

PVS-330-TL

Product Manual

About This Document

Purpose

This document describes the installation, commissioning, maintenance, and troubleshooting of the PVS-330-TL. Before installing and operating the inverter, ensure that you are familiar with the features, functions, and safety precautions provided in this document.






Figures provided in this document are for reference only.

Intended Audience

This document is intended for photovoltaic (PV) plant operating personnel and qualified electricians. Technical support engineers

Symbol Conventions

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

Symbol	Description
	DANGER Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	WARNING Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	ATTENTION Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	NOTE Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTE used to address practices not related to personal injury.
	READ THE MANUAL Supplements the important information in the main text. READ THE MANUAL is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

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

Issue 01 (2026-01-16)

This issue is the first official release.

Issue 02 (2026-03-09)

Updated Commissioning Section.

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1 Safety Information

Statement

Before transporting, storing, installing, operating, using, and/or maintaining the equipment, read this document, strictly follow the instructions provided herein, and follow all the safety instructions on the equipment and in this document. In this document, "equipment" refers to the products, software, components, spare parts, and/or services related to this document; "the Company" refers to the manufacturer (producer), seller, and/or service provider of the equipment; "you" refers to the entity that transports, stores, installs, operates, uses, and/or maintains the equipment.

The Danger, Warning, Caution, and Notice statements described in this document do not cover all the safety precautions. You also need to comply with relevant international, national, or regional standards and industry practices. **The Company shall not be liable for any consequences that may arise due to violations of safety requirements or safety standards concerning the design, production, and usage of the equipment.**

The equipment shall be used in an environment that meets the design specifications. Otherwise, the equipment may be faulty, malfunctioning, or damaged, which is not covered under the warranty. The Company shall not be liable for any property loss, personal injury, or even death caused thereby.

Comply with applicable laws, regulations, standards, and specifications during transportation, storage, installation, operation, use, and maintenance.

Do not perform reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations on the equipment software. Do not study the internal implementation logic of the equipment, obtain the source code of the equipment software, violate intellectual property rights, or disclose any of the performance test results of the equipment software.

The Company shall not be liable for any of the following circumstances or their consequences:

- The equipment is damaged due to force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions.
- The equipment is operated beyond the conditions specified in this document.
- The equipment is installed or used in environments that do not comply with international, national, or regional standards.
- The equipment is installed or used by unqualified personnel.
- You fail to follow the operation instructions and safety precautions on the product and in the document.
- You remove or modify the product or modify the software code without authorization.
- You or a third party authorized by you cause the equipment damage during transportation.
- The equipment is damaged due to storage conditions that do not meet the requirements specified in the product document.
- You fail to prepare materials and tools that comply with local laws, regulations, and related standards.
- The equipment is damaged due to your or a third party's negligence, intentional breach, gross negligence, or improper operations, or other reasons not related to the Company.

1.1 Personal Safety

- ⊘ **DANGER** - Ensure that power is off during installation. Do not install or remove a cable with power on. Transient contact between the core of the cable and the conductor will cause electric arcs, sparks, fire, or explosion, which may result in personal injury.
- ⊘ **DANGER** - Non-standard and improper operations on the energized equipment may cause fire, electric shocks, or explosion, resulting in property damage, personal injury, or even death.
- ⊘ **DANGER** - Before operations, remove conductive objects such as watches, bracelets, bangles, rings, and necklaces to prevent electric shocks.
- ⊘ **DANGER** - During operations, use dedicated insulated tools to prevent electric shocks or short circuits. The dielectric withstanding voltage level must comply with local laws, regulations, standards, and specifications.
- ⚠ **WARNING** - During operations, wear personal protective equipment such as protective clothing, insulated shoes, goggles, safety helmets, and insulated gloves.

General Requirements

- Do not stop protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment.
- If there is a likelihood of personal injury or equipment damage during operations, immediately stop, report the case to the supervisor, and take feasible protective measures.
- Do not power on the equipment before it is installed or confirmed by professionals.
- Do not touch the power supply equipment directly or with conductors such as damp objects. Before touching any conductor surface or terminal, measure the voltage at the contact point to ensure that there is no risk of electric shock.
- Do not touch operating equipment because the enclosure is hot.
- Do not touch a running fan with your hands, components, screws, tools, or boards. Otherwise, personal injury or equipment damage may occur.
- In the case of a fire, immediately leave the building or the equipment area and activate the fire alarm or call emergency services. Do not enter the affected building or equipment area under any circumstances.

Personnel Requirements

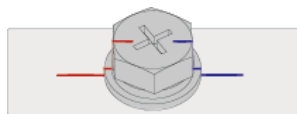
- Only professionals and trained personnel are allowed to operate the equipment.
 - Professionals: personnel who are familiar with the working principles and structure of the equipment, trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation, operation, maintenance
 - Trained personnel: personnel who are trained in technology and safety, have required experience, are aware of possible hazards on themselves in certain operations, and are able to take protective measures to minimize the hazards on themselves and other people
- Personnel who plan to install or maintain the equipment must receive adequate training, be able to correctly perform all operations, and understand all necessary safety precautions and local relevant standards.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will perform special tasks such as electrical operations, working at heights, and operations of special equipment must possess the required local qualifications.
- Only certified high-voltage electricians are allowed to operate medium-voltage equipment.
- Only authorized professionals are allowed to replace the equipment or components (including software).
- Only personnel who need to work on the equipment are allowed to access the equipment.

1.2 Electrical Safety

- ⊘ **DANGER** - Before connecting cables, ensure that the equipment is intact. Otherwise, electric shocks or fire may occur.
- ⊘ **DANGER** - Non-standard and improper operations may result in fire or electrical shocks.
- ⊘ **DANGER** - Prevent foreign matter from entering the equipment during operations. Otherwise, equipment short-circuits or damage, load power derating, power failure, or personal injury may occur.
- ⊘ **DANGER** - For the equipment that needs to be grounded, install the ground cable first when installing the equipment and remove the ground cable last when removing the equipment.
- ⚠ **ATTENTION** - Do not route cables near the air intake or exhaust vents of the equipment.

General Requirements

- Follow the procedures described in the document for installation, operation, and maintenance. Do not reconstruct or alter the equipment, add components, or change the installation sequence without permission.
- Obtain approval from the national or local electric utility company before connecting the equipment to the grid.
- Observe the power plant safety regulations, such as the operation and work ticket mechanisms.
- Install temporary fences or warning ropes and hang "No Entry" signs around the operation area to keep unauthorized personnel away from the area.
- Before installing or removing power cables, turn off the switches of the equipment and its upstream and downstream switches.
- If any liquid is detected inside the equipment, disconnect the power supply immediately and do not use the equipment.
- Before performing operations on the equipment, check that all tools meet the requirements and record the tools. After the operations are complete, collect all of the tools to prevent them from being left inside the equipment.
- Before installing power cables, check that cable labels are correct and cable terminals are insulated.
- When installing the equipment, use a torque tool of a proper measurement range to tighten the screws. When using a wrench to tighten the screws, ensure that the wrench does not tilt and the torque error does not exceed 10% of the specified value.
- Ensure that bolts are tightened with a torque tool and marked in red and blue after double-check. Installation personnel mark tightened bolts in blue. Quality inspection personnel confirm that the bolts are tightened and then mark them in red. (The marks must cross the edges of the bolts.)



- After the installation is complete, ensure that protective cases, insulation tubes, and other necessary items for all electrical components are in position to avoid electric shocks.
- If the equipment has multiple inputs, disconnect all the inputs and wait until the equipment is completely powered off before performing operations on the equipment.
- Before maintaining a downstream electrical or power distribution device, turn off the output switch on the power supply equipment.
- During equipment maintenance, attach "Do not switch on" labels near the upstream and downstream switches or circuit breakers as well as warning signs to prevent accidental connection. The equipment can be powered on only after troubleshooting is complete.
- If fault diagnosis and troubleshooting need to be performed after power-off, take the following safety measures: Disconnect the power supply. Check whether the equipment is live. Install a ground cable. Hang warning signs and set up fences.
- Check equipment connections periodically, ensuring that all screws are securely tightened.

- Only qualified professionals can replace a damaged cable.
- Do not scrawl, damage, or block any labels or nameplates on the equipment. Promptly replace labels that have worn out.
- Do not use solvents such as water, alcohol, or oil to clean electrical components inside or outside of the equipment.

Grounding

- Ensure that the grounding impedance of the equipment complies with local electrical standards.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check its electrical connection to ensure that it is reliably grounded.
- Do not work on the equipment in the absence of a properly installed ground conductor.
- Do not damage the ground conductor.
- If high touch current may occur on the equipment, ground the protective ground terminal on the equipment enclosure before connecting the power supply; otherwise, electric shock as a result of touch current may occur.

Cabling Requirements

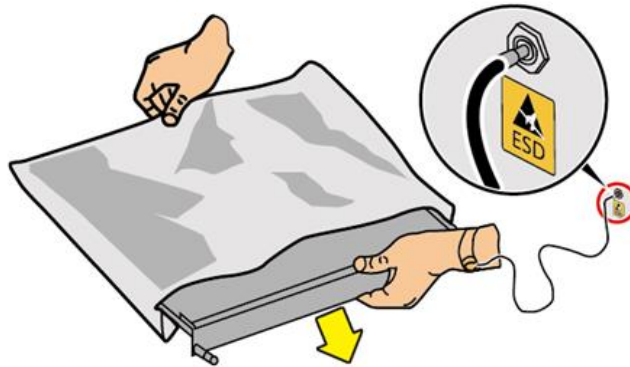
- When selecting, installing, and routing cables, follow local safety regulations and rules.
- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.
- Ensure that all cables are properly connected and insulated and meet specifications.
- Ensure that the slots and holes for routing cables are free from sharp edges, and that the positions where cables are routed through pipes or cable holes are equipped with cushion materials to prevent the cables from being damaged by sharp edges or burrs.
- If a cable is routed into the cabinet from the top, bend the cable in a U shape outside the cabinet and then route it into the cabinet.
- Ensure that cables of the same type are bound together neatly and straight and that the cable sheath is intact. When routing cables of different types, ensure that they are at least 30 mm away from each other.
- When cable connection is completed or paused for a short period of time, seal the cable holes with sealing putty immediately to prevent small animals or moisture from entering.
- Secure buried cables using cable supports and cable clips. Ensure that the cables in the backfill area are in close contact with the ground to prevent cable deformation or damage during backfilling.
- If the external conditions (such as the cable layout or ambient temperature) change, verify the cable usage in accordance with the IEC-60364-5-52 or local laws and regulations. For example, check that the current-carrying capacity meets requirements.
- When routing cables, reserve at least 30 mm clearance between the cables and heat-generating components or areas. This prevents deterioration or damage to the cable insulation layer.
- When the temperature is low, violent impact or vibration may damage the plastic cable sheathing. To ensure safety, comply with the following requirements:
 - Cables can be laid or installed only when the temperature is higher than 0°C. Handle cables with caution, especially at a low temperature.
 - Cables stored at below 0°C must be stored at room temperature for more than 24 hours before they are laid out.
- Do not perform any improper operations, for example, dropping cables directly from a vehicle. Otherwise, the cable performance may deteriorate due to cable damage, which affects the current-carrying capacity and temperature rise.

ESD

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

- 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.

Figure 1-1 Wearing an 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.

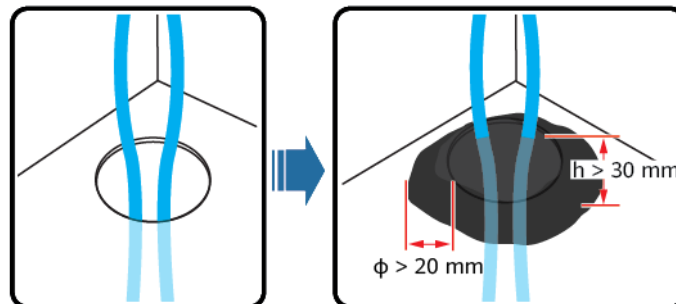
1.3 Environment Requirements

- ⊘ **DANGER** - Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.
- ⊘ **DANGER** - Do not store any flammable or explosive materials in the equipment area.
- ⊘ **DANGER** - Do not place the equipment near heat sources or fire sources, such as smoke, candles, heaters, or other heating devices. Overheat may damage the equipment or cause a fire.
- ⚠ **WARNING** - Install the equipment in an area far away from liquids. Do not install it under areas prone to condensation, such as under water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.
- ⚠ **WARNING** - To prevent damage or fire due to high temperature, ensure that the ventilation vents or heat dissipation systems are not obstructed or covered by other objects while the equipment is running.

General Requirements

- 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 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.
- Before opening doors during the installation, operation, and maintenance of the equipment, clean up any water, ice, snow, or other foreign objects on the top of the equipment to prevent foreign objects from falling into the equipment.
- When installing the equipment, ensure that the installation surface is solid enough to bear the weight of the equipment.
- All cable holes must be sealed. Seal the used cable holes with sealing putty. Seal the unused cable holes with the caps delivered with the equipment. The following figure shows the criteria for correct sealing with sealing putty.



- After installing the equipment, remove the packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

1.4 Mechanical Safety

- ⊘ **DANGER** - When working at heights, wear a safety helmet and safety harness or waist belt and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.
- ⚠ **WARNING** - Ensure that all necessary tools are ready and inspected by a professional organization. Do not use tools that have signs of scratches or fail to pass the inspection or whose inspection validity period has expired. Ensure that the tools are secure and not overloaded.
- ⚠ **WARNING** - Before installing equipment in a cabinet, ensure that the cabinet is securely fastened with a balanced center of gravity. Otherwise, tipping or falling cabinets may cause bodily injury and equipment damage.
- ⚠ **WARNING** - When pulling equipment out of a cabinet, be aware of unstable or heavy objects in the cabinet to prevent injury.
- ⚠ **WARNING** - Do not drill holes into the equipment. Doing so may affect the sealing performance and electromagnetic containment of the equipment and damage components or cables inside. Metal shavings from drilling may short-circuit boards inside the equipment.

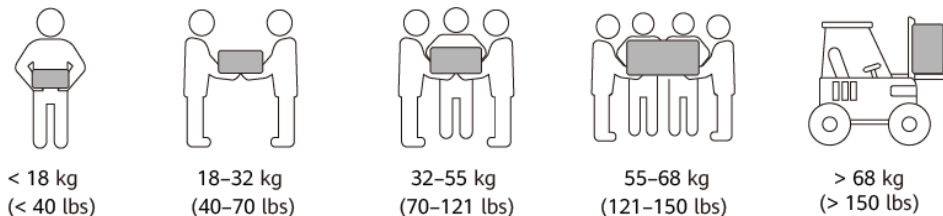
General Requirements

- Repaint any paint scratches caused during equipment transportation or installation in a timely manner. Equipment with scratches must not be exposed for an extended period of time.

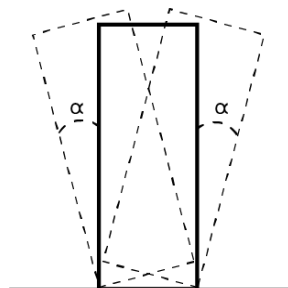
- Do not perform operations such as arc welding and cutting on the equipment without evaluation by the Company.
- Do not install other devices on the top of the equipment without evaluation by the Company.
- When performing operations over the top of the equipment, take measures to protect the equipment against damage.
- Use correct tools and operate them in the correct way.

Moving Heavy Objects

- Be cautious to prevent injury when moving heavy objects.



- If multiple persons need to move a heavy object together, determine the manpower and work division with consideration of height and other conditions to ensure that the weight is equally distributed.
- If two persons or more move a heavy object together, ensure that the object is lifted and landed simultaneously and moved at a uniform pace under the supervision of one person.
- Wear personal protective gears such as protective gloves and shoes when manually moving the equipment.
- To move an object by hand, approach to the object, squat down, and then lift the object gently and stably by the force of the legs instead of your back. Do not lift it suddenly or turn your body around.
- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules that are installed in the equipment.
- Do not quickly lift a heavy object above your waist. Place the object on a workbench that is half-waist high or any other appropriate place, adjust the positions of your palms, and then lift it.
- Move a heavy object stably with balanced force at an even and low speed. Put down the object stably and slowly to prevent any collision or drop from scratching the surface of the equipment or damaging the components and cables.
- When moving a heavy object, be aware of the workbench, slope, staircase, and slippery places. When moving a heavy object through a door, ensure that the door is wide enough to move the object and avoid bumping or injury.
- When transferring a heavy object, move your feet instead of turning your waist around. When lifting and transferring a heavy object, ensure that your feet point to the target direction of movement.
- When transporting the equipment using a pallet truck or forklift, ensure that the tynes are properly positioned so that the equipment does not topple. Before moving the equipment, secure it to the pallet truck or forklift using ropes. When moving the equipment, assign dedicated personnel to take care of it.
- Ensure that tilt angle of the cabinet meets the requirements shown in the figure. The tilt angle α of a cabinet with packaging must be less than or equal to 15° . After the cabinet is unpacked, its tilt angle α must be less than or equal to 10° .



Working at Heights

- Any operations performed 2 m or higher above the ground shall be supervised properly.
- Only trained and qualified personnel are allowed to work at heights.
- Do not work at heights when steel pipes are wet or other risky situations exist. After the preceding conditions no longer exist, the safety owner and relevant technical personnel need to check the equipment involved. Operators can begin working only after safety is confirmed.
- Set a restricted area and prominent signs for working at heights to warn away irrelevant personnel.
- Set guard rails and warning signs at the edges and openings of the area involving working at heights to prevent falls.
- Do not pile up scaffolding, springboards, or other objects on the ground under the area involving working at heights. Do not allow people to stay or pass under the area involving working at heights.
- Carry operation machines and tools properly to prevent equipment damage or personal injury caused by falling objects.
- Personnel involving working at heights are not allowed to throw objects from the height to the ground, or vice versa. Objects shall be transported by slings, hanging baskets, aerial work platforms, or cranes.
- Do not perform operations on the upper and lower layers at the same time. If unavoidable, install a dedicated protective shelter between the upper and lower layers or take other protective measures. Do not pile up tools or materials on the upper layer.
- Dismantle the scaffolding from top down after finishing the job. Do not dismantle the upper and lower layers at the same time. When removing a part, ensure that other parts will not collapse.
- Ensure that personnel working at heights strictly comply with the safety regulations. The Company is not responsible for any accident caused by violation of the safety regulations on working at heights.
- Behave cautiously when working at heights. Do not rest at heights.

Using Ladders

- Use wooden or insulated ladders when you need to perform live-line work at heights.
- Platform ladders with protective rails are preferred. Do not use single ladders.
- Before using a ladder, check that it is intact and confirm its load bearing capacity. Do not overload it.
- Ensure that the ladder is securely positioned and held firm.

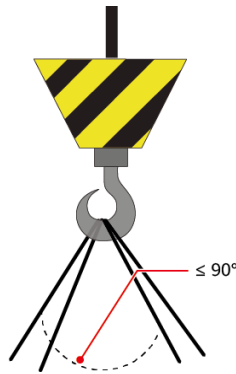


- When climbing up the ladder, keep your body stable and your center of gravity between the side rails, and do not overreach to the sides.
- When a step ladder is used, ensure that the pull ropes are secured.

Hoisting

- Only trained and qualified personnel are allowed to perform hoisting operations.
- Install temporary warning signs or fences to isolate the hoisting area.
- Ensure that the foundation where hoisting is performed on meets the load-bearing requirements.
- Before hoisting objects, ensure that hoisting tools are firmly secured onto a fixed object or wall that meets the load-bearing requirements.
- During hoisting, do not stand or walk under the crane or hoisted objects.

- Do not drag steel ropes and hoisting tools or bump the hoisted objects against hard objects during hoisting.
- Ensure that the angle between two hoisting ropes is no more than 90 degrees, as shown in the following figure.



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 Equipment Safety

1.5.1 ESS Safety

- ⊘ **DANGER** - Do not open cabinet doors when the system is running.
- ⊘ **DANGER** - If the ESS is faulty, do not stand within the opening range of the cabinet doors.
- ⚠ **ATTENTION** - Evacuate from the site immediately once the fire alarm horn/strobe is triggered.
- When installing the ESS, comply with the fire separation distance or fire wall requirements specified in local standards, including but not limited to *GB 51048-2014 Design Code for Electrochemical Energy Storage Station* and *NFPA 855 Standard for the Installation of Stationary Energy Storage Systems*.
- Check the fire safety of the ESS regularly, at least once a month.
- When inspecting the system with power on, pay attention to the hazard warning signs on the equipment. Do not stand at the battery cabin doors.
- After power components of the ESS are replaced or cable connections are changed, you need to manually start cable connection detection to prevent system malfunction.
- Do not insert or remove the auxiliary power module of the LTMS with power on.
- It is recommended that you prepare a camera to record the detailed processes of equipment installation, operation, and maintenance.

1.5.2 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 may cause battery leakage, smoke, flammable gas release, thermal runaway, fire, or explosion. To avoid battery short circuits, do not maintain batteries with power on.
- ⊘ **DANGER** - 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.

- ⊘ **DANGER** - Protect batteries from mechanical vibration, falling, collision, punctures, and strong impact. Otherwise, the batteries may be damaged or catch fire.
- ⊘ **DANGER** - 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.
- ⊘ **DANGER** - Do not touch battery terminals with other metal objects, which may cause heat or electrolyte leakage.
- ⊘ **DANGER** - 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.
- ⊘ **DANGER** - 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.
- ⊘ **DANGER** - 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.
- ⊘ **DANGER** - The gas generated by a burning battery may irritate your eyes, skin, and throat. Take protective measures promptly.
- ⚠ **WARNING** - Install batteries in an area far away from liquids. Do not install it under areas prone to condensation, such as under water pipes and air exhaust vents, or areas prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.
- ⚠ **WARNING** - Before installing and commissioning batteries, prepare fire fighting facilities, such as fire sand and carbon dioxide fire extinguishers, according to construction standards and regulations. Before putting into operation, ensure that fire fighting facilities that comply with local laws and regulations are installed.
- ⚠ **WARNING** - 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.
- ⚠ **WARNING** - 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.
- ⚠ **WARNING** - 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.
- ⚠ **WARNING** - After batteries are discharged, charge them in time to avoid damage due to overdischarge.


Statement

The Company shall not be liable for any battery damage, personal injury, death, property loss, and/or other consequences caused by the following reasons:

- Force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions
- The battery warranty period has expired. You are advised not to use a battery whose warranty period has expired, as this poses safety risks.
- Actions that do not follow instructions in the user manual or direct advice from the Company, including but not limited to the following scenarios:

- The onsite equipment operating environment or external power parameters do not meet the environment requirements for normal operation, for example, the actual operating temperature of batteries is too high or too low, or the power grid is unstable and experiences outages frequently.
- Batteries are dropped or incorrectly operated or connected.
- Batteries are overdischarged due to delayed acceptance or power-on after battery installation.
- Battery running parameters are incorrectly set.
- Different types of batteries, for example, batteries of different brands or rated capacities, are used together without prior approval from the Company.
- Batteries are frequently overdischarged due to improper battery maintenance.
- Battery use scenarios are changed without prior approval from the Company.
- Battery maintenance is not performed according to the instructions in the user manual, for example, failing to check battery terminals regularly.
- Batteries are not transported, stored, or charged according to the instructions in the user manual.
- Instructions from the Company are not followed during battery relocation or reinstallation.

General Requirements

 **NOTE** - To ensure battery safety and battery management accuracy, use batteries provided by the Company. The Company is not responsible for any faults of batteries not provided by it.

- Before installing, operating, and maintaining batteries, read the battery manufacturer's instructions and comply with their requirements. The safety precautions specified in this document are highly important and require special attention. For additional safety precautions, see the instructions provided by the battery manufacturer.
- Use batteries within the specified temperature range. When the ambient temperature of the batteries is lower than the allowed range, do not charge the batteries to prevent internal short circuits caused during low-temperature charging.
- Do not use a damaged battery (such as damage caused when a battery is dropped, bumped, bulged, or dented on the enclosure), because the damage may cause electrolyte leakage or flammable gas release. In the case of electrolyte leakage or structural deformation, contact the installer or professional O&M personnel immediately to remove or replace the battery. Do not store the damaged battery near other devices or flammable materials and keep it away from non-professionals.
- Before working on a battery, ensure that there is no irritant or scorched smell around the battery.
- When installing batteries, do not place installation tools, metal parts, or sundries on the batteries. After the installation is complete, clean up the objects on the batteries and the surrounding area.
- Check whether the positive and negative battery terminals are grounded unexpectedly. If so, disconnect the battery terminals from the ground.
- 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.
- When battery packs are installed as spare parts, the following requirements must be met:
 - Before unpacking batteries, check whether the packaging is intact. Do not use batteries with damaged packaging. If any damage is found, notify the carrier and manufacturer immediately.
 - Install batteries within 24 hours after unpacking. If the batteries cannot be installed in time, put them in the original packaging and place them in a dry indoor environment without corrosive gases. Power on the ESS within 24 hours after installation. The process from unpacking batteries to

powering on the system must be completed within 72 hours. During routine maintenance, ensure that the power-off time does not exceed 24 hours.

- Before installing a battery pack, check that its enclosure is not deformed or damaged.
- When installing batteries, do not place installation tools, metal parts, or sundries on the batteries. After the installation is complete, clean up the objects on the batteries and the surrounding area.
- Do not install battery packs on rainy, snowy, or foggy days. Otherwise, the battery packs may be corroded by moisture or rain.
- If batteries are exposed to water accidentally, do not install them. Instead, transport the batteries to a safe isolation point and contact technical engineers in a timely manner.
- 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.

Leakage Handling

NOTE - Electrolyte leakage may damage the equipment. It will corrode metal parts, boards and ultimately damage the boards.

Electrolyte is corrosive and can cause irritation and chemical burns. If you come into direct contact with the battery electrolyte, do as follows:

- Inhalation: Evacuate from contaminated areas, get fresh air immediately, and seek immediate medical attention.
- Eye contact: Immediately wash your eyes with water for at least 15 minutes, do not rub your eyes, and seek immediate medical attention.
- Skin contact: Wash the affected areas immediately with soap and water and seek immediate medical attention.
- Intake: Seek immediate medical attention.

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.

2 Overview

The PVS-330-TL is a three-phase grid-tied PV string inverter that converts the DC power generated by PV strings into AC power and feeds the power into the power grid

2.1 Model Description

This document involves the following product models:

- PVS-330-TL

Figure 2-1 Model number (example)

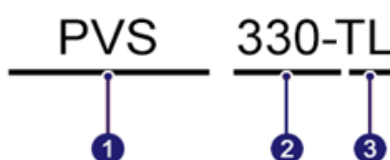



Table 2-1 Model number description

No.	Item	Description
1	Product family identifier	PVS: grid-tied solar inverter
2	Power level identifier	330K: power level
3	Topology identifier	TL: transformerless

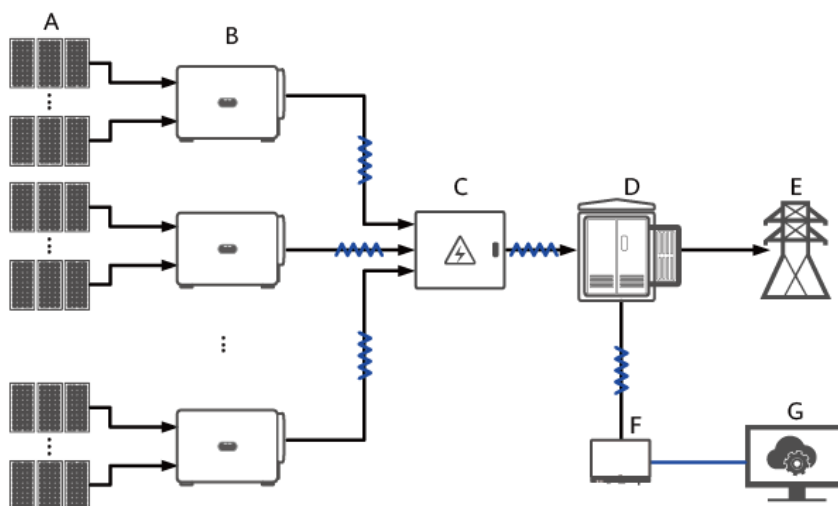
2.2 Networking Application

Typical Networking

The PVS-330-TL supports RS485 communication and MBUS communication. In the networking diagram, — indicates the power cable, → indicates the power flow direction,  and — indicate the signal flow. Battery charging: Controlled by the RCM, the electricity from the mains or other power supplies is converted by the DCDC (optional) and PCS into DC electricity, which is then stored in batteries.

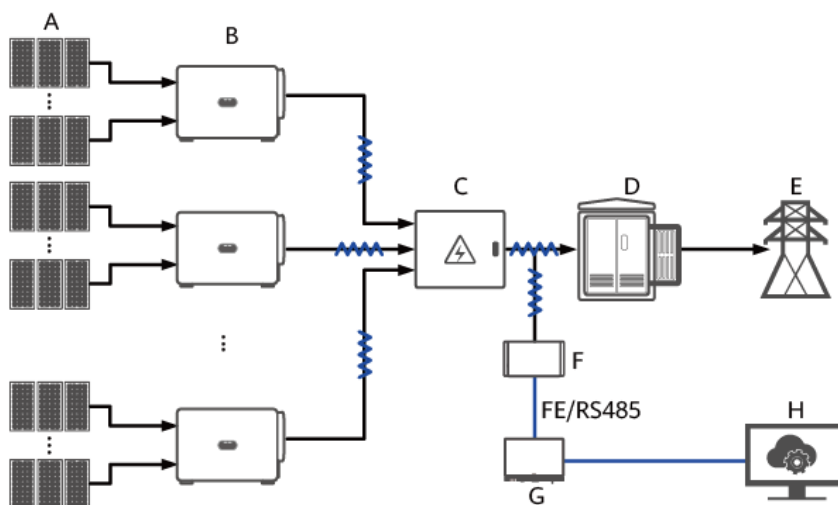
NOTE - The MBUS communication is applicable to medium-voltage grid connection scenarios and non-low-voltage public grid connection scenarios (industrial environment).

Figure 2-2 MBUS networking application (without a MBUS CCO)



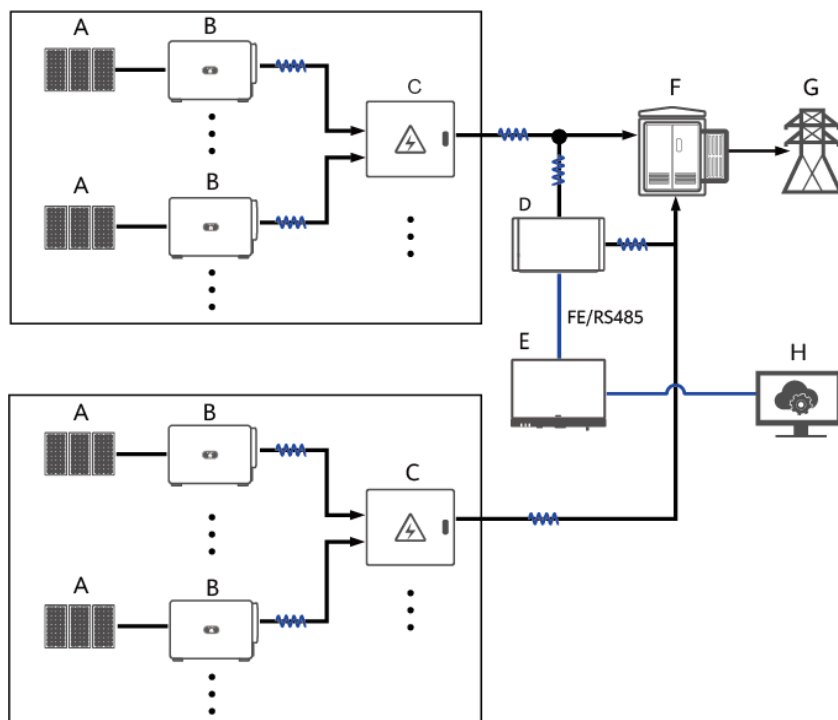
(A) PV strings	(B) Inverter	(C) AC combiner box
(D) Transformer station	(E) Power grid	(F) DataLogger
(G) Management system	-	-

Figure 2-3 MBUS networking application (double-winding transformer + MBUS CCO)



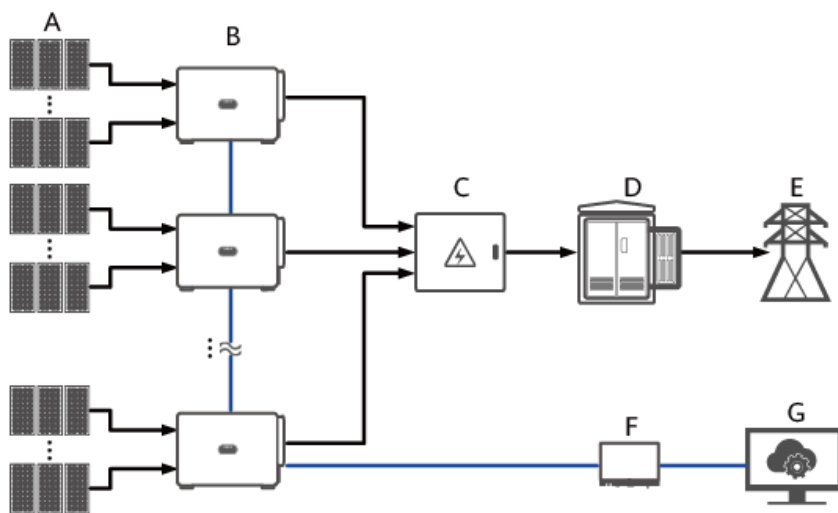
(A) PV strings	(B) Inverters	(C) AC combiner box
(D) Transformer station	(E) Power grid	(F) MBUS CCO
(G) DataLogger	(H) Management system	-

Figure 2-4 MBUS networking application (double-split transformer + MBUS CCO)



(A) PV strings	(B) Inverters	(C) AC combiner box
(D) MBUS CCO	(E) DataLogger	(F) Transformer station
(G) Power grid	(H) Management system	-

Figure 2-5 RS485 networking application (DataLogger)

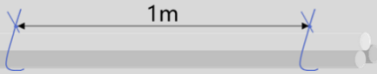


(A) PV strings	(B) Inverter	(C) AC combiner box
(D) Transformer station	(E) Power grid	(F) DataLogger
(G) Management system	-	-

NOTE - To ensure the system response speed, you are advised to connect less than 30 cascaded inverters on each COM port of the DataLogger.

NOTE - If RS485 communication is used, the RS485 communication distance between the inverter at the end and the DataLogger cannot exceed 1000 m.

NOTE - If MBUS communication is used, multi-core cables are recommended and the maximum communication distance is 1000 m. If single-core cables are used, the three-phase cables must be bound

at an interval of 1 m () and the maximum communication distance is 400 m. (When the MBUS CCO is configured, the maximum single-core cable communication distance is 750 m, and the distance between the CCO and the busbar sampling cable of the transformer station cannot exceed 3 m.)

NOTE - You are advised not to upgrade the software or export logs in fast scheduling scenarios.

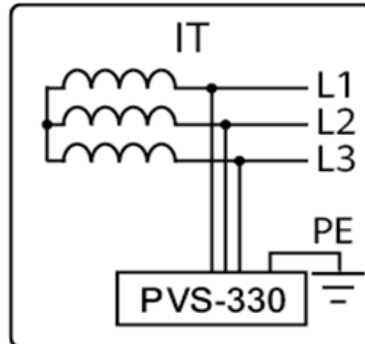
READ THE MANUAL - The inverter must be connected to a dedicated power transformer and cannot be connected to a low-voltage overhead power cable.

READ THE MANUAL - The inverters described in this document must not be connected to a winding (of the transformer station) that has other models of inverters connected to it.

Earthing System

The PVS-330-TL supports the IT earthing system.

Figure 2-6 Earthing system

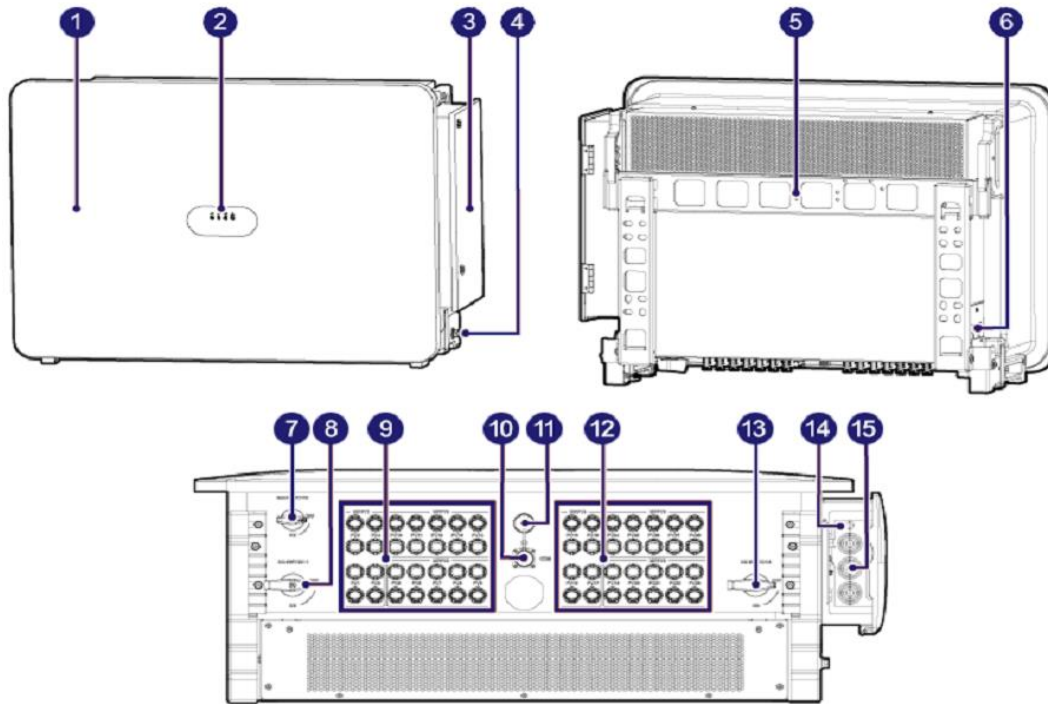


READ THE MANUAL - The PVS-330-TL supports the IT earthing system in PV-only scenarios. The use of the inverter in other types of earthing systems, such as TT, TN-C, and TN-C-S, is not recommended. (If such an earthing system is encountered, contact the Company's engineers.)

2.3 Appearance

Appearance and Ports

Figure 2-7 Appearance



(1) Panel	(2) LED indicators	(3) Maintenance compartment door
(4) Ground point on the enclosure	(5) Mounting bracket ^[1]	(6) Fan tray
(7) Auxiliary switch (AUX. SWITCH) ^[2]	(8) DC switch 1 (DC SWITCH 1)	(9) DC input terminal group 1 (PV1–PV14, controlled by DC SWITCH 1)

READ THE MANUAL - Note [1]: Figure 2-8 shows the appearance of the mounting bracket for the offshore inverter.

READ THE MANUAL - Note [2]: The silkscreen on some models is MAIN SWITCH. The actual product silkscreen may vary.

Figure 2-8 Mounting bracket for the offshore inverter

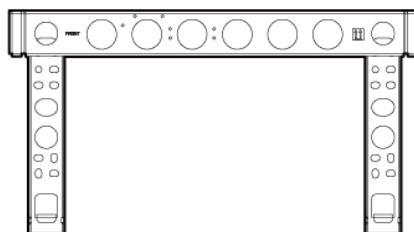






Table 2-2 Indicator description

Indicator	Status	Meaning	
PV connection indicator 	Steady red	If the alarm/maintenance indicator is steady red, an internal fault at the DC side of the inverter is generated.	
	Steady green	At least one PV string is properly connected, and the DC input voltage of the corresponding MPPT circuit is higher than or equal to 500 V.	
	Blinking green fast	If the alarm/maintenance indicator is red, an environmental fault at the DC side of the inverter was generated.	
	Off	The inverter disconnects from all PV strings, or the DC input voltages of all MPPT circuits are less than 500 V.	
Grid connection indicator 	Steady red	If the alarm/maintenance indicator is steady red, an internal fault at the AC side of the inverter is generated.	
	Steady green	The inverter is in grid-tied mode.	
	Blinking green fast	If the alarm/maintenance indicator is red, an environmental fault at the AC side of the inverter was generated.	
	Off	The inverter is not in grid-tied mode.	
Communication indicator 	Blinking green fast	The inverter receives communication data normally.	
	Off	The inverter has not received communication data for 10 seconds.	
Alarm/Maintenance indicator 	Alarm state	Steady red	<p>A major alarm was generated.</p> <ul style="list-style-type: none"> If the PV connection indicator or grid connection indicator is blinking green fast, troubleshoot DC or AC environmental faults as instructed by the app. If the PV connection indicator and grid connection indicator are both not blinking green fast, replace components or the device as instructed by the app. (Upon the first power-on, after you turn on the AUX. SWITCH, the PV connection indicator is steady green and the alarm indicator is steady red. This is normal and no alarm needs to be handled.)
		Blinking red fast	A minor alarm was generated.

	Blinking red slowly	A warning alarm was generated.
Local maintenance state	Steady green	The local maintenance is successful.
	Blinking green fast	The local maintenance failed.
	Blinking green slowly	The device is under local maintenance or shut down after receiving a command.

- 📖 **READ THE MANUAL** - The PV connection indicator and the grid connection indicator preferentially indicate environmental faults.
- 📖 **READ THE MANUAL** - Local maintenance refers to operations performed after a USB flash drive, WLAN module, or USB data cable is inserted into the USB port of the inverter. For example, export data using a USB flash drive, or connect to the app using a WLAN module or USB data cable.
- 📖 **READ THE MANUAL** - If the alarming and the local maintenance happen concurrently, the alarm/maintenance indicator shows the local maintenance state first. After the USB flash drive, WLAN module, or USB data cable is removed, the indicator shows the alarm state.

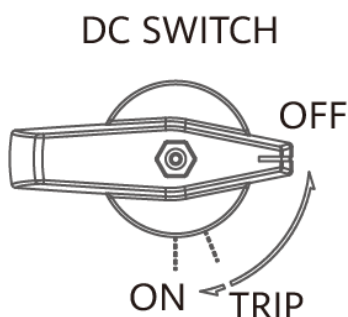
DC SWITCH

- ⚠️ **DANGER** - If the DC SWITCH automatically turns off and the inverter generates a **String Reverse Connection**, **String Current Backfeed**, or **String Voltage High** alarm, rectify the fault based on the alarm handling suggestions. After the fault is rectified, wait for at least 3 minutes, turn the switch handle to **OFF** to complete the reset, and then turn it on. For details, see 8.6 Resetting and Turning On the DC SWITCH.
- ⚠️ **DANGER** - The DC SWITCH automatically turns off if a fault occurs in the inverter. In this case, the alarm/maintenance indicator is steady red and at least one of the PV connection indicator and grid connection indicator is steady red. Then, contact technical support and do not turn on the DC SWITCH by yourself.

Table 2-3 DC SWITCH description

Switch	Description	
DC SWITCH	ON	The DC SWITCH is on and can turn off for protection.
	TRIP	The DC SWITCH is automatically turned off. (The switch handle is between ON and OFF.)
	OFF	The DC SWITCH is off.

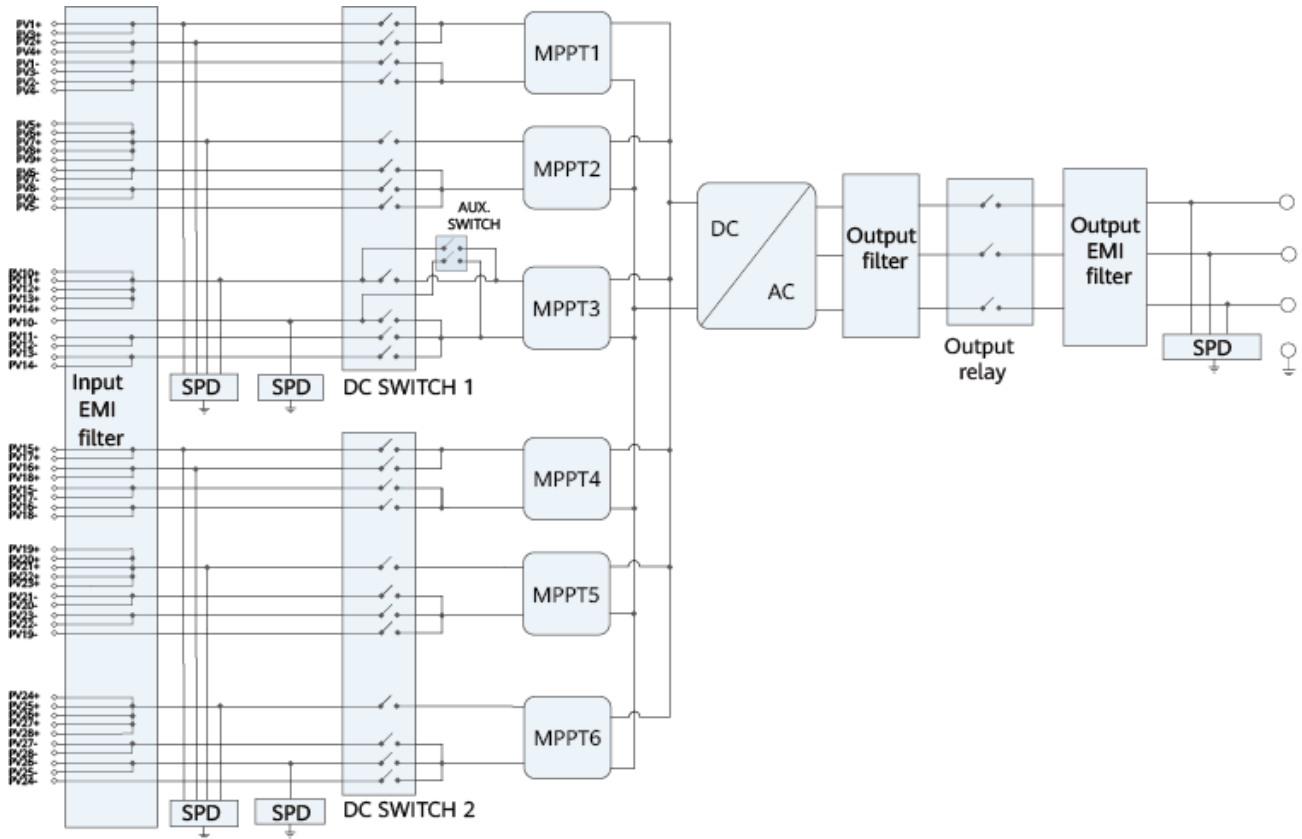
Figure 2-9 DC SWITCH



2.4 Circuit Diagram

The PVS-330-TL receives inputs from 28 PV strings. The inputs are grouped into 6 MPPT circuits inside the inverter to track the maximum power point of the PV strings. The DC power is converted into three-phase AC power through an inverter circuit. Surge protection is supported on both the DC and AC sides.

Figure 2-10 Circuit diagram



2.5 Working Modes

The inverter can work in Standby, Operating, or Shutdown mode.

Figure 2-11 Working modes

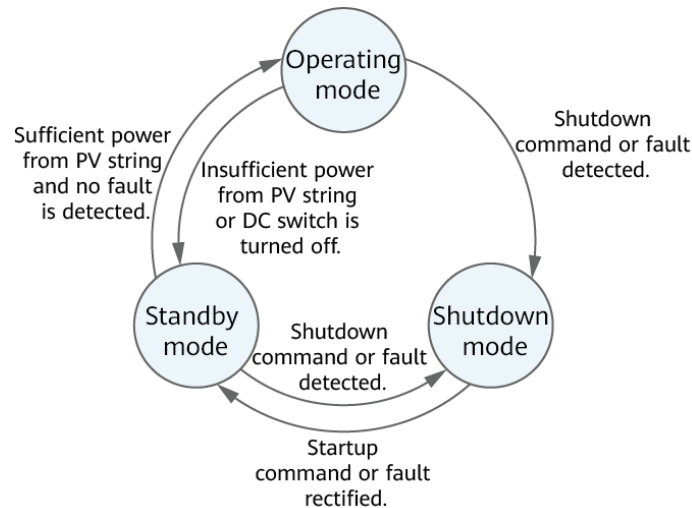









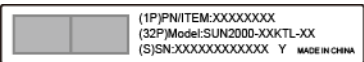





Table 2-4 Working mode description

Working Mode	Description
Standby	<p>The inverter enters Standby mode when the external environment does not meet the operating requirements. In Standby mode:</p> <ul style="list-style-type: none"> The inverter continuously performs status check and enters the Operating mode once the operating requirements are met. The inverter enters Shutdown mode after detecting a shutdown command or a fault after startup.
Operating	<p>In Operating mode:</p> <ul style="list-style-type: none"> The inverter converts DC power from PV strings into AC power and feeds the power to the power grid. The inverter tracks the maximum power point to maximize the PV string output. If the inverter detects a fault or a shutdown command, it enters the Shutdown mode. The inverter enters Standby mode after detecting that the PV string output power is not suitable for connecting to the power grid for generating power.
Shutdown	<ul style="list-style-type: none"> In Standby or Operating mode, the inverter enters Shutdown mode after detecting a fault or shutdown command. In Shutdown mode, the inverter enters Standby mode after detecting a startup command or that the fault is rectified.

2.6 Label Description

Symbol	Name	Meaning
	Operation warning	Potential hazards exist after the inverter is powered on. Take protective measures when operating the inverter.
	High temperature hazard	Do not touch the inverter when it is running because its enclosure is hot.
	Electric shock hazard	Hazardous voltage exists after the device is powered on. Take protective measures during operation and maintenance (O&M).
	Delayed discharge	<ul style="list-style-type: none"> High voltage exists after the inverter is powered on. Only qualified and trained electrical technicians are allowed to perform operations on the inverter. Residual voltage exists after the inverter is powered off. It takes 15 minutes for the inverter to discharge to the safe voltage.
	Refer to documentation	Reminds operators to refer to the documentation for the device. Losses caused by operations that do not comply with the requirements of site selection, storage, or mounting specified in the user manual are not covered under the warranty.
	Grounding	Indicates the position for connecting the ground cable.
 Do not disconnect under load! 禁止带负荷断开连接!	Operation warning	Do not remove the DC input connector when the inverter is running.
	Fan operation warning	High voltage exists after the inverter is powered on. Do not touch the fans when the inverter is working.
 CAUTION Before replacing the fan, disconnect the FAN-POWER cable and then the fan cable. 更换风扇前，必须先拔除风扇电源线，再拔除风扇线。	Fan replacement warning	Before replacing the fan, disconnect its power connector.
 (1P)P/N:ITEM:XXXXXXXX (32P)Model:SUN2000-XXXKTL-XX (S)SN:XXXXXXXXXXXXXXXX Y MADE IN CHINA	Inverter SN label	Indicates the inverter serial number.
	Weight label	The inverter needs to be carried by four persons or using a forklift.

Symbol	Name	Meaning
	DC switch operation warning	After a DC switch is automatically turned off, do not directly reset or turn on the DC switch. Instead, follow the instructions in the section "Resetting and Turning On the DC SWITCH" in the user manual, or contact after-sales service personnel.
	Warning for inserting or removing a DC terminal	Internal high voltage. To remove or insert a DC terminal, perform the following steps: Send a shutdown command. → Turn off the AC switch. → Turn off all DC switches. → Use a clamp meter to check that the PV strings have no current. → Remove or insert the DC terminal.

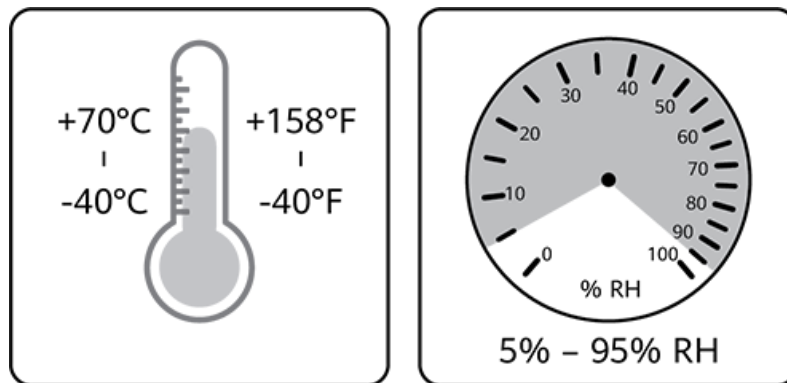
3 Transportation Requirements

NOTE - Store the device according to the storage requirements. Device damage caused by unqualified storage conditions is not covered under the warranty.

If inverters will not be put into use immediately, store them according to the requirements specified in this section. Device damage caused by unqualified storage conditions is not covered under the warranty.

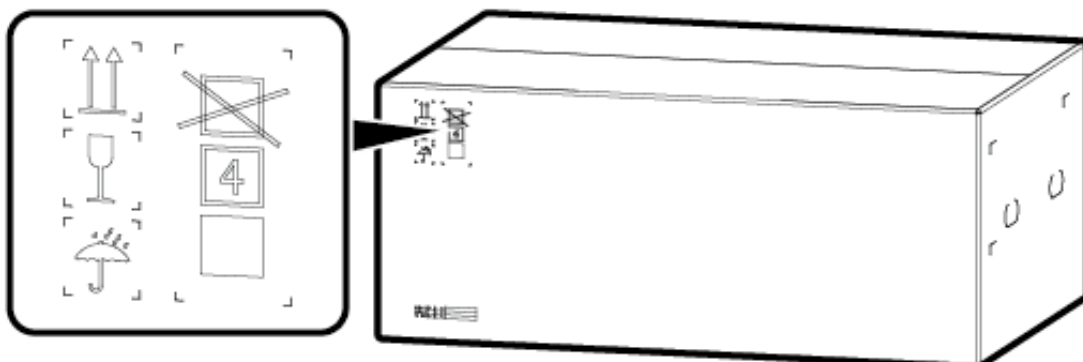
- Do not store the device without outer packaging.
- Do not remove the outer packaging. Check the packaging regularly (recommended: once every three months). Replace any packaging that is damaged during storage. If the inverter is unpacked but will not be used immediately, put it back to the original packaging with the desiccant, and seal with tape.
- Inverters must be stored in a clean and dry environment with appropriate temperature and humidity. The air must not contain corrosive or flammable gases.

Figure 3-1 Storage temperature and humidity



- When temporarily storing inverters outdoors, do not stack them on a pallet. Take rainproof measures such as using tarpaulins to protect inverters from rain and water.
- Do not tilt a packing case or place it upside down.
- To avoid personal injury or device damage, stack inverters with caution to prevent them from falling over.

Figure 3-2 Maximum number of stacking layers



- Do not store inverters for more than two years. If inverters have been stored for two years or longer, they must be checked and tested by professionals before being put into use.

4 Installation

4.1 Installation Modes

The inverter can be installed on a support or pole clamp.

Table 4-1 Installation modes

Installation Mode	Screw Specifications	Description
Support mounting	M12x40 bolt assembly	Delivered with the product
Pole-clamp mounting	Depending on the pole clamp	Prepared by the customer

4.2 Installation Requirements

4.2.1 Site Selection Requirements

Installation Environment Requirements

- Do not install the inverter in working or living areas to avoid personal injury or property loss caused by accidental contact by non-professionals or other reasons during device operation.
- Do not install the inverter in noise-sensitive areas (such as residential areas, office areas, and schools) to avoid complaints. If the preceding areas are unavoidable, the distance between the installation position and noise-sensitive areas must be greater than or equal to 40 m. Alternatively, use other low-noise models.
- If the inverter is installed in public places (such as parking lots, stations, and factories) other than working and living areas, install a protective net outside the device and set up a safety warning sign to isolate the device. This is to avoid personal injury or property loss caused by accidental contact by non-professionals or other reasons during device operation.
- 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 (the area shall be greater than or equal to 3 m x 2.5 m).
- Do not install the inverter in areas containing flammable materials (such as sulfur, phosphorus, liquefied petroleum gas, marsh gas, flour, and cotton) to avoid personal injury or property loss caused by fire or other reasons.
- Do not install the inverter in areas containing explosives (such as blasting agents, display shells, fireworks, and firecrackers) to avoid personal injury or property loss caused by explosion or other reasons.
- Do not install the inverter in areas with corrosive substances (such as sulfuric acid, hydrochloric acid, nitric acid, hydrogen sulfide, and chlorine) to avoid inverter failure caused by corrosion, which is not covered under the warranty.
- Do not install the inverter in an easily accessible place, because the voltage is high and its enclosure and heat sink are hot during device operation. This is to avoid personal injury or property loss caused by accidental contact by non-professionals or other reasons during device operation.
- Install the inverter in a well-ventilated environment to ensure good heat dissipation. The inverter provides self-protection in high-temperature environments. If the inverter is installed in a poorly ventilated environment, its energy yield may decrease as the ambient temperature increases.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference. The equipment shall be installed in an environment with a magnetic field strength less than 4 Gauss. If the

magnetic field strength is greater than or equal to 4 Gauss, the equipment may fail to work properly. If the magnetic field strength is high, for example, in a smeltery, you are advised to use a gauss meter to measure the magnetic field strength of the equipment installation position when the smelting equipment is running normally.

- If the inverter is installed in an enclosed environment, a heat dissipation device or ventilation device shall be installed. The indoor ambient temperature must not be higher than the outdoor ambient temperature. The inverter provides self-protection in high-temperature environments. Its energy yield may decrease as the ambient temperature increases.
- Install the inverter in a sheltered place to prevent exposure to direct sunlight. The inverter provides self-protection in high-temperature environments. If the inverter is installed in a place subject to direct sunlight, its energy yield may decrease as the temperature increases.
- If you need to install the inverter outdoors in salt-affected areas that may cause corrosion, contact technical support. A salt-affected area refers to a 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).
- The distance between each inverter and the AC combiner box or the low-voltage panel of the transformer station must be at least 10 m, or the total distances from two adjacent inverters to the AC combiner box or the low-voltage panel of the transformer station must be at least 20 m. The inverter provides output resonance self-protection. Its energy yield may decrease if protection against resonance is triggered as the length of the inverter output cables decreases.
- When routing PV cables whose pipe is less than 1.5 m long, the positive and negative PV string cables shall be routed in different pipes to prevent cable damage and short circuits caused by improper operations during construction. For details, see Figure 5-1.
- Take waterproof and insulation measures for unused DC power cables. High voltage may exist in unused DC power cables. Take measures to prevent personal injury or property damage caused by accidental contact with high voltage or other reasons.
- Cables must be vertically routed into combiner boxes and wiring terminals to avoid damage caused by horizontal stress on the terminals, which is not covered under the warranty.
- If an inverter has not been running for six months or longer (three months or longer in the offshore scenario) after being mounted, it may have failed and must be checked and tested by professionals before being put into operation.
- To prevent the inverter from being corroded by moisture, PV terminals that will not be used for a long time must be sealed with dedicated PV terminal plugs. Inverter failure due to not using dedicated PV terminal plugs is not covered under the warranty.


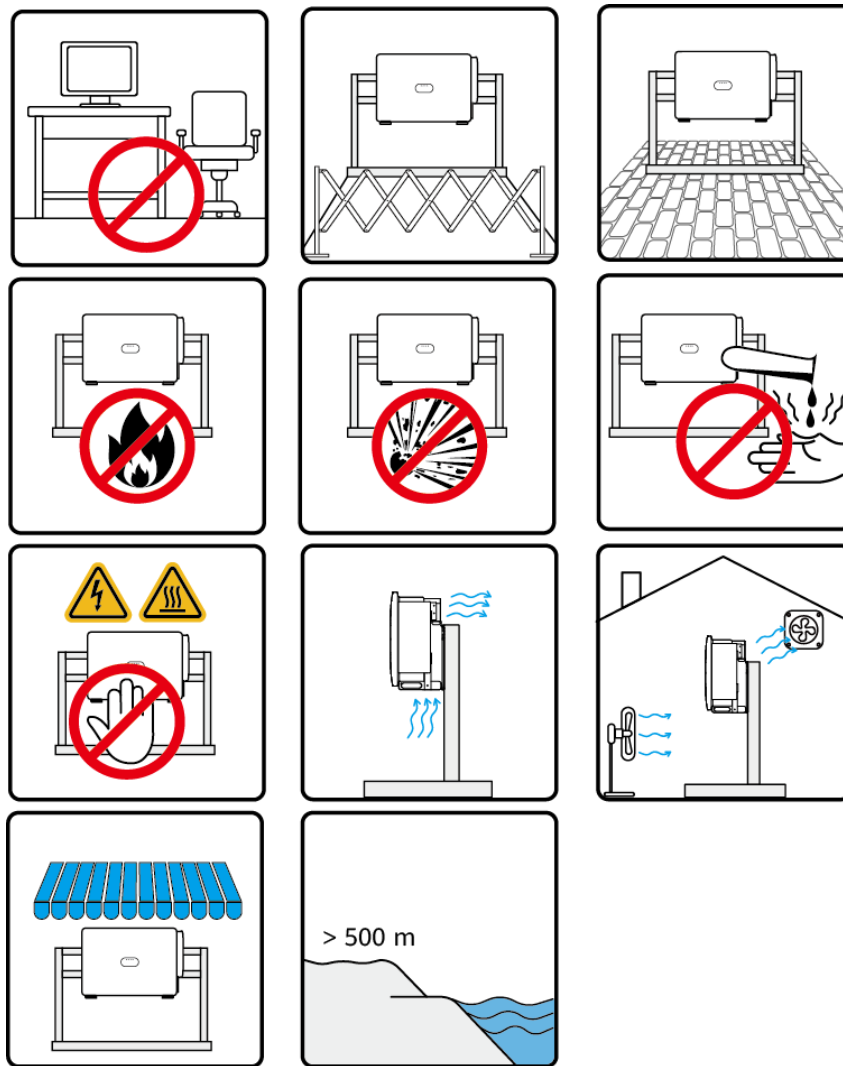
 **NOTE** - The inverter shall be physically isolated from third-party wireless communications facilities and residential environments at a distance greater than 30 m.

Figure 4-1 Installation environment requirements



Mounting Structure Requirements

- The mounting structure for the inverter must be fireproof. Do not install the inverter on flammable building materials to avoid personal injury or property loss caused by fire or other reasons.
- Do not install the inverter on a mounting structure that may generate resonance.
- Ensure that the installation surface is solid enough to bear the weight of the inverter to avoid personal injury or property loss caused by the collapse of the mounting structure or other reasons.

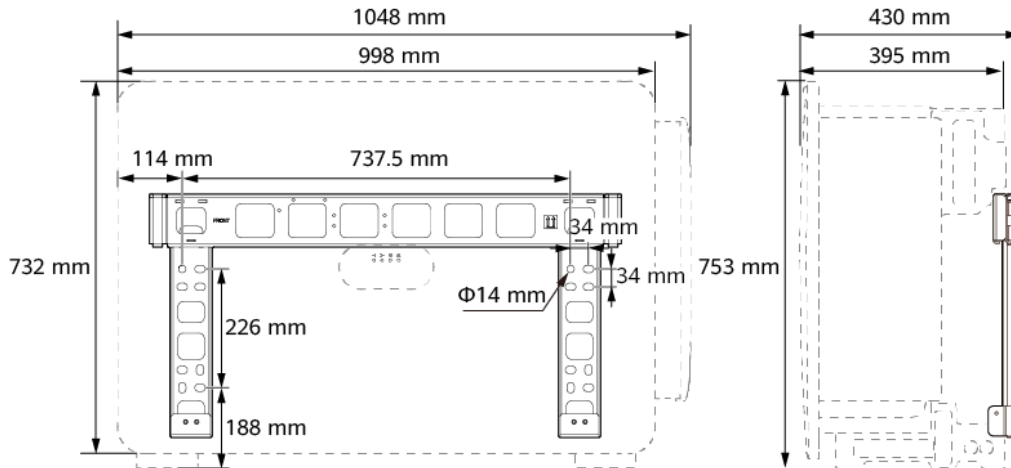
Figure 4-2 Mounting structure requirements



4.2.2 Clearance Requirements

Dimensions

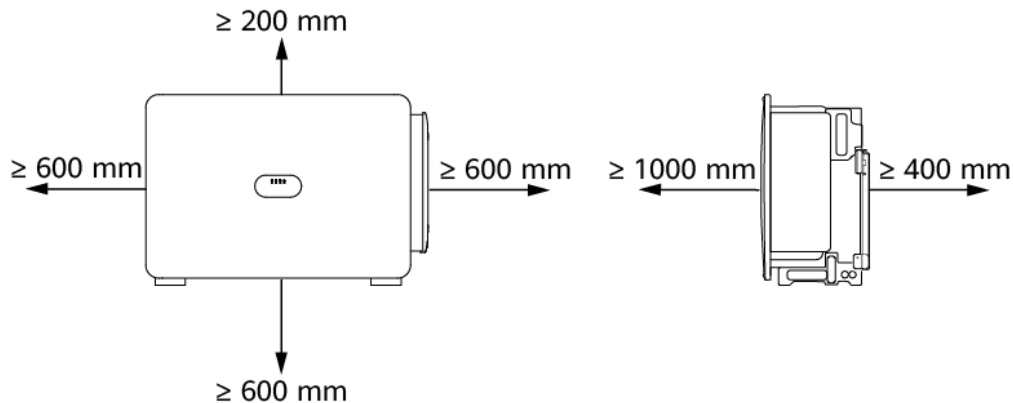
Figure 4-3 Dimensions



Installation Clearance Requirements

Reserve sufficient clearance around the inverter for installation and heat dissipation. The inverter provides self-protection in high-temperature environments. The impact of environmental changes on the clearance for heat dissipation needs to be considered during design. The clearance around the inverter may become insufficient for reasons such as rotation axis change. The energy yield of the inverter may decrease if heat cannot be effectively dissipated.

Figure 4-4 Clearance



NOTE - For ease of the inverter installation on the mounting bracket, cable connecting at the bottom, and future maintenance, it is recommended that the clearance from the bottom be between 600 mm and 730 mm. For further questions regarding clearance, consult local technical support engineers.

NOTE - The clearance from the bottom must meet the requirements on the bending radius of the AC output power cables.

If multiple inverters need to be installed and the clearance is sufficient, install them in horizontal mode. The triangle, back-to-back, and close-to-wall installation modes are not recommended. For triangle, back-to-back, and close-to-wall installation modes, you need to prepare air baffles to isolate air intake from air exhaust.

Figure 4-5 Horizontal installation mode (recommended)

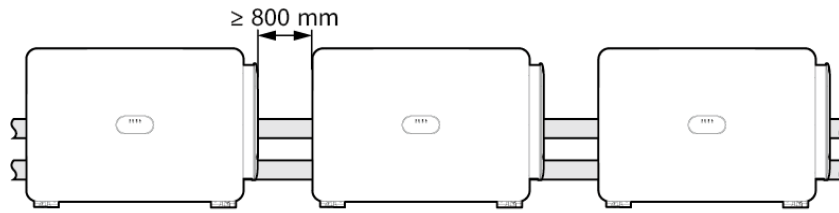
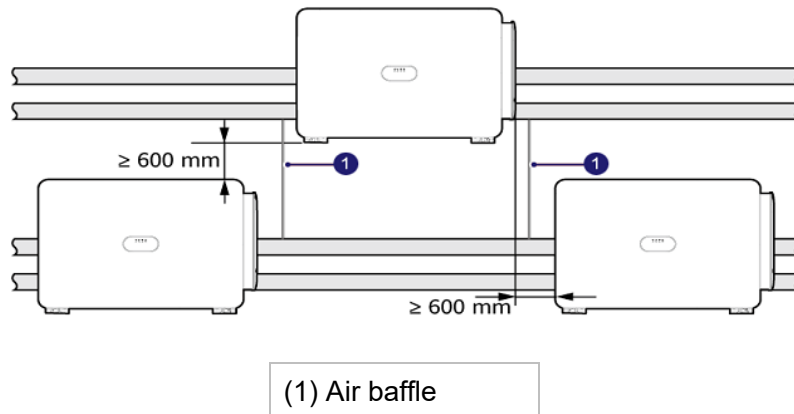
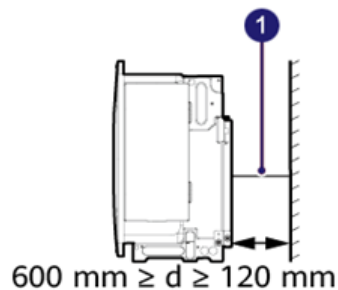


Figure 4-6 Triangle installation mode (not recommended)



NOTE - Stacked installation is not allowed.

Figure 4-7 Close-to-wall installation mode (not recommended)



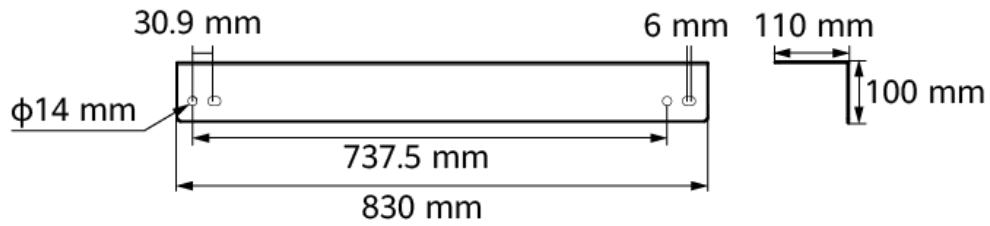
(1) L-shaped air baffle

NOTE - In close-to-wall installation mode, reserve space for the air channel and install an L-shaped air baffle to prevent air intake and exhaust from forming return flow. If the distance between the mounting bracket and the wall is greater than 600 mm, the air baffle is not required.

NOTE - It is recommended that an L-shaped air baffle be made of aluminum plates with a thickness greater than or equal to 2 mm and a recommended width of $d-10$ mm (d indicates the distance between the mounting bracket and the wall).

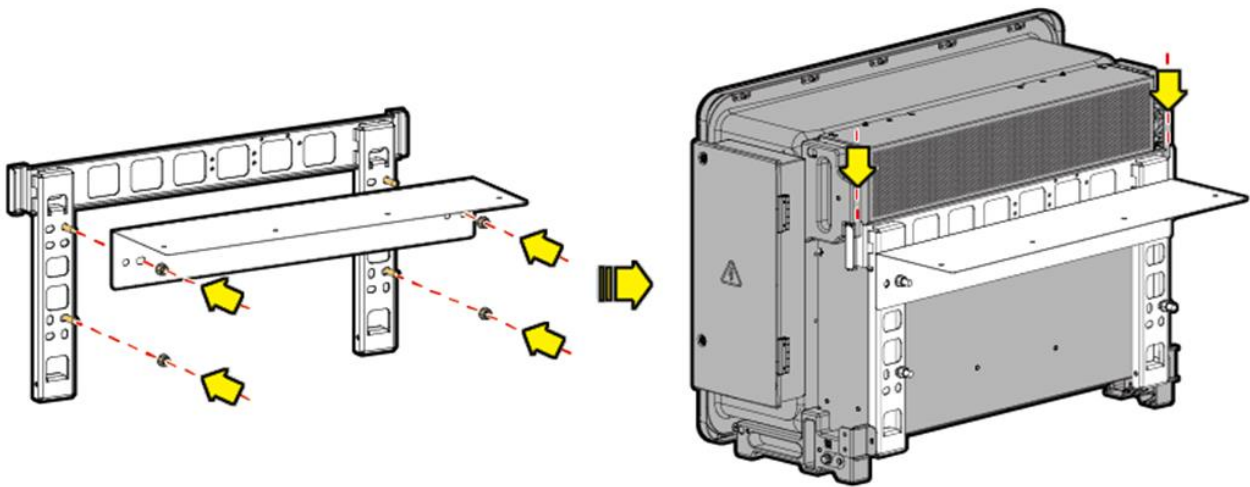
When the distance between the mounting bracket and the wall is 120 mm, the recommended dimensions of an air baffle are as follows:

Figure 4-8 Recommended air baffle dimensions



Preinstall the air baffle on the mounting bracket and then install the mounting bracket with the air baffle on the wall support.

Figure 4-9 Installing an air baffle

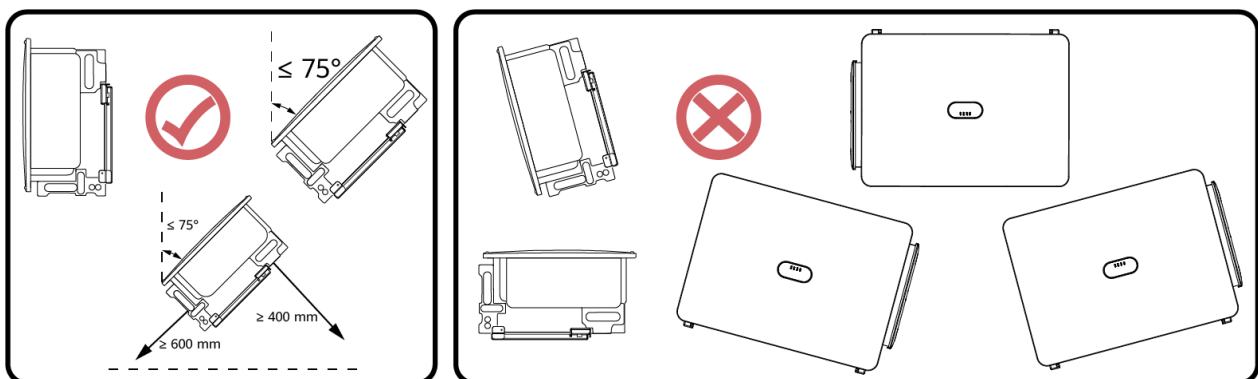


4.2.3 Angle Requirements

The inverter can be installed on a support. The installation angle requirements are as follows:

- Install the inverter vertically or at a maximum back tilt of 75 degrees to facilitate heat dissipation.
- Do not install the inverter at forward tilted, excessive back tilted, side tilted, horizontal, or upside-down positions.

Figure 4-10 Installation angle



4.3 Preparing Tools

Table 4-2 Personal protective equipment (PPE)







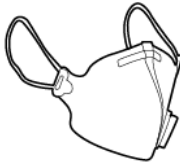

			
Safety helmet	Goggles	Protective shoes	Reflective vest
			
Insulated gloves	Protective gloves	Dust mask	Insulated shoes

Table 4-3 Hoisting and transporting tools




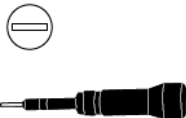



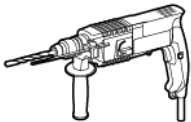


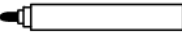
			
Crane	Pallet truck	Lifting rope	

Table 4-4 Hardware installation tools

			
Flat-head insulated torque screwdriver (M3)	Phillips insulated torque screwdriver (M3/M4)	Insulated torque socket wrench (M4/M10/M12, including an extended socket)	Torx key
			
Hammer drill	Hammer drill bit (Φ14 mm)	Utility knife	Marker


 <p>Insulated ladder</p>	-	-	-
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Table 4-5 Cable installation tools


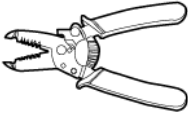
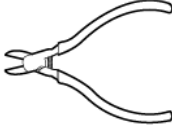
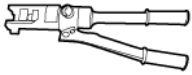

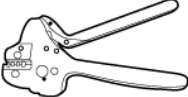

 <p>Cable cutter</p>	 <p>Wire strippers</p>	 <p>Diagonal pliers</p>	 <p>Hydraulic pliers</p>
 <p>Heat gun</p>	 <p>Crimping tool H4STC0001 (AMPHENOL)</p>	 <p>Removal wrench H4TW0001 (AMPHENOL)</p>	-

Table 4-6 Measurement instruments

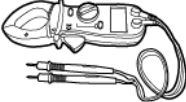
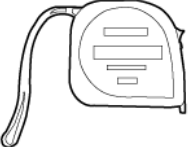

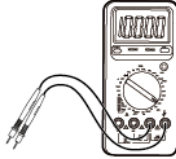
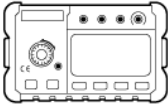
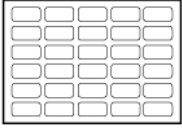

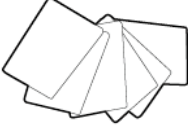


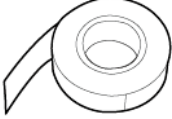


 <p>Clamp meter</p>	 <p>Steel measuring tape</p>	 <p>Level</p>	 <p>Multimeter DC voltage measurement range \geq 1500 V DC</p>
 <p>Insulation resistance tester (output voltage > 1500 V)</p>	-	-	-


Table 4-7 Auxiliary materials and other tools

			
Label	Cable tie	Cotton cloth	Sandpaper
			
Heat-shrink tubing	Insulation tape	Brush	Vacuum cleaner


4.4 Checking Before Installation

Outer Packing Materials


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

 **READ THE MANUAL** - You are advised to remove the packing materials within 24 hours before installing the inverter.

Package Contents

 **NOTE** - After placing the equipment in the installation position, unpack it with care to prevent scratches. Keep the equipment stable during unpacking.

After unpacking the inverter, check that the contents are intact and complete. If any damage is found or any component is missing, contact your supplier.

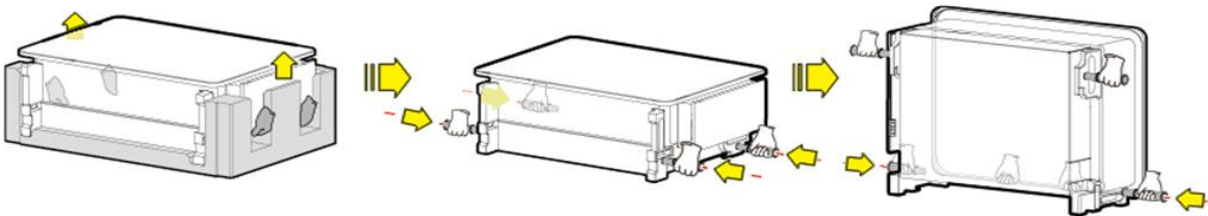
 **READ THE MANUAL** - For details about the number of contents, see the *Packing List* in the packing case.

4.5 Moving the Inverter

Step 1 Take the inverter out of the packing case and move it to the installation position.

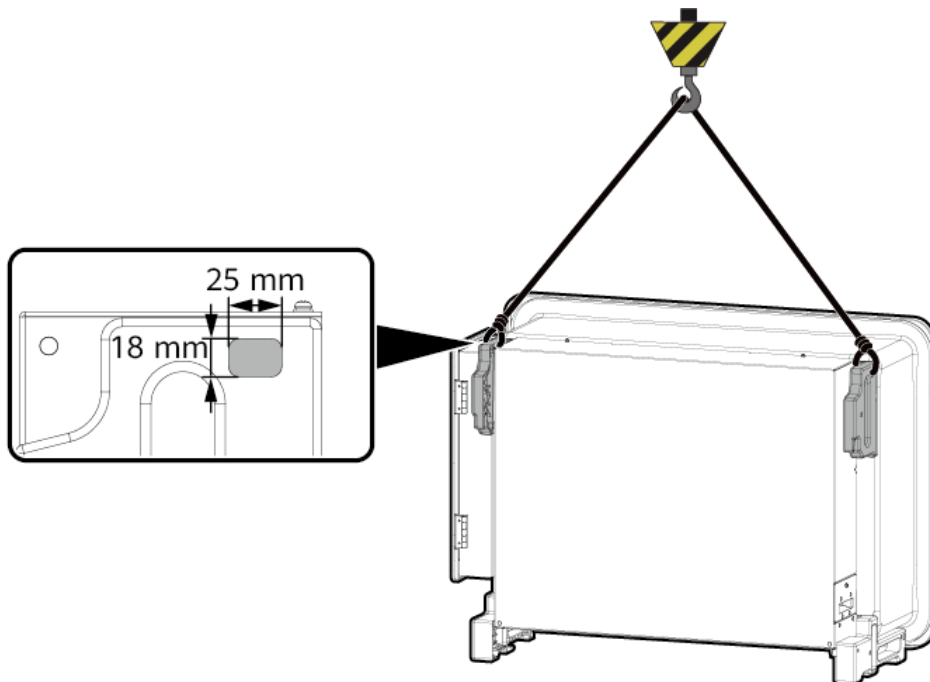
- 🗨 **NOTE** - After placing the equipment in the installation position, unpack it with care to prevent scratches. Keep the equipment stable during unpacking.
- 🗨 **NOTE** - Handles are packed in a fitting bag and are not delivered with the inverter.
- 🗨 **NOTE** - Secure the lifting handles (with the steel washers of the lifting handles closely fitted to the device).
- 🗨 **NOTE** - If the stud of a lifting handle is bent, replace the lifting handle in time.
- 🗨 **NOTE** - Four persons or appropriate transportation tools are required to move the inverter.
- 🗨 **NOTE** - Do not use the ports or wiring terminals at the bottom to support any weight of the inverter.
- 🗨 **NOTE** - When you need to temporarily place the inverter on the ground, use foam, cardboard, or other protection material to prevent damage to its enclosure.

Figure 4-11 Moving the inverter



📖 **READ THE MANUAL** - If the installation position is high, you can hoist the inverter.

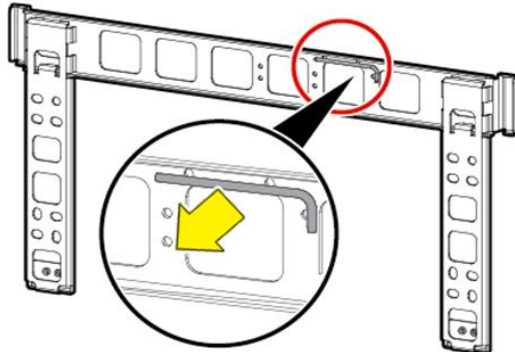
Figure 4-12 Hoisting



4.6 Installing the Inverter on a Support

Step 1 Remove the torx key and store it properly.

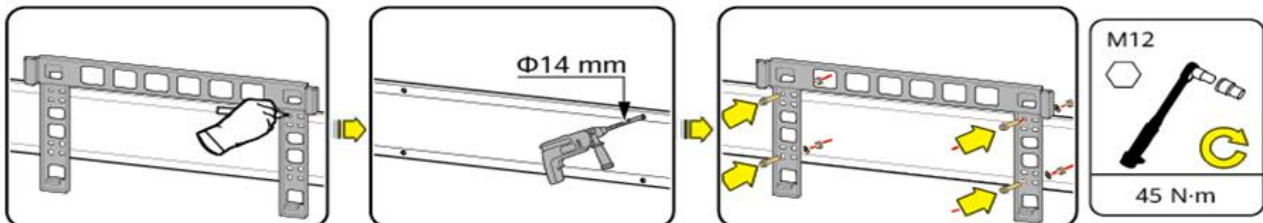
Figure 4-13 Removing the torx key



Step 2 Secure the mounting bracket.

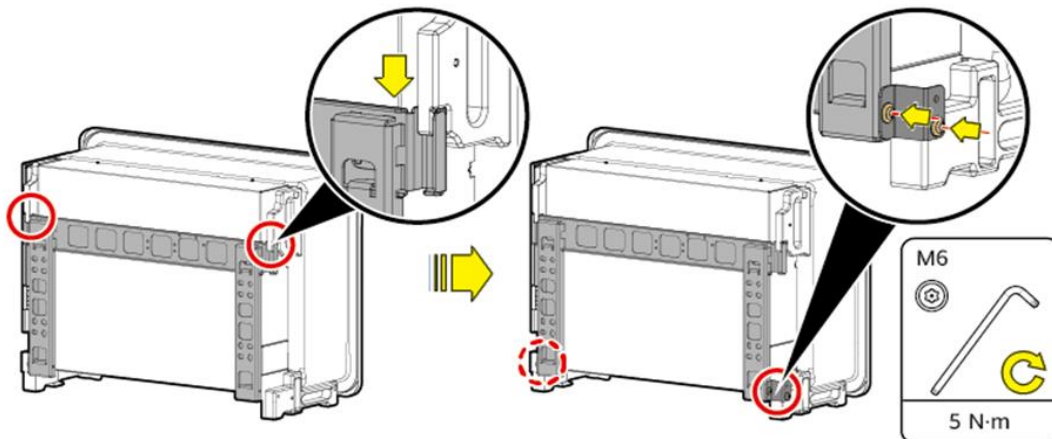
- 📖 **READ THE MANUAL** - The mounting bracket of the inverter has four groups of tapped holes, each group containing four tapped holes. Mark any hole in each group based on site requirements and mark four holes in total. The two round holes are recommended.
- 📖 **READ THE MANUAL** - M12x40 bolt assemblies are delivered with the inverter and bound to the mounting bracket. If the bolt length does not meet the installation requirements, prepare M12 bolt assemblies by yourself and use them together with the delivered M12 nuts.

Figure 4-14 Installing the mounting bracket



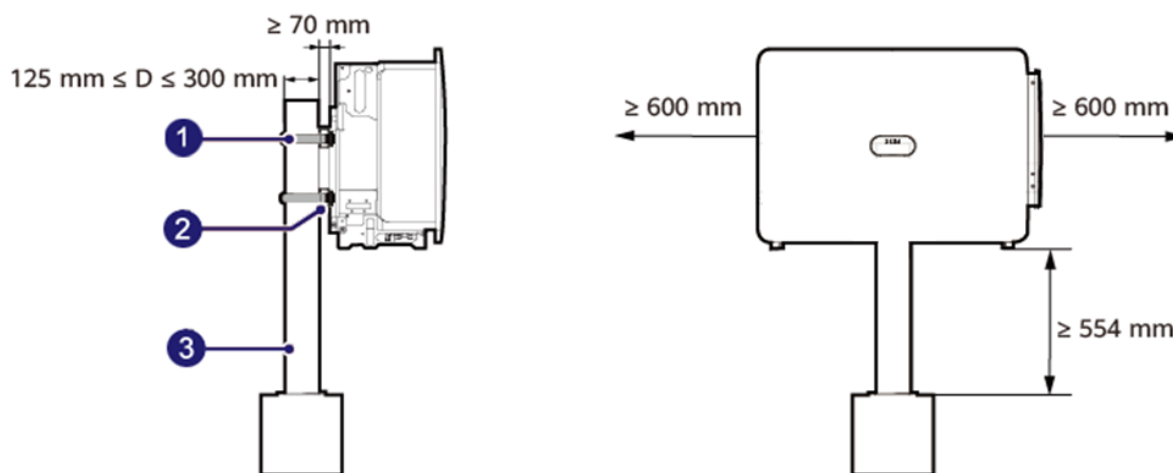
Step 3 Secure the inverter.

Figure 4-15 Securing the inverter



4.7 Installing the Inverter on a Pole Clamp

Figure 4-16 Pole-clamp installation



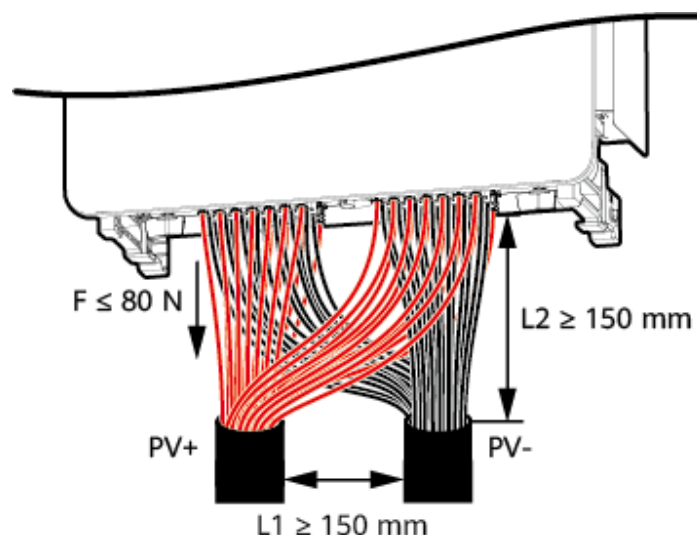
(1) Square bolt clamp	(2) Inverter mounting beam	(3) Vertical pole
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5 Electrical Connections

5.1 Precautions

- ⊘ **DANGER** - When exposed to sunlight, the PV arrays supply DC voltage to the inverter. Before connecting cables, ensure that all **DC SWITCHES** on the inverter are OFF. Otherwise, the high voltage of the inverter may result in electric shocks.
- ⊘ **DANGER** - The site must be equipped with qualified firefighting facilities, such as fire sand and carbon dioxide fire extinguishers.
- ⊘ **DANGER** - Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- ⚠ **WARNING** - The equipment damage caused by incorrect cable connections is beyond the warranty scope.
- ⚠ **WARNING** - Only certified electricians can perform electrical terminations.
- ⚠ **WARNING** - Operation personnel must wear PPE when connecting cables.
- ⚠ **WARNING** - Before connecting cables to ports, leave enough slack to reduce the tension on the cables and prevent poor cable connections.
- ⚠ **ATTENTION** - Stay away from the equipment when preparing cables to prevent cable scraps from entering the equipment. Cable scraps may cause sparks and result in personal injury and equipment damage.
- ⚠ **ATTENTION** - The positive and negative DC PV string cables within 1.5 m of the inverter shall be routed in separate pipes to prevent cable damage and short circuits caused by improper operations during construction.

Figure 5-1 Cable routing in different pipes



- 📖 **READ THE MANUAL** - The cable colors shown in the electrical connection diagrams provided in this section are for reference only. Select cables in accordance with local cable specifications (green-and-yellow cables are only used for protective earthing).

5.2 Preparing Cables

Figure 5-2 Cable connections (configure the components in the dotted box as required)

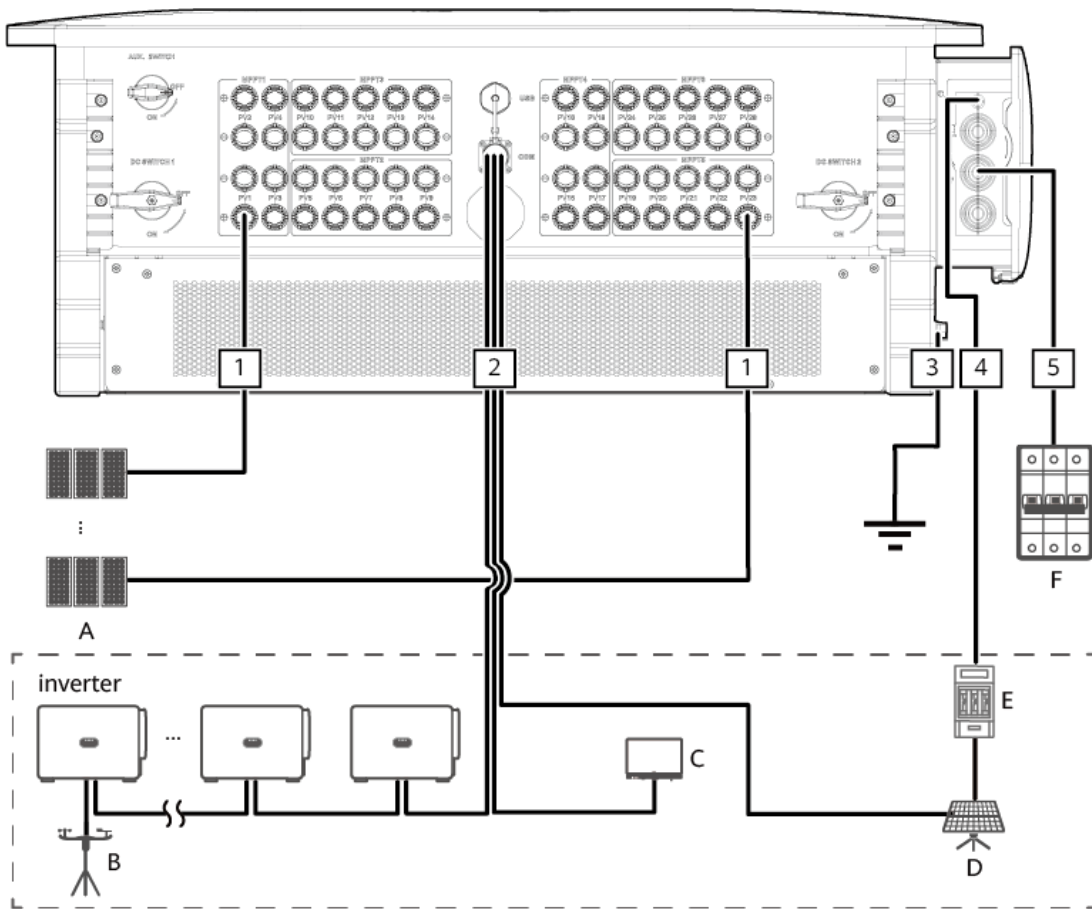



Table 5-1 Component description

No.	Component	Description	Source
A	PV string	<ul style="list-style-type: none"> A PV string consists of PV modules connected in series. The inverter supports 28 PV string inputs. 	Prepared by the customer
B	Environmental monitoring instrument (EMI)	When the DataLogger is used, the EMI can be directly connected to the DataLogger or connected to the last inverter cascaded over RS485.	Prepared by the customer
C	DataLogger	The inverter communicates with the management system through the DataLogger.	Purchased from the Company
D	Tracking system	The angle of trackers can be adjusted.	Prepared by the customer

No.	Component	Description	Source
E	Fuse/Circuit breaker	<p>The tracking system should be equipped with an overcurrent protection device or component. The power cable between the device or component and the wiring terminal should be shorter than or equal to 2.5 m.</p> <p>A fuse or a circuit breaker is recommended.</p> <ul style="list-style-type: none"> • Installed between the inverter and tracking control box • Fuse specifications: rated voltage \geq 800 V; rated current: 16 A; protection: gG • Circuit breaker specifications: rated voltage \geq 800 V; rated current: 16 A; tripping: C 	Prepared by the customer
F	AC switch	<p>To ensure that the inverter can be safely disconnected from the power grid when an exception occurs, connect an AC switch to the AC side of the inverter. Select an appropriate AC switch in accordance with local industry standards and regulations.</p> <ul style="list-style-type: none"> • Installed in the AC combiner box • Recommended: a three-phase AC circuit breaker with a rated voltage greater than or equal to 800 V AC and a rated current of 400 A 	Prepared by the customer

 **NOTE** - The inverter has an internal residual current monitoring unit (RCMU). Its external AC switch should be a three-phase circuit breaker or any other AC load circuit breaker to safely disconnect the inverter from the power grid.

 **READ THE MANUAL** - The cable diameter must comply with local cable standards.


 **READ THE MANUAL** - The factors that affect cable selection include the rated current, cable type, routing mode, ambient temperature, and maximum expected line loss.

Table 5-2 Cable description (S indicates the conductor cross-sectional area of the AC output cable, and S_p indicates the conductor cross-sectional area of the PE cable)

No.	Cable	Type	Conductor Cross-Sectional Area	Outer Diameter	Source
1	DC input power cable	1500 V copper multi-strand twisted PV cable ^{[1][2]}	4–6 mm ²	5–7.8 mm	Prepared by the customer
2	RS485 communications cable	Outdoor shielded twisted pair cable that meets the local standard	0.25–1 mm ²	<ul style="list-style-type: none"> • One or two communications cables: 4–11 mm • Three communications cables: 4–8 mm 	Prepared by the customer
3	PE cable ^[3]	Single-core outdoor copper cable and M10 OT/DT terminal	$S_p \geq S/2$	-	Prepared by the customer
4	Tracking system power cable	Three-core outdoor copper cable with two layers of protection and M4 OT terminal	10 mm ²	15–18 mm	Prepared by the customer
5	AC output power cable (single-core)	(Recommended) Single-core outdoor cable and M12 OT/DT terminal	<ul style="list-style-type: none"> • Copper cable: <ul style="list-style-type: none"> – S: 120–400 mm² – $S_p \geq S/2$ • Aluminum alloy cable or copper-clad aluminum cable: <ul style="list-style-type: none"> – S: 150–400 mm² – $S_p \geq S/2$ 	14–40 mm	Prepared by the customer

<p>AC output power cable (multi-core)^[4]</p>	<ul style="list-style-type: none"> • If the ground point on the enclosure is used, three-core (L1, L2, and L3) outdoor cables and M12 OT/DT terminals (L1, L2, and L3) are recommended. • If the ground point in the maintenance compartment is used, four-core (L1, L2, L3, and PE) outdoor cables, M12 OT/DT terminals (L1, L2, and L3), and M10 OT/DT terminals (PE) are recommended. You do not need to prepare a PE cable. 	<ul style="list-style-type: none"> • Copper cable: 24–66 mm <ul style="list-style-type: none"> – S: 120–240 mm² – $S_p \geq S/2$ • Aluminum alloy cable or copper-clad aluminum cable: <ul style="list-style-type: none"> – S: 150–240 mm² (cable stripping inside the compartment); S: 300–400 mm² (cable stripping outside the compartment supported when protection is added) – $S_p \geq S/2$ 	<p>Prepared by the customer</p>
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-
- **Note [1]: Do not connect aluminum or aluminum alloy DC power cables directly to the DC terminals of the inverter.**
 - **Note [2]: The 1500 V PV cables must comply with IEC 62930 or EN 50618.**
 - **Note [3]: The value of S_p is valid only if the conductors of the PE cable and AC power cable use the same material. If the materials are different, ensure that the conductor cross-sectional area of the PE cable produces a conductance equivalent to that specified in this table. The specifications of the PE cable are subject to this table or calculated according to IEC 60364-5-54.**
 - **Note [4]: For details about the installation procedure and precautions for cable stripping outside the compartment, see 5.5 Requirements for AC Power Cable Stripping Outside the Compartment.**
-

5.3 Connecting a PE Cable

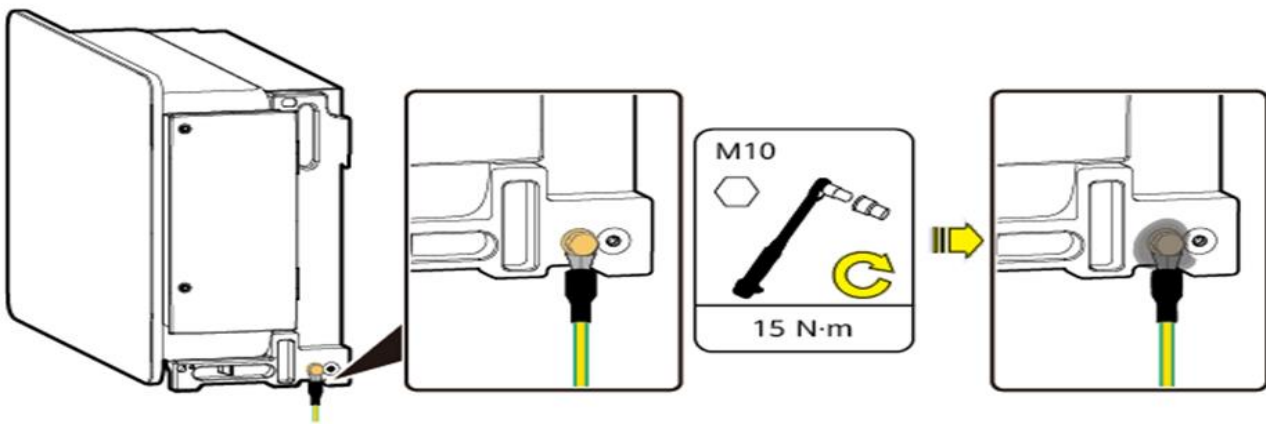
Precautions

- Preferentially connect the PE cable for the inverter to the ground point on the enclosure. The ground point in the maintenance compartment is used for connecting to the PE wire of a multi-core AC power cable.
- It is recommended that the inverter be connected to a nearby ground point. For a system with multiple inverters connected in parallel, connect the ground points of all inverters to ensure equipotential bonding between PE cables.

Procedure

- Step 1** Connect the PE cable to the ground point. To enhance the corrosion resistance of a ground terminal, apply silicone grease or paint on it after connecting the PE cable to the ground point on the enclosure.

Figure 5-3 Connecting a PE cable to the ground point (on the enclosure)



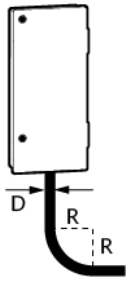
5.4 Connecting an AC Output Power Cable

Precautions

- A three-phase AC switch should be installed on the AC side of the inverter. To ensure that the inverter can safely disconnect itself from the power grid when an exception occurs, select a proper overcurrent protection device in compliance with local power distribution regulations.
- The inverter is integrated with a comprehensive residual current detection unit to distinguish fault current from residual current. Upon detecting that the residual current exceeds the threshold, the inverter immediately disconnects from the power grid.

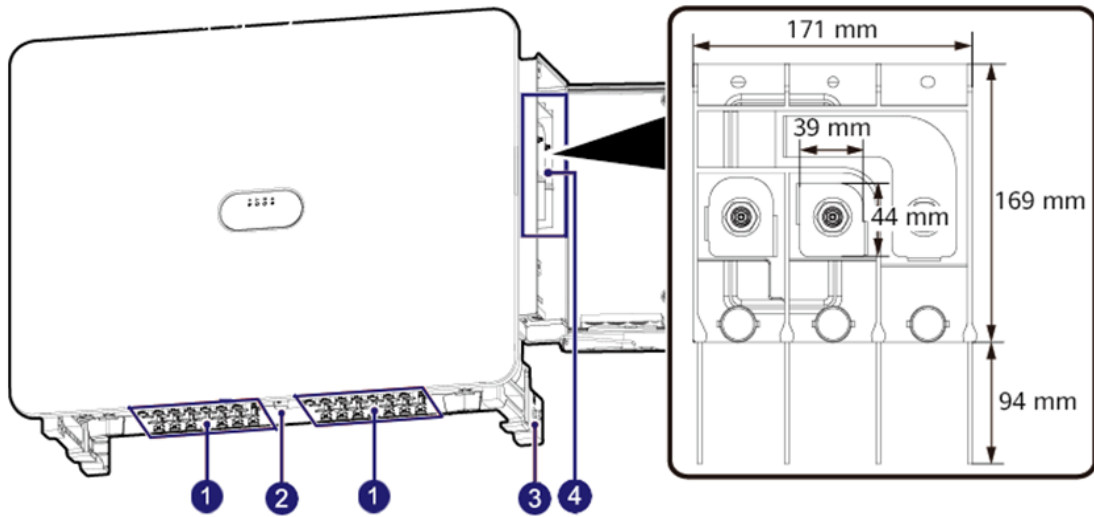
- ⚠ **WARNING** - Do not connect loads between an inverter and an AC switch that directly connects to the inverter. Otherwise, the switch may trip by mistake.
- ⚠ **WARNING** - If an AC switch is used with specifications beyond local standards, regulations, or the Company's recommendations, the switch may fail to turn off in a timely manner in case of exceptions, causing serious faults.
- ⚠ **WARNING** - Do not open the panel of the inverter.
- ⚠ **WARNING** - Before opening the maintenance compartment door, ensure that no electrical connections are made for the inverter on the AC or DC side.
- ⚠ **WARNING** - Do not open the maintenance compartment door on rainy or snowy days. If you need to, take protective measures to prevent rain or snow from entering the maintenance compartment. If protective measures cannot be taken, do not open the maintenance compartment door.
- ⚠ **WARNING** - Do not leave unused screws in the maintenance compartment.
- ⚠ **ATTENTION** - Each inverter shall be equipped with an AC output switch. Multiple inverters shall not connect to the same AC switch.
- 📏 **NOTE** - The cable outer diameter can be measured using the ruler sticker in the maintenance compartment.
- 📏 **NOTE** - Ensure that the cable jacket is in the maintenance compartment.
- 📏 **NOTE** - Ensure that the AC output power cables are connected securely and insulated properly (using three-way breakout boots and cold/heat shrink tubing). Otherwise, the inverter may fail to operate, or become overheated during operation due to an unreliable connection, which will damage the terminal block. The resulting device damage is not covered by the warranty.
- 📏 **NOTE** - In the quick scheduling scenario with MBUS communication networking, connect AC power cables in the maintenance compartment from left to right in the sequence of L1, L2, and L3.

Table 5-3 Bending radius requirements for AC power cables

Picture	Single-core Cable		Three-core or Four-core Cable	
	Unarmored	Armored	Unarmored	Armored
	$R \geq 20D$	$R \geq 15D$	$R \geq 15D$	$R \geq 12D$
	<p>R indicates the bending radius, and D indicates the outer diameter of the cable.</p> <p>NOTE The AC power cable must be routed vertically into the maintenance compartment.</p>			

Wiring Area

Figure 5-4 Wiring ports

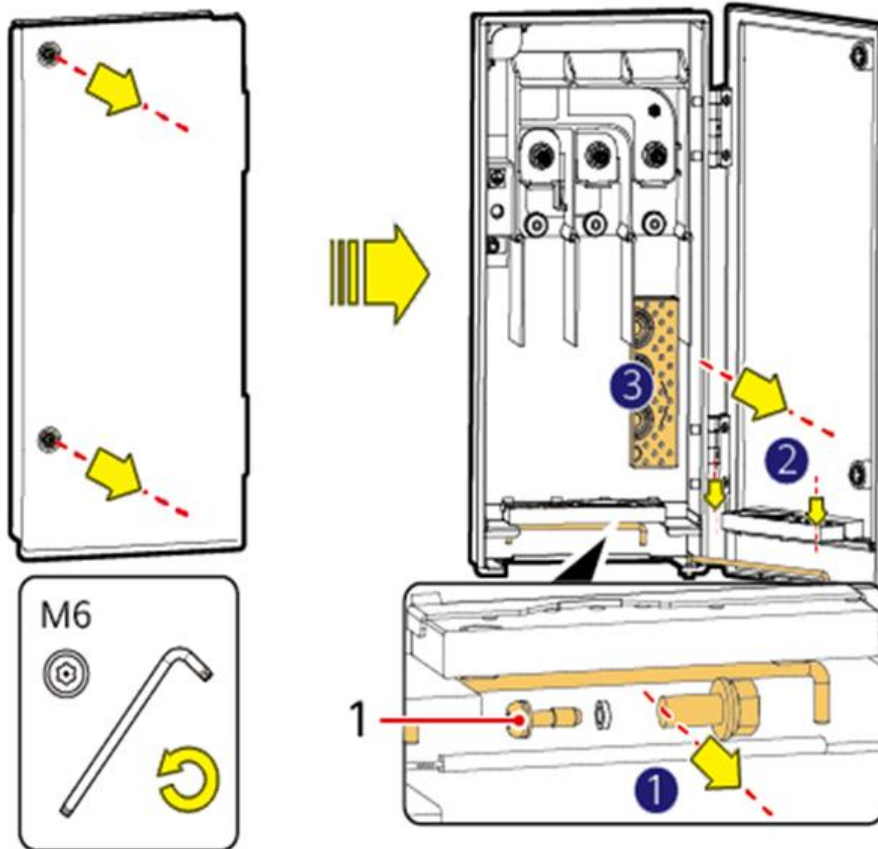


(1) DC input terminals	(2) RS485 communications port
(3) Ground point on the enclosure	(4) AC terminal block

Procedure

- Step 1** Open the maintenance compartment door and install the support strut. Remove the accessories and set them aside.

Figure 5-5 Opening a maintenance compartment door



(1) Position for binding the ground screw

- Step 2** Connect the AC output power cables based on the cable type.

Figure 5-6 Specifications of the crimped OT/DT terminal

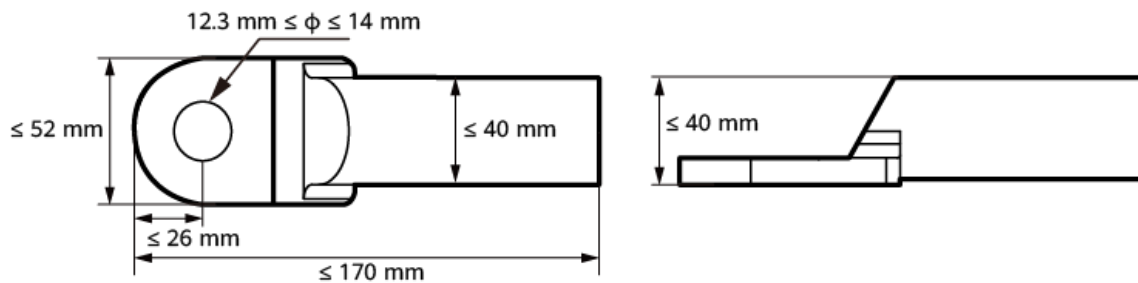


Figure 5-7 Cable connection 1

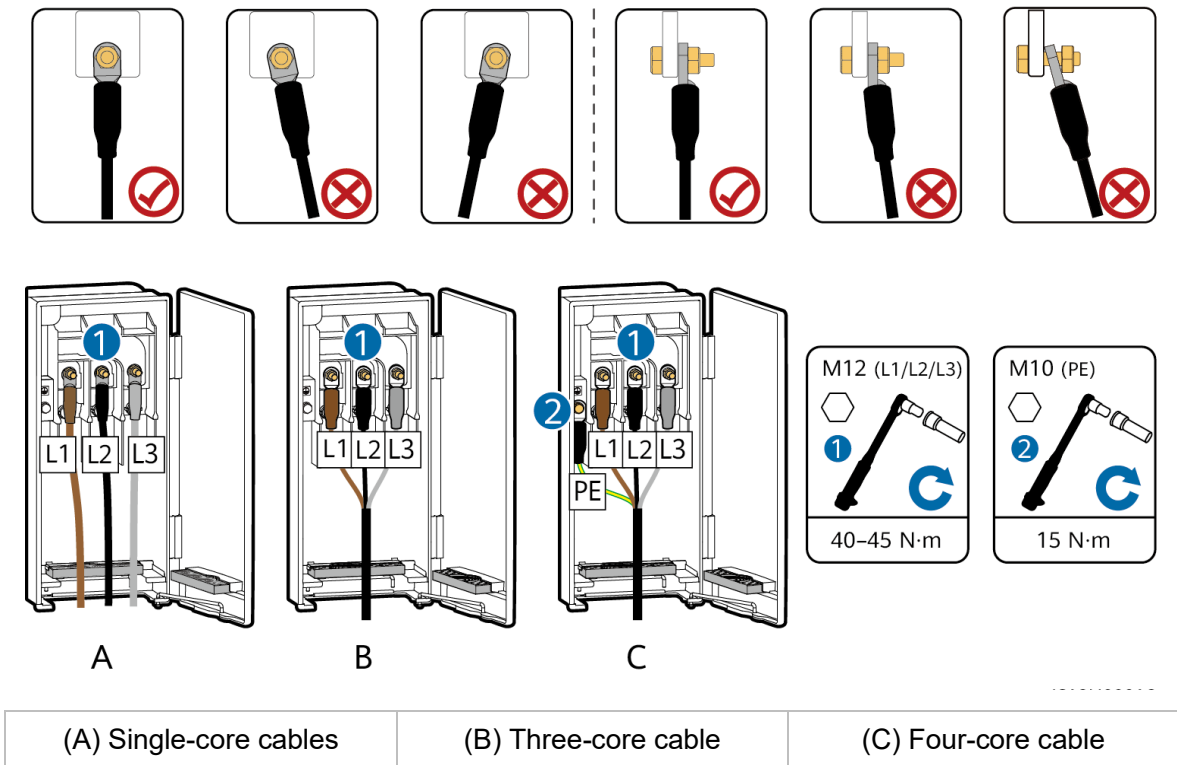
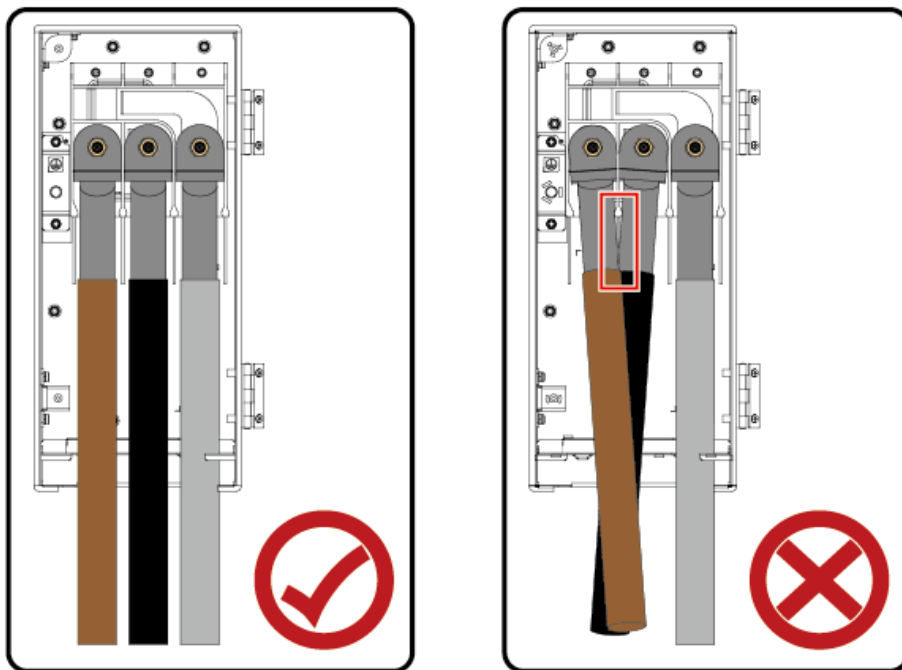
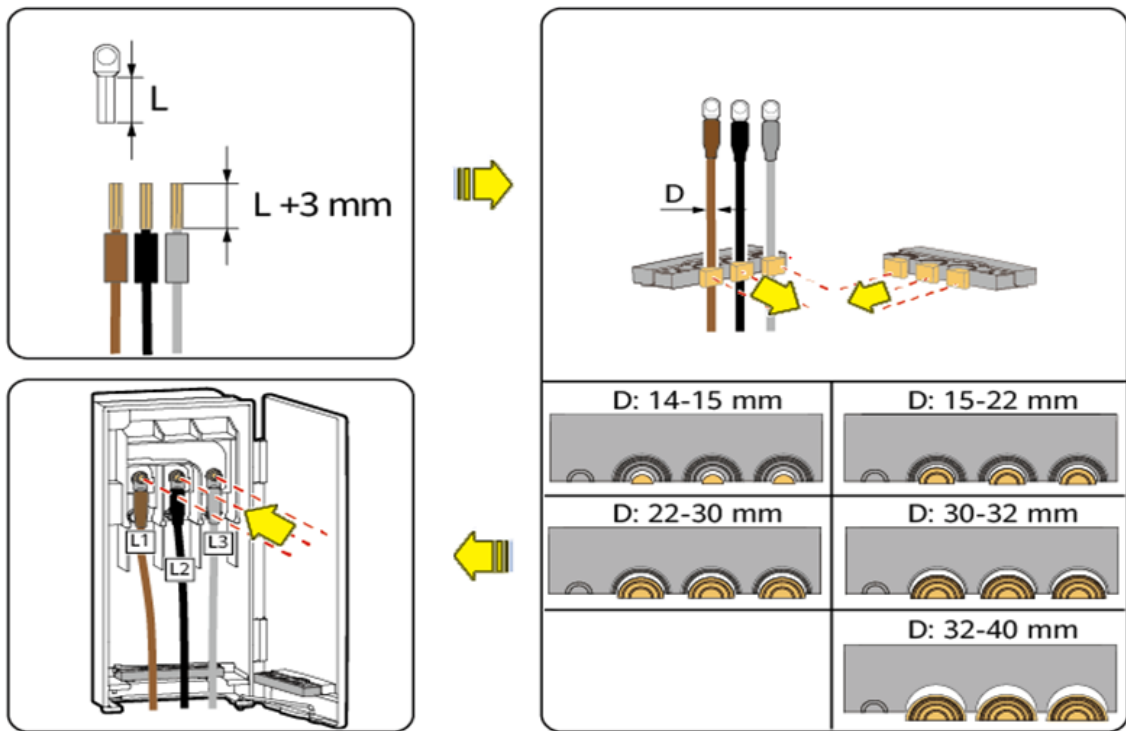


Figure 5-8 Cable connection 2



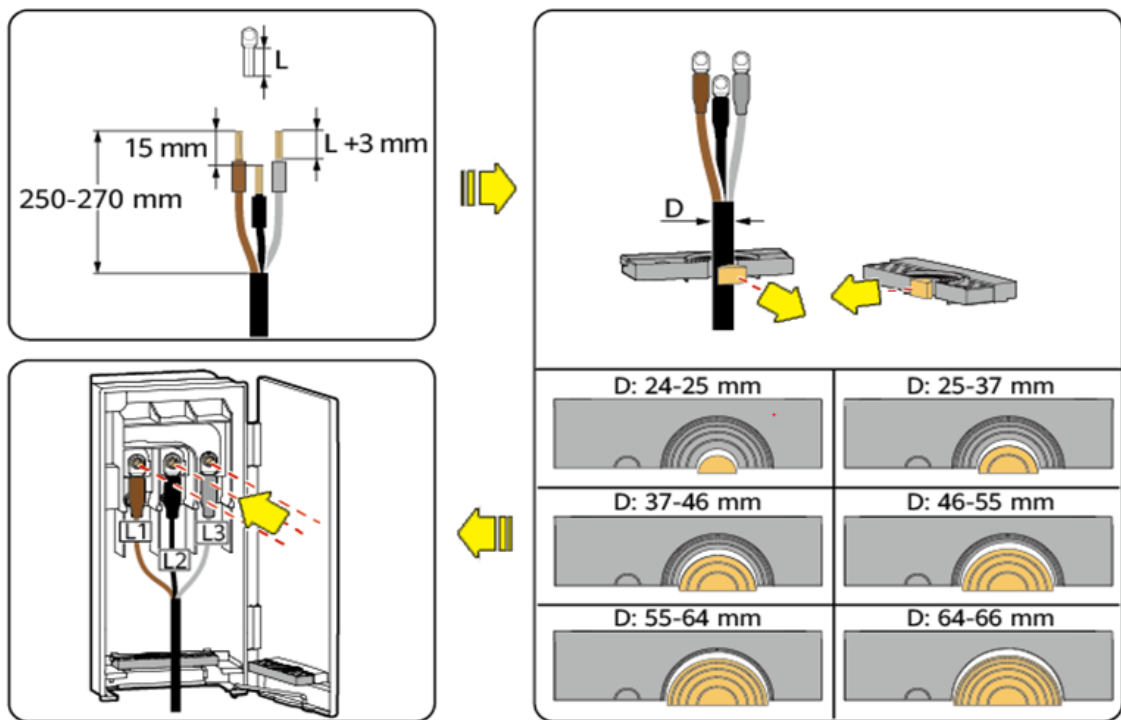
- NOTE** - Reserve sufficient slack for the PE cable to ensure that the last cable bearing the force is the PE cable when the AC output power cable is subject to a pulling force due to force majeure.
- NOTE** - After cables are connected, prevent them from contacting the inter-phase baffle plates.

Figure 5-9 Single-core cable connection



NOTE - If a multi-core cable is used, it is recommended that the stripping length of the L2 wire be 15 mm shorter than those of the L1 and L3 wires.

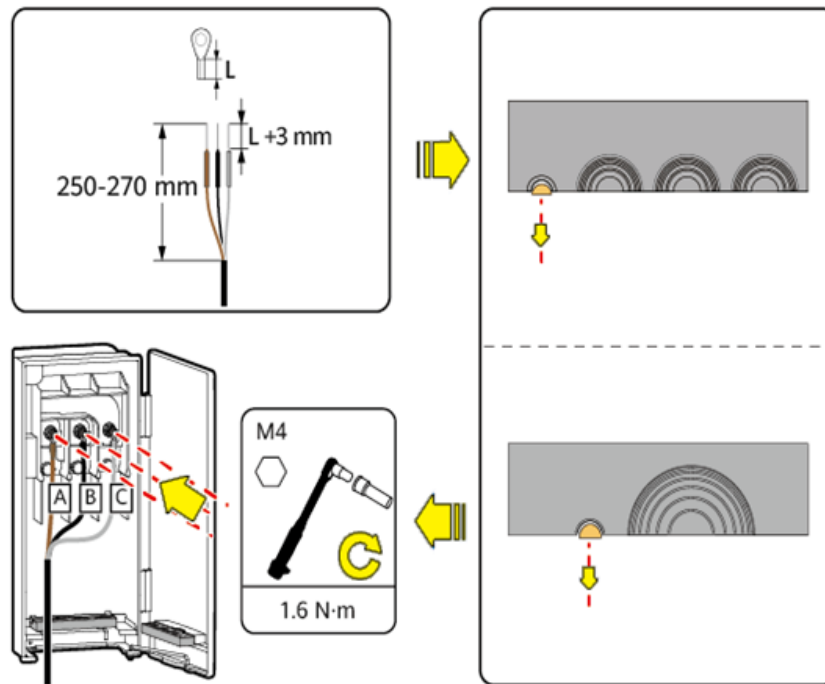
Figure 5-10 Multi-core cable connection (using a three-core cable as an example)



Step 3 If the system is configured with a tracking system, connect the power cable of the tracking system.

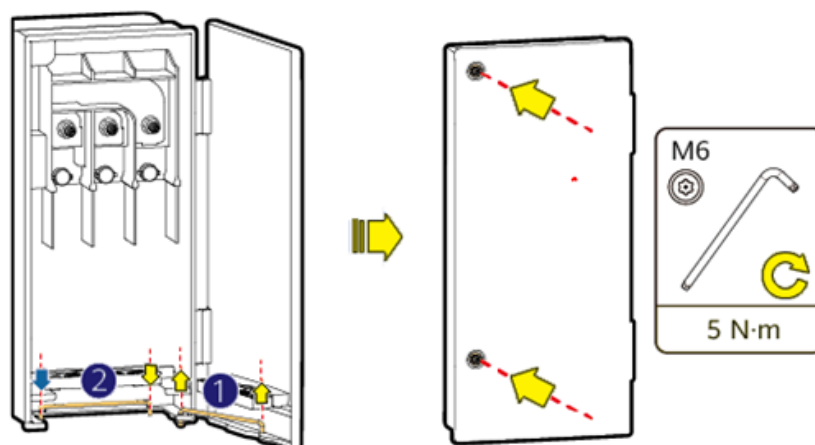
- ⚠ **WARNING** - The tracking system obtains power from the AC three-phase power grid. The rated voltage of the power supply is the rated output voltage of the inverter.
- ⚠ **WARNING** - Keep flammable materials away from cables.
- ⚠ **WARNING** - Cables must be protected with a conduit to prevent short circuits caused by insulation layer damage.

Figure 5-11 Connecting a power cable of the tracking system



Step 4 Clear foreign matter from the maintenance compartment, close the maintenance compartment door, and check that the cable holes at the bottom of the maintenance compartment are sealed.

Figure 5-12 Closing a door



5.5 Requirements for AC Power Cable Stripping Outside the Compartment

Materials

Material	Specifications	Source
Cold/Heat tubing	shrink Matches the cable and has anti-ultraviolet radiation performance.	Prepared by the customer
Three-way boot	breakout Matches the cable.	Prepared by the customer
Electrical conduit	<ul style="list-style-type: none"> • Inner diameter $\geq 1.5 \times$ Cable outer diameter • Material: stainless steel pipe or PVC pipe. Steel pipes cannot be used in corrosive environments. • Anti-ultraviolet radiation 	Prepared by the customer
Sealing putty	-	Prepared by the customer

Procedure

- Step 1** Strip the AC power cable. The distance between the cable stripping end and the ground must be greater than or equal to 300 mm.
- Step 2** Ensure that the cable stripping end is even, wrap it with the insulation tape, and then install the three-way breakout boot and cold/heat shrink tubing.
- Step 3** Crimp OT/DT terminals.
- Step 4** Cut the electrical conduit to a proper length based on the actual installation height and design requirements. Ensure that the lower end of the electrical conduit is greater than or equal to 300 mm above the ground. Route the AC power cable through the electrical conduit.
- Step 5** Adjust the cable and electrical conduit to be vertical. Seal the bottom of the electrical conduit with waterproofing materials. After the waterproofing measure is complete, backfill and compact the ground.
- Step 6** Connect the AC power cable.
- Step 7** Close the maintenance compartment door, and seal the cable inlet of the maintenance compartment and cable top outlet of the electrical conduit with fireproofing materials.

NOTE - Waterproofing measures must be taken at the bottom of the electrical conduit. The electrical conduit and cable must be vertical. Ensure that the upper end is vertically routed into the maintenance compartment and the lower end is vertically routed into the ground.

NOTE - After the electrical conduit is routed into the ground, the underground cable must meet the bending radius requirements of the AC power cable.

NOTE - The bottom of the electrical conduit must be sealed with waterproofing materials to prevent water or moisture from entering the electrical conduit and reducing the cable insulation performance.

NOTE - Prevent stress on the inverter wiring terminals from the cable during backfilling.

NOTE - After stripping the jacket off the three-core cable, route the wires into the inverter maintenance compartment as three single-core cables. Take fireproofing and waterproofing measures at the cable inlet of the maintenance compartment to prevent water or moisture from entering the electrical conduit and reducing the cable insulation performance.

- NOTE** - The armored layer of the cable must be grounded according to the design requirements.
- NOTE** - Wires between the maintenance compartment and electrical conduit must not be exposed to the air. Protective measures must be taken.

Figure 5-13 Cable protection

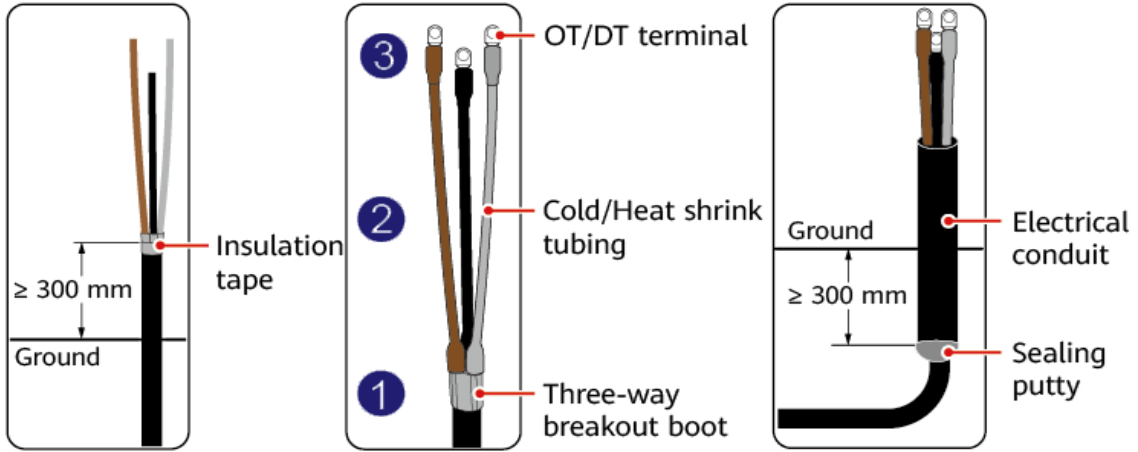
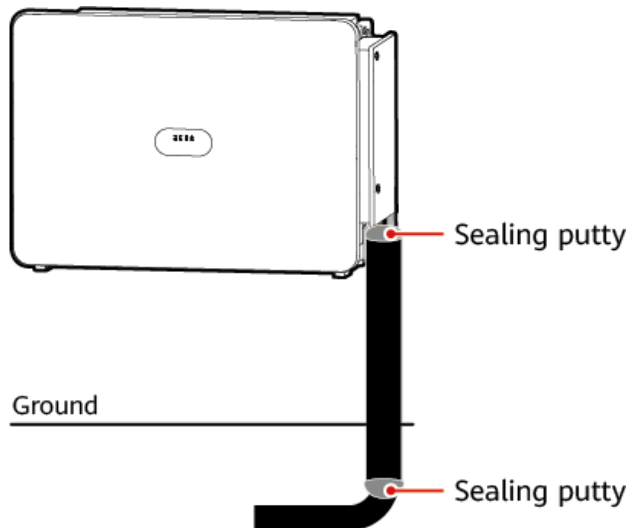


Figure 5-14 Installation completed



5.6 Connecting DC Input Power Cables

Precautions

- ⊘ **DANGER** - Before connecting DC input power cables, ensure that the DC voltage is within the safe range (lower than 60 V DC) and that the **AUX. SWITCH** and all **DC SWITCH** of the inverter are **OFF**. Otherwise, the high voltage may result in electric shocks.
- ⊘ **DANGER** - In the scenario where the installation is complete but the inverter is not connected to the power grid, the DC SWITCH 1 and DC SWITCH 2 must be turned on if DC input power cables are connected to the inverter. For details, see [Step 3](#) to [Step 5](#) in [Powering On the Inverter](#).
- ⊘ **DANGER** - When the inverter operates in grid-tied mode, do not perform maintenance or operations on the DC input power cables, such as connecting or disconnecting a PV string or a PV module in the PV string. Otherwise, electric shocks or arcing (which may cause fire) may occur.
- ⊘ **DANGER** - For details about how to remove and insert DC input connectors, see [8.3 Power-Off for Maintenance](#).
- ⚠ **WARNING** - Ensure that the following conditions are met. Otherwise, the inverter may be damaged or even a fire may occur.
- ⚠ **WARNING** - The open-circuit voltage of each PV string must be lower than or equal to 1500 V DC under any circumstances.
- ⚠ **WARNING** - The polarities of electric connections must be correct on the DC input side. The positive and negative terminals of a PV string must be connected to corresponding positive and negative DC input terminals of the inverter.
- ⚠ **WARNING** - During the installation of PV strings and the inverter, the positive or negative terminals of PV strings may be short-circuited to ground if the power cables are not properly installed or routed. In this case, an AC or DC short circuit may occur and damage the inverter. The resulting device damage is not covered under any warranty.
- 🗨 **NOTE** - Ensure that the PV module output is well insulated to ground.
- 🗨 **NOTE** - The PV strings connecting to the same MPPT circuit should use the same model and quantity of PV modules.
- 🗨 **NOTE** - The inverter does not support full parallel connection for PV strings (full parallel connection: PV strings connect to one another in parallel outside the inverter and then connect to it separately).
- 🗨 **NOTE** - The inverter does not support Y-branch PV connectors.

Terminal Description

The inverter provides 28 DC input terminals, which are controlled by its two DC switches. DC SWITCH 1 controls the DC input terminals PV1–PV14 and DC SWITCH 2 controls the DC input terminals PV15–PV28.

Figure 5-15 DC terminals controlled by DC SWITCH 1

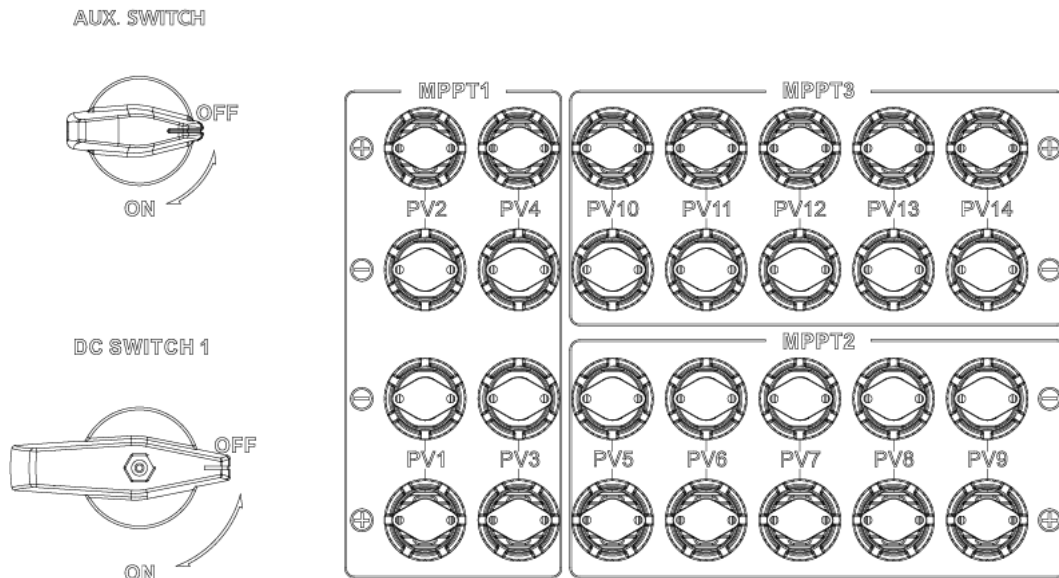
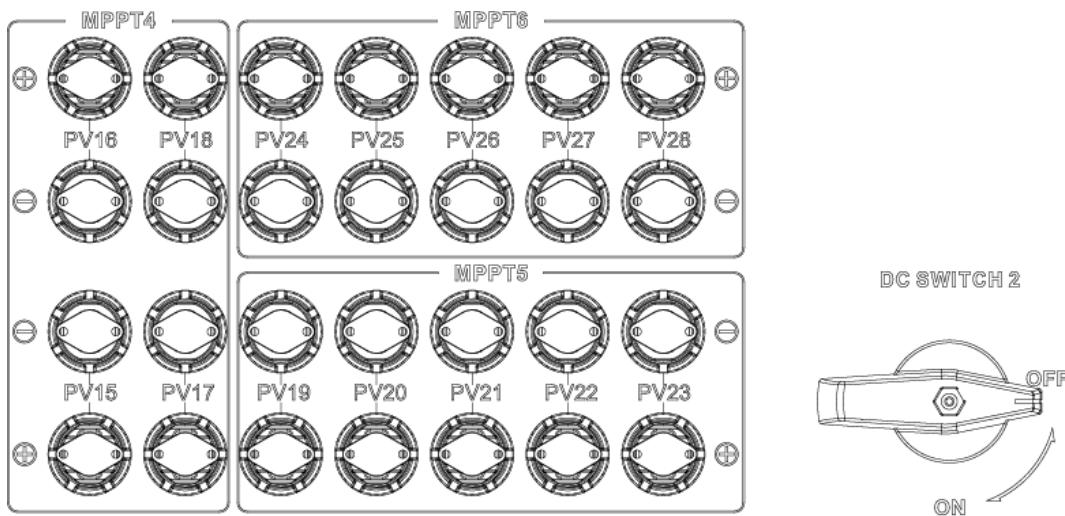


Figure 5-16 DC terminals controlled by DC SWITCH 2

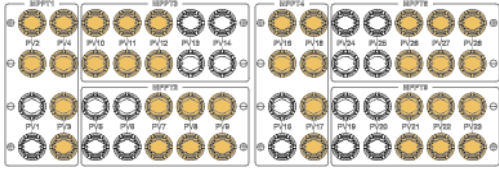


Requirements for selecting DC input terminals:

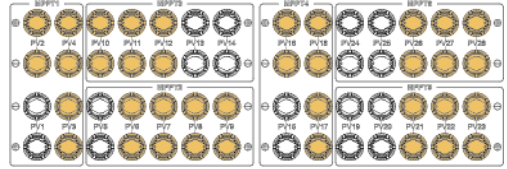
1. DC input terminal PV10 must be connected to a PV string.
2. At least one PV string is connected to the DC input terminals PV1–PV9.
3. Ensure that PV strings are evenly distributed on each MPPT. If there are 18 to 27 PV strings, connect them according to the following table.
4. If 210 mm PV modules are used, a maximum of four PV strings can be connected to each MPPT.
5. Install sealing plugs on the DC input terminals that are not connected to PV strings. For details, see Figure 5-19.

Number of PV Strings	Terminal Selection	Number of PV Strings	Terminal Selection
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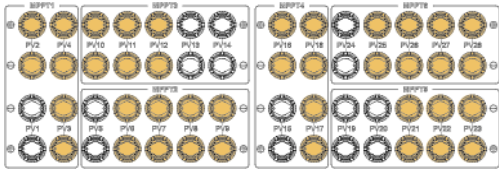
18 Connect to PV2–PV4, PV7–PV12, PV16–PV18, PV21–PV23, and PV26–PV28.



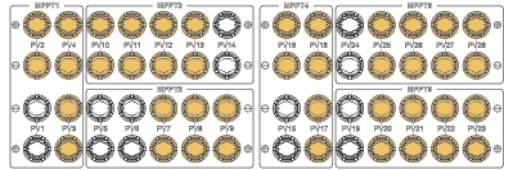
19 Connect to PV2–PV4, PV6–PV12, PV16–PV18, PV21–PV23, and PV26–PV28.



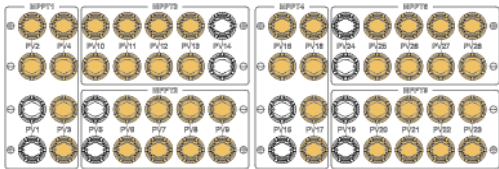
20 Connect to PV2–PV4, PV6–PV12, PV16–PV18, PV21–PV23, and PV25–PV28.



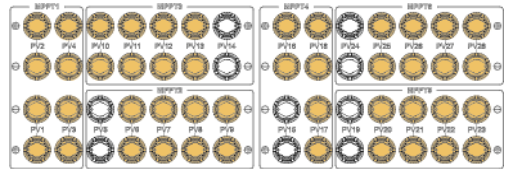
21 Connect to PV2–PV4, PV7–PV13, PV16–PV18, PV20–PV23, and PV25–PV28.



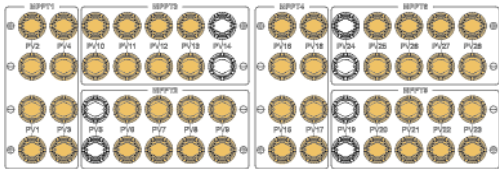
22 Connect to PV2–PV4, PV6–PV13, PV16–PV18, PV20–PV23, and PV25–PV28.



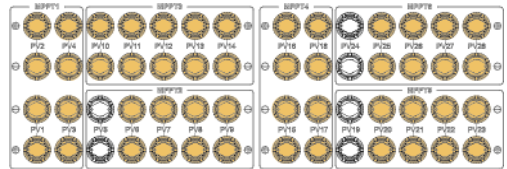
23 Connect to PV1–PV4, PV6–PV13, PV16–PV18, PV20–PV23, and PV25–PV28.



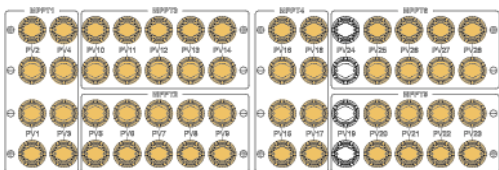
24 Connect to PV1–PV4, PV6–PV13, PV15–PV18, PV20–PV23, and PV25–PV28.



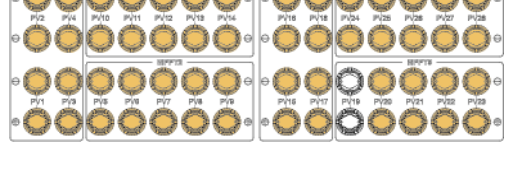
25 Connect to PV1–PV4, PV6–PV18, PV20–PV23, and PV25–PV28.



26 Connect to PV1–PV18, PV20–PV23, and PV25–PV28.



27 Connect to PV1–PV18 and PV20–PV28.



Procedure

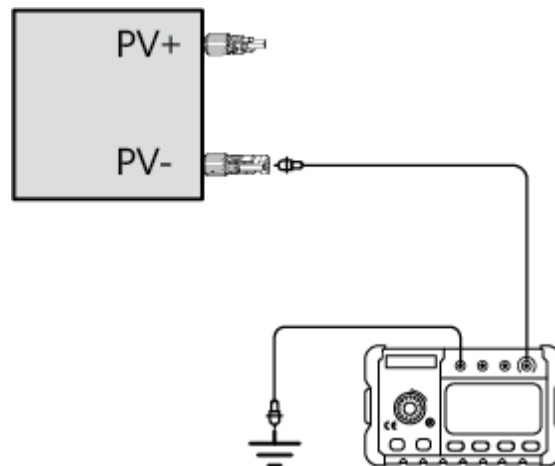
- NOTE - For the PVS-330-TL use the HH4SFD4TMS/HH4SMD4TMS (AMPHENOL) PV connectors delivered with the inverter. If the PV connectors are lost or damaged, purchase the connectors of the same model. The device damage caused by incompatible PV connectors is not covered under any warranty.
- NOTE - The DC voltage measurement range of the multimeter must be at least 1500 V.
- NOTE - If the voltage is a negative value, the DC input polarity is incorrect. Rectify the connection.
- NOTE - If the voltage is greater than 1500 V, too many PV modules are connected to the same string. Remove some PV modules.
- NOTE - Connect the connectors on the PV strings to the connectors on the inverter, and pull back the connectors on the PV strings along the axial direction to check whether the connectors are securely installed.
- NOTE - Ensure that the connectors are properly connected. Any connector damage due to improper connection is not covered by the warranty.

Step 1 Before connecting PV strings to the inverter, ensure that the insulation resistance of each PV string to the ground is normal.

Test method: Use an insulation resistance tester to test the insulation resistance of the PV– cable to the ground. Add a DC voltage of more than 1500 V between the PV– cable and the ground and check the insulation resistance.

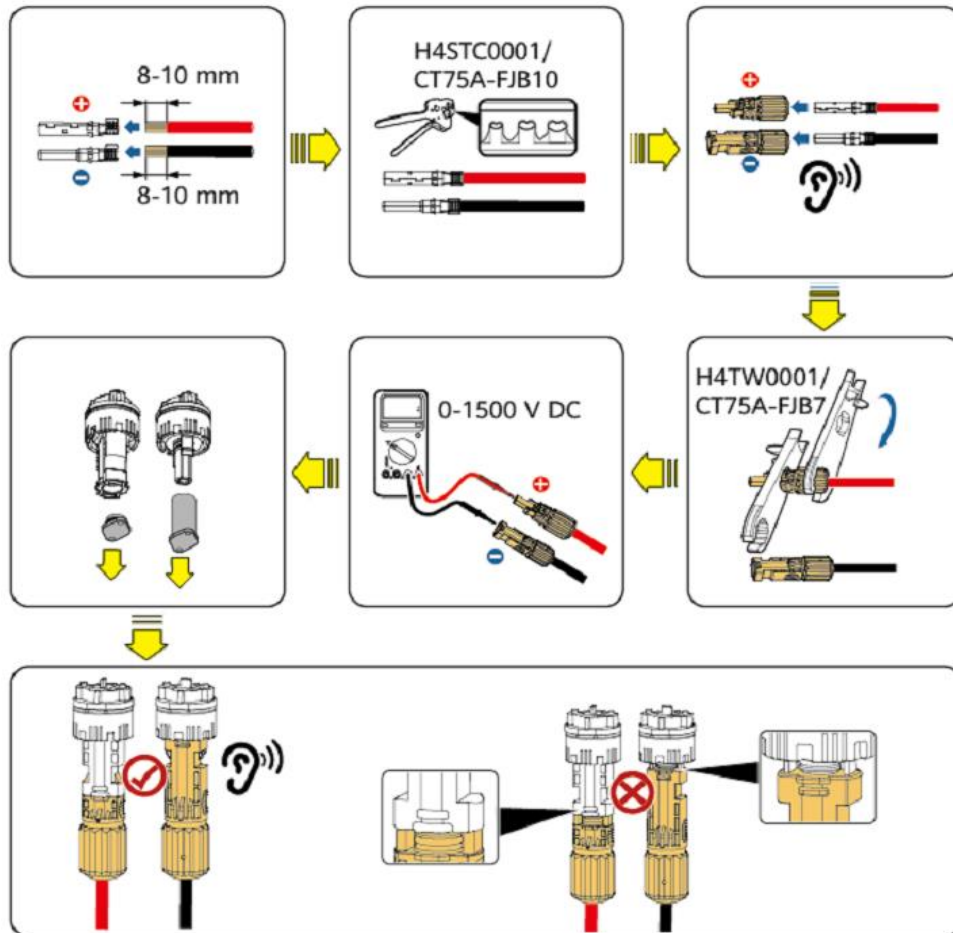
- If the insulation resistance is greater than or equal to 1 M Ω , the insulation resistance is normal.
- If the insulation resistance is less than 1 M Ω , troubleshoot the insulation fault of the cable or PV string.

Figure 5-17 Testing the insulation resistance



Step 2 Connect DC input power cables.

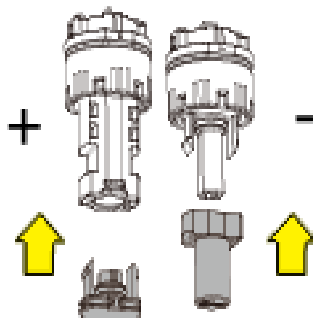
Figure 5-18 Connecting DC input power cables



NOTE - When installing DC input power cables, leave at least 150 mm of slack. The axial tension on PV connectors must not exceed 80 N. Radial stress or torque must not be generated on PV connectors.

Step 3 If there are DC input terminals that are not connected to PV strings, use sealing plugs with snap-fits (models: CT75A-FJB6/HY024-FHG-3 and CT75A-FJB5/HY024-FHG-4) to seal the terminals. Device damage caused by the absence of sealing plugs is not covered by warranty.

Figure 5-19 Sealing plugs with snap-fits



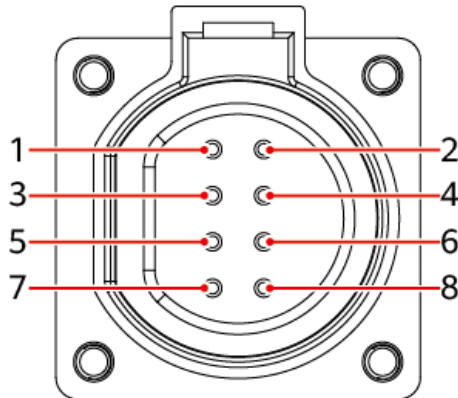
5.7 Connecting Signal Cables

Precautions

When routing communications cables, separate communications cables from power cables to prevent communication from being affected.

COM Port Pin Definitions

Figure 5-20 Communications port

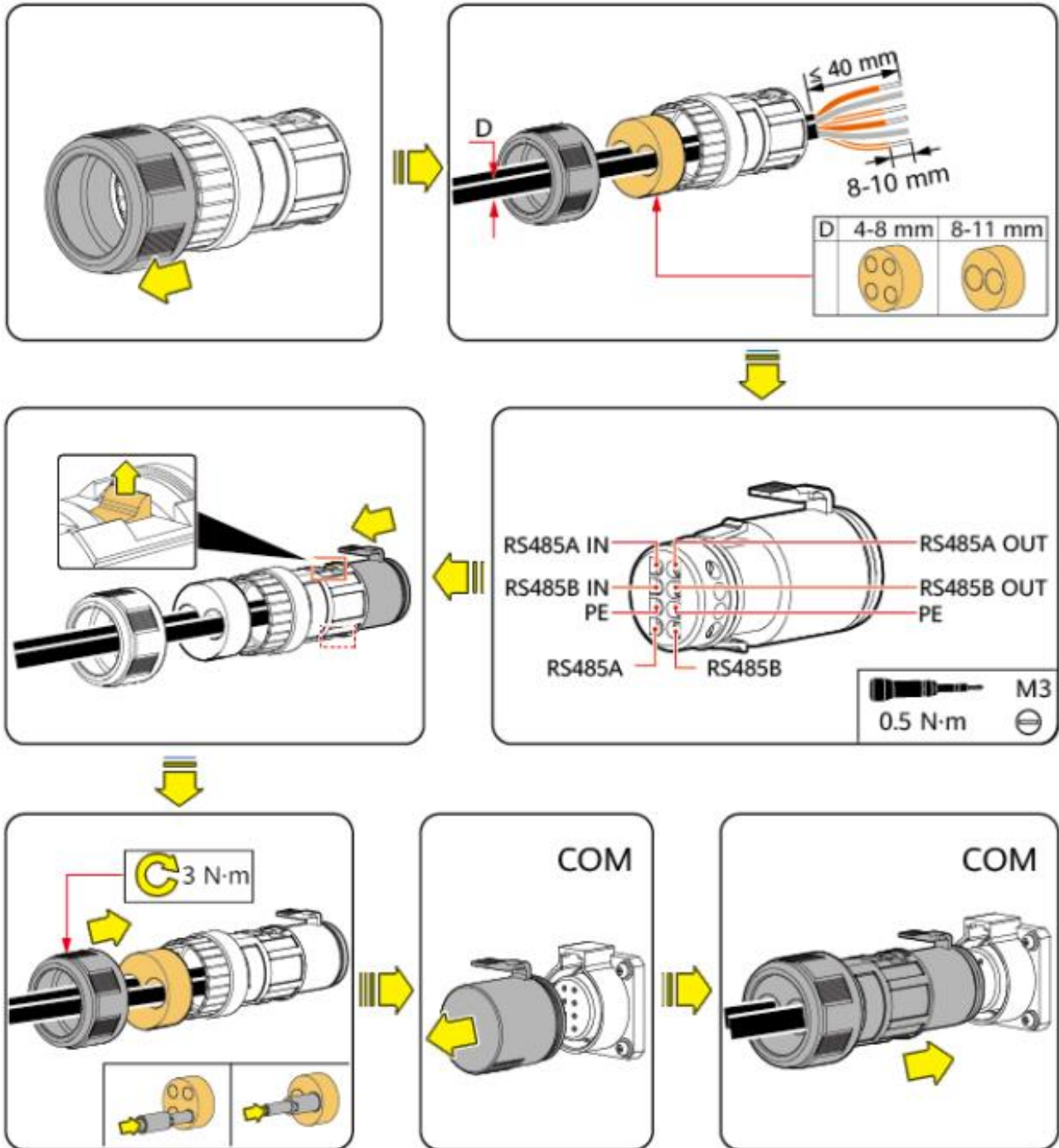


Port	Pin	Definition	Pin	Definition	Description
RS485-1	1	RS485A IN, RS485 differential signal+	2	RS485A OUT, RS485 differential signal+	Used to cascade inverters or connect devices such as the DataLogger.
	3	RS485B IN, RS485 differential signal-	4	RS485B OUT, RS485 differential signal-	
PE	5	PE, shield layer grounding	6	PE, shield layer - grounding	
RS485-2	7	RS485A, RS485 differential signal+	8	RS485B, RS485 differential signal-	Used to connect an RS485 slave device.

Procedure

Step 1 Connect the RS485 communications cables.

Figure 5-21 Connecting communications cables



NOTE - Use a plug to block the unused cable hole with the waterproof rubber ring, and then tighten the locking cap.

6 Check Before Power-On

No.	Check Item	Acceptance Criteria
1	Overall installation	<ul style="list-style-type: none"> The inverter is installed correctly and securely. The installation space is proper, and the installation environment is clean and tidy.
2	Appearance	<ul style="list-style-type: none"> The inverter exterior is intact without deviation, deformation, peeling paint, or rust. Cables are intact and routed neatly.
3	Switch	The AUX. SWITCH , DC SWITCH , and downstream AC output switch are OFF .
4	PE cable	<ul style="list-style-type: none"> The PE cable is connected correctly, securely, and reliably. The resistance of a bond is less than 0.1 ohms.
5	AC power cable	AC power cables are connected correctly and securely.
6	Maintenance compartment	<ul style="list-style-type: none"> The maintenance compartment interior is clean and tidy without foreign matter After the check, ensure that the maintenance compartment door is closed and the screws on the door are tightened.
7	DC power cable	DC power cables are connected correctly and securely.
8	Unused port	<ul style="list-style-type: none"> Unused DC terminals are sealed with sealing plugs. Unused COM and USB ports are plugged with waterproof plugs.

7 Power-On and Commissioning

7.1 Powering On the Inverter

- ⚠ **DANGER** - Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- ⚠ **WARNING** - When the grid connection indicator is steady green (the inverter is connected to the power grid), do not turn on the DC switch. Otherwise, the inverter may be damaged because insulation resistance detection is not performed.
- 📄 **NOTE** - Before the equipment is put into operation for the first time, ensure that the parameters are set correctly by professional personnel. Incorrect parameter settings may result in noncompliance with local grid connection requirements and affect the normal operations of the equipment.
- 📄 **NOTE** - Before turning on the AC switch between the inverter and the power grid, check that the AC voltage is within the specified range using a multimeter.
- 📄 **NOTE** - If an inverter has not been running for six months or longer (three months or longer in the offshore scenario) after being mounted, do not connect the DC input power cables to the inverter. Connect the DC input power cables only when the inverter needs to connect to the power grid. In addition, the inverter must be checked and tested by professionals before being put into operation. If the DC input power cables are connected to the inverter, turn on **DC SWITCH 1** and **DC SWITCH 2** by referring to [Step 3](#) to [Step 5](#). Seal unused PV connectors with sealing plugs. When the inverter allows on-grid operation, if the PV connection indicator is steady green, turn on the AC switch between the inverter and the power grid.
- 📄 **NOTE** - Upon the first power-on, ensure that the **AUX. SWITCH** is turned on first. After the PV connection indicator is steady green and the alarm indicator is steady red, turn on **DC SWITCH 1** and **DC SWITCH 2**. After the system is successfully connected to the power grid, turn off the **AUX. SWITCH**. The Company shall not be liable for any device damage caused by operations performed in wrong sequence.
- 📄 **NOTE** - The DC switches implement automatic disconnection. If cables are reversely connected, PV modules are not properly configured, or an internal fault occurs in the inverter, the DC switches automatically turn off for protection. In this case, rectify the fault as prompted on the app, check that the alarm is cleared, and then turn on the DC switches. If the alarm/maintenance indicator is steady red and at least one of the PV connection indicator and grid connection indicator is steady red, contact technical support after the DC switches automatically turn off and do not turn on the DC switches by yourself. Device damage caused by forcible switch-on after the DC switches turn off is not covered by the warranty.
- 📄 **NOTE** - When the system is powered on or running, ensure that there are no obstacles in path of travel of the DC switch handles (for example, the handle is not stuck by cables or mistakenly held by hands) to ensure that the handles can move freely. Otherwise, the DC switches cannot automatically turn off.
- 📄 **NOTE** - If you perform [Step 3](#) before [Step 2](#), the inverter reports a fault about unexpected shutdown. You can start the inverter only after the fault is automatically rectified.

Step 1 Wear proper personal protective equipment (PPE).

Step 2 Turn on the AC switch between the inverter and the power grid.

Step 3 Set the **AUX. SWITCH** at the bottom of the inverter to **ON**. When you hear a click, the switch is completely turned on. Observe the LED indicators.

Step 4 If the PV connection indicator is steady green and the alarm indicator is steady red, set **DC SWITCH 1** and **DC SWITCH 2** to **ON**. Observe the LED indicators to check the operating status of the inverter.

If the PV connection indicator is off 1 minute after the inverter is powered on, do not turn on the **DC SWITCH**. Turn off the **AUX. SWITCH** immediately and check whether the input power cables are reversely connected or

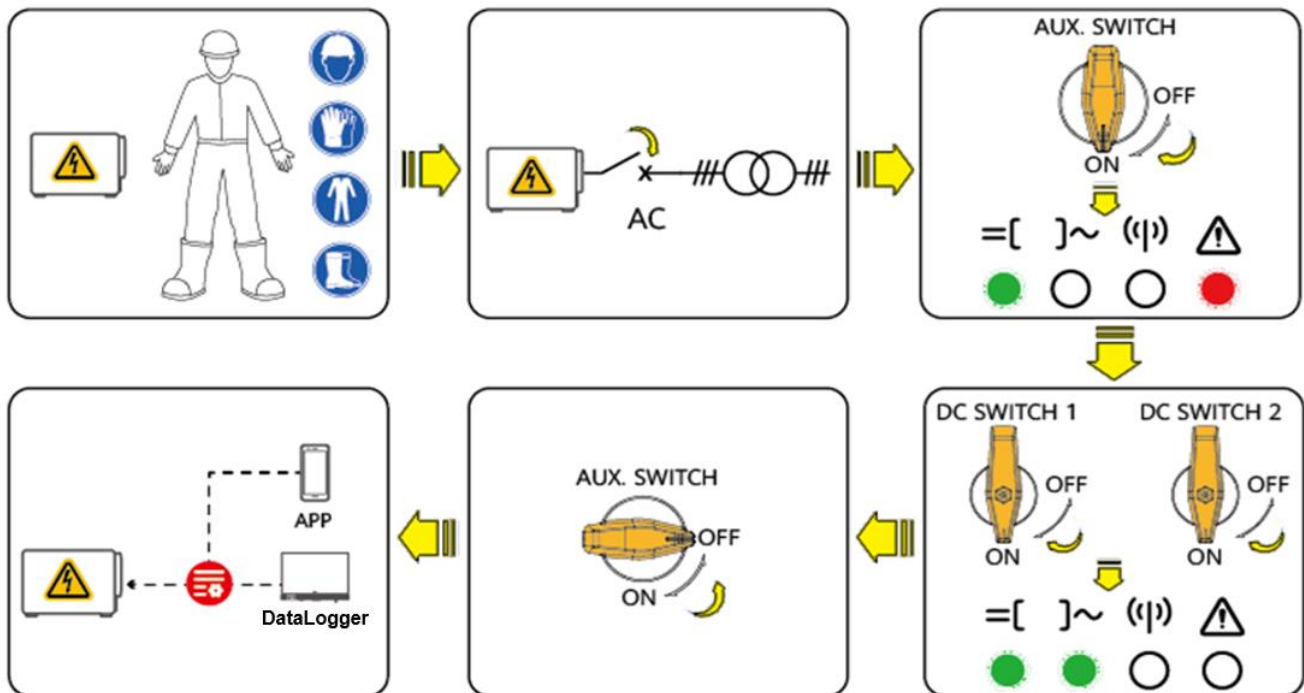
whether the input voltage meets the startup voltage requirements. After the fault is rectified, perform [Step 3](#) again. If the PV connection indicator is off, turn off the **AUX. SWITCH** and contact technical support engineers.

Step 5 If the inverter is running properly, turn off the **AUX. SWITCH**.

NOTE - The **AUX. SWITCH** needs to be turned on only when the system is powered on for the first time and needs to be turned off during subsequent operation. If the **AUX. SWITCH** is not turned off within 2 minutes after the **DC SWITCH 1** or **DC SWITCH 2** is turned on, the inverter will report the **DC Switch Status Abnormal** alarm, and the alarm indicator will blink red fast. After the **AUX. SWITCH** is turned off, the alarm will be automatically cleared.

Step 6 Set the parameters on the DataLogger. For details, see 7.3 Commissioning the Inverter (Using the DataLogger) or the **VSN2025-01 DataLogger Product Manual**.

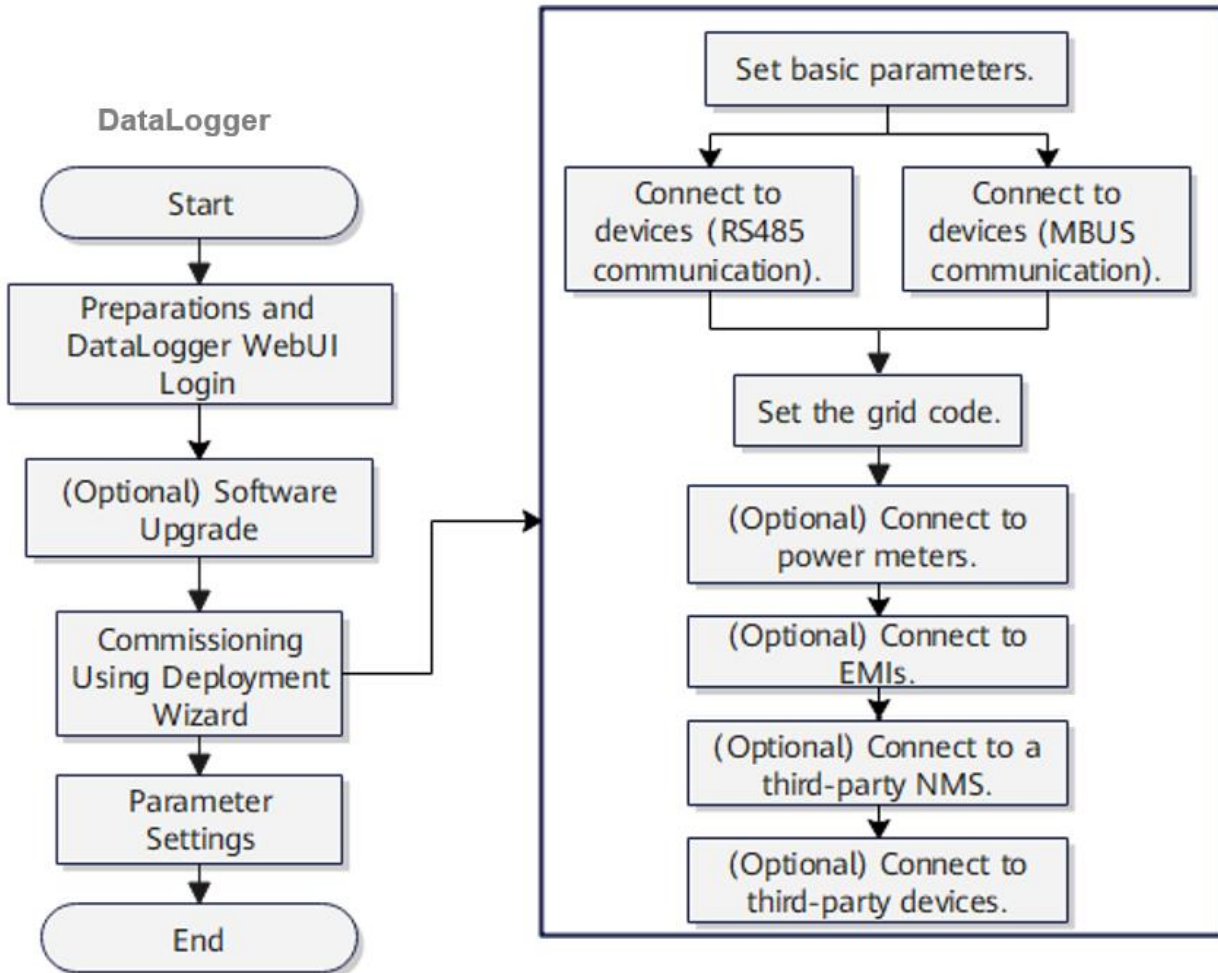
Figure 7-1 Power-on



7.2 Commissioning Methods and Process

The inverter can be commissioned on the DataLogger WebUI. You are advised to use the DataLogger WebUI for deployment commissioning and use the app for password resetting and alarm viewing.

Figure 7-2 Commissioning process using the DataLogger



7.3 Commissioning the Inverter (Using the DataLogger)

7.3.1 Preparations and DataLogger WebUI Login

For details about preparations and WebUI login, see the *VSN2025-01 DataLogger Product Manual* available on the website.

7.3.2 Software Upgrade

For details about software upgrade, see the *VSN2025-01 DataLogger Product Manual* available on the website.

7.3.3 Commissioning Using Deployment Wizard

Procedure

Step 1 Set basic parameters.

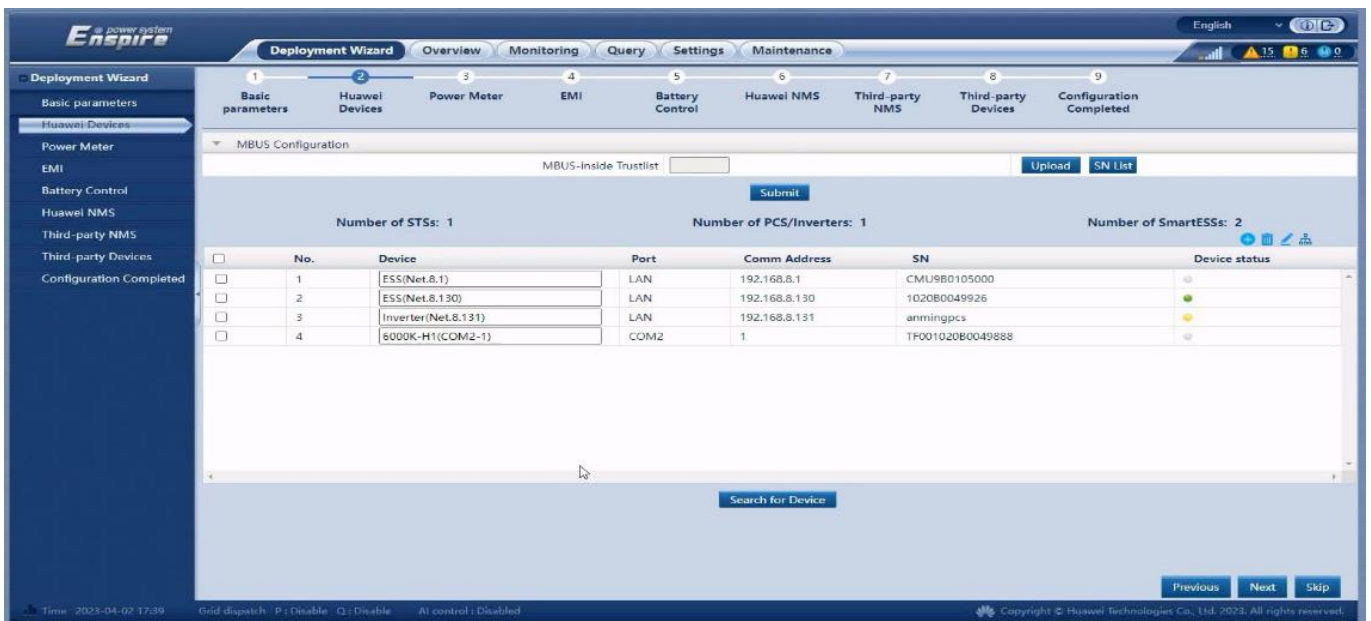
Figure 7-3 Setting basic parameters



Step 2 Connect to a devices.

- For RS485 communication, click **Search for Device**. The address is automatically allocated.

Figure 7-4 RS485 communication



- For MBUS communication, choose **Monitoring > MBUS > Networking Settings > SN List > Template** to download the SN list template. Return to the deployment wizard, click **Upload**, and upload the configured template file.

Figure 7-5 Downloading the SN list template

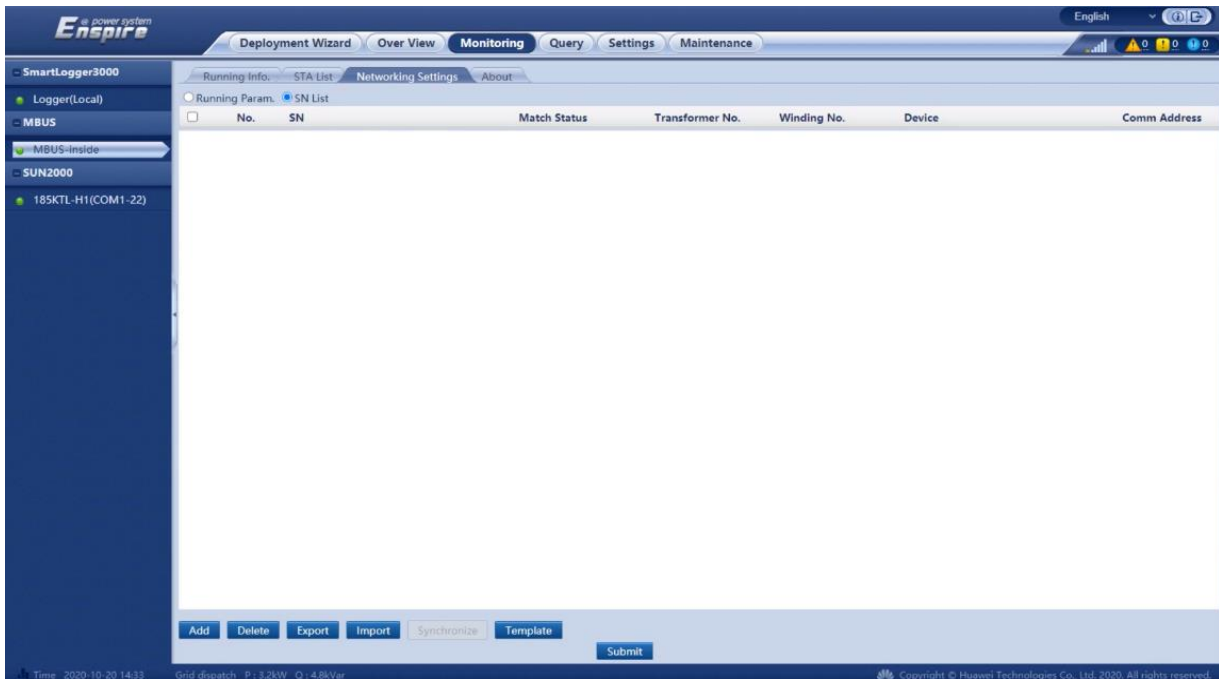
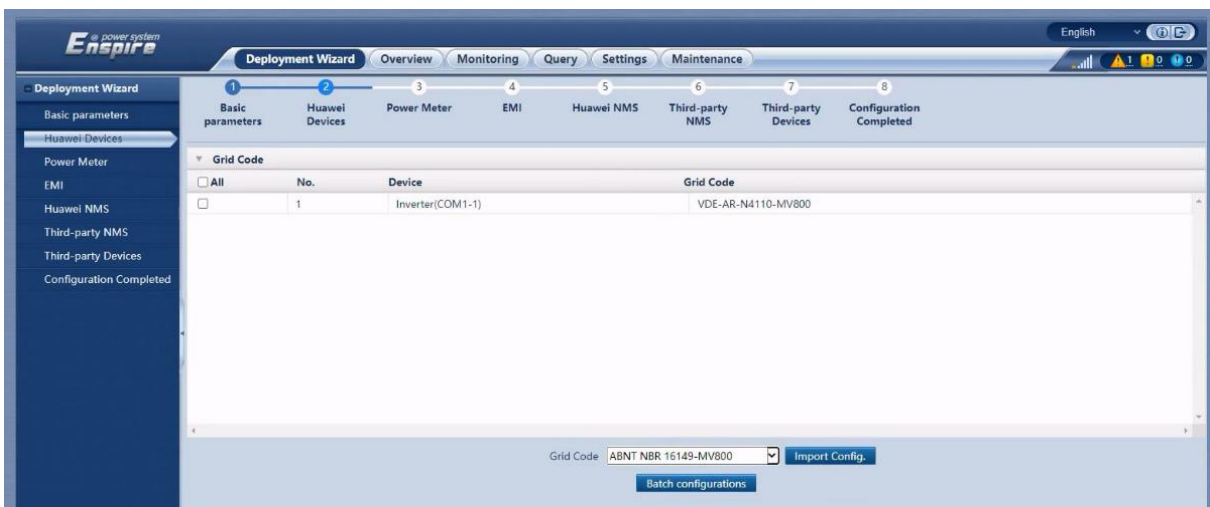


Figure 7-6 Uploading the SN list



Step 3 After the device is connected, set the grid code based on the site requirements.

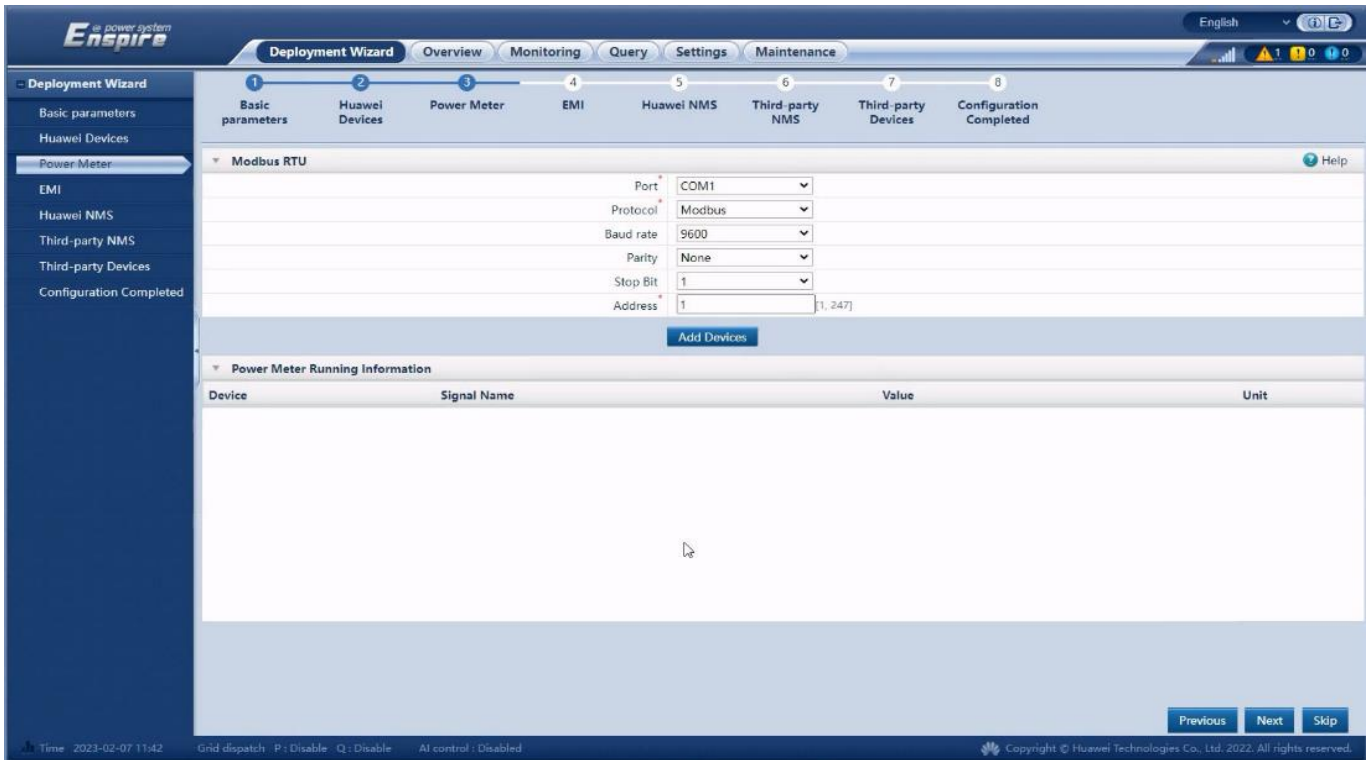
Figure 7-7 Setting the grid code



Step 4 Connect to power meters.

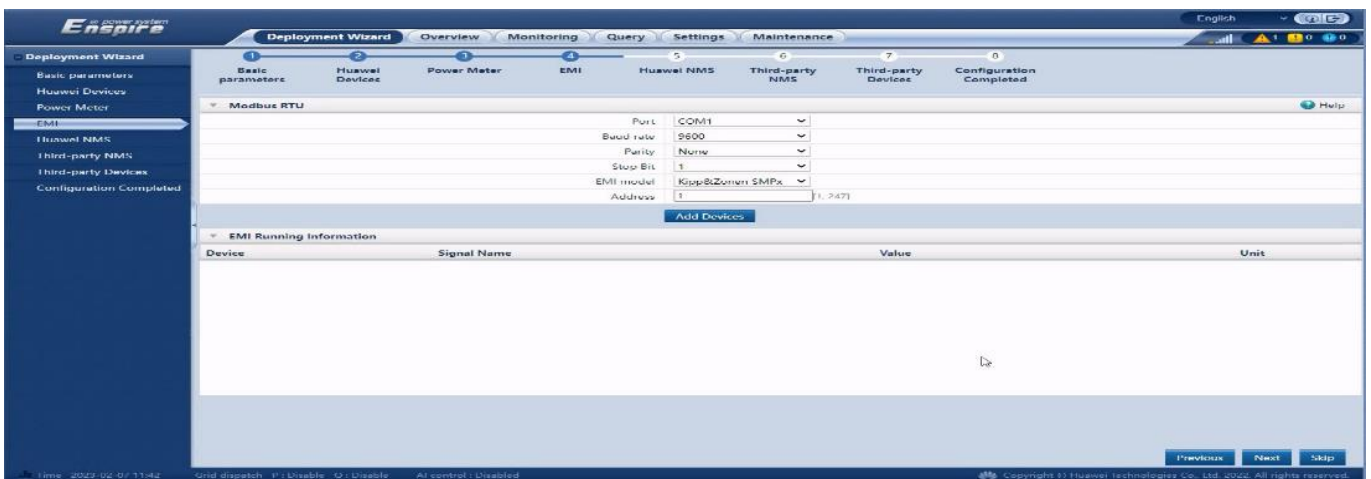
Set related parameters by referring to "[Setting Meter Parameters](#)" in the *VSN2025-01 DataLogger Product Manual*.

Figure 7-8 Connecting to power meters



Step 5 Connect to EMIs.

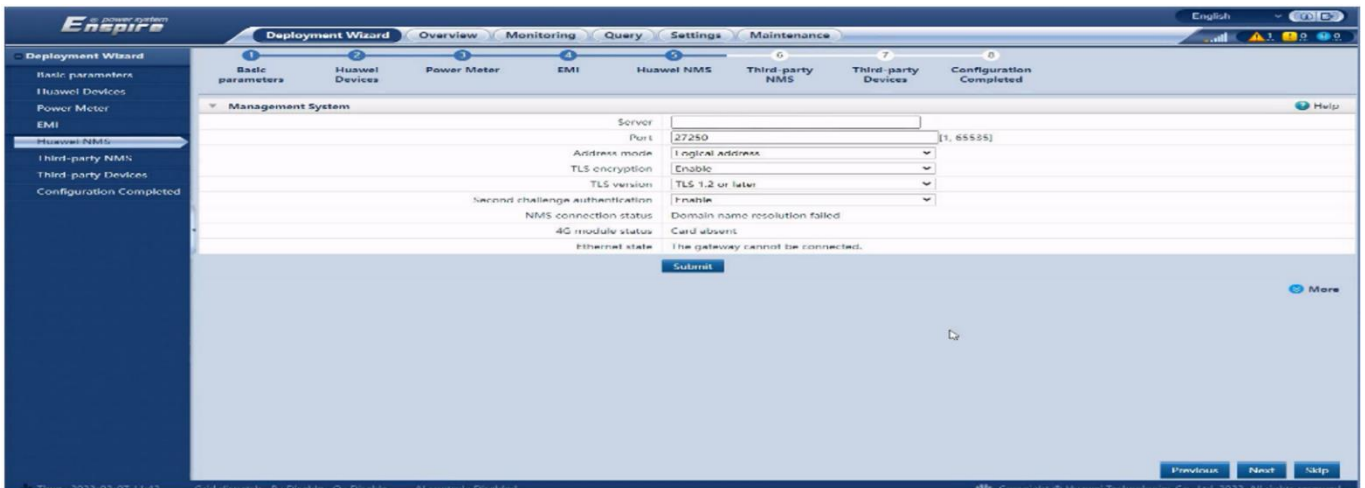
Figure 7-9 Connecting to EMIs



Step 6 Connect to a network management system (NMS).

Set related parameters by referring to "[Setting Parameters for Connecting to the Management System](#)" (content related to a NMS) in the *VSN2025-01 DataLogger Product Manual*.

Figure 7-10 Connecting to a NMS



Step 7 Connect to a third-party NMS.

Set related parameters by referring to "[Setting Parameters for Connecting to the Management System](#)" (content related to a third-party NMS) in the *VSN2025-01 DataLogger Product Manual*.

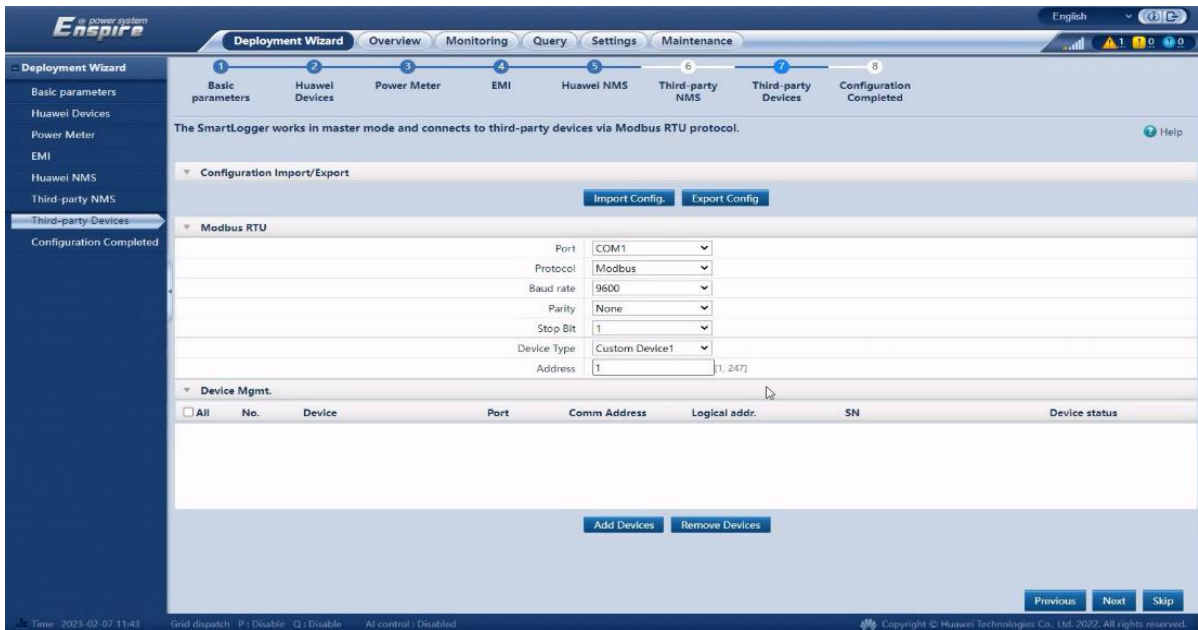
Figure 7-11 Connecting to a third-party NMS



Step 8 Connect to third-party devices.

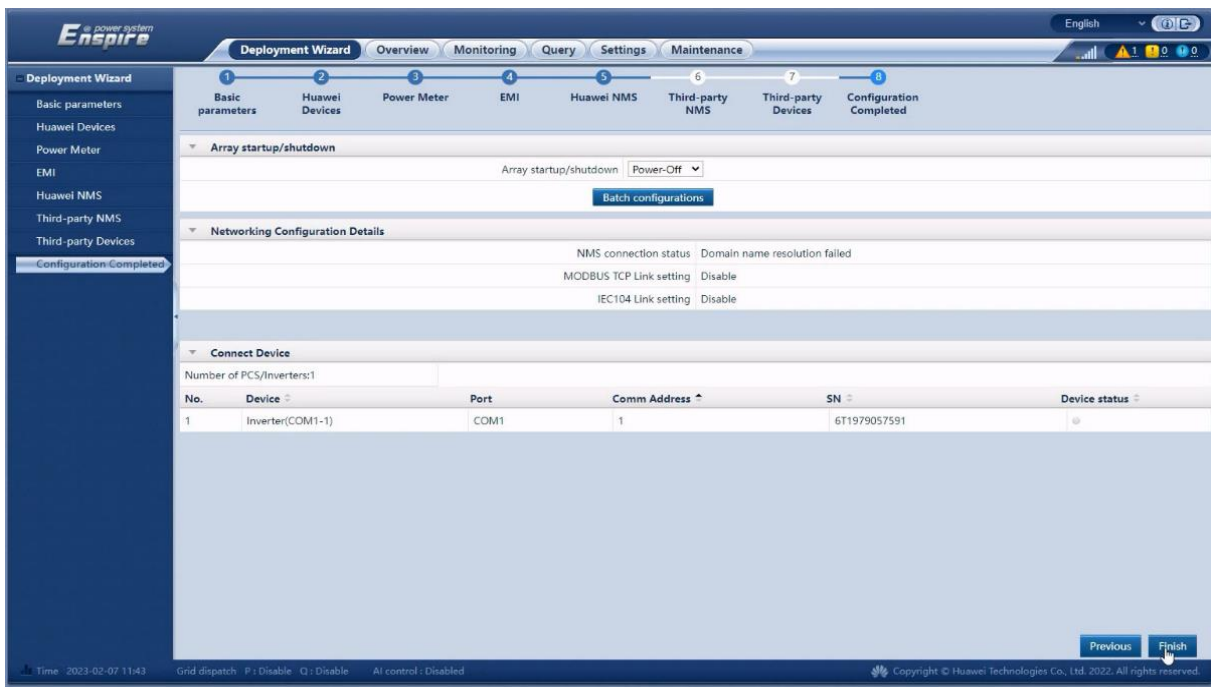
Set related parameters by referring to "[Setting Custom Device Parameters](#)" in the *VSN2025-01 DataLogger Product Manual*.

Figure 7-12 Connecting to third-party devices



Step 9 Click **Finish**.

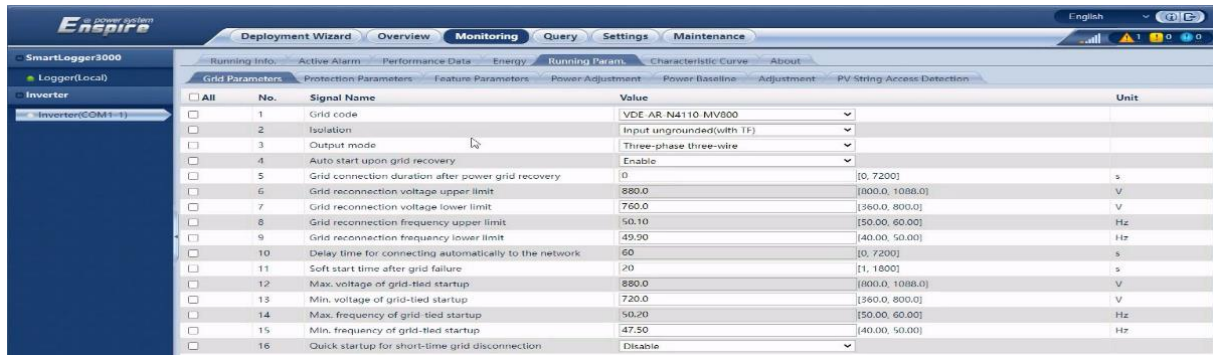
Figure 7-13 Completing the configuration



7.3.4 Parameters Settings

Choose **Monitoring > Inverter > Running Param.**, set running parameters, and click **Submit**.

Figure 7-14 Setting running parameters



For details about the parameter settings, see the **VSN2025-01 DataLogger Product Manual** available on the website.

7.4 Aurora Vision to monitor your assets

With Aurora Vision (www.auroravision.net), you can monitor and interact with your assets. You can register all your assets for free and start viewing production data remotely or via the mobile app (Energy Viewer, available on the Apple Store or Google Play Store). You can manage firmware updates, asset health status, check standard alarms, and configure custom alarms and reports. The only requirement is that the asset has a valid internet connection.

Consult the online documentation: <https://documentation.auroravision.net/index.html>

8 System Maintenance

⚠ **DANGER** - Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.

⚠ **WARNING** - Before performing maintenance, power off the equipment, follow the instructions on the delayed discharge label, and wait for a period of time as specified to ensure that the equipment is not energized.

8.1 Routine Maintenance

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

⚠ **ATTENTION** - Before cleaning the inverter, connecting cables, and checking the grounding reliability, power off the inverter and ensure that the **AUX. SWITCH** and all **DC SWITCH** of the inverter are **OFF**.

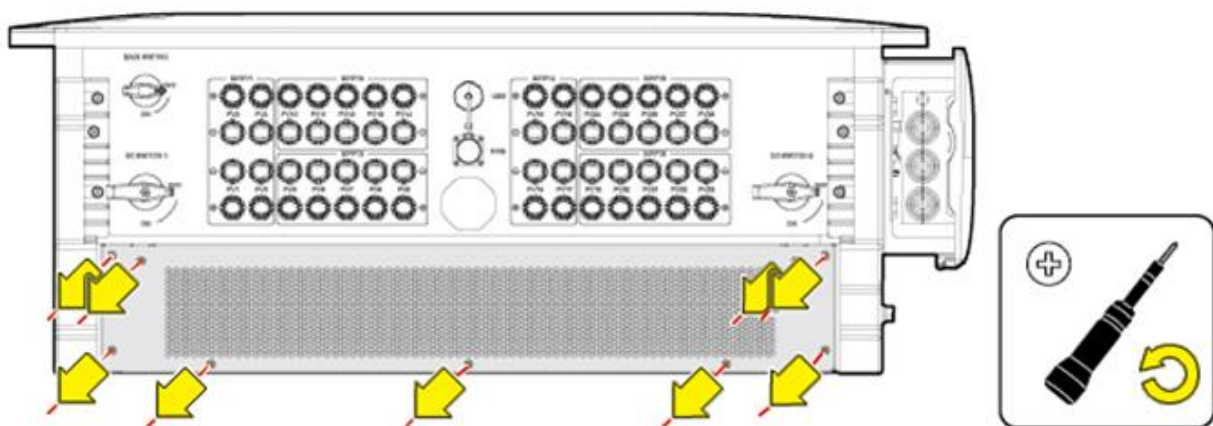
⚠ **ATTENTION** - Do not open the maintenance compartment door on rainy or snowy days. If you need to, take protective measures to prevent rain or snow from entering the maintenance compartment. If protective measures cannot be taken, do not open the maintenance compartment door.

Table 8-1 Maintenance checklist

Check Item	Check Method	Maintenance Method	Maintenance Interval
Alarm	Check alarms on the app, DataLogger, or management system.	For details, see Alarm Reference . For details about the alarm ID 2062, see Locating Insulation Resistance Faults .	Routine maintenance
Cleanness of air inlet and outlet	Periodically check whether there is dust or foreign objects at the air intake and exhaust vents.	Power off the inverter and remove dust and foreign objects. If necessary, remove the baffle plate from the air intake vent for cleaning.	Once every 6 to 12 months (or once every 3 to 6 months based on the actual dust conditions in the environment)
Fan	Check whether the fans generate abnormal noise during operation.	Remove foreign objects from the fan. If the abnormal noise persists, replace the fan. For details, see 8.4 Replacing a Fan.	Once every 6 to 12 months

Check Item	Check Method	Maintenance Method	Maintenance Interval
System running status	<ul style="list-style-type: none"> • Check whether the inverter is damaged or deformed. • Check whether the inverter generates abnormal sounds during operation. • Check whether all inverter parameters are correctly set during operation. 	Contact the Company's service engineers.	Once every 6 months
Electrical connection	<ul style="list-style-type: none"> • Check whether cables are disconnected or loose. • Check whether cables are damaged, especially whether the cable sheath that contacts a metal surface is damaged. • Check whether the sealing plugs of unused DC input terminals fall off. • Check whether the unused COM and USB ports are locked by waterproof caps. 	<ul style="list-style-type: none"> • Power off the inverter and secure loose or disconnected cables. • Power off the inverter and replace the damaged cables. • Install sealing plugs on unused DC input terminals. • Tighten the waterproof caps on the unused COM and USB ports. 	6 months after the first commissioning and once every 6 to 12 months after that
Grounding reliability	<p>Check whether the ground cables are securely grounded.</p> <p>Use a multimeter to check whether the ground resistance at the inverter ground screws is less than or equal to 4 Ω.</p>	Tighten the screws on both sides of the ground cable and ensure that the resistance meets the requirements.	6 months after the first commissioning and once every 6 to 12 months after that
Vegetation around the inverter	Check whether there are weeds around the inverter.	<ul style="list-style-type: none"> • Perform inspection and weeding as required. • Clean the site promptly after weeding. 	Based on the local wilting season

Figure 8-1 Removing the baffle plate of the air intake vent



NOTE - After the cleaning is complete, reinstall the baffle plate. Tighten the M4 screws with a torque of 1.2 N·m.

8.2 Shutdown and Power-Off

⚠ WARNING - After the system is powered off, the inverter is still energized and hot, which may cause electric shocks or burns. Therefore, wait for at least 15 minutes and wear PPE before working on the inverter.

Step 1 Send a shutdown command on the app, DataLogger, or management system.

For details, see the user manual of corresponding product.

Step 2 Turn off the AC switch between the inverter and the power grid.

Step 3 Set the two **DC SWITCH** to **OFF**.

8.3 Power-Off for Maintenance

Precautions

To prevent personal injury and device damage, use the DC current scale of a clamp meter to measure the PV string current (even if the DC switches have been turned off) before removing PV connectors when troubleshooting or replacing the inverter or PV strings. Ensure that the PV strings have no current and quickly remove and insert connectors for adjustment.

⚠ ATTENTION - If the inverter is faulty, do not stand in front of it if possible.

⚠ ATTENTION - If the LED1 indicator on the inverter is off and the DC switches are **OFF**, do not operate the DC switches. For details, see [Step 4](#).

⚠ ATTENTION - Do not operate the DC switches on the inverter before you perform steps [Step 3](#) to [Step 5](#).

⚠ ATTENTION - When the inverter detects a fault, it triggers automatic DC disconnection protection. Do not turn on the DC switches before the fault is rectified.

⚠ ATTENTION - If the AC switch between the inverter and the power grid has been turned off automatically, do not turn it on before the fault is rectified.

⚠ ATTENTION - Before power-off for maintenance, do not touch the energized components of the inverter. Otherwise, electric shocks or arcs may occur.

Procedure

Step 1 Wear proper PPE.

Step 2 If the inverter does not shut down due to a fault, send a shutdown command on the app, DataLogger, or management system. If the inverter has shut down due to a fault, go to the next step.

Step 3 Turn off the AC switch between the inverter and the power grid.

Step 4 Use a clamp meter to measure the DC current of each PV string input to the inverter.

- If the current is less than or equal to 0.01 A, go to the next step.
- If the current is higher than 0.01 A, wait until the solar irradiance decreases and the PV string current decreases below 0.01 A at night, and then go to the next step.

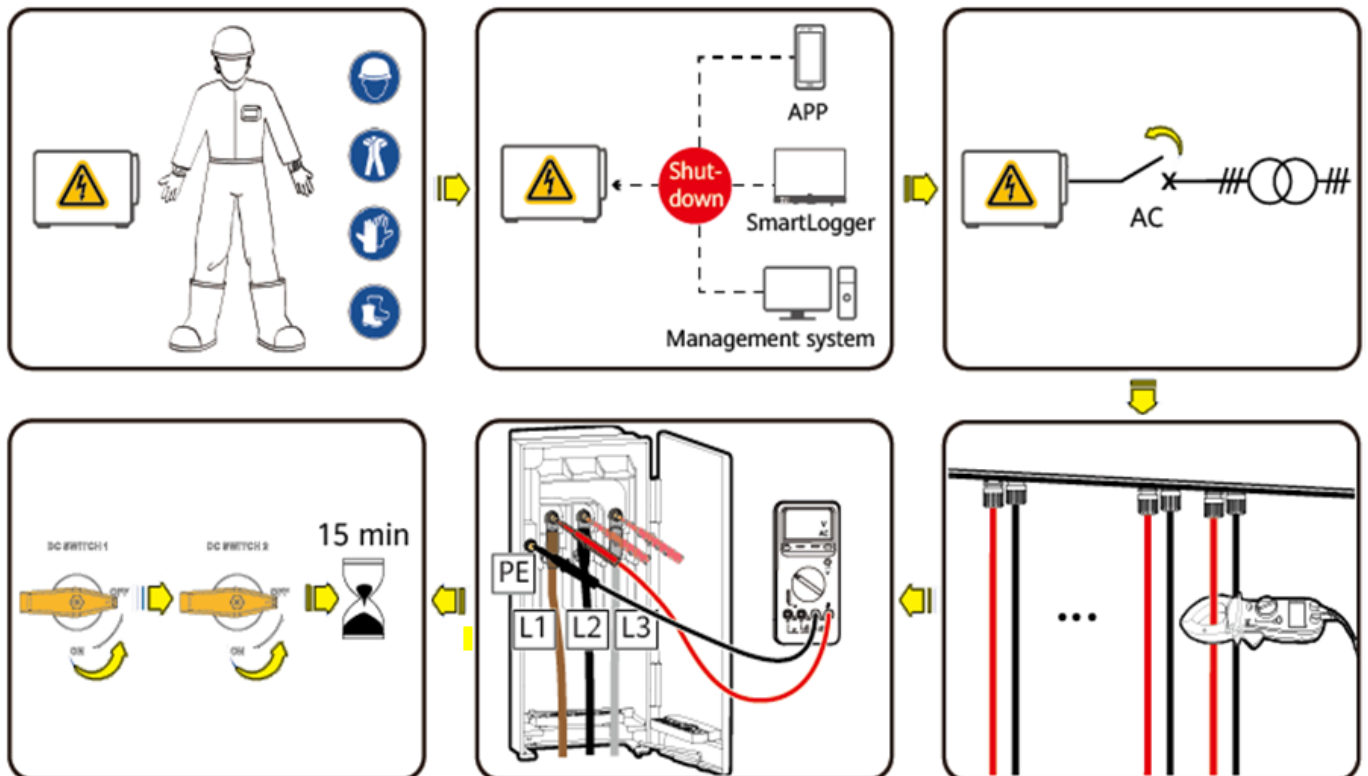
Step 5 Open the maintenance compartment door, install a support strut, and use a multimeter to check the voltage between the AC terminal block and the ground. Ensure that the AC side of the inverter is powered off.

Step 6 Turn off all DC input switches of the inverter and ensure that all switches are **OFF**. If the DC switches are automatically turned off, go to the next step.

Step 7 Wait for 15 minutes and troubleshoot or repair the inverter.

- ⚠ **WARNING** - Do not open the panel for maintenance if the inverter is emitting abnormal smell or smoke, or has obvious exceptions.
- ⚠ **WARNING** - If the inverter does not emit abnormal smell or smoke and is intact, repair or restart it based on the alarm handling suggestions. Do not stand in front of the inverter during the restart.

Figure 8-2 Power-off for maintenance



8.4 Replacing a Fan

⚠ ATTENTION - Before replacing a fan, power off the inverter.

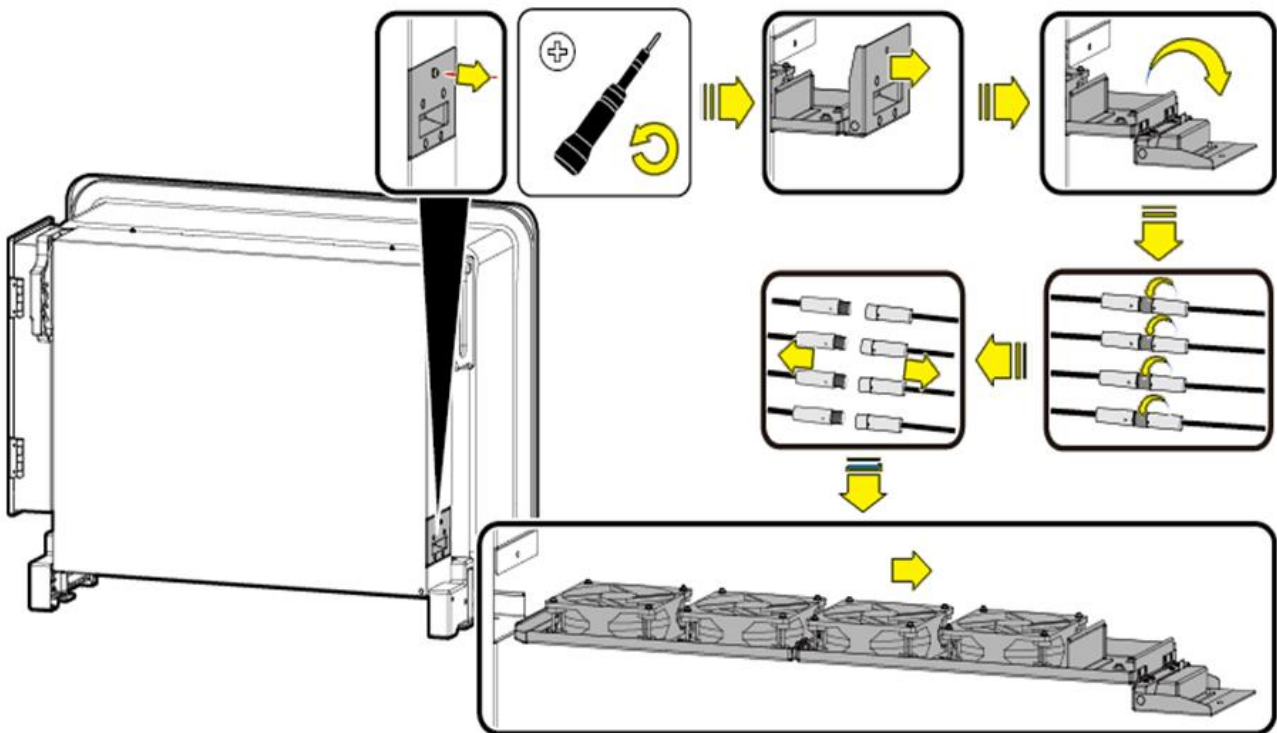
⚠ ATTENTION - When replacing a fan, use insulated tools and wear PPE.

📖 READ THE MANUAL - If the fan gets stuck when being pulled or pushed, slightly lift it.

Step 1 Remove the fan tray.

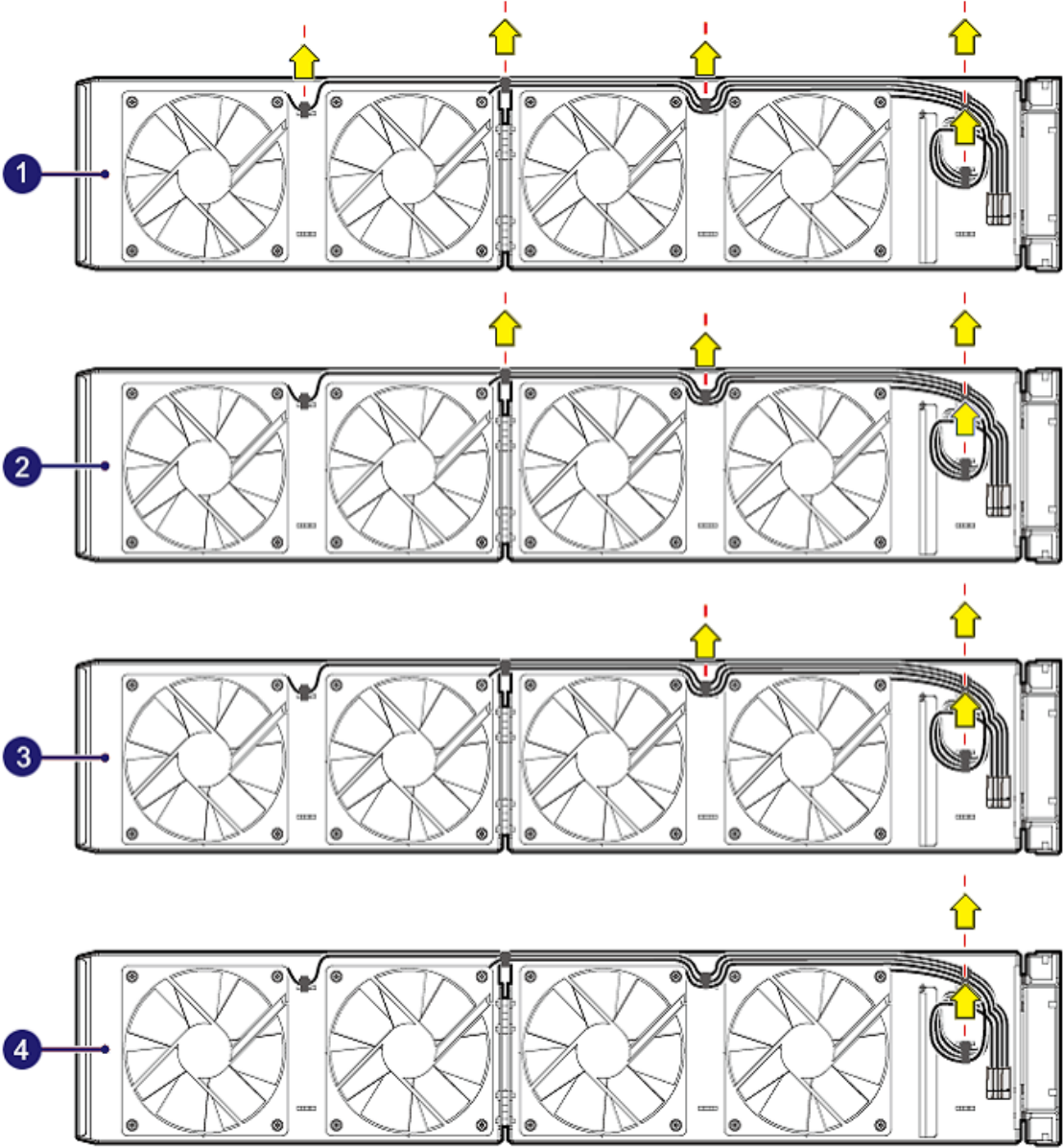
1. Remove the screws from the fan tray and store them properly.
2. Pull out the fan tray until the fan baffle plate is flush with the inverter enclosure.
3. Place down the handle.
4. Unscrew the connectors.
5. Disconnect the cables.
6. Pull out the fan tray.

Figure 8-3 Pulling out the fan tray



Step 2 Remove the cable ties from the faulty fan.

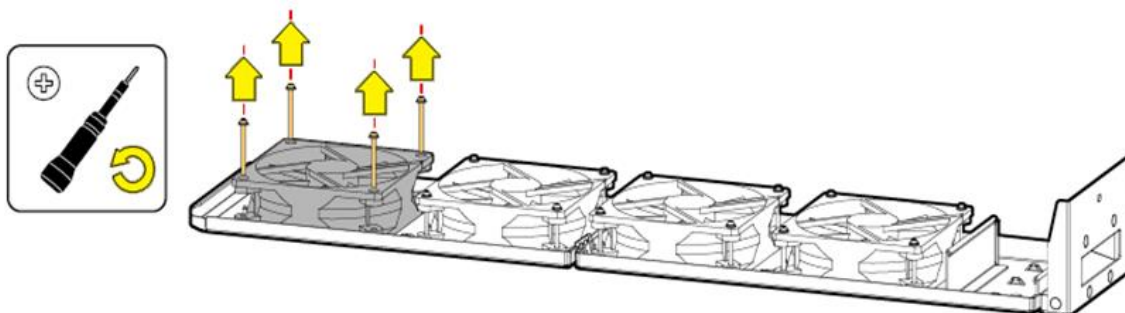
Figure 8-4 Removing cable ties



(1) Remove the cable ties from FAN 1.	(2) Remove the cable ties from FAN 2.
(3) Remove the cable ties from FAN 3.	(4) Remove the cable ties from FAN 4.

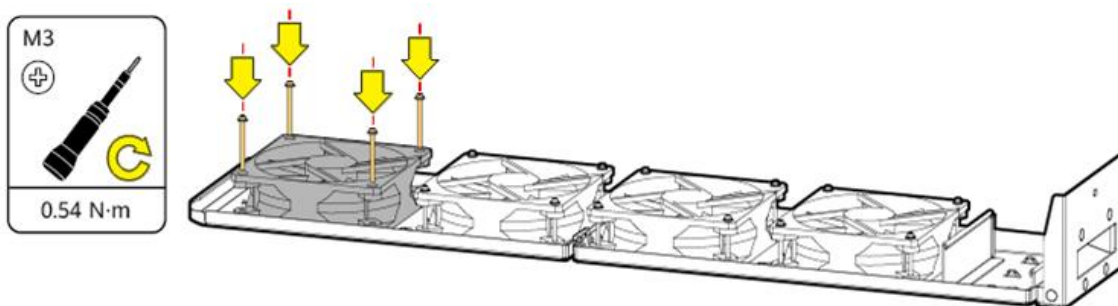
Step 3 Remove the faulty fan.

Figure 8-5 Removing a fan (using FAN 1 as an example)



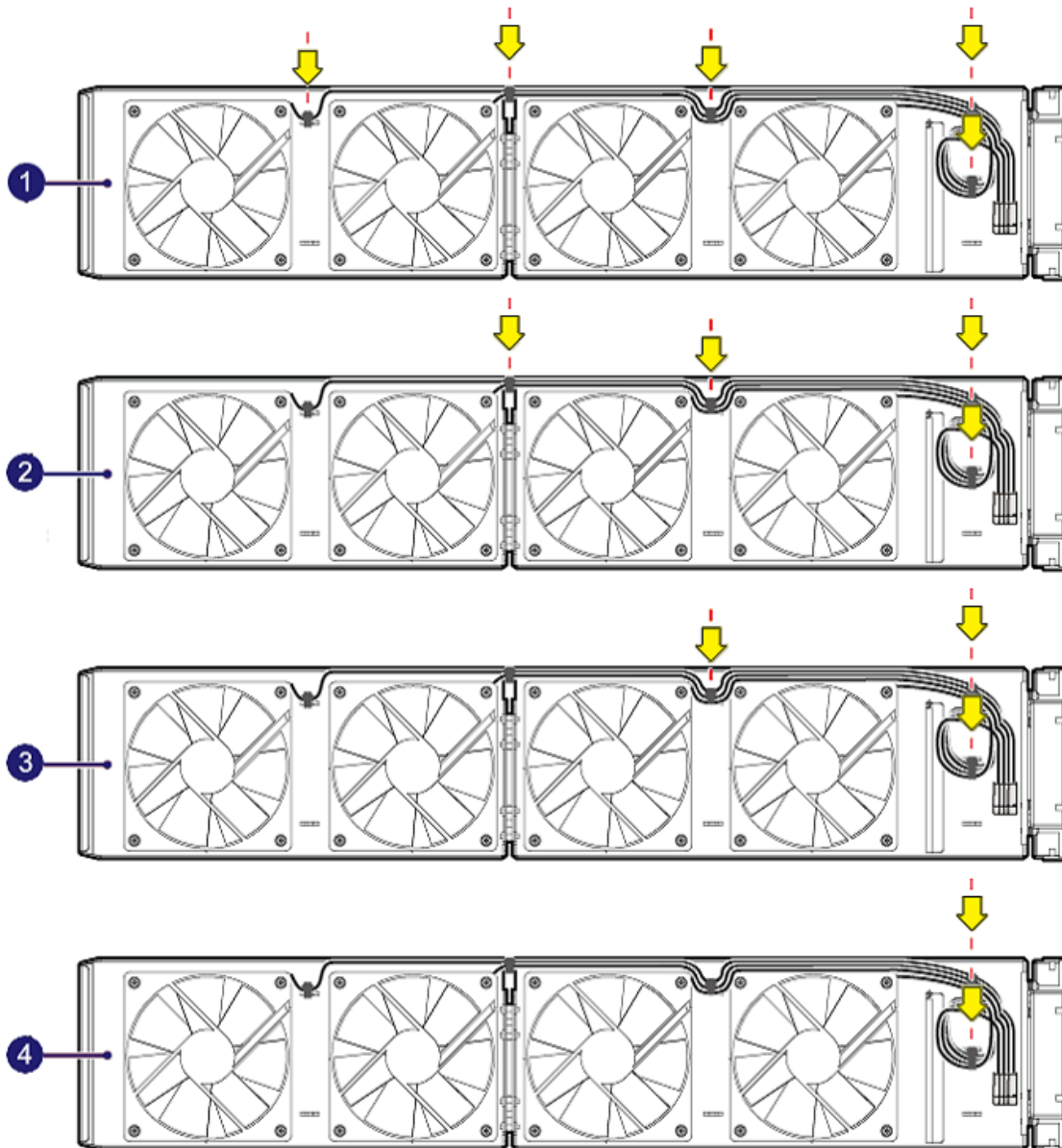
Step 4 Install a new fan.

Figure 8-6 Installing a fan (using FAN 1 as an example)



Step 5 Bind the fan cables.

Figure 8-7 Binding cables



(1) Bind the cables of FAN 1.

(2) Bind the cables of FAN 2.

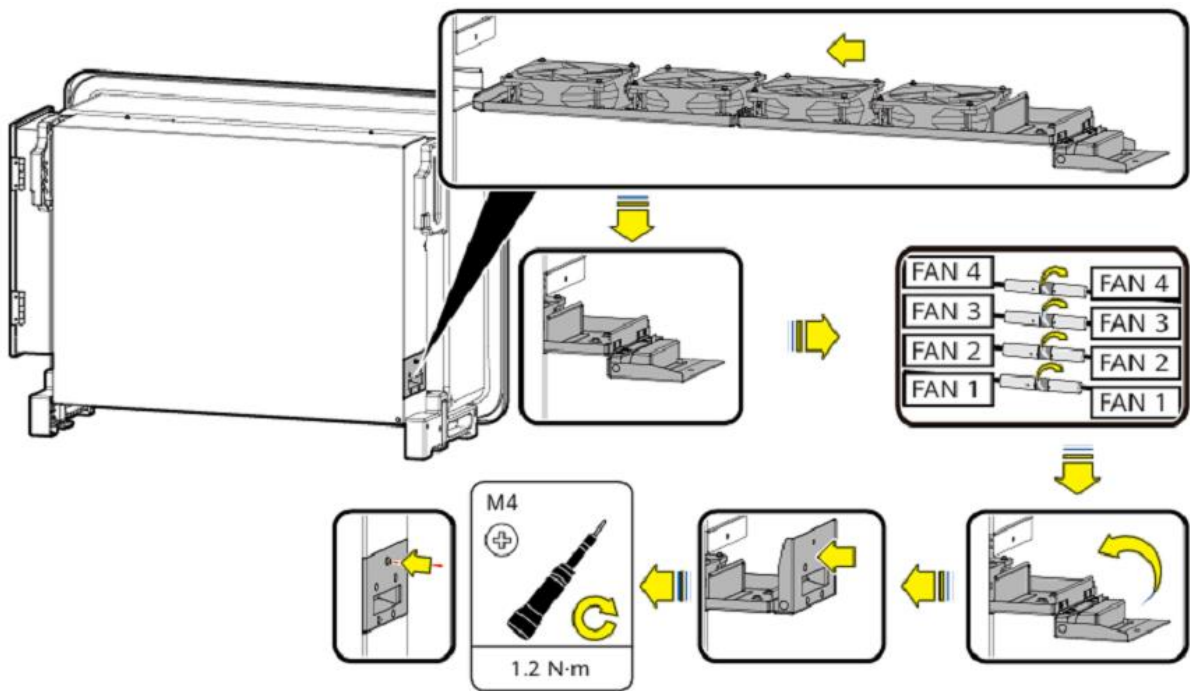
(3) Bind the cables of FAN 3.

(4) Bind the cables of FAN 4.

Step 6 Install the fan tray.

7. Clean the fan tray and ensure that no foreign matter is left. Align the fan tray with the installation position.
8. Push in the fan tray until the fan baffle plate is flush with the inverter enclosure.
9. Connect the cables correctly according to the cable labels.
10. Rotate the handle.
11. Push the fan tray completely in place.
12. Tighten the screws on the fan tray.

Figure 8-8 Installing a fan tray



8.5 Replacing the Inverter

 **NOTE** - Before removing the inverter, disconnect both the AC and DC power supplies.


Step 1 Remove the inverter.

13. Disconnect all cables from the inverter, including RS485 communications cables, DC input power cables, AC output power cables, and protective earthing (PE) cables.
14. Remove the inverter from the mounting bracket.
15. Remove the mounting bracket.

Step 2 Pack the inverter.

- If the original packaging is available, put the inverter inside it and then seal it using adhesive tape.
- If the original packaging is unavailable, put the inverter inside a suitable hard cardboard box and seal it properly.






Step 3 Dispose of the inverter.

 **READ THE MANUAL** - If the inverter reaches the end of its service life, dispose of it according to local regulations for the disposal of electrical equipment.

Step 4 Install a new inverter. For details, see [Installation](#) and [Electrical Connections](#).

8.6 Resetting and Turning On the DC SWITCH

Prerequisites

- ⊘ **DANGER** - If all the DC SWITCH are automatically turned off at the same time, the AC switch does not trip, and the indicators on the inverter displays the following status, do not turn on the DC SWITCH by yourself. Contact your vendor or technical support.
- ⊘ , , and  indicators are steady red.
- ⊘  and  indicators are steady red.
- ⊘ **DANGER** - If all the DC SWITCH are automatically turned off at the same time and the AC switch trips, check that no short circuit occurs on the AC side between phases or between a phase and the ground, turn on the AC switch, export logs, and send the logs to your vendor or technical support. Rectify the fault after your vendor or technical support provides a solution. If there is any short circuit on the AC side between phases or between a phase and the ground, do not turn on the AC switch. Contact your vendor or technical support.
- ⊘ **DANGER** - If the DC SWITCH automatically turns off and the inverter generates a **String Reverse Connection**, **String Current Backfeed**, or **String Voltage High** alarm, rectify the fault based on the alarm handling suggestions. After the fault is rectified, wait for at least 3 minutes, turn the switch handle to **OFF** to complete the reset, and then turn it on.
- ⊘ **DANGER** - Before turning on a switch, ensure that all alarms have been cleared.

Procedure

Step 1 Set the DC SWITCH to OFF.

Step 2 Set the DC SWITCH to ON.

8.7 Locating Insulation Resistance Faults

NOTE - The inverter supports insulation resistance detection:

NOTE - If reactive power output at night is enabled for the inverter, log in to the DataLogger WebUI, choose **Monitoring > Inverter > Running Param. > Power Adjustment** and set **Insulation resistance inspection during reactive power output at night** to **Enable**. Then, the inverter will perform insulation resistance detection once a day.

NOTE - If reactive power output at night is disabled, the inverter performs insulation resistance detection by default when it is started.

If the ground resistance of a PV string connected to the inverter is too low, the inverter generates a **Low insulation resistance** alarm.

The possible causes are as follows:

- A short circuit occurs between the PV array and the ground.
- The ambient air of the PV array is damp and the insulation between the PV array and the ground is poor.

After the **Low insulation resistance** alarm is generated, the inverter automatically triggers insulation resistance fault location. If the fault location is successful, the location information is displayed on the **Alarm details** screen of the **Low insulation resistance** alarm on the HiSolar app.

Log in to the HiSolar app, choose **Alarm > Active alarm**, and choose **Low insulation resistance** to enter the **Alarm details** screen.

READ THE MANUAL - The positive and negative terminals of a PV string are connected to the PV+ and PV- terminals of the inverter, respectively. The 0% position corresponds to the PV- terminal, and the 100% position corresponds to the PV+ terminal. Other percentages indicate that the fault occurs on a PV module or cable in the PV string.

READ THE MANUAL - Possible fault position = Total number of PV modules in a PV string x Percentage of possible short-circuit positions. For example, if a PV string consists of 14 PV modules and the percentage of the possible short-circuit position is 34%, the possible fault position is 4.76 (14 x 34%), indicating that the fault is located near PV module 4, including the adjacent PV modules and their cables. The inverter has a detection precision of ± 1 PV module.

READ THE MANUAL - For details about the PV strings corresponding to the MPPT that may be faulty, see Table 8-2. The fault can be located only to the MPPT level. Perform the following steps to connect the PV strings corresponding to the faulty MPPT to the inverter one by one to further locate and rectify the fault.

READ THE MANUAL - When a non-short-circuit fault occurs, the possible short-circuit percentage is not displayed. If the insulation resistance is greater than $0.001 \text{ M}\Omega$, the fault is not related to short circuit. Check all PV modules in the faulty PV string one by one to locate and rectify the fault.

Figure 8-9 Definition of the percentage of the short-circuit position

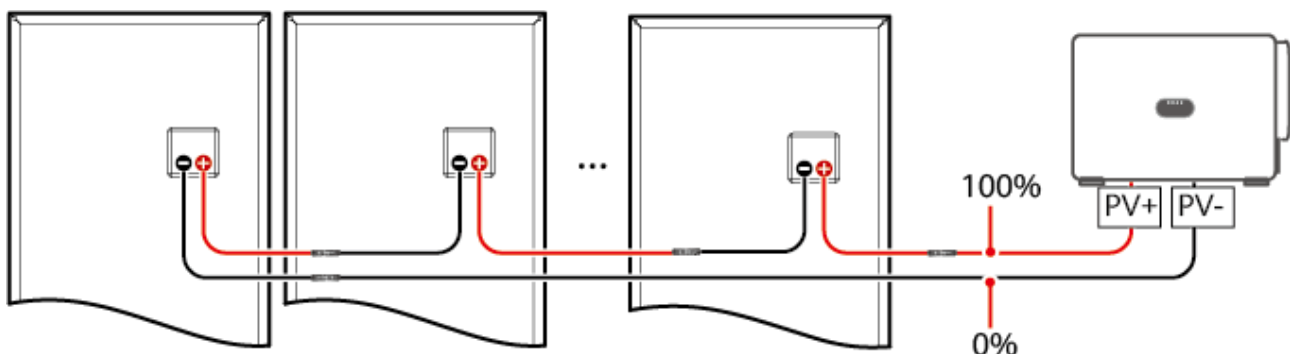


Table 8-2 Mapping between MPPTs and PV strings

MPPTn	PV String	MPPTn	PV String
MPPT1	PV1–PV4	MPPT2	PV5–PV9
MPPT3	PV10–PV14	MPPT4	PV15–PV18
MPPT5	PV19–PV23	MPPT6	PV24–PV28

Procedure

NOTE - If the irradiance or the PV string voltage is too high, the insulation resistance fault location may fail. In this case, the fault location status on the **Alarm details** screen is **Conditions not met**. Perform the following steps to connect PV strings to the inverter one by one to locate the fault.

- Step 1** Ensure that the AC connections are normal. Log in to the HiSolar app, choose **Maintenance > Inverter ON/OFF** on the home screen, and send a shutdown command. Set the **DC SWITCH** of the inverter to **OFF**.
- Step 2** Connect a PV string to the inverter and set the **DC SWITCH** to **ON**. If the inverter status is **Shutdown: Command**, choose **Maintenance > Inverter ON/OFF** on the home screen and send a startup command.
- Step 3** Choose **Alarm** on the home screen, enter the **Active alarm** screen, and check whether a **Low insulation resistance** alarm is reported.
 - If no **Low insulation resistance** alarm is reported 1 minute after the DC side is powered on, choose **Maintenance > Inverter ON/OFF** on the home screen and send a shutdown command. Set the **DC SWITCH** to **OFF**. Go to [Step 2](#) and check the other PV strings one by one.
 - If a **Low insulation resistance** alarm is reported 1 minute after the DC side is powered on, check the percentage of possible short-circuit positions on the **Alarm details** screen and calculate the location of the possibly faulty PV module based on the percentage. Then go to [Step 4](#).
 - Step 4** Choose **Maintenance > Inverter ON/OFF** on the home screen and send a shutdown command. Set the **DC SWITCH** to **OFF**. Check whether the connectors or DC power cables between the possibly faulty PV modules and adjacent PV modules are damaged.
- If yes, replace the damaged connectors or DC power cables and then set the **DC SWITCH** to **ON**. If the inverter status is **Shutdown: Command**, choose **Maintenance > Inverter ON/OFF** on the home screen and send a startup command. View alarm information.
 - If no **Low insulation resistance** alarm is reported 1 minute after the DC side is powered on, the insulation resistance fault location of the PV string is complete. Choose **Maintenance > Inverter ON/OFF** on the home screen and send a shutdown command. Set the **DC SWITCH** to **OFF**. Go to [Step 2](#) and check the other PV strings one by one. Then, go to [Step 7](#).
 - If the **Low insulation resistance** alarm is still reported 1 minute after the the DC side is powered on, choose **Maintenance > Inverter ON/OFF** on the home screen and send a shutdown command. Set the **DC SWITCH** to **OFF** and go to [Step 5](#).
- If no, go to [Step 5](#).
 - Step 5** Disconnect the possibly faulty PV module from the PV string, and use a DC extension cable with MC4 connectors to connect the adjacent PV modules. Set the **DC SWITCH** to **ON**. If the inverter status is **Shutdown: Command**, choose **Maintenance > Inverter ON/OFF** on the home screen and send a startup command. View alarm information.
- If no **Low insulation resistance** alarm is reported 1 minute after the DC side is powered on, the fault occurred on the disconnected PV module. Choose **Maintenance > Inverter ON/OFF** on the home screen, send a shutdown command, and set the **DC SWITCH** to **OFF**. Go to [Step 7](#).

- If the **Low insulation resistance** alarm is still reported 1 minute after the DC side is powered on, the fault did not occur on the disconnected PV module. Go to [Step 6](#).
 - Step 6** Choose **Maintenance > Inverter ON/OFF** on the home screen and send a shutdown command. Set the **DC SWITCH** to **OFF**, reconnect the disconnected PV module, and repeat [Step 5](#) to check the adjacent PV modules at the possible fault position.
 - Step 7** Set the **DC SWITCH** to **ON**. If the inverter status is **Shutdown: Command**, choose **Maintenance > Inverter ON/OFF** on the home screen and send a startup command.

9 Alarm Reference

For details about alarms, see the *PVS-330-TL Inverter Alarm Manual* available on the website.

10 Technical Specifications

Efficiency

Item	PVS-330-TL
Maximum efficiency	≥ 99.03 %
European efficiency	≥ 98.8 %

Input

Item	PVS-330-TL
Number of MPPTs	6
Maximum input voltage	1500 V
Rated input voltage	1080 V
Maximum input current per MPPT	65 A
Maximum short-circuit current per MPPT	115 A
Maximum PV Inputs per MPPT	4/5/5/4/5/5
Maximum input power	336,800 W
Minimum operating voltage/startup voltage	500 V / 550 V
MPPT voltage range	500 – 1500 V
Full-load MPPT voltage range	930 – 1300 V

Output

Item	PVS-330-TL
Rated output power	300 kW
Maximum apparent power	330 kVA
Maximum active power (cosφ = 1)	330 kW
Rated output voltage	800 V AC, 3W+PE
Rated output current	216.6 A
Maximum output current	238.2 A
Adapted power grid frequency	50 Hz / 60 Hz
Power factor	0.8 leading and 0.8 lagging
Maximum total harmonic distortion (rated power)	< 1%

Protection

Item	PVS-330-TL
Input DC switch disconnection	Supported
Anti-islanding protection	Supported
Output overcurrent protection	Supported
Input reverse connection protection	Supported
PV string fault detection	Supported
DC surge protection	Type II
AC surge protection	Type II
DC insulation resistance detection	Supported
Residual current monitoring unit (RCMU)	Supported

Typical Noise Value

Item	PVS-330-TL
Typical noise value	75 dB(A)

NOTE - The typical noise value is the test result obtained under typical working conditions in a lab. To avoid complaints, do not install the inverter in a noise-sensitive area.

Display and Communication

Item	PVS-330-TL
Display	LED indicators
RS485	Supported
MBUS	Supported
USB	Supported
WLAN + App	Supported

General Specifications

Item	PVS-330-TL
Topology	Transformerless
Dimensions (W x H x D)	1048 mm x 732 mm x 395 mm
Weight (with mounting plate)	≤ 112 kg
Operating temperature range	-25°C to +60°C
Cooling mode	Smart air cooling
Maximum operating altitude	5000 m (derated when the altitude is greater than 4000 m)
Relative humidity range	0% – 100% RH
Input terminal	HH4SFD4TMS / HH4SMD4TMS
Output terminal	Waterproof terminal + OT/DT terminal (max 400 mm ²)
IP rating	IP66
Anti-corrosion Protection	C5-Medium
Self-consumption at night (sleep mode)	4.8 W

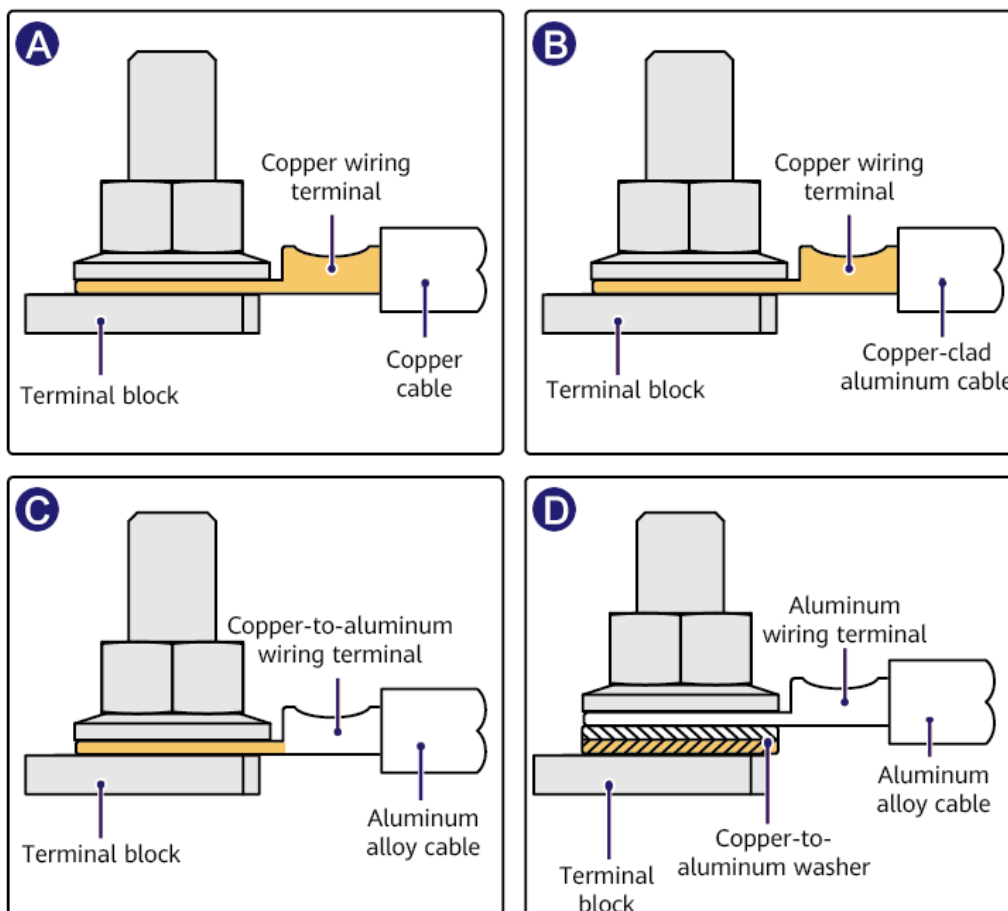
A Crimping an OT or DT Terminal

Requirements for an OT or DT Terminal

- If a copper cable is used, use copper wiring terminals.
- If a copper-clad aluminum cable is used, use copper wiring terminals.
- If an aluminum alloy cable is used, use copper-to-aluminum wiring terminals, or aluminum wiring terminals along with copper-to-aluminum washers.

- ⚠ **ATTENTION** - Do not connect aluminum wiring terminals to the terminal block. Otherwise electrochemical corrosion may occur, affecting the reliability of cable connections.
- ⚠ **ATTENTION** - Comply with the IEC 61238-1 requirements when using copper-to-aluminum wiring terminals, or aluminum wiring terminals along with copper-to-aluminum washers.
- ⚠ **ATTENTION** - Do not mix up the aluminum and copper sides of a copper-to-aluminum washer. Ensure that the aluminum side of the washer contacts the aluminum wiring terminal, and that the copper side contacts the terminal block.

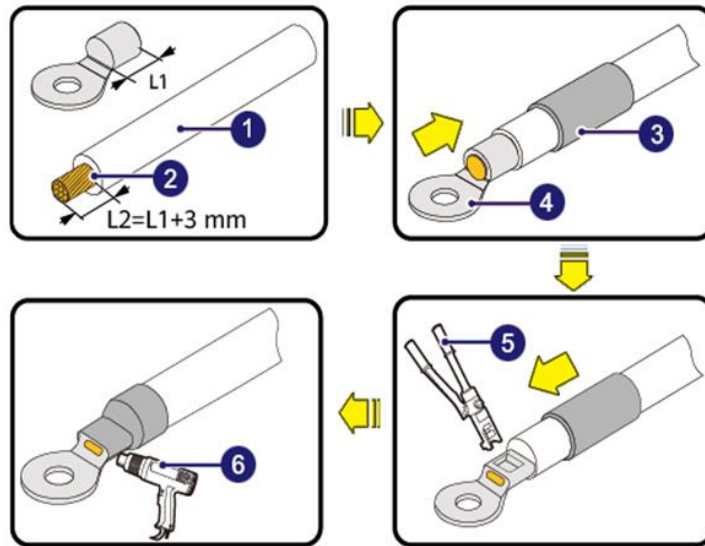
Figure A-1 Requirements on an OT or DT terminal



Crimping an OT or DT Terminal

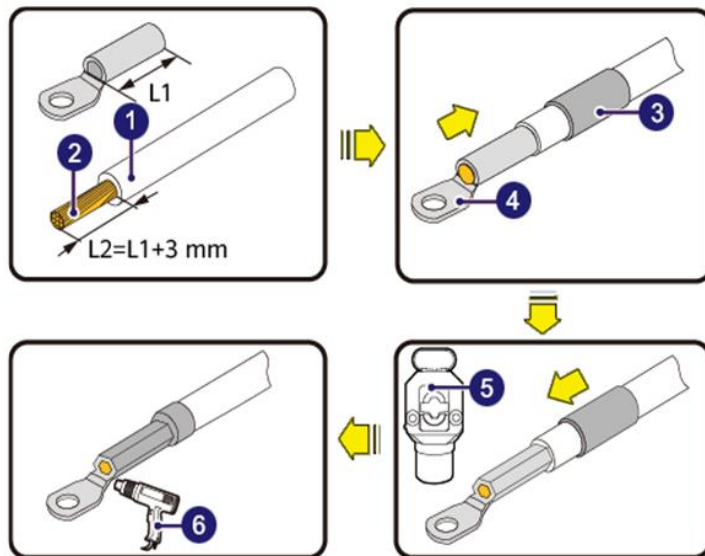
- NOTE - Avoid scratching the core wire when stripping a cable.
- NOTE - The cavity formed after the conductor crimp strip of the OT or DT terminal has been crimped must wrap around the core wire completely. The core wire must make close contact with the OT or DT terminal.
- NOTE - Wrap the wire crimping area with heat shrink tubing, cold shrink tubing, or insulation tape. The heat shrink tubing is used as an example.
- NOTE - Use a heat gun carefully to avoid heat damage to the equipment.

Figure A-2 Crimping an OT terminal



(1) Cable	(2) Core wire	(3) Heat shrinks tubing
(4) OT terminal	(5) Hydraulic pliers	(6) Heat gun

Figure A-3 Crimping a DT terminal



(1) Cable	(2) Core wire	(3) Heat shrinks tubing
(4) DT terminal	(5) Hydraulic pliers	(6) Heat gun

B Grid Codes





No.	Grid Code	Description
1	KOREA-MV800	South Korea power grid
2	TAIPOWER-MV800	Taiwan Power medium-voltage power grid
3	SINGAPORE-MV800	Singapore medium-voltage power grid
4	AS4777-MV800	Australia medium-voltage power grid
5	AUSTRALIA-AS4777_A-MV800	Australia power grid
6	Philippines-MV800	Philippines power grid
7	TAI-PEA-MV800	Thailand power grid
8	TAI-MEA-MV800	Thailand power grid
9	Malaysian-MV800	Malaysia power grid
10	Bangladesh-MV800	Bangladesh power grid
11	Vietnam-MV800	Vietnam medium-voltage power grid
12	Cambodia-MV800	Cambodia power grid
13	VDE-AR-N4110-MV800	Europe power grid
14	CEI0-21-MV800	Italy power grid
15	CEI0-16-MV800	Italy medium-voltage power grid
16	UTE C 15-712-1-MV800	France power grid
17	RD1699/661-MV800	Spain medium-voltage power grid
18	PO12.3-MV800	Spain medium-voltage power grid
19	NTS-MV800	Spain power grid
20	EN50438_IE-MV800	Ireland power grid
21	EN50549-MV800	Ireland power grid
22	IRELAND-EN50549-MV800	Ireland power grid
23	Northern Ireland-MV800	Northern Ireland power grid
24	DENMARK-EN50549-MV800	Denmark power grid
25	C10/11-MV800	Belgium power grid
26	PORTUGAL-MV800	Portugal power grid
27	ANRE-MV800	Romania power grid
28	AUSTRIA-MV800	Austria power grid

No.	Grid Code	Description
29	AUSTRIA-HV800	Austria power grid
30	Israel-MV800	Israel power grid
31	Israel-HV800	Israel power grid
32	POLAND-EN50549-MV800	Poland power grid
33	CZECH-EN50549-MV800	Czech Republic power grid
34	EN50438-TR-MV800	Türkiye power grid
35	Macedonia-MV800	Republic of North Macedonia power grid
36	Mexico-MV800	Mexico power grid
37	ABNT NBR 16149-MV800	Brazil medium-voltage power grid
38	BRASIL-ANEEL-MV800	Brazil power grid
39	Chile-MV800	Chile power grid
40	GREG060-MV800	Colombia power grid
41	ARGENTINA-MV800	Argentina medium-voltage power grid
42	Nicaragua-MV800	Nicaragua power grid
43	Panama-MV800	Panama power grid
44	FRANCE-RTE-MV800	France power grid
45	VDE-AR-N4130-800	Germany power grid
46	G99-TYPEB-HV-MV800	United Kingdom power grid
47	G99-TYPEC-HV-MV800	United Kingdom power grid
48	G99-TYPED-MV800	United Kingdom power grid

NOTE - The grid codes are subject to change. The listed codes are for reference only.

C Resetting Passwords

Method 1: HiSolar App

- Step 1** Check that the AC and DC sides of the inverter are both powered on, and indicators  and  are steady green or blinking slowly for more than 3 minutes.
- Step 2** Turn off the AC switch, set the DC SWITCH at the bottom of the inverter to OFF, and wait until all LED indicators on the inverter panel turn off.
- Step 3** After the inverter is powered off, complete the following operations within 4 minutes:
16. Turn on the AC switch and wait for about 90s or until the inverter indicator  blinks.
 17. Turn off the AC switch and wait about 30s or until all LED indicators on the inverter panel turn off.
 18. Turn on the AC switch and wait for about 90s or until the inverter indicator  blinks.
- Step 4** Log in to the app and reset the password within 10 minutes. (If no operation is performed within 10 minutes, all parameters of the inverter remain unchanged.)

Method 2: DataLogger and HiSolar App

- Step 1** On the **Monitoring** page of the DataLogger, choose the inverter, choose **Running Param.** > **Feature Parameters** and set **Safe mode** to **Enter**.
- Step 2** Log in to the app and reset the password within 4 hours. (If the software restarts or no operation is performed within 4 hours, all parameters of the inverter remain unchanged.)

 **NOTE** - You are advised to reset the password in the morning or at night when the solar irradiance is low.

D Acronyms and Abbreviations

A	
AUX.	Auxiliary
L	
LED	light emitting diode
M	
MBUS	monitoring bus
MPP	maximum power point
MPPT	maximum power point tracking
P	
PID	potential induced degradation
PV	photovoltaic
R	
RCMU	residual current monitoring unit
A	
AUX.	Auxiliary
L	
LED	light emitting diode

PVS-330-TL Product Manual REV_B 09.03.2026



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fimer.com

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