

SUN2000-(460KTL, 506KTL) Series

User Manual

Issue 03
Date 2026-03-30



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About This Document

Purpose

This document describes the installation, commissioning, maintenance, and troubleshooting of the following inverter models (also referred to as SUN2000). Before installing and operating the inverter, ensure that you are familiar with the features, functions, and safety precautions provided in this document.





- SUN2000-460KTL-H0
- SUN2000-506KTL-H1
- SUN2000-506KTL-H2
- SUN2000-506KTL-H3


Intended Audience

This document is intended for photovoltaic (PV) plant operators and qualified electricians.

Symbol Conventions

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

Symbol	Description
	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

Symbol	Description
 NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

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

Issue 03 (2026-03-30)

Added the SUN2000-506KTL-H1, SUN2000-506KTL-H2, and SUN2000-506KTL-H3 models.

Updated [About This Document](#).

Updated [1.2 Electrical Safety](#).

Updated [2.2.1 Typical Networking](#).

Updated [4.2.1 Site Selection Requirements](#).

Updated [4.3 Tools](#).

Updated [4.6 Installing the Inverter on a Support](#).

Updated [4.7 Installing the Inverter on a Pole Clamp](#).

Updated [5.2 Preparing Cables](#).

Updated [5.5 Connecting DC Input Power Cables](#).

Updated [7.2 Commissioning Methods and Process](#).

Updated [7.4 Commissioning the Inverter \(Using the App\)](#).

Updated [8.1 Routine Maintenance](#).

Updated [8.7 Locating Insulation Resistance Faults](#).

Updated [10 Technical Specifications](#).

Updated [A Grid Codes](#).

Updated [B Resetting a Password](#).

Issue 02 (2025-11-25)

Updated [2.4 Circuit Diagram](#).

Updated [4.2.3 Angle Requirements](#).

Updated [4.6 Installing the Inverter on a Support](#).

Issue 01 (2025-08-30)

This issue is used for first office application (FOA).

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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 generate electric arcs or sparks, which may cause a fire or 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.

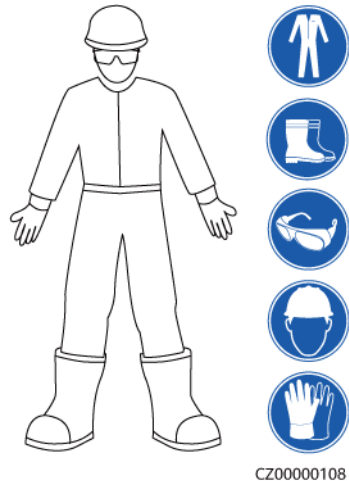
 **DANGER**

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.

Figure 1-1 Personal protective equipment



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 the 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 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 electric 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.

 **WARNING**

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.

 **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.

 **CAUTION**

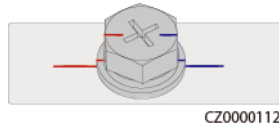
Do not route cables near the air intake or exhaust vents of the equipment.

 **CAUTION**

The components (such as power distribution boxes, circuit breakers, and cables) used for electrical connections shall comply with fire resistance and flame retardance standards (such as IEC 60670-1). The materials and structure shall meet fire safety requirements.

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.
- 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.)



- 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.
- Do not open equipment panels.
- 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.

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.
- Ensure that cables of the same type are bound together neatly and straight (if there are many DC power cables, group them based on MPPT, bind each group, and then bind all groups together) and that the cable sheath is intact. When routing cables of different types, ensure that they are away from each other without entanglement and overlapping.

- 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.

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

- Store the equipment according to the storage requirements. Equipment damage caused by unqualified storage conditions is not covered under the warranty.
- Keep the installation and operating environments of the equipment within the allowed ranges. Otherwise, its performance and safety will be compromised.
- The operating temperature range provided in the equipment's technical specifications refers to the ambient temperatures in equipment's installation environment.
- 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. 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.
- 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 (the area shall be greater than or equal to 3 m x 2.5 m).
- Do not install the equipment outdoors in salt-affected areas because it may be corroded. A salt-affected area refers to the region within 500 m of the coast or prone to sea breeze. Regions prone to sea breeze vary with weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).
- Before 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.
- After installing the equipment, remove the packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

1.4 Mechanical Safety

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

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.



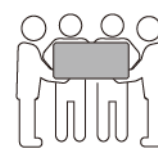
< 18 kg
(< 40 lbs)



18–32 kg
(40–70 lbs)



32–55 kg
(70–121 lbs)



55–68 kg
(121–150 lbs)



> 68 kg
(> 150 lbs)

CZ0000110

- 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.
- 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.
- Choose sea, roads in good conditions, or airplanes for transportation. Do not transport the equipment by railway. Avoid tilt or jolt during transportation.

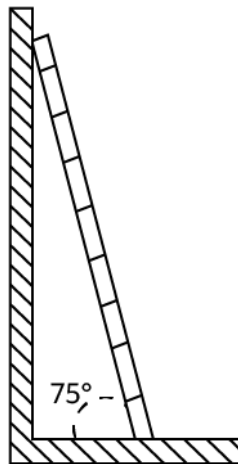
Using Ladders

- Use wooden or insulated ladders when you need to perform live-line working at heights.
- Platform ladders with protective rails are preferred. Single ladders are not recommended.
- 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.



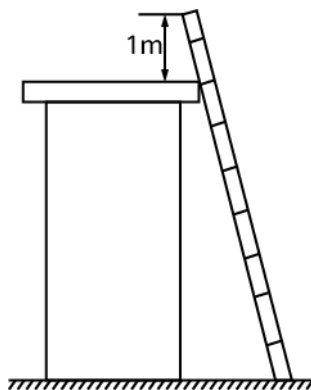
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- When climbing up the ladder, keep your body stable and your center of gravity between the side rails, and do not overreach to the sides.
- When a step ladder is used, ensure that the pull ropes are secured.
- If a single ladder is used, the recommended angle for the ladder against the floor is 75 degrees, as shown in the following figure. A square can be used to measure the angle.



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- If a single ladder is used, ensure that the wider end of the ladder is at the bottom, and take protective measures to prevent the ladder from sliding.
- If a single ladder is used, do not climb higher than the fourth rung of the ladder from the top.
- If you use a single ladder to climb up to a platform, ensure that the ladder is at least 1 m higher than the platform.

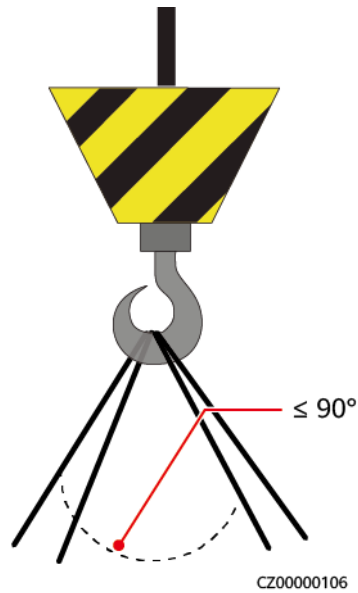


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Hoisting

- 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 the 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.

2 Overview

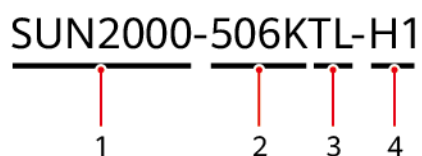
This product is a three-phase grid-tied PV string inverter. It converts the DC power generated by PV strings into AC power and then feeds the power into the power grid.

2.1 Model Number Description

This document involves the following product model:

- SUN2000-460KTL-H0
- SUN2000-506KTL-H1
- SUN2000-506KTL-H2
- SUN2000-506KTL-H3





Figure 2-1 Model number description



No.	Item	Description
1	Product family identifier	SUN2000: grid-tied PV inverter
2	Power level identifier	460K/506K: power level
3	Topology identifier	TL: transformerless
4	Product series identifier	HX: product series with an input voltage level of 1500 V DC <ul style="list-style-type: none"> • 460KTL-H0: rated power of 460 kW • 506KTL-H1: rated power of 460 kW • 506KTL-H2: rated power of 420 kW • 506KTL-H3: rated power of 460 kW

2.2 Networking Application

2.2.1 Typical Networking

- The inverter supports MBUS communication.
- The inverter does not support RS485 communication.
- In the networking diagram,  indicates a DC power cable,  indicates an AC power cable,  indicates a communications cable, and  indicates a signal flow.

NOTICE


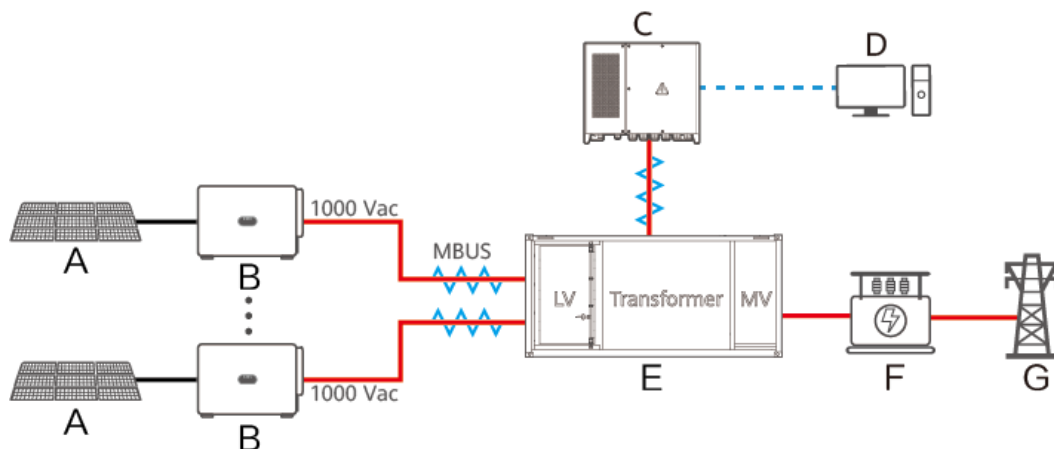
- If multi-core cables are used, the maximum communication distance is 1000 m when the Smart Array Controller (SACU) is installed outside the transformer station ($D \leq 10$ m). D indicates the distance from the busbar of the transformer station to the port of the SmartMBUS.
- If single-core cables are used, the maximum communication distance is 800 m when the SACU is installed outside the transformer station ($D \leq 10$ m). D indicates the distance from the busbar of the transformer station to the port of the SmartMBUS.
- Single-core cables must be bound at an interval of 1 m

 Single-core cables do not need to be bound if they are routed through a pipe.
- If single-core cables are used, cables with dual insulation layers are recommended. For other application methods and corresponding communication distances, contact technical support.
- Connect cables between the inverter and the transformer station in the L1/A, L2/B, and L3/C phase sequence, and ensure that the phase sequence is the same as that between the transformer station and the SmartMBUS.

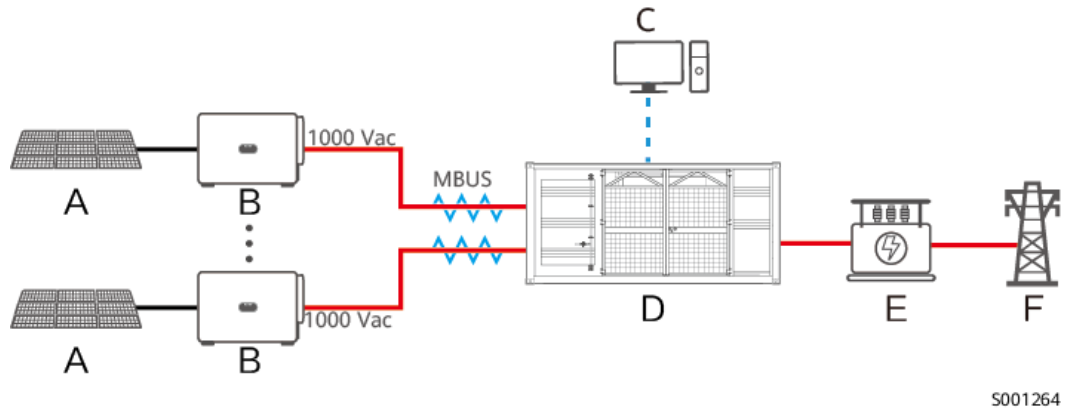
Figure 2-2 MBUS networking (third-party transformer station)



5001263

(A) PV array	(B) Inverter ^[1]	(C) SACU cabinet ^[2]
(D) Management system	(E) Third-party transformer station	(F) Transformer
(G) Power grid	-	-
Note [1]: The SUN2000-460KTL-H0, SUN2000-506KTL-H1, SUN2000-506KTL-H2, and SUN2000-506KTL-H3 can be used. Note [2]: The SmartACU2000F-F-00, SmartACU2000F-F-01, and SmartACU2000F-F-02 can be used.		

Figure 2-3 MBUS networking (self-developed transformer station)



(A) PV array	(B) Inverter ^[1]	(C) Management system
(D) Self-developed transformer station ^[2]	(E) Transformer	(F) Power grid
<p>Note [1]: The SUN2000-506KTL-H1, SUN2000-506KTL-H2, and SUN2000-506KTL-H3 can be used.</p> <p>Note [2]: The JUPT-3000K-HD1, JUPT-7000K-HD1, and JUPT-11000K-HD1 can be used.</p>		

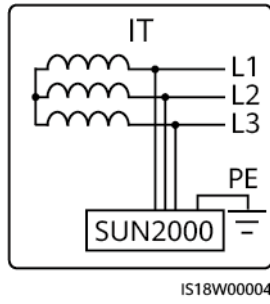
NOTE

- The inverter must be connected to a dedicated power transformer and cannot be connected to a low-voltage overhead power cable.
- This device is class A equipment of group 1.
 - Class A equipment: Class A equipment is the equipment suitable for use in all locations other than those allocated to residential environments and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.
 - Group 1 equipment: Group 2 contains all industrial, scientific, and medical (ISM) RF equipment in which radio-frequency energy in the frequency range of 9 kHz to 400 GHz is intentionally generated and used or only used locally, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material, for inspection/analysis purposes, or for transfer of electromagnetic energy. Group 1 contains all equipment which is not classified as group 2 equipment.
- The inverter described in this document must not be connected to a winding (of the transformer station) that has other models of inverters connected to it.

2.2.2 Earthing Systems

The inverter supports the IT earthing system.

Figure 2-4 Earthing system



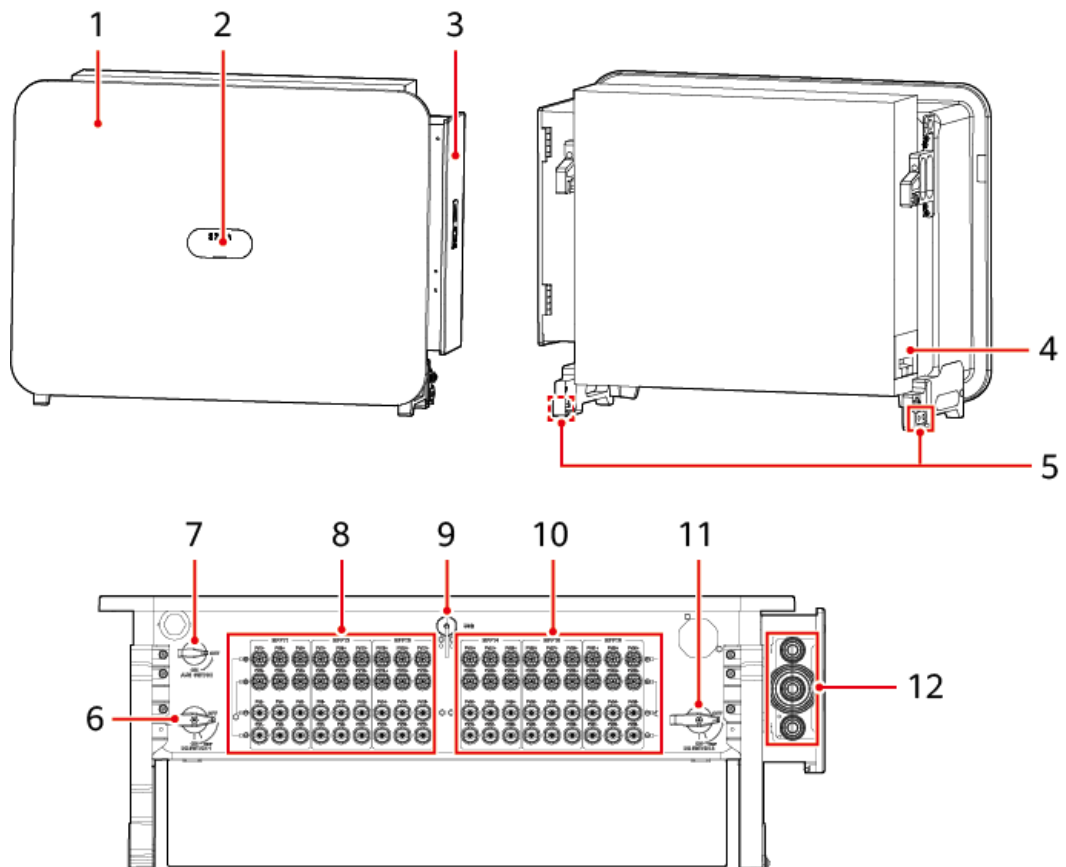
NOTE

The inverter 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 2-5 Appearance and ports







S001252

(1) Panel	(2) LED indicators
(3) Maintenance compartment door	(4) Fan tray
(5) PE point on the enclosure	(6) DC switch 1 (DC SWITCH 1)
(7) Auxiliary switch (AUX. SWITCH) ^a	(8) DC input terminal group 1 (PV1–PV18, controlled by DC SWITCH 1)
(9) USB port (USB)	(10) DC input terminal group 2 (PV19–PV36, controlled by DC SWITCH 2)
(11) DC switch 2 (DC SWITCH 2)	(12) AC output cable hole
Note a: DC input terminal PV1 must be connected to a PV string.	

Indicator Description

Indicator	Status (Blinking Fast: On for 0.2s and Off for 0.2s; Blinking Slowly: On for 1s and Off for 1s)	Description
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 on the DC side of the inverter is generated.
	Off	The inverter is disconnected from all PV strings, or the DC input voltage of all MPPT circuits is 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 on the AC side of the inverter is generated.
	Off	The inverter is not in grid-tied mode.

Indicator	Status (Blinking Fast: On for 0.2s and Off for 0.2s; Blinking Slowly: On for 1s and Off for 1s)		Description
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	Steady red	A major alarm is generated. <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	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.

NOTE

- Local maintenance refers to operations performed after a WLAN module or USB data cable is inserted into the USB port on the inverter. Connect to the device on the app using a WLAN module or USB data cable. A WLAN module is used only in China.
- If the alarming and the local maintenance happen concurrently, the alarm/maintenance indicator shows the local maintenance state first. After the WLAN module or USB data cable is removed, the indicator shows the alarm state.
- iOS mobile phones do not support connection to the app using a USB data cable. You are advised to use the SmartLogger for O&M.
- During local maintenance after connecting to the inverter using a USB data cable, do not place the mobile phone on the inverter.

DC SWITCH Description

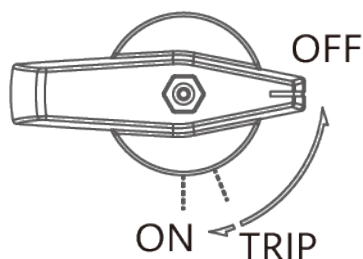
⚠ DANGER

- If a 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 a DC Switch](#).
- If a DC switch is locked in the OFF position, the inverter has an internal fault or has experienced more than five external faults (that is, the **String Reverse Connection, String Current Backfeed, or String Voltage High** alarm). In this case, the DC switch cannot be reset from the outside. Contact the customer service center. Do not turn on the DC switch by yourself.

Table 2-1 DC switch description

Switch	Description	
DC SWITCH	ON	The DC switch is on and can be automatically turned 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.

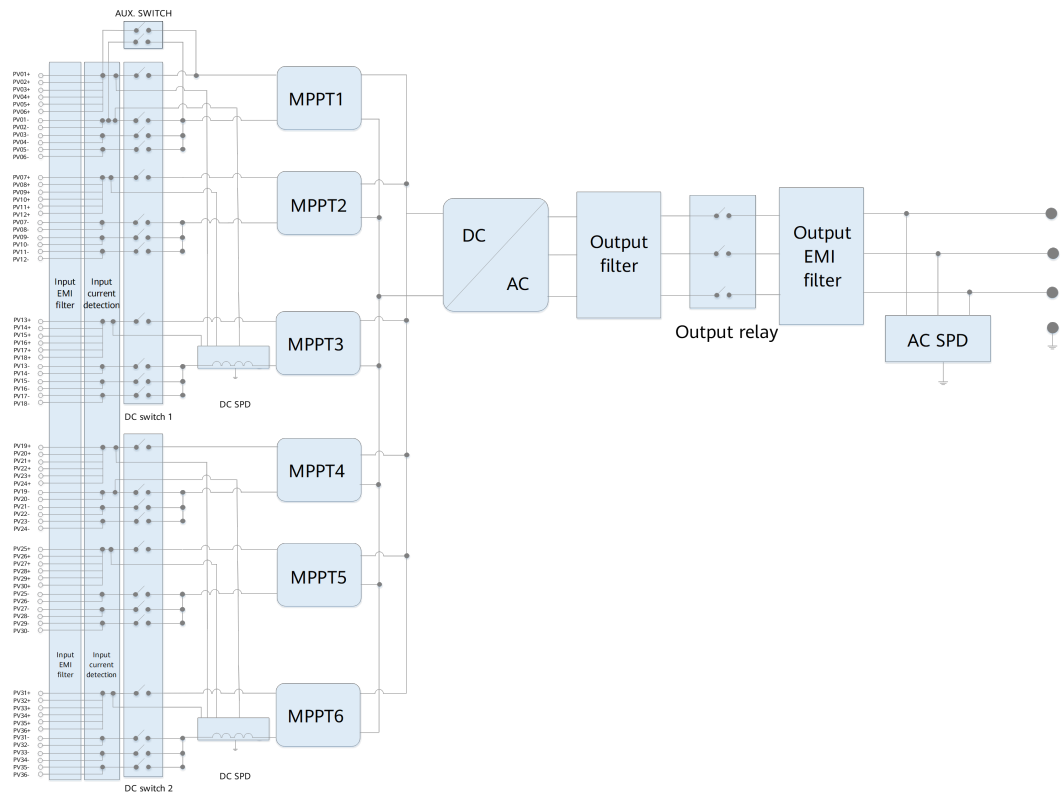
Figure 2-6 DC SWITCH
DC SWITCH



2.4 Circuit Diagram

The inverter receives inputs from 36 PV strings. The inputs are grouped into six 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.

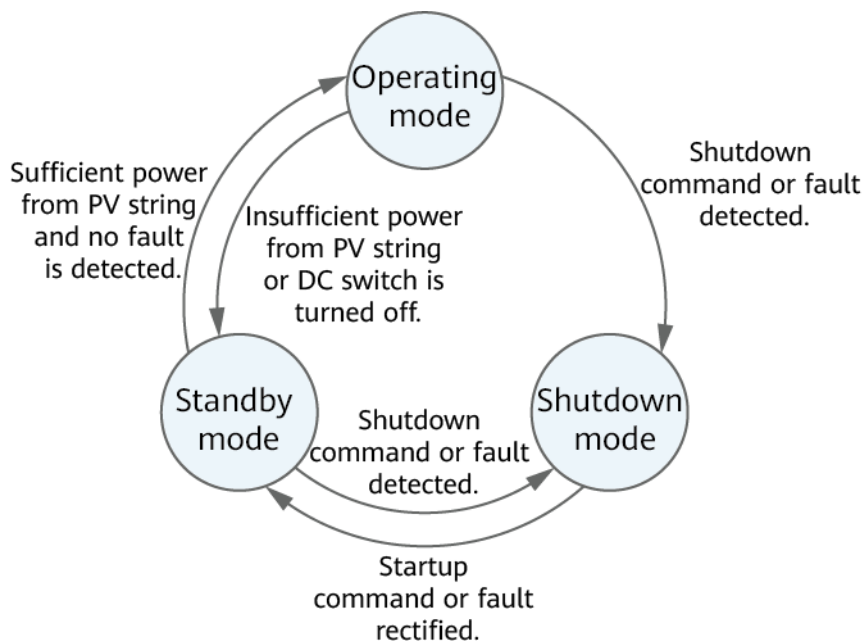
Figure 2-7 Circuit diagram



2.5 Working Modes

The inverter has three working modes: standby, operating, and shutdown.

Figure 2-8 Working modes









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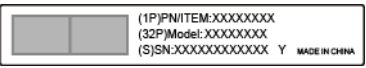



Table 2-2 Working mode description

Working Mode	Description
Standby	<p>The inverter enters the standby mode when the external environment does not meet the operating requirements. In the standby mode:</p> <ul style="list-style-type: none"> • The inverter continuously detects its operation status. Once the operation conditions are met, the inverter enters the operating mode. • If the inverter receives a shutdown command or detects a fault after startup, it enters the shutdown mode.
Operating	<p>In the operating mode:</p> <ul style="list-style-type: none"> • The inverter converts DC power received from PV strings into AC power and then feeds the power to the power grid. • The inverter tracks the maximum power point to maximize the PV string output power. • If the inverter receives a shutdown command or detects a fault, it enters the shutdown mode. • If the inverter detects that the output power of PV strings does not meet the requirements for grid-tied power generation, it enters the standby mode.

Working Mode	Description
Shutdown	<ul style="list-style-type: none"> • In the standby or operating mode, if the inverter receives a shutdown command or detects a fault, it enters the shutdown mode. • In the shutdown mode, if the inverter detects that the fault is rectified or receives a startup command, it enters the standby mode.

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 a 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 protective earthing (PE) cable.

Symbol	Name	Meaning
 <p>Do not disconnect under load! 禁止带负荷断开连接!</p>	Operation warning	Do not remove the DC input connector when the inverter is running.
 <p>CAUTION BEFORE REPLACING THE FAN, DISCONNECT THE FAN-POWER CABLE AND THEN THE FAN CABLE. 更换风扇前，必须先拔掉风扇电源线，再拔除风扇线。</p>	Fan operation warning	<ul style="list-style-type: none"> High voltage exists after the inverter is powered on. Do not touch the fans when the inverter is working. Handle a fan with care. Before replacing a fan, remove the fan power cable and then the fan cable.
	Inverter SN label	Indicates the inverter serial number.
 <p>> 55 kg (121 lbs)</p>	Weight label	The inverter is heavy and must be carried by using a forklift.
 <p>WARNING AFTER THE DC SWITCH IS DISCONNECTED AUTOMATICALLY, DO NOT TURN IT ON AGAIN. PERFORM OPERATIONS ACCORDING TO THE ALARM INFORMATION AND USER MANUAL. 直流开关自动分断后，请勿重新闭合，按照告警指示和用户手册进行操作。</p>	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.
 <p>WARNING INTERNAL HIGH VOLTAGE. TO AVOID ELECTRIC SHOCKS, PERFORM THE FOLLOWING STEPS BEFORE PLUGGING OR UNPLUGGING DC CONNECTORS: 1.SEND A SHUTDOWN COMMAND. 2.TURN OFF THE AC SWITCH. 3.TURN OFF ALL DC SWITCHES. 内部高压，插拔直流端子前，请按如下步骤操作：发送关机指令→断开交流断路器→断开所有直流开关，避免电击！</p>	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 Storage Requirements

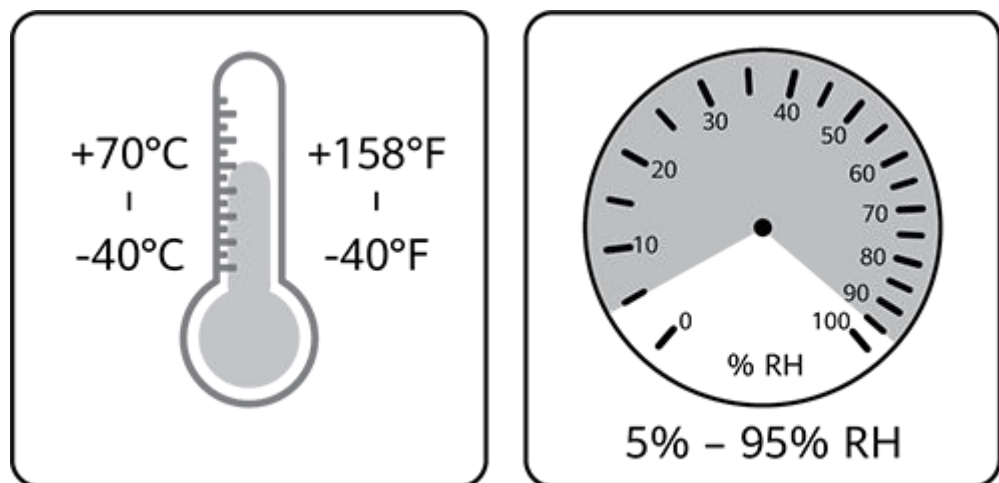
NOTICE

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). You are advised to remove the outer packaging within 24 hours before installing the inverter.
- 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

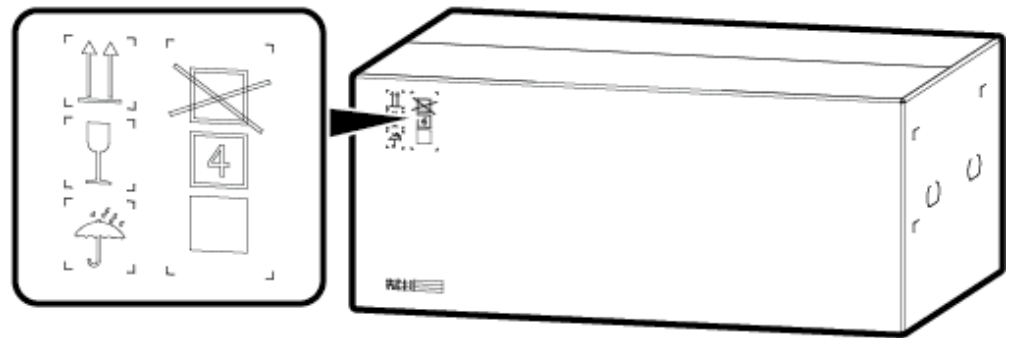


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- Do not use halogen-containing desiccants.

- 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



IS12W00007

- 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.

NOTE

When first used after prolonged storage, the inverters will undergo an initialization phase upon startup. This process typically lasts for 1.5–3 hours. Once initialization is completed, the inverters will operate normally.

4 Installation

4.1 Installation Modes

The inverter can be mounted 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.
- Do not install the inverter on the rooftop of a commercial or industrial building (such as a school, hospital, or factory). If the preceding areas are unavoidable, ensure that the installation position can bear a load of 1 t/m².

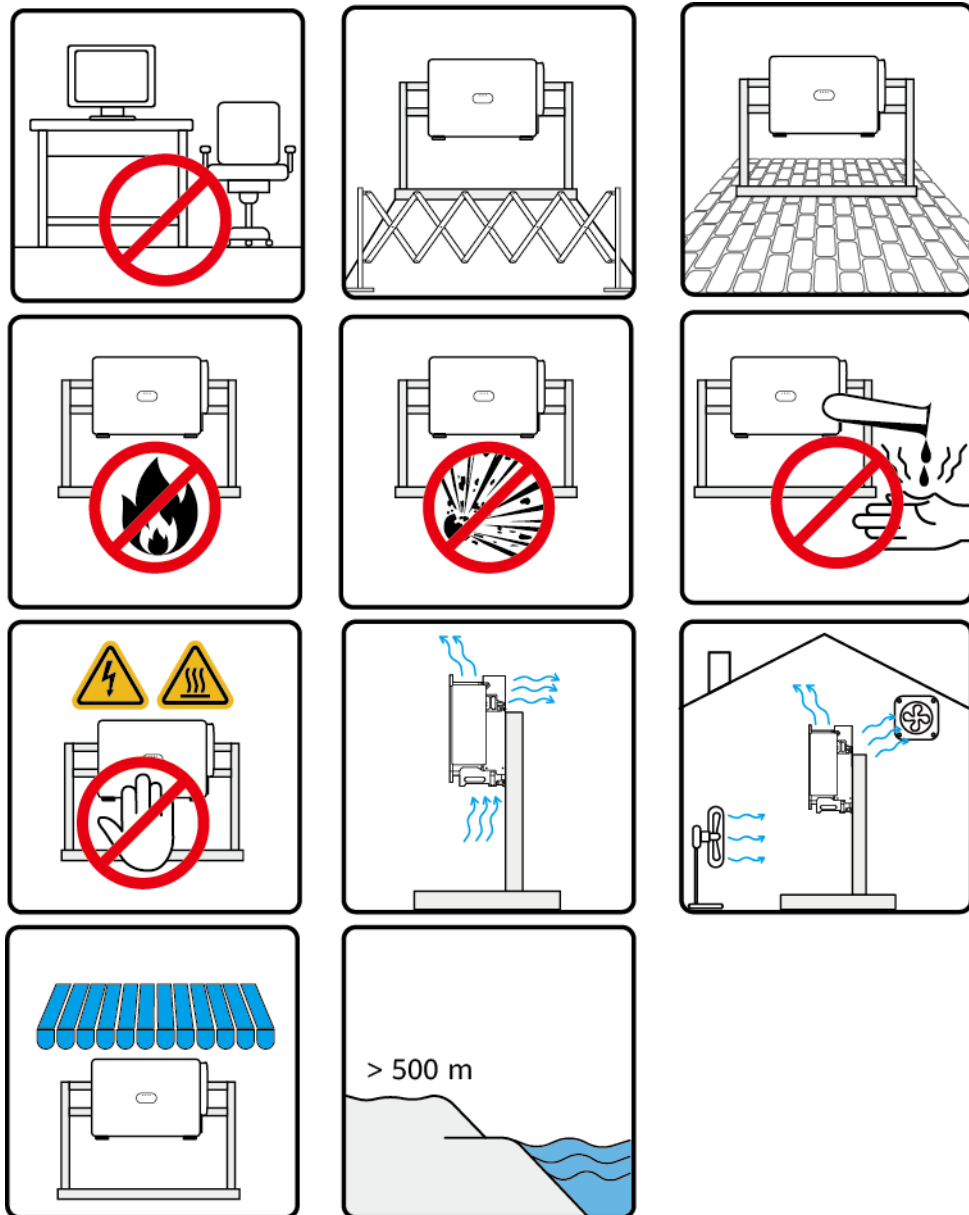
- If the device is installed in public places (such as parking lots, stations, and factories) other than working and living areas, install a protective net outside the device and set up a safety warning sign to isolate the device. This is to avoid personal injury or property loss caused by accidental 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 or its failure rate may increase 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, the heat dissipation equipment or ventilation equipment 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 or its failure rate may increase as the ambient temperature increases.
- Install the inverter in a sheltered place (for example, under a PV module or awning) 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 or its failure rate may increase as the temperature increases.
- The inverter will become corroded if installed in areas exposed to salt. Before installing the inverter outdoors in such areas, consult with the Company. A salt-affected area refers to the region within 500 m of the coast or prone to sea breeze. Regions prone to sea breeze vary with weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).

- 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 harmonic self-protection. Its energy yield may decrease or its failure rate may increase if protection against harmonics is triggered as the length of the inverter output cables decreases.
- 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. (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 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 separated from residential environments or radio receivers by distance greater than 30 m. If noise-sensitive areas are involved, the distance between the installation position and noise-sensitive areas must be greater than or equal to 40 m.
- Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Figure 4-1 Installation Environment Requirements

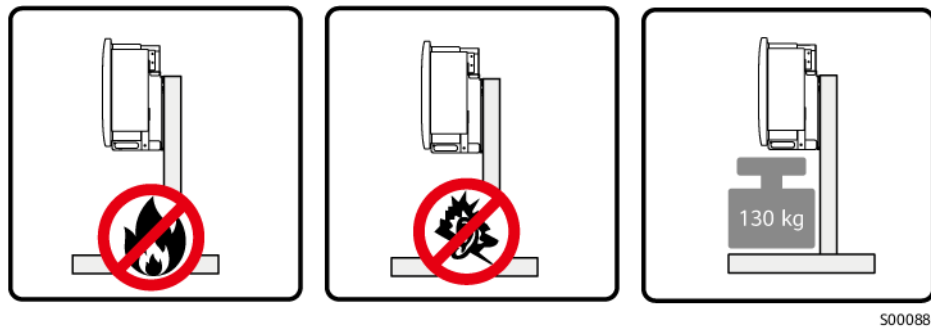


S000844

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

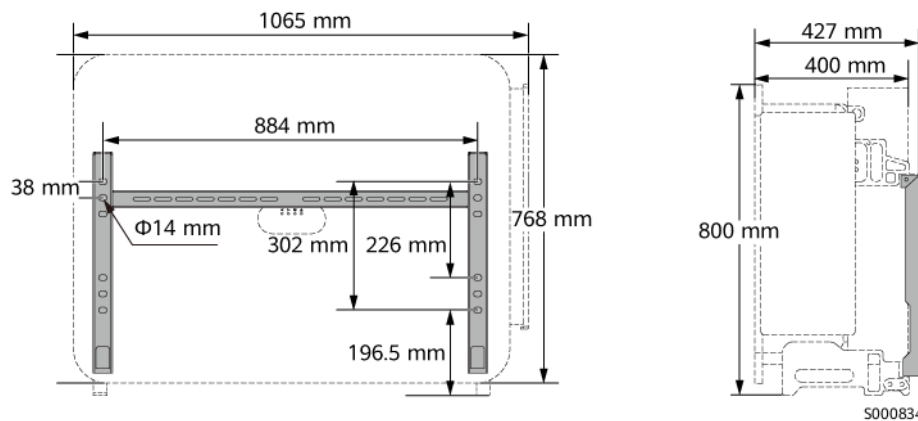


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4.2.2 Clearance Requirements

Dimensions

Figure 4-3 Dimensions

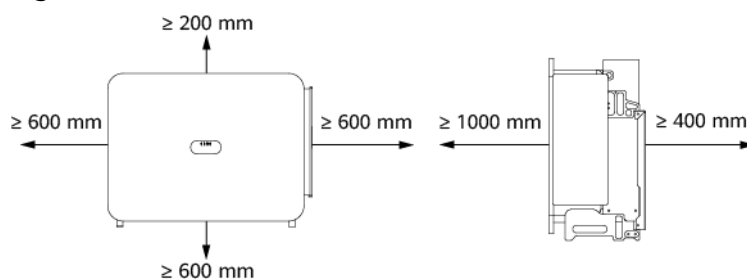


S000834

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 environment changes on the clearance for heat dissipation needs be considered during design. The heat dissipation clearance around the inverter may become insufficient for reasons such as rotation axis change. The energy yield of the inverter may decrease or its failure rate may increase if heat cannot be effectively dissipated.

Figure 4-4 Clearance



S000887

 **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 (recommended)

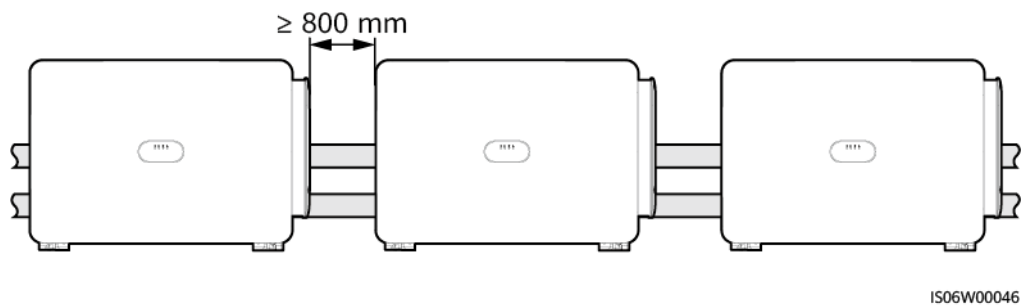
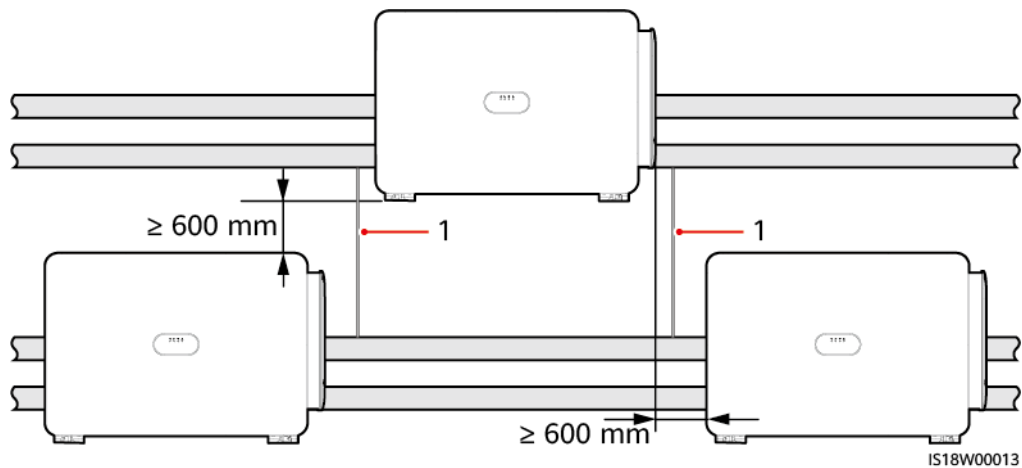


Figure 4-6 Triangle installation (not recommended)

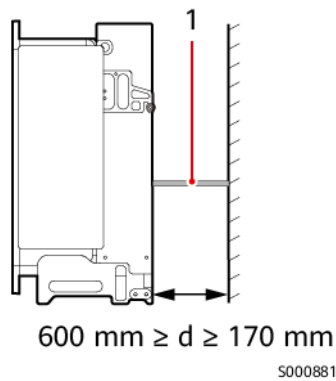


(1) Air baffle

 **NOTE**

Stacked installation is not allowed.

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



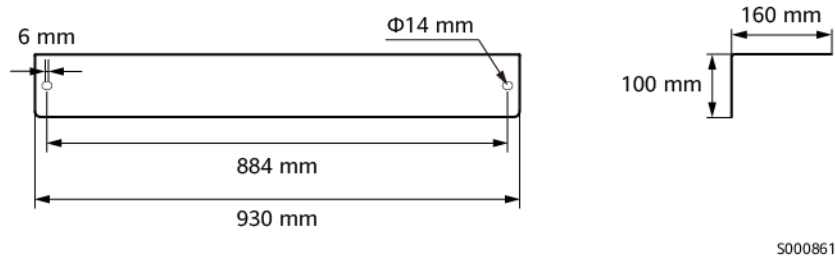
(1) L-shaped air baffle

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.
- 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 minus 10 mm (d indicates the distance between the mounting bracket and the wall).

When the distance between the mounting bracket and the wall is 170 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

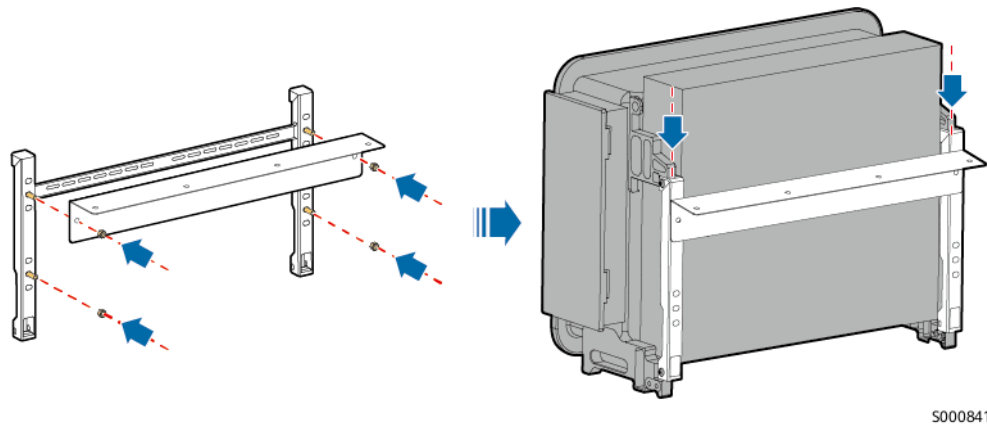
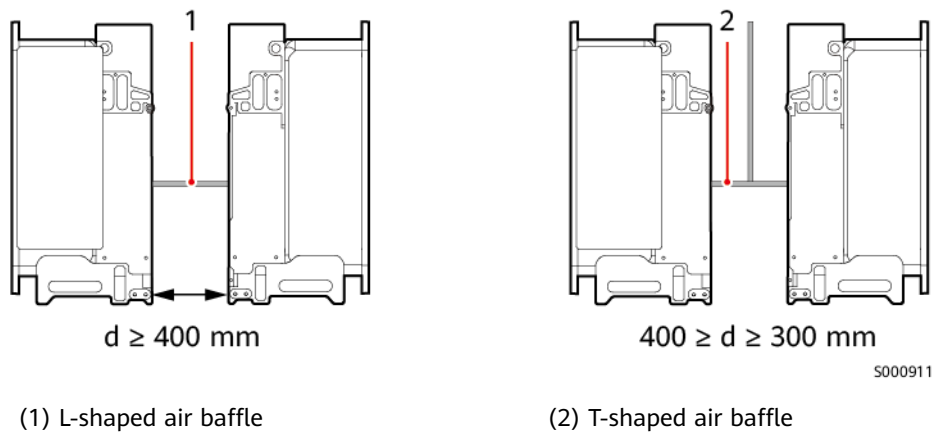


Figure 4-10 Back-to-back installation (not recommended)



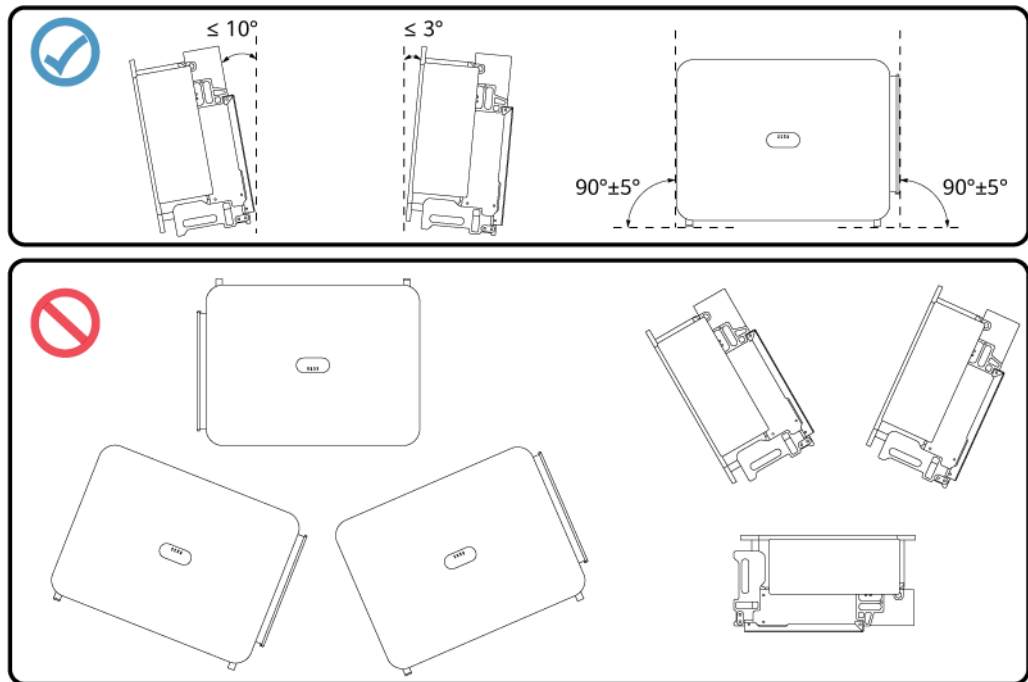
NOTE

The T-shaped air baffle must be higher than the air channel at the rear of the inverter.

4.2.3 Angle Requirements

- Install the inverter vertically to facilitate heat dissipation.
- Ensure that the left or right tilt angle is $\leq 5^\circ$, the front tilt angle is $\leq 10^\circ$, and the rear tilt angle is $\leq 3^\circ$. Failing to meet the requirements may compromise the heat dissipation performance.

Figure 4-11 Installation angles



5000888

4.3 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





 <p>Crane</p>	 <p>Sling and shackle</p>	 <p>Electric forklift</p>	 <p>Pallet truck</p>
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Table 4-4 Hardware installation tools

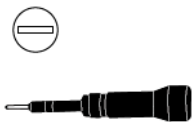
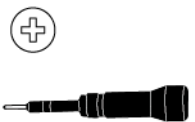

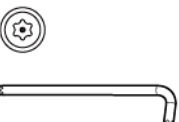
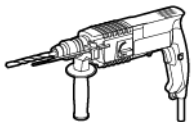




 <p>Flat-head insulated torque screwdriver (M3)</p>	 <p>Phillips insulated torque screwdriver (M3/M4)</p>	 <p>Insulated torque socket wrench (M4/M10/M12, including an extended socket)</p>	 <p>Torx key</p>
 <p>Hammer drill</p>	 <p>Hammer drill bit (Φ14 mm)</p>	 <p>Utility knife</p>	 <p>Marker</p>
 <p>Insulated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

Table 4-5 Cable installation tools


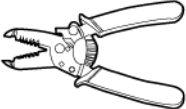
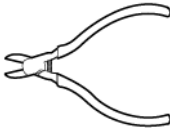
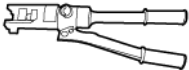


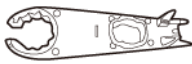
 Cable cutter	 Wire stripper	 Diagonal pliers	 Hydraulic pliers
 Heat gun	 Crimping tool H4STC0001 (AMPHENOL) or CT75A-FJB10 (AVIC JONHON)	 Spanner H4TW0001 (AMPHENOL) or CT75A-FJB7 (AVIC JONHON)	-

Table 4-6 Measurement instruments

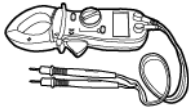
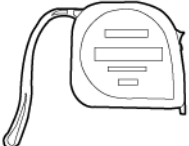

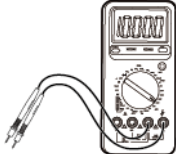
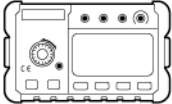
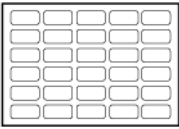

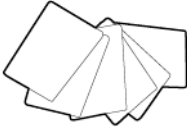

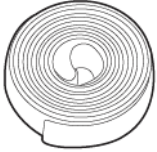
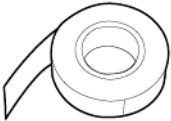


 Clamp meter	 Steel measuring tape	 Level	 Multimeter DC voltage measurement range ≥ 1600 V DC
 Insulation resistance tester (output voltage > 1500 V)	-	-	-

Table 4-7 Auxiliary materials and other tools

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

4.4 Check Before Installation

Checking the Outer Packing

Before unpacking the inverter, check the outer packing for damage (such as holes, cracks, or other signs of internal damage), check whether the tiltwatch indicator has changed color, and check the inverter model. If any damage is found, the tiltwatch indicator has changed color, or the inverter model is not what you requested, do not unpack the device and contact your vendor as soon as possible.

NOTE

You are advised to remove the outer packaging within 24 hours before installing the inverter.

Checking Deliverables

NOTICE

- 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 deliverables are intact and complete. If any item is missing or damaged, contact your vendor.
- Do not step on or sit on the inverter. The Company will not be held responsible for any resulting damage or deformation to the inverter.

NOTE

For details about the quantity of deliverables, see the *Packing List* in the packing case.

4.5 Moving the Inverter

NOTICE

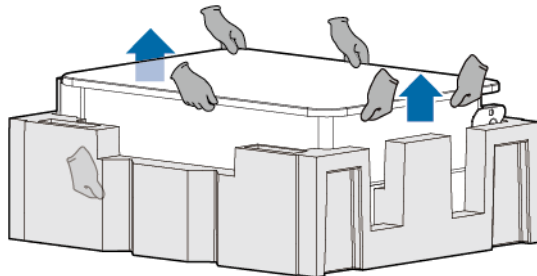
Use an appropriate tool (such as a forklift) to move the inverter to the installation position before taking the inverter out of the packing case.

Step 1 Take the inverter out of the packing case.

NOTICE

- After placing the equipment in the installation position, unpack it with care to prevent scratches. Keep the equipment stable during unpacking.
- At least five persons are required to take the inverter out of the packing case.
- The connectors and terminals at the bottom of the inverter must not bear any weight. Ensure that they do not come into direct contact with the ground or other supports.
- 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 4-12 Taking out the inverter

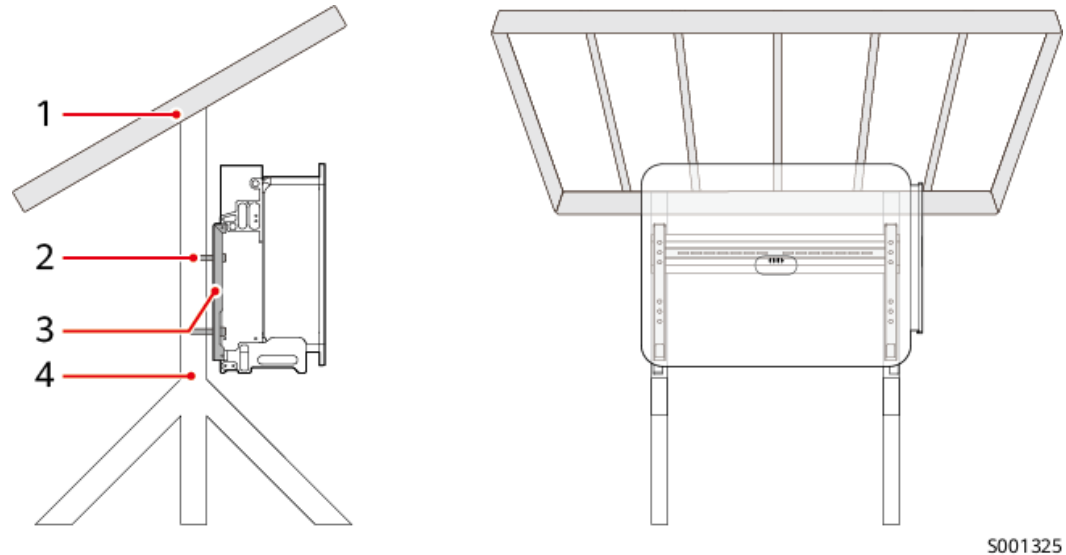


5000882

----End

4.6 Installing the Inverter on a Support

Figure 4-13 Support mounting



S001325

(1) PV module or awning	(2) Bolt assembly	(3) Mounting bracket	(4) Support
-------------------------	-------------------	----------------------	-------------

NOTE

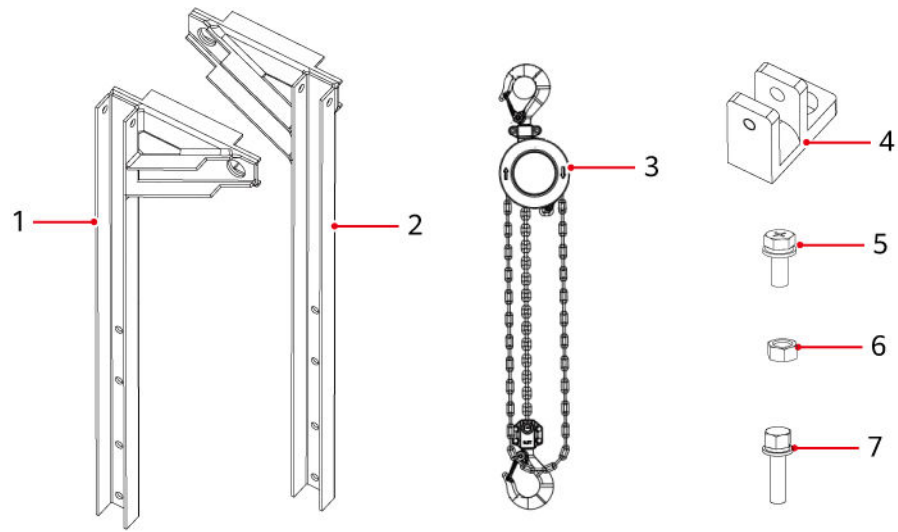
- The PV module or awning shown in the figure is for reference only. Factors such as the local sunlight angle and temperature must be considered during evaluation and design.
- The following describes the orientations of the PV module or awning and inverter:
 - If the local area is in the northern hemisphere, the front of the inverter shall face north, and the PV module or awning shall face south.
 - If the local area is in the southern hemisphere, the front of the inverter shall face south, and the PV module or awning shall face north.

NOTICE

- The inverter is heavy. It is recommended that the inverter be hoisted for installation.
- You can select a hoisting fixture or other tools for hoisting. If a hoisting fixture is used, see this section. For details about the hoisting requirements in other scenarios, see [4.8 Hoisting the Inverter](#).
- You need to purchase a hoisting fixture by yourself. You can contact technical support engineers to obtain the drawing.

Hoisting Fixture Description

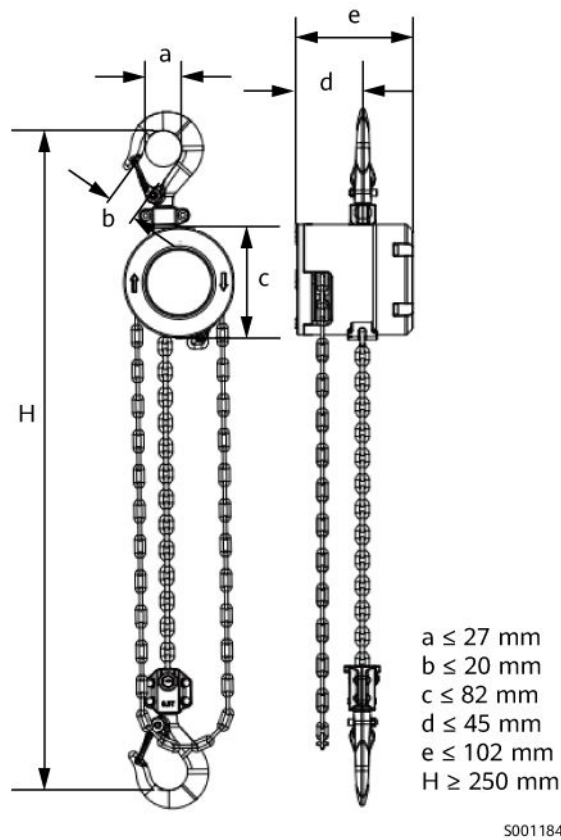
Figure 4-14 Components



S001182

No.	Component	Quantity	Description
1	Hoisting support (left)	1	Installed at the mounting bracket to provide installation points for the chain hoist.
2	Hoisting support (right)	1	
3	Chain hoist	1	Used to hoist the inverter. The load-bearing capacity must be 250 kg. For details about the dimensions requirements, see Figure 4-15 .
4	Auxiliary fixture	2	If there is limited space above the inverter, you can secure the chain hoist to the auxiliary fixture.
5	M10x25 bolt assembly	4	Used to install the hoisting supports at the mounting bracket.
6	M10 nut	4	
7	M10x55 bolt assembly	2	Used to install the auxiliary fixture at the inverter.

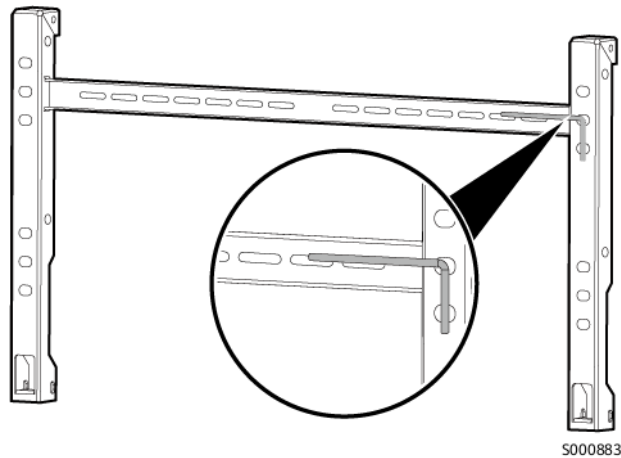
Figure 4-15 Chain hoist dimensions requirements



Procedure

Step 1 Remove the torx key and store it properly.

Figure 4-16 Removing the torx key

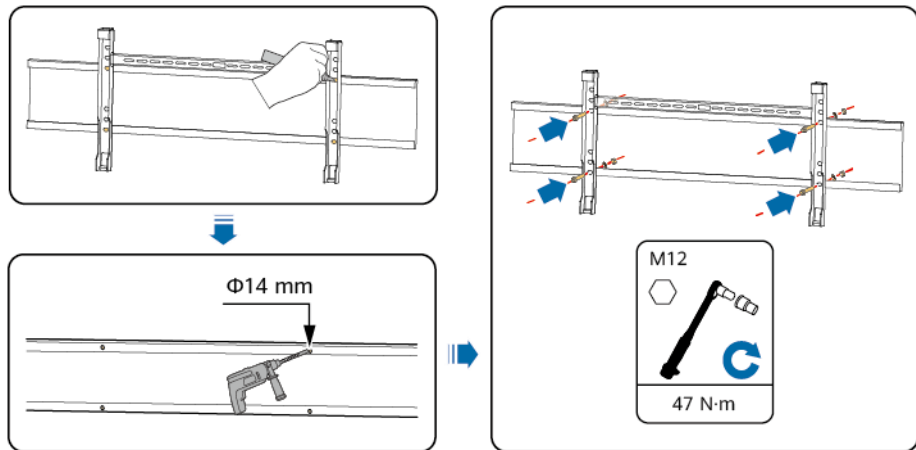


Step 2 Secure the mounting bracket.

 NOTE

- The mounting bracket of the inverter has four groups of screw holes, with each group containing three holes. Select a hole in each group to mark the drilling positions based on site requirements. It is recommended that the distance between the holes in the upper and lower groups be greater than or equal to 226 mm.
- 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 4-17 Installing the mounting bracket

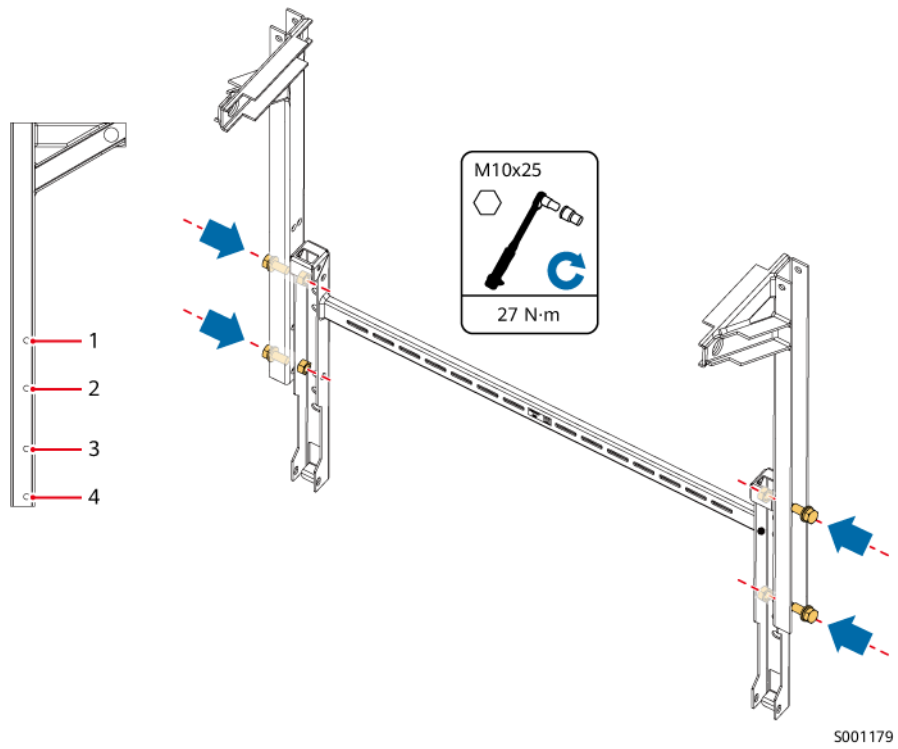


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Step 3 Install the hoisting supports at the mounting bracket based on the installation space.

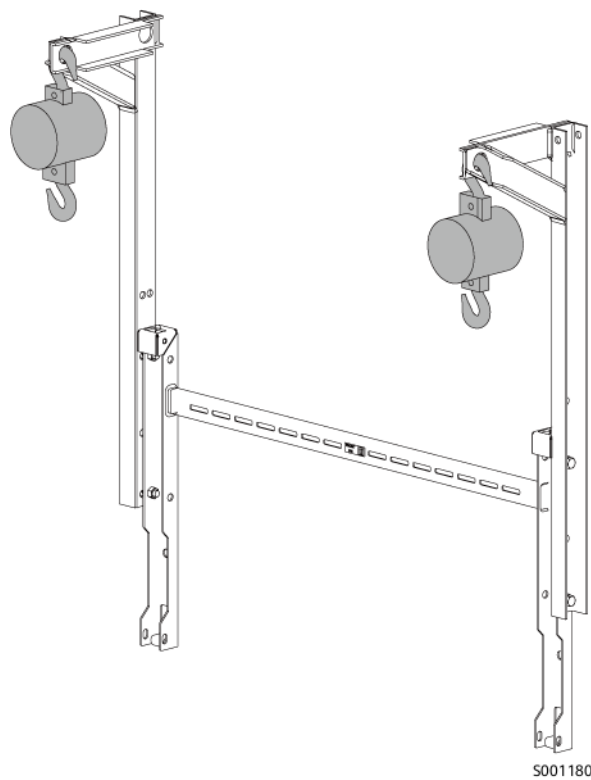
Preferentially choose hole groups 2 and 4. If the space above the device is insufficient, choose hole groups 1 and 3.

Figure 4-18 Installing the hoisting supports



Step 4 Install the chain hoist at the hoisting supports.

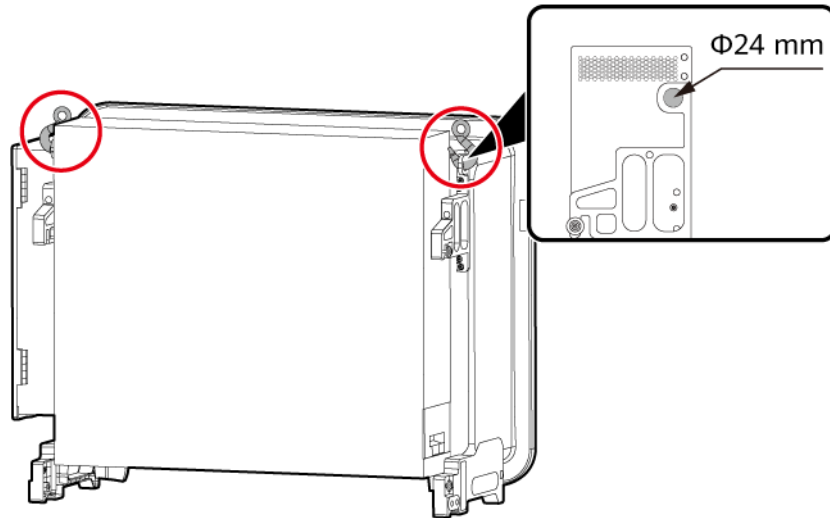
Figure 4-19 Installing the chain hoist



Step 5 Secure the hooks to the inverter.

- If hole groups 2 and 4 are chosen, install the hooks at the hoisting holes on both sides of the inverter.

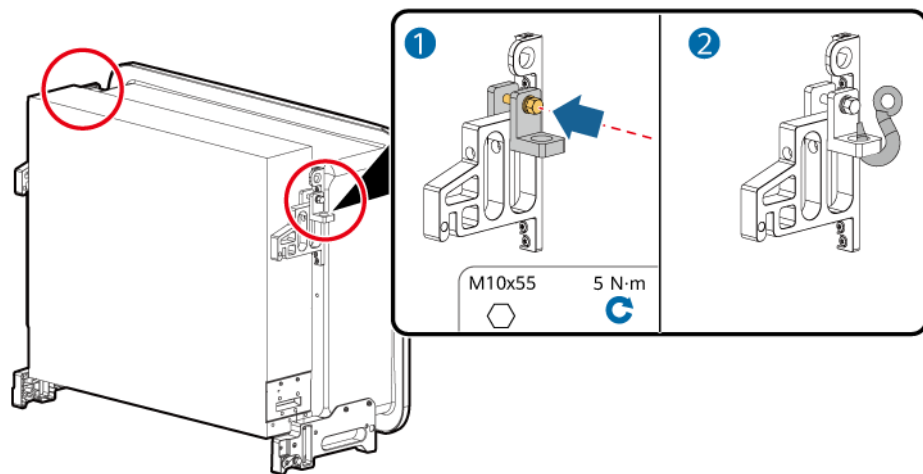
Figure 4-20 Securing the hooks at the hoisting holes on the inverter



S001185

- If hole groups 1 and 3 are chosen, install the auxiliary fixture and then install the hooks at the auxiliary fixture.

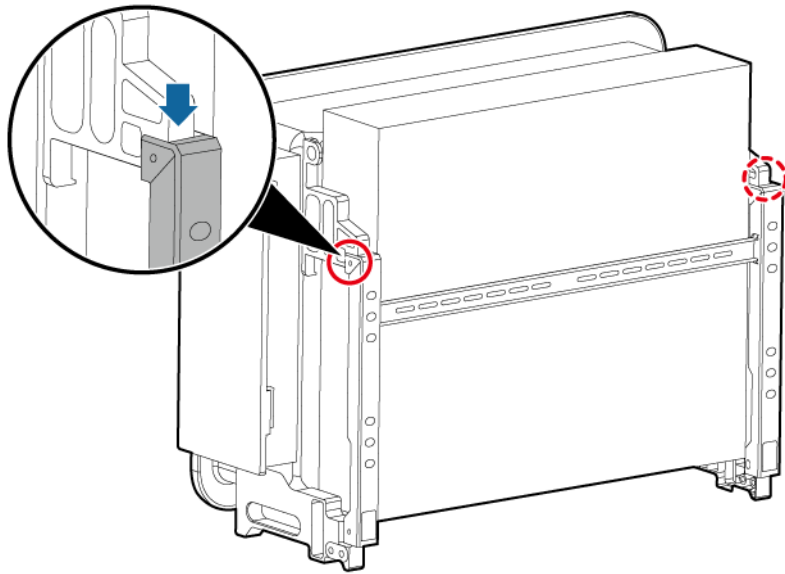
Figure 4-21 Securing the hooks at the auxiliary fixture



S001181

Step 6 Lift the inverter at both sides at the same time. Hold the inverter to avoid collision during hoisting. Mount the inverter onto the mounting bracket.

Figure 4-22 Mounting the inverter



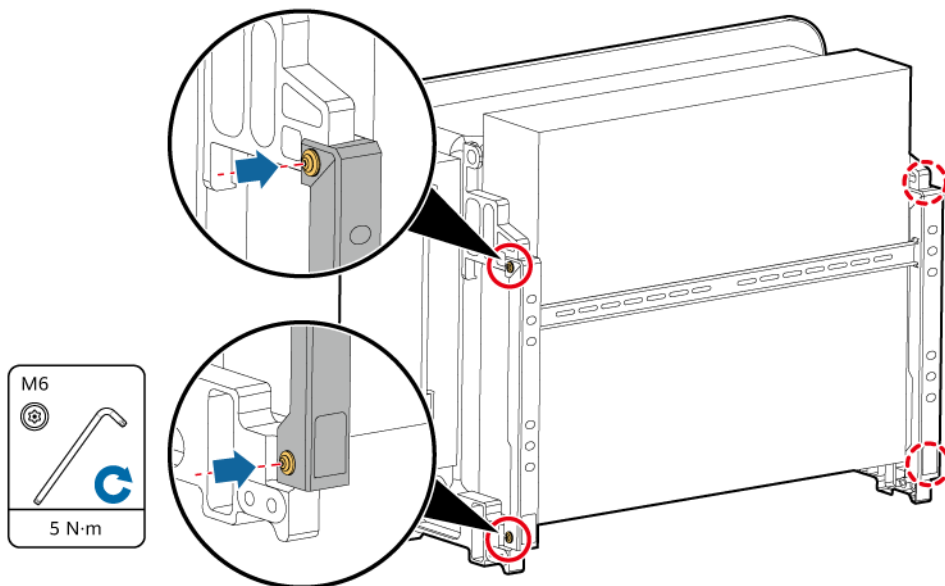
S001183

Step 7 Remove the hoisting fixture.

1. Remove the hooks from the inverter.
2. Remove the chain hoist from the hoisting supports.
3. Remove the hoisting supports from the mounting bracket.
4. Remove the auxiliary fixture if it is used.
5. Place the hoisting fixture in a dedicated package.

Step 8 Secure the inverter.

Figure 4-23 Securing the inverter



S000853

NOTE

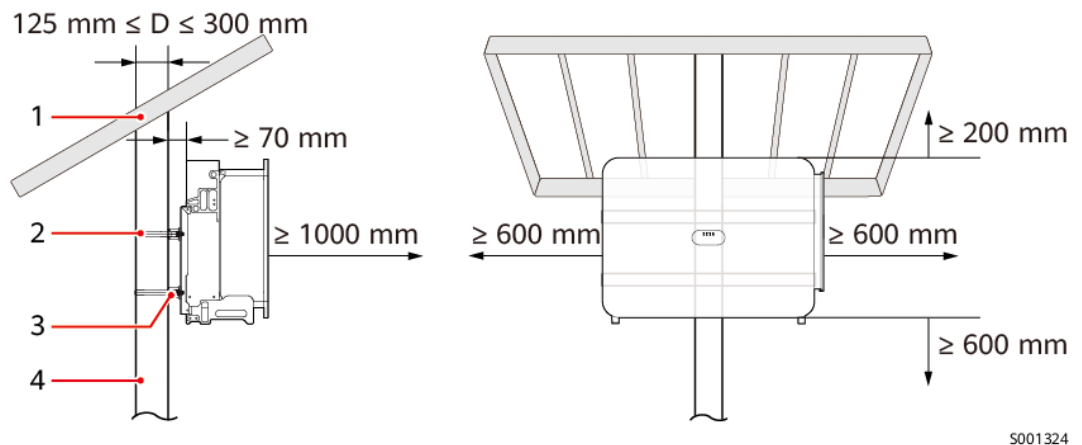
The screws are bound to the mounting bracket.

Step 9 Install an awning (optional if the inverter is installed under a PV module).

----End

4.7 Installing the Inverter on a Pole Clamp

Figure 4-24 Pole-clamp mounting



S001324

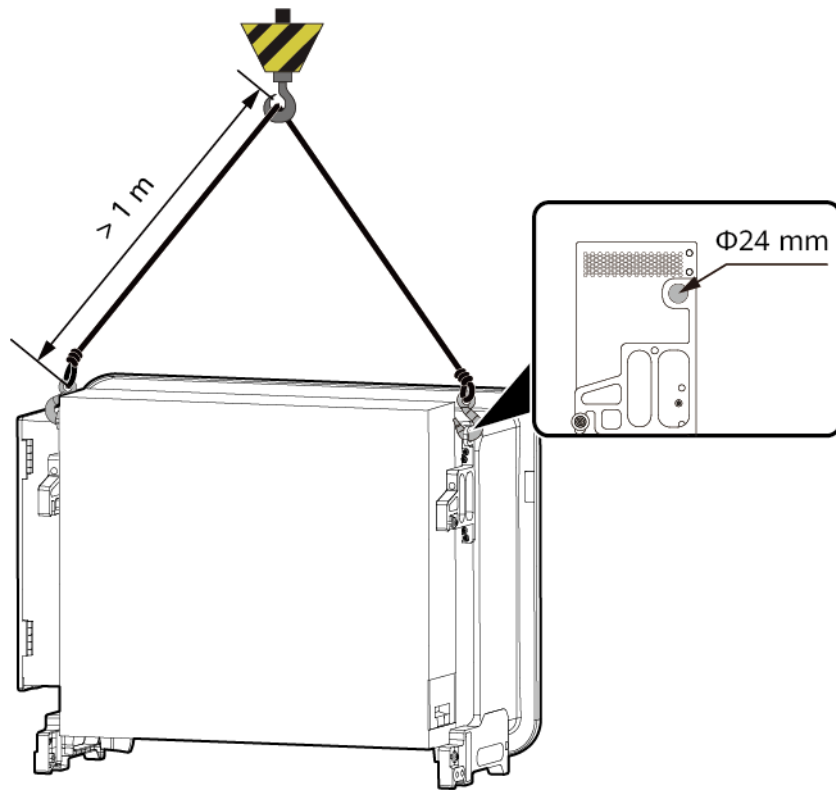
(1) PV module or awning	(2) Square bolt clamp	(3) Inverter mounting beam	(4) Vertical pole
-------------------------	-----------------------	----------------------------	-------------------

NOTE

- The PV module or awning shown in the figure is for reference only. Factors such as the local sunlight angle and temperature must be considered during evaluation and design.
- The following describes the orientations of the PV module or awning and inverter:
 - If the local area is in the northern hemisphere, the front of the inverter shall face north, and the PV module or awning shall face south.
 - If the local area is in the southern hemisphere, the front of the inverter shall face south, and the PV module or awning shall face north.

4.8 Hoisting the Inverter

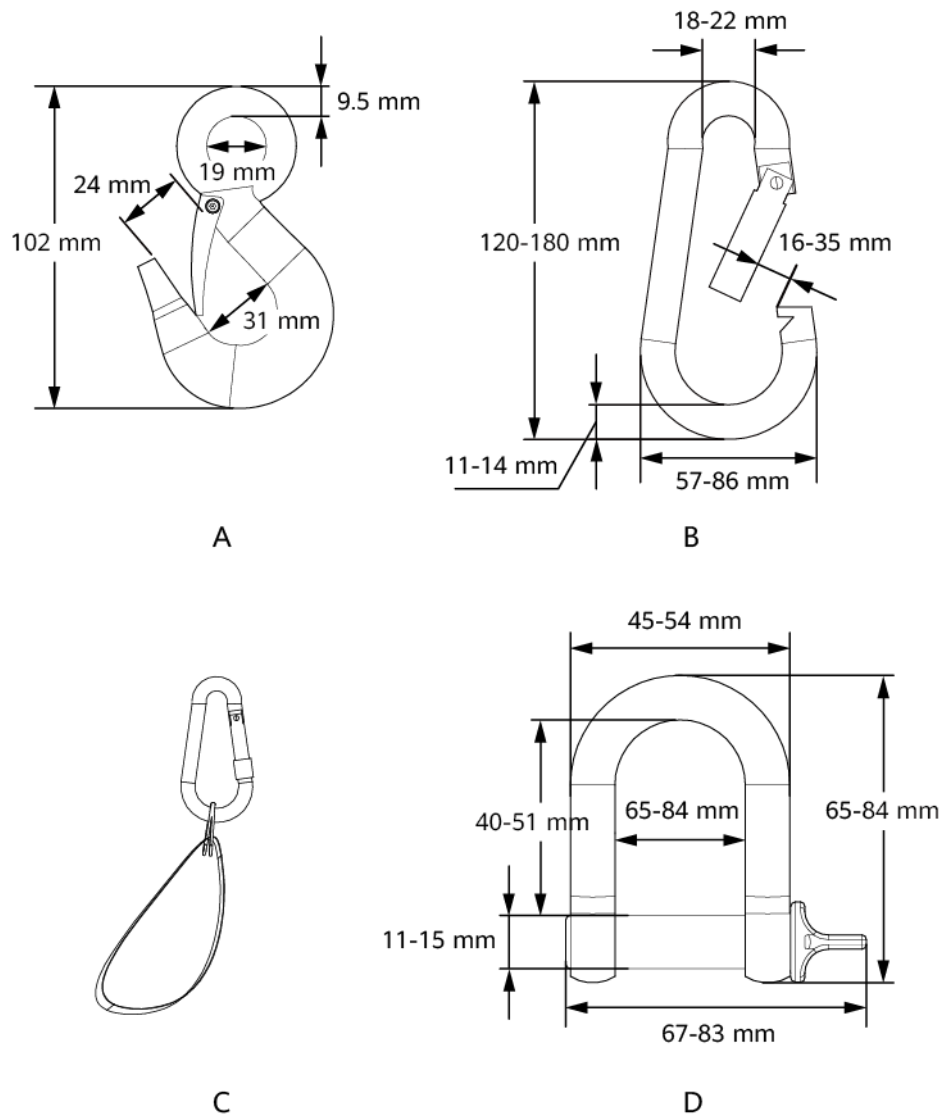
Figure 4-25 Hoisting holes



S000856

Select a hook with the required size and load-bearing capacity. Ensure that the hook does not contact the air baffle at the rear of the inverter during installation to prevent the inverter from falling. The recommended hooks are as follows.

Figure 4-26 Recommended hooks



5000838

Table 4-8 Hook description

No.	Component	Load-Bearing Capacity	Description
A	American hook	1t	Ensure that the hook does not contact the air baffle at the rear of the inverter.
B	Spring hook	≥ 0.2 t	-
C	Hook + sling	≥ 0.5 t	-
D	D-shaped shackle	0.2–0.8 t	Note the direction during installation. The screw knob of the shackle must face the outside of the device.

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 SWITCH** 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 fire fighting facilities, such as fire sand and carbon dioxide fire extinguishers.
 - Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
-

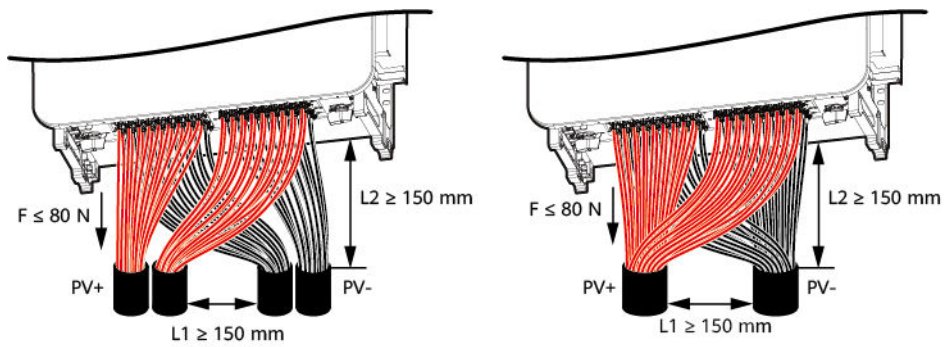
 **WARNING**

- Equipment damage caused by incorrect cable connections is not covered by the product warranty.
 - Only professional electrical technicians are allowed to perform electrical connection operations.
 - Operation personnel must wear PPE when connecting cables.
 - Before connecting cables to ports, leave enough slack to reduce the tension on the cables and prevent poor cable connections.
-

CAUTION

- 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.
- 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



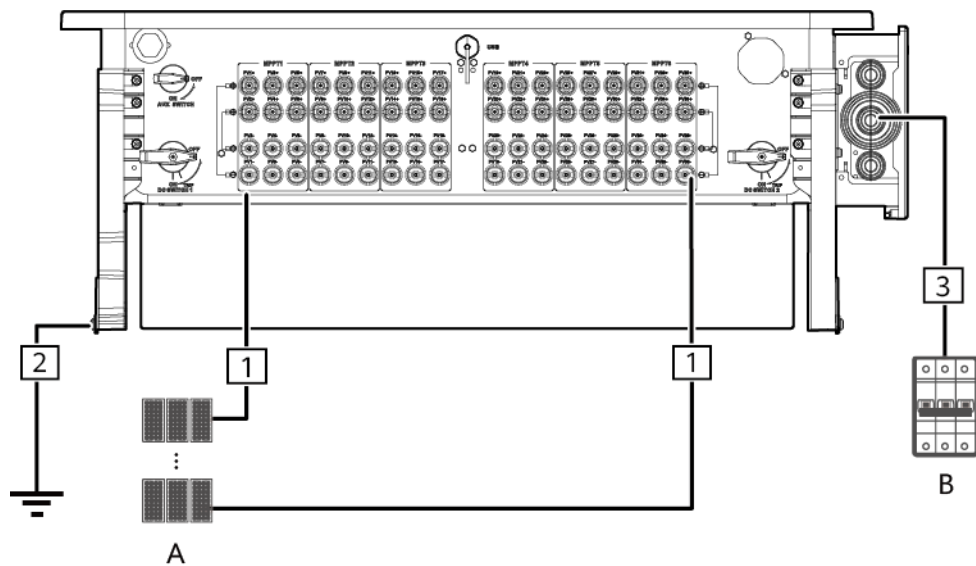
S000890

NOTE

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 Inverter cable connections



S000875

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 36 PV string inputs. 	Prepared by the customer
B	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 or transformer station. • Recommended: a three-phase AC circuit breaker with a rated voltage greater than or equal to 1000 V AC and a rated current of 400 A 	Prepared by the customer

 **NOTE**

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

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]	4–6 mm ² (10 mm ² optional) ^[2]	5–7.8 mm	Prepared by the customer
2	PE cable ^[3]	(Recommended) Single-core outdoor copper cable and M10 OT/DT terminal	$S_p \geq S/2$	-	Prepared by the customer
3	AC output power cable (single-core)	(Recommended) Single-core (L1, L2, L3) outdoor cable and M12 OT/DT terminal (L1, L2, L3)	<p>Copper cable, aluminum alloy cable, or copper-clad aluminum cable^[4]:</p> <ul style="list-style-type: none"> • S: 150–400 mm² • $S_p \geq S/2$ 	21–36 mm	Prepared by the customer

No.	Cable	Type	Conductor Cross-Sectional Area	Outer Diameter	Source
	AC output power cable (single-core, dual per phase) [5]	(Recommended) Single-core (L1, L2, L3) outdoor cable and M12 OT/DT terminal (L1, L2, L3)	240 mm ²	19–26 mm	Prepared by the customer
	AC output power cable (multi-core) [6]	(Recommended) Three-core (L1, L2, L3) outdoor cable and M12 OT/DT terminal (L1, L2, L3)	Copper cable, aluminum alloy cable, or copper-clad aluminum cable: <ul style="list-style-type: none"> • S: 150–400 mm² (cable stripping outside the compartment after protection is added) • $S_p \geq S/2$ 	43–68 mm	Prepared by the customer

Note [1]: The 1500 V PV cables must comply with IEC 62930 or EN 50618.

Note [2]: If the conductor cross-sectional area of the DC input power cable is 10 mm², the fitting bag of matched DC terminals is required.

Note [3]: The value of S_p is valid only if the conductors of the PE cable and AC output 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.

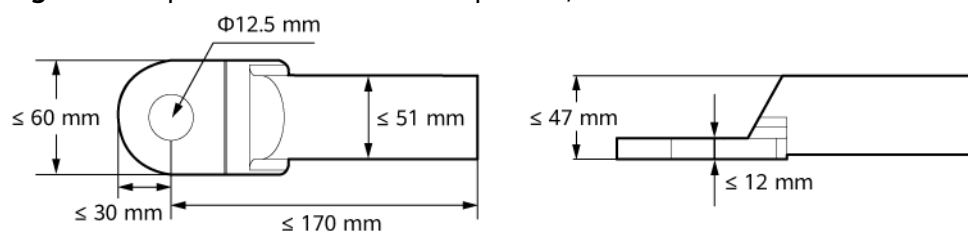
Note [4]: A maximum conductor cross-sectional area of 500 mm² is supported. For details, see [Figure 5-3](#).

Note [5]: If dual cables per phase are used, the corresponding fitting bag is required.

Note [6]: For details about the installation procedure and precautions for cable stripping outside the compartment, see [5.4.3 Requirements for AC Power Cable Stripping Outside the Compartment](#).

The maximum conductor cross-sectional area of a single-core cable can be 500 mm² if the crimped OT/DT terminal meets the requirements illustrated in the following figure.

Figure 5-3 Specifications of the crimped OT/DT terminal



S000849

5.3 Connecting a PE Cable

Precautions

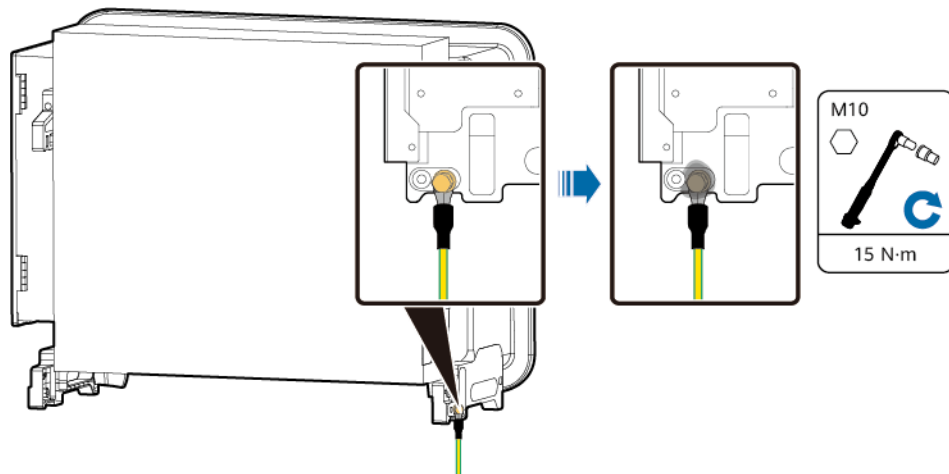
NOTICE

- It is recommended that the inverter be connected to a nearby PE point. For a system with multiple inverters connected in parallel, connect the PE points of all inverters to ensure equipotential bonding between PE cables.
- Do not connect the ground grid of the inverter to the ground grid of the lightning arrester.
- Both sides of the inverter have PE points. If a multi-core AC power cable is used, it is recommended that the PE cable be connected to the PE point on the left side of the inverter so that the armor shield layer of the AC power cable can be connected to the PE point on the right side of the inverter.

Procedure

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

Figure 5-4 Connecting the PE cable



S000854

----End

5.4 Connecting an AC Output Power Cable

5.4.1 Precautions

- A three-phase AC switch shall 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.
- 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.
- Do not open the panel of the inverter.
- Before opening the maintenance compartment door, ensure that no electrical connections are made for the inverter on the AC or DC side.
- 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.
- Do not leave unused screws in the maintenance compartment.

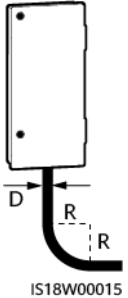
 **CAUTION**

Each inverter shall be equipped with an AC output switch. Multiple inverters shall not connect to the same AC switch.

NOTICE

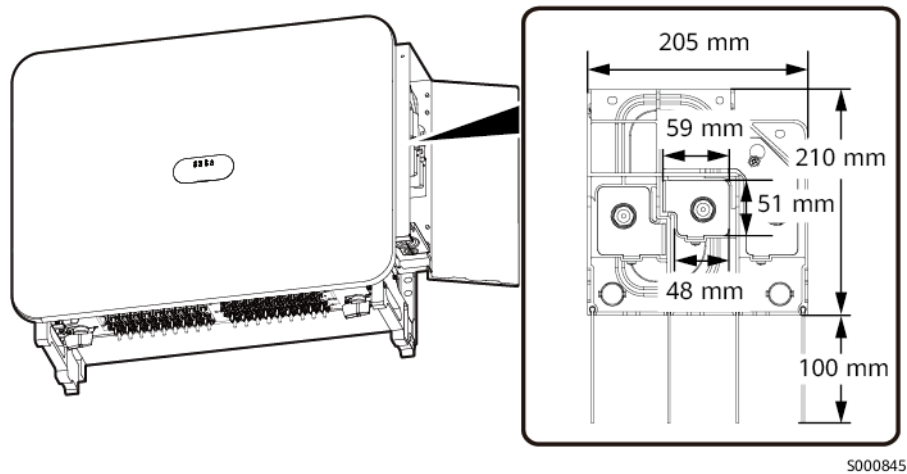
- The cable outer diameter can be measured using the ruler sticker in the maintenance compartment.
 - Ensure that the cable jacket is in the maintenance compartment.
 - Ensure that the AC output power cables are connected securely and insulated properly (using three-way breakout boots and cold/heat shrink 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.
 - 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 5-5 Wiring ports

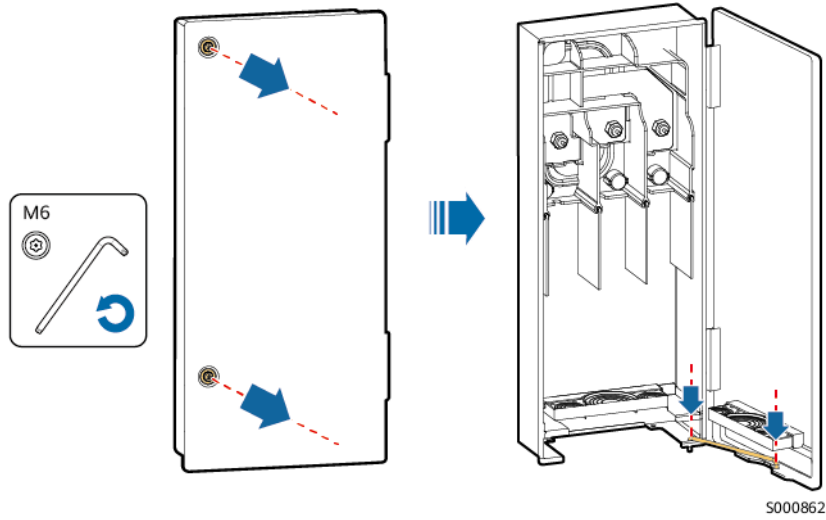


5.4.2 Connecting an AC Output Power Cable

Procedure

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

Figure 5-6 Opening the maintenance compartment door



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

Figure 5-7 Specifications of the crimped OT/DT terminal

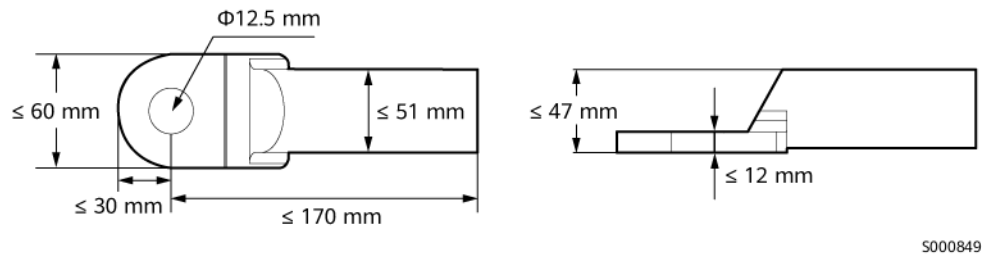
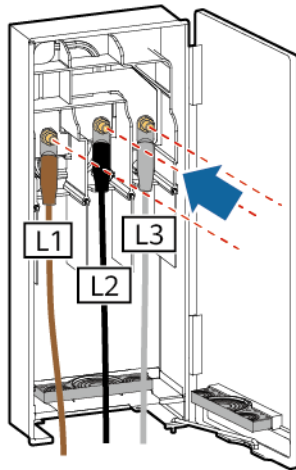
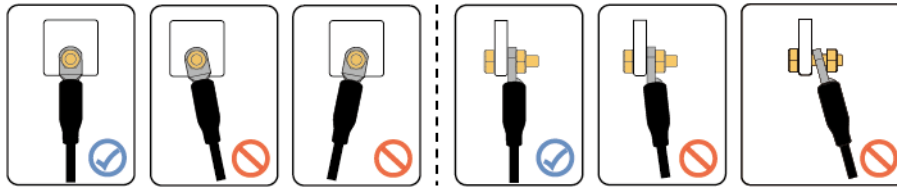
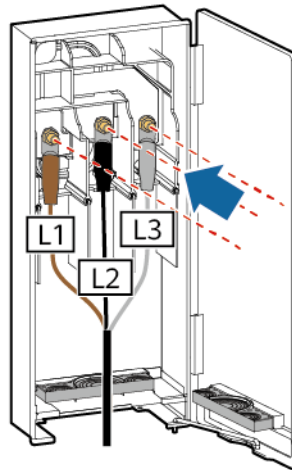


Figure 5-8 Cable connection 1



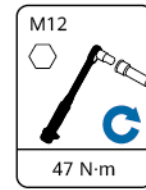
A

(A) Single-core cables



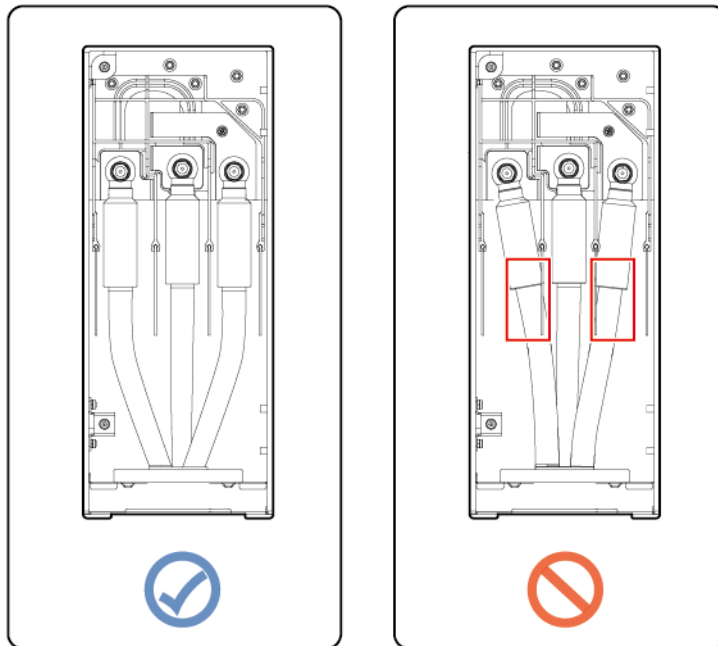
B

(B) Three-core cable



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Figure 5-9 Cable connection 2

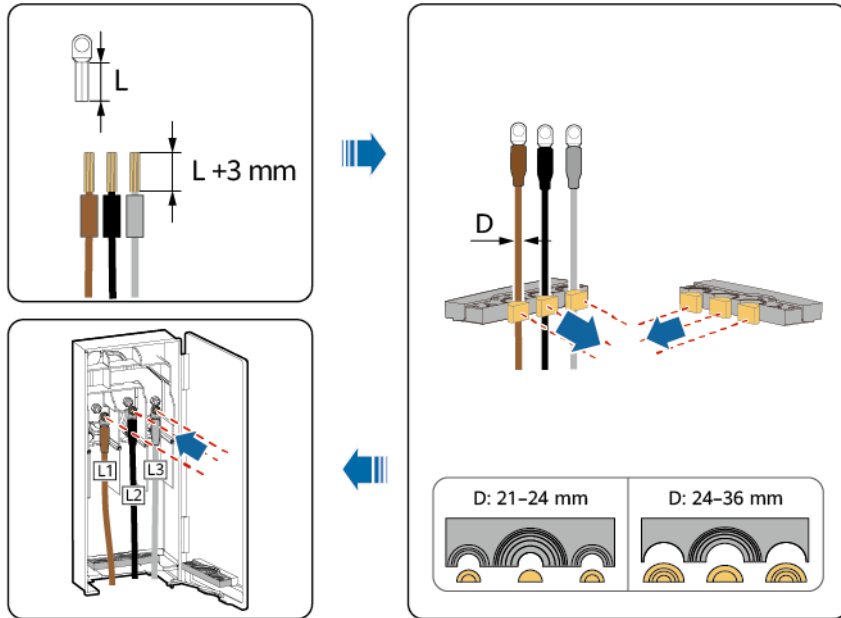


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NOTICE

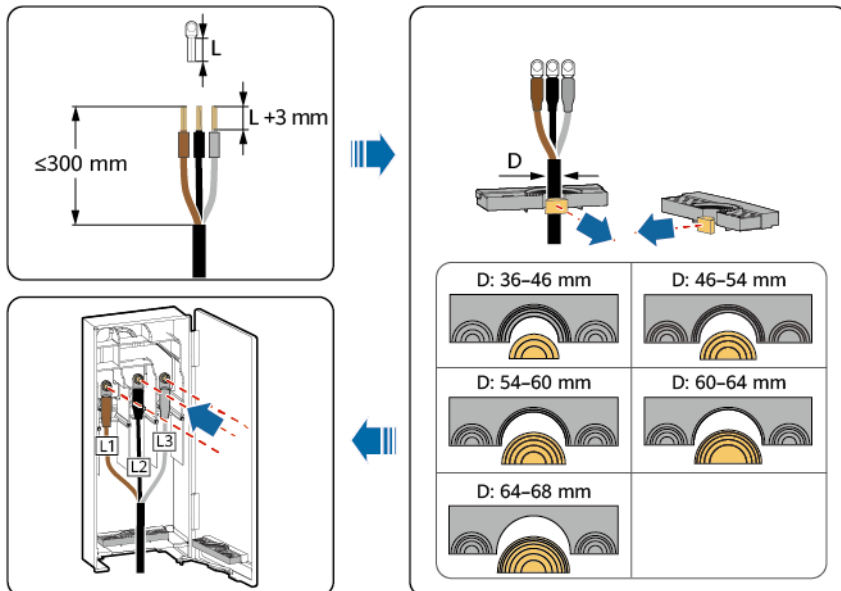
After cables are connected, prevent them from contacting the inter-phase baffle plates.

Figure 5-10 Single-core cable connection method



S000866

Figure 5-11 Multi-core cable connection method



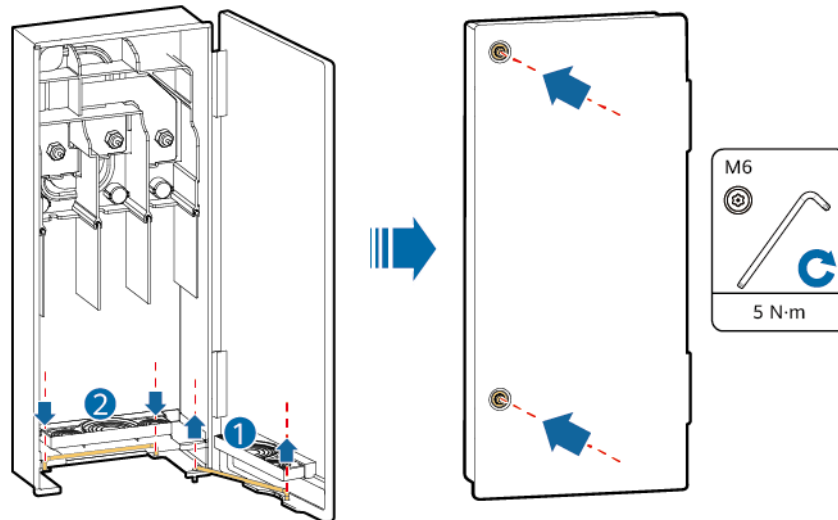
S000852

NOTICE

It is recommended that the multi-core cable be stripped outside the maintenance compartment. The armored shield layer shall be connected to a PE point on the enclosure (sealing is required) with the M10 screw tightening torque of 15 N·m.

Step 3 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 the door



S000835

----End

5.4.3 Requirements for AC Power Cable Stripping Outside the Compartment

Materials

Material	Specifications	Source
Cold/Heat shrink tubing	Matches the cable and has anti-ultraviolet radiation performance.	Prepared by the customer
Three-way breakout boot	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

Material	Specifications	Source
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 completed, backfill and compact the ground.
- Step 6** Connect the AC power cable.

NOTICE

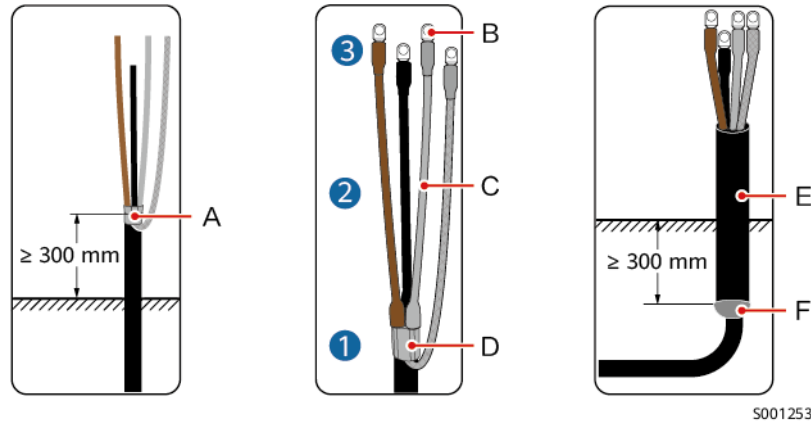
The armored layer of the cable must be grounded as required: The armored shield layer of the multi-core cable shall be connected to a PE point on the enclosure, with the M10 screw tightening torque of 15 N·m.

- 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.

NOTICE

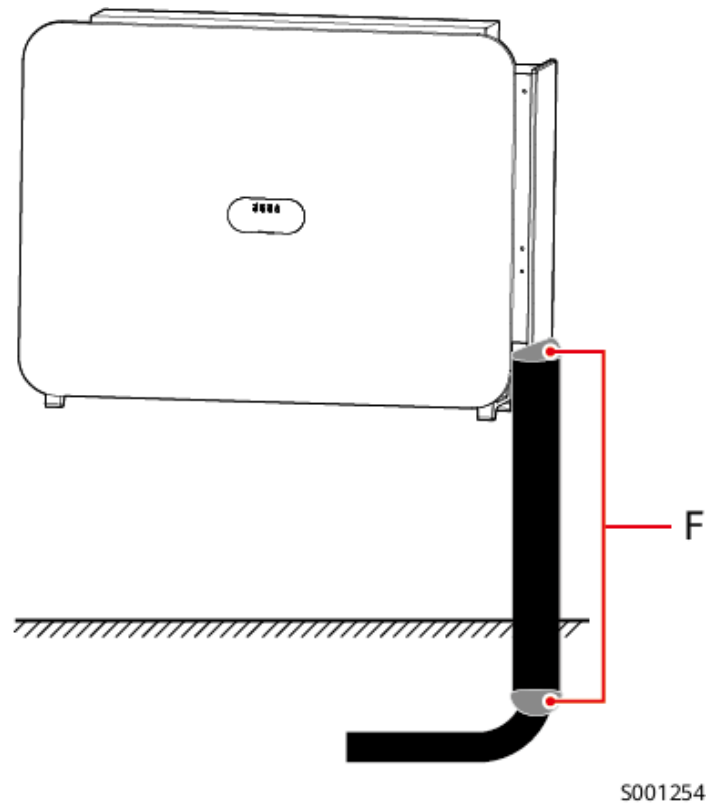
- Waterproofing measures must be taken at the bottom of the electrical conduit. The electrical conduit and cable must be vertical. Ensure that the upper end is vertically routed into the maintenance compartment and the lower end is vertically routed into the ground.
- After the electrical conduit is routed into the ground, the underground cable must meet the bending radius requirements of the AC power cable.
- 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.
- Prevent stress on the inverter wiring terminals from the cable during backfilling.
- 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.
- Do not use halogen-containing firestop putty or sealing putty.
- 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



(A) Insulation tape	(B) OT/DT terminal	(C) Cold shrink/Heat shrink tube
(D) Three-way breakout boot	(E) Electrical conduit	(F) Sealing putty

Figure 5-14 Installation completed



(F) Sealing putty

----End

5.5 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.
- In the scenario where the installation is completed 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 7.1 Powering On the Inverter](#).
- 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.
- 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.

- The maximum open-circuit voltage of each PV string must be lower than or equal to 1600 V DC under any circumstances.
- 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.

NOTICE

- Ensure that the PV module output is well insulated to ground.
- The PV strings connecting to the same MPPT circuit shall use the same model and quantity of PV modules.
- To ensure the optimal power generation of the system, the voltage difference between different MPPT circuits shall be less than 110 V.
- 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).
- The inverter does not support Y-branch PV connectors.

Checking the Length of Each PV String (Number of PV Modules Connected in Series)

Determine the maximum open-circuit voltage of each PV string based on the local actual irradiance and low temperature situations.

1. The maximum open-circuit voltage of each PV string must not exceed the maximum input voltage of the inverter. The upper limit of PV string length can be calculated.
2. The full-load operating voltage of each PV string (corresponding to the full-load working condition of the inverter) must be within the full-load MPPT voltage range of the inverter. The upper and lower limits of PV string length under full-load conditions can be calculated.
3. Determine an appropriate PV string length based on the upper and lower limits of PV string length calculated above.

Assume that the lowest temperature is -25°C . If common 182 mm PV modules are used, each PV string consists of about 28 PV modules when V_{oc} is 49.9 V at standard test conditions (STC) and the capacity ratio is 1.1. If common 210 mm modules are used, each PV string consists of about 34 modules when V_{oc} is 41.3 V at STC and the capacity ratio is 1.1.

The length of each PV string can be adjusted based on the PV module specifications and the local actual irradiance and temperature situations. The device can be put into operation only after being checked and tested by professionals.

NOTE

V_{oc} is the open-circuit voltage. STC: irradiance 1000 W/m^2 , cell temperature 25°C , and air mass 1.5

Terminal Description

The inverter provides 36 DC input terminals, which are controlled by its two DC switches: DC SWITCH 1 controls the DC input terminals PV1–PV18 and DC SWITCH 2 controls the DC input terminals PV19–PV36.

Figure 5-15 DC terminals controlled by DC SWITCH 1

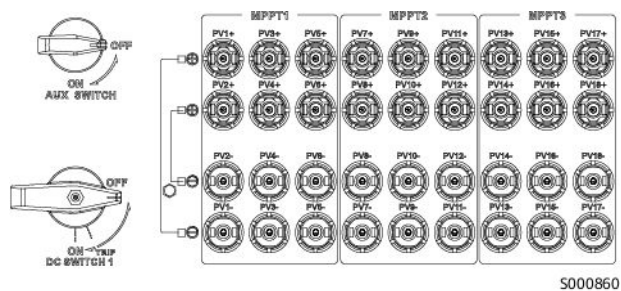
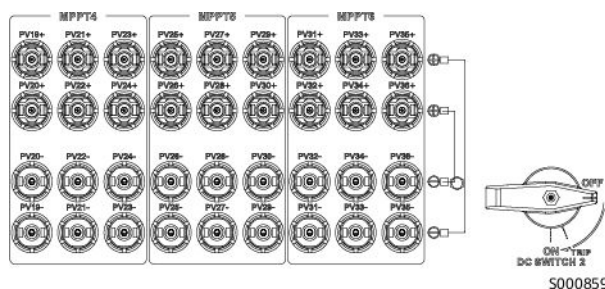


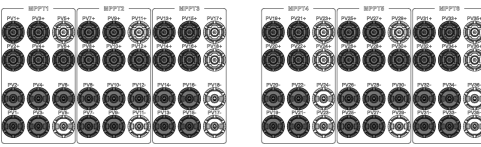
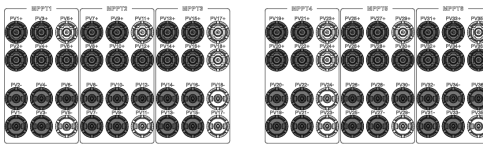
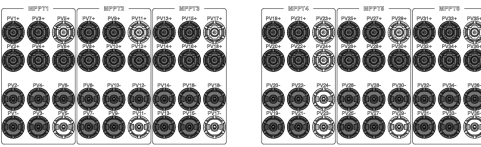
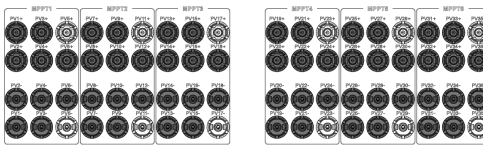
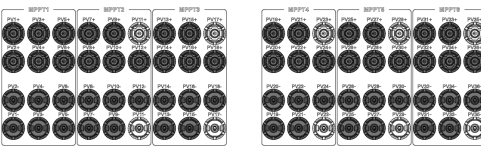
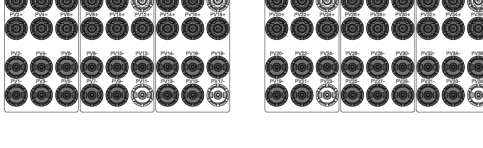
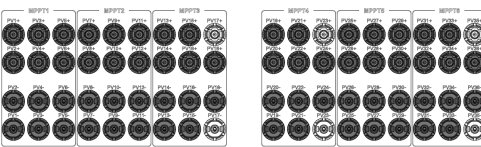
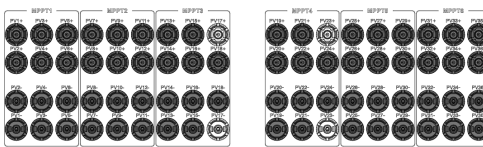
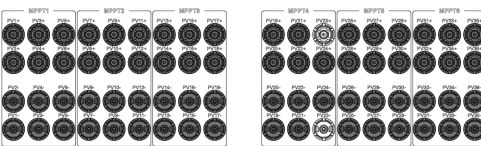
Figure 5-16 DC terminals controlled by DC SWITCH 2



Requirements for selecting DC input terminals:

1. DC input terminal PV1 must be connected to a PV string.
2. At least one PV string shall be connected to the DC input terminals PV7–PV18.
3. DC input terminals shall be evenly distributed on MPPTs.
4. If 210 mm PV modules are used, a maximum of five 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 5-20](#).

Number of PV Strings	Terminal Selection	Number of PV Strings	Terminal Selection
25	Connect to PV1–PV4, PV6–PV10, PV13–PV16, PV19–PV22, PV25–PV28, and PV31–PV34.	26	Connect to PV1–PV4, PV6–PV10, PV13–PV16, PV19–PV22, PV25–PV28, and PV30–PV34.

Number of PV Strings	Terminal Selection	Number of PV Strings	Terminal Selection
27	Connect to PV1–PV4, PV6–PV10, PV12–PV16, PV19–PV22, PV25–PV28, and PV30–PV34. 	28	Connect to PV1–PV4, PV6–PV10, PV12–PV16, PV19–PV22, PV25–PV28, PV30–PV34, and PV36. 
29	Connect to PV1–PV4, PV6–PV10, PV12–PV16, PV18–PV22, PV25–PV28, PV30–PV34, and PV36. 	30	Connect to PV1–PV4, PV6–PV10, PV12–PV16, PV18–PV22, PV24–PV28, PV30–PV34, and PV36. 
31	Connect to PV1–PV10, PV12–PV16, PV18–PV22, PV24–PV28, PV30–PV34, and PV36. 	32	Connect to PV1–PV10, PV12–PV16, PV18–PV22, PV24–PV34, and PV36. 
33	Connect to PV1–PV16, PV18–PV22, PV24–PV34, and PV36. 	34	Connect to PV1–PV16, PV18–PV22, and PV24–PV36. 
35	Connect to PV1–PV22 and PV24–PV36. 	-	-

Procedure

NOTICE

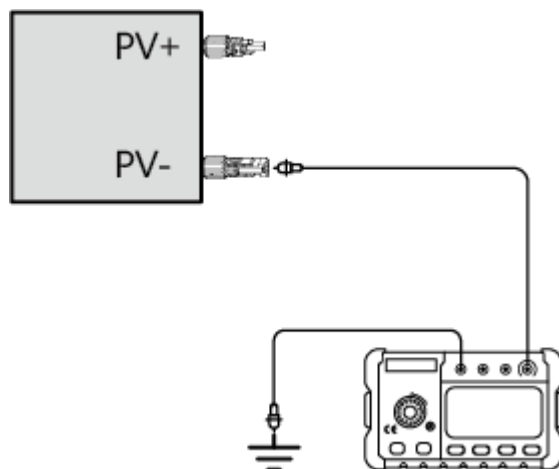
- Use the PV connectors delivered with the inverter (if the fitting bag of DC terminals is configured, use the PV connectors in the fitting bag). If the PV connectors are lost or damaged, purchase the connectors of the same model. The device damage caused by incompatible PV connectors is not covered under any warranty.
- The multimeter must have a DC voltage range of at least 1600 V.
- If the voltage is a negative value, the DC input polarity is incorrect. Rectify the connection.
- If the voltage is greater than 1600 V, too many PV modules are connected to the same string. Remove some PV modules.
- 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.
- 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.

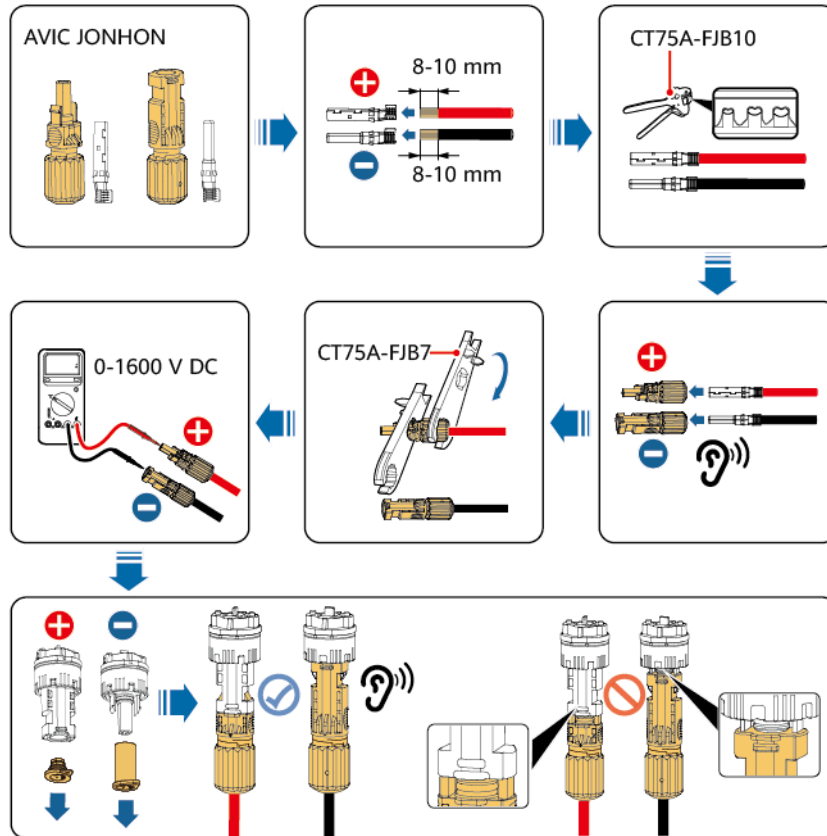
- If the insulation resistance is greater than or equal to 1 M Ω , the insulation resistance is normal.
- If the insulation resistance is less than 1 M Ω , troubleshoot the insulation fault of the cable or PV string.

Figure 5-17 Testing the insulation resistance



Step 2 Connect DC input power cables.

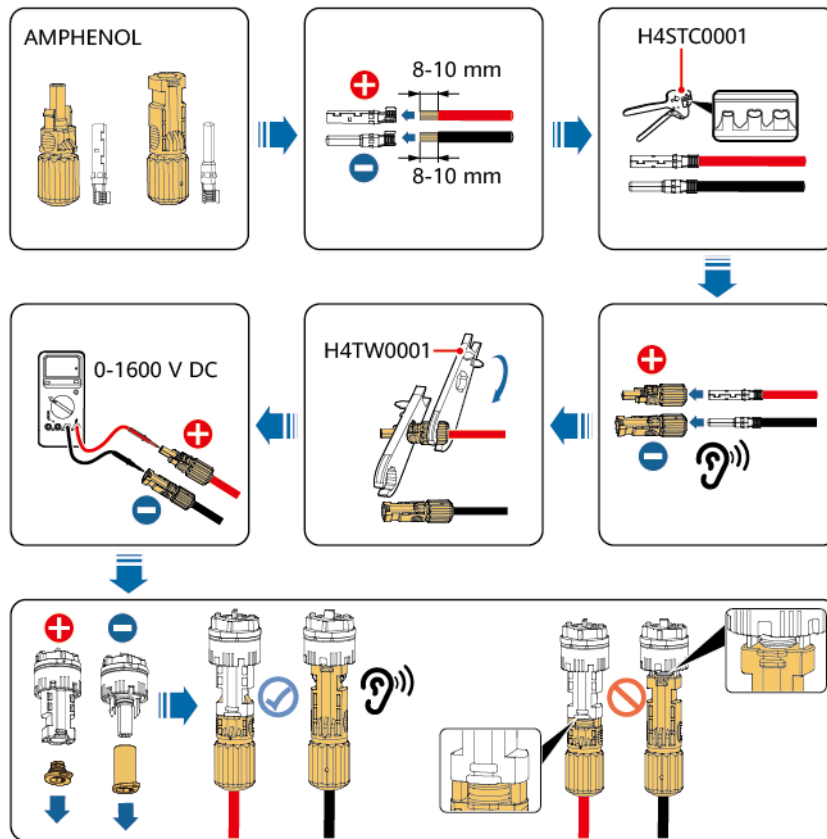
Figure 5-18 Connecting DC input power cables (AVIC JONHON)



S000840

Terminal Type	Inverter Model
AVIC JONHON	SUN2000-460KTL-H0

Figure 5-19 Connecting DC input power cables (Amphenol)



S001251

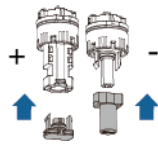
Terminal Type	Inverter Model
Amphenol	SUN2000-506KTL-H1
	SUN2000-506KTL-H2
	SUN2000-506KTL-H3

NOTICE

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 5-20 Sealing plugs with snap-fits



----End

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 without foreign objects.
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 and securely.• 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.• The unused USB port is plugged with a waterproof plug.

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.

NOTICE

- 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.
- Before turning on the AC switch between the inverter and the grid, check that the AC voltage is within the specified range using a multimeter.
- If an inverter has not been running for six months or longer 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.
- When the system is powered on for the first time, 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 the **DC SWITCH 1** and **DC SWITCH 2**. After confirming that no exception occurs, turn off the **AUX. SWITCH**. Then the system can be successfully connected to the power grid. The Company is not liable for any device damage caused by operations performed in a wrong sequence.
- 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.
- 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.
- 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 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.

NOTICE

If the PV connection indicator is not steady green 1 minute after the **AUX. SWITCH** is turned 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 still not steady green, turn off the **AUX. SWITCH** and contact technical support engineers.

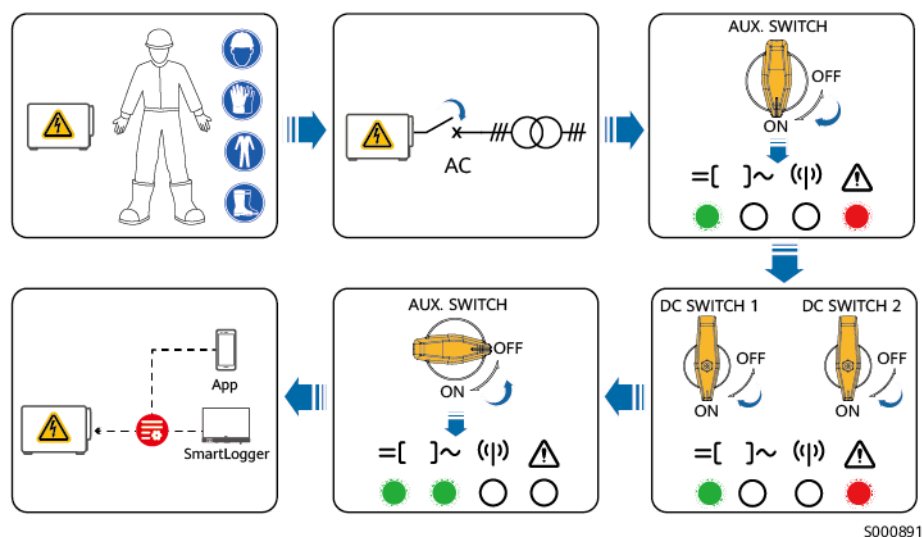
- Step 4** If the PV connection indicator is steady green and the alarm indicator is steady red, set **DC SWITCH 1** and **DC SWITCH 2** to **ON**. Observe the LED indicators to check the operating status of the inverter.
- Step 5** After 10 seconds, check that the inverter is normal and turn off the **AUX. SWITCH**. The system will be successfully connected to the power grid.

NOTICE

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 after confirming that no exception occurs. Otherwise, the inverter reports the **DC Switch Status Abnormal** alarm (cause ID: 2), the alarm indicator blinks red fast, and the inverter cannot be connected to the power grid.

- Step 6** Set the parameters on the app or SmartLogger. For details, see **7.3 Commissioning the Inverter (Using the SmartLogger)** or the SmartLogger user manual.

Figure 7-1 Power-on



----End

7.2 Commissioning Methods and Process

The inverter can be commissioned on the SmartLogger WebUI or app. The SmartLogger WebUI is recommended for deployment commissioning.

7.3 Commissioning the Inverter (Using the SmartLogger)

7.3.1 Preparations and SmartLogger WebUI Login

For details about preparations and WebUI login, see [SmartLogger5000A User Manual](#).

7.3.2 Software Upgrade

For details about software upgrade, see [SmartLogger5000A User Manual](#).

7.3.3 Commissioning Using the Deployment Wizard

NOTE

- Path: **Wizard > Deployment Wizard**
- You can click **Previous**, **Next**, or **Skip** to set parameters in the wizard.

Procedure

Step 1 Configure basic settings.

Set the parameters based on site requirements. For details, see the [SmartLogger5000A User Manual](#).

Step 2 Configure device management.

1. Set the inverter whitelist.

NOTE

If MBUS networking is used, an SN list, that is, a whitelist, must be set for inverters. Set the inverter whitelist as follows:

- One by one: Click **Add**, enter the inverter SN, and click **Submit**.
- In batches:

Method 1: If this is the first time to configure a whitelist, click **Download Template** to download the template to the local PC, enter the inverter SNs in the template, and click **Import** to import the modified template.

Method 2: If this is not the first time to configure the whitelist, click **Export** to download the template to the local PC, add the inverter SNs to the template based on the template format, and click **Import** to import the modified template.

2. Set the power and network frequency band.

Choose **Monitoring > MBUS-Inside > Running Parameters**.

Retain the default value **10** for **Power setting**. You are advised to set **Network frequency band** to **1** or **4**.

Step 3 Connect to devices.

- **Searching for devices**

Click **Search** to search for non-third-party devices that have been connected to the system.

- **Adding devices**

- Click **Add Device**. The dialog box for adding devices is displayed.
- Select **Device type** and set the parameters according to the **Device Type** setting.
- Click **Add**.

- **Deleting devices**

- Select the devices to be deleted.
- Click **Delete**. The confirmation dialog box is displayed.
- Click **Delete**.

Step 4 Configure communication networking.

Set the parameters based on site requirements. For details, see the [SmartLogger5000A User Manual](#).

Step 5 Set the grid code.

Table 7-1 Inverter parameters

Parameter	Description
Grid code	<ul style="list-style-type: none"> ● Set this parameter based on the grid code of the country or region where the device is located and the application scenario of the device. ● For details about grid codes, see A Grid Codes.

Step 6 Complete the settings.

----End

7.3.4 Parameter Settings

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

For details about the parameters, see [SmartLogger5000A User Manual](#).

7.4 Commissioning the Inverter (Using the App)

You can reset a password and view alarms on the app. For details, see App User Manual.

- For details about how to reset a password, see [B Resetting a Password](#).
- To view alarms, log in to the app, choose **Alarm** > **Active alarm**, and rectify the fault based on the alarm handling suggestions.

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.

CAUTION

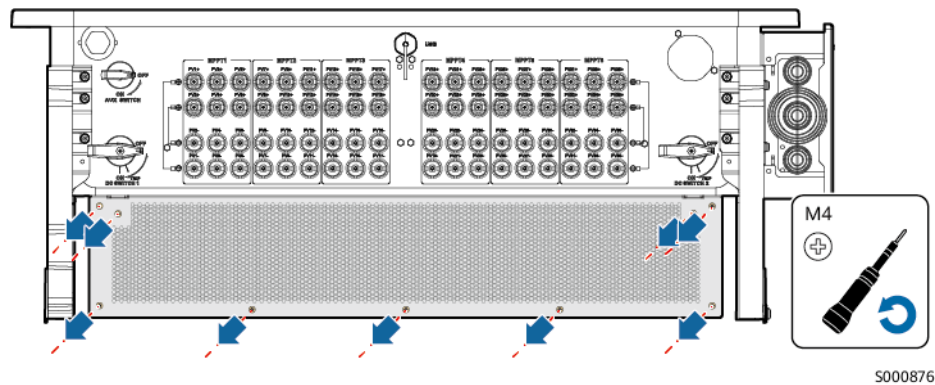
- Before cleaning the inverter, connecting cables, and checking the grounding reliability, power off the inverter and ensure that the **AUX. SWITCH** and all **DC SWITCH** of the inverter are **OFF**.
 - Do not open the maintenance compartment door on rainy or snowy days. If you need to, take protective 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, SmartLogger, or management system.	For details, see 9 Alarm Reference . For details about alarm 2062, see 8.7 Locating Insulation Resistance Faults .	Daily maintenance
Cleanness of air intake and exhaust vents	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; once a month if a dust cover is used.)
Fan	Check whether the fan generates 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
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

Check Item	Check Method	Maintenance Method	Maintenance Interval
Electrical connections	<ul style="list-style-type: none"> • Check whether cables are securely connected. • 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 USB port is locked by a waterproof cap. 	<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 cap on the unused USB port. 	6 months after the first commissioning and once every 6 to 12 months after that
Grounding reliability	<p>Check whether the ground cable is securely grounded.</p> <p>Use a multimeter to check whether the ground resistance at the inverter ground screws is less than or equal to 0.1 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 of the air intake vent



NOTICE

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 inverter system is powered off, the remaining electricity and heat on the enclosure 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, SmartLogger, or management system.

For details, see the user manual of the corresponding product.

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

Step 3 Set the two DC switches (**DC SWITCH**) to **OFF**.

----End

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.

 **CAUTION**

- If the inverter is faulty, do not stand in front of it if possible.
 - 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](#).
 - Do not operate the DC switches on the inverter before you perform [Step 3](#) to [Step 5](#).
 - When the inverter detects a fault, it triggers automatic DC disconnection protection. Do not turn on the DC switches before the fault is rectified.
 - 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.
 - 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 PPE.

Step 2 If the inverter does not shut down due to a fault, send a shutdown command on the app, SmartLogger, 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 door stopper, 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.

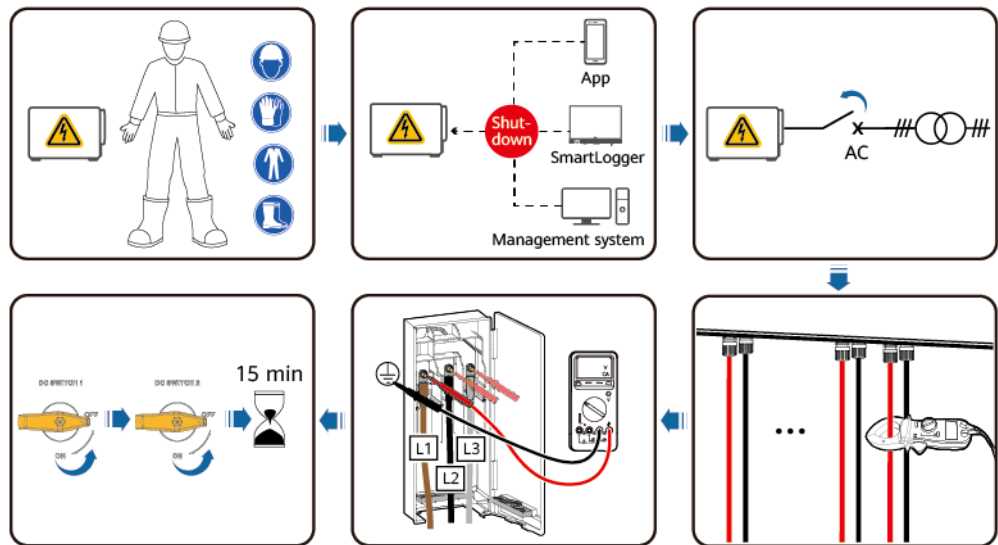
Step 6 Turn off all DC input switches of the inverter and ensure that all switches are **OFF**. If the DC switches are automatically turned off, go to the next step.

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.
 - 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



S000846

----End

8.4 Replacing a Fan

CAUTION

- Before replacing a fan, power off the inverter.
- When replacing a fan, use insulated tools and wear PPE.

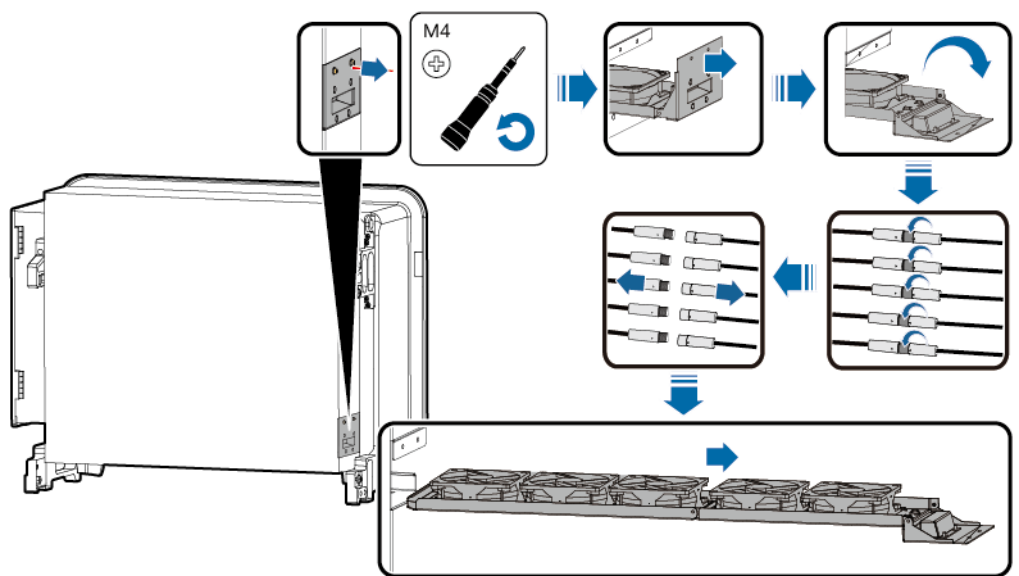
NOTE

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.

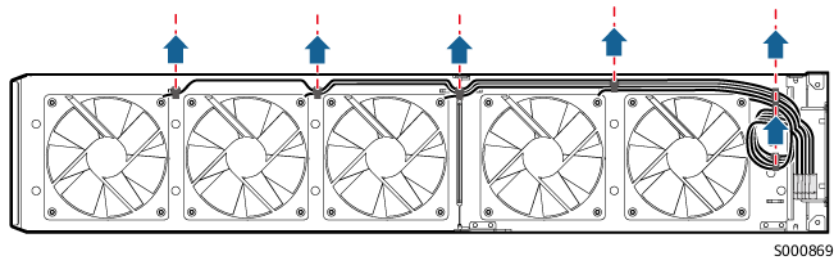
Figure 8-3 Pulling out the fan tray



S000874

Step 2 Remove the cable ties of the faulty fan based on the fan position.

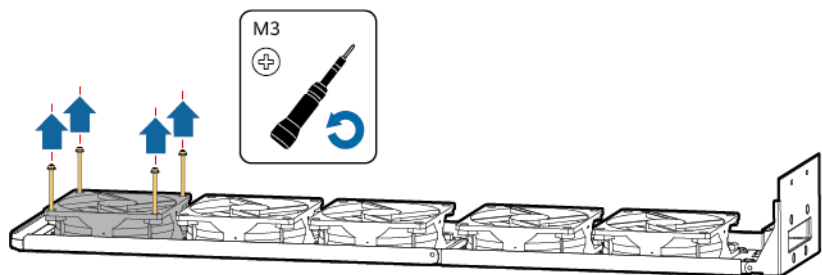
Figure 8-4 Removing cable ties



S000869

Step 3 Remove the faulty fan.

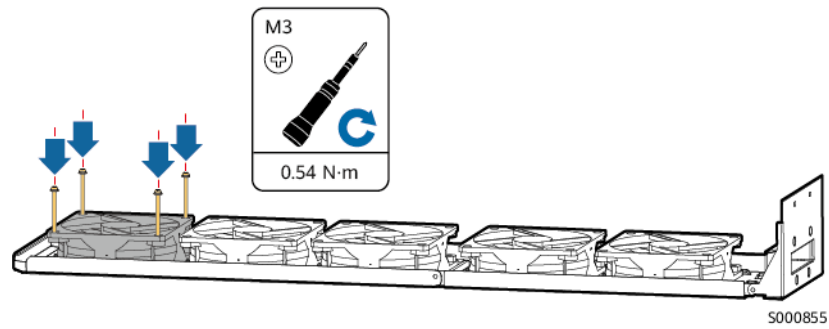
Figure 8-5 Removing the faulty fan



S000877

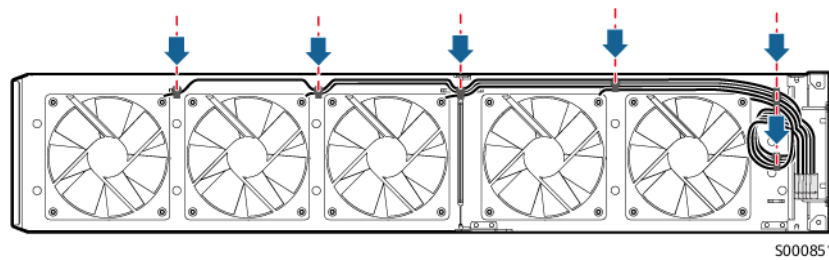
Step 4 Install a new fan.

Figure 8-6 Installing a new fan



Step 5 Bind the fan cables.

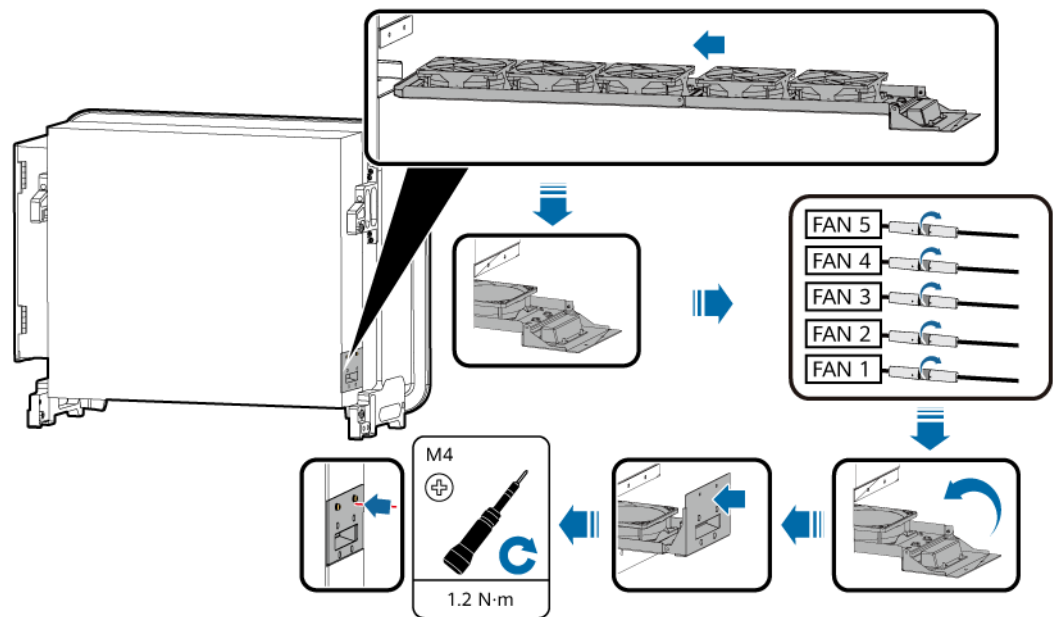
Figure 8-7 Binding cables



Step 6 Install the fan tray.

1. Clean the fan tray and ensure that no foreign matter is left. Align the fan tray with the installation position.
2. Push in the fan tray until the fan baffle plate is flush with the inverter enclosure.
3. Connect the cables correctly according to the cable labels.
4. Rotate the handle.
5. Push the fan tray completely in place.
6. Tighten the screws on the fan tray.

Figure 8-8 Installing a fan tray



5000879

----End

8.5 Replacing an Inverter

NOTICE

Before removing the inverter, disconnect the AC and DC power supplies.

Step 1 Remove the inverter.

1. Disconnect all cables from the inverter, including DC input power cables, AC output power cables, and PE cables.
2. Remove the inverter from the mounting bracket.
3. 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.

NOTE

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 [4 Installation](#) and [5 Electrical Connections](#).

Step 5 Perform device replacement on the SmartLogger WebUI.

Path: **Maintenance > Device Management > Device Replacement**

Figure 8-9 Device replacement

The screenshot shows the 'Device Replacement' web interface. At the top, there are two steps: '1 Enter information' (active) and '2 Confirm information'. Below the steps, there are three dropdown menus: 'Device Type' (set to 'Inverter'), 'Old device SN' (set to 'Select'), and 'New device SN' (set to 'Select'). A 'Next' button is located below the dropdowns.

Step 6 Set parameters as required

Choose **Monitoring > Inverter > Running Parameters**, select the parameters to be set, and click **Batch Sync** to synchronize the parameters to the new inverter.

Figure 8-10 Parameter settings

ID	Name	Value
9	PV string 5 access type	Auto
10	PV string 6 access type	Auto
11	PV string 7 access type	Auto






Buttons: Set, Batch Sync

----End

8.6 Resetting and Turning On a DC Switch

Prerequisites

 **DANGER**

- If a DC switch is locked in the OFF position, the inverter has an internal fault or has experienced more than five external faults (that is, the **String Reverse Connection**, **String Current Backfeed**, or **String Voltage High** alarm). Do not turn on the DC switch by yourself. Contact your vendor or technical support.
 - If all DC switches are automatically turned off at the same time, the AC switch does not trip, and the indicators on the inverter display the following status, do not turn on the DC switches by yourself. Contact your vendor or technical support.
 - , , and  indicators are steady red.
 -  and  indicators are steady red.
 - If all DC switches 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.
 - If a 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.
 - 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**.

----End

8.7 Locating Insulation Resistance Faults

NOTICE

The inverter supports insulation resistance detection:

- If reactive power output at night is enabled for the inverter, log in to the SmartLogger WebUI, choose **Monitoring > Inverter > Running Parameters > 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.
- 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 has occurred 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 app.

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

NOTE

- 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.
- 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.
- 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.
- 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 8-11 Definition of the percentage of the short-circuit position

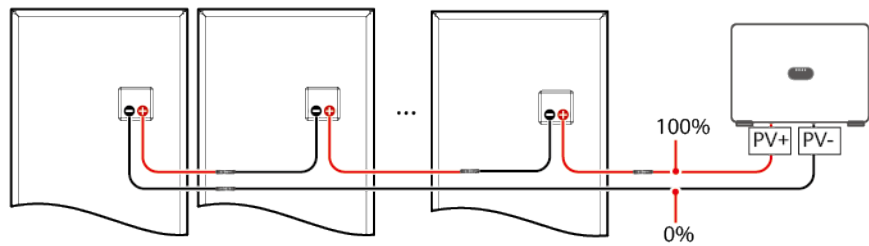


Table 8-2 Mapping between MPPTs and PV strings

MPPT n	PV String	MPPT n	PV String
MPPT1	PV1-PV6	MPPT2	PV7-PV12
MPPT3	PV13-PV18	MPPT4	PV19-PV24
MPPT5	PV25~PV30	MPPT6	PV31~PV36

Procedure

NOTICE

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 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 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.

----End

9 Alarm Reference

For details about alarms, see [Inverter Alarm Reference](#).

10 Technical Specifications

Efficiency

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
Maximum efficiency	99.10%	99.10%	99.10%	99.10%
Efficiency in China	98.58%	/	/	/
Efficiency in Europe	/	98.80%	98.80%	98.80%

Input

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
Maximum input voltage ^a	1500 V	1500 V	1500 V	1500 V
Rated input voltage	1200 V	1200 V	1200 V	1200 V
Minimum operating voltage/ startup voltage	500 V/550 V	500 V/550 V	500 V/550 V	500 V/550 V
MPP voltage range	500–1500 V	500–1500 V	500–1500 V	500–1500 V
Full-load MPPT voltage range	950–1470 V	950–1470 V	950–1470 V	950–1470 V

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
Number of inputs	36	36	36	36
Number of MPPTs	6	6	6	6
Maximum input current (per PV string)	28.75 A	28.75 A	28.75 A	28.75 A
Maximum input current (per MPPT)	105 A	105 A	105 A	105 A
Maximum short-circuit current (per MPPT)	180 A	180 A	180 A	180 A

Note a: The inverter can withstand a maximum operating voltage of 1600 V.

Output

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
Rated output power	460 kW	460 kW	420 kW	460 kW
Maximum apparent power	506 kVA	506 kVA	506 kVA	506 kVA
Maximum active power (cos ϕ = 1)	506 kW	506 kW	506 kW	506 kW
Rated output voltage	Phase voltage/Line voltage: 577.4/1000 V AC, 3W+PE	Phase voltage/Line voltage: 577.4/1000 V AC, 3W+PE	Phase voltage/Line voltage: 577.4/1000 V AC, 3W+PE	Phase voltage/Line voltage: 577.4/1000 V AC, 3W+PE
Rated output current	265.6 A	265.6 A	242.5 A	265.6 A
Maximum output current	292.2 A	292.2 A	292.2 A	292.2 A

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
Supported power grid frequency	50 Hz	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz
Power factor	0.8 leading to 0.8 lagging	0.8 leading to 0.8 lagging	0.8 leading to 0.8 lagging	0.8 leading to 0.8 lagging
Maximum total harmonic distortion (rated power)	< 1%	< 1%	< 1%	< 1%
Output DC component (DCI)	< 0.5% x 265.6 A	< 0.5% x 265.6 A	< 0.5% x 242.5 A	< 0.5% x 265.6 A

Protection

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
Input DC switch	Supported	Supported	Supported	Supported
Anti-islanding protection	Supported	Supported	Supported	Supported
Output overcurrent protection	Supported	Supported	Supported	Supported
Input reverse polarity protection	Supported	Supported	Supported	Supported
PV string fault detection	Supported	Supported	Supported	Supported
Insulation resistance detection	Supported	Supported	Supported	Supported
Residual current monitoring unit (RCMU)	Supported	Supported	Supported	Supported
DC surge protection	Type II	Type II	Type II	Type II

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
AC surge protection	Type II	Type II	Type II	Type II
Overvoltage category	II (DC)/III (AC)	II (DC)/III (AC)	II (DC)/III (AC)	II (DC)/III (AC)

Typical Noise Value

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
Noise (typical working conditions)	75 dB(A)	75 dB(A)	75 dB(A)	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.
- The typical working conditions are as follows: room temperature 25°C, rated input voltage 1200 V DC, rated output voltage 1000 V AC, rated output frequency 50 Hz/60 Hz, rated power 460 kW, and grid voltage THDu ≤ 0.5%.

Display and Communication

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
Display	LED indicators	LED indicators	LED indicators	LED indicators
RS485	Not supported	Not supported	Not supported	Not supported
MBUS	Supported	Supported	Supported	Supported
USB	Supported	Supported	Supported	Supported

General Specifications

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
Dimensions (W x H x D)	1065 mm x 800 mm x 400 mm	1065 mm x 800 mm x 400 mm	1065 mm x 800 mm x 400 mm	1065 mm x 800 mm x 400 mm

Item	SUN2000-460 KTL-H0	SUN2000-506 KTL-H1	SUN2000-506 KTL-H2	SUN2000-506 KTL-H3
Net weight (including hanging kits)	130 kg	130 kg	130 kg	130 kg
Operating temperature	-30°C to +60°C	-25°C to +60°C	-25°C to +60°C	-25°C to +60°C
Storage temperature	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C
Cooling mode	Smart air cooling	Smart air cooling	Smart air cooling	Smart air cooling
Maximum operating altitude	5000 m (derated when the altitude is greater than 4000 m)	5000 m (derated when the altitude is greater than 4000 m)	5000 m (derated when the altitude is greater than 4000 m)	5000 m (derated when the altitude is greater than 4000 m)
Relative humidity	0%–100% RH	0%–100% RH	0%–100% RH	0%–100% RH
Input terminal	AVIC JONHON CT75A-1T-34/ CT75A-1T-35 (standard) AVIC JONHON CT75A-1T-32/ CT75A-1T-33 (for 10 mm ² copper cables)	HH4SFD4TMS / HH4SMD4TMS	HH4SFD4TMS / HH4SMD4TMS	HH4SFD4TMS / HH4SMD4TMS
Output terminal	Waterproof terminal +OT/DT terminal	Waterproof terminal +OT/DT terminal	Waterproof terminal +OT/DT terminal	Waterproof terminal +OT/DT terminal
IP rating	IP66	IP66	IP66	IP66
Topology	Transformerless	Transformerless	Transformerless	Transformerless
Self- consumption at night (without PID modules)	5 W	5W	5W	5W

A Grid Codes

No.	Grid Code	Description	SUN2000 -460KTL- H0	SUN2000 -506KTL- H1	SUN2000 -506KTL- H2	SUN2000 -506KTL- H3
1	CHINA-1000	Chinese grid code	Supporte d	-	-	-
2	CHINA- GBT19964-1000	Chinese grid code	Supporte d	-	-	-
3	CHINA- GBT29319-1000	Chinese grid code	Supporte d	-	-	-
4	NRS-097-2-1-1000	South Africa medium-voltage power grid	-	-	Supporte d	Supporte d
5	SA-RPPS-1000	South Africa RPPs medium-voltage power grid	-	-	Supporte d	Supporte d
6	JORDAN- TRANSMISSION- MV-1000	Jordan power transmission network medium-voltage power grid	-	-	Supporte d	-
7	JORDAN- DISTRIBUTION- MV-1000	Jordan power distribution network medium-voltage power grid	-	-	Supporte d	-
8	EGYPT ETEC-1000	Egyptian power grid	-	-	Supporte d	-
9	SAUDI-1000	Saudi Arabia medium-voltage power grid	-	-	Supporte d	-

No.	Grid Code	Description	SUN2000-460KTL-H0	SUN2000-506KTL-H1	SUN2000-506KTL-H2	SUN2000-506KTL-H3
10	PAKISTAN-1000	Pakistan medium-voltage power grid (50 Hz)	-	-	Supported	-
11	ZAMBIA-1000	Zambia medium-voltage power grid	-	-	Supported	Supported
12	KENYA-ETHIOPIA-1000	Kenya low-voltage power grid and Ethiopia medium-voltage power grid	-	-	Supported	Supported
13	NAMIBIA-1000	Namibia medium-voltage power grid	-	-	Supported	Supported
14	CAMEROON-1000	Cameroon medium-voltage power grid	-	-	Supported	-
15	NIGERIA-1000	Nigeria medium-voltage power grid	-	-	Supported	Supported
16	LEBANON-1000	Lebanon medium-voltage power grid	-	-	Supported	-
17	JORDAN-TRANSMISSION-HV-1000	Jordan high-voltage power grid	-	-	Supported	-
18	TUNISIA-1000	Tunisia medium-voltage power grid	-	-	Supported	-
19	GHANA-1000	Ghana medium-voltage power grid	-	-	Supported	Supported
20	OMAN-1000	Oman medium-voltage power grid	-	-	Supported	-
21	KUWAIT-1000	Kuwait medium-voltage power grid	-	-	Supported	-

No.	Grid Code	Description	SUN2000-460KTL-H0	SUN2000-506KTL-H1	SUN2000-506KTL-H2	SUN2000-506KTL-H3
22	BAHRAIN-1000	Bahrain medium-voltage power grid	-	-	Supported	-
23	KAZAKHSTAN-1000	Kazakhstan medium-voltage power grid	-	-	Supported	-
24	MAURITIUS-1000	Mauritius medium-voltage power grid	-	-	Supported	Supported
25	OMAN-PDO-1000	Oman PDO medium-voltage power grid	-	-	Supported	-
26	UZBEKISTAN-1000	Uzbekistan power grid	-	-	Supported	-
27	IRAQ-1000	Iraq power grid	-	-	Supported	-
28	MOROCCO-1000	Morocco power grid	-	-	Supported	-
29	ALGERIA-1000	Algeria power grid	-	-	Supported	-
30	ABNT NBR 16149-1000	Brazil medium-voltage power grid	-	-	-	Supported
31	UTE C 15-712-1-1000	France mainland power grid	-	Supported	-	Supported
32	ChILE-1000	Chile medium-voltage power grid	-	-	-	Supported
33	MEXICO-1000	Mexico power grid	-	-	-	Supported
34	TAI-PEA-1000	Thailand medium-voltage grid-connection (PEA)	-	-	-	Supported
35	PHILIPPINES-1000	Philippines medium-voltage power grid	-	-	-	Supported

No.	Grid Code	Description	SUN2000-460KTL-H0	SUN2000-506KTL-H1	SUN2000-506KTL-H2	SUN2000-506KTL-H3
36	MALAYSIAN-1000	Malaysia medium-voltage power grid	-	-	-	Supported
37	EN50438-IE-1000	Ireland medium-voltage power grid	-	Supported	-	Supported
38	EN50549-1000	Ireland new standard	-	Supported	-	Supported
39	NORTHERN IRELAND-1000	Northern Ireland medium-voltage power grid	-	Supported	-	Supported
40	CEI0-21-1000	Italy power grid	-	Supported	-	Supported
41	BRASIL-ANEEL-1000	Brazil ANEEL utility-scale power grid (60 Hz)	-	-	-	Supported
42	ISRAEL-MV-1000	Israel medium-voltage power grid (50 Hz)	-	-	-	Supported
43	CEI0-16-1000	Italy CEI 016 medium-voltage power grid	-	Supported	-	Supported
44	ARGENTINA-1000	Argentina medium-voltage power grid	-	-	-	Supported
45	NICARAGUA-1000	Nicaragua power grid	-	-	-	Supported
46	RD1699/661-1000	Spain power grid	-	Supported	-	Supported
47	PO12.3-1000	Spain power grid	-	Supported	-	Supported
48	VIETNAM-1000	Vietnam medium-voltage power grid	-	-	-	Supported
49	TAIPOWER-1000	Taiwan Power medium-voltage power grid	-	-	-	Supported

No.	Grid Code	Description	SUN2000-460KTL-H0	SUN2000-506KTL-H1	SUN2000-506KTL-H2	SUN2000-506KTL-H3
50	BANGLADESH-1000	Bangladesh medium-voltage power grid	-	-	-	Supported
51	TAI-MEA-1000	Thailand power grid	-	-	-	Supported
52	PORTUGAL-1000	Portugal power grid	-	Supported	-	Supported
53	C10/11-1000	Belgium power grid	-	Supported	-	Supported
54	VDE-AR-N4110-1000	Germany medium-voltage power grid (VDE 4110)	-	Supported	Supported	Supported
55	PANAMA-1000	Panama medium-voltage power grid	-	-	-	Supported
56	MACEDONIA-1000	North Macedonia medium-voltage power grid	-	Supported	-	Supported
57	NTS-1000	Spain power grid	-	Supported	-	Supported
58	SINGAPORE-1000	Singapore power grid	-	-	-	Supported
59	CAMBODIA-1000	Cambodian power grid	-	-	-	Supported
60	GREG060-1000	Colombian power grid	-	-	-	Supported
61	ISRAEL-HV-1000	Israel high-voltage power grid (161 kV)	-	-	-	Supported
62	AUSTRIA-TYPEB-1000	Austria power grid (Type B)	-	Supported	-	Supported
63	AUSTRIA-TYPED-1000	Austria power grid (Type D)	-	Supported	-	Supported
64	POLAND-EN50549-1000	Poland power grid	-	Supported	-	Supported
65	DENMARK-EN50549-DK2-1000	Denmark power grid (DK2)	-	Supported	-	Supported

No.	Grid Code	Description	SUN2000-460KTL-H0	SUN2000-506KTL-H1	SUN2000-506KTL-H2	SUN2000-506KTL-H3
66	DENMARK-EN50549-DK1-1000	Denmark power grid (DK1)	-	Supported	-	Supported
67	CZECH-EN50549-1000	Czech Republic power grid	-	Supported	-	Supported
68	ANRE-1000	Romania medium-voltage power grid	-	Supported	-	Supported
69	LITHUANIA-EN50549-1000	Lithuania power grid	-	Supported	-	Supported
70	VDE-AR-N4130-1000	Germany high-voltage power grid (VDE 4130)	-	Supported	Supported	Supported
71	G99-TYPEA-MV-1000	UK G99-TYPEA	-	Supported	Supported	Supported
72	AZERBAIJAN-1000	Azerbaijan power grid	-	-	Supported	-
73	SRI LANKA-1000	Sri Lanka power grid	-	-	-	Supported
74	ESTONIA-1000	Estonia power grid	-	Supported	-	Supported
75	LATVIA-1000	Latvia power grid	-	Supported	-	Supported
76	GUATEMALA-1000	Guatemala power grid	-	-	-	Supported
77	G99/NI-TYPEA-1000	Northern Ireland power grid (type A)	-	Supported	-	Supported
78	G99/NI-TYPEB-1000	Northern Ireland power grid (type B)	-	Supported	-	Supported
79	G99/NI-TYPEC-1000	Northern Ireland power grid (type C)	-	Supported	-	Supported
80	G99/NI-TYPED-1000	Northern Ireland power grid (type D)	-	Supported	-	Supported
81	FRANCE-EN50549-1000	France FD C11-519-12	-	Supported	-	Supported

No.	Grid Code	Description	SUN2000-460KTL-H0	SUN2000-506KTL-H1	SUN2000-506KTL-H2	SUN2000-506KTL-H3
82	ITALY-A68-1000	Italy power grid	-	Supported	-	Supported
83	IEC61727-1000-50HZ	IEC 61727 medium-voltage grid-connection (50 Hz)	-	Supported	Supported	Supported
84	TAI-EGAT-1000	Thailand EGAT power grid	-	-	-	Supported
85	IEC 61727-1000-60HZ	IEC 61727 medium-voltage grid-connection (60 Hz)	-	Supported	Supported	Supported
86	VDE-AR-N4120-1000	Germany medium-voltage power grid (VDE 4120)	-	Supported	Supported	Supported
87	FRANCE-RTE-1000	France RTE power grid	-	Supported	-	Supported
88	AUSTRIA-TYPEC-1000	Austria medium-voltage power grid (type C)	-	Supported	-	Supported
89	G99-TYPEB-HV-1000	UK G99 power grid (Type B)	-	Supported	Supported	Supported
90	G99-TYPEC-HV-1000	UK G99 power grid (Type C)	-	Supported	Supported	Supported
91	UK G99 (Type D)	UK G99 power grid (Type D)	-	Supported	Supported	Supported
92	INDIA-1000	India non-standard medium-voltage power grid	-	-	Supported	-
93	CEA-1000	India CEA power grid	-	-	Supported	Supported
94	CHILE-PMGD-1000	Chile PMGD medium-voltage power grid	-	-	-	Supported
95	JAMAICA-1000	Jamaica medium-voltage power grid	-	-	-	Supported





No.	Grid Code	Description	SUN2000-460KTL-H0	SUN2000-506KTL-H1	SUN2000-506KTL-H2	SUN2000-506KTL-H3
96	IEEE 1547-1000	IEEE 1547-MV1000	-	-	Supported	Supported
97	ABUDHABI-1000	Abu Dhabi medium-voltage power grid	-	-	Supported	-
98	SENEGAL-1000	Senegal medium-voltage power grid	-	-	Supported	-
99	DUBAI-1000	Dubai medium-voltage power grid	-	-	Supported	-

 **NOTE**

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

B Resetting a Password

B.1 Resetting the Password After Power-On and Power-Off

- 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 are off.
- Step 3** After the inverter is powered off, complete the following operations within 4 minutes:
1. **Turn on the AC switch and wait about 90s or until the inverter indicator  blinks.**
 2. Turn off the AC switch and wait about 30s or until all LED indicators on the inverter panel are off.
 3. Turn on the AC switch and wait 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.)
- End

B.2 Resetting the Password on the SmartLogger WebUI

Prerequisites

1. The inverter is networked with the SmartLogger5000.
2. The inverter, SmartLogger5000, and app are of the latest versions.

Procedure

1. Log in to the SmartLogger WebUI and choose **Maintenance > Security Management > Password Reset**.

2. Select the inverter for which the password needs to be reset.
3. Click **Reset** to obtain a verification code.

 **NOTE**

The verification code is valid for 4 hours. Enter it in the text box within the validity period.

4. Log in to the app and choose **Services > Device Commissioning**.
5. Select **USB connection** and connect to the inverter using a USB data cable to access the **Log In** screen.
6. On the **Log in** screen, select the user role whose password needs to be reset and tap **Forgot password?**.
7. On the **Reset Password** screen, enter the verification code and tap **OK**.

 **NOTE**

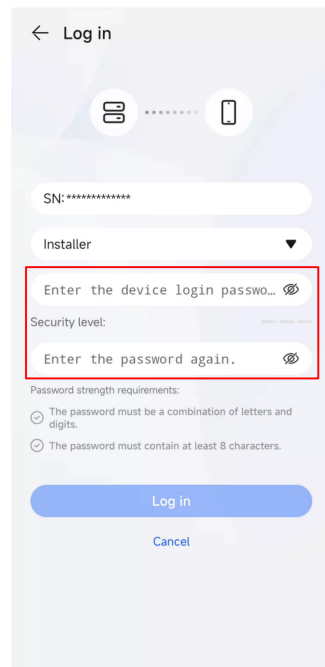
The verification code will expire after 10 failed attempts. In that case, you need to obtain a new verification code.

8. Select **USB connection** and connect to the inverter to access the **Log in** screen.
9. On the **Log In** screen, set a new password.

 **NOTE**

Set a new password to log in to the device again within 10 minutes.

Figure B-1 Login screen



C Connecting AC Output Power Cables (Dual per Phase)

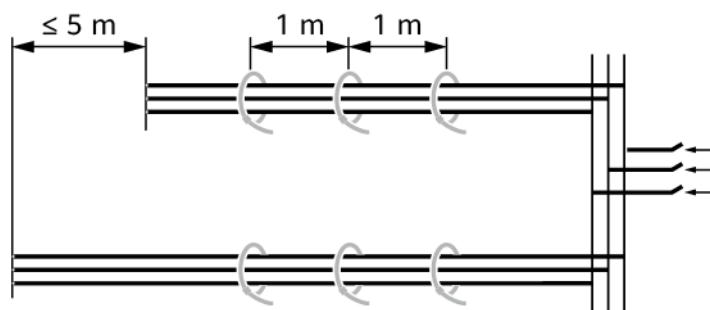
NOTICE

- If single-core cables (dual per phase) are used, the maximum communication distance is 800 m when the SACU is installed outside the transformer station ($D \leq 10$ m). D indicates the distance from the busbar of the transformer station to the port of the SmartMBUS.
- Single-core cables must be bound at an interval of 1 m

(). Single-core cables do not need to be bound if they are routed through a pipe.

- The inverter can be connected using dual cables per phase. The matched fitting bag is required.
- If dual cables per phase are adopted, the length difference between the two groups of cables must not exceed 5 m to ensure normal MBUS communication.

Figure C-1 Connection with dual cables per phase

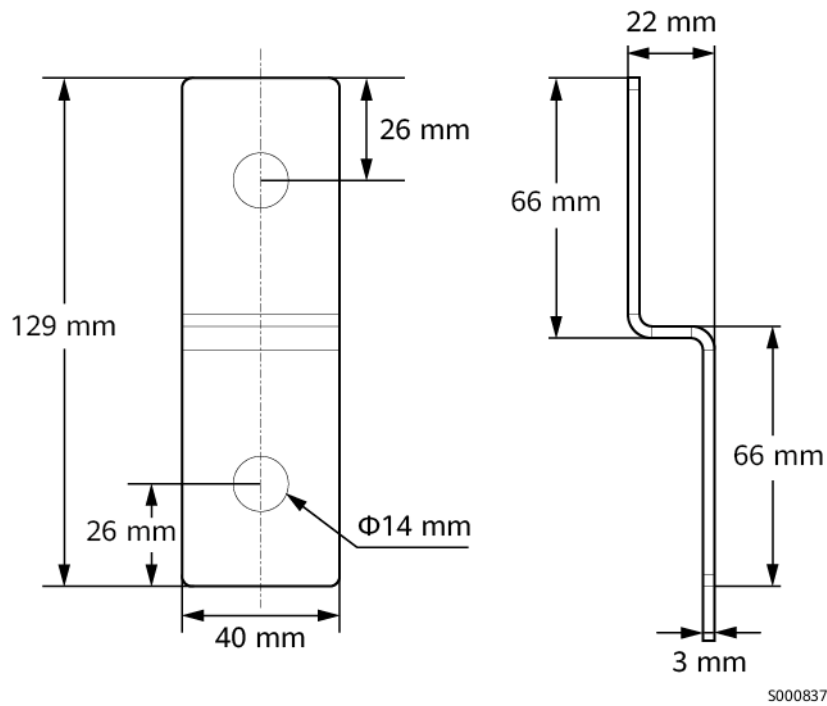


S000865

Fitting Bag

Material	Quantity
M12x40 bolt assembly	3
M12 nut	3
Transfer copper bar	3
Plastic part	3
Single-core cable crimping module	2
Separator	1

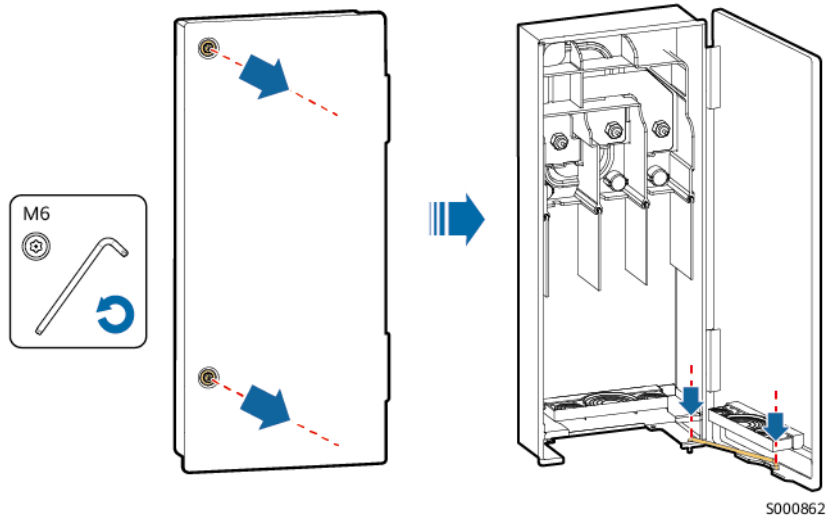
Figure C-2 Transfer copper bar dimensions



Procedure

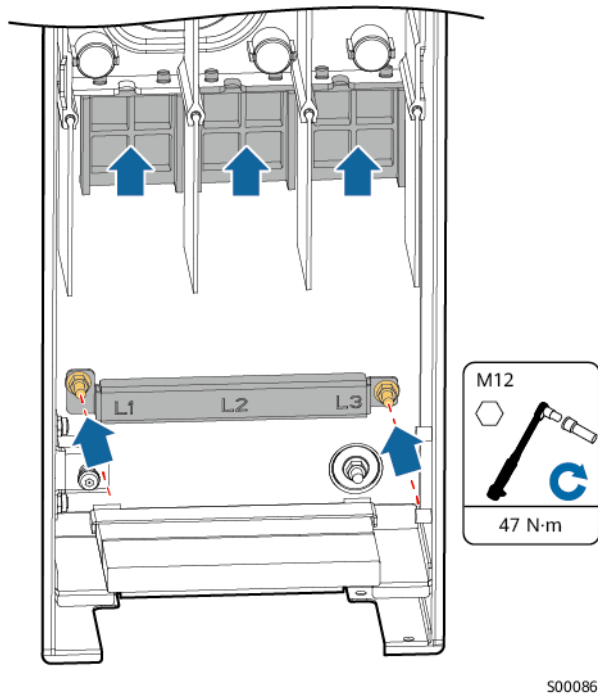
- Step 1** Open the maintenance compartment door and install the door stopper. Remove the accessories and set them aside.

Figure C-3 Opening the maintenance compartment door



Step 2 Install the plastic parts and separator.

Figure C-4 Installing the plastic parts and separator



Step 3 Prepare AC power cables.

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

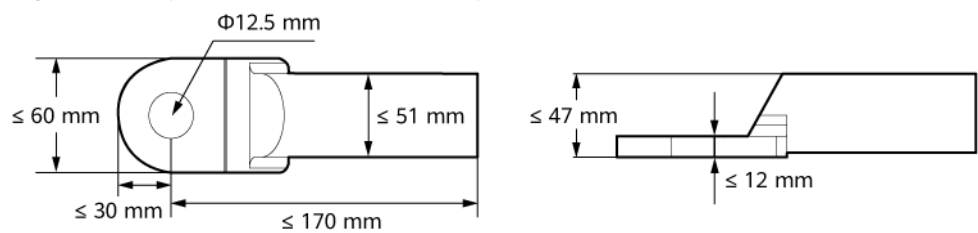
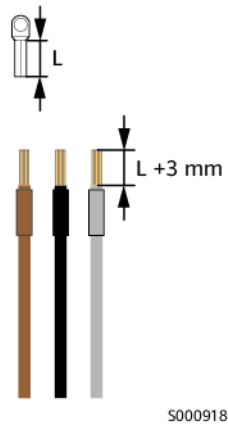
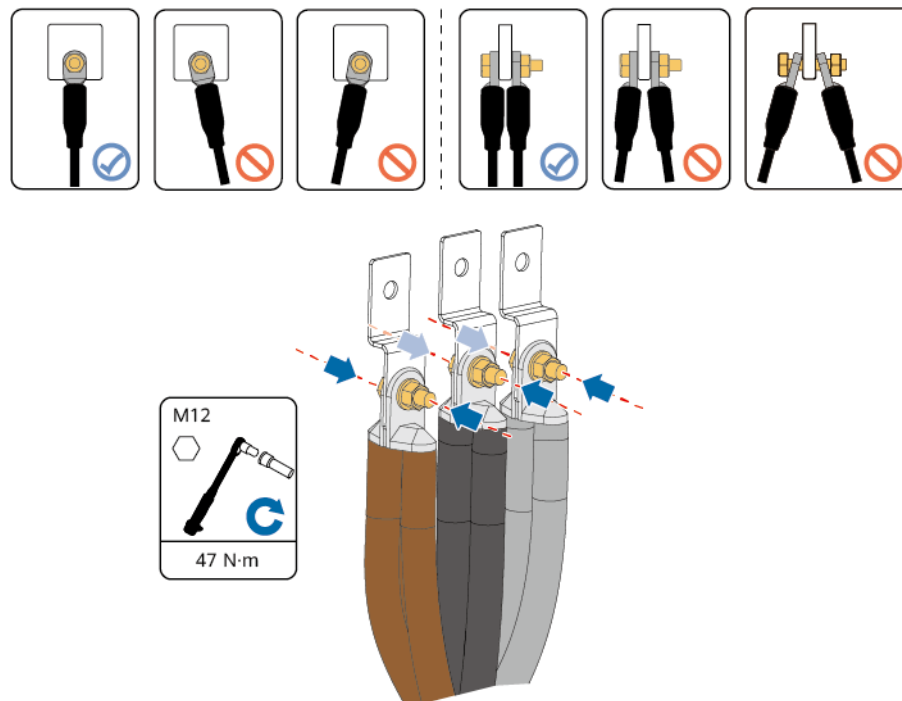


Figure C-6 Wire stripping requirements



Step 4 Connect the AC output power cables to the transfer copper bar.

Figure C-7 Copper bar connection

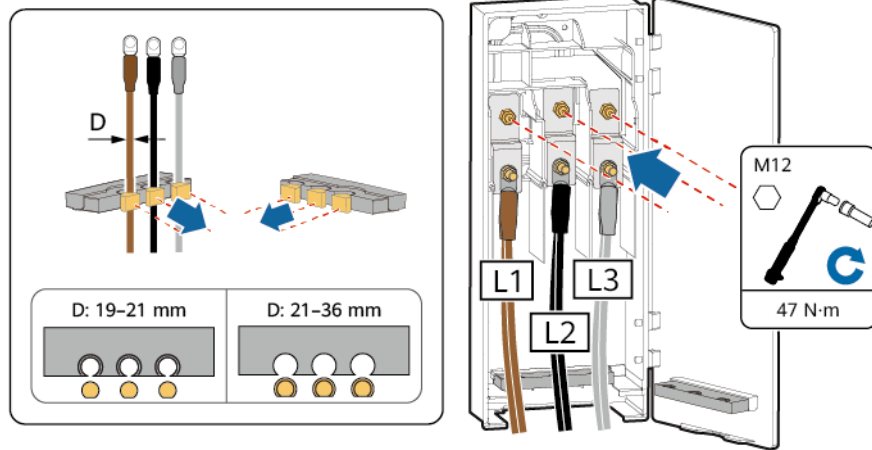


Step 5 Connect the transfer copper bar inside the AC maintenance compartment.

NOTICE

- After cables are connected, prevent them from contacting the inter-phase baffle plates.
- Ensure that the transfer copper bar is securely and reliably connected.

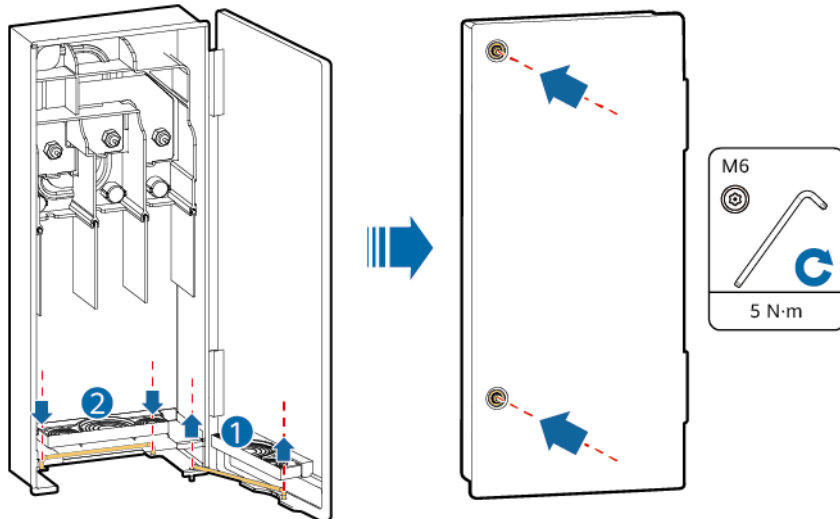
Figure C-8 Connecting single-core power cables (dual per phase)



S000843

Step 6 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 C-9 Closing the door



S000835

----End

D Crimping an OT or DT Terminal

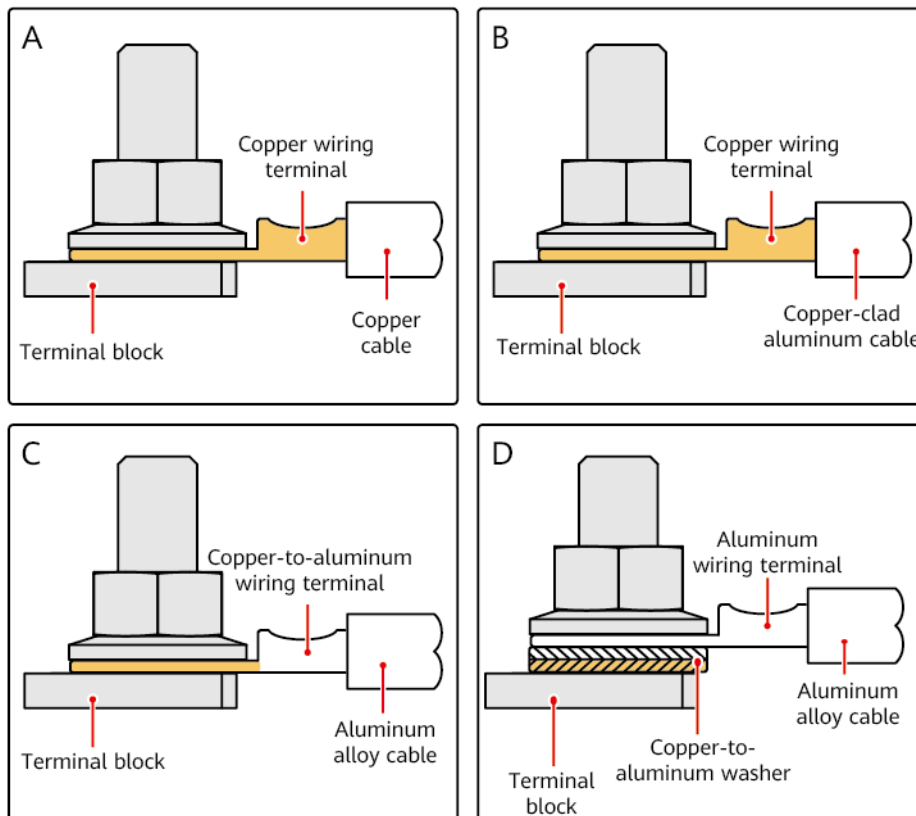
Requirements on an OT or DT Terminal

- 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.

NOTICE

- Do not connect aluminum wiring terminals to the terminal block. Otherwise electrochemical corrosion may occur, affecting the reliability of cable connections.
 - Comply with the IEC 61238-1 requirements when using copper-to-aluminum wiring terminals, or aluminum wiring terminals along with copper-to-aluminum washers.
 - 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 D-1 Requirements on an OT or DT terminal

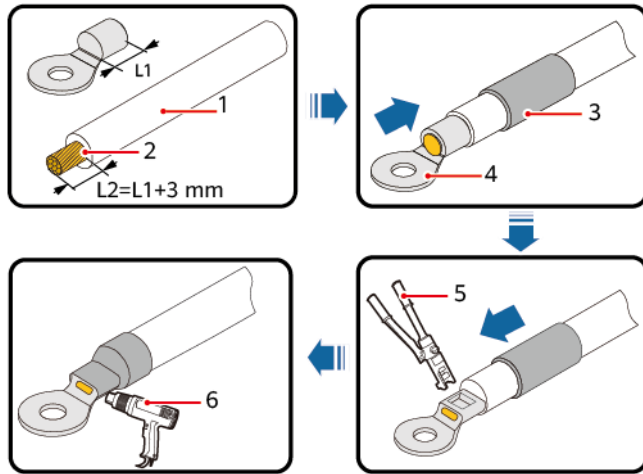


Crimping an OT or DT Terminal

NOTICE

- Avoid scratching the core wire when stripping a cable.
- 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.
- Wrap the wire crimping area with heat shrink tubing, cold shrink tubing, or insulation tape. The heat shrink tubing is used as an example.
- Use a heat gun carefully to avoid heat damage to the equipment.

Figure D-2 Crimping an OT terminal



IS06Z00001

(1) Cable

(2) Core wire

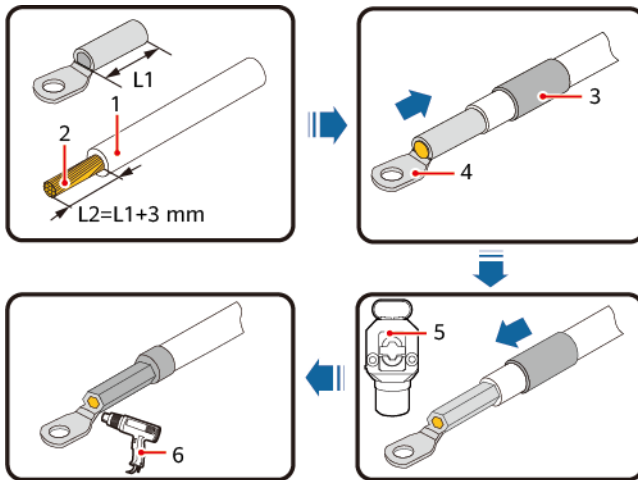
(3) Heat shrink tubing

(4) OT terminal

(5) Hydraulic pliers

(6) Heat gun

Figure D-3 Crimping a DT terminal



IP04I40001

(1) Cable

(2) Core wire

(3) Heat shrink tubing

(4) DT terminal

(5) Hydraulic pliers

(6) Heat gun

E Contact Information

If you have any questions about this product, please contact us.



<https://digitalpower.huawei.com>

Path: **About Us > Contact Us > Service Hotlines**

To ensure faster and better services, we kindly request your assistance in providing the following information:

- Model
- Serial number (SN)
- Software version
- Alarm ID or name
- Brief description of the fault symptom

 **NOTE**

EU Representative Information: Huawei Technologies Hungary Kft.
Add.: HU-1133 Budapest, Váci út 116-118., 1. Building, 6. floor.
Email: hungary.reception@huawei.com

F Digital Power Customer Service



<https://digitalpower.huawei.com/robotchat/>

G 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