

## Smart PV Single-phase Inverter (2kW-6kW)

# Quick Guide

Issue: 01

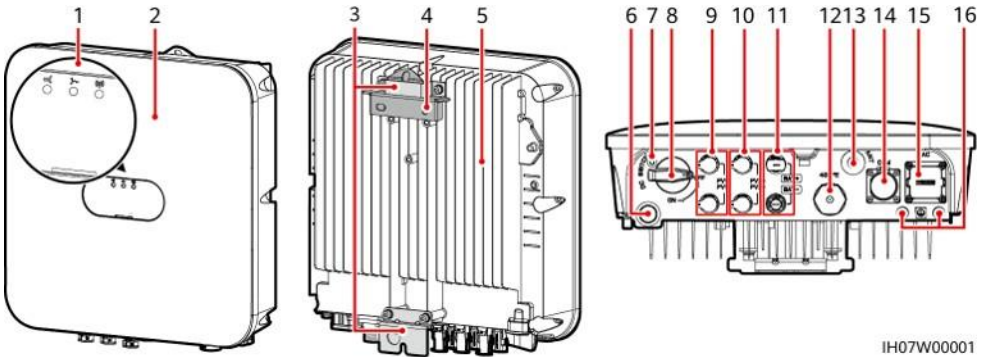
Part Number: 31500JJH

Date: 2023-08-23

## 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, closely read the user manual to get familiar with product information and safety precautions.
3. Only certified electricians are allowed to operate the device. Operation personnel must wear proper personal protective equipment (PPE).
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. The device damage caused by the violation of instructions in this document is not covered under warranty.
6. The cable colors involved in this document are for reference only. Select cables in accordance with local cable specifications.

## I Overview



IH07W00001

- |   |  |
|---|--|
| (1) LED indicators                            | (2) Front panel                        |
| (3) Hanging kit                               | (4) Mounting bracket                   |
| (5) Heat sink                                 | (6) Ventilation valve                  |
| (7) Screw hole for the DC switch <sup>a</sup> | (8) DC switch <sup>b</sup> (DC SWITCH) |
| (9) DC input terminals (PV1+/PV1-)            | (10) DC input terminals (PV2+/PV2-)    |
| (11) Battery terminals (BAT+/BAT-)            | (12) Smart Dongle port (WLAN-FE)       |
| (13) Antenna port (ANT)                       | (14) COM port (COM)                    |
| (15) AC output port (AC)                      | (16) Ground point                      |

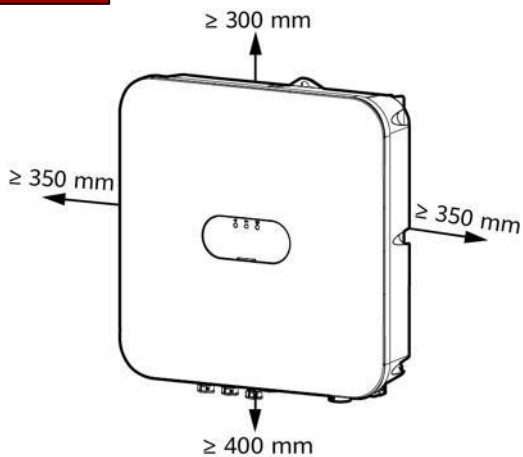
### NOTE

- a: The screw is used to secure the DC switch to prevent accidental startup. The screw is delivered with the solar inverter.
- b: DC input terminals PV1 and PV2 are controlled by the DC switch.

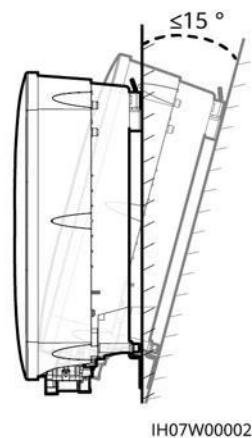
## 2 Installing the Device

### 2.1 Installation Requirements

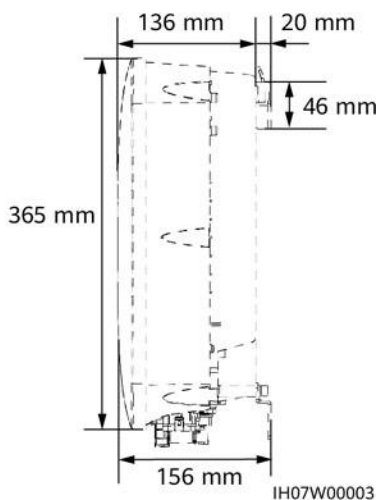
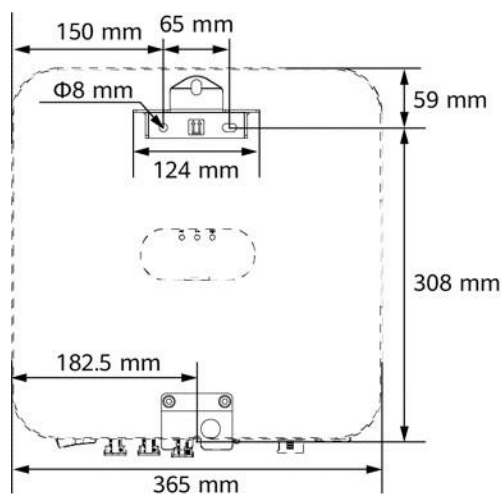
#### Space



#### Angle



#### Mounting Hole Dimensions



### 2.2 Installing the Solar Inverter

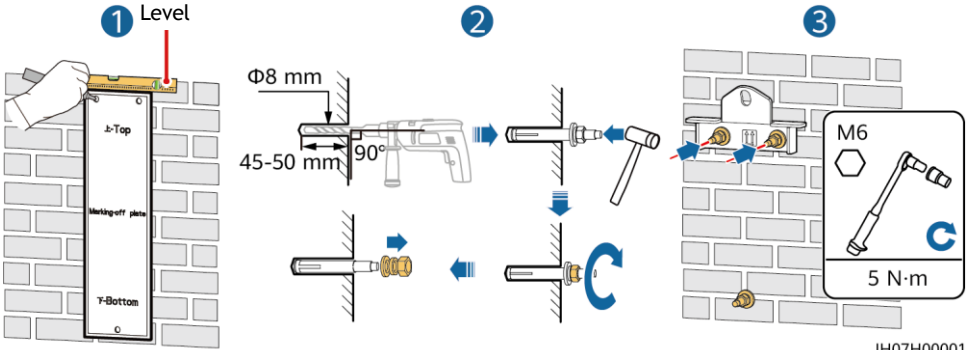
1. Install the mounting bracket.

**⚠ DANGER**

Avoid drilling holes in the water pipes and cables buried in the wall.

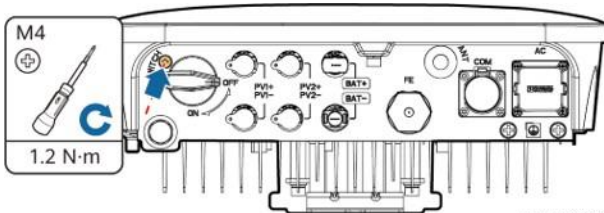
**NOTE**

- M6x60 expansion bolts are delivered with the solar 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 solar inverter are mainly 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 solar inverter.
- In residential areas, do not install the solar inverter on drywalls or walls made of similar materials which have a weak sound insulation performance because the noise generated by the solar inverter is noticeable.
- Loosen the nut, flat washer, and spring washer of the expansion bolt at the bottom.



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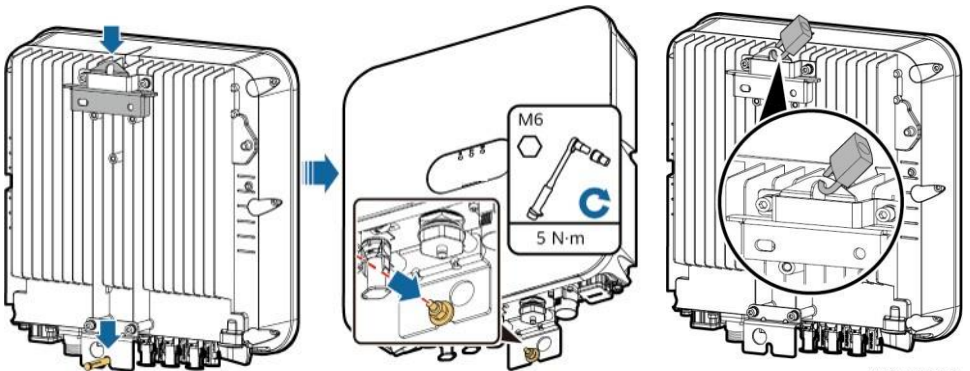
2. (Optional) Install the screw for locking the DC switch.



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3. Install the solar inverter onto the mounting bracket.

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



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IH07H00010

**NOTE**

Prepare an anti-theft lock by yourself. The lock should be suitable for the lock hole diameter (Φ10 mm) so that it can be installed successfully. An outdoor waterproof lock is recommended.

## 3 Connecting Cables

### 3.1 Preparing Cables

#### 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 of the solar inverter and all the switches connected to it are set to OFF. Otherwise, the high voltage produced by the solar inverter may cause electric shocks.

Prepare cables based on site requirements.

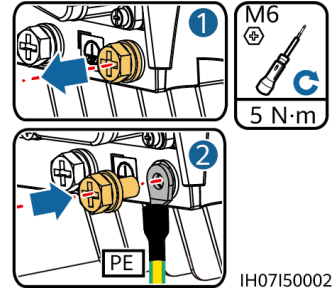
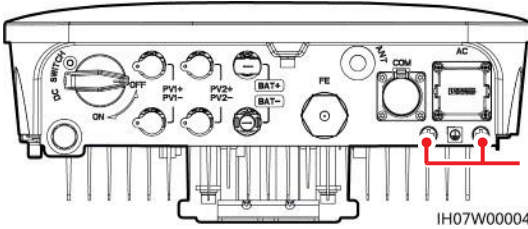
| No. | Cable   | Type   | Conductor Cross-Sectional Area Range  | Outer Diameter  |
|-----|---|--|---|---|
| 1   | Protective earthing (PE) cable                    | Single-core outdoor copper cable                                     | 4-10 mm <sup>2</sup>  | N/A   |
| 2   | AC output power cable                             | Two-core (L and N) or three-core (L, N, and PE) outdoor copper cable | 4-6 mm <sup>2</sup>   | 10-21 mm  |
| 3   | DC input power cable and (optional) battery cable | Standard outdoor PV cable in the industry                            | 4-6 mm <sup>2</sup>   | 5.5-9 mm  |
| 4   | (Optional) Signal cable                           | Outdoor shielded twisted pair cable                                  | When cables are crimped: 0.20-0.35 mm <sup>2</sup><br>When cables are not crimped: 0.20-1 mm <sup>2</sup> | <ul style="list-style-type: none"><li>• four-hole rubber plug: 4-8 mm</li><li>• two-hole rubber plug: 8-11 mm</li></ul> |

| No. | Component | Description                                    | Source   |
|-----|-----------|--|--|
| 1   | AC switch | Recommended: a single-phase AC circuit breaker | Rated voltage $\geq$ 250 V AC<br>Rated current: 32 A |

## 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.



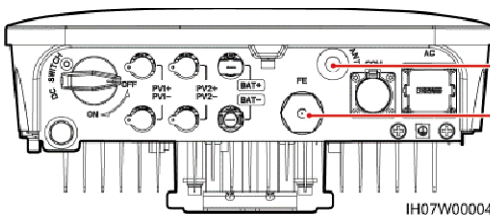
### NOTE

- 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.
- Silica gel or paint must be applied around the ground terminal after the PE cable is connected.
- It is recommended that the right ground point be used for grounding. The other ground point is reserved.

## 3.3 Installing a WLAN Antenna or Smart Dongle

### NOTE

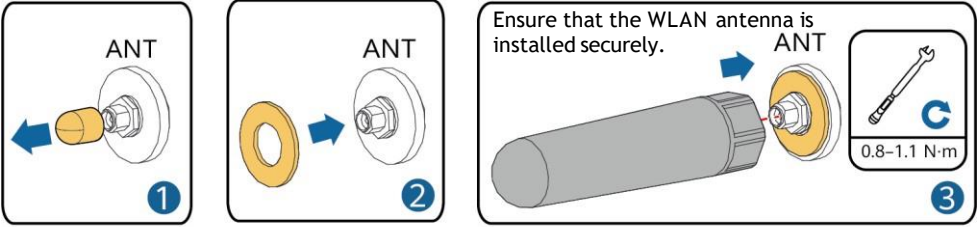
If FE communication is used, install a WLAN-FE Smart Dongle. You need to purchase the WLAN-FE Smart Dongle by yourself.



Antenna port (ANT)

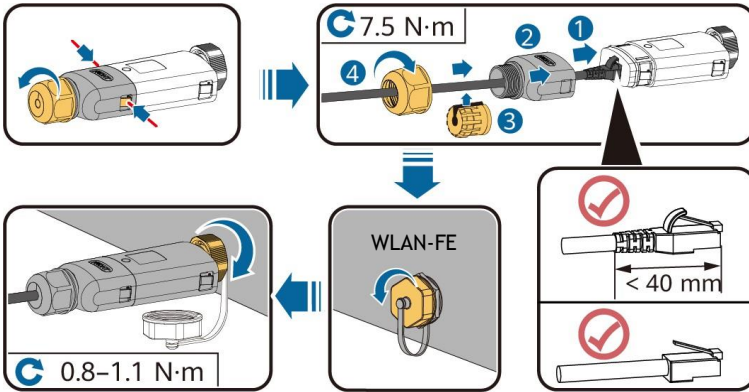
Smart Dongle port (WLAN-FE)

## WLAN Antenna (WLAN Communication)



## (Optional) WLAN-FE Smart Dongle (FE Communication)

You are advised to use a Cat 5e outdoor shielded network cable (outer diameter < 9 mm; internal resistance  $\leq 1.5$  ohms/10 m) and shielded RJ45 connectors.



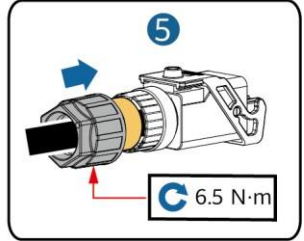
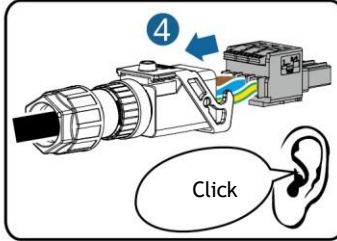
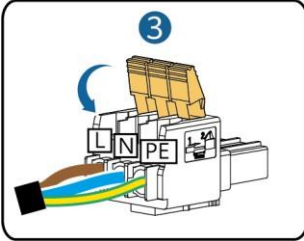
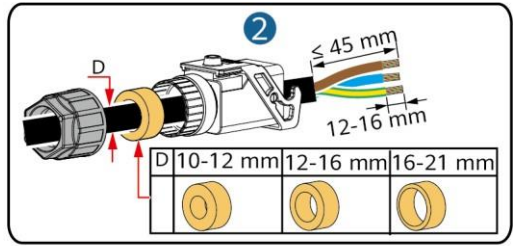
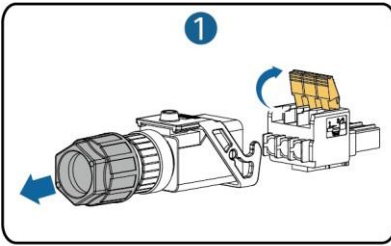
## 3.4 Installing the AC Output Power Cable

### NOTICE

Ensure that the protective layer of the AC output power cable is inside the connector, that the core wires are totally inserted into the cable hole, and that 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.

### Three-Core Cable (L, N, and PE)

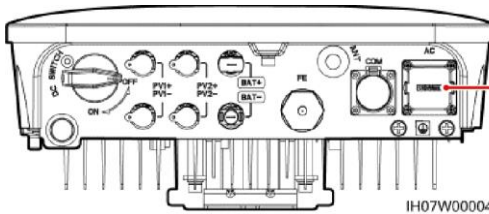


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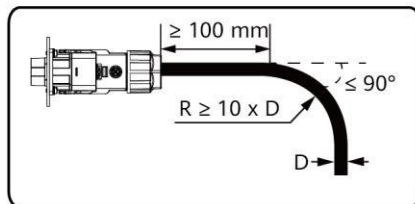
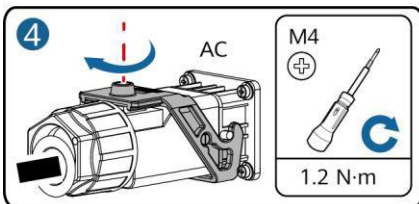
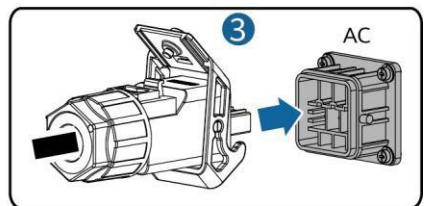
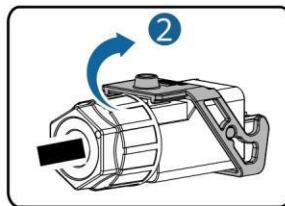
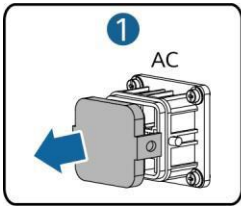
#### NOTE

The method for connecting a two-core AC output power cable is the same except that the cable is not connected to PE.

2. Connect the AC connector to the AC output port. Check the route of the AC output power cable.



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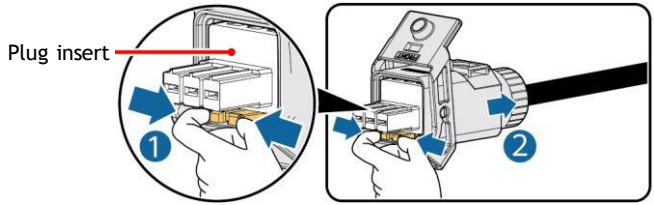


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**NOTE**

To remove the AC connector, perform the operations in reverse order of installing the AC connector. Then, remove the plug insert, as shown in the following figure.



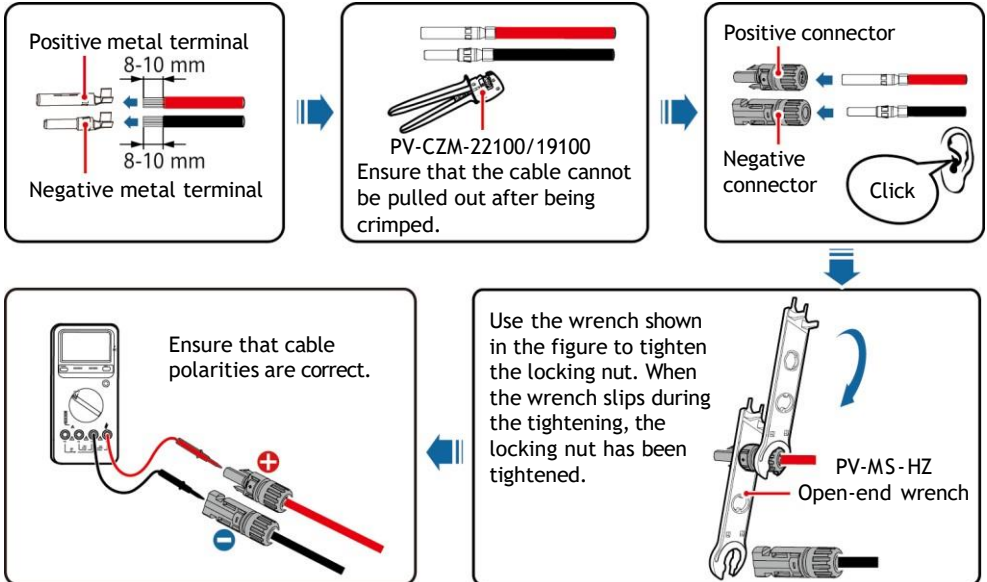
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### 3.5 Installing DC Input Power Cables

**NOTICE**

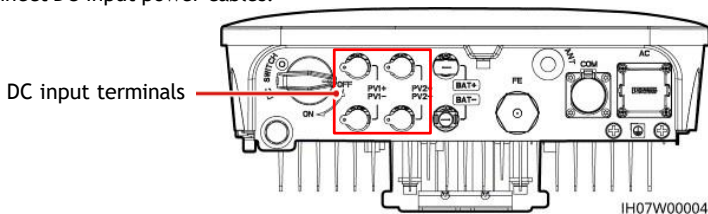
1. Ensure that the PV module output is well insulated to ground.
2. Use the Staubli MC4 positive and negative metal terminals and DC connectors supplied with the solar inverter. Using incompatible positive and negative metal terminals and DC connectors may result in serious consequences. The caused device damage is not covered under warranty.
3. The DC input voltage of the solar inverter must not exceed maximum input voltage.
4. Before installing DC input power cables, label the cable polarities to ensure correct cable connections.
5. If DC input power cables are 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 warranty. Wait until the solar irradiance declines at night and the PV string current reduces to below 0.5 A, and then turn off the DC switch and remove the positive and negative connectors. Correct the string polarity before reconnecting the PV string to the solar inverter.

1. Assemble DC connectors.

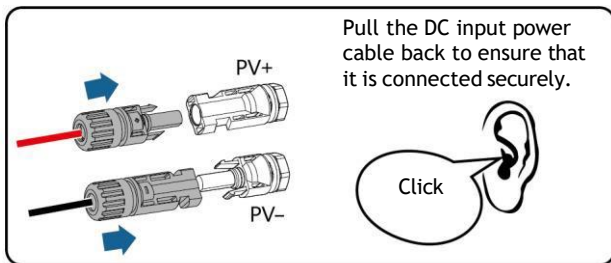
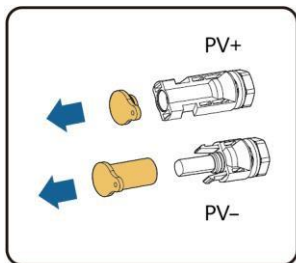


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2. Connect DC input power cables.



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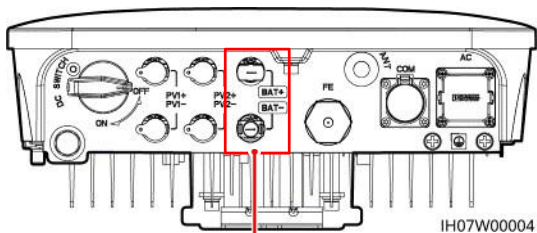
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### 3.6 (Optional) Installing Battery Cables

**DANGER**

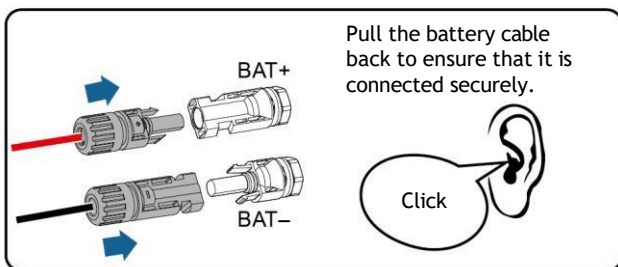
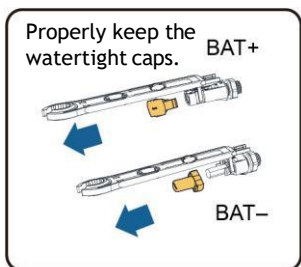
- Use insulated tools when connecting cables.
- Connect battery cables with correct polarity. If battery cables are reversely connected, the solar inverter may be damaged.

Assemble the positive and negative connectors by following the instructions in section 3.5 "Installing DC Input Power Cables."



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Battery terminals (BAT+/BAT-)

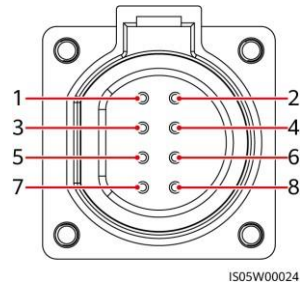
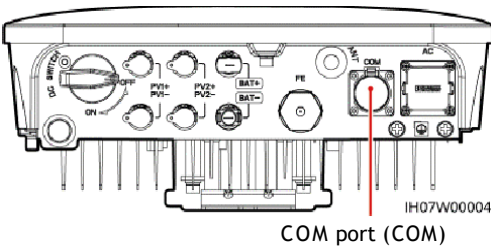


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### 3.7 (Optional) Installing Signal Cables

#### NOTICE

- When laying out a signal cable, separate it from power cables to avoid strong signal interference.
- Ensure that the protective layer of the cable is inside the connector, that excess core wires are cut off from the protection layer, that the exposed core wire is totally inserted into the cable hole, and that the cable is connected securely.
- Block the unused cable hole using a cap and tighten the cable gland.
- If more than one signal cables are required, ensure that they have the same outer diameter.

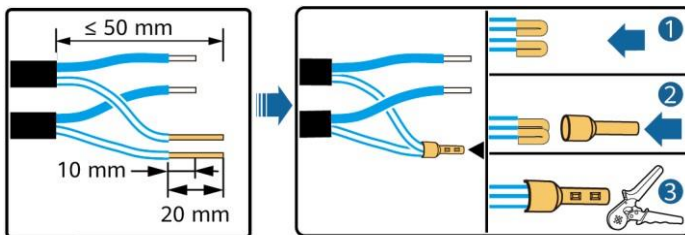


#### COM Port Pin Definitions

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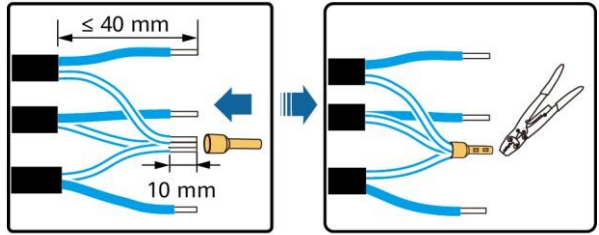
| No. | Label | Definition                           | Description  |
|-----|-------|--------------------------------------|--|
| 1   | 485B1 | RS485B, RS485 differential signal-   | Solar inverters cascading scenario: used for connecting to the solar inverters.  |
| 2   | 485A1 | RS485A, RS485 differential signal+   |  |
| 3   | 485B2 | RS485B, RS485 differential signal-   | Used for connecting to the RS485 signal ports of the battery and power meter. When both battery and power meter are configured, they need be crimped to the 485B2 and 485A2 ports. |
| 4   | 485A2 | RS485A, RS485 differential signal+   |  |
| 5   | GND   | GND of the enable signal/12V/DI1/DI2 | Used for connecting to GND of the enable signal/12V/DI1/DI2.   |
| 6   | EN+   | Enable signal+/12V+                  | Used for connecting to the enable signal of the battery and the 12V positive signal.   |
| 7   | DI1   | Digital input signal 1+              | Used to connect to the DI1 positive signal. It can be used for connecting to the DRM0 scheduling signal or serve as a port for the rapid shutdown signal.                          |
| 8   | DI2   | Digital input signal 2+              | Used to connect to the DI2 positive signal. It can serve as a port for the feedback signal of the Backup Box.  |

#### Crimping Two Signal Cables



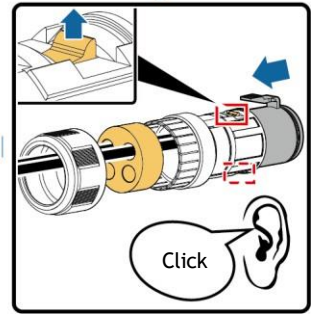
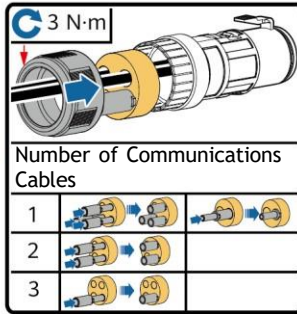
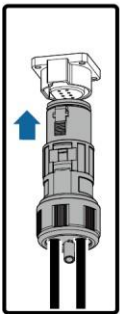
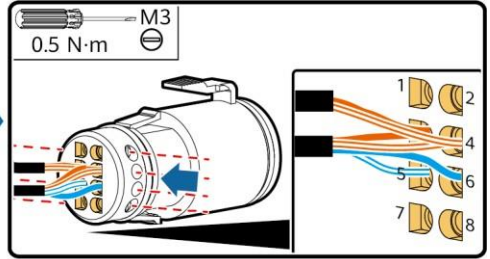
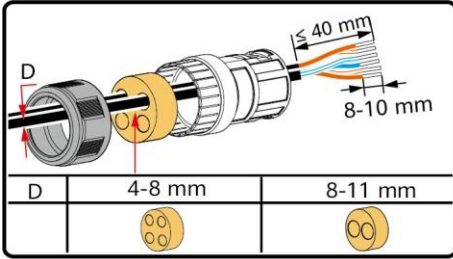
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### Crimping Three Signal Cables



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### Connecting Signal Cables



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## 4 Verifying the Installation

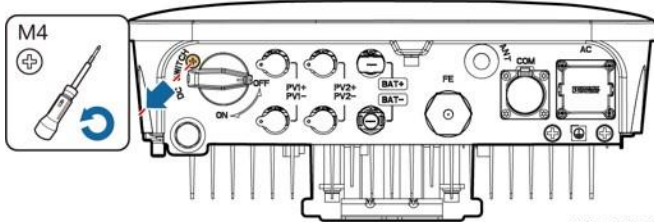
| No. | Acceptance Criteria  |
|-----|--|
| 1   | The solar inverter is installed correctly and securely.  |
| 2   | The WLAN antenna is installed correctly and securely.  |
| 3   | Cables are routed properly as required by the customer.  |
| 4   | Cable ties are evenly distributed and no burr exists.  |
| 5   | The PE cable is connected correctly and securely.  |
| 6   | The DC switch and all the switches connected to the solar inverter are set to the OFF position.          |
| 7   | The AC output power cable, DC input power cables, 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 an LG 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 AC switch at the bottom of the solar inverter.
6. Observe the LED indicators to check the operating status of the solar 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 | LED1    | LED2  | 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.  |

| 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   |
|-------------------------------|--|---|
| Communication indication      | LED3    | 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 | LED1  LED2  LED3  | N/A   |
|                               | Steady red    Steady red    Steady red   | The solar inverter hardware is faulty. The solar inverter needs to be replaced. |

## 6 Commissioning

### NOTE

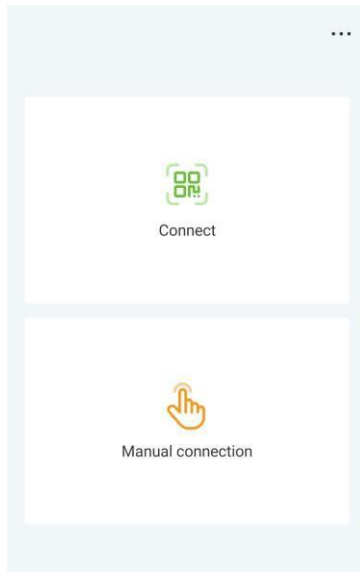
- The screenshots are for reference only. The actual screens may vary.
- Obtain the initial password for connecting to the solar inverter WLAN from the label on the side of the solar inverter.
- Set the password at the first login. To ensure account security, change the password periodically and keep 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

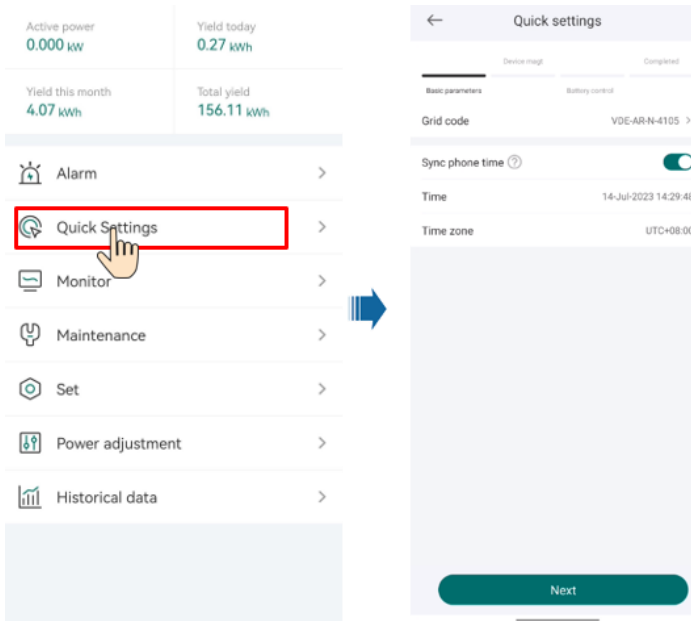
Search for **HiSolar** on Google Play and download the latest installation package.

### 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**.



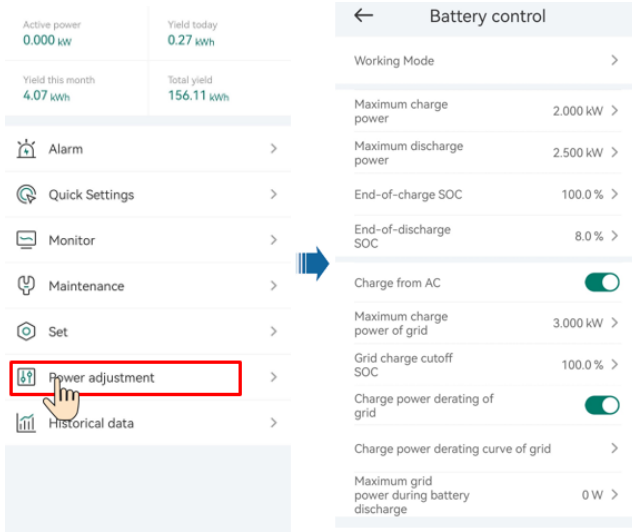
2. Log in as an **Installer**. Set the login password upon the first login.
3. Set parameters as prompted on the **Quick settings** screen.



## 6.3 Setting Battery Parameters

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

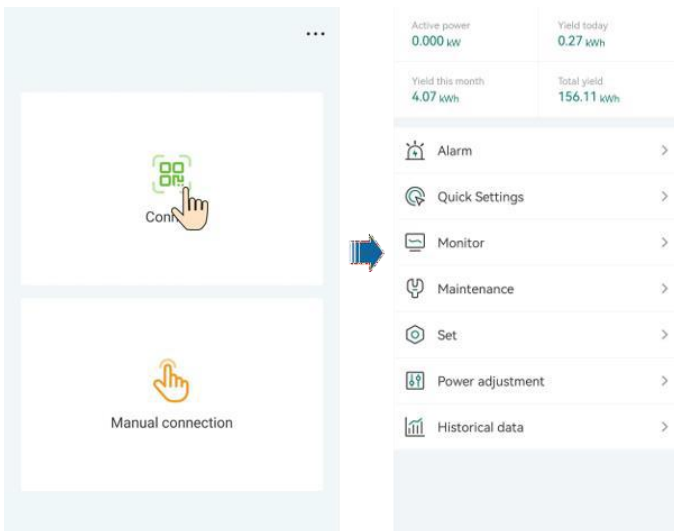
1. Log in to the **HiSolar** app and the device commissioning screen (Refer to 7.1 Device Commissioning.) is displayed.
2. Choose **Power adjustment > Battery control** and set battery parameters, including **Charge from AC, Working Mode (Maximum self-consumption, TOU, Fully fed to grid)**, and so on.



## 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.

