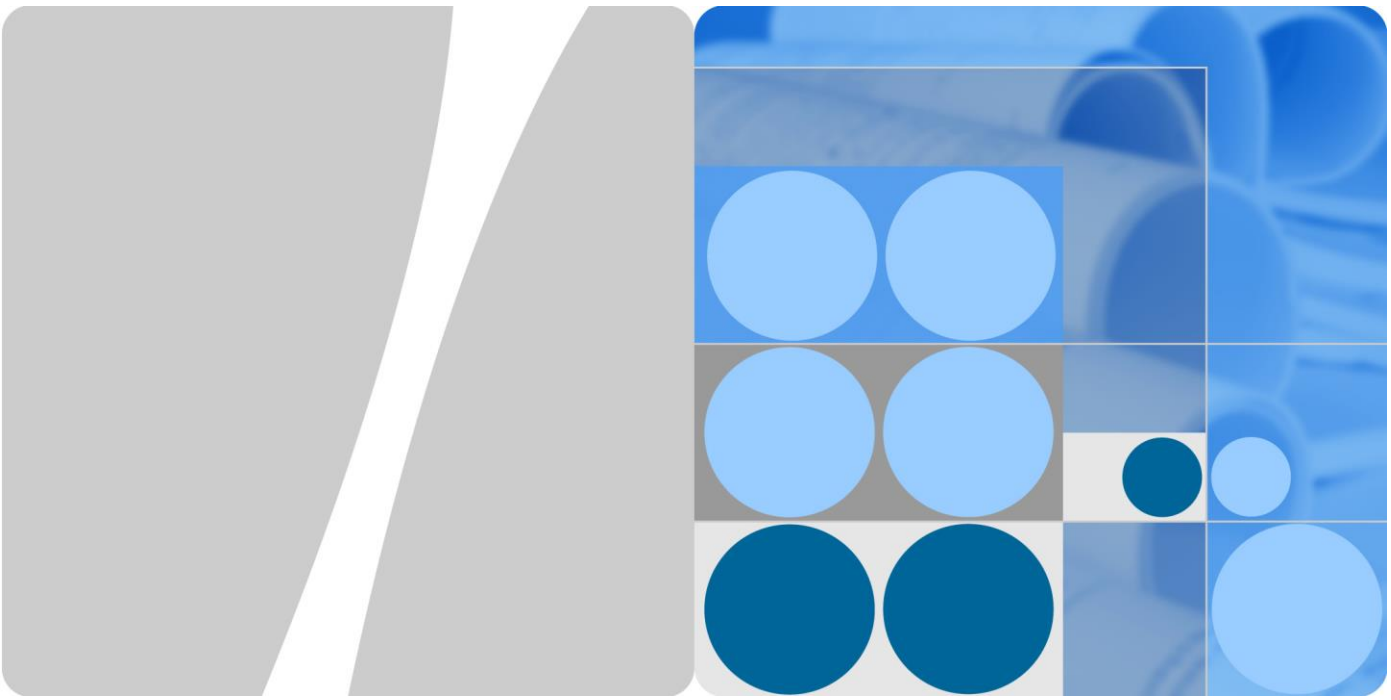

SUN2000-(29.9KTL, 33KTL-A, 36KTL, 42KTL)

User Manual

Edition 11

Date 06/08/2019

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About this document

Aim

This document describes the installation, electrical connections, commissioning, maintenance and troubleshooting of the SUN2000-29.9KTL/33KTL-A/36KTL/42KTL (hereinafter referred to as "the SUN2000"). Before installing and operating it, please understand the safety and familiarity information. cessation of functions and characterizedSUN2000 statistics.

Recipients

This document is intended for photovoltaic (PV) plant personnel and qualified electrical technicians.

Symbolism

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

Symbol	Description
⚠ PELIGRO	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ ADVERTENCIA	Indicates a hazard with a medium risk level which, if not avoided, could to cause death or serious injury.
⚠ ATENCIÓN	Indicates a hazard with a low level of risk which, if not avoided, could to cause minor injuries or moderate.
AVISO	Indicates a potentially hazardous situation which, if not avoided, could result in cause damage to the equipment, loss of data, deterioration of performance, or unexpected results. NOTICE is used to address practices that are not related to personal injury.
NOTA	Supplements important information in the main text. NOTE is used to address information that is not related to personal injury, equipment damage, or environmental damage.

Changelog

Changes made to document versions are cumulative. The most recent document includes all updates made to previous versions.

Version 11 (06/08/2019)

The section is updated6.2 Turning on the SUN2000.

Version 10 (03/01/2019)

The section is updated10 Technical specifications.

Version 09 (09/14/2018)

Added description of SUN2000-29.9KTL.

Version 08 (08/23/2018)

The section is updated8.2 Troubleshooting.

Version 07 (04/05/2018)

The section is updated5.3 Connecting the AC output cables.

Added description of metal contact of stamping forming in section5.4 Connecting DC input cables.

Version 06 (11/29/2017)

The section has been updated3 Storage.

Added description of rubber settings and updated section5.3 Connecting the AC output cables.

The section has been updatedA Electrical Network Codes.

Version 05 (09/25/2017)

Requirements for OT terminals have been added in5.3 Connecting the AC output cables.

Version 04 (07/30/2017)

The section has been updated2.3 Label description.

The section has been updated5.2 Ground wire (PE) connection.

The section has been updated10 Technical specifications.

Version 03 (03/30/2017)

Added description of SUN2000-33KTL-A.

Version 02 (02/20/2017)

- Updated environmental installation requirementsEnvironmental requirements for installationof the section4.3, “SUN2000 Wall Mount Installation”.
- Updated environmental installation requirementsEnvironmental requirements for installationof the section4.4, “Installing the SUN2000 on a Stand”.
- Added description of SUN2000-42KTL with 4-pin AC terminal in the section 5.3, “Connecting the AC output cables”.
- The section has been updated5.4, “Connecting DC Input Cables”. The
- section has been updated8.1, “Routine Maintenance”.

Version 01 (07/30/2016)

This is the first official version.

Contents

1 Safety precautions

AVISO

Before performing any operations, please read this manual in its entirety and follow all precautionary measures to avoid accidents. The safety precautions included in this document are not exhaustive. Huawei will not be liable for any consequences resulting from failure to comply with safe operation regulations and design, production, and usage standards.

Disclaimer

Huawei will not be liable for any consequences arising from any of the following events.

- Transport
- Storage conditions do not meet the requirements specified in this document.
- Failure to follow the operating instructions and safety precautions included in this document for installation, cable connections, and maintenance.
- Operation in harsh environments not specified in this document.
- Unauthorized modifications to the product or software code.
- Installation or use in environments not specified in the corresponding international standards.

Requirements for staff

Installation and operation of the SUN2000 may only be performed by certified electricians.

- Operating personnel must receive professional training.
- Operating personnel must read this entire document and follow all precautionary measures.
- Operating personnel must be familiar with the safety specifications of the electrical system.

- Operating personnel must understand the composition and operating principles of the grid-connected photovoltaic power system, as well as local regulations.

Label protection

- Do not alter any warning labels placed on the surface of the inverter, as these labels contain important information for safe operation.
- Do not alter the nameplate on the surface of the inverter, as it contains important information about the product.

Facility

- Before starting the installation, make sure the inverter is not connected to a power source or turned on.
- Ensure that there are clearances of 300 mm, 200 mm, 500 mm, 600 mm, and 1000 mm to the left, right, above, below, and in front of the inverter. This allows for sufficient space for installation and heat dissipation. For ease of installation, ensure that the bottom of the inverter is no more than 730 mm above the floor. If you have any questions regarding clearances, please contact us.
  Please contact local technical support engineers.
- Ensure the inverter is installed in a well-ventilated environment.
- Ensure the inverter heat sinks are free of obstructions.
- Before connecting cables, open the chassis maintenance compartment door. Do not perform any work on other components inside the chassis, except for connecting the ground cable, AC power cables, and communication cables.

Cable connections

⚠ PELIGRO

Before connecting the cables, make sure that the inverter is firmly seated and is not damaged in any way. Otherwise, it may cause electric shocks may occur or fires may occur.

- Make sure all electrical connections comply with local electrical standards.
- Obtain approval from your local power company before using the inverter to generate grid-connected electricity.
- Ensure that cables used in a grid-connected photovoltaic power system are properly connected and insulated, and that they meet all the requirements of the applicable specifications.

Operation

⚠ PELIGRO

High voltages can cause electric shocks in the inverter in use, which could to cause death, serious injury, or serious property damage. When operating the inverter, strictly adhere to the safety precautions set forth herein and in associated documents.

- Do not touch a live inverter, as the heat sink temperature may exceed 60°C.
- When using the device, comply with local laws and regulations.

Maintenance and replacement

⚠ PELIGRO

High voltages can cause electric shocks in the inverter in use, which could to cause death, serious injury, or serious property damage. Before performing maintenance, turn off the inverter and strictly follow the safety precautions for use included in this document and related documents.

- Perform inverter maintenance with sufficient knowledge of this document and with appropriate tools and testing equipment.
- Before performing maintenance, turn off the inverter and wait at least 5 minutes.
- Post temporary warning signs or install fences to prevent unauthorized access to the maintenance site.
- Before restarting the inverter, rectify any faults that may affect the safety performance of the equipment.
- During maintenance work, take appropriate precautions regarding electrostatic discharge.
- For personal safety, wear insulated gloves and protective footwear.

2 General aspects

2.1 Introduction

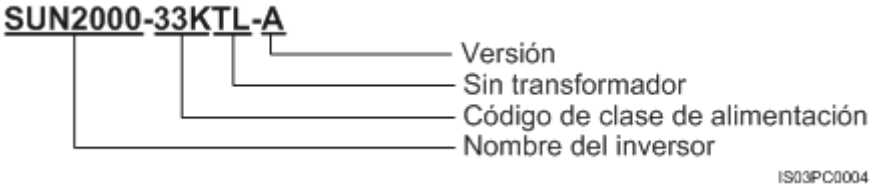
Function

The SUN2000 is a three-phase grid-connected modular PV string inverter that converts DC power generated by PV strings into AC power and feeds that power back into the utility grid.

Model

TheFigure 2-1shows a model number of SUN2000, taking SUN2000-33KTL-A as an example.

Figure 2-1 Model Number Description



TheTable 2-1displays the power and nominal output voltage.

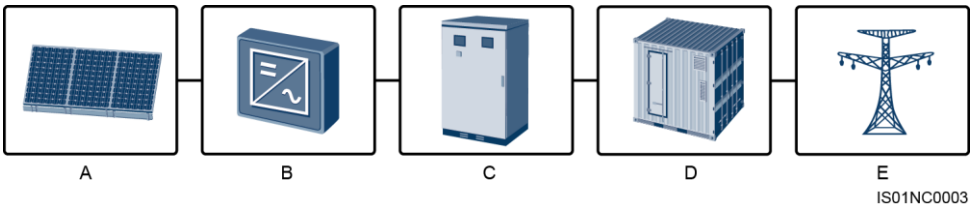
Table 2-1SUN2000 models and their corresponding rated voltage and output power values

Model	Nominal output power	Nominal output voltage
SUN2000-29.9KTL	29.9 kW	400 V
SUN2000-33KTL-A	30 kW	400 V
SUN2000-36KTL	36 kW	380 V/400 V/480 V
SUN2000-42KTL	42 kW	480 V

Network application

The SUN2000 is applicable to grid-connected photovoltaic power supply systems for commercial rooftops and large power plants. typically, a system of Grid-connected photovoltaic power supply is composed of photovoltaic strings, grid-connected inverters, AC distribution units (ACDUs) and an isolation transformer, as shown in Fig.Figure 2-2.

Figure 2-2 Network application

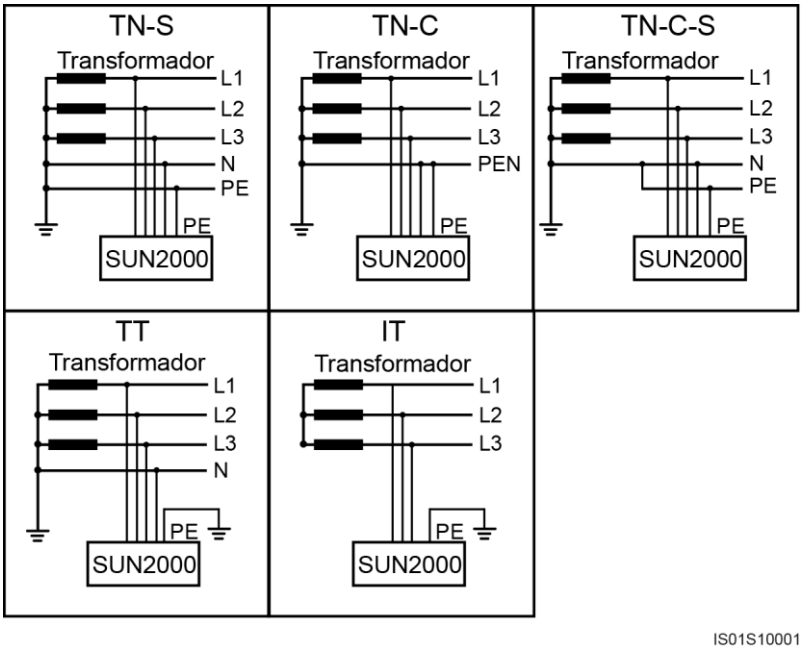


(A) Photovoltaic chain
(B) SUN2000
(C) ACDU
(D) Isolation transformer
(E) Power grid

Compatible power grids

The SUN2000-29.9KTL/33KTL-A/36KTL supports the following power grid modes: TN-S, TN-C, TN-CS, TT, and IT. The SUN2000-42KTL supports only the IT grid mode.

Figure 2-3 Power grid modes

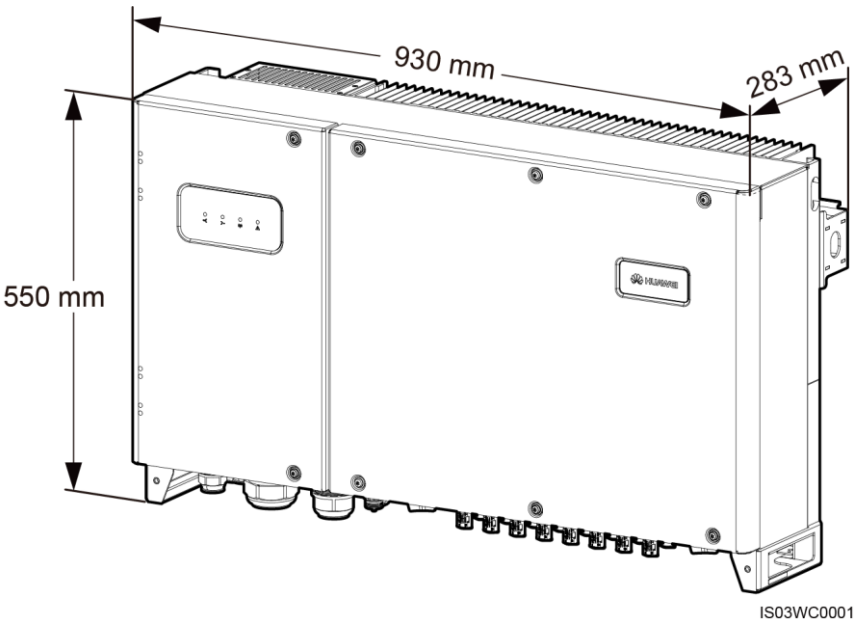


2.2 Appearance

Dimensions of the SUN2000

TheFigure 2-4shows the dimensions of the SUN2000.

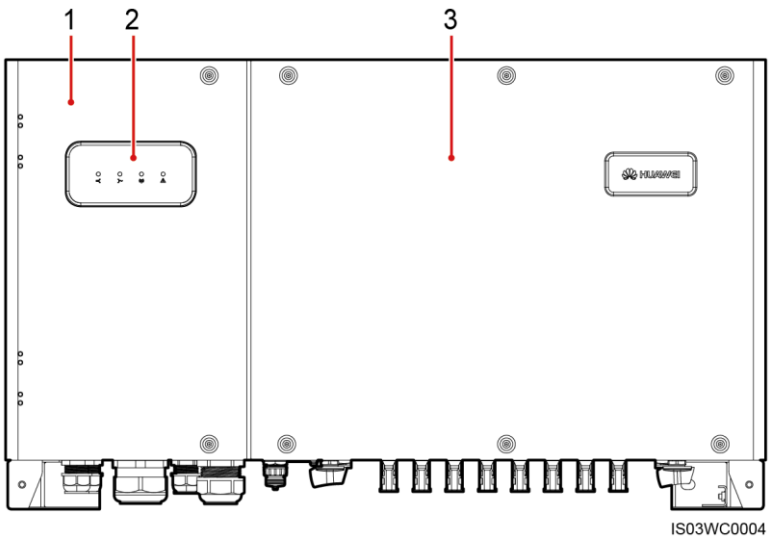
Figure 2-4SUN2000 Dimensions (includes mounting plate)



Front view

TheFigure 2-5shows the front view of the SUN2000.

Figure 2-5 Front view of the SUN2000



(1) Maintenance compartment door (2) LED indicator (3) Host panel

TheTable 2-2describes the LED indicators.

Table 2-2 Description of LED indicators (from left to right)

Indicator	State		Meaning
Connection indicator photovoltaic 	Green, on		At least one photovoltaic string is connected properly, and the DC input voltage of the corresponding MPPT circuit is greater than or equal to 200 V.
	Green, off		The investor is disconnected from all photovoltaic strings or the DC input voltage of each MPPT circuit is less than 200 V.
Connection indicator to the power grid 	Green, on		The SUN2000 is connected to the power grid.
	Green, off		The SUN2000 is not connected to the power grid.
Indicator of communications 	Flashing green for short intervals (on for 0.5 s and off for 0.5 s)		The SUN2000 receives communications data normally.
	Green, off		The SUN2000 does not receive communications data for 10 seconds.
Indicator of maintenance/alarm 	State of the alarm	Flashing red during intervals long (on for 1 sy off for 4 s)	A warning alarm has been generated.
		Flashing red during intervals shorts (on for 0.5 s and off for 0.5 s)	A minor alarm has been generated.
		Red without blinking	A serious alarm has been generated.

Indicator	State		Meaning
	State of maintenance local nt	Flashing green during intervals long (on for 1 sy off for 1 s)	Local maintenance in course.
		Flashing green during intervals shorts (on for 0.125 s and off for 0.125 s)	There was a local maintenance failure.
		Green without blinking	Local maintenance successful.

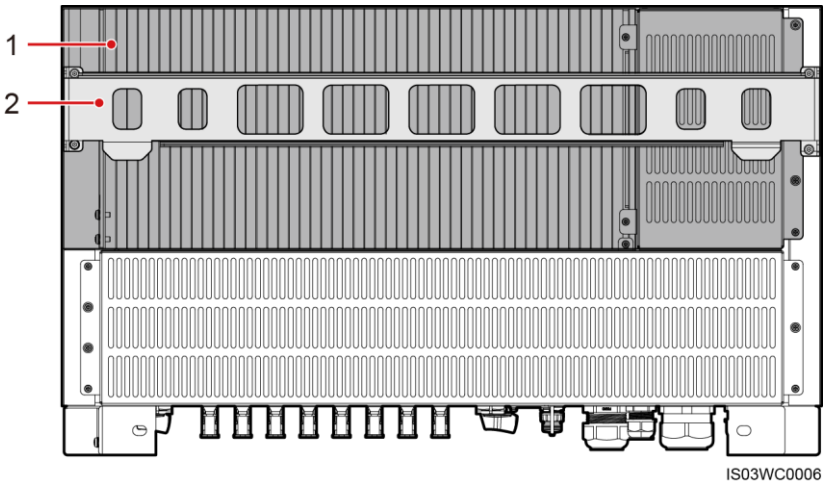
NOTA

- Local maintenance refers to operations performed after a USB flash drive, WLAN module, Bluetooth module, or USB data cable is inserted into the solar inverter's USB port. For example, importing and exporting data using a USB flash drive, or connecting to the SUN2000 app using a WLAN module, Bluetooth module, or USB data cable.
- If an alarm and local maintenance occur simultaneously, the alarm/maintenance indicator first displays the local maintenance status. After removing the USB flash drive, WLAN module, Bluetooth module, or USB data cable, the indicator displays the alarm status.

Rear view of the SUN2000

TheFigure 2-6shows the rear view of the SUN2000.

Figure 2-6 Rear view of the SUN2000

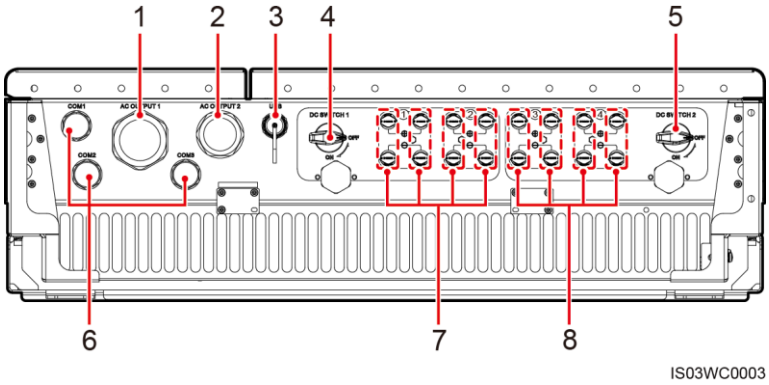


(1) Heat sink (2) Mounting plate

Bottom view of the SUN2000

TheFigure 2-7shows the bottom view of the SUN2000.

Figure 2-7 Bottom view of the SUN2000



No.	Component	Serigraphy
1	Waterproof cable connector (inner diameter: 18-44 mm)	AC OUTPUT 1
2	Waterproof cable connector (inner diameter: 24-32 mm)	AC OUTPUT 2
3	USB port	USB
4	DC switch 1	DC SWITCH 1
5	DC switch 2	DC SWITCH 2
6	Waterproof cable connectors (inner diameter: 14-18 mm)	COM1, COM2, COM3
7	DC input terminals (controlled by DC SWITCH 1)	+ /–
8	DC input terminals (controlled by DC SWITCH 2)	+ /–

NOTA

- Hereinafter, the phrase "waterproof cable connector" will be abbreviated using the word "connector".
- Only use the USB port during maintenance tasks (such as setting power settings, updating, and exporting data). Ensure the USB cover is properly in place when the USB port is not in use.

2.3 Label description

Symbols

TheTable 2-3Describes the labels placed on the SUN2000 and their meanings.

Table 2-3 Description of labels

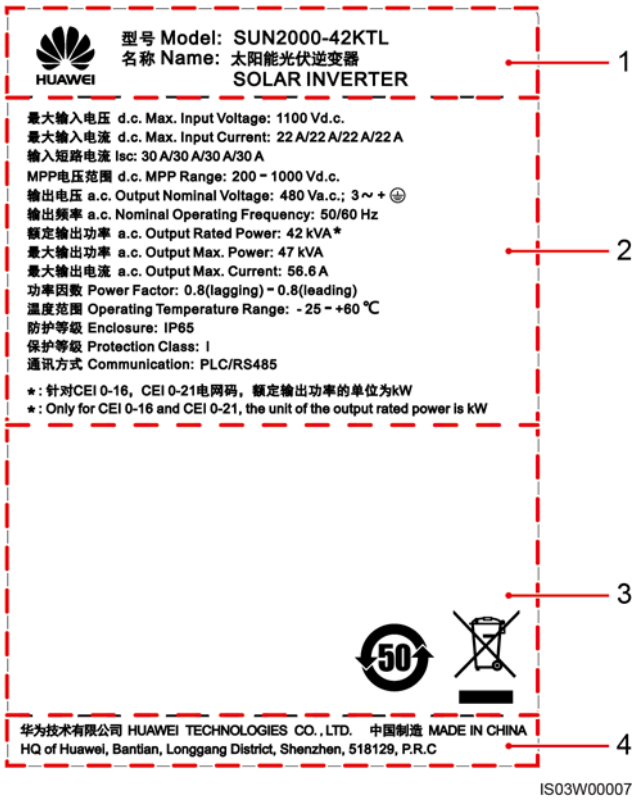
Symbol	Name	Meaning
	Operation warning	The lighting of the SUN2000 entails potential hazards. Take measures to protection to operate the SUN2000.
	Burn Hazard Warning	Do not touch the SUN2000 while it is in operation, as the casing generates high voltages. temperatures.
	Delayed download	- The lighting of the SUN2000 generates a high voltage. Only electrical technicians qualified and trained can perform operations on the SUN2000. - The shutdown of the SUN2000 generates a residual voltage. The SUN2000 takes 5 minutes in download up to reach a safe tension level.
	See the documentation	Remind operators to consult the documentation delivered with the SUN2000.
	Grounding	Indicates the position to connect the grounding cable protection.
	Operation warning	When the SUN2000 is in operation, do not remove the DC input connector.

Symbol	Name	Meaning
	SUN2000 serial number label	Indicates the serial number of the SUN2000.

Identification plate

The SUN2000 has an identification plate on the side containing the model information, technical specifications and regulatory compliance symbols as shown in the figure. Figure 2-8.

Figure 2-8SUN2000-42KTL nameplate



(1) Trademark and product model

(2) Important technical specifications

(3) Yes regulatory compliance symbols

(4) Company name and countrys of manufacturing

NOTA

The nameplate image is for reference only. The actual nameplate shall prevail.

2.4 Principle of operation

Conceptual diagram

The SUN2000 receives inputs from eight PV strings. The inputs are then aggregated into four MPPT paths within the SUN2000 for maximum power point tracking of the PV strings. The DC power is then converted to three-phase AC power via an inverter circuit. Overcurrent protection is supported on both the DC and AC sides.Figure 2-9 shows the conceptual diagram of the SUN2000-29.9KTL/33KTL-A/36KTL. TheFigure 2-10shows the conceptual diagram of the SUN2000-42KTL.

Figure 2-9 Conceptual diagram of SUN2000-29.9KTL/33KTL-A/36KTL

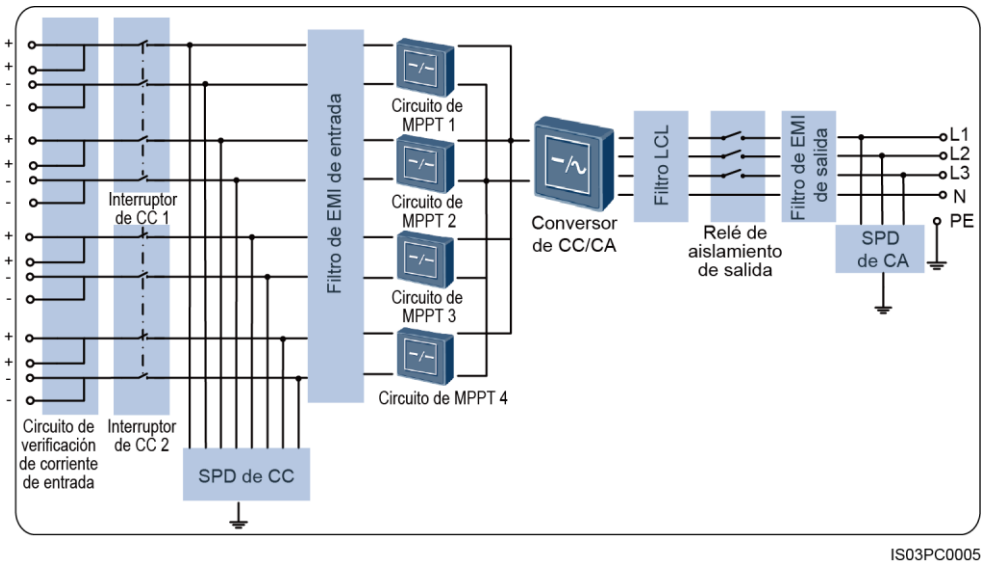
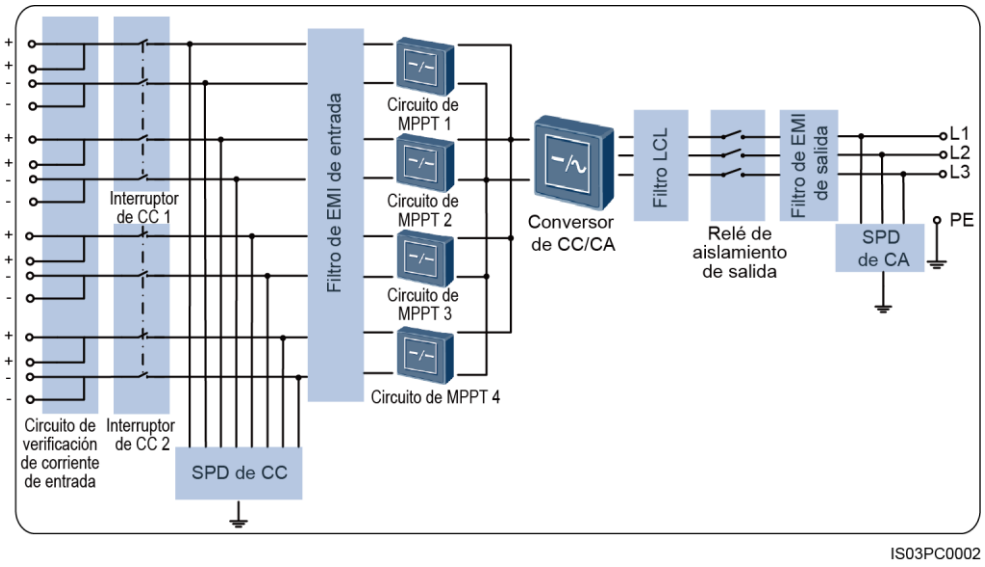


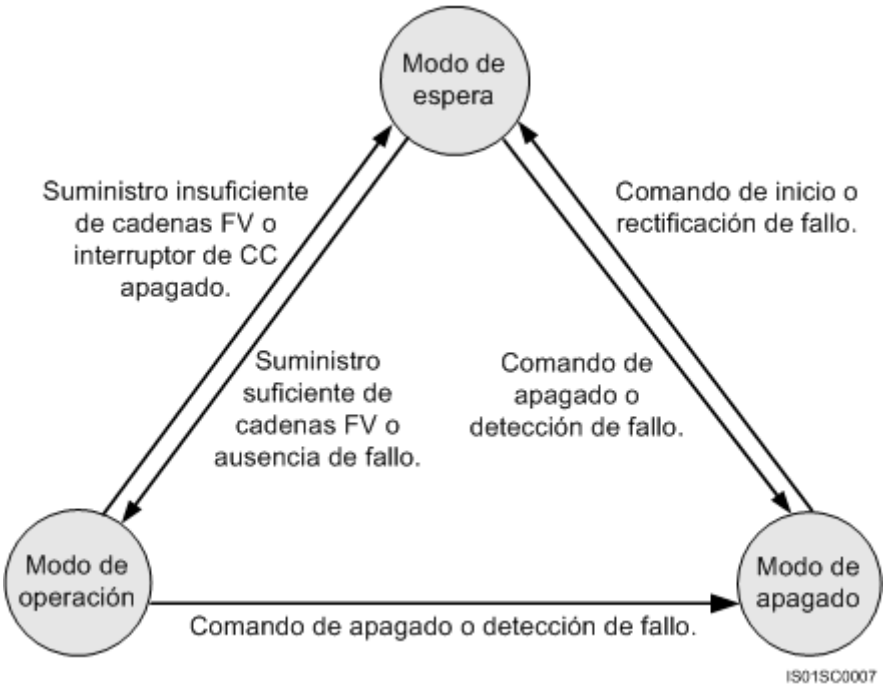
Figure 2-10 Conceptual diagram of the SUN2000-42KTL



Operating modes

The SUN2000 can operate in standby, operational or off mode.Figure 2-11shows the relationship between these three modes of operation.

Figure 2-11SUN2000 Operating Modes



TheTable 2-5describes the three modes of operation shown in theFigure 2-11.

Table 2-4 Description of operating modes

Mode of operation	Description
Standby	The SUN2000 enters standby mode when the external environment does not meet the requirements for startup. In standby mode: - The SUN2000 continuously performs self-test 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.

Mode of operation	Description
Operational	In operational mode: - The SUN2000 converts DC power from the photovoltaic strings into AC power and delivers that power to the power grid. - The SUN2000 tracks the maximum power point to maximize the output of photovoltaic strings. - The SUN2000 enters shutdown mode after detecting a fault or a shutdown command, and enters standby mode after detecting that the output power of the photovoltaic strings does not meet the requirements for grid-connected power generation.
Off	- When in standby or operation mode, the SUN2000 enters shutdown mode after detecting a fault or a shutdown command. - When in power-off mode, the SUN2000 enters standby mode after detecting a start command or a fault has been rectified.

3 Storage

If the SUN2000 is not going to be used immediately, the following requirements must be met:

- Place the SUN2000 in its original packaging. Save the desiccant and seal it with adhesive tape.
- Maintain storage temperature between -40°C and +70°C, and relative humidity between 5% and 95%.
- The SUN2000 should be stored in a clean, dry place and protected from dust and corrosion caused by water vapor.
- Up to five SUN2000s can be stacked together with the packing dimensions (width x height x depth) of 1095 mm x 395 mm x 745 mm. Up to six SUN2000s can be stacked together with the packing dimensions (width x height x depth) of 1045 mm x 400 mm x 680 mm. To avoid personal injury or property damage, store SUN2000s carefully to prevent them from falling. you give.
- Periodic inspections should be conducted throughout the storage period. Replace packaging materials immediately if rodent bites are detected.
- If the SUN2000 has been stored for an extended period, it must be inspected and tested by qualified personnel before being put into operation.

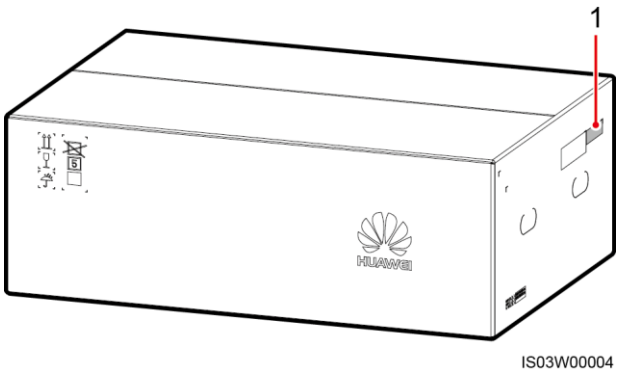
4 System Installation

4.1 Pre-installation verification

Outer packaging materials

Before unpacking the inverter, check the exterior packaging materials for damage, such as holes or cracks, and also check the inverter model. If any damage is found or if the inverter model is not the one ordered, do not unpack the equipment and contact the supplier as soon as possible.

Figure 4-1 Position of the inverter model label



(1) Position of the model label

NOTA

It is recommended that you remove the packaging materials within 24 hours prior to installing the inverter.

Package contents

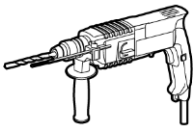
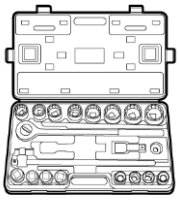
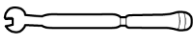
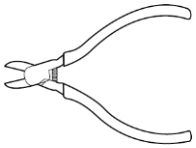
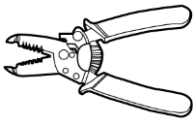
After unpacking the inverter, check that the contents are intact and complete. If you notice any damage or missing components, please contact stay with the supplier.

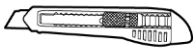
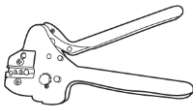
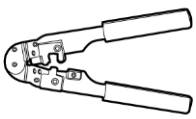
NOTA

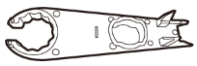
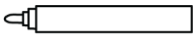
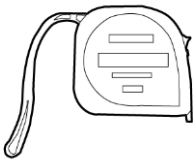
For detailed information on the quantity of contents, please refer to the*Packing list* found inside the product box.

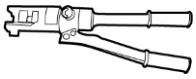
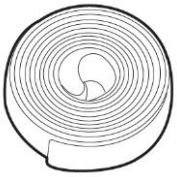
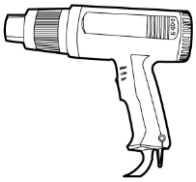
4.2 Tools

Prepare the tools required for installation and cable connections.

Tool	Model	Function
Percussion drill 	Drill bit: Φ14 mm and Φ16 mm	- Drill bit: Φ14 mm, used to make holes in the bracket. - Drill bit: Φ 16 mm, used to make holes in the wall.
Adjustable wrench 	- With a length of 200 mm - With one end 24mm open	Tighten the bolts.
Socket wrench 	N/A	Tighten the bolts and AC output terminals.
Torquímetro 	With an open end of 18 mm, 33 mm, 52 mm or 65 mm	Adjust the bolts on the locking mechanisms.
Diagonal cutting pliers 	N/A	Cut the cable ties.
Wire strippers 	N/A	Strip the cable covers.

Tool	Model	Function
Flat head screwdriver 	Head: 0.6 mm x 3.5 mm	Connects wires to terminal bases.
Rubber mallet 	N/A	Hammer the expansion bolts into the holes.
Cutter 	N/A	Remove the packaging.
Cable cutter 	N/A	Cut the power cables
Crimping tool 	Model: UTXTC0005 or H4TC0003 Manufacturer: Amphenol	Crimp the metal contacts when preparing the DC input cables. **NOTE** - The UTXTC0005 (Amphenol) crimping tool is used for crimping metal contacts of cold formed. - The H4TC0003 (Amphenol) crimping tool is used for crimping metal contacts of formed by stamping.
RJ45 Crimping Tool 	N/A	Prepare RJ45 connectors for communication cables.

Tool	Model	Function
Tool of extraction 	H4TW0001 Manufacturer: Amphenol	Remove the DC connectors from the SUN2000.
Vacuum cleaner 	N/A	Clean up any dust from drilling the holes.
Multimeter 	DC voltage measurement range: ≥ 1100 VDC	Measures voltages.
Marker 	Diameter: ≤ 10 mm	Mark directions.
Measuring tape 	N/A	Measure the distances.
Level 	N/A	Level the hole positions.

Tool	Model	Function
Protective gloves 	N/A	Protects hands during installation.
Safety glasses 	N/A	Protects eyes while drilling holes.
Dust mask 	N/A	Protects against dust when drilling holes.
Hydraulic clamp 	N/A	Crimp the OT terminals.
Heat shrink tubingble 	N/A	Coats the wire crimping area of an OT terminal.
Hot air gun 	N/A	It is used to heat shrink a tube.

Tool	Model	Function
Cable ties 	N/A	Tie the cables.

4.3 Wall-mounting the SUN2000

4.3.1 How to determine the installation location

Basic requirements

- The SUN2000 has IP65 protection and can be installed indoors or outdoors.
- Do not install the SUN2000 in a location where personnel can easily come into contact with the chassis and heat sinks, as the temperature of these parts is extremely high while the equipment is in operation.
- Do not install the SUN2000 in areas where flammable or explosive materials are present.

Environmental requirements for installation

The SUN2000 should be installed in a well-ventilated environment to ensure good heat dissipation. If installed in direct sunlight, performance may be impaired. to decrease due to a further increase in temperature. Recommendation: Install the SUN2000 in a covered location or in a location with an awning.

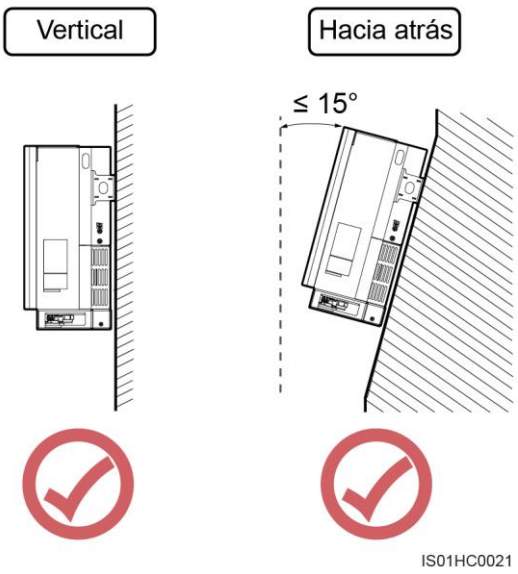
Requirements for support

- The support on which the SUN2000 is installed must be fireproof.
- Do not install the SUN2000 on flammable building materials.
- Make sure the installation surface is solid enough to support the weight of the load.
- In residential areas, do not install the SUN2000 on plasterboard or similar materials with poor sound insulation, as the noise generated by the SUN2000 is annoying to residents.

Installation angle requirements

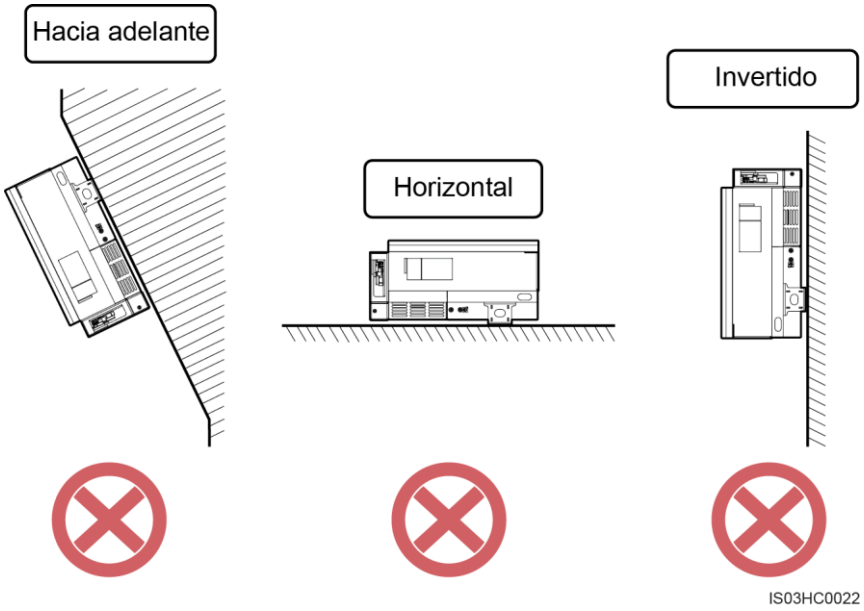
- Install the SUN2000 vertically or with a maximum backward tilt of 15 degrees to facilitate heat dissipation.

Figure 4-2 Correct installation angles



- Do not install the SUN2000 tilted forward, tilted excessively backward, tilted sideways, horizontally, or upside down.

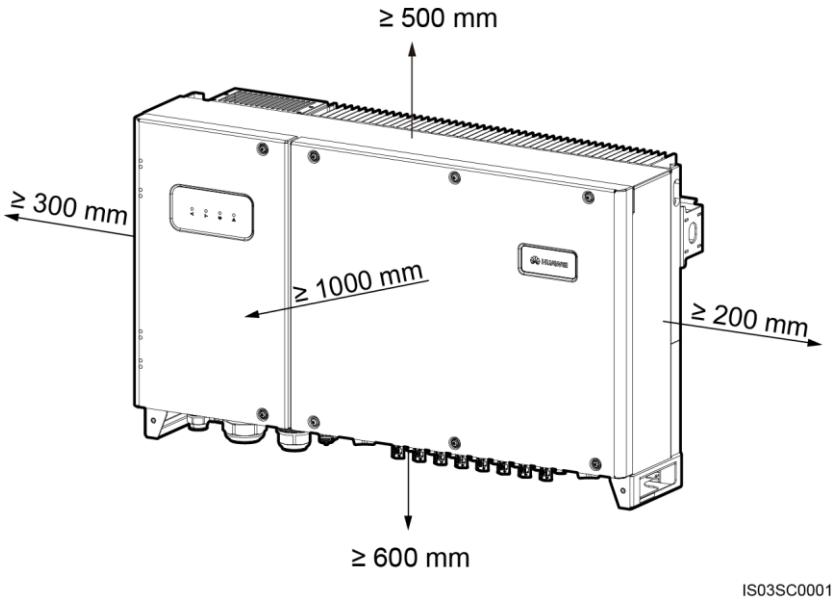
Figure 4-3 Incorrect installation angles



Space requirements for installation

- The dimensions of the SUN2000 (width x height x depth, including the mounting bracket) are 930 mm x 550 mm x 283 mm. Leave enough clearance around the SUN2000 to ensure sufficient installation space and heat dissipation, as shown in the figure.Figure 4-4.

Figure 4-4 Installation space



NOTA

To facilitate installation of the SUN2000 on the mounting bracket, cable connections at the bottom of the inverter, and future maintenance, it is recommended that the clearance at the bottom be greater than or equal to 600 mm and less than or equal to 730 mm. If you have any questions regarding clearances, please contact your local technical support engineers.

- When installing multiple SUN2000s, place them horizontally if there is enough space, and place them in a triangular position if there is not. Stacked installation is not recommended.

Figure 4-5 Horizontal installation mode (recommended)

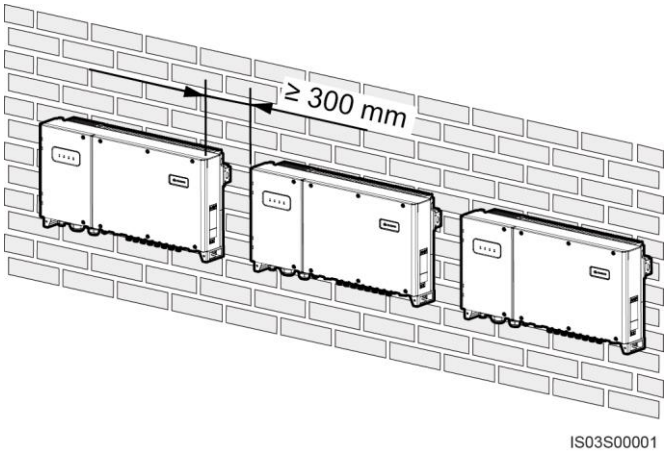


Figure 4-6 Triangular installation mode (recommended)

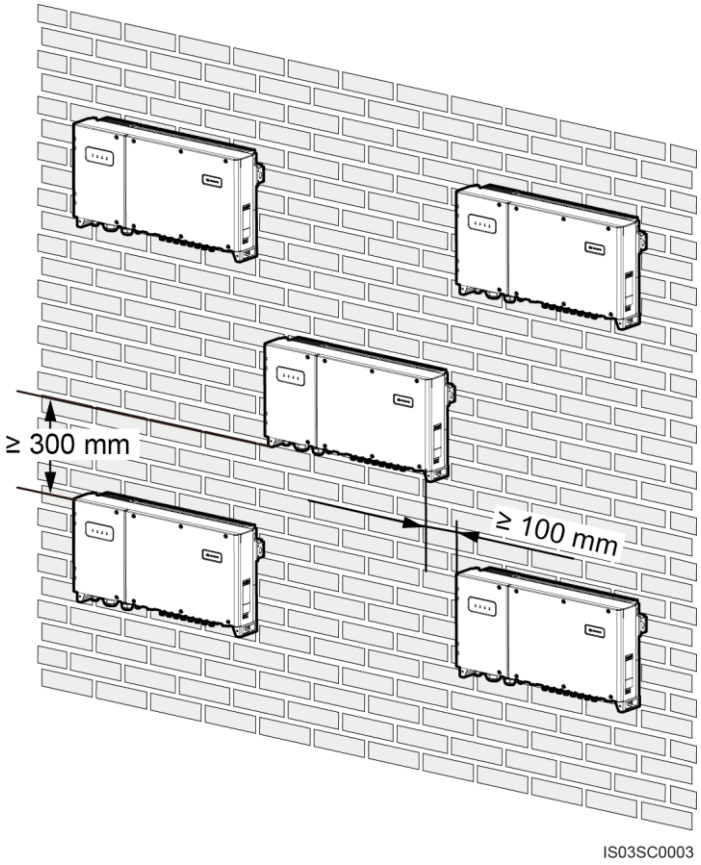
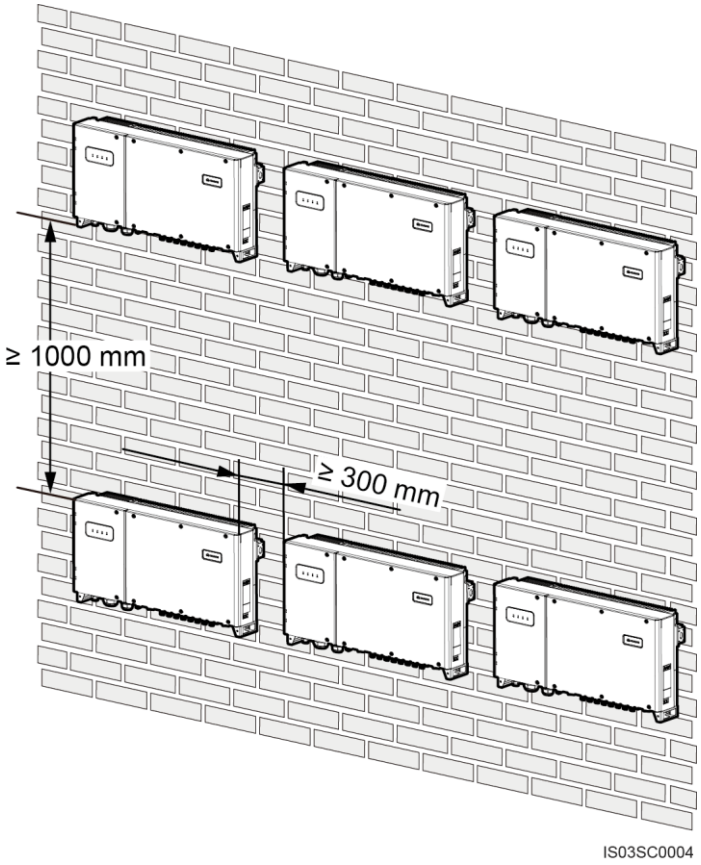


Figure 4-7 Stacked installation mode (not recommended)



4.3.2 How to move the inverter

Context

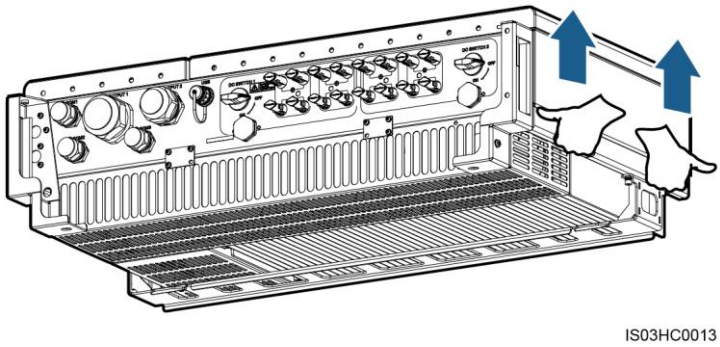
⚠ ATENCIÓN

- To avoid damage to the equipment and injuries, carry the SUN2000 with proper balance, as it is a heavy piece of equipment.
- Do not place the SUN2000 with the bottom wiring terminals in contact with the floor or any other object, as the terminals are not designed to withstand the weight of the equipment.
- When placing the SUN2000 on the floor, place foam rubber or paper under the equipment to protect the casing.

Procedure

Step 1 Coordinate the move so that two people hold the side handles of the SUN2000.

Figure 4-8 How to lift the SUN2000



Step 2 Take the SUN2000 out of the packing box and move it to the installation site with the help of others.

- - - - End

4.3.3 How to install the mounting bracket

Prerequisites

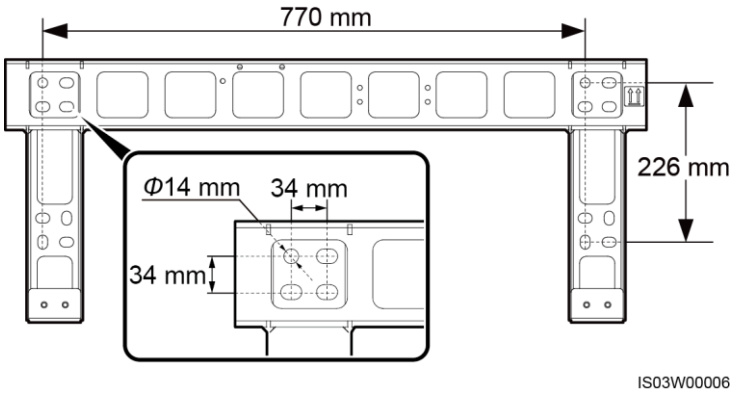
NOTA

- For the installation of the SUN2000-29.9KTL/33KTL-A/36KTL, you can use the expansion bolts supplied with the equipment to install the mounting bracket.
- To install the SUN2000-42KTL, you need to prepare expansion bolts. We recommend using M12 x 60 stainless steel expansion bolts.

Context

TheFigure 4-9shows the dimensions of the SUN2000 mounting bracket.

Figure 4-9 Mounting bracket dimensions



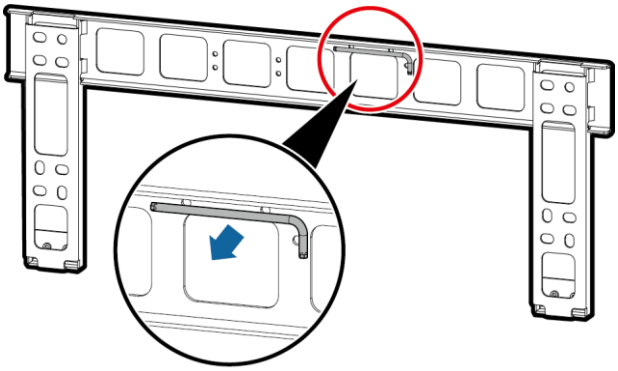
NOTA

The SUN2000 mounting bracket has 16 threaded holes arranged in four groups. Mark any of the holes in each group according to site requirements (a total of four holes must be marked). Two round holes are preferred.

Procedure

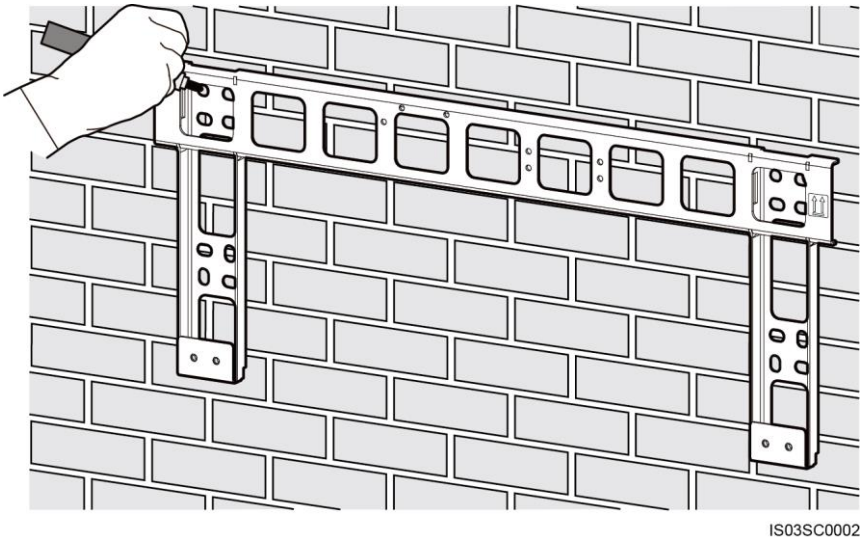
Step 1 Remove the torx wrench from the mounting bracket and set it aside.

Figure 4-10 Removing the security torx nut wrench



Step 2 Determine the hole locations using the mounting bracket included in the packaging. Level the hole locations using a level and mark them with a marker.

Figure 4-11 Determining hole locations



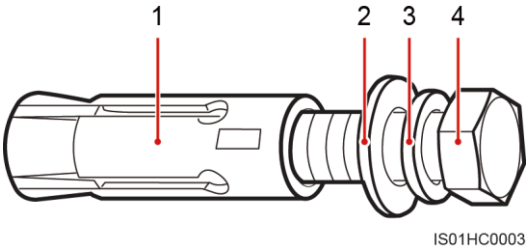
Step 3 Drill holes using a hammer drill and install expansion bolts.

PELIGRO

Do not make holes in water pipes or power cables embedded in the wall.

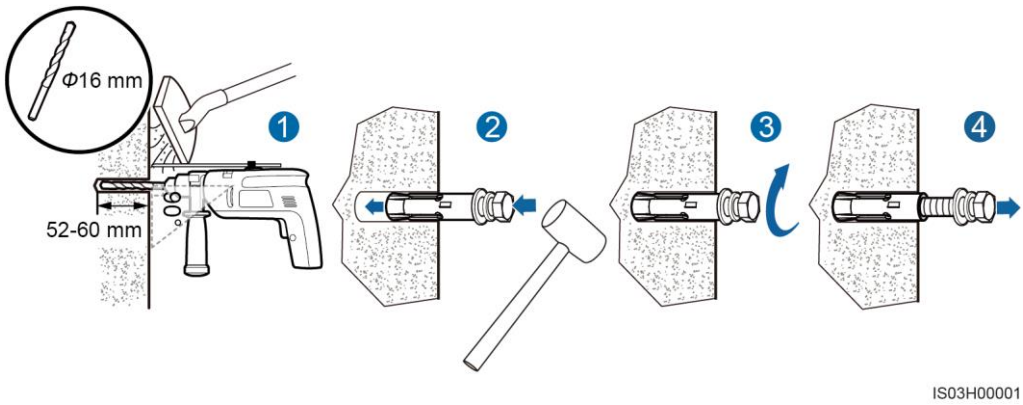
An expansion bolt is composed of four parts, as shown in the figure.Figure 4-12.

Figure 4-12 Parts of an expansion bolt



(1) Expansion sleeve (2) Flat washer (3) Spring washer (4) Bolt

Figure 4-13 Drilling a hole and installing an expansion bolt



AVISO

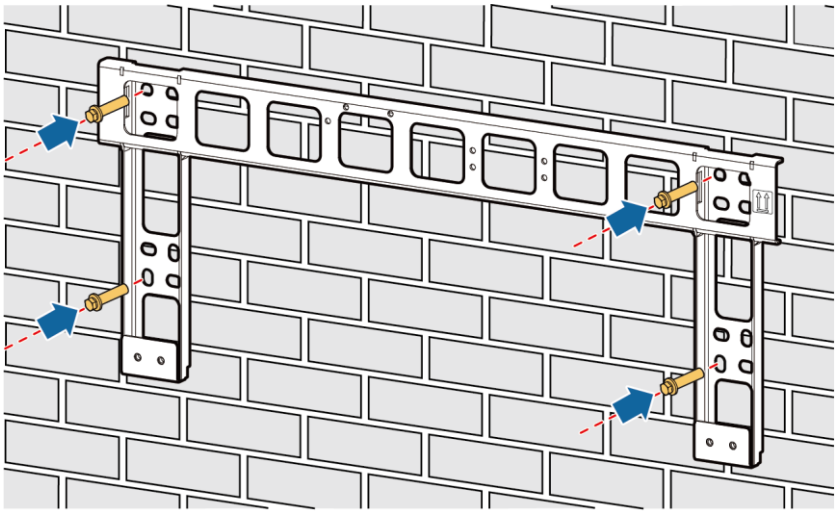
- To avoid inhalation of dust or contact with eyes, wear safety goggles and a dust mask while drilling holes.
- Clean any dust from or around the holes and measure the distance between them. If the holes are incorrectly positioned, re-drill them.
- Level the front of the expansion sleeve with the concrete wall after removing the bolt, spring washer, and flat washer. Failure to do so will result in the mounting bracket not being securely installed on the concrete wall.

1. Place a hammer drill with a 16 mm drill bit on one of the marked holes, perpendicular to the wall. Drill holes 52–60 mm deep.
2. Loosely adjust an expansion bolt, insert it vertically into the hole, and use a rubber mallet to fully insert it.
3. Partially tighten the expansion bolt.
4. Remove the bolt, spring washer, and flat washer by turning them counterclockwise.

Step 4 Align the mounting bracket with the holes. Insert the expansion bolts through the mounting bracket and tighten them to a torque of 45 Nm using a socket wrench.

18 mm.

Figure 4-14 Installing a mounting bracket



- - - - End

4.3.4 How to install the SUN2000

Procedure

Step 1 If the height of the installation location is low and the SUN2000 can be installed on the mounting bracket, follow the Step 3 and then the Step 5.

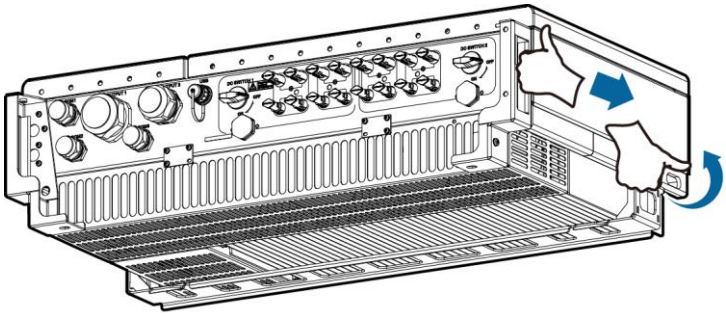
Step 2 If the height of the installation location is high and the SUN2000 cannot be installed on the mounting bracket, follow the steps 3 to 6.

Step 3 Ensure two people lift the SUN2000 and place it in an upright position. To lift the SUN2000, grasp the handle on the bottom of the unit with one hand and the handle on the top with the other.

⚠ ATENCIÓN

To avoid injury due to a fall of the SUN2000, please keep balance when lifting it, since it is a heavy equipment.

Figure 4-15 How to lift the SUN2000

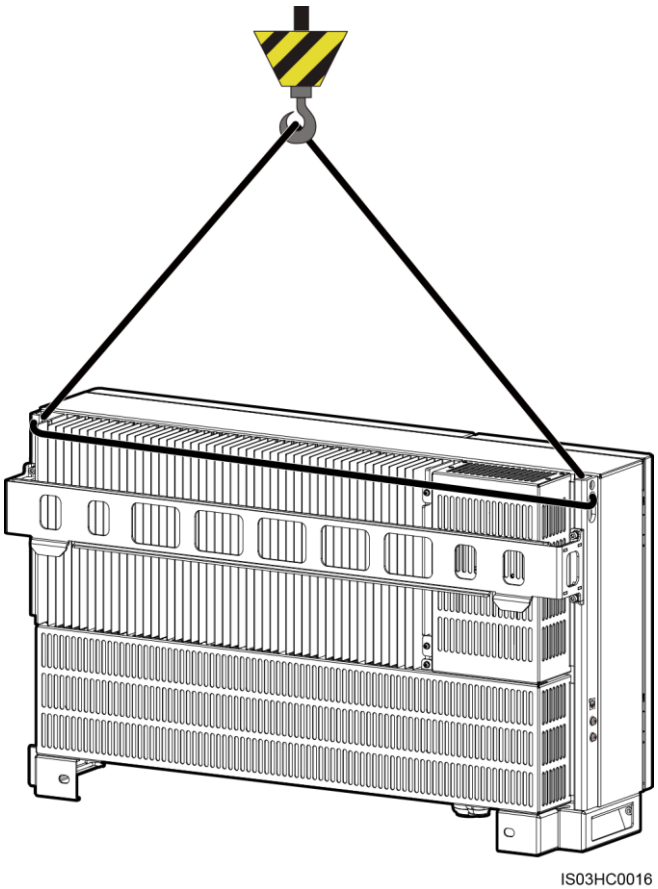


Step 4 Pass a rope with sufficient strength to support the SUN2000 through the lifting eyes and raise the equipment.

AVISO

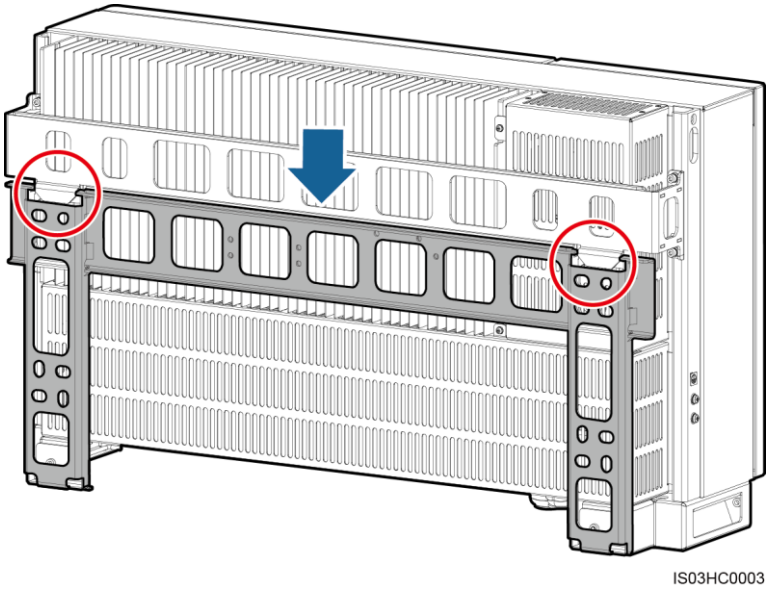
When lifting the SUN2000, please maintain balance to prevent the equipment from hitting the wall or other objects.

Figure 4-16 Elevation of the SUN2000



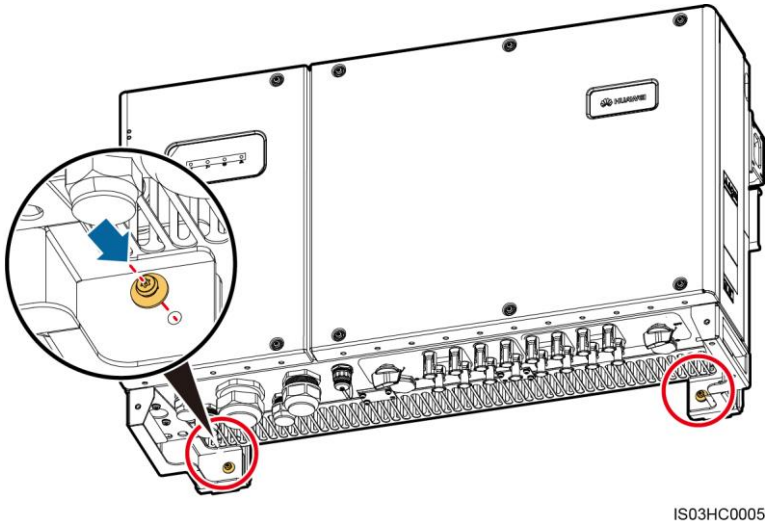
Step 5 Install the SUN2000 on the mounting bracket and level the SUN2000 chassis with the bracket.

Figure 4-17 Attaching the SUN2000 to the mounting bracket



Step 6 Tighten the two security torx screws using a torx wrench with a torque of 5 Nm.

Figure 4-18 Tightening the security torx screws



- - - - End

4.4 Installing the SUN2000 on a stand

4.4.1 How to determine the installation location

Basic requirements

- The SUN2000 has IP65 protection and can be installed indoors or outdoors.
- Do not install the SUN2000 in a location where personnel can easily come into contact with the chassis and heat sinks, as the temperature of these parts is extremely high while the equipment is in operation.
- Do not install the SUN2000 in areas where flammable or explosive materials are present.

Environmental requirements for installation

The SUN2000 should be installed in a well-ventilated environment to ensure good heat dissipation. If installed in direct sunlight, performance may be impaired. to decrease due to a further increase in temperature. Recommendation: Install the SUN2000 in a covered location or in a location with an awning.

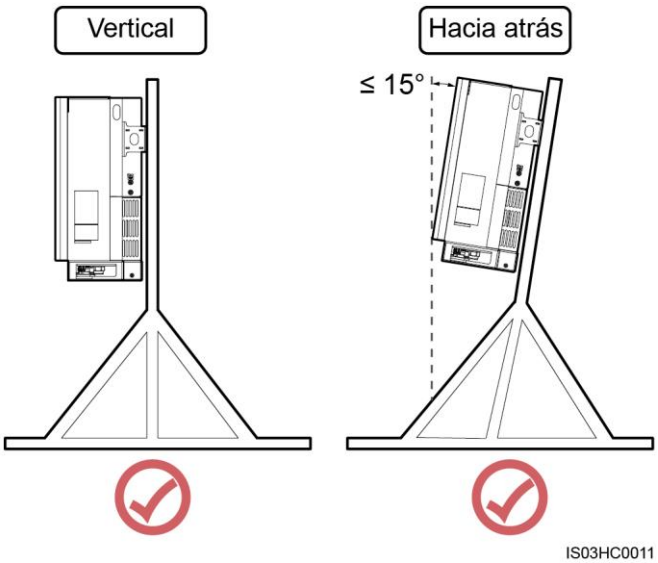
Requirements for support

- The support on which the inverter is installed must be fire-resistant.
- Do not install the inverter on flammable building materials.
- Make sure the installation surface is solid enough to support the weight of the load.

Installation angle requirements

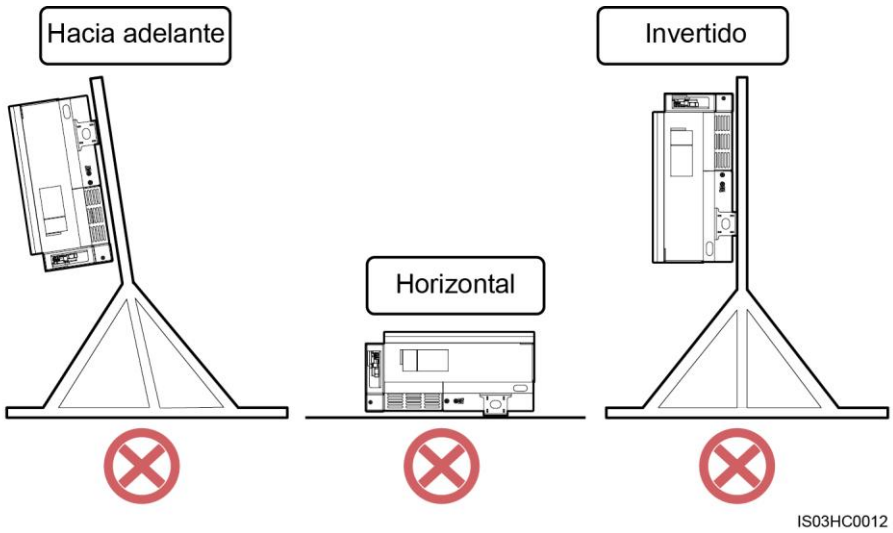
- Install the SUN2000 vertically or with a maximum backward tilt of 15 degrees to facilitate heat dissipation.

Figure 4-19 Correct installation angles



- Do not install the inverter tilted forward, tilted excessively backward, tilted sideways, horizontally, or upside down.

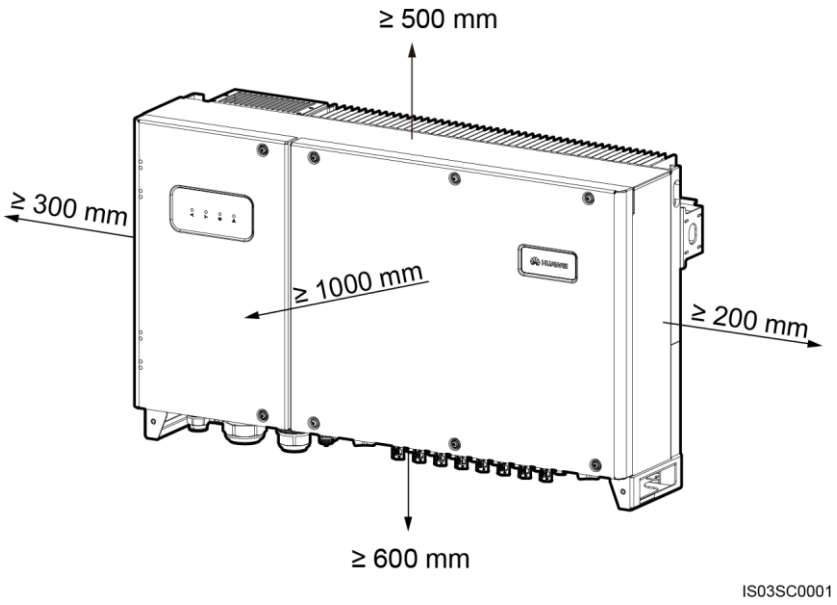
Figure 4-20 Incorrect installation angles



Space requirements for installation

The dimensions of the SUN2000 (width x height x depth, including the mounting bracket) are 930 mm x 550 mm x 283 mm. Leave enough clearance around the SUN2000 to ensure sufficient installation space and heat dissipation, as shown in the figure.Figure 4-21.

Figure 4-21 Installation space



NOTA

To facilitate installation of the SUN2000 on the mounting bracket, cable connections at the bottom of the inverter, and future maintenance, it is recommended that the clearance at the bottom be greater than or equal to 600 mm and less than or equal to 730 mm. If you have any questions regarding clearances, please contact your local technical support engineers.

4.4.2 How to move the inverter

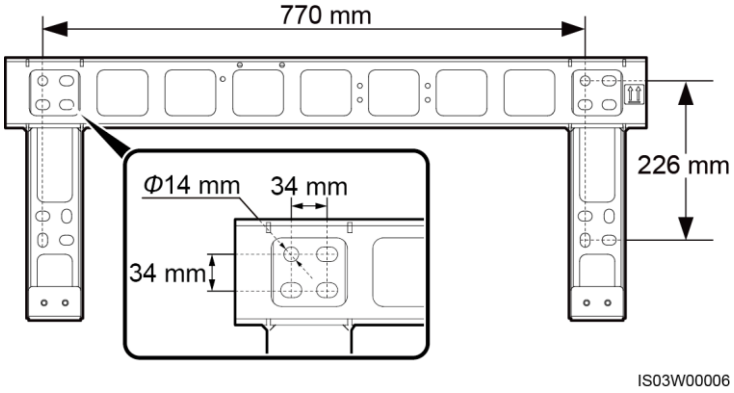
For detailed information, see the section4.3.2 How to move the inverter.

4.4.3 How to install the mounting bracket

Context

TheFigure 4-22shows the dimensions of the SUN2000 mounting bracket.

Figure 4-22 Mounting bracket dimensions



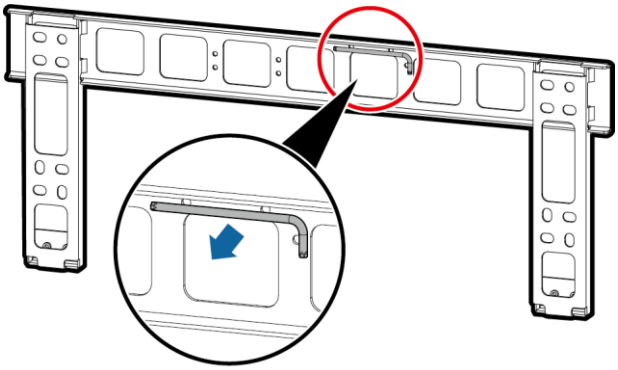
NOTA

The SUN2000 mounting bracket has 16 threaded holes arranged in four groups. Mark any of the holes in each group according to site requirements (a total of four holes must be marked). Two round holes are preferred.

Procedure

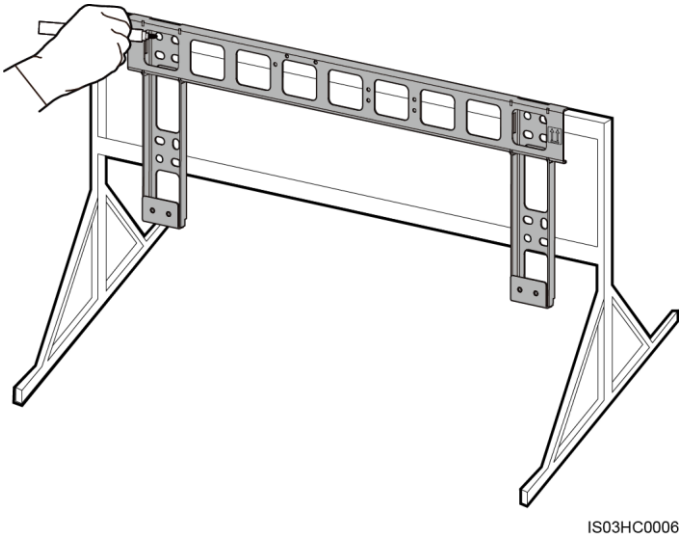
Step 1 Remove the torx wrench from the mounting bracket and set it aside.

Figure 4-23 Removing the security torx nut wrench



Step 2 Use the mounting bracket to determine the hole locations. Level the hole locations using a level and mark them with a marker.

Figure 4-24 Determining hole locations

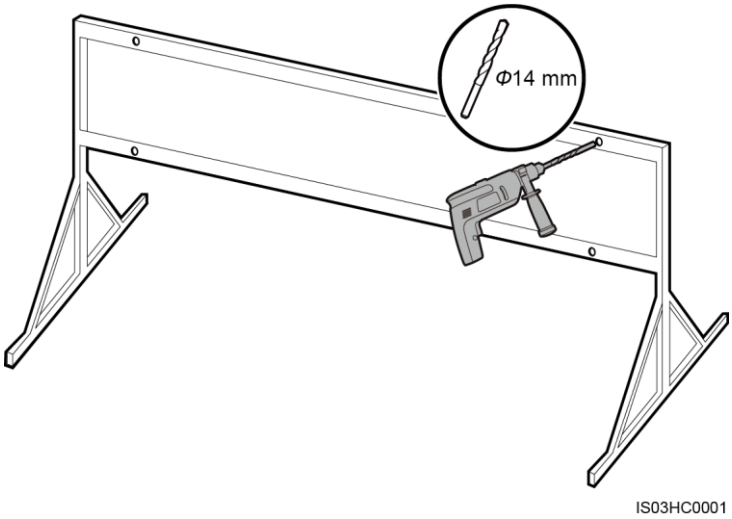


Step 3 Drill the holes using a hammer drill.

NOTA

It is advisable to apply anti-rust paint to the hole positions as a protective measure.

Figure 4-25 Drilling holes

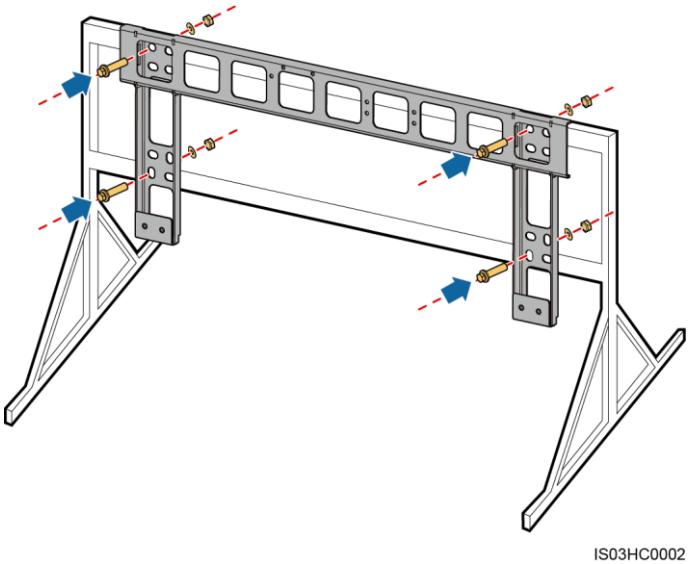


Step 4 Align the mounting bracket with the hole locations, insert the bolt anchors (flat washers, spring washers and M 12 x 40 bolts) into the holes through the mounting bracket, fix Secure them using the flat washers and stainless steel nuts that are included, and tighten the bolts to a torque of 45 Nm using an 18 mm socket wrench.

NOTA

The SUN2000 is delivered with M12 x 40 bolt anchors. If the bolt length does not meet the installation requirements, prepare your own M12 bolt anchors and use them with the delivered M12 nuts.

Figure 4-26 Installing a mounting bracket



- - - - End

4.4.4 How to install the SUN2000

For detailed information, see the section4.3.4 How to install the SUN2000.

5 Cable connection

Precautions

PELIGRO

Before connecting the cables, make sure that both DC switches on the inverter are in the OFF position. Otherwise, the high voltage from the inverter could cause to cause discharges electric.

AVISO

To avoid poor cable connection caused by overload, it is recommended that the cables be folded and reserved and then connected to the appropriate ports.

NOTA

The wire colors shown in the electrical connection drawings in this chapter are for reference purposes only. Select wires according to local wire specifications (yellow and green wires are used only for grounding).

5.1 Opening the maintenance compartment door

Prerequisites

ATENCIÓN

- Never open the host panel of the SUN2000.
- Before opening the maintenance compartment door, disconnect the AC and DC power supplies. For information on how to disconnect the power supplies,

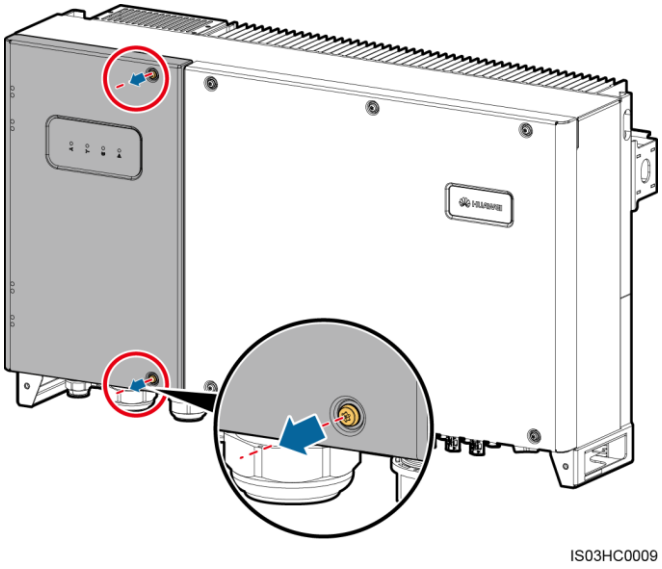
see the section6.3 Shutting down the SUN2000. After turning off the SUN2000, wait at least 5 minutes before performing any operations on it.

- If you need to open the maintenance compartment door in daytime as rainy or snow, take precautionary measures to prevent water or snow from entering the compartment. If such measures are not possible, do not open the compartment door under these weather conditions.
- Do not leave unused screws in the maintenance compartment.

Procedure

Step 1 Remove the two screws from the maintenance compartment door using a security torx wrench and set them aside.

Figure 5-1 Removing the screws

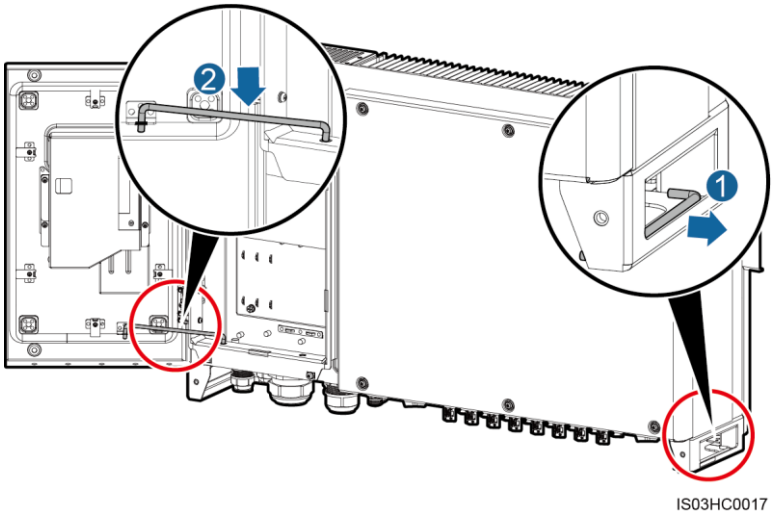


Step 2 Open the maintenance compartment door and install a support bar.

NOTA

The support bar is attached to the base of the chassis.

Figure 5-2 Installing a support bar



- - - - End

5.2 Connecting the grounding (PE) cable

Prerequisites

It must have a ground cable and OT terminals.

- Ground cable: It is recommended to use an outdoor copper cable with a conductor cross-section area greater than or equal to 16 mm.2, and the cross-sectional area of the conductor must be greater than or equal to half of the cross-sectional area of the AC output cable conductor.
- OT Terminal: M6

Context

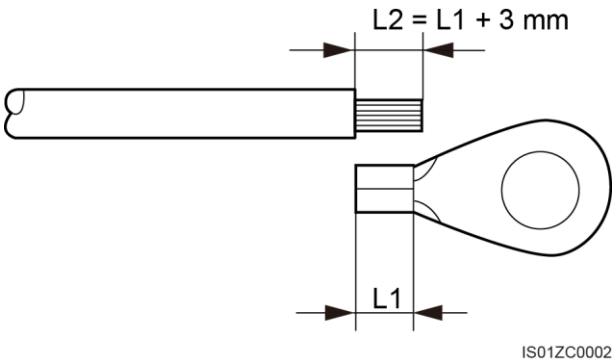
- The chassis grounding point should preferably be connected to the ground wire in the case of the SUN2000.
- The maintenance compartment grounding point is used to connect the ground wire included with the multi-core AC power cable. For details, see the section5.3 Connecting the AC output cables.
- The chassis housing has two ground points, one of which is the inactive one.
- It is recommended to connect the ground wire to a nearby grounding point. In a system with multiple SUN2000s connected in parallel, connect the grounding points of all of them to ensure that the ground wire connections are equipotential.

Procedure

Step 1 Strip off an appropriate length of the insulation layer using a wire stripper, as shown.

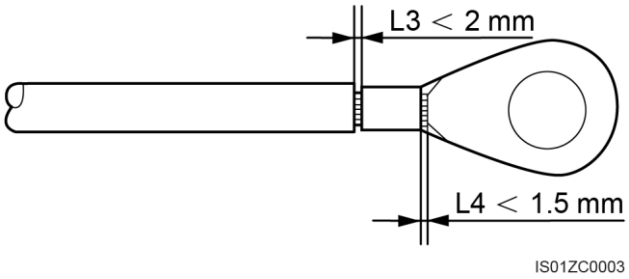
sample in theFigure 5-3.

Figure 5-3 Length to be peeled



Step 2 Insert the exposed wire cores into the crimping area of the OT terminal and crimp them using a hydraulic pliers, as shown in the figure.Figure 5-4.

Figure 5-4 Crimping a cable



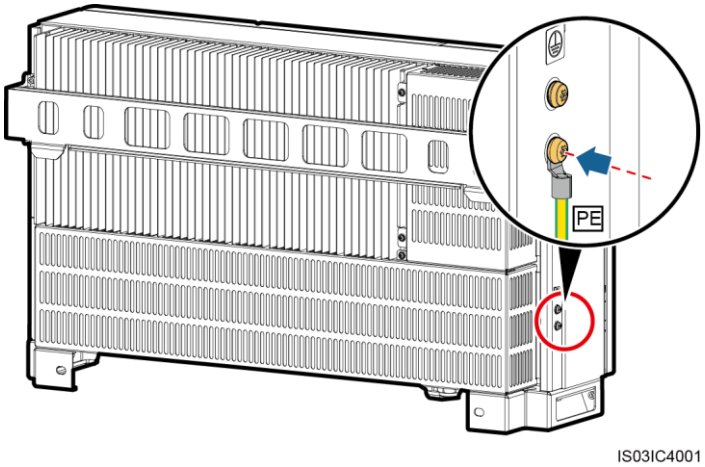
NOTA

The cavity formed after crimping the conductor must completely cover the wire cores. The wire cores must have close contact with the terminal.

Step 3 Remove the grounding screws from the ground points.

Step 4 Secure the ground wire using the ground screw and tighten the screw using a security torx wrench to a torque of 5 Nm.

Figure 5-5 Connecting a ground wire



NOTA

To improve the corrosion resistance of the ground terminal, cover it with silica gel or plastic. write it down later of connecting the ground wire.

- - - - End

5.3 Connecting the AC output cables

Prerequisites

A three-phase AC breaker must be set up outside the AC side of the SUN2000. To ensure that the SUN2000 can be safely disconnected from the power grid under abnormal conditions, select a suitable overcurrent protection device in accordance with existing power distribution standards. to.

ADVERTENCIA

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

Context

- If a ground wire is connected to the chassis casing grounding point in a scenario where there is no neutral wire, it is recommended to use an outdoor three-core (L1, L2, and L3) cable as the AC output cable for the SUN2000-29.9KTL/33KTL-A/36KTL.
- If a ground wire is connected to the maintenance compartment grounding point in a scenario where there is no neutral wire, it is recommended to use an outdoor four-core cable (L1, L2, L3 and PE) as the AC output cable for the SUN2000-29.9KTL/33KTL-A/36KTL.
- If a ground wire is connected to the chassis casing grounding point in a scenario where there is a neutral wire, it is recommended to use an outdoor four-core (L1, L2, L3 and N) cable as the AC output cable for the SUN2000-29.9KTL/33KTL-A/36KTL.

- If a ground wire is connected to the grounding point of the maintenance compartment in a scenario where there is a neutral wire, it is recommended to use an outdoor five-core cable (L1, L2, L3, N and PE) as the AC output cable for the SUN2000-29.9KTL/33KTL-A/36KTL.
- If a ground wire is connected to the grounding point of the chassis enclosure, it is recommended to use an outdoor three-core cable (L1, L2, and L3) as the AC output cable for the SUN2000-42KTL.
- If a ground wire is connected to the grounding point of the maintenance compartment, it is recommended to use an outdoor four-core cable (L1, L2, L3 and PE) as the AC output cable for the SUN2000-42KTL.

Table 5-1SUN2000-29.9KTL/33KTL-A Cable Specifications

Cable specifications		**Core cable copper**	**Alloy cable aluminum or aluminum with coating of copper**
Section of the conductor (mm^2)	Range of values	16–70	25–70
	Recommended value	16	35
External diameter of the supported cable via AC OUTPUT 1 connector (mm)	Range of values	18–44	
	Recommended value	40	

Table 5-2SUN2000-36KTL/42KTL Cable Specifications

Cable specifications		**Core cable copper**	**Alloy cable aluminum or aluminum with coating of copper**
Section of the conductor (mm^2)	Range of values	16–70	25–70
	Recommended value	25	35
External diameter of the supported cable via AC OUTPUT 1 connector (mm)	Range of values	18–44	
	Recommended value	40	

- Prepare the OT M8 terminals by yourself.

NOTA

If a ground wire is connected to the grounding point in the maintenance compartment, prepare an OT M6 terminal by yourself.

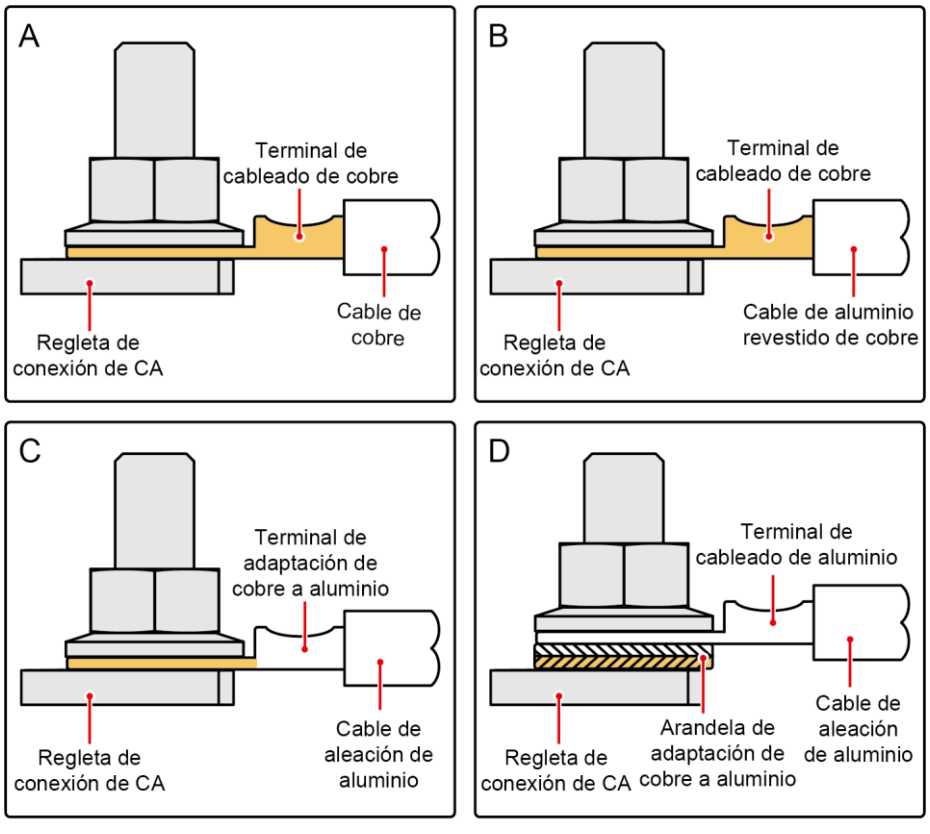
OT Terminal Requirements:

- If copper wire is used, use a copper wiring terminal.
- If copper-clad aluminum cable is used, use a copper wiring terminal.
- If aluminum alloy cable is used, use a copper-to-aluminum adapter terminal or an aluminum wiring terminal with a copper-to-aluminum adapter washer.

AVISO

- Direct connection of an aluminum wiring terminal to the AC terminal block will cause electrochemical corrosion.mica and will decrease the reliability of the cable connection.
- The copper-to-aluminum adapter terminal or an aluminum wiring terminal with a copper-to-aluminum adapter washer shall conform to IEC61238-1.
- Do not mix the aluminum and copper parts of the copper-to-aluminum adapter washer. Make sure the aluminum part of the washer makes contact with the aluminum wiring terminal, and the copper part makes contact with the AC terminal block.

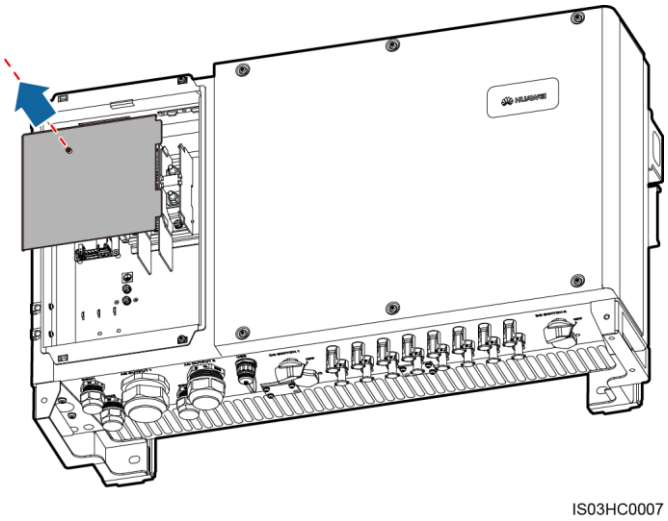
Figure 5-6OT Terminal Requirements



Procedure

Step 1 Remove the AC terminal cover as shown in the figure.Figure 5-7.

Figure 5-7 Removing the AC terminal cover



NOTA

To highlight the area in question, the figure does not show the door open.

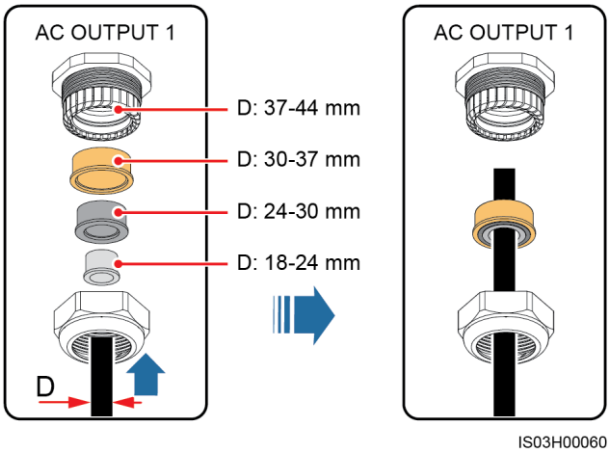
Step 2 Pull out the locking mechanism from the AC OUTPUT 1 connector and then remove the plug.

Step 3 If you want to use rubber fittings based on the cable's outer diameter, select one or more if necessary. Thread the cable through the locking mechanism and then the rubber fitting.

AVISO

- A discrepancy between the cable's outer diameter and the rubber fitting may decrease theDust and water protection rating of the device.
- Do not pass any cable with a crimped OT terminal directly through a rubber fitting to prevent damage to the latter.
- Do not move the cable when the locking mechanism is properly adjusted. Otherwise, the rubber seal will move, affecting the cable.Dust and water protection index device.

Figure 5-8 Selecting rubber settings

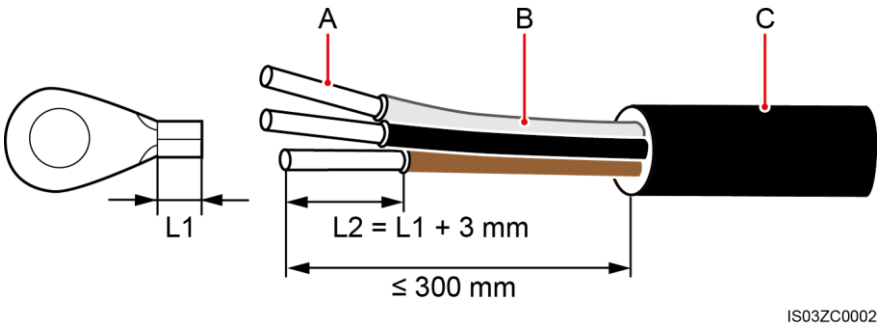


Step 4 Strip an appropriate length of insulation and jacket from the AC output cable using a wire stripper.

AVISO

Make sure the cover is in the maintenance compartment.

Figure 5-9 Three-core cable (excluding earth wire and neutral conductor)



(A) Wire core (B) Insulation layer (C) Cover

Figure 5-10 Four-core cable (includes the earth wire but not the neutral wire)

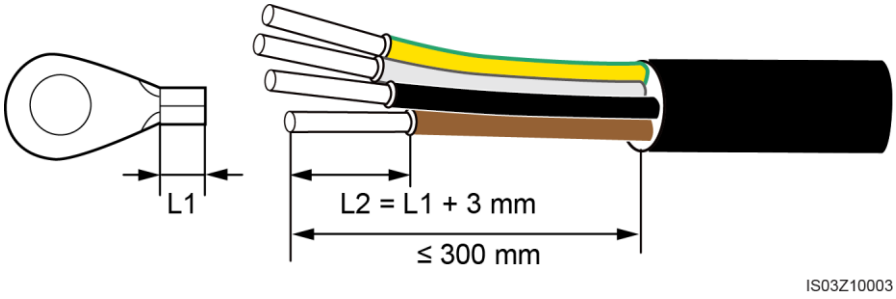


Figure 5-11 Four-core cable (excluding earth wire but including neutral wire)

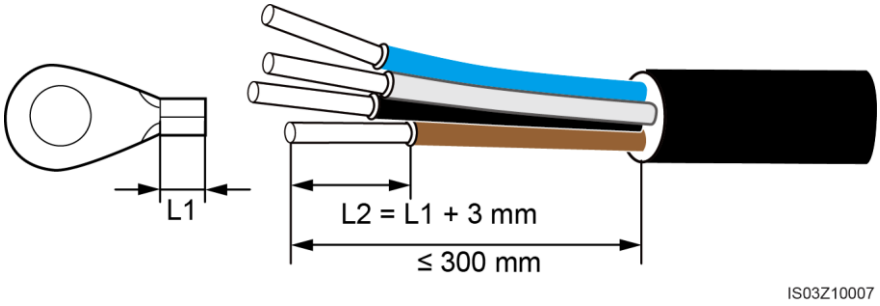
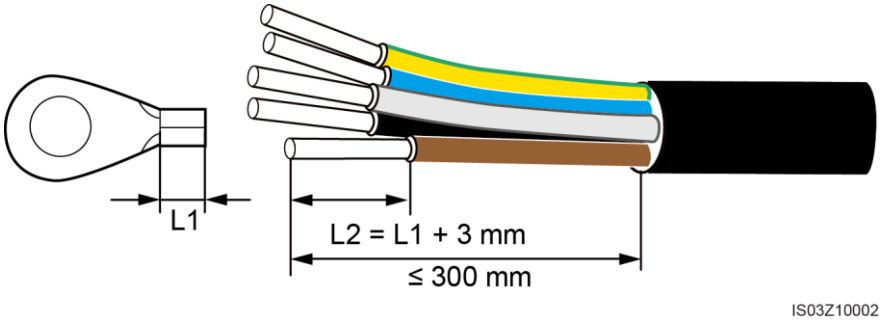


Figure 5-12 Five-core cable (including ground wire and neutral wire)



Step 5 Insert the exposed wire cores into the crimping area of the OT terminal and crimp them using hydraulic pliers.

NOTA
A wire core is connected to an OT terminal.

Step 6 Cover the crimping area using heat shrink tubing PVC insulating tape or tape.

NOTA
If using heat shrink tubing, place it along the power cable and then crimp the OT terminal.

Step 7 Route the AC output cable through the AC OUTPUT 1 connector located on the bottom of the chassis.

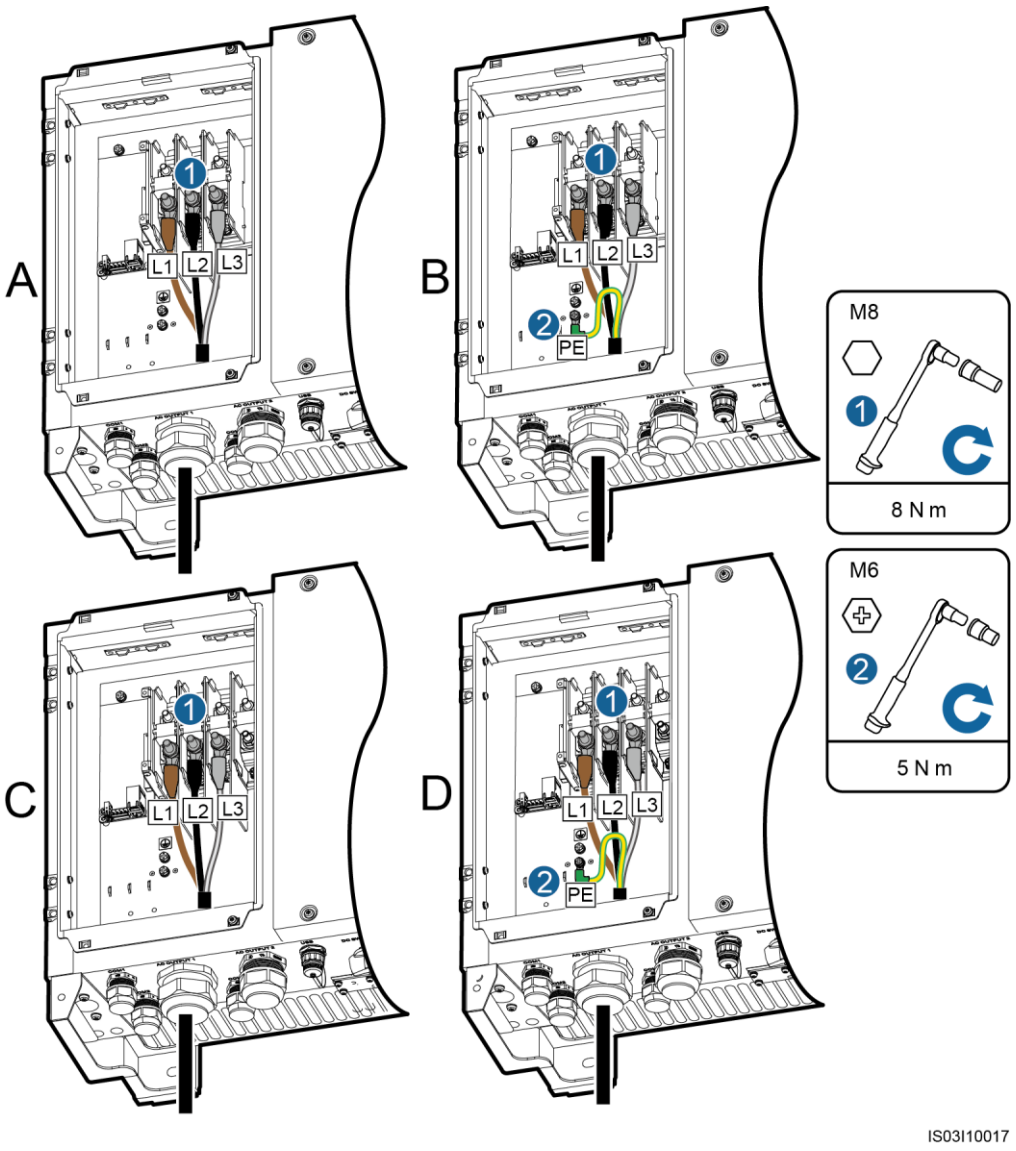
Step 8 Connect the AC output cable to the AC power strip, then tighten the nut using a 13 mm socket wrench with a threaded bar to a torque of 8 N m. If connecting a ground wire to the maintenance compartment ground point, tighten the ground screw using a 10 mm socket wrench with a threaded bar to a torque of 5 N m.

AVISO

- Make sure the AC terminals are protected. Failure to do so may result in the SUN2000 not functioning properly or damage to the power strip due to problems such as overheating.
- If the SUN2000 is not installed securely and the AC output cable bears the pulling force, make sure that the last cable to bear the force is the power cable.

land.

Figure 5-13SUN2000-42KTL



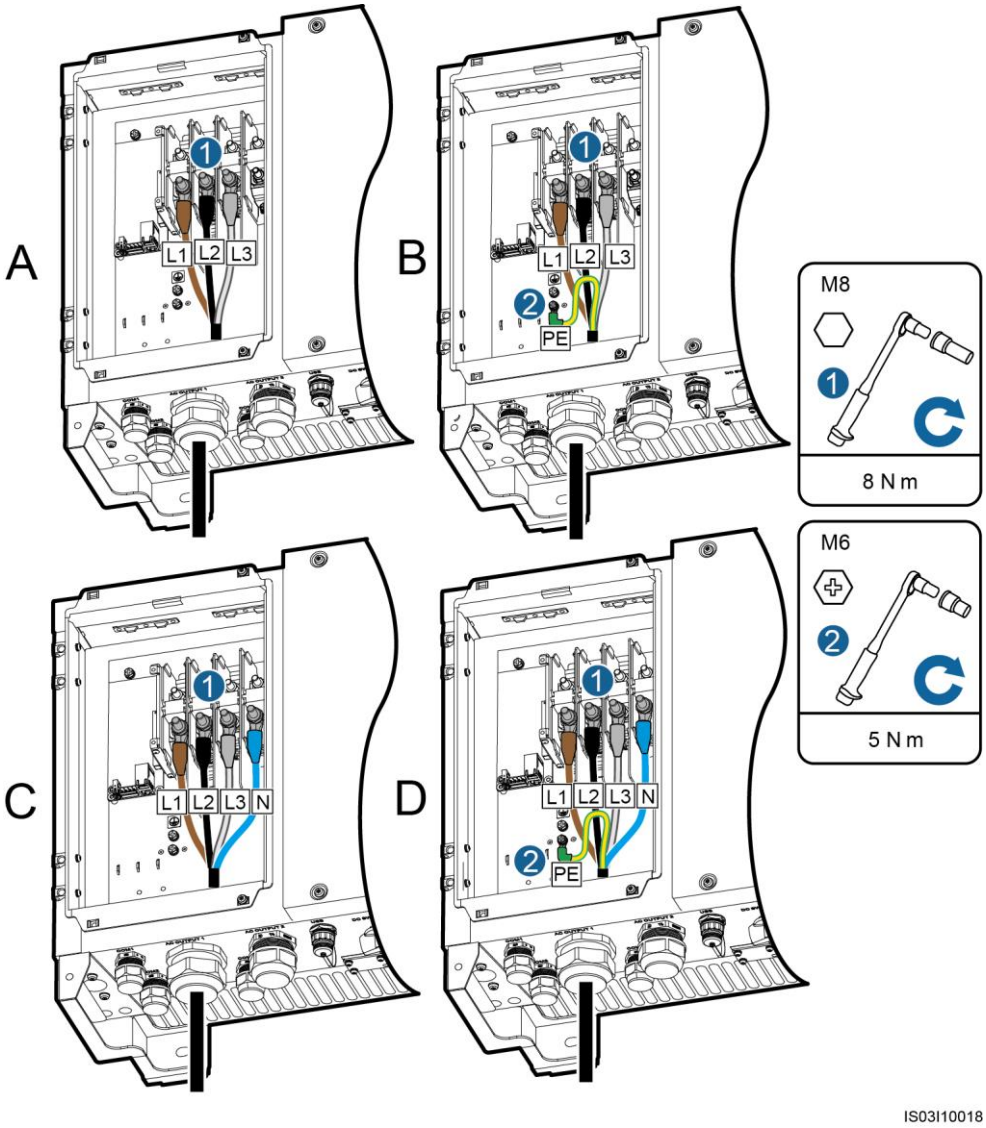
(A) 3 pin, no ground wire

(B) 3 pin, with ground wire

(C) 4 pins, no ground wire or neutral conductor

(D) 4 pins, with ground wire but without neutral conductor

Figure 5-14SUN2000-29.9KTL/33KTL-A/36KTL



(A) No ground wire or neutral conductor

(B) With ground wire but without neutral conductor

(C) Without ground wire but with neutral conductor

(D) With ground wire and neutral conductor

NOTA

The wire colors in the figures are for reference purposes only. Select appropriate wires based on local standards.

Step 9 Install the rubber seal on the AC OUTPUT 1 connector located on the bottom of the chassis. Use a torque wrench. meter with an open end of 65 mm to adjust the mechanism closing with a torque of 7.5 N·m.

- - - - End

Follow-up procedure

Check that the cables are connected correctly and securely. Then seal the connectors.

5.4 Connecting DC input cables

Prerequisites

⚠ PELIGRO

- Before connecting the DC input cables, make sure that the DC voltage is within the safe range (less than 60 VDC) and that both DC switches of the SUN2000 are in the OFF position. Otherwise, high voltage may cause a fire. to cause electric shocks.
- When the SUN2000 is connected to the mains power supply, maintenance on the DC input cables (for example, connecting or disconnecting a string or a module in a string) is not permitted. Otherwise, electric shock may occur.

⚠ ADVERTENCIA

Make sure the following conditions are met. Otherwise, the SUN2000 may be damaged or even destroyed. a fire may break out.

- The open circuit voltage of each photovoltaic string must always be equal to or less than 1100 VDC.
- The positive and negative terminals of a photovoltaic module should be connected to the positive and negative DC input terminals of the SUN2000, respectively.
- If the DC input cable is connected backward, do not use the DC switches or the positive and negative connectors immediately. Wait until nightfall when solar radiation decreases and the PV string current drops to less than 0.5 A. Then, turn off both DC switches, remove the positive and negative connectors, and correct the DC input cable polarity.

AVISO

- Ensure that the PV module output is well insulated from ground. If the SUN2000 is connected directly to the grid via the neutral conductor connected to the ground wire (for example, in the case of a low-voltage grid or a grid with a grounded neutral conductor), do not ground the positive and negative terminals of the PV strings. The device may be damaged if the instructions are not followed. This damage will not be covered by the warranty. nor by the agreement service.
- During the installation of the photovoltaic strings and the SUN2000, the positive terminals

or negative of the photovoltaic strings may be grounded if the power cables are not installed or routed correctly. In this case, it could to be generated an AC or DC short circuit and it would be damaged to the SUN2000. The damage caused to the equipment for this reason are outside the scope of the warranty to.

NOTA

The following requirements must be met if the positive or negative terminals of the photovoltaic strings are to be grounded:

- A three-phase isolation transformer must be installed on the output side.
- Only one isolation transformer should be installed per SUN2000. Do not connect two or more SUN2000s to the same isolation transformer. Otherwise, the SUN2000s may not operate due to the loop current generated between them.

Context

- DC Terminal Selection

  TheFigure 5-15shows the DC terminals on the bottom of the SUN2000. Table 5-3 describes the requirements for selecting the DC terminals.

NOTA

The SUN2000 has two DC switches: DC SWITCH 1 and DC SWITCH 2. DC SWITCH 1 controls the first through fourth paths of DC input terminals, while DC SWITCH 2 controls the fifth through eighth paths of DC input terminals.

Figure 5-15DC Terminals

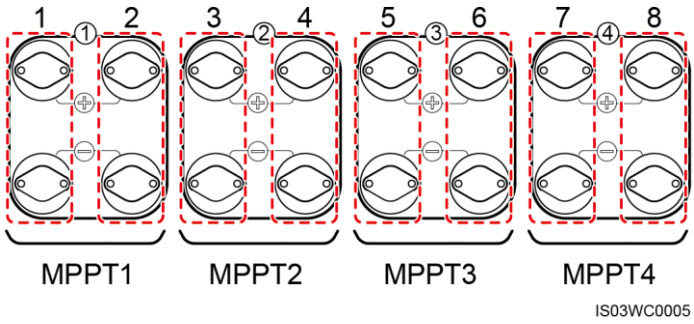


Table 5-3DC Terminal Selection Requirements

Amount of tickets	SUN2000
1	Connects to any route.
2	Connects to routes 1 and 5.
3	Connects to routes 1, 3 and 5.
4	Connects to routes 1, 3, 5 and 7.
5	Connects to routes 1, 2, 3, 5 and 7.
6	Connects to routes 1, 2, 3, 5, 6 and 7.
7	Connects to routes 1, 2, 3, 4, 5, 6 and 7.

Amount of tickets	SUN2000
8	Connects to routes 1, 2, 3, 4, 5, 6, 7 and 8.

- DC Input Cable Specifications

  TheTable 5-4lists the specifications for DC input cables.

Table 5-4 Recommended specifications for DC input cables

Cable type	Conductor section (mm)2)		External diameter of the cable (mm)
	Range	Worth recommended	
Photovoltaic cables common in the industry (model: PV1-F)	4.0-6.0 (or 12-10 AWG)	4.0 (or 12 AWG)	4.5–7.8

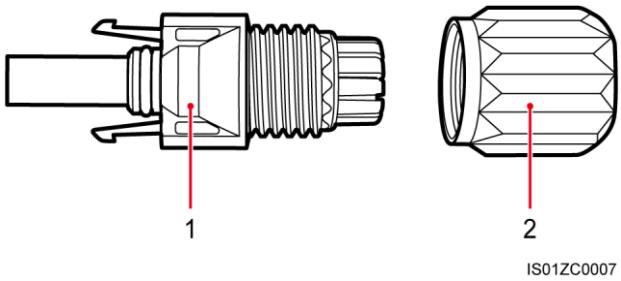
AVISO

Rigid cables are not recommended.rigid, such as shielded cables, since it can poor contact may occur in its curves.

- Positive and negative connectors

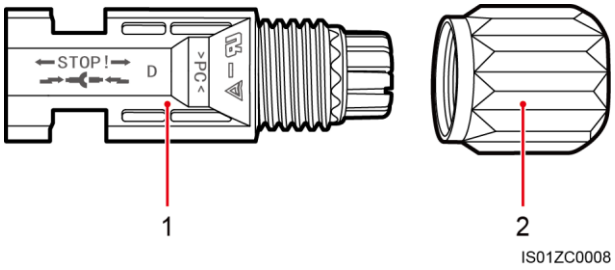
  DC input connectors are categorized into positive and negative connectors as shown in the figure.Figure 5-16and in theFigure 5-17.

Figure 5-16 Positive connector



(1) Insulation housing (2) Lock nut

Figure 5-17 Negative connector



(1) Insulation housing (2) Lock nut

⚠ ATENCIÓN

Use the DC connectors and the positive and negative metal connectors supplied with the SUN2000. Using other models with positive and negative metal contacts and other DC connectors may have serious consequences. Damage to the device is not covered by any warranty. a service agreement.

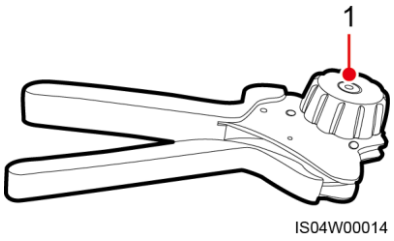
Procedure

Step 1 Prepare the positive and negative connectors

AVISO

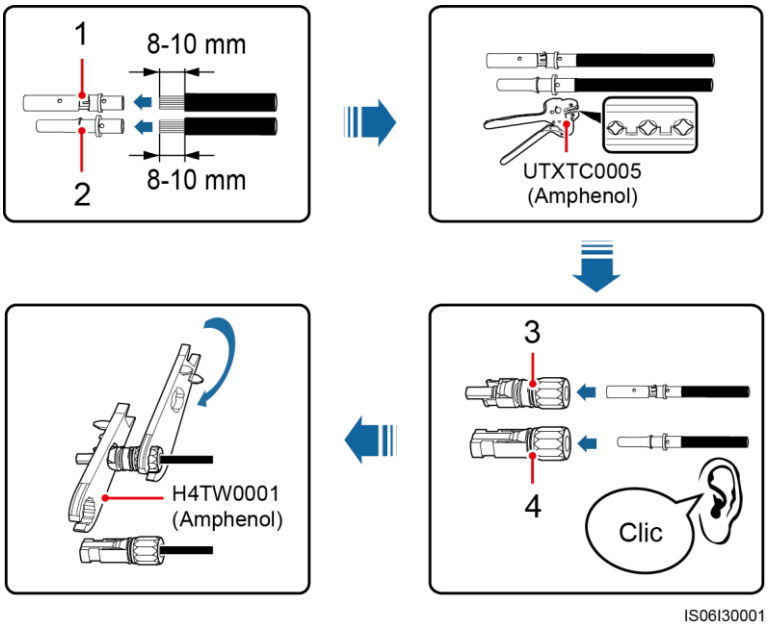
- The metal contacts supplied with the DC connectors are cold-formed contacts. oo stamp-forming contacts. Select the crimping tool according to the type of metal contacts. Do not mix tools.
- Crimp the cold forming contacts or metal with crimping tools UTXTC0005 (Amphenol, recommended) or H4TC0001 (Amphenol).
- Crimp metal stamping forming contacts using crimping tools H4TC0003 (Amphenol, recommended), H4TC0002 (Amphenol), PV-CZM-22100 (Staubli), or PV-CZM-19100 (Staubli). When choosing PV-CZM-22100 or PV-CZM-19100, do not use a locator. Otherwise, the metal contacts may be damaged.

Figure 5-18 Crimping Tool (H4TC0003)



(1) Locator

Figure 5-19 Preparing the positive and negative connectors (using cold-formed metal contacts)either).



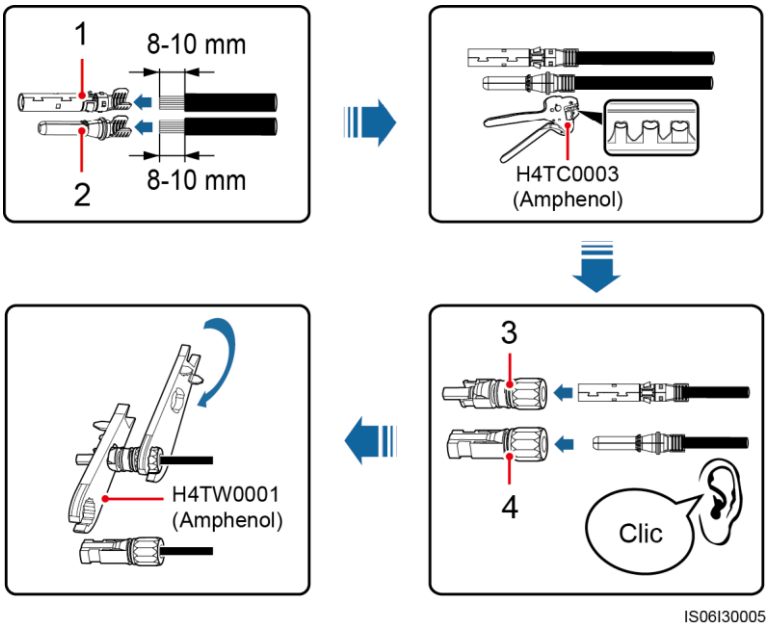
(1) Positive metal contact (cold formed) either)

(2) Negative metallic contact (cold formed)

(3) Positive connector

(4) Negative connector

Figure 5-20 Preparation of the positive and negative connectors (using stamp-formed metal contacts).



(1) Positive metal contact (formed by stamping)

(2) Negative metal contact (formed by stamping)

(3) Positive connector (4) Negative connector

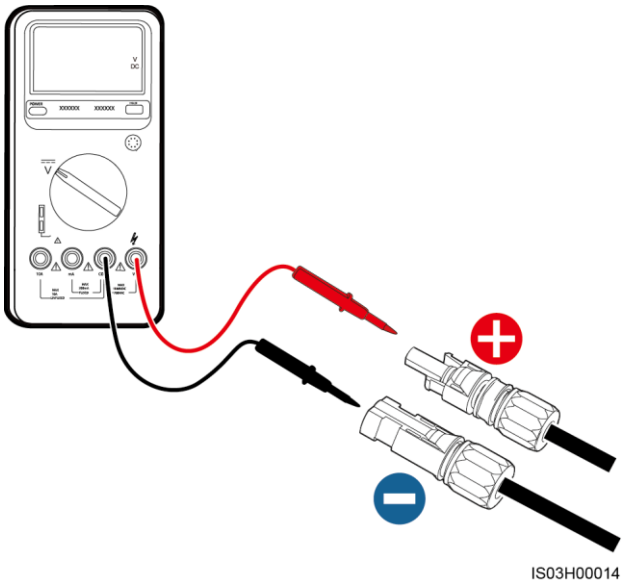
AVISO

The metal contacts supplied with the photovoltaic connectors are cold-formed contacts. oo stamping forming contacts.

Step 2 Remove the blue dust-proof plugs from the ends of the DC input connectors.

Step 3 Ensure that the DC input voltage of each PV string is not higher than 1100 VDC using a multimeter and verify that the polarities of the DC input cables are correct.

Figure 5-21 Measuring DC input voltage



⚠ ADVERTENCIA

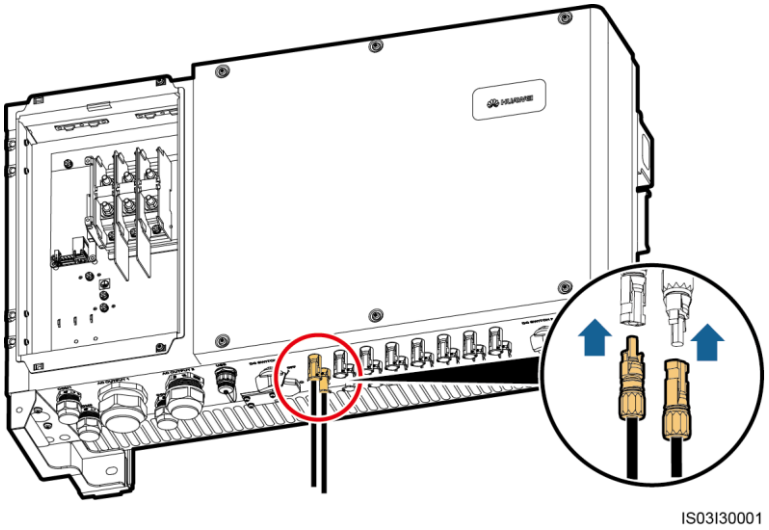
Before carrying out theStep 4, make sure both DC switches are in the OFF position.

Step 4 Insert the positive and negative connectors into the corresponding positive and negative DC input terminals of the SUN2000 until a click sound is heard, as shown in the figure.Figure 5-22.

AVISO

After the positive and negative connectors have been inserted, pull the DC input cables to ensure they are firmly connected.

Figure 5-22 Connecting the DC input cables



AVISO

If the DC input cable is connected backward, do not use the DC switches or the positive and negative connectors immediately. Otherwise, the SUN2000 will be damaged. Damage to the equipment caused by this cause is beyond the scope of the warranty. a. Wait until night when solar radiation decreases and the photovoltaic string current drops to less than 0.5 A. Then turn off the two DC switches, remove the positive and negative connectors, and rectify the polarity of the DC input cable.

- - - - End

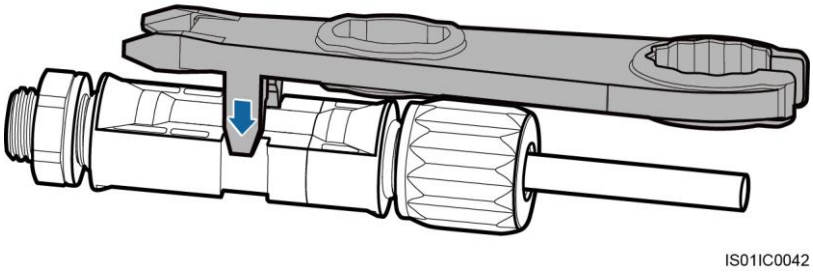
Follow-up procedure

⚠ ADVERTENCIA

Before removing the positive and negative connectors, make sure that both DC switches are in the OFF position.

To remove the positive and negative connectors of the SUN2000, insert a removal wrench into the notch and tighten it with appropriate force, as shown in the figure. Figure 5-23.

Figure 5-23 Removing a DC input connector



5.5 Connecting communication cables

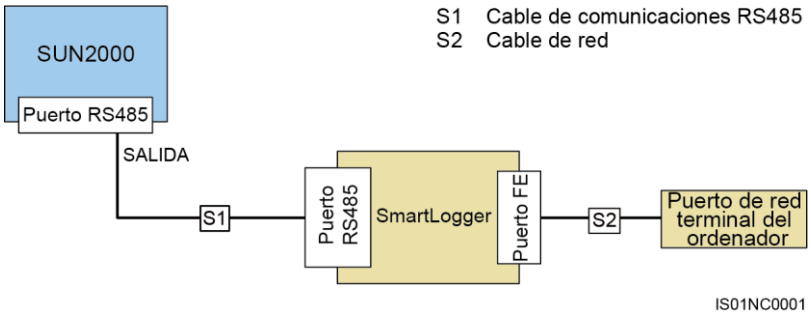
5.5.1 Description of communication modes

RS485 communication

The SUN2000 can be connected to a SmartLogger or a computer via SmartLogger to implement RS485 communication. You can use the SUN2000 app, the built-in web user interface, or network management software (e.g., NetEco) on the computer to view information about the SUN2000, such as energy efficiency, alarms, and operating status.

- TheFigure 5-24shows the communication mode of a single SUN2000.

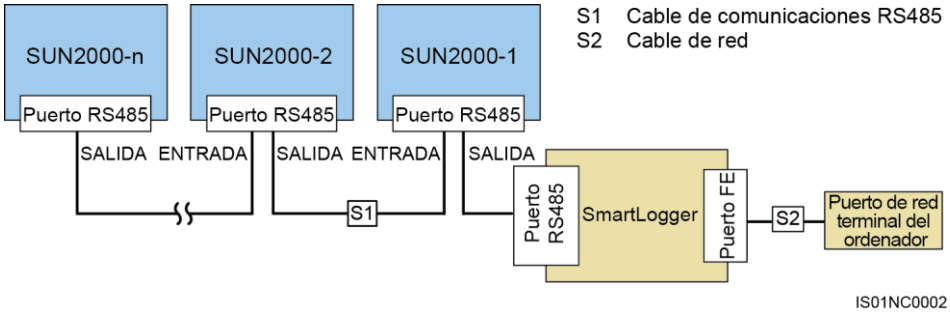
Figure 5-24 Single SUN2000 communication mode



- TheFigure 5-25Displays the communication mode for multiple SUN2000.

  If multiple SUN2000s are used, connect them all in a ring shape using an RS485 communication cable.

Figure 5-25 Communication mode for multiple SUN2000



NOTA

- The RS485 communication distance between the SUN2000 at the ring end and the SmartLogger cannot be more than 1000 meters.
- If multiple SUN2000s need to communicate with each other and are connected to a computer via the SmartLogger1000, a maximum of three rings can be configured.
- If multiple SUN2000s need to communicate with each other and are connected to a computer via the SmartLogger2000, a maximum of six rings can be configured.
- To ensure a rapid system response, it is recommended that the number of devices connected in each ring be less than 30.

MBUS Communication (PLC)

The MBUS communication card (PLC) loads the communication signals onto the power cables for transmission.

NOTA

The MBUS module (PLC) integrated in the SUN2000 does not require any cables to be connected.

FE (optional)

FE communication is primarily used in distributed rooftop scenarios where the number of inverters is low. The inverter can be connected directly to the computer via Ethernet to implement monitoring networking.

NOTA

- FE communication is optional for the SUN2000-36KTL.
- If SUN2000-36KTL adopts FE communication mode, only RS485 and FE communication modes will be supported, but MBUS (PLC) communication mode will not be supported.
- If FE communication is adopted, a maximum of 10 SUN2000 devices can be connected. In addition, NetEco must be installed on the computer for monitoring networking.

If FE communication mode is selected, set**Ethernet**and**Management system**for the SUN2000 in the SUN2000 app. Follow the steps below:

NOTA

- For information on operations using the SUN2000 application, refer to the SUN2000 Application User Manual.
- For information on NMS operations, see the iManager NetEco 1000S User Manual (iManager NetEco 1000S V100R002C20 and later).

Selecting the communication mode

RS485 and MBUS (PLC) communication modes are mutually exclusive.

- If MBUS (PLC) communication mode is selected, do not connect the RS485 communication cable. In addition, you must configure**MBUS communication**with the value**Enable**in the SUN2000 app.

AVISO

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

- If RS485 communication mode is used, it is recommended to configure**MBUS communication**with the value**Disable**in the SUN2000 app.

NOTA

The parameter**MBUS communication**is set to the value**Enable**default.

5.5.2 Connecting RS485 communication cables

Note

An RS485 communication cable can be connected in two ways:

- Connection via terminal block

  It is recommended to use a DJYP2VP2-22 2 x 2 x 1 network cable or a communication cable with a conductor cross section of 1 $mm^2$and an external diameter of 14-18 mm.

- Connection via an RJ45 network port

  It is recommended to use a shielded RJ45 connector and a shielded CAT 5E outdoor network cable with an outer diameter less than 9 mm and an internal resistance no greater than 1.5 ohms/10 m.

NOTA

Select either of these two connection modes during installation. Connection to a power strip is recommended.

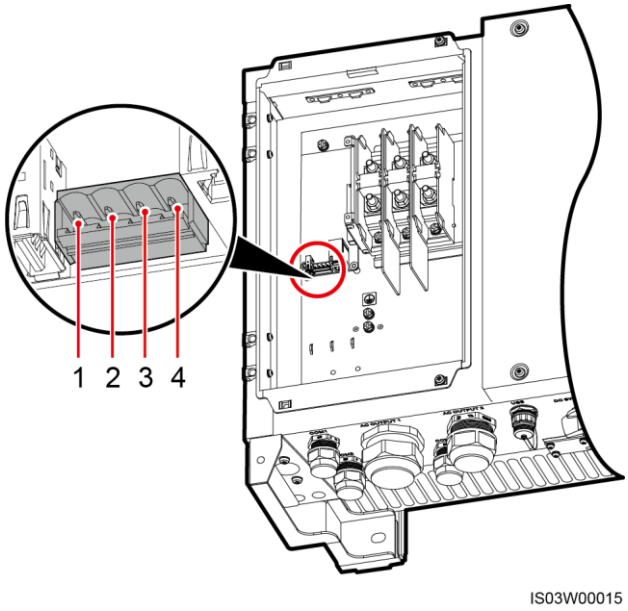
AVISO

When installing communication cables, separate them from power cables and keep them away from strong signal sources to avoid communication interference.

Functions of the connection strip

TheFigure 5-26shows an RS485 connection strip.

Figure 5-26 Connection strip



The Table 5-5 describes the functions of the RS485 connection strip.

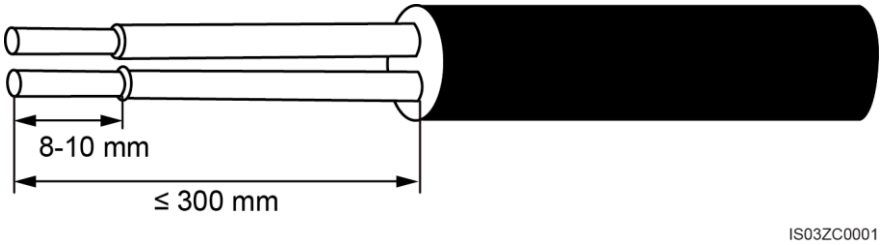
Table 5-5RS485 terminal block functions

No.	Definition of the port	Description
1	RS485A IN	Differential signal RS485A, RS485 with positive sign
2	RS485A OUT	Differential signal RS485A, RS485 with positive sign
3	RS485B IN	Differential signal RS485B, RS485 with negative sign
4	RS485B OUT	Differential signal RS485B, RS485 with negative sign

Connecting cables to the terminal block

Step 1 Strip a suitable length of insulation layer from the wire core and sheath of the communication cable using a wire stripper.

Figure 5-27 How to strip an RS485 communication cable



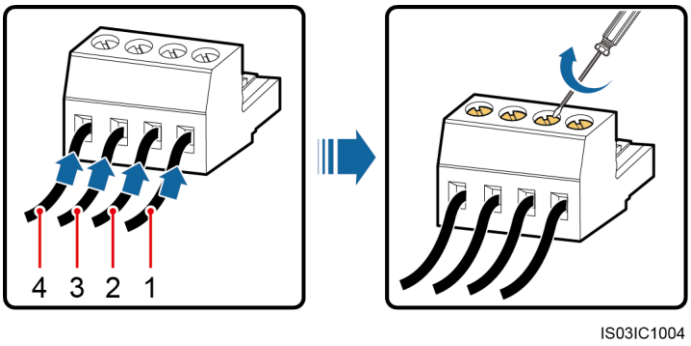
Step 2 Remove the locking mechanisms from the COM1 and COM2 waterproof cable connectors on the bottom of the SUN2000 and remove the locking mechanism caps.

Step 3 Pass the communication cable through the locking mechanisms and through the COM1 (RS485 IN) and COM2 (RS485 OUT) connectors on the bottom of the SUN2000.

Step 4 Remove the terminal base from the terminal block.

Step 5 Connect the communication cables to the terminal base.

Figure 5-28 Connecting cables to a terminal block



(1) RS485A IN (2) RS485A OUT

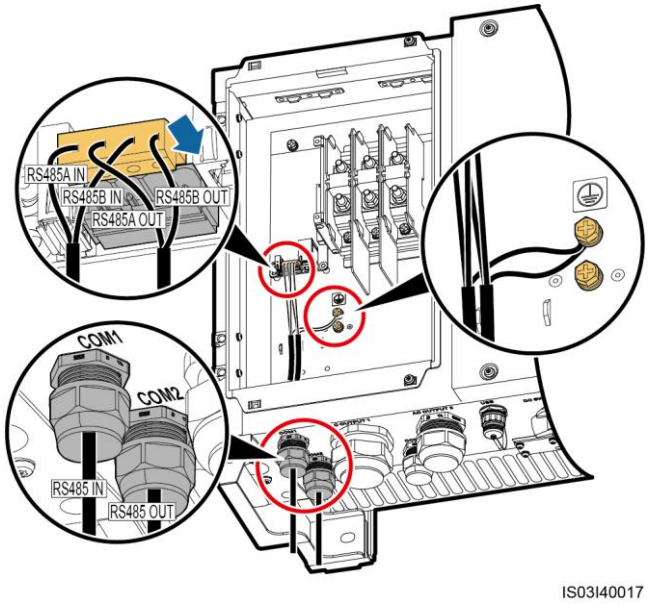
(3) RS485B IN (4) RS485B OUT

Step 6 Place the terminal base on the terminal block and connect the shielding layers to the grounding point.

NOTA

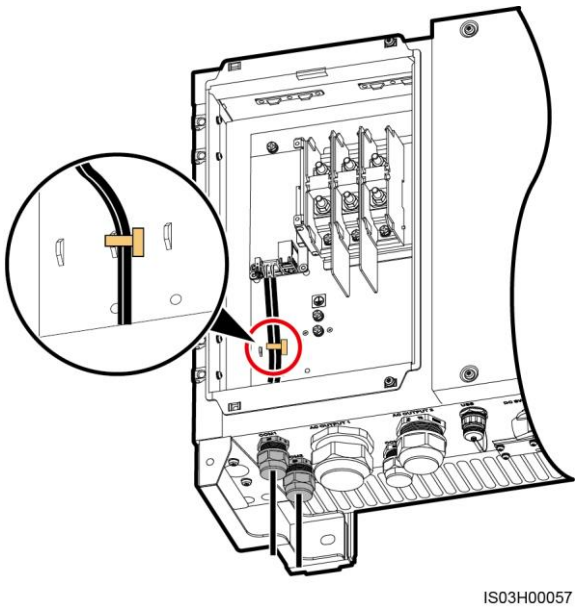
When connecting shielded cables, decide whether to crimp the OT terminal according to site requirements.

Figure 5-29 Connecting the communication cables



Step 7 Tie the communication cables after connecting them.

Figure 5-30 How to tie communication cables



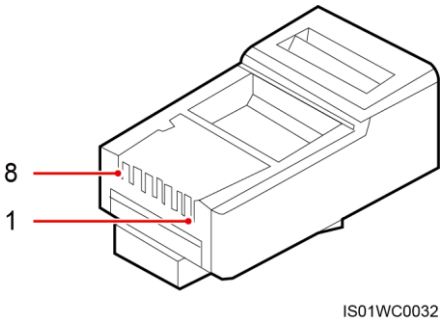
Step 8 Use a torque wrenchmeter with a 33 mm open end to adjust locking mechanisms with a torque of 7.5 N m.

- - - - End

RJ45 connector pin definitions

TheFigure 5-31shows an RJ45 connector.

Figure 5-31RJ45 connector



TheTable 5-6lists the pin definitions of an RJ45 connector.

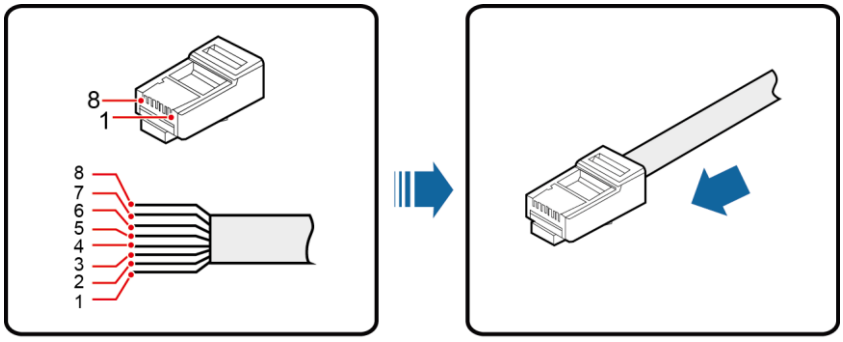
Table 5-6RJ45 connector pin definitions

Pin	Color	Definition of the pin
1	White and orange	Differential signal RS485A, RS485 with positive sign
2	Orange	Differential signal RS485B, RS485 with negative sign
3	White and green	N/A
4	Blue	Differential signal RS485A, RS485 with positive sign
5	White and blue	Differential signal RS485B, RS485 with negative sign
6	Green	N/A
7	White and brown	N/A
8	Brown	N/A

Connecting a cable to the RJ45 network port

Step 1 Insert the network cable wires into the RJ45 connector in order, as shown in the figure. Figure 5-32.

Figure 5-32 Connecting wires to an RJ45 connector



(1) White and orange	(2) Orange	(3) White and green	(4) Blue
(5) White and blue	(6) Green	(7) White and brown	(8) Brown

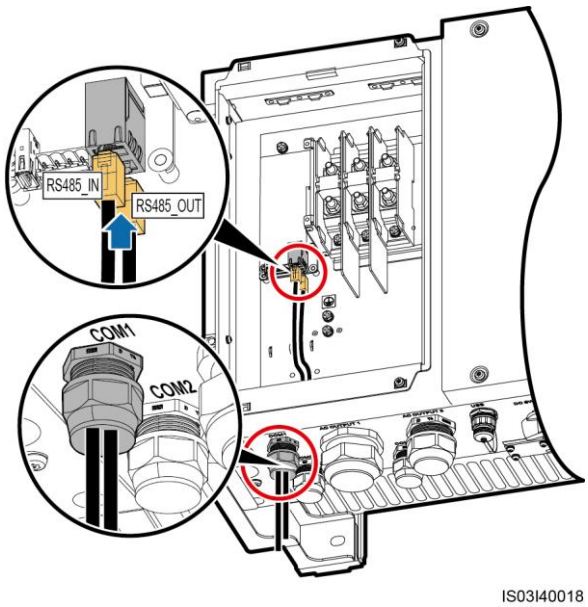
Step 2 Crimp the RJ45 connector using a crimping tool.

Step 3 Pull out the locking mechanism from the COM1 waterproof cable connector on the bottom of the SUN2000 and remove the locking mechanism cap.

Step 4 Pass the cables through the locking mechanisms and the COM1 port located on the bottom of the SUN2000.

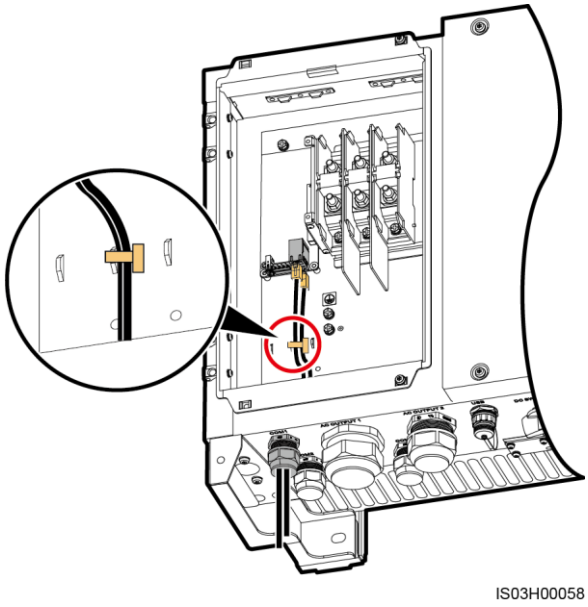
Step 5 Insert the RJ45 connector into the RJ45 network port located in the maintenance compartment of the SUN2000.

Figure 5-33 Connecting the communication cables



Step 6 Tie the communication cables after connecting them.

Figure 5-34 How to tie communication cables



Step 7 Use a torque wrenchmeter with an open end of 33 mm to fit the locking mechanism with a torque of 7.5 N m.

- - - - End

Follow-up procedure

Check that the cables are connected correctly and securely. Then seal the connectors.

5.5.3 (Optional) Connecting FE communication cables

Description

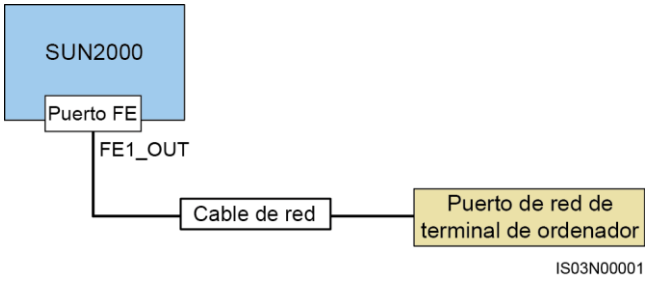
FE communication is primarily used in distributed rooftop scenarios where the number of inverters is low. The inverter can be connected directly to the computer via Ethernet to implement monitoring networking.

NOTA

FE communication is optional for the SUN2000-36KTL. To adopt FE communication, please contact local technical support.

- TheFigure 5-35shows the communication mode of a single SUN2000.

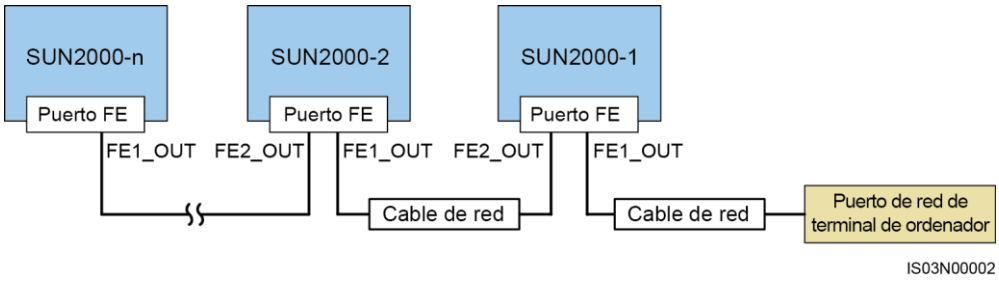
Figure 5-35FE communication mode of a single SUN2000



- TheFigure 5-36Displays the communication mode for multiple SUN2000.

  If multiple SUN2000s are used, connect them all in a ring shape using a network cable.

Figure 5-36FE communication mode for multiple SUN2000



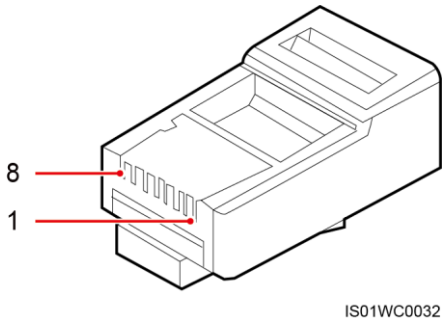
NOTA

- The FE communication distance between two adjacent SUN2000s in a ring cannot exceed 100 meters.
- One ring supports connection of maximum 10 SUN2000 for communication.

RJ45 connector pin definitions

TheFigure 5-37shows an RJ45 connector.

Figure 5-37RJ45 connector



The FE communication cable connects via standard network cables. A standard network cable can be 568A or 568B. Network cables used in the same grid-connected photovoltaic power generation system must be prepared according to the same standard.Table 5-7lists the 568A thread sequence standards. Theboard

5-8lists the 568B thread sequence standards.

Table 5-7 Standard 568A

Pin	Color
1	White and green
2	Green
3	White and orange
4	Blue
5	White and blue
6	Orange
7	White and brown
8	Brown

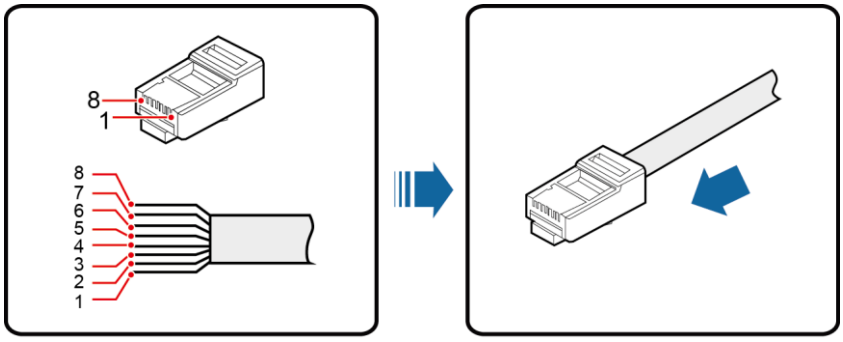
Table 5-8 Standard 568B

Pin	Color
1	White and orange
2	Orange
3	White and green
4	Blue
5	White and blue
6	Green
7	White and brown
8	Brown

Connecting a cable to the FE network port

Step 1 Insert the network cable wires into the RJ45 connector in order, as shown in the figure. Figure 5-38.

Figure 5-38 Connecting wires to an RJ45 connector



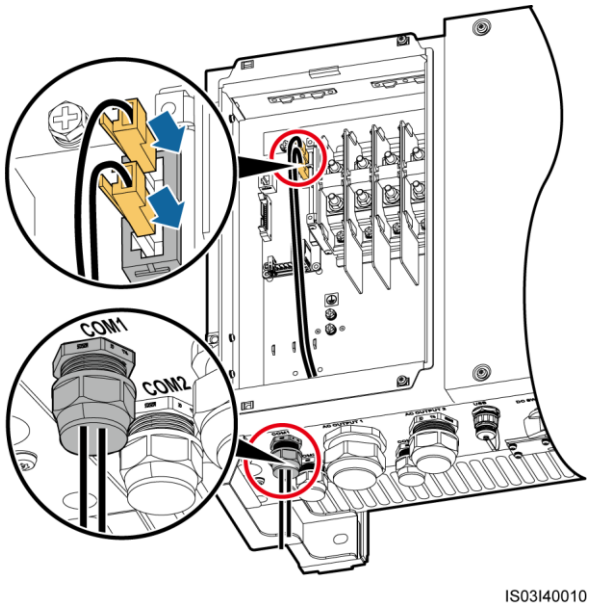
Step 2 Crimp the RJ45 connector using a crimping tool.

Step 3 Remove the locking mechanism from the waterproof cable connector**COM1** located at the bottom of the SUN2000 and remove the mechanism plug.

Step 4 Pass the cables through the locking mechanisms and the port**COM1**which is located at the bottom of the SUN2000.

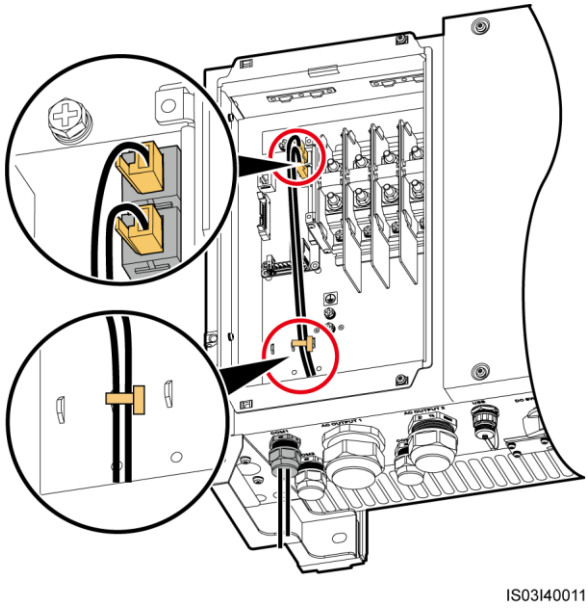
Step 5 Insert the RJ45 connector into the FE1_OUT and FE2_OUT ports located in the maintenance compartment of the SUN2000.

Figure 5-39 Connecting the communication cables



Step 6 Tie the communication cables after connecting them.

Figure 5-40 How to tie communication cables



Step 7 Use a torque wrench meter with a 33 mm open end to adjust locking mechanisms with a torque of 7.5 N m.

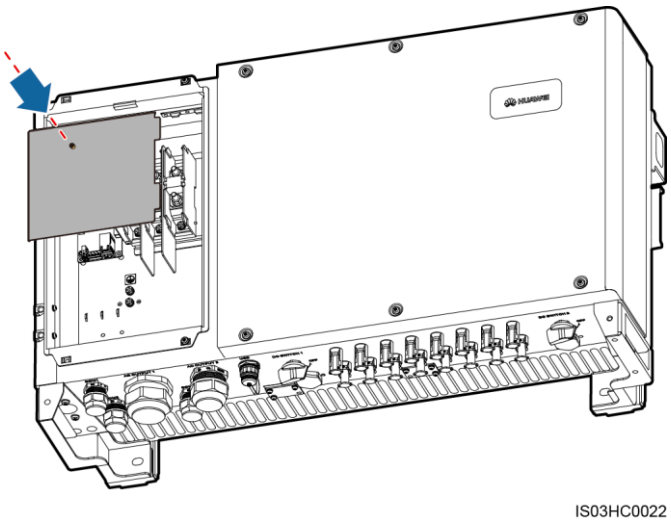
- - - - End

5.6 Closing the maintenance compartment door

Procedure

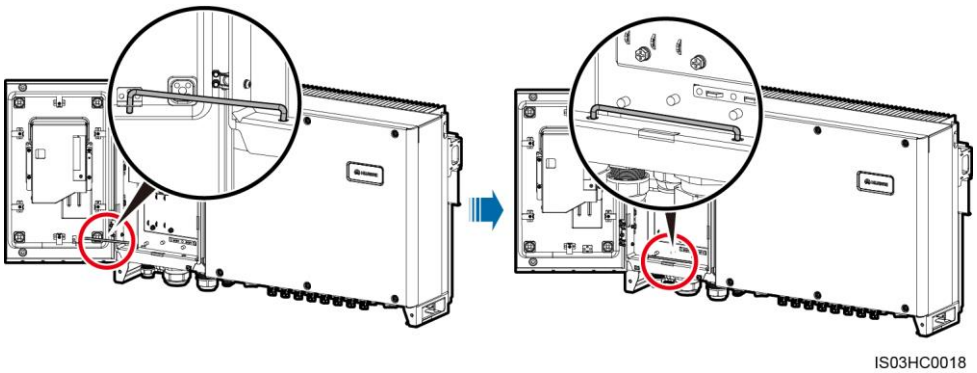
Step 1 Install the AC terminal cover.

Figure 5-41 Installing the cover



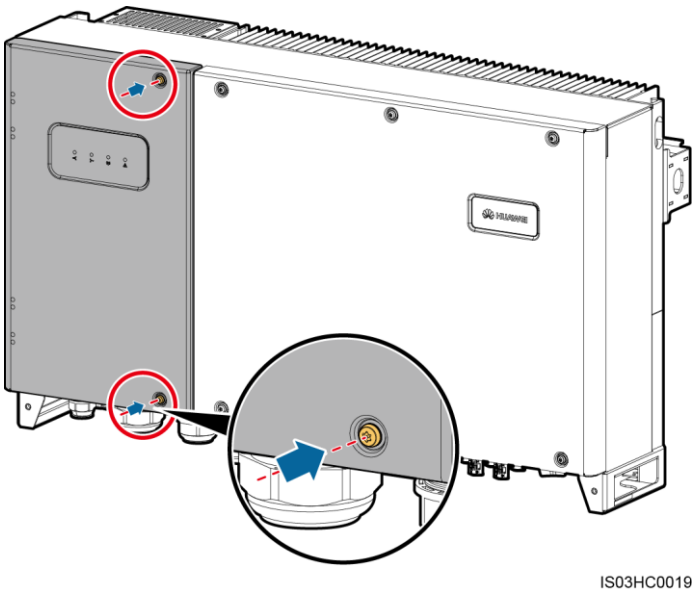
Step 2 Adjust the support bar.

Figure 5-42 Adjusting the support bar



Step 3 Close the maintenance compartment door. Tighten the two maintenance compartment door screws using a security Torx wrench to a torque of 5 Nm.

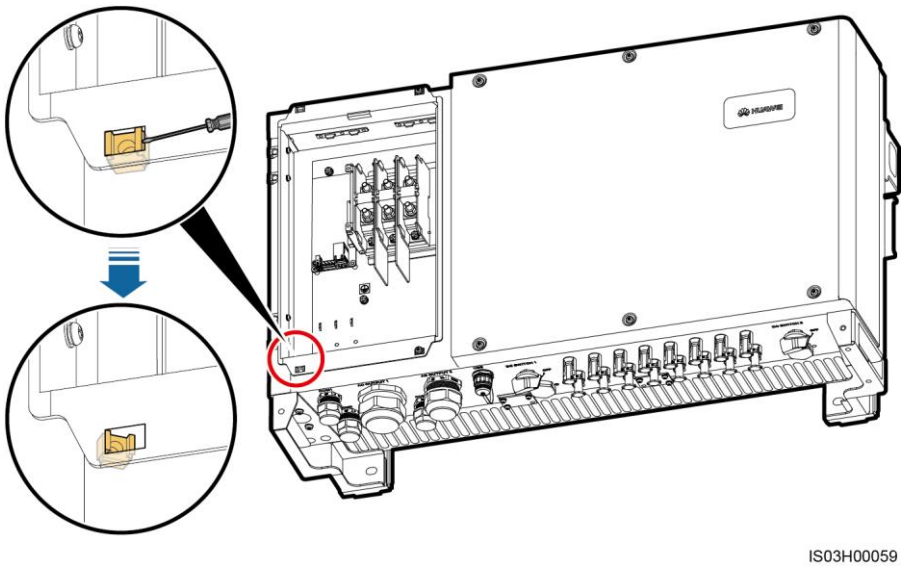
Figure 5-43 How to adjust the maintenance compartment door screws



NOTA

- If any screws are missing from the maintenance compartment door, use the available ground screw located on the chassis housing as a spare screw.
- If the floating nut used to secure the maintenance compartment door is missing, use the spare floating nut shown in the figure.Figure 5-44.

Figure 5-44 Removing the reserve floating nut



- - - - End

6 Commissioning of the system

6.1 Check before power-on

1. The inverter must be installed correctly and firmly.
2. Verify that the DC switches and the AC output switch corresponding to the downlink are in the OFF position.
3. The ground wires must be firmly connected, without open circuits or short circuits.
4. AC output cables must be connected correctly and firmly, without open circuits or short circuits.
5. DC input cables must be connected correctly and firmly, without open circuits or short circuits.
6. Communication cables must be connected correctly and firmly.
7. All connectors used on the bottom of the chassis must be sealed.
8. The AC terminal cover should now be back in place.
9. The maintenance compartment door must be closed and the corresponding screws must be tightened.
10. Inactive DC input terminals must be sealed.
11. The unused USB port must be covered with a waterproof plug.
12. Unused AC OUTPUT and COM connectors must be covered and the locking mechanisms must be tight.

6.2 Turning on the SUN2000

Prerequisites

Before turning on the AC switch between the inverter and the power grid, use a multimeter to verify that the AC voltage is within the specified range.

Procedure

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

AVISO

If you do thestep 2before himstep 1, the SUN2000 will report an abnormal shutdown fault. The device can restart normally after the fault is automatically rectified. The default alarm rectification time is 1 minute. This time can be modified using the NMS software installed on the computer connected to the SUN2000.

Step 2 Turn on the DC switches on the bottom of the inverter chassis.

Step 3 (Optional) Measure the temperatures of the junctions between the DC terminals and the connectors using a thermometer.

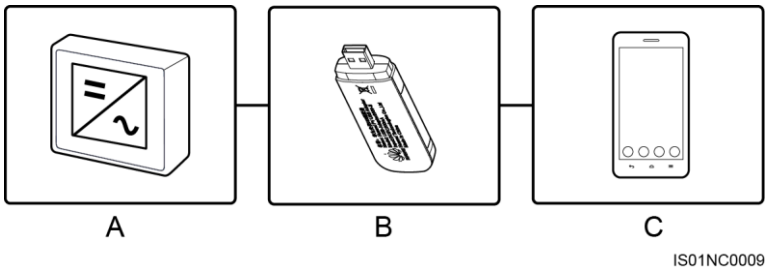
To ensure good DC terminal contact, check the temperatures of the junctions between the DC terminals and the connectors after the SUN2000 has been in operation for a period of time. Ensure the temperature rise does not exceed 40°C.

Step 4 Connect a mobile phone running the SUN2000 app to an inverter via a Bluetooth module, WLAN module, or USB data cable.

AVISO

The screenshots in this document correspond to application 3.2.00.001 (Android).

Figure 6-1 Connection via WLAN/Bluetooth

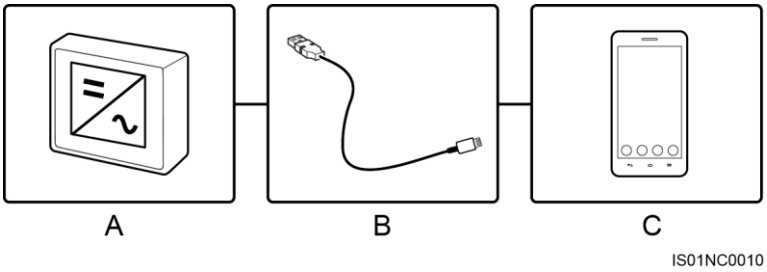


(A) Investor (B) WLAN Module/Bluetooth Module (C) Mobile phone

NOTA

Purchase the WLAN module/Bluetooth module that comes with the SUN2000. WLAN modules/Bluetooth modules purchased from other vendors may not support communication between the SUN2000 and the app.

Figure 6-2USB data cable connection



(A) Investor (B) USB data cable (C) Mobile phone

NOTA

Use the USB data cable supplied with your mobile phone. The port type of the USB data cable connected to the SUN2000 is USB 2.0.

Figure 6-3 Login screen

Figure 6-4 Selecting a connection mode

NOTA

- When using WLAN connections, the initial name of the WLAN zone is**Adapter-*WLAN module SN***and the initial password is**Change me**.
- For the first power-up, use the initial password and change it immediately after logging in. To ensure account security, change the password periodically and remember the new one. Failure to do so may result in the password being compromised. A password left unchanged for a long period of time can be stolen or cracked. If the password is lost, the devices cannot be accessed. In these cases, the user is responsible for any losses caused to the photovoltaic system.
- After selecting**Use by default for this USB accessory**, the message will not appear if the app connects to the inverter again without removing the USB data cable.

Step 5 Select the user type (regular user, advanced user, and special user) by clicking the user name bar.

Figure 6-5 User selection

NOTA

- The login password is the same as the one for the inverter connected to the app and is used only when the inverter is connected to the app.
- The initial password for**Common user**,**Advanced user**and**User esp**is**00000a**.
- For the first power-up, use the initial password and change it immediately after logging in. To ensure account security, change the password periodically and remember the new one. Failure to do so may result in the password being compromised. A password left unchanged for a long period of time can be stolen or cracked. If the password is lost, the devices cannot be accessed. In these cases, the user is responsible for any losses caused to the photovoltaic system.
- During login, if you enter an incorrect password five times in a row (with an interval of less than 2 minutes between consecutive invalid password entries), your account will be locked for 10 minutes. The password consists of six digits.

Step 6 Enter the password and press**Access**.

Step 7 After logging in, the screen will be displayed**Quick Settings**or the screen**Function menu**.

NOTA

- If you log in to the app after the device connects to the app for the first time or after a factory reset, the Quick Settings screen will appear, where you can configure basic settings. Once the settings are implemented, access the main menu screen and modify the settings on the screen.**Settings**By default, the inverter can be connected to the power grid and no parameters need to be configured.
- It is recommended to log in on the screen**Quick Settings**as an advanced user to configure the parameters.

Figure 6-6 Screen**Quick Settings**(login as a power user)

NOTA

- Set the power grid code applicable to the country or region where the power plant is located, as well as the inverter model.
- If you change the grid code, some factory settings may be reset. After changing the grid code, check whether this has affected any previously configured parameters.
- Set user parameters according to the current date and time.
- Configure the parameters**Baud rate**,**RS485 protocol**and**Address com**depending on the site requirements. The parameter**Baud rate** can be configured with the values**4800**, **9600**either**19200**. The parameter**RS485 protocol**can be configured with the value **MODBUS RTU**, while the parameter**Address com**can be set to any value within the range of 1 to 247.
- When multiple inverters communicate with SmartLogger via RS485, the addresses of all inverters on each RS485 path must be within the range configured on SmartLogger and must not be duplicated. Otherwise, communication will be interrupted. Furthermore, the baud rates of all inverters on each RS485 path must match the baud rate of SmartLogger.

Figure 6-7 Screen**Function menu**

- - - - End

6.3 Shutting down the SUN2000

Context

⚠ ADVERTENCIA

- If two SUN2000s share the same AC switch on the AC side, turn off both SUN2000s.
- Once the SUN2000 is turned off, residual heat and electricity from the equipment can cause electric shocks and burns. Therefore, wear safety gloves and begin working with the SUN2000 within five minutes of turning it off.

Procedure

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

For detailed information, please refer to the*SUN2000 App User Manual*, he *SmartLogger1000 User Manual*, he*SmartLogger2000 User Manual*or the *iManager NetEco 1000S User Manual*.

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

Step 3 Set both DC switches to the OFF position.

- - - - End

7 Human-machine interactions

7.1 Operations with a USB flash drive

USB flash drives from SanDisk, Netac, and Kingston are recommended. Other brands may not be compatible.

7.1.1 Exporting Configurations

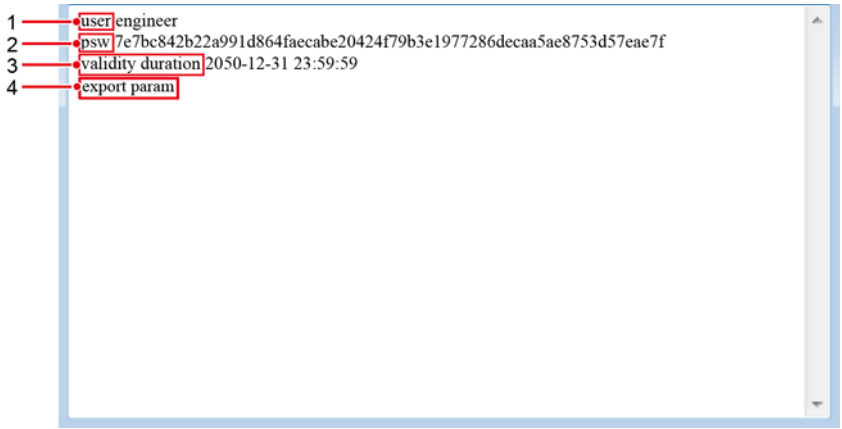
Procedure

Step 1 In the SUN2000 app, tap**Inverter command settings**to generate a boot script file. For details, see the SUN2000 Application User Manual.

Step 2 Import the boot script file to a computer.

(Optional) The bootstrap script file can be opened as a .txt file, as shown in the figure. Figure 7-1.

Figure 7-1 Boot script file



No.	Meaning	Observations
1	Name of user	- Advanced User: Engineer - Special User: Admin
2	Ciphertext	The ciphertext varies a depending on the login password SUN2000 application session.
3	Period of validity of the sequence of commands	The validity period of the script varies to in depending on its export date.
4	Command	Different command settings may produce different commands. - Configuration export command:**export param**. - Configuration import command:**import param**. Data - export command:**export log**. Update command: - **upgrade**.

Step 3 Import the bootstrap script file into the root directory z of a unit USB flash drive.

Step 4 Connect the USB flash drive to the USB port. The system will automatically identify the USB flash drive and execute all commands specified in the boot script file. Observe the LED indicator to determine the operating status.

AVISO

Verify that the encrypted text in the boot script file matches the SUN2000 application login password. If they do not match and the USB flash drive is inserted five times in a row, the user account will be locked out for 10 minutes.

Table 7-1 Description of LED indicators

LED indicator	State	Meaning
	Green, off	No operations with a USB flash drive.
	Flashing green for long intervals (on for 1 s and off for 1 s)	There is an operation with a USB flash drive.
	Flashing green for short intervals (on for 0.125 s and off for 0.125 s)	An operation involving a USB flash drive failed.

LED indicator	State	Meaning
	Green without blinking	An operation with a USB flash drive has been successful.

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

NOTA

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

- - - - End

7.1.2 Importing Configurations

Prerequisites

The entire configuration file has been exported.

Procedure

Step 1 In the SUN2000 app, tap**Inverter command settings**to generate a boot script file. For details, see the SUN2000 Application User Manual.

Step 2 Import the boot script file to a computer.

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

AVISO

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

Step 4 Connect the USB flash drive to the USB port. The system will automatically identify the USB flash drive and execute all commands specified in the boot script file. Observe the LED indicator to determine the operating status.

AVISO

Verify that the encrypted text in the boot script file matches the SUN2000 application login password. If they do not match and the USB flash drive is inserted five times in a row, the user account will be locked out for 10 minutes.

Table 7-2 Description of LED indicators

LED indicator	State	Meaning
	Green, off	No operations with a USB flash drive.
	Flashing green for long intervals (on for 1 s and off for 1 s)	There is an operation with a USB flash drive.
	Flashing green for short intervals (on for 0.125 s and off for 0.125 s)	An operation involving a USB flash drive failed.
	Green without blinking	An operation with a USB flash drive has been successful.

- - - - End

7.1.3 Exporting data

Procedure

Step 1 In the SUN2000 app, tap**Inverter command settings**to generate a boot script file. For details, see the SUN2000 Application User Manual.

Step 2 Import the bootstrap script file into the root directory z of a unit USB flash drive.

Step 3 Connect the USB flash drive to the USB port. The system will automatically identify the USB flash drive and execute all commands specified in the boot script file. Observe the LED indicator to determine the operating status.

AVISO

Verify that the encrypted text in the boot script file matches the SUN2000 application login password. If they do not match and the USB flash drive is inserted five times in a row, the user account will be locked out for 10 minutes.

Table 7-3 Description of LED indicators

LED indicator	State	Meaning
	Green, off	No operations with a USB flash drive.

LED indicator	State	Meaning
	Flashing green for long intervals (on for 1 s and off for 1 s)	There is an operation with a USB flash drive.
	Flashing green for short intervals (on for 0.125 s and off for 0.125 s)	An operation involving a USB flash drive failed.
	Green without blinking	An operation with a USB flash drive has been successful.

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

NOTA

When the data export is complete, the boot script file and the exported file will be in the root directory of the USB flash drive.

- - - - End

7.1.4 Updates

Procedure

Step 1 Obtain the required update package from the Huawei technical support website (for example, SUN2000 V200R002C00SPC*XXX*).

Step 2 Unzip the update package.

After obtaining the update package **SUN2000V200R002C00SPCXXX_package.zip**, unzip it and make sure the extracted files two include the following:

- config.txt
- config_arm9.txt
- sun_lmt_mgr_cmd.emap (This is a boot script file) SUN2000.bin
-
- SUN2000_CPLD.bin
- SUN2000_FE.bin
- SUN2000_Master_Release.bin
- SUN2000_Slave_Release.bin
- update.sh
- vercfg.xml

AVISO

-If the login password of the SUN2000 application is the initial password

(**00000a**), there will be no need to perform thesteps 3to the5.

- If the login password of SUN2000 APP is not the initial password, follow the steps 3to the7.

Step 3 In the SUN2000 app, tap**Inverter command settings**to generate a boot script file. For details, see the SUN2000 Application User Manual.

Step 4 Import the boot script file to a computer.

Step 5 Replace the boot script file in the upgrade package with the file generated by the SUN2000 application.

Step 6 Copy the extracted filestwo in the root directoryz of the USB flash drive.

Step 7 Plug the USB flash drive into the USB port. The system will automatically identify the USB flash drive and execute all commands specified in the boot script file. Observe the LED indicator to determine the operating status.

AVISO

Verify that the encrypted text in the boot script file matches the SUN2000 application login password. If they do not match and the USB flash drive is inserted five times in a row, the user account will be locked out for 10 minutes.

Table 7-4 Description of LED indicators

LED indicator	State	Meaning
	Green, off	No operations with a USB flash drive.
	Flashing green for long intervals (on for 1 s and off for 1 s)	There is an operation with a USB flash drive.
	Flashing green for short intervals (on for 0.125 s and off for 0.125 s)	An operation involving a USB flash drive failed.
	Green without blinking	An operation with a USB flash drive has been successful.

Step 8 (Optional) The system reboots automatically when the update is complete. During the reboot, all LED indicators turn off. After the reboot, the green indicator flashes continuously (on for 1 second, then off for 1 second) for 1 minute until it remains solid, indicating a successful update.

NOTA

It is also possible to update the SUN2000 using the function**Investor update**in the SUN2000 app. For details, see the SUN2000 App User Manual.

- - - - End

7.2 Operations with SmartLogger

For information on operations with SmartLogger, see the*SmartLogger1000 User Manual*or the*SmartLogger2000 User Manual*.

7.3 Operations with the NMS

For information on operations with the NMS, see the*iManager NetEco 1000S User Manual*.

7.4 Operations with the SUN2000 application

For information on operations with the SUN2000 application, refer to the *SUN2000 App User Manual*.

8 Maintenance

8.1 Routine maintenance

To ensure that the SUN2000 can operate properly for a long time, it is recommended that you perform routine maintenance as described in this chapter.
title.

⚠ ATENCIÓN

- Before cleaning the system and maintaining cable connections and grounding reliability, turn off the system (see section6.3 Shutting Down the SUN2000)and make sure that both DC switches on the inverter are in the OFF position.
- If you need to open the maintenance compartment door in daytime as rainy or snow, take precautionary measures to prevent water or snow from entering the compartment. If such measures are not possible, do not open the compartment door under these weather conditions.

Table 8-1 Maintenance list

Item	Verification method	Interval of maintenance
Cleaning the system	Periodically check that the heat sinks are free of obstructions and dust.	Once for every period of 6 months to 1 year
State of operation of the system	- Check that the inverter is not damaged or deformed. - Check that the sound the inverter makes when operating is normal. - When the inverter is in operation, check that all its parameters are correctly configured.	Once every six months

Item	Verification method	Interval of maintenance
Connections of cables	- Check that the cables are connected firmly. - Check that the cables are intact and, especially, that the parts that come into contact with the metal surface are not scratched. - Check that the free COM, USB and AC OUTPUT ports are covered with waterproof plugs.	The first inspection is carried out half a year later. after the initial commissioning. From that moment, the inspection It should be carried out once every 6 months to 1 year period.
Reliability of the grounding	Check that the ground wires are firmly connected.	The first inspection is carried out half a year later. after the initial commissioning. From that moment, the inspection It should be carried out once every 6 months to 1 year period.

8.2 Troubleshooting

The alarm severities are defined below:

- Serious: The inverter goes into off mode and disconnects from the power grid to stop generating power. to electrical after a fault occurs.
- Minor: Some components have failed, but the inverter can still generate electricity.
- Warning: The output power of the inverter decreases due to external factors.

Table 8-2 Common alarms and troubleshooting measures

ID of the alarm	Name of the alarm	Severity of the alarm	Possible cause	Suggestion
103	High voltage from the entrance of DC	Serious	- Cause ID = 1 The arrangement photovoltaic is not configured properly. There are too many modules photovoltaic connected in series to the chains photovoltaic 1 and 2, so the open circuit voltage	- Cause ID = 1 Reduce the number of PV modules connected in series to PV strings 1 and 2 until the open-circuit voltage is less than or equal to the maximum operating voltage of the SUN2000. After the array configuration is corrected photovoltaic, the inverter alarm will disappear.

ID of the alarm	Name of the alarm	Severity of the alarm	Possible cause	Suggestion
			of the chains photovoltaic exceeds the voltage of maximum operation of the SUN2000. - Cause ID = 2 The arrangement photovoltaic is not configured properly. There are too many modules photovoltaic connected in series to the chains photovoltaic 3 and 4, so the open circuit voltage of the chains photovoltaic exceeds the voltage of maximum operation of the SUN2000. - Cause ID = 3 The arrangement photovoltaic is not configured properly. There are too many modules photovoltaic connected in series to the chains photovoltaic 5 and 6, so the open circuit voltage of the chains photovoltaic exceeds the voltage of maximum operation of the SUN2000. - Cause ID = 4 The arrangement photovoltaic is not configured properly. There are too many modules photovoltaic connected in series to the chains photovoltaic 7 and 8, so the voltage	- Cause ID = 2 Reduce the number of PV modules connected in series to PV strings 3 and 4 until the open-circuit voltage is less than or equal to the maximum operating voltage of the SUN2000. After the array configuration is corrected photovoltaic, the inverter alarm will disappear. - Cause ID = 3 Reduce the number of PV modules connected in series to PV strings 5 and 6 until the open-circuit voltage is less than or equal to the maximum operating voltage of the SUN2000. Once the array configuration is corrected photovoltaic, the inverter alarm will disappear. - Cause ID = 4 Reduce the number of PV modules connected in series to PV strings 7 and 8 until the open-circuit voltage is less than or equal to the maximum operating voltage of the SUN2000. Once the array configuration is corrected photovoltaic, the inverter alarm will disappear.

ID of the alarm	Name of the alarm	Severity of the alarm	Possible cause	Suggestion
			open circuit of the chains photovoltaic exceeds the voltage of maximum operation of the SUN2000.	
106–113	Anomalous in chain 1-8	Warning	Cause ID = 1 - The chain photovoltaic no was exposed to sunlight for a long time. - The chain photovoltaic is damaged or deteriorated.	1. Check if the current of the photovoltaic string is significantly lower than the currents of the other photovoltaic strings. 2. If so , check if the chain photovoltaic in question is not exposed to sunlight. 3. If the PV string is clean and exposed to sunlight, check if any module photovoltaic presents failures.
120–127	Investment in chain 1-8	Cause ID = 1: Serious Cause ID = 2: Warning	- Cause ID = 1 The chain photovoltaic is connected in a way reverse. - Cause ID = 2 There are only a few modules photovoltaic connected in series to the chain, so the final tension is lower than that of other chains photovoltaic.	- Cause ID = 1 Check if the PV string is connected to the inverter in reverse. If so, , Turn off both DC switches once the PV string voltage has dropped to within the safe voltage range (below 60 VDC) and then correct the problem. connection of the photovoltaic string. - Cause ID = 2 Check whether the number of PV modules connected to the inverter in series is small. If so, , increase the quantity.
200	Circuit of CC with abnormality s	Serious	There are conditions abnormal external ones that activate protection of the inverter's internal DC circuit. Possible causes include: - Cause ID = 3 The entrance of the investor has disconnected by accident, or the power output of	Case ID = 3/10/11 1. The inverter detects its external operating conditions in real time. Once the fault is rectified, the inverter recovers. automatically. 2. If the alarm is triggered repeatedly, contact your cheese with Huawei technical support. Cause ID = 12/15 Turn off the AC output breaker and the DC input breaker.

ID of the alarm	Name of the alarm	Severity of the alarm	Possible cause	Suggestion
			the chain photovoltaic has changed abruptly because the chain is not exposed to the sunshine. - Cause ID = 10 There is an imbalance serious between the three phases of the network electrical, which is why the protection of the control circuit internal investor. - Cause ID = 11 The voltage of the electrical network has changed drastically, and the input power the inverter does not discharge in a short time time, what tension increases internal and activates protection against surge. - Cause ID = 12/15 An unrecoverable error has occurred on a circuit internal investor.	Turn them on after 5 minutes. If the fault persists, contact youthat with the Huawei technical support.
202	Circuit of investor with abnormalitys	Serious	There are conditions abnormal external ones that activate protection of the inverter's internal circuit. The causes possible are the following: - Cause ID = 13 The voltage of the electrical network is reduced drastically, or the power grid short-circuits, which damages the circuit	Case ID = 13/14/16 1. The inverter detects its external operating conditions in real time. Once the fault is rectified, the inverter recovers. automatically. 2. If the alarm is triggered repeatedly, contact your cheese with Huawei technical support. Cause ID = 20 1. Check whether the inverter output cable has short circuits.

ID of the alarm	Name of the alarm	Severity of the alarm	Possible cause	Suggestion
			voltage detection internal investor. - Cause ID = 14 The voltage of the electrical network is reduced drastically, or well the power grid comes into short circuit. As result, the output current transient of the investor exceeds the upper threshold, by which activates the protection of the device. - Cause ID = 16 The DC current from the mains is above the upper threshold. - Cause ID = 20 The exit of the investor enters into short circuit. As result, the output current increases suddenly and reaches a value that exceeds the limite maximum, which activate protection of the investor.	2. If the alarm is triggered repeatedly, contact your cheese with Huawei technical support.
301	Strain abnormal in the power grid	Serious	The voltage of the power grid exceeds the acceptable range. The Possible causes are as follows: - Cause ID = 4 The voltage of the electrical network is below the threshold lower specified. - Cause ID = 16 Network voltage	Cause ID = 4 1. If the alarm is accidentally triggered, the grid may temporarily operate abnormally. The inverter will recover. automatically after detecting that the power grid has returned to normal. 2. If the alarm is triggered frequently, check whether the mains voltage is within the acceptable range. If not, , communiothat's with him

ID of the alarm	Name of the alarm	Severity of the alarm	Possible cause	Suggestion
			electric stapor over the threshold superior specified. - Cause ID = 19 The voltage of the electrical grid remained above the upper threshold specified during 10 minutes. - Cause ID = 26 The voltage of the electrical network is over the threshold superior specified. - Cause ID = 28 The voltages of the three phases of the power grid differ substantially. - Cause ID = 29 1. The power grid experiences a court. 2. The AC circuit is disconnected, or the switch AC is off. - Cause ID = 31-33 The impedance of the cable A (Cause ID = 31)/B (Cause ID = 32)/C (Cause ID = 33) of the output phase, connected to the protective ground is low or a short circuit has occurred.	local electricity supply operator. If so, log in to the SUN2000 app, SmartLogger, or NMS to modify the power grid's undervoltage and overvoltage protection thresholds with the authorization of the local power supply operator. 3. If the fault persists for a long time, check the AC switch and AC output cable. Case ID = 16/19/26 1. Check whether the mains voltage exceeds the upper threshold. If so, , communion contact your local electricity supply operator. 2. If you have confirmed that the connection voltage to the mains electricity supply exceeds the upper threshold and if you have obtained the authorization of the local power supply operator, modify the low voltage and overvoltage protection thresholds. 3. Check whether the maximum voltage of the power grid exceeds the upper threshold. Cause ID = 28 1. If the exception is due to an external fault, the inverter recovers automatically after the fault is rectified. 2. If the alarm persists and affects the power plant's energy efficiency, contact the cheese with the local electricity supply operator. Cause ID = 29 1. Check the AC voltage. 2. Check that the AC power cord is connected securely and the AC switch is turned on. Cause ID = 31-33 Check the impedance of wire A (Cause ID = 31)/B (Cause ID =

ID of the alarm	Name of the alarm	Severity of the alarm	Possible cause	Suggestion
				32)/C (Cause ID = 33) of the output phase connected to the protective ground and locate the location with the lowest impedance; resolve the problem.
305	Frequency abnormal of the power grid	Serious	- Cause ID = 2 The actual frequency of the power grid is higher than the required by the standard for the local electrical grid. - Cause ID = 4 The actual frequency of the power grid is lower than the required by the standard for the local electrical grid. - Cause ID = 5 The speed of actual change in the frequency of the power grid does not satisfy the requirements normative applicable to the local electrical grid.	Cause ID = 2/4 1. If the alarm is accidentally triggered, the grid may temporarily operate abnormally. The inverter will recover. automatically after detecting that the power grid has returned to normal. 2. If the alarm is triggered frequently, check whether the power grid frequency is within the acceptable range. If not, , communionPlease contact your local electricity supplier. If so, , log in to the app SUN2000, in SmartLogger or in the NMS to modify the low frequency and high frequency protection thresholds of the power grid with the authorization from the local electricity supply operator. Cause ID = 5 1. If the alarm is accidentally triggered, the grid may temporarily operate abnormally. The inverter will recover. automatically after detecting that the power grid has returned to normal. 2. If the alarm is triggered frequently, check whether the power grid frequency is within the acceptable range. If not, , communioncontact your local electricity supply operator.
313	Low resistance of isolation	Serious	Cause ID = 1 - A occurs short circuit between the photovoltaic chain	1. Check the impedance between the PV string and the PGND cable. If a short circuit, rectify the fault. 2. If you are sure that the

ID of the alarm	Name of the alarm	Severity of the alarm	Possible cause	Suggestion
			and the PGND cable. - The chain photovoltaic has been installed in a humid environment for a long time time.	If the impedance is lower than the default value for a cloudy or rainy environment, log in to the SUN2000 app, SmartLogger, or NMS and set the parameter. **Insulation resistance protection**.
318	Current residual abnormal	Serious	Cause ID = 1 The resistance of insulation against the PGND cable on the input side decreases when the inverter is running, which that produces a residual current excessively high.	1. If the alarm is accidentally triggered, the operation of the external circuit may be temporarily abnormal. Once the fault is rectified, the inverter recovers automatically. 2. If the alarm is triggered repeatedly or persists, check whether the impedance between the photovoltaic string and the ground is excessively low.
321	Temperature excessive of the cupboard	Serious	Cause ID = 1 - The investor is installed in a site with little ventilation. - The temperature environment exceeds the upper threshold. - The internal fan does not work with normal.	1. Check the ventilation and ambient temperature of the inverter installation location. 2. If ventilation is poor or if the ambient temperature exceeds the upper threshold, improve the ventilation and heat dissipation. 3. If both ventilation and room temperature meet the requirements, communicate that with the Huawei technical support.
322	Communication n SPI abnormal	Serious	Cause ID = 1 An unrecoverable failure has occurred in an internal circuit of the inverter.	Turn off the AC output breaker and the DC input breaker. Turn them back on after 5 minutes. If the fault persists, contact your that with the Huawei technical support.
326	Grounding abnormal	Serious	Cause ID = 1 The neutral wire or PGND does not connect to the investor.	Check that the neutral or PGND wire is correctly connected to the inverter.
400	Failure of the system	Serious	Cause ID = 1/3/21/23/27 An unrecoverable failure has occurred in an internal circuit of the inverter.	Turn off the AC output breaker and the DC input breaker. Turn them back on after 5 minutes. If the fault persists, contact your that with the Huawei technical support.

ID of the alarm	Name of the alarm	Severity of the alarm	Possible cause	Suggestion
410	Feeding assistant abnormal	Serious	Cause ID = 4 The voltage of the sampling control board is abnormal, which may be due to one of the following causes: - The chip of internal power supply from the sampling control card has flaws. - The circuit of detection has started to fail.	1. When the alarm is triggered, the inverter shuts down automatically. Once the fault is rectified, the inverter restarts. automatically. 2. If the alarm is triggered repeatedly, contact your cheese with Huawei technical support.
411	Error in self-check AFCI on	Serious	Cause ID = 1/2/3 An AFCI verification failure occurred.	1. Turn off the AC output switch and the DC input switch. Turn them on after 5 seconds. minutes. If the fault persists, contact Huawei technical support. 2. Disable the AFCI function if you are sure that it will not use it.
412	Arc fault of CC	Serious	Cause ID = 1/2/3/4 The cable of the photovoltaic string has a weak contact or open circuits.	Check the photovoltaic string cable for weak contact or open circuits. If so, reconnect it.
504	Incompatibility give of version of software	Minor	Cause ID = 1/2/3 During the software update of the inverter, an incorrect version is loaded said software.	Check if you have recently performed a software update. If so, , come back to perform the update based on the correct version.
505	Failure of update	Serious	Cause ID = 1 The update does not ends normally.	Please perform the update again.
61440	Failure of flash drive	Minor	Cause ID = 1 - Flash memory is insufficient. - Flash memory has sectors defective.	1. Replace the monitoring card. 2. If the monitoring card is integrated into the monitoring device, replace the monitoring device.

NOTA

If the faults cannot be rectified by the measures listed in the table above, contact Huawei technical support.

9 Handling the SUN2000

9.1 Removing the SUN2000

AVISO

Before removing the SUN2000, disconnect the AC and DC connections. For the disconnection procedure, see the section6.3, “Shutting Down the SUN2000”. After turning off the SUN2000, wait at least 5 minutes before performing any operations on it.

To remove the SUN2000, perform the following operations:

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

9.2 Packaging of the SUN2000

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

9.3 How to dispose of the SUN2000

If the SUN2000's useful life has ended, dispose of it in accordance with local regulations regarding the disposal of waste electrical equipment.

10 Technical specifications

Efficiency

Item	SUN2000-29.9KTL	SUN2000-33KTHE	SUN2000-36KTL		SUN2000-42KTL
Maximum efficiency of conversion	98.6%	98.6%	98.6% (380 V/400 V)	98.8% (480 V)	98.8%
Efficiency European	98.4%	98.4%	98.4% (380 V/400 V)	98.6% (480 V)	98.6%

Entrance

Item	SUN2000-29.9KTL	SUN2000-33KTL-A	SUN2000-36KTL	SUN2000-42KTL
Power of maximum input (cos φ = 1)	30,600 W	30,600 W	40,800 W	47,900 W
Voltage of maximum input	1100 V			
Voltage of start/voltage of operation myspirits	200 V/250 V (200 V_{to})			
Voltage of operation maximum	1000 V			
Range of voltage of MPPT	200-1000 V			

Item	SUN2000-29.9 KTL	SUN2000-33K TL-A	SUN2000-36 KTL	SUN2000-42K TL
Range of MPPT voltage of power maximum	480–800 V	480–800 V	480–800 V (380 V/400 V)/580–850 V (480 V)	580–850 V
Strain nominal of entrance	620 V	620 V	620 V (380 V/400 V)/720 V (480 V)	720 V
Current of maximum input (by MPPT)	22 A			
Current maximum of short circuit (by MPPT)	30 A			
Current of maximum return from the investor to the arrangement photovoltaic	0 A			
Amount of tickets	8			
Amount of MPPT	4			
Note “a”: The minimum starting voltage of SUN2000-36KTL is 200V according to grid code NB/T 32004.				

Exit

Item	SUN2000-29.9K TL	SUN2000-33KT THE	SUN2000-36KTL	SUN2000-42 KTL
Power active nominal	29,900 W	30,000 W	36,000 W	42,000 W
Power apparent maximum	29,900 VA	33,000 VA	40,000 VA	47,000 VA
Power active maximumto (cos φ = 1)	29,900 W	30,000 W	40,000 W (if can configure (about 36,000 W)	47,000 W (se can set up like 42,000 W)

Item	SUN2000-29.9KTL	SUN2000-33KTHE	SUN2000-36KTL	SUN2000-42KTL
Voltage of exit nominal[b]	230 V/400 V, 3W+(N)[c]+PE	230 V/400 V, 3W+(N)[c]+PE	220 V/380 V, 230 V/400 V, 3W+(N)[c]+PE; 277 V/480 V, 3W+PE	277 V/480 V, 3W+PE
Frequency from network electric adapted	50 Hz / 60 Hz			
Current exit maximum	43.2 A (400 V)	48 A (400 V)	60.8 A (380 V)/57.8 A (400 V)/48.2 A (480 V)	56.6 A (480 V)
Factor of power	0.8 capacitive ... 0.8 inductive			
Distortion harmonica total maximum (power nominal)	< 3%			

Note "a": Note “a”: The maximum active power is determined by**PQ Mode**, which can be configured in the SUN200 app, SmartLogger or NetEco. If**PQ Mode 1**is selected, the maximum active power is equal to the maximum apparent power. If**PQ Mode 2**is selected, the maximum active power is equal to the nominal active power.

Note "b": The nominal output voltage depends on the parameter**Network code**, which can be configured in the SUN2000 application, SmartLogger or NMS.

Note “c”: Decide whether to connect the neutral conductor to the SUN2000-29.9KTL/33KTL-A and SUN2000-36KTL depending on the application scenario. In cases where they are used without a neutral conductor, set the neutral conductor to “A” or “B”**Exit mode**as**Three-phase, three-wire**. In cases where they are used with neutral conductor, configure the**Exit mode**as**Three-phase, four-wire**.

When the**Network code**of the SUN2000-36KTL is configured as Mexico-MV480 and the SUN2000-36KTL is used for power generation on a 440 VAC grid connection, the Level 1 and Level 2 undervoltage protection thresholds should be set to 384 V. The suitable AC output voltage is within the range of 384–576 V.

Protection

Item	SUN2000-29.9KTL	SUN2000-33KTL-A	SUN2000-36KTL	SUN2000-42KTL
Switch DC input	It is admitted			
Protection anti-isolation	It is admitted			

Item	SUN2000-29.9 KTL	SUN2000-33K TL-A	SUN2000-36 KTL	SUN2000-42K TL
Protection against the overcurrent exit	It is admitted			
Protection against the connection inverse of entrance	It is admitted			
Detection of failures in chains photovoltaic	It is admitted			
Protection against overcurrent of CC	Type II			
Protection against overcurrent from AC	Type II			
Detection of resistance of isolation	It is admitted			
Unit of monitoring current residual (RCMU)	It is admitted			
Protection against arc fault (AFCI: switch circuit by arc fault)	Not compatible	Not compatible	Optional	Not compatible

Communication

Item	SUN2000-29.9 KTL	SUN2000-33K TL-A	SUN2000-36 KTL	SUN2000-42K TL
Screen	LED indicator, Bluetooth module + app, USB data cable + app and WLAN module + app			
RS485	It is admitted			

Item	SUN2000-29.9 KTL	SUN2000-33K TL-A	SUN2000-36 KTL	SUN2000-42K TL
MBUS (PLC)	It is admitted			
FAITH	Not allowed	Not allowed	Optional	Not allowed
Note "a": If SUN2000-36KTL adopts FE communication mode, only RS485 and FE communication modes will be supported, but MBUS (PLC) communication mode will not be supported.				

Common parameters

Item	SUN2000-29.9 KTL	SUN2000-33K TL-A	SUN2000-36 KTL	SUN2000-42K TL
Dimensions (width x height x depth)	930 mm x 550 mm x 283 mm (with mounting plate)			
Net weight	About 60 kg (without mounting plate) / about 62 kg (with mounting plate)			
Temperature of operation	-25°C to +60°C			
Mode of cooling	Natural convection			
Highest altitude	4000 m			
Humidity	Relative humidity from 0% to 100%			
Terminal of entrance	Amphenol Helios H4			
Terminal of exit	Waterproof cable connector + OT terminal			
Classification of protection of income	IP65			
Topology	Without transformer			

TQ Electrical network codes

NOTA

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

TheTable A-1Lists the power grid codes supported by the SUN2000-29.9KTL.

Table A-1 Electrical grid codes (SUN2000-29.9KTL)

No.	Electrical Grid Code	Description	Mains voltage electric
1	VDE-AR-N-4105	Germany's low-voltage power grid	230 V/400 V
2	UTE C 15-712-1 (A)	Low-voltage electricity grid of continental France	230 V/400 V
3	UTE C 15-712-1 (B)	230 V 50 Hz in the French islands	230 V/400 V
4	UTE C 15-712-1 (C)	230 V 60 Hz in the French islands	230 V/400 V
5	BDEW-MV	German Medium Voltage Power Grid (BDEW-MV)	230 V/400 V
6	G59 of England	230V mains electricity in England (I > 16 A)	230 V/400 V
7	CEI0-21	Italy's low-voltage power grid	230 V/400 V
8	EN50438-CZ	Low-voltage power grid of the Czech Republic	230 V/400 V
9	RD1699/661	Spain's low-voltage power grid	230 V/400 V
10	C10/11	Belgium's low-voltage power grid	230 V/400 V
11	AS4777	Australia's low-voltage power grid	230 V/400 V

No.	Electrical Grid Code	Description	Mains voltage electric
12	IEC61727	IEC61727 (50 Hz) low voltage power grid	230 V/400 V
13	CEI0-16	Italy's low-voltage power grid	230 V/400 V
14	TAI-MEA	Thailand's Low Voltage Power Grid (MEA)	230 V/400 V
15	EN50438-TR	Turkey's low-voltage power grid to	230 V/400 V
16	EN50438-NL	Electrical grid of the countrythe Low Countries	230 V/400 V
17	NRS-097-2-1	South African low-voltage power grid	230 V/400 V
18	IEC61727-60Hz	IEC61727 (60 Hz) low voltage power grid	230 V/400 V
19	ANRE	Romanian low-voltage power grid to	230 V/400 V
20	EN50438_IE	Ireland's Low Voltage Power Grid (EN50438_IE)	277 V/400 V
21	INDIA	India's low-voltage power grid	230 V/400 V
22	PO12.3	Spain's low-voltage power grid	230 V/400 V
23	Egypt ETEC	Egypt's low-voltage power grid	230 V/400 V
24	CLC/TS50549_IE	Ireland's Low Voltage Power Grid (CLC/TS50549_IE)	230 V/400 V
25	Jordan-Transmission	Jordan's low-voltage power grid	230 V/400 V
26	NAMIBIA	Namibian power grid	230 V/400 V
27	SA_RPPs	South African low-voltage power grid	230 V/400 V
28	Malaysian	Malaysia's low-voltage power grid	230 V/400 V
29	KENYA_ETHIOPIA	Kenyan low-voltage power grid and Ethiopian low-voltage power grid to	230 V/400 V
30	NIGERIA	Nigeria's low-voltage power grid	230 V/400 V

No.	Electrical Grid Code	Description	Mains voltage electric
31	DUBAI	Dubai's low-voltage power grid	230 V/400 V
32	Northern Ireland	Northern Ireland low voltage electricity grid	230 V/400 V
33	Cameroon	Cameroon's low-voltage power grid	230 V/400 V
34	Jordan-Distribution	Low voltage electrical network of the power distribution network to from Jordan	230 V/400 V
35	LEBANON	Low voltage power grid of the Lí bathroom	230 V/400 V
36	Jordan Transmission HV	Jordan's high-voltage power grid	230 V/400 V
37	TUNISIA	Tunisian power grid	230 V/400 V
38	AUSTRALIA-NER	Australia's NER standard power grid	230 V/400 V
39	SAUDI	Saudi Arabian power grid	230 V/400 V
40	Israel	Israel's power grid	230 V/400 V
41	Chile-PMGD	Chile's PMGD project power grid	230 V/400 V
42	VDE-AR-N4120_HV	Standard electrical network VDE4120	230 V/400 V
43	Custom(50Hz)	Reserved	230 V/400 V
44	Custom(60Hz)	Reserved	230 V/400 V
45	Fuel-Engine-Grid	Fuel-Engine-Grid (50 Hz)	230 V/400 V
46	Fuel-Engine-Grid-60Hz	Fuel-Engine-Grid (60 Hz)	230 V/400 V

TheTable A-2Specifies the power grid codes supported by the SUN2000-33KTL-A.

Table A-2 Power grid codes (for the SUN2000-33KTL-A)

No.	Electrical Grid Code	Description	Mains voltage electric
1	VDE-AR-N-4105	Germany's low-voltage power grid	230 V/400 V
2	UTE C 15-712-1(A)	Low-voltage electricity grid of continental France	230 V/400 V
3	UTE C 15-712-1(B)	230 V 50 Hz in the French islands	230 V/400 V

No.	Electrical Grid Code	Description	Mains voltage electric
4	UTE C 15-712-1(C)	230 V 60 Hz in the French islands	230 V/400 V
5	CEI0-21	Italy's low-voltage power grid	230 V/400 V
6	RD1699/661	Spain's low-voltage power grid	230 V/400 V
7	PO12.3	Spain's low-voltage power grid	230 V/400 V
8	CEI0-16	Italy's low-voltage power grid	230 V/400 V
9	EN50438-TR	Turkey's low-voltage power grid to	230 V/400 V

TheTable A-3Lists the power grid codes supported by the SUN2000-36KTL.

Table A-3 Electrical network codes (SUN2000-36KTL)

No.	Electrical Grid Code	Description	Mains voltage electric
1	VDE-AR-N-4105	Germany's low-voltage power grid	230 V / 400 V
2	NB/T 32004	China's low-voltage power grid	220 V / 380 V
3	UTE C 15-712-1 (A)	Low-voltage electricity grid of continental France	230 V / 400 V
4	UTE C 15-712-1 (B)	230 V 50 Hz in the French islands	230 V / 400 V
5	UTE C 15-712-1 (C)	230 V 60 Hz in the French islands	230 V / 400 V
6	BDEW-MV	German Medium Voltage Power Grid (BDEW-MV)	230 V / 400 V
7	G59 of England	230V mains electricity in England (I > 16 A)	230 V / 400 V
8	G59 of Scotland	Scotland's 240V mains (I > 16 A)	240 V / 415 V
9	CEI0-21	Italy's low-voltage power grid	230 V / 400 V
10	EN50438-CZ	Low-voltage power grid of the Czech Republic	230 V / 400 V
11	RD1699/661	Spain's low-voltage power grid	230 V / 400 V

No.	Electrical Grid Code	Description	Mains voltage electric
12	RD1699/661-MV480	Spain's medium voltage power grid	277 V / 480 V
13	C10/11	Belgium's low-voltage power grid	230 V / 400 V
14	AS4777	Australia's low-voltage power grid	230 V / 400 V
15	IEC61727	IEC61727 (50 Hz) low voltage power grid	230 V / 400 V
16	CEI0-16	Italy's low-voltage power grid	230 V / 400 V
17	TAI-MEA	Thailand's Low Voltage Power Grid (MEA)	230 V / 400 V
18	TAI-PEA	Thailand's Low Voltage Power Grid (LVPG)	220 V / 380 V
19	BDEW-MV480	German medium voltage power grid (BDEW-MV480)	277 V / 480 V
20	G59-England-MV480	England's medium voltage power grid 480 V (I > 16 A)	277 V / 480 V
21	IEC61727-MV480	IEC61727 medium voltage power grid (50 Hz)	277 V/480 V
22	UTE C 15-712-1-MV480	Medium voltage electricity grid in France	277 V / 480 V
23	TAI-PEA-MV480	Thailand's Medium Voltage Power Grid (PEA)	277 V / 480 V
24	TAI-MEA-MV480	Thailand's Medium Voltage Power Grid (MEA)	277 V / 480 V
25	EN50438-DK-MV480	Denmark's medium voltage power grid	277 V / 480 V
26	EN50438-TR-MV480	Turkey's medium voltage power grid to	277 V / 480 V
27	EN50438-TR	Turkey's low-voltage power grid to	230 V / 400 V
28	C11/C10-MV480	Belgium's medium voltage electricity grid	277 V / 480 V
29	Philippines	Low-voltage power grid in the Philippines	220 V / 380 V
30	Philippines-MV480	Medium voltage power grid of the Philippines	277 V / 480 V

No.	Electrical Grid Code	Description	Mains voltage electric
31	EN50438-NL	Electrical grid of the country the Low Countries	230 V/400 V
32	NRS-097-2-1	South African low-voltage power grid	230 V / 400 V
33	NRS-097-2-1-MV480	South African medium voltage power grid	277 V / 480 V
34	KOREA	South Korea's low-voltage power grid	220 V / 380 V
35	IEC61727-60Hz	IEC61727 (60 Hz) low voltage power grid	230 V / 400 V
36	IEC61727-60Hz-MV480	IEC61727 medium voltage power grid (60 Hz)	277 V / 480 V
37	ANRE	Romanian low-voltage power grid	230 V / 400 V
38	ANRE-MV480	Romanian medium voltage power grid	277 V / 480 V
39	PO12.3-MV480	Spain's medium voltage power grid	277 V / 480 V
40	EN50438_IE-MV480	Ireland's medium voltage electricity grid	277 V / 480 V
41	EN50438_IE	Ireland's low voltage electricity grid	277 V / 400 V
42	INDIA	India's low-voltage power grid	230 V/ 400 V
43	CEI0-16-MV480	Italian medium voltage electricity grid (CEI0-16)	277 V / 480 V
44	PO12.3	Spain's low-voltage power grid	230 V / 400 V
45	CEI0-21-MV480	Italian medium voltage electricity grid (CEI0-21)	277 V / 480 V
46	Egypt ETEC	Egypt's low-voltage power grid	230 V / 400 V
47	Egypt ETEC-MV480	Egypt's medium voltage power grid	277 V / 480 V
48	CLC/TS50549_IE	Ireland's Low Voltage Power Grid (CLC/TS50549_IE)	230 V / 400 V
49	CLC/TS50549_IE-MV480	Ireland's Medium Voltage Power Grid (CLC/TS50549_IE)	277 V / 480 V

No.	Electrical Grid Code	Description	Mains voltage electric
50	Jordan-Transmission	Jordan's low-voltage power grid	230 V / 400 V
51	Jordan Transmission MV480	Jordan's medium voltage power grid	277 V / 480 V
52	NAMIBIA	Namibian power grid	230 V / 400 V
53	ABNT NBR 16149	Brazil's low-voltage power grid	220 V / 380 V
54	SA_RPPs	South African low-voltage power grid	230 V/400 V
55	SA_RPPs-MV480	South African medium voltage power grid	277 V/480 V
56	ZAMBIA	Zambia's low-voltage power grid	220 V/380 V
57	Chili	Chile's low-voltage power grid	220 V/380 V
58	Mexico-MV480	Mexico's medium voltage power grid	277 V/480 V
59	Malaysian	Malaysia's low-voltage power grid	230 V/400 V
60	KENYA_ETHIOPIA	Kenyan low-voltage power grid and Ethiopian low-voltage power grid	230 V/400 V
61	NIGERIA	Nigeria's low-voltage power grid	230 V/400 V
62	NIGERIA-MV480	Nigeria's medium voltage power grid	277 V/480 V
63	DUBAI	Dubai's low-voltage power grid	230 V/400 V
64	DUBAI-MV480	Dubai's medium voltage power grid	277 V/480 V
65	Northern Ireland	Northern Ireland low voltage electricity grid	230 V/400 V
66	Northern Ireland-MV480	Northern Ireland medium voltage electricity grid	277 V/480 V
67	Cameroon	Cameroon's low-voltage power grid	230 V/400 V
68	Cameroon-MV480	Cameroon's medium voltage power grid	277 V/480 V

No.	Electrical Grid Code	Description	Mains voltage electric
69	Jordan-Distribution	Low voltage electrical network of the power distribution network to from Jordan	230 V/400 V
70	LEBANON	Low voltage power grid of the Lí bathroom	230 V/400 V
71	Jordan Transmission HV	Jordan's high-voltage power grid	230 V/400 V
72	TUNISIA	Tunisian power grid	230 V/400 V
73	AUSTRALIA-NER	Australia's NER standard power grid	230 V/400 V
74	SAUDI	Saudi Arabian power grid	230 V/400 V
75	Israel	Israel's power grid	230 V/400 V
76	Chile-PMGD	Chile's PMGD project power grid	230 V/400 V
77	VDE-AR-N4120_HV	Standard electrical network VDE4120	230 V/400 V
78	VDE-AR-N4120_HV480	Standard electrical network VDE4120 (480 V)	277 V/480 V
79	Vietnam	Vietnam's power grid	220 V/380 V
80	Custom(50Hz)	Reserved	230 V / 400 V
81	Custom(60Hz)	Reserved	230 V / 400 V
82	Custom-MV480(50Hz)	Reserved	277 V / 480 V
83	Custom-MV480(60Hz)	Reserved	277 V / 480 V

TheTable A-4Lists the power grid codes supported by the SUN2000-42KTL.

Table A-4 Electrical network codes (SUN2000-42KTL)

No.	Electrical Grid Code	Description	Mains voltage electric nominal
1	RD1699/661-MV480	Spain's medium voltage power grid	277 V / 480 V
2	BDEW-MV480	German medium voltage power grid (BDEW-MV480)	277 V / 480 V
3	G59-England-MV480	England's medium voltage power grid 480 V (I > 16 A)	277 V / 480 V

No.	Electrical Grid Code	Description	Mains voltage electric nominal
4	IEC61727-MV480	IEC61727 medium voltage power grid (50 Hz)	277 V / 480 V
5	UTE C 15-712-1-MV480	Medium voltage electricity grid of French islands	277 V / 480 V
6	TAI-PEA-MV480	Thailand's Medium Voltage Power Grid (PEA)	277 V / 480 V
7	TAI-MEA-MV480	Thailand's Medium Voltage Power Grid (MEA)	277 V / 480 V
8	EN50438-DK-MV480	Denmark's medium voltage power grid	277 V / 480 V
9	EN50438-TR-MV480	Turkey's medium voltage power grid	277 V / 480 V
10	C11/C10-MV480	Belgium's medium voltage electricity grid	277 V/480 V
11	Philippines-MV480	Medium voltage power grid of the Philippines	277 V / 480 V
12	AS4777-MV480	Australia's medium voltage power grid	277 V/480 V
13	ANRE-MV480	Romanian medium voltage power grid	277 V/480 V
14	NRS-097-2-1-MV480	South African medium voltage power grid	277 V / 480 V
15	IEC61727-60Hz-MV480	IEC61727 medium voltage power grid (60 Hz)	277 V / 480 V
16	PO12.3-MV480	Spain's medium voltage power grid	277 V / 480 V
17	EN50438_IE-MV480	Ireland's Medium Voltage Power Grid (EN50438_IE)	277 V / 480 V
18	KOREA-MV480	South Korea's medium-voltage power grid	277 V / 480 V
19	CEI0-16-MV480	Italian medium voltage electricity grid (CEI0-16)	277 V / 480 V
20	CEI0-21-MV480	Italian medium voltage electricity grid (CEI0-21)	277 V / 480 V
21	Egypt ETEC-MV480	Egypt's medium voltage power grid	277 V / 480 V

No.	Electrical Grid Code	Description	Mains voltage electric nominal
22	CLC/TS50549_IE-MV480	Ireland's Medium Voltage Power Grid (CLC/TS50549_IE)	277 V / 480 V
23	Jordan Transmission MV480	Jordan's medium voltage power grid	277 V / 480 V
24	SA_RPPs-MV480	South African medium voltage power grid	277 V/480 V
25	ZAMBIA-MV480	Zambia's medium voltage power grid	277 V/480 V
26	Chile-MV480	Chile's medium voltage power grid	277 V/480 V
27	Mexico-MV480	Mexico's medium voltage power grid	277 V/480 V
28	Malaysian-MV480	Malaysia's medium voltage power grid	277 V/480 V
29	KENYA_ETHIOPIA_MV480	Kenya's medium voltage power grid and Ethiopia's medium voltage power grid	277 V/480 V
30	NIGERIA-MV480	Nigeria's medium voltage power grid	277 V/480 V
31	DUBAI-MV480	Dubai's medium voltage power grid	277 V/480 V
32	Northern Ireland-MV480	Northern Ireland medium voltage electricity grid	277 V/480 V
33	Cameroon-MV480	Cameroon's medium voltage power grid	277 V/480 V
34	Jordan-Distribution-MV480	Medium voltage electrical network of the power distribution network to Jordan	277 V/480 V
35	NAMIBIA_MV480	Namibian power grid	277 V/480 V
36	LEBANON-MV480	Medium voltage power grid of the Lí bathroom	277 V/480 V
37	Jordan Transmission HV480	Jordan's high-voltage power grid	277 V/480 V
38	TUNISIA-MV480	Tunisia's medium voltage power grid	277 V/480 V
39	AUSTRALIA-NER-MV480	Australia's NER standard power grid	277 V/480 V

No.	Electrical Grid Code	Description	Mains voltage electric nominal
40	SAUDI-MV480	Saudi Arabian power grid	277 V/480 V
41	Ghana-MV480	Ghana's medium voltage power grid	277 V/480 V
42	Israel-MV480	Israel's power grid	277 V/480 V
43	Chile-PMGD-MV480	Chile's PMGD project power grid	277 V/480 V
44	VDE-AR-N4120_HV480	Standard electrical network VDE4120 (480 V)	277 V/480 V
45	Vietnam-MV480	Vietnam's power grid	277 V/480 V
46	Custom-MV480(50Hz)	Reserved	277 V / 480 V
47	Custom-MV480(60Hz)	Reserved	277 V / 480 V

B Acronyms and abbreviations

TO	
ACDU	AC distribution unit
C	
CCO	Central controller
AND	
EFUP	Environmentally friendly use period
L	
LED	Light emitting diode
M	
MBUS	Monitoring bus
MPP	Maximum power point
MPPT	Maximum power point tracking
N	
NMS	Network management system
P	
PID	Potential induced degradation

PLC	Power line communication	nea of power supply)
PV	Photovoltaic	
R		
RCMU	Residual current monitoring unit	
T		
THD	Total harmonic distortion	
W		
WEEE	Waste electrical and electronic equipment	