SUN2000-(100KTL, 110KTL, 125KTL) Series

User Manual

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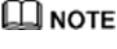# About This Document

Overview

This document describes the SUN2000-125KTL-M0, SUN2000-110KTL-M0, SUN2000-100KTL-M0, SUN2000-100KTL-M1 and SUN2000-100KTL-INM0 (SUN2000 for short) in terms of installation, electrical connection, commissioning, maintenance, and troubleshooting. Before installing and operating the solar inverter, ensure that you are familiar with the features, functions, and safety precautions provided in this document.

Intended Audience

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

Symbol Conventions

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

Symbol	Remarks
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	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.
📖 NOTE	Calls attention to important information, best practices and tips. 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 02 (2019-08-09)

Added the SUN2000-110KTL-M0, SUN2000-100KTL-M0, SUN2000-100KTL-M1, and SUN2000-100KTL-INM0 models.

Issue 01 (2019-05-15)

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

Contents

1 Safety Precautions

General Safety

Before performing any operation, read the precautions and instructions in this manual and strictly follow the precautions and special safety instructions provided by Huawei to avoid accidents.

The installation, operation, and maintenance of the equipment must comply with local laws and regulations. The NOTICE, WARNING, and DANGER items in this document do not cover all the safety cautions and are only supplementary to the laws and regulations. Huawei assumes no responsibility for violation of general safety operation requirements or design, production, and equipment safety standards.

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

Statement

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

- Damage during the transportation by the customer
- Storage conditions that do not meet the requirements specified in this document
- Installation or use in environments which are not specified in related international standards
- Failure to follow the operation instructions and safety precautions in this document
- Operation of the product beyond specified parameter ranges
- Unauthorized modifications to the product or software code or removal of the product
- Device damage due to abnormal natural factors (force majeure, such as earthquake, fire, and storm)

Personnel Requirements

Only qualified and trained electrical technicians are allowed to operate the device. Operators need to meet the following requirements.

- Be properly trained.
- Read through this manual and master related safety precautions.
- Get familiar with the safety specifications about the electrical system.

- Understand the components and functioning of a grid-tied PV power system and relevant local standards.

Personal Safety

- Wear personal protective equipment, including but not limited to safety shoes, protective goggles, and safety gloves.
- Before using a device, remove any conductors such as jewelry or watches to avoid electric shock or burns.
- Use tools in correct methods to avoid hurting people or damaging devices.
- If there is a probability of personal injury or equipment damage during the operation of the device, immediately stop operations on the equipment, report the case to the project owner, and take feasible protective measures.
- In the case of a fire, immediately leave the building or the equipment area, and turn on the fire alarm bell or make an emergency call. Do not enter the building on fire in any case.

Protection Label

Do not scrawl, damage, or block any warning label on the device.

System Installation

> ⚠ **DANGER**
>
> Never work with power-on during installation.

- Ensure that the devices are not connected to a power supply or powered on before finishing installation.
- Do not install the device under bad weather conditions such as thunderstorms, raining, snowing, or strong winds.
- Ensure that the device is installed in a well ventilated environment.
- Ensure that the heat dissipation system of the device is not blocked.
- Do not open the host panel of the device.
- Tighten the screws using tools when installing the device.
- After installation, remove the packing materials from the equipment area.

Grounding

- When installing the device, always make the ground connection first and disconnect it in the end.
- Do not damage the ground conductor.
- Do not operate the device in the absence of a properly installed ground conductor.
- The device must be connected permanently to the protective ground. Before operating the device, check the electrical connection of it to ensure that it is securely grounded.

Electrical Connections

⚠ DANGER

Before connecting cables, ensure that the device is not damaged. Otherwise, electric shocks or fire may occur.

- Ensure that all electrical connections comply with local electrical standards.
- Obtain approval from the country or local utility company before using the inverter in grid-tied mode.
- Ensure that the cables used in a grid-tied PV power system are properly connected and insulated and meet specifications.
- Before connecting a power cable, check that the label on the power cable is correct.
- Before making electrical connections, switch off the disconnector on the upstream device to cut the power supply if people may contact energized components.
- When routing cables, ensure that a sufficient distance exists between the cables and heat emitting equipment to prevent damage to the insulation layers of cables.
- Signal cables and power cables should be bound separately.
- Ensure that the cables you prepared meet local regulations.

Operations

⚠ DANGER

High voltage generated by the device during operation may cause an electric shock, which could result in death, serious injury, or serious property damage. Perform operations in strict accordance with safety precautions specified in this document and other relevant documents.

- Do not disconnect DC or AC power cables when the device is running.
- Do not touch an energized device, as the enclosure is hot.
- When the device is running, ensure that the heat dissipation system is not blocked to prevent high temperature alarms and fire from damaging the device.

Commissioning

When the device is powered on for the first time, professional personnel is required to set parameters correctly. Incorrect settings may result in inconsistency between the device and the certification of the country or region where the device is located, affecting the normal operation of the device.

Maintenance and Replacement

⚠ DANGER

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

- Only qualified professionals are allowed to remove safety facilities and inspect the device.
- Only personnel certified or authorized by Huawei are allowed to replace the device or components (including software).
- Any fault or error that might cause safety problems must be reported immediately to a supervisor.
- Maintain the device after you get familiar with this document and prepare the tools and testing equipment.
- Before maintaining the device, power it off and follow the instructions on the delayed discharge label to ensure that the device is powered off.
- The device has multiple inputs. Switch off all inputs before maintenance.
- Temporary warning signs or fences must be placed to prevent unauthorized person from entering the site.
- If the device is faulty, contact your dealer.
- The device can be powered on only after all faults are rectified. Failing to do so may escalate faults or damage the device.

2 Overview

2.1 Product Model

Model Description

This document covers the following product models:

- SUN2000-125KTL-M0
- SUN2000-110KTL-M0
- SUN2000-100KTL-M0
- SUN2000-100KTL-M1
- SUN2000-100KTL-INM0

Figure 2-1 Model
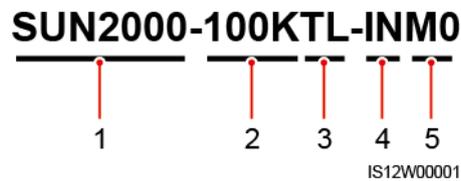
Table 2-1 Model description

No.	Description	Value
1	Series	SUN2000: grid-tied solar inverter
2	Power	- 125K: The power level is 125 kW. - 110K: The power level is 110 kW. - 100K: The power level is 100 kW.
3	Topology	TL: transformerless
4	Region	IN: India
5	Design code	M0 and M1: product series with an input voltage level of 1100 V DC

Model Identification

You can obtain the solar inverter model from the model label on the external package and the nameplate on the side of the enclosure.

Figure 2-2 Position of the model label on the external package

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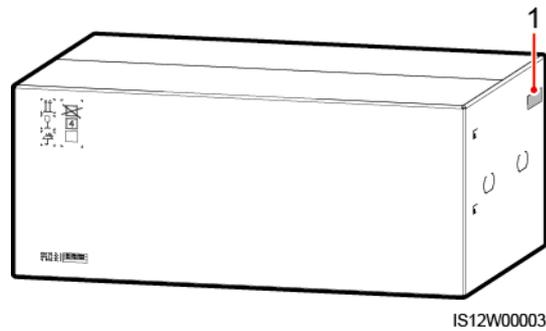
(1) Position of the model label

Figure 2-3 Nameplate

型号 Model: SUN2000-125KTL-M0
名称 Name: 太阳能光伏逆变器
SOLAR INVERTER

最大输入电压 d.c. Max. Input Voltage: 1100 Vd.c.
最大输入电流 d.c. Max. Input Current: 10×26 A
输入短路电流 Isc: 10×40 A
MPP电压范围 d.c. MPP Range: 200 ~ 1000 Vd.c.
输出电压 a.c. Output Nominal Voltage: 500 Va.c.; 3 ~ + ⏚
输出频率 a.c. Nominal Operating Frequency: 50 Hz
额定输出功率 a.c. Output Rated Power: 125 kW
最大视在功率 a.c. Output Max.Apparent Power: 137.5 kVA
最大输出电流 a.c. Output Max. Current: 160.4 A
功率因数 Power Factor: 0.8(lagging) ~ 0.8(leading)
温度范围 Operating Temperature Range: - 25 ~ +60 ℃
逆变器拓扑 Inverter Topology: Non-Isolation
防护等级 Enclosure: IP66
保护等级 Protection Class: I
过电压类别 Overvoltage Category: II(DC)/III(AC)
污染等级 Pollution Degree: III
海拔 Altitude: 4000m
通讯方式 Communication: MBUS/RS485

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(1) Trademark and product model	(2) Key technical specifications
(3) Compliance symbols	(4) Company name and country of origin

☉ NOTE

The nameplate figure is for reference only.

Table 2-2 Compliance symbols

Icon	Name	Description
	CQC certification symbol	The product has been awarded the NB/T 32004 certification by CQC.
	Environment friendly use period (EFUP) symbol	The product does not pollute the environment during the specified period.
	EU waste electrical and electronic equipment (WEEE) symbol	Do not dispose of solar inverters as household garbage.

2.2 Overview

Description

SUN2000 solar inverters are grid-tied PV string inverters that convert the DC power generated by PV strings into AC power and feed the power into the power grid.

Characteristics

Smart

- Ten independent maximum power point tracking (MPPT) circuits and 20 PV string inputs. Flexible configuration of PV strings is supported.

- Smart PV module self-learning: Automatically detects PV module failures, helping rectify faults. Optimizes the working mode to obtain the optimal working mode of the system.

- Smart air cooling: Adjusts the fan speed based on the ambient temperature and load to ensure the service life of fans and avoid frequent maintenance.

- MBUS networking: Uses the existing power line for communication and does not require additional communications cable, which reduces the construction and maintenance costs and improves communication reliability and efficiency.

- Smart I-V curve diagnosis: Implements I-V scanning and health diagnosis for PV strings. In this way, potential risks and faults can be detected in time, improving the plant operation & maintenance (O&M) quality.

Safe

- Embedded DC and AC surge protection devices (SPDs): all-dimensional surge protection
- Embedded residual current monitoring unit: Immediately disconnects from the power grid upon detecting that the residual current exceeds the threshold.

Networking

SUN2000 solar inverters apply to grid-tied systems of large-scale PV plants and commercial distributed grid-tied systems. Typically, a grid-tied PV system consists of the PV string, solar inverter, AC combiner box, and transformer station.

Figure 2-4 Networking

| (1) PV string | (2) SUN2000 | (3) AC combiner box |
| (4) Transformer station | (5) Power grid | |

□ NOTE

The SUN2000-125KTL-M0 is powered by a dedicated power transformer instead of connecting to low-voltage overhead power lines.

Supported Power Grids

- SUN2000-110KTL-M0, SUN2000-100KTL-M0, SUN2000-100KTL-M1 and SUN2000-100KTL-INM0 solar inverters support the TN-S, TN-C, TN-C-S, TT, and IT power grids.
- The SUN2000-125KTL-M0 supports only the IT power grid.

Figure 2-5 Supported Power Grids
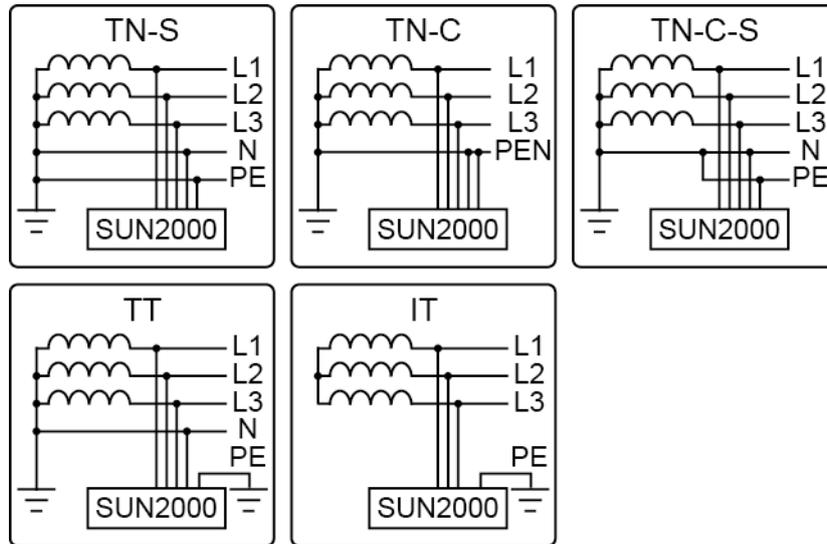
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2.3 Label Description

Symbol	Name	Meaning
	Running warning	Potential hazards exist after the inverter is powered on. Take protective measures when operating the inverter.
	Burn warning	Do not touch a running inverter, as the shell becomes hot during operation.
	Large current warning	Before powering on the inverter, ensure that the inverter is grounded because there is a large contact current after the inverter is powered on.
	Delayed discharge	• High voltage exists after the inverter is powered on. Only qualified and trained electrical technicians are allowed to perform operations on the inverter. • Residual voltage exists after the inverter is powered off. It takes 15 minutes for the inverter to discharge to the safe voltage.

Symbol	Name	Meaning
	Refer to documentation	Reminds operators to refer to the documents shipped with the inverter.
	Grounding	Indicates the position for connecting the protective earthing (PE) cable.
Do not disconnect under load! 禁止带负荷断开连接!	Operation warning	Do not remove the DC input connector when the inverter is running.
	Fan operation warning	High voltage exists after the inverter is powered on. Do not touch the fans when the inverter is working.
⚠CAUTION Before replacing the fan, disconnect the FAN-POWER cable and then the fan cable. 更换风扇前, 必须先拔除风扇电源线, 再拔除风扇线。	Fan replacement warning	Before replacing a fan, disconnect its power connectors.
(1P)PN/ITEM:XXXXXXXX (32P)Model:SUN2000-XXKTL-XX (S)SN:XXXXXXXXXXXX Y MADE IN CHINA	Inverter ESN label	Indicates the inverter serial number.
OR > 55 kg (121 lbs)	Weight label	The inverter needs to be carried by four persons or using a pallet truck.
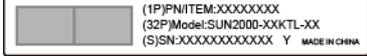
2.4 Product Appearance

2.4.1 Product Appearance

Appearance

Figure 2-6 Appearance
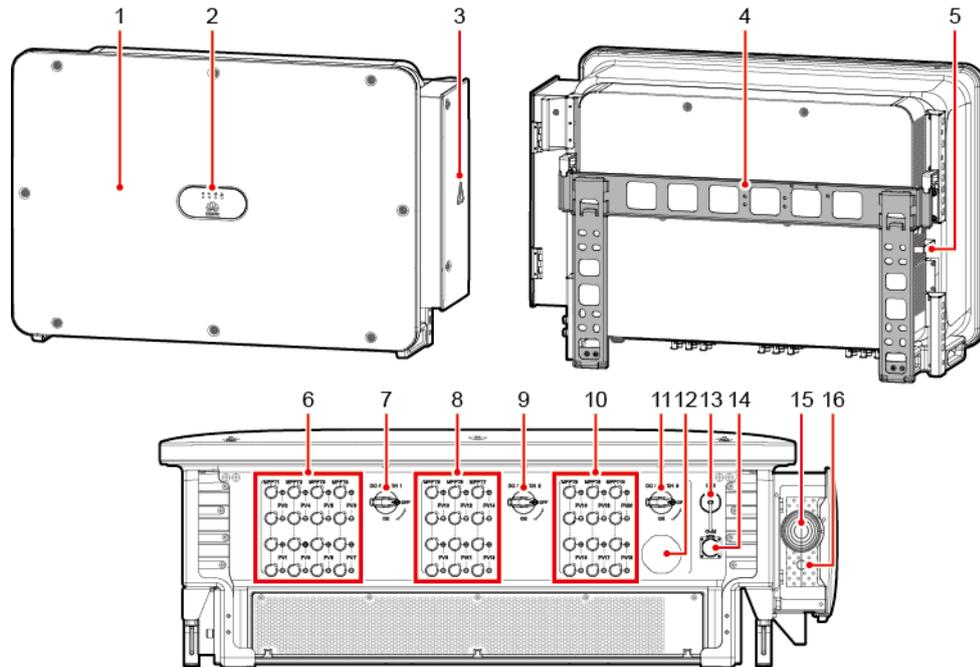
(1) Panel	(2) LED indicators
(3) Maintenance compartment door	(4) Mounting bracket
(5) External fan tray	(6) DC input terminal group 1 (PV1–PV8, controlled by DC SWITCH 1)
(7) DC switch 1 (DC SWITCH 1)	(8) DC input terminal group 2 (PV9–PV14, controlled by DC SWITCH 2)
(9) DC switch 2 (DC SWITCH 2)	(10) DC input terminal group 3 (PV15–PV20, controlled by DC SWITCH 3)
(11) DC switch 3 (DC SWITCH 3)	(12) Ventilation valve
(13) USB port (USB)	(14) Communications port (COM)
(15) Hole for the AC output power cable	(16) Hole for the tracking system power cable

Dimensions

Figure 2-7 Dimensions
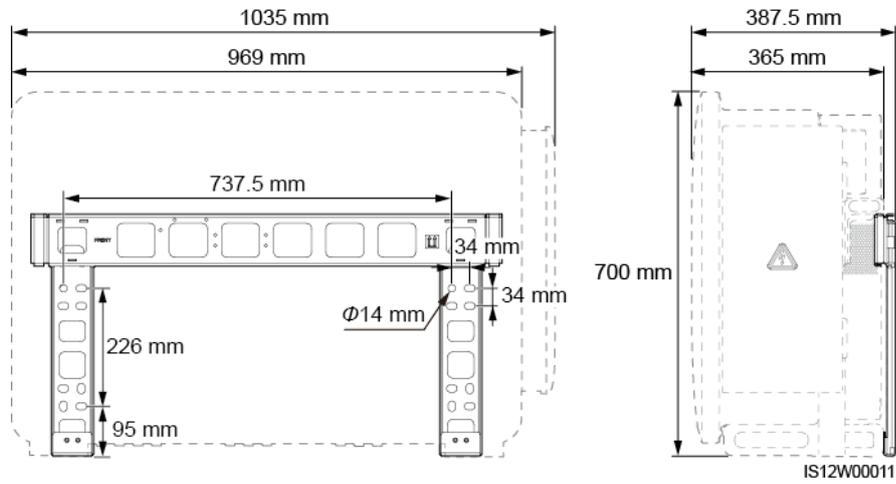
Wiring Area

Figure 2-8 Wiring port of a 3-pin model (SUN2000-125KTL-M0)
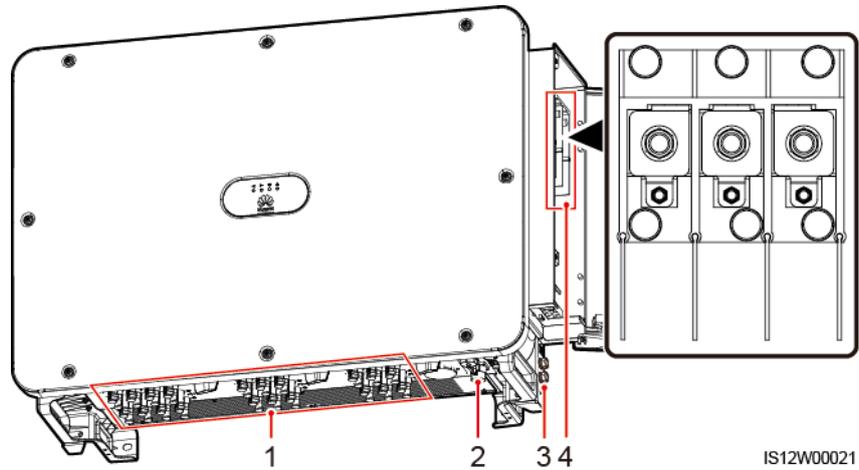
(1) DC input terminals	(2) RS485 port
(3) Ground point on the enclosure	(4) AC terminal block (3-pin)

Figure 2-9 Wiring port of 4-pin models (SUN2000-110KTL-M0, SUN2000-100KTL-M0, SUN2000-100KTL-M1, and SUN2000-100KTL-INM0)
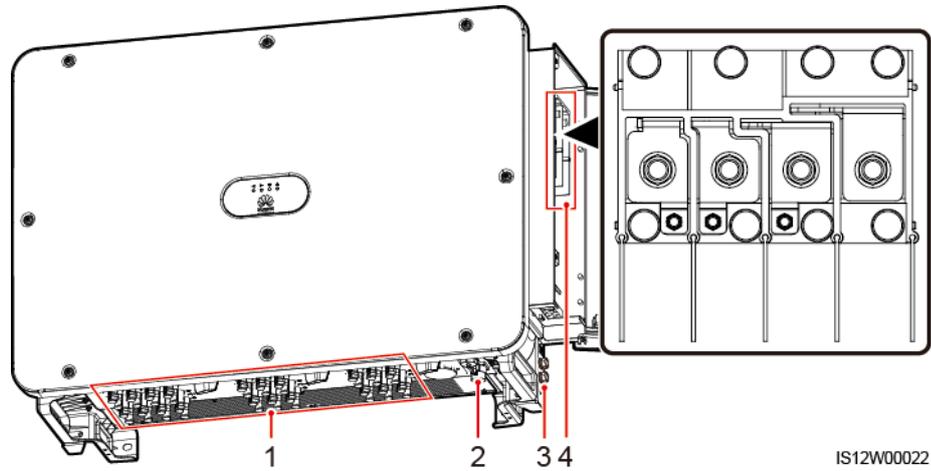
(1) DC input terminals	(2) RS485 port
(3) Ground point on the enclosure	(4) AC terminal block (4-pin)

2.4.2 Indicator Status

Figure 2-10 Indicator
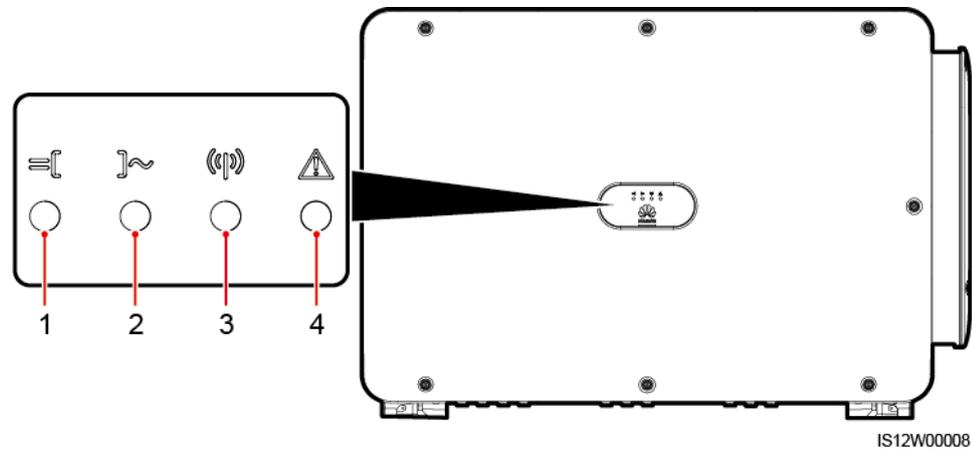
No.	Indicator	Status (Blinking Fast: On for 0.2s and then Off for 0.2s; Blinking Slowly: On for 1s and then Off for 1s)	Description
1	PV connection indicator	Steady green	At least one PV string is properly connected, and the DC input voltage of the corresponding MPPT circuit is at least 200 V.

No.	Indicator	Status (Blinking Fast: On for 0.2s and then Off for 0.2s; Blinking Slowly: On for 1s and then Off for 1s)		Description
	⊒〔	Blinking green fast		If the alarm/maintenance indicator is red, an environmental fault at the DC side of the solar inverter is generated.
		Off		The solar inverter disconnects from all PV strings, or the DC input voltage of all MPPT circuits is less than 200 V.
2	Grid connection indicator 〕∼	Steady green		The solar inverter is in grid-tied mode.
		Blinking green fast		If the alarm/maintenance indicator is red, an environmental fault (excluding **Grid Loss**) at the AC side of the solar inverter is generated.
		Off		The solar inverter is not in grid-tied mode (due to reasons including **Grid Loss**).
3	Communications indicator (((•|))	Blinking green fast		The solar inverter receives communication data normally.
		Off		The solar inverter has not received communication data for 10 seconds.
4	Alarm/Maintenance indicator ⚠	Alarm status	Steady red	A major alarm is generated. • If the PV connection indicator or grid connection indicator is blinking green fast, troubleshoot DC or AC environmental faults as instructed by the SUN2000 app. • If the PV connection indicator and grid connection indicator are both not blinking green fast, replace components or the solar inverter as instructed by the SUN2000 app.
			Blinking red fast	A minor alarm is generated.
			Blinking red slowly	A warning alarm is generated.
		Local maintenance status	Steady green	Local maintenance succeeds.
			Blinking green fast	Local maintenance fails.

No.	Indicator	Status (Blinking Fast: On for 0.2s and then Off for 0.2s; Blinking Slowly: On for 1s and then Off for 1s)		Description
			Blinking green slowly	In local maintenance or shuts down over a command.

 NOTE

- The PV connection indicator and the grid connection indicator preferentially indicate environmental faults.
- Local maintenance refers to operations performed after a USB flash drive, a WLAN module, a Bluetooth module, or a USB data cable is inserted into the USB port of the solar inverter. For example, local maintenance includes data import and export using a USB flash drive, and connecting to the SUN2000 app over a WLAN module, a Bluetooth module, or a USB data cable.
- If an alarm is generated during local maintenance, the alarm/maintenance indicator shows the local maintenance state first. After the USB flash drive, WLAN module, Bluetooth module, or USB data cable is removed, the indicator shows the alarm state.

2.5 Working Principles

2.5.1 Circuit Diagram

The solar inverter receives inputs from 20 PV strings. The inputs are grouped into 10 MPPT circuits inside the solar inverter to track the maximum power point of the PV strings. The DC power is then converted into three-phase AC power through an inverter circuit. Surge protection is supported on both the DC and AC sides.

Figure 2-11 Schematic diagram of a 3-pin model
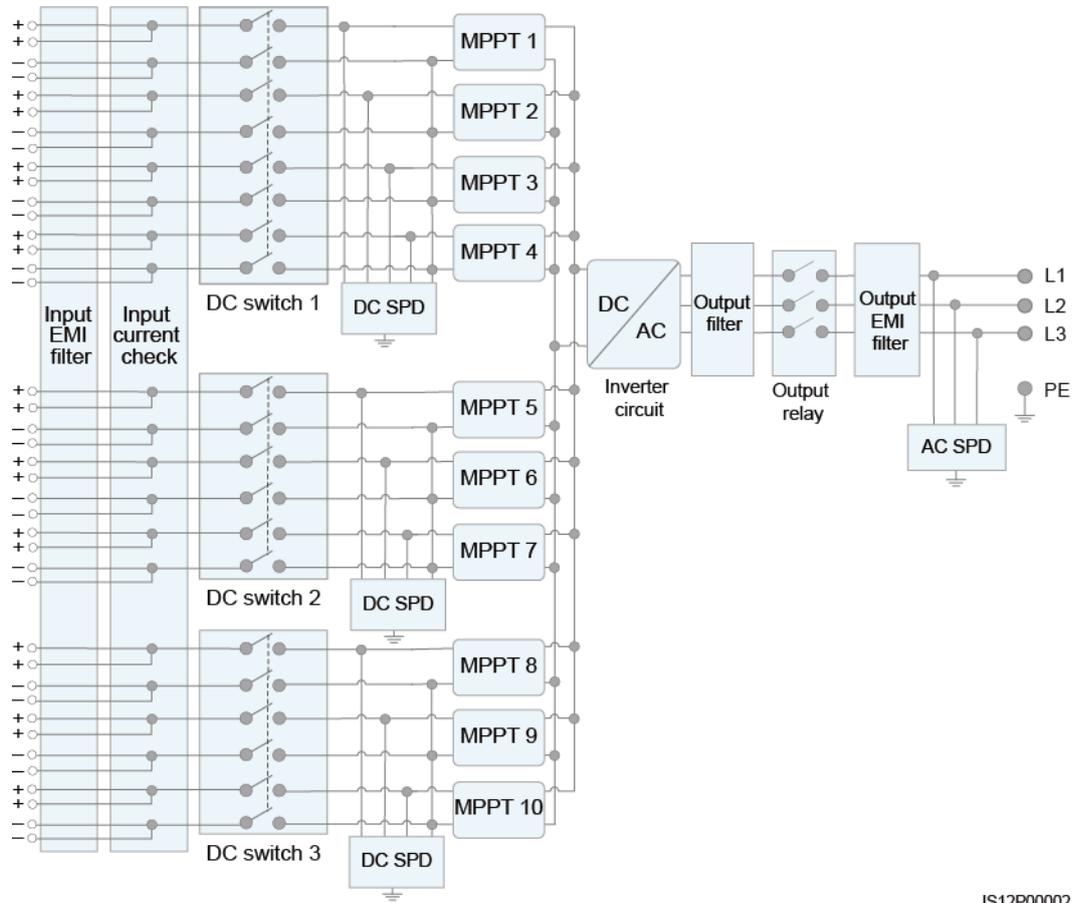
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Figure 2-12 Schematic diagram of 4-pin models
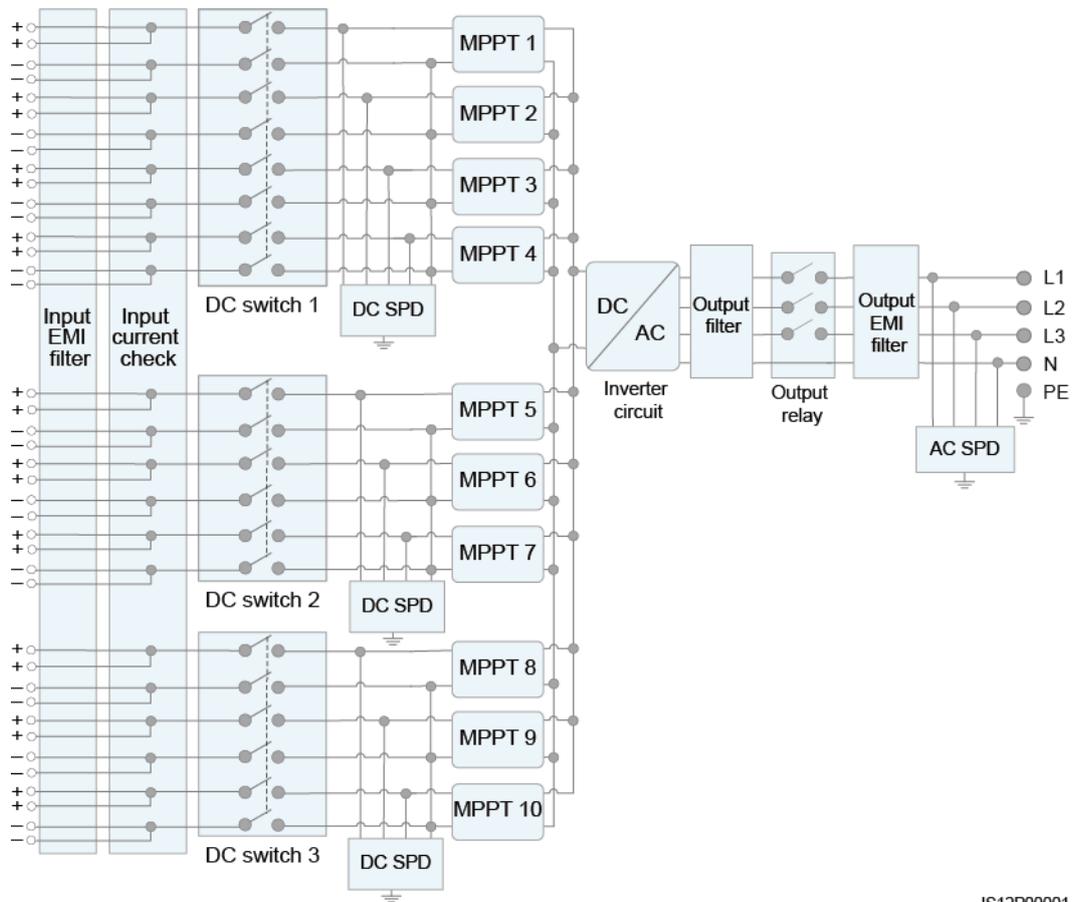
2.5.2 Working Modes

The SUN2000 can work in Standby, Operating, or Shutdown mode.

Figure 2-13 Working modes
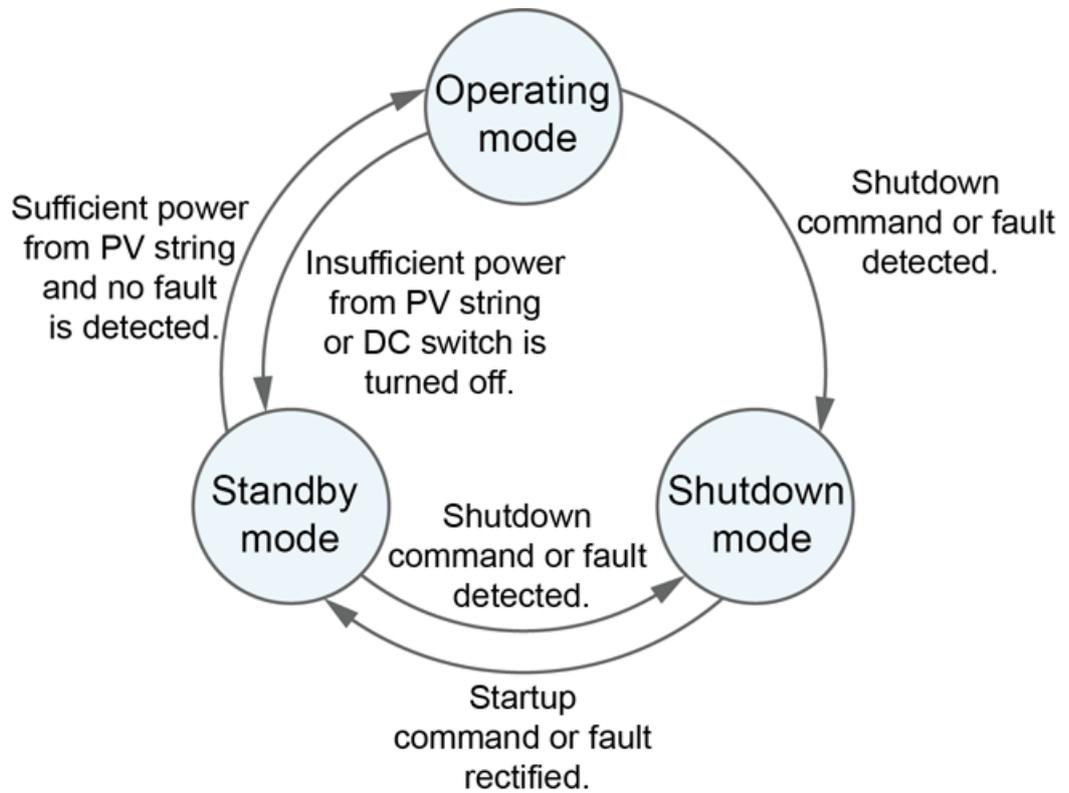
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Table 2-3 Working mode description

Working Mode	Description
Standby	The SUN2000 enters Standby mode when the external environment does not meet the operating requirements. In Standby mode: • The SUN2000 continuously performs status check and enters the Operating mode once the operating requirements are met. • The SUN2000 enters Shutdown mode after detecting a shutdown command or a fault after startup.
Operating	In Operating mode: • The SUN2000 converts DC power from PV strings into AC power and feeds the power to the power grid. • The SUN2000 tracks the maximum power point to maximize the PV string output. • If the SUN2000 detects a fault or a shutdown command, it enters the Shutdown mode. • The SUN2000 enters Standby mode after detecting that the PV string output power is not suitable for connecting to the power grid for generating power.

Working Mode	Description
Shutdown	• In Standby or Operating mode, the SUN2000 enters Shutdown mode after detecting a fault or shutdown command. • In Shutdown mode, the SUN2000 enters Standby mode after detecting a startup command or that the fault is rectified.

3 Solar Inverter Storage

The following requirements should be met if the solar inverter is not put into use immediately:

- Do not unpack the solar inverter and check it periodically. Replace the packing materials if necessary. If the solar inverter is unpacked but not put into use immediately, put it inside the original package with the desiccant bag, and seal it using tape.
- The ambient temperature and humidity are suitable for the storage.

Figure 3-1 Storage temperature and humidity
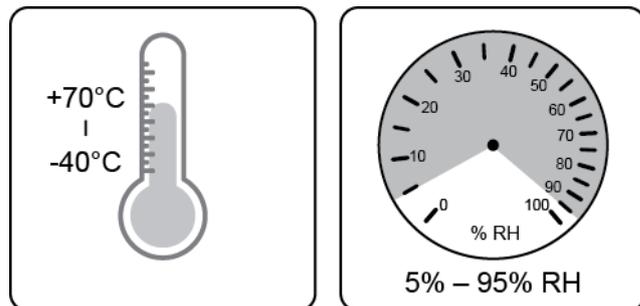
- The inverter should be stored in a clean and dry place and be protected from dust and water vapor corrosion.
- To avoid personal injury or device damage, stack inverters with caution to prevent them from falling over.

Figure 3-2 Maximum number of pile-up layers allowed
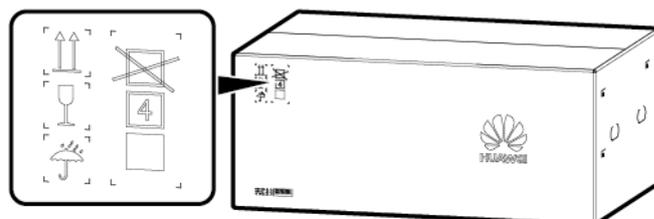
- If the solar inverter has been stored for a long time, inspections and tests should be conducted by qualified personnel before it is put into use.

4 Installation

4.1 Check Before Installation

Checking Outer Packing Materials

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

☐ NOTE

You are advised to remove the packing materials within 24 hours before installing the solar inverter.

Checking Accessories

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

☐ NOTE

For details about the number of accessories delivered with the solar inverter, see the *Packing List* in the packing case.

4.2 Tools

Category	Tool			
Installation tools	Hammer drill (with Φ14 mm and Φ16 mm drill bits)	Socket wrench set	Torque wrench	Torque screwdriver (Phillips head: M3 and M4; flat head: M3 and M4)
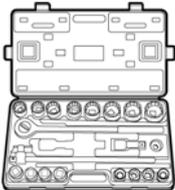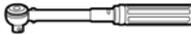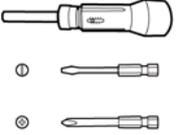
Category	Tool			
	Diagonal pliers	Wire strippers	Flat-head screwdriver (head: M3)	Rubber mallet
	Utility knife	Cable cutter	Crimping tool (model: PV-CZM-22100)	RJ45 crimping tool
	Open-end wrench (model: PV-MS)	Vacuum cleaner	Multimeter (DC voltage measurement range ≥ 1100 V DC)	Marker
	Measuring tape	Bubble or digital level	Hydraulic pliers	Heat shrink tubing
	Heat gun	Cable tie	Scissors	N/A
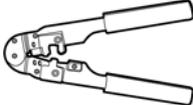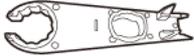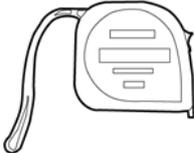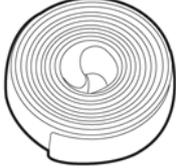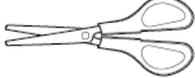
Category	Tool			
Personal protective equipment (PPE)	Safety gloves	Safety goggles	Anti-dust respirator	Safety boots

4.3 Determining the Installation Position

Installation Environment Requirements

- The solar inverter can be installed indoors or outdoors.
- Do not install the solar inverter near flammable or explosive materials.
- Do not install the solar inverter where its enclosure and heat sink are easily accessible, because the voltage is high and these parts are hot during operation.
- Install the solar inverter in a well-ventilated environment for heat dissipation
- When the solar inverter is installed under direct sunlight, the power may be derated due to the temperature rise. You are advised to install the solar inverter in a sheltered place or install an awning over it.
- The SUN2000-125KTL-M0 should be physically separated from third-party wireless communication facilities and residential environments by distance greater than 30 m.

Figure 4-1 Installation environment
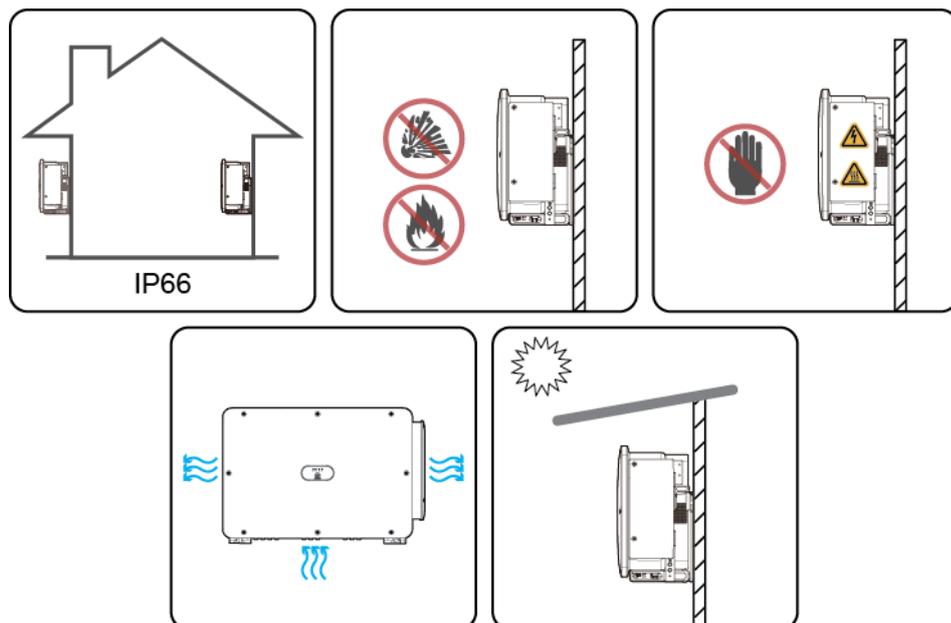
IS12H00003

Mounting Structure Requirements

- The mounting structure where the solar inverter is installed must be fire resistant. Do not install the solar inverter on flammable building materials.

- Ensure that the installation surface is solid enough to bear the solar inverter.

- In residential areas, do not install the solar inverter on drywalls or walls made of similar materials with a weak sound insulation performance because the noise generated by the solar inverter may interfere with residents.

Figure 4-2 Mounting structure
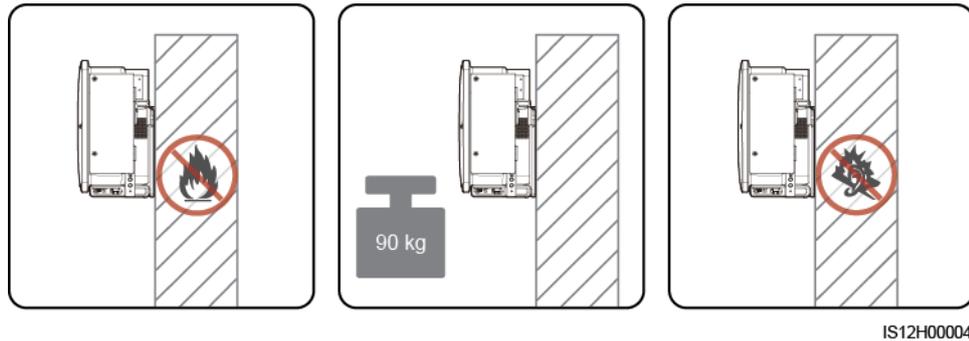
Installation Angle Requirements

The solar inverter can be support-mounted or wall-mounted. The installation angle requirements are as follows:

- Install the solar inverter vertically or at a maximum back tilt of 75 degrees to facilitate heat dissipation.

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

Figure 4-3 Angle
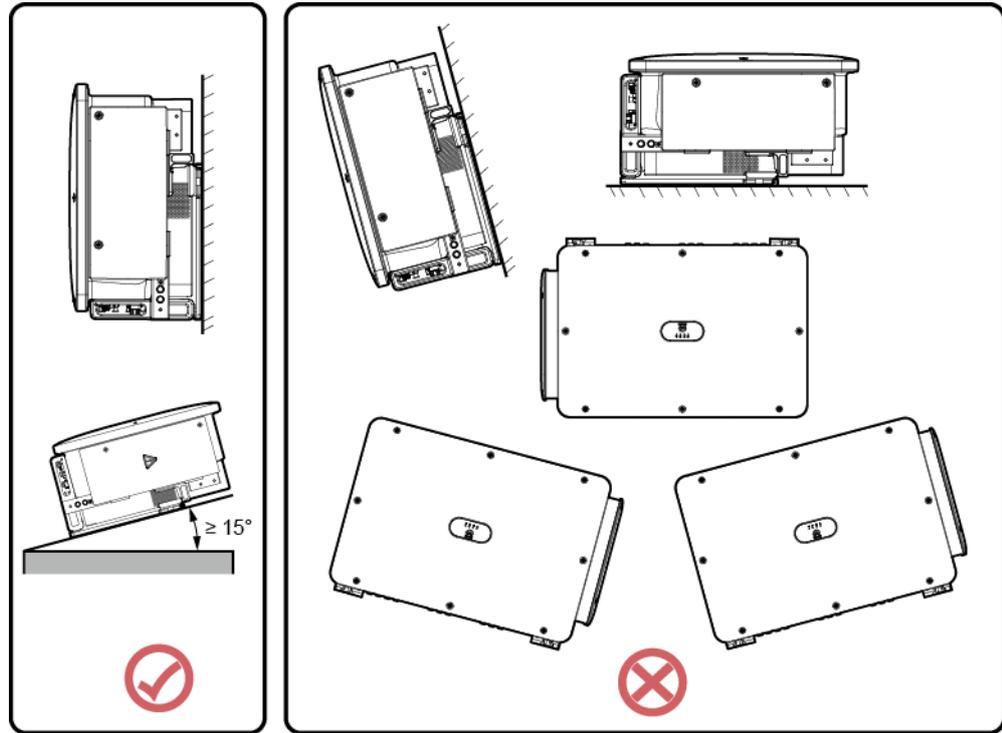
IS12W00014

Installation Dimensions Requirements

Reserve enough space around the solar inverter for installation and heat dissipation.

Figure 4-4 Installation dimensions
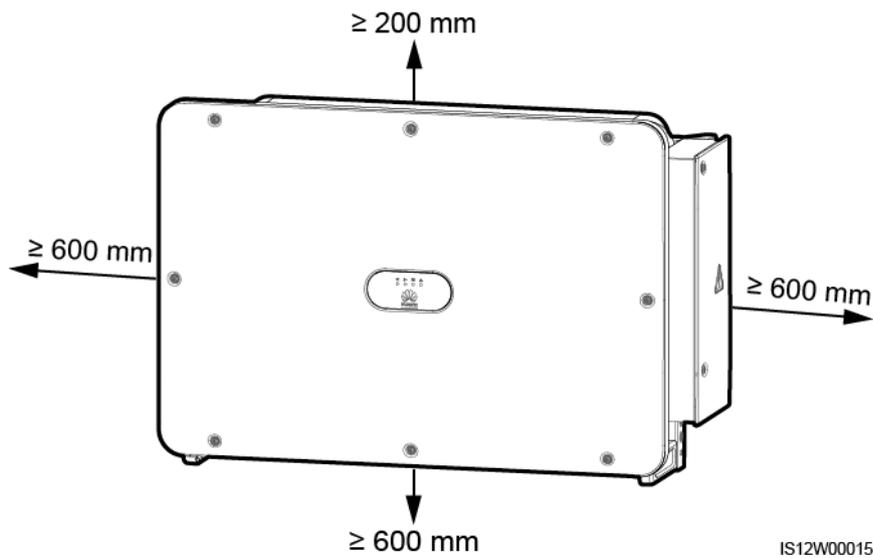
IS12W00015

☐ **NOTE**

For ease of installing the solar inverter on the mounting bracket, connecting cables to the bottom of the solar inverter, and maintaining the solar inverter in future, it is recommended that the bottom clearance be between 600 mm and 730 mm. If you have any question about the clearance, consult the local technical support engineers.

When installing multiple solar inverters, install them in horizontal mode if sufficient space is available and install them in triangle mode if no sufficient space is available. Stacked installation is not recommended.

Figure 4-5 Horizontal installation mode (recommended)
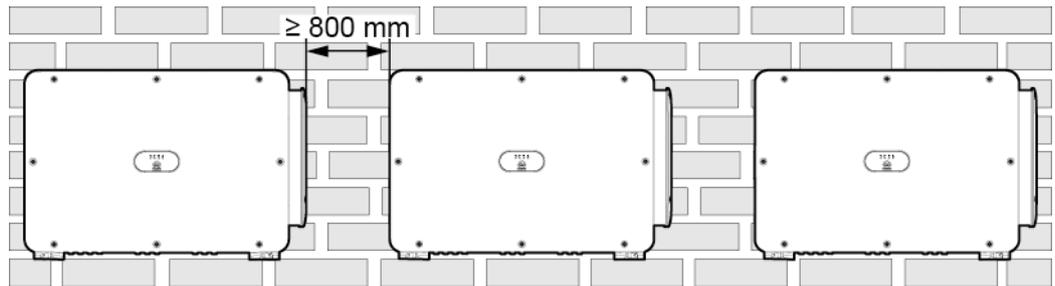
Figure 4-6 Triangle installation mode (recommended)
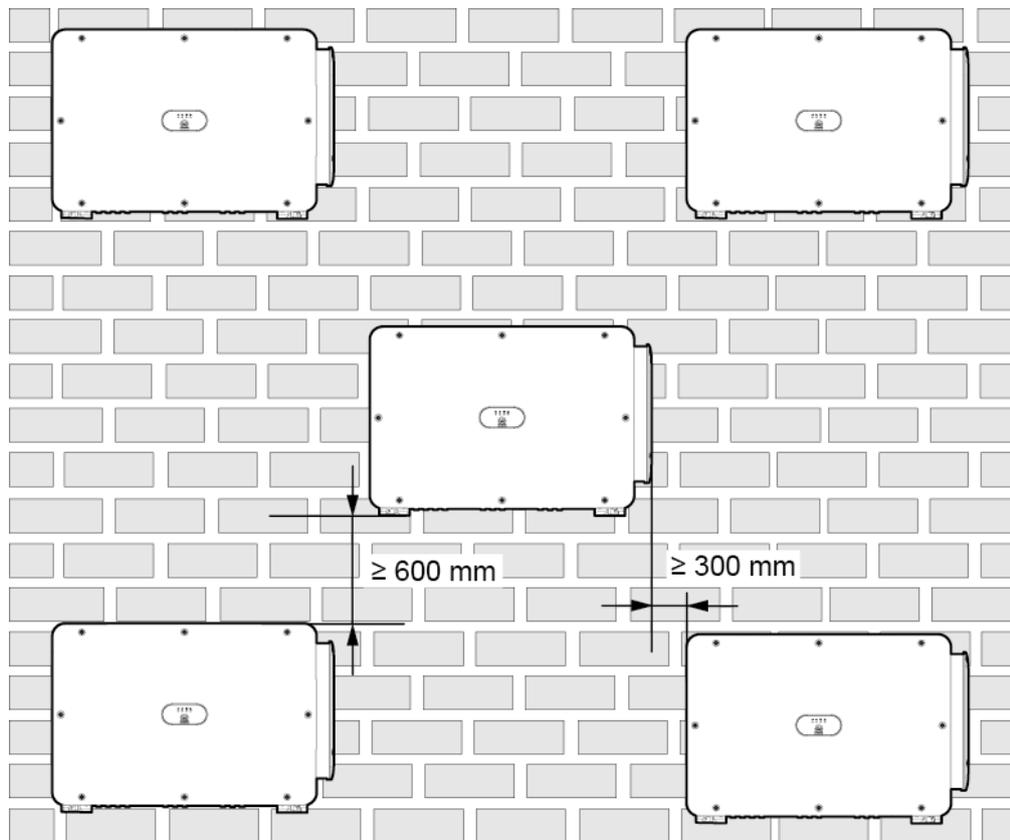
Figure 4-7 Stacked installation mode (not recommended)
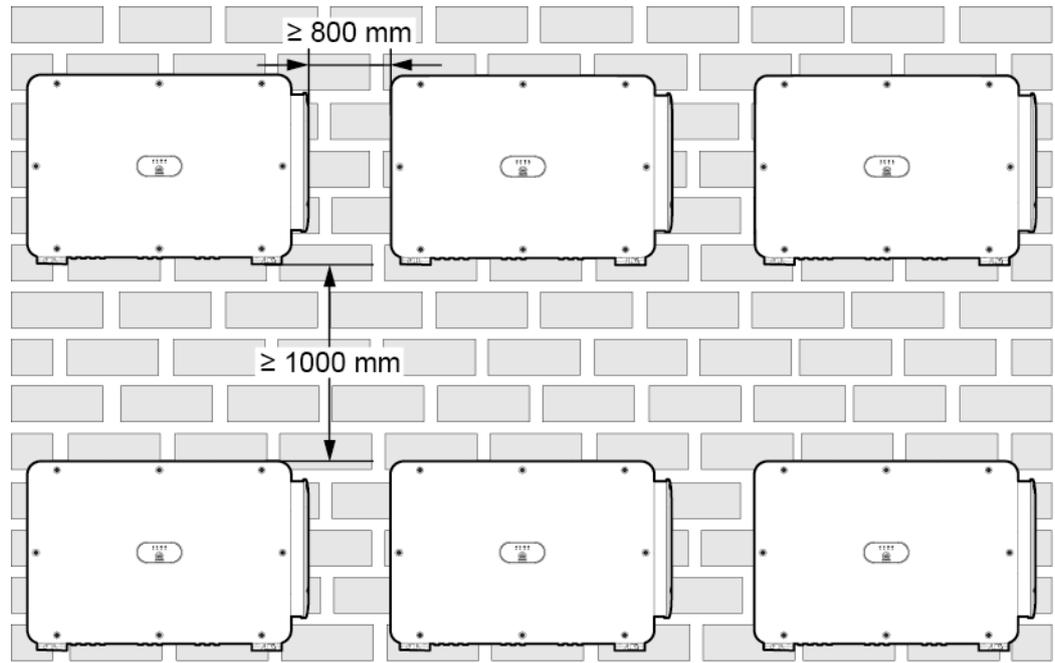
4.4 Installing the Mounting Bracket

Before installing the mounting bracket, remove the security Torx wrench and keep it for later use.

Figure 4-8 Position for binding the security Torx wrench
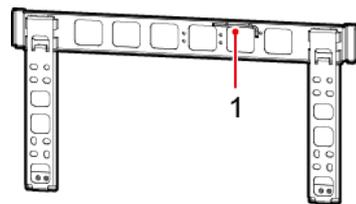
(1) Security Torx wrench

The mounting bracket of the solar inverter has four groups of tapped holes, each group containing four tapped holes. Mark any hole in each group based on site requirements and mark four holes in total. The two round holes are recommended.

Figure 4-9 Hole dimensions
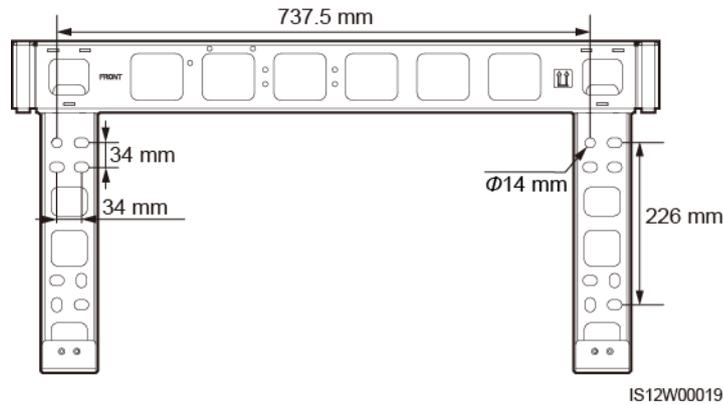
4.4.1 Support-mounted Installation

Prerequisites

M12x40 bolt assemblies are supplied with 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 supplied M12 nuts.

Procedure

Step 1 Determine the positions for drilling holes using the mounting bracket. Level the positions of mounting holes using a bubble or digital level, and mark the positions with a marker.

Step 2 Drill holes using a hammer drill. It is recommended that anti-rust measures be taken on the positions for drilling holes.

Step 3 Secure the mounting bracket.

Figure 4-10 Installing the mounting bracket
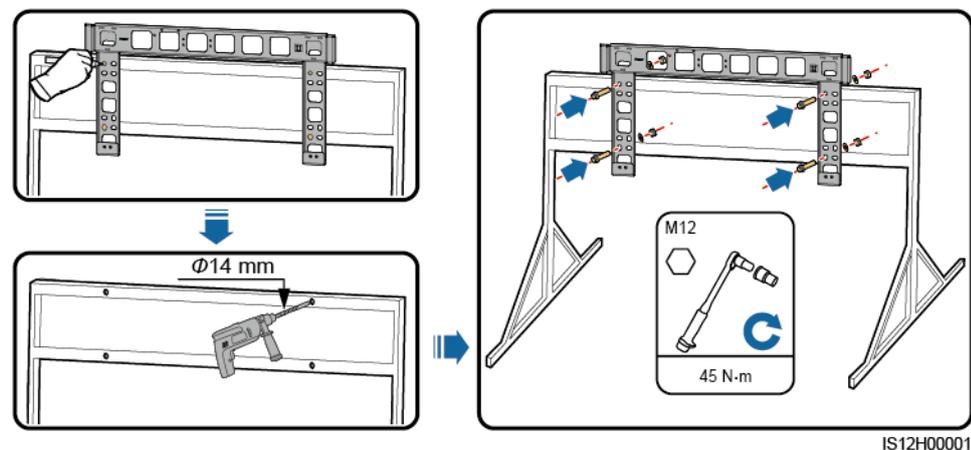
----End

4.4.2 Wall-mounted Installation

Prerequisites

You have prepared expansion bolts. M12x60 stainless steel expansion bolts are recommended.

Procedure

Step 1 Determine the positions for drilling holes using the mounting bracket. Level the positions of mounting holes using a bubble or digital level, and mark the positions with a marker.

Step 2 Drill holes using a hammer drill and install expansion bolts.

⚠ **WARNING**

Avoid drilling holes in the position of the wall with water pipes and power cables buried inside.

NOTICE

- To prevent dust inhalation or contact with eyes, wear safety goggles and an anti-dust respirator when drilling holes.
- Clean up any dust in and around the holes using a vacuum cleaner and measure the distance between holes. If the holes are inaccurately positioned, drill a new set of holes.
- Level the head of the expansion sleeve with the concrete wall after removing the bolt, spring washer, and flat washer. Otherwise, the mounting bracket will not be securely installed on the wall.

Step 3 Secure the mounting bracket.

Figure 4-11 Installing the mounting bracket
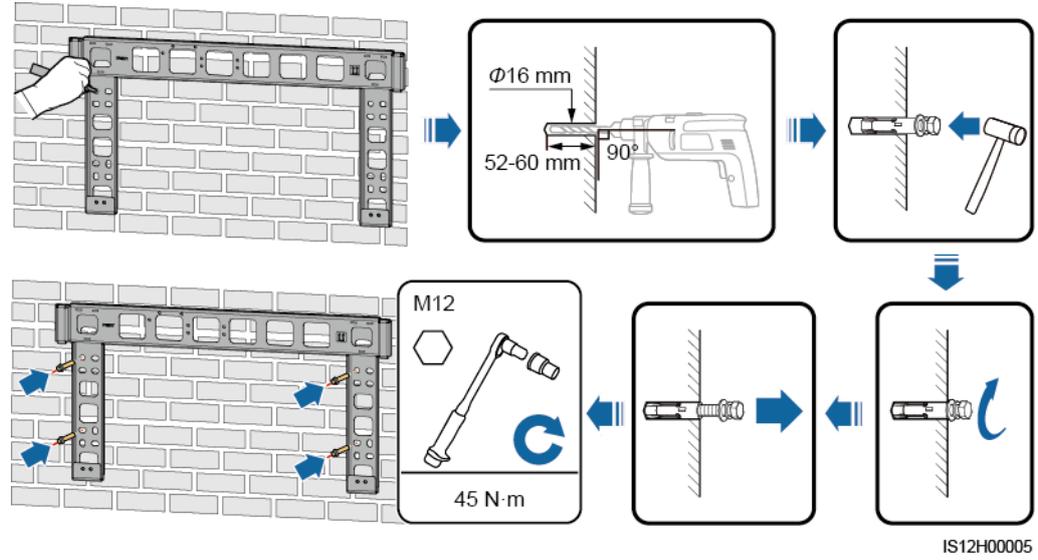
----End

4.5 Installing a Solar Inverter

Context

NOTICE

- Move the solar inverter with care to prevent device damage and personal injury.
- It takes multiple persons or a pallet truck to move the solar inverter.
- Do not use the ports and wiring terminals at the bottom to support any weight of the solar inverter.
- When you need to temporally place the solar inverter on the ground, use foam, paper, or other protection material to prevent damage to its cover.
- Use the handles to facilitate installation. Handles are optional and delivered separately. Ensure that the handles are securely installed. After the installation is complete, remove the handles and keep them properly.

Figure 4-12 Positions for installing the handles
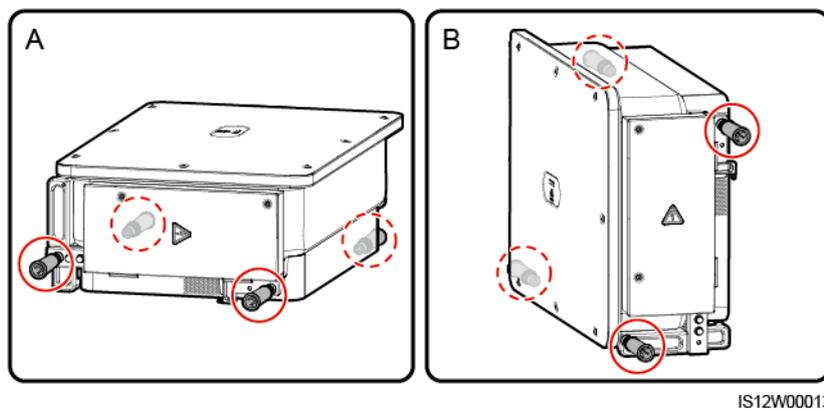
(A) Transportation scenario   (B) Installation scenario

Procedure

Step 1 Lift the solar inverter from the packing case and move it to the installation position.

Figure 4-13 Taking out the solar inverter
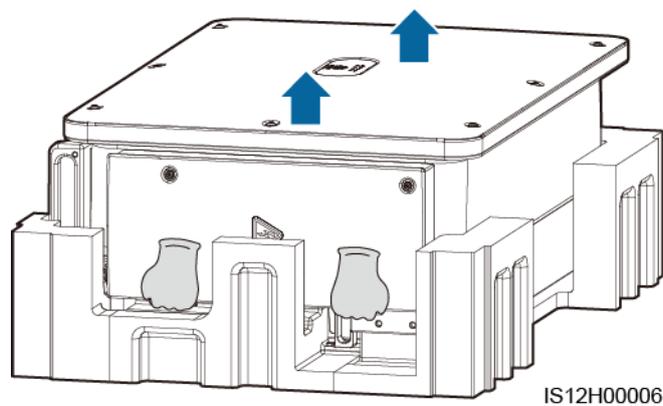
Step 2 Lift the solar inverter and keep it upright.

Figure 4-14 Lifting the solar inverter and keeping it upright
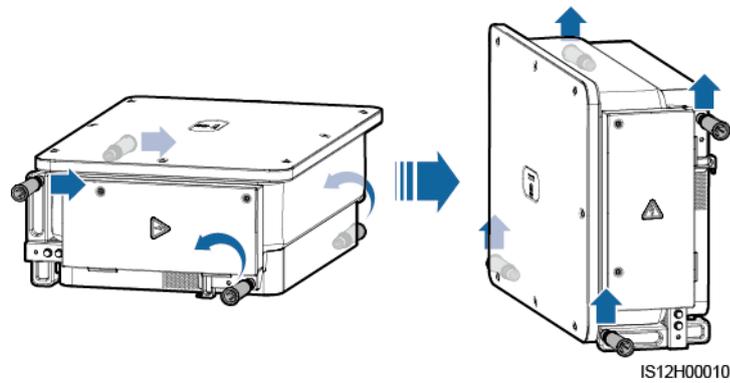
Step 3 If the installation position is too high to install the solar inverter on the mounting bracket, run a rope that is strong enough to bear the solar inverter through the two lifting eyes, and hoist the solar inverter.

NOTICE

Hoist the solar inverter with care to protect it from colliding with the wall or other objects.

Figure 4-15 Hoisting the solar inverter
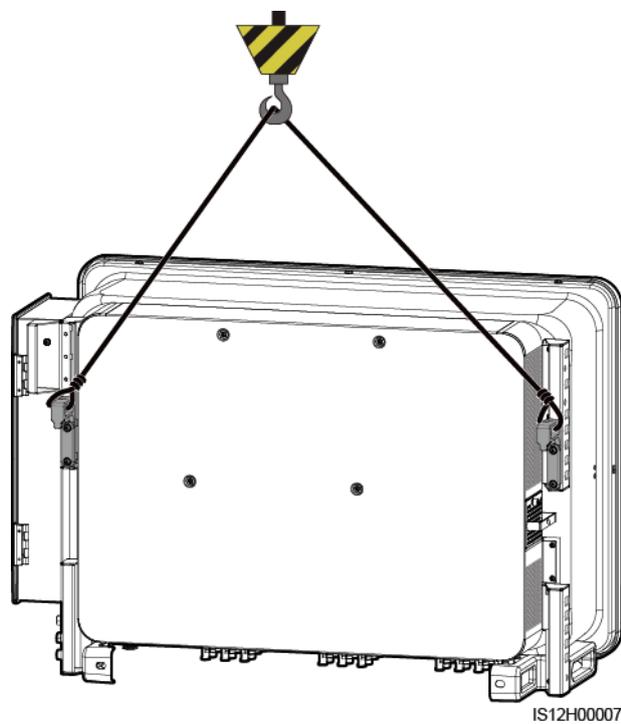
Step 4 Install the solar inverter on the mounting bracket and align the solar inverter enclosure with the mounting bracket.

Figure 4-16 Mounting the solar inverter
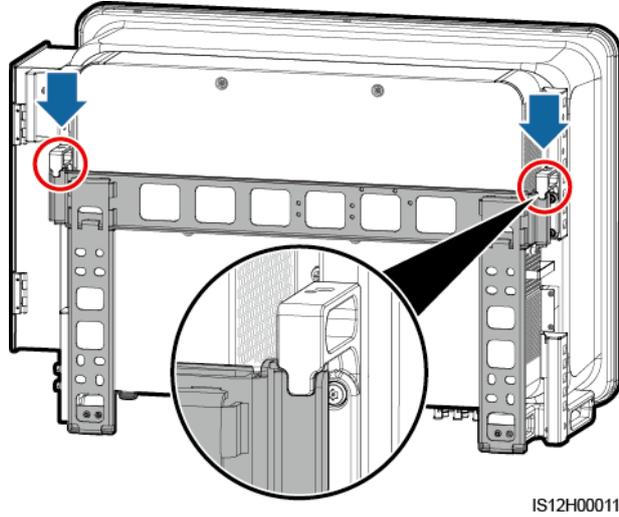
Step 5 Secure the solar inverter.

Figure 4-17 Tightening security Torx screws
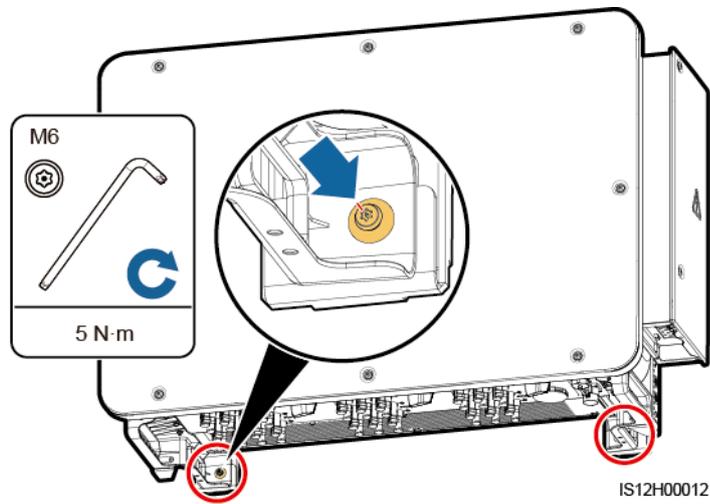
----End

5 Electrical Connections

5.1 Precautions

⚠ DANGER

After the PV array receives solar irradiance, it transmits the DC voltage to the solar inverter. Before connecting cables, ensure that the three DC switches on the solar inverter are set to OFF. Otherwise, the high voltage of the solar inverter may result in electric shocks.

⚠ WARNING

- The device damage caused by incorrect cable connections is beyond the warranty scope.
- Only qualified technicians can perform operations about electrical connection.
- Wear proper PPE at all time when connecting cables.
- To prevent poor cable connection due to overstress, leave enough slack before connecting the cables to the appropriate ports.

📖 NOTE

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

5.2 Preparing Cables

SUN2000 solar inverters support RS485 communication and MBUS communication.

NOTICE

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

NOTE

In the networking diagram, ⎯ indicates the power cable, ➔ indicates the power flow direction, and ⎯ and 〰 indicate the signal flow.

Figure 5-1 RS485 networking (SmartLogger)
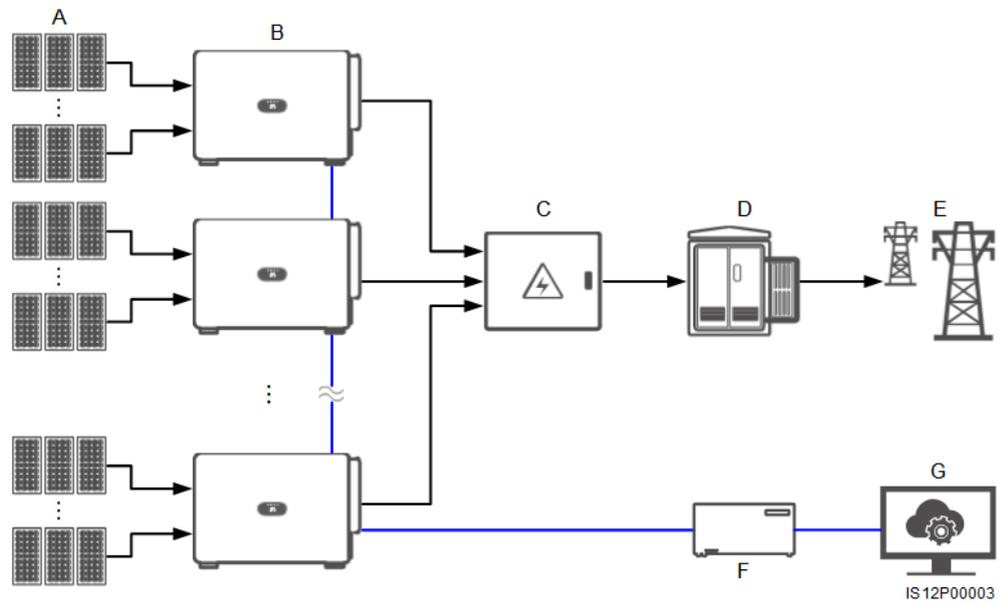
(A) PV string (B) SUN2000 (C) AC combiner box

(D) Transformer station (E) Power grid (F) SmartLogger

(G) Management system

Figure 5-2 RS485 networking (SDongle)
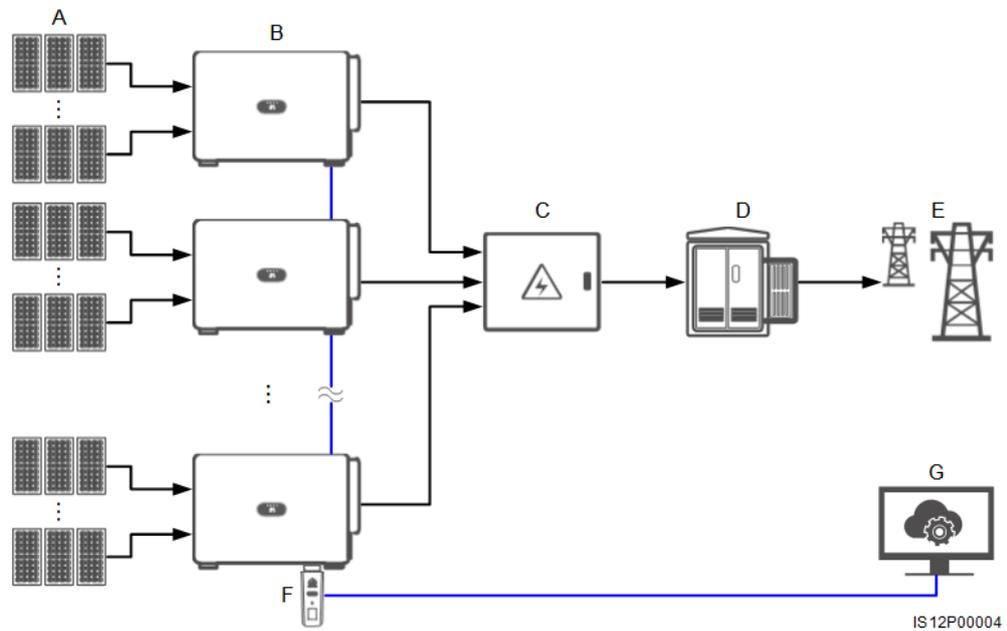
(A) PV string	(B) SUN2000	(C) AC combiner box
(D) Transformer station	(E) Power grid	(F) SDongle
(G) Management system		

Figure 5-3 MBUS networking (SmartLogger)
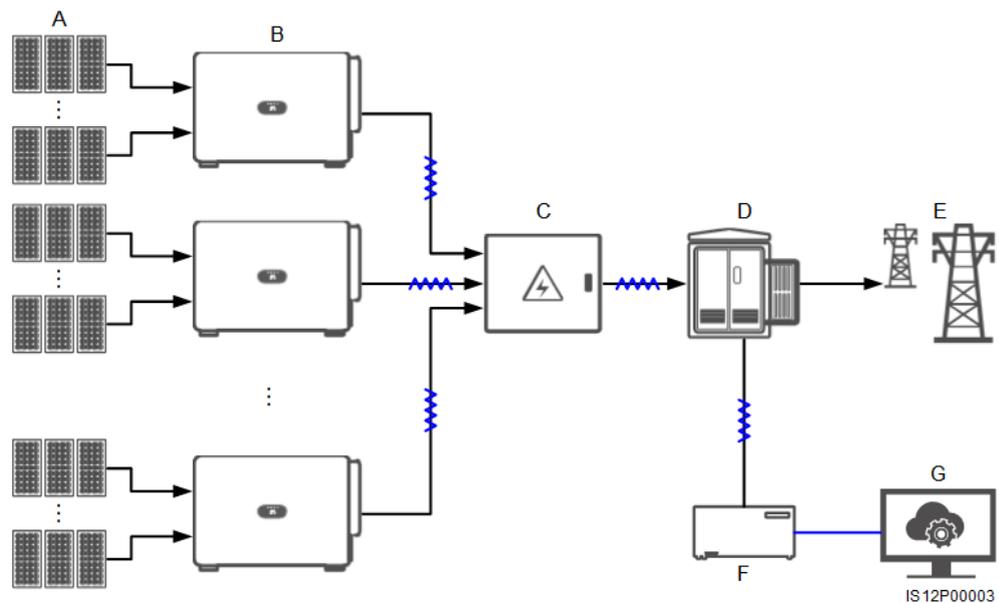
(A) PV string	(B) SUN2000	(C) AC combiner box
(D) Transformer station	(E) Power grid	(F) SmartLogger

(G) Management system

Figure 5-4 MBUS networking (SDongle)
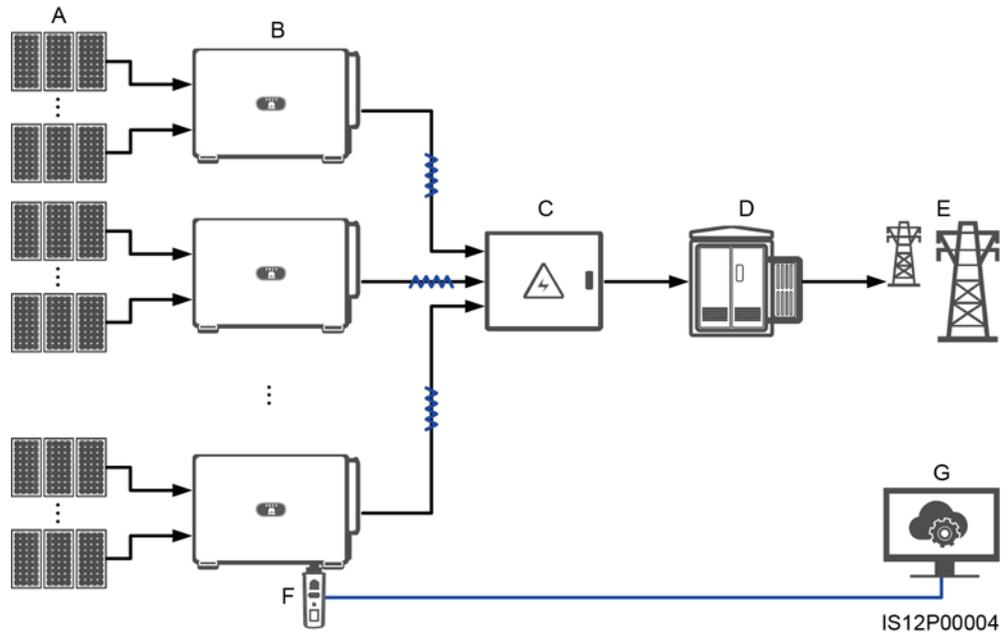
IS12P00004

(A) PV string	(B) SUN2000	(C) AC combiner box
(D) Transformer station	(E) Power grid	(F) SDongle
(G) Management system		

● To ensure the system response speed, it is recommended that less than 30 solar inverters be connected to each COM port on the SmartLogger and that less than 10 solar inverters be cascaded over the SDongle.
● The RS485 communication distance between the last solar inverter and the SmartLogger cannot exceed 1000 m.

Figure 5-5 Cable connections (configure the components in the dotted box as required)
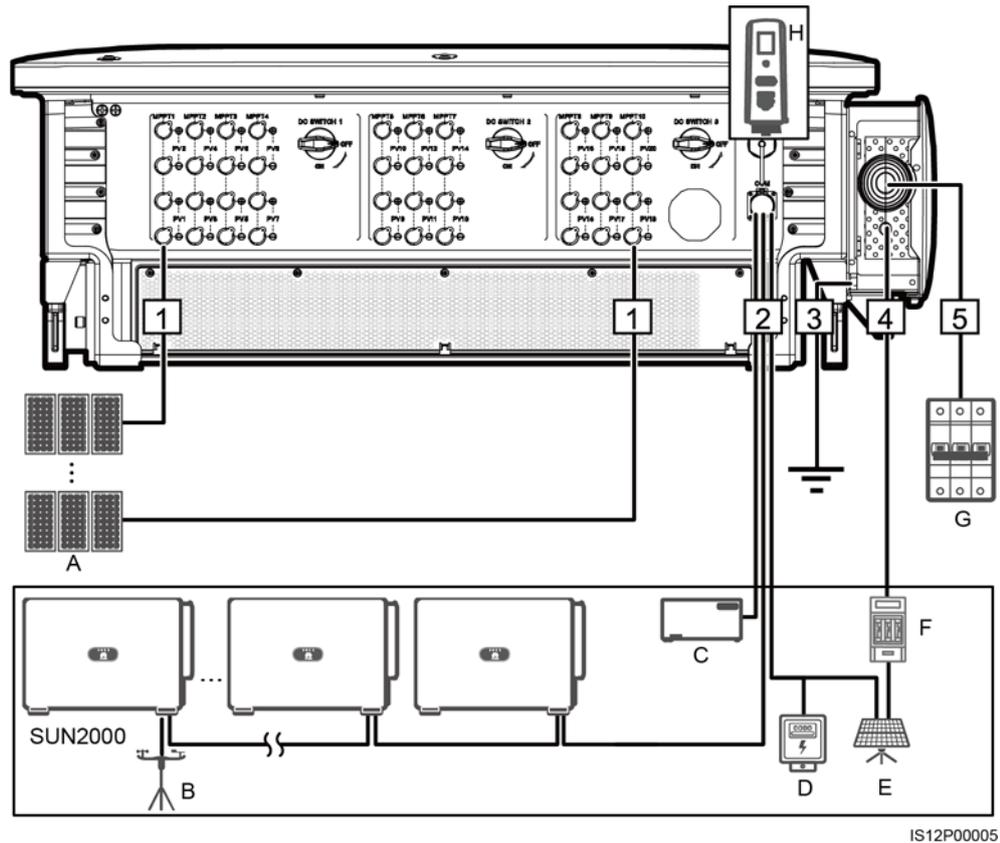
IS12P00005

Table 5-1 Components

No.	Component	Description	Source
A	PV string	● PV strings consist of PV modules in series. ● A solar inverter supports 20 PV string inputs.	Prepared by the customer

No.	Component	Description	Source
B	Environmental monitoring instrument (EMI)	• When the SmartLogger is used, the EMI can be directly connected to the SmartLogger or connected to the last solar inverter cascaded over RS485. • When the SDongle is used, the EMI is a cascaded device that needs to be connected to the solar inverter where the SDongle is installed.	Prepared by the customer
C	SmartLogger	The solar inverter communicates with the management system through the SmartLogger.	Purchased from Huawei
D	Power Meter	Implements power control at the grid-tied point in low voltage scenarios using a power meter.	Prepared by the customer
E	Support tracking system	Adjusts the angle of the supports.	Prepared by the customer
F	Fuse/Circuit breaker	The tracking system should be equipped with an overcurrent protection device or component. The power cable between the device or component and the wiring terminal should be no longer than 2.5 m. Therefore, a fuse or a circuit breaker is recommended. • Installed between the solar inverter and tracking control box • Fuse specifications: rated voltage ≥ 500 V; rated current: 16 A; protection: gG • Circuit breaker specifications: rated voltage ≥ 500 V; rated current: 16 A; tripping: C	Prepared by the customer
G	AC switch	• Installed in the AC combiner box • Recommended: a three-phase AC circuit breaker with a rated voltage greater than or equal to 500 V AC and a rated current of 250 A	Prepared by the customer
H	SDongle	The solar inverter communicates with the management system through the SDongle.	Purchased from Huawei

> **NOTICE**
>
> The solar inverter has an RCMU inside. Its external AC switch should be a three-phase circuit breaker or other AC load circuit breakers to safely disconnect the solar inverter from the power grid.

Table 5-2 Cable description of a 3-pin model (S: cross-sectional area of the AC cable conductor; S_p: cross-sectional area of the PE cable conductor)

No.	Cable	Category	Conductor Cross-Sectional Area Range	Outer Diameter	Source
1	DC input power cable	PV cable that meets the 1100 V standard	4–6 mm^2	4.5–7.8 mm	Prepared by the customer
2	RS485 communications cable	Outdoor shielded twisted pair that meets the local standard	0.25–1 mm^2	• One or two communications cables: 4–11 mm • Three communications cables: 4–8 mm	Prepared by the customer
3	PE cable	Single-core outdoor copper cable and M10 OT/DT terminals **NOTICE** You are advised to choose the ground point on the enclosure. The ground point in the maintenance compartment is used for connecting to the PE cable contained in the multi-core AC power cable.	$S_p \geq S/2$	N/A	Prepared by the customer
4	Tracking system power cable	Three-core outdoor copper cable with dual-layer protection	10 mm^2	15–18 mm	Prepared by the customer
5	AC output power cable (multi-core)	• If you connect a PE cable to the ground point on the enclosure, you are advised to use a three-core (L1, L2, and L3) outdoor cable and M12 OT/DT terminals (L1, L2, and L3). • If you connect a PE cable to the ground point in the maintenance compartment, you are advised to use a four-core (L1, L2, L3, and PE) outdoor cable, M12 OT/DT terminals (L1, L2, and L3), and M10 OT/DT terminals (PE). You do not need to prepare a PE cable.	• Copper cable: – S: 95–185 mm^2 – $S_p \geq S/2$ • Aluminum alloy cable or copper-clad aluminum cable: – S: 120–240 mm^2 – $S_p \geq S/2$	24–66 mm	Prepared by the customer

No.	Cable	Category	Conductor Cross-Sectional Area Range	Outer Diameter	Source
	AC output power cable (single-core)	You are advised to use a single-core outdoor cable and M12 OT/DT terminals.	• Copper cable: – S: 95–185 mm^2 • Aluminum alloy cable or copper-clad aluminum cable: – S: 120–240 mm^2	14–35 mm	Prepared by the customer

The value of S_p is valid only if the conductors of the PE cable and AC power cable use the same material. If the materials are different, ensure that the conductor of the PE cable with a proper cross-sectional area produces a conductance equivalent to that of the cable specified in the table.

Table 5-3 Cable description of 4-pin models (S: cross-sectional area of the AC cable conductor; S_p: cross-sectional area of the PE cable conductor)

No.	Cable	Category	Conductor Cross-Sectional Area Range	Outer Diameter	Source
1	DC input power cable	PV cable that meets the 1100 V standard	4–6 mm^2	4.5–7.8 mm	Prepared by the customer
2	RS485 communications cable	Outdoor shielded twisted pair that meets the local standard	0.25–1 mm^2	• One or two communications cables: 4–11 mm • Three communications cables: 4–8 mm	Prepared by the customer
3	PE cable	Single-core outdoor copper cable and M10 OT/DT terminals **NOTICE** You are advised to choose the ground point on the enclosure. The ground point in the maintenance compartment is used for connecting to the PE cable contained in the multi-core AC power cable.	$S_p \geq S/2$	N/A	Prepared by the customer

No.	Cable	Category	Conductor Cross-Sectional Area Range	Outer Diameter	Source
4	Tracking system power cable	Three-core outdoor copper cable with dual-layer protection	10 mm^2	15–18 mm	Prepared by the customer

5	AC output power cable (multi-core)	• If you connect a PE cable to the ground point on the enclosure and the neutral wire is not used, you are advised to use a three-core (L1, L2, and L3) outdoor cable and M12 OT/DT terminals (L1, L2, and L3).
		
		• If you connect a PE cable to the ground point in the maintenance compartment and the neutral wire is not used, you are advised to use a four-core (L1, L2, L3, and PE) outdoor cable, M12 OT/DT terminals (L1, L2, and L3), and M10 OT/DT terminals (PE).
		
		• If you connect a PE cable to the ground point on the enclosure and the neutral wire is used, you are advised to use a four-core (L1, L2, L3, and N) outdoor cable and M12 OT/DT terminals (L1, L2, L3, and N).
		
		• If you connect a PE cable to the ground point in the maintenance compartment and the neutral wire is used, you are advised to use a five-core (L1, L2, L3, N, and PE) outdoor cable, M12 OT/DT terminals (L1, L2, L3, and N), and M10 OT/DT terminals (PE).
			• Copper cable:
			  – S: 95–185 mm^2
			  – $S_p \geq S/2$
			• Aluminum alloy cable or copper-clad aluminum cable:
			  – S: 120–240 mm^2
			  – $S_p \geq S/2$
				24–66 mm	Prepared by the customer

No.	Cable	Category	Conductor Cross-Sectional Area Range	Outer Diameter	Source
	AC output power cable (single-core)	You are advised to use a single-core outdoor cable and M12 OT/DT terminals.	- Copper cable: - S: 95–185 mm^2 - Aluminum alloy cable or copper-clad aluminum cable: - S: 120–240 mm^2	14–35 mm	Prepared by the customer

The value of S_p is valid only if the conductors of the PE cable and AC power cable use the same material. If the materials are different, ensure that the conductor of the PE cable with a proper cross-sectional area produces a conductance equivalent to that of the cable specified in the table.

5.3 Connecting the PE Cable

Context

NOTICE

- Proper grounding is helpful for resisting the impact of surge voltage and improving the electromagnetic interference (EMI) performance. Before connecting the AC power cable, DC power cables, and communications cable, connect the PE cable to the PE point.
- It is recommended that the PE cable of the solar inverter be connected to a nearby ground point. Connect the PE points of all solar inverters in the same array to ensure equipotential connections to PE cables.

Procedure

Step 1 Connect the PE cable to the PE point.

Figure 5-6 Connecting the PE cable to the PE point (on the enclosure)
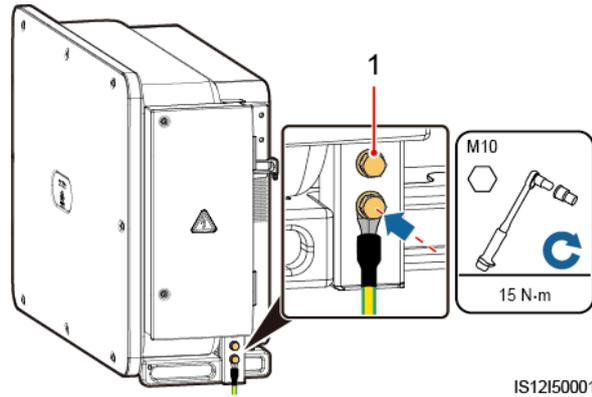
(1) Reserved PE point

----End

Follow-up Procedure

To enhance the corrosion resistance of a ground terminal, apply silica gel or paint on it after connecting the PE cable.

5.4 Opening the Maintenance Compartment Door

Precautions

⚠ CAUTION

- Do not open the panel cover of the solar inverter.
- Before opening the maintenance compartment door, ensure that no electrical connections are made for the solar inverter on the AC or DC side.
- If you need to open the maintenance compartment door in rainy or snowy days, take protective measures to prevent rain or snow from entering the maintenance compartment. If unavoidable, do not open the maintenance compartment door.
- Do not leave unused screws in the maintenance compartment.

Procedure

Step 1 Open the maintenance compartment door and install the support bar.

Figure 5-7 Opening the maintenance compartment door

IS12H00010
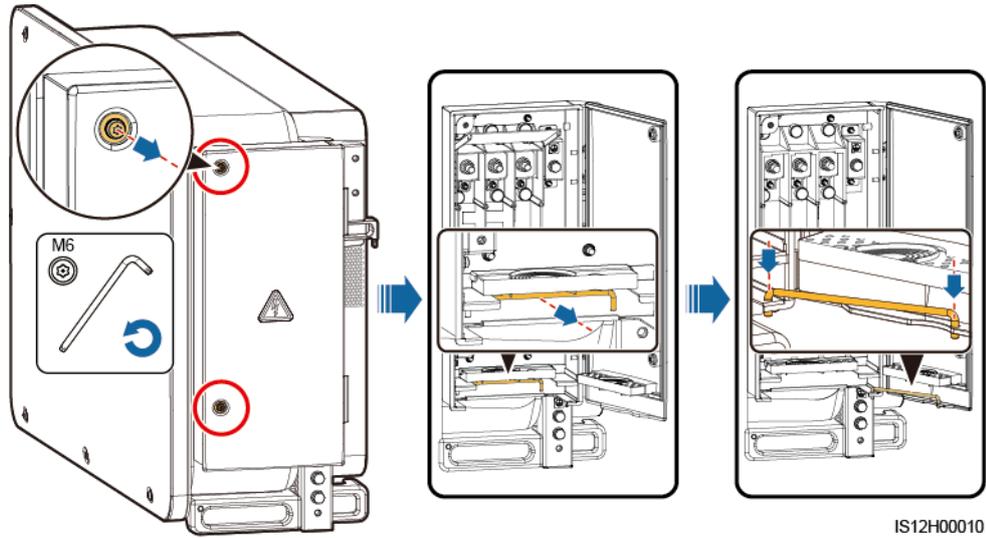
Step 2 Remove the accessories and keep them properly.

Figure 5-8 Removing the accessories

IS12W00023
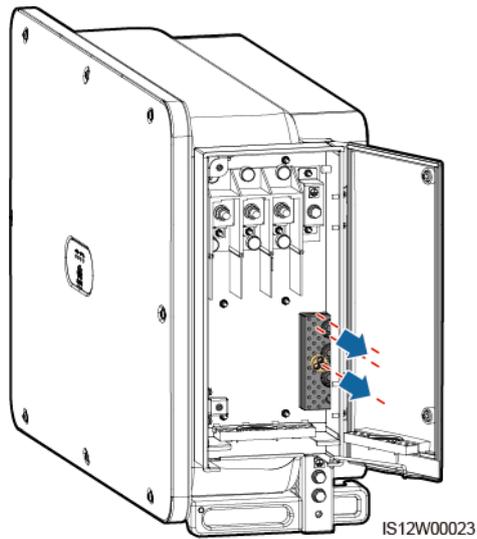
Step 3 Select a crimping module according to the type of the AC output power cable.

Figure 5-9 Select the crimping module
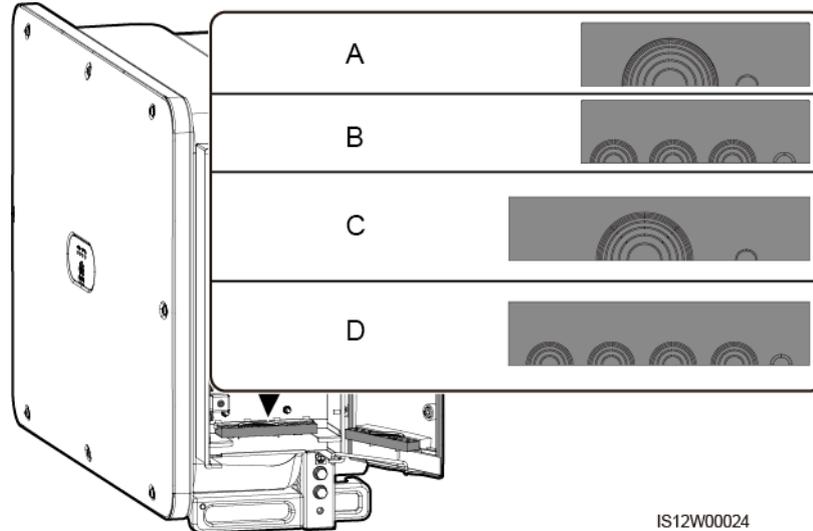
(A) Crimping module for multi-core cables of a 3-pin model

(B) Crimping module for single-core cables of a 3-pin model

(C) Crimping module for multi-core cables of 4-pin models

(D) Crimping module for single-core cables of 4-pin models

----End

Follow-up Procedure

Use scissors to cut off the joints of the rubber rings to remove them. All rubber rings are removed in the same way.

> **NOTICE**
>
> Remove the corresponding rubber rings in strict accordance with the cable diameter, and ensure that the crimping module is not damaged. Otherwise the protection level of the solar inverter will be affected.

Figure 5-10 Remove the rubber ring
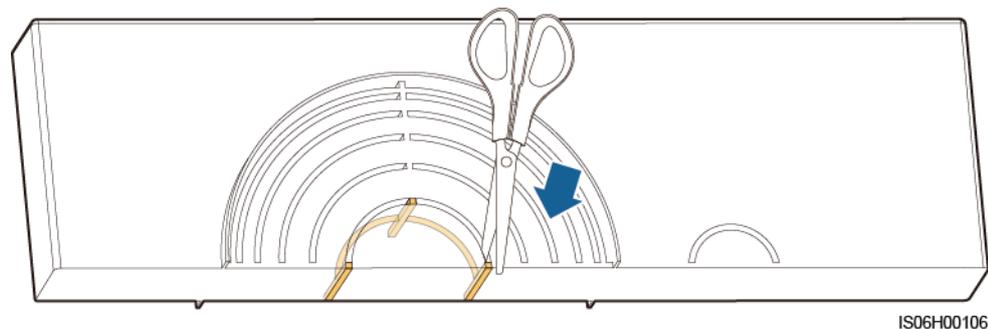
5.5 (Optional) Installing the Power Cable of the Tracking System

Precautions

⚠ **WARNING**

- The tracking system obtains power from the AC three-phase power grid. The rated voltage of the power supply is the rated output voltage of the solar inverter.
- Keep inflammable materials away from the power cable.
- The power cable must be protected with a conduit to prevent short circuits caused by insulation layer damage.
- Connect the power cable of the tracking system before the AC output power cable. Otherwise, reworking will be caused.

Procedure

Step 1 Prepare a cable.

Step 2 Remove the corresponding rubber rings.

Step 3 Connect the power cable of the tracking system.

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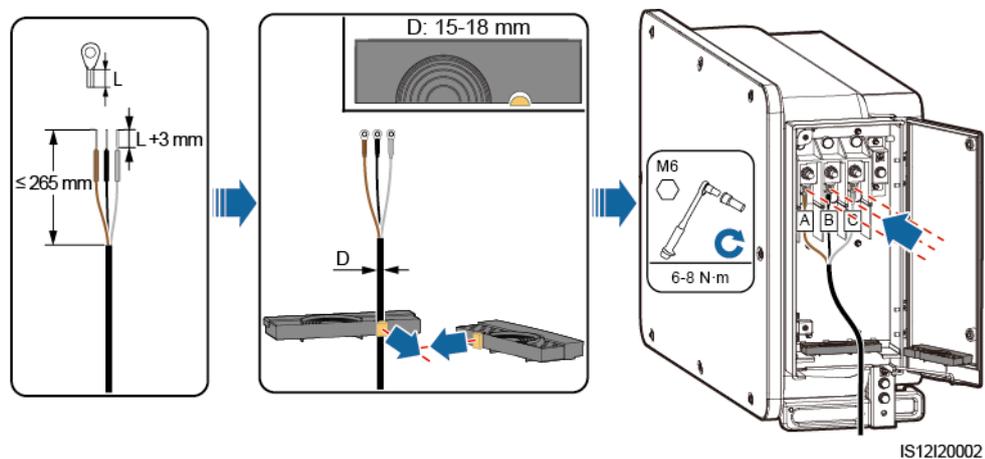
----End

5.6 Connecting an AC Output Power Cable

Prerequisites

- A three-phase AC switch should be installed on the AC side of the solar inverter. To ensure that the solar 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.
- Connect the AC output power cable according to the requirements specified by local power grid operators.

⚠ **WARNING**

Do not connect loads between the solar inverter and the AC switch.

Requirements for OT/DT terminals

- 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 adapter terminals, or aluminum wiring terminals.

Figure 5-12 Requirements for OT/DT terminals
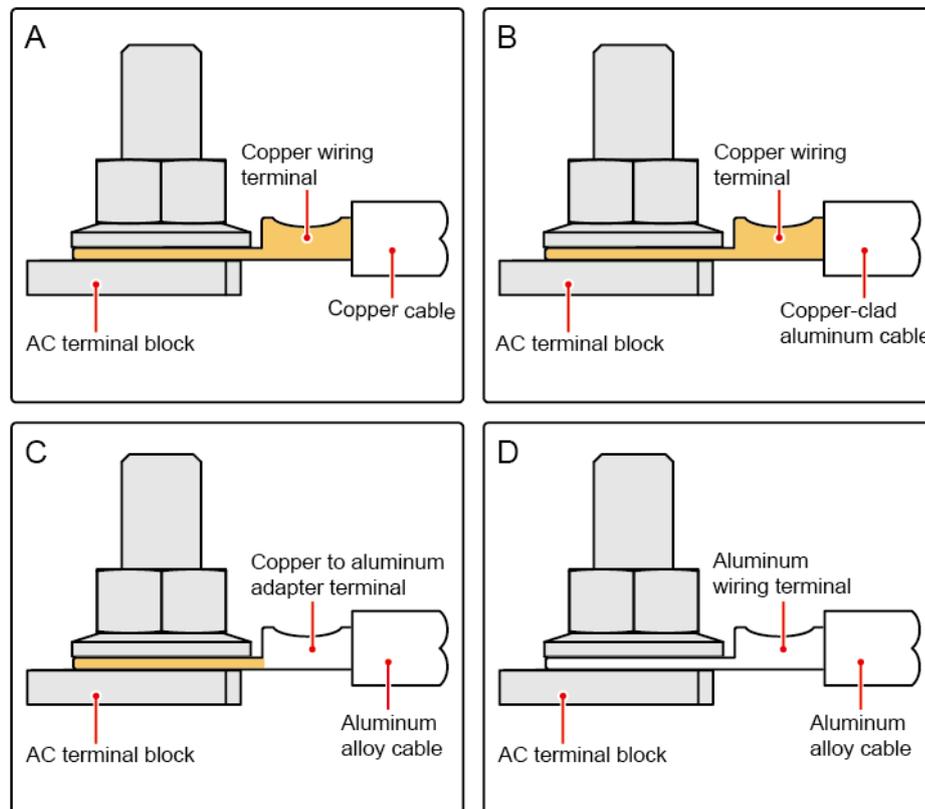
Figure 5-13 AC terminal block dimensions of a 3-pin model
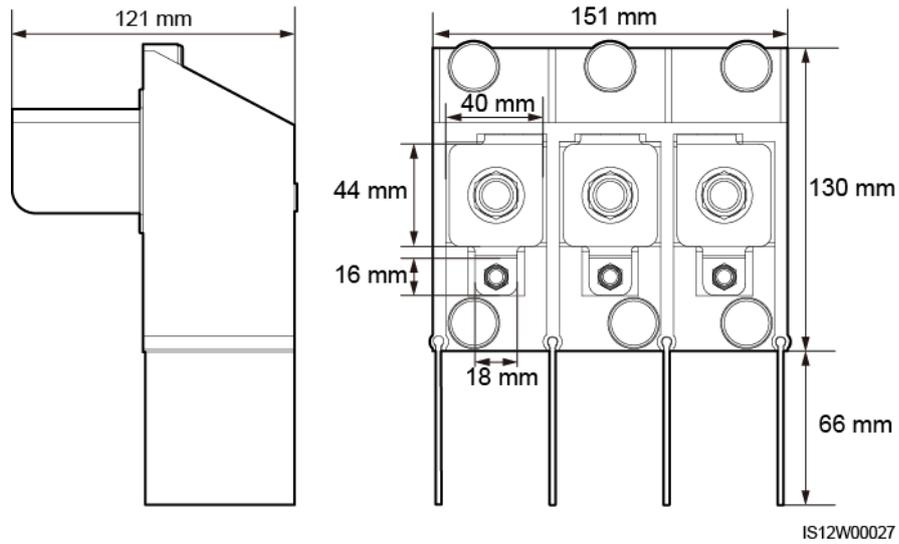
Figure 5-14 AC terminal block dimensions of 4-pin models
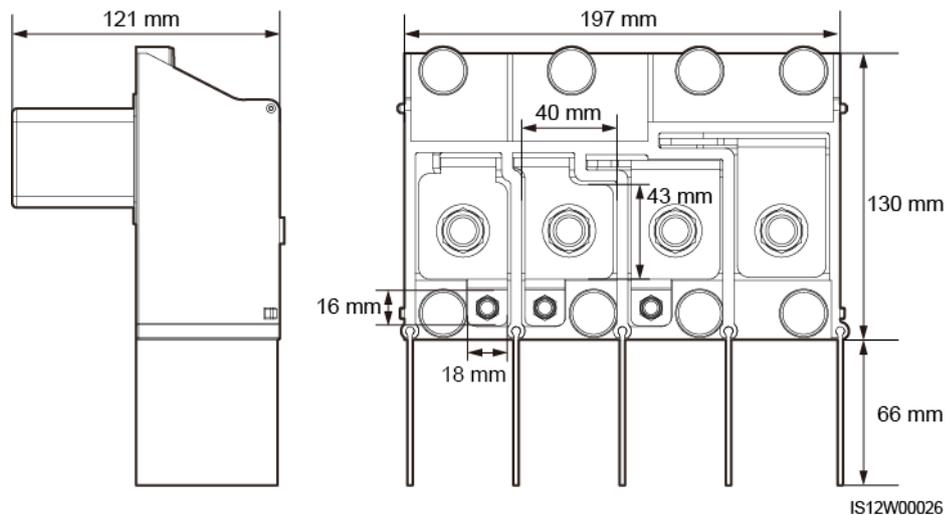
📖 **NOTE**

This section describes how to install an AC output power cable for the 3-pin model.

Procedure

Step 1 Prepare a cable.

Step 2 Remove rubber rings according to the cable diameter range.

Step 3 Secure the AC output power cable and PE cable.

Step 4 Install the support bar.

Step 5 Close the maintenance compartment door and tighten the two screws on the door.

> **NOTICE**
>
> - Sufficient slack should be provided in the PE cable to ensure that the last cable bearing the force is the PE cable when the AC output power cable bears pulling force due to force majeure.
> - 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 cable is secured. Failing to do so may cause the solar inverter to malfunction or damage to its terminal block by issues such as overheating.
> - Before closing the maintenance compartment door, check that the cables are connected correctly and securely, and clean up the foreign matter from the maintenance compartment.
> - If a screw on the maintenance compartment door is lost, obtain the spare screw from the fitting bag tied at the bottom of the maintenance compartment.

Figure 5-15 Multi-core cable connections
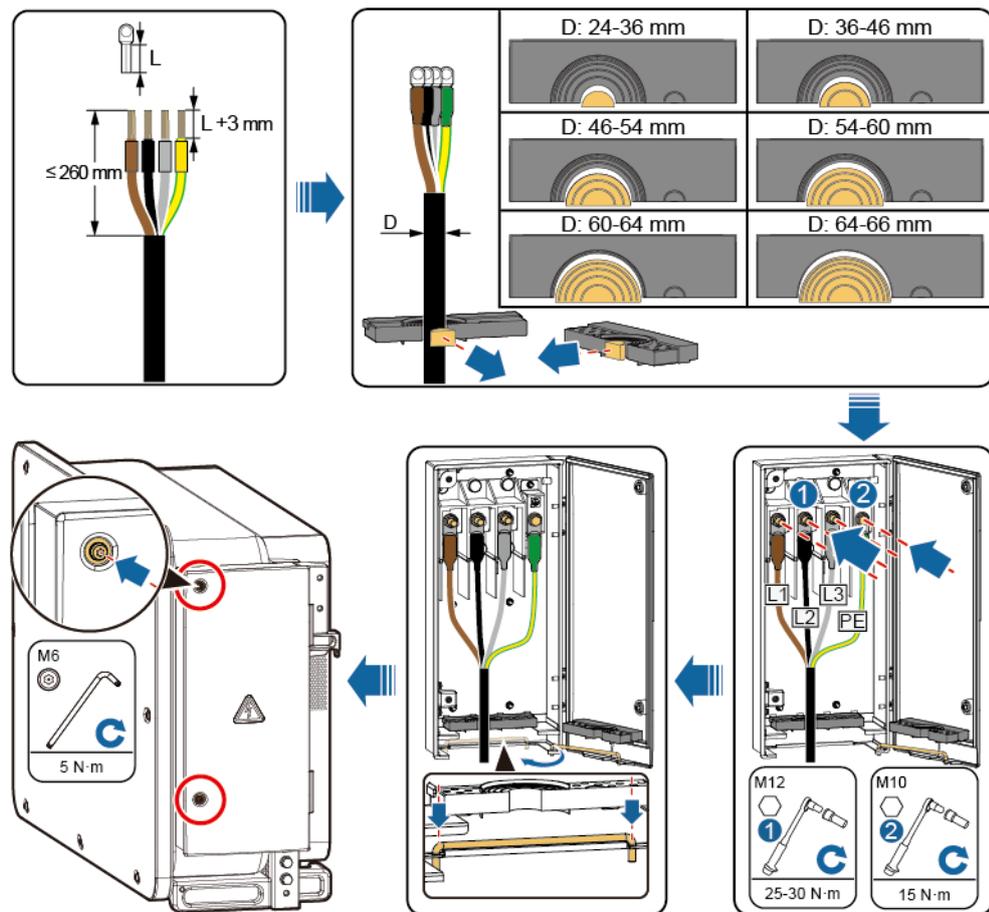
Figure 5-16 Single-core cable connections
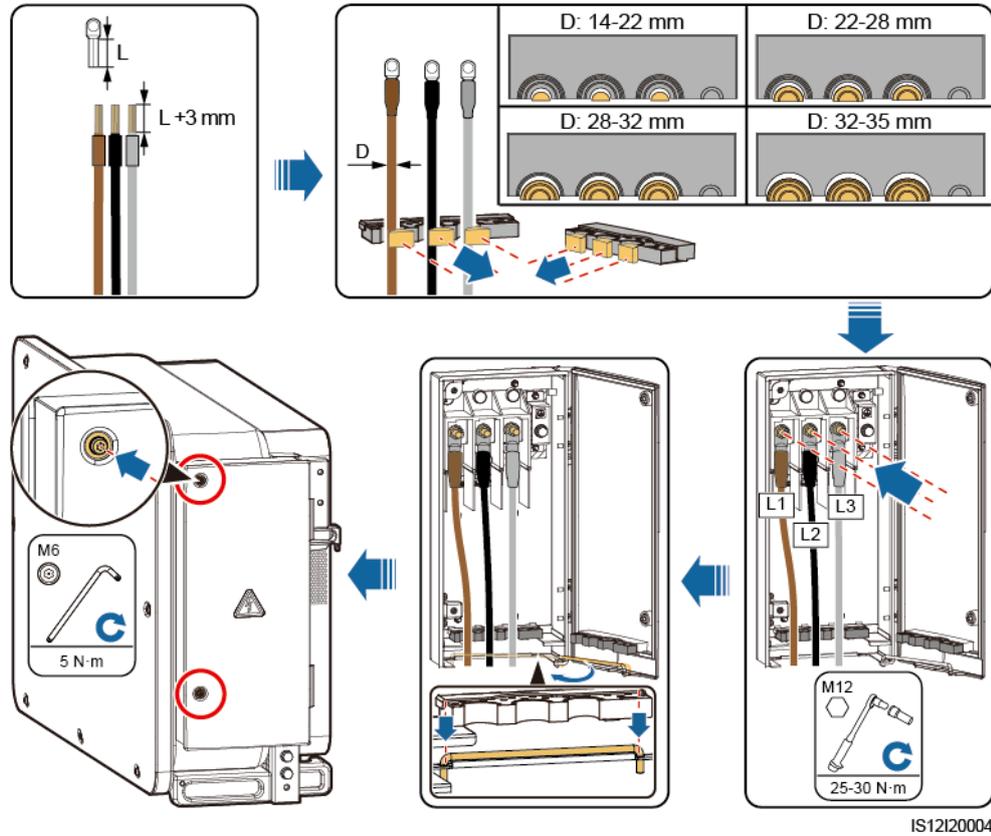
Figure 5-17 3-pin model (125KTL) cable connections
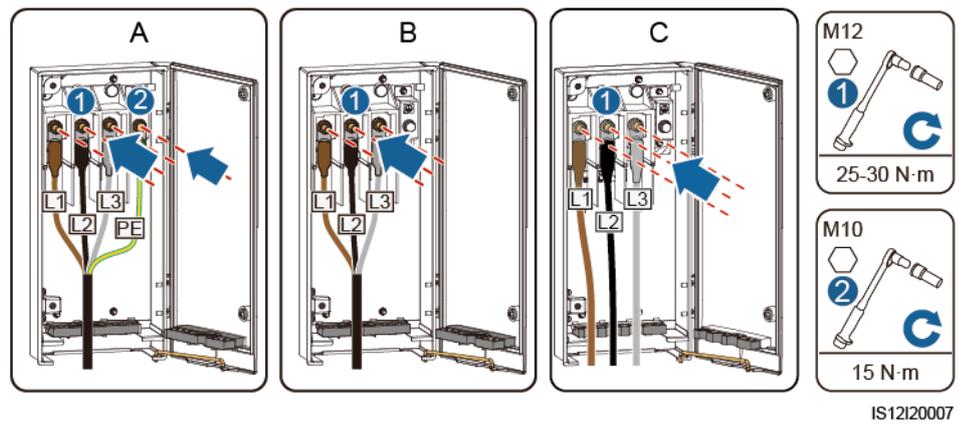
(A) Four-core cable   (B) Three-core cable   (C) Single-core cable

Figure 5-18 4-pin model (100KTL/110KTL) cable connections
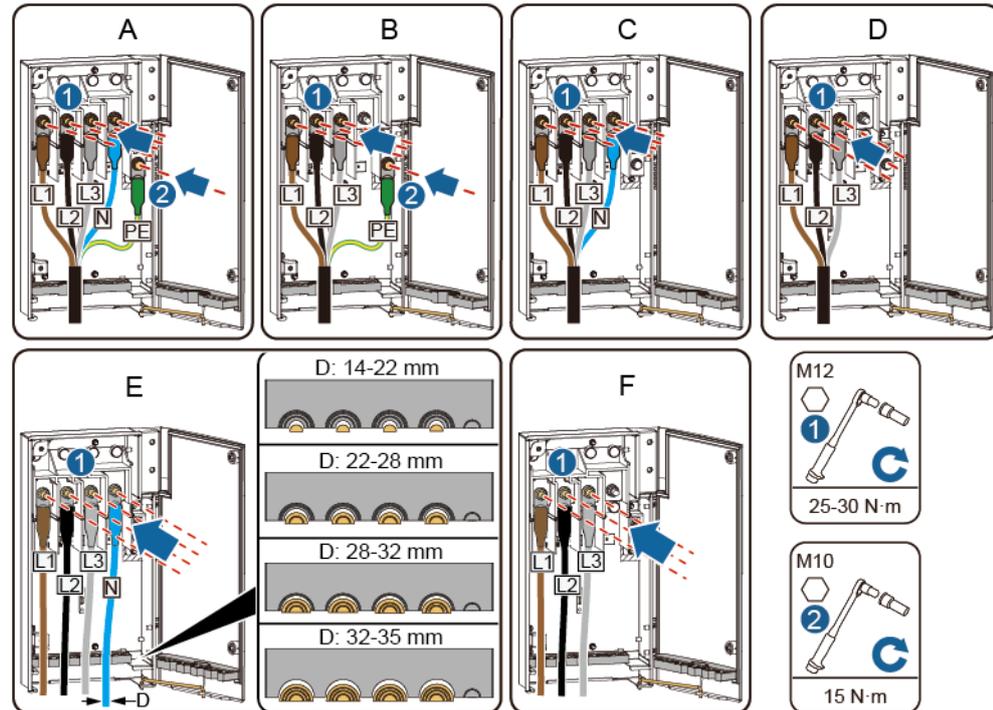
(A) Five-core cable	(B) Four-core cable (including the PE cable)	(C) Four-core cable (including the neutral wire)
(D) Three-core cable	(E) Single-core cable (including the neutral wire)	(F) Single-core cable (excluding the neutral wire)

◫ NOTE

The cable colors shown in figures are for reference only. Select an appropriate cable according to the local standards.

----End

5.7 Installing DC Input Power Cables

Precautions

⚠ DANGER

- Before connecting the DC input power cable, ensure that the DC voltage is within the safe range (lower than 60 V DC) and that the three DC switches on the solar inverter are set to OFF. Failing to do so may result in electric shocks.
- When the solar inverter operates in grid-tied mode, do not perform maintenance or operations on the DC circuit, such as connecting or disconnecting a PV string or a PV module in the PV string. Failing to do so may cause electric shocks or arcing, which may also cause fire.

⚠ WARNING

Ensure that the following conditions are met. Otherwise, the solar inverter may be damaged, or even a fire could happen.

- The open-circuit voltage of each PV string must be 1100 V DC or lower under any circumstances.
- The polarities of electric connections are correct on the DC input side. The positive and negative terminals of a PV module connect to corresponding positive and negative DC input terminals of the solar inverter.

NOTICE

- Ensure that the PV module output is well insulated to ground.
- The PV strings connecting to the same MPPT circuit should contain the same number of identical PV modules.
- The solar inverter does not support full parallel connection for PV strings (full parallel connection: PV strings connect to one another in parallel outside the solar inverter and then connect to the solar inverter separately).
- During the installation of PV strings and the solar inverter, the positive or negative terminals of PV strings may be short-circuited to ground if the power cable is not properly installed or routed. In this case, an AC or DC short circuit may occur and damage the solar inverter. The caused device damage is not covered under any warranty.

Terminal Description

The solar inverter has 20 DC input terminals. DC SWITCH 1 controls PV1–PV8 (MPPT1–MPPT4), DC SWITCH 2 controls PV9–PV14 (MPPT5–MPPT7), and DC SWITCH 3 controls PV15–PV20 (MPPT8–MPPT10).

Figure 5-19 DC terminals
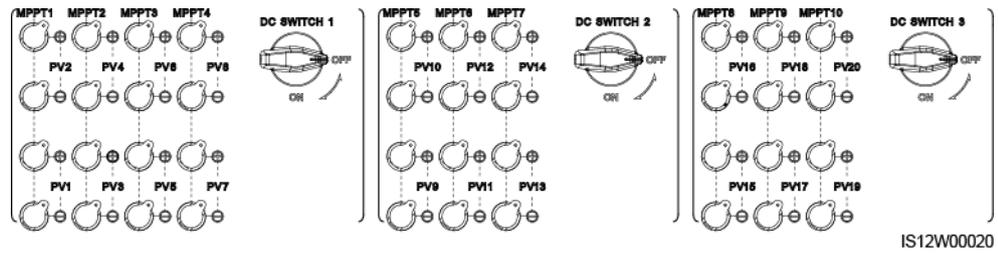
IS12W00020

When the DC input is not fully configured, the DC input terminals must meet the following requirements:

1. Evenly distribute the DC input power cables on the DC input terminals controlled by the three DC switches. DC SWITCH 1 is preferred.
2. Maximize the number of connected MPPT circuits.
3. Give preference to even-numbered DC input terminals.

For example, if the number of input routes is 1–19, the DC input terminals are selected as follows.

Number of PV Strings	Terminal Selection	Number of PV Strings	Terminal Selection
1	Any even-numbered route	2	PV2 and PV10
3	PV2, PV10, and PV18	4	PV2, PV6, PV10, and PV18
5	PV2, PV6, PV10, PV14, and PV18	6	PV2, PV4, PV6, PV10, PV14, and PV18
7	PV2, PV4, PV6, PV10, PV14, PV18, and PV20	8	PV2, PV4, PV6, PV8, PV10, 1PV4, PV18, and PV20
9	PV2, PV4, PV6, PV8, PV10, PV14, PV16, PV18, and PV20	10	PV2, PV4, PV6, PV8, PV10, PV12, PV14, PV16, PV18, and PV20
11	PV1, PV2, PV4, PV6, PV8, PV10, PV12, PV14, PV16, PV18, and PV20	12	PV1, PV2, PV4, PV6, PV8, PV10, PV12, PV14, PV16, and PV18–PV20
13	PV1–PV4, PV6, PV8, PV10, PV12, PV14, PV16, and PV18–PV20	14	PV1–PV4, PV6, PV8, PV10, PV12, PV14, and PV16–PV20
15	PV1–PV6, PV8, PV10, PV12, PV14, and PV16–PV20	16	PV1–PV6, PV8, PV10, PV12, and PV14–PV20
17	PV1–PV8, PV10, PV12, and PV14–PV20	18	PV1–PV8, PV10, and PV12–PV20
19	PV1–PV10 and PV12–PV20	N/A	N/A

Specification Requirements

Cables with high rigidity, such as armored cables, are not recommended, because poor contact may be caused by the bending of cables.

⚠ **CAUTION**

Use the Staubli MC4 connectors delivered with the solar inverter. If the PV connectors are lost or damaged, purchase the connectors of the same model. The device damage caused by incompatible PV connectors is beyond the warranty scope.

Procedure

Step 1 Remove the insulation layer of the DC input power cable by an appropriate length using a wire stripper.

Step 2 Crimp positive and negative metal contacts.

Step 3 Insert the contacts into the corresponding positive and negative connectors.

Step 4 Tighten the lock nuts on the positive and negative connectors.

Step 5 Use a multimeter to measure the voltage between the positive and negative terminals of the PV string (measurement range no less than 1100 V).

- If the voltage is a negative value, the DC input polarity is incorrect and needs correction.
- If the voltage is greater than 1100 V, too many PV modules configured to the same string. Remove some PV modules.

Step 6 Insert the positive and negative connectors into the corresponding DC positive and negative input terminals of the solar inverter.

Figure 5-20 Installing DC Input Power Cables
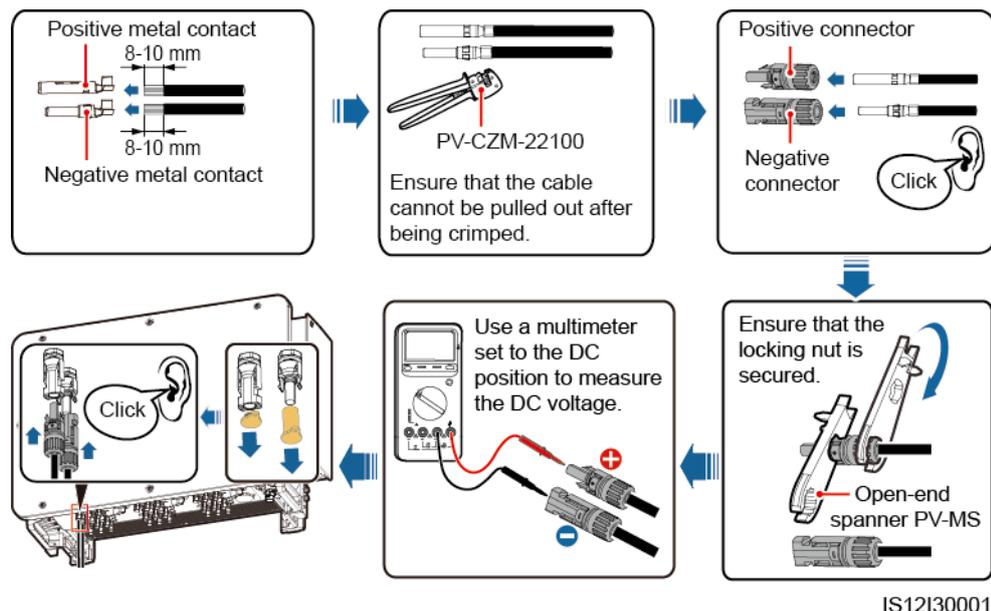
NOTICE

If the DC input power cable is reversely connected and DC switches are set to ON, do not immediately turn off the DC switches or reconnect the positive and negative connectors. Otherwise, the device may be damaged. The caused device damage is not covered under any warranty. Wait until the solar irradiance declines at night and the PV string current reduces to below 0.5 A. Then, turn off the three DC switches, remove the positive and negative connectors, and rectify the connection of the DC input power cable.

----End

5.8 Connecting the RS485 Communications Cable

Pin Definitions of the Communications Port

Figure 5-21 Communications port

IS05W00024
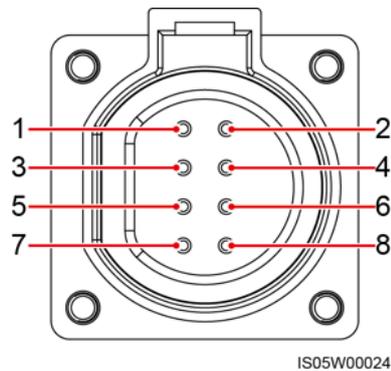
Port	Pin	Definition	Pin	Definition	Description
RS485-1	1	RS485A IN, RS485 differential signal+	2	RS485A IN, RS485 differential signal+	Used for cascading solar inverters or connecting to devices such as the SmartLogger.
	3	RS485B IN, RS485 differential signal–	4	RS485B IN, RS485 differential signal–	
Protection ground	5	PE, shielding ground	6	PE, shielding ground	N/A
RS485-2	7	RS485A, RS485 differential signal+	8	RS485B, RS485 differential signal–	Used for connecting to an RS485 slave device.

Connecting the RS485 Communications Cable

When routing the communications cable, separate it from power cables to prevent communication from being affected. Connect the shield layer to the PE point. This section describes how to connect three communications cables.

Figure 5-22 Connecting the RS485 communications cable

IS12I40001
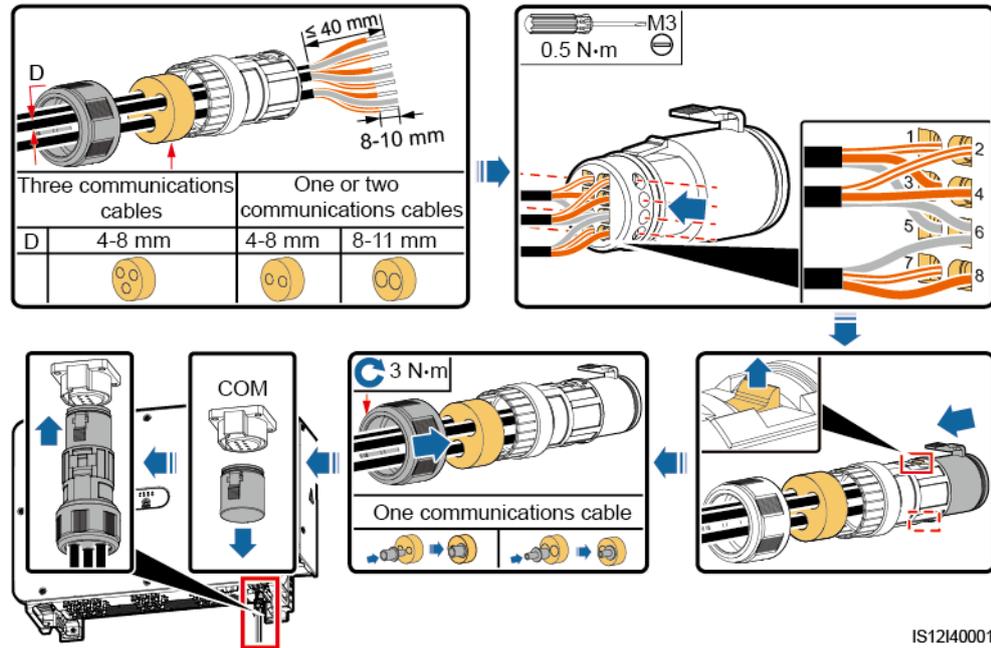
6 Commissioning

6.1 Check Before Power-on

No.	Acceptance Criteria
1	The solar inverter is installed correctly and securely.
2	The DC switches and the downstream AC switch are OFF.
3	All cables are connected correctly and securely.
4	Unused terminals and ports are locked by waterproof caps.
5	The installation space is proper, and the installation environment is clean and tidy.
6	The maintenance compartment door is closed and the door screws are tightened.

6.2 Powering On the SUN2000

Precautions

NOTICE

Before turning on the AC switch between the SUN2000 and the power grid, use a multimeter set to the AC position to check that the AC voltage is within the specified range.

Procedure

Step 1 Turn on the AC switch between the SUN2000 and the power grid.

NOTICE

If you perform Step 2 before Step 1, the SUN2000 reports a fault about abnormal shutdown. You can start the SUN2000 only after the fault is automatically rectified.

Step 2 Set DC SWITCH 1 (MAIN SWITCH) at the bottom of the solar inverter chassis to ON.

Step 3 1Check the status of the PV connection indicator. If it is steady green, set DC SWITCH 2 and DC SWITCH 3 to ON.

Step 4 Perform quick settings on the SUN2000 app. For details, see 7.1 Operations with the SUN2000 App.

----End

7 Man-Machine Interactions

7.1 Operations with the SUN2000 App

7.1.1 App Introduction

Description

The SUN2000 app (app for short) is a mobile phone app that communicates with the solar inverter over a WLAN module, a Bluetooth module or a USB data cable to allow for querying alarms, setting parameters, and performing routine maintenance as an easy-to-use maintenance platform.

Connection Mode

After the DC or AC side of the solar inverter is powered on, the app can connect to it either over a WLAN module, a Bluetooth module or a USB data cable.

> **NOTICE**
>
> - Over a WLAN module: The USB-Adapter2000-C WLAN module is supported.
> - Over a Bluetooth module: The USB-Adapter2000-B Bluetooth module is supported.
> - Over a USB data cable: The USB 2.0 port is supported. Use the USB data cable delivered with the mobile phone.
> - Requirements for the mobile phone operating system: Android 4.0 or later.
> - Recommended phone brands: Huawei, Samsung.

Figure 7-1 Connection over a WLAN module or a Bluetooth module
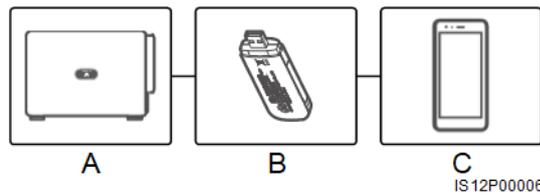
(A) Solar inverter   (B) WLAN module or Bluetooth module   (C) Mobile phone

Figure 7-2 Connection over a USB data cable
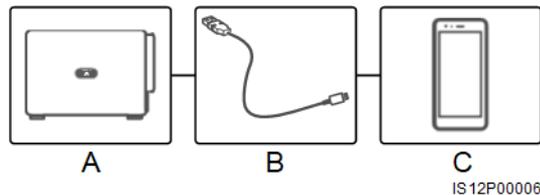
(A) Solar inverter   (B) USB data cable   (C) Mobile phone

Statement

The app snapshots provided in this document correspond to the SUN2000 app 3.2.00.001. The snapshots are for reference only.

> **NOTICE**
>
> - The configurable parameters of the solar inverter vary with the device model and grid code.
> - Changing the grid code may restore some parameters to factory defaults. Check whether the previously set parameters are affected.
> - The parameter names, value ranges, and default values are subject to change.

User Operation Permissions

The user accounts that can log in to the app are classified into common users, special users, and advanced users based on the responsibilities of PV plant operation personnel.

- Common user: Has the permission of viewing data and setting user parameters.
- Advanced user: Has the permission of viewing data, setting functional parameters, and maintaining devices.
- Special user: Has the permissions of viewing solar inverter data, setting grid related parameters, and maintaining devices (including starting and shutting down the solar inverter, restoring factory defaults, and upgrading devices).

☐ **NOTE**

File save path is displayed only on the Android app.

Figure 7-3 Operation permissions of common users
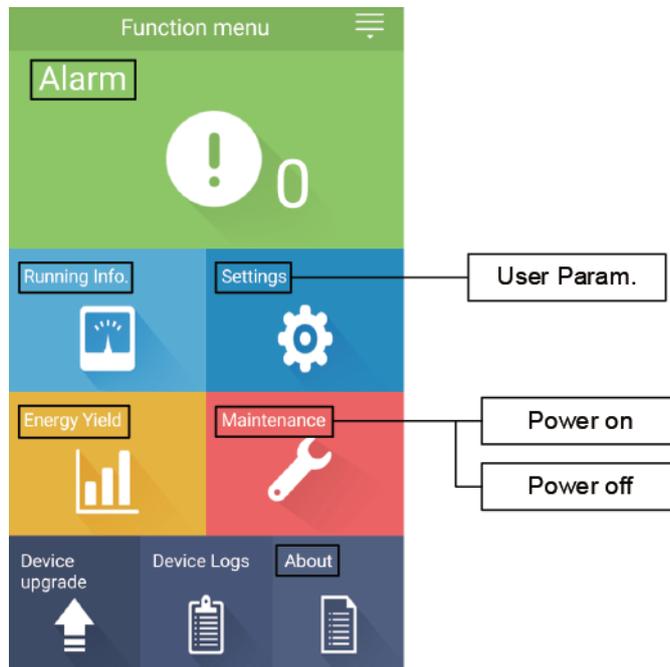
Figure 7-4 Operation permissions of advanced users
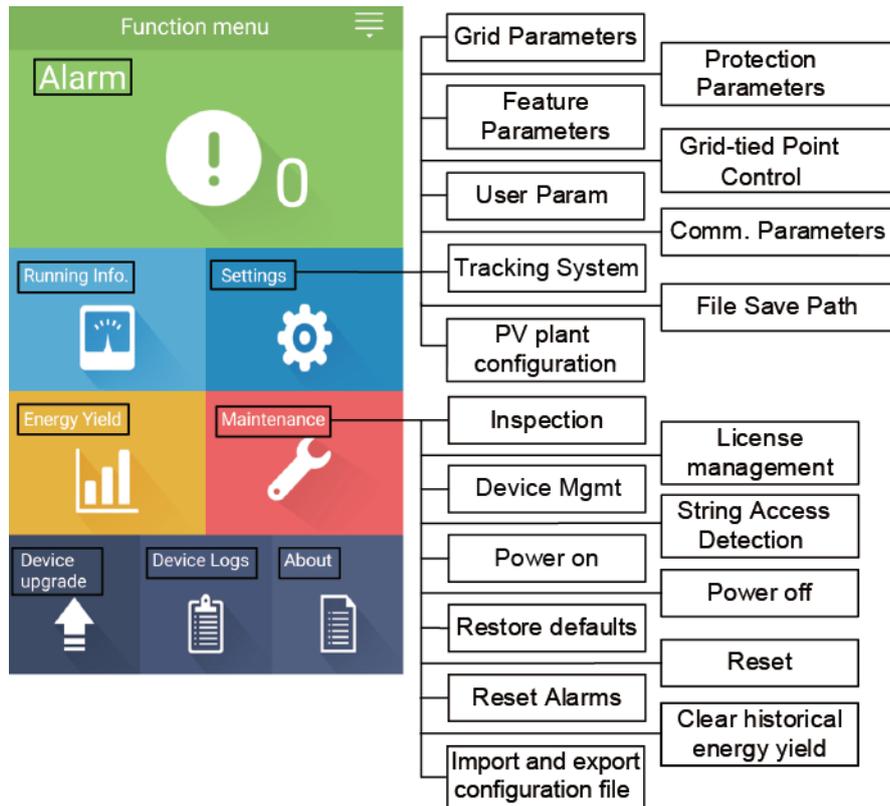
Figure 7-5 Operation permissions of special users
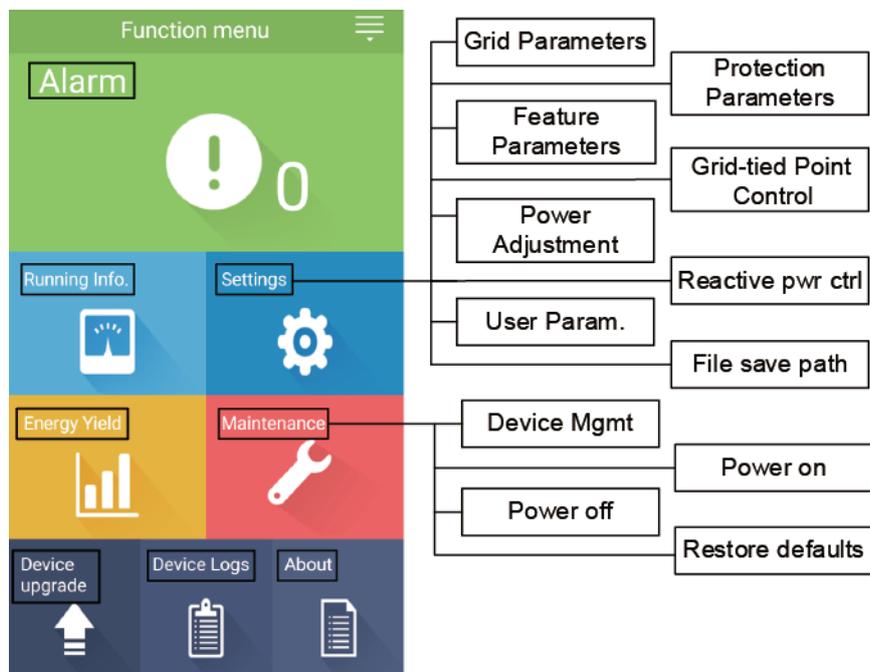
7.1.2 Downloading and Installing the App

Search **SUN2000** on the following app stores, download the app installation package, and complete the installation by following the operation guide.

- Huawei App Store (Android)
- Google Play (Android)

After the app is installed, the **SUN2000** symbol will be displayed as below:

7.1.3 App Login

Prerequisites

- The DC or AC side of the solar inverter has been energized.
- Connection over a WLAN module or a Bluetooth module:
  a. The WLAN module or Bluetooth module is connected to the USB port at the bottom of the solar inverter.
  b. The WLAN or Bluetooth function is enabled.
  c. Keep the mobile phone within 5 m from the solar inverter. Otherwise, the communication between them would be affected.
- Connection over a USB cable:
  a. The USB data cable is connected from the USB port at the bottom of the solar inverter to the USB port on the mobile phone.
  b. The USB data cable has been successfully connected and **Connected to USB Accessory** is displayed on the screen. Otherwise, the connection is invalid.

Procedure

Step 1 Start the app. The login screen is displayed. Select **Connection Mode** to connect to the solar inverter.

☐ **NOTE**

- When the WLAN connection is used, the initial name of the WLAN network is **Adapter-WLAN module SN**, and the initial password is **Changeme**. Use the initial password upon first power-on and change it immediately after login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial password may cause password disclosure. A password left unchanged for a long period of time may be stolen or cracked. If a password is lost, devices cannot be accessed. In these cases, the user is liable for any loss caused to the PV plant.
- When the Bluetooth connection is used, the name of the connected Bluetooth device is the last eight digits of the SN bar code+HWAPP.
- When the USB connection is used, after you select **Use by default for this USB accessory**, the message prompting you to confirm that the app is allowed to access the USB device will not appear if you log in to the app again without removing the USB data cable.

Step 2 Select a login user and enter the password.

NOTICE

- The login password is the same as that for the solar inverter connected to the app and is used only when the solar inverter connects to the app.
- The initial passwords for **Common User**, **Advanced User**, and **Special User** are both **00000a**.
- Use the initial password upon first power-on and change it immediately after login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial password may cause password disclosure. A password left unchanged for a long period of time may be stolen or cracked. If a password is lost, devices cannot be accessed. In these cases, the user is liable for any loss caused to the PV plant.
- During the login, if five consecutive invalid password entries are made (the interval between two consecutive entries is less than 2 minutes), the account will be locked for 10 minutes. The password should consist of six characters.

Step 3 After successful login, the quick settings or main menu screen is displayed.

NOTICE

- If you log in to the SUN2000 app after the device connects to the app for the first time or factory defaults are restored, the **Quick Settings** screen will be displayed. If you do not set the basic parameters for the solar inverter on the **Quick Settings** screen, the screen is still displayed when you log in next time.
- To set the basic parameters on the **Quick Settings** screen, switch to **Advanced User**. When you log in as **Common User** or **Special User**, enter the password of **Advanced User** in the dialog box that is displayed. After you confirm the password, go to the **Quick Settings** screen.

Figure 7-6 App login
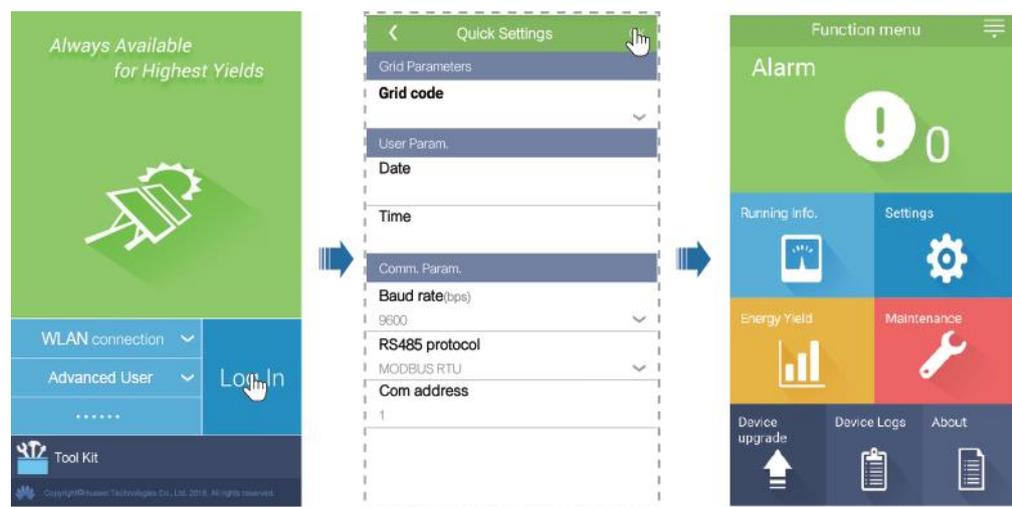
Table 7-1 Quick settings

Parameter	Description	Value Range
Grid code	Set this parameter based on the grid code of the country or region where the SUN2000 is used and the SUN2000 application scenario.	N/A
Date	Specifies the system date.	[2000-01-01, 2068-12-31]
Time	Specifies the system time.	[00:00:00, 23:59:59]
Baud rate (bps)	Set the RS485 baud rate to be consistent with the baud rate of the devices on the same bus.	• 4800 • 9600 • 19200
RS485 protocol	• The solar inverter can connect to the upper-layer management unit over the Modbus RTU, SunSpec, or AVM protocol. • When the solar inverter connects to the support tracking system, only the Modbus RTU protocol is supported.	• MODBUS RTU • Sunspec • AVM
Com address	Set the communications address of the SUN2000 when it connects to the upper-level management unit, which should not conflict with the addresses of other devices on the same bus.	[1, 247]

----End

7.1.4 Operations Related to the Common User

7.1.4.1 Setting User Parameters

Procedure

Step 1 Choose **Function Menu** > **Settings** > **User Param.** to set user parameters.

Figure 7-7 Setting user parameters
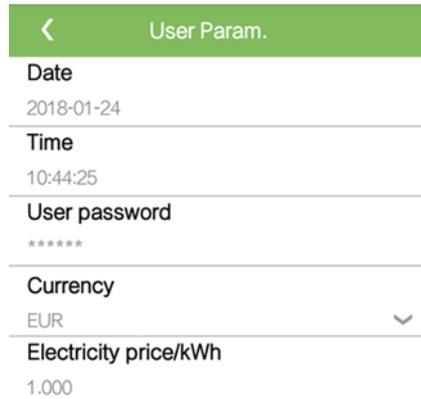
Table 7-2 User parameters

Item	Description	Value Range
Date	Set the system date.	[2000-01-01, 2068-12-31]
Time	Set the system time.	[00:00:00, 23:59:59]
User password	Set the login password.	• Contains six characters. • Contains at least two types of lowercase letters, uppercase letters, and digits. • Differ from the original password in at least one character.
Currency	Set the SUN2000 revenue currency.	• EUR • GBP • USD • CNY • JPY
Electricity price/kWh	Set the SUN2000 revenue per kWh. The revenue/kWh indicates the local electricity price, which is used to calculate the conversion revenue of the energy yield.	[0, 999.999]

----End

7.1.4.2 Starting and Shutting Down the SUN2000

Procedure

Step 1 Choose **Function Menu** > **Maintenance**. The maintenance screen will be displayed.

Step 2 Tap ▶ behind **Power on** or **Power off**, enter the login password, and tap **OK**.

----End

7.1.5 Operations Related to the Advanced User

7.1.5.1 Parameter Settings

Ensure that the DC side of the SUN2000 is energized before setting grid parameters, protection parameters, and feature parameters.

7.1.5.1.1 Setting Grid Parameters

Procedure

Step 1 Choose **Function Menu** > **Settings** > **Grid Parameters** to set grid parameters.

Figure 7-8 Grid parameters
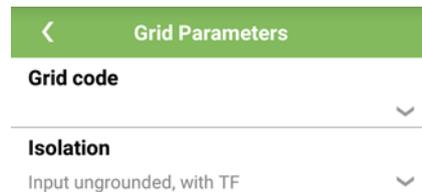
Table 7-3 Grid parameters

Parameter	Description	Value Range
Grid code	Set this parameter based on the grid code of the country or region where the SUN2000 is used and the SUN2000 application scenario.	N/A
Isolation	Specifies the working mode of the SUN2000 according to the grounding status at the DC side and the connection status to the grid.	• Input ungrounded, without TF • Input ungrounded, with TF

----End

7.1.5.1.2 Setting Protection Parameters

Procedure

Step 1 Choose **Function Menu** > **Settings** > **Protection Parameters** to set protection parameters.

Figure 7-9 Protection parameters
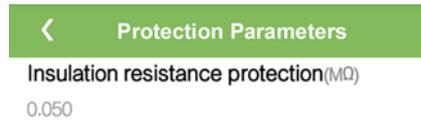
Table 7-4 Protection parameters

Parameter	Description	Value Range
Insulation resistance protection (MΩ)	To ensure device safety, the SUN2000 detects the insulation resistance between the input side and the ground when it starts a self-check. If the detected value is less than the preset value, the SUN2000 does not export power to the power grid.	[0.037, 1.5]

----End

7.1.5.1.3 Setting Feature Parameters

Procedure

Step 1   Choose **Function Menu** > **Settings** > **Feature Parameters**, and set feature parameters.

Figure 7-10 Feature parameters
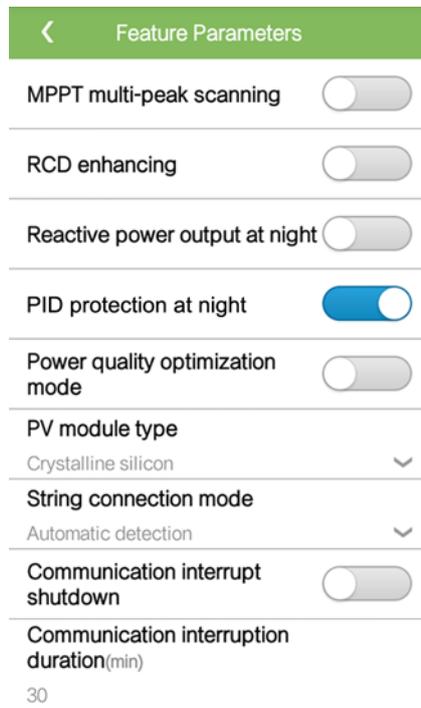
Table 7-5 Feature parameters

Parameter	Description	Value Range
MPPT multi-peak scanning	When the SUN2000 is used in scenarios where PV strings are obviously shaded, enable this function. Then the SUN2000 will perform MPPT scanning at regular intervals to locate the maximum power. The scanning interval is set by **MPPT multi-peak scanning interval**.	• Disable • Enable
MPPT multi-peak scanning interval (min)	Specifies the MPPT multi-peak scanning interval. This parameter is displayed only when **MPPT multi-peak scanning** is set to **Enable**.	[5, 30]
RCD enhancing	RCD refers to the residual current of the SUN2000 to the ground. To ensure device security and personal safety, RCD should comply with the standard. If an AC switch with a residual current detection function is installed outside the SUN2000, this function should be enabled to reduce the residual current generated during SUN2000 running, thereby preventing the AC switch from misoperations.	• Disable • Enable
Reactive power output at night	In some specific application scenarios, a power grid company requires that the SUN2000 can perform reactive power compensation at night to ensure that the power factor of the local power grid meets requirements. This parameter is configurable only when **Isolation** is set to **Input ungrounded, with a transformer**.	• Disable • Enable
PID protection at night	• When **PID protection at night** is set to **Enable**, the solar inverter will shut down automatically if it detects abnormality of the voltage compensation of the anti-PID module during the reactive power compensation at night. • When **PID protection at night** is set to **Disable**, the solar inverter will operate in grid-tied mode if it detects abnormality of the voltage compensation of the anti-PID module during the reactive power compensation at night.	• Disable • Enable
Power quality optimization mode	If **Power quality optimization mode** is set to **Enable**, the inverter output current harmonics will be optimized.	• Disable • Enable

Parameter	Description	Value Range

PV module type	This parameter is used to set different types of PV modules and the shutdown time of the concentration PV module. If the concentration PV modules are shaded, the power drops drastically to 0 and the solar inverter shuts down. The energy yield would be affected since it takes too long for the power to resume and solar inverter to restart. The parameter does not need to be set for crystalline silicon and filmy PV modules.
	
	• When **PV module type** is set to **Crystalline silicon** or **Film**, the solar inverter automatically detects the PV module power when the PV module is shaded. If the power is insufficient, the solar inverter shuts down automatically.
	
	• When concentration PV modules are used:
	  – When **PV module type** is set to **CPV 1**, the solar inverter can quickly restart in 60 minutes if the input power of PV modules drops drastically due to shading.
	  – When **PV module type** is set to **CPV 2**, the solar inverter can quickly restart in 10 minutes if the input power of PV modules drops drastically due to shading.
		• Crystalline silicon
		• Film
		• CPV 1
		• CPV 2

PID compensation direction	When the solar inverter generates reactive power at night, an external PID compensation device (such as the anti-PID module) is required to perform PID compensation for the system. In addition, this parameter must be correctly set for the solar inverter. The solar inverter can generate reactive power at night only when it detects that the value of this parameter is the same as the compensation direction of the external PID compensation device. • If no PID compensation device exists in the system, set this parameter to **Output disabled**. • When the system uses the PID compensation device to increase the voltage of PV– with respect to ground to a value greater than 0 V, set this parameter to **PV- positive offset**. • When the system uses the PID compensation device to decrease the voltage of PV+ with respect to ground to a value less than 0 V, set this parameter to **PV+ positive offset**.	• Output disabled • PV- positive offset • PV+ negative offset

Parameter	Description	Value Range
String connection mode	Specifies the connection mode of PV strings. • When PV strings connect to the solar inverter separately (fully separate connection), you do not need to set this parameter. The solar inverter can automatically detect the connection mode of the PV strings. • When PV strings connect to one another in parallel outside the solar inverter and then connect to it independently (fully parallel connection), set this parameter to **All PV strings connected**.	• Automatic detection • All PV strings separated • All PV strings connected
Communication interrupt shutdown	The standards of certain countries and regions require that the SUN2000 must shut down after the communication is interrupted for a certain time. If **Communication interrupt shutdown** is set to **Enable** and the SUN2000 communication has been interrupted for a specified time (set by **Communication interruption duration**), the SUN2000 will automatically shut down.	• Disable • Enable
Communication resumed startup	If this parameter is enabled, the SUN2000 automatically starts after communication recovers. If this parameter is disabled, the SUN2000 needs to be started manually after communication recovers. This parameter is displayed when **Communication interrupt shutdown** is set to **Enable**.	• Disable • Enable
Communication interruption duration (min)	Specifies the duration for determining communication interruption, and is used for automatic shutdown for protection in case of communication interruption.	[1, 120]
Soft start time (s)	Specifies the duration for the power to gradually increase when the SUN2000 starts.	[1, 1800]
Hibernate at night	The SUN2000 monitors PV strings at night. If **Hibernate at night** is set to **Enable**, the monitoring function of the SUN2000 will hibernate at night, reducing power consumption.	• Disable • Enable
MBUS communication	For solar inverters that support RS485 communication and MBUS communication, you are advised to set this parameter to **Disable** to reduce power consumption.	• Disable • Enable

Parameter	Description	Value Range
Upgrade delay	**Upgrade delay** is mainly used in the upgrade scenarios where the PV power supply is disconnected at night due to no sunlight or unstable at dawn or dusk due to poor sunlight. After the solar inverter starts to upgrade, when **Upgrade delay** is set to **Enable**, the upgrade package is loaded first. After the PV power supply resumes and the activation conditions are met, the solar inverter automatically activates the upgrade.	• Disable • Enable
RS485-2 communication	If this parameter is set to **Enable**, the RS485-2 port can be used. If the port is not used, you are advised to set this parameter to **Disable** to reduce power consumption.	• Disable • Enable
Tracking system controller	Selects a controller vendor.	N/A
Duration for determining short-time grid disconnection (ms)	The standards of certain countries and regions require that the inverter should not disconnect from the power grid if the power grid experiences a short-time failure. After the fault is rectified, the inverter output power needs to be quickly restored.	[500, 20000]

----End

7.1.5.1.4 Setting User Parameters

Procedure

Step 1 Choose **Function Menu** > **Settings** > **User Param.** to set user parameters.

Figure 7-11 Setting user parameters
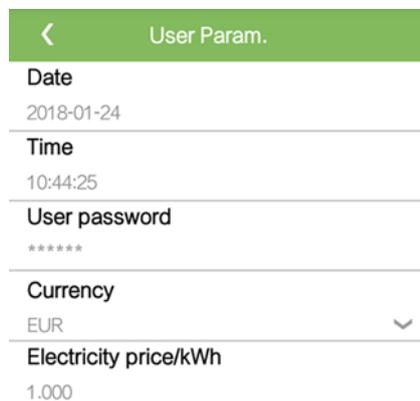
Table 7-6 User parameters

Item	Description	Value Range
Date	Set the system date.	[2000-01-01, 2068-12-31]
Time	Set the system time.	[00:00:00, 23:59:59]
User password	Set the login password.	• Contains six characters. • Contains at least two types of lowercase letters, uppercase letters, and digits. • Differ from the original password in at least one character.
Currency	Set the SUN2000 revenue currency.	• EUR • GBP • USD • CNY • JPY
Electricity price/kWh	Set the SUN2000 revenue per kWh. The revenue/kWh indicates the local electricity price, which is used to calculate the conversion revenue of the energy yield.	[0, 999.999]

----End

7.1.5.1.5 Setting the Grid-tied Control Parameters

Prerequisites

After the Smart Power Sensor is connected to the solar inverter through **Function Menu** > **Maintenance** > **Device Mgmt**, you can set the grid-tied control parameters to control the active and reactive power output of the grid-tied point.

Procedure

Step 1 Choose **Function Menu** > **Settings** > **Grid-tied Point Control**, enter the login password, and set the corresponding power control parameters based on the PV plant requirements.

Figure 7-12 Grid-tied point control
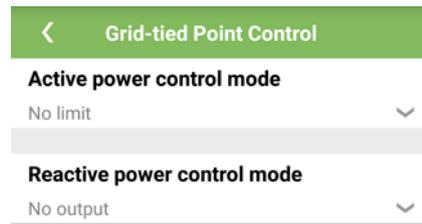
Table 7-7 Grid-tied control parameters

Parameter	Description	Value Range
Active power control mode	Specifies the active power output mode at the grid-tied point.	• No limit • Grid connection with zero power • Grid connection with limited power (kW) • Grid connection with limited power (%)
Closed-loop controller	Specifies the grid-tied power controller. Before setting the parameter, confirm the controller type. Incorrect setting will result in abnormal power output of the solar inverter. **Solar inverter** applies only to the scenario where a single solar inverter is used or where a single inverter is used with a Smart Dongle.	• SDongle/SmartLogger • Solar inverter
Limitation mode	Specifies the active power limitation mode as required by the power grid.	• Total power • Single phase power
PV plant capacity (kW)	Specifies the PV array capacity.	[0, 2000]
Maximum grid feed-in power (kW)	In **Grid connection with limited power (kW)** mode, set the maximum power fed to the power grid from the PV array.	[–1000, PV plant capacity]
Maximum grid feed-in power (%)	In **Grid connection with limited power (%)** mode, set the proportion of the maximum power fed to the power grid from the PV array to the capacity of the PV plant.	[0, 100]
Power lowering adjustment period (s)	Specifies the interval for sending adjustment commands.	[0.2, 300]
Maximum protection time (s)	Specifies the protection duration to determine whether the communication between the SDongle/SmartLogger and the Smart Power Sensor is interrupted.	[0.2, 300]
Power raising threshold (kW)	Specifies the threshold for power raising.	[0, 50]

Parameter	Description	Value Range
Fail-safe power (%)	When the communication between the SDongle/SmartLogger as well as the Smart Power Sensor and the solar inverter is interrupted, the solar inverter generates power based on this threshold.	[0, 100]
Reactive power control mode	Specifies the reactive power output mode at the grid-tied point.	• No output • Pwr factor closed-loop control
Power factor	Specifies the target value for the power factor of the Smart Power Sensor.	(–1, –0.8] U [0.8, 1]
Adjustment period (s)	Specifies the interval for sending adjustment commands.	[0.2, 10]
Adjustment deadband	Specifies the adjustment power factor precision.	[0.001, 1]
Fail-safe power factor	When the communication between the Smart Dongle as well as the Smart Power Sensor and solar inverter is interrupted, the solar inverter generates power based on this threshold.	(–1, –0.8] U [0.8, 1]
Communication disconnection fail-safe	When this parameter is set to **Enable**, and the communication between the solar inverter and the SDongle/SmartLogger is interrupted for a certain period (set by **Communication disconnection detection time**), the solar inverter generates power based on **Fail-safe power**.	• Disable • Enable
Communication disconnection detection time (s)	Specifies the protection duration to determine whether the communication between the SDongle/SmartLogger and the solar inverter is interrupted.	[1, 10]

----End

7.1.5.1.6 Setting Communications Parameters

Procedure

Step 1 Choose **Function Menu** > **Settings** > **Comm. Param.**, and set communication parameters based on the communication mode used by the solar inverter.

Figure 7-13 Communications parameters
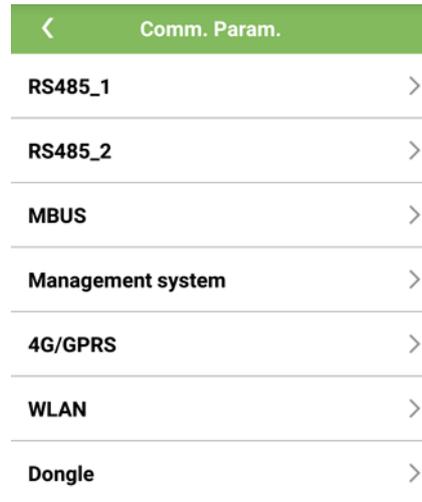
- Set RS485 communications parameters when the solar inverters are cascaded using an RS485 communications cable or connect to a slave RS485 device.

Table 7-8 RS485 communications parameters

Parameter	Description	Value Range
Baud rate (bps)	Set the RS485 baud rate to that of the devices on the same bus.	• 4800 • 9600 • 19200
RS485 protocol	• The solar inverter can connect to the upper-layer management unit over the Modbus RTU, SunSpec, or AVM protocol. • When the solar inverter connects to the support tracking system, only the Modbus RTU protocol is supported.	• MODBUS RTU • Sunspec • AVM
Parity	Set the parity of RS485 communication to that of the devices on the same bus.	• None • Odd parity • Even parity
Com address	Set the communications address of the solar inverter when it connects to the upper-layer management unit. The address should not conflict with the addresses of other devices on the same bus.	[1, 247]
Port mode	Specifies the RS485 port mode. You are advised to retain the default value. The port mode is automatically matched based on the device connected.	• Slave mode • Host mode

- Set MBUS communication parameters when the solar inverter uses the MBUS networking.

Table 7-9 MBUS communications parameters

Parameter	Description	Value Range
MBUS protocol	Specifies the MBUS communication protocol.	• MODBUS RTU • Sunspec
Box-type transformer No.	Specifies the number of the transformer station connecting to the solar inverter.	[0, 511]
Winding No.	Specifies the number of the winding connecting to the solar inverter.	[0, 7]
Com address	Same as the communication address of RS485-1. Specifies the communication address for the solar inverter to connect to the upper-layer management unit. The address should not conflict with the addresses of other devices on the same bus.	[1, 247]

- Set management system parameters when the solar inverter connects to the management system through a Smart Dongle.

Table 7-10 Management system parameters

Parameter	Description
NMS server	Specifies the IP address or domain name of the management system.
NMS server port	Specifies the port number of the management system to which the SmartLogger connects over a network protocol.
SSL encryption	Retain the default value **Enable**. **NOTE** If this function is disabled, the data exchange between the SmartLogger and the management system is not encrypted, which poses security risks.
Cascading channel	• Set this parameter to **Enable** for the solar inverter that is equipped with a Smart Dongle. If this parameter is set to **Disable**, the data from other cascaded solar inverters cannot be transferred. • For other solar inverters, retain the default value **Disable**.

> **NOTICE**
>
> ● When connecting solar inverters to a third-party management system, you need to ensure that the third-party management system supports the standard Modbus TCP protocol and configure the access point table based on the definitions of Huawei solar inverter interfaces. You need to set **NMS server** and **NMS server port** for solar inverters as required by a third-party management system and replace the client certificate. A third-party management system must comply with the definitions of Huawei solar inverter interfaces. You need to obtain solar inverter interface definitions from Huawei technical support.
> ● You are advised to retain the default values for other management system parameters.

● Set 4G/GPRS communication parameters when the solar inverter connects to the management system through a 4G/GPRS Smart Dongle.

Table 7-11 4G/GPRS communications parameters

Parameter	Description
Monthly Traffic Package	Set this parameter based on the SIM card package.
Monthly Used Traffic	Adjusts the monthly traffic.
Network mode	Set this parameter based on the SIM card network mode.
APN mode	The default value is **Automatic**. If the **Automatic** mode cannot be used to access the Internet, set this parameter to **Manual**.
Identification type	When APN mode is set to **Manual**, set the parameters related to the SIM card with the information obtained from the carrier.
APN access point	
APN dialup number	
APN user name	
APN user password	

● The solar inverter reserves the WLAN extension function, which is implemented by setting WLAN parameters.
● When the solar inverter connects to the management system through a Smart Dongle, the Smart Dongle parameters can be used to enable automatic address allocation.

----End

7.1.5.1.7 Setting the Tracking System

Context

Parameter settings of the support parameters may vary depending on the vendor.

Procedure

Step 1   Choose **Function Menu** > **Settings** > **Tracking System** to set support parameters.

Figure 7-14 Support parameters
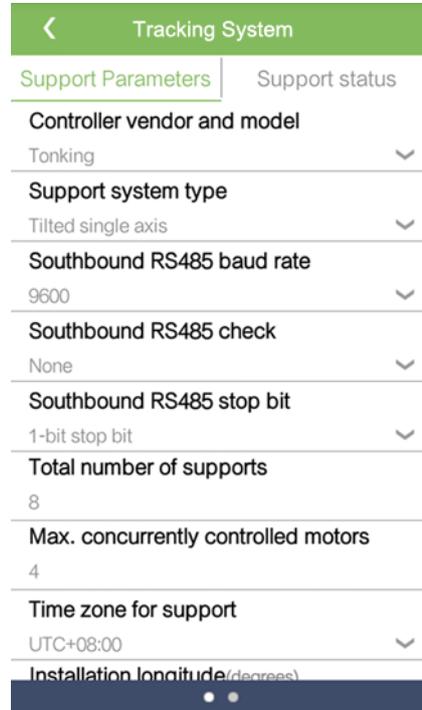
Step 2   Swipe left on the screen, tap a support, and set parameters for the support.

Figure 7-15 Setting parameters of a single support

----End

7.1.5.1.8 Setting a File Save Path

Context

In the Android system, you can modify the save path for user operation logs and SUN2000 logs and export logs from the path subsequently.

Procedure

Step 1 Choose **Function Menu** > **Settings** > **File save path** to set the file save path.

Figure 7-16 Setting the path

----End

7.1.5.1.9 Configuring a PV Plant

Context

- In SDongle networking mode, you can synchronize the grid code, time, and date to the cascaded solar inverters by setting the parameters of the solar inverter where the SDongle is installed.

- In MBUS networking mode, you can choose **Function Menu > Running Info. > Details > Other** to view the MBUS networking status and number of networked solar inverters after setting parameters.

Procedure

Step 1 Choose **Function Menu** > **Settings** > **PV plant configuration** and set PV plant configuration parameters.

- In RS485 networking mode, set the PV plant configuration parameters and tap **OK** to synchronize the parameters. If there is any failure in the synchronization list, tap the corresponding line to synchronize the data again.

Figure 7-17 RS485 PV plant configuration
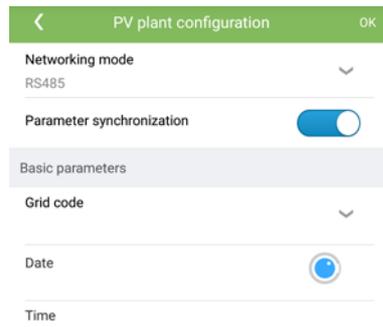
Table 7-12 RS485 networking

Parameter	Description	Value Range
Networking mode	Set this parameter to **RS485**.	• RS485 • MBUS
Parameter synchronization	Enable this parameter.	• Disable • Enable
Grid code	Set this parameter based on the power grid code of the country or region where the solar inverters are located and the application scenario.	N/A
Date	Specifies the system date.	[2000-01-01, 2068-12-31]
Time	Specifies the system time.	[00:00:00, 23:59:59]

- In MBUS networking mode, set the PV plant configuration parameters and tap **OK** to synchronize the parameters. If there is any failure in the synchronization list, tap the corresponding line to synchronize the data again.

Figure 7-18 MBUS networking
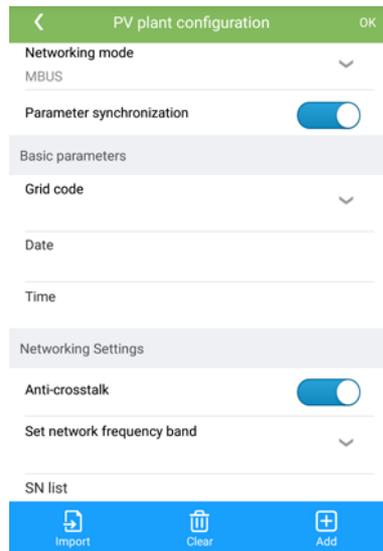
Table 7-13 MBUS networking

Parameter	Description	Value Range
Networking mode	Set this parameter to **MBUS**.	• RS485 • MBUS
Parameter synchronization	Enable this parameter.	• Disable • Enable
Grid code	Set this parameter based on the power grid code of the country or region where the solar inverters are located and the application scenario.	N/A
Date	Specifies the system date.	[2000-01-01, 2068-12-31]
Time	Specifies the system time.	[00:00:00, 23:59:59]
Anti-crosstalk	If **Anti-crosstalk** is enabled, a solar inverter whose SN is in the SN list can be networked.	• Disable • Enable
Set network frequency band	• USA: Set this parameter to **1.7–4.9 (MHz)**. • Other areas: Retain the default value **2.5–5.7 (MHz)**. **NOTE** Other network frequency bands are reserved.	• 1.7–4.9 (MHz) • 0.5–3.7 (MHz) • 2.5–5.7 (MHz) • 2–12 (MHz)

Parameter	Description	Value Range
SN list	Tap **Scan** to scan the solar inverter SNs one by one or in batches, or manually enter the SNs to generate an SN list file. You can import, delete, and add an SN list.	• Import • Delete • Add

----End

7.1.5.2 System Maintenance

7.1.5.2.1 Device inspection

Context

After a SUN2000 is put into use, it should be inspected periodically to detect any potential risks and problems.

Procedure

Step 1 Choose **Function Menu** > **Maintenance** > **Inspection**, and tap to start the SUN2000 inspection.

----End

7.1.5.2.2 Managing the License

Context

Smart I-V Curve Diagnosis can be used only after a license is purchased. The license file for Smart I-V Curve Diagnosis is stored in the SUN2000. The SUN2000 SN uniquely maps to the license.

You can view the SUN2000 license information and obtain the license status through the license management. Before a device is replaced, the current device license needs to be revoked so that the revocation code can be generated and used for applying for a new device license.

Procedure

Step 1 Choose **Function Menu** > **Maintenance** > **License management**. The **License management** screen is displayed.

- When **License status** is **Normal**, revoke the license by tapping .
- When **License status** is **Deregistered**, export and view the license revocation code by tapping .

- When **License status** is **No license**, load the license by tapping ▤.

Figure 7-19 License management
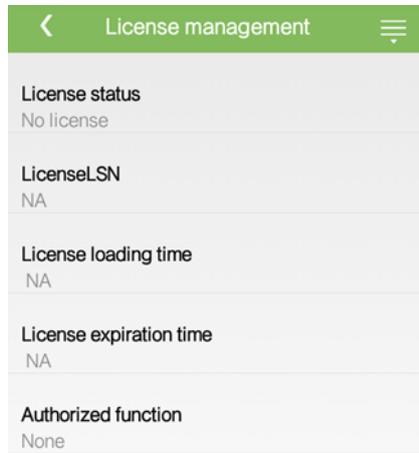
----**End**

7.1.5.2.3 Device management

Step 1 Choose **Function Menu** > **Maintenance** > **Device Mgmt** to go to the **Device Mgmt** screen.

- If there is no Smart Power Sensor on the screen, tap ▤ to add a Smart Power Sensor.

Parameter	Description	Value Range
Model	Set this parameter to the corresponding power meter model.	• JANITZA-UMG604 • JANITZA-UMG103 • JANITZA-UMG104 **NOTE** Select an appropriate power meter based on the application scenario. The device model is subject to change. The actual product prevails.
Device address	Set this parameter to the communication address of the power meter.	[1, 247]
Current change ratio	• Set this parameter to **1** when the power meter uploads a value once. • When the power meter uploads a value twice, set this parameter based on the actual transformer ratio.	[1, 3000]

● After a Smart Power Sensor is added, tap it to view and modify the Smart Power Sensor parameters. To delete the Smart Power Sensor, touch and hold it.

Figure 7-20 Device management

----End

7.1.5.2.4 PV String Access Detection

Context

● Applies to large-scale commercial ground PV plants with PV strings facing the same direction.
● In AC or DC power limiting scenarios:
  – If the PV string access type has not been identified, **String Access Detection** will be displayed as **Not connected**. The PV string access type can be identified only when the solar inverters restore to the non-power limiting state and the current of all connected PV strings reaches the startup current.
  – If the PV string access type has been identified, when some PV strings connected to the 2-in-1 terminals are lost, no alarm will be generated. If some PV strings connected to the 2-in-1 terminals are restored, the access type cannot be identified. You can determine whether both 2-in-1 PV strings are restored only when the PV string current reaches **Startup current for 2-in-1 detection**.
● After setting the parameters, choose **Function Menu > Running Info. > Details** to check whether the PV string access status is normal.

Procedure

Step 1 Choose **Function Menu** > **Maintenance > String Access Detection** from the main menu and set PV string access detection parameters.

Figure 7-21 PV string access detection
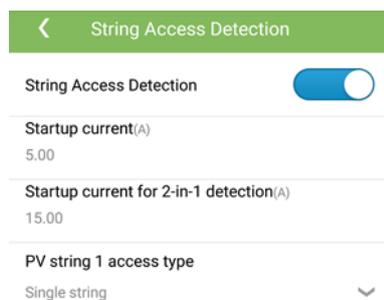
Table 7-14 PV string access detection

Parameter	Description	Value Range
String Access Detection	**String Access Detection** is set to **Disable** by default. After the solar inverters are connected to the power grid, set **String Access Detection** to **Enable**.	• Disable • Enable
Startup current(A)	When the current of all connected PV strings reaches the preset value, the PV string access detection function is enabled. **NOTE** Startup current setting rules: • Startup current = I_{sc} (S_{tc}) x 0.6 (rounded up). For details about I_{sc} (S_{tc}), see the PV module nameplate. • Default startup current (5 A): applicable to the scenarios where the short-circuit current I_{sc} (S_{tc}) is greater than 8 A for the monocrystalline and polycrystalline PV modules.	[3.00, 10.00]
Startup current for 2-in-1 detection(A)	When the current of a PV string reaches **Startup current for 2-in-1 detection**, the PV string is automatically identified as **2-in-1 string**. You are advised to use the default value.	[10.00, 20.00]
PV string *N* access type **NOTE** *N* is the DC input terminal number of the solar inverter.	Set this parameter based on the type of the PV string connected to DC input terminal *N* of the solar inverter. You are advised to retain the default value. If the value is incorrectly set, the PV string access type may be incorrectly identified and alarms may be generated by mistake for the PV string access status.	• Automatic identification • Not connected • Single string • 2-in-1 string

----End

7.1.5.2.5 Starting and Shutting Down the SUN2000

Procedure

Step 1 Choose **Function Menu** > **Maintenance**. The maintenance screen will be displayed.

Step 2 Tap ⊳ behind **Power on** or **Power off**, enter the login password, and tap **OK**.

----End

7.1.5.2.6 Restoring Factory Settings

Context

> **NOTICE**
>
> Perform this operation with caution because all configured parameters except the current date, time, baud rate, and address will be restored to their factory default values. This operation will not affect operating information, alarm records, or system logs.

Procedure

Step 1　Choose **Function Menu** > **Maintenance**. The maintenance screen will be displayed.

Step 2　Tap ▶ behind **Restore defaults**, enter the app login password, and tap **OK**.

----End

7.1.5.2.7 Resetting the SUN2000

Context

Reset the SUN2000, and it will automatically shut down and restart.

Procedure

Step 1　Choose **Function Menu** > **Maintenance**. The maintenance screen will be displayed.

Step 2　Tap ▶ behind **Reset**, enter the app login password, and tap **OK**.

----End

7.1.5.2.8 Resetting Alarms

Context

Reset alarms, and all the active and historical alarms of the SUN2000s will be cleared.

Procedure

Step 1　Choose **Function Menu** > **Maintenance**. The maintenance screen will be displayed.

Step 2　Tap ▶ behind **Reset Alarms**, enter the login password, and tap **OK**.

----End

7.1.5.2.9 Clearing Historical Energy Yield Data

Context

Clear historical energy yield data, and all the historical energy yield data of the SUN2000 connecting to the app will be cleared.

Procedure

Step 1 Choose **Function Menu** > **Maintenance**. The maintenance screen will be displayed.

Step 2 Tap (▶) behind **Clear historical energy yield**, enter the login password, and tap **OK**.

----End

7.1.5.2.10 Importing and Exporting Configuration Files

Step 1 Choose **Function Menu** > **Maintenance** > **Import and export configuration file** to go to the **Import and export configuration file** screen.

- Tap **Export Configuration File** to export the configuration files of the solar inverter to the phone.
- Tap **Import Configuration File** to import the configuration files that have been exported to the phone to the solar inverter.

----End

7.1.5.3 Device upgrade

Prerequisites

- You have obtained the upgrade package with the help of the supplier or Huawei engineers.
- In the Android system, you have copied the upgrade package to the mobile phone. The package is a **.zip** file, which can be saved flexibly and searched. To reduce the time for searching the package, you are advised to save it under the root directory of the memory or SD card of the mobile phone.

Procedure

Step 1 Choose **Function Menu** > **Device upgrade** and complete the upgrade by following the operation guide.

Figure 7-22 SUN2000 upgrade
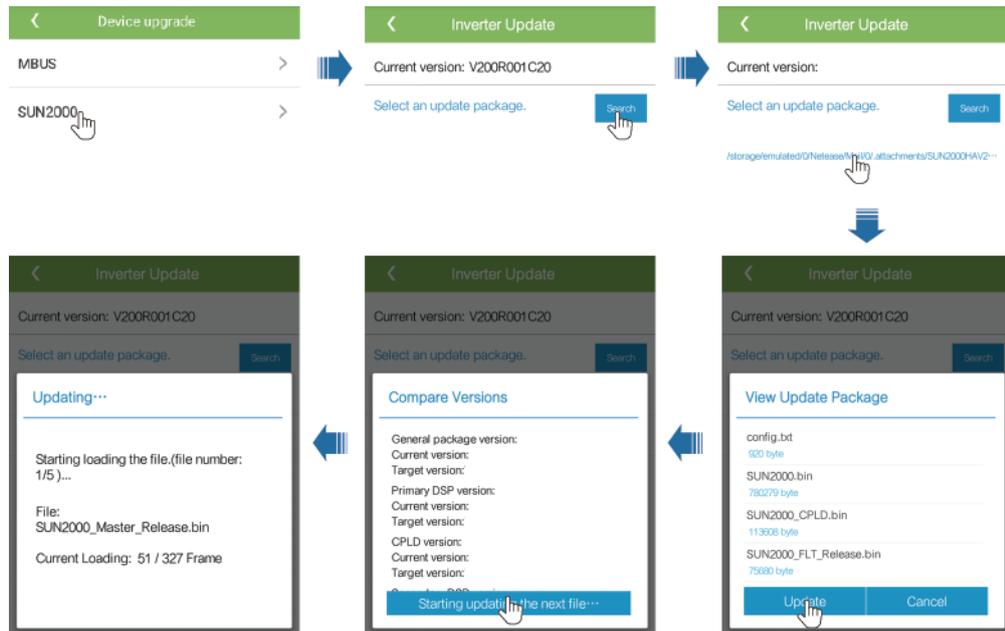
Figure 7-23 MBUS upgrade
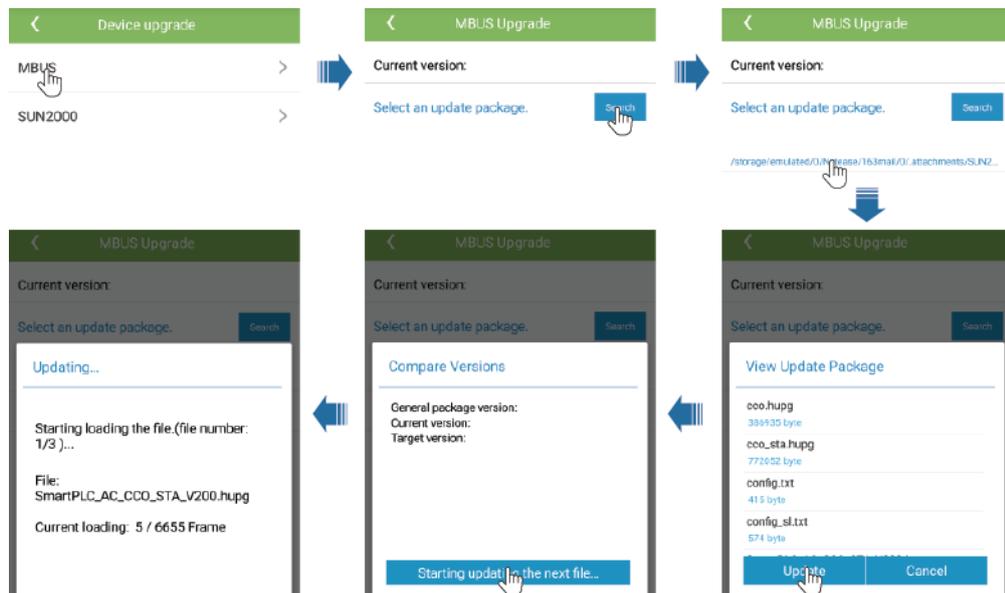
----End

7.1.5.4 Device Logs

Context

Tap **Device logs** to export operation logs, as well as alarm records and energy yield information of the solar inverter from the mobile phone.

Procedure

Step 1 Choose **Function Menu** > **Device logs**. The device log screen is displayed.

Step 2 Select alarm and performance data logs, and tap **Download file** to export and send them by email.

> **NOTE**
>
> ● In the Android system, logs are saved in the **storage/emulated/0/sun2000app_download** file by default. You can modify the saving path by choosing **Function Menu** > **Settings** > **File save path**.

Figure 7-24 Device logs
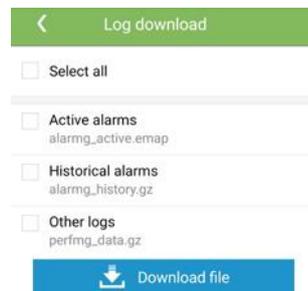
----End

7.1.6 Operations Related to the Special User

7.1.6.1 Parameter Settings

Ensure that the DC side of the SUN2000 is energized before setting grid parameters, protection parameters, feature parameters, and grid adjustment parameters.

7.1.6.1.1 Setting Grid Parameters

Procedure

Step 1 Choose **Function Menu** > **Settings** > **Grid Parameters** and set grid parameters.

Figure 7-25 Grid parameters
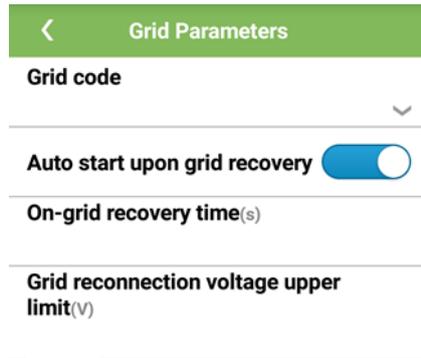
Table 7-15 Grid parameters

Parameter	Description	Value Range (Vn: Rated Voltage; Fn: Rated Frequency)
Grid code	Set this parameter based on the grid code of the country or region where the SUN2000 is used and the SUN2000 application scenario.	N/A
Isolation	Specifies the working mode of the SUN2000 according to the grounding status at the DC side and the connection status to the grid.	• Input ungrounded, without TF • Input ungrounded, with TF
Output mode	Specifies whether the inverter output has a neutral wire based on the application scenario.	• Three-phase, three-wire • Three-phase, four-wire
PQ mode	If this parameter is set to **PQ mode 1**, the maximum AC output power equals the maximum apparent power. If this parameter is set to **PQ mode 2**, the maximum AC output power equals the rated output power.	• PQ mode 1 • PQ mode 2
Auto start upon grid recovery	Specifies whether to allow the SUN2000 to automatically start after the power grid recovers.	• Disable • Enable
On-grid recovery time (s)	Specifies the waiting time for SUN2000 restart after the power grid recovers.	[0, 7200]
Grid reconnection voltage upper limit (V)	The standards of certain countries and regions require that the SUN2000 must not export power to the power grid again when the grid voltage exceeds the value of **Grid reconnection voltage upper limit** after the SUN2000 shuts down due to a fault.	[100% Vn, 136% Vn]
Grid reconnection voltage lower limit (V)	The standards of certain countries and regions require that the SUN2000 must not export power to the power grid again when the grid voltage is below the value of **Grid reconnection voltage lower limit** after the SUN2000 shuts down due to a fault.	[45% Vn, 100% Vn]

Parameter	Description	Value Range (Vn: Rated Voltage; Fn: Rated Frequency)
Grid reconnection frequency upper limit (Hz)	The standards of certain countries and regions require that the SUN2000 must not export power to the power grid again when the grid frequency exceeds the value of **Grid reconnection frequency upper limit** after the SUN2000 shuts down due to a fault.	[100% Fn, 120% Fn]
Grid reconnection frequency lower limit (Hz)	The standards of certain countries and regions require that the SUN2000 must not export power to the power grid again when the grid frequency is below the value of **Grid reconnection frequency lower limit** after the SUN2000 shuts down due to a fault.	[80% Fn, 100% Fn]
Reactive power compensation (cosφ-P) trigger voltage (%)	Specifies the voltage threshold for triggering reactive power compensation based on the cosφ-P curve.	[100, 136]
Reactive power compensation (cosφ-P) exit voltage (%)	Specifies the voltage threshold for exiting reactive power compensation based on the cosφ-P curve.	[70, 100]

----End

7.1.6.1.2 Setting Protection Parameters

Procedure

Step 1 Choose **Function Menu** > **Settings** > **Protection Parameters** and set protection parameters.

Figure 7-26 Protection parameters
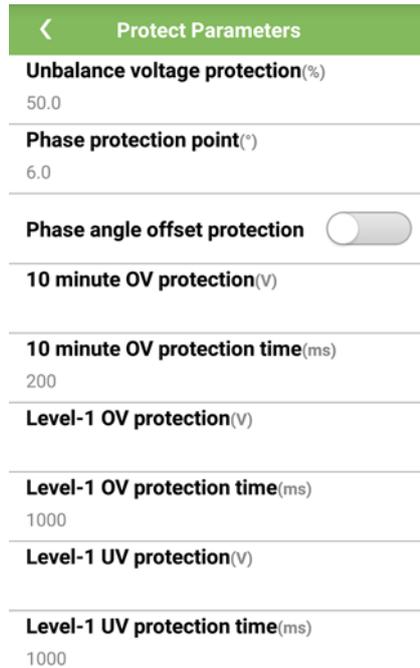
Table 7-16 Protection parameters

Parameter	Description	Value Range (Vn: Rated Voltage; Fn: Rated Frequency)
Unbalance voltage protection (%)	Specifies the solar inverter protection threshold when the power grid voltage is unbalanced.	[0.0, 50.0]
10 minute OV protection (V)	Specifies the 10-minute overvoltage protection threshold.	[1 x Vn, 1.25 x Vn]
10 minute OV protection time (ms)	Specifies the 10-minute overvoltage protection duration.	[50, 7200000]
Level-N OV protection (V)	Specifies the level-N grid overvoltage protection threshold. **NOTE** • N can be 1, 2, 3, 4, 5, or 6. • When **HVRT** is set to **Enable**, and the value of **Level-1 OV protection** is larger than that of **HVRT threshold**, the solar inverter may repeatedly start and shut down if the power grid voltage is between the two values.	• Level-1 OV protection: [1 x Vn, 1.25 x Vn] • Level-2 OV protection: [1 x Vn, 1.36 x Vn]
Level-N OV protection time (ms)	Specifies the level-N grid overvoltage protection duration. **NOTE** N can be 1, 2, 3, 4, 5, or 6.	[50, 7200000]

Parameter	Description	Value Range (Vn: Rated Voltage; Fn: Rated Frequency)
Level-N UV protection (V)	Specifies the level-N grid undervoltage protection threshold. **NOTE** ● N can be 1, 2, 3, 4, 5, or 6. ● When **LVRT** is set to **Enable**, and the value of **Level-1 UV protection** is less than that of **LVRT threshold**, the solar inverter may repeatedly start and shut down if the power grid voltage is between the two values.	[0.15 x Vn, 1 x Vn]
Level-N UV protection time (ms)	Specifies the level-N grid undervoltage protection duration. **NOTE** N can be 1, 2, 3, 4, 5, or 6.	[50, 7200000]
Level-N OF protection (Hz)	Specifies the level-N grid overfrequency protection threshold. **NOTE** N can be 1, 2, 3, 4, 5, or 6.	[1 x Fn, 1.15 x Fn]
Level-N OF protection time (ms)	Specifies the level-N grid overfrequency protection duration. **NOTE** N can be 1, 2, 3, 4, 5, or 6.	[50, 7200000]
Level-N UF protection (Hz)	Specifies the level-N grid underfrequency protection threshold. **NOTE** N can be 1, 2, 3, 4, 5, or 6.	[0.85 x Fn, 1 x Fn]
Level-N UF protection time (ms)	Specifies the level-N grid underfrequency protection duration. **NOTE** N can be 1, 2, 3, 4, or 5.	[50, 7200000]

----End

7.1.6.1.3 Setting Feature Parameters

Procedure

Step 1 Choose **Function Menu** > **Settings** > **Feature Parameters**, and set feature parameters.

Figure 7-27 Feature parameters
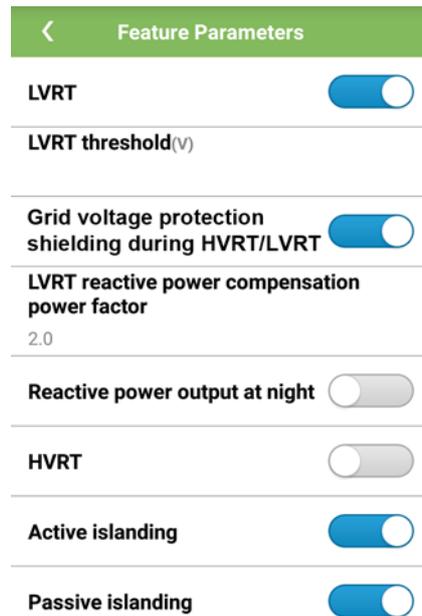
Table 7-17 Feature parameters

Parameter	Description	Value Range (Vn: Rated Voltage)
LVRT	When the power grid voltage is abnormally low for a short time, the SUN2000 cannot disconnect from the power grid immediately and has to work for some time. This is called LVRT.	• Disable • Enable
LVRT threshold (V)	Specifies the threshold for triggering LVRT.	[50% Vn, 100% Vn]
LVRT reactive power compensation power factor	During LVRT, the SUN2000 needs to generate reactive power to support the power grid. This parameter is used to set the reactive power generated by the SUN2000. For example, if you set **LVRT reactive power compensation power factor** to **2**, the reactive current generated by the SUN2000 is 20% of the rated current when the AC voltage drops by 10% during LVRT.	[0, 10]
HVRT	When the power grid voltage is abnormally high for a short time, the SUN2000 cannot disconnect from the power grid immediately and has to work for some time. This is called high voltage ride-through (HVRT).	• Disable • Enable
HVRT threshold (V)	Specifies the threshold for triggering HVRT. The threshold settings should meet the local grid standard.	[100% Vn, 136% Vn]

Parameter	Description	Value Range (Vn: Rated Voltage)
HVRT reactive power compensation factor	During HVRT, the solar inverter needs to generate reactive power to support the power grid. This parameter is used to set the reactive power generated by the solar inverter. For example, if this parameter is set to **2**, the reactive power generated by the solar inverter is 20% of the rated power when the AC voltage drops by 10% during HVRT.	[0, 10]
Grid voltage protection shield during HVRT/LVRT	Specifies whether to shield the undervoltage/overvoltage protection during HVRT/LVRT.	• Disable • Enable
Active islanding	Specifies whether to enable the active islanding protection function.	• Disable • Enable
Communication interrupt shutdown	The standards of certain countries and regions require that the inverter must shut down after the communication is interrupted for a certain time.	• Disable • Enable
Communication resumed startup	If this parameter is set to **Enable**, the inverter automatically starts after communication recovers. If this parameter is set to **Disable**, the inverter needs to be started manually after communication recovers.	• Disable • Enable
Communication interruption duration (min)	Specifies the duration for determining communication interruption. Used for automatic shutdown for protection in case of communication interruption.	[1, 120]
Soft start time (s)	Specifies whether to enable the active islanding protection function.	[1, 1800]
Soft start time after grid failure (s)	Specifies the time for the power to gradually increase when the solar inverter restarts after the power grid recovers.	[1, 1800]

----End

7.1.6.1.4 Setting the Grid-tied Control Parameters

Prerequisites

After you connect a Smart Power Sensor to the solar inverter by choosing **Function Menu** > **Maintenance** > **Device Mgmt**, you can set grid-tied control parameters to control the active and reactive power outputs of the grid-tied point.

Procedure

Step 1 Choose **Function Menu** > **Settings** > **Grid-tied Point Control**, enter the app login password, and set power control parameters based on the PV plant requirements.

Figure 7-28 Grid-tied point control
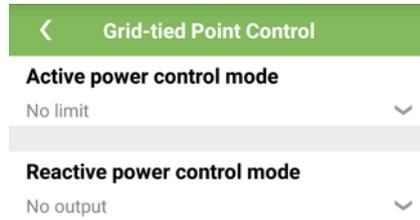
Table 7-18 Grid-tied control parameters

Parameter	Description	Value Range
Active power control mode	Specifies the active power output mode at the grid-tied point.	• No limit • Grid connection with zero power • Grid connection with limited power (kW) • Grid connection with limited power (%)
Closed-loop controller	Specifies the grid-tied power controller. Before setting the parameter, confirm the controller type. Incorrect setting will result in abnormal power output of the solar inverter. **Solar inverter** applies only to the scenario where a single solar inverter is used or where a single solar inverter is used with an SDongle.	• SDongle/SmartLogger • Solar inverter
Limitation mode	Specifies the active power limitation mode as required by the power grid.	• Total power • Single-phase power
PV plant capacity (kW)	Specifies the PV array capacity.	[0, 2000]
Maximum grid feed-in power (kW)	In **Grid connection with limited power (kW)** mode, set the maximum power fed to the power grid from the PV array.	[–1000, PV plant capacity]
Maximum grid feed-in power (%)	In **Grid connection with limited power (%)** mode, set the proportion of the maximum power fed to the power grid from the PV array to the capacity of the PV plant.	[0, 100]
Power lowering adjustment period (s)	Specifies the interval for sending adjustment commands.	[0.2, 300]

Parameter	Description	Value Range
Maximum protection time (s)	Specifies the protection duration to determine whether the communication between the external controller and the Smart Power Sensor is interrupted.	[0.2, 300]
Power raising threshold (kW)	Specifies the threshold for power raising.	[0, 50]
Fail-safe power (%)	When the communication between the SDongle/SmartLogger as well as the Smart Power Sensor and solar inverter is interrupted, the solar inverter generates power based on this threshold.	[0, 100]
Reactive power control mode	Specifies the reactive power output mode at the grid-tied point.	• No output • Pwr factor closed-loop control
Power factor	Specifies the target value for the power factor of the Smart Power Sensor.	(–1, –0.8] U [0.8, 1]
Adjustment period (s)	Specifies the interval for sending adjustment commands.	[0.2, 10]
Adjustment deadband	Specifies the adjustment power factor precision.	[0.001, 1]
Fail-safe power factor	When the communication between the SDongle/SmartLogger as well as the Smart Power Sensor and solar inverter is interrupted, the solar inverter generates power based on this threshold.	(–1, –0.8] U [0.8, 1]
Communication disconnection fail-safe	When this parameter is set to **Enable**, and the communication between the solar inverter and the SDongle/SmartLogger is interrupted for a certain period (set by **Communication disconnection detection time**), the solar inverter generates power based on **Fail-safe power**.	• Disable • Enable
Communication disconnection detection time (s)	Specifies the protection duration to determine whether the communication between the SDongle/SmartLogger and the solar inverter is interrupted.	[1, 10]

----End

7.1.6.1.5 Setting Power Adjustment Parameters

Procedure

Step 1 Choose **Function Menu** > **Settings** > **Power Adjustment** and set power adjustment parameters.

Figure 7-29 Power adjustment parameters
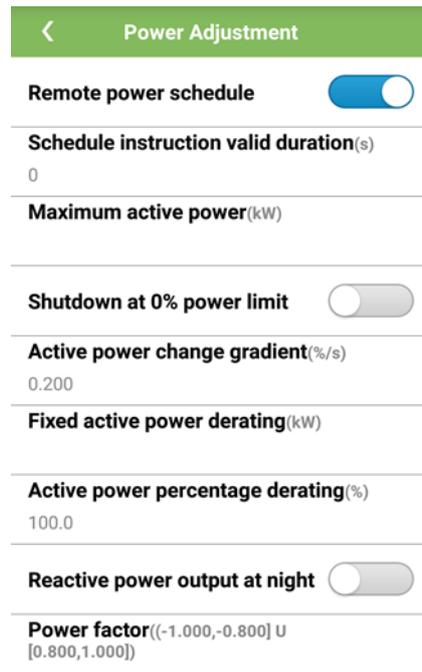
Table 7-19 Power adjustment parameters

Parameter	Description	Value Range (S_{max}: Maximum Apparent Power; P_{max}: Maximum Active Power; Q_{max}: Maximum Reactive Power)
Remote power schedule	If this parameter is set to **Enable**, the solar inverter responds to the remote power scheduling command. If it is set to **Disable**, the solar inverter does not respond to the command.	• Disable • Enable
Schedule instruction valid duration (s)	Adjusts the time for maintaining the scheduling command.	[0, 86400]
Maximum apparent power (kVA)	Specifies the output upper threshold for the maximum apparent power to adapt to the capacity requirements of standard and customized inverters.	$[P_{max}, S_{max\_limit}]$ or $[P_{max}, S_{max}]$
Maximum active power (kW)	Specifies the output upper threshold for the maximum active power to adapt to different market requirements.	$[0.1, P_{max}]$
Shutdown at 0% power limit	If this parameter is set to **Enable**, the solar inverter shuts down after receiving the 0% power limit command. If this parameter is set to **Disable**, the solar inverter does not shut down after receiving the 0% power limit command.	• Disable • Enable

Parameter	Description	Value Range (S_{max}: Maximum Apparent Power; P_{max}: Maximum Active Power; Q_{max}: Maximum Reactive Power)
Active power change gradient (%/s)	Adjusts the change speed of the active power of the solar inverter.	[0.1, 1000]
Fixed active power derating (kW)	Adjusts the active power output of the solar inverter by fixed value.	[0, P_{max}]
Active power percentage derating (%)	Adjusts the active power output of the solar inverter by percentage. If this parameter is set to **100**, the solar inverter generates power based on the maximum output power.	[0, 100]
Reactive power output at night	In some specific application scenarios, a power grid company requires that the inverter can perform reactive power compensation at night to ensure that the power factor of the local power grid meets requirements.	• Disable • Enable
Enable reactive power parameters at night	When this parameter is set to **Enable**, the inverter outputs reactive power based on the setting of **Reactive power compensation at night**. Otherwise, the inverter executes the remote scheduling command.	• Disable • Enable
Reactive power compensation at night (kVar)	During the reactive power compensation at night, the reactive power is scheduled by fixed value.	[$-Q_{max}$, Q_{max}]
Reactive power change gradient (%/s)	Specifies the change speed of the inverter reactive power.	[0.1, 1000]
Plant active power gradient (min/100%)	Specifies the rate of active power rise due to sunlight changes.	[0, 60]
Filter duration for average active power (ms)	Specifies the period of active power rise due to sunlight changes. This parameter is used with **Plant active power gradient**.	[20, 300000]
Power factor	Specifies the power factor of the inverter.	(−1.000, −0.800] U [0.800, 1.000]
Reactive power compensation (Q/S)	Specifies the reactive power output by the inverter.	(-1, 1]
Overfrequency derating	If this parameter is set to **Enable**, the active power of the inverter will be derated according to a certain slope when the grid frequency exceeds the frequency that triggers overfrequency derating.	• Disable • Enable
PF (U) voltage detection filter time (s)	Specifies the time for filtering the grid voltage in the PF-U curve.	[0.1, 120]

Parameter	Description	Value Range (S_{max}: Maximum Apparent Power; P_{max}: Maximum Active Power; Q_{max}: Maximum Reactive Power)
Apparent power baseline (kVA)	Adjust the apparent output baseline of the inverter.	$[P_{max}, S_{max\_real}]$
Active power baseline (kW)	Adjusts the active output baseline of the inverter.	$[0.1, Min(P_{max\_real}, S_{max})]$

----End

7.1.6.1.6 Setting Reactive Power Control

Procedure

Step 1 Choose **Function Menu** > **Settings** > **Reactive pwr ctrl** to access the reactive power control screen and edit the curve points to control reactive power output.

Figure 7-30 Reactive power control
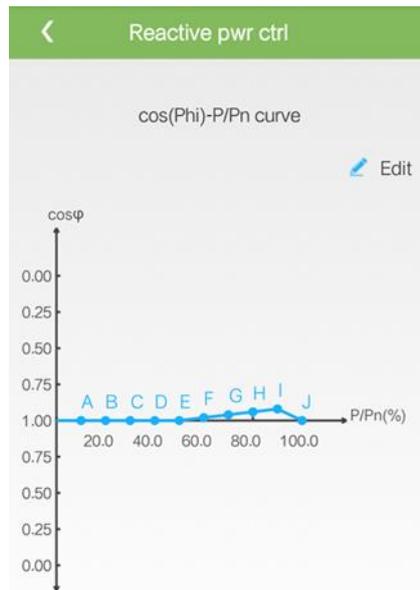
----End

7.1.6.1.7 Setting User Parameters

Procedure

Step 1 Choose **Function Menu** > **Settings** > **User Param.** to set user parameters.

📖 **NOTE**

The password should meet the following requirements:

- Contains six characters.
- Contains at least two types of lowercase letters, uppercase letters, and digits.
- Differ from the original password in at least one character.

Figure 7-31 User parameters

----End

7.1.6.1.8 Setting a File Save Path

Context

In the Android system, you can modify the save path for user operation logs and SUN2000 logs and export logs from the path subsequently.

Procedure

Step 1 Choose **Function Menu** > **Settings** > **File save path** to set the file save path.

Figure 7-32 Setting the path

----End

7.1.6.2 System Maintenance

7.1.6.2.1 Device management

Step 1 Choose **Function Menu** > **Maintenance** > **Device Mgmt** to go to the **Device Mgmt** screen.

- If there is no Smart Power Sensor on the screen, tap to add a Smart Power Sensor.

Parameter	Description	Value Range
Model	Set this parameter to the corresponding power meter model.	• JANITZA-UMG604 • JANITZA-UMG103 • JANITZA-UMG104 **NOTE** Select an appropriate power meter based on the application scenario. The device model is subject to change. The actual product prevails.
Device address	Set this parameter to the communication address of the power meter.	[1, 247]
Current change ratio	• Set this parameter to **1** when the power meter uploads a value once. • When the power meter uploads a value twice, set this parameter based on the actual transformer ratio.	[1, 3000]

- After a Smart Power Sensor is added, tap it to view and modify the Smart Power Sensor parameters. To delete the Smart Power Sensor, touch and hold it.

Figure 7-33 Device management

----End

7.1.6.2.2 Starting and Shutting Down the SUN2000

Procedure

Step 1 Choose **Function Menu** > **Maintenance**. The maintenance screen will be displayed.

Step 2 Tap ⊙ behind **Power on** or **Power off**, enter the login password, and tap **OK**.

----End

7.1.6.2.3 Restoring Factory Settings

Context

> **NOTICE**
>
> Perform this operation with caution because all configured parameters except the current date, time, baud rate, and address will be restored to their factory default values. This operation will not affect operating information, alarm records, or system logs.

Procedure

Step 1 Choose **Function Menu** > **Maintenance**. The maintenance screen will be displayed.

Step 2 Tap ⓘ behind **Restore defaults**, enter the app login password, and tap **OK**.

----End

7.1.6.3 Device upgrade

Prerequisites

- You have obtained the upgrade package with the help of the supplier or Huawei engineers.
- In the Android system, you have copied the upgrade package to the mobile phone. The package is a **.zip** file, which can be saved flexibly and searched. To reduce the time for searching the package, you are advised to save it under the root directory of the memory or SD card of the mobile phone.

Procedure

Step 1 Choose **Function Menu** > **Device upgrade** and complete the upgrade by following the operation guide.

Figure 7-34 SUN2000 upgrade
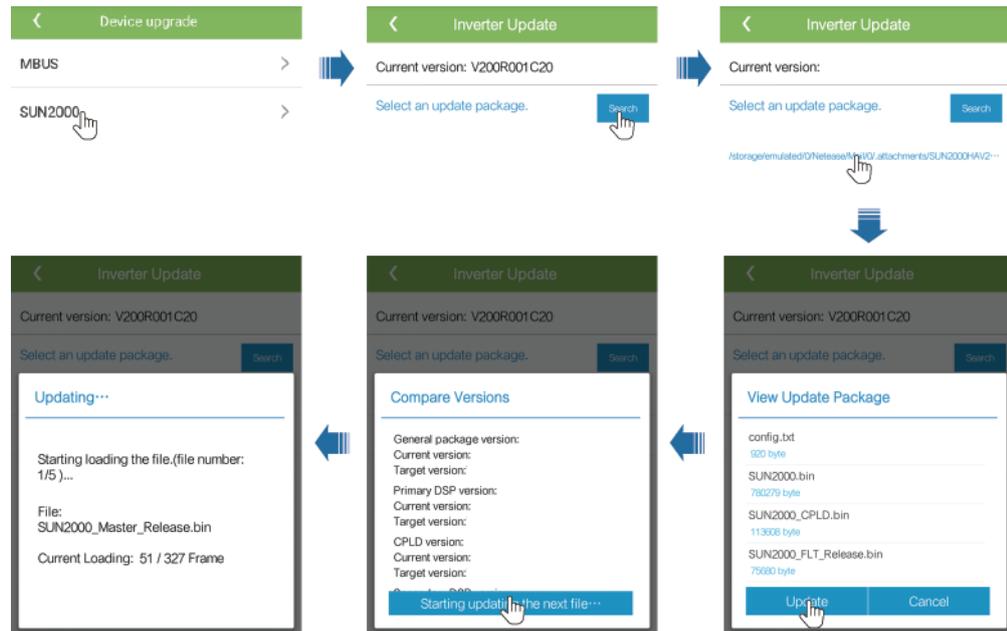
Figure 7-35 MBUS upgrade
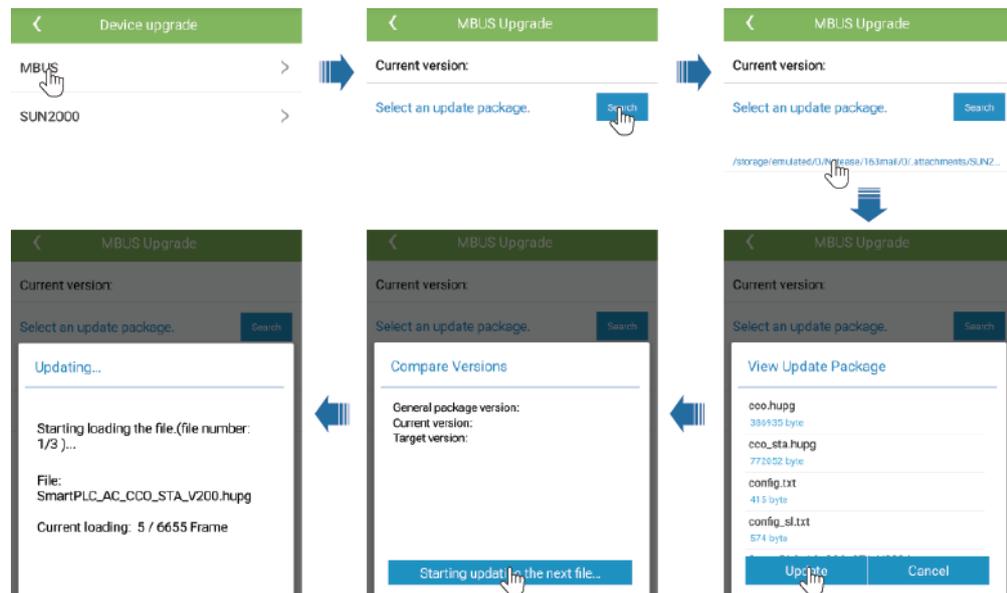
----**End**

7.1.6.4 Device Logs

Context

Tap **Device logs** to export operation logs, as well as alarm records and energy yield information of the solar inverter from the mobile phone.

Procedure

Step 1 Choose **Function Menu** > **Device logs**. The device log screen is displayed.

Step 2 Select alarm and performance data logs, and tap **Download file** to export and send them by email.

> 📖 NOTE
> ● In the Android system, logs are saved in the **storage/emulated/0/sun2000app_download** file by default. You can modify the saving path by choosing **Function Menu** > **Settings** > **File save path**.

Figure 7-36 Device logs
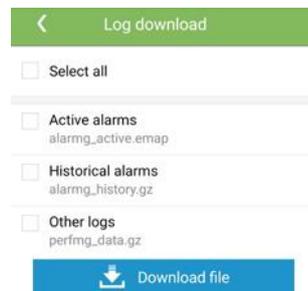
----End

7.1.7 Querying the Status

7.1.7.1 Querying Alarm Records

Procedure

Step 1 Choose **Function Menu** > **Alarm**, and tap an alarm record to view the details.

> 📖 NOTE
> ● To set the alarm sorting mode for active alarms or historical alarms, tap [icon].
> ● Tap [icon] to set a time criterion. The historical alarms generated within the time segment are displayed.

Figure 7-37 Alarm screen
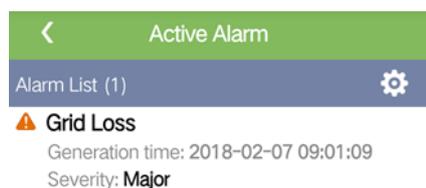
----End

7.1.7.2 Querying SUN2000 Running Information

Procedure

Step 1   Choose **Function Menu** > **Running Info.** to query the running information.

Figure 7-38 Running info

No.	Name	Description
1	Running information tabs	The **Summary**, **Details**, **Support**, and **Insulation Resistance** tab pages display relevant information about the SUN2000.
2	Power flow diagram	• Connection from PV strings to the SUN2000 • Connection from the SUN2000 to the power grid • If the SUN2000 has generated an alarm, ![alarm icon] is displayed on the screen. Tap ![alarm icon] to access the alarm screen and view the alarm.
3	Energy yield-Energy yield power histogram	Energy yield and energy yield power for each hour of the current day
4	Yield power, energy yield, and revenue data	Power, energy yield, and revenue of the current day

----End

7.1.7.3 Querying Energy Yield Data

Procedure

Step 1 Choose **Function Menu** > **Energy Yield** to query the energy yield information.

📖 **NOTE**

Tap 📅 to display the energy yield data based on day, month, or year, or display historical data.

Figure 7-39 Querying energy yield data

----End

7.1.7.4 Viewing System Version Information

Procedure

Step 1 Choose **Function Menu** > **About** to query the version information.

Figure 7-40 About
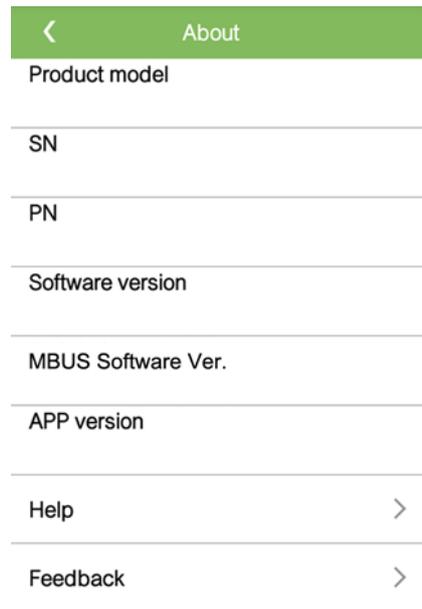
----End

7.1.8 Tool Kit

7.1.8.1 Scanning SN Bar Codes

Context

The SUN2000 SN bar codes are obtained in centralized mode. These bar codes help set up mapping between SUN2000 names and SN bar codes on the SmartLogger and assist the SmartLogger to communicate with SUN2000s and commission SUN2000s.

Procedure

Step 1 Tap **Tool Kit** on the app login screen.

Figure 7-41 Tool kit
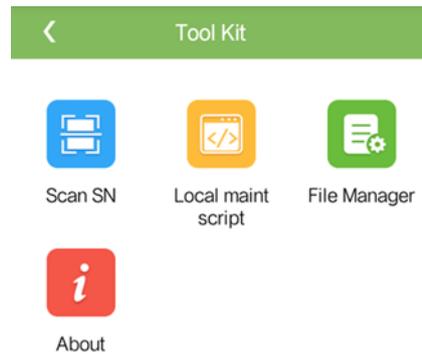
Step 2 Tap **Scan SN**, enter a file name on the **SN File** screen, and tap **Next**.

Figure 7-42 SN file
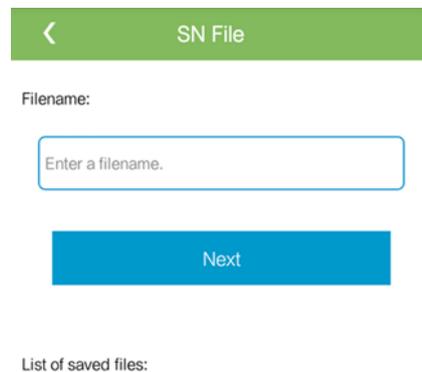
📖 **NOTE**

If the SN file already exists, open and scan the file.

Step 3 On the **SN List** screen, tap **Scan** or **Manual input** to record the SN bar code and SUN2000 name.

● Method 1: Scan

a. Tap **Scan** to start scanning and ensure that the camera is about 15 cm away from the SN label or QR codes, and the red midline cuts the bar code horizontally.

b. After scanning, enter the device number at the back of the scanned label on the **SN Details** screen.

● Method 2: Manual input

a. Tap **Manual input**. On the **SN Details** screen, enter the SN bar code and the SUN2000 name at the back of the label.

b. Tap **OK** to save the SN information.

----End

Follow-up Procedure

Upload the scanned information file to the PC and rename the file as DeviceInfo.csv, which provides information when changing the device name and device address on the SmartLogger. For detailed operations, see the SmartLogger user manual.

7.1.8.2 SUN2000 Maintenance Script

Context

The SUN2000 maintenance script is used to set SUN2000 commands. After the script file is copied to the USB flash drive, the SUN2000 executes the maintenance script to import or export configuration, export data, and upgrade devices.

Procedure

Step 1 On the app login screen, choose **Tool Kit** > **Local maint script** > **Inverter Maint Script (Also applies to PID)**. The **Inverter Command Settings** screen will be displayed.

- Tap ⌄ and select an operation as required.

- Tap ➕ to add steps.

Figure 7-43 Selecting the target local maintenance script
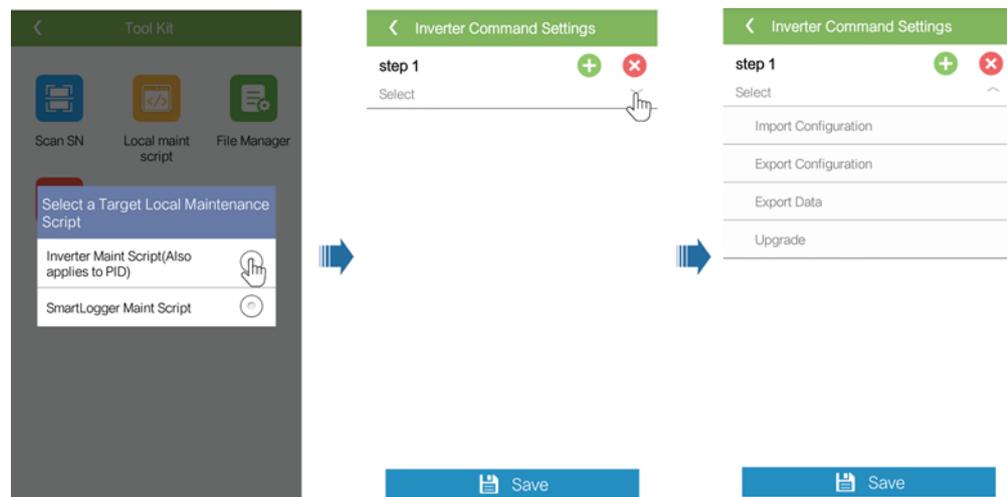
Step 2 Tap **Save**, enter the user name and password for logging in to the app, and then tap **OK** to save the maintenance script on the mobile phone.

----End

7.1.8.3 File Manager

Context

The file manager manages app operation logs, device logs, and generated script files and configuration files. You can delete the logs and files, send them to your mailbox.

Procedure

Step 1 On the app login screen, tap **Tool Kit** > **File Manager** to enter the **File Manager** screen.

- To delete log files, select one or more files and then tap **Clear**.
- To send files to your mailbox, select one or more files and tap **Send**.

----End

7.1.8.4 Changing the WLAN Password

Prerequisites

The communication between the SUN2000 app and the solar inverter has been established over WLAN.

Procedure

Step 1 On the login screen of the SUN2000 app, choose **Tool kit** > **Change WLAN Password** to change the password.

📖 NOTE

If the communication between the SUN2000 app and the solar inverter has not been established over WLAN, **Change WLAN Password** is not displayed on the screen.

Figure 7-44 Changing the WLAN password
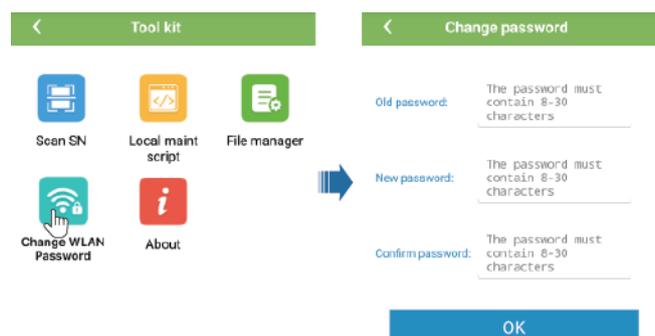
----End

7.1.8.5 About

Context

This screen allows you to query the app version, privacy policy, and open source software policy, and to submit your advice and suggestions through text, pictures, or files.

📖 **NOTE**

When the app starts for the first time after being downloaded or updated, the privacy policy is displayed. You can use the app only after agreeing to the privacy policy, and the privacy policy will no longer appear. If you do not agree to the privacy policy, the app exits, and the privacy policy is still displayed when you start the app next time until you agree to the privacy policy.

Procedure

Step 1 On the app login screen, choose **Tool Kit** > **About** to access the **About** screen.

- Tap **Feedback** to provide feedback in app use.
- Tap **Privacy policy** to view the privacy policy.
- Tap **Open source software policy** to view the open source software policy.

Figure 7-45 About
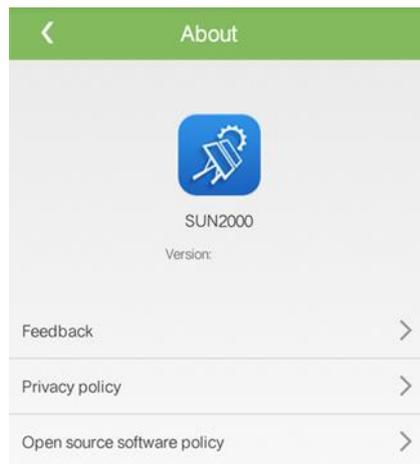
----End

7.2 (Optional) Installing a Smart Dongle

Communication parameters have been set for the solar inverter.

Step 1 Install the SIM card.

📖 **NOTE**

- If the Smart Dongle is configured with a SIM card, you do not need to perform this step.
- If the Smart Dongle is not configured with a SIM card, you need to prepare a standard SIM card (size: 25 mm x 15 mm; capacity: ≥ 64 KB).
- When installing the SIM card, determine its installation direction based on the silk screen and arrow on the card slot.

- Press the SIM card in place to lock it. In this case, the SIM card is correctly installed.
- When removing the SIM card, push it inward to eject it.
- When reinstalling the cover of the Smart Dongle, ensure that the buckle springs back in place.

Step 2 Secure the Smart Dongle.

Figure 7-46 Installing the Smart Dongle

----End

7.3 Operations with a USB Flash Drive

USB flash drives of SanDisk, Netac, and Kingston are recommended. Other brands may be incompatible.

7.3.1 Exporting Configurations

Procedure

Step 1 Click **Inverter Command Settings** on the SUN2000 app to generate a boot script file, as shown in 7.1.8.2 SUN2000 Maintenance Script.

Step 2 Import the boot script file to a PC.

(Optional) The boot script file can be opened as a .txt file, as shown in Figure 7-47.

Figure 7-47 Boot script file

No.	Meaning	Remarks
1	User name	• Advanced user: engineer • Special user: admin
2	Ciphertext	The ciphertext varies depending on the login password of the SUN2000 APP.
3	Script validity period	-
4	Command	Different command settings can produce different commands. • Configuration export command: **export param**. • Configuration import command: **import param**. • Data export command: **export log**. • Upgrade command: **upgrade**.

Step 3 Import the boot script file to the root directory of a USB flash drive.

Step 4 Connect the USB flash drive to the USB port. The system automatically identifies the USB flash drive and executes all commands specified in the boot script file. View the LED indicator to determine the operating status.

> **NOTICE**
>
> Verify that the ciphertext in the boot script file matches the login password of the SUN2000 APP. If they do not match and you insert the USB flash drive for five consecutive times, the user account will be locked for 10 minutes.

Table 7-20 LED indicator description

LED Indicator	Status	Meaning
⚠	Green off	There is no operation with a USB flash drive.

LED Indicator	Status	Meaning
	Blinking green slowly	There is an operation with a USB flash drive.
	Blinking green fast	An operation with a USB flash drive has failed.
	Steady green	An operation with a USB flash drive is successful.

Step 5 Insert the USB flash drive into a computer and check the exported data.

📖 **NOTE**

When the configuration export is complete, the boot script file and exported file are in the root directory of the USB flash drive.

----End

7.3.2 Importing Configurations

Prerequisites

A complete configuration file has been exported.

Procedure

Step 1 Click **Inverter Command Settings** on the SUN2000 app to generate a boot script file, as shown in 7.1.8.2 SUN2000 Maintenance Script.

Step 2 Import the boot script file to a PC.

Step 3 Replace the exported boot script file in the root directory of the USB flash drive with the imported one.

NOTICE

Replace the boot script file only and keep the exported files.

Step 4 Connect the USB flash drive to the USB port. The system automatically identifies the USB flash drive and executes all commands specified in the boot script file. View the LED indicator to determine the operating status.

NOTICE

Verify that the ciphertext in the boot script file matches the login password of the SUN2000 APP. If they do not match and you insert the USB flash drive for five consecutive times, the user account will be locked for 10 minutes.

Table 7-21 LED indicator description

LED Indicator	Status	Meaning
⚠	Green off	There is no operation with a USB flash drive.
	Blinking green slowly	There is an operation with a USB flash drive.
	Blinking green fast	An operation with a USB flash drive has failed.
	Steady green	An operation with a USB flash drive is successful.

----End

7.3.3 Exporting Data

Procedure

Step 1 Click **Inverter Command Settings** on the SUN2000 app to generate a boot script file, as shown in 7.1.8.2 SUN2000 Maintenance Script.

Step 2 Import the boot script file to the root directory of a USB flash drive.

Step 3 Connect the USB flash drive to the USB port. The system automatically identifies the USB flash drive and executes all commands specified in the boot script file. View the LED indicator to determine the operating status.

> **NOTICE**
>
> Verify that the ciphertext in the boot script file matches the login password of the SUN2000 APP. If they do not match and you insert the USB flash drive for five consecutive times, the user account will be locked for 10 minutes.

Table 7-22 LED indicator description

LED Indicator	Status	Meaning
⚠	Green off	There is no operation with a USB flash drive.
	Blinking green slowly	There is an operation with a USB flash drive.
	Blinking green fast	An operation with a USB flash drive has failed.
	Steady green	An operation with a USB flash drive is successful.

Step 4 Insert the USB flash drive into a PC and check the exported data.

📖 **NOTE**

After the data is exported, the boot script file and exported file are in the root directory of the USB flash drive.

----End

7.3.4 Upgrading

Procedure

Step 1 Download the required software upgrade package from the technical support website.

Step 2 Decompress the upgrade package.

<div style="border:1px solid; padding:4px;">

NOTICE

● When the login password of the SUN2000 app is the initial password, there is no need to perform Step 3–Step 5.

● When the login password of the SUN2000 app is not the initial password, perform Step 3–Step 7.

</div>

Step 3 Click **Inverter Command Settings** on the SUN2000 app to generate a boot script file, as shown in 7.1.8.2 SUN2000 Maintenance Script.

Step 4 Import the boot script file to a PC.

Step 5 Replace the boot script file (sun_lmt_mgr_cmd.emap) in the upgrade package with the one generated by the SUN2000 app.

Step 6 Copy the extracted files to the root directory of the USB flash drive.

Step 7 Connect the USB flash drive to the USB port. The system automatically identifies the USB flash drive and executes all commands specified in the boot script file. View the LED indicator to determine the operating status.

<div style="border:1px solid; padding:4px;">

NOTICE

Verify that the ciphertext in the boot script file matches the login password of the SUN2000 app. If they do not match and you insert the USB flash drive for five consecutive times, the user account will be locked for 10 minutes.

</div>

Table 7-23 LED indicator description

LED Indicator	Status	Meaning
⚠	Green off	There is no operation with a USB flash drive.

LED Indicator	Status	Meaning
	Blinking green slowly	There is an operation with a USB flash drive.
	Blinking green fast	An operation with a USB flash drive has failed.
	Steady green	An operation with a USB flash drive is successful.

Step 8 The system automatically restarts when the upgrade is completed. All LED indicators are off during the restart. After the restart, the indicator is blinking green slowly for 1 minute and then it becomes steady green, which indicates that the upgrade is successful.

----End

8 Maintenance

8.1 Powering Off the SUN2000

Context

⚠ **WARNING**

- If two SUN2000s share the same AC switch on the AC side, power off the two SUN2000s.
- After the SUN2000 powers off, the remaining electricity and heat may still cause electric shocks and body burns. Therefore, put on protective gloves and begin servicing the SUN2000 15 minutes after the power-off.

Procedure

Step 1 Run a shutdown command on the SUN2000 app, SmartLogger, or NMS.

For details, see 7.1 Operations with the SUN2000 App, or the SmartLogger or NMS user manual.

Step 2 Turn off the AC switch between the SUN2000 and the power grid.

Step 3 Set all DC switches to OFF.

----End

8.2 Routine Maintenance

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

⚠ CAUTION

● Before cleaning the system, connecting cables, and maintaining the grounding reliability, power off the system and ensure that the all DC switches on the solar inverter are OFF.
● If you need to open the maintenance compartment door in rainy or snowy days, take protective measures to prevent rain or snow from entering the maintenance compartment. If unavoidable, do not open the maintenance compartment door.

Table 8-1 Maintenance list

Check Item	Check Method	Maintenance Interval
Cleanness of air intake and exhaust vents, and fans	● Check whether there is dust on the air intake and exhaust vents. If necessary, remove the baffle of the air intake vent and clean the dust. ● Check whether the fans produce abnormal sounds during operation.	Once every 6 to 12 months
System running status	● The solar inverter is not damaged or deformed. ● The solar inverter operates with no abnormal sound. ● All solar inverter parameters are correctly set. Perform this check when the solar inverter is running.	Once every 6 months
Cables connections	● Cables are securely connected. ● Cables are intact, and in particular, the parts touching the metallic surface are not scratched. ● Check that the unused ports are locked by waterproof caps.	The first inspection is 6 months after the initial commissioning. From then on, the interval can be 6 to 12 months.
Grounding reliability	Ground cables are securely connected.	The first inspection is 6 months after the initial commissioning. From then on, the interval can be 6 to 12 months.

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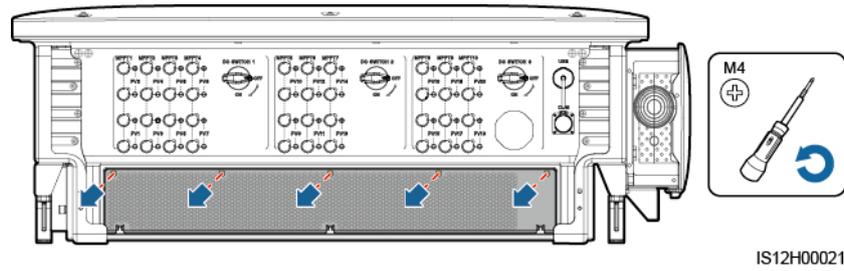
NOTICE

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

8.3 Troubleshooting

Alarm severities are defined as follows:

- Major: The solar inverter is faulty. As a result, the output power decreases or the grid-tied power generation is stopped.

- Minor: Some components are faulty without affecting the grid-tied power generation.

- Warning: The solar inverter works properly. The output power decreases or some authorization functions fail due to external factors.

Table 8-2 Common alarms and troubleshooting measures

Alarm ID	Alarm Name	Alarm Severity	Possible Causes	Suggestions
2001	High String Input Voltage	Major	• Cause ID = 1: PV1 and PV2 • Cause ID = 2: PV3 and PV4 • Cause ID = 3: PV5 and PV6 • Cause ID = 4: PV7 and PV8 • Cause ID = 5: PV9 and PV10 • Cause ID = 6: PV11 and PV12 • Cause ID = 7: PV13 and PV14 • Cause ID = 8: PV15 and PV16 • Cause ID = 9: PV17 and PV18 • Cause ID = 10: PV19 and PV20 The PV array is not properly configured. Excessive PV modules are connected in series to a PV string, and therefore the PV string open-circuit voltage exceeds the maximum operating voltage of the solar inverter.	Reduce the number of PV modules connected in series in the PV string until the PV string open-circuit voltage is not greater than the maximum operating voltage of the solar inverter. After the PV array configuration is corrected, the alarm disappears.
2011	String Reverse Connection	Major	Cause ID = 1–20: PV1–PV20 The PV string is reversely connected.	Check whether the PV string is reversely connected to the solar inverter. If yes, wait until the solar irradiance declines at night and the PV string current drops below 0.5 A. Then, turn off the DC switches and correct the PV string connection.
2012	String Current Backfeed	Warning	Cause ID = 1–20: PV1–PV20 Only a few PV modules are connected in series in the PV string. Therefore, the terminal voltage is lower than that of other PV strings.	1. Check whether the number of PV modules connected in series in the PV string is less than that in other PV strings connected in parallel. If yes, wait until the solar irradiance declines at night and the PV string current drops below 0.5 A. Then, turn off the DC switches and add more PV modules. 2. Check whether the PV string is shaded. 3. Check whether the open-circuit voltage of the PV string is normal.

Alarm ID	Alarm Name	Alarm Severity	Possible Causes	Suggestions
2014	High Input String Voltage to Ground	Major	Cause ID = 1 The voltage between the input PV string and the ground is abnormal, and there is a risk of power attenuation.	1. If no PID compensation device exists in the system, disable the PID protection function at night. Note: If the PID protection function is disabled but reactive power compensation at night is enabled, PV modules may attenuate. 2. If there is a PID compensation device in the system, check whether it is faulty. If yes, rectify the fault. 3. Check whether the settings of compensation direction for the solar inverter and the PID device are consistent. If not, set them to be consistent based on the PV module model. (Note: If the PV– is set to positive offset, the voltage between the solar inverter PV– and the ground should be greater than 0 V to clear the alarms; if the PV+ is set to negative offset, the voltage between the solar inverter PV+ and the ground should be less than 0 V to clear the alarms.) 4. If the alarm persists, contact Huawei technical support.
2015	PV String Loss	Warning	Cause ID = 1–20 This alarm is generated when the PV string status is abnormal due to the following conditions: a single PV string is lost; both 2-in-1 PV strings are lost; one of the 2-in-1 PV strings is lost.	1. Check whether the solar inverter terminals are properly connected. 2. Check whether the PV string terminals are properly connected. 3. If a 2-in-1 terminal is used, check whether it is normal.
2031	Phase Wire Short-Circuited to PE	Major	Cause ID = 1 The impedance of the output phase wire to PE is low or the output phase wire is short-circuited to PE.	Check the impedance of the output phase wire to PE, locate the position with lower impedance, and rectify the fault.

Alarm ID	Alarm Name	Alarm Severity	Possible Causes	Suggestions
2032	Grid Loss	Major	Cause ID = 1 1. The power grid experiences an outage. 2. The AC circuit is disconnected or the AC switch is off.	1. Check the AC voltage. 2. Check whether the AC circuit is disconnected or the AC switch is off.
2033	Grid Undervoltage	Major	Cause ID = 1 The grid voltage is below the lower threshold or the undervoltage duration exceeds the time that triggers low voltage ride-through (LVRT).	1. If the alarm occurs occasionally, the power grid may be abnormal temporarily. The solar inverter automatically recovers after detecting that the power grid becomes normal. 2. If the alarm occurs frequently, check whether the power grid voltage is within the acceptable range. If not, contact the local power operator. If yes, log in to the mobile app, SmartLogger, or network management system (NMS) to modify the grid undervoltage protection threshold with the consent of the local power operator. 3. If the fault persists for a long time, check the AC circuit breaker and AC output power cable.
2034	Grid Overvoltage	Major	Cause ID = 1 The grid voltage exceeds the upper threshold or the overvoltage duration exceeds the time that triggers high voltage ride-through (HVRT).	1. Check whether the grid connection voltage exceeds the upper threshold. If yes, contact the local power operator. 2. If you have confirmed that the grid connection voltage exceeds the upper threshold and have obtained the consent of the local power operator, modify the overvoltage protection threshold. 3. Check whether the peak grid voltage exceeds the upper threshold.

Alarm ID	Alarm Name	Alarm Severity	Possible Causes	Suggestions
2035	Grid Volt. Imbalance	Major	Cause ID = 1 The difference between grid phase voltages exceeds the upper threshold.	1. Check that the grid voltage is within the normal range. 2. Check that the AC output power cable is correctly connected. If the AC output power cable is correctly connected, yet the alarm persists and affects the energy yield of the PV plant, contact the local power operator.
2036	Grid Overfrequency	Major	Cause ID = 1 Power grid exception: The actual power grid frequency is higher than the standard requirement for the local power grid.	1. If the alarm occurs occasionally, the power grid may be abnormal temporarily. The solar inverter automatically recovers after detecting that the power grid becomes normal. 2. If the alarm occurs frequently, check whether the power grid frequency is within the acceptable range. If not, contact the local power operator. If yes, log in to the mobile phone app, SmartLogger, or NMS to modify the power grid overfrequency protection threshold with the consent of the local power operator.
2037	Grid Underfrequency	Major	Cause ID = 1 Power grid exception: The actual power grid frequency is lower than the standard requirement for the local power grid.	1. If the alarm occurs occasionally, the power grid may be abnormal temporarily. The solar inverter automatically recovers after detecting that the power grid becomes normal. 2. If the alarm occurs frequently, check whether the power grid frequency is within the acceptable range. If not, contact the local power operator. If yes, log in to the mobile phone app, SmartLogger, or NMS to modify the power grid underfrequency protection threshold with the consent of the local power operator.

Alarm ID	Alarm Name	Alarm Severity	Possible Causes	Suggestions
2038	Unstable Grid Frequency	Major	Cause ID = 1 Power grid exception: The actual grid frequency change rate does not comply with the local power grid standard.	1. If the alarm occurs occasionally, the power grid may be abnormal temporarily. The solar inverter automatically recovers after detecting that the power grid becomes normal. 2. If the alarm occurs frequently, check whether the grid frequency is within the acceptable range. If not, contact the local power operator.
2039	Output Overcurrent	Major	Cause ID = 1 The power grid voltage drops dramatically or the power grid is short-circuited. As a result, the solar inverter transient output current exceeds the upper threshold and therefore the solar inverter protection is triggered.	1. The solar inverter detects its external working conditions in real time. After the fault is rectified, the solar inverter automatically recovers. 2. If the alarm occurs frequently and affects the energy yield of the PV plant, check whether the output is short-circuited. If the fault cannot be rectified, contact your dealer or Huawei technical support.
2040	Output DC Component Overhigh	Major	Cause ID = 1 The DC component of the solar inverter output current exceeds the specified upper threshold.	1. If the exception is caused by an external fault, the solar inverter automatically recovers after the fault is rectified. 2. If the alarm occurs frequently, contact your dealer or Huawei technical support.
2051	Abnormal Residual Current	Major	Cause ID = 1 The insulation impedance of the input side to PE decreases when the solar inverter is operating.	1. If the alarm occurs occasionally, the external circuit may be abnormal temporarily. The solar inverter automatically recovers after the fault is rectified. 2. If the alarm occurs frequently or persists, check whether the impedance between the PV string and the ground is too low.

Alarm ID	Alarm Name	Alarm Severity	Possible Causes	Suggestions
2061	Abnormal Grounding	Major	Cause ID = 1 The neutral wire or PE wire is not connected when **Output mode** of the solar inverter is set to **Three-phase four-wire**.	1. Check that the neutral wire and PE wire of the solar inverter are properly connected. 2. Check whether the voltage between the neutral wire and the ground exceeds 30 V. If yes, set **Output mode** to **Three-phase three-wire** on the mobile app, SmartLogger, or NMS after obtaining the consent of the local power operator.
2062	Low Insulation Resistance	Major	Cause ID = 1 1. The PV string is short-circuited to PE. 2. The PV string has been in a moist environment for a long time and the circuit is not well insulated to ground.	1. Check the impedance of the PV string to PE. If a short circuit occurs or the insulation is insufficient, rectify it. 2. Check that the PE cable of the solar inverter is correctly connected. 3. If you are sure that the impedance is less than the default value in a cloudy or rainy environment, reset **Insulation resistance protection**.
2063	Cabinet Overtemperature	Minor	Cause ID = 1 1. The solar inverter is installed in a place with poor ventilation. 2. The ambient temperature is too high. 3. The solar inverter is not working properly.	1. Check the ventilation and whether the ambient temperature of the solar inverter exceeds the upper limit. If the ventilation is poor or the ambient temperature is too high, improve ventilation. 2. If both the ventilation and ambient temperature meet requirements yet the fault persists, contact your dealer or Huawei technical support.
2064	Device Fault	Major	Cause ID = 1–15 An unrecoverable fault has occurred on a circuit inside the solar inverter.	Turn off the AC output switch and DC input switch, and then turn them on after 5 minutes. If the fault persists, contact your dealer or Huawei technical support. **NOTICE** Cause ID = 1: Perform the preceding operations when the PV string current is less than 1 A.

Alarm ID	Alarm Name	Alarm Severity	Possible Causes	Suggestions
2065	Upgrade Failed or Software Version Unmatch	Minor	Cause ID = 1–4 The upgrade does not complete normally.	1. Perform an upgrade again. 2. If the upgrade fails for multiple times, contact your dealer or Huawei technical support.
2066	License Expired	Warning	Cause ID = 1 1. The privilege license has entered the grace period. 2. The privilege feature will be invalid soon.	1. Apply for a new license. 2. Load a new license.
2067	Faulty Power Collector	Major	Cause ID = 1 The power meter is disconnected.	1. Check whether the configured power meter model is the same as the actual model. 2. Check whether the communications parameters of the power meter are the same as the RS485 configurations of the solar inverter. 3. Check whether the power meter is powered on and whether the RS485 communications cable is connected.
2086	External Fan Abnormal	Major	Cause ID = 1–3: FAN 1–3 The external fan is short-circuited, the power supply is insufficient, or the air channel is blocked.	1. Shut down the fan, turn off the DC switch, check whether the fan blades are damaged, and clear the foreign matter around the fan. 2. Reinstall the fan, turn on the DC switch, and wait for the solar inverter to start. If the fault persists after 15 minutes, replace the external fan.
2087	Internal Fan Abnormal	Major	Cause ID = 1 The internal fan is short-circuited, the power supply is insufficient, or the fan is damaged.	Turn off the AC output switch and then the DC input switch. Turn them on after 5 minutes and wait for the solar inverter to connect to the power grid. If the fault persists, contact your dealer or Huawei technical support.
2088	Abnormal DC Protection Unit	Major	Cause ID = 1 The fuse is not in position or is blown. Cause ID = 2 The two relays on the breaking board are open-circuited.	Turn off the AC output switch and then the DC input switch. Turn them on after 5 minutes and wait for the solar inverter to connect to the power grid. If the fault persists, contact your dealer or Huawei technical support.

Alarm ID	Alarm Name	Alarm Severity	Possible Causes	Suggestions
61440	Faulty Monitoring Unit	Minor	Cause ID = 1 1. The flash memory is insufficient. 2. The flash memory has bad sectors.	Turn off the AC output switch and DC input switch, and then turn them on after 15 minutes. If the fault persists, replace the monitoring board or contact your dealer or Huawei technical support.

☐ NOTE

If you cannot rectify faults with the measures listed in the **Suggestions** column, contact your dealer or Huawei technical support.

8.4 Replacing a Fan

⚠ CAUTION

- Before replacing a fan, power off the inverter.
- When replacing a fan, use insulation tools and wear personal protective devices.

☐ NOTE

If the fan tray gets stuck when being pulled or pushed, slightly lift it.

Step 1 Remove the screw on the fan tray and save it. Pull out the fan tray until the fan baffle plate aligns with the inverter chassis.

Figure 8-2 Pulling out fan tray (1)
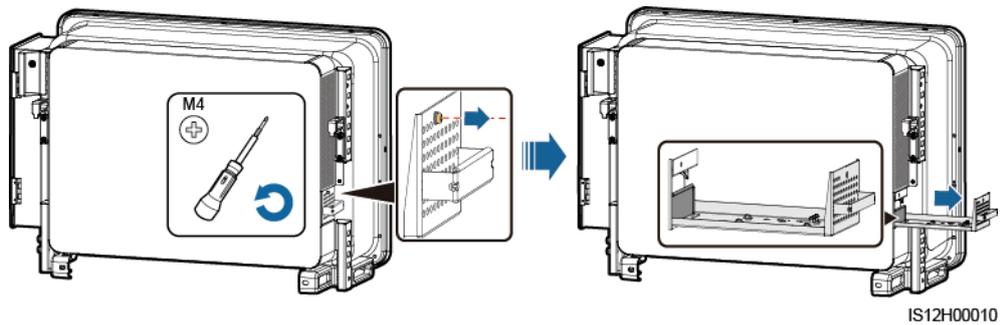
Step 2 Remove the cable ties shared by the cables, unscrew the connectors, and disconnect the cables.

Figure 8-3 Disconnecting cables

IS12H00011
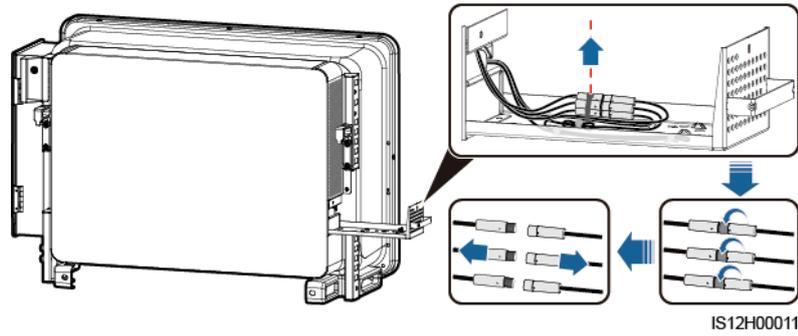
Step 3 Pull out the fan tray.

Figure 8-4 Pulling out fan tray (2)

IS12H00012
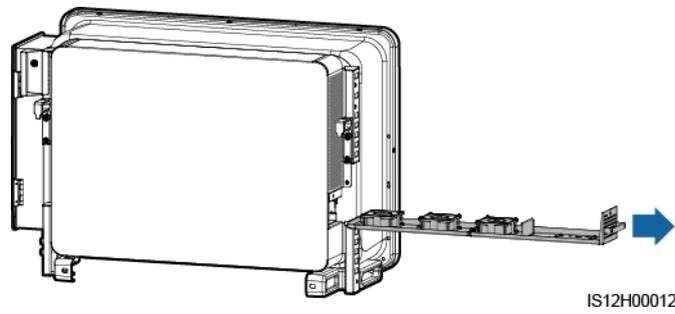
Step 4 Remove cable ties from the faulty fan.

- FAN 1 Faulty

Figure 8-5 Removing the FAN 1 cable ties

IS06H00110
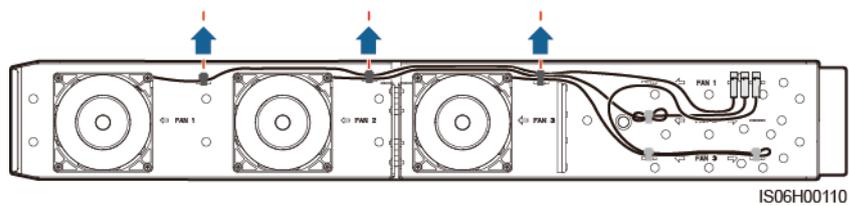
- FAN 2 Faulty

Figure 8-6 Removing the FAN 2 cable ties

IS06H00111
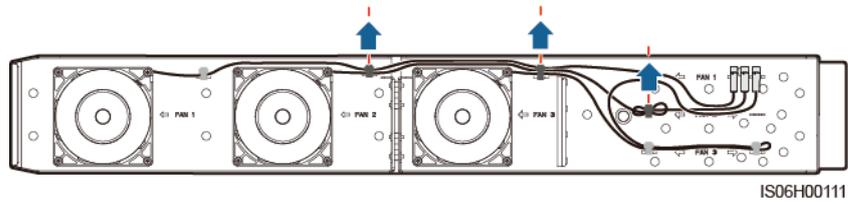
- FAN 3 Faulty

Figure 8-7 Removing the FAN 3 cable ties

IS06H00112
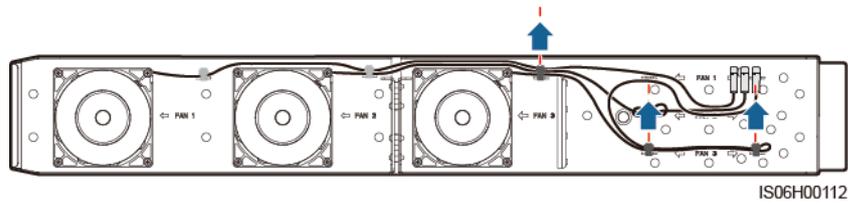
Step 5 Remove the faulty fan (FAN 1 is used as an example).

Figure 8-8 Removing the fan

IS12H00014
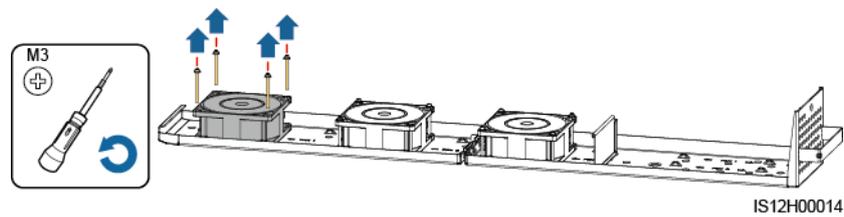
Step 6 Install the new fan (FAN 1 is used as an example).

Figure 8-9 Installing a new fan

IS12H00015
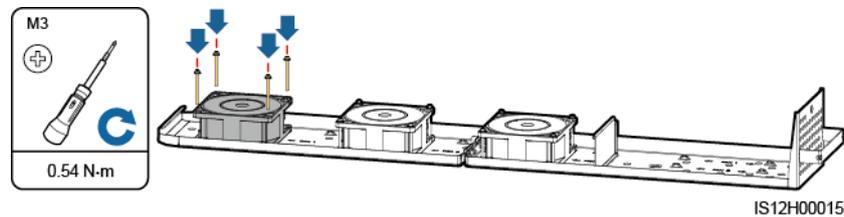
Step 7 Bind the fan cables.

- Binding positions for fan 1

Figure 8-10 Binding the FAN 1 cables
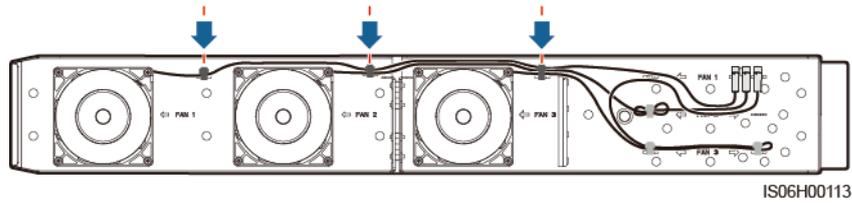
- Binding positions for fan 2

Figure 8-11 Binding the FAN 2 cables
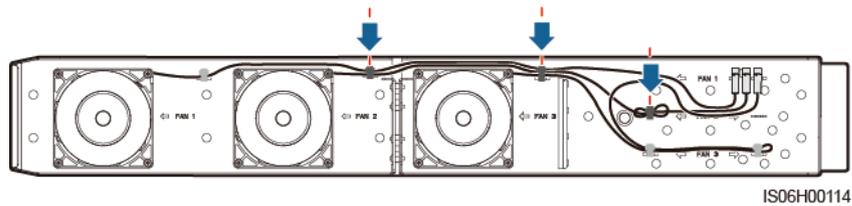
- Binding positions for fan 3

Figure 8-12 Binding the FAN 3 cables
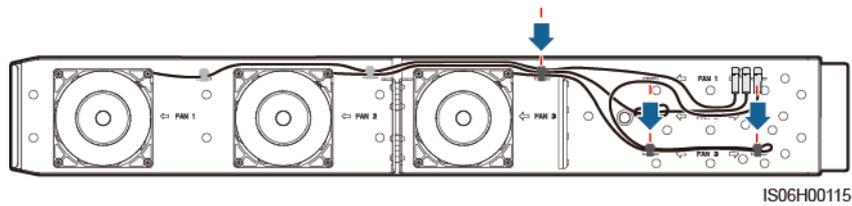
Step 8 Push the fan tray into the slot until the fan baffle plate aligns with the inverter chassis.

Figure 8-13 Pushing the fan tray in
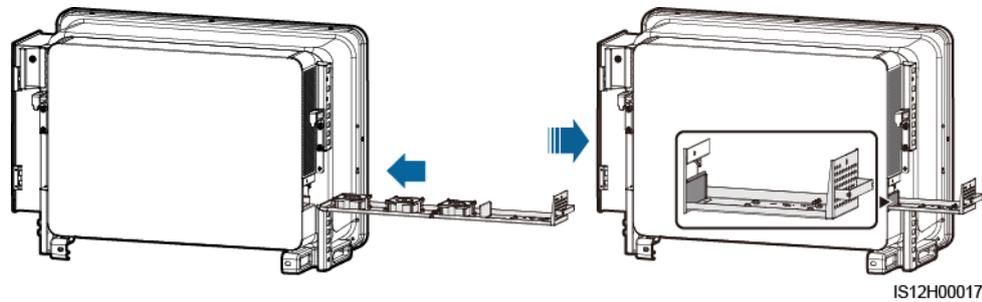
Step 9 Connect the cables correctly according to the cable labels and bind the cables.

Figure 8-14 Reconnecting and binding the cables
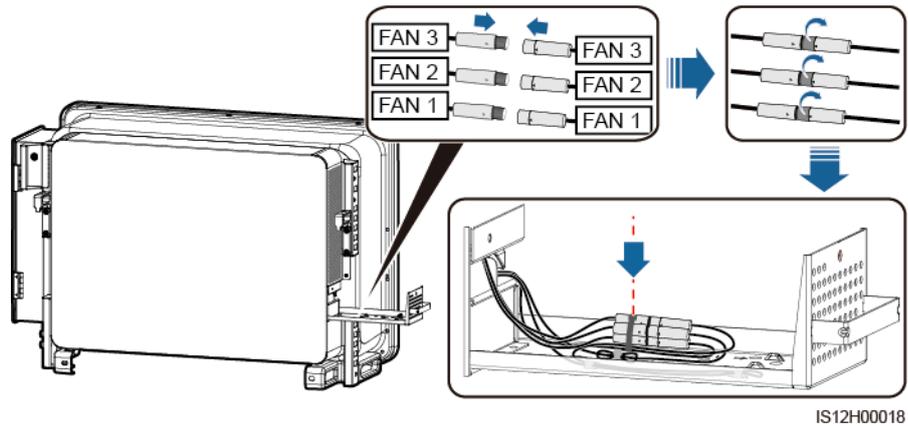
Step 10 Push the fan tray into the slot and tighten the screw.

Figure 8-15 Reinstalling the fan tray
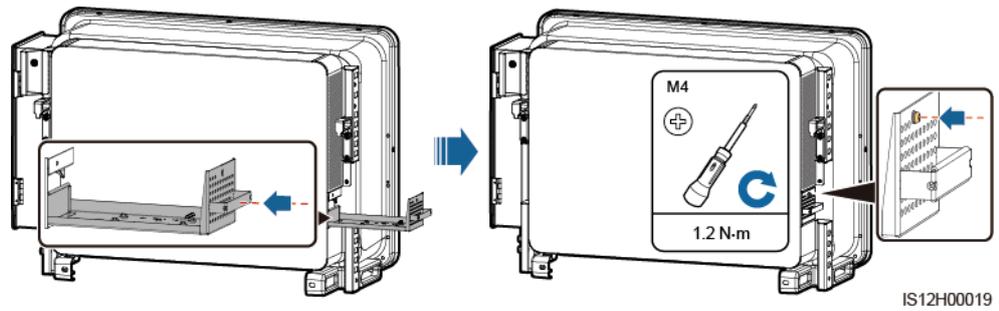
----End

9 Handling the Inverter

9.1 Removing the SUN2000

> **NOTICE**
>
> Before removing the SUN2000, disconnect both AC and DC connections. For processes of disconnecting, see 8.1 Powering Off the SUN2000.

Perform the following operations to remove the SUN2000:

1. Disconnect all cables from the SUN2000, including RS485 communications cables, DC input power cables, AC output power cables, and PGND cables.
2. Remove the SUN2000 from the mounting bracket.
3. Remove the mounting bracket.

9.2 Packing the SUN2000

- If the original packing materials are available, put the SUN2000 inside them and then seal them by using adhesive tape.
- If the original packing materials are not available, put the SUN2000 inside a suitable cardboard box and seal it properly.

9.3 Disposing of the SUN2000

If the SUN2000 service life expires, dispose of it according to the local disposal rules for electrical equipment waste.

10 Technical Specifications

Efficiency

Item	SUN2000-125 KTL-M0	SUN2000-110 KTL-M0	SUN2000-100 KTL-M0	SUN2000-100KTL-M1	SUN2000-100 KTL-INM0
Maximum efficiency	$\geq$ 99.0%	$\geq$ 98.6%	$\geq$ 98.6%	$\geq$ 98.6% (380 V/400 V) and $\geq$ 98.8% (480 V)	$\geq$ 98.6% (415 V) and $\geq$ 98.8% (480 V)
Chinese efficiency	$\geq$ 98.3%	$\geq$ 98.1%	$\geq$ 98.1%	N/A	N/A

Input

Item	SUN2000-125 KTL-M0	SUN2000-110 KTL-M0	SUN2000-100 KTL-M0	SUN2000-100KTL-M1	SUN2000-100 KTL-INM0
Maximum input power	140,300 W	123,500 W	112,200 W	112,200 W	112,200 W
Maximum input voltage[a]	1100 V				
Operating voltage range[b]	200–1000 V				
Minimum startup voltage	200 V				
Full-load MPPT voltage range	625–850 V	540–800 V	540–800 V	540–800 V (380 V/400 V) and 625–850 V (480 V)	540–800 V (415 V) 625–850 V (480 V)
Rated Input voltage	750 V	600 V	600 V	600 V (380 V/400 V) and 720 V (480 V)	620 V (415 V) and 720 V (480 V)

Item	SUN2000-125 KTL-M0	SUN2000-110 KTL-M0	SUN2000-100 KTL-M0	SUN2000-100KTL -M1	SUN2000-100 KTL-INM0
Maximum input current (per MPPT)	26 A				
Maximum short-circuit current (per MPPT)	40 A				
Maximum backfeed current to the PV array	0 A				
Number of inputs	20				
Number of MPP trackers	10				

- Note a: The maximum input voltage is the upper threshold of the DC voltage. If the input voltage exceeds the threshold, the solar inverter may be damaged.
- Note b: If the input voltage is beyond the operating voltage range, the solar inverter cannot work properly.

Output

Item	SUN2000-125 KTL-M0	SUN2000-110 KTL-M0	SUN2000-100 KTL-M0	SUN2000-100KTL -M1	SUN2000-100 KTL-INM0
Rated active power	125 kW	110 kW	100 kW	100 kW	100 kW
Maximum apparent power	137.5 kVA	121 kVA	110 kVA	110 kVA	110 kVA
Maximum active power (cosφ = 1)	137.5 kW	121 kW	110 kW	110 kW	110 kW
Rated output voltage[a] (phase voltage/line voltage)	288 V/500 V, 3W + PE	220 V/380 V and 230 V/400 V, 3W + (N)[b] + PE	220 V/380 V and 230 V/400 V, 3W + (N)[b] + PE	220 V/380 V, 230 V/400 V, and 277 V/480 V, 3W + (N)[b] + PE	240 V/415 V and 277 V/480 V, 3W + (N)[b] + PE
Rated output current	144.4 A	167.2 A (380 V) and 158.8 A (400 V)	152.0 A (380 V) and 144.4 A (400 V)	152.0 A (380 V), 144.4 A (400 V), and 120.3 A (480 V)	139.2 A (415 V)

Item	SUN2000-125 KTL-M0	SUN2000-110 KTL-M0	SUN2000-100 KTL-M0	SUN2000-100KTL -M1	SUN2000-100 KTL-INM0
Adapted power grid frequency	50 Hz	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz
Maximum output current	160.4 A	185.7 A (380 V) and 176.4 A (400 V)	168.8 A (380 V) and 160.4 A (400 V)	168.8 A (380 V), 160.4 A (400 V), and 133.7 A (480 V)	154.6 A (415 V), 133.7 A (480 V)
Power factor	0.8 leading and 0.8 lagging				
Maximum total harmonic distortion (rated power)	< 3%				
Note a: The rated output voltage is determined by **Grid code**, which can be set on the SUN2000 app, SmartLogger, or NMS.					
Note b: You can determine whether to connect the neutral wire to the SUN2000-110KTL-M0, SUN2000-100KTL-M0, SUN2000-100KTL-M1, or SUN2000-100KTL-INM0 based on the application scenario. If no neutral wire is used, set **Output mode** to **Three-phase three-wire**. If the neutral wire is used, set the **Output mode** to **Three-phase four-wire**.					

Protection

Item	SUN2000-125 KTL-M0	SUN2000-110 KTL-M0	SUN2000-100 KTL-M0	SUN2000-100KTL -M1	SUN2000-100 KTL-INM0
Input DC switch	Supported				
Anti-islanding protection	Supported				
Output overcurrent protection	Supported				
Input reverse connection protection	Supported				
PV string fault detection	Supported				
DC surge protection	Type II				
AC surge protection	Type II				

Item	SUN2000-125 KTL-M0	SUN2000-110 KTL-M0	SUN2000-100 KTL-M0	SUN2000-100KTL -M1	SUN2000-100 KTL-INM0
Insulation resistance detection	Supported				
Residue current monitoring unit (RCMU)	Supported				
Overvoltage category	PV II/AC III				

Display and Communication

Item	SUN2000-125 KTL-M0	SUN2000-110 KTL-M0	SUN2000-100 KTL-M0	SUN2000-100KTL -M1	SUN2000-100 KTL-INM0
Display	LED indicators, WLAN module + app, Bluetooth module + app, USB data cable + app				
Communication	MBUS/RS485				

Common Parameters

Item	SUN2000-125 KTL-M0	SUN2000-110 KTL-M0	SUN2000-100 KTL-M0	SUN2000-100KTL -M1	SUN2000-100 KTL-INM0
Dimensions (W x H x D)	1035 mm x 700 mm x 365 mm				
Net weight	≤ 81kg	≤ 90kg			
Operating temperature	−25 ℃ to +60 ℃				
Cooling mode	Intelligent air cooling				
Highest operating altitude	4000 m				
Relative humidity	0%−100% RH				
Input terminal	Staubli MC4				
Output terminal	Crimping module + OT/DT terminal				

Item	SUN2000-125 KTL-M0	SUN2000-110 KTL-M0	SUN2000-100 KTL-M0	SUN2000-100KTL -M1	SUN2000-100 KTL-INM0
IP rating	IP66				
Topology	Transformerless				

A Grid Code

Set the correct grid code based on the application area and scenario of the solar inverter.

Grid Code	Description	SUN2000-1 25KTL-M0	SUN2000-1 10KTL-M0	SUN2000-1 00KTL-M0	SUN2000-1 00KTL-M1	SUN2000-1 00KTL-IN M0
VDE-AR-N-4 105	Germany LV	N/A	Supported	Supported	Supported	N/A
NB/T 32004	China Golden Sun LV	N/A	Supported	Supported	Supported	N/A
UTE C 15-712-1(A)	France continent	N/A	Supported	Supported	Supported	N/A
UTE C 15-712-1(B)	France islands	N/A	Supported	Supported	Supported	N/A
UTE C 15-712-1(C)	France islands	N/A	Supported	Supported	Supported	N/A
VDE 0126-1-1-BU	Bulgaria	N/A	Supported	Supported	Supported	N/A
VDE 0126-1-1-GR(A)	Greece continent	N/A	Supported	Supported	Supported	N/A
VDE 0126-1-1-GR(B)	Greece islands	N/A	Supported	Supported	Supported	N/A
BDEW-MV	Germany MV	N/A	Supported	Supported	Supported	N/A
G59-England	England 230 V (I > 16 A)	N/A	Supported	Supported	Supported	N/A
G59-Scotland	Scotland 240 V (I > 16 A)	N/A	Supported	Supported	Supported	N/A

Grid Code	Description	SUN2000-125KTL-M0	SUN2000-110KTL-M0	SUN2000-100KTL-M0	SUN2000-100KTL-M1	SUN2000-100KTL-IN M0
G83-England	England 230 V (I < 16 A)	N/A	Supported	Supported	Supported	N/A
G83-Scotland	Scotland 240 V (I < 16 A)	N/A	Supported	Supported	Supported	N/A
CEI0-21	Italy	N/A	Supported	Supported	Supported	N/A
EN50438-CZ	Czech Republic	N/A	Supported	Supported	Supported	N/A
RD1699/661	Spain LV	N/A	Supported	Supported	Supported	N/A
RD1699/661-MV480	Spain MV	N/A	N/A	N/A	Supported	N/A
EN50438-NL	Netherlands	N/A	Supported	Supported	Supported	N/A
C10/11	Belgium	N/A	Supported	Supported	Supported	N/A
AS4777	Australia	N/A	Supported	Supported	Supported	N/A
IEC61727	IEC 61727 LV (50 Hz)	N/A	Supported	Supported	Supported	N/A
Custom (50 Hz)	Reserved	N/A	Supported	Supported	Supported	N/A
Custom (60 Hz)	Reserved	N/A	Supported	Supported	Supported	N/A
CEI0-16	Italy	N/A	Supported	Supported	Supported	N/A
CHINA-MV480	China MV	N/A	N/A	N/A	Supported	N/A
CHINA-MV	China MV	N/A	Supported	Supported	Supported	N/A
TAI-PEA	Thailand	N/A	Supported	Supported	Supported	N/A
TAI-MEA	Thailand	N/A	Supported	Supported	Supported	N/A
BDEW-MV480	Germany MV	N/A	N/A	N/A	Supported	N/A
Custom MV480 (50 Hz)	Reserved	N/A	N/A	N/A	Supported	N/A
Custom MV480 (60 Hz)	Reserved	N/A	N/A	N/A	Supported	N/A
G59-England-MV480	UK 480 V MV (I > 16 A)	N/A	N/A	N/A	Supported	N/A

Grid Code	Description	SUN2000-125KTL-M0	SUN2000-110KTL-M0	SUN2000-100KTL-M0	SUN2000-100KTL-M1	SUN2000-100KTL-IN M0
IEC61727-MV480	IEC 61727 MV (50 Hz)	N/A	N/A	N/A	Supported	N/A
UTE C 15-712-1-MV 480	France islands	N/A	N/A	N/A	Supported	N/A
TAI-PEA-MV 480	Thailand MV PEA	N/A	N/A	N/A	Supported	N/A
TAI-MEA-MV480	Thailand MV MEA	N/A	N/A	N/A	Supported	N/A
EN50438-DK-MV480	Denmark MV	N/A	N/A	N/A	Supported	N/A
EN50438-TR-MV480	Turkey MV	N/A	N/A	N/A	Supported	N/A
EN50438-TR	Turkey LV	N/A	Supported	Supported	Supported	N/A
C11/C10-MV 480	Belgium MV	N/A	N/A	N/A	Supported	N/A
Philippines	Philippines LV	N/A	Supported	Supported	Supported	N/A
Philippines-MV480	Philippines MV	N/A	N/A	N/A	Supported	N/A
AS4777-MV480	Australia MV	N/A	N/A	N/A	Supported	N/A
NRS-097-2-1	South Africa	N/A	Supported	Supported	Supported	N/A
NRS-097-2-1-MV480	South Africa MV	N/A	N/A	N/A	Supported	N/A
KOREA	South Korea	N/A	Supported	Supported	Supported	N/A
IEC61727-60 Hz	IEC 61727 LV (60 Hz)	N/A	Supported	Supported	Supported	N/A
IEC61727-60 Hz-MV480	IEC 61727 MV (60 Hz)	N/A	N/A	N/A	Supported	N/A
CHINA_MV500	China MV	Supported	N/A	N/A	N/A	N/A
ANRE	Romania LV	N/A	Supported	Supported	Supported	N/A
ANRE-MV480	Romania MV	N/A	N/A	N/A	Supported	N/A
PO12.3-MV480	Spain MV	N/A	N/A	N/A	Supported	N/A

Grid Code	Description	SUN2000-1 25KTL-M0	SUN2000-1 10KTL-M0	SUN2000-1 00KTL-M0	SUN2000-1 00KTL-M1	SUN2000-1 00KTL-IN M0
EN50438_IE-MV480	Ireland MV	N/A	N/A	N/A	Supported	N/A
EN50438_IE	Ireland LV	N/A	Supported	Supported	Supported	N/A
CEI0-16-MV 480	Italy MV	N/A	N/A	N/A	Supported	N/A
PO12.3	Spain LV	N/A	Supported	Supported	Supported	N/A
CEI0-21-MV 480	Italy MV	N/A	N/A	N/A	Supported	N/A
KOREA-MV 480	South Korea MV	N/A	N/A	N/A	Supported	N/A
Egypt ETEC	Egypt LV	N/A	Supported	Supported	Supported	N/A
Egypt ETEC-MV48 0	Egypt MV	N/A	N/A	N/A	Supported	N/A
CLC/TS5054 9_IE	Ireland	N/A	Supported	Supported	Supported	N/A
CLC/TS5054 9_IE-MV480	Ireland MV	N/A	N/A	N/A	Supported	N/A
Jordan-Trans mission	Jordan LV	N/A	Supported	Supported	Supported	N/A
Jordan-Trans mission-MV4 80	Jordan MV	N/A	N/A	N/A	Supported	N/A
NAMIBIA	Namibia	N/A	Supported	Supported	Supported	N/A
ABNT NBR 16149	Brazil	N/A	Supported	Supported	Supported	N/A
ABNT NBR 16149-MV48 0	Brazil MV	N/A	N/A	N/A	Supported	N/A
SA_RPPs	South Africa LV	N/A	Supported	Supported	Supported	N/A
SA_RPPs-M V480	South Africa MV	N/A	N/A	N/A	Supported	N/A
INDIA	India LV	N/A	Supported	Supported	Supported	Supported
ZAMBIA	Zambia LV	N/A	Supported	Supported	Supported	N/A
ZAMBIA-M V480	Zambia MV	N/A	N/A	N/A	Supported	N/A

Grid Code	Description	SUN2000-125KTL-M0	SUN2000-110KTL-M0	SUN2000-100KTL-M0	SUN2000-100KTL-M1	SUN2000-100KTL-IN M0
Chile	Chile LV	N/A	Supported	Supported	Supported	N/A
Chile-MV480	Chile MV	N/A	N/A	N/A	Supported	N/A
Mexico-MV480	Mexico MV	N/A	N/A	N/A	Supported	N/A
Malaysian	Malaysia LV	N/A	Supported	Supported	Supported	N/A
Malaysian-MV480	Malaysia MV	N/A	N/A	N/A	Supported	N/A
KENYA_ETHIOPIA	Kenya LV and Ethiopia	N/A	Supported	Supported	Supported	N/A
KENYA_ETHIOPIA_MV48	Kenya LV and Ethiopia MV	N/A	N/A	N/A	Supported	N/A
NIGERIA	Nigeria LV	N/A	Supported	Supported	Supported	N/A
NIGERIA-MV480	Nigeria MV	N/A	N/A	N/A	Supported	N/A
DUBAI	Dubai LV	N/A	Supported	Supported	Supported	N/A
DUBAI-MV480	Dubai MV	N/A	N/A	N/A	Supported	N/A
Northern Ireland	Northern Ireland LV	N/A	Supported	Supported	Supported	N/A
Northern Ireland-MV480	Northern Ireland MV	N/A	N/A	N/A	Supported	N/A
Cameroon	Cameroon LV	N/A	Supported	Supported	Supported	N/A
Cameroon-MV480	Cameroon MV	N/A	N/A	N/A	Supported	N/A
Jordan-Distribution	Jordan power distribution network LV	N/A	Supported	Supported	Supported	N/A
Jordan-Distribution-MV480	Jordan power distribution network MV	N/A	N/A	N/A	Supported	N/A
NAMIBIA_MV480	Namibia	N/A	N/A	N/A	Supported	N/A
LEBANON	Lebanon LV	N/A	Supported	Supported	Supported	N/A
LEBANON-MV480	Lebanon MV	N/A	N/A	N/A	Supported	N/A

Grid Code	Description	SUN2000-1 25KTL-M0	SUN2000-1 10KTL-M0	SUN2000-1 00KTL-M0	SUN2000-1 00KTL-M1	SUN2000-1 00KTL-IN M0
ARGENTINA -MV500	Argentina MV	N/A	N/A	N/A	Supported	N/A
Jordan-Trans mission-HV	Jordan HV	N/A	Supported	Supported	Supported	N/A
Jordan-Trans mission-HV4 80	Jordan HV	N/A	N/A	N/A	Supported	N/A
TUNISIA	Tunisia	N/A	Supported	Supported	Supported	N/A
TUNISIA-M V480	Tunisia MV	N/A	N/A	N/A	Supported	N/A
AUSTRALIA -NER	Australia NER	N/A	Supported	Supported	Supported	N/A
AUSTRALIA -NER-MV480	Australia NER	N/A	N/A	N/A	Supported	N/A
SAUDI	Saudi Arabia	N/A	Supported	Supported	Supported	N/A
SAUDI-MV4 80	Saudi Arabia	N/A	N/A	N/A	Supported	N/A
Ghana-MV48 0	Ghana MV	N/A	N/A	N/A	Supported	N/A
Israel	Israel	N/A	Supported	Supported	Supported	N/A
Israel-MV480	Israel	N/A	N/A	N/A	Supported	N/A
Chile-PMGD	Chile PMGD project	N/A	Supported	Supported	Supported	N/A
Chile-PMGD- MV480	Chile PMGD project	N/A	N/A	N/A	Supported	N/A
VDE-AR-N41 20_HV	VDE4120	N/A	Supported	Supported	Supported	N/A
VDE-AR-N41 20_HV480	VDE4120	N/A	N/A	N/A	Supported	N/A
Vietnam	Vietnam	N/A	Supported	Supported	Supported	N/A
Vietnam-MV 480	Vietnam	N/A	N/A	N/A	Supported	N/A
TAIPOWER	Taiwan LV	N/A	Supported	Supported	Supported	N/A
TAIPOWER- MV480	Taiwan MV (480 V)	N/A	N/A	N/A	Supported	N/A

Grid Code	Description	SUN2000-1 25KTL-M0	SUN2000-1 10KTL-M0	SUN2000-1 00KTL-M0	SUN2000-1 00KTL-M1	SUN2000-1 00KTL-IN M0
ARGENTINA -MV480	Argentina MV	N/A	N/A	N/A	Supported	N/A
OMAN	Oman LV	N/A	Supported	Supported	Supported	N/A
OMAN-MV4 80	Oman MV	N/A	N/A	N/A	Supported	N/A
KUWAIT	Kuwait LV	N/A	Supported	Supported	Supported	N/A
KUWAIT-M V480	Kuwait MV	N/A	N/A	N/A	Supported	N/A
BANGLADE SH	Bangladesh LV	N/A	Supported	Supported	Supported	N/A
BANGLADE SH-MV480	Bangladesh MV	N/A	N/A	N/A	Supported	N/A
CHILE_NET _BILLING	Chile NetBilling project	N/A	Supported	Supported	Supported	N/A
EN50438-NL- MV480	Netherlands MV	N/A	N/A	N/A	Supported	N/A
BAHRAIN	Bahrain LV	N/A	Supported	Supported	Supported	N/A
BAHRAIN-M V480	Bahrain MV	N/A	N/A	N/A	Supported	N/A
Fuel_Engine_ Grid	DG-grid hybrid	N/A	Supported	Supported	Supported	N/A
Fuel-Engine- Grid-60Hz	DG-grid hybrid	N/A	Supported	Supported	Supported	N/A
ARGENTINA	Argentina	N/A	Supported	Supported	Supported	N/A
Mauritius	Mauritius	N/A	Supported	Supported	Supported	N/A
Mauritius-MV 480	Mauritius MV	N/A	N/A	N/A	Supported	N/A
EN50438-SE	Sweden LV	N/A	Supported	Supported	Supported	N/A
Pakistan	Pakistan	N/A	Supported	Supported	Supported	N/A
Pakistan-MV4 80	Pakistan MV	N/A	N/A	N/A	Supported	N/A

B Acronyms and Abbreviations

C

CEC   California Energy Commission

CPV   Concentrated Photovoltaics technology

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

W

WEEE   waste electrical and electronic equipment