	BMS and PCS communication fault
15	Fault	Chip error
16	Fault	High voltage bus bar short circuit fault
17	Fault	Self-test error
18	Fault	Internal bus error
19	Fault	BMIC error
20	Fault	Shutdown circuit error
21	Alarm	Single Cell Low Voltage Alarm
22	Alarm	Single Cell High Voltage Alarm
23	Alarm	MLV: Module Low Voltage Alarm

24	Alarm	MHV: Module High Voltage Alarm
25	Alarm	CLT: Charge Cell Low Temperature Alarm
26	Alarm	CHT: Charge Cell High Temperature Alarm
27	Alarm	DLT: Discharge Cell Low Temperature Alarm
28	Alarm	DHT: Discharge Cell High Temperature Alarm
29	Alarm	COCA: Charge MAP Over Current Alarm
30	Alarm	DOCA: Discharge MAP Over Current Alarm
31	Alarm	Terminal charging low temperature alarm
32	Alarm	Blind High Temperature Alarm
33	Alarm	Battery SOC low alarm
34	Alarm	PACK Cell Static Differential Pressure Alarm
35	Alarm	Depth of discharge detection
36	Alarm	PACK internal cell NTC temperature difference alarm
37	Alarm	Ambient temperature over-temperature alarm
38	Alarm	MOS tube over temperature alarm
39	Alarm	Ambient temperature low-temperature alarm
40	Alarm	BMS Software version inconsistencies alarm
41	Alarm	Hardware versions inconsistencies alarm
42	Alarm	Boot Software version inconsistencies alarm
43	Protection	BUV: Single Cell Under Voltage Protect
44	Protection	BOV: Single Cell Over Voltage Protect
45	Protection	MUV: Module Under Voltage Protect
46	Protection	MOV: Module Over Voltage Protect
47	Protection	COT: Charge Cell Over Temperature Protect
48	Protection	DUT: Discharge Cell Under Temperature Protect
49	Protection	DOT: Discharge Cell Over Temperature Protect
50	Protection	COC: Charge MAP Over Current Protect
51	Protection	DOC: Discharge MAP Over Current Protect
52	Protection	Terminal Low-Temperature Protection
53	Protection	Terminal High-Temperature Protection
54	Protection	Cell Overdischarge Fault
55	Protection	Blind Plug Over Temperature Protection
56	Protection	PACK Cell Dynamic Differential Pressure Protection
57	Protection	Cell High Temperature Protection (Static)
58	Protection	PACK internal cell NTC temperature difference protection
59	Protection	Ambient temperature over-temperature protection
60	Protection	MOS tube over-temperature protection
61	Protection	Ambient temperature low-temperature protection
62	Protection	Low insulation resistance protection on battery side
63	Protection	Low insulation resistance protection on battery side
64	Protection	System Overcurrent Protection
65	Protection	System lock

When the product displays a battery information alert, the user can try pressing and holding the battery switch button for three seconds to restart the battery; if the alert still does not disappear after restarting, please contact after-sales service personnel promptly.

Appendix A Removing the Machine

Warning

- After the machine is completely powered off, there are still dangerous voltage hazards in the machine! Wait for 20 minutes before moving the machine!
- Before removing the machine, disconnect both AC and DC connections.

Procedure

Step 1 Power off the machine (refer to Section 8.2) and wait for twenty minutes.

Step 2 Disconnect all cables from the inverter, including communications cables, DC input power cables, AC output power cables, and Ground cables.

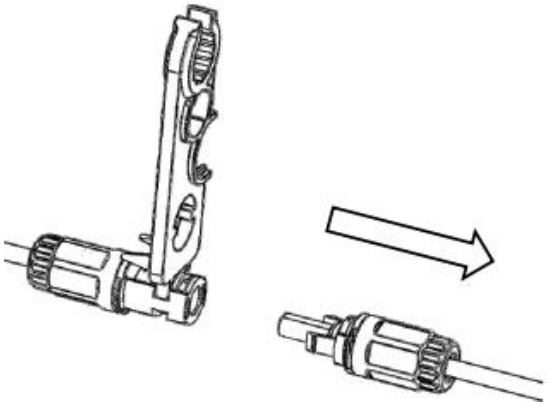


Figure A-1 Remove the connector

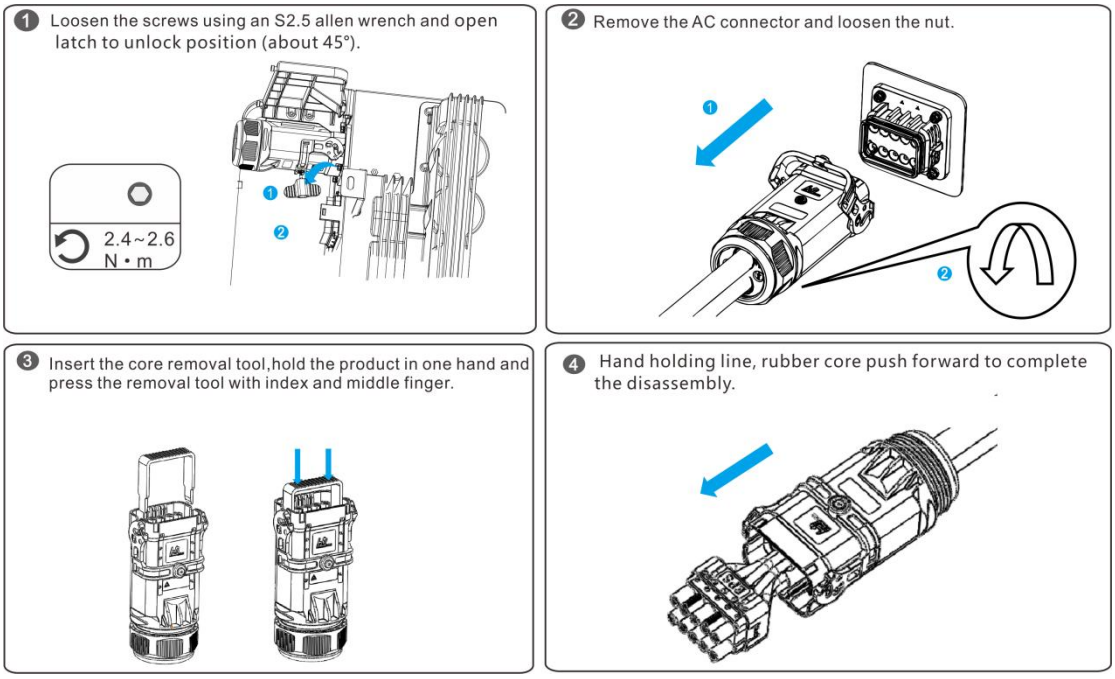


Figure A-2 AC terminal disassembly

Step 3 Remove the fixing screws on the inverter.

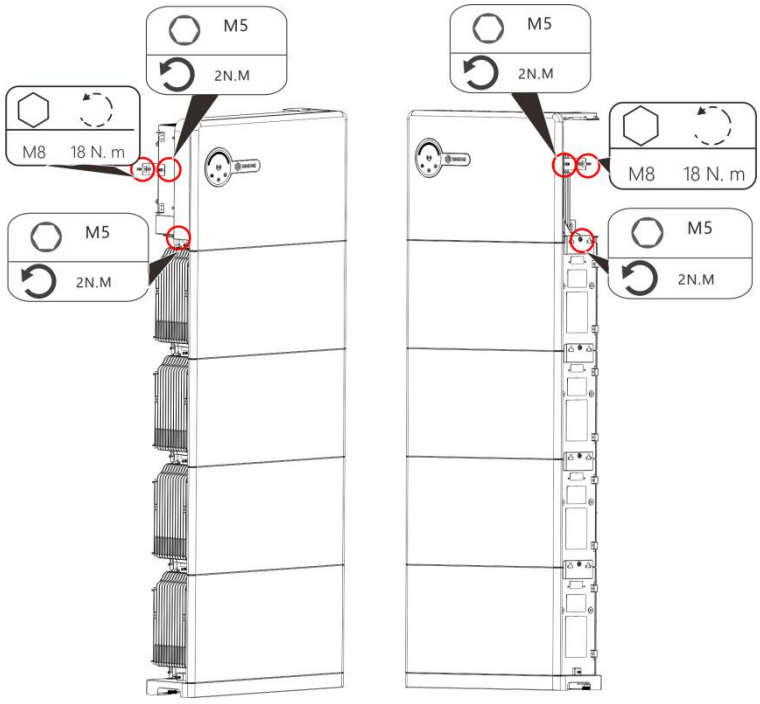


Figure A-3 Removal of the inverter's fixing screws

Step 4 Carry away the inverter.

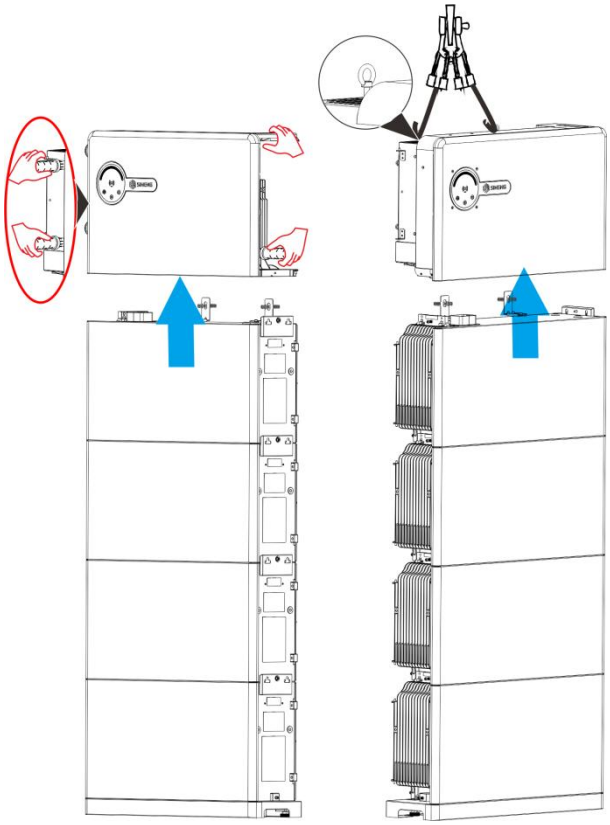


Figure A-4 Inverter disassembly

Step 5 Remove the battery's mounting fixture (remove and move one battery at a time; do not remove all at once; when multiple batteries are stacked, their combined height becomes too high, posing a risk.)

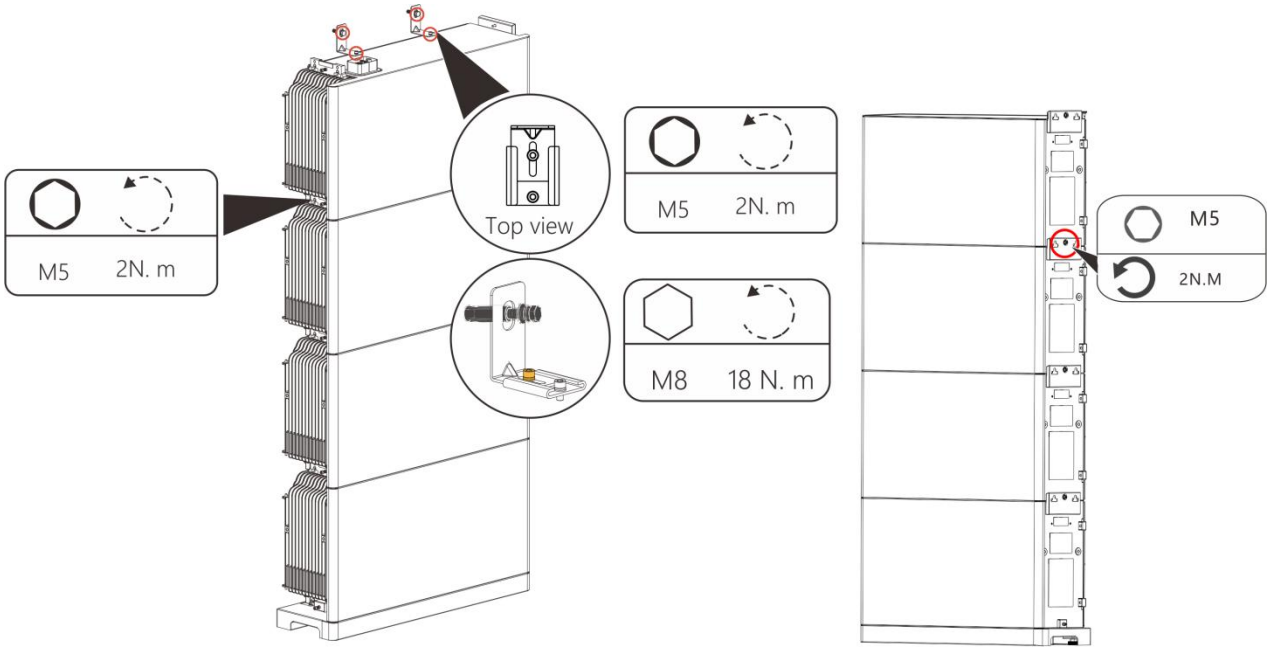


Figure A-5 Battery Mounting Fixture Removal

Step 6 Carry away the battery.

Appendix B Disposal of the Machine

Warning

The machine is to be disposed of by the user. A discarded machine is a kind of electronic waste containing hazardous substances, which will cause harm to the human body and the environment if not properly handled. Therefore, pay attention to the following when dealing with discarded machine:

- Do not discard or pile up discarded machine at will. Instead, hand them over to professional recycling organizations or departments in accordance with relevant laws and regulations to avoid secondary pollution.
- Do not dismantle or repair the discarded machine by yourself to avoid electric shock or exposure to harmful substances. It must be handled by professionals who wear protective equipment and take safety measures.
- Do not mix discarded machine with other wastes. Store them as separate categories, and indicate their properties and sources to facilitate recycling.

Appendix C System Specifications

Table C-1 HTC Energy Storage System Regular parameters 1

Item	Specification			
Equipment model	SN5.0HTC-6.4	SN5.0HTC-12.8	SN5.0HTC-19.2	SN5.0HTC-25.7
Module Number	1	2	3	4
Energy (kWh)	6.4	12.8	19.2	25.7
Battery Nomina Voltage (Vd.c.)	412.8			
Battery designation	IFpP58/147/417[6S] E/0+40/90	IFpP58/147/417[(6S)2P] E/0+40/90	IFpP58/147/417[(6S)3P] E/0+40/90	IFpP58/147/417[(6S)4P] E/0+40/90
Nominal Capacity (Ah)	15.58	31.16	46.74	62.33
Energy (kWh)	6.4	12.8	19.2	25.7
Rated (max.) Discharge / Charge Current (Ad.c.)	7.9	13.4	13.4	13.4
Dimensions (Length*Width*Height)	750*231*863.5 mm	750*231*1233.5mm	750*231*1603.5mm	750*231*1973.5 mm
Net weight (kg)	98.7	166.4	234.1	301.8

Table C-2 HTC Energy Storage System Regular parameters 2

Item	Specification			
Equipment model	SN6.0HTC-6.4	SN6.0HTC-12.8	SN6.0HTC-19.2	SN6.0HTC-25.7
Module Number	1	2	3	4
Energy (kWh)	6.4	12.8	19.2	25.7
Battery Nomina Voltage (Vd.c.)	412.8			
Battery designation	IFpP58/147/417[6S] E/0+40/90	IFpP58/147/417[(6S)2P] E/0+40/90	IFpP58/147/417[(6S)3P] E/0+40/90	IFpP58/147/417[(6S)4P] E/0+40/90
Nominal Capacity (Ah)	15.58	31.16	46.74	62.33
Energy (kWh)	6.4	12.8	19.2	25.7
Rated (max.) Discharge / Charge Current (Ad.c.)	7.9	13.9	13.9	13.9
Dimensions (Length*Width*Height)	750*231*863.5 mm	750*231*1233.5 mm	750*231*1603.5 mm	750*231*1973.5 mm
Net weight (kg)	98.7	166.4	234.1	301.8

Table C-3 HTC Energy Storage System Regular parameters 3

Item	Specification

Equipment model	SN8.0HTC-6.4	SN8.0HTC-12.8	SN8.0HTC-19.2	SN8.0HTC-25.7
Module Number	1	2	3	4
Energy (kWh)	6.4	12.8	19.2	25.7
Battery Nomina Voltage (Vd.c.)	412.8			
Battery designation	IFpP58/147/417[6S] E/0+40/90	IFpP58/147/417[(6S)2P] E/0+40/90	IFpP58/147/417[(6S)3P] E/0+40/90	IFpP58/147/417[(6S)4P] E/0+40/90
Nominal Capacity (Ah)	15.58	31.16	46.74	62.33
Energy (kWh)	6.4	12.8	19.2	25.7
Rated (max.) Discharge / Charge Current (Ad.c.)	7.9	15.8	22.3	22.3
Dimensions (Length*Width*Height)	750*231*863.5 mm	750*231*1233.5 mm	750*231*1603.5 mm	750*231*1973.5 mm
Net weight (kg)	98.7	166.4	234.1	301.8

Table C-4 HTC Energy Storage System Regular parameters 4

Item	Specification			
Equipment model	SN10HTC-6.4	SN10HTC-12.8	SN10HTC-19.2	SN10HTC-25.7
Module Number	1	2	3	4
Energy (kWh)	6.4	12.8	19.2	25.7
Battery Nomina Voltage (Vd.c.)	412.8			
Battery designation	IFpP58/147/417[6S] E/0+40/90	IFpP58/147/417[(6S)2P] E/0+40/90	IFpP58/147/417[(6S)3P] E/0+40/90	IFpP58/147/417[(6S)4P] E/0+40/90
Nominal Capacity (Ah)	15.58	31.16	46.74	62.33
Energy (kWh)	6.4	12.8	19.2	25.7
Rated (max.) Discharge / Charge Current (Ad.c.)	7.9	15.8	23.7	28
Dimensions (Length*Width*Height)	750*231*863.5 mm	750*231*1233.5 mm	750*231*1603.5 mm	750*231*1973.5 mm
Net weight (kg)	98.7	166.4	234.1	301.8

Table C-5 HTC Energy Storage System Regular parameters 5

Item	Specification			
Equipment model	SN12HTC-6.4	SN12HTC-12.8	SN12HTC-19.2	SN12HTC-25.7
Module Number	1	2	3	4
Energy (kWh)	6.4	12.8	19.2	25.7
Battery Nomina Voltage (Vd.c.)	412.8			

Battery designation	IFpP58/147/417[6S] E/0+40/90	IFpP58/147/417[(6S)2P] E/0+40/90	IFpP58/147/417[(6S)3P] E/0+40/90	IFpP58/147/417[(6S)4P] E/0+40/90
Nominal Capacity (Ah)	15.58	31.16	46.74	62.33
Energy (kWh)	6.4	12.8	19.2	25.7
Rated (max.) Discharge / Charge Current (Ad.c.)	7.9	15.8	23.7	31.6
Dimensions (Length*Width*Height)	750*231*863.5 mm	750*231*1233.5 mm	750*231*1603.5 mm	750*231*1973.5 mm
Net weight (kg)	100.7	168.4	236.1	303.8

Table C-6 HTC Energy Storage System Regular parameters 6

Item	Specification			
Equipment model	SN15HTC-6.4	SN15HTC-12.8	SN15HTC-19.2	SN15HTC-25.7
Module Number	1	2	3	4
Energy (kWh)	6.4	12.8	19.2	25.7
Battery Nomina Voltage (Vd.c.)	412.8			
Battery Designation	IFpP58/147/417[6S] E/0+40/90	IFpP58/147/417[(6S)2P] E/0+40/90	IFpP58/147/417[(6S)3P] E/0+40/90	IFpP58/147/417[(6S)4P] E/0+40/90
Nominal Capacity (Ah)	15.58	31.16	46.74	62.33
Energy (kWh)	6.4	12.8	19.2	25.7
Rated (max.) Discharge / Charge Current (Ad.c.)	7.9	15.8	23.7	31.6
Dimensions (Length*Width*Height)	750*231*863.5 mm	750*231*1233.5 mm	750*231*1603.5 mm	750*231*1973.5 mm
Net weight (kg)	100.7	168.4	236.1	303.8

Table C-7 HTC Energy Storage System Regular parameters 7

Item	Specification
Operating temperature (℃)	-20～55
Storage temperature (℃)	-40～70 (Inverter); -20～45 (Battery, 1 month)
Inverter weight(kg)	SN5.0HTC, SN6.0HTC, SN8.0HTC, SN10HTC:31 SN12HTC, SN15HTC:33
Inverter Dimensions (Length*Width*Height)	750*218*443.5mm
Battery weight(kg)	67.7
Inverter Dimensions (Length*Width*Height)	750*231*400mm
Relative humidity	0～95%, no condensation

Altitude (m)	≤2000
Pollution degree	3
Environmental category	Outdoor

Table C-8 Electrical characteristics (battery output/input)

Item	EB-6.4 kWh	EB-12.8 kWh	EB-19.2 kWh	EB-25.7 kWh
Rated Power	3kW	6kW	9kW	12kW
Battery Nomina Voltage (Vd.c.)	412.8V			
Voltage range	361.2~492.8V			
Rated current	7.9A	15.8A	23.7A	31.6A
PACK quantity	1	2	3	4
DOD	≥90%			

Table C-9 Electrical characteristics (DC Input)

Item	Specification					
Model	SN5.0HTC	SN6.0HTC	SN8.0HTC	SN10HTC	SN12HTC	SN15HTC
Maximum DC input power (W)	7500	9000	12000	15000	18000	22500
Maximum DC input voltage (Vdc)	1000					
Star-up voltage (Vdc)	180					
MPPT voltage range (Vdc)	160-950					
Full load MPPT voltage range (Vdc)	200-850	200-850	200-850	200-850	240-850	300-850
MPPT Qty.	2	2	3	3	3	3
The maximum number of strings per MPPT	1/1		1/1/1			
The maximum input current per channel of MPPT (Adc)	18/18		18/18/18			
Maximum short-circuit current (Adc)	25/25		25/25/25			
Max. inverter backfeed current to the array (Adc)	0					

Table C-10 Electrical characteristics (AC output/input)

Item	Specification					
Equipment model	SN5.0HTC	SN6.0HTC	SN8.0HTC	SN10HTC	SN12HTC	SN15HTC
Grid system	3/N/PE					
Output rated power (W)	5000	6000	8000	10000	12000	15000
Maximum output apparent power (VA)	5500	6600	8800	11000	13200	16500
The maximum power taken from the grid (W)	22500	22500	22500	22500	22500	22500
Output rated voltage (Vac)	380/220;400/230;415/240					
Output working voltage range (Vac)	195--276					
Rated output current (Aac)	7.6/7.3/7.0	9.1/8.7/8.4	12.2/11.6/11.2	15.2/14.5/13.9	18.2/17.4/16.7	22.8/21.8/20.9
Maximum output current (Aac)	8.4/8.0/7.7	10/9.6/9.2	13.4/12.8/12.3	16.7/16/15.3	20/19.2/18.4	25/24/23
The maximum current taken from the grid (Aac)	34.1/32.7/31.3	34.1/32.7/31.3	34.1/32.7/31.3	34.1/32.7/31.3	34.1/32.7/31.3	34.1/32.7/31.3
Rated frequency (Hz)	50Hz/60Hz					
Output current waveform distortion	Total distortion rate＜3%					
Output power factor	Adjustable range: -0.8 lagging ~+0.8 leading					
Component of output DC	<0.5% *In (rated current)					
Inrush Current (peak and duration)	3.35A@5ms					
Maximum output fault current	short-circuit current 346A, duration 171.8ms					

Table C-11 Electrical characteristics (Back up)

Item		Specification					
Off-grid mode	Equipment model	SN5.0HTC	SN6.0HTC	SN8.0HTC	SN10HTC	SN12HTC	SN15HTC
	Rated output power (W)	5000	6000	8000	10000	12000	15000
	Short-period transient output (VA)	7500, 60s	9000, 60s	12000, 60s	15000, 60s	18000, 60s	18000, 60s
	Switching time (ms)	10					
	Rated output voltage (Vac)	380/220;400/230;415/240					
	Rated grid frequency	50/60					

	(Hz)	
	Output THDv (@linear load)	≤3%
On-grid mode	Max. output power for backup load (W)	22500
	Max. output current for backup load (A)	34.1

Table C-12 Electrical characteristics (Protection characteristics)

Item	Specification					
Equipment model	SN5.0HTC	SN6.0HTC	SN8.0HTC	SN10HTC	SN12HTC	SN15HTC
DC reverse polarity protection	Yes					
Leakage current protection	Yes					
Islanding protection	Yes					
Output current protection	Yes					
DC switch	Yes					
Insulation resistance detection	Yes					
AFCI	Yes					
AC and DC surge protection	II					
Over voltage category	III(Grid, BACKUP), II(PV)					
RSD	Optional					

Table C-13 Electrical characteristics (System characteristics)

Item	Specification					
Equipment model	SN5.0HTC	SN6.0HTC	SN8.0HTC	SN10HTC	SN12HTC	SN15HTC
Maximum inverter efficiency (%)	97.80	97.80	98.20	98.20	98.20	98.20
European efficiency (%)	96.5	96.8	97.2	97.4	97.5	97.5
Battery maximum charging efficiency By PV (%)	98.3					
Battery maximum charging /discharging	97.5					

efficiency from/to AC Max.Efficiency (%)		
Power self-consumption at night (W)	< 25 (No backup output)	
HMI	LED	
Protection class	I	
Cooling method	Natural cooling	Smart Cooling
Noise (dB)	< 35	<55
User interface	LED&APP	
Communication with meter	RS485	
Monitoring	WIFI/Ethernet/4G&Bluetooth	
Ingress protection	IP66	
Mounting	Floor-Installation Base	
Topology	Non-isolation	

Table C-14 Certification and standards

Item	Specification
Safety regulation certification	IEC/EN62109-1/2
EMC certification	IEC/EN61000-2/3/6

Appendix D Safety Regulations

Safety Standard Code	List of safety regulations	
0	China-1	CHN-A
1	General-1	General-A
2	China-2	CHN-B
3	General-3	General-C
4	General-4	General-D
5	Germany-1	DEU-A
6	General Europe-1	EU-General-A
7	Belgium	BEL
8	Holland	NLD
9	Portuguesa	PRT
10	Sweden	CHE
11	Brazil-1	BRA-A
12	France	FRA
13	Italy	ITA
14	Spain	ESP
15	Greece-1	GRC-A
16	General-2	General-B
17	Korea	KOR
18	UK-1	GBR-A
19	UK-2	GBR-B
20	India	IND
21	Poland	POL
22	General Europe-2	EU-General-B
23	Chech	CZE
24	Denmark-1	DNK-A
25	Greece-2	GRC-B
26	Ireland	IRL
27	Lithuania	LUX
28	Norway	NOR
29	Slovenia	SVN
30	Switzerland	SWE
31	Turkey	TUR
32	Finland	FIN
33	Cyprus	CYP
34	Slovakia-1	SVK-A
35	Iceland	ISL
36	Latvia	LVA
37	Romania	ROM
38	Australia-1	AUS-A
39	Australia-2	AUS-B
40	Australia-3	AUS-C
41	Austria	AUT
42	New Zealand	NZL
43	Denmark-2	DNK-B
44	Brazil-2	BRA-B

45	South Africa	ZAF
46	Invalid safety	Undefined
47	Thailand-PEA	THA-P
48	Thailand-MEA	THA-M
49	Germany-2	DEU-B
50	Saudi Arabia	SAU
51	IEC General-50HZ	IEC General-50HZ
52	Pakistan	PAK
53	Sri Lanka	LKA
54	Hungary	HUN
55	Singapore	SGP
56	Dubai	Dubai
57	IEC General-60HZ	IEC General-60HZ
58	Morocco	MAR
59	Serbia	SRB
60	Czech	CZE-B
61	General-5	General-E
62	Estonia	EST
63	Qatar	QAT
64	Diesel Generator	DG
65	General Europe-J	EU-General-J

Appendix E After-sales Service Information

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

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