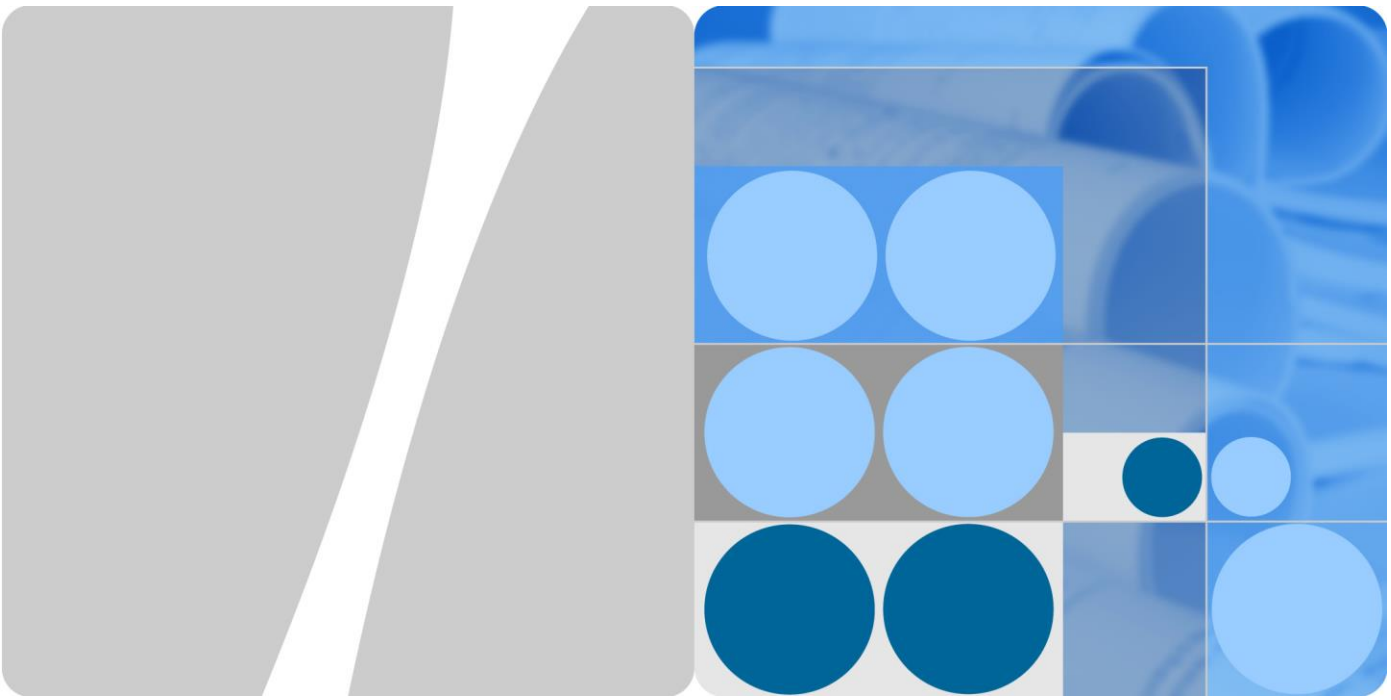

SUN2000-(3.8KTL-11.4KTL)-USL0

User Manual

Issue 02

Date 2018-08-30

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About This Document

Purpose

This document describes the SUN2000-3.8KTL-USL0, SUN2000-5KTL-USL0, SUN2000-7.6KTL-USL0, SUN2000-9KTL-USL0, SUN2000-10KTL-USL0, and SUN2000-11.4KTL-USL0 (SUN2000 for short) in terms of installation, electrical connections, commissioning, maintenance, and troubleshooting. Understand the safety information and get familiar with the SUN2000 functions and features before installing and operating the SUN2000.

Intended Audience

This document is intended for:

- PV plant operation personnel and qualified electrical technicians responsible for installing, wiring, commissioning, maintaining, and troubleshooting the SUN2000
- Personnel using the app to view data and carry out operations

Symbol Conventions

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

Symbol	Description
	Indicates an imminently hazardous situation which, if not avoided, will result in serious injury or death.
	Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.
	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

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Symbol	Description
NOTE	Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, or environment deterioration.

Change History

Changes between document issues are cumulative. The latest document issue contains all updates made in previous issues.

Issue 02 (2018-08-30)

Added the domain name and the port number connecting to the Locus management system.

Issue 01 (2018-05-21)

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

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Contents

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1 Safety Precautions

Safety

NOTICE

- Before performing operations, read through this manual and follow all the precautions to prevent accidents. The "DANGER", "WARNING", "CAUTION", and "NOTICE" statements in this document do not represent all the safety instructions. They are only supplements to the safety instructions.
- Only certified electricians are allowed to install, connect cables for, commission, maintain, and troubleshoot Huawei products, and they must understand basic safety precautions to avoid hazards.

When operating Huawei equipment, in addition to following the general precautions in this document, follow the specific safety instructions given by Huawei. Huawei will not be liable for any consequence caused by the violation of the safety operation regulations and design, production, and usage standards.

Disclaimer

Huawei shall not be liable for any consequence caused by any of the following events:

- Damage during transportation
- Storage conditions that do not meet the requirements specified in this document.
- Incorrect storage, installation, or use
- Installation or use by unqualified personnel
- Failure to follow the operation instructions and safety precautions in this document
- Operation in extreme environments which are not covered in this document
- Operation beyond specified ranges.
- Unauthorized modifications to the product or software code or removal of the product
- Device damage due to force majeure (such as lightning, earthquake, fire, and storm)
- Warranty expiration without extension of warranty service.
- Installation or use in environments which are not specified in relevant international standards

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS - This manual contains important instructions for Models SUN2000-3.8KTL-USL0, SUN2000-5KTL-USL0, SUN2000-7.6KTL-USL0, SUN2000-9KTL-USL0, SUN2000-10KTL-USL0, and SUN2000-11.4KTL-USL0 that shall be followed during installation and maintenance of the inverter.

Personnel Requirements

Only certified electricians are allowed to install, connect cables for, commission, maintain, troubleshoot, and replace the SUN2000.

- Operation personnel should receive professional training.
- Operation personnel should read through this document and follow all the precautions.
- Operation personnel should be familiar with the safety standards relevant to electrical systems.
- Operation personnel should understand the composition and working principles of the grid-tied PV system and be aware of local regulations.
- Operation personnel must wear proper personal protective equipment (PPE).

Protecting Labels

- Do not scrawl or damage any labels on the SUN2000 enclosure. These labels contain important information about safe operation.
- Do not scrawl or damage the nameplate on the SUN2000 enclosure. This nameplate contains important product information.

Installation

DANGER

Never power on the SUN2000 during installation.

- Ensure that the SUN2000 is not connected to a power supply or powered on before finishing installation.
- To allow proper heat dissipation and installation, maintain appropriate clearances between the SUN2000 and other objects, as shown in Figure 1-1. If you have any questions about the clearances, consult local technical support engineers.

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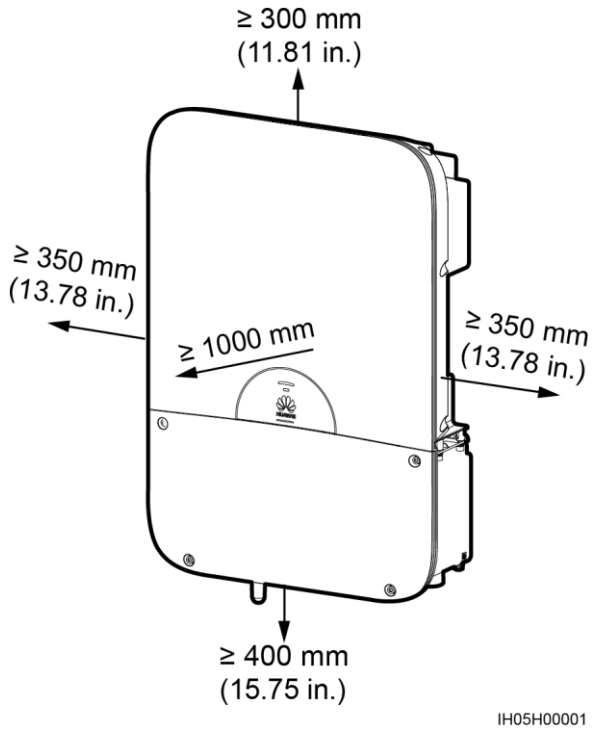
Figure 1-1 Installation clearance



- Ensure that the SUN2000 is installed in a well-ventilated environment.
- Ensure that the SUN2000 heat sinks are free from blockage.
- Do not open the front panel of the SUN2000.
- Do not remove the terminals and ports at the bottom of the SUN2000.

Electrical Connections

DANGER

Before connecting cables, ensure that the SUN2000 is secured in position and not damaged in any way. Otherwise, electric shock or fire may occur.

- Ensure that all electrical connections comply with local electrical standards.
- Obtain approval from the local utility company before using the SUN2000 to generate electricity in grid-tied mode.
- Ensure that the cables used in a grid-tied PV system are properly connected and insulated and meet all specification requirements.

Operation

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DANGER

High voltage may cause an electric shock, which results in serious property damage, serious injury, or death from the SUN2000 in operation. Strictly comply with the safety precautions in this document and associated documents when operating the SUN2000.

- When the SUN2000 is powered on for the first time, only certified electricians are allowed to perform quick setting. Incorrect settings may affect the normal SUN2000 operation and cause the SUN2000 to not comply with the country certification.
- When the SUN2000 is operating, do not disconnect under load.
- Do not touch an energized SUN2000 because the heat sink reaches a high temperature.
- Follow local laws and regulations when operating the equipment.

Maintenance and Replacement

DANGER

High voltage may cause an electric shock, which results in serious property damage, serious injury, or death, or serious property damage from the SUN2000 in operation. Prior to maintenance, power off the SUN2000 and strictly comply with the safety precautions in this document and associated documents when operating the SUN2000.

- Before performing maintenance on the SUN2000, ensure that you have sufficient knowledge of this document, and proper tools, and testing equipment.
- Before performing maintenance tasks, power off the SUN2000 and wait at least 5 minutes.
- Temporary warning signs or fences must be placed to prevent unauthorized people from entering the site.
- If the SUN2000 is faulty, contact your supplier.
- The SUN2000 can be powered on only after all faults are rectified. Failing to do so may escalate faults or damage the device.
- Observe ESD precautions and wear ESD gloves during maintenance.

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2 Product Overview

2.1 Product Introduction

Function

The SUN2000 is a single-phase grid-tied PV string inverter that converts the DC power generated by PV strings into AC power and feeds the power into the power grid.

Models

This document involves the following product models:

- SUN2000-3.8KTL-USL0
- SUN2000-5KTL-USL0
- SUN2000-7.6KTL-USL0
- SUN2000-9KTL-USL0
- SUN2000-10KTL-USL0
- SUN2000-11.4KTL-USL0

NOTE

- Each of the preceding product models has two editions: 4G and WLAN.
- The products look alike. The SUN2000-3.8KTL-USL0 is used as an example.

Figure 2-1 Model number

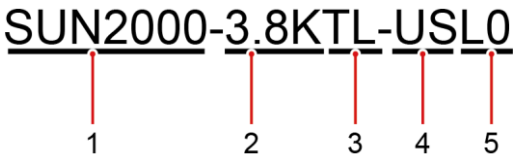

Table 2-1 Model number explanation

No.	Meaning	Description
1	Product	SUN2000: grid-tied PV string inverter

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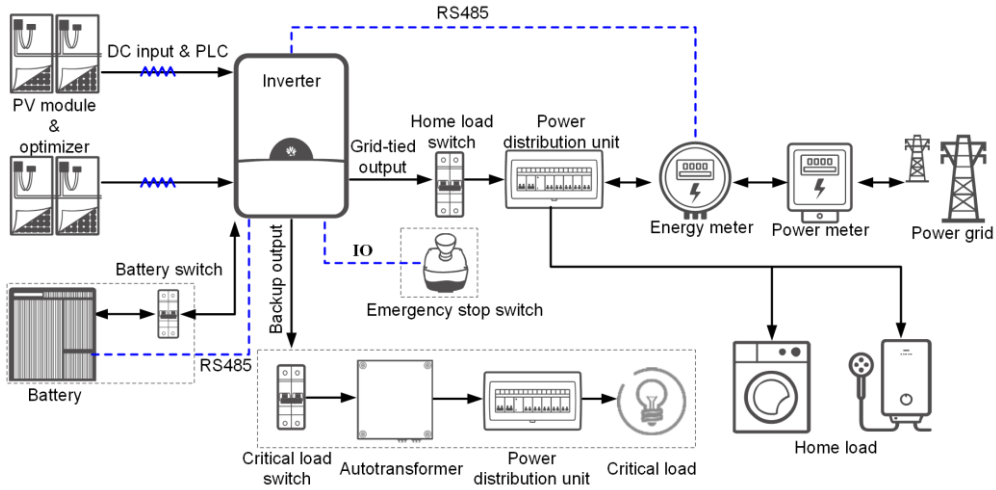
No.	Meaning	Description
2	Power	• 3.8K: The power level is 3.8 kW. • 5K: The power level is 5 kW. • 7.6K: The power level is 7.6 kW. • 9K: The power level is 9 kW. • 10K: The power level is 10 kW. • 11.4K: The power level is 11.4 kW.
3	Topology	TL: transformerless
4	Region	US: the U.S.
5	Design code	L0: residential

Networking Application

The SUN2000 applies to a residential rooftop grid-tied system. Typically, a grid-tied system consists of the PV string, grid-tied inverter, power distribution unit (PDU), and electricity meter.

Figure 2-2 Networking application(dashed boxes indicate optional components)



NOTE

- → indicates the power flow direction. ---- indicates the signal cable. ~~~ indicates the signal flow.
- SUN2000-3.8KTL-USL0/SUN2000-5KTL-USL0/SUN2000-7.6KTL-USL0 supports two PV string inputs. SUN2000-9KTL-USL0/SUN2000-10KTL-USL0/SUN2000-11.4KTL-USL0 supports three PV string inputs. Two PV string inputs are used as an example.
- The autotransformer is used only when there is 120 V load and the power grid is 240/120 split phase or 240 delta shown in Figure 2-3.
- Normally closed (NC) contact and the UL certification are required for the emergency stop switch.

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Supported Power Grids

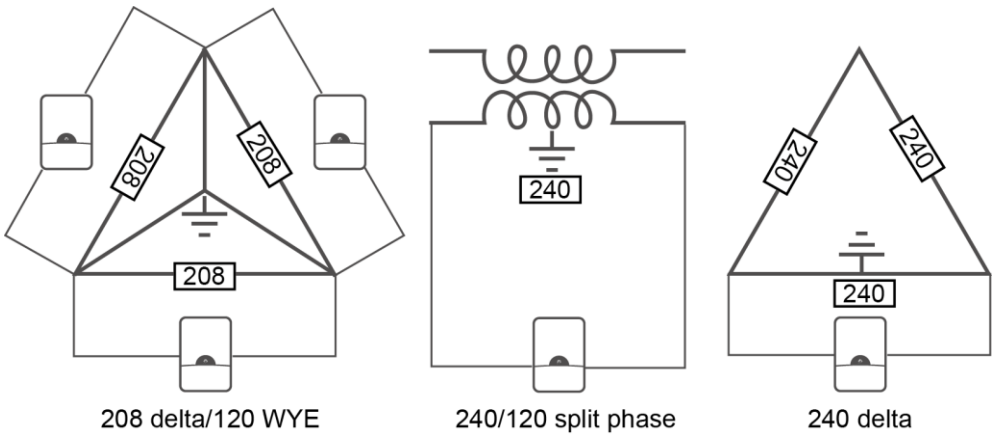
The SUN2000 supports low-voltage power grids.

- The following power grids are in L1/L2/N mode. The output mode needs to be set to L1/L2/N.

NOTE

To set the output mode, choose **Grid-connect config** > **Expert** > **Grid parameters** on the **Home** screen of the FusionHome app.

Figure 2-3 Power grid types (L1/L2/N)



- The following power grids are in L1/L2 mode. The output mode needs to be set to L1/L2.

NOTE

To set the output mode, choose **Grid-connect config** > **Expert** > **Grid parameters** on the **Home** screen of the FusionHome app.

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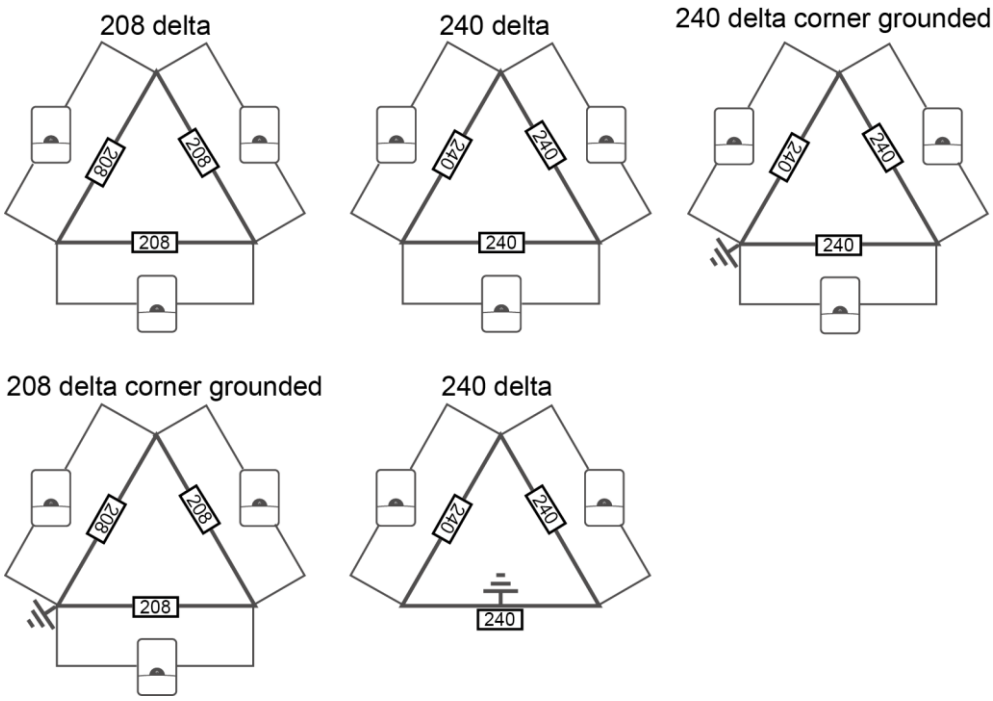
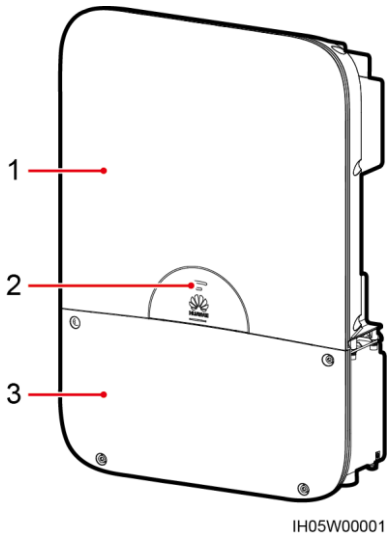
Figure 2-4 Power grid types (L1/L2)



2.2 Appearance

Enclosure Appearance

Figure 2-5 Front view



(1) Host panel (2) LEDs (3) Maintenance compartment door

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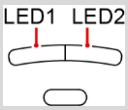
Table 2-2 describes the LED indicators.

Table 2-2 LED description

Type	Status		Meaning
Running indication 	**LED1**	**LED2**	N/A
	Steady green	Steady green	The SUN2000 is exporting power to the power grid.
	Blinking green at long intervals (on for 1s and then off for 1s)	Off	The DC is on and the AC is off.
	Off	Blinking green at long intervals (on for 1s and then off for 1s)	The DC is off and the AC is on.
	Blinking green at long intervals (on for 1s and then off for 1s)	Blinking green at long intervals (on for 1s and then off for 1s)	The DC is on, the AC is on, and the SUN2000 is not exporting power to the power grid.
	Steady orange	Steady orange	The SUN2000 is running in backup state.
	Blinking orange at long intervals	Off	The DC is on and the SUN2000 has no output in backup state.
	Off	Off	Both the DC and AC are off, or the SUN2000 is in Low Power Consumption mode. Low Power Consumption mode means that the monitoring system of the SUN2000 is hibernating.
	Steady red	Steady red	The SUN2000 is faulty.
	Blinking red slowly (on for 1s and then off for 1s)	Steady green	Exporting power to the power grid, optimizer fault.
	Blinking red slowly (on for 1s and then off for 1s)	Steady Orange	Backup mode, optimizer fault.

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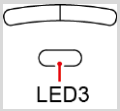
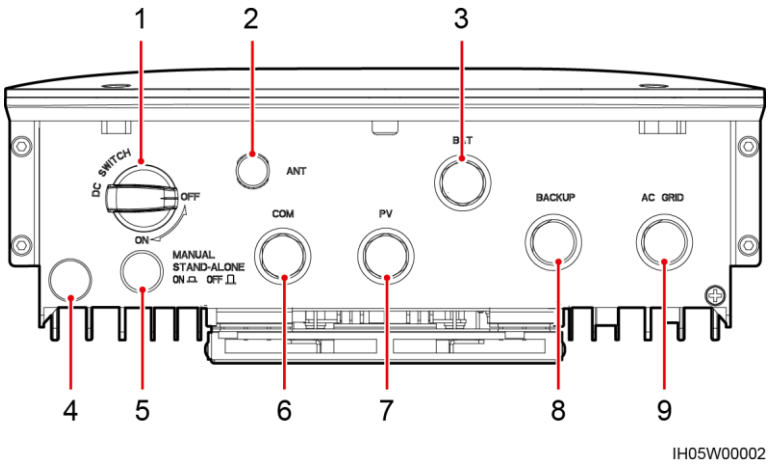
Type	Status	Meaning
Communication indication 	**LED3**	N/A
	Blinking green at short intervals (on for 0.2s and then off for 0.2s)	Communicating (Communicating means that communication with the management system is in progress. However, if a mobile phone accesses the SUN2000, the LED indicates the "mobile phone access status: blinking green at long intervals" first.)
	Blinking green at long intervals (on for 1s and then off for 1s)	A mobile phone is connected to the SUN2000.
	Off	No communication.

Port Description

Figure 2-6 Bottom of the SUN2000-3.8KTL-USL0



No.	Component	No.	Component
1	DC switch	2	Antenna port
3	Battery cable hole	4	Ventilation valve
5	Backup enable button	6	Signal cable hole
7	DC input power cable hole	8	AC output cable hole (critical load)
9	AC output cable hole (home load)	N/A	N/A

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Enclosure Dimensions

Figure 2-7 shows the SUN2000 enclosure dimensions.

Figure 2-7 Enclosure dimensions (SUN2000-3.8KTL/5KTL/7.6KTL-USL0)

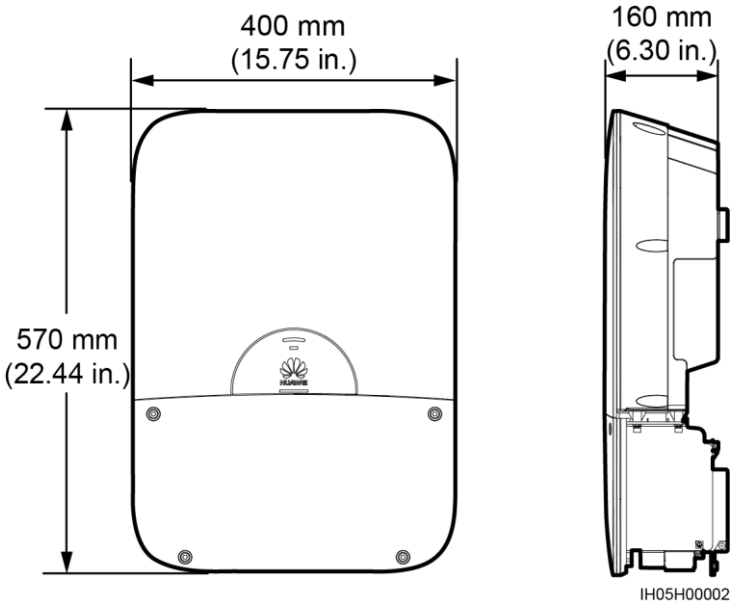
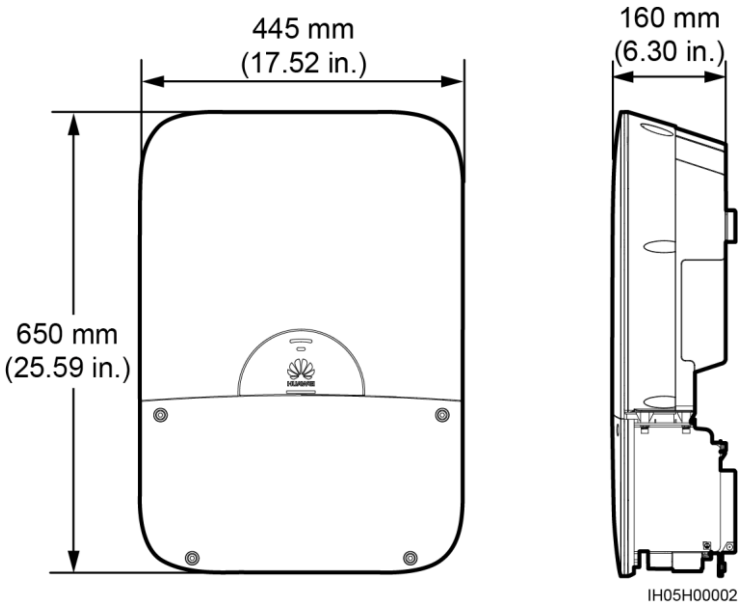


Figure 2-8 Enclosure dimensions (SUN2000-9KTL/10KTL/11.4KTL-USL0)



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2.3 Label Description

Enclosure Labels

Table 2-3 describes the labels on the SUN2000 enclosure and their meanings.

Table 2-3 Label description

Label	Name	Meaning
	Electric shock warning	• The SUN2000 has a voltage of 500 V. Electric shock could be fatal. Keep a safe distance. • All components inside the SUN2000 can be maintained only by trained service personnel. • The DC input terminals and AC output terminals have high voltages. Disconnect the DC input and AC output from the SUN2000 before maintenance. • When a PV module is exposed to sunlight, it supplies DC power to the SUN2000. • The DC conductors of the PV system are not grounded and may be energized. • The DC conductors of the PV system are not grounded under normal conditions. However, the DC conductors may be intermittently grounded unexpectedly when the SUN2000 is measuring the insulation resistance at the PV side.

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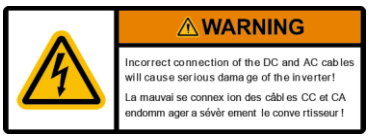
Label	Name	Meaning
	Burn warning	Do not touch a running SUN2000 because the shell is hot when the SUN2000 is running.
	Delayed discharge	• High voltage exists after the SUN2000 is powered on. Only qualified and trained electrical technicians are allowed to perform operations on the SUN2000. • Residual voltage exists after the SUN2000 is powered off. It takes 5 minutes for the SUN2000 to discharge to a safe voltage.
	Transformerless inverter	The SUN2000 output does not pass through an isolation transformer.
	Grounding	Indicates the position for connecting the protective earthing (PE) cable.
	Operation warning	High touch current, earth connection essential before connecting supply.
	Operation warning	Incorrect connection of the DC and AC cables will result in serious damage to the inverter.

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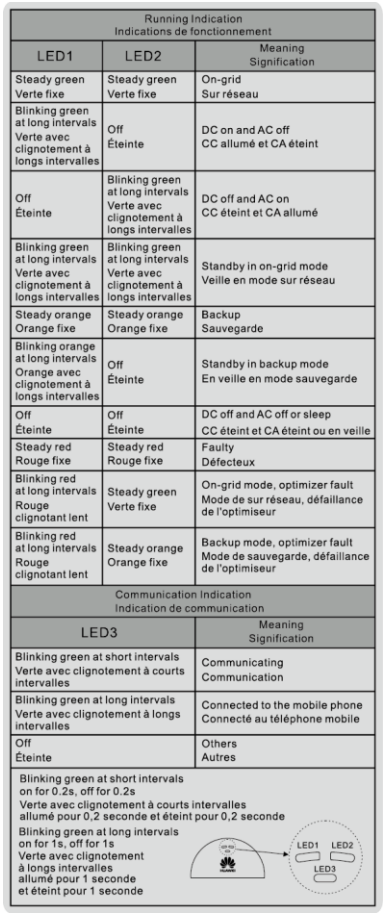
Label	Name	Meaning
	Indicator status description label	Describes the indicator status.
	SUN2000 serial number (SN) label	Indicates the SUN2000 SN.
	SUN2000 MAC address label	Indicates the MAC address.
	QR code for SUN2000 WiFi connection	Scan the QR code to connect to Huawei SUN2000 WiFi network (Android) or obtain the WiFi password (iOS).
	Weight label	The SUN2000 is heavy and needs to be carried by multiple persons.

NOTE

The labels are for reference only.

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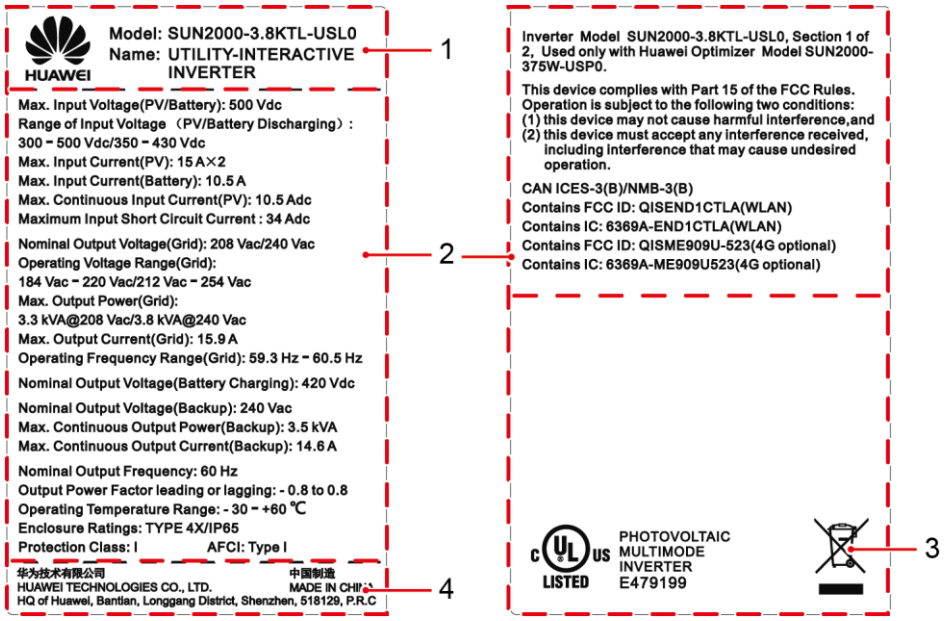
Nameplate

Figure 2-9 Nameplate of the SUN2000-3.8KTL-USL0



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

NOTE
The nameplate figure is for reference only.

Table 2-4 Compliance symbol

Symbol	Name	Meaning
	EU waste electrical and electronic equipment (WEEE) mark	Do not dispose of the product as household waste.

2.4 Working Principles

Conceptual Diagram

The SUN2000 is a single-level inverter that converts DC power into single-phase AC power through an inverter circuit. Surge protection is supported on both the DC and AC sides.

The SUN2000 uses a battery port to connect to batteries which are used to store the surplus power produced by PV strings and not required by local loads. To meet peak power

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consumption requirements and maximize benefits, the power stored in batteries can be exported to the power grid based on the load condition.

Figure 2-10 Conceptual diagram (SUN2000-3.8KT/5KTL/7.6KTL-USL0)

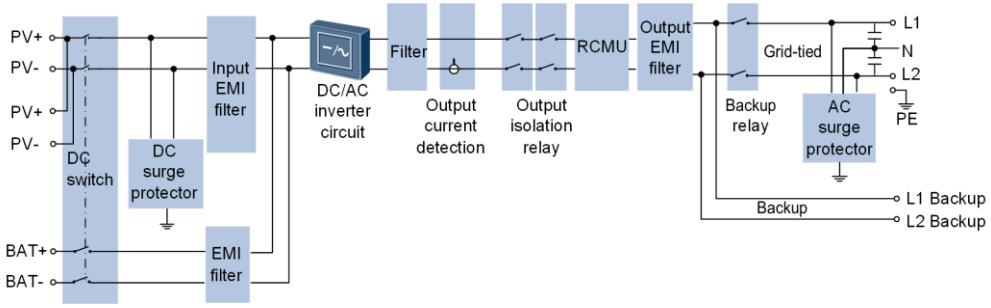
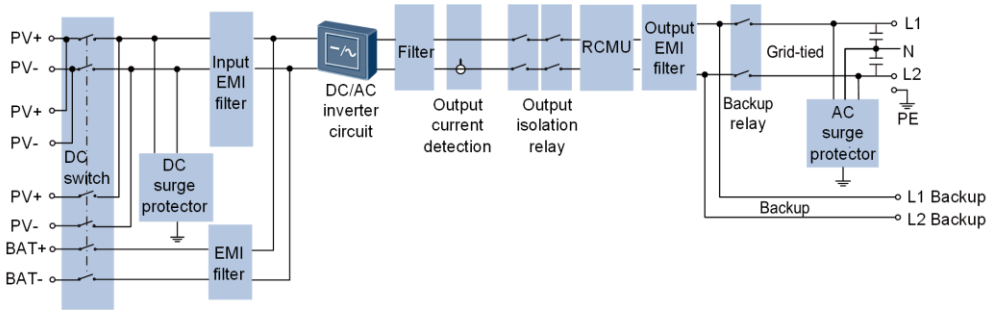


Figure 2-11 Conceptual diagram (SUN2000-9KTL/10KTL/11.4KTL-USL0)



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Working Modes

Figure 2-12 Working modes

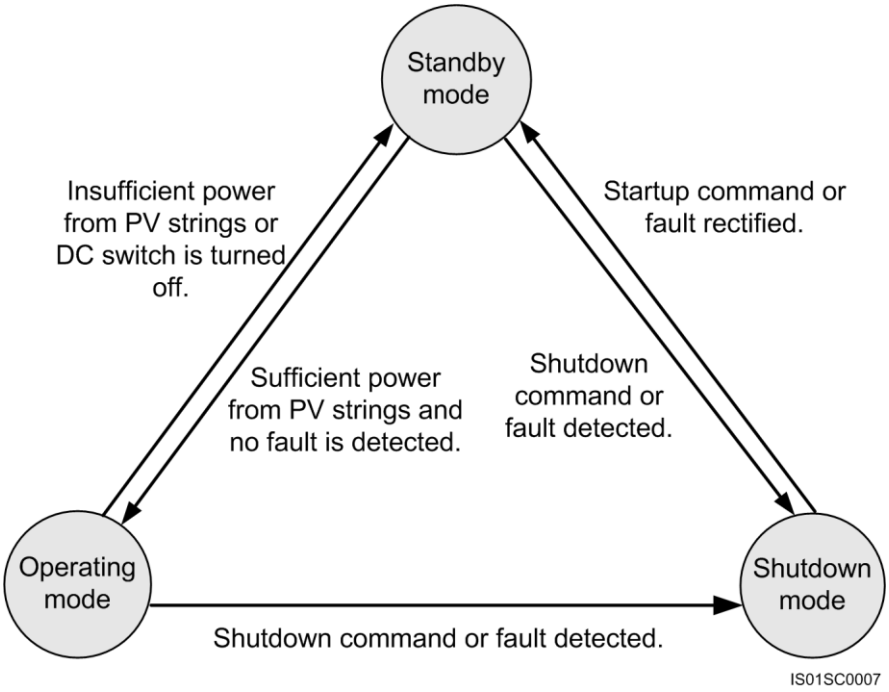

Table 2-5 Working mode description

Working Mode	Description
Standby	The SUN2000 enters Standby mode when the external environment does not meet the requirements for starting the SUN2000. In Standby mode: • The SUN2000 continuously checks its status and enters 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 controls optimizers to track the maximum power point to maximize the PV string output. • The SUN2000 enters Shutdown mode after detecting a fault or a shutdown command, and enters Standby mode after detecting that the PV string output power is not suitable for connecting to the power grid and producing power.

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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 detecting that the fault has been rectified.

NOTE

The inverter can be started only when both AC and DC voltages are available and within the normal range.The inverter cannot be started if grid outage or DC input is unavailable.

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3 Storage

The following requirements should be met when the SUN2000 needs to be stored prior to installation:

- Do not unpack the SUN2000.
- Keep the storage temperature at –30°C to +60°C and the humidity at 5%–95% RH.
- The SUN2000 should be stored in a clean and dry place and be protected from dust and water vapor corrosion.
- A maximum of 10 SUN2000s can be stacked. To avoid personal injury or device damage, stack SUN2000s with caution to prevent them from falling over.
- Regular inspection is required during the storage. Replace the packing materials when necessary.
- After long-term storage, an inspection and test are necessary before the SUN2000 is put into use. The inspection and test must be conducted by qualified personnel.

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4 System Installation

4.1 Checking Before Installation

Outer Packing Materials

Before unpacking the SUN2000, check the outer packing materials for damage, such as holes and cracks, and check the SUN2000 model. If any damage is found or the SUN2000 model is not what you requested, do not unpack the product and contact your supplier as soon as possible.

NOTICE

You are advised to remove the packing materials no more than 24 hours before installing the SUN2000.

Package Contents

After unpacking the SUN2000, check that the contents are intact and complete. If any damage is found or any component is missing, contact your supplier.

NOTE

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

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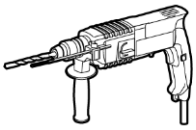
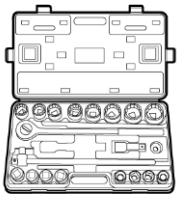
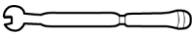
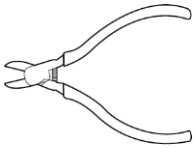
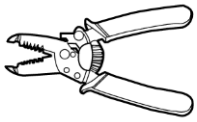
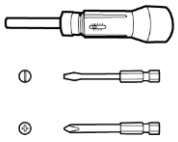
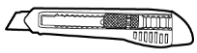
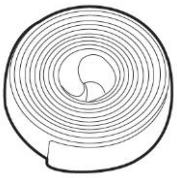
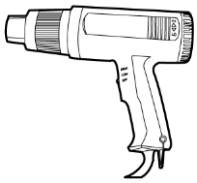
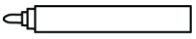
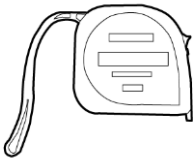
4.2 Tools and Instruments

Category	Tools and Instruments		
Installation	 Hammer drill (with a Φ10 mm drill bit)	 Torque socket wrench	 Torque wrench
	 Diagonal pliers	 Wire stripper	 Torque screwdriver
	 Rubber mallet	 Utility knife	 Cable cutter
	 Heat shrink tubing	 Heat gun	 Cable tie
	 Vacuum cleaner	 Multimeter (DC voltage measurement range ≥ 600 V DC)	 Marker
	 Measuring tape	 Level	 Stud finder

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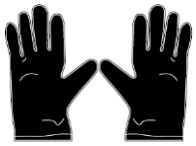
Category	Tools and Instruments		
	 Hex key (M6)	N/A	N/A
PPE	 Safety gloves	 Safety goggles	 Anti-dust respirator
	 Safety shoes	N/A	N/A

4.3 Determining the Installation Position

Basic Requirements

- The SUN2000 is protected to TYPE 4X/IP65 and can be installed indoors or outdoors.
- Do not install the SUN2000 in a place where people are likely to come into contact with its enclosure and heat sinks, because these parts are hot during operation.
- Do not install the SUN2000 in areas with flammable or explosive materials.
- Install the SUN2000 in a place out of reach of children.
- The SUN2000 is vulnerable to salt corrosion, and this may cause fire. Do not install the SUN2000 outdoors in salt areas. A salt area refers to the region within 500 meters from the coast or prone to sea breeze. The regions prone to sea breeze vary depending on weather conditions (such as typhoons and monsoons) and terrains (such as dams and hills).

Installation Environment Requirements

- The SUN2000 must be installed in a well-ventilated environment to ensure good heat dissipation.
- When the SUN2000 is installed under direct sunlight, its power may decrease due to the rise in temperature.

Mounting Structure Requirements

- The mounting structure where the SUN2000 is installed must be fireproof.

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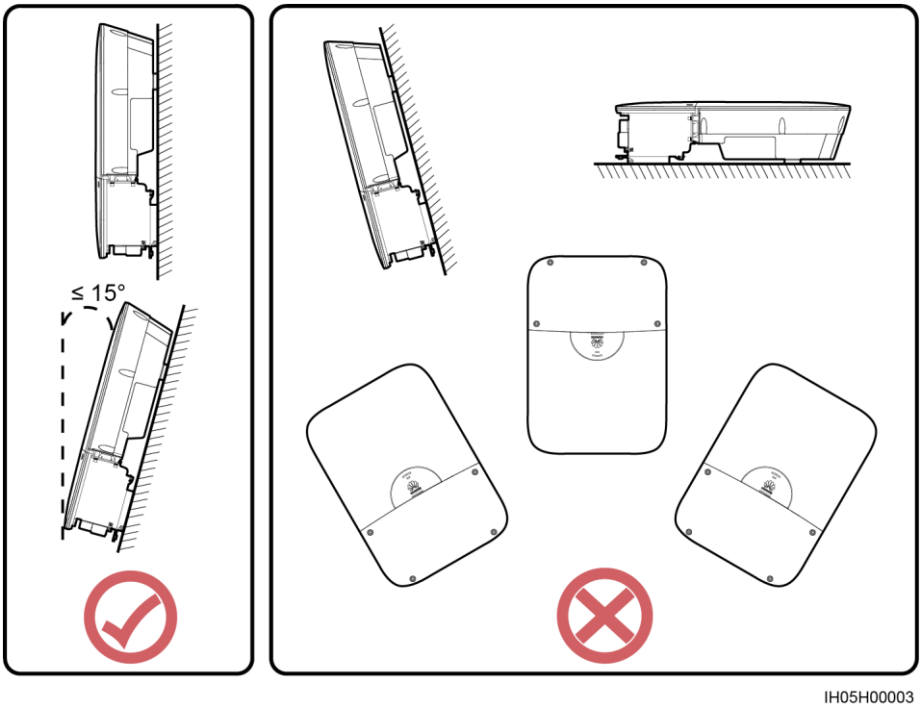
- Do not install the SUN2000 on flammable building materials.
- Ensure that the installation surface is flat and sturdy enough to bear the weight load.
- In residential areas, do not install the SUN2000 on drywalls or walls made of similar materials which have a weak sound insulation performance, as the noise generated by the SUN2000 is noticeable.

Installation Angle Requirements

The SUN2000 can be wall-mounted or support-mounted. The installation angle requirements are as follows:

- Install the SUN2000 vertically or at a maximum back tilted angle of 15 degrees to facilitate heat dissipation.
- Do not install the SUN2000 at forward tilted, excessively back tilted, side tilted, horizontal, or upside down positions.

Figure 4-1 Installation angle



Installation Space Requirements

- Reserve enough clearance around the SUN2000 to ensure sufficient space for installation and heat dissipation.

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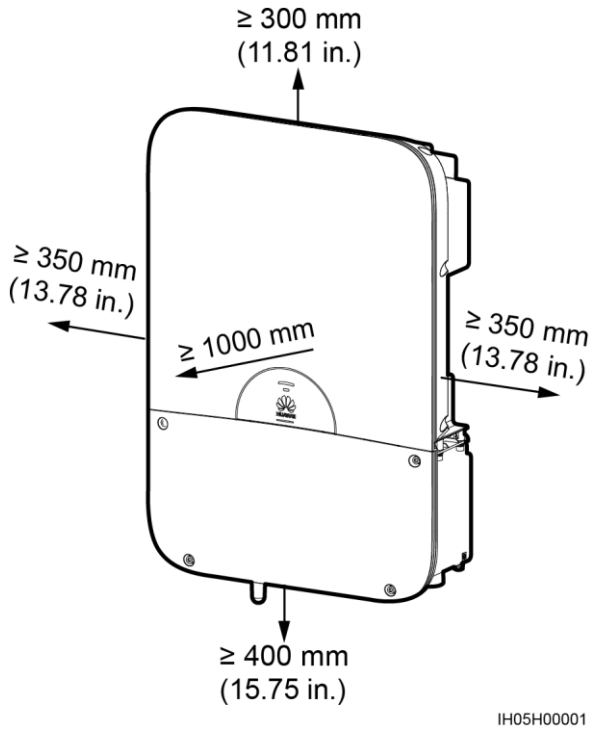
Figure 4-2 Installation space requirements



- When installing multiple SUN2000s, install them horizontally if sufficient space is available. Otherwise, install them in a staggered arrangement. Stacked installation is not recommended.

Figure 4-3 Horizontal installation (recommended)

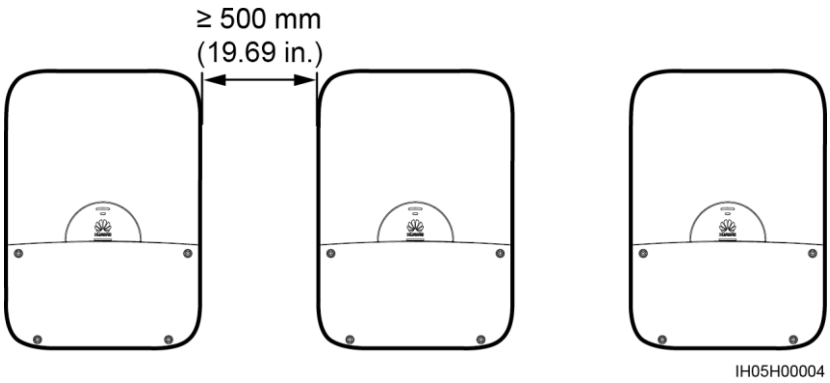


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Figure 4-4 Staggered installation (recommended)

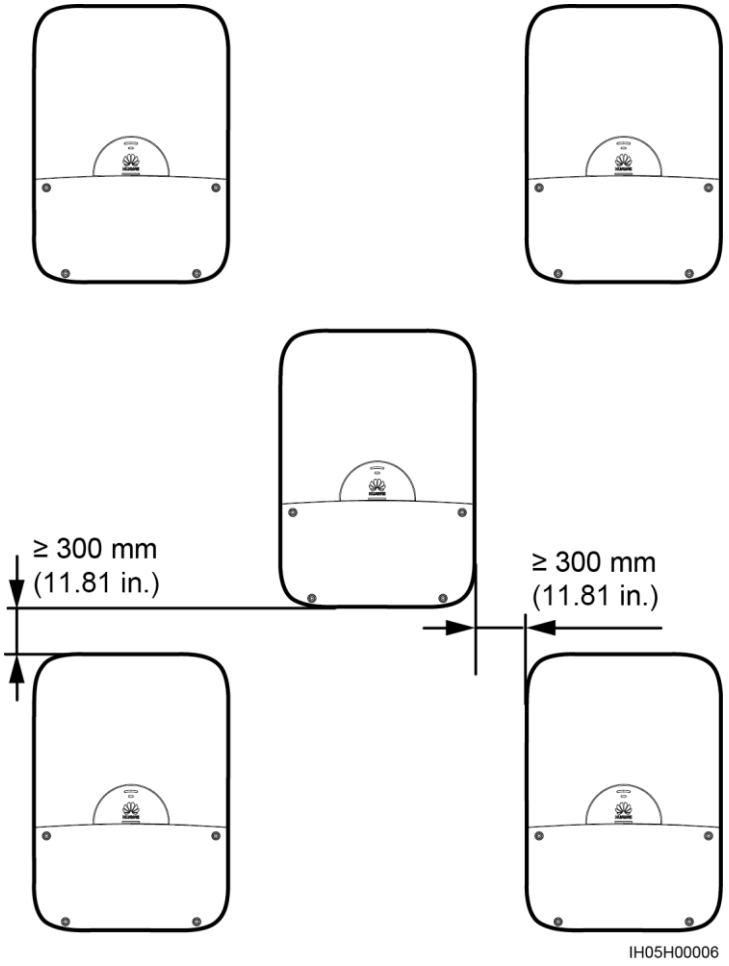

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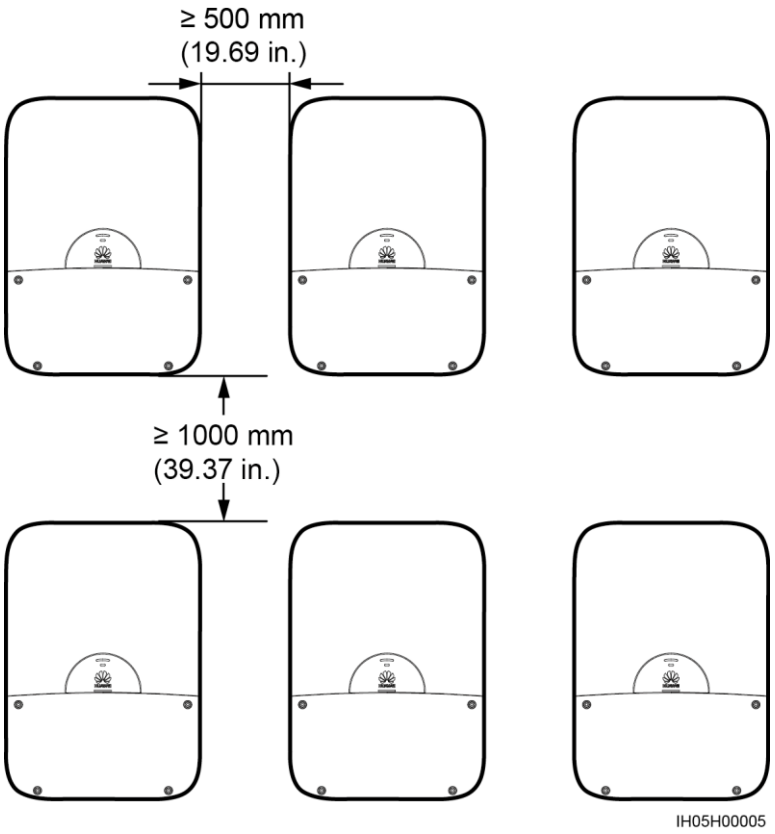
Figure 4-5 Stacked installation (not recommended)



4.4 Installing the Mounting Bracket

Figure 4-6 Mounting bracket location (SUN2000-3.8KTL/5KTL/7.6KTL-USL0)

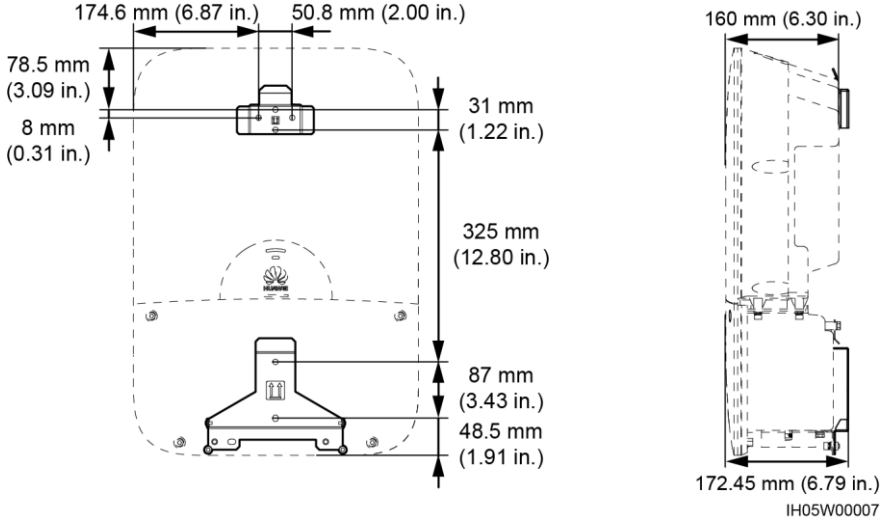


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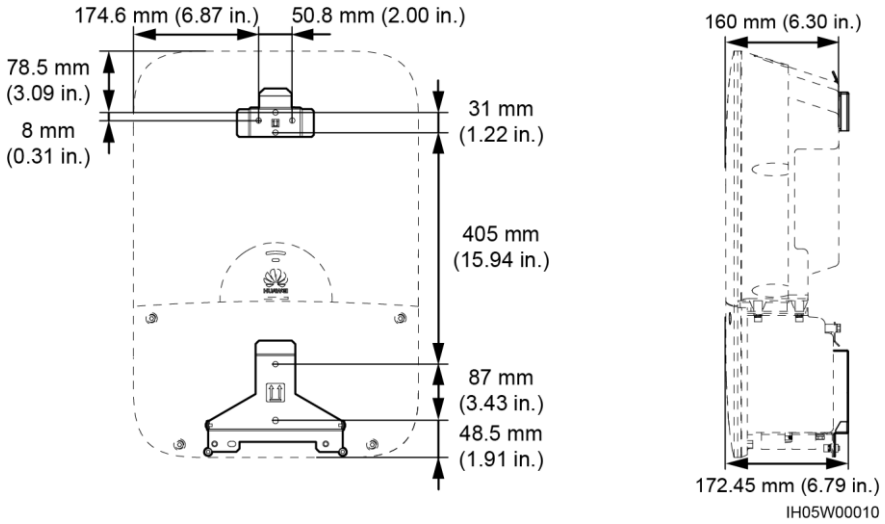
Figure 4-7 Mounting bracket location (SUN2000-9KTL/10KTL/11.4KTL-USL0)

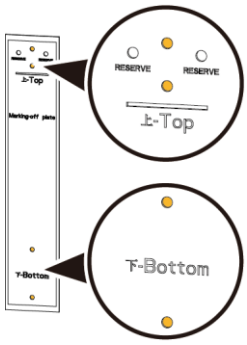
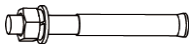
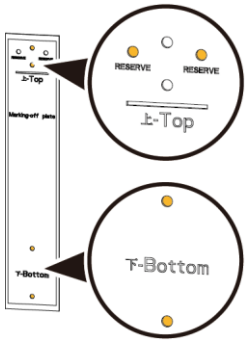
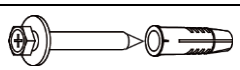


4.4.1 Wall-Mounted Installation

Prerequisites

User-supplied bolts are required for wall-mounted installation.

Table 4-1 User-supplied bolts

Load-Bearing Structure	Tightening Screw	Screw Quantity	Screw Appearance	Hole Combination in the Marking-off Template
Frame post (recommended)	M6 tapping screw	4 PCS		
Brick wall/Fiber-cement composite panel	M6 expansion bolt	4 PCS		
Plywood	M6 expansion anchor screw	4 PCS		

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NOTE

The example used in this document describes a frame post installation of the SUN2000.

Procedure

Step 1 Determine the positions for drilling holes using the marking-off template. Level the positions of mounting holes using a level, and mark the positions with a marker.

NOTE

If the wall uses a frame structure, tightening screws need to be installed at the frame post. Use a stud finder to find the frame post behind the wall panel.

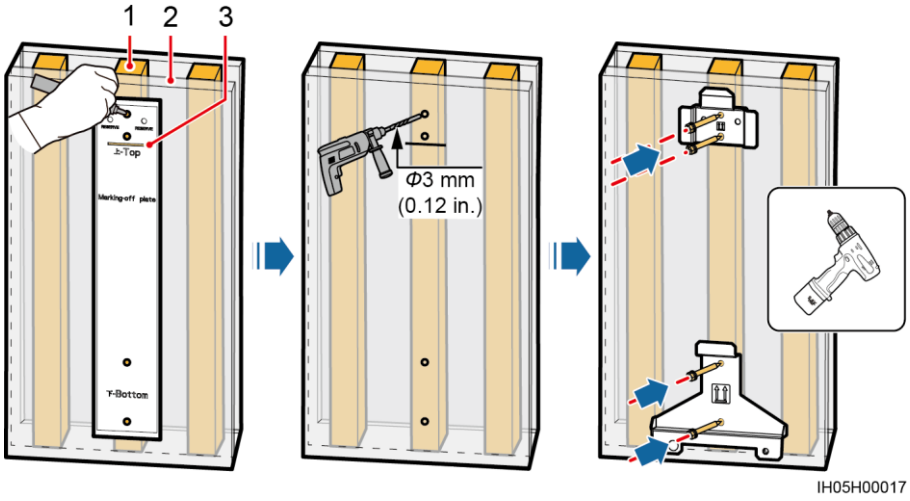
Step 2 Install tightening screws.

DANGER

Avoid drilling holes into the utility pipes and/or cables attached to the back of the wall.

Step 3 Secure the mounting bracket.

Figure 4-8 Wall-mounted installation



(1) Frame post (2) Wall panel (3) Bottom alignment line for the mounting bracket (top)

----End

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4.4.2 Support-Mounted Installation

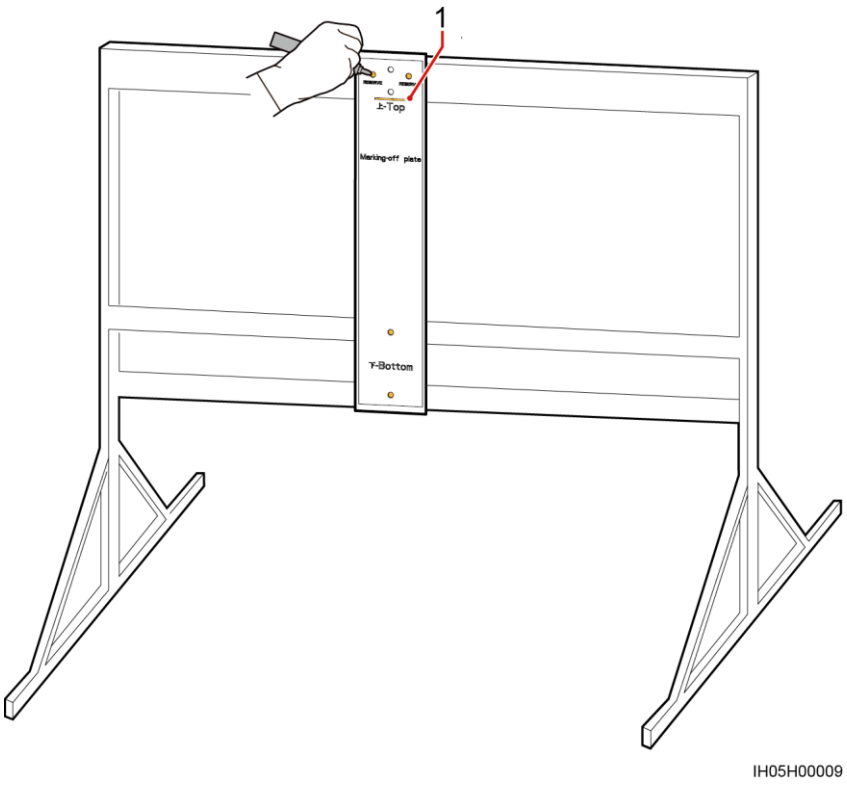
Prerequisites

Prepare M6 stainless bolt assemblies (including flat washers, spring washers, and M6 bolts) with appropriate lengths as well as matched flat washers and nuts based on the support specifications.

Procedure

Step 1 Determine the positions for drilling holes using the marking-off template. Level the positions of mounting holes using a level, and mark the positions with a marker.

Figure 4-9 Determining hole positions



(1) Bottom alignment line for the mounting bracket (top)

Step 2 Drill holes using a hammer drill.

NOTE

You are advised to apply anti-rust paint on to the hole positions for protection.

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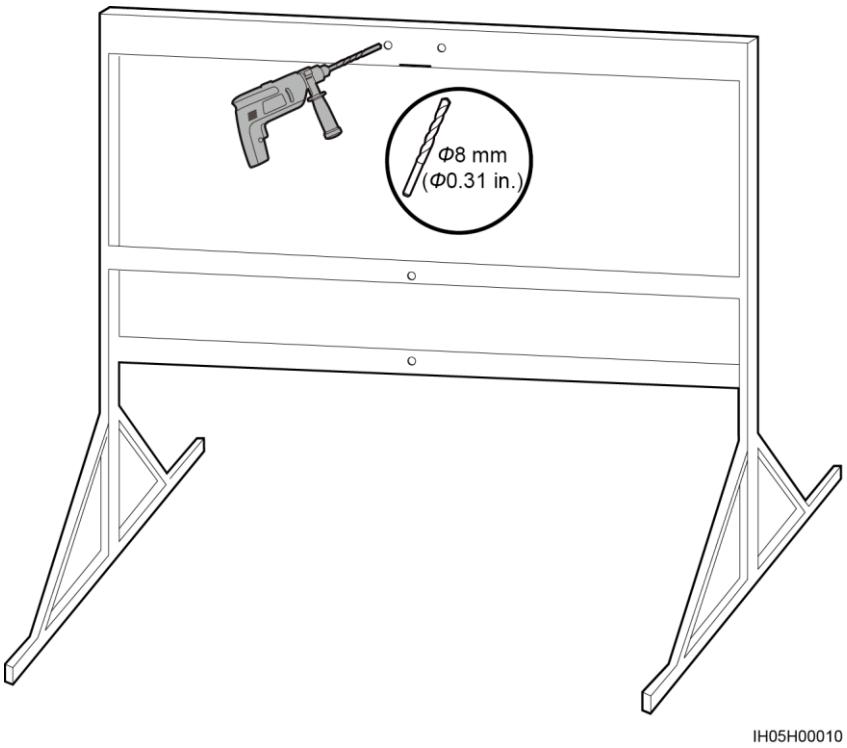
Figure 4-10 Drilling holes



Step 3 Secure the mounting bracket.

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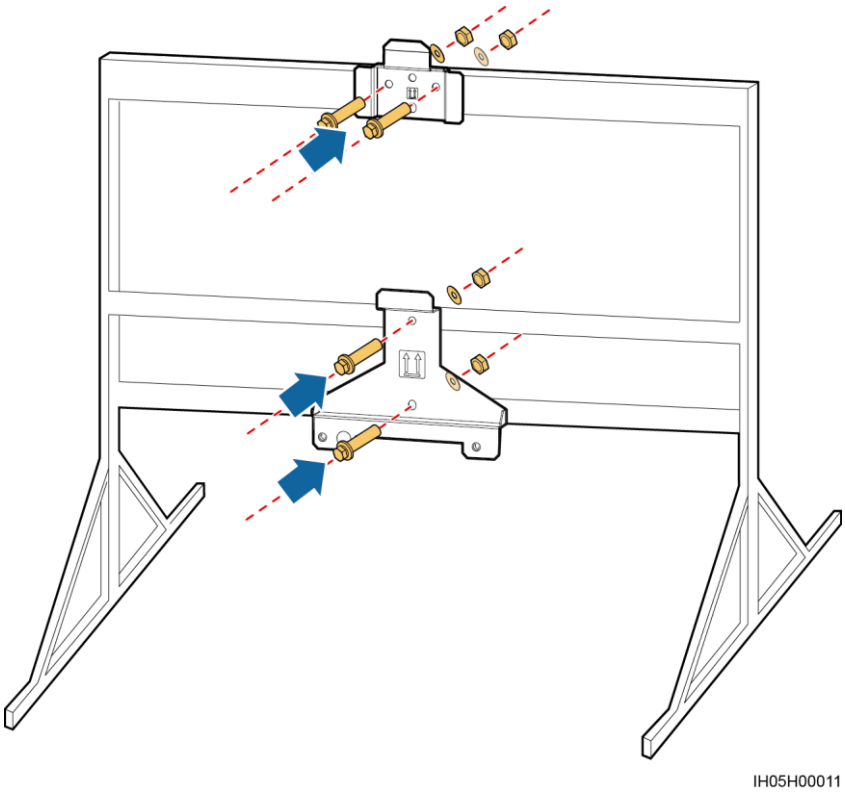
Figure 4-11 Securing a mounting bracket



----End

4.5 Installing the SUN2000

Procedure

Step 1 Hold the handles on both sides of the SUN2000, lift the SUN2000 from the packing case, and move it to the installation position.

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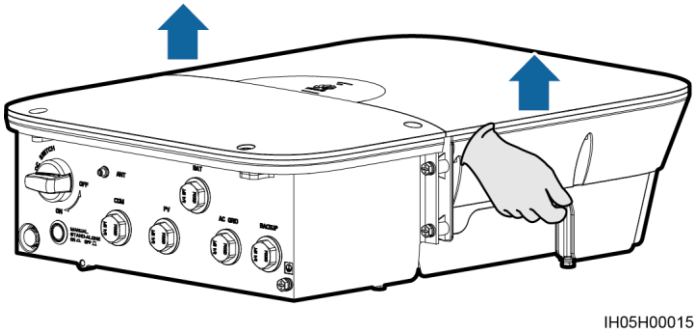
CAUTION

- To prevent personal injury and damage to the device, take care to keep your balance when moving the SUN2000.
- Do not use the wiring terminals and ports at the bottom to support any weight of the SUN2000.
- When you need to temporally place the SUN2000 on the ground, use foam, paper or other protective materials to prevent damage to its enclosure.

Figure 4-12 Moving a SUN2000



Step 2 Install the SUN2000 on the mounting bracket and tighten screw assemblies.

Step 3 (Optional) Install an anti-theft lock.

The function of an anti-theft lock is to secure the SUN2000 to the mounting bracket and protect it from thieves.

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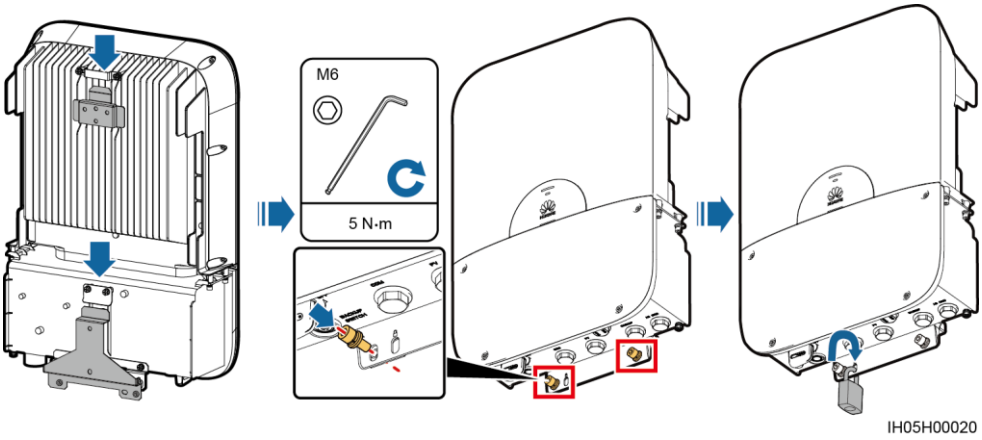
NOTICE

- Use an anti-theft lock suitable for the Φ8 mm (031 in.) lock hole diameter. The anti-theft lock is supplied by the customer.
- Keep the key to the anti-theft lock safe.

Figure 4-13 Tightening screw assemblies



----End

4.6 (Optional) Installing a SIM Card

Prerequisites

The 4G function is configured.

The 4G function requires a SIM card, size: 25 mm x 15 mm (0.98 in. x 0.59 in.). The SIM card is supplied by the customer. AT&T and T-Mobile SIM cards are both supported.

Ensure that the SIM card is activated.

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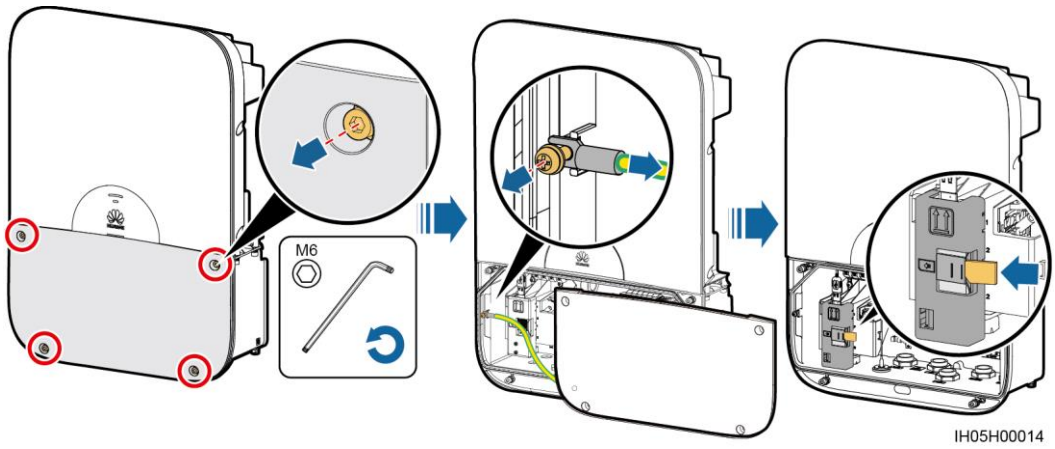
NOTICE

- Do not open the host panel of the SUN2000.
- Before opening the SUN2000 maintenance compartment door, turn off the downstream AC output switch and the bottom DC switch.
- Do not open the maintenance compartment door during rainfall or snowfall. If you must, take protective measures to prevent rain or snow from entering the maintenance compartment.
- Do not leave unused screws in the maintenance compartment.

Procedure

Step 1 Remove the cover of the maintenance compartment and install a SIM card.

Figure 4-14 Installing a SIM card



NOTE

- Install the SIM card in the direction shown on the arrow on the card slot.
- To install the SIM card, press it in place until it locks. Do not remove the 4G module when installing the SIM card.
- To remove the SIM card, push it inward and then let go to eject it.

----End

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5 Electrical Connections

Precautions

DANGER

Before connecting cables, ensure that the DC switch on the SUN2000 and all the switches connecting to the SUN2000 are OFF. Otherwise, the high voltage of the SUN2000 may result in electric shock.

WARNING

- Any equipment damage caused by incorrect cable connections is not covered by the warranty.
- Only certified electricians are allowed to connect cables.
- Operation personnel must wear proper PPE all the time when connecting cables.

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 PE).
- The DC and AC circuits are isolated from the enclosure and that system grounding, if required by Section 250 of the National Electrical Code, ANSI/NFPA 70, is the responsibility of the installer.

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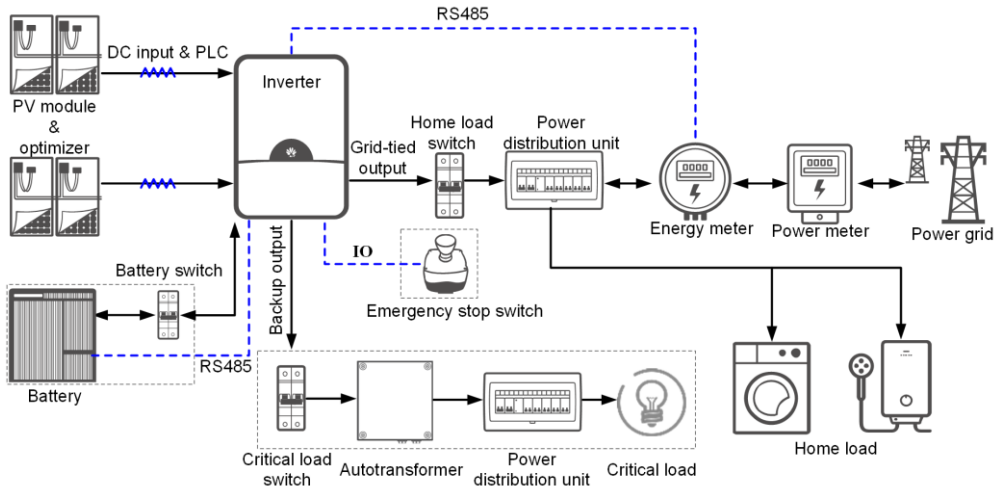
5.1 Preparing Cables

Figure 5-1 Networking application(dashed boxes indicate optional components)



NOTE

SUN2000-3.8KTL/5KTL/7.6KTL-USL0 supports two PV string inputs.
SUN2000-9KTL/10KTL/11.4KTL-USL0 supports three PV string inputs. In the example, two PV string inputs are used.

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Figure 5-2 SUN2000 cable connections (dashed boxes indicate optional components)

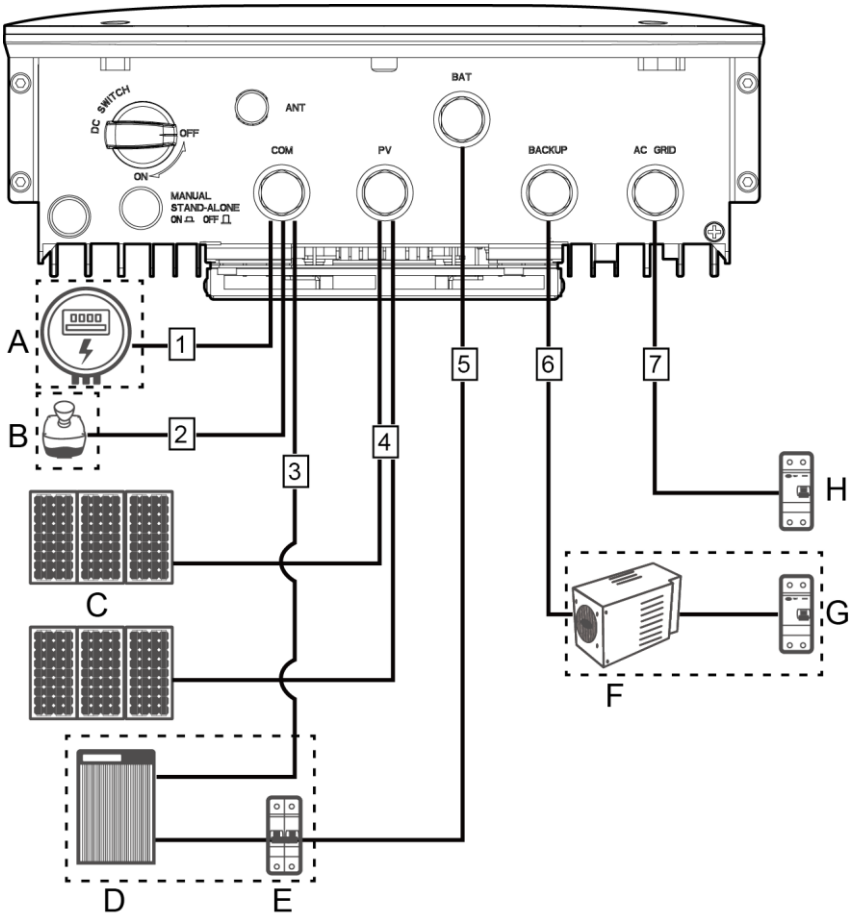

Table 5-1 Component description

No.	Component	Description	Source
A	Energy meter	The energy meter that can connect to the SUN2000 is the CCS-WNC-3D-240-MB.	Purchased by the customer
B	Emergency stop switch	Normally closed (NC) contact The UL certification is required for the emergency stop switch.	Purchased by the customer
C	PV string	• A PV string is composed of PV modules connected in series. PV modules can work with an optimizer. The recommended optimizer model is SUN2000-375W-USP0. • SUN2000-3.8KTL/5KTL/7.6KTL-USL0 supports two PV string inputs. • SUN2000-9KTL/10KTL/11.4KTL-USL0 supports three PV string inputs.	Purchased by the customer
D	Battery	The batteries that can connect to the SUN2000 are LG RESU7H(Type-R) and LG RESU10H (Type-R).	Purchased by the customer

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No.	Component	Description	Source
E	Battery switch	Recommended: a DC circuit breaker with a rated voltage greater than or equal to 600 V DC and a rated current of: • 15 A (SUN2000-3.8KTL/5KTL/7.6KTL-USL0) • 20 A (SUN2000-9KTL/10KTL/11.4KTL-USL0)	Purchased by the customer
F	Autotransformer[a]	Recommended: HW-TX-5000	Can be purchased from Huawei
G	Critical load switch	Recommended: a 2-pole AC circuit breaker with a rated voltage greater than or equal to 240 V AC and a rated current of: • 25 A (SUN2000-3.8KTL/5KTL/7.6KTL-USL0) • 30 A (SUN2000-9KTL/10KTL/11.4KTL-USL0)	Purchased by the customer
H	Home load switch	Recommended: a 2-pole AC circuit breaker with a rated voltage greater than or equal to 240 V AC and a rated current of: • 20 A (SUN2000-3.8KTL-USL0) • 25 A (SUN2000-5KTL-USL0) • 40 A (SUN2000-7.6KTL-USL0) • 50 A (SUN2000-9KTL/10KTL-USL0) • 60 A (SUN2000-11.4KTL-USL0)	Purchased by the customer
Note a: There are two ground points (power grid side and user side) for residential power distribution in the U.S. If the general loop to residence has a leakage protection device, there may be a risk of misprotection. Connecting the SUN2000 may increase the risk. It is recommended that the leakage protection device be relocated to a branch not involving the SUN2000.			

NOTICE

Compatibility with RCD and RCM

- The SUN2000 is equipped with a residual current monitoring unit (RCMU). Its external AC switch (G and F in Figure 5-2) should be a 2-pole circuit breaker or any other AC load circuit breaker to safely disconnect the SUN2000 from the power grid.
- If the external AC switch can perform earth leakage protection, the rated leakage action current should be greater than or equal to 100 mA.
- If multiple SUN2000s connect to the general residual current device (RCD) through their respective external AC switches, the rated leakage action current of the general RCD should be greater than or equal to the number of SUN2000s multiplied by 100 mA.

A knife switch cannot be used as an AC switch.

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Table 5-2 Cable description (SUN2000-3.8KTL/5KTL/7.6KTL-USL0)

No.	Cable	Type	Conductor Cross-sectional Area Range	Source
1	Energy meter signal cable	Multi-paired and individually foil shielded cable that complies with UL2919, CM/CMG (NEC type), or CMH (CSA type)	24–16 AWG	Purchased by the customer
2	Emergency stop switch signal cable			Purchased by the customer
3	Battery signal cable			Purchased by the customer
4	PV input power cable	• PV cable that meets the 600 V standard • Use cables that can withstand 90°C (194°F) or 105°C (221°F). • Single-core outdoor copper cable	10–8 AWG	Purchased by the customer
	(Optional) Ground cable at the PV side (GND)	• Use cables that can withstand 90°C (194°F) or 105°C (221°F). • Single-core outdoor copper cable	6 AWG	Purchased by the customer
5	Battery cable	• PV cable that meets the 600 V standard • Use cables that can withstand 90°C (194°F) or 105°C (221°F). • Single-core outdoor copper cable	14–8 AWG	Purchased by the customer
6	Critical load AC output power cable	• Use cables that can withstand 90°C (194°F) or 105°C (221°F). • Two single-core outdoor copper cables (L1 and L2)	12–6 AWG	Purchased by the customer

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No.	Cable	Type	Conductor Cross-sectional Area Range	Source
7	Home load AC output power cable	• Use cables that can withstand 90°C (194°F) or 105°C (221°F). • If the output mode is set to single-phase three-wire, use four single-core outdoor copper cables (L1, N, L2, PE). • If the output mode is set to single-phase two-wire, use three single-core outdoor copper cables (L1, L2, PE).	• L1, N, L2: – 12–6 AWG (SUN2000-3.8KTL-USL0) – 10–6 AWG (SUN2000-5KTL-USL0) – 6 AWG (SUN2000-7.6KTL-USL0) • PE: 6 AWG	Purchased by the customer

Table 5-3 Cable description (SUN2000-9KTL/10KTL/11.4KTL-USL0)

No.	Cable	Type	Conductor Cross-sectional Area Range	Source
1	Energy meter signal cable	Multi-paired and individually foil shielded cable that complies with UL2919, CM/CMG (NEC type), or CMH (CSA type)	24–16 AWG	Purchased by the customer
2	Emergency stop switch signal cable			Purchased by the customer
3	Battery signal cable			Purchased by the customer
4	PV input power cable	• PV cable that meets the 600 V standard • Use cables that can withstand 90°C (194°F) or 105°C (221°F). • Single-core outdoor copper cable	10–8 AWG	Purchased by the customer
	(Optional) Ground cable at the PV side (GND)	• Use cables that can withstand 90°C (194°F) or 105°C (221°F). • Single-core outdoor copper cable	6 AWG	Purchased by the customer
5	Battery cable	• PV cable that meets the 600 V standard • Use cables that can withstand 90°C (194°F) or 105°C (221°F).	12–8 AWG	Purchased by the customer

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No.	Cable	Type	Conductor Cross-sectional Area Range	Source
		• Single-core outdoor copper cable		
6	Critical load AC output power cable	• Use cables that can withstand 90°C (194°F) or 105°C (221°F). • Two single-core outdoor copper cables (L1 and L2)	10–4 AWG	Purchased by the customer
7	Home load AC output power cable	• Use cables that can withstand 90°C (194°F) or 105°C (221°F). • If the output mode is set to single-phase three-wire, use four single-core outdoor copper cables (L1, N, L2, PE). • If the output mode is set to single-phase two-wire, use three single-core outdoor copper cables (L1, L2, PE).	• L1, N, L2: – 6–4 AWG (SUN2000-9KTL/10KTL-USL0) – 4 AWG (SUN2000-11.4KTL-USL0) • PE: 6 AWG	Purchased by the customer

5.2 Installing the Pipe Fittings

Context

The pipe specifications should comply with the waterproofing bolt specifications.

The following figure shows the diameters of the cable holes with waterproofing bolts removed.

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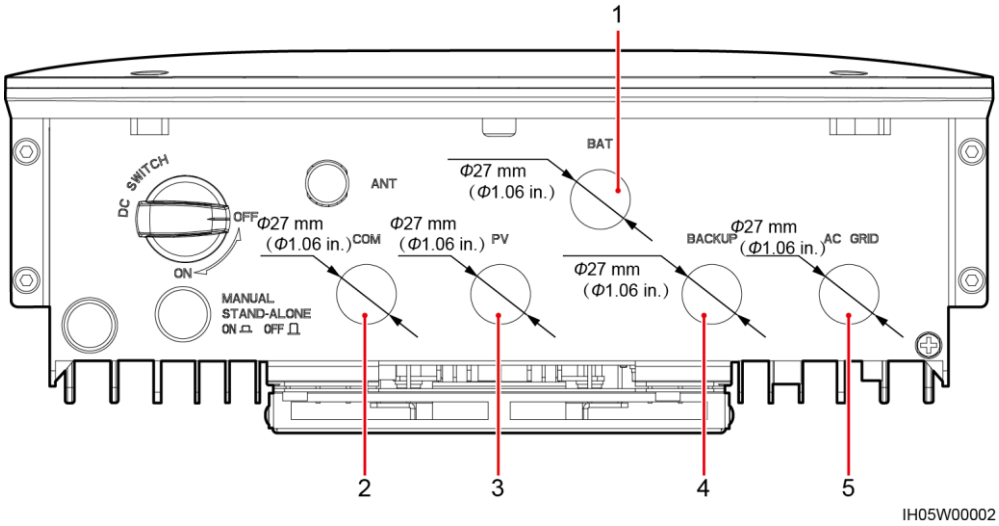
Figure 5-3 Cable hole diameters (SUN2000-3.8KTL/5KTL/7.6KTL-USL0)



(1) Battery cable hole (BAT)

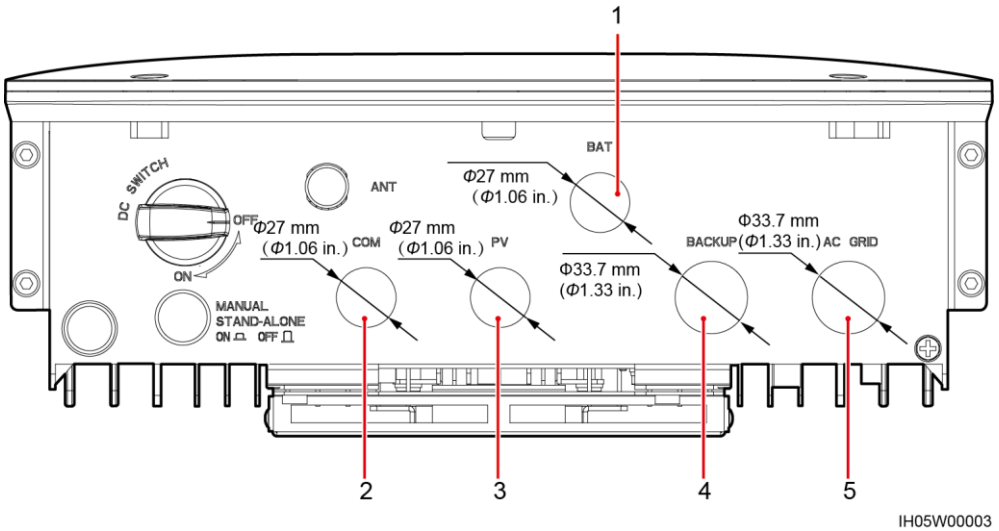
(2) Signal cable hole (COM)

(3) DC cable hole (PV)

(4) Critical load cable hole (BACKUP)

(5) Home load cable hole (AC GRID)

Figure 5-4 Cable hole diameters (SUN2000-9KTL/10KTL/11.4KTL-USL0)



(1) Battery cable hole (BAT)

(2) Signal cable hole (COM)

(3) DC cable hole (PV)

(4) Critical load cable hole (BACKUP)

(5) Home load cable hole (AC GRID)

The following figure shows a pipe for routing cables.

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Figure 5-5 Pipe for routing cables

(1) Nut (2) Fitting (3) Conduit

NOTE

The pictured pipe is for reference only. The actual pipe may differ.

Procedure

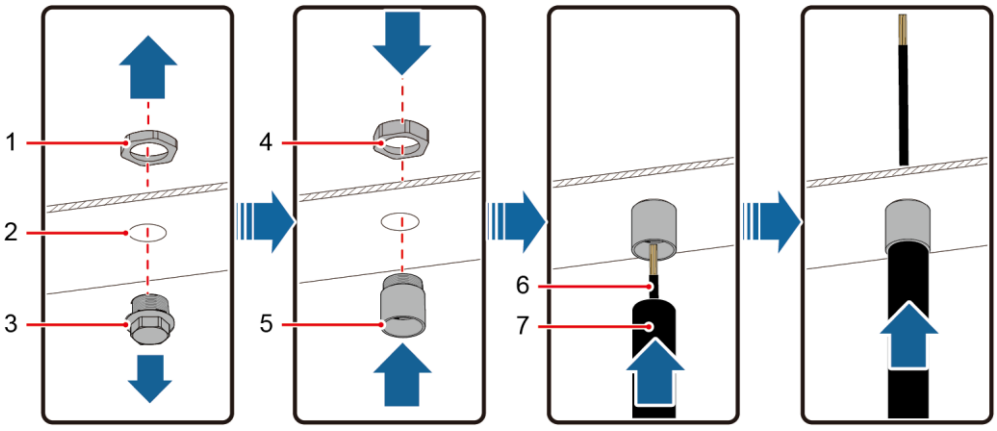
Step 1 Remove the locking nut and waterproofing bolt.

Step 2 Secure the pipe fitting to the enclosure using the nut provided with the pipe.

Step 3 Route cables through the conduit and then secure the conduit to the pipe fitting.

Step 4 Check that the cables are connected correctly and securely. Then take appropriate measures to ensure that the pipe conduit and fitting are secured reliably, and seal the cable holes.

Figure 5-6 Installing a pipe for routing cables



(1) Locking nut (2) Cable hole at the bottom of the SUN2000 (3) Waterproofing bolt

(4) Pipe nut (5) Pipe fitting (6) Cable

(7) Conduit

----End

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5.3 Electrical Connections

5.3.1 Connecting the AC Output Power Cable

Connecting the AC Output Power Cable for Home Load

An AC switch must be installed on the AC side of the SUN2000 to ensure that the SUN2000 can be safely disconnected from the power grid.

WARNING

Do not connect loads between the SUN2000 and the AC switch.

Step 1 Install the pipe fittings. For details, see 5.2 Installing the Pipe Fittings.

Step 2 Route the AC output power cable through the conduit and then the fitting of the pipe.

Step 3 Connect the AC output power cable to the terminal block.

Step 4 Secure the fitting to the conduit.

Step 5 Check that the cables are connected correctly and securely. Then take appropriate measures to ensure that the pipe conduit and fittings are secured reliably, and seal the cable holes.

Step 6 Keep the maintenance compartment clean.

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NOTICE

- Ensure that AC terminations are secured. Failure to do so may cause the SUN2000 to malfunction or cause damage to its terminal block due to issues such as overheating. Any such damage is not covered by the warranty.
- The cable colors shown in following figures are for reference only. Select an appropriate cable according to local standards.
- In the following figure, 1.0 mm x 5.5 mm (0.04 in. x 0.22 in.) is the thickness and width of the screwdriver blade.

Figure 5-7 SUN2000-3.8KTL/5KTL/7.6KTL-USL0 (L1/L2/N)

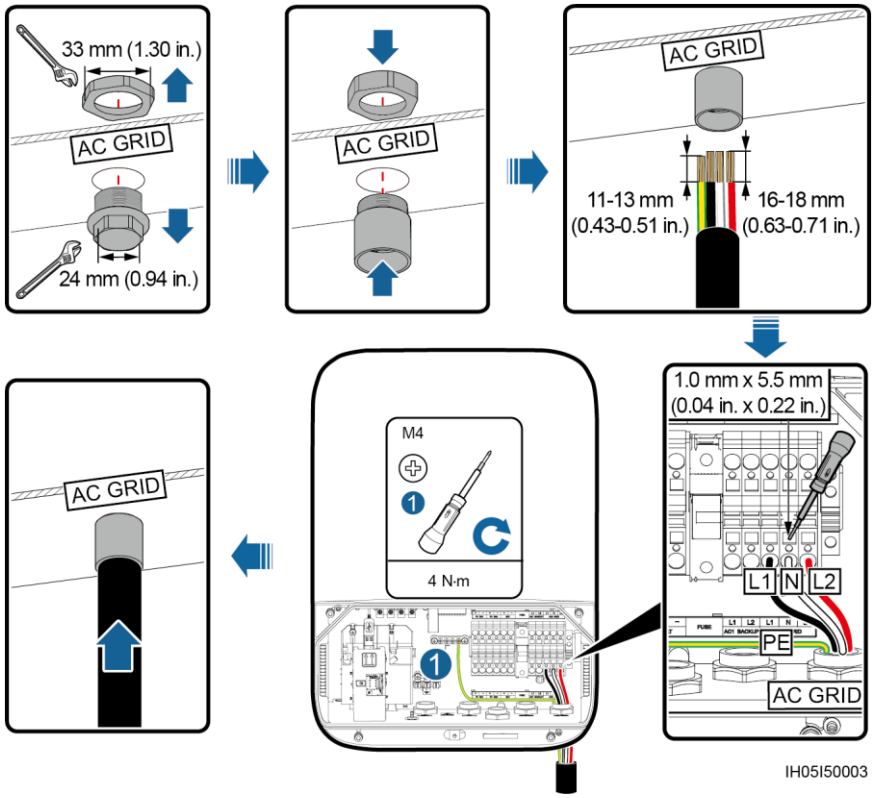

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Figure 5-8 SUN2000-3.8KTL/5KTL/7.6KTL-USL0 (L1/L2)

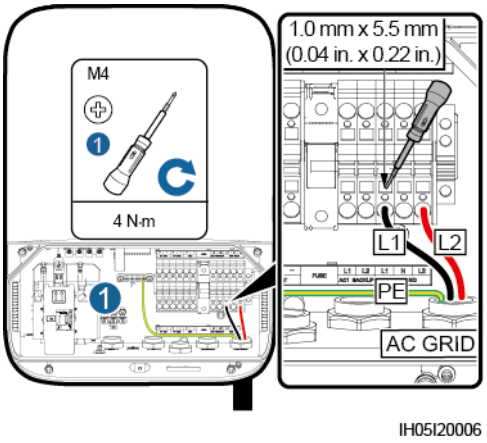

Figure 5-9 SUN2000-9KTL/10KTL/11.4KTL-USL0 (L1/L2/N)

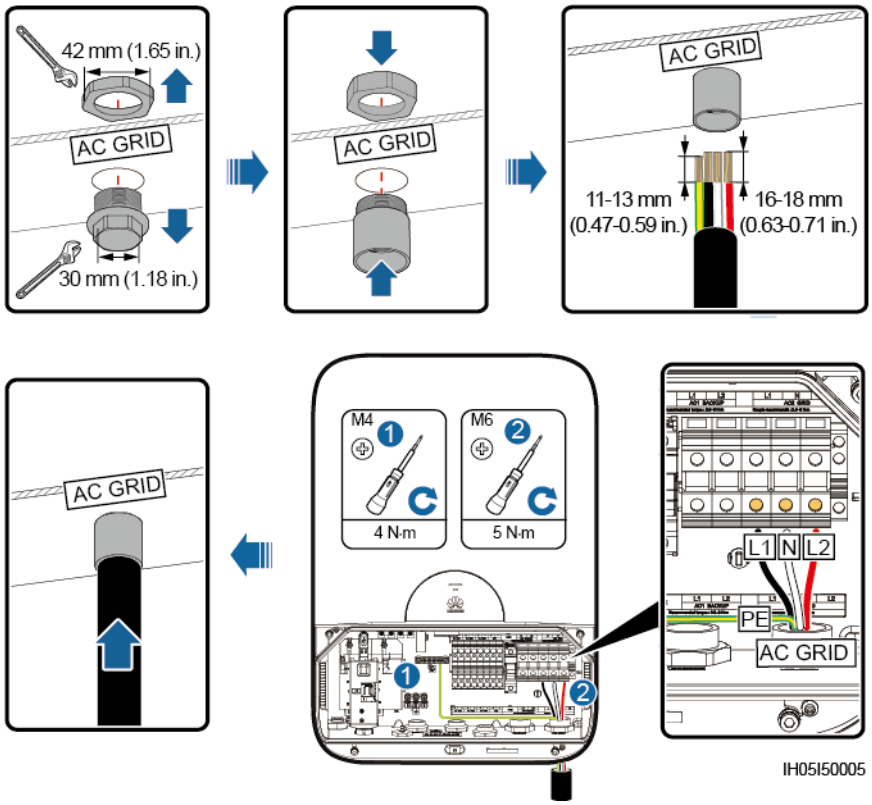

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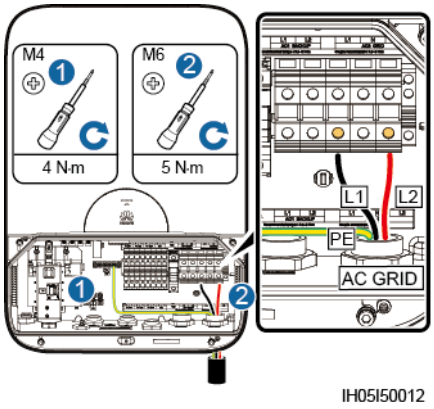
Figure 5-10 SUN2000-9KTL/10KTL/11.4KTL-USL0 (L1/L2)



----End

Connecting the AC Output Power Cable for Critical Load

Step 1 Install the pipe fittings. For details, see 5.2 Installing the Pipe Fittings.

Step 2 Route the AC output power cable through the conduit and then the fitting of the pipe.

Step 3 Connect the AC output power cable to the terminal block.

Step 4 Secure the fitting to the conduit.

Step 5 Check that the cables are connected correctly and securely. Then take appropriate measures to ensure that the pipe conduit and fitting are secured reliably, and seal the cable holes.

Step 6 Keep the maintenance compartment clean.

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NOTICE

- Ensure that AC terminations are secured. Failure to do so may cause the SUN2000 to malfunction or cause damage to its terminal block due to issues such as overheating. Any such damage is not covered by the warranty.
- The cable colors shown in the following figures are for reference only. Select an appropriate cable according to local standards.

Figure 5-11 SUN2000-3.8KTL/5KTL/7.6KTL-USL0

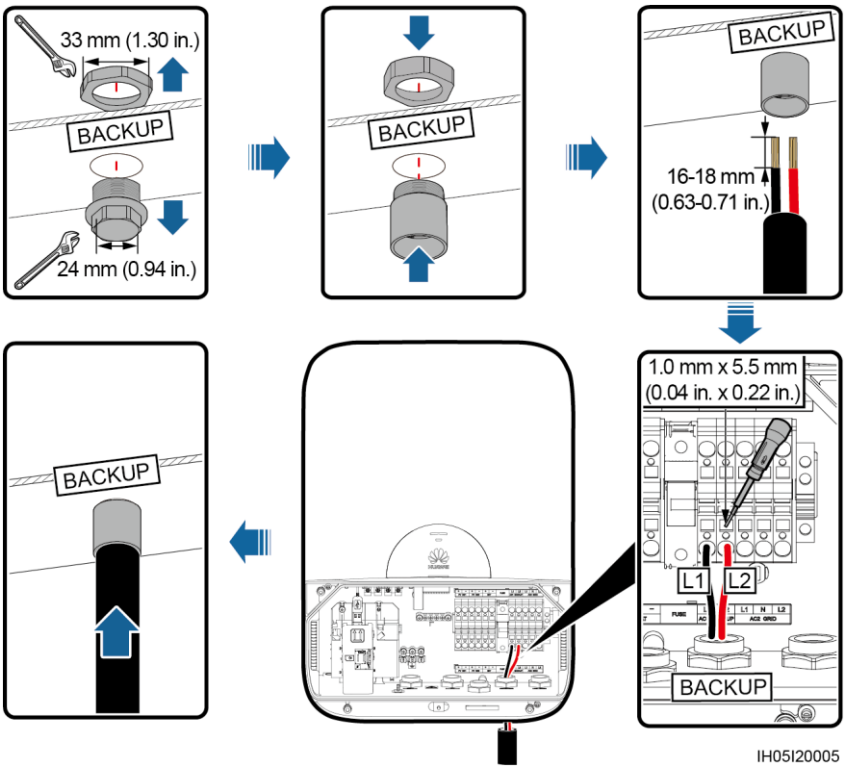

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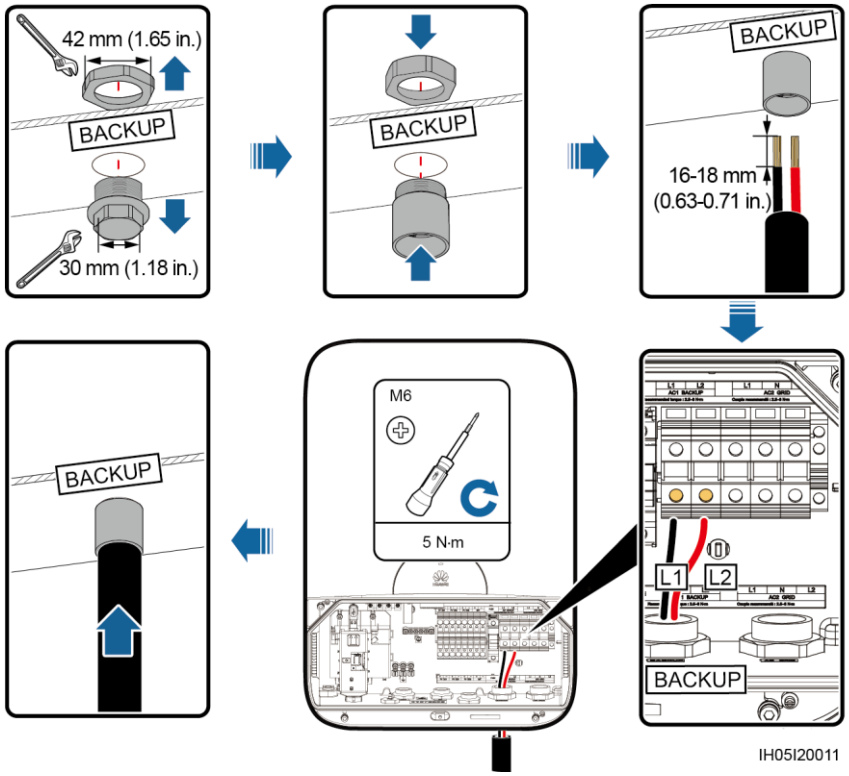
Figure 5-12 SUN2000-9KTL/10KTL/11.4KTL-USL0



----End

5.3.2 Connecting the PV Input Power Cable

Prerequisites

DANGER

- The output wiring terminals of PV modules or connected optimizers may have hazardous voltages. Touching the terminals may cause electric shock. Before connecting PV input power cables, ensure that the DC SWITCH of the SUN2000 is OFF and that the DC input terminals of the SUN2000 have no voltage.
- When the SUN2000 is running, operations on the PV input power cable, such as connecting or disconnecting a PV string or a PV module in a PV string, are not permitted, due to the risk of electric shock.
- If no PV string is connected to a DC input terminal of the SUN2000, do not remove the waterproofing bolt from the DC input terminal. Otherwise, the IP rating of the SUN2000 will be affected.

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WARNING

The SUN2000 could be damaged, or even become a fire hazard, if the following conditions are not met:

- The positive and negative cables of PV strings are connected to the PV positive (+) and negative (–) terminals respectively.
- The ground cable at the PV side (GND) is connected to the ground point on the PV module support, ensuring reliable connection between the PV module frame and the SUN2000 ground point.
- The PV terminal of the inverter supports only the optimizer input and cannot be connected to other power supplies.

NOTICE

- Since the output of the PV string connected to the SUN2000 cannot be grounded, ensure that the PV module output is well insulated to ground.
- During the installation of PV strings and SUN2000, the positive or negative terminals of PV strings may be grounded if power cables are not properly installed or routed. In this case, an AC or DC short circuit may occur and damage the SUN2000. Any such damage is not covered by the warranty.

Procedure

Step 1 Install the pipe fittings. For details, see 5.2 Installing the Pipe Fittings.

Step 2 Route the PV input power cable through the conduit and then fitting of the pipe.

WARNING

Before performing Step 2, ensure that the DC switch is OFF.

Step 3 Connect the PV input power cable to the terminal block.

Step 4 Secure the fitting to the conduit.

Step 5 Check that the cables are connected correctly and securely. Then take appropriate measures to ensure that the pipe conduit and fittings are secured reliably, and seal the cable holes.

Step 6 Keep the maintenance compartment clean.

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Figure 5-13 Connecting the PV input power cable (SUN2000-3.8KTL/5KTL/7.6KTL-USL0)

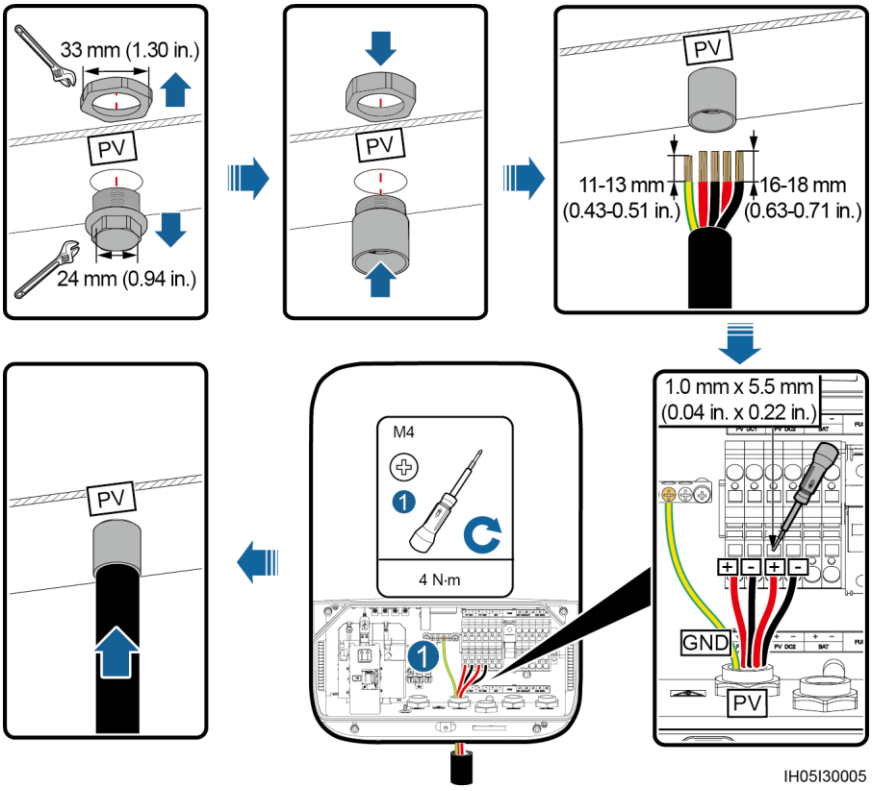
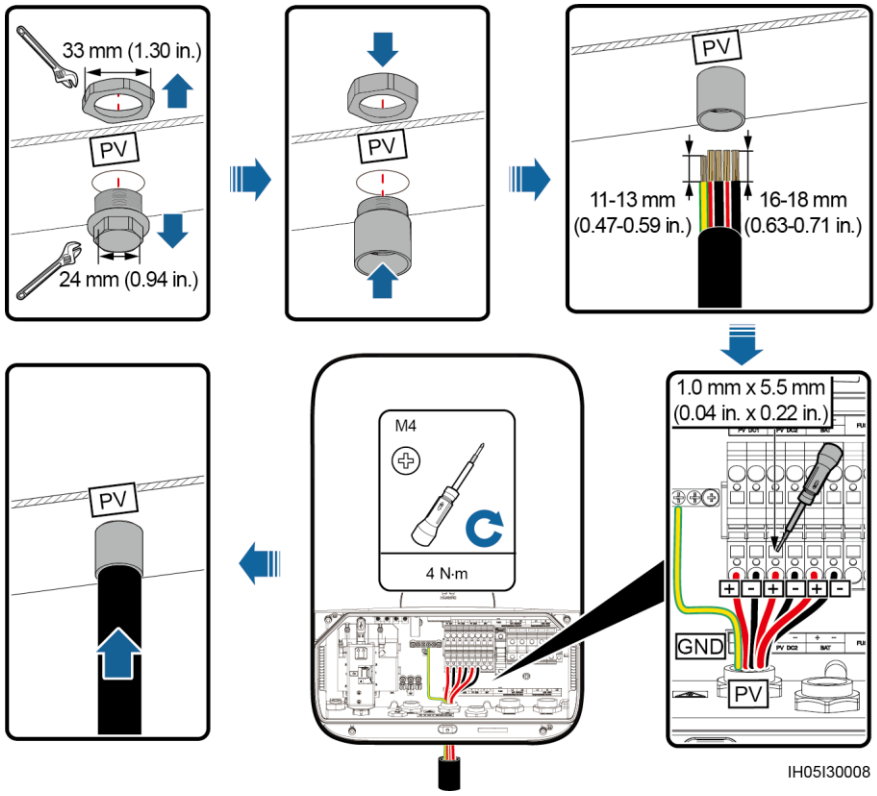


Figure 5-14 Connecting the PV input power cable (SUN2000-9KTL/10KTL/11.4KTL-USL0)



----End

5.3.3 Connecting the Battery Cable

Prerequisites

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DANGER

- Battery short circuits may cause personal injury. The high transient current generated by a short circuit will release a surge of energy and may even cause fire.
- To prevent the risk of electric shock, do not connect or disconnect battery cables when the SUN2000 is running.
- Before connecting battery cables, ensure that the DC switch on the SUN2000 and all the switches connecting to the SUN2000 are in the OFF position, and the SUN2000 contains no residual electricity. Otherwise, the high voltage of the SUN2000 and battery may result in electric shock.
- If no battery is connected to the SUN2000, do not remove the waterproofing bolt from the battery terminal. Otherwise, the IP rating of the SUN2000 will be affected. If a battery is connected to the SUN2000, set aside the waterproofing bolt. Reinstall the waterproofing bolt immediately after removing the connector. Otherwise, the high voltage of the battery terminal may result in electric shock.

A battery switch can be configured between the SUN2000 and the battery to ensure that the SUN2000 can be safely disconnected from the battery.

WARNING

Do not connect loads between the SUN2000 and the battery.

The SUN2000 could be damaged, or even become a fire hazard, if the following conditions are not met:

- Overcurrent protection for the battery input circuit is to be provided by the customer.
- The battery open-circuit voltage is always lower than or equal to 500 V DC.
- The battery cable is connected correctly. That is, the positive and negative terminals of the battery connect to the positive battery terminal and negative battery terminal on the SUN2000 respectively.

NOTICE

- During the installation of the SUN2000 and battery, the positive or negative terminal of the battery will be short-circuited to ground if power cables are not installed or routed as required. In this case, an AC or DC short circuit may occur and damage the SUN2000. Such damage is not covered by the warranty.
- The cabling distance between the battery and the SUN2000 should be less than or equal to 10 meters, ideally less than 5 meters.

Procedure

Step 1 Install the pipe fittings. For details, see 5.2 Installing the Pipe Fittings.

Step 2 Route the battery cable through the conduit and then the fitting of the pipe.

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Step 3 Connect the battery cable to the terminal block.

Step 4 Secure the fitting to the conduit.

Step 5 Check that the cables are connected correctly and securely. Then take appropriate measures to ensure that the pipe conduit and fittings are secured reliably, and seal the cable holes.

Step 6 Keep the maintenance compartment clean.

DANGER

- Exposure to battery voltage can result in serious injury. Use dedicated insulation tools to connect cables.
- Ensure that cables are correctly connected between the terminals on the battery and the battery switch, and between the battery switch and the battery terminal on the SUN2000.

NOTICE

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

Figure 5-15 Connecting the battery cable (SUN2000-3.8KTL/5KTL/7.6KTL-USL0)

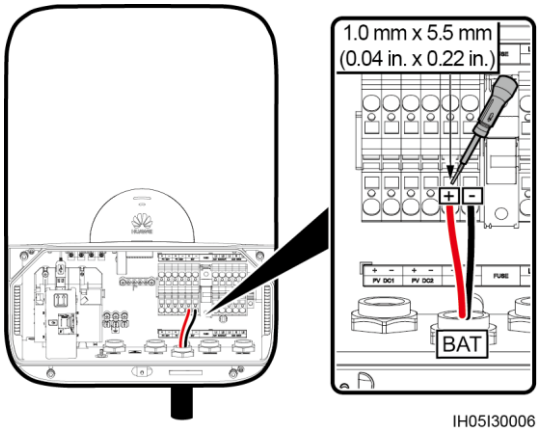

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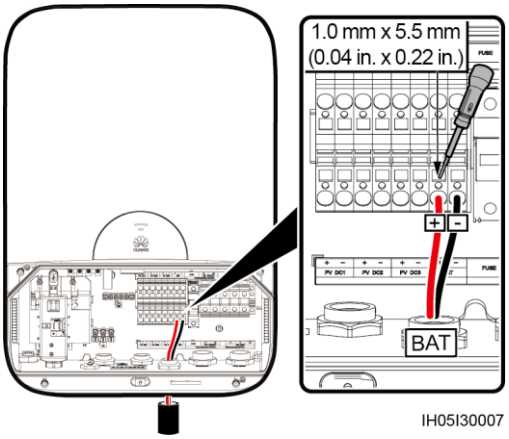
Figure 5-16 Connecting the battery cable (SUN2000-9KTL/10KTL/11.4KTL-USL0)



----End

5.3.4 Connecting the Signal Cables

Context

NOTICE

When laying out signal cables, separate them from power cables to minimize signal interference.

Figure 5-17 COM port

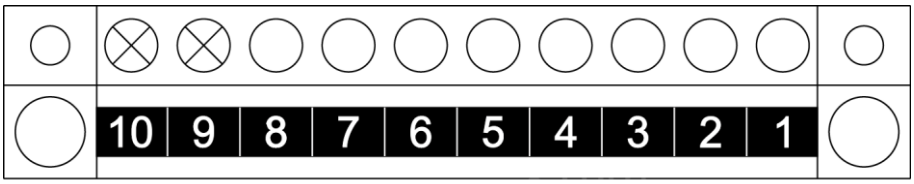


Table 5-4 COM port definitions

No.	Device	Label	Definition	Description
1	EMERGENCY STOP switch	RSS+	EMERGENCY STOP switch signal input	Can connect to the signal port (NC) on the emergency stop switch.
2		RSS–		
3	Battery	EN+	Enable signal+	Can connect to the RS485 or enable signal
4		EN–	Enable signal–	

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No.	Device	Label	Definition	Description
5		RS485A2	RS485A, RS485 differential signal+	port on the battery.
6		RS485B2	RS485B, RS485 differential signal–	
7	Energy meter	RS485A1	RS485A, RS485 differential signal+	Reserved, Can connect to the RS485 signal port on the energy meter.
8		RS485B1	RS485B, RS485 differential signal–	
9	N/A	N/A	N/A	N/A
10	N/A	N/A	N/A	N/A

Procedure

Step 1 Install the pipe fittings. For details, see 5.2 Installing the Pipe Fittings.

Step 2 Route the signal cable through the conduit and then the fitting of the pipe.

Step 3 Connect the signal cable to the corresponding terminal block and clamp the shield layer of the cable into the ground point.

Step 4 Secure the fitting to the conduit.

Step 5 Check that the cables are connected correctly and securely. Then take appropriate measures to ensure that the pipe conduit and fittings are secured reliably, and seal the cable holes.

Step 6 Keep the maintenance compartment clean.

NOTE
The signal cable terminal block is provided with the SUN2000.

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Figure 5-18 Connecting the signal cables (SUN2000-3.8KTL/5KTL/7.6KTL-USL0)

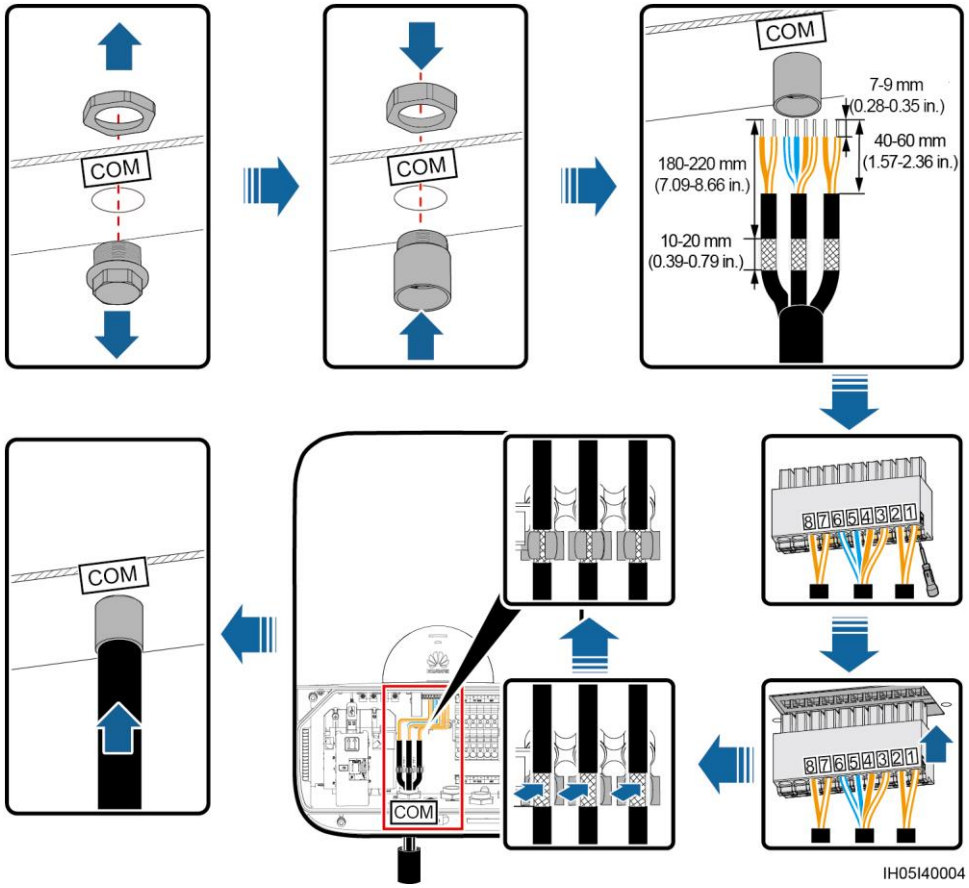

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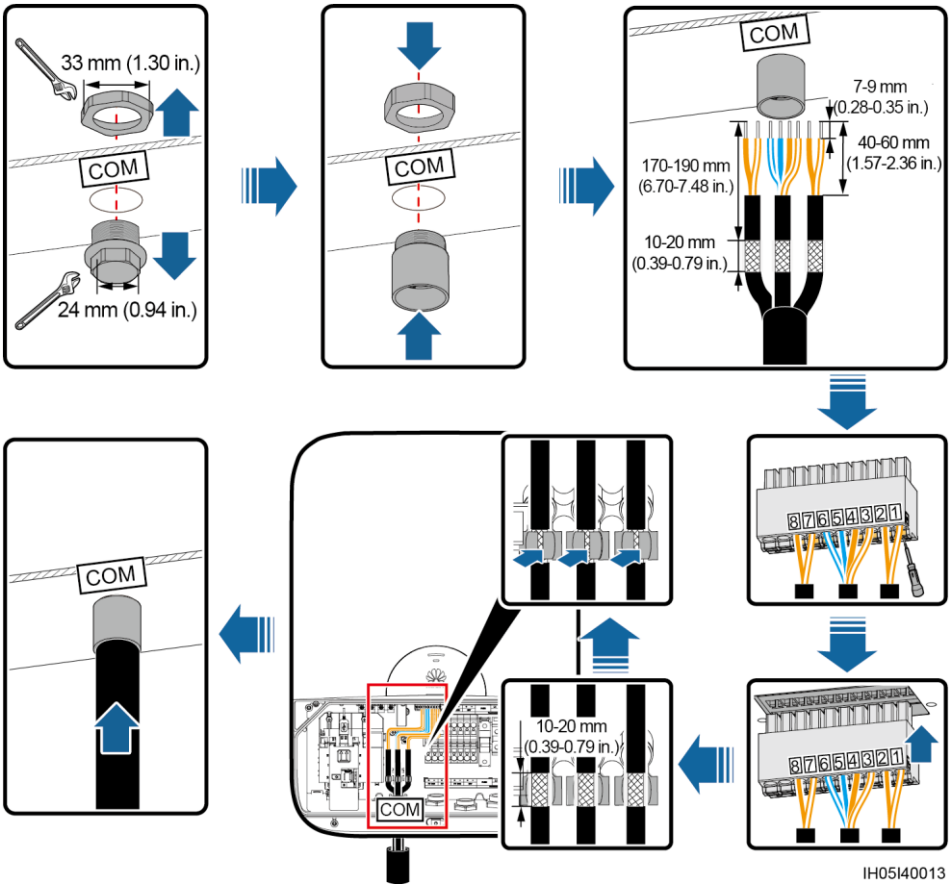
Figure 5-19 Connecting the signal cables (SUN2000-9KTL/10KTL/11.4KTL-USL0)



----End

5.3.5 (Optional) Installing an Antenna

Prerequisites

An antenna is configured.

NOTE

- 4G and WLAN antennas can be installed in the same way. The following describes the installation of a 4G antenna.
- Ensure that the pad for the antenna is installed correctly.

Procedure

Step 1 Remove the watertight cap from the ANT port.

Step 2 Install the pad.

Step 3 Install the antenna.

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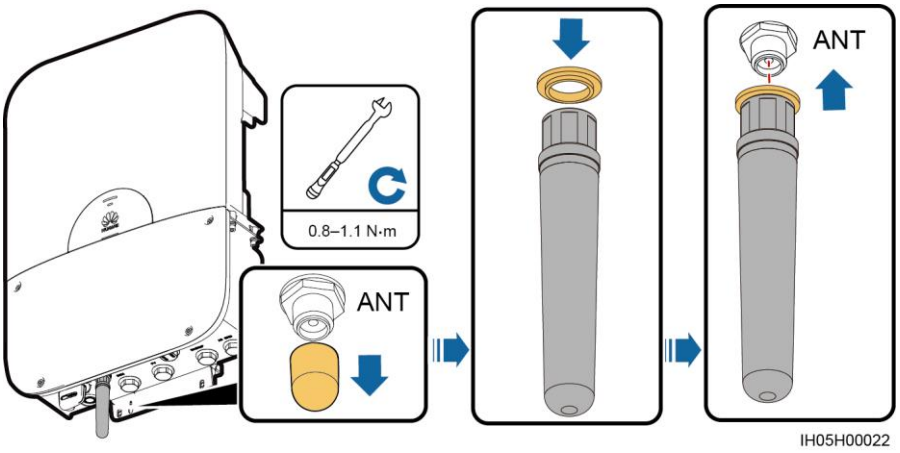
NOTICE

Ensure that the antenna is installed securely.

Figure 5-20 Installing an antenna



----End

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6 System Commissioning

6.1 Checking Before Power-On

Table 6-1 Checklist

No.	Check Item	Acceptance Criteria
1	SUN2000 installation	The SUN2000 is installed correctly, securely, and reliably.
2	Antenna installation	The antenna is installed correctly, securely, and reliably.
3	SIM card installation	The SIM card is installed correctly, securely, and reliably.
4	Cable layout	Cables are routed properly as required by the customer.
5	Cable tie	Cable ties are secured evenly, with no sharp protrusions.
6	Grounding	The ground cable is connected correctly, securely, and reliably.
7	Switches	The DC switch and all the switches connecting to the SUN2000 are in the OFF position.
8	Cable connections	The AC output power cable, DC input power cable, battery cable, and signal cable are connected correctly, securely, and reliably.
9	Unused terminals and ports	Unused terminals and ports are fitted with waterproofing bolts or watertight caps.
10	Cable routing pipe sealing	All cable routing pipes at the bottom of the enclosure are sealed.
11	Cleanliness in the maintenance compartment	The maintenance compartment interior is clean and tidy.
12	Installation environment	An appropriate installation space has been

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No.	Check Item	Acceptance Criteria
		chosen, and the installation environment is clean and tidy.

6.2 Powering On the System

Prerequisites

Before turning on the AC switch between the SUN2000 and the power grid, check that the AC voltage on the power grid side of the AC switch is within the specified range.

NOTICE

- If the AC is on and the battery is off, the SUN2000 will report a **Battery Abnormal** alarm.
- If the DC switch is not turned on within 1 minute after the AC is powered on, the SUN2000 will report a **Device Abnormal** alarm and will start normally only after the DC switch is turned on.
- If there is a power grid outage, the SUN2000 will assume a power-off state regardless of whether sunlight is sufficient or a battery is configured. The LEDs will turn off.

Procedure

Step 1 If a battery connects to the battery port of the SUN2000, turn off the battery Auxiliary Power ON/OFF switch, and then turn off the battery Circuit Breaker switch.

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

Step 3 Turn on the DC switch at the bottom of the SUN2000.

Step 4 Perform quick setting and set the SUN2000 parameters on the FusionHome app. For details, see 7 Operations on the Local FusionHome App.

Step 5 (Optional) Measure the temperatures at DC terminals and battery terminals using a point-test thermometer.

Under normal operation conditions of the SUN2000, the temperature rise at DC terminals should remain below 30°C at all times.

Step 6 Observe the LEDs to check the SUN2000 operating status.

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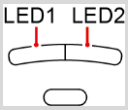
Table 6-2 LED description

Type	Status		Meaning
Running indication 	**LED1**	**LED2**	N/A
	Steady green	Steady green	The SUN2000 is exporting power to the power grid.
	Blinking green at long intervals (on for 1s and then off for 1s)	Off	The DC is on and the AC is off.
	Off	Blinking green at long intervals (on for 1s and then off for 1s)	The DC is off and the AC is on.
	Blinking green at long intervals (on for 1s and then off for 1s)	Blinking green at long intervals (on for 1s and then off for 1s)	The DC is on, the AC is on, and the SUN2000 is not exporting power to the power grid.
	Steady orange	Steady orange	The SUN2000 is running in backup state.
	Blinking orange at long intervals	Off	The DC is on and the SUN2000 has no output in backup state.
	Off	Off	Both the DC and AC are off, or the SUN2000 is in Low Power Consumption mode. Low Power Consumption mode means that the monitoring system of the SUN2000 is hibernating.
	Steady red	Steady red	The SUN2000 is faulty.
	Blinking red slowly (on for 1s and then off for 1s)	Steady green	Exporting power to the power grid, optimizer fault.
	Blinking red slowly (on for 1s and then off for 1s)	Steady Orange	Backup mode, optimizer fault.
Communicatio	**LED3**		N/A

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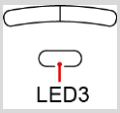
Type	Status	Meaning
n indication 	Blinking green at short intervals (on for 0.2s and then off for 0.2s)	Communicating (Communicating means that communication with the management system is in progress. However, if a mobile phone accesses the SUN2000, the LED indicates the "mobile phone access status: blinking green at long intervals" first.)
	Blinking green at long intervals (on for 1s and then off for 1s)	A mobile phone is connected to the SUN2000.
	Off	No communication.

----End

6.3 Powering Off the System

Context

WARNING

- After the SUN2000 powers off, the remaining electricity and heat may still cause electric shock and burns. After power-off, wait 5 minutes before servicing the SUN2000. Always wear protective gloves when servicing the SUN2000
- If the SUN2000 is connected to the battery, ensure that a shutdown command is sent from the app. Power off the system after the SUN2000 has shut down. If no shutdown command is sent from the app, the SUN2000 will shut down after the power grid is powered off. The SUN2000 will wait for 1 minute and restart (not grid-tied) and charge the battery, which poses an electrical hazard when you turn off the DC switch.
- If **Off-grid mode** is set to **Enable** and **Grid-tied/Off-grid mode switching** is set to **Automatic switching** for the SUN2000, ensure that a shutdown command is sent from the app and power off the system only after the SUN2000 has shut down. If no shutdown command is sent from the app, the SUN2000 will switch to the backup state after the power grid is powered off, which poses an electrical hazard when you turn off the DC switch.

Procedure

Step 1 Send a shutdown command from the app. Perform operations by referring to 7.4.3.5 Starting or Shutting Down the SUN2000 if you log in as **installer**; perform operations by referring to 7.5.6 Settings if you log in as **user**.

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

Step 3 Turn off the DC switch at the bottom of the SUN2000.

Step 4 If a battery connects to the battery port of the SUN2000, power off the battery.

----End

6.4 Grid-tied/Backup Mode Switching

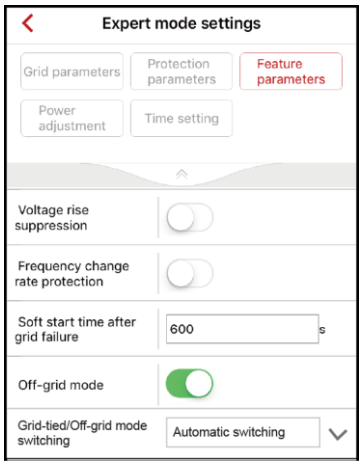
After **Off-grid mode** is enabled on the **Home** screen of the FusionHome app, the critical load (BACKUP) route of AC output can be switched between grid-tied and backup modes.

Automatic Switching

Step 1 On the **Home** screen of the FusionHome app, choose **Grid-connect config** > **Expert** > **Feature parameters**, set **Off-grid mode** to **Enable** and set **Grid-tied/Off-grid mode switching** to **Automatic switching**. The switching time is less than 6s.

NOTE
The default value of **Off-grid mode** is **Disable**. The default value of **Grid-tied/Off-grid mode switching** is **Manual switching**.

Figure 6-1 Automatic switching



----End

Manual Switching

Step 1 On the **Home** screen of the FusionHome app, choose **Grid-connect config** > **Expert** > **Feature parameters**, set **Off-grid mode** to **Enable** and set **Grid-tied/Off-grid mode switching** to **Manual switching**.

NOTE
The default value of **Off-grid mode** is **Disable**. The default value of **Grid-tied/Off-grid mode switching** is **Manual switching**.

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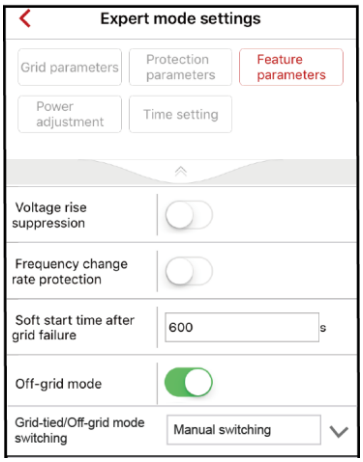
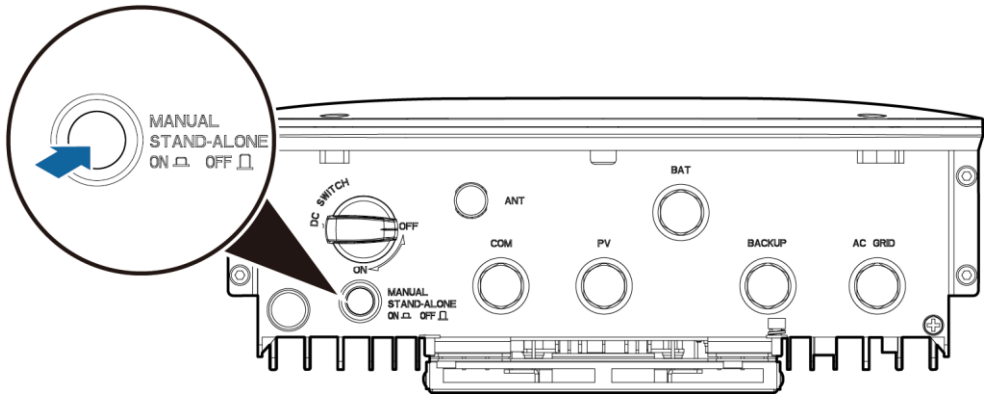
Figure 6-2 Manual switching



Step 2 If there is a power grid outage, the SUN2000 in the grid-tied state shuts down.

Step 3 After you press the backup enable button, the SUN2000 switches to the backup state.

Figure 6-3 Pressing the backup enable button



Step 4 When the power grid resumes normal functioning, the SUN2000 keeps running in the backup state.

Step 5 After you press the backup enable button again to release it, the SUN2000 switches to the grid-tied state.

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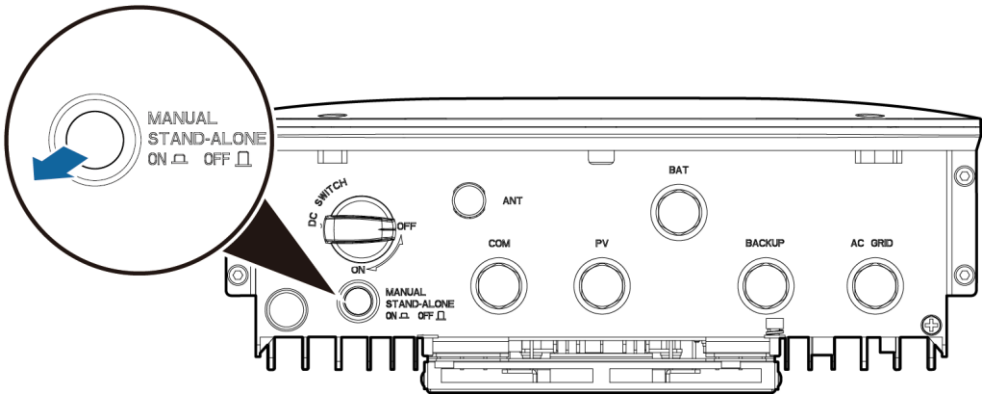
Figure 6-4 Releasing the backup enable button



----End

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7 Operations on the Local FusionHome App

7.1 App Overview

Function

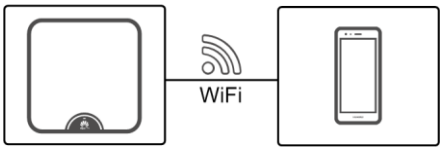
The Near-end FusionHome app is a mobile phone app that locally communicates with the SUN2000 over WiFi to allow for querying alarms, configuring parameters, and performing routine maintenance, and commissioning.

Connection Method

After the DC or AC side of the SUN2000 is energized, the app can connect to the SUN2000 in either of the following ways:

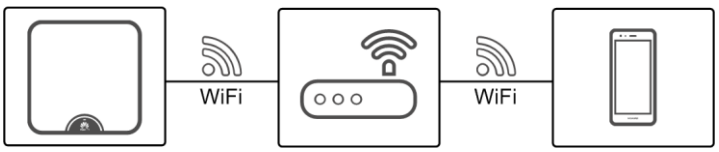
- **Method 1:** The mobile phone connects to the SUN2000 directly.

  Figure 7-1 Mobile phone connecting to the SUN2000 directly

- **Method 2:** The mobile phone connects to the SUN2000 through a router. Do not use this method for the first login. Ensure that the SUN2000 has connected to the router if you need to use this method.

  Figure 7-2 Mobile phone connecting to the SUN2000 over a router

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NOTICE

- Mobile phone operating system: Android 4.4 or later, iOS 8.0 or later.
- Recommended brands: Huawei, Samsung, and iPhone
- The mobile phone must support the access to the Internet over a web browser.
- The mobile phone must support WiFi.
- The router supports WiFi (IEEE 802.11 b/g/n, 2.4 GHz) and be within range of the SUN2000.

Disclaimer

The app screen snapshots provided in this document correspond to FusionHome 2.1.11.300. The figures are for reference only.

User Operation Permissions

The app users are classified as the installer and user.

Figure 7-3 Operation permissions of the installer

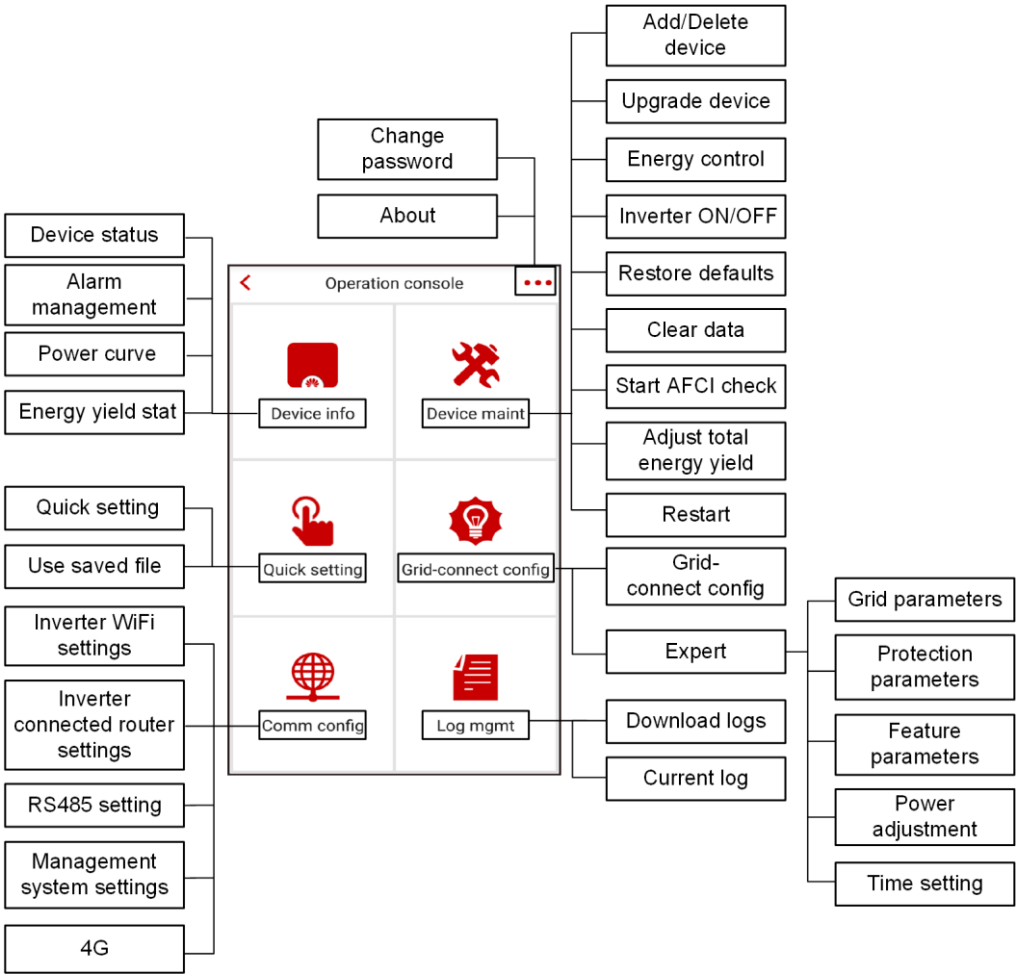

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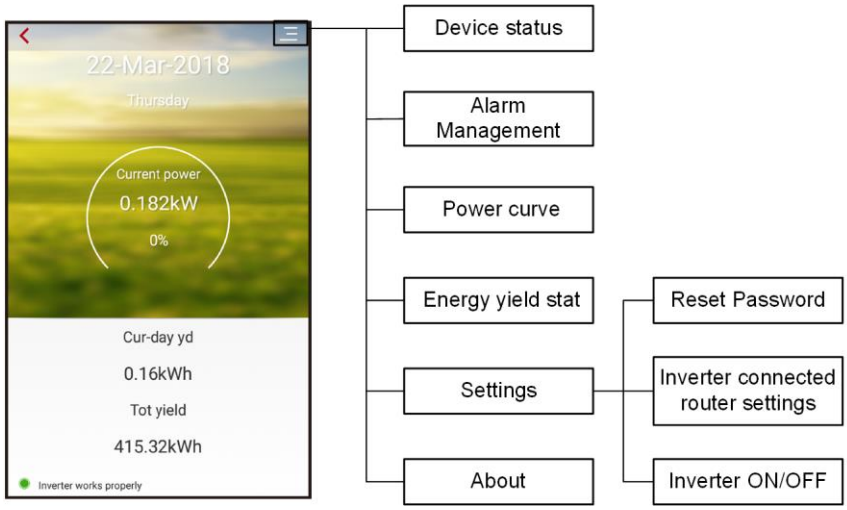
Figure 7-4 Operation permissions of the user



7.2 Downloading and Installing the App

Search for **FusionHome** from one of the following app stores in the following list, download the installation package, and install the FusionHome app by following the instructions.

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

After the app is installed, the **FusionHome** icon is displayed on the home screen.

Tap the **FusionHome** icon to access the home screen of the app.

Home Screen on Android

The home screen on Android contains **WiFi**, **Inverter**, and **Tool Kit**. The file manager in the tool kit can be used to export the logs of the SUN2000 and app in offline mode.

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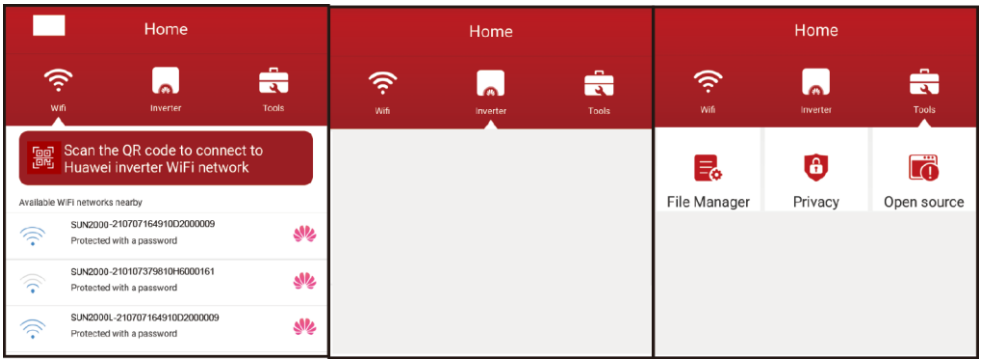
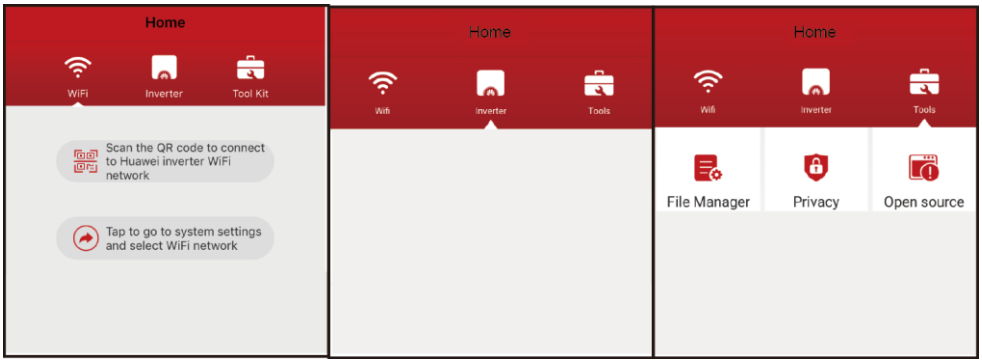
Figure 7-5 Home screen on Android



Home Screen on iOS

The home screen on iOS contains **WiFi**, **Inverter**, and **Tool Kit**. The file manager in the tool kit can be used to export the logs of the SUN2000 and app in offline mode.

Figure 7-6 Home screen on iOS



7.3 Connecting to a SUN2000 WiFi Network

Prerequisites

- The DC or AC side of the SUN2000 has been energized.
- The WiFi function is enabled on the mobile phone.
- When connecting to the SUN2000 directly from the mobile phone, keep the mobile phone visible within 3 meters of the SUN2000 (4G) to ensure the communication quality between the app and SUN2000.
- When connecting to the SUN2000 directly from the mobile phone, keep the mobile phone visible within 3 meters of the SUN2000 (WLAN) if the built-in antenna is used or within 50 meters of the SUN2000 (WLAN) if the external antenna is used to ensure the communication quality between the app and SUN2000. The distances are for reference only and may vary with mobile phones and shielding conditions.

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- When connecting the app to the SUN2000 over a router, the mobile phone and SUN2000 are within range of the router and the SUN2000 is connected to the router.

NOTICE

The way of connecting the SUN2000 to the router is as follows:

- The installer taps **Quick setting** (see 7.4.4 Quick Setting for details) or **Comm config** (see 7.4.6 Communication Configuration for details).
- The user taps **Set** (see 7.5.6 Settings for details).

NOTE

If the WiFi signal is weak, you will be prompted to try again multiple times. Follow the instructions.

Procedure on the Android System

The app allows for connecting to the SUN2000 in the following two ways. Select either way based on site requirements. After the connection is established, the **Inverter** screen is displayed. If your mobile phone fails to connect to the SUN2000 or router WiFi network from the app, try to connect to the WiFi network from your mobile phone system. To connect to the router over WiFi from the mobile phone system, ensure that you have logged out of the app.

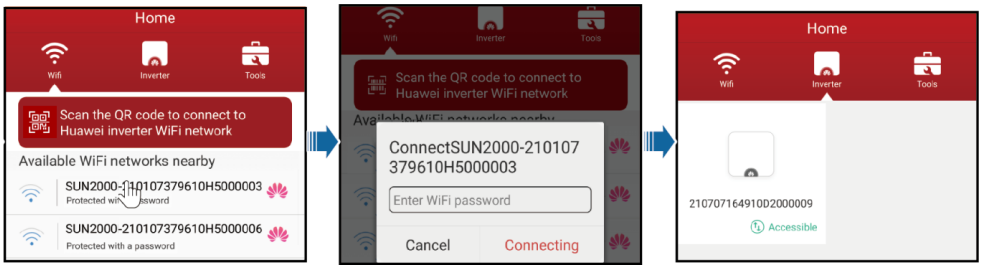
- **Method 1:** The mobile phone connects to the SUN2000 directly.

  Run the app, tap the WiFi name corresponding to the SUN2000, and enter the WiFi password to connect to the WiFi network. Use the initial password **Changeme** upon first login. To ensure account security, change the password immediately after login.

NOTE

The name of the connected SUN2000 WiFi network is represented by **SUN2000**-*its serial number (SN)*. The SN can be found on the label attached to the side of the SUN2000.

Figure 7-7 Mobile phone connecting to the SUN2000 directly



If you log in for the first time and the initial SUN2000 WiFi password is not changed, you can scan the WiFi login QR code on the side of the SUN2000 to connect to the SUN2000 WiFi network.

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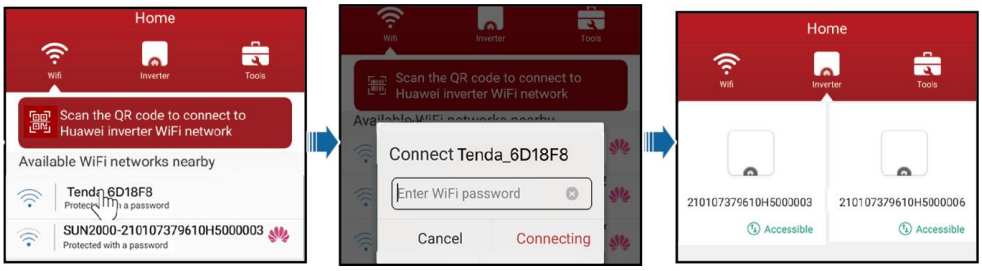
Figure 7-8 Scanning the QR code to connect the mobile phone to the SUN2000 directly

- **Method 2:** The mobile phone connects to the SUN2000 over a router. Do not use this method for the first login. Ensure that the SUN2000 has connected to the router.

  Run the app. If the SUN2000 WiFi network has connected to the router, tap the WiFi name corresponding to the router for connection. After the connection is established, the **Inverter** screen displays all the Huawei SUN2000s that have connected to the router.

Figure 7-9 Mobile phone connecting to the SUN2000 over a router



----End

Procedure on the iOS System

The app allows for connecting to the SUN2000 in the following two ways. Select either way based on site requirements. After the connection succeeds, the **Inverter** screen is displayed.

- **Method 1:** The mobile phone connects to the SUN2000 directly.
  a. Run the app and tap **Tap to go to system settings and select WiFi network** to access the setting screen of the mobile phone. Choose **Settings** > **WLAN** and tap the SUN2000 WiFi name.

NOTE

The name of the connected SUN2000 WiFi network is represented by **SUN2000-***its serial number (SN)*. The SN can be found on the label attached to the side of the SUN2000.

  b. Enter the SUN2000 WiFi password to establish a connection. Use the initial password **Changeme** upon first login. To ensure account security, change the password immediately after login.

NOTE

If you log in for the first time and the SUN2000 WiFi password is not changed, tap **Scan the QR code to connect to Huawei inverter WiFi network**, and scan the WiFi login QR code on the side of the SUN2000 to obtain the WiFi login password.

  c. Run the app. After the connection succeeds, the **Inverter** screen is displayed.

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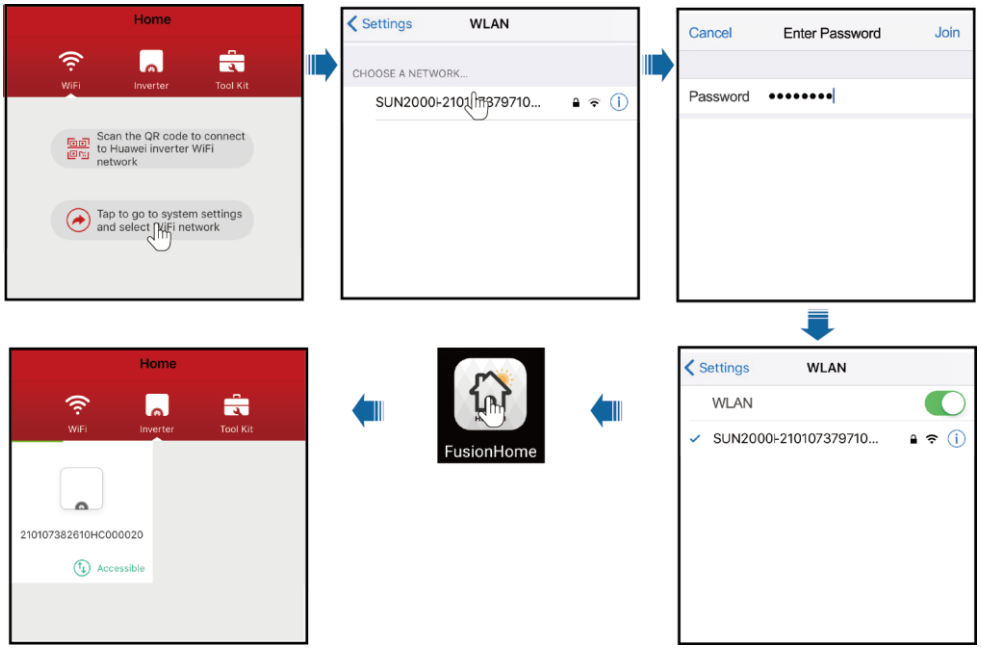
Figure 7-10 Mobile phone connecting to the SUN2000 directly



- **Method 2:** The mobile phone connects to the SUN2000 over a router. Do not use this method for the first login. Ensure that the SUN2000 has connected to the router.
  a. If the SUN2000 WiFi network is connected to a router, tap **Tap to go to system settings and select WiFi network** to access the setting screen of the mobile phone. Choose **Settings** > **WLAN** and tap the router WiFi name.
  b. Enter the router WiFi password to establish a connection.
  c. Run the app. The **Inverter** screen displays all the Huawei SUN2000s that have connected to the router.

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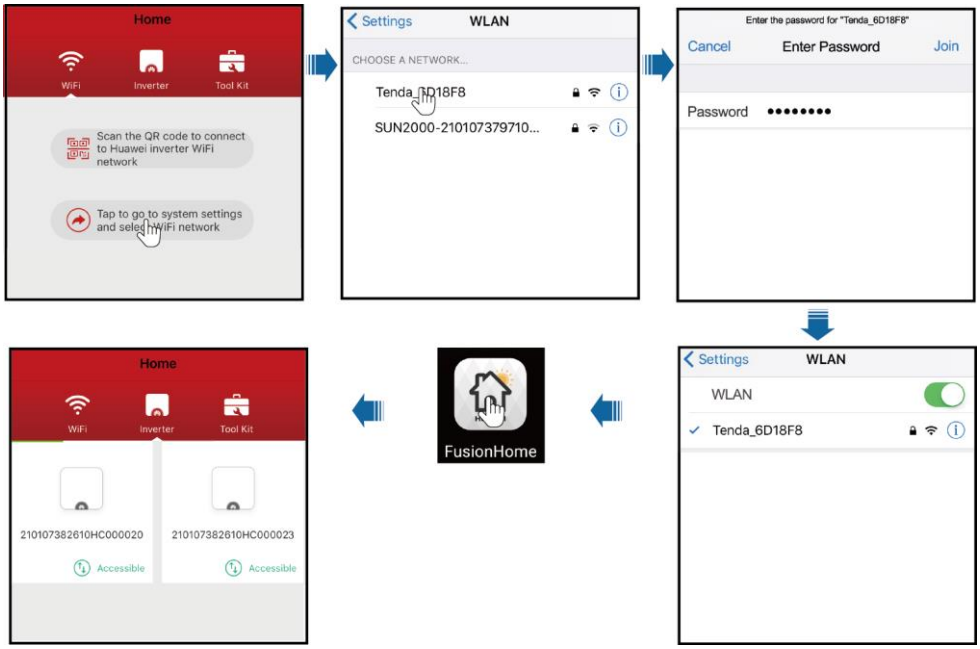
Figure 7-11 Mobile phone connecting to the SUN2000 over a router



----End

NOTICE

The following text describes the operations on Android systems. The operations on iOS systems are the same as those on Android systems, but some aspects of the screens may look somewhat different. The pictures in this guide are for reference only.

7.4 App Operations by the Installer

7.4.1 Logging In to the App

Prerequisites

The corresponding SUN2000 is displayed on the **Inverter** screen.

Procedure

Step 1 On the **Inverter** screen, select **installer**, enter the password, and log in to the app.

NOTE

- The name of the connected SUN2000 is represented by its (SN), which can be found on the SN label attached to the side of the SUN2000.
- The login password is the same as that for the SUN2000 connected to the app and is used only when the SUN2000 connects to the app.

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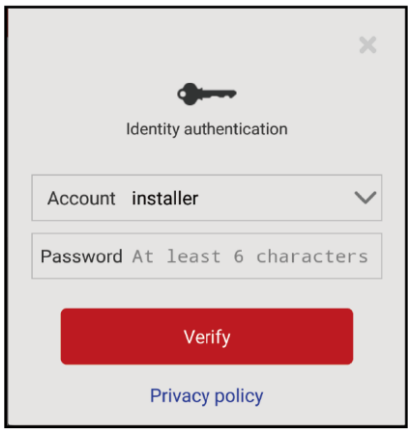
- The initial password is **00000a**. Use the initial password for first login. To ensure account security, change the password immediately after login.
- If you enter the passwords incorrectly for five consecutive times and the interval between consecutive entries is less than 2 minutes, your account will be locked for 5 minutes.

Figure 7-12 Identity authentication



Step 2 If you log in successfully, the **Quick setting** or **Home** screen is displayed. (The **Quick setting** screen is displayed only when the SUN2000 connects to the app for the first time or the factory defaults of the SUN2000 are restored.)

Step 3 Perform quick setting.

NOTE

- Before setting the grid code, ensure that the DC side of the inverter is energized.
- The **Quick setting** screen is displayed only when the SUN2000 connects to the app for the first time or the factory defaults of the SUN2000 are restored.
- If you do not follow the setting wizard, the **Quick setting** screen will still be displayed when you log in next time.
- To exit the setting, press the **Back** button on the mobile phone. To enter the **Quick setting** screen again, choose **Quick setting** from the **Home** screen.

The **Quick setting** screen provides two setting modes. Select either of them based on site requirements.

- **Method 1:** quick setting

NOTE

The following figure shows an example of connecting to the Locus management system.

- Set domain name to **huawei.devicedataacquisition.com**.
- Set the port number to **55555**.
- Set the remote protocol type to **MODBUS**.
- Enable encrypted transmission.

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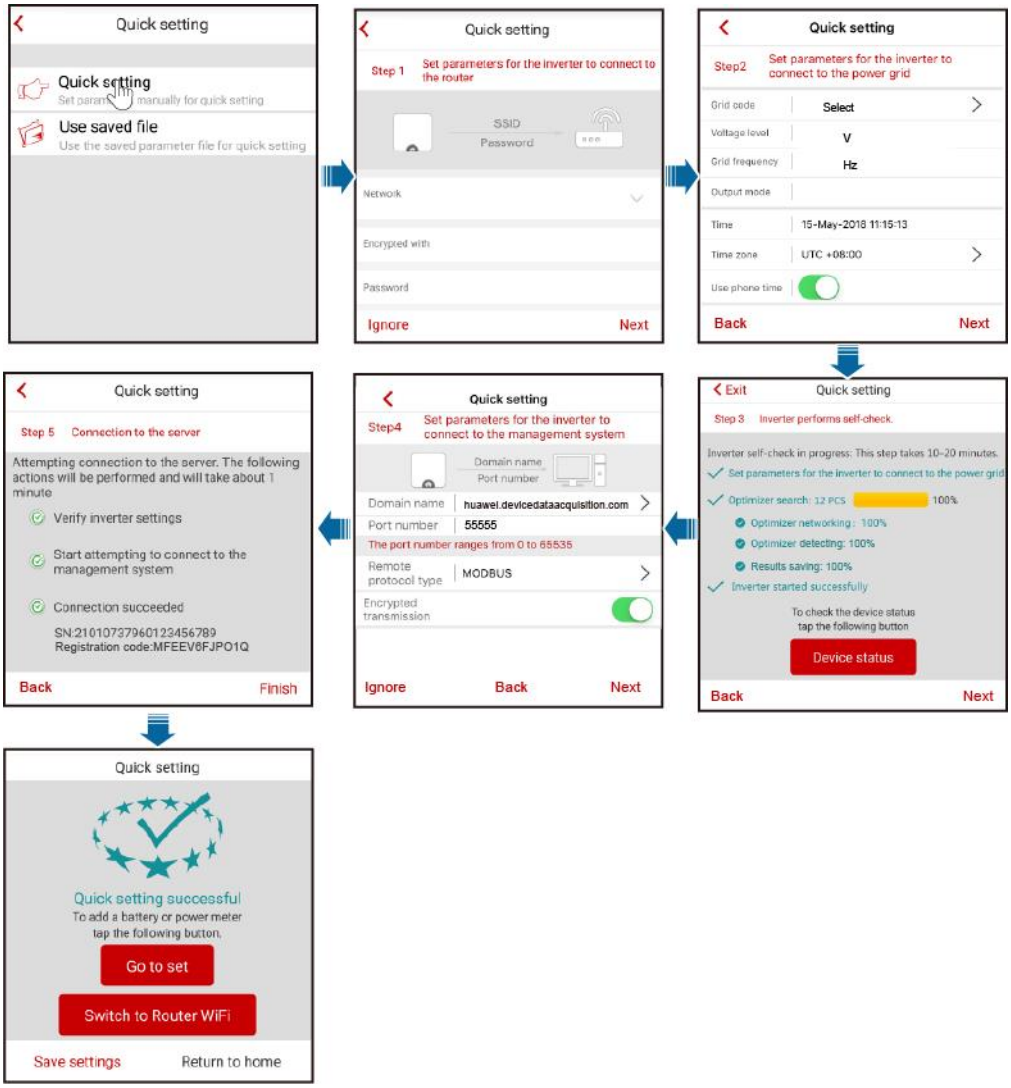
Figure 7-13 Quick setting



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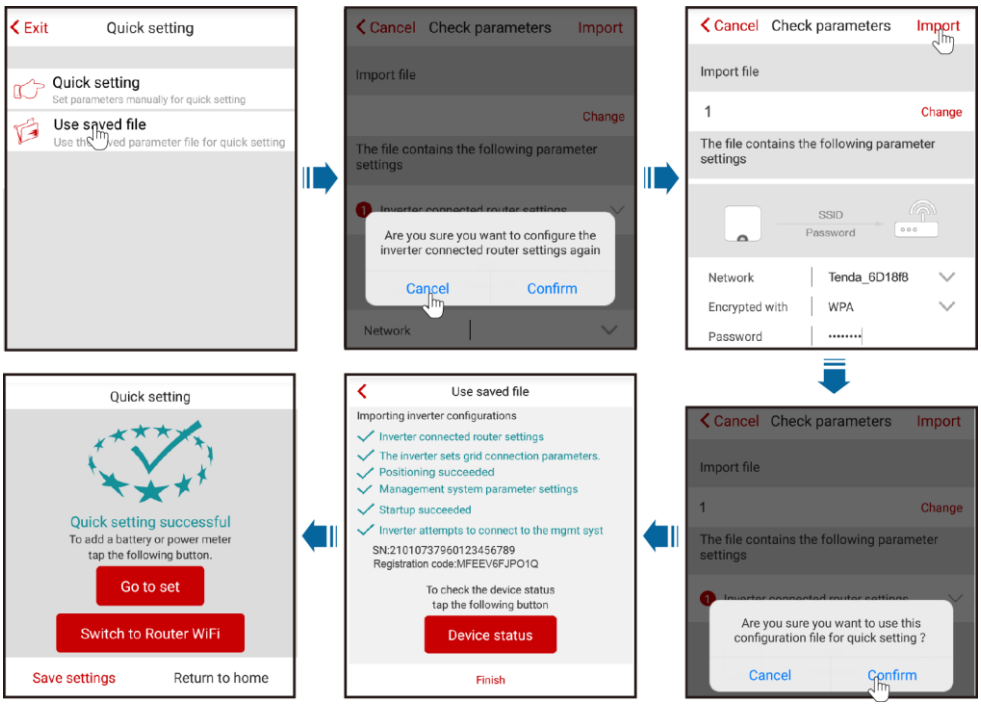
NOTICE

- Set the grid code that applies to the country or region where the PV plant is located and the particular SUN2000 model.
- If there is no need to connect to the router or management system, skip the corresponding steps.
- After the management system is successfully connected, the SUN2000 will report the SN and installer registration code. If the connection fails, another connection attempt will start after 10 seconds. The installer registration code is generated by the SUN2000 automatically and is used for the installer to register with the management system and manage the inverter.
- For the operations about how to add devices, see 7.4.3.1 Adding/Deleting Devices.
- After quick setting is complete, tap **Switch to Router WiFi** to switch to the **Available WiFi networks nearby** screen and tap the corresponding router WiFi connection to switch to the router WiFi network.
- To connect to the router WiFi network from the mobile phone system after router parameters have been successfully set, you need to log out of the app and log in again.
- After following all the instructions on the **Quick setting** screen, tap **Save settings** to store the configurations or tap **Return to home** to return to the **Home** screen.

- **Method 2:** use the saved file

Before choosing **Use saved file** for quick setting, ensure that the corresponding configuration file is saved in your mobile phone. To generate a configuration file, tap **Save settings** on the **Quick setting** screen.

Figure 7-14 Performing quick setting using a saved file



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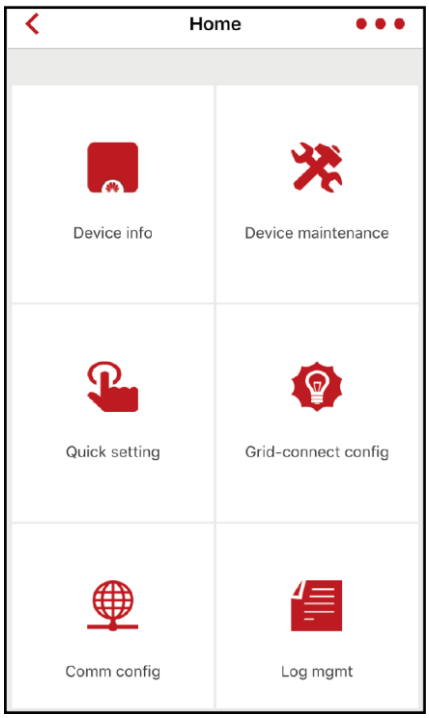
NOTE

- To change the configuration file to be imported, tap **Change**.
- In the dialog box with **Are you sure you want to configure the inverter connected router settings again**, if you tap **Confirm**, the previously saved router configurations will be cleared. If you tap **Cancel**, you only have to enter the saved router password.
- After quick setting is complete, tap **Switch to Router WiFi** to switch to the **Available WiFi networks nearby** screen and tap the corresponding router WiFi connection to switch to the router WiFi network.
- To connect to the router WiFi network from the mobile phone system after router parameters are successfully set, you need to log out of the app and log in again.
- After the management system is successfully connected, the SUN2000 will report the SN and installer registration code. If the connection fails, another connection attempt will start after 10 seconds. The installer registration code is generated by the SUN2000 automatically and is used for the installer to register with the management system and manage the inverter.

Figure 7-15 Home



----End

7.4.2 Querying the Device Information

To query the SUN2000 information, choose **Device info** from the **Home** screen.

Querying Device Status

You can query the status of each device.

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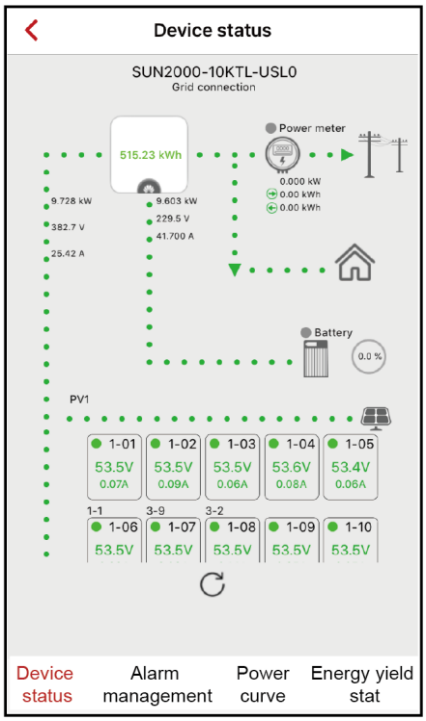
Figure 7-16 Device status



Querying Alarms

You can query active and historical alarms.

To set the sorting mode for active alarms or historical alarms, tap . To query the historical alarms within a certain time range, tap and select the time range.

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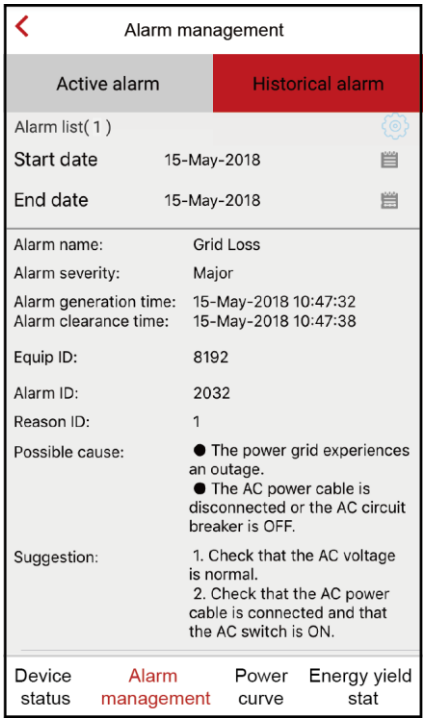
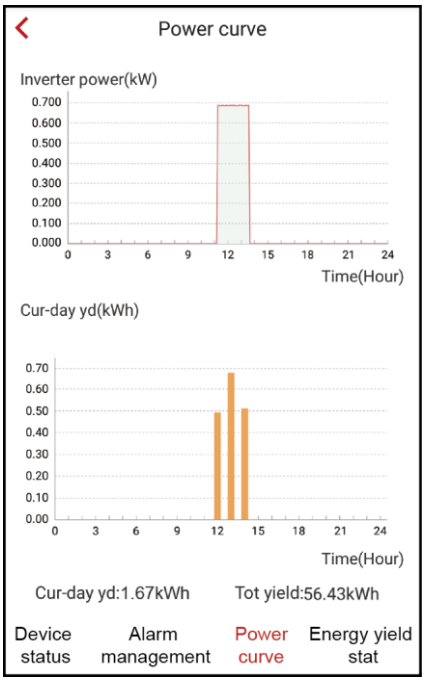
Figure 7-17 Alarm management



Querying Power Curves

You can query the current-day power curve and energy yield.

Figure 7-18 Power curve



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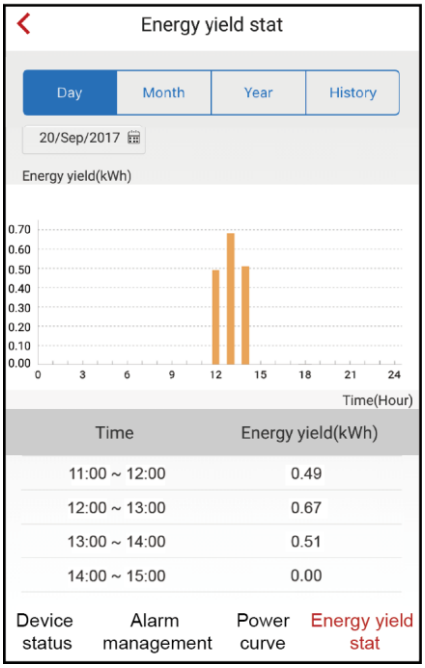
Querying Energy Yields

You can query daily, monthly, yearly, and historical energy yields.

Figure 7-19 Energy yield stat



7.4.3 Maintaining the Devices

To maintain the devices, choose **Device maint** from the **Home** screen.

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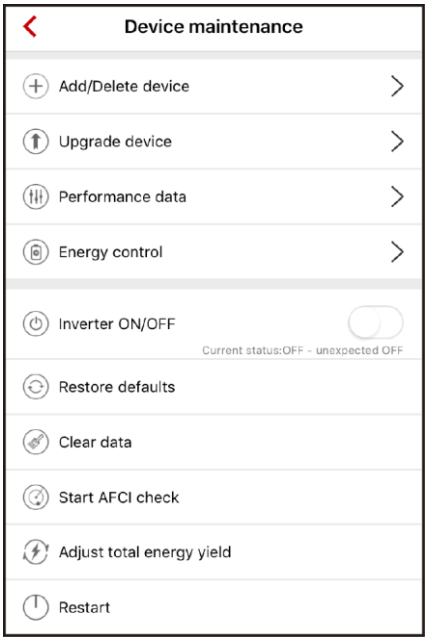
Figure 7-20 Device maintenance



7.4.3.1 Adding/Deleting Devices

Procedure

Step 1 On the **Home** screen, choose **Device maint** > **Add/Delete device**, and add an energy meter and battery based on actual needs. Tap **Submit** to deliver the device information to the SUN2000. You can also tap **Search** next to **Optimizer** to automatically locate the string number and position of an optimizer and then add the optimizer.

NOTE
Each device must have a unique communications address.

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NOTICE

- During the optimizer search process, the SUN2000 enters Shutdown mode. After the search is completed and the SUN2000 has resumed normal functioning, the SUN2000 can be restarted.
- If the optimizer is changed after the system deployment, optimizer search must be performed.

Figure 7-21 Adding/Deleting devices

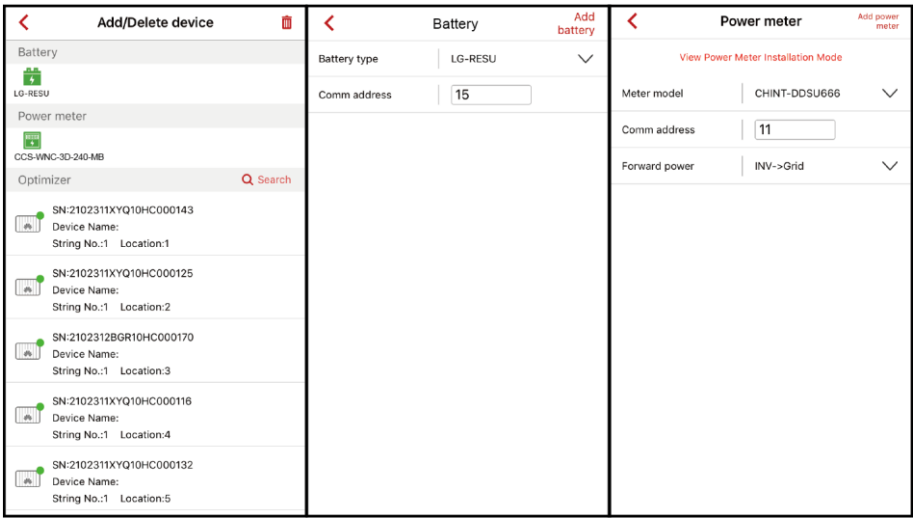

Table 7-1 Description of the parameters for adding a battery

Parameter	Description	Value Range
Comm addr	Specifies the RS485 address of the connected battery. The address should be the actual address of the battery.	[1, 247]
Battery type	Specifies the model of the connected battery. No other models of batteries can be connected.	LG-RESU

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Parameter	Description	Value Range
Maximum Charging Power (W)	Specifies the maximum battery charging power. It is displayed after the energy storage module added successfully. The maximum charging power is limited by the maximum output power of the SUN2000 and whether the **Feed power into grid** function is enabled.	• SUN2000-3.8KTL/5KTL/7.6KTL-USL0: configurable range [0, 3500] • SUN2000-9KTL/10KTL/11.4KTL-USL0: configurable range [0, 5000]
Maximum Discharging Power (W)	Specifies the maximum battery discharging power. It is displayed after the energy storage module added successfully. The maximum discharging power is limited by the maximum output power of the SUN2000 and whether the **Feed power into grid** function is enabled.	• SUN2000-3.8KTL/5KTL/7.6KTL-USL0: configurable range [0, 3500] • SUN2000-9KTL/10KTL/11.4KTL-USL0: configurable range [0, 5000]
Full Charging Capacity (%)	Specifies the battery charging cutoff capacity. It is displayed after the energy storage module added successfully.	[90, 100]
Full Discharging Capacity (%)	Specifies the battery discharging cutoff capacity. It is displayed after the energy storage module added successfully.	[12, 20]

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Table 7-2 Description of the parameters on adding a meter

Parameter	Description	Value Range
Meter model	Specifies the model of the connected power meter. No other models of power meter can be connected.	• CHINT-DDSU666 • DDSU666-H • DTSU666-H • CCS-WNC-3D-240-MB • CCS-WNC-3Y-400-MB • Gavazzi-EM340DINAV 23XS1X • Gavazzi-EM111DINAV 81XS1X • Gavazzi-EM112DINAV 01XS1X
Comm addr	Specifies the RS485 address of the connected power meter. The address should be the actual address of the power meter.	[1, 247]
Forward power	Set forward power.	• INV-Grid • Grid-INV

Table 7-3 Description of the parameters on adding the Optimizer

Parameter	Description	Value Range
SN	Optimizer SN.	N/A
Device Name	The optimizer name can be set.	N/A
String No.	String number automatically allocated by the inverter after optimizer search is performed. The value starts from 1 and cannot be set.	[1, 3]
Location	After optimizer search is performed, the optimizer implements sequencing based on the voltage to ground and then provides the simulated location.	[1, 25]

----End

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7.4.3.2 Upgrading Devices

Prerequisites

You have obtained the upgrade file through your supplier or Huawei engineers.

Context

- In the iOS system, the upgrade file can be imported to the mobile phone by email. The upgrade file name extension must be .zip. **Manually select** is unavailable.
- In the Android system, the upgrade file can be copied to the mobile phone. The upgrade file name extension must be .zip and the file can be stored in your required directory. **Manually select** is available.

Procedure

Step 1 On the **Home** screen, choose **Device maint** > **Upgrade device** and follow the instructions.

NOTE
The SUN2000 and battery are used to illustrate the upgrade method.

Figure 7-22 Upgrading the SUN2000

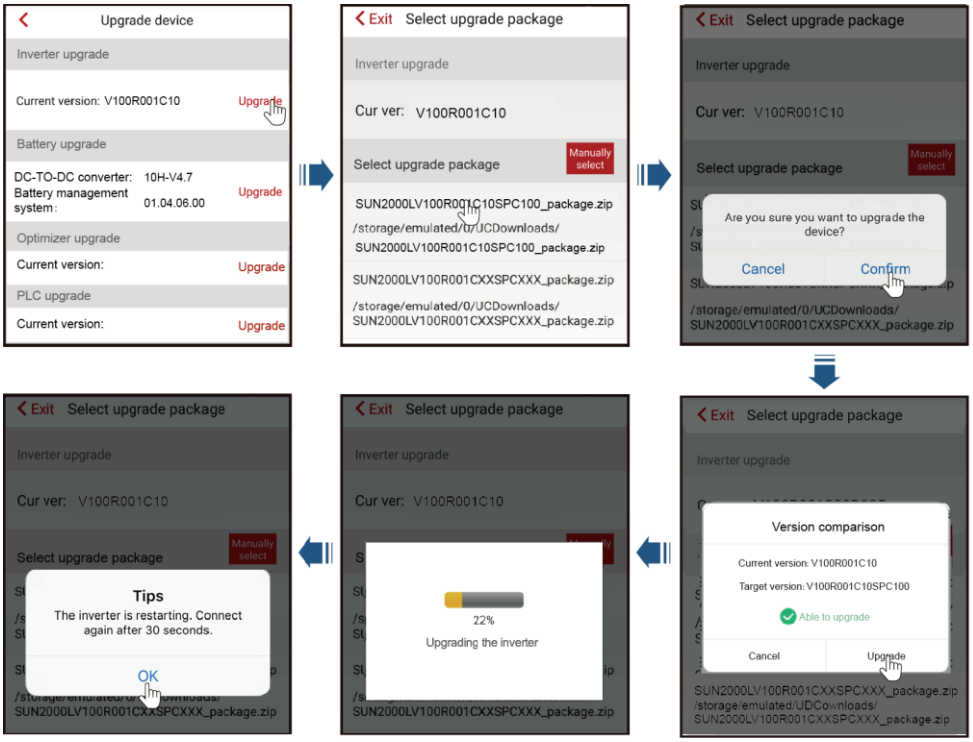

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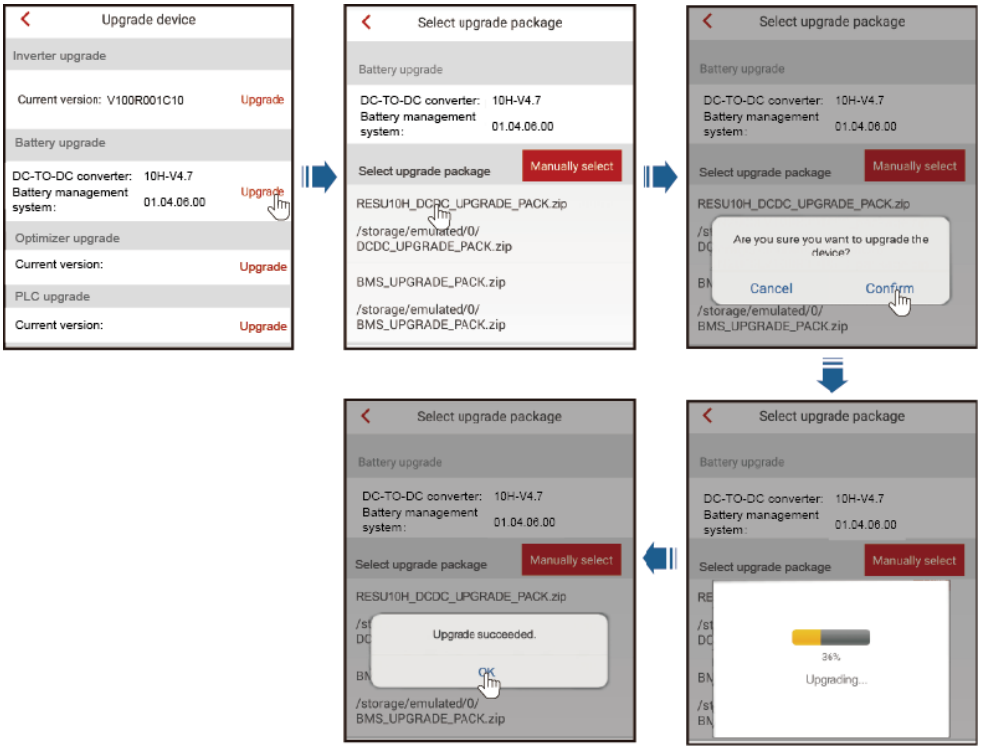
Figure 7-23 Upgrading the battery



NOTE

There are DC-TO-DC converter and Battery management system upgrade packages for the battery. Choose one or both of the upgrade packages based on actual needs.

----End

7.4.3.3 Performance Data

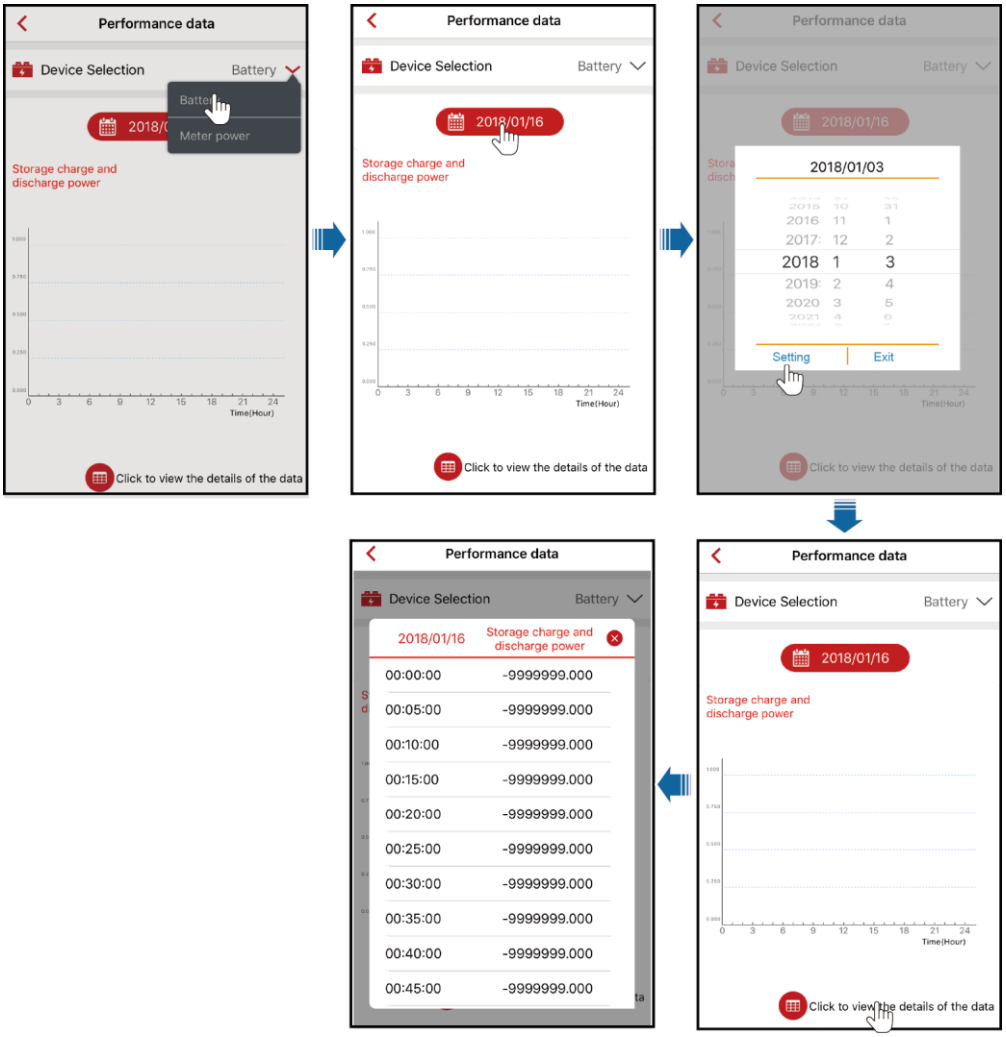
Procedure

Step 1 On the **Operation console** screen, choose **Device maint** > **Performance data** and then query the charge and discharge power of the battery or the power of the meter.

NOTE

Battery performance data is used to illustrate the query method.

Figure 7-24 Performance data



----End

7.4.3.4 Energy Control

On the **Operation console** screen, choose **Device maint** > **Energy control** and perform the required operation.

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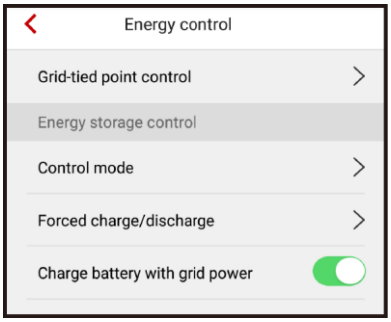
Figure 7-25 Energy control



7.4.3.4.1 Grid-tied Point Control

Procedure

Step 1 On the **Operation console** screen, choose **Device maint** > **Energy control** > **Grid-tied point control** and perform the required operation.

Figure 7-26 Grid-tied point control

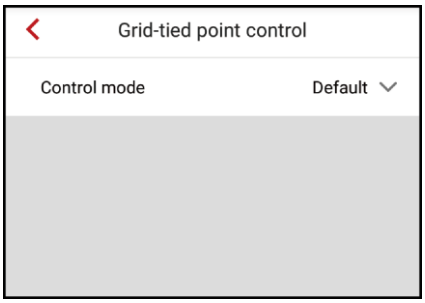


Table 7-4 Description of control mode parameters

Parameter	Description	Value Range
Control mode	If this parameter is set to **Default**, the SUN2000 output power is not limited. The SUN2000 can export its rated power to the power grid. If this parameter is set to **Grid connection with zero power** and the SUN2000 is connected to a power meter, the output power of the SUN2000 is supplied only to the local load, but not the power grid. If this parameter is set to **Power-limited Grid**	• Default • Grid connection with zero power • Power-limited Grid Connection

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Parameter	Description	Value Range
	Connection and the SUN2000 is connected to a power meter, the SUN2000 supplies power limited based on the setting of **Grid-tied Point Power** to the power grid.	

----End

7.4.3.4.2 Energy Storage Control

Control Mode

Step 1 On the **Operation console** screen, choose **Device maint** > **Energy control** > **Energy storage control** > **Control mode** and perform the required operation.

Figure 7-27 Fixed charge/discharge

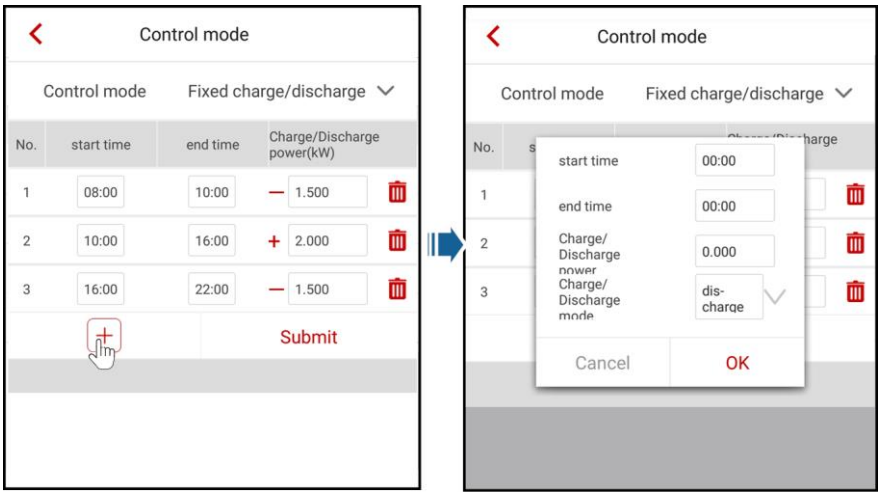

Figure 7-28 Maximum use of self-produced power

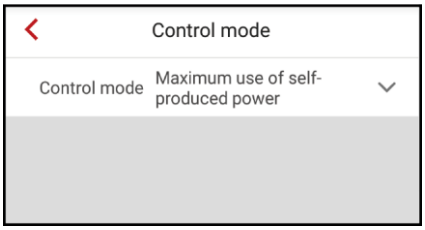

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Figure 7-29 Time-of-use price

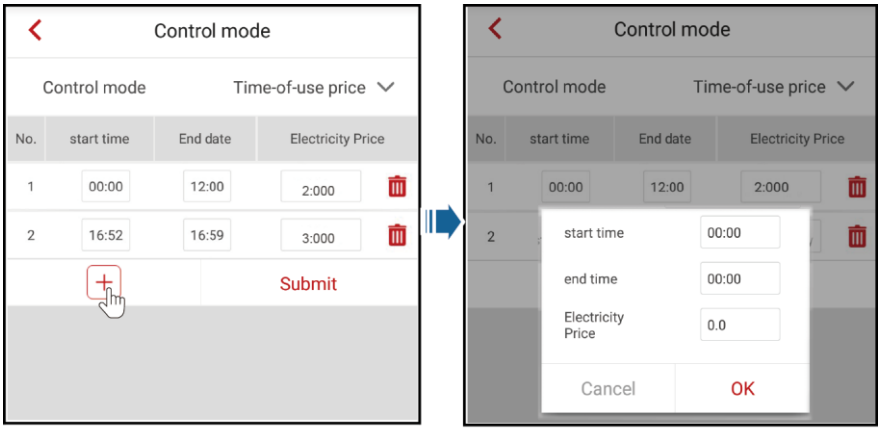

Table 7-5 Description of energy storage control parameters

Parameter	Description	Value Range
Control mode	• If this parameter is set to **Fix chg/dis**, the battery is charging or discharging during the configured period. A maximum of 10 time periods can be added. • If this parameter is set to **Maximum use of self-produced power** and the SUN2000 is connected to a power meter, the battery is charging when the PV power is more than the local load. The battery is discharging when the PV power is less than the local load. • If this parameter is set to **Time-of-use price**, the battery is discharged when the electricity price is high and charged when the electricity price is low. A maximum of 10 price time periods can be added.	• Fix chg/dis • Maximum use of self-produced power • Time-of-use price

----End

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Forced Charge/Discharge

Step 1 On the **Operation console** screen, choose **Device maint** > **Energy control** > **Energy storage control** > **Forced charge/discharge** and perform operations as required.

Figure 7-30 Forced charge/discharge

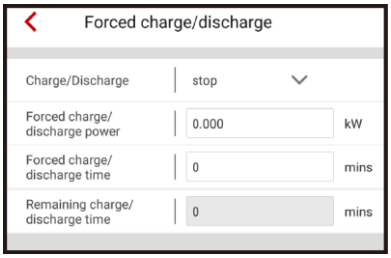

Table 7-6 Description of forced charge/discharge parameters

Parameter	Description	Value Range
Charge/discharge power	The battery is charging or discharging when the command is set.	• Stop • Charge power • Discharge power
Forcible chg/dis pwr (kW)	Specifies the forced charge/discharge power.	• Charge: [0, Maximum charge power] • Discharge: [0, Maximum discharge power]
Forcible chg/dis time (mins)	Specifies the forced charge/discharge duration.	[0, 1440]
Remaining charge/discharge time (mins)	Displays the remaining charge/discharge time. This parameter cannot be set.	[0, 1440]

----End

Charge battery with grid power

Step 1 On the **Operation console** screen, choose **Device maint** > **Energy control** > **Energy storage control** > **Charge battery with grid power** and perform the required operation.

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Figure 7-31 Charge battery with grid power

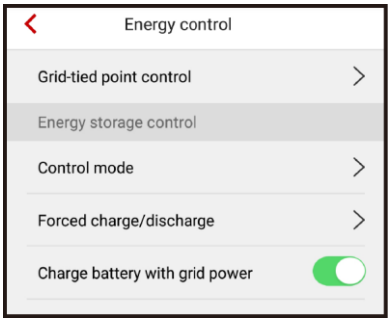

Table 7-7 Parameter description of Charge battery with grid power

Parameter	Description	Value Range
Charge battery with grid power	The power grid will charge the battery if **Charge battery with grid power** is enabled. **Charge battery with grid power** is set to **Disable** by default. If this function is enabled, comply with the grid charge requirements stipulated in local laws and regulations.	• Disable • Enable

----End

7.4.3.5 Starting or Shutting Down the SUN2000

Procedure

Step 1 On the **Operation console** screen, choose **Device maint** > **Inverter ON/OFF**, and perform operations as required.

NOTE
To start or shut down the SUN2000, you need to need to re-enter the password.

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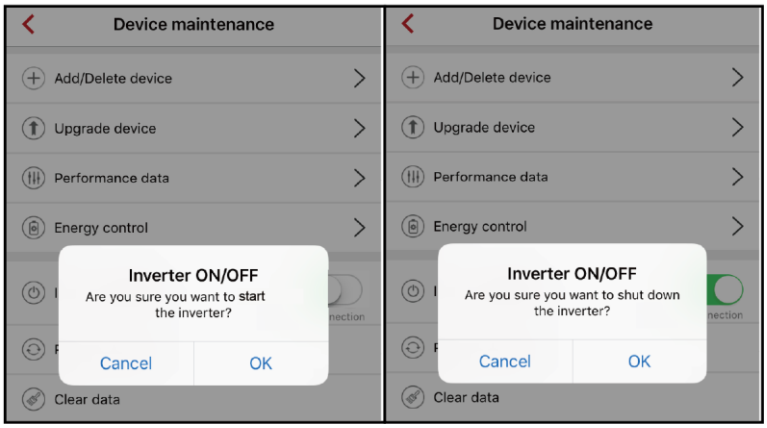
Figure 7-32 Starting or shutting down the SUN2000



----End

7.4.3.6 Restoring Factory Defaults

Context

NOTICE

Perform this operation with caution because all configured parameters except the current date, time, and networking related parameters will be restored to their factory defaults. This operation will not affect operating information, alarm records, or system logs.

Procedure

Step 1 On the **Operation console** screen, choose **Device maint** > **Restore defaults**, and then tap **Confirm**.

NOTE

To restore factory defaults, you need to re-enter the password.

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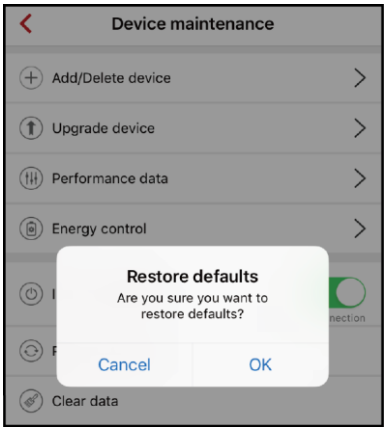
Figure 7-33 Restoring factory defaults



----End

7.4.3.7 Clearing Data

Context

NOTICE

If you clear data, all alarms and energy yield data will be cleared.

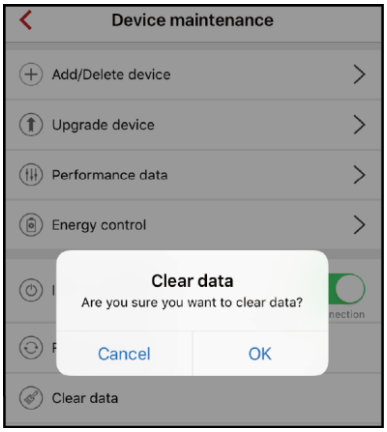
Procedure

Step 1 On the **Operation console** screen, choose **Device maint** > **Clear data**.

NOTE

To clear data, you need to re-enter the password.

Figure 7-34 Clearing data



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----End

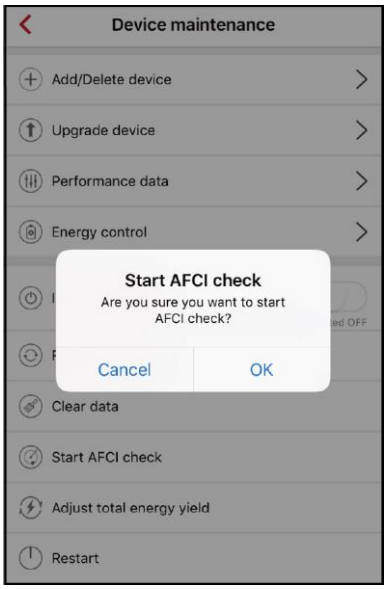
7.4.3.8 Starting AFCI Check

Procedure

Step 1 On the **Operation console** screen, choose **Device maint** > **Start AFCI check** and perform the required operation.

NOTE
To start the AFCI check, you need to re-enter the password.

Figure 7-35 Starting AFCI check



----End

7.4.3.9 Adjusting Total Energy Yield

Procedure

Step 1 On the **Operation console** screen, choose **Device maintenance** > **Adjust total energy yield** and perform the required operation.

NOTE
To Adjust total energy yield, you need to re-enter the password.

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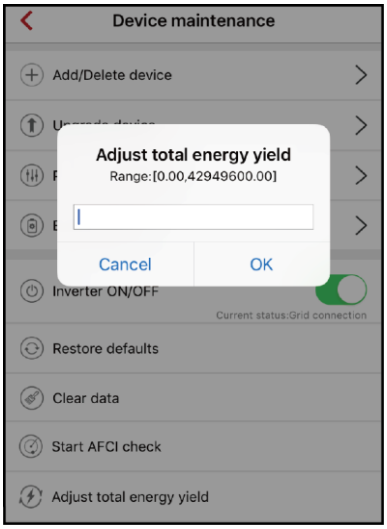
Figure 7-36 Adjusting total energy yield



Adjusting total energy yield: Specifies the initial value of inverter energy yield. This parameter is used in SUN2000 replacement scenarios. Set the initial energy yield of the new SUN2000 to the total energy yield of the old SUN2000 to ensure continuity of cumulative energy yield statistics.

----End

7.4.3.10 Restarting the SUN2000

Procedure

Step 1 On the **Operation console** screen, choose **Device maint** > **Restart** to restart the SUN2000

NOTE
To restart the SUN2000, you need to re-enter the password.

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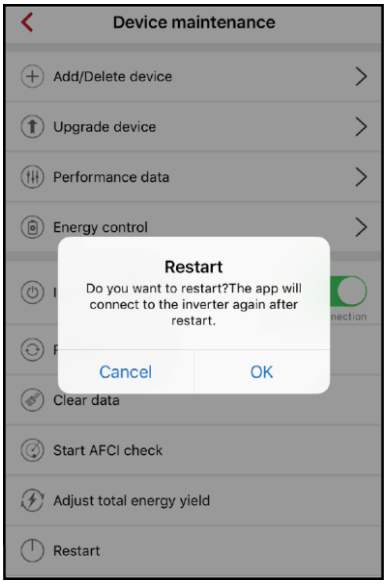
Figure 7-37 Restart



----End

7.4.4 Quick Setting

To enter the **Quick setting** screen, choose **Quick setting** from the **Operation console** screen.

The **Quick setting** screen provides two setting modes. Select either of them based on site requirements.

To exit the setting, press the **Back** button on the mobile phone or tap **Exit** on the screen.

Method 1: Quick Setting

Step 1 Choose **Quick setting** from the **Operation console** screen and perform setting by following the instructions.

NOTE

The following figure shows an example of connecting to the Locus management system.

- Set domain name to **huawei.devicedataacquisition.com**.
- Set the port number to **55555**.
- Set the remote protocol type to **MODBUS**.
- Enable encrypted transmission.

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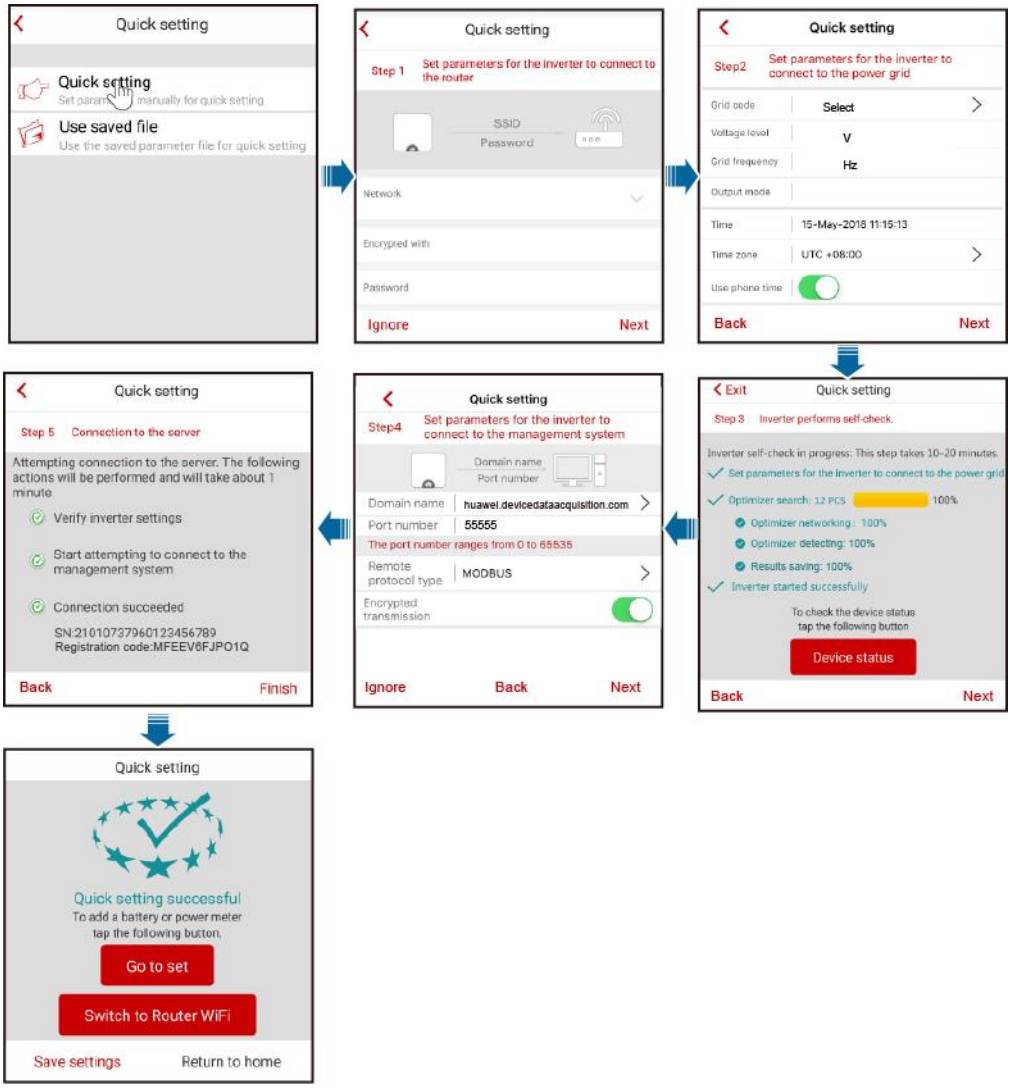
Figure 7-38 Quick setting



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NOTICE

- Set the grid code that applies to the country or region where the PV plant is located and the particular SUN2000 model.
- If there is no need to connect to the router or management system, skip the corresponding steps.
- After the management system is successfully connected, the SUN2000 will report the SN and installer registration code. If the connection fails, another connection attempt will start after 10 seconds. The installer registration code is generated by the SUN2000 automatically and is used for the installer to register with the management system and manage the inverter.
- For the operations about how to add devices, see 7.4.3.1 Adding/Deleting Devices.
- After quick setting is complete, tap **Switch to Router WiFi** to switch to the **Available WiFi networks nearby** screen and tap the corresponding router WiFi connection to switch to the router WiFi network.
- To connect to the router WiFi network from the mobile phone system after router parameters have been successfully set, you need to log out of the app and log in again.
- After following all the instructions on the **Quick setting** screen, tap **Save settings** to store the configurations or tap **Return to home** to return to the **Home** screen.

----End

Method 2: use the saved file

Before choosing **Use saved file** for quick setting, ensure that the corresponding configuration file is saved in your mobile phone. To generate a configuration file, tap **Save settings** on the **Quick setting** screen.

Step 1 Choose **Quick setting** > **Use saved file** from the **Operation console** screen and perform deployment by following the instructions.

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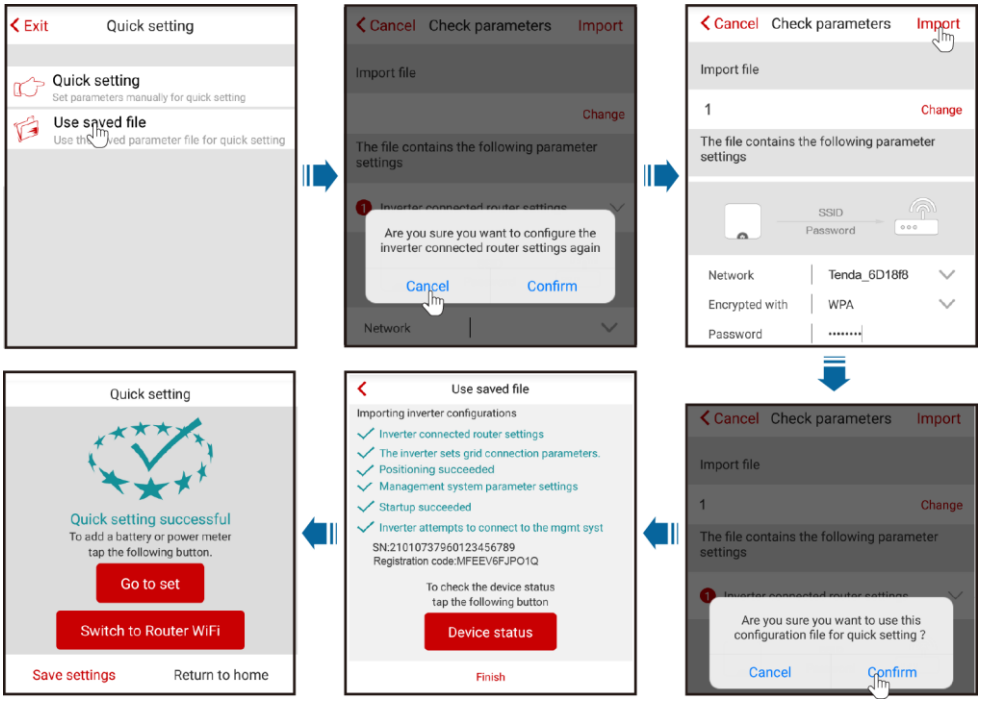
Figure 7-39 Performing quick setting using a saved file



NOTE

- To change the configuration file to be imported, tap **Change**.
- In the dialog box with **Are you sure you want to configure the inverter connected router settings again**, if you tap **Confirm**, the previously saved router configurations will be cleared. If you tap **Cancel**, you only have to enter the saved router password.
- After quick setting is complete, tap **Switch to Router WiFi** to switch to the **Available WiFi networks nearby** screen and tap the corresponding router WiFi connection to switch to the router WiFi network.
- To connect to the router WiFi network from the mobile phone system after router parameters are successfully set, you need to log out of the app and log in again.
- After the management system is successfully connected, the SUN2000 will report the SN and installer registration code. If the connection fails, another connection attempt will start after 10 seconds. The installer registration code is generated by the SUN2000 automatically and is used for the installer to register with the management system and manage the inverter.

----End

7.4.5 Setting Grid-Connection Parameters

Setting Grid-Connection Parameters

To set grid codes, choose **Grid-connect config** from the **Operation console** screen.

NOTE

- Before setting a grid code, ensure that the DC side of the inverter is energized. **Voltage level**, **Grid frequency**, and **Output mode** do not have to be set because they are associated with the grid code.
- When **Use phone time** is enabled, you can use the time and time zone of your phone.

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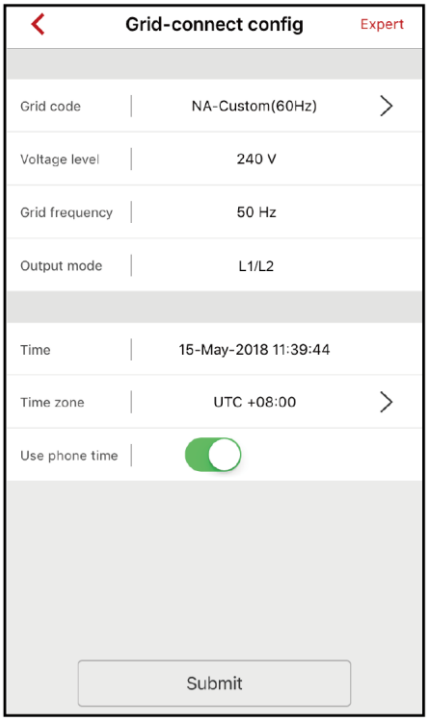
Figure 7-40 Grid-connect config



Expert Mode

To set grid parameters, protection parameters, feature parameters, power adjustment parameters, and time in expert mode, choose **Grid-connect config** > **Expert** from the **Operation console** screen.

7.4.5.1 Setting Grid Parameters

To set grid parameters, choose **Grid-connect config** > **Expert** > **Grid parameters** from the **Operation console** screen.

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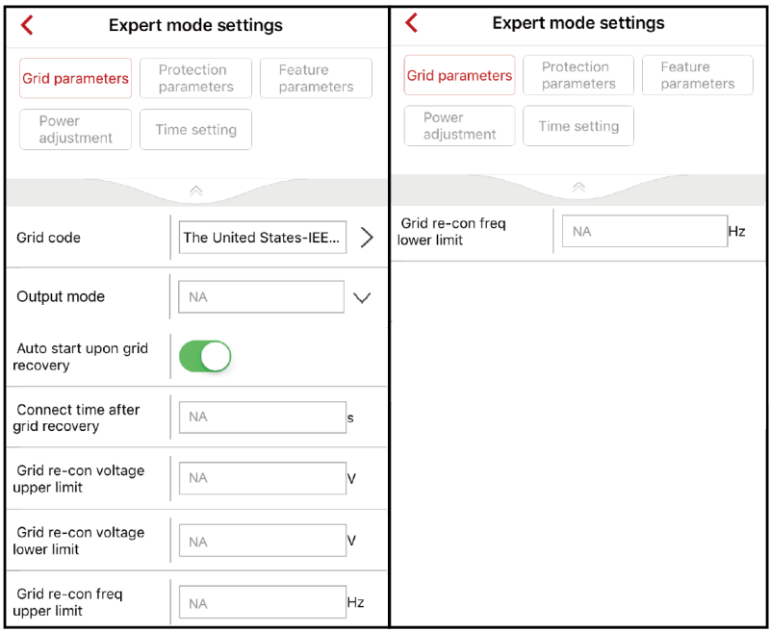
Figure 7-41 Grid parameters



NOTE

- Vn represents the rated voltage and Fn represents the rated frequency.
- The grid parameter values vary with grid codes.

Table 7-8 Description of 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 being used and the SUN2000 application scenario. Before setting the grid code, ensure that the DC side of the inverter is energized. For details of grid codes, see A Grid Codes.	The default value varies depending on the model.
Output mode		• L/N • L1/L2/N • L1/L2
Auto start upon grid recovery	Specifies whether the SUN2000 can start automatically after the power grid recovers.	• Disable • Enable
Connect time after grid recovery (s)	Specifies the time after which the SUN2000 begins restarting after the power grid recovers.	[0, 900]
Grid re-con voltage upper limit (V)	For a specific grid code, if the grid voltage exceeds the	[100%Vn, 136%Vn]

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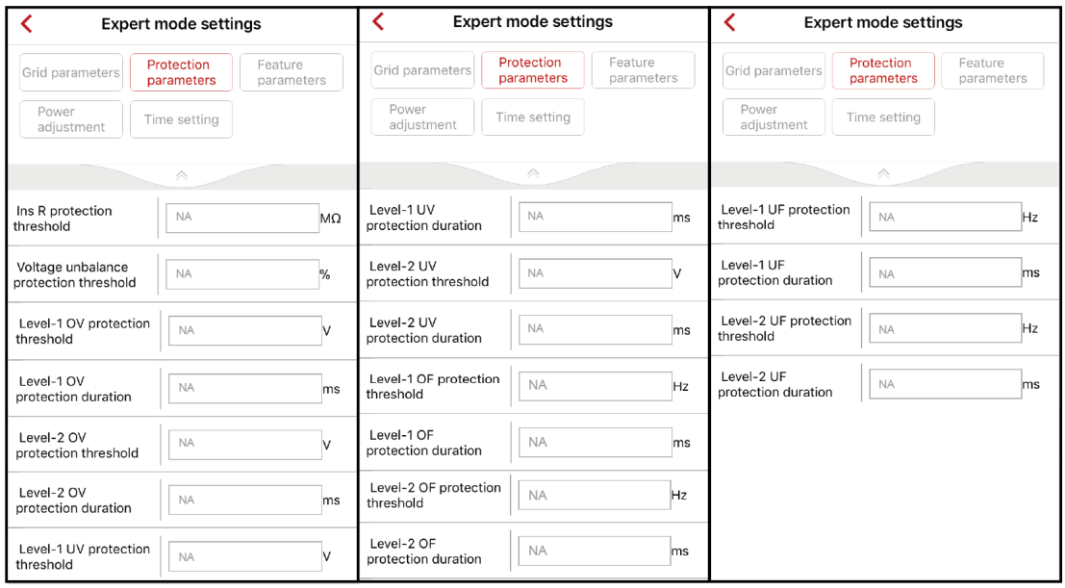
Parameter	Description	Value Range
	upper threshold, the SUN2000 is not allowed to connect to the power grid.	
Grid re-con voltage lower limit (V)	For a specific grid code, if the grid voltage is below the lower threshold, the SUN2000 is not allowed to connect to the power grid.	[45%Vn, 95%Vn]
Grid re-con freq upper limit (Hz)	For a specific grid code, if the grid frequency exceeds the upper threshold, the SUN2000 is not allowed to connect to the power grid.	[100%Fn, 112%Fn]
Grid re-con freq lower limit (Hz)	For a specific grid code, if the grid frequency is below the lower threshold, the SUN2000 is not allowed to connect to the power grid.	[85%Fn, 100%Fn]

7.4.5.2 Protection Parameters

To set protection parameters, choose **Grid-connect config** > **Expert** > **Protection parameters** from the **Operation console** screen.

Figure 7-42 Protection parameters



NOTE

- Vn represents the rated voltage and Fn represents the rated frequency.

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- The protection parameter values vary with the grid code.

Table 7-9 Description of protection parameters

Parameter	Description	Value Range
Ins R protection threshold (MΩ)	To ensure device safety, the SUN2000 detects the insulation resistance of the input side to the ground when it starts a self-check. If the detected value is less than the preset value, the SUN2000 does not start.	[0.02, 1.5]
Unbalance voltage protection	Specifies the SUN2000 protection threshold in the case of unbalanced power grid voltage.	[0, 50]
Level-1 OV protection threshold (V)	Specifies the level-1 overvoltage protection threshold.	[1xVn, 1.5xVn]
Level-1 OV protection duration (ms)	Specifies the level-1 overvoltage protection duration.	[50, 7200000]
Level-2 OV protection threshold (V)	Specifies the level-2 overvoltage protection threshold.	[1xVn, 1.5xVn]
Level-2 OV protection duration (ms)	Specifies the level-2 overvoltage protection duration.	[50, 7200000]
Level-1 UV protection threshold (V)	Specifies the level-1 undervoltage protection threshold.	[0.15xVn, 1xVn]
Level-1 UV protection duration (ms)	Specifies the level-1 undervoltage protection duration.	[50, 7200000]
Level-2 UV protection threshold (V)	Specifies the level-2 undervoltage protection threshold.	[0.15xVn, 1xVn]
Level-2 UV protection duration (ms)	Specifies the level-2 undervoltage protection duration.	[50, 7200000]
Level-1 OF protection threshold (Hz)	Specifies the level-1 overfrequency protection threshold.	[1xFn, 1.15xFn]

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Parameter	Description	Value Range
Level-1 OF protection duration (ms)	Specifies the level-1 overfrequency protection duration.	[50, 7200000]
Level-2 OF protection threshold (Hz)	Specifies the level-2 overfrequency protection threshold.	[1xFn, 1.15xFn]
Level-2 OF protection duration (ms)	Specifies the level-2 overfrequency protection duration.	[50, 7200000]
Level-1 UF protection threshold (Hz)	Specifies the level-1 underfrequency protection threshold.	[0.85xFn, 1xFn]
Level-1 UF protection duration (ms)	Specifies the level-1 underfrequency protection duration.	[50, 7200000]
Level-2 UF protection threshold (Hz)	Specifies the level-2 underfrequency protection threshold.	[0.85xFn, 1xFn]
Level-2 UF protection duration (ms)	Specifies the level-2 underfrequency protection duration.	[50, 7200000]

7.4.5.3 Feature Parameters

To set feature parameters, choose **Grid-connect config** > **Expert** > **Feature parameters** from the **Operation console** screen

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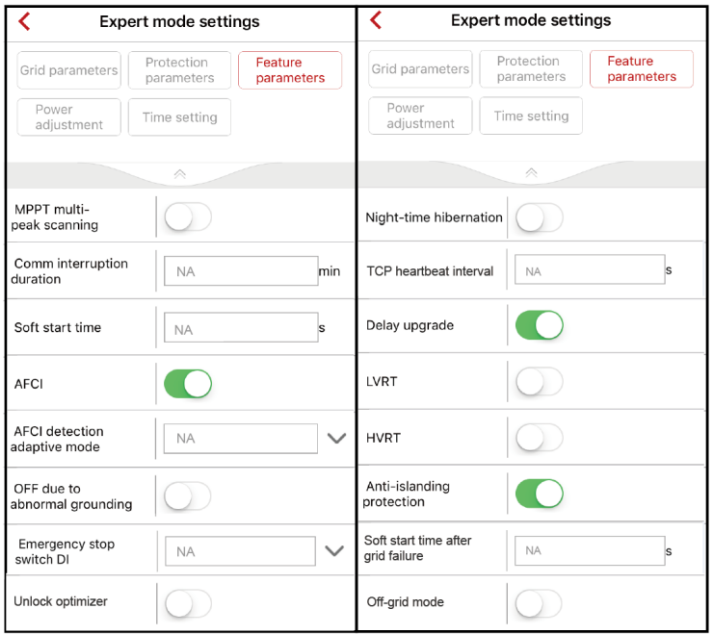
Figure 7-43 Feature parameters



NOTE

The feature parameter values vary with the grid code.

Table 7-10 Description of 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 for all PV strings at regular intervals to locate the maximum power. The scan interval is specified by **MPPT multi-peak scan interval**.	• Disable • Enable
MPPT multi-peak scan 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]

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Parameter	Description	Value Range
Comm 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 the duration for the power to gradually increase when the SUN2000 starts.	[20, 1800]
AFCI	The North American standard requires the SUN2000 to provide the DC arc detection function.	• Disable • Enable
AFCI detection adaptive mode	Adjusts the sensitivity of arc detection.	• High • Moderate • Low
OFF due to abnormal grounding	This function is used to detect whether the SUN2000 is properly grounded before starting the SUN2000, or to detect whether the ground cable is disconnected when the SUN2000 is working. This parameter is set to **Enable** by default. For certain types of power grids, if an isolation transformer connects to the output side of the SUN2000, you need to set **OFF due to abnormal grounding** to **Disable** after checking that the SUN2000 is properly grounded. Then the SUN2000 can start normally. If you are not sure whether the SUN2000 connects to such a power grid, check with your supplier or Huawei technical support.	• Disable • Enable
Emergency stop switch DI	Specifies the I/O signal of the emergency stop switch.	• Disable • NC • NO

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Parameter	Description	Value Range
Unlock optimizer	The optimizer needs to be unlocked before inverter replacement.	• Disable • Enable
Night-time hibernation	The SUN2000 monitors PV strings at night. If **Night-time hibernation** is set to **Enable**, the monitoring function of the SUN2000 will hibernate at night, reducing power consumption.	• Disable • Enable
TCP heartbeat interval	Set the TCP heartbeat interval between the management system and the inverter. If it is set to 65535, there is no heartbeat. If it is set to 0, the heartbeat interval is 3 minutes by default.	[0, 65535]
Delay upgrade	This parameter is mainly used in upgrade scenarios at night when there is no power output from the PV strings or the dawn or dusk when output is unstable.	• Disable • Enable
LVRT	When the 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 low voltage ride-through (LVRT).	• Disable • Enable
Threshold for triggering LVRT (V)	Specifies the threshold for triggering LVRT.	[50%Vn, 92%Vn]
LVRT undervoltage protection shield	Enables or disables the undervoltage protection shield during LVRT.	• Disable • Enable
LVRT reactive power comp factor	During LVRT, the SUN2000 needs to generate reactive power to support the power grid. This parameter specifies the reactive power generated by the SUN2000.	[0, 3]

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Parameter	Description	Value Range
HVRT	When the 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
HVRH threshold	Specifies the threshold for triggering HVRT.	[105%Vn, 130%Vn]
Anti-islanding protection	Enables or disables the active islanding protection function.	• Disable • Enable
Soft start time after grid failure (s)	Specifies the time for the power to gradually increase when the SUN2000 restarts after the power grid recovers.	[20, 800]
Off-grid mode	Enables or disables the backup mode. • Enable: The SUN2000 provides the backup function (if there is a power grid outage, it supplies power to loads through the backup port in backup mode). • Disable: The SUN2000 does not provide the backup function.	• Enable • Disable

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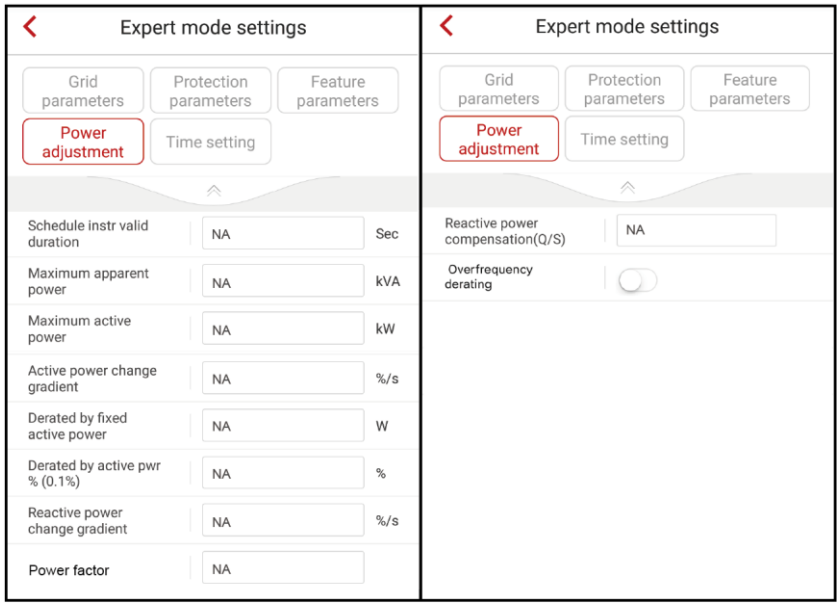
Parameter	Description	Value Range
Grid-tied/Off-grid mode switching	• Automatic switching: the SUN2000 automatically switches between grid-tied and backup modes based on the power grid status. • Manual switching: The SUN2000 determines the running mode based on the position of the off-grid/backup button located on the bottom of the unit. If you press the button when there is a power grid outage, the SUN2000 switches to the backup mode. If you release the button after the power grid recovers, the SUN2000 switches to the grid-tied mode.	• Automatic switching • Manual switching

7.4.5.4 Power Adjustment

To set power adjustment parameters, choose **Grid-connect config** > **Expert** > **Power adjustment** from the **Operation console** screen.

Figure 7-44 Power adjustment



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NOTE
The power adjustment parameter values vary with grid codes. The displayed values prevail.

Table 7-11 Description of power adjustment parameters

Parameter	Description	Value Range
Schedule instr valid duration (Sec)	Adjusts the duration within which the scheduling instruction is valid. If this parameter is set to **0**, the instruction is valid permanently.	[0, 86400]
Maximum apparent power (kVA)	Specifies the output upper threshold for the maximum apparent power to adapt to the capacity requirements for standard transformers and customized transformers. If the maximum active power equals Smax_limit, this parameter is not displayed.	[Maximum active power, Smax_limit]
Maximum active power (kW)	Specifies the output upper threshold for the maximum active power to adapt to different market requirements.	[0.1, Pmax_limit]
Active power change gradient (%/s)	Adjusts the change speed of the SUN2000 active power.	[0.1, 1000]
Derated by fixed active power (W)	Adjusts the active power output of the SUN2000 based on fixed values. Pmax refers to the maximum active power.	[0, Pmax_limit]
Derated by active pwr % (0.1%)	Adjusts the active power output of the SUN2000 by a percentage. If this parameter is set to **100**, the SUN2000 delivers its maximum output power.	[0, 100]
Reactive power change gradient (%/s)	Adjusts the change speed of the SUN2000 reactive power.	[0.1, 1000]
Power factor	Adjusts the SUN2000 output power factor.	(–1, –0.8] U [0.8, 1]
Reactive power compensation (Q/S)	Adjusts the SUN2000 output reactive power.	[–0.6, 0.6]

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Parameter	Description	Value Range
Overfrequency derating	Enables or disables the overfrequency derating function.	• Disable • Enable
Freq for triggering OF derating (Hz)	For a specific grid code, the SUN2000 output active power needs to be derated when the grid frequency exceeds the set value.	• When the output frequency is 50 Hz, the value range is 45.00–55.00 Hz. • When the output frequency is 60 Hz, the value range is 55.00–65.00 Hz.
Freq for exiting OF derating (Hz)	Specifies the frequency threshold for exiting overfrequency derating.	• When the output frequency is 50 Hz, the value range is 45.00–55.00 Hz. • When the output frequency is 60 Hz, the value range is 55.00–65.00 Hz.
Cutoff frequency of overfrequency	Specifies the frequency threshold for cutting off overfrequency derating.	• When the output frequency is 50 Hz, the value range is 45.00–55.00 Hz. • When the output frequency is 60 Hz, the value range is 55.00–65.00 Hz.
Cutoff power of overfrequency	Specifies the power threshold for cutting off overfrequency derating.	[0, 100]
Recovery grad of OF derating (%/min)	Specifies the power recovery gradient for overfrequency derating.	[5, 20]

7.4.5.5 Time Setting

To set time, choose **Grid-connect config** > **Expert** > **Time setting** from the **Operation console** screen.

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Figure 7-45 Time setting

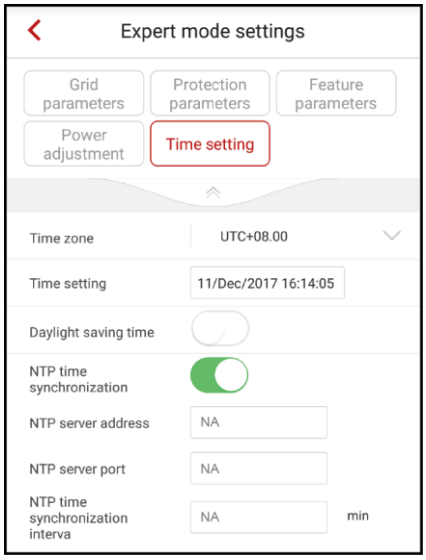

Table 7-12 Description of time parameters

Parameter	Description	Value Range
Time zone	Specifies the time zone.	-
Time setting	Specifies the time.	-
Daylight saving time	Enables or disables the DST.	• Disable • Enable
Daylight saving time settings (min)	Specifies the DST offset.	[-240, 240]
Start date	Specifies the DST offset start date.	[01-01, 12-31]
Start time	Specifies the DST offset start time.	[00:00:00, 23:59:59]
End date	Specifies the DST offset end date.	[01-02, 12-30]
End time	Specifies the DST offset end time.	[00:00:00, 23:59:59]
NTP time synchronization	Enables or disables NTP time synchronization.	• Disable • Enable
NTP server address	Specifies the NTP server IP address or domain name.	-
NTP server port	Specifies the server port.	[0, 65535]
NTP time synchronization interval	Specifies the NTP time synchronization interval.	[1, 1440]

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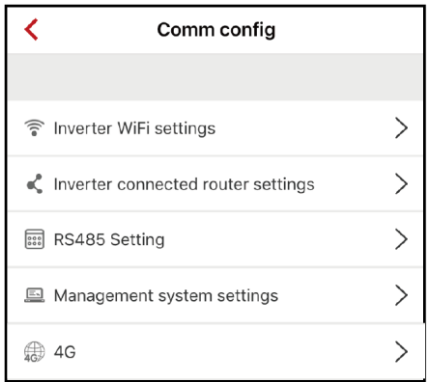
7.4.6 Communication Configuration

To access the **Comm config** screen, choose **Comm config** from the **Operation console** screen.

Figure 7-46 Comm config



Setting Inverter WiFi Parameters

To set the inverter WiFi parameters, choose **Comm config** > **Inverter WiFi settings** from the **Operation console** screen, and then select the appropriate SUN2000.

Figure 7-47 Inverter WiFi settings

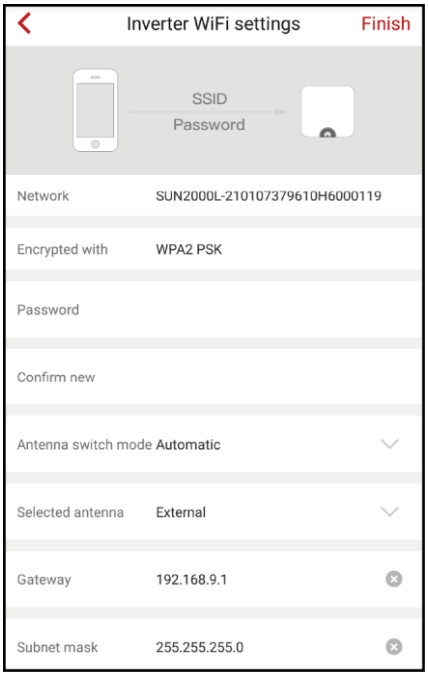


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Table 7-13 Description of the parameters on the Inverter WiFi settings screen

Parameter	Description	Value Range
Network	Specifies the service set identifier (SSID) of the inverter WiFi network that functions as an access point (AP).	N/A
Encrypted with	Specifies the encryption level of the physical layer of the inverter WiFi network.	N/A
Password	Specifies the password for the inverter WiFi network. The initial password is **Changeme**. To ensure account security, change the password as soon as possible.	• The password must be 8 to 64 characters. • The password cannot contain special characters long.
Confirm new		
Antenna switch mode	If this parameter is set to **Manual**, you can select either the embedded or external antenna. If it is set to **Automatic**, the system automatically detects signals received by the embedded antenna and external antenna and selects the antenna with the stronger signal. The detection cycle is 5 minutes.	• Automatic • Manual
Select antenna	Selects the embedded or external antenna. (If **Antenna switch mode** is set to **Manual** and **Select antenna** is set to **External**, ensure that the external antenna is correctly connected.)	• Embedded • External
Gateway	Specifies the IP address of the inverter WiFi network that functions as an AP. The default value is recommended.	[1.0.0.0, 223.255.255.255]
Subnet mask	The default value (**255.255.255.0**) is recommended.	[1.0.0.0, 223.255.255.255]

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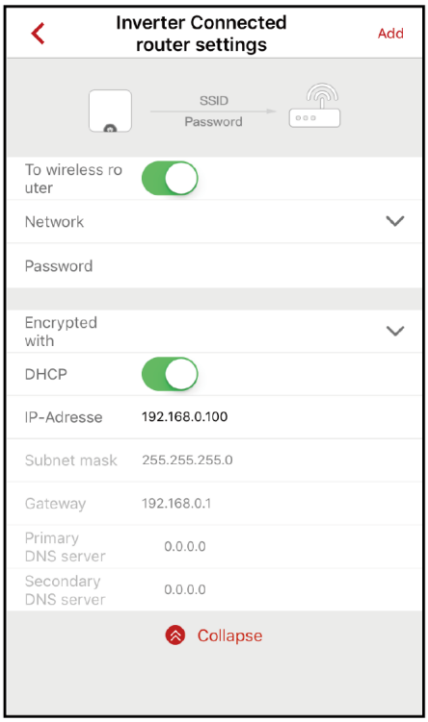
Setting the Router Connected to the SUN2000

To set the parameters for the router connected to the SUN2000, choose **Comm config** > **Inverter connected router settings** from the **Operation console** screen.

Figure 7-48 Inverter connected router settings



NOTE

Before the **Inverter connected router settings** screen is displayed, the app sends a command to start scanning. Then the SUN2000 starts to scan nearby WiFi networks and sends the list of WiFi networks to the app.

Table 7-14 Description of the parameters on the Inverter connected router settings screen

Parameter	Description	Value Range
To wireless router	Enables or disables connection between the SUN2000 and a router.	• Disable • Enable
Network	Specifies the SSID of the router to which the inverter WiFi network connects.	N/A
Password	Specifies the WiFi password for the router.	N/A

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Parameter	Description	Value Range
Encrypted with	Specifies the encryption level for the SUN2000 to connect to the router over WiFi. It should be the same as the encryption level of the router. This parameter is associated with the network name.	• Not encrypted • WEP_OPEN • WEP_SHARED • WPA • WPA2 • WPA/WPA2
DHCP	• If the IP address automatically assigned by the home router is used, enable this parameter. Then the following parameters will be automatically assigned. • If the IP address automatically assigned by the home router is not used, disable this parameter. Then the following parameters need to be manually assigned.	• Disable • Enable
IP address	Specifies the IP address of the router to which the inverter WiFi network connects. Recommended: Set the IP address in the same network segment as the home router IP address.	[1.0.0.0, 223.255.255.255]
Subnet mask	Specifies the router subnet mask.	N/A
Gateway	Specifies the router gateway address.	N/A
Primary DNS server	Specifies the address of the primary domain name service (DNS) server.	N/A
Secondary DNS server	Specifies the address of the secondary DNS server.	N/A

RS485 Setting

To set RS485 communications parameters, choose **Comm config** > **RS485 setting** from the **Operation console** screen.

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NOTE

- If a power meter or battery is connected, the SUN2000 baud rate should be the same as the baud rate of the power meter or battery. Otherwise, the power meter or battery cannot communicate with the SUN2000.
- The communications address is used only when the SUN2000 connects to the management system over RS485.

Figure 7-49 RS485 setting

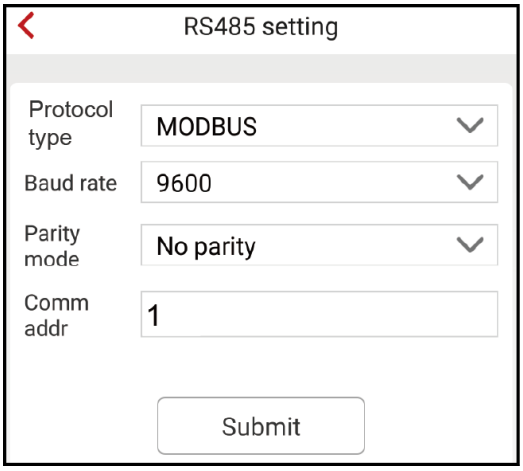

Table 7-15 Description of the parameters on the RS485 setting screen

Parameter	Description	Value Range
Protocol type	• The SUN2000 can connect to the upper-level management unit over MODBUS, or Sunspec. • If the SUN2000 connects to an energy meter or battery, set this parameter only to **MODBUS**. • If the SUN2000 does not communicate over RS485, set this parameter to **Invalid protocol type**.	• MODBUS • Sunspec
Baud rate (bps)	Specifies the RS485 communication rate, which should be the same as the communication baud rates of the energy meter and battery.	• 4800 • 9600 • 19200

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Parameter	Description	Value Range
Parity mode	Specifies the parity mode of RS485 communications, which should be the same as the communication parity modes of the energy meter and battery.	• No parity • Odd parity • Even parity
Comm addr	Specifies the SUN2000 address connecting to the management system. The address should not conflict with the addresses of other devices on the same bus.	[1, 247]

Configuring the Management System

1. To set the management system parameters and connect to the management system, choose **Comm config** > **Management system settings** from the **Operation console** screen.

   Figure 7-50 shows an example of connecting to the Locus management system.

   - Set domain name to **huawei.devicedataacquisition.com**.
   - Set the port number to **55555**.
   - Set the remote protocol type to **MODBUS**.
   - Enable encrypted transmission.

   Figure 7-50 Connecting to the management system

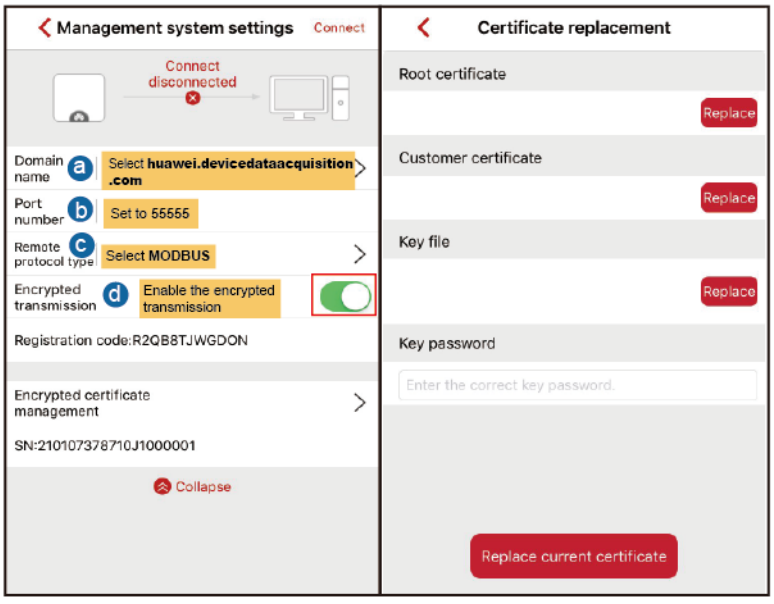

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Table 7-16 Description of the parameters on the Connecting to the management system screen

Parameter	Description	Value Range
Domain name	Specifies the IP address or network address used for connecting to the management system.	N/A
Port number	Specifies the number of the port on the management system to which the SUN2000 connects over a network protocol. Set this parameter according to the requirements of the connected management system.	[0, 65535]
Remote protocol type	Specifies remote protocol type, which the SUN2000 connect to the management system. Set this parameter to **MODBUS**, when connecting to the Locus management system.	• MODBUS • Sunspec
Encrypted transmission	If this parameter is enabled, data is transmitted between the SUN2000 and the management system after being encrypted with SSL. If this parameter is disabled, data is transmitted between the SUN2000 and the management system as plaintext, which poses security risks.	• Disable • Enable
Encrypted certificate mgmt	If encrypted connection to a third-party network management system (NMS) is required, replace the client certificate with the certificate provided by the third party. You can select the appropriate root certificate, customer certificate, or key file and enter the private key password. After the replacement is complete, connect the SUN2000 to the management system and check the correctness of the certificate.	N/A

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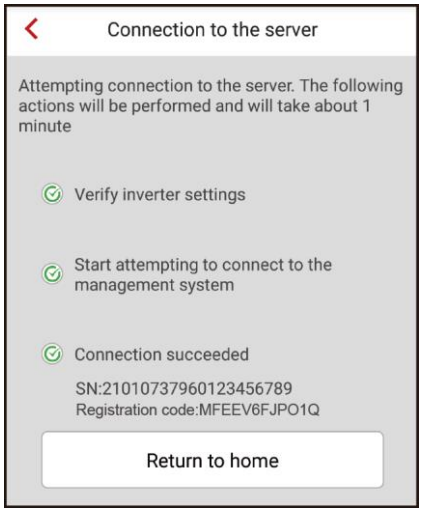
Parameter	Description	Value Range
SN	SUN2000 equipment SN.	N/A
Registration code	The installer registration code is generated by the SUN2000 automatically and is used for the installer to register with the management system and manage the inverter.	N/A

2. Tap **Connect** in the upper right corner. After establishing a connection with the management system is successfully connected, the SUN2000 will report the SN and installer registration code. If the connection fails, another connection attempt will start after 10 seconds.

NOTE
The installer registration code is generated by the SUN2000 automatically and is used for the installer to register with the management system and manage the inverter.

Figure 7-51 Connection succeeded



4G Configuration

To set 4G access parameters, choose **Comm config** > **4G** from the **Operation console** screen.

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Figure 7-52 Setting 4G access parameters

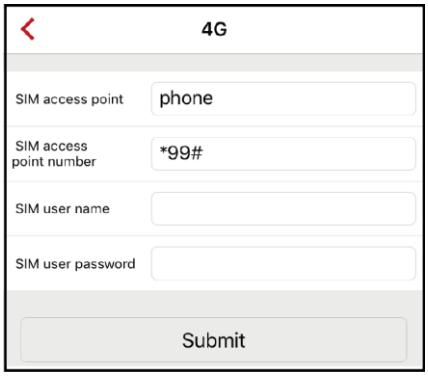

Table 7-17 Description of 4G access parameters

Parameter	Description
SIM access point	If the default access point in the system cannot be dialed up, you need to manually set the SIM card access point, access point number, SIM card user name, and SIM card user password. Use the data from the carrier that issues the SIM card.
SIM access point number	
SIM user name	
SIM user password	

7.4.7 Managing Logs

Context

The procedure for downloading all logs and fault logsis the same as that for downloading battery logs. This section describes how to download all logs.

Procedure

Step 1 On the **Operation console** screen, choose **Log mgmt** to access the **Download logs** screen, and then download logs by following the instructions.

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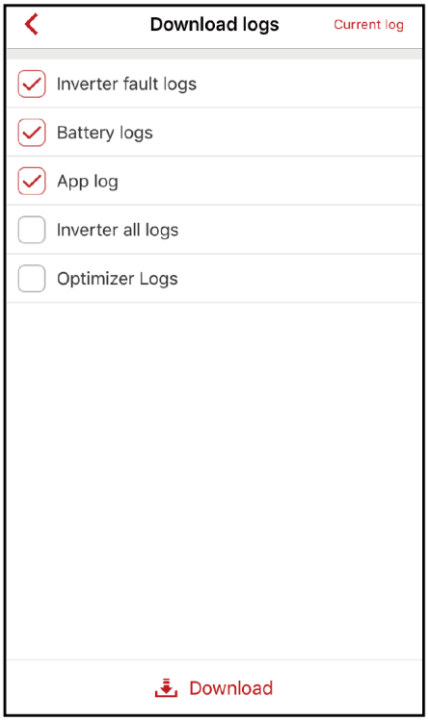
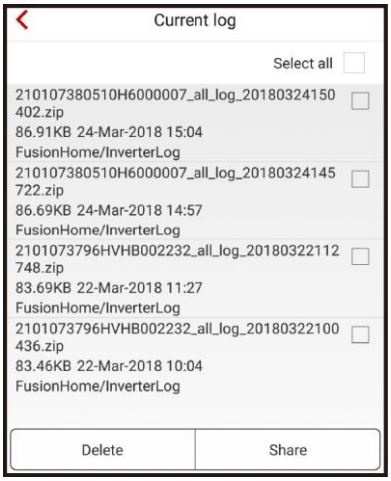
Figure 7-53 Downloading logs



Step 2 After logs are downloaded, choose **Current log** to access the log list, where you can view the downloaded logs. To delete logs or share logs by email, select the logs that need to be deleted or shared.

Figure 7-54 Current log



----End

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7.4.8 Menu

7.4.8.1 Changing the Password

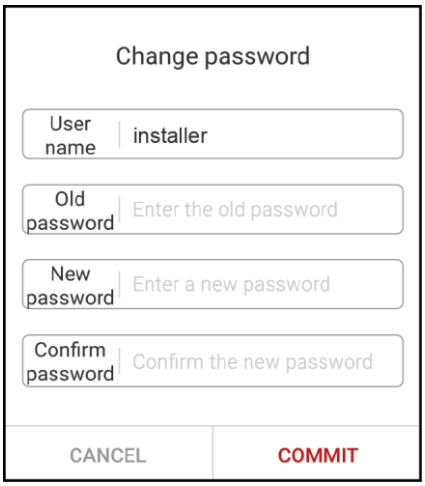
To change the login password for the installer, choose ••• > **Change password** in the upper right corner on the **Operation console** screen.

NOTE

The password should meet the following requirements:

- Contains 6–20 characters.
- Contains at least two of the following types: lowercase letters, uppercase letters, and digits.
- Differs from the old password by at least two characters.

Figure 7-55 Change password



7.4.8.2 About

To view the version information, choose ••• > **About** from the **Operation console** screen.

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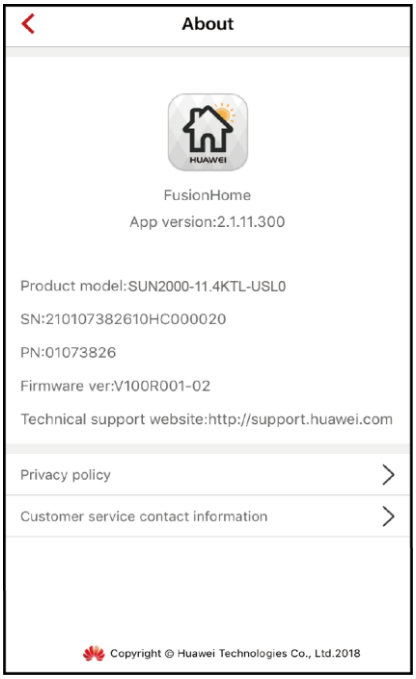
Figure 7-56 About



7.5 App Operations by the User

7.5.1 Logging In to the App

Prerequisites

- You have logged in as **installer** and followed the instructions on the **Quick setting** screen.
- The corresponding SUN2000 is displayed on the **Inverter** screen.

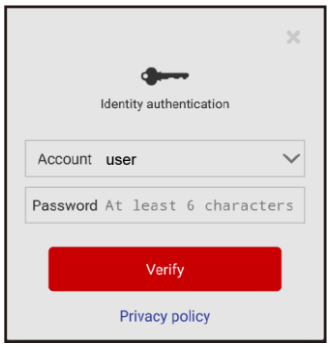
Procedure

Step 1 On the **Inverter list** screen, tap the corresponding SUN2000, select **user**, enter the password, and log in to the app.

NOTE

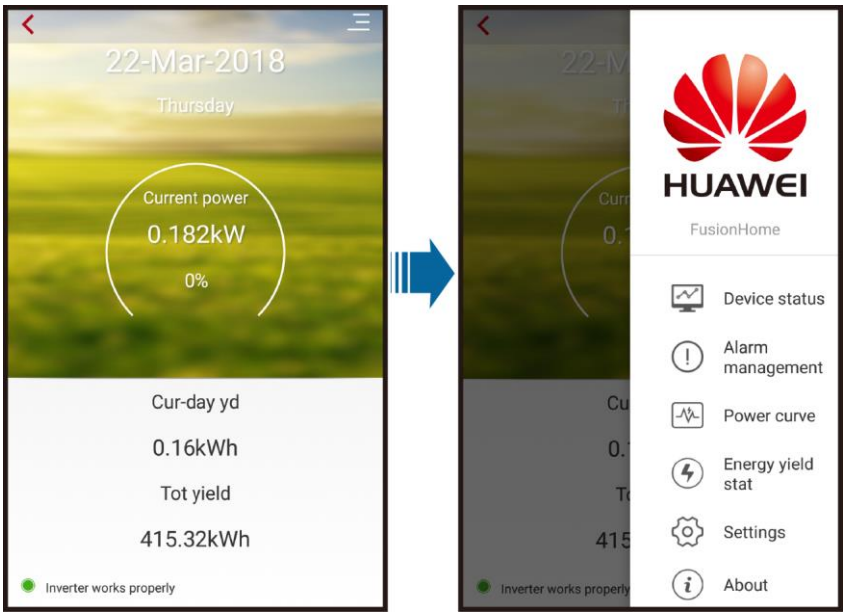
- The name of the connected SUN2000 is represented by its (SN), which can be found on the SN label attached to the side of the SUN2000.
- The login password is the same as that for the SUN2000 connected to the app and is used only when the SUN2000 connects to the app.
- The initial password is **00000a**. Use the initial password for first login. To ensure account security, change the password immediately after login.
- If you enter the passwords incorrectly for five consecutive times and the interval between consecutive entries is less than 2 minutes, your account will be locked for 5 minutes.

Figure 7-57 Identity verification



Step 2 If you log in successfully, the home screen is displayed.

Figure 7-58 Home screen



----End

7.5.2 Querying the Device Status

To query the status of each device, choose > **Device status** from the main screen.

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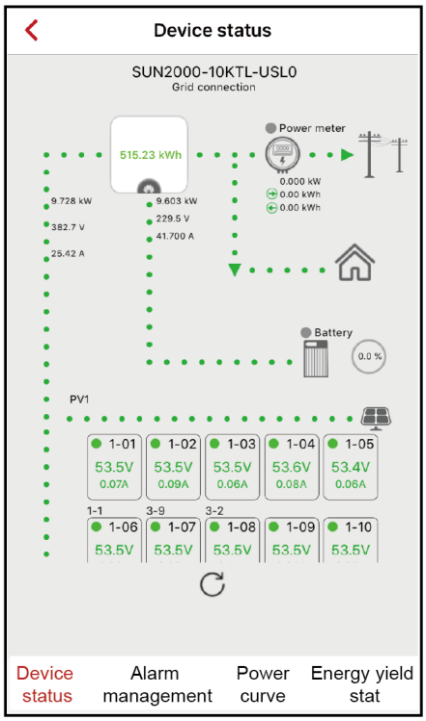
Figure 7-59 Querying the device status



7.5.3 Alarm Management

On the home screen, choose > **Alarm management** to view active and historical alarms.

To set the sorting mode for active alarms or historical alarms, tap . To query the historical alarms within a certain time range, tap and select the time range.

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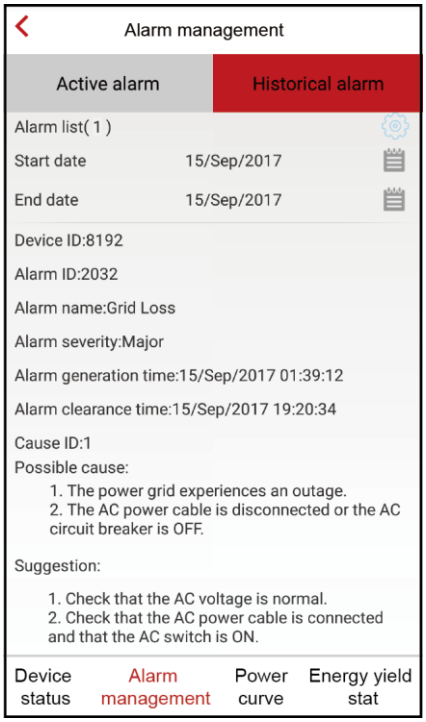
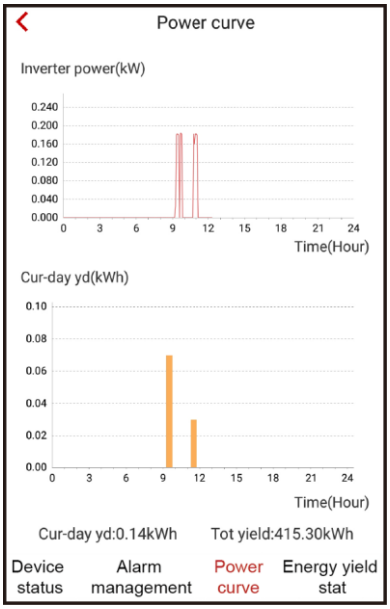
Figure 7-60 Alarm management



7.5.4 Querying the Power Curve

To query the current-day power curve and energy yield, choose > **Power curve** from the main screen.

Figure 7-61 Power curve



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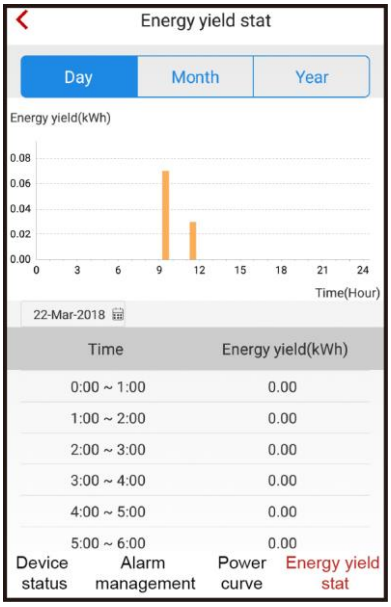
7.5.5 Querying Energy Yields

On the main screen, choose > **Energy yield stat** to query the daily, monthly, and yearly energy yields.

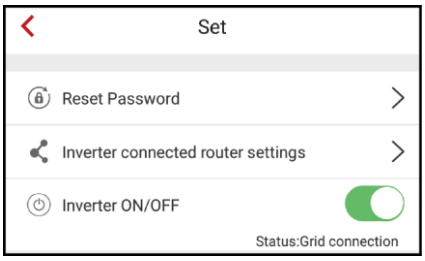
Figure 7-62 Querying energy yields



7.5.6 Settings

On the main screen, choose > **Set** and perform the following operations as required.

Figure 7-63 Settings



- Reset the password for **user** to log in to the SUN2000.

NOTE

The password should meet the following requirements:

- Contains 6–20 characters.
- Contains at least two of the following types: lowercase letters, uppercase letters, and digits.
- Differs from the old password by at least two characters.

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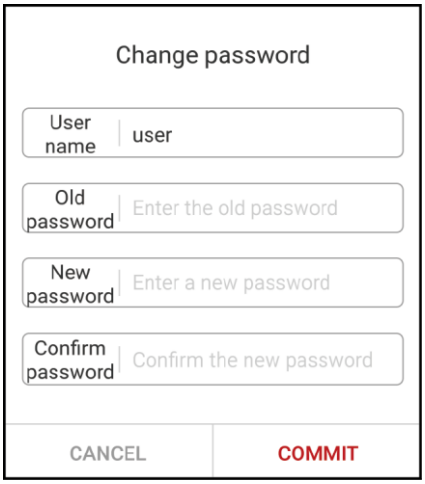
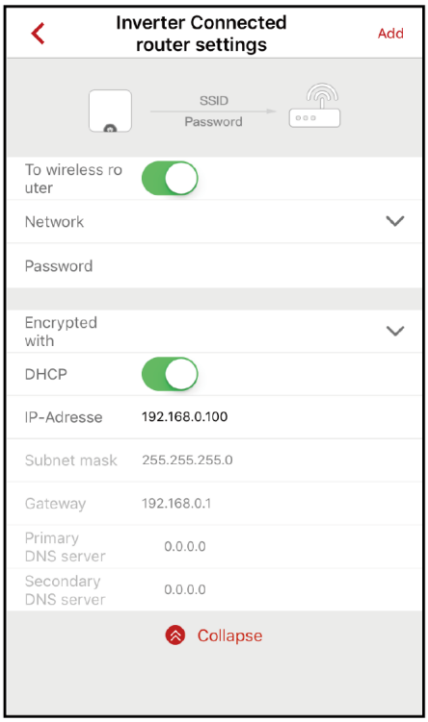
Figure 7-64 Change password



- Select the router to be connected and set parameters as required.

Figure 7-65 Inverter connected router settings



NOTE

Before the **Inverter connected router settings** screen is displayed, the app sends a command to start scanning. Then the SUN2000 starts to scan nearby WiFi networks and sends the list of WiFi networks to the app.

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Table 7-18 Description of the parameters on the Inverter connected router settings screen

Parameter	Description	Value Range
To wireless router	Enables or disables connection between the SUN2000 and a router.	• Disable • Enable
Network	Specifies the SSID of the router to which the inverter WiFi network connects.	N/A
Password	Specifies the WiFi password for the router.	N/A
Encrypted with	Specifies the encryption level for the SUN2000 to connect to the router over WiFi. It should be the same as the encryption level of the router. This parameter is associated with the network name.	• Not encrypted • WEP_OPEN • WEP_SHARED • WPA • WPA2
DHCP	• If the IP address automatically assigned by the home router is used, enable this parameter. Then the following parameters will be automatically assigned. • If the IP address automatically assigned by the home router is not used, disable this parameter. Then the following parameters need to be manually assigned.	• Disable • Enable
IP address	Specifies the IP address of the router to which the inverter WiFi network connects. Recommended: Set the IP address in the same network segment as the home router IP address.	[1.0.0.0, 223.255.255.255]
Subnet mask	Specifies the router subnet mask.	N/A
Gateway	Specifies the router gateway address.	N/A

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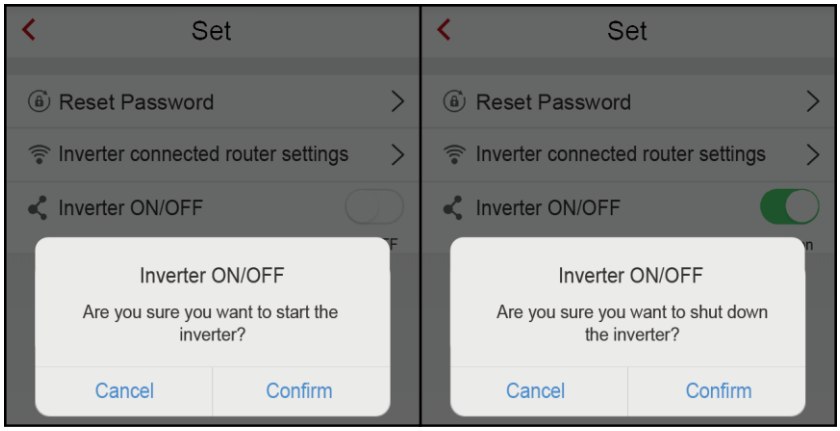
Parameter	Description	Value Range
Primary DNS server	Specifies the address of the primary domain name service (DNS) server.	N/A
Secondary DNS server	Specifies the address of the secondary DNS server.	N/A

- Start or shut down the SUN2000.

NOTE
To start or shut down the SUN2000, you need to re-enter the password.

Figure 7-66 Starting or shutting down the SUN2000



7.5.7 About

To view the version information, choose > **About** from the main screen.

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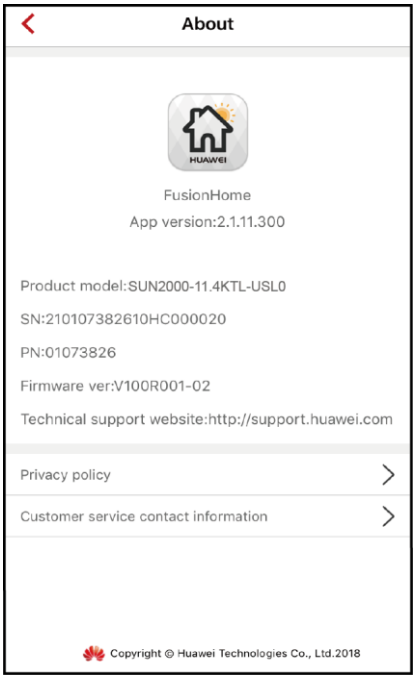
Figure 7-67 About



7.6 App Troubleshooting

Table 7-19 Common faults and troubleshooting measures

Symptom	Possible Cause	Measure
The app fails to install on an Android mobile phone.	• The mobile phone is running a version of the operating system that does not support the FusionHome app. • **Allow Installation of apps from unknown source** is not selected. • The original version on the mobile phone is not deleted.	• Upgrade the mobile phone operating system to a required version. • Choose **Settings** > **Security** and select **Allow Installation of apps from unknown sources**.
The communication fails.	The mobile phone or router is more than 3 meters away from the SUN2000, so the WiFi is not connected.	Keep the mobile phone or router within 3 meters of the SUN2000 to maintain a reliable WiFi connection.
The **Failed to connect to the inverter. Reconnecting...** message is displayed.	The mobile phone or router is more than 3 meters away from the SUN2000, or the WiFi signal is weak.	Ensure that the WiFi network is connected. Log out of the app and then log in again.

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Symptom	Possible Cause	Measure
All data fails to be obtained during operations.	Connection to the SUN2000 has been interrupted.	Reconnect to the SUN2000.
The SUN2000 cannot be obtained.	An error has occurred in the WiFi connection to the app.	• If the list still cannot be obtained after several attempts, log out. Then log in and try again. • Check whether the WiFi connection is correct.
No upgrade package is available for an upgrade.	No upgrade package is saved to the mobile phone.	Save the upgrade package to the mobile phone.

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8 System Maintenance

8.1 Routine Maintenance

To ensure that the SUN2000 can operate properly over the long term, you are advised to perform routine maintenance as described in this chapter.

CAUTION

Before cleaning the system, connecting cables, checking the grounding reliability, or doing any other maintenance, first power off the system (see 6.3 Powering Off the System for details).

Table 8-1 Maintenance check list

Check Item	Acceptance Criteria	Maintenance Interval
System cleanliness	The heat sinks are free from obstacles or dust.	Once every 6 to 12 months
System running status	• The SUN2000 is not damaged or deformed. • The SUN2000 operates without making any abnormal sounds. • All SUN2000 parameters are correctly set. Perform this check when the SUN2000 is running.	Once every 6 months

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Check Item	Acceptance Criteria	Maintenance Interval
Electrical connections	• Cables are securely connected. • Cables are intact, Pay particular attention to the cable jackets touching the metallic surface, ensuring that they are not scratched. • Unused DC input terminals, battery terminals, and COM ports are sealed by waterproofing bolts. Unused ANT ports are sealed by watertight caps.	The first maintenance should be conducted 6 months after the initial commissioning. From then on, perform the maintenance once every 6 to 12 months.
Grounding reliability	Ground cables are securely connected.	The first maintenance should be conducted 6 months after the initial commissioning. From then on, perform the maintenance once every 6 to 12 months.

8.2 Parts Replacement

8.2.1 Replacing the Power Compartment

Prerequisites

- Before replacing the power compartment, perform the power-off operation. For details, see 6.3 Powering Off the System.
- Before replacing the power compartment, ensure that the screw assemblies between the maintenance compartment and mounting bracket have been tightened.

NOTE

The power compartment of SUN2000-3.8KTL/5KTL/7.6KTL-USL0 and SUN2000-9KTL/10KTL/11.4KTL-USL0 can be replaced in the same way. The following describes the installation of the SUN2000-3.8KTL/5KTL/7.6KTL-USL0.

Procedure

Step 1 Remove the maintenance compartment cover.

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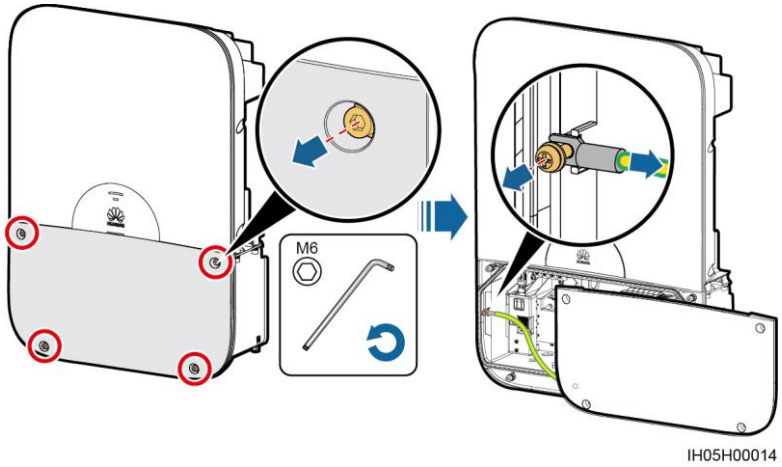
Figure 8-1 Removing the maintenance compartment cover



Step 2 Remove the 10-pin signal terminal and 2-pin enable terminal.

Figure 8-2 Removing the 10-pin signal terminal

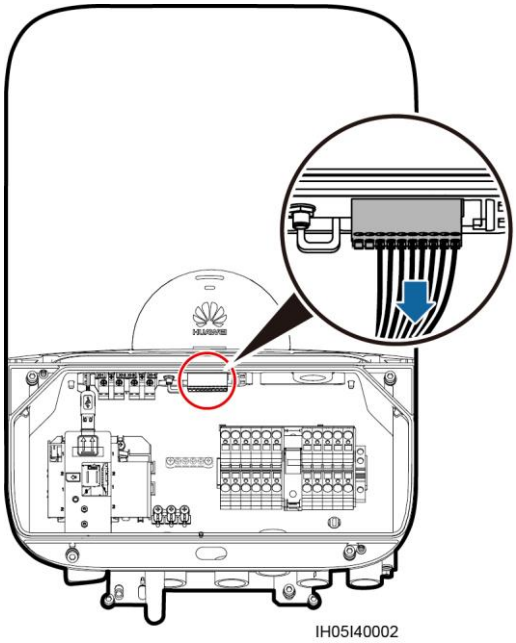


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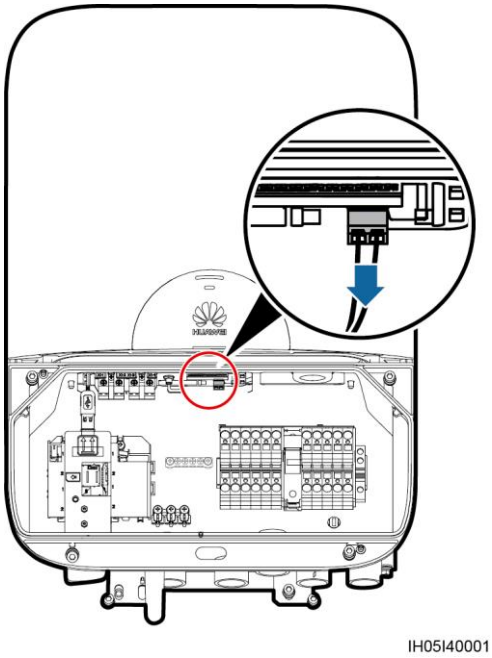
Figure 8-3 Removing the 2-pin enable terminal



Step 3 Remove the USB cable (optional, only for the 4G model), or remove the WLAN cable (optional, only for the WLAN model).

NOTE

Do not remove the 4G module when removing the USB cable.

Figure 8-4 Removing the USB cable (optional, only for the 4G model)

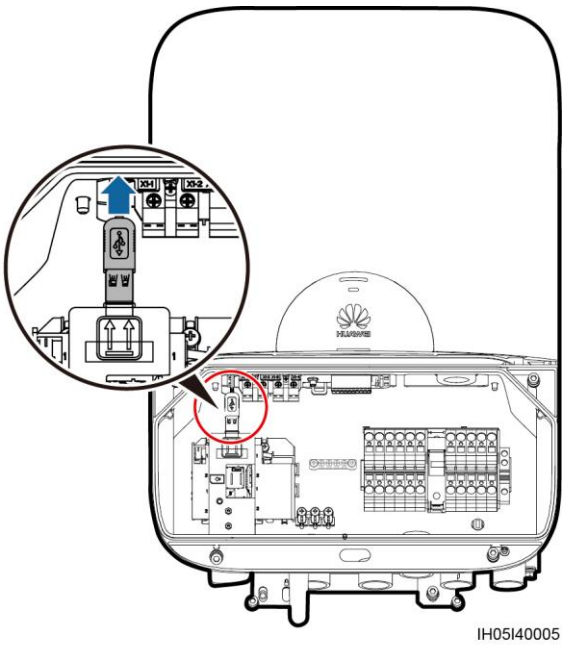


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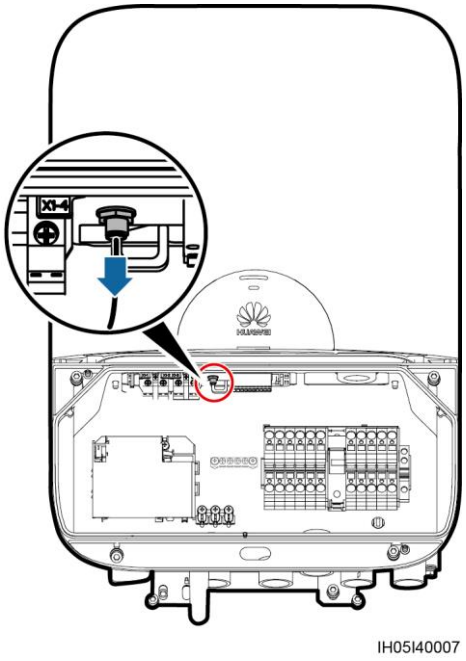
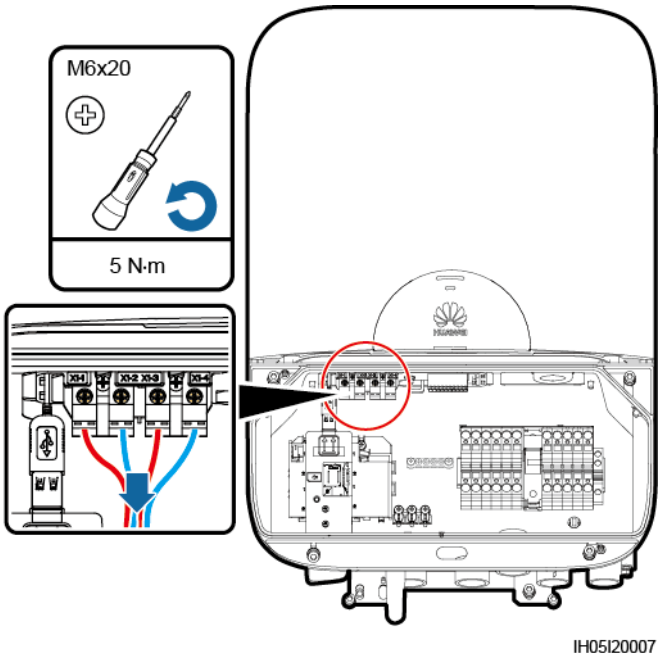
Figure 8-5 Removing the WLAN cable (optional, only for the WLAN model)



Step 4 Remove the DC cable.

Figure 8-6 Removing the DC cable



Step 5 Remove the AC cable and the fuse cable.

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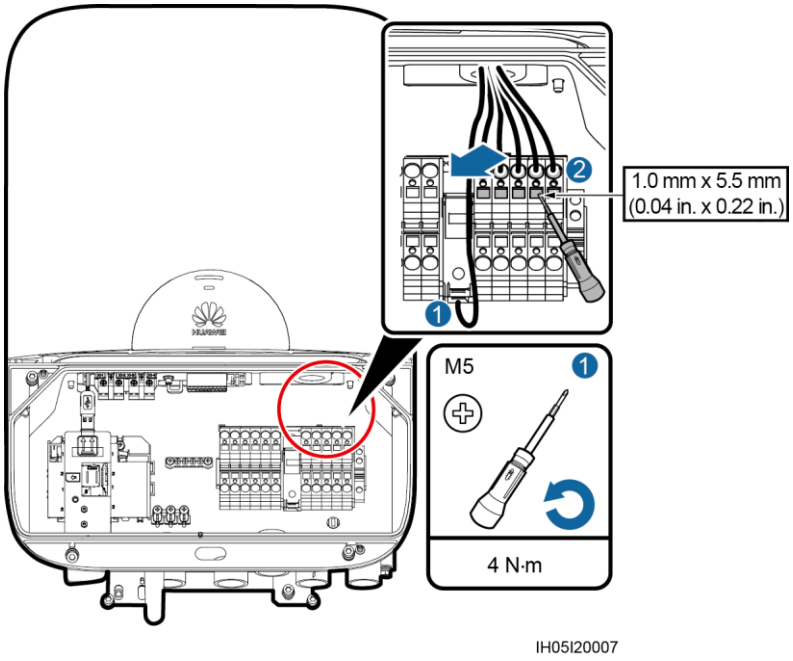
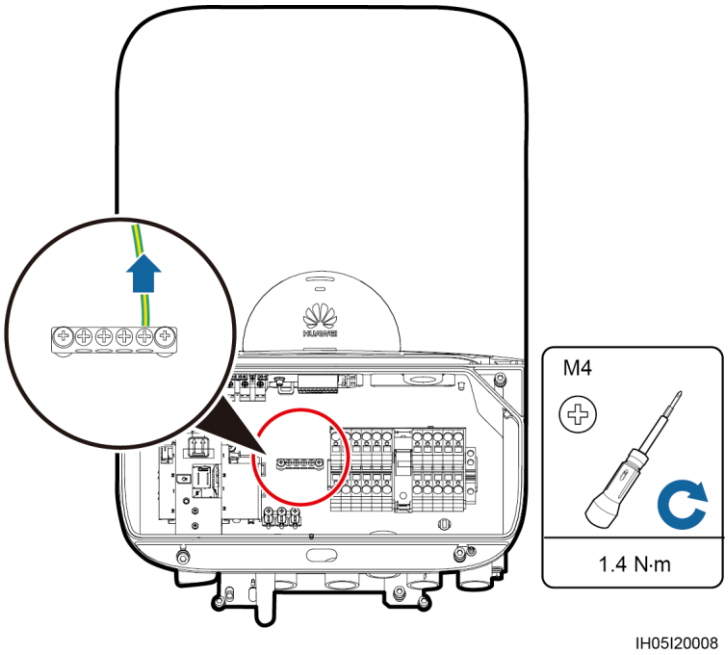
Figure 8-7 Removing the AC cable and the fuse cable



Step 6 Remove the ground cable.

Figure 8-8 Removing the ground cable



Step 7 Remove the external four M6 screws that secure the power and maintenance compartments.

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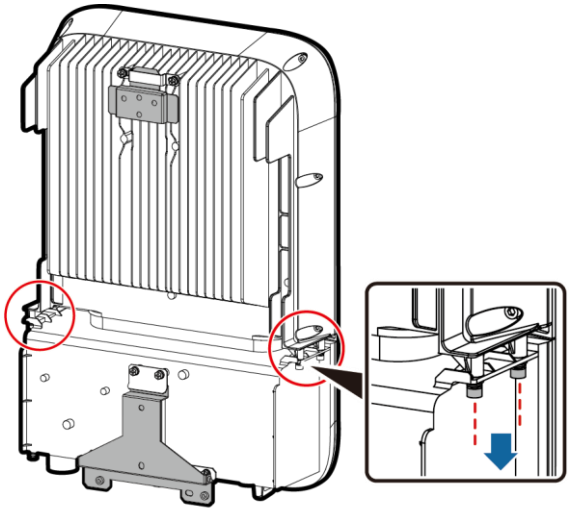
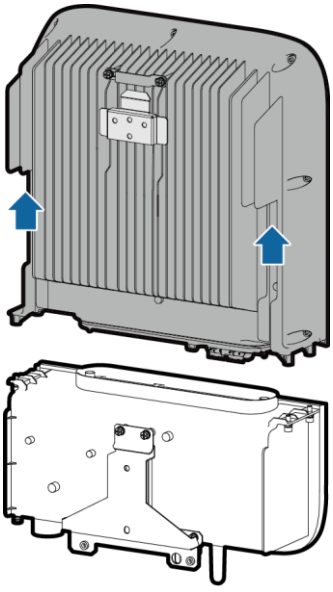
Figure 8-9 Removing the screws



Step 8 Remove the power compartment.

Figure 8-10 Removing the power compartment



Step 9 Install the lower mounting kit of the new power compartment onto the mounting bracket and route cables.

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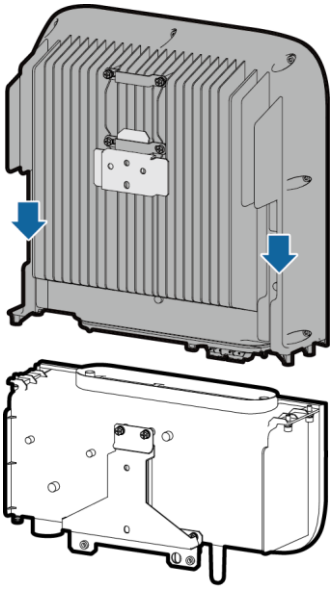
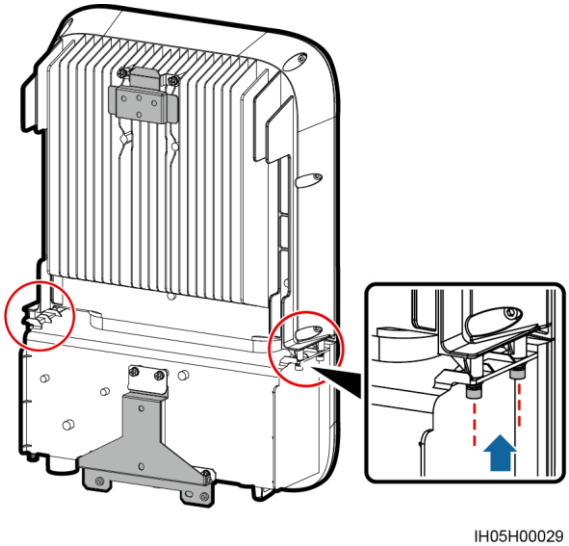
Figure 8-11 Placing the new power compartment



Step 10 After cables are routed, install the upper mounting kit of the new power compartment onto the mounting bracket. Reinstall the four M6 screws to secure the power and maintenance compartments.

Figure 8-12 Securing the power and maintenance compartments



Step 11 Reinstall the ground, fuse, AC and DC cables in sequence.

Step 12 Reinstall the USB cable (optional, only for the 4G model), or reinstall the WLAN cable (optional, only for the WLAN model).

Step 13 Reinstall the 10-pin signal terminal and 2-pin enable terminal.

Step 14 Reinstall the maintenance compartment cover.

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----End

8.3 SUN2000 Troubleshooting

Alarm severities are defined as follows:

- Major: The SUN2000 enters Shutdown mode and disconnects from the power grid to stop generating power after a fault occurs.
- Minor: Some components are faulty but the SUN2000 can still connect to the power grid and generate power.
- Warning: The SUN2000 output power decreases due to external factors.

NOTE

- The reset alarm cannot be automatically cleared after the fault is rectified. Choose **Device info** > **Alarm management** > **Active alarm**on the FusionHome app, as shown in Figure 8-13 , to manually clear it or power off the SUN2000. Powering off the SUN2000 to clear the alarm: Turn off the AC output switch and then the DC input switch. After 5 minutes, turn on the AC output switch and then the DC input switch.
- Contact your installer if the fault still persists after completing all failure analysis procedures listed above.

Figure 8-13 Manually clear alarm

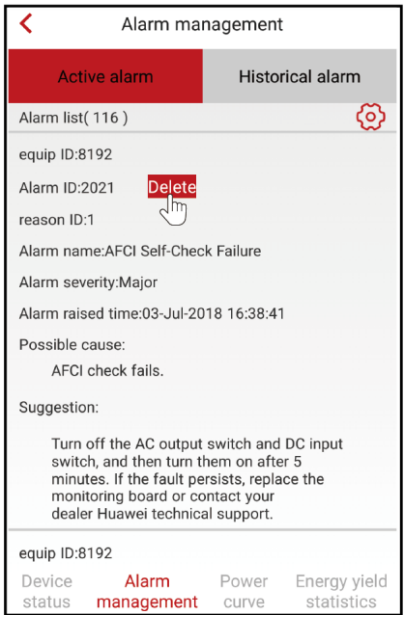

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Table 8-2 Common alarms and troubleshooting measures

Alarm ID	Alarm Name	Alarm Severity	Alarm Action	Possible Cause	Suggestion
2002	DC Arc Fault (ADMC alarm, need to be manually cleared)	Major	Shutdown, alarm reporting (reset alarm)	The PV string power cable arcs or is in poor contact.	You are advised to check whether the string circuit arcs or is in poor contact. After the fault is rectified, manually clear the alarm and then start again. • Cause ID 1: string 1 • Cause ID 2: string 2
2021	AFCI Self-Check Failure	Major	Shutdown, alarm reporting (reset alarm)	Cause ID = 1–2 The AFCI self-check fails.	Turn off the AC output switch and DC input switch, wait 5 minutes, and then turn them on again. If the fault persists, contact your installer.
2032	Grid Failure	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 • The power grid experiences an outage. • The AC circuit is disconnected or the AC switch is set to the OFF position.	1. Check the AC voltage. 2. Check that the AC power cable is connected and that the AC switch is set to the ON position.

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Alarm ID	Alarm Name	Alarm Severity	Alarm Action	Possible Cause	Suggestion
2033	Grid Undervoltage	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 The grid voltage is below the lower threshold or the low voltage has lasted for more than the value specified for LVRT.	1. If the alarm is triggered accidentally, it may be due to temporary abnormalities in the power grid. The SUN2000 will automatically recover after the power grid has resumed normal functioning. 2. If the alarm is triggered frequently, check whether the grid voltage is within the acceptable range. If it is not, contact the local power operator. If grid voltage is within the acceptable range, modify the power grid undervoltage protection threshold with the consent of the local power operator. 3. If the fault persists for a long time, check the connection between the AC switch and the output power cable.
2034	Grid Overvoltage	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 The grid voltage exceeds the higher threshold or the high voltage has lasted for more than the value specified for HVRT.	1. Check whether the grid connection voltage exceeds the upper threshold. If so, 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.

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Alarm ID	Alarm Name	Alarm Severity	Alarm Action	Possible Cause	Suggestion
2035	Unbalanced Grid Voltage	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	The difference between grid phase voltages exceeds the upper threshold.	1. Check that the grid voltage is within the normal range. 2. Check the connection of the AC output power cable. 3. If the cable is connected properly but the alarm is triggered frequently and affects the power production of the PV plant, contact the local power operator.
2036	Grid Overfrequency	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 Power grid exception: The actual grid frequency is higher than the local power grid standard.	1. If the alarm is triggered accidentally, it may be due to temporary abnormalities in the power grid. The SUN2000 will automatically recover after the power grid has resumed normal functioning. 2. If the alarm is triggered frequently, check whether the grid frequency is within the acceptable range. If it is not, contact the local power operator. If grid frequency is within the acceptable range, modify the grid overfrequency protection threshold with the consent of the local power operator.
2037	Grid Underfrequency	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 Power grid exception: The actual grid frequency is lower than the local power grid standard.	1. If the alarm is triggered accidentally, it may be due to temporary abnormalities in the power grid. The SUN2000 will automatically recover after the power grid has resumed normal functioning. 2. If the alarm is triggered frequently, check whether the grid frequency is within the acceptable range. If it is not, contact the local power operator. If grid frequency is within the acceptable range, modify the grid underfrequency protection threshold with the consent of the local power operator.

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Alarm ID	Alarm Name	Alarm Severity	Alarm Action	Possible Cause	Suggestion
2039	Output Overcurrent	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 The grid voltage drops dramatically or the power grid is short-circuited. As a result, the inverter transient output current exceeds the upper threshold and, which triggers the inverter protection.	1. The SUN2000 monitors its external working conditions in real time. The SUN2000 automatically recovers after the fault is rectified. 2. If the alarm is triggered frequently and affects the power production of the PV plant, check whether the output is short-circuited. If the fault persists, contact your installer.
2040	Output DC Component Overhigh	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 The DC component of the SUN2000 output current exceeds the upper threshold.	1. The SUN2000 monitors its external working conditions in real time. The SUN2000 automatically recovers after the fault is rectified. 2. If the alarm is triggered frequently, contact your installer.
2051	Abnormal Residual Current	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 The insulation impedance of the input side to PE decreases when the SUN2000 is operating.	1. If the alarm is triggered accidentally, the external power cable may be abnormal temporarily. The SUN2000 automatically recovers after the fault is rectified. 2. If the alarm is triggered frequently or persists, check that the impedance between the PV string and ground is not below the lower threshold.

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Alarm ID	Alarm Name	Alarm Severity	Alarm Action	Possible Cause	Suggestion
2061	Abnormal Grounding	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 • The PE cable for the SUN2000 is not connected. • The voltage between the SUN2000 neutral wire and ground exceeds the upper threshold.	1. Check that the PE cable for the SUN2000 is connected properly. 2. If the SUN2000 is connected to the TN power grid, check whether the voltage of the neutral wire to ground is normal. 3. Check whether the output is connected to an isolation transformer. If so, set **OFF due to abnormal grounding** to **Disable** (for details, see 7.4.5.3 Feature Parameters).
2062	Low Insulation Resistance	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 • The PV string is short-circuited to PE. • The PV string has been operating in a moist environment for a long time.	1. Check the impedance between the PV array output and PE, and eliminate short circuits and poor insulation points. 2. Check that the SUN2000 PE cable 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	Overtemperature	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 • The SUN2000 is installed in a place with poor ventilation. • The ambient temperature exceeds the upper threshold. • The SUN2000 is not working properly.	• Check the ventilation and ambient temperature at the SUN2000 installation position. • If the ventilation is poor or the ambient temperature exceeds the upper threshold, improve the ventilation and heat dissipation. • If the ventilation and ambient temperature both meet requirements, contact your installer.
2064	Device Fault	Major	Shutdown, alarm reporting, and automatic	Cause ID = 3 An unrecoverable fault has occurred on a circuit inside the SUN2000.	Turn off the AC output switch and DC input switch, wait 5 minutes, and then turn them on again. If the fault persists, contact your installer.

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Alarm ID	Alarm Name	Alarm Severity	Alarm Action	Possible Cause	Suggestion
			recovery after the fault is rectified	Cause ID = 4 An unrecoverable fault has occurred on a circuit inside the SUN2000.	
			Shutdown, alarm reporting (reset alarm)	Cause ID = 5 An unrecoverable fault has occurred on a circuit inside the SUN2000.	
			Alarm reporting	Cause ID = 6–7 An unrecoverable fault has occurred on a circuit inside the SUN2000.	
			Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 8–13 An unrecoverable fault has occurred on a circuit inside the SUN2000.	
			Shutdown, alarm reporting (reset alarm)	Cause ID = 14 An unrecoverable fault has occurred on a circuit inside the SUN2000.	
2065	Upgrade Failed	Major	Shutdown, alarm reporting (reset alarm)	Cause ID = 1–4 The upgrade does not complete normally.	1. Perform an upgrade again. 2. If the upgrade fails several times, contact your installer.
61440	Monitoring Unit Faulty	Minor	Alarm reporting	Cause ID = 1 • The flash memory is insufficient. • The flash memory has bad sectors.	Turn off the AC output switch and DC input switch, wait 5 minutes, and then turn them on again. If the fault persists, contact your installer.

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Alarm ID	Alarm Name	Alarm Severity	Alarm Action	Possible Cause	Suggestion
2067	Faulty Power Collector	Major	Alarm reporting	Cause ID = 1 • In Grid Connection with Zero Power mode, the energy meter communication is interrupted. • In Power-limited Grid Connection Power mode, the energy meter communication is interrupted.	1. Check that the energy meter model setting is the same as the actual model. 2. Check that the preset communications parameter settings for the energy meter are the same as the actual configurations. 3. Check that the energy meter is powered on and the RS485 communications cable is connected correctly.
2068	Battery Abnormal	Minor	Alarm reporting	Cause ID = 1, 3, 4 • The battery is faulty. • The battery communication is interrupted. • The battery switch trips when the SUN2000 is running.	1. If the FAULT indicator on the front of the battery pack is ON or flashing, contact your installer. 2. Check that the communications cable and power cable between the SUN2000 and the battery are properly connected. Check that the communication parameters are consistent with the RS485 configurations of the SUN2000. Check that the Auxiliary Power switch on the battery is set to ON. 3. Send a shutdown command on the app. Turn off the AC output switch, DC input switch, and battery switch in order, and then turn on the battery switch, AC output switch, and DC input switch in sequence after 5 minutes. 4. If the alarm still exists, contact your installer.
			Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 2 • The battery is faulty. • The battery communication is interrupted. • The battery switch trips when the SUN2000 is running.	

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Alarm ID	Alarm Name	Alarm Severity	Alarm Action	Possible Cause	Suggestion
2077	Output Overload (needs to be manually cleared)	Major	Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1–2 The output is overloaded or short-circuited.	1. Check whether the device output is short-circuited. 2. Check whether the device load exceeds the rated value.
2080	Abnormal PV Module Configuration	Major	Shutdown, alarm reporting (reset alarm)	Cause ID = 1–4 PV module configuration does not meet requirements, or the PV module output is reversely connected or short-circuited.	Check whether the total number of PV modules, number of PV modules in a string, and number of PV strings meet requirements and whether the PV module output is reversely connected. • ID1: The total number of PV modules is greater than 75. • ID2: The number of PV modules in a string is greater than 25. • ID3: The number of PV modules in a string is less than 6. • ID4: The total number of PV strings is greater than 2 (3.8 kW/5 kW/7.6 kW) or 3 (9 kW/10 kW/11.4 kW). • ID5: The total output of PV modules is reversely connected or short-circuited.
			Shutdown, alarm reporting, and automatic recovery after the fault is rectified	Cause ID = 1 PV module configuration does not meet requirements, or the PV module output is reversely connected or short-circuited.	

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9 Handling the SUN2000

9.1 Removing the SUN2000

Procedure

Step 1 Power off the system by following the instructions in 6.3 Powering Off the System.

Step 2 Disconnect all cables from the SUN2000, including signal cables, DC input power cables, battery cables, AC output power cables, and PE cables.

Step 3 Remove the WiFi antenna from the SUN2000.

Step 4 Remove the SUN2000 from the mounting bracket.

Step 5 Remove the mounting bracket.

----End

9.2 Packing the SUN2000

- If the original packaging is available, put the SUN2000 inside it and then seal it using adhesive tape.
- If the original packaging is 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 and electronic component waste.

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10 Technical Specifications

Efficiency

Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
Maximum efficiency (240 V)	99%					
CEC efficiency (240 V)	99%					

Input

Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
Maximum input current	30 A			35 A		
Maximum battery current	15 A			20 A		
Operating voltage range	300–500 V DC					
Rated input voltage	325 V (208 V AC), 370 V (240 V AC)					
Full-load input voltage range	325–420 V (208 V AC), 370–420 V (240 V AC)					

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Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
Maximum rated voltage to ground	600 V					
Number of inputs	2			3		
Maximum Input Short Circuit Current (Each input)[a]	17 A					
Line Synchronization Characteristics/In-rush current	In-rush current: 2.7Arms, 12Apk					
Note a: This input short-circuit current rating applies to ports such as the mains, PV input, and battery circuits, it is not intended for low power signal, control, or communications circuits.						

Grid-tied Output

Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
Rated output power	3.3 kW (208 V) 3.8 kW (240 V)	4.3 kW (208 V) 5 kW (240 V)	6.6 kW (208 V) 7.6 kW (240 V)	7.8 kW (208 V) 9 kW (240 V)	8.7 kW (208 V) 10 kW (240 V)	9.9 kW (208 V) 11.4 kW (240 V)
Maximum apparent power	3.3 kVA (208 V) 3.8 kVA (240 V)	4.3 kVA (208 V) 5 kVA (240 V)	6.6 kVA (208 V) 7.6 kVA (240 V)	7.8 kVA (208 V) 9 kVA (240 V)	8.7 kVA (208 V) 10 kVA (240 V)	9.9 kVA (208 V) 11.4 kVA (240 V)
Grid voltage	Single-phase power grid, 208 V AC/240 V AC; allowed operating range: 88%–110%					
Grid frequency	60 Hz; allowed operating range: 60 Hz±15%					
Maximum output current	15.9 A	20.9 A	31.7 A	37.5 A	41.7A	47.5 A
Power factor	–0.8 leading ... +0.8 lagging					

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Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
Maximum total harmonic distortion	≤ 3%					
Max. output fault current (A)/duration (ms)	49Arms, 192Apk/21ms					
Max. Branch Circuit overcurrent protection	25 Adc for Battery					

Backup Output

Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
Output voltage	240 V AC±1% (autotransformer for 120 V AC load in standard configuration, supporting only the power grid types in Figure 10-1), not supporting 208 V AC					
Output frequency	60 Hz±0.25%					
Rated apparent power (Linear load)	3.5 kVA	3.5 kVA	3.5 kVA	5 kVA	5 kVA	5 kVA
Maximum apparent power (10s, linear load)	3.8 kVA	5 kVA	5 kVA	7 kVA	7 kVA	7 kVA
Rated input voltage	390 V					
Soft start time	< 10s					
Voltage THDv	Linear load: < 3%; non-linear load: < 5%					
Max. output fault current (A)/duration (ms)	49Arms, 192Apk/21ms					
Max. Branch Circuit overcurrent	25 Adc for Battery					

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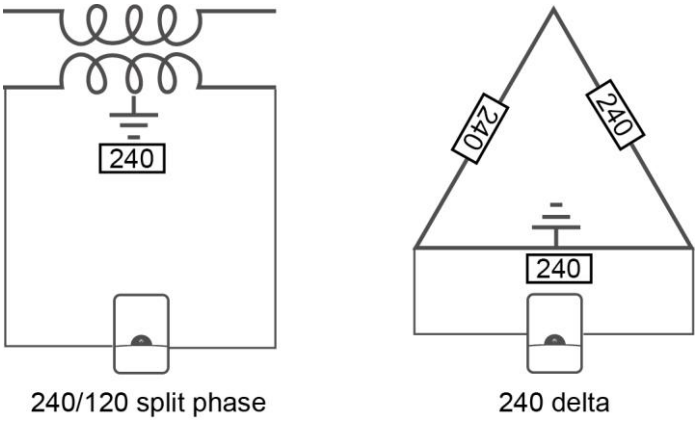
Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
protection						

Figure 10-1 Power grid types supported by 120 V AC load



Protection

Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
AFCI	UL 1699B, CSA TIL M-07					
Rapid turn-off protection	NEC 2017, NEC 2014					
Anti-islanding protection	IEEE 1547					
ISO detection	UL 1741					
DCI detection	IEEE 1547					
RCMU detection	UL 1741					
Overvoltage category	III for AC side, II for DC side					
Input reverse connection protection	Supported					
Overtemperature protection	Supported					

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Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
Input anti-reverse discharge protection	Supported					
Input surge protection	Supported					
Output surge protection	Supported					
Reconnection upon fault recovery	Supported					
Backfeed short-circuit current (A)[a]	69Arms, 248Apk	69Arms, 248Apk	69Arms, 248Apk	112Arms, 492Apeak	112Arms, 492Apeak	112Arms, 492Apeak
Note a: available from the inverter on input and output conductors under fault conditions.						

Trip limits

Item	SUN2000-3.8KTL-USL0/SUN2000-5KTL-USL0/SUN2000-7.6KTL-USL0/ SUN2000-9KTL-USL0/SUN2000-10KTL-USL0/SUN2000-11.4KTL-USL0			
Adjustable LIMITS - Utility interconnection voltage trip limits and trip times:	**Maximum 208/240**	**Minimum 208/240**	**Clearing times (max Sec)**	
-	L-L	L-L	Maximum	Minimum
Overvoltage/Fast	260/288	208/240	900	0.05
Overvoltage/Slow	260/288	208/240	900	0.05
Undervoltage/Slow	208/240	83.2/96	900	0.05
Undervoltage/Fast	208/240	83.2/96	900	0.05

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Item	SUN2000-3.8KTL-USL0/SUN2000-5KTL-USL0/SUN2000-7.6KTL-USL0/ SUN2000-9KTL-USL0/SUN2000-10KTL-USL0/SUN2000-11.4KTL-USL0			
Adjustable LIMITS - Utility interconnection frequency trip limits and trip times:	Maximum	Minimum	Clearing times (max Sec)	
-	(Hz)	(Hz)	Maximum	Minimum
Overfrequency	69	60	900	0.05
Underfrequency	60	48	900	0.05

Communication

Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
Display	LED and app					
WiFi	Supported					
RS485	Supported					

Common Parameters

Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
Topology	Transformerless					
Ingress Protection Rating	TYPE 4X, IP65					
Cooling mode	Natural cooling					
Dimensions (W x H x D)	400 mm x 570 mm x 160 mm (15.75 in x 22.44 in x 6.30 in)			445 mm x 650 mm x 160 mm (17.52 in x 25.59 in x 6.30 in)		
Weight	18 kg (39.7 lb)			23 kg (50.7 lb)		

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Item	SUN2000-3.8KTL-USL0	SUN2000-5KTL-USL0	SUN2000-7.6KTL-USL0	SUN2000-9KTL-USL0	SUN2000-10KTL-USL0	SUN2000-11.4KTL-USL0
Operating temperature	–30°C to +60°C (–22°F to +140°F)					
Operating humidity	0%–100% RH					
Operating altitude	0–4000m (0–13123.36 ft), derated above 2000 m (6561.68 ft)					
Storage temperature	–30°C to +60°C (–22°F to +140°F)					
Storage humidity	5%–95% RH					
Pollution Degree	3					
Limits of accuracy of frequency measurement	0.02 Hz					
Maximum input voltage (battery open circuit voltage)	500 Vdc					

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A Grid Codes

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

Table A-1 Grid codes

Grid Code	Description	Default Output Mode	Grid Voltage	Grid Frequency
IEEE 1547-LV208	US low-voltage power grid	Single-phase	208 V	60 Hz
IEEE 1547-LV240	US low-voltage power grid	Split phase	240 V	60 Hz
IEEE 1547a-LV208	US low-voltage power grid	Single-phase	208 V	60 Hz
IEEE 1547a-LV240	US low-voltage power grid	Split phase	240 V	60 Hz
ELECTRIC RULE NO.21-LV208	US low-voltage power grid	Single-phase	208 V	60 Hz
ELECTRIC RULE NO.21-LV240	US low-voltage power grid	Split phase	240 V	60 Hz
HECO-LV208	US low-voltage power grid	Single-phase	208 V	60 Hz
HECO-LV240	US low-voltage power grid	Split phase	240 V	60 Hz
PRC_024_Eastern-LV208	US low-voltage power grid	Single-phase	208 V	60 Hz
PRC_024_Eastern-LV240	US low-voltage power grid	Split phase	240 V	60 Hz
PRC_024_Western-LV208	US low-voltage power grid	Single-phase	208 V	60 Hz

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Grid Code	Description	Default Output Mode	Grid Voltage	Grid Frequency
PRC_024_Western-LV240	US low-voltage power grid	Split phase	240 V	60 Hz
PRC_024_Quebec-LV208	US low-voltage power grid	Single-phase	208 V	60 Hz
PRC_024_Quebec-LV240	US low-voltage power grid	Split phase	240 V	60 Hz

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B Acronyms and Abbreviations

A	
AC	alternating current
D	
DC	direct current
I	
ID	identifier
IO	input/output
L	
LED	light emitting diode
LVRT	low voltage ride-through
M	
MAC	Media Access Control
MPPT	maximum power point tracking
P	
PC	personal computer
PE	protective earthing
PLC	power line communication
PV	photovoltaic

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R	
RCD	residual current device
RCMU	residual current monitoring unit
RH	relative humidity
S	
SN	serial number
T	
THDi	total distortion of the input current waveform
W	
WEEE	waste electrical and electronic equipment
WiFi	Wireless Fidelity

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