

Smart PV Three-phase Inverter (3kW-10kW)

Quick Guide

Issue: 01

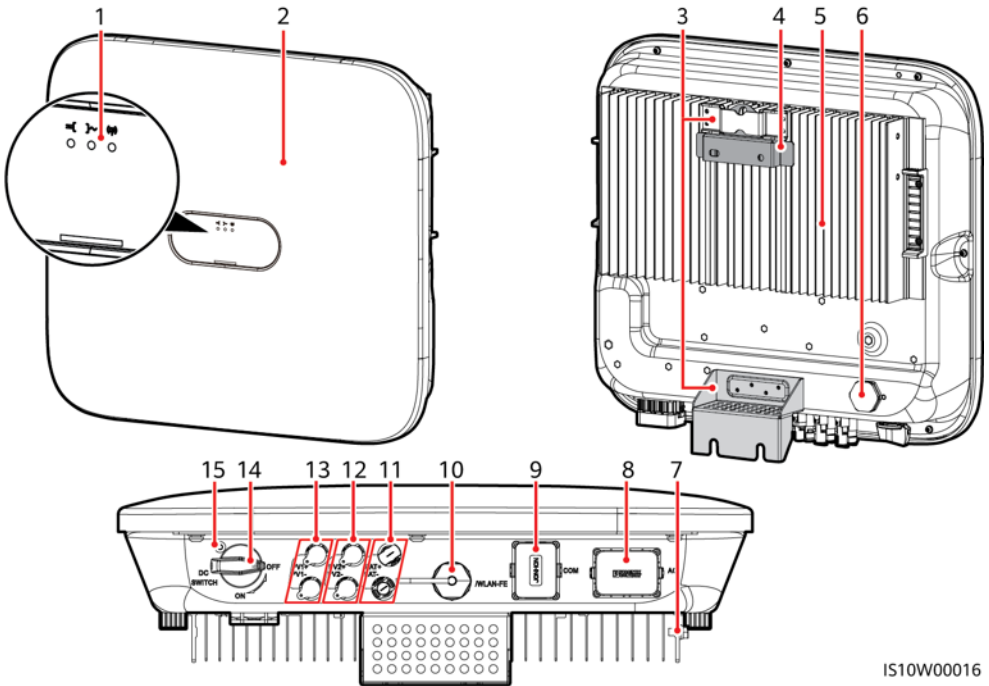
Part Number: 31500JJ

Date: 2023-08-23

NOTICE

1. The information in this document is subject to change due to version upgrades or other reasons. 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, closely read the user manual to get familiar with product information and safety precautions.
3. Only qualified and trained electrical technicians are allowed to operate the device. Operation personnel should understand the composition and working principles of the grid-tied PV power system and local regulations.
4. Before installing the device, check that the package contents are intact and complete against the packing list. If any damage is found or any component is missing, contact your dealer.
5. Use insulating tools when installing the device. For personal safety, wear proper personal protective equipment (PPE).
6. The device damage caused by the violation of instructions in this document is not covered under warranty.

1 Product Description



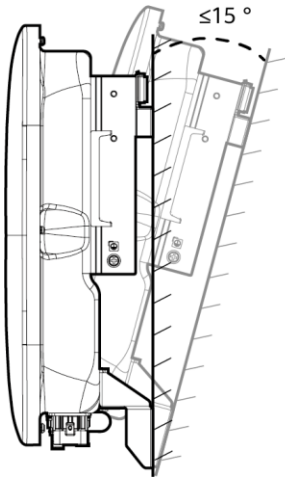
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- | | |
|-------------------------------------|-------------------------------------|
| (1) LED | (2) Front panel |
| (3) Hanging kit | (4) Mounting bracket |
| (5) Heat sink | (6) Ventilation valve |
| (7) Ground screw | (8) AC output port (AC) |
| (9) Communication port (COM) | (10) Smart Dangle port (WLAN-FE) |
| (11) Battery terminals (BAT+/BAT-) | (12) DC input terminals (PV2+/PV2-) |
| (13) DC input terminals (PV1+/PV1-) | (14) DC switch (DC SWITCH) |
| (15) Screw hole for the DC switch | |

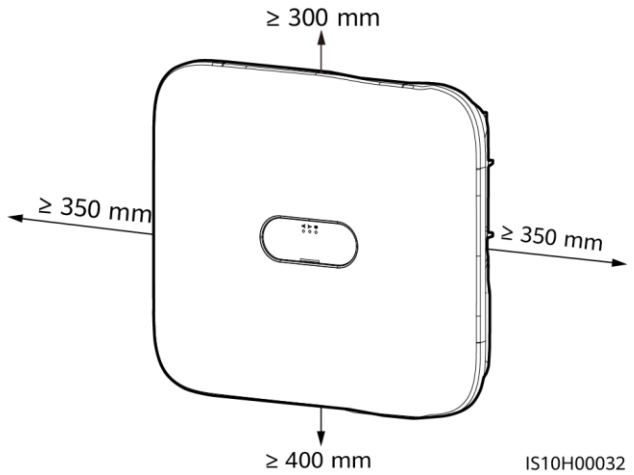
2 Installing the Equipment

2.1 Installation Requirements

Angle

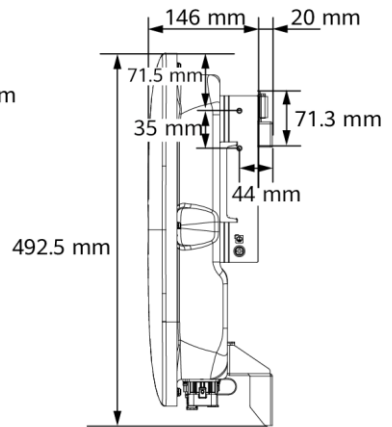
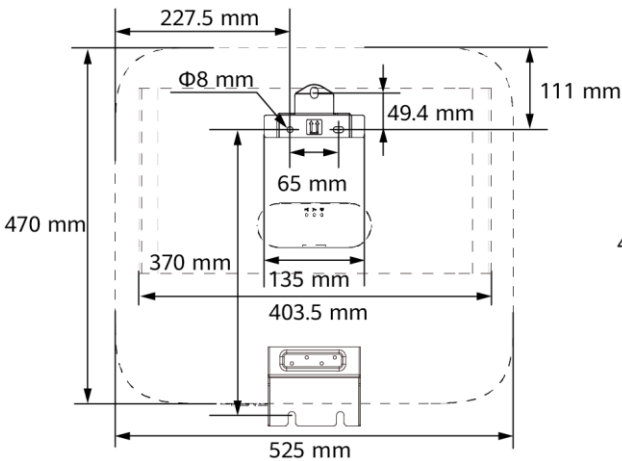


Space



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Dimensions



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NOTE

Two M6 screw holes are reserved on both left and right sides of the inverter for installing an awning.

2.2 Installing the Inverter

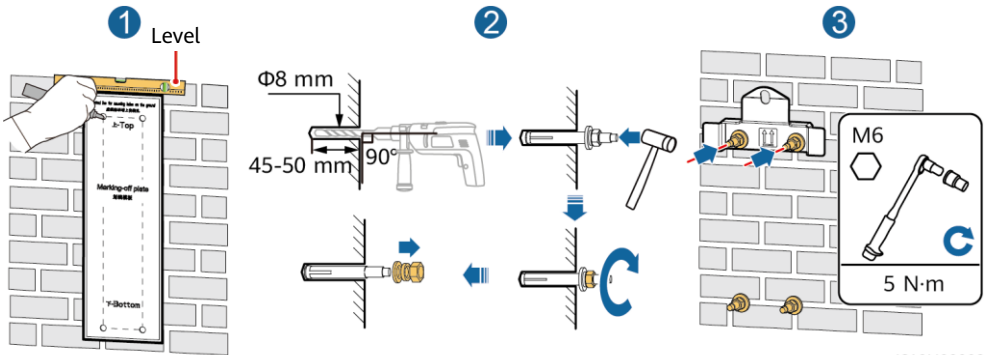
DANGER

When drilling holes, avoid the water pipes and power cables buried in the wall.

1. Install the mounting bracket.

NOTE

- M6x60 expansion bolts are delivered with the inverter. If the length and number of the bolts do not meet installation requirements, prepare M6 stainless steel expansion bolts by yourself.
- The expansion bolts delivered with the inverter are used for solid concrete walls. For other types of walls, prepare bolts by yourself and ensure that the wall meets the load bearing requirements of the inverter.
- Loosen the nuts, flat washers, and spring washers of the two expansion bolts.

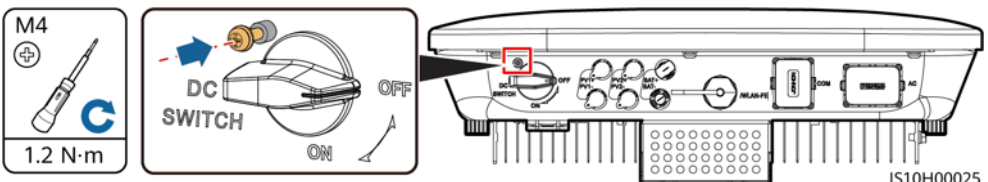


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2. (Optional) Install the screw for locking the DC switch.

NOTE

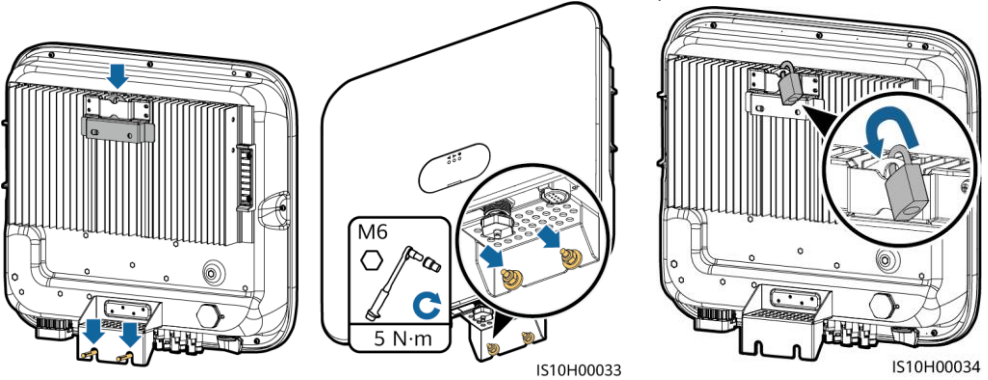
- The screws for DC switches are delivered with solar inverters. According to Australian standards, the screws are used to secure DC switches (DC SWITCH) to prevent them from being turned on by mistake.
- For the model used in Australia, perform this step to meet the local standards.



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3. Install the inverter on the mounting bracket.

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



NOTE

Prepare an anti-theft lock suitable for the lock hole diameter ($\Phi 8$ mm) and ensure that the lock can be installed successfully. An outdoor waterproof lock is recommended.

3 Electrical Connections

3.1 Preparing for Installation

WARNING

- Do not connect loads between the inverter and the AC switch that directly connects to the inverter. Otherwise, the switch may trip by mistake.
- If an AC switch is used with specifications beyond local standards, regulations, or recommendations, the switch may fail to turn off in a timely manner in case of exceptions, causing serious faults.

CAUTION

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

NOTICE

- To ensure that the inverter can be safely disconnected from the power grid when an exception occurs, connect an AC switch to the AC side of the inverter. Select an appropriate AC switch in accordance with local industry standards and regulations.
- Connect cables in accordance with the local installation laws and regulations.
- Before connecting cables, ensure that the DC switch on the inverter and all the switches connecting to the inverter are set to OFF. Otherwise, the high voltage of the inverter may result in electric shocks.

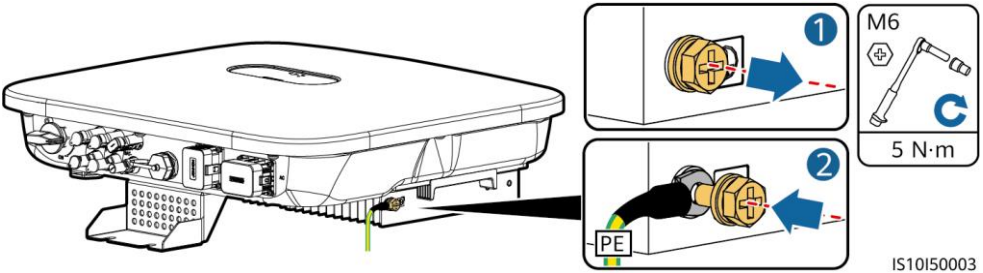
No.	Item	Type	Specifications
1	PE cable	Single-core outdoor copper cable	Conductor cross-sectional area $\geq 4 \text{ mm}^2$
2	AC output power cable	Outdoor copper cable	<ul style="list-style-type: none"> • Conductor cross-sectional area: 4–6 mm^2 • Cable outer diameter: 10–21 mm

No.	Item	Type	Specifications
3	DC input power cable and (optional) battery cable	Standard outdoor PV cable in the industry (recommended model: PV1-F)	<ul style="list-style-type: none"> • Conductor cross-sectional area: 4–6 mm² • Cable outer diameter: 5.5–9 mm
4	(Optional) RS485 communications cable (used to cascade inverters)	Two-core outdoor shielded twisted pair cable	<ul style="list-style-type: none"> • Conductor cross-sectional area: 0.2–1 mm² Note: When devices such as the Smart Power Sensor and the energy storage device are both connected to the inverter, use 0.2–0.5 mm² cords. • Cable outer diameter: 4–11 mm
5	(Optional) RS485 communications cable (used to connect to the RS485 signal port on devices such as the Smart Power Sensor and the energy storage device)		
6	(Optional) Rapid shutdown switch signal cable		
7	AC switch	Recommended: three-phase AC circuit breaker	<p>Rated voltage ≥ 380 V AC</p> <p>Rated current:</p> <ul style="list-style-type: none"> • 16 A (Smart Solar Inverter 3KTL–6KTL) • 25 A (Smart Solar Inverter 8KTL–10KTL)

3.2 Installing the PE Cable

DANGER

Do not connect the neutral wire to the enclosure as a PE cable. Otherwise, electric shocks may occur.



NOTE

- The PE point at the AC output port is used only as a PE equipotential point, and cannot substitute for the PE point on the enclosure.
- It is recommended that silica gel or paint be used around the ground terminal after the PE cable is connected.

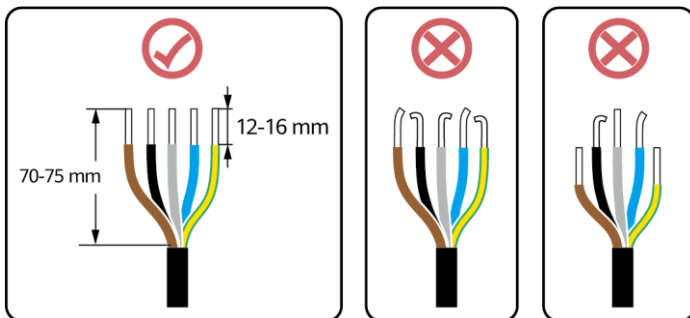
3.3 Installing the AC Output Power Cable

NOTICE

Ensure that the protection layer of the AC output power cable is inside the connector, the core wires are totally inserted into the cable hole, and the cable is connected securely. Failing to do so may cause device malfunction or damage.

1. Connect the AC output power cable to the AC connector.

Stripping requirements

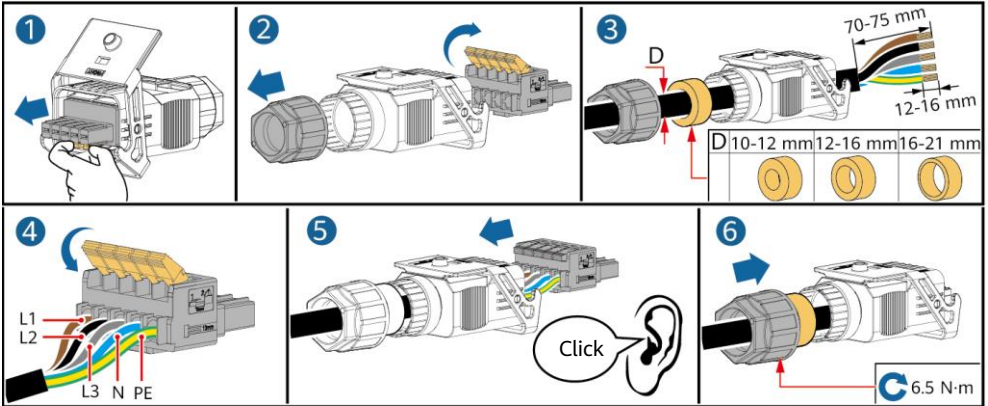


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Five-Core Cable (L1, L2, L3, N, and PE)

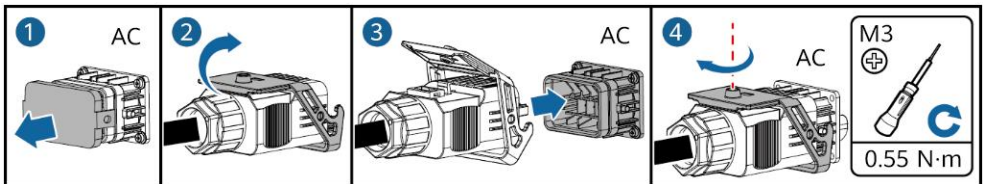
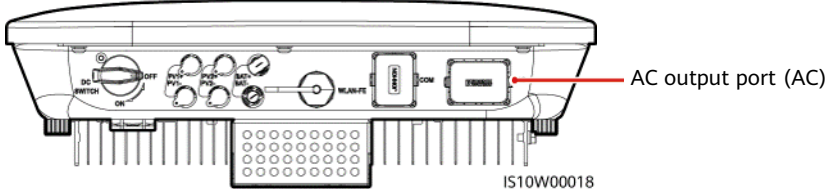
NOTE

- This section describes how to connect a five-core AC output power cable to an AC connector.
- A three-core AC output power cable can be connected similarly. The three-core cable (L1, L2, and L3) is not connected to the neutral wire or PE wire.
- A four-core or five-core AC output power cable can be connected similarly. The four-core cable (L1, L2, L3, and PE) is not connected to the N wire, and the four-core cable (L1, L2, L3, and N) is not connected to the PE wire.



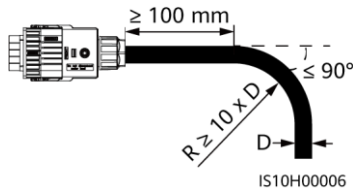
2. Connect the AC connector to the AC output port.

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3. Check the route of the AC output power cable.

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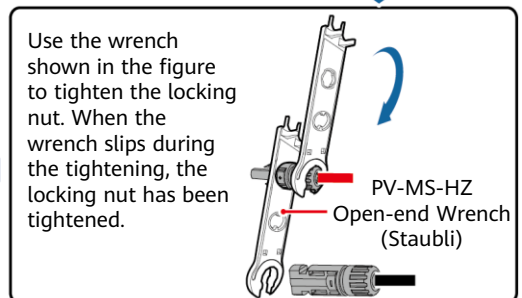
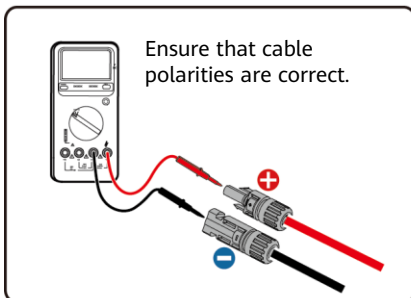
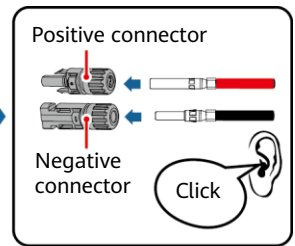
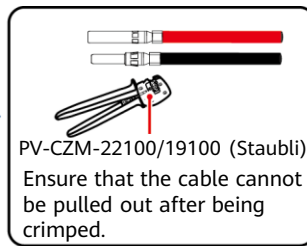
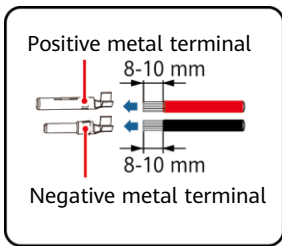
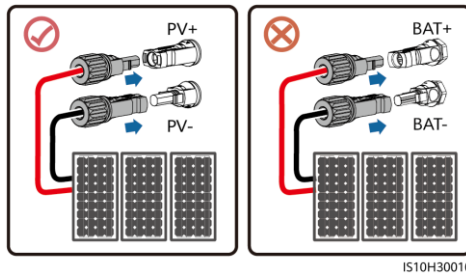
3.4 Installing the DC Input Power Cable

NOTICE

1. Ensure that the PV module output is well insulated to ground.
2. Use the Staubli MC4 positive and negative metal terminals and DC connectors supplied with the solar inverter. Using incompatible positive and negative metal terminals and DC connectors may result in serious consequences. The caused device damage is not covered under warranty.
3. The DC input voltage of the Smart Solar Inverter shall not exceed 1100 V DC under any circumstance.
4. Before installing the DC input power cable, label the cable polarities to ensure correct cable connections.
5. If the DC input power cable is reversely connected, do not operate the DC switch as well as positive and negative connectors immediately. Failing to do so may cause device damage, which is not covered under any warranty. Wait until the night when solar irradiance declines and the PV string current drops to below 0.5 A. Then set the DC switch to the OFF position, remove the positive and negative connectors, and correct the polarities of the DC input power cable.

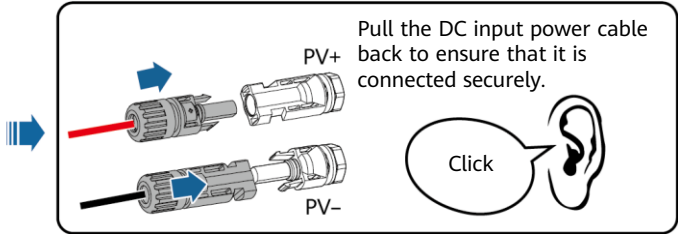
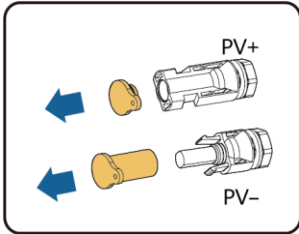
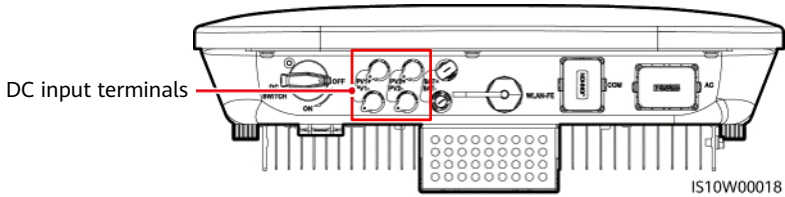
1. Assemble DC connectors.

Correct wiring terminals



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2. Connect DC input power cables.



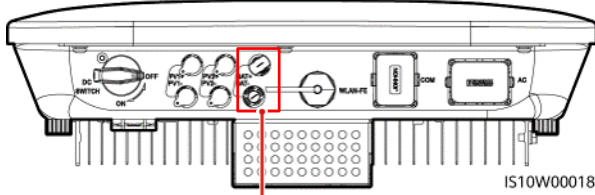
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3.5 (Optional) Installing Battery Cables

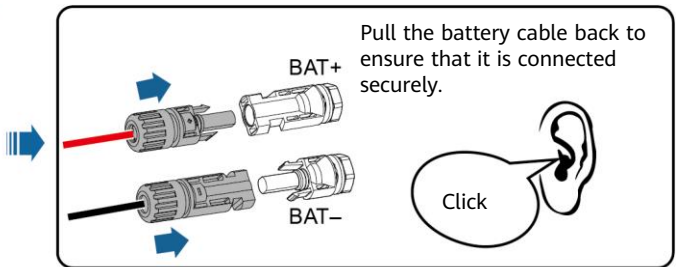
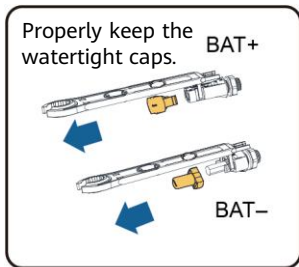
⚠ DANGER

- Use insulated tools when connecting cables.
- Connect battery cables with correct polarity. If battery cables are reversely connected, the solar inverter may be damaged.

Assemble the positive and negative connectors by following the instructions in section 3.4 "Installing DC Input Power Cables."



Battery terminals (BAT+/BAT-)

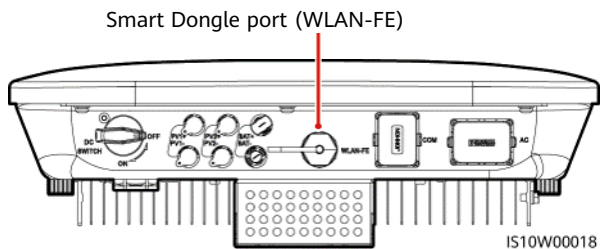


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3.6 Installing the Smart Dongle

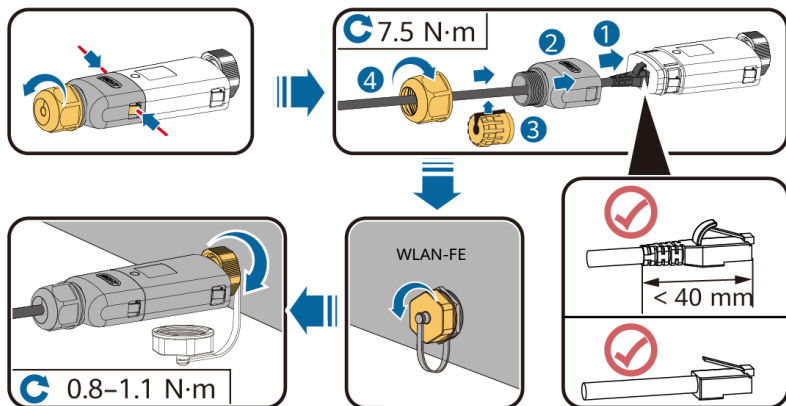
NOTE

If FE communication is used, install a WLAN-FE Smart Dongle. The WLAN-FE Smart Dongle is delivered with the Smart Solar Inverter.



WLAN-FE Smart Dongle (FE Communication)

You are advised to use a CAT 5E outdoor shielded network cable (outer diameter < 9 mm; internal resistance $\leq 1.5 \Omega/10 \text{ m}$) and shielded RJ45 connectors.



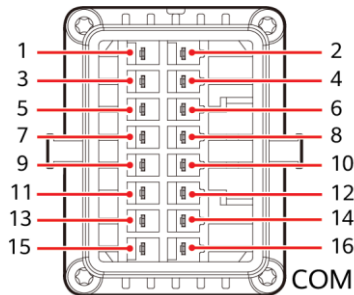
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3.7 (Optional) Installing the Signal Cable

NOTICE

- Not all inverter models are delivered with the signal cable connector.
- When laying out the signal cable, separate it from the power cable and keep it away from strong interference sources to avoid strong communication interference.
- Ensure that the protection layer of the cable is inside the connector, surplus core wires are cut off from the protection layer, the exposed core wire is totally inserted into the cable hole, and that the cable is connected securely.
- If the Smart Dongle is configured, you are advised to install the Smart Dongle before connecting the signal cable.

Communications Port Pin Definition



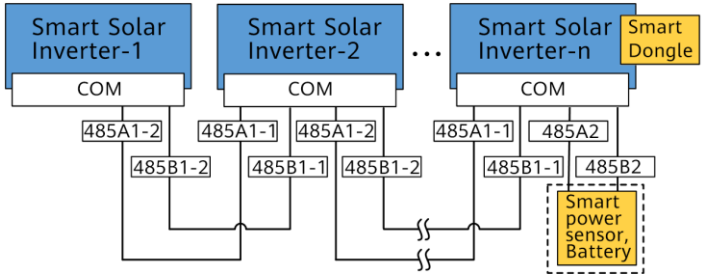
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NOTE

- When the RS485 communications cables of devices such as the Smart Power Sensor and the energy storage device are both connected to the inverter, 485A2 (pin 7), 485B2 (pin 9), and PE (pin 5) are shared.
- When the enable signal cable of the energy storage device and the signal cable of the rapid shutdown switch are both connected to the inverter, GND (pin 13) is shared.

Pin	Definition	Function	Description	Pin	Definition	Function	Description
1	485A1-1	RS485A, RS485 differential signal+	Used to cascade inverters	2	485A1-2	RS485A, RS485 differential signal+	Used to cascade inverters
3	485B1-1	RS485B, RS485 differential signal-		4	485B1-2	RS485B, RS485 differential signal-	
5	PE	Shielding ground	N/A	6	PE	Shielding ground	N/A
7	485A2	RS485A, RS485 differential signal+	Used to connect to the RS485 signal port on devices such as the Smart Power Sensor and the energy storage device	8	DIN1	Digital input signal 1+	Dry contact for grid scheduling
9	485B2	RS485B, RS485 differential signal-		10	DIN2	Digital input signal 2+	
11	EN	Enabling signal	Used to connect to the enable signal port on an energy storage device	12	DIN3	Digital input signal 3+	Dry contact for grid scheduling
13	GND	GND	Used to connect to the rapid shutdown DI signal port or serve as a port for the signal cable of the NS protection.	14	DIN4	Digital input signal 4+	
15	DIN5	Rapid shutdown signal+		16	GND	GND of DIN1/DIN2/DIN3/DIN4	Used to connect to the GND of DIN1/DIN2/DIN3/DIN4

Smart Dongle Networking Scenario

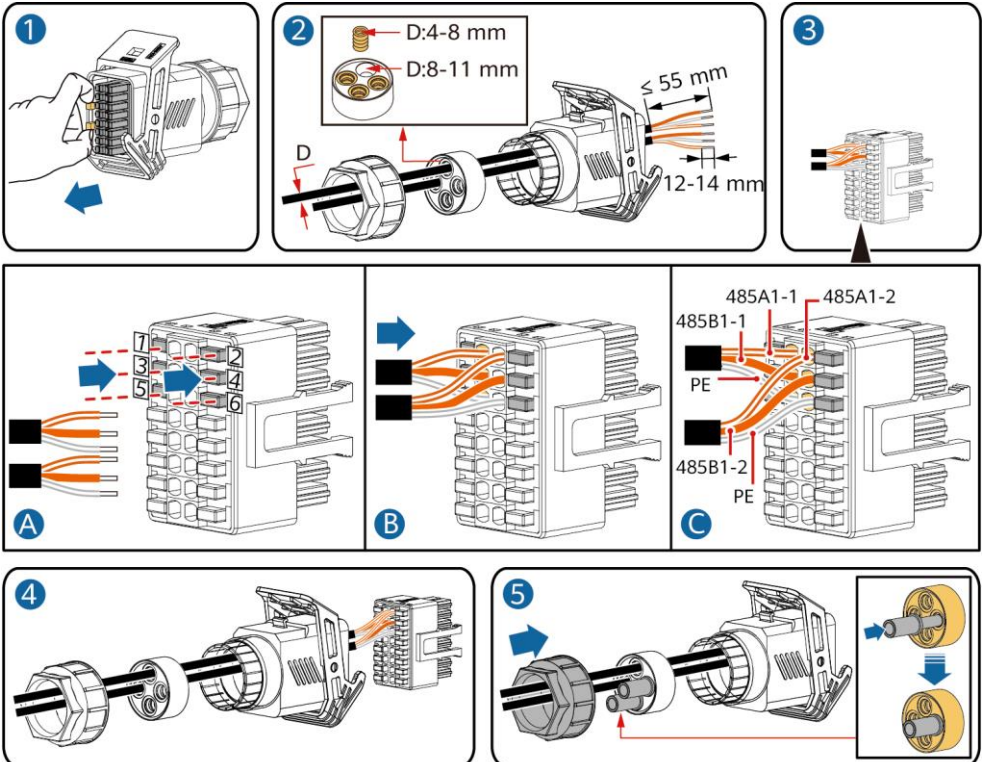


NOTE

- The Smart Power Sensor is necessary for export limitation. The DTSU666-H, DTSU666-HW or YDS60-80 Smart Power Sensor can be used.
- A maximum of 10 devices can be connected to the WLAN-FE Smart Dongles. The Smart Power Sensors connected to the RS485A2 and RS485B2 ports are not included.
- If a battery is connected, a maximum of three inverters can be cascaded. Any one of the inverters can be connected to the battery. (The inverter connected to the Smart Dongle must be connected to the battery.)

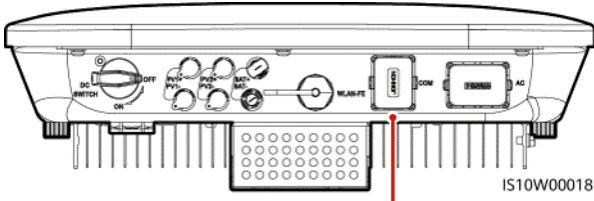
(Optional) Installing the RS485 Communications Cable (Inverter Cascading)

1. Connect the signal cable to the signal cable connector.



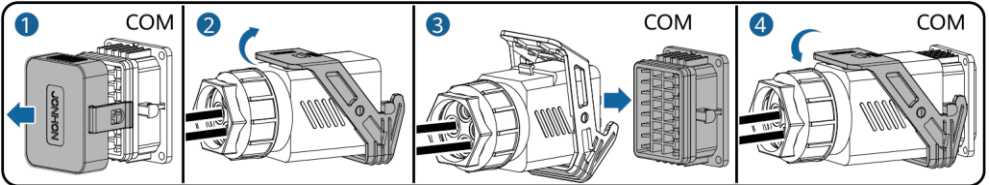
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2. Connect the signal cable connector to the communication port.



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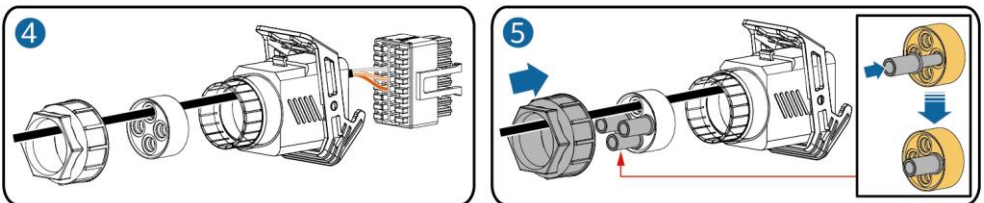
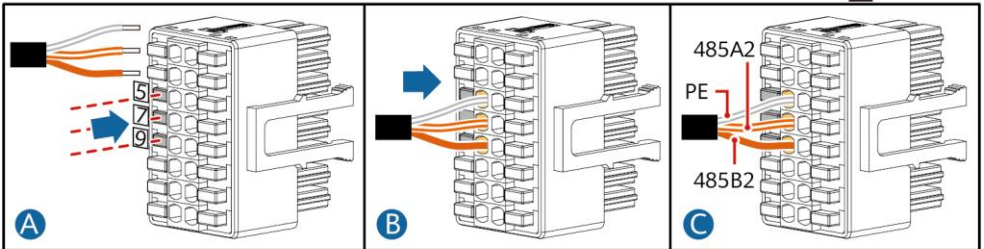
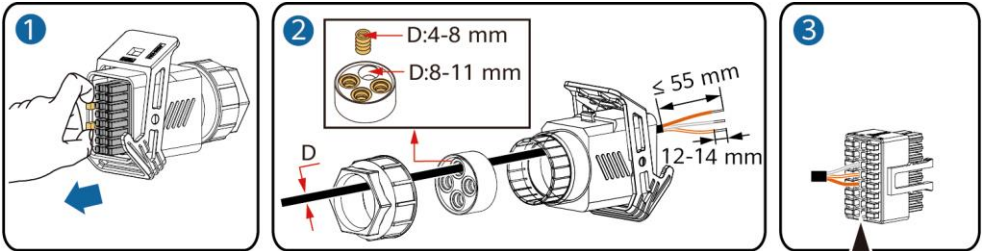
Communications port (COM)



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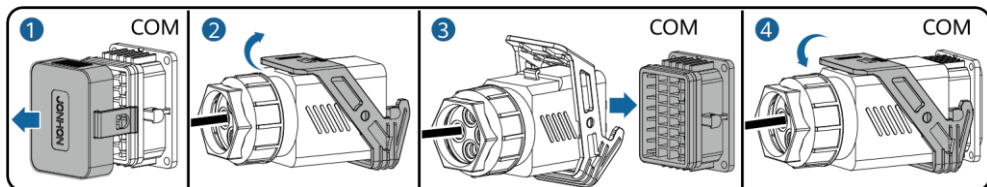
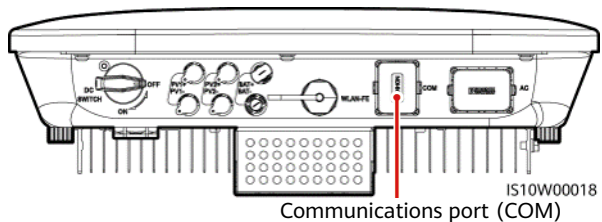
(Optional) Installing the RS485 Communications Cable (Only Smart Power Sensor Connected)

1. Connect the signal cable to the signal cable connector.



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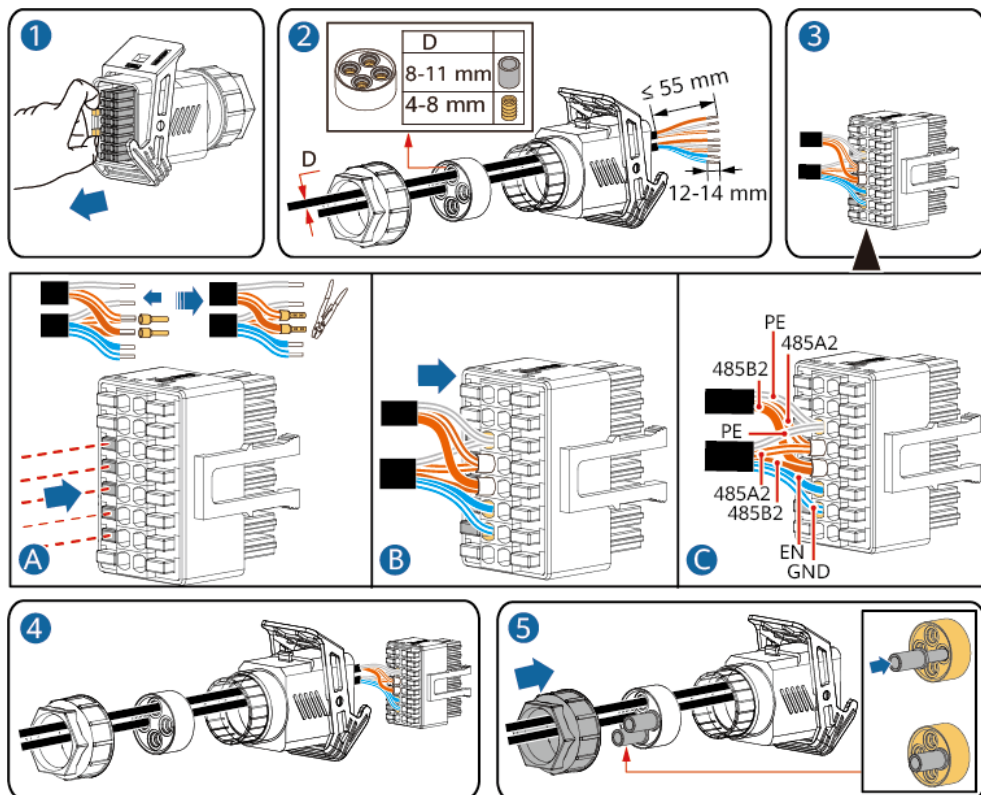
2. Connect the signal cable connector to the communication port.



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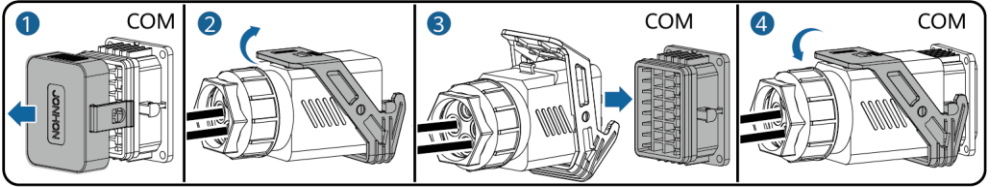
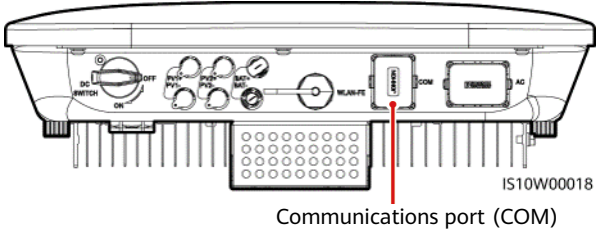
(Optional) Installing the RS485 Communications Cable (Smart Power Sensor and Energy Storage Device Connected)

1. Connect the signal cable to the signal cable connector.



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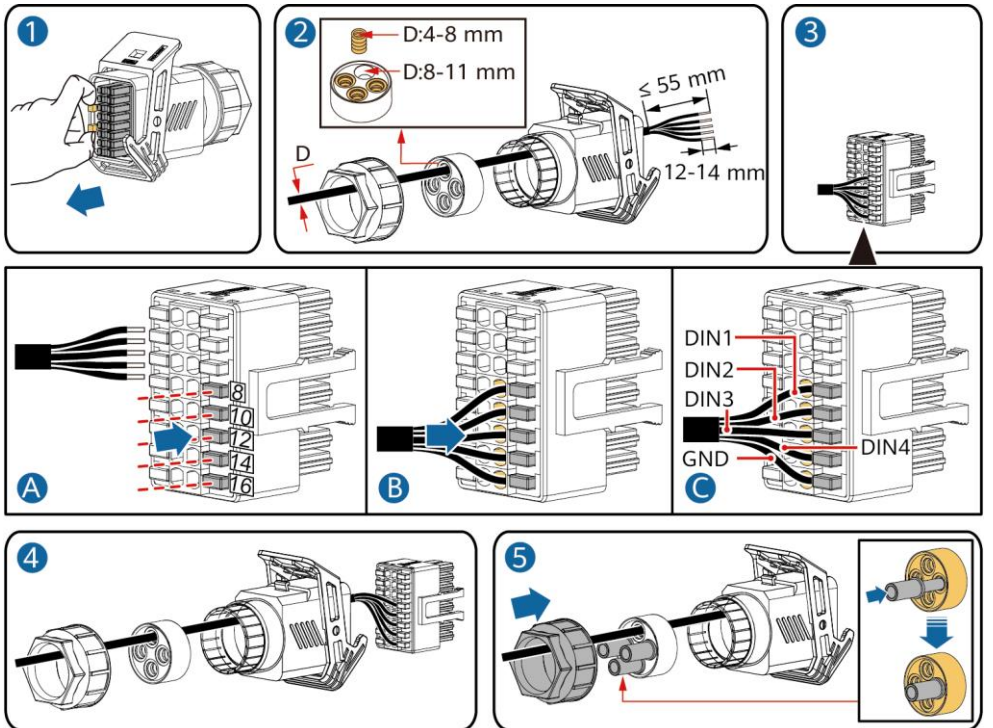
2. Connect the signal cable connector to the Communication port.



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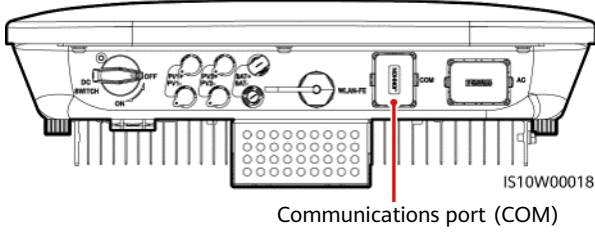
(Optional) Installing the Grid Scheduling Dry Contact Signal Cable

1. Connect the signal cable to the signal cable connector.

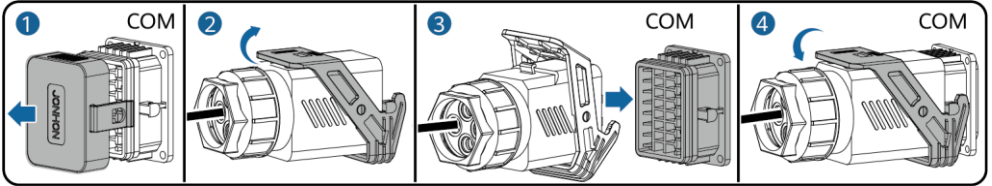


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2. Connect the signal cable connector to the Communication port.



Communications port (COM)



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4 Verifying Installation

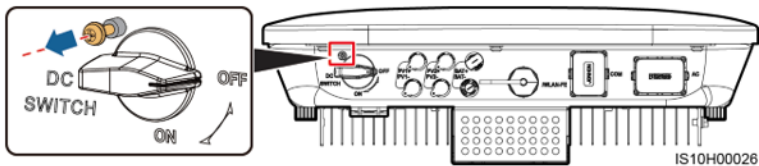
No.	Acceptance Criteria
1	The inverter is installed correctly and securely.
2	Cables are routed properly as required by the customer.
3	The Smart Dongle is installed correctly and securely.
4	Cable ties are evenly distributed and no burr exists.
5	The PE cable is connected correctly, securely, and reliably.
6	The DC switch and all the switches connected to the inverter are set to the OFF position.
7	The AC output power cable, DC input power cable, battery cable, and signal cable are connected correctly and securely.
8	Unused terminals and ports are locked by watertight caps.
9	The installation space is proper, and the installation environment is clean and tidy.

5 Powering On the System







NOTICE

- Before turning on the AC switch between the solar inverter and the power grid, check that the AC voltage is within the specified range using a multimeter set to the AC position.
- If the solar inverter is connected to a battery, turn on the DC switch within 1 minute after turning on the AC switch. If you turn on the DC switch after more than 1 minute, the solar inverter will shut down and start again.

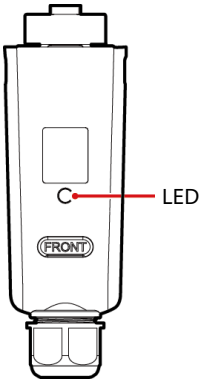
1. If a battery is connected, turn on the battery switch.
2. Turn on the AC switch between the solar inverter and the power grid.
3. (Optional) Remove the screw for locking the DC switch.



4. Turn on the DC switch (if any) between the PV string and the solar inverter.
5. Turn on the DC switch at the bottom of the solar inverter.
6. Observe the LEDs to check the operating status of the inverter.

Type	Status (Blinking at long intervals: On for 1s and then Off for 1s; Blinking at short Intervals: On for 0.2s and then Off for 0.2s)		Meaning
Running indication			N/A
	Steady green	Steady green	The solar inverter is operating in grid-tied mode.
	Blinking green at long intervals	Off	The DC is on and the AC is off.
	Blinking green at long intervals	Blinking green at long intervals	Both the DC and AC are on, and the solar inverter is not exporting power to the power grid.
	Off	Blinking green at long intervals	The DC is off and the AC is on.
	Off	Off	Both the DC and AC are off.
	Blinking red at short intervals	N/A	There is a DC environmental alarm, such as an alarm indicating that High String Input Voltage, String Reverse Connection, or Low Insulation Resistance.
	N/A	Blinking red at short intervals	There is an AC environmental alarm, such as an alarm indicating Grid Undervoltage, Grid Overvoltage, Grid Overfrequency, or Grid Underfrequency.
	Steady red	Steady red	Fault.
Communication indication			N/A
	Blinking green at short intervals		Communication is in progress.
	Blinking green at long intervals		A mobile phone is connected to the solar inverter.
	Off		There is no communication.
Device replacement indication			
	Steady red	Steady red	Steady red

7. (Optional) Observe the LED to check the operating status of the Smart Dongle.



LED		Description
Color	Status	
Yellow (blinking green and red simultaneously)	Steady on	The Dongle is secured and powered on.
Red	Blinking at short intervals (on for 0.2s and then off for 0.2s)	The parameters for connecting to the router are to be set.
Green	Blinking at long intervals (on for 0.5s and then off for 0.5s)	Connecting to the router
Green	Steady on	Successfully connected to the management system.
Green	Blinking at short intervals (on for 0.2s and then off for 0.2s)	The inverter is communicating with the management system through the Dongle.

6 Commissioning

NOTE

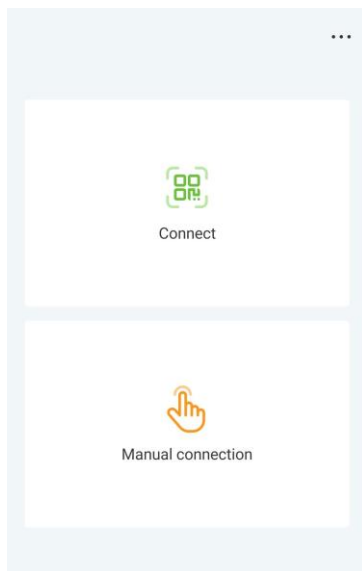
- The screenshots are for reference only. The actual screens may vary.
- Obtain the initial password for connecting to the solar inverter WLAN from the label on the side of the solar inverter.
- Set the password at the first login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the password may cause password disclosure. A password left unchanged for a long period of time may be stolen or cracked. If a password is lost, devices cannot be accessed. In these cases, the user is liable for any loss caused to the PV plant.

6.1 Downloading the App

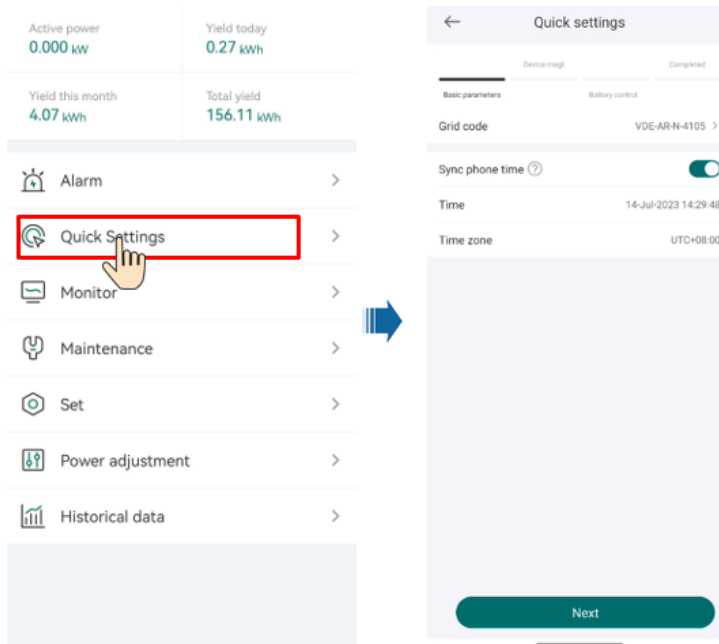
Search for **HiSolar** on Google Play and download the latest installation package.

6.2 Connecting to the Inverter

1. You can connect to the inverter by scanning the QR code or choosing manual connection on the app.
 - Scanning the QR code: Tap **Connect** and scan the QR code of the inverter to automatically connect to the inverter.
 - Manual connection: Tap **Manual connection**, select **WLAN connection**, and connect to the corresponding WLAN hotspot in the WLAN list on the app. The initial name of the WLAN hotspot is the inverter SN, and the initial password is **ChangeMe**.



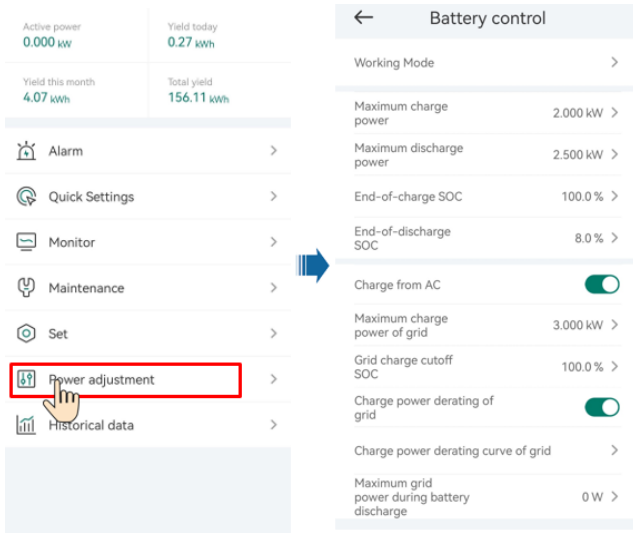
2. Log in as an **Installer**. Set the login password upon the first login.
3. Set parameters as prompted on the **Quick settings** screen.



6.3 Setting Battery Parameters

If the solar inverter connects to batteries, set battery parameters.

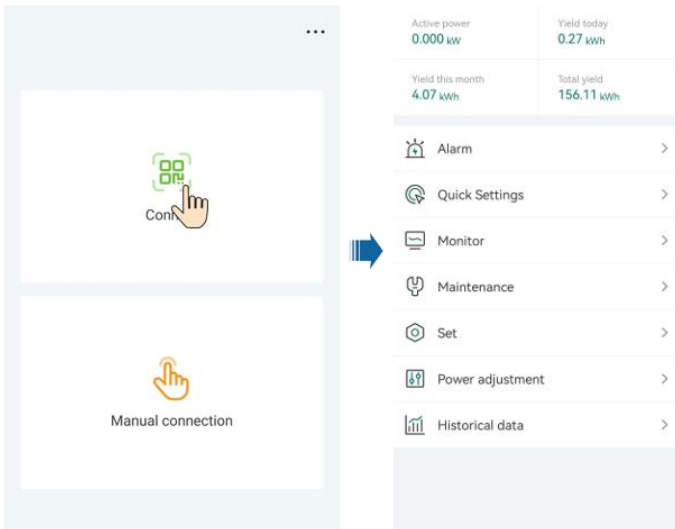
1. Log in to the **HiSolar** app and the device commissioning screen (Refer to 7.1 Device Commissioning.) is displayed.
2. Choose **Power adjustment > Battery control** and set battery parameters, including **Charge from AC, Working Mode (Maximum self-consumption, TOU, Fully fed to grid)**, and so on.







7 FAQ

7.1 Device Commissioning

Connect to the solar inverter WLAN and log in as **installer** to access the device commissioning screen.



7.2 Resetting the Password

1. Ensure that the Smart Solar Inverter connects to the AC and DC power supplies at the same time. Indicators  and  are steady green or blink at long intervals for more than 3 minutes.
2. Perform the following operations within 3 minutes:
 - a. Turn off the AC switch and set the DC switch at the bottom of the Smart Solar Inverter to OFF. If the Smart Solar Inverter connects to batteries, turn off the battery switch. Wait until all the LED indicators on the Smart Solar Inverter panel turn off.
 - b. Turn on the AC switch and set the DC switch to ON. Ensure that the indicator  is blinking green at long intervals.
 - c. Turn off the AC switch and set the DC switch to OFF. Wait until all LED indicators on the Smart Solar Inverter panel are off.
 - d. Turn on the AC switch and set the DC switch to ON.
3. Reset the password within 10 minutes. (If no operation is performed within 10 minutes, all inverter parameters remain unchanged.)
 - a. Wait until the indicator  blinks green at long intervals.
 - b. Obtain the initial WLAN hotspot name (SSID) and initial password (PSW) from the label on the side of the Smart Solar Inverter and connect to the app.
 - c. On the login screen, set a new login password and log in to the app.
4. Set router parameters.

