

SUN2000-(30KTL-A, 33KTL, 33KTL-E001, 40KTL) Quick Guide

Issue: 07

Part Number: 31507079

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HUAWEI TECHNOLOGIES CO., LTD.

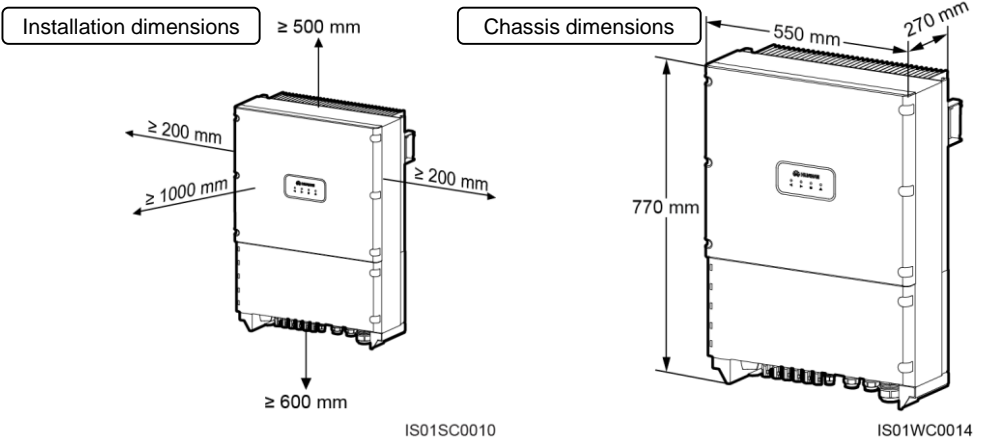


NOTICE

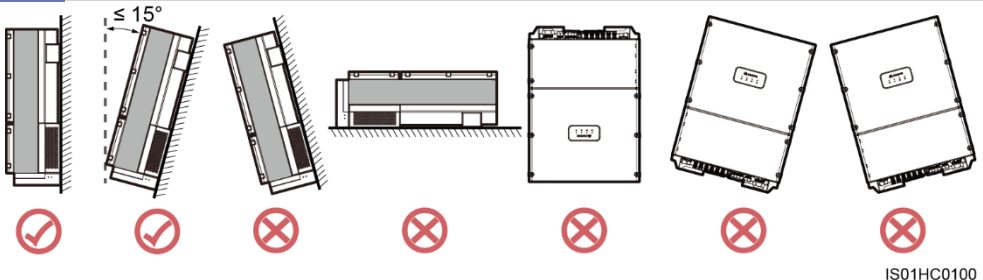
1. The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.
2. Before installing the device, read the *SUN2000-(30KTL-A, 33KTL, 33KTL-E001, 40KTL) User Manual* for knowledge of product information and safety precautions. To obtain the user manual, log in to <http://support.huawei.com/carrier/> and browse or search for SUN2000 on the **Product Support** page.
3. Only qualified and trained electrical technicians are allowed to operate the device. Operators should understand the components and functioning of a grid-tied PV power system and be familiar with relevant local standards.
4. Before installing the device, check that deliverables are intact and complete against the *packing list*. If any damage is found or any component is missing, contact the dealer.
5. Use insulated tools when installing the device. For personal safety, wear insulation gloves and protective shoes.
6. The device warranty will not cover the following conditions:
 - The warranty label is removed.
 - The device is damaged caused by violation of the storage, transportation, installation, and operation regulations specified in this document and user manual.

1 System Installation

1.1 Determining the Installation Position



1.2 Determining the Installation Mode

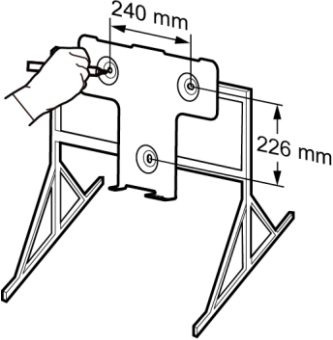


NOTE

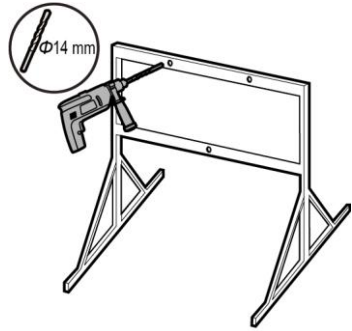
Install the inverter vertically or with a backward tilt of no more than 15 degrees.

1.3 Installing an Inverter (Support-mounting Used as an Example)

1. Determine the hole positions on the support based on rear panel dimensions.
2. Drill holes. (You are advised to apply anti-rust paint on the hole positions for protection.)

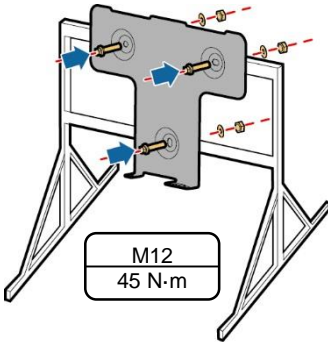


IS01HC0016



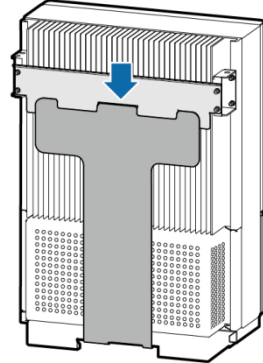
IS01HC0017

3. Secure the rear panel.



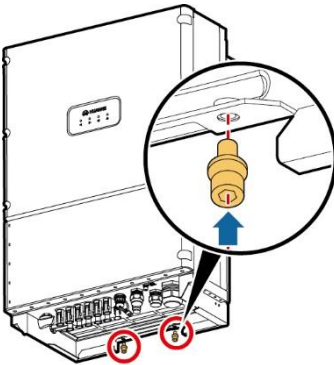
IS01HC0012

4. Mount the inverter on the rear panel.



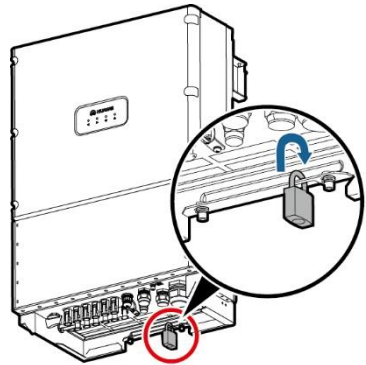
IS01HC0033

5. Tighten hexagon bolts.



IS01HC0023

6. (Optional) Install an anti-theft lock.



IS01HC0024

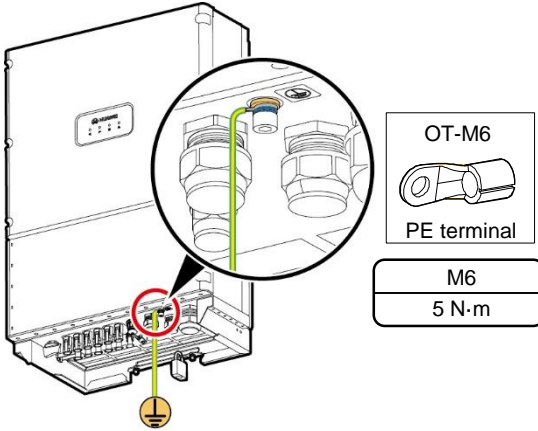
NOTE

1. The anti-theft lock is prepared by the customer.
2. For details about how to wall-mount the device, see the *SUN2000-(30KTL-A, 33KTL, 33KTL-E001, 40KTL) User Manual*.

2 Electrical Connection

2.1 Installing a PGND Cable (Using the Ground Point on the Chassis Shell)

Both the shell and maintenance compartment of the inverter provide a ground point. Select either for connecting the ground cable.



IS011C0021

NOTE

1. It is recommended that an 8 mm², 10 mm², 8 AWG or 7 AWG outdoor copper-core cable be used as a ground cable. Ground cables must be securely connected.
2. It is recommended that the ground cable be connected to a nearby ground position. For a system with multiple inverters connected in parallel, connect the ground points of all inverters to ensure equipotential connections.
3. To prevent corrosion, apply silica gel or paint to the PE terminal after connecting the PGND cable.

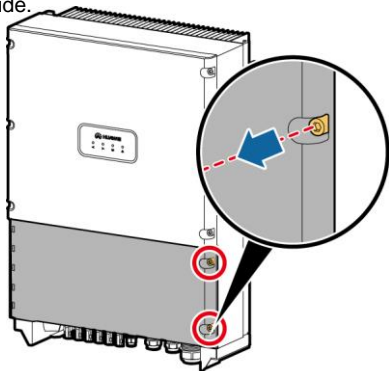
2.2 Installing AC Output Power Cables

NOTE

- If you connect a ground cable to the ground point on the chassis shell, you are recommended to use a four-core (L1, L2, L3, and N) outdoor copper-core cable for the SUN2000-33KTL/33KTL-E001. If you connect a ground cable to the ground point in the maintenance compartment, you are recommended to use a five-core (L1, L2, L3, N, and PE) outdoor copper-core cable.
- If you connect a ground cable to the ground point on the chassis shell, you are recommended to use a three-core (L1, L2, and L3) outdoor copper-core cable for the SUN2000-30KTL-A/40KTL. If you connect a ground cable to the ground point in the maintenance compartment, you are recommended to use a four-core (L1, L2, L3, and PE) outdoor copper-core cable.
- You need to prepare OT terminals by yourself: The OT terminal corresponding to the SUN2000-33KTL/33KTL-E001 AC output power cable is of M6 model and matches a cable with the maximum cross-sectional area of 25 mm². The OT terminal corresponding to the SUN2000-30KTL-A/40KTL AC output power cables is of M8 model and matches a cable with the maximum cross-sectional area of 35 mm². The OT terminal corresponding to the ground cable is of M6 model and matches a cable with the maximum cross-sectional area of 25 mm².

Inverter Model	Conductor Cross-Sectional Area		Cable Outer Diameter	
	Range	Recommended Value	Range	Recommended Value
SUN2000-33KTL/33KTL-E001	16–25 mm ² (or 6–3 AWG)	16 mm ² or 6 AWG	24–32 mm	28 mm
SUN2000-30KTL-A/40KTL	16–35 mm ² (or 6–2 AWG)			

1. Remove the two screws from the maintenance compartment door using a hex key and set them aside.

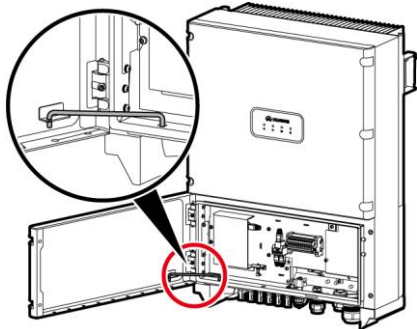


⚠ NOTICE

1. Obtain the hex key and reserved screws from the fitting bag bound to the reinforcing rib at the chassis base.
2. Do not leave unused screws in the chassis.
3. Do not open the host panel of the inverter.
4. Before opening the maintenance compartment door, switch off the downstream AC output circuit breaker and DC SWITCH.

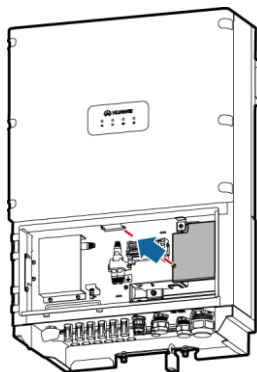
IS01HC0025

2. Open the maintenance compartment door and install the support bar available in the fitting bag bound to the reinforcing rib at the chassis base.



IS01HC0027

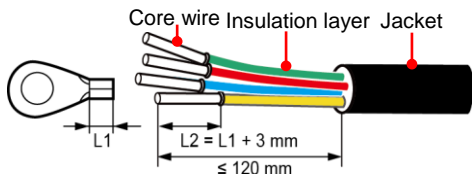
3. Remove the AC terminal cover.



IS01HC0028

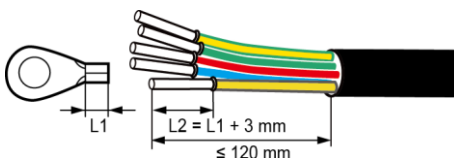
4. Remove an appropriate length of the jacket and insulation layer from the AC output cable using a wire stripper.

- a. SUN2000-33KTL/33KTL-E001 (excluding the ground cable)



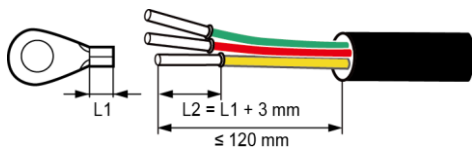
IS01ZC0015

- b. SUN2000-33KTL/33KTL-E001 (including the ground cable)



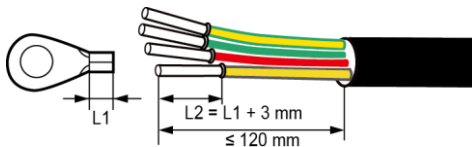
IS01Z10003

- c. SUN2000-30KTL-A/40KTL (excluding the ground cable)



IS01ZC0030

- d. SUN2000-30KTL-A/40KTL (including the ground cable)



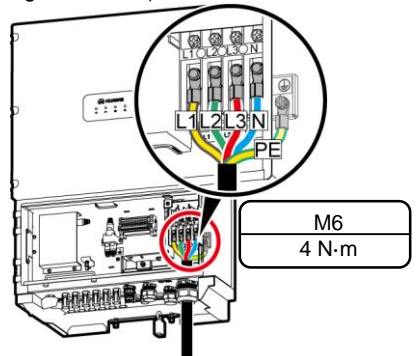
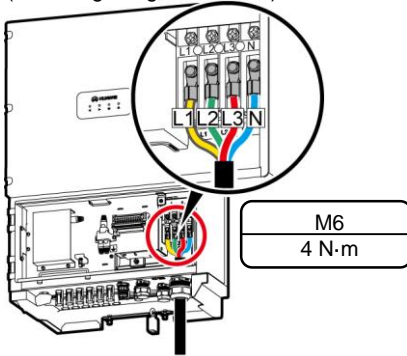
IS01Z10004

5. Insert the exposed core wires into the crimp area of the OT terminal and crimp them using hydraulic pliers.
6. Wrap the wire crimp area with heat shrink tubing or PVC insulation tape.

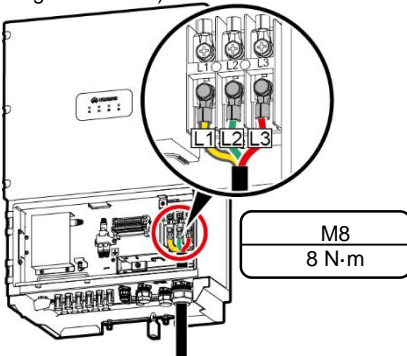
NOTE

If heat shrink tubing is used, put it through the power cable and then crimp the OT terminal.

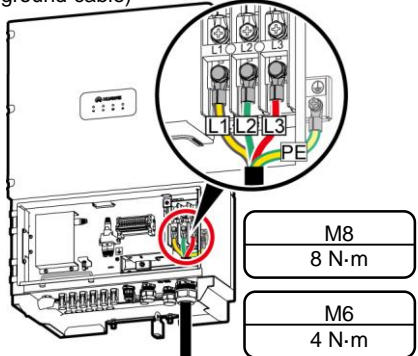
7. Remove the locking cap from the AC OUTPUT waterproof cable connector at the inverter bottom and remove the plug from the locking cap.
8. Route the AC output power cable into the locking cap and the AC OUTPUT connector at the inverter bottom.
9. Connect the wires of the AC output cable for the SUN2000-33KTL/33KTL-E001 to L1, L2, L3, and N on the AC terminal block. Secure the screws using a 10 mm socket wrench. Connect the wires of the AC output cable for the SUN2000-30KTL-A/40KTL to L1, L2, and L3 on the AC terminal block. Secure the screws using a 13 mm socket wrench. If you connect a ground cable to the ground point in the maintenance compartment, tighten the ground screw using an M6 torque screwdriver.
 - a. SUN2000-33KTL/33KTL-E001 (excluding the ground cable)
 - b. SUN2000-33KTL/33KTL-E001 (including the ground cable)



c. SUN2000-30KTL-A/40KTL (excluding the ground cable)



d. SUN2000-30KTL-A/40KTL (including the ground cable)



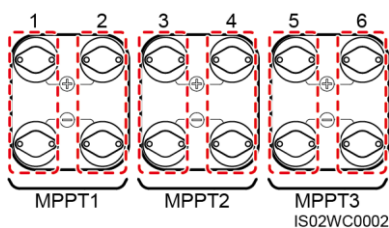
NOTICE

Ensure that the AC output power cable is connected securely. Otherwise, the inverter may fail to operate or experience a fault that will damage the terminal block. For example, the inverter may generate heat during operation due to unreliable connection.

10. Use a torque wrench with an open end of 52 mm to tighten the locking cap to a torque of 7.5 N·m.

2.3 Installing DC Input Power Cables

Optional DC input terminals

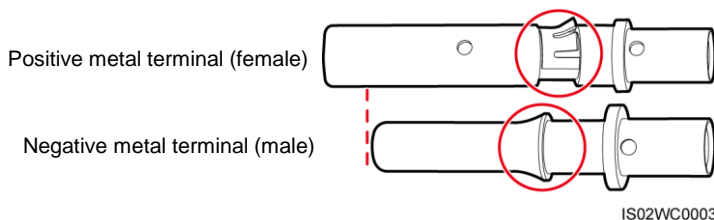


Number of Inputs	SUN2000
1	Connects to any one route
2	Connects to routes 1 and 3
3	Connects to routes 1, 3, and 5
4	Connects to routes 1, 2, 3, and 5
5	Connects to routes 1, 2, 3, 4, and 5
6	Connects to routes 1, 2, 3, 4, 5, and 6

NOTE

Routes 1, 2, 3, 4, 5, and 6 are defined from left to right.

Positive and negative metal terminals

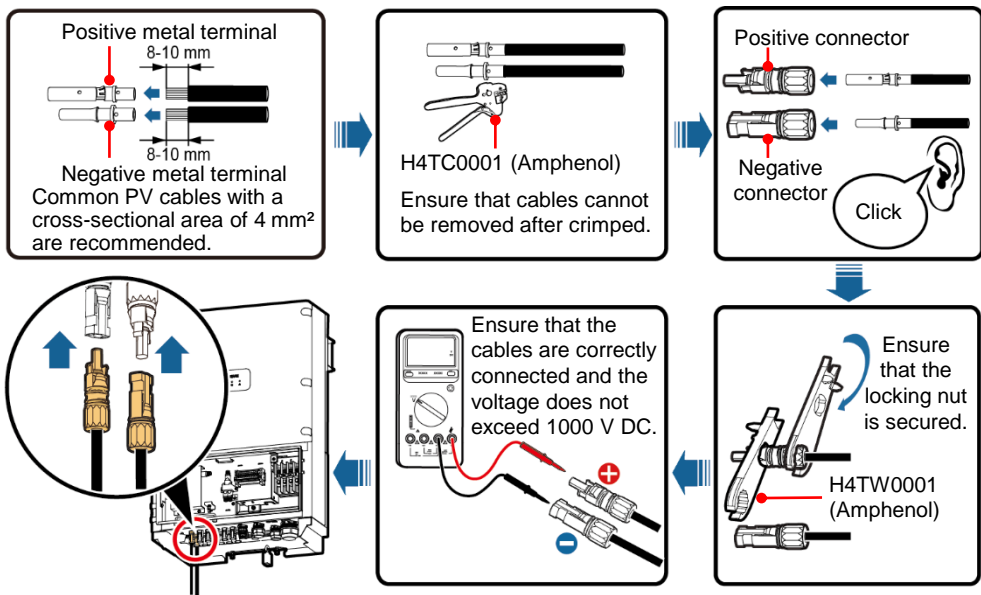


WARNING

- Ensure that the PV string is well insulated to the ground.
- Before inserting the positive and negative connectors respectively into the positive and negative DC input terminals of the inverter, check that the DC voltage does not exceed 1000 V DC using a multimeter and that the cables are connected correctly. Otherwise, the inverter will be damaged.

NOTICE

1. Before connecting DC input power cables, mark the polarities on the cables to ensure that the cables are connected correctly. If the cables are connected incorrectly, the device may be damaged.
2. Insert the crimped metal terminals of the positive and negative power cables into the appropriate positive and negative connectors. Then pull the DC input power cables to ensure that they are connected securely.
3. Connect the positive and negative connectors to the appropriate positive and negative DC input terminals. Then pull the DC input power cables to ensure that they are connected securely.
4. If the DC input power cables are reversely connected and the DC SWITCH is ON, do not turn off the DC SWITCH immediately. Otherwise, the inverter may be damaged and the damage is beyond the warranty scope. Wait until the PV string voltage reduces to the safety range (below 60 V DC). Then, turn off the DC SWITCH, remove the positive and negative connectors, and rectify the connection.



IS01IC0022

2.4 Selecting a Communication Mode

Model	Communication Mode		Remarks
	RS485	PLC	
SUN2000-30KTL-A (with PLC)	Supported	Supported	1. Only one communications mode can be selected in application scenarios. 2. If PLC is used, you do not have to connect any cable to the inverter, but have to connect AC power cables to the PLC CCO module or SmartLogger2000. For detailed operations, see the <i>PLC CCO01A User Manual</i> or <i>SmartLogger2000 User Manual</i> . 3. If RS485 is used, do not connect the PLC CCO module to the AC power cable.
SUN2000-33KTL/33KTL-E001 (with PLC)	Supported	Supported	
SUN2000-40KTL (with PLC)	Supported	Supported	
SUN2000-30KTL-A (without PLC)	Supported	Not supported	
SUN2000-33KTL (without PLC)	Supported	Not supported	
SUN2000-40KTL (without PLC)	Supported	Not supported	

2.5 Installing RS485 Communications Cables

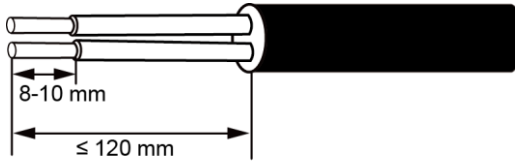
NOTICE

- When routing communications cables, ensure that communications cables are separated from power cables and away from interfering source to prevent communication from being affected.
- RS485 communications cables can be connected to the terminal block or RJ45 ports. Connecting to the terminal block is recommended.

Method 1: Connecting to the terminal block (recommended)

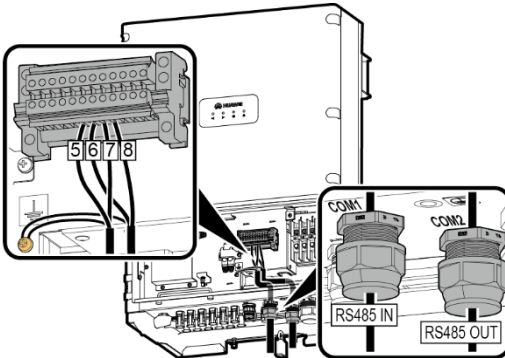
The DJYP2VP2-22 2x2x1 network cable or a communications cable with a cross sectional area of 1 mm^2 and external diameter of 14–18 mm is recommended.

1. Remove an appropriate length of the insulation layer from the cable using a wire stripper.



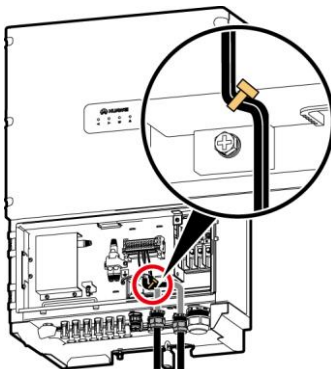
IS01ZC0013

2. Remove the locking caps from the COM1 and COM2 waterproof cable connectors at the inverter bottom and remove the plugs from the locking caps.
3. Route the cables through the locking caps and then the COM1 (RS485 IN) and COM2 (RS485 OUT) connectors at the inverter bottom.
4. Connect the input end to terminals 5 and 7 on the terminal block and connect the output end to terminals 6 and 8 on the terminal block. Tighten the terminals using an M3 flat-head screwdriver to a torque of 0.5 N·m. Connect the shield layer to the ground point and tighten the screw using an M4 Phillips torque screwdriver to a torque of 1.2 N·m.



IS011C0025

5. Bind the RS485 communications cables.



IS011C0040

NOTE

When connecting the shielded cable, choose whether to crimp the OT-M4 terminal based on site requirements.

6. Use a torque wrench with an open end of 33 mm to tighten the locking caps to a torque of 7.5 N·m.

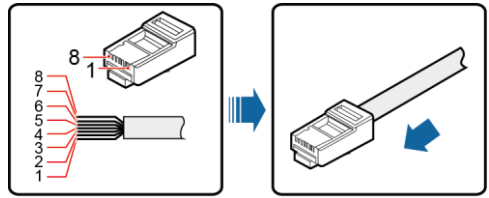
NOTE

1. Block unused waterproof cable connectors with waterproof plugs.
2. To ensure good sealing, you are advised to apply firestop putty to the used waterproof cable connectors at the bottom of the chassis.

Method 2: Connecting to RJ45 ports

You are recommended to use a shielded RJ45 connector and a CAT 5E outdoor shielded network cable with an outer diameter less than 9 mm and internal resistance not greater than 1.5 ohms/10 m.

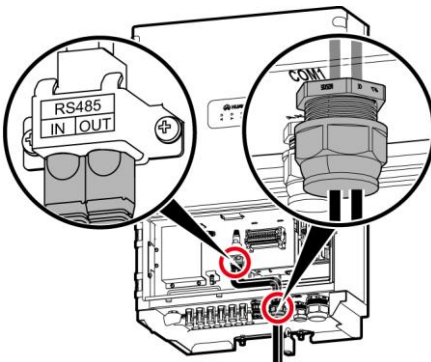
1. Insert the wires of the network cable to the RJ45 connector in sequence.
2. Crimp the connectors using a crimping tool.



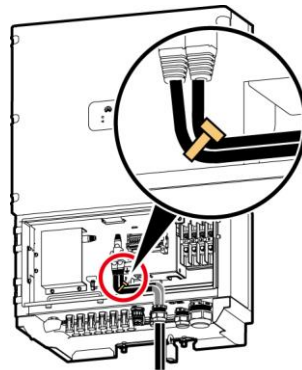
IS01ZC0021

No.	Color	Pin Definition
1	White-orange	RS485A, RS485 differential signal +
2	Orange	RS485B, RS485 differential signal -
3	White-green	PGND
4	Blue	RS485A, RS485 differential signal +
5	White-blue	RS485B, RS485 differential signal -
6	Green	PGND
7	White-brown	PGND
8	Brown	PGND

3. Remove the locking cap from the COM1 waterproof cable connector at the inverter bottom and remove the plug from the locking cap.
4. Route the cables through the locking cap and the COM1 connector at the inverter bottom.
5. Connect the RJ45 connectors to the RS485 IN and RS485 OUT ports in the SUN2000 maintenance area.
6. Bind the RS485 communications cables.



IS011C0024



IS011C0041

7. Use a torque wrench with an open end of 33 mm to tighten the locking cap to a torque of 7.5 N·m.

NOTE

1. Block unused waterproof cable connectors with waterproof plugs.
2. To ensure good sealing, you are advised to apply firestop putty to the used waterproof cable connectors at the bottom of the chassis.

3 Installation Verification

1. The SUN2000 is installed correctly and securely.	Yes <input type="checkbox"/> No <input type="checkbox"/>
2. All screws, especially the screws used for electrical connections, are tightened.	Yes <input type="checkbox"/> No <input type="checkbox"/>
3. The DC SWITCH and downstream AC output circuit breaker are OFF.	Yes <input type="checkbox"/> No <input type="checkbox"/>
4. Ground cables are connected correctly and securely, with no open circuit or short circuit.	Yes <input type="checkbox"/> No <input type="checkbox"/>
5. AC output power cables are connected correctly and securely, with no open circuit or short circuit.	Yes <input type="checkbox"/> No <input type="checkbox"/>
6. DC input power cables are connected correctly and securely, with no open circuit or short circuit.	Yes <input type="checkbox"/> No <input type="checkbox"/>
7. The DC input voltage is not higher than 1000 V and meets the local voltage range requirements.	Yes <input type="checkbox"/> No <input type="checkbox"/>
8. RS485 communications cables are connected correctly and securely.	Yes <input type="checkbox"/> No <input type="checkbox"/>
9. Idle DC input terminals are sealed.	Yes <input type="checkbox"/> No <input type="checkbox"/>
10. The idle USB port and waterproof cable connectors are plugged with waterproof plugs.	Yes <input type="checkbox"/> No <input type="checkbox"/>

NOTICE

After the verification, reinstall the AC terminal cover, adjust the support bar, and close the maintenance compartment door. Then tighten the two screws on the door to a torque of 4 N·m. Check that the maintenance compartment door is locked.

4 System Power-on

NOTICE



Before switching on the AC circuit breaker between the inverter and the power grid, use a multimeter to check that the AC voltage is within the specified range.



1. Switch on the AC circuit breaker between the inverter and the power grid.
2. Set the DC SWITCH at the bottom of the inverter to ON.
3. (Optional) Measure the temperatures at the joints between the DC terminals and the connectors using a thermometer.

NOTE

To check that the DC terminals are in good contact, check that the temperatures at the joints between DC terminals and connectors do not exceed 85°C after the inverter has been running for a period of time.

4. Observe the LED indicators to check the inverter operating status.

Indicator	Status	Meaning
PV connection indicator 	Steady green	At least one PV string is properly connected, and the DC input voltage of the corresponding MPPT circuit is higher than or equal to 200 V.
	Off	The inverter disconnects from all PV strings, or the DC input voltage of each MPPT circuit is less than 200 V.
Grid-tie indicator 	Steady green	The inverter is grid-tied.
	Off	The inverter is not grid-tied.

Indicator	Status	Meaning	
Communication indicator 	Blinking green (on for 0.5s and off for 0.5s)	The inverter receives data over RS485/PLC communication.	
	Off	The inverter has not received data over RS485/PLC communication for 10 seconds.	
Alarm/ Maintenance indicator 	Alarm state	Blinking red slowly (on for 1s and then off for 4s)	The inverter has generated a warning.
		Blinking red fast (on for 0.5s and then off for 0.5s)	The inverter has generated a minor alarm.
		Steady red	The inverter has generated a major alarm.
	Local maintenance state	Blinking green slowly (on for 1s and then off for 1s)	Local maintenance is in progress.
		Blinking green fast (on for 0.125s and off for 0.125s)	Local maintenance has failed.
		Steady green	Local maintenance is successful.

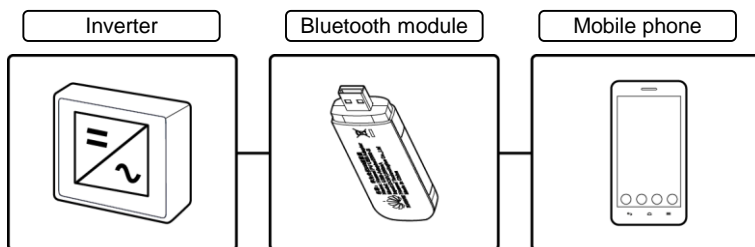
5 SUN2000 APP



NOTE

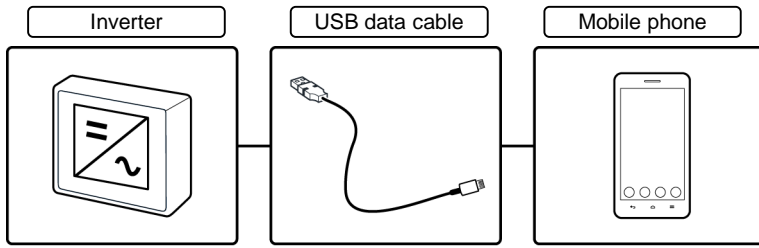
1. The SUN2000 APP enables the inverter to communicate with the monitoring system through a USB data cable or Bluetooth for you to query alarms, configure parameters, and perform routine maintenance. The SUN2000 APP is a convenient platform for local monitoring and maintenance. The APP name is SUN2000.
2. Mobile phone operating system: Android 4.0 or later, and iOS 7.0 or later. When the iOS is used, the APP supports only Bluetooth connection.
3. Access the Huawei app store (<http://appstore.huawei.com>), Google Play (<https://play.google.com>), or App Store (iOS), search for SUN2000, and download the SUN2000 APP installation package.
4. Connect a USB data cable or a Bluetooth module to the USB port of the inverter to implement the communication between the inverter and the APP.

Bluetooth module connection



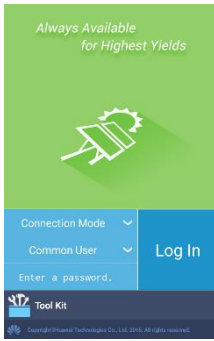
IS01NC0009

Data cable connection

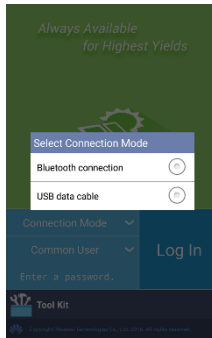


IS01NC0010

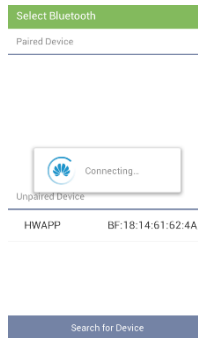
Login screen



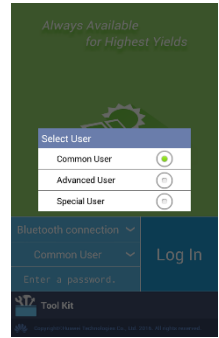
Select a connection mode



Connect Bluetooth



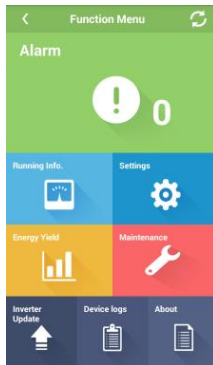
Switch between users



Quick setting




Function menu



NOTICE

- The preset password for **Common User**, **Advanced User**, and **Special User** is **00000a**.
- Use the preset password upon initial login. To ensure account security, change the password immediately after login.
- The screen snapshots in this document correspond to app V200R001C20SPC010.

NOTE

1. Tap  to return to the login screen.
2. Inverter grid connection setup requires no parameter setting by default. The parameters can be adjusted based on site requirements. For parameter settings, see the *SUN2000 APP User Manual*.

Appendix 1: Power Grid Standard Code Mapping Table (SUN2000-33KTL/SUN2000-33KTL-E001)

No.	Power Grid Standard Code	Country and Condition	No.	Power Grid Standard Code	Country and Condition
1	NB/T 32004	China low-voltage power grid	2	VDE-AR-N-4105	Germany low-voltage power grid
3	EN50438-NL	Netherlands low-voltage power grid	4	BDEW-MV	Germany medium-voltage power grid
5	UTE C 15-712-1 (A)	France low-voltage power grid	6	EN50438-CZ	Czech Republic low-voltage power grid
7	UTE C 15-712-1 (B)	Islands of France 230 V 50 Hz	8	TAI-PEA	Thailand low-voltage power grid (PEA)
9	UTE C 15-712-1 (C)	Islands of France 230 V 60 Hz	10	TAI-MEA	Thailand low-voltage power grid (MEA)
11	NRS-097-2-1	South Africa low-voltage power grid	12	VDE 0126-1-1-GR (A)	Mainland of Greece low-voltage power grid
13	KOREA	South Korea low-voltage power grid	14	VDE 0126-1-1-GR (B)	Islands of Greece low-voltage power grid
15	G59-England	England 230 V power grid ($I > 16$ A)	16	RD1699/661	Spanish low-voltage power grid (RD1699/661)
17	G59-Scotland	Scotland 240 V power grid ($I > 16$ A)	18	VDE 0126-1-1-BU	Bulgaria low-voltage power grid
19	G83-England	England 230 V power grid ($I < 16$ A)	20	AS4777	Australia low-voltage power grid
21	G83-Scotland	Scotland 240 V power grid ($I < 16$ A)	22	EN50438-TR	Turkey low-voltage power grid
23	CEI0-21	Italian low-voltage power grid	24	C10/11	Belgium low-voltage power grid
25	CEI0-16	Italian medium-voltage power grid	26	ANRE	Romania low-voltage power grid
27	Philippines	Philippines low-voltage power grid	28	EN50438_IE	Ireland low-voltage power grid
29	IEC61727	IEC low-voltage power grid	30	PO12.3	Spain low-voltage power grid (PO12.3)
31	IEC61727-60Hz	IEC low-voltage power grid (60 Hz)	32	Custom (60Hz)	Reserved
33	Custom (50Hz)	Reserved	-	-	-

Appendix 2: Power Grid Standard Code Mapping Table (SUN2000-30KTL-A /SUN2000-40KTL)

No.	Power Grid Standard Code	Country and Condition	No.	Power Grid Standard Code	Country and Condition
1	RD1699/661-MV480	Spain medium-voltage power grid (RD1699/661)	2	CHINA-MV480	China medium-voltage power grid (480 V)
3	BDEW-MV480	Germany medium-voltage power grid	4	Custom-MV480 (50Hz)	Reserved
5	Custom-MV480 (60Hz)	Reserved	6	G59-England-MV480	UK 480 V Medium-voltage power grid (I > 16 A)
7	IEC61727-MV480	IEC medium-voltage power grid (50 Hz)	8	UTE C 15-712-1-MV480	France medium-voltage power grid
9	TAI-PEA-MV480	Thailand medium-voltage power grid (PEA)	10	TAI-MEA-MV480	Thailand medium-voltage power grid (MEA)
11	EN50438-DK-MV480	Denmark medium-voltage power grid	12	Japan (50Hz)	Japan power grid (50 Hz)
13	Japan (60Hz)	Japan power grid (60 Hz)	14	EN50438-TR-MV480	Turkey medium-voltage power grid
15	C11/C10-MV480	Belgium medium-voltage power grid	16	Philippines-MV480	Philippines medium-voltage power grid
17	AS4777-MV480	Australia medium-voltage power grid	18	NRS-097-2-1-MV480	South Africa medium-voltage power grid
19	IEC61727-60Hz-MV480	IEC medium-voltage power grid (60 Hz)	20	ANRE-MV480	Romania medium-voltage power grid
21	PO12.3-MV480	Spain medium-voltage power grid (PO12.3)	22	EN50438_IE-MV480	Ireland medium-voltage power grid



NOTE

Grid codes are subject to change. The listed codes are for your reference only.

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