FusionSolar Smart PV Management System Connection

User Manual (Inverters + SDongleA)

Issue	02
Date	2021-11-25

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About This Document

Purpose

This document describes how to connect inverters to the FusionSolar Smart PV Management System through the Smart Dongle. For details about the installation of each device, see the corresponding user manual or quick guide. This document describes only cable connections between devices, power-on commissioning, and maintenance.

Intended Audience

This document is intended for photovoltaic (PV) plant operators and qualified electricians.

Symbol Conventions

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

Symbol	Remarks
DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

Symbol	Remarks
NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue 02 (2021-11-25)

Updated **2.2 Communication Networking of the SDongleA-03 (4G)**.

Updated **2.3 Communication Networking of the SDongleA-05 (WLAN-FE)**.

Updated **3.2 Installing the 4G/WLAN Smart Dongle**.

Updated **5.2 Setting Grid-tied Control Parameters**.

Issue 01 (2020-12-10)

This issue is the first official release.

Contents

1 Safety Precautions

General Safety

NOTICE

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

Follow all the safety precautions and instructions provided by Huawei. The safety precautions provided in this document do not cover all the safety precautions. Huawei shall not be liable for any consequence caused by the violation of the safety operation regulations and design, production, and usage standards.

Statement

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

- Damage caused by storage conditions that do not meet the requirements specified in related documents
- Incorrect storage, installation, or use
- Installation or use by unqualified personnel
- Failure to follow the operation instructions and safety precautions in this document
- Operation in extreme environments which are not covered in this document
- Operation of the product beyond specified parameter ranges
- Unauthorized modifications to the product or software code or removal of the product
- Equipment damage due to force majeure (such as earthquakes, fires, and storms)

- Warranty expiration without extension of the warranty service
- Installation or use in environments which are not specified in related international standards

Personnel requirement

Only certified electricians are allowed to install, connect cables for, commission, maintain, troubleshoot, and replace the equipment. Operators need to meet the following requirements:

- Be properly trained.
- Read through this manual and master related safety precautions.
- Get familiar with the safety specifications about the electrical system.
- Understand the components and functioning of a grid-tied PV power system and relevant local standards.
- Wear proper personal protective equipment (PPE) all the time.

Protecting Labels

- Do not scrawl, damage, or block any warning label on the device enclosure.
- Do not scrawl, damage, or block the nameplate on the device enclosure.

System Installation

Ensure that the equipment is installed in a well ventilated environment.

Electrical Connections

DANGER

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

- Ensure that all electrical connections comply with local electrical standards.
- Obtain approval from the local electric utility before connecting the inverter to the grid.
- Ensure that the cables used in a grid-tied PV power system are properly connected and insulated and meet specifications.

Operation

DANGER

High voltage generated by the equipment during operation may cause an electric shock, which could result in death, serious injury, or serious property damage. Perform operations in strict accordance with safety precautions specified in this document and other relevant documents.

- Do not touch an energized device, as the heat sink is hot.
- When operating the equipment, comply with local laws and regulations.

Maintenance and Replacement

DANGER

High voltage generated by the equipment during operation may cause an electric shock, which could result in death, serious injury, or serious property damage. Prior to maintenance, power off the equipment and strictly comply with the safety precautions in this document and relevant documents.

- Maintain the equipment after you get familiar with this document and prepare the tools and testing equipment.
- Before performing maintenance, power off the equipment and wait at least 5 minutes.
- Place temporary warning signs or erect fences to prevent unauthorized access to the maintenance site.
- Rectify any faults that may compromise the equipment security performance before powering on the equipment again.
- Observe ESD precautions during maintenance.

2 Introduction to the Solution

This solution mainly applies to residential or small-scale ground-mounted PV plants, in which the inverter and power meter are connected to the FusionSolar Smart PV Management System through the Smart Dongle.

Table 2-1 Smart Dongle models

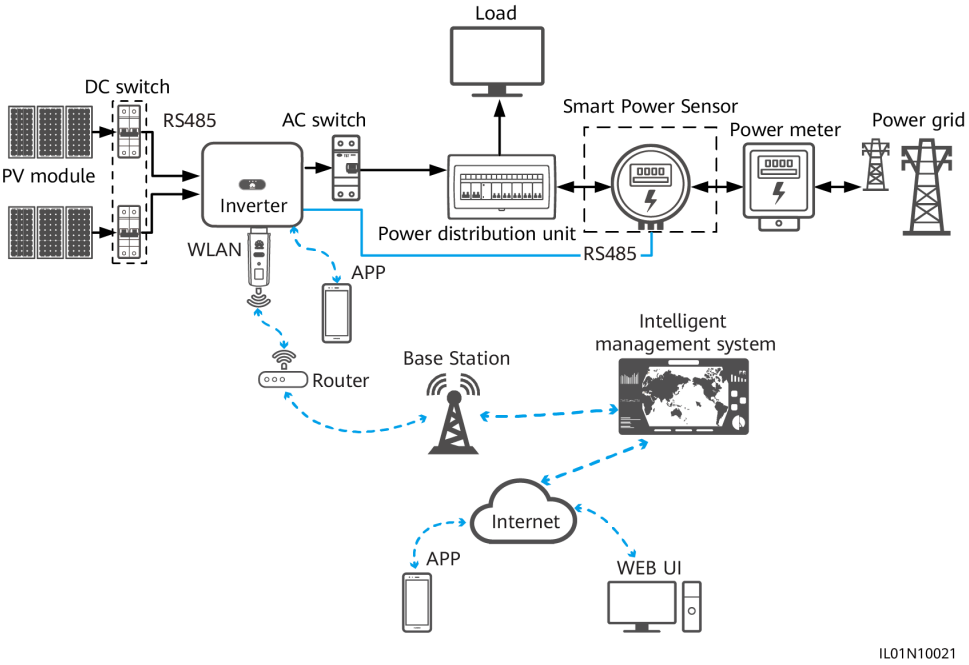
Model	Communications Mode	Description
SDongleA-01	WLAN	Connects to a router over a WLAN. The router connects to the FusionSolar Smart PV Management System over an IP network.
SDongleA-03-CN[a] SDongleA-03-EU SDongleA-03-AU SDongleA-03-JP SDongleA-03-KR	4G	Connects to the FusionSolar Smart PV Management System through the 4G network by using a SIM card.
SDongleA-05	WLAN and FE	Connects to a router over WLAN or FE. The router connects to the FusionSolar Smart PV Management System over an IP network.
Note a: The SDongleA-03-CN Smart Dongle is applicable only to the Chinese mainland. For other countries or regions, Huawei does not provide quality assurance.		

2.1 Communication Networking of the SDongleA-01 (WLAN)

- The inverter connects to the router through the WLAN Smart Dongle, and then connects to the FusionSolar Smart PV Management System through the router.

- The inverter connects to the FusionSolar app through its WLAN. You can use the FusionSolar app to view the running information and settings of the inverter.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.

Figure 2-1 Networking description



NOTE

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- When multiple inverters are cascaded, only one Smart Dongle or SmartLogger can be connected to the RS485 communications link.
- When the Smart Dongle is used in China, it can be used for device cascading using RS485 communication (inverters cascading with inverters or other non-inverter devices). A maximum of 10 devices can be cascaded. In site communication scenarios, the number of inverters that can be cascaded also depends on the inverter features. When this Smart Dongle is used in other areas, device cascading using RS485 communication is not supported.

Table 2-2 Number of cascaded inverters

Limit	Actual Connection	
Maximum Number of Devices That Can Be Connected to the Smart Dongle[ab]	**Number of Slave Inverters**	**Number of Other Devices (Such as Power Meters)**
10	n ≤ 9	≤ 9 – n

Limit	Actual Connection	
Maximum Number of Devices That Can Be Connected to the Smart Dongle[ab]	**Number of Slave Inverters**	**Number of Other Devices (Such as Power Meters)**
Note a: You can view the number of devices that can be connected to the Smart Dongle from the label on the external package. Note b: If the number of inverters exceeds the limit, configure multiple Smart Dongles. The installation and commissioning for each Smart Dongle are the same.		

Table 2-3 Device description

Device	Description	Service Owner
PV module	Prepared by the customer.	Device supplier
Inverter	SUN2000-(3KTL-20KTL)-M0. Software version: SUN2000MA V100R001C00SPC100 or later. Only one inverter can be connected.	Huawei
Dongle	Purchased by the customer. The model should be SDongleA-01.	Huawei
Router	• The router supports WLAN (IEEE 802.11 b/g/n, 2.4 GHz), and the inverters are within the WLAN signal coverage. • The WPA, WPA2, or WPA/WPA2 encryption mode is recommended. • The Enterprise mode is not supported (such as airport WLAN and other public hotspots that require authentication). • WEP and WPA TKIP encryption modes are not recommended because they have serious security vulnerabilities. • If the access fails in WEP or WPA TKIP mode, log in to the router and change the encryption mode of the router to WPA2 or WPA/WPA2.	Device supplier
Intelligent management system	FusionSolar Smart PV Management System. Software version: SmartPVMS V500R007C00SPC110 or later.	Huawei
App	FusionSolar app of 5.7.001 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System.	Huawei
Power distribution unit	Prepared by the customer	Device supplier

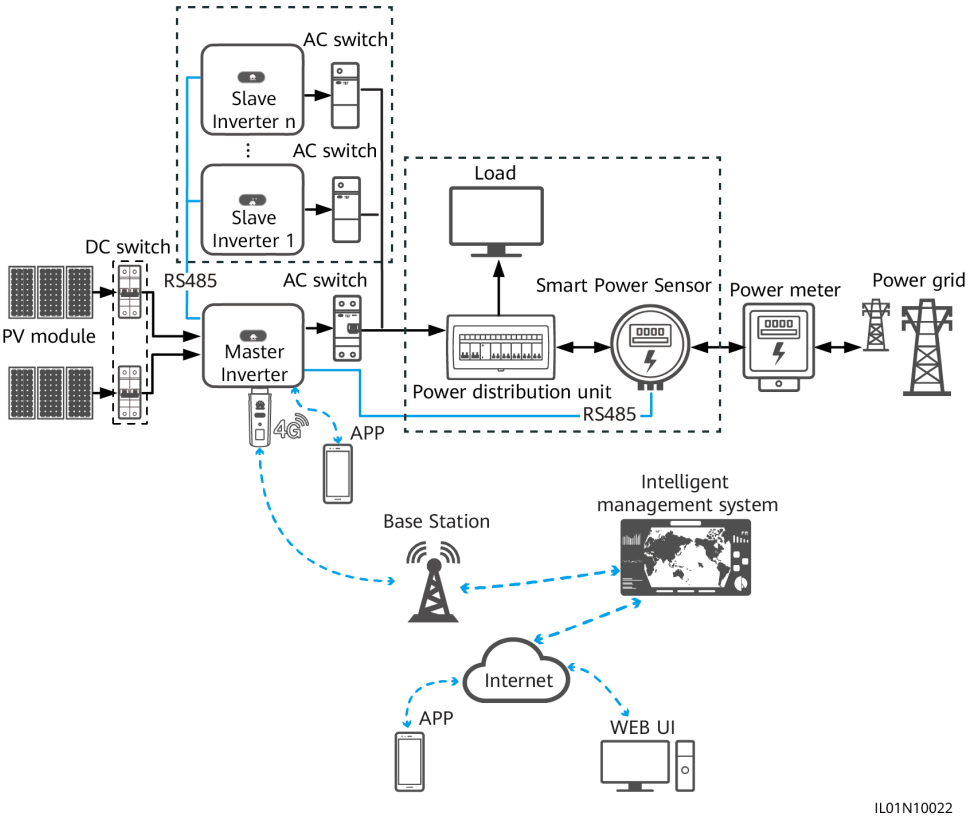
Device	Description	Service Owner
Smart Power Sensor	Recommended model: DTSU666-H	Huawei
Power meter	Prepared by the customer	Device supplier

2.2 Communication Networking of the SDongleA-03 (4G)

- The inverter connects to the FusionSolar Smart PV Management System through the 4G Smart Dongle.
- The master inverter connects to the FusionSolar app. You can use the FusionSolar app to view the running information and settings of the inverter.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.

RS485 networking

Figure 2-2 Networking description



NOTE

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- In the networking, the inverter where the Dongle is installed is the master inverter, and other inverters are slave inverters. Slave inverters can communicate with the Dongle through cascading.
- When multiple inverters are cascaded, only one Smart Dongle or SmartLogger can be connected to the RS485 communications link.
- The Smart Power Sensor connects to the RS485-2 and RS485_2 ports, or 485B2 and 485A2 ports on the master inverter. The RS485-1 and RS485_1 ports, or 485B1 and 485A1 ports are used for inverter cascading.

Table 2-4 Device description

Device		Description	Service Owner
PV module		Prepared by the customer	Device supplier
Inverter	Master inverter	• SUN2000-(2KTL-5KTL)-CN or SUN2000-(2KTL-5KTL)-L0. Software version: SUN2000L V100R001C00SPC333 or later. • SUN2000-(2KTL-6KTL)-L1. Software version: SUN2000L V200R001C00 or later. • SUN2000-(3KTL-20KTL)-M0 • SUN2000-(3KTL-12KTL)-M1 • SUN2000-(8KTL-20KTL)-M2 • SUN2000-(20KTL-40KTL)-M3 • SUN2000-70KTL/75KTL-C1 (optional), SUN2000-70KTL-INM0, SUN2000-50KTL/60KTL/65KTL-M0, SUN2000-50KTL/SUN2000-63KTL-JPM0, or SUN2000-50KTL-JPM1. Software version: SUN2000 V300R001C00SPC112 or later. • SUN2000-100KTL/110KTL/125KTL-M0, SUN2000-75KTL/100KTL-M1, or SUN2000-100KTL-INM0. • SUN2000-175KTL/196KTL/215KTL-H0, SUN2000-185KTL-INH0, SUN2000-185KTL-H1. Software version: SUN2000. HAV300R001C00SPC101 or later. • SUN2000-125KTL-JPH0 • SUN2000-196KTL/200KTL/215KTL-H3 • SUN2000-200KTL-H2	Huawei

Device		Description	Service Owner
	Slave inverter	• A master inverter can be used as a slave inverter. A master inverter that does not support cascading, such as SUN2000-(2KTL-5KTL)-CN or SUN2000-(2KTL-5KTL)-L0, cannot be used as a slave inverter. • SUN2000-29.9KTL/36KTL/42KTL/50KTL • SUN2000-33KTL-A • SUN2000-33KTL/40KTL-JP • SUN2000-43KTL-IN-C1 • SUN2000-50KTL-C1	Huawei
Dongle		Purchased by the customer. The model should be SDongleA-03-XX. For details, see the Smart Dongle models.	Huawei
SIM card		If the Smart Dongle is not configured with a SIM card, prepare a standard SIM card of the local carriers (size: 25 mm x 15 mm).	Customer
Intelligent management system		• Huawei management system: FusionSolar Smart PV Management System with the software version of SmartPVMS V500R007C00SPC110 or later. You are advised to use the latest version. • Third-party management system: A third-party management system is supported. For details, see the third-party management system documentation.	Huawei
App		• FusionSolar app of 5.7.001 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System. • SUN2000 app of 3.2.00.005 or a later version for Android. The app can be locally connected to the inverter.	Huawei
Power distribution unit		Prepared by the customer	Device supplier
Smart Power Sensor		• Recommended model for three-phase inverters: DTSU666-H • Recommended models for single-phase inverters: DDSU666-H and DTSU666-H	Huawei
Power meter		Prepared by the customer	Device supplier

MBUS Communication Networking

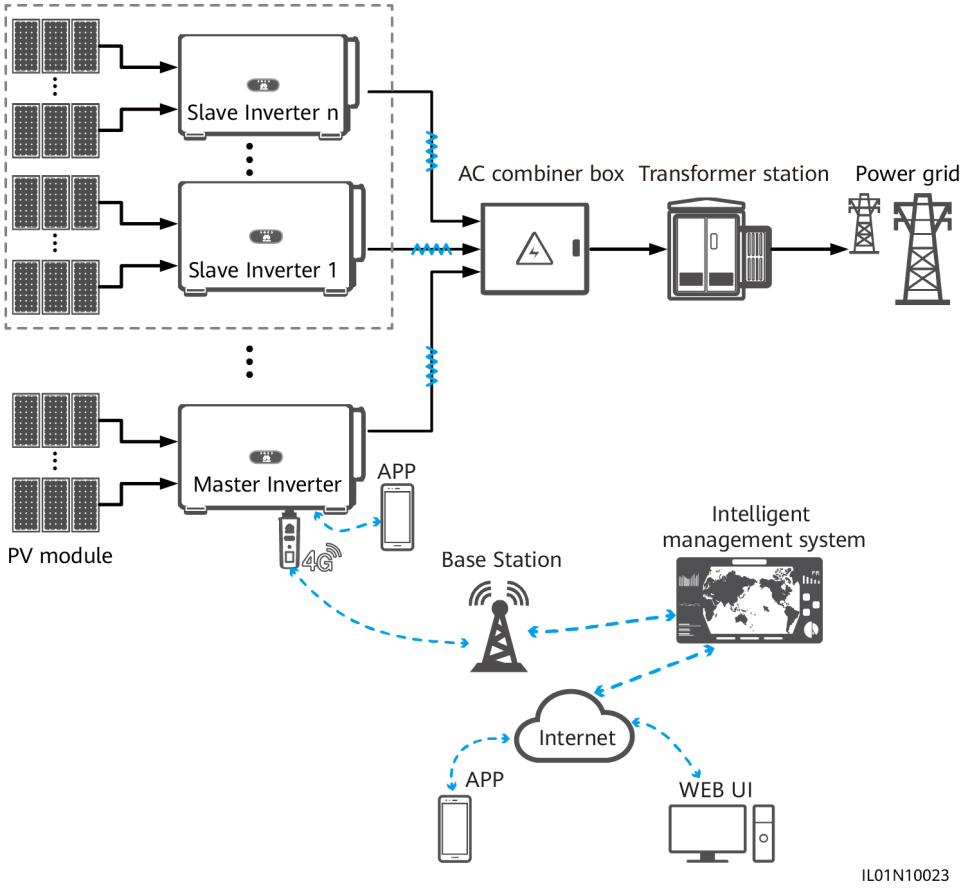
- The inverter connects to the FusionSolar Smart PV Management System through the 4G Smart Dongle.

- The inverter connects to a phone through a Smart USB-WLAN Adapter (shortened to WLAN module in this document), Bluetooth module, or a data cable. You can use the SUN2000 app to view the running information and set inverter parameters locally.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.

NOTICE

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

Figure 2-3 Networking description



NOTE

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- In the networking, the inverter where the Dongle is installed is the master inverter, and other inverters are slave inverters. Slave inverters can communicate with the Dongle through cascading.
- When multiple inverters are cascaded, only one Smart Dongle or SmartLogger can be connected to the RS485 communications link.
- The Smart Power Sensor connects to the RS485-2 and RS485_2 ports, or 485B2 and 485A2 ports on the master inverter. The RS485-1 and RS485_1 ports, or 485B1 and 485A1 ports are used for inverter cascading.

Table 2-5 Device or software description

Device		Description	Service Owner
PV module		Prepared by the customer	Customer
Inverter	Master inverter	SUN2000-100KTL/110KTL/125KTL-M0. Software version: SUN2000 V500R001C00SPC100 or later.	Huawei
	Slave inverter	SUN2000-36KTL SUN2000-50KTL/60KTL-M0 SUN2000-100KTL/110KTL/125KTL-M0	Huawei
Dongle		Purchased by the customer. The model should be SDongleA-03-XX. For details, see the Smart Dongle models.	Huawei
SIM card		If the Smart Dongle is not configured with a SIM card, prepare a standard SIM card (size: 25 mm x 15 mm) of a local carrier.	Customer
Intelligent management system		• Huawei management system: FusionSolar Smart PV Management System with the software version of SmartPVMS V500R007C00SPC110 or later. You are advised to use the latest version. • Third-party management system: A third-party management system is supported. For details, see the third-party management system documentation.	• Huawei • Device supplier
App		• FusionSolar app of 5.7.001 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System. • SUN2000 app of 3.2.00.005 or a later version for Android. The app is locally connected to the inverter.	Huawei
AC combiner box		Prepared by the customer	Customer

Device	Description	Service Owner
Transformer station	Prepared by the customer	Customer
Power meter	Prepared by the customer	Device supplier

Smart Dongle Parameters

Table 2-6 Number of cascaded inverters

Limit	Actual Connection	
Maximum Number of Devices That Can Be Connected to the Smart Dongle[abcd]	**Number of Slave Inverters**	**Number of Other Devices (Such as Power Meters)**
10	n ≤ 9	≤ 9 – n
2	n ≤ 1	≤ 1 – n
Note a: You can view the number of devices that can be connected to the Smart Dongle from the label on the external package. Note b: If the number of inverters exceeds the limit, configure multiple Smart Dongles. The installation and commissioning for each Smart Dongle are the same. Note c: If cascaded inverters include a single-phase inverter or are connected to batteries, a maximum of three inverters can be cascaded. Note d: If RS485 communication is used and the device is connected to the RS485-2 and RS485_2 ports, or 485B2 and 485A2 ports on the master inverter, the device is not counted as a cascaded device.		

Table 2-7 Frequency bands and systems of the Smart Dongle

Model	Supported Frequency Bands and Systems
SDongleA-03-CN	LTE FDD: B1, B3, B8 LTE TDD: B38, B39, B40, B41 DC-HSPA+/HSPA+/HSPA/UMTS: B1, B5, B8, B9 TD-SCDMA: B34, B39 GSM/GPRS/EDGE: 900 MHz, 1800 MHz
SDongleA-03-EU	LTE FDD: B1, B3, B7, B8, B20 LTE TDD: B38, B40 WCDMA/HSDPA/HSUPA/HSPA+: B1, B8 GSM/GPRS/EDGE: 900 MHz, 1800 MHz

Model	Supported Frequency Bands and Systems
SDongleA-03-AU	LTE FDD: B1, B2, B3, B4, B5, B7, B8, B28 LTE TDD: B40 WCDMA: B1, B2, B5, B8 GSM: 850 MHz, 900 MHz, 1800 MHz, 1900 MHz
SDongleA-03-JP	LTE FDD: B1, B3, B8, B18, B19, B26 LTE TDD: B41 WCDMA: B1, B6, B8, B19
SDongleA-03-KR	LTE FDD: B1, B3, B5, B7 WCDMA: B1

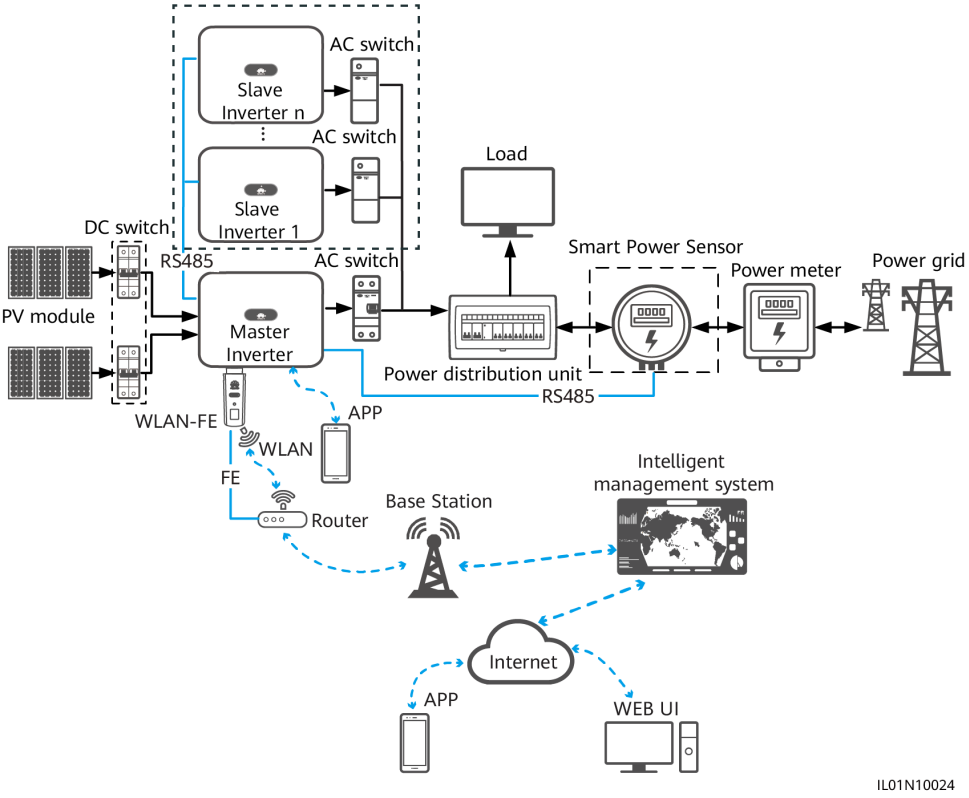
Table 2-8 Traffic requirements for the SIM card

Access Management System Type	Monthly Traffic Requirement for the SIM Card			Traffic Capability
FusionSolar Smart PV Management System	Inverter	Without a power sensor or energy storage	10 MB + 4 MB x Number of inverters	• Device performance data can be updated every 5 minutes. • The Smart Dongle logs, inverter logs, and I-V diagnosis data can be exported monthly. The Smart Dongle and inverters can be upgraded monthly.
		With a power sensor	10 MB + 7 MB x Number of inverters	
		With energy storage	13 MB + 7 MB x Number of inverters + 5 MB x Number of DC-DC converters	
		With a power sensor and energy storage	13 MB + 7 MB x Number of inverters + 5 MB x Number of DC-DC converters	
	With Smart PV Optimizers		13 MB + 7 MB x Number of inverters + 5 MB x Number of DC-DC converters	

2.3 Communication Networking of the SDongleA-05 (WLAN-FE)

- The inverter connects to the router through the WLAN-FE Smart Dongle, and then connects to the FusionSolar Smart PV Management System through the router.
- The master inverter connects to the FusionSolar app through its WLAN. You can use the FusionSolar app to view the running information and settings of the inverter.
- You can remotely log in to the FusionSolar Smart PV Management System over the WebUI or FusionSolar app.

Figure 2-4 Networking description (WLAN-FE)



NOTE

- The components in the dotted box are optional.
- The inverter model is subject to change. The model information and device appearance in this document are for reference only.
- In the networking, the inverter where the Dongle is installed is the master inverter, and other inverters are slave inverters. Slave inverters can communicate with the Dongle through cascading.
- When multiple inverters are cascaded, only one Smart Dongle or SmartLogger can be connected to the RS485 communications link.
- The Smart Power Sensor connects to the RS485-2 and RS485_2 ports, or 485B2 and 485A2 ports on the master inverter. The RS485-1 and RS485_1 ports, or 485B1 and 485A1 ports are used for inverter cascading.

Table 2-9 Number of cascaded inverters

Limit	Actual Connection	
Maximum Number of Devices That Can Be Connected to the Smart Dongle[abcd]	**Number of Slave Inverters**	**Number of Other Devices (Such as Power Meters)**
10	n ≤ 9	≤ 9 – n
Note a: You can view the number of devices that can be connected to the Smart Dongle from the label on the external package. Note b: If the number of inverters exceeds the limit, configure multiple Smart Dongles. The installation and commissioning for each Smart Dongle are the same. Note c: If cascaded inverters include a single-phase inverter or are connected to batteries, a maximum of three inverters can be cascaded. Note d: If RS485 communication is used and the device is connected to the RS485-2 and RS485_2 ports, or 485B2 and 485A2 ports on the master inverter, the device is not counted as a cascaded device.		

Table 2-10 Device description

Device		Description	Service Owner
PV module		Purchased by the customer	Device supplier
Inverter	Master inverter	• SUN2000-(2KTL-6KTL)-L1. Software version: SUN2000L V200R001C00 or later. (all software versions of this inverter model are supported.) • SUN2000-(3KTL-20KTL)-M0 • SUN2000-(3KTL-12KTL)-M1 • SUN2000-(8KTL-20KTL)-M2 • SUN2000-(20KTL-40KTL)-M3	Huawei

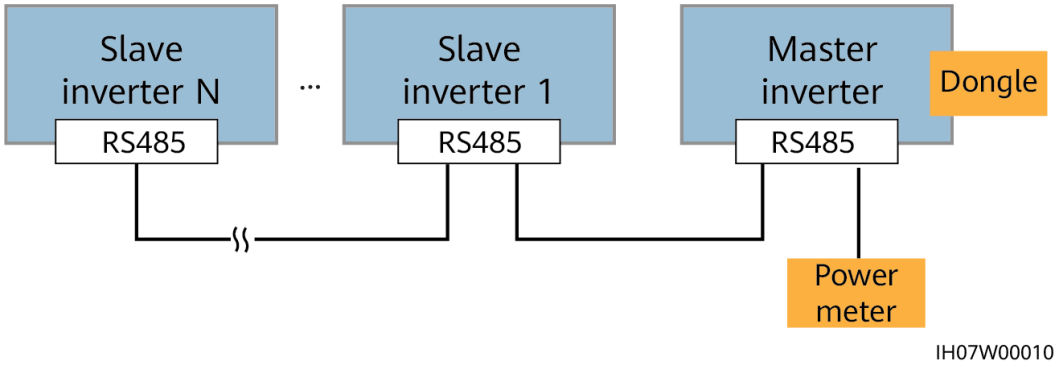
Device		Description	Service Owner
	Slave inverter	• A master inverter can be used as a slave inverter. • SUN2000-33KTL • SUN2000-29.9KTL/33KTL-A/36KTL • SUN2000-50KTL/60KTL-M0 • SUN2000-100KTL/110KTL-M0	Huawei
Dongle		Purchased by the customer. The model should be SDongleA-05.	Huawei
Router		• The router supports WLAN (IEEE 802.11 b/g/n, 2.4 GHz), and the inverters are within the WLAN signal coverage. • The WPA, WPA2, or WPA/WPA2 encryption mode is recommended. • The Enterprise mode is not supported (such as airport WLAN and other public hotspots that require authentication). • WEP and WPA TKIP encryption modes are not recommended because they have serious security vulnerabilities. • If the access fails in WEP or WPA TKIP mode, log in to the router and change the encryption mode of the router to WPA2 or WPA/WPA2.	Device supplier
Intelligent management system		FusionSolar Smart PV Management System. Software version: SmartPVMS V500R007C00SPC110 or later.	Huawei
App		FusionSolar app of 2.5.8 or a later version. The app can be locally connected to the inverter and remotely connected to the FusionSolar Smart PV Management System.	Huawei
Power distribution unit		Prepared by the customer	Device supplier
Smart Power Sensor		DTSU666-H	Huawei
Power meter		Prepared by the customer	Device supplier

3 Cable Connections

3.1 Connecting Cables for Cascaded Inverters

This document provides only the schematic diagram of inverter cascading. For details about communications port definitions and cable connections, see the user manual of each inverter.

Figure 3-1 Cable connections for cascaded inverters



NOTICE

- Ensure that the shielding layer is grounded when connecting the RS485 cable.
- When laying out communications cables, separate them from power cables and keep them away from strong interference sources to prevent communication interruption.

Figure 3-2 Connecting cables to the DTSU666-H (three-phase three-wire)

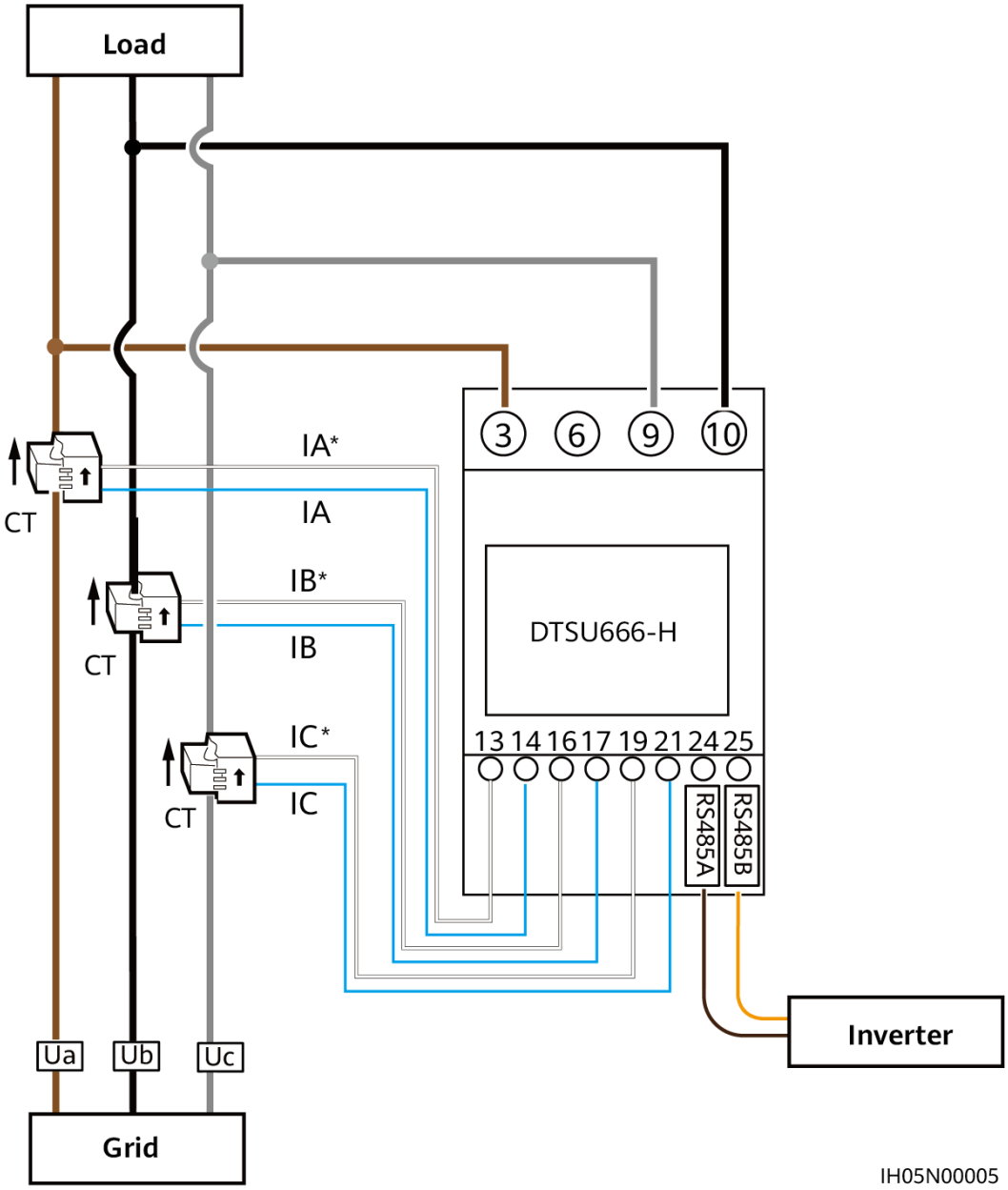
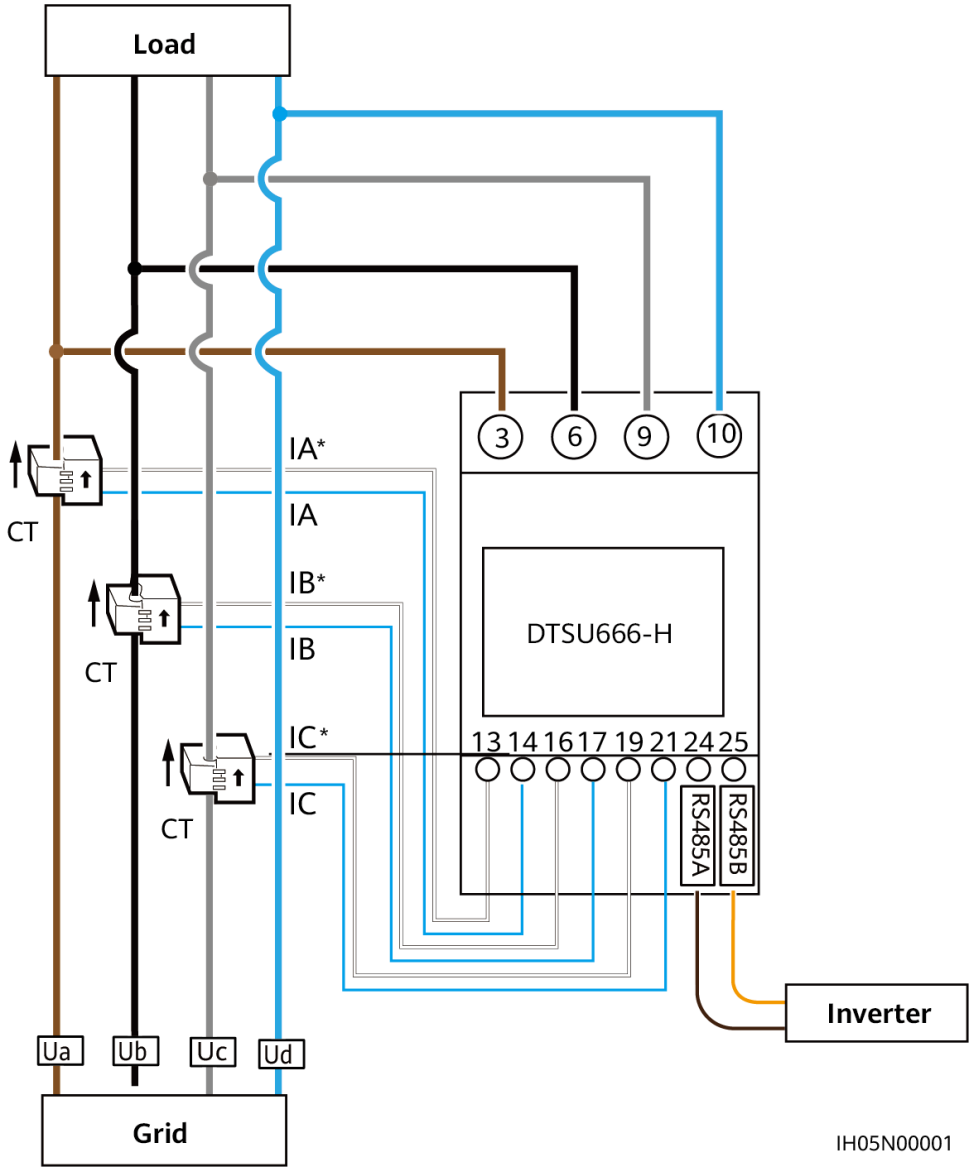


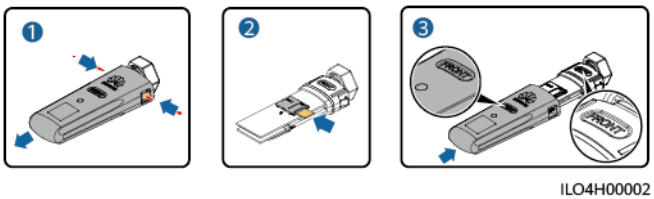
Figure 3-3 Connecting cables to the DTSU666-H (three-phase four-wire)



3.2 Installing the 4G/WLAN Smart Dongle

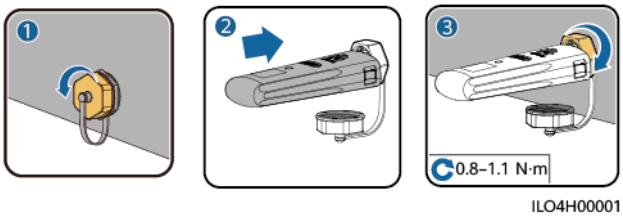
Step 1 Install a SIM card. (Skip this step for the WLAN Smart Dongle or the Smart Dongle that is configured with a SIM card.)

Figure 3-4 Installing a SIM card



Step 2 Install the Smart Dongle onto the USB port on the master inverter.

Figure 3-5 Installing a Smart Dongle



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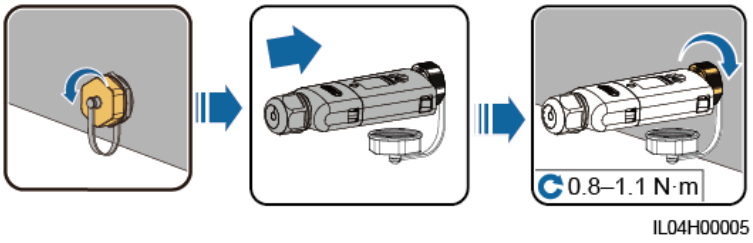
3.3 Installing the WLAN-FE Smart Dongle

WLAN communication

Install the Smart Dongle onto the USB port on the master inverter.

Figure 3-6 Installing a Smart Dongle

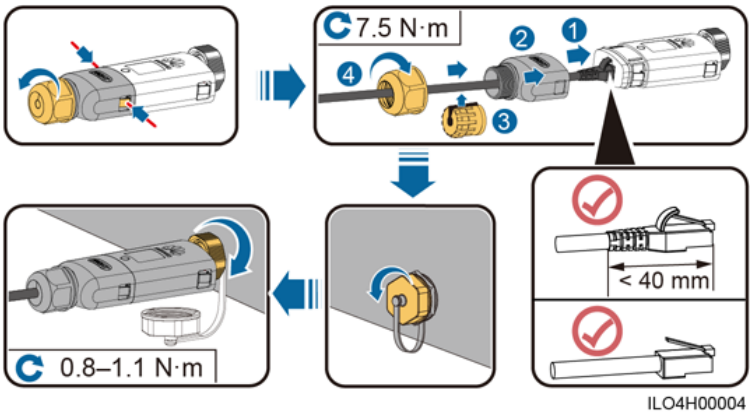


FE Communication

After connecting the FE cable, install the Smart Dongle onto the USB port on the master inverter.

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

Figure 3-7 Installing a Smart Dongle



4 System Power-On and Commissioning

4.1 Checking Before Power-On

1. Ensure that the ground cable of the inverter is securely connected.
2. Ensure that the inverter is properly installed and all cables are correctly and reliably connected.
3. Ensure that the Smart Dongle is properly installed.

4.2 Powering On the Inverter

Power on the inverter after cable connections are completed.

Procedure

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

Step 2 Turn on the DC switch at the bottom of the inverter.

----End

Viewing the LED Indicator Status of the Smart Dongle

Table 4-1 LED indicator status (WLAN Smart Dongle and WLAN-FE Smart Dongle)

Operation	Indicator Color	Indicator Status	Remarks	Description
Installing the Smart Dongle	N/A	Off	Normal	The Smart Dongle is not secured or is not powered on.
	Yellow (blinking green and red simultaneously)	Steady on		The Smart Dongle is secured and powered on.

Operation	Indicator Color	Indicator Status	Remarks	Description
	Red	Blinking fast (on for 0.2s and then off for 0.2s)		The parameters for connecting to the router are to be set.
	Red	Steady on	Abnormal	Replace the Smart Dongle because it has an internal fault.
	Blinking red and green alternatively	Blinking slowly (red for 1s and then green for 1s)		No communication with the inverter • Remove and insert the Smart Dongle. • Check that the inverter matches the Smart Dongle. • Connect the Smart Dongle to another inverter. Check whether the Smart Dongle or the USB port of the inverter is faulty.
Upgrading the Smart Dongle	Blinking red and green alternatively	Blinking fast (red for 0.2s and then green for 0.2s)	Normal	The Smart Dongle is being upgraded locally.
Setting an inverter's connection to a router	Green	Blinking slowly (on for 0.5s and then off for 0.5s)	Normal	Connecting to the router
	Red	Blinking fast (on for 0.2s and then off for 0.2s)	Abnormal	Failed to connect to the router. Check whether the parameters for connecting the Smart Dongle to the router are properly set. If not, set the parameters correctly.
Set parameters in the management system	Green	Steady on	Normal	Successfully connected to the management system.
	Red	Blinking slowly (on for 1s and then off for 1s)	Abnormal	Failed to connect to the management system. Check whether the parameters for connecting inverters to the management system are properly set. If not, set the parameters correctly.
	Green	Blinking fast (on for 0.2s and then off for 0.2s)	Normal	The inverter is communicating with the management system through the Smart Dongle.

Table 4-2 LED indicator status (4G Smart Dongle)

Indicator		Remarks	Description
N/A	Off	Normal	The Smart Dongle is not secured or is not powered on.
Yellow (blinking green and red simultaneously)	Steady on		The Smart Dongle is secured and powered on.
Green	The indicator blinks at intervals of 2s, on for 0.1s and then off for 1.9s.	Normal	Dialing (duration < 1 min)
		Abnormal	If the duration is longer than 1 min, the 4G parameter settings are incorrect. Reset the parameters.
	Blinking slowly (on for 1s and then off for 1s)	Normal	The dial-up connection is set up successfully (duration < 30s).
		Abnormal	If the duration is longer than 30s, the settings of the management system parameters are incorrect. Reset the parameters.
	Steady on	Normal	Successfully connected to the management system.
	Blinking fast (on for 0.2s and then off for 0.2s)		The inverter is communicating with the management system through the Smart Dongle.
Red	Steady on	Abnormal	Replace the Smart Dongle because it has an internal fault.
	Blinking fast (on for 0.2s and then off for 0.2s)		The Smart Dongle has no SIM card or the SIM card is in poor contact. Check whether the SIM card has been installed or is in good contact. If not, install the SIM card or remove and insert the SIM card.
	Blinking slowly (on for 1s and then off for 1s)		The Smart Dongle fails to connect to the management system because the SIM card has no traffic or the signal strength is poor. If the Smart Dongle is reliably connected, check the SIM card signal through the app. If no signal is received or the signal strength is weak, contact the carrier. Check whether the tariff and traffic of the SIM card are normal. If not, recharge the SIM card or purchase a data package.

Indicator		Remarks	Description
Blinking red and green alternatively	Blinking slowly (red for 1s and green for 1s)		No communication with the inverter • Remove and insert the Smart Dongle. • Check that the inverter matches the Smart Dongle. • Connect the Smart Dongle to another inverter. Check whether the Smart Dongle or the USB port of the inverter is faulty.
	Blinking fast (red for 0.2s and then green for 0.2s)	Normal	The Smart Dongle is being upgraded locally.

5 Site Deployment and Commissioning

5.1 Creating a PV Plant

5.1.1 Creating a PV Plant over the App

Prerequisites

- You have downloaded and installed the FusionSolar app which can be obtained by searching for **FusionSolar** in Huawei AppGallery or scanning the QR code.

  FusionSolar APP

- The inverter is properly powered on and the Smart Dongle communicates with the management system properly.
- You have obtained the login account and password from the installation contractor or Huawei service engineer. If no account or password is available, create an account.

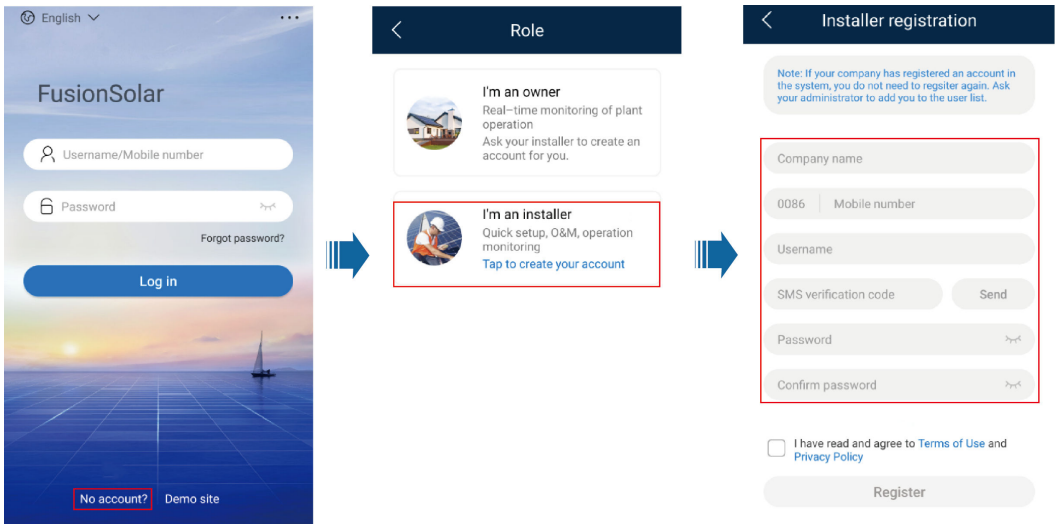
NOTE

- The latest app version is required for device commissioning. You can search for **FusionSolar** in App Store or scanning the QR code to install the app for iOS.
- This section contains a large number of screenshots, which are only used to illustrate the operation method. The PV plant, device model, and parameters in the figures are for reference only.
- The version of the FusionSolar app is 5.7.001. The actual screens may vary.

Procedure

Step 1 Register an installer account using a mobile number (only in China) or email address. If an installer account exists, skip this step.

Figure 5-1 Registering an account



Step 2 Log in to the app using the installer account, and tap **Setup Wizard** to create a PV plant. For details, see the *FusionSolar APP Quick Guide* by scanning the QR code.

NOTE

- Use the initial password upon the first Log-in and change it immediately after login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial 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.
- To create multiple installer accounts for a company, log in to the app and create an installer account by choosing **New User**.

Figure 5-2 Creating a PV plant

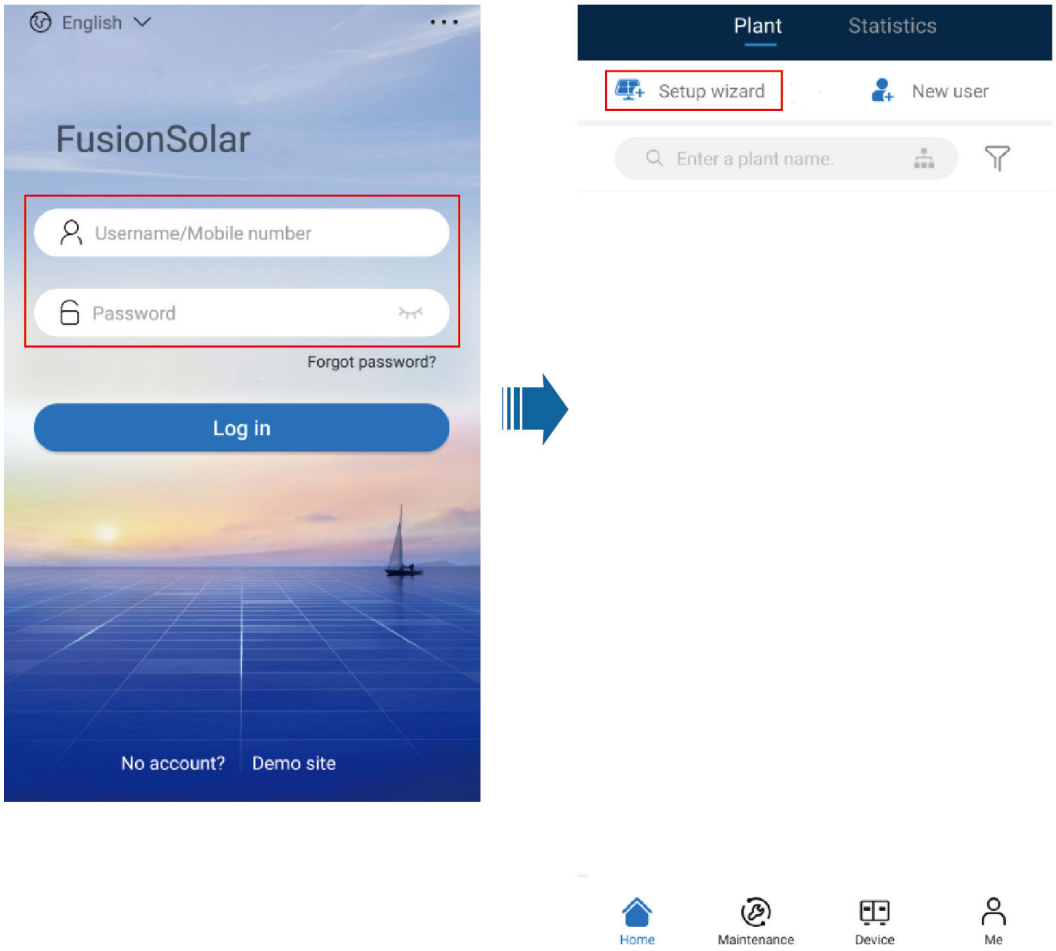


Figure 5-3 FusionSolar APP Quick Guide

FusionSolar
Quick Guide

----End

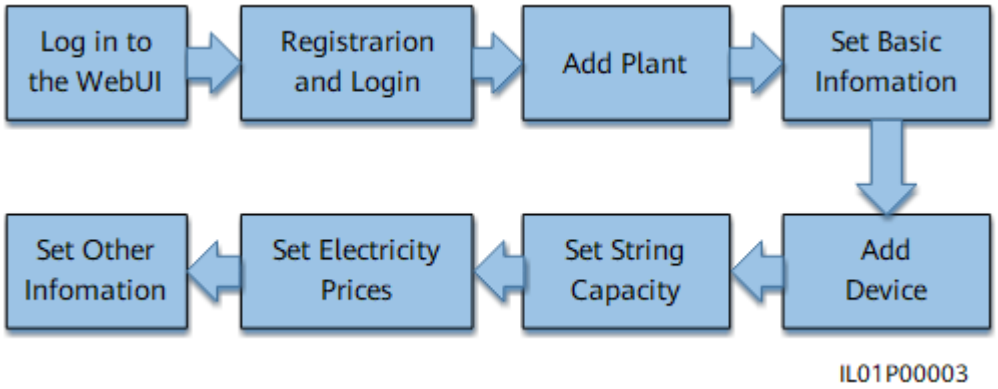
5.1.2 Creating a PV Plant over the WebUI

Prerequisites

- You have matched the devices with the PV plant with the PV plant with the help of the installation contractor.
- The inverter and Smart Dongle have been powered on and communicates properly with the management system.

- You have obtained the login account and password from the installation contractor or Huawei service engineer. If no account or password is available, create an account.

Figure 5-4 Procedure for creating a PV plant



Procedure

Step 1 Enter the management system address in the address box of a browser: https://intl.fusionsolar.huawei.com.

NOTE

- Browser: Chrome 67, Safari 9.0, Internet Explorer 11, or a later version is recommended.
- The software version corresponding to the user interface (UI) snapshots is SmartPVMS V500R007C00CP2101. The UIs may vary with software versions and are for reference only.

Step 2 If you have obtained the login account and password from the installation contractor or Huawei service engineer, enter the account and password, and click **Login** to go to the home page. If you have not created an account, click **Installer Registration**, fill in the registration information, and activate the account with the email verification code sent to you.

Figure 5-5 Login page

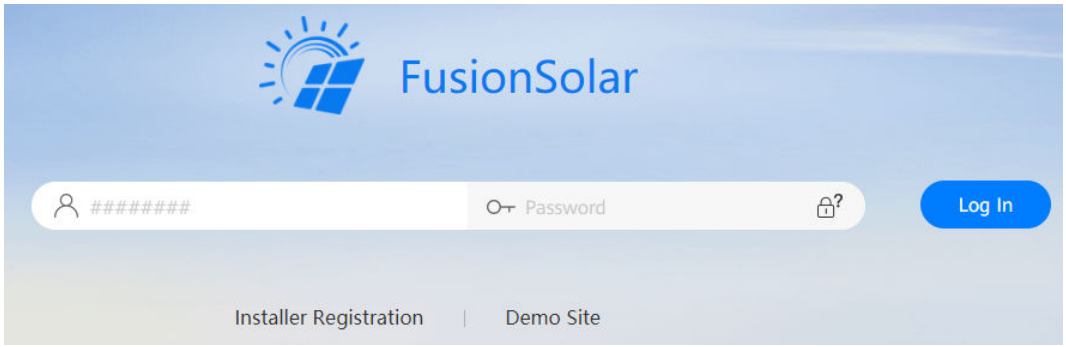
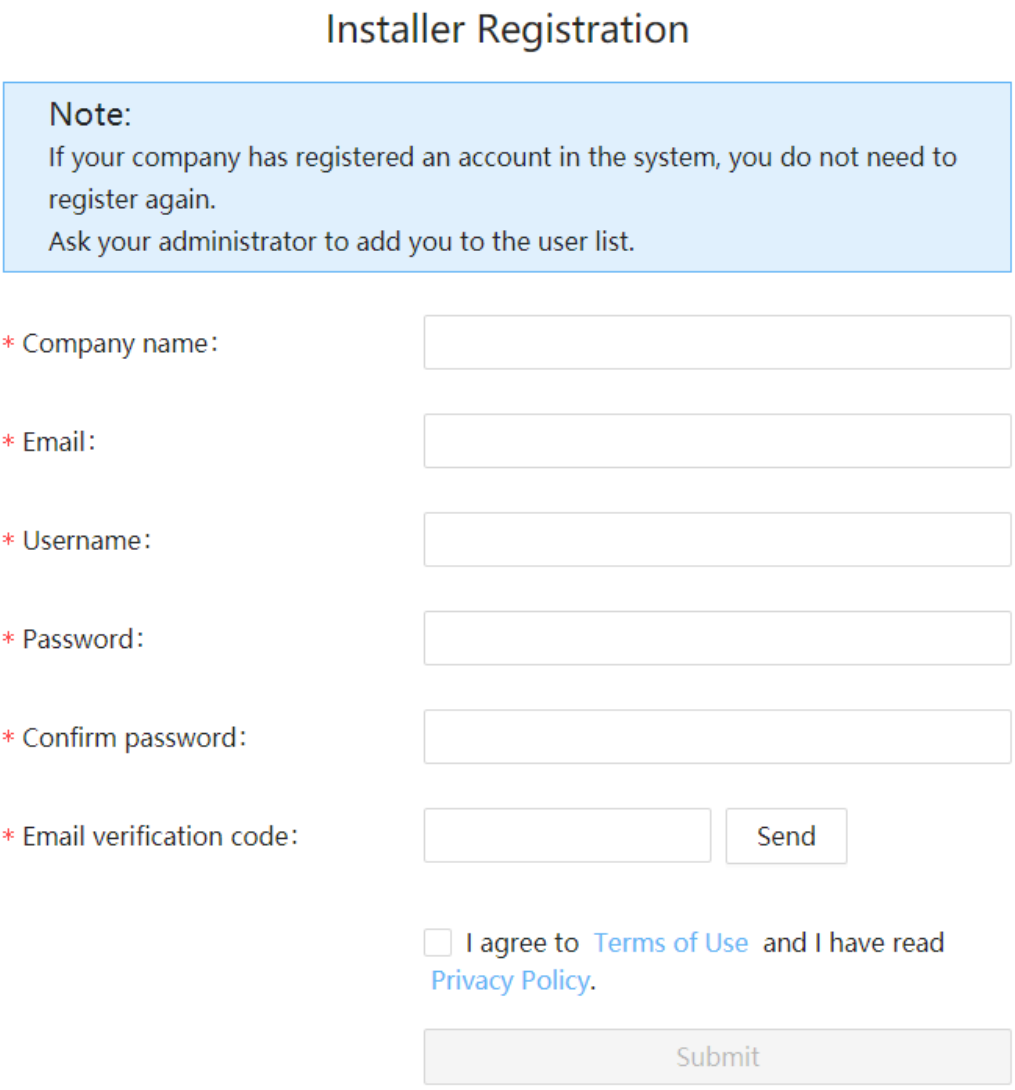


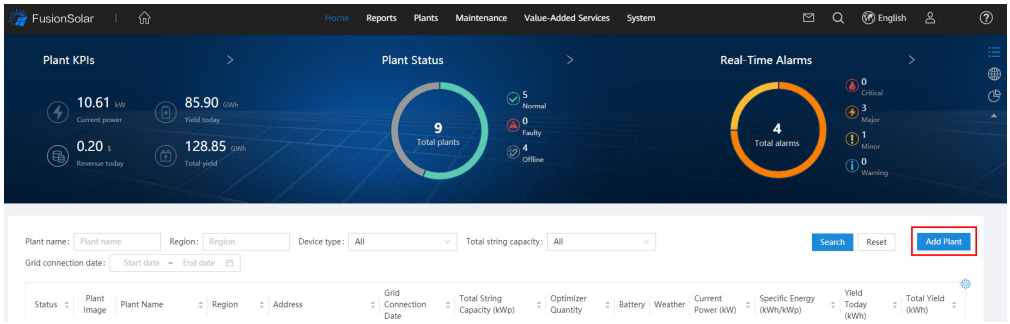
Figure 5-6 Registering an account



Step 3 Add Plant.

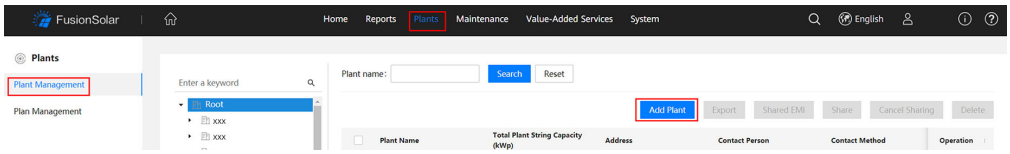
- Method 1: On the home page, click **Add Plant**.

Figure 5-7 Creating a PV plant (Method 1)



- Method 2: On the home page, click **Plants** in the upper-right corner to go to the **Plant** page, and choose **Plant Management,** click **Add Plant**.

Figure 5-8 Creating a PV plant (Method 2)

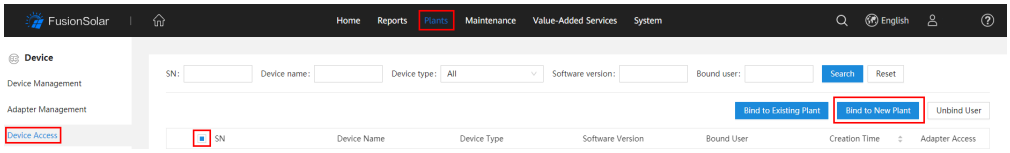


- Method 3: On the home page, click **Plants** in the upper-right corner to go to the **Device** page, and choose **Device Access**, select any device, and click **Bind to New Plant**.

  NOTE

  At least one device must be connected in the **Device Access**.

Figure 5-9 Creating a PV plant (Method 3)



Step 4 Fill in the basic information about the PV plant as required and click **Next**.

Figure 5-10 Basic information of the PV plant

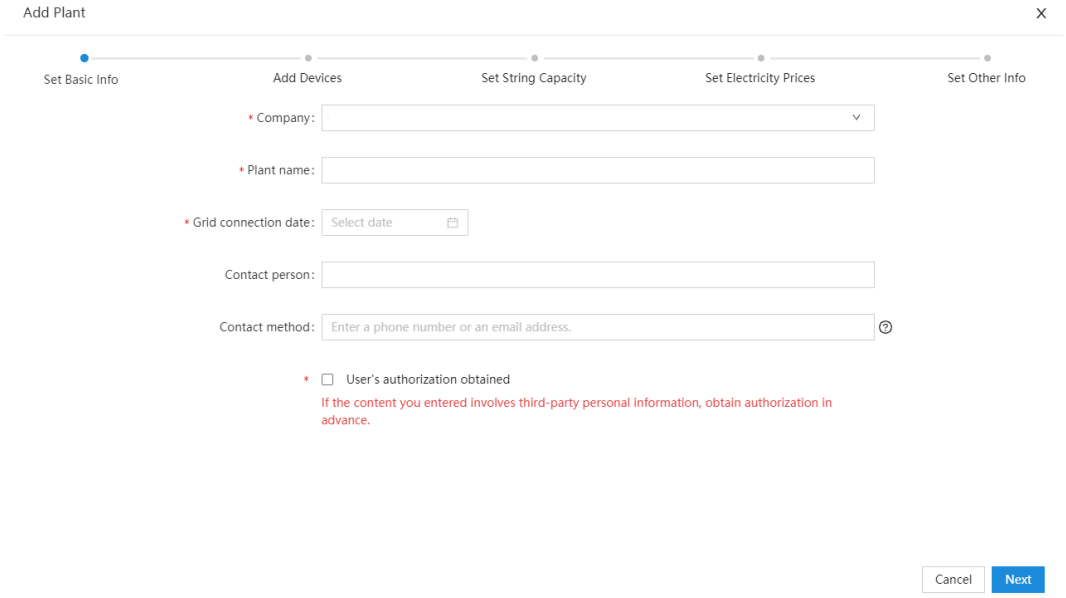


Table 5-1 Description of basic information (* means required fields)

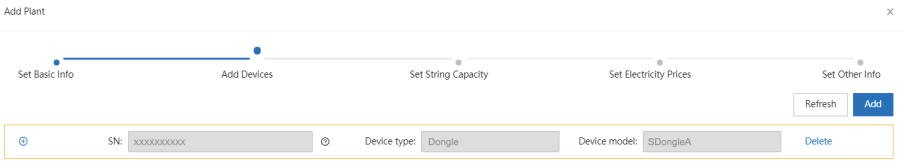
Parameter	Description
Company*	Company to which the new PV plant belongs.
Plant name*	Name of the new PV plant.
Grid connection time*	Start date of the safe operation of the PV plant.

Parameter	Description
Contact Person	PV plant contact who facilitates problem handling. You are advised to set this parameter.
Contact method	Contact information which facilitates problem handling. You are advised to set this parameter.

Step 5 On the **Access Device** tab page, set the connected devices for the PV plant.

1. Manually enter the SN of the Smart Dongle and click the blank area of **Device type**. The system automatically displays the device name and model. The affiliated inverters and power meter are automatically added. Click **+** on the left of the SN to expand the device information. (The **+** icon becomes the **–** icon after the information is expanded.) Then, check whether the connected devices are correct.

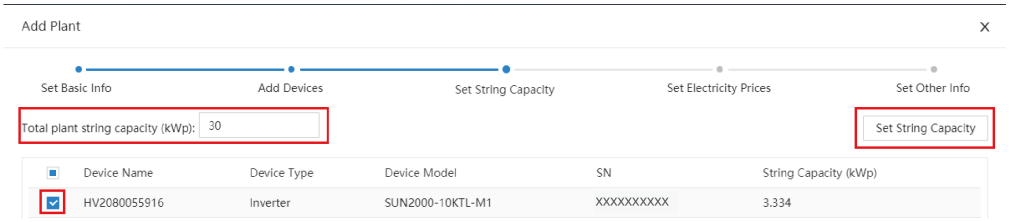
Figure 5-11 Entering the device SN



Step 6 Click **Next** to go to the **String Configuration** tab page.

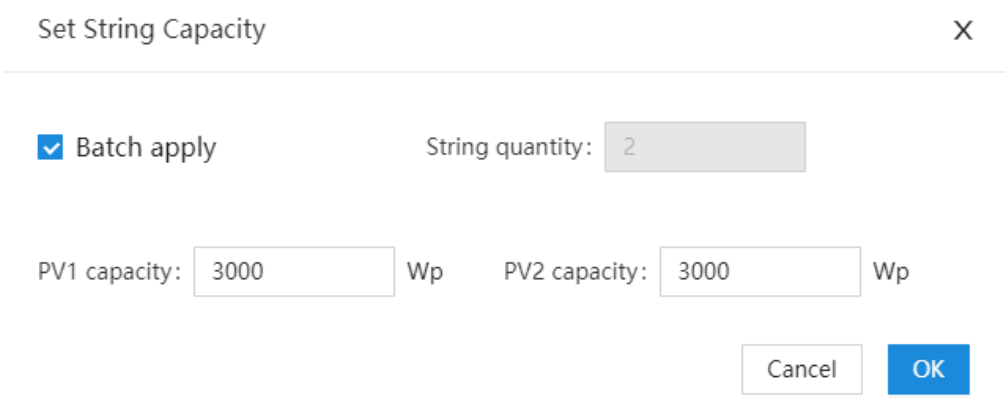
1. Fill **Total plant string capacity (kWp)** (Total rated active power of the plant generator set) as required. In the device list, select one or more devices to be configured and click **String Capacity Configuration**. The **String Capacity Configuration** dialog box is displayed.

Figure 5-12 String capacity configuration



2. Verify the number of PV strings and the string capacity, and click **OK**.

Figure 5-13 Verifying the number of PV strings and the string capacity

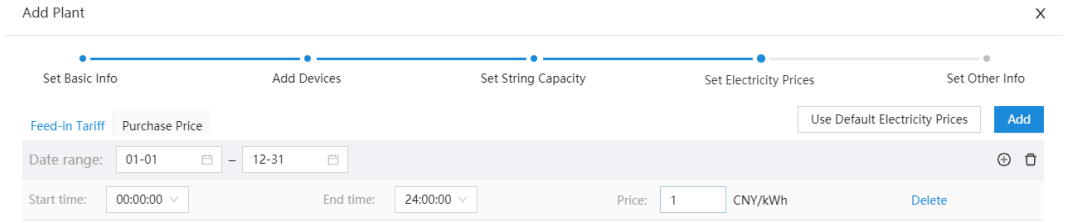


NOTE

If **Batch Configuration** is selected, the capacity of other PV strings to be configured is automatically set to the same value as PV1 after PV1 capacity is configured.

Step 7 Click **Next**. On the displayed **Electric Price Configuration** tab page, set the date range, time period, and electricity price.

Figure 5-14 Adding time-based prices

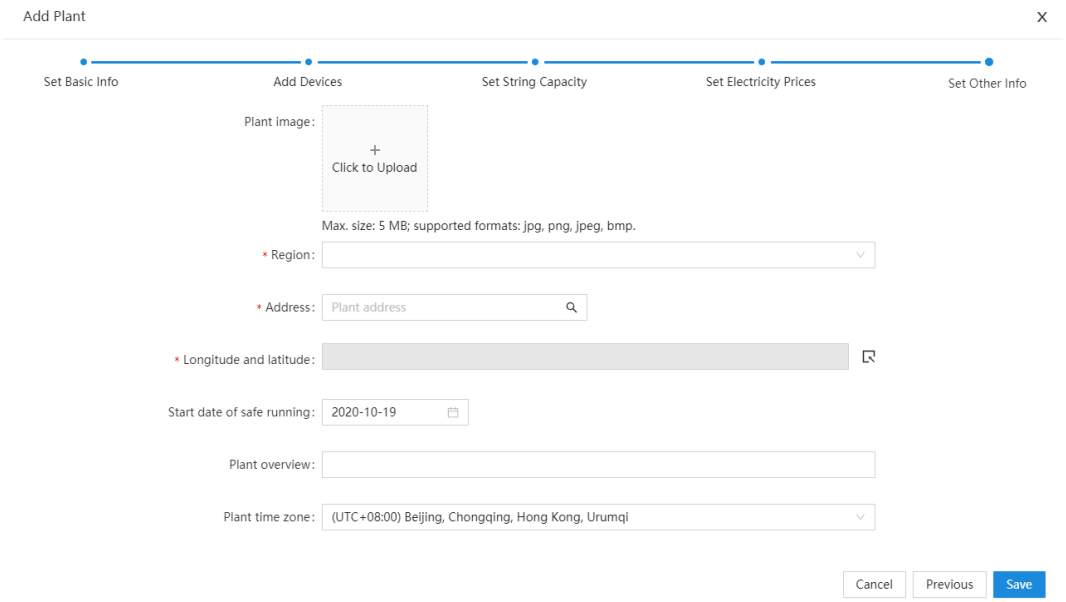


NOTE

- Click **Add** to add a date range. Multiple date ranges cannot overlap and must cover a full year.
- Click to add a time period and price. Multiple time periods cannot overlap and must cover a full year.
- Click **Delete** to delete a time-based price.
- Click to delete a date range.

Step 8 Click **Next** to go to the **Other Information** tab page. Set other information about the PV plant, including **Plant image**, **Address**, **Start time of safe running**, **Plant introduction**, and **Plant time zone** of the PV plant. **Start time of safe running** refers to the day when the PV plant starts to generate electricity normally. It is mainly used to calculate the safe running days of the PV plant.

Figure 5-15 Other information



Step 9 Click **Save**. In the displayed dialog box, click **OK**. The PV plant is created successfully.

----End

Follow-up Procedure

- Modifying PV plant information: In the PV plant list, click **Modify** for the PV plant to be modified.
- Deleting a PV plant: In the PV plant list, select one or more PV plants to be deleted and click **Delete**.

5.2 Setting Grid-tied Control Parameters

5.2.1 Setting Parameters over the App

Prerequisites

- The FusionSolar app is recommended when the inverter is connected to the FusionSolar Smart PV Management System. The SUN2000 app is recommended when the inverter is connected to other management systems.
- You have downloaded and installed the FusionSolar app which can be obtained by searching for **FusionSolar** in Huawei AppGallery or scanning the QR code.

FusionSolar APP

- SUN2000 APP: Search for "SUN2000" in Huawei AppGallery, download the latest installation package, and install the SUN2000 app by following the instructions.

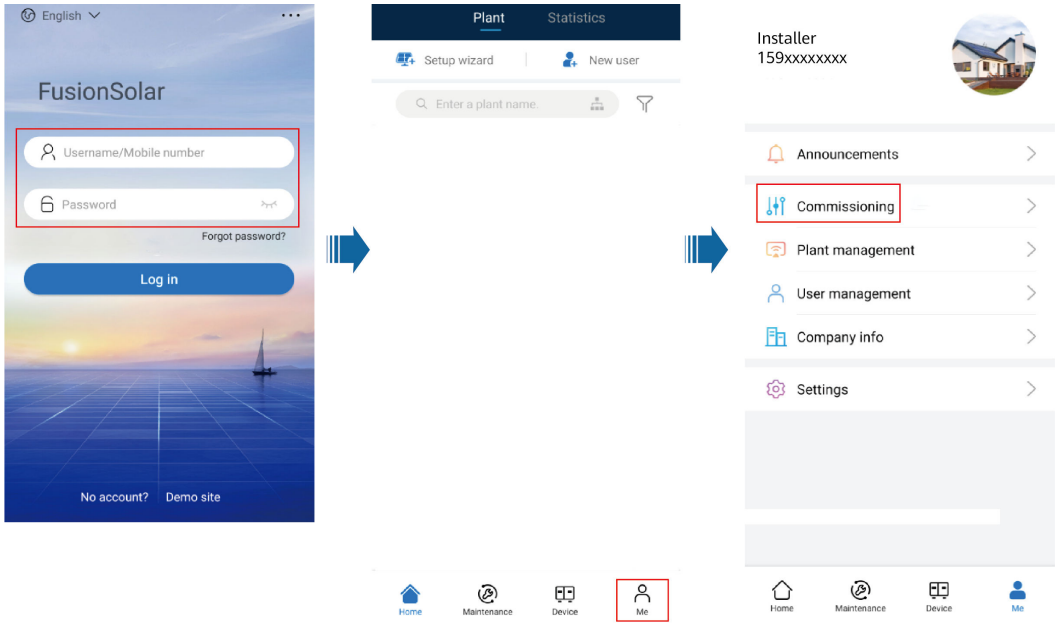
NOTE

- In areas (such as the UK) where the FusionSolar app is not available, or when a third-party management system is used, only the SUN2000 app can be used for commissioning. This document uses the FusionSolar app as an example to describe the commissioning method. For the SUN2000 app, perform operations as required.
- The SUN2000 app version should be 3.2.00.005 (Android) or later.

Procedure

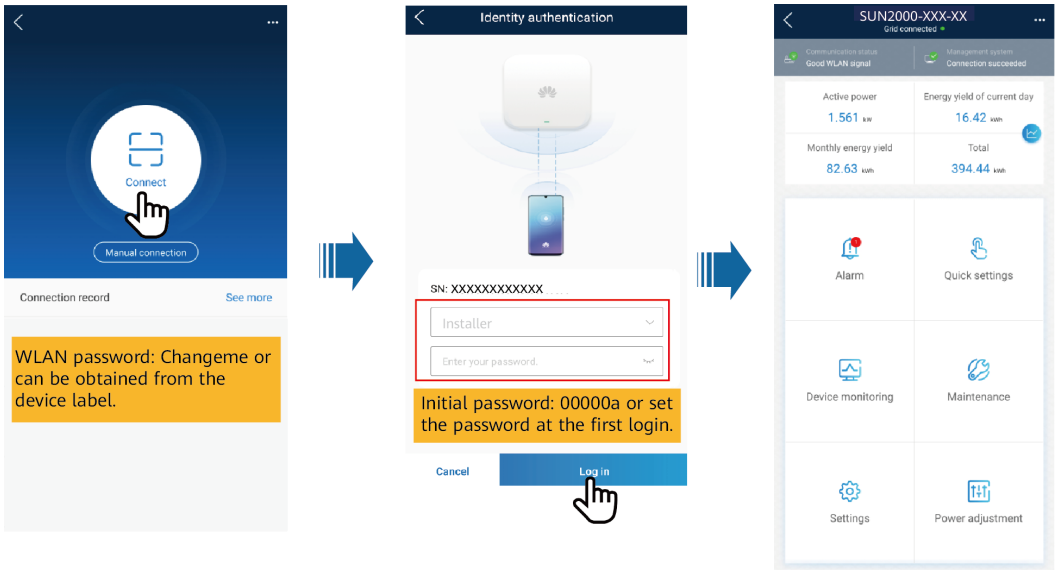
Step 1 Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)

Figure 5-16 Device commissioning



Step 2 Connect to the inverter.

Figure 5-17 Connecting to the inverter



NOTE

- The inverter WLAN password can be changed on the **Communication configuration** screen. You can tap ••• in the upper-right corner of the home screen to change the login password for **Common User**, **Advanced User**, **Special User**, and **installer**.
- If you enter wrong login passwords for **installer** for five consecutive times and the interval between two attempts is within 2 minutes, your account will be locked. Log in to the app again after 5 minutes.
- Use the initial password upon the first Log-in and change it immediately after login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial 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.

Step 3 Set grid-tied control parameters.

Figure 5-18 Parameter settings

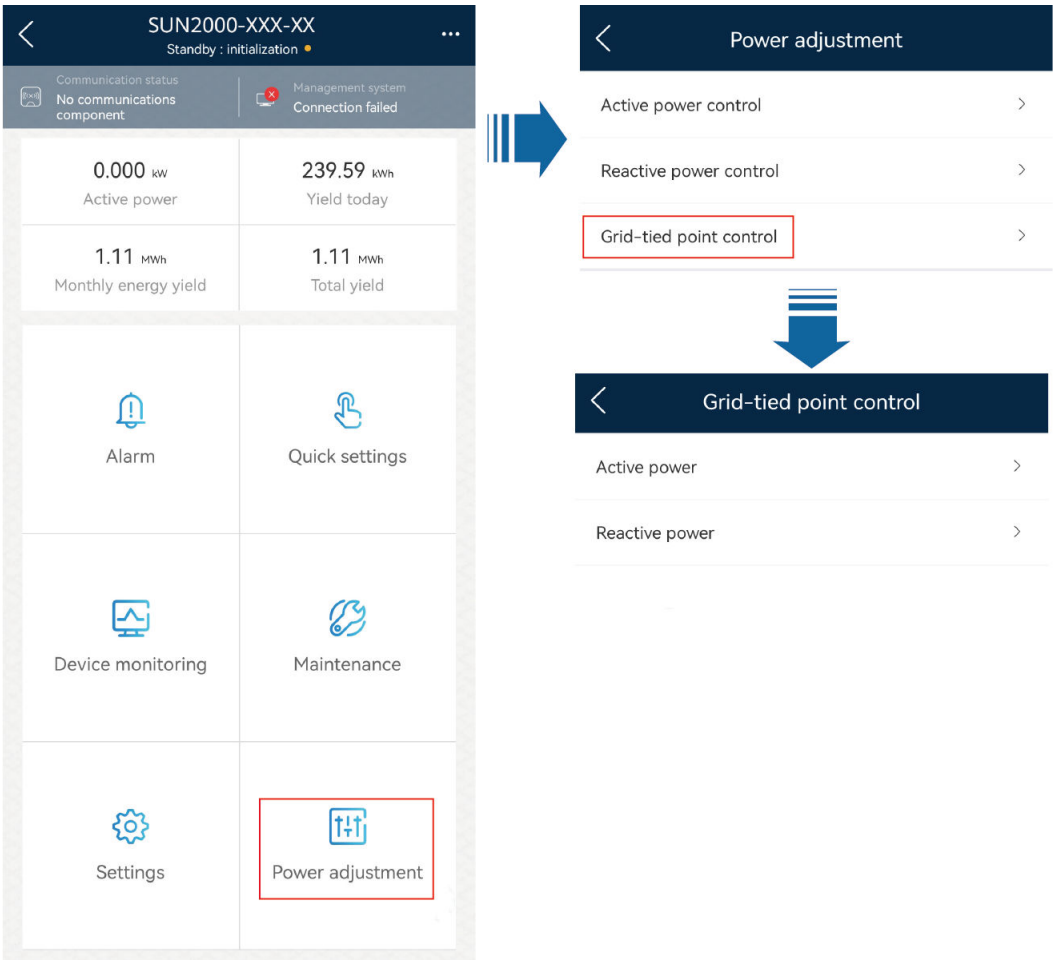


Table 5-2 Control mode

Parameter			Description
Unlimited	N/A	N/A	If this parameter is set to **Unlimited**, the inverter output power is not limited and the inverter can feed its rated power to the power grid.
Grid connection with zero power	Closed-loop controller	• SDongle/ SmartLogger • Inverter	• For a single inverter, set **Closed-loop controller** to **Inverter**. • For multiple inverters, **Closed-loop controller** can only be set to **SDongle/SmartLogger**.
	Limitation mode	• Total power • Single-phase power	• When this parameter is set to **Total power**, no backfeeding occurs on the three phases. • When this parameter is set to **Single-phase power**, no backfeeding occurs on the phase with the maximum power.

Parameter			Description
	Power adjustment period	N/A	Specifies the shortest interval for a single export limitation adjustment.
	Maximum protection time	N/A	• Specifies the time for detecting power meter data. If the Smart Dongle does not detect any power meter data within the preset time, the Smart Dongle delivers the preset value of the **Fail-safe power threshold** to the inverter for protection. • The recommended value is 5s or greater.
	Power control hysteresis	N/A	Specifies the dead zone for adjusting the inverter output power. If the power fluctuates within the power control hysteresis, the power is not adjusted.
	Communication disconnection fail-safe	• Disable • Enable	In the inverter export limitation scenario, if this parameter is set to **Enable**, the inverter will derate according to the active power derating percentage when the communication between the inverter and the Smart Dongle is disconnected for a period longer than **Communication disconnection detection time**.
	Communication disconnection detection time	N/A	Specifies the time for determining the communication disconnection between the inverter and the Smart Dongle. This parameter is displayed when **Communication disconnection fail-safe** is set to **Enable**.
	Active power output limit for fail-safe	N/A	Specifies the derating value of the inverter active power by percentage. If the Smart Dongle does not detect any power meter data or the communication between the Smart Dongle and the inverter is disconnected, the Smart Dongle delivers the derating value of the inverter active power by percentage.

Parameter			Description
Grid connection with limited power (kW)	Closed-loop controller	• SDongle/ SmartLogger • Inverter	• For a single inverter, set **Closed-loop controller** to **Inverter**. • For multiple inverters, **Closed-loop controller** can only be set to **SDongle/SmartLogger**.
	Limitation mode	• Total power • Single-phase power	• When this parameter is set to **Total power**, no backfeeding occurs on the three phases. • When this parameter is set to **Single-phase power**, no backfeeding occurs on the phase with the maximum power.
	PV plant capacity	N/A	Specifies the total maximum active power in the inverter cascading scenario.
	Maximum grid feed-in power (kW)	N/A	Specifies the maximum active power transmitted from the grid-tied point to the power grid.
	Power adjustment period	N/A	Specifies the shortest interval for a single export limitation adjustment.
	Maximum protection time	N/A	• Specifies the time for detecting power meter data. If the Smart Dongle does not detect any power meter data within the preset time, the Smart Dongle delivers the preset value of the **Fail-safe power threshold** to the inverter for protection. • The recommended value is 5s or greater.
	Power control hysteresis	N/A	Specifies the dead zone for adjusting the inverter output power. If the power fluctuates within the power control hysteresis, the power is not adjusted.

Parameter			Description
	Communication disconnection fail-safe	• Disable • Enable	In the inverter export limitation scenario, if this parameter is set to **Enable**, the inverter will derate according to the active power derating percentage when the communication between the inverter and the Smart Dongle is disconnected for a period longer than **Communication disconnection detection time**.
	Communication disconnection detection time	N/A	Specifies the time for determining the communication disconnection between the inverter and the Smart Dongle. This parameter is displayed when **Communication disconnection fail-safe** is set to **Enable**.
	Active power output limit for fail-safe	N/A	Specifies the derating value of the inverter active power by percentage. If the Smart Dongle does not detect any power meter data or the communication between the Smart Dongle and the inverter is disconnected, the Smart Dongle delivers the derating value of the inverter active power by percentage.
Grid connection with limited power (%)	Closed-loop controller	• SDongle/ SmartLogger • Inverter	• For a single inverter, set **Closed-loop controller** to **Inverter**. • For multiple inverters, **Closed-loop controller** can only be set to **SDongle/SmartLogger**.
	Limitation mode	• Total power • Single-phase power	• When this parameter is set to **Total power**, no backfeeding occurs on the three phases. • When this parameter is set to **Single-phase power**, no backfeeding occurs on the phase with the maximum power.
	PV plant capacity	N/A	Specifies the total maximum active power in the inverter cascading scenario.
	Maximum grid feed-in power (%)	N/A	Specifies the percentage of the maximum active power of the grid-tied point to the PV plant capacity.

Parameter			Description
	Power adjustment period	N/A	Specifies the shortest interval for a single export limitation adjustment.
	Maximum protection time	N/A	• Specifies the time for detecting power meter data. If the Smart Dongle does not detect any power meter data within the preset time, the Smart Dongle delivers the preset value of the **Fail-safe power threshold** to the inverter for protection. • The recommended value is 5s or greater.
	Power control hysteresis	N/A	Specifies the dead zone for adjusting the inverter output power. If the power fluctuates within the power control hysteresis, the power is not adjusted.
	Communication disconnection fail-safe	• Disable • Enable	In the inverter export limitation scenario, if this parameter is set to **Enable**, the inverter will derate according to the active power derating percentage when the communication between the inverter and the Smart Dongle is disconnected for a period longer than **Communication disconnection detection time**.
	Communication disconnection detection time	N/A	Specifies the time for determining the communication disconnection between the inverter and the Smart Dongle. This parameter is displayed when **Communication disconnection fail-safe** is set to **Enable**.
	Active power output limit for fail-safe	N/A	Specifies the derating value of the inverter active power by percentage. If the Smart Dongle does not detect any power meter data or the communication between the Smart Dongle and the inverter is disconnected, the Smart Dongle delivers the derating value of the inverter active power by percentage.

----End

5.2.2 Setting Parameters over the WebUI

Prerequisites

- You have matched the devices with the PV plant with the PV plant with the help of the installation contractor.
- The inverter and Smart Dongle have been powered on and communicates properly with the management system.
- You have obtained the login account and password from the installation contractor or Huawei service engineer. If no account or password is available, create an account.

Procedure

Step 1 Enter the management system address in the address box of a browser: https://intl.fusionsolar.huawei.com.

NOTE

- Browser: Chrome 67, Safari 9.0, Internet Explorer 11, or a later version is recommended.
- The software version corresponding to the user interface (UI) snapshots is SmartPVMS V500R007C00CP2101. The UIs may vary with software versions and are for reference only.

Step 2 If you have obtained the login account and password from the installation contractor or Huawei service engineer, enter the account and password, and click **Login** to go to the home page. If you have not created an account, click **Installer Registration**, fill in the registration information, and activate the account with the email verification code sent to you.

Figure 5-19 Login page

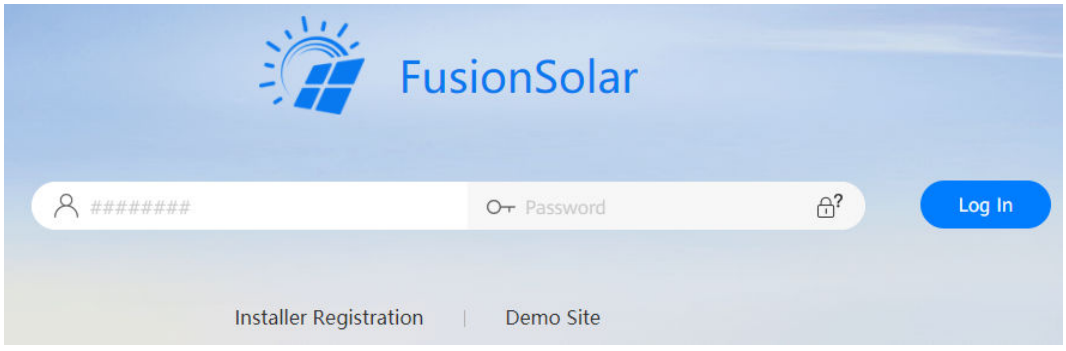
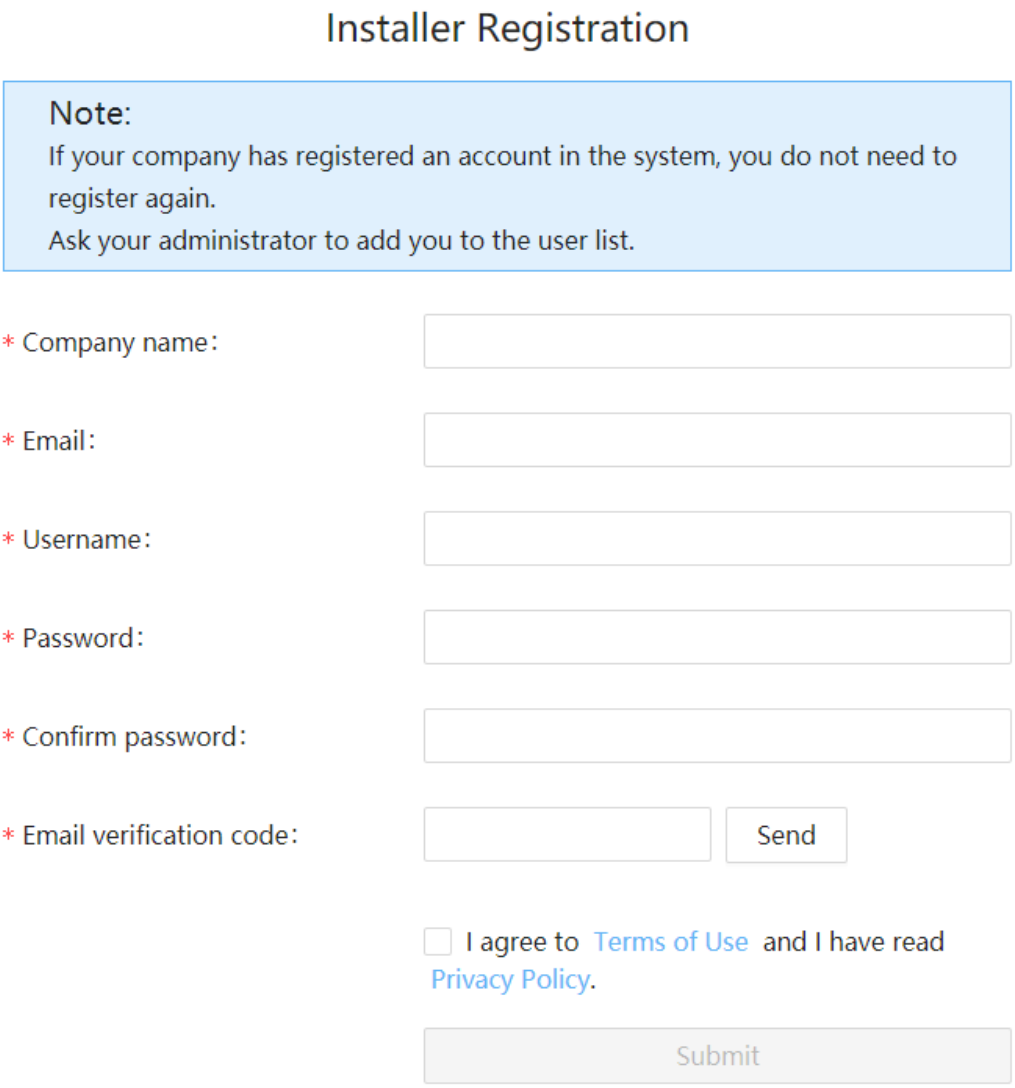
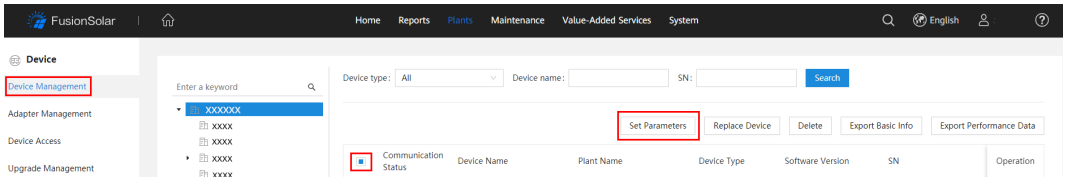


Figure 5-20 Registering an account



Step 3 On the home page, click **Plants** in the upper-right corner to go to the **Device** page, and choose **Device Management**, select the corresponding PV plant, select **Smart Dongle**, and click **Ser Parameters**.

Figure 5-21 Setting export limitation 1



Step 4 Choose **Active Power Control** and set related parameters.

Figure 5-22 Setting export limitation 2

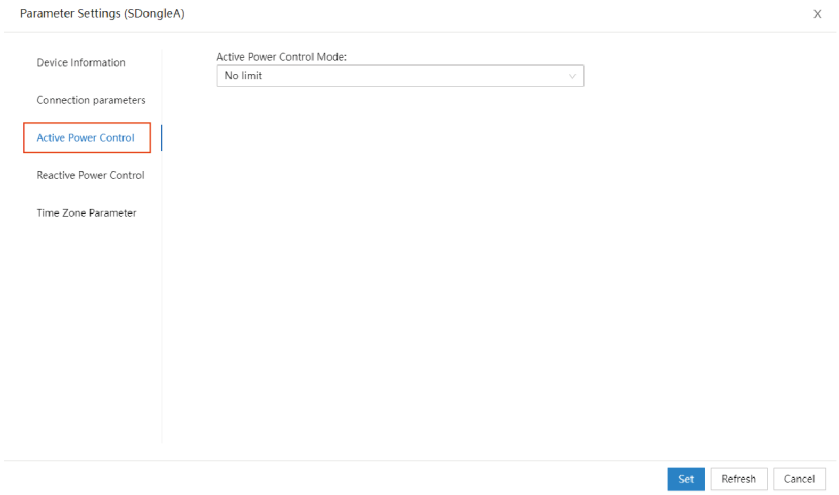


Table 5-3 Active power control mode

Parameter			Description
Unlimited	N/A	N/A	If this parameter is set to **Unlimited**, the inverter output power is not limited and the inverter can feed its rated power to the power grid.
Grid connection with zero power	Closed-loop controller	• SDongle/ SmartLogger • Inverter	• For a single inverter: When the Smart Dongle is connected, set **Closed-loop controller** to **Inverter**. When the inverter is directly connected, **Closed-loop controller** to **Inverter**. When the SmartLogger is connected, set **Closed-loop controller** to **SDongle/SmartLogger**. • For multiple inverters, **Closed-loop controller** can only be set to **SDongle/SmartLogger**.
	Limitation mode	• Total power • Single-phase power	• When this parameter is set to **Total power**, no backfeeding occurs on the three phases. • When this parameter is set to **Single-phase power**, no backfeeding occurs on the phase with the maximum power.
	Power adjustment period	N/A	Specifies the shortest interval for a single export limitation adjustment.

Parameter			Description
	Maximum protection time	N/A	• Specifies the time for detecting power meter data. If the Smart Dongle does not detect any power meter data within the preset time, the Smart Dongle delivers the preset value of the **Fail-safe power threshold** to the inverter for protection. • The recommended value is 5s or greater.
	Power control hysteresis	N/A	Specifies the dead zone for adjusting the inverter output power. If the power fluctuates within the power control hysteresis, the power is not adjusted.
	Fail-safe power threshold	N/A	Specifies the derating value of the inverter active power by percentage. If the Smart Dongle does not detect any power meter data or the communication between the Smart Dongle and the inverter is disconnected, the Smart Dongle delivers the derating value of the inverter active power by percentage.
Grid connection with limited power (kW)	Closed-loop controller	• SDongle/ SmartLogger • Inverter	• For a single inverter: When the Smart Dongle is connected, set **Closed-loop controller** to **Inverter**. When the inverter is directly connected, **Closed-loop controller** to **Inverter**. When the SmartLogger is connected, set **Closed-loop controller** to **SDongle/SmartLogger**. • For multiple inverters, **Closed-loop controller** can only be set to **SDongle/SmartLogger**.
	Limitation mode	• Total power • Single-phase power	• When this parameter is set to **Total power**, no backfeeding occurs on the three phases. • When this parameter is set to **Single-phase power**, no backfeeding occurs on the phase with the maximum power.
	PV plant capacity	N/A	Specifies the total maximum active power in the inverter cascading scenario.

Parameter			Description
	Maximum grid feed-in power (kW)	N/A	Specifies the maximum active power transmitted from the grid-tied point to the power grid.
	Power adjustment period	N/A	Specifies the shortest interval for a single export limitation adjustment.
	Maximum protection time	N/A	• Specifies the time for detecting power meter data. If the Smart Dongle does not detect any power meter data within the preset time, the Smart Dongle delivers the preset value of the **Fail-safe power threshold** to the inverter for protection. • The recommended value is 5s or greater.
	Power control hysteresis	N/A	Specifies the dead zone for adjusting the inverter output power. If the power fluctuates within the power control hysteresis, the power is not adjusted.
	Fail-safe power threshold	N/A	Specifies the derating value of the inverter active power by percentage. If the Smart Dongle does not detect any power meter data or the communication between the Smart Dongle and the inverter is disconnected, the Smart Dongle delivers the derating value of the inverter active power by percentage.
Grid connection with limited power (%)	Closed-loop controller	• SDongle/ SmartLogger • Inverter	• For a single inverter: When the Smart Dongle is connected, set **Closed-loop controller** to **Inverter**. When the inverter is directly connected, **Closed-loop controller** to **Inverter**. When the SmartLogger is connected, set **Closed-loop controller** to **SDongle/SmartLogger**. • For multiple inverters, **Closed-loop controller** can only be set to **SDongle/SmartLogger**.

Parameter			Description
	Limitation mode	• Total power • Single-phase power	• When this parameter is set to **Total power**, no backfeeding occurs on the three phases. • When this parameter is set to **Single-phase power**, no backfeeding occurs on the phase with the maximum power.
	PV plant capacity	N/A	Specifies the total maximum active power in the inverter cascading scenario.
	Maximum grid feed-in power (%)	N/A	Specifies the percentage of the maximum active power of the grid-tied point to the PV plant capacity.
	Power adjustment period	N/A	Specifies the shortest interval for a single export limitation adjustment.
	Maximum protection time	N/A	• Specifies the time for detecting power meter data. If the Smart Dongle does not detect any power meter data within the preset time, the Smart Dongle delivers the preset value of the **Fail-safe power threshold** to the inverter for protection. • The recommended value is 5s or greater.
	Power control hysteresis	N/A	Specifies the dead zone for adjusting the inverter output power. If the power fluctuates within the power control hysteresis, the power is not adjusted.
	Fail-safe power threshold	N/A	Specifies the derating value of the inverter active power by percentage. If the Smart Dongle does not detect any power meter data or the communication between the Smart Dongle and the inverter is disconnected, the Smart Dongle delivers the derating value of the inverter active power by percentage.

----End

6 Maintenance

6.1 Modifying Inverter Communications Parameters

Prerequisites

- The FusionSolar app is recommended when the inverter is connected to the FusionSolar Smart PV Management System. The SUN2000 app is recommended when the inverter is connected to other management systems.
- You have downloaded and installed the FusionSolar app which can be obtained by searching for **FusionSolar** in Huawei AppGallery or scanning the QR code.

  FusionSolar APP
- SUN2000 APP: Search for "SUN2000" in Huawei AppGallery, download the latest installation package, and install the SUN2000 app by following the instructions.

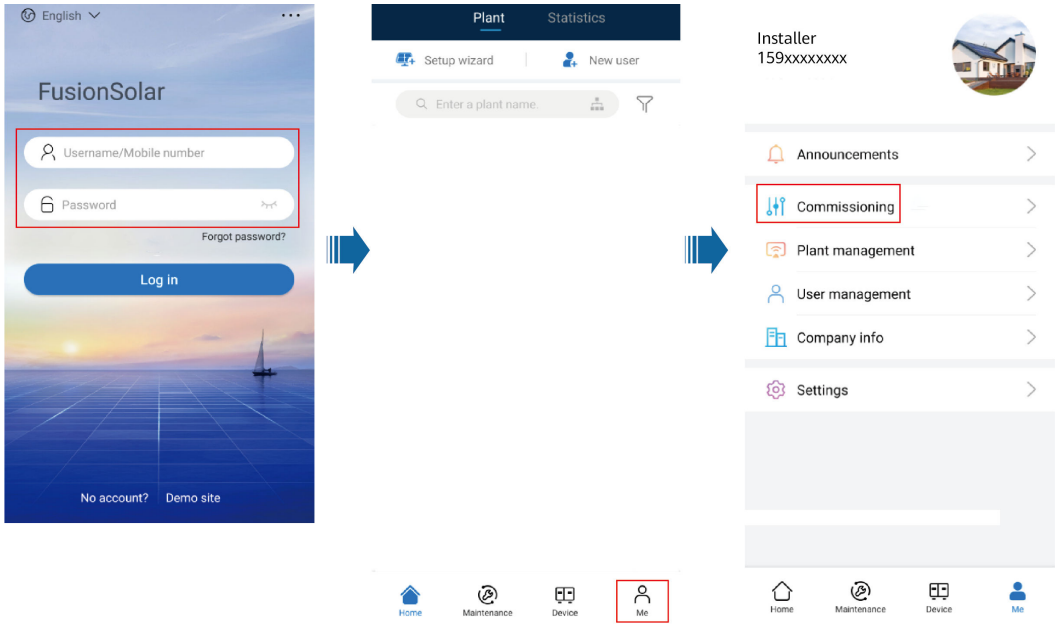
NOTE

- In areas (such as the UK) where the FusionSolar app is not available, or when a third-party management system is used, only the SUN2000 app can be used for commissioning. This document uses the FusionSolar app as an example to describe the commissioning method. For the SUN2000 app, perform operations as required.
- The SUN2000 app version should be 3.2.00.005 (Android) or later.

6.1.1 WLAN Communication Networking

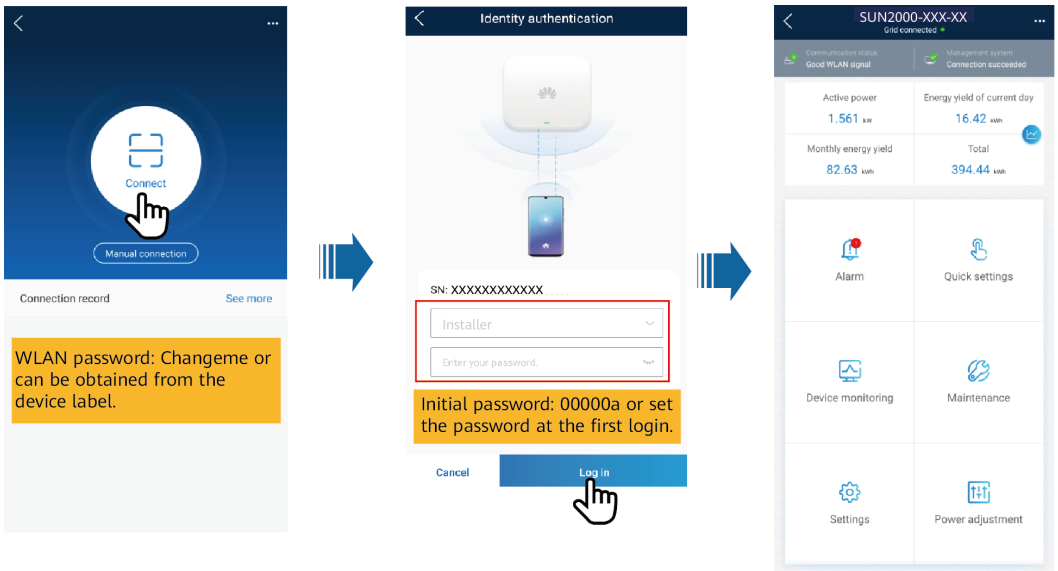
Step 1 Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)

Figure 6-1 Device commissioning



Step 2 Connect to the inverter.

Figure 6-2 Connecting to the inverter



NOTE

- The inverter WLAN password can be changed on the **Communication configuration** screen. You can tap ••• in the upper-right corner of the home screen to change the login password for **Common User**, **Advanced User**, **Special User**, and **installer**.
- If you enter wrong login passwords for **installer** for five consecutive times and the interval between two attempts is within 2 minutes, your account will be locked. Log in to the app again after 5 minutes.
- Use the initial password upon the first Log-in and change it immediately after login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial 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.

Step 3 Tap **Communication configuration** and set the parameters for **Router connection settings**.

Figure 6-3 Inverter communication settings

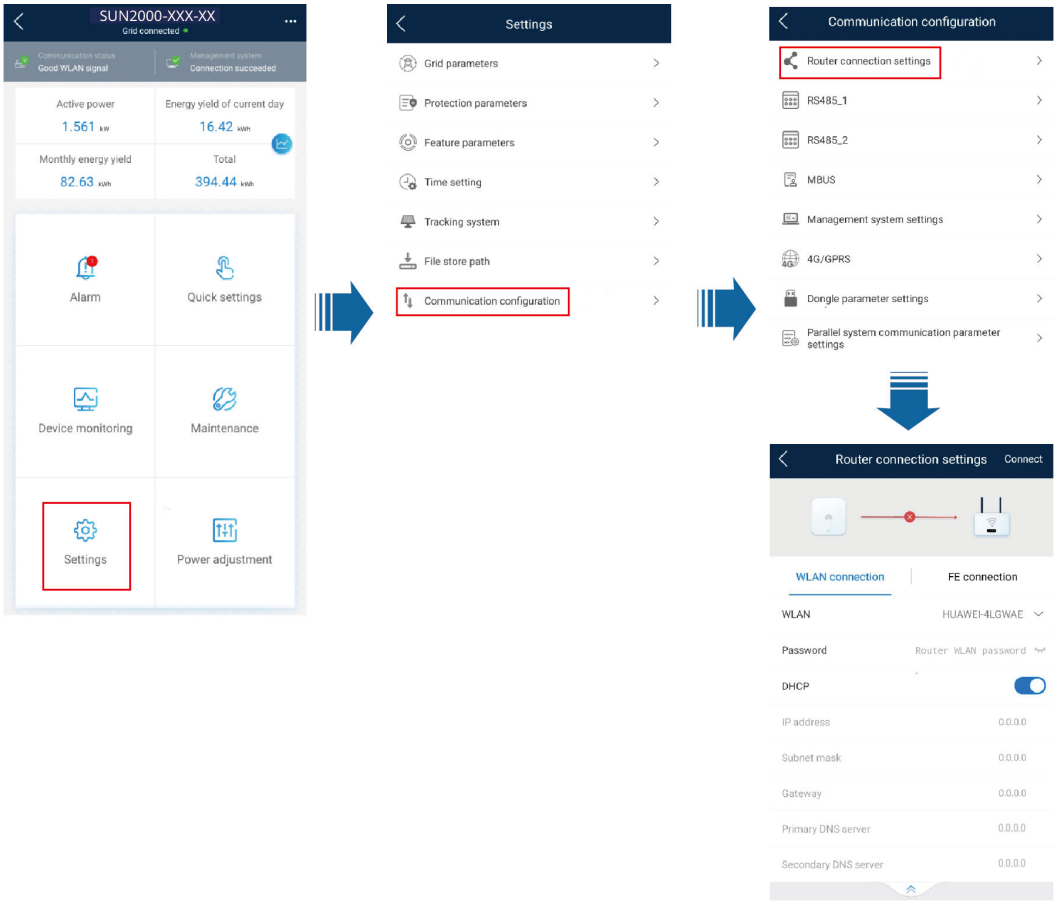


Table 6-1 Parameter description

Type	Parameter	Setting Description
Inverter's connection to a router	WLAN list	Specifies the name of the wireless network.
	Password	Specifies the password for logging in to the wireless network.
	DHCP	• Enable this parameter if you use the IP address automatically allocated by the router. In this case, the values of **IP address**, **Subnet mask**, **Gateway**, **Primary DNS server**, and **Secondary DNS server** are automatically allocated. • Disable this parameter if you do not use the IP address automatically allocated by the router. In this case, you need to set the values of **IP address**, **Subnet mask**, **Gateway**, **Primary DNS server**, and **Secondary DNS server**.
	IP address	Specifies the IP address for the router to which the inverter WLAN network connects. The IP address must be in the same network segment as the router IP address.
	Subnet mask	Specifies the router subnet mask.
	Gateway	Specifies the router gateway address.
	Primary DNS server	Specifies the address for the primary domain name service (DNS) server.
	Secondary DNS server	Specifies the address for the secondary DNS server.

Table 6-2 Description of icons

Icon	Router			Management system	
					
Meaning	Disconnected	Incorrect password	Connected; signal strength	Connection failed.	Connection is successful.

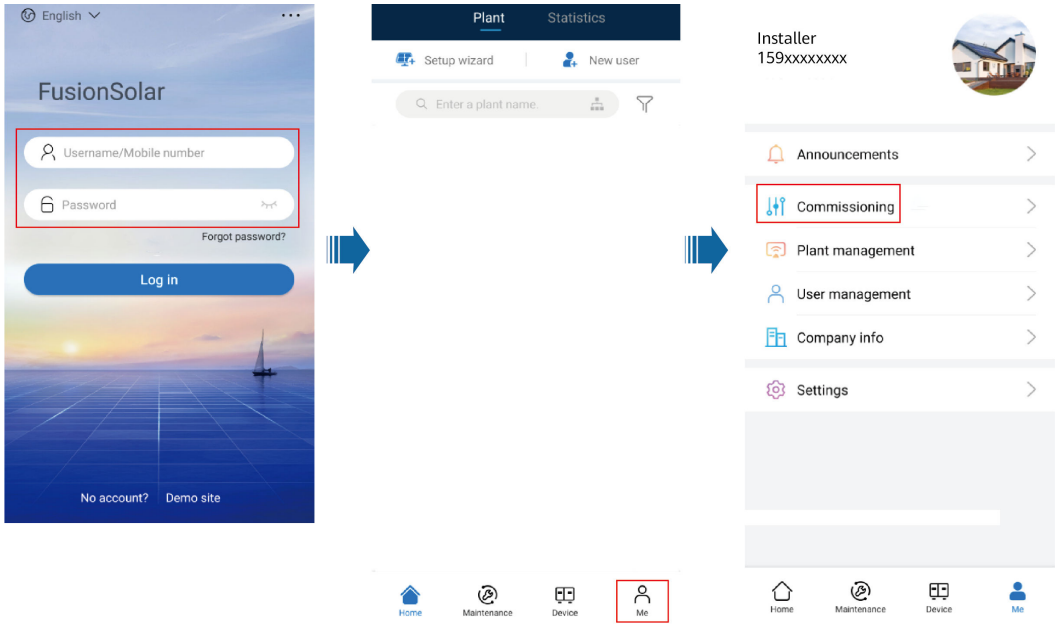
----End

6.1.2 4G Communication Networking

Procedure

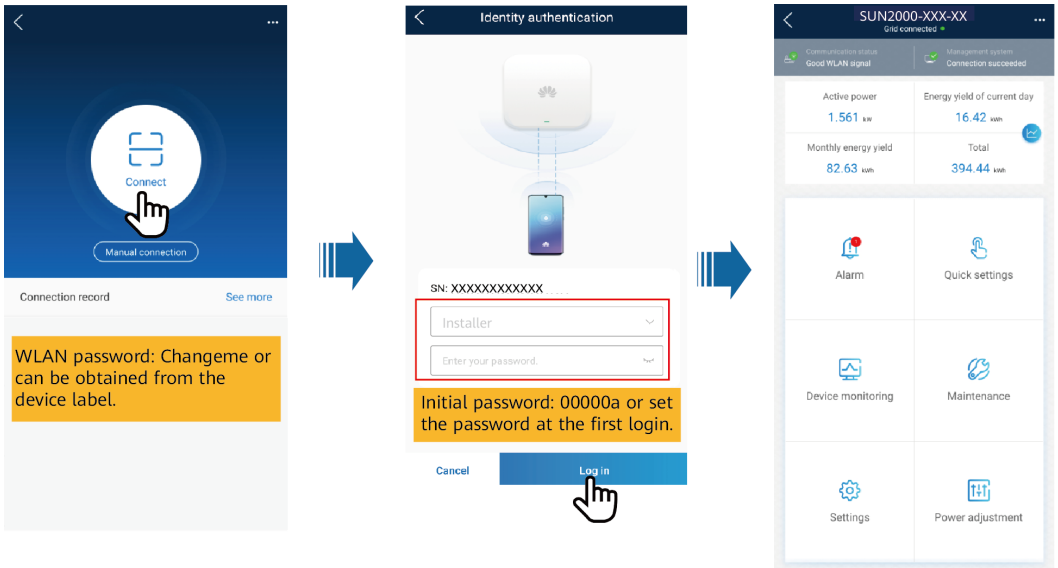
Step 1 Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)

Figure 6-4 Device commissioning



Step 2 Connect to the inverter.

Figure 6-5 Connecting to the inverter



NOTE

- The inverter WLAN password can be changed on the **Communication configuration** screen. You can tap ••• in the upper-right corner of the home screen to change the login password for **Common User**, **Advanced User**, **Special User**, and **installer**.
- If you enter wrong login passwords for **installer** for five consecutive times and the interval between two attempts is within 2 minutes, your account will be locked. Log in to the app again after 5 minutes.
- Use the initial password upon the first Log-in and change it immediately after login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial 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.

Step 3 Tap **Communication configuration** and set **4G** parameters.

Figure 6-6 Inverter communication settings

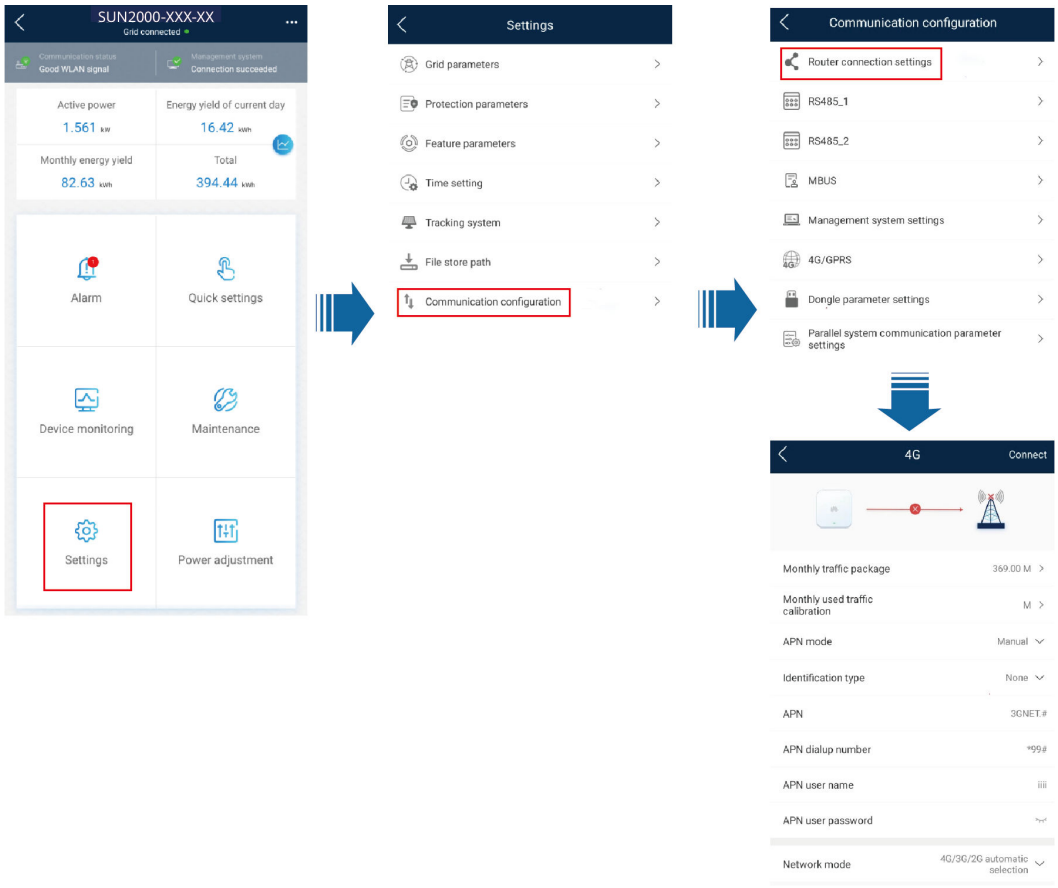


Table 6-3 Parameter description

Type	Parameter	Setting Description
4G	APN mode	• Set the parameters related to the SIM card based on the information provided by the SIM card carrier.
	APN	

Type	Parameter	Setting Description
	APN dialup number	• When **APN mode** is set to **Manual**, **APN**, **APN dialup number**, **APN user name**, and **APN user password** are all displayed and configurable. When **APN mode** is set to **Automatic**, these parameters are not displayed.
	APN user name	
	APN user password	
	Network mode	
	PIN	

Table 6-4 Description of icons

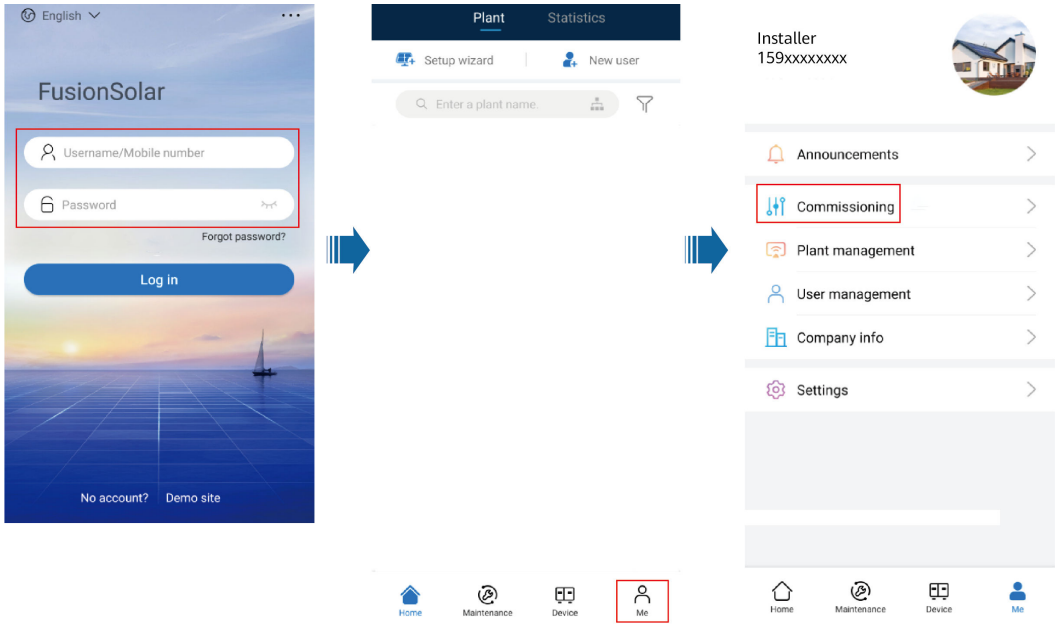
Icon	SIM card			Management system	
					
Meaning	Enter the PIN.	No SIM card	Not connected; signal strength	Connection failed.	Connection is successful.
Icon				N/A	N/A
Meaning	Enter the PUK.	Failed to read the card. The signal is poor or the subscriber is in arrears.	Connected; signal strength	N/A	N/A

----End

6.1.3 FE Communication Networking

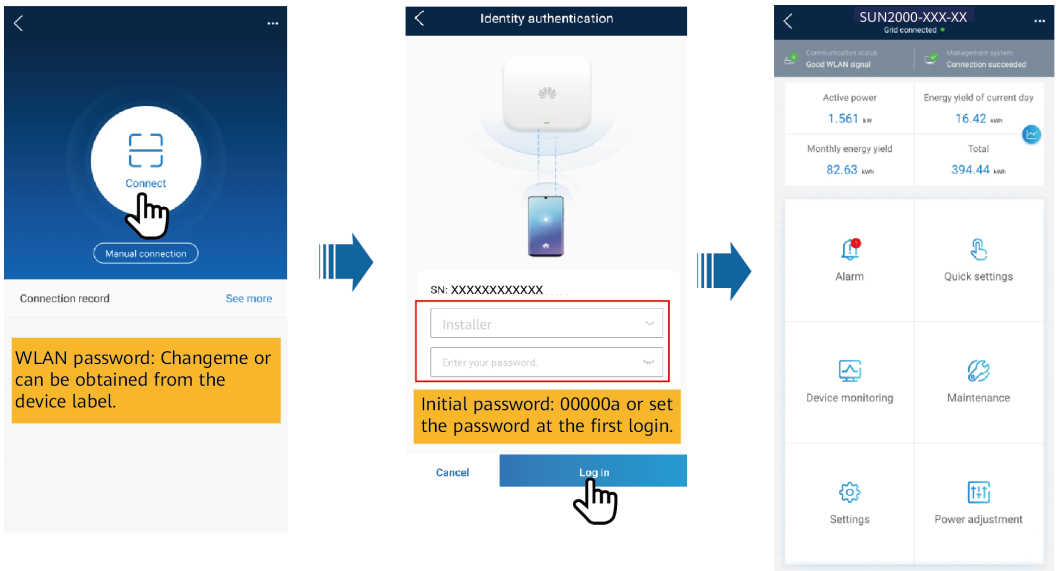
Step 1 Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)

Figure 6-7 Device commissioning



Step 2 Connect to the inverter.

Figure 6-8 Connecting to the inverter



NOTE

- The inverter WLAN password can be changed on the **Communication configuration** screen. You can tap ••• in the upper-right corner of the home screen to change the login password for **Common User**, **Advanced User**, **Special User**, and **installer**.
- If you enter wrong login passwords for **installer** for five consecutive times and the interval between two attempts is within 2 minutes, your account will be locked. Log in to the app again after 5 minutes.
- Use the initial password upon the first Log-in and change it immediately after login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial 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.

Step 3 Tap **Communication configuration** and set the parameters for **Router connection settings**.

Figure 6-9 Inverter communication settings

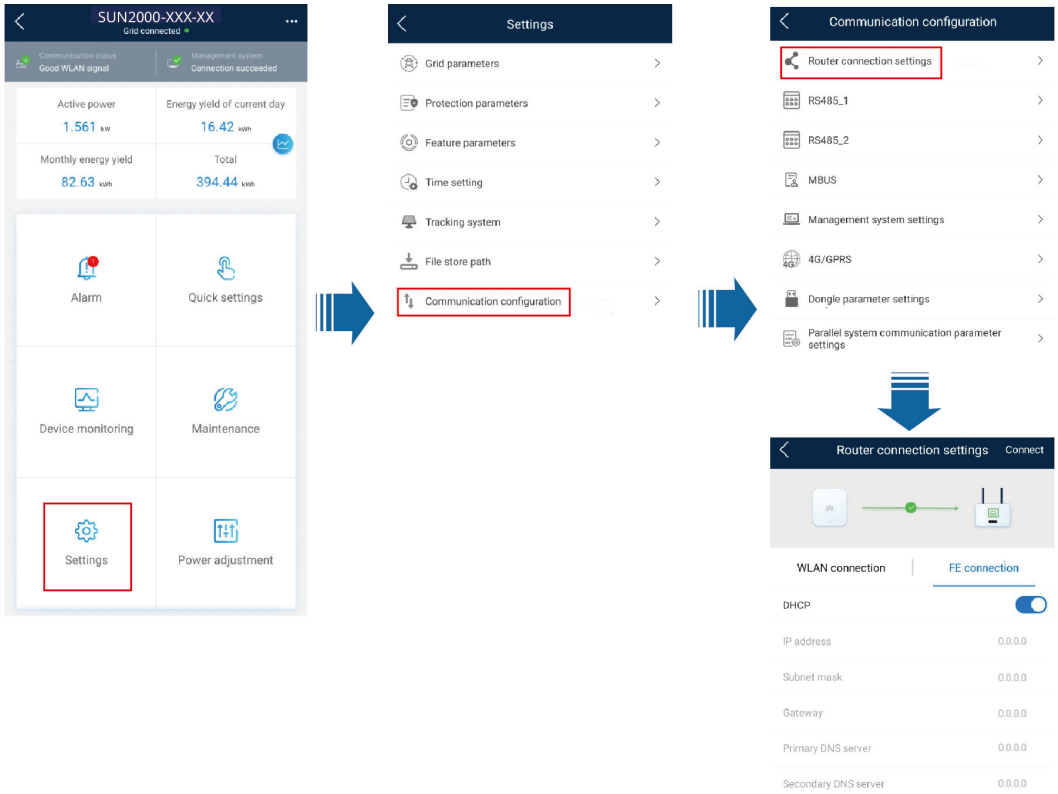


Table 6-5 Parameter description

Type	Parameter	Setting Description
Inverter's connection to a router	DHCP	• Enable this parameter if you use the IP address automatically allocated by the router. In this case, the values of **IP address**, **Subnet mask**, **Gateway**, **Primary DNS server**, and **Secondary DNS server** are automatically allocated. • Disable this parameter if you do not use the IP address automatically allocated by the router. In this case, you need to set the values of **IP address**, **Subnet mask**, **Gateway**, **Primary DNS server**, and **Secondary DNS server**.
	IP address	Specifies the IP address for the router to which the inverter WLAN network connects. The IP address must be in the same network segment as the router IP address.
	Subnet mask	Specifies the router subnet mask.
	Gateway	Specifies the router gateway address.
	Primary DNS server	Specifies the address for the primary domain name service (DNS) server.
	Secondary DNS server	Specifies the address for the secondary DNS server.

Table 6-6 Description of icons

Icon	Router			Management system	
					
Meaning	Connection failed.	Connecting ...	Connection is successful.	Connection failed.	Connection is successful.

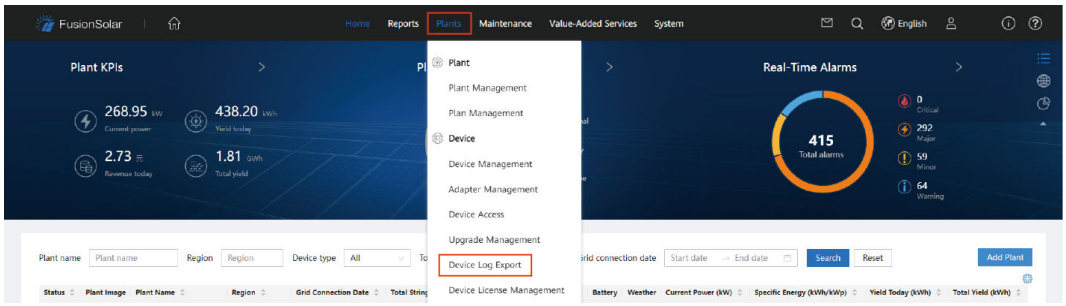
----End

6.2 Exporting Inverter and Smart Dongle Logs

Procedure

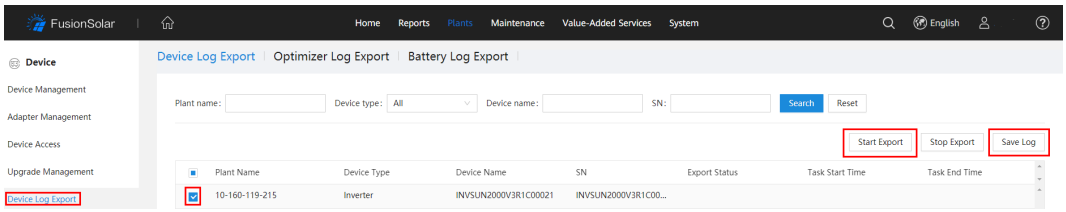
Step 1 Log in to the management system, click **Settings** in the upper-right corner to go to the **System Settings** page, and choose **Log Export**.

Figure 6-10 System Settings page



Step 2 Select devices and click **Start Export** to create an export task. When the export status is **Succeeded**, select the corresponding logs and click **Save Log** to save the logs locally.

Figure 6-11 Exporting and saving logs



----End

6.3 Upgrading the Inverter and Smart Dongle Software

Prerequisites

- You have contacted Huawei technical support engineers to upload the upgrade package of the software.
- The FusionSolar app is recommended when the inverter is connected to the FusionSolar Smart PV Management System. The SUN2000 app is recommended when the inverter is connected to other management systems.
- You have downloaded and installed the FusionSolar app which can be obtained by searching for **FusionSolar** in Huawei AppGallery or scanning the QR code.

  FusionSolar APP

- SUN2000 APP: Search for "SUN2000" in Huawei AppGallery, download the latest installation package, and install the SUN2000 app by following the instructions.

Connecting to the Inverter over the App

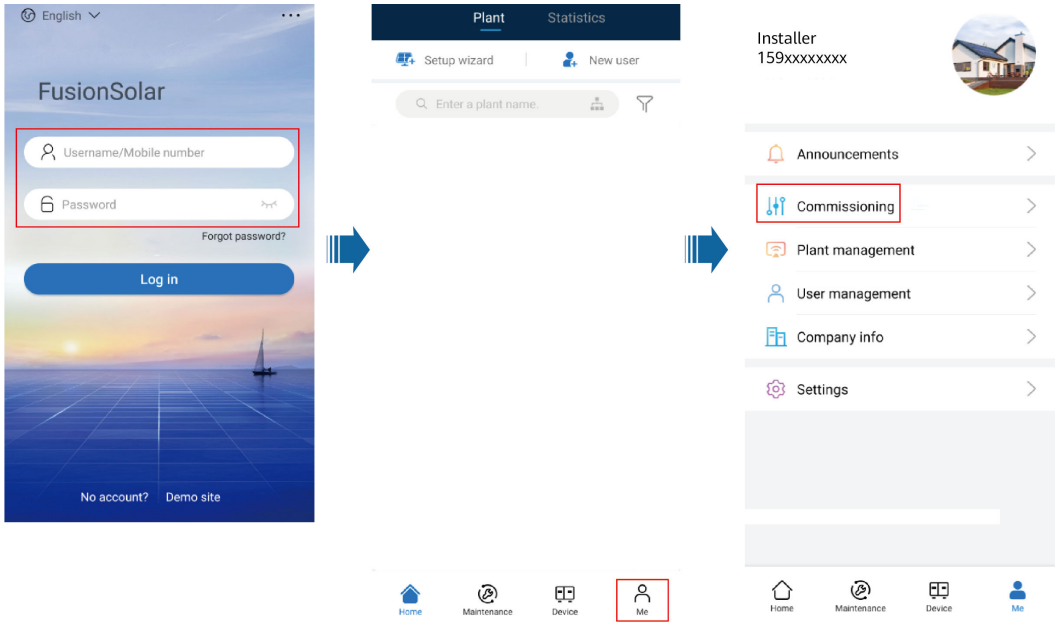
Step 1 Ensure that the Smart Dongle to be upgraded is inserted into a running inverter. Wait for more than 2 minutes, remove the Smart Dongle, and connect the WLAN module, Bluetooth module, or USB data cable to the inverter.

NOTE

Perform this step if communication with the inverter over a WLAN module, Bluetooth module, or USB data cable is required.

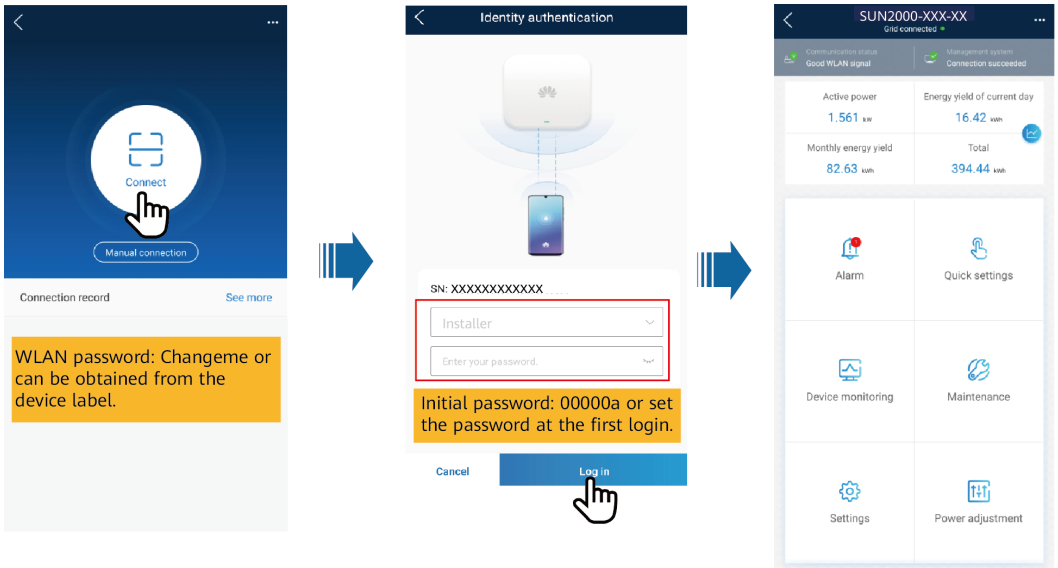
Step 2 Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)

Figure 6-12 Device commissioning



Step 3 Connect to the inverter.

Figure 6-13 Connecting to the inverter



NOTE

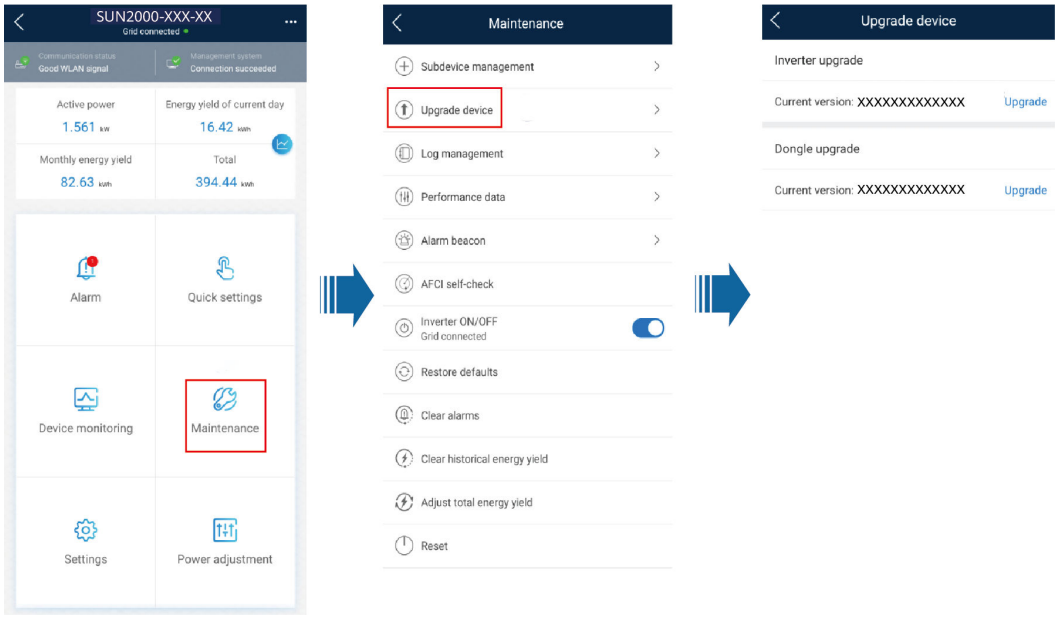
- The inverter WLAN password can be changed on the **Communication configuration** screen. You can tap ••• in the upper-right corner of the home screen to change the login password for **Common User**, **Advanced User**, **Special User**, and **installer**.
- If you enter wrong login passwords for **installer** for five consecutive times and the interval between two attempts is within 2 minutes, your account will be locked. Log in to the app again after 5 minutes.
- Use the initial password upon the first Log-in and change it immediately after login. To ensure account security, change the password periodically and keep the new password in mind. Not changing the initial 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.

Step 4 Upgrade a device as prompted.

NOTE

- Prepare the upgrade package before upgrading the device.
- Delivering an upgrade command to an inverter may cause power grid connection failure of the inverter and affect the energy yield.

Figure 6-14 Upgrading a device



----End

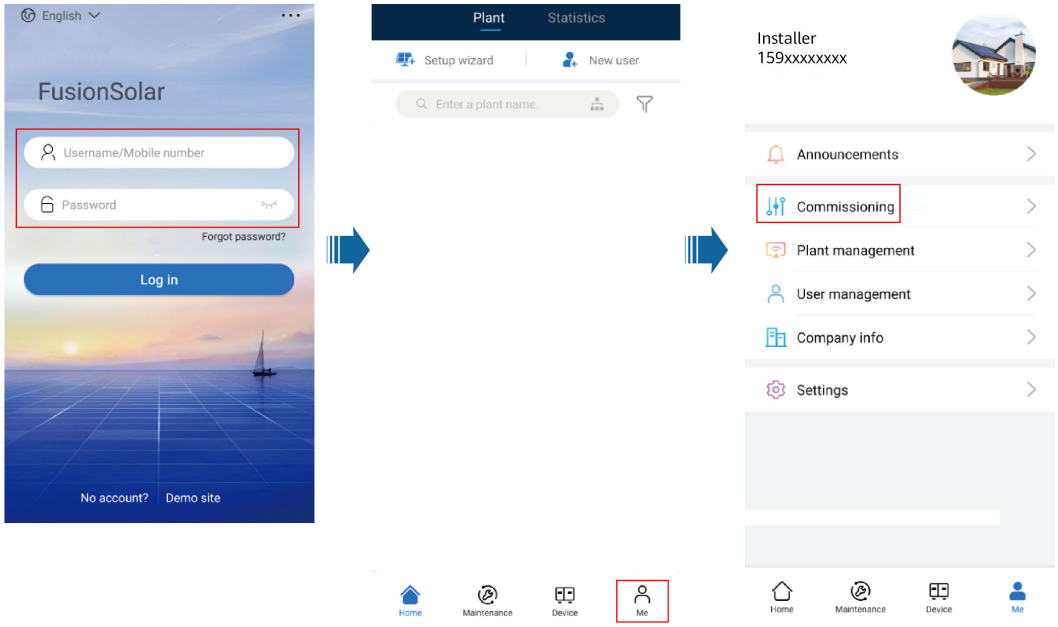
Connecting to the Smart Dongle over the App

NOTE

Only SDongleA-05 supports this upgrade mode.

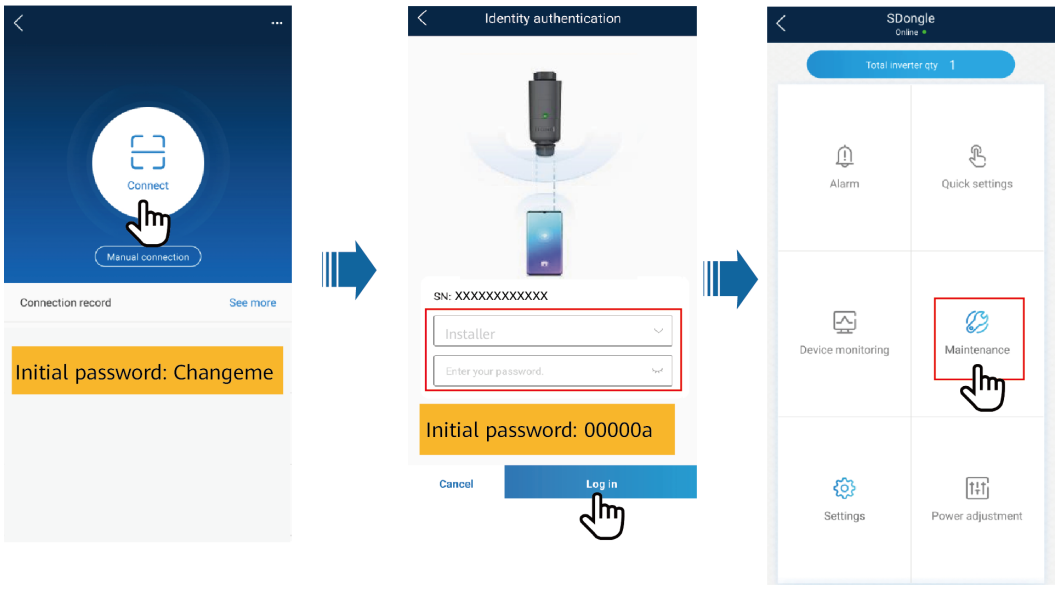
Step 1 Run the FusionSolar app and go to the **Device commissioning** screen. (Perform this step only for the FusionSolar app.)

Figure 6-15 Device commissioning



Step 2 Connect the Smart Dongle.

Figure 6-16 Connecting the Smart Dongle

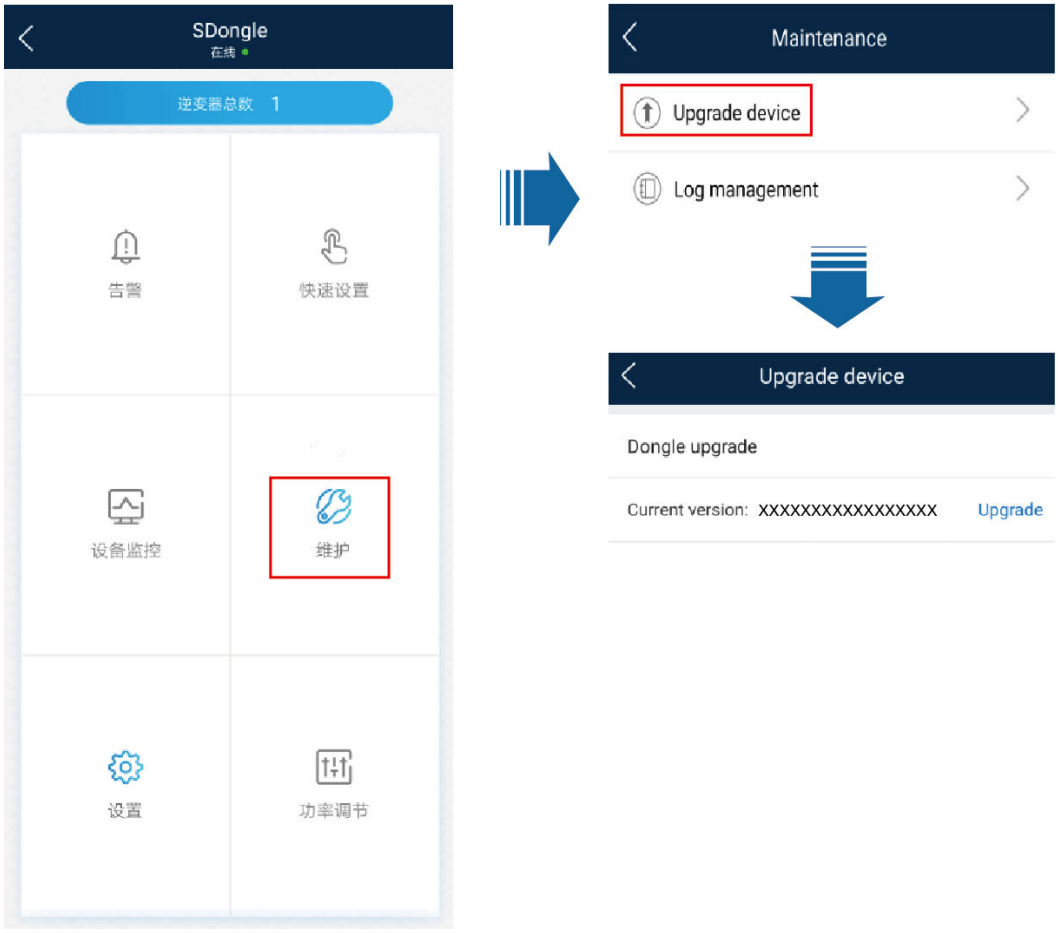


Step 3 Upgrade a device as prompted.

NOTE

Prepare the upgrade package before upgrading the device.

Figure 6-17 Upgrading a device

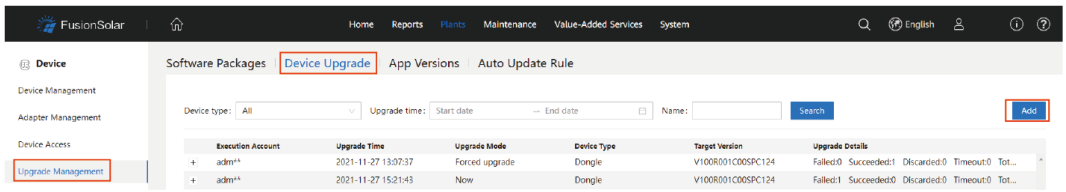


----End

Over the WebUI

Step 1 Log in to the management system, click **Settings** in the upper-right corner to go to the **System Settings** page, and choose **Upgrade Management**. On the **Device Upgrade** tab page, click **Add**, and create an upgrade task.

Figure 6-18 Creating an upgrade task

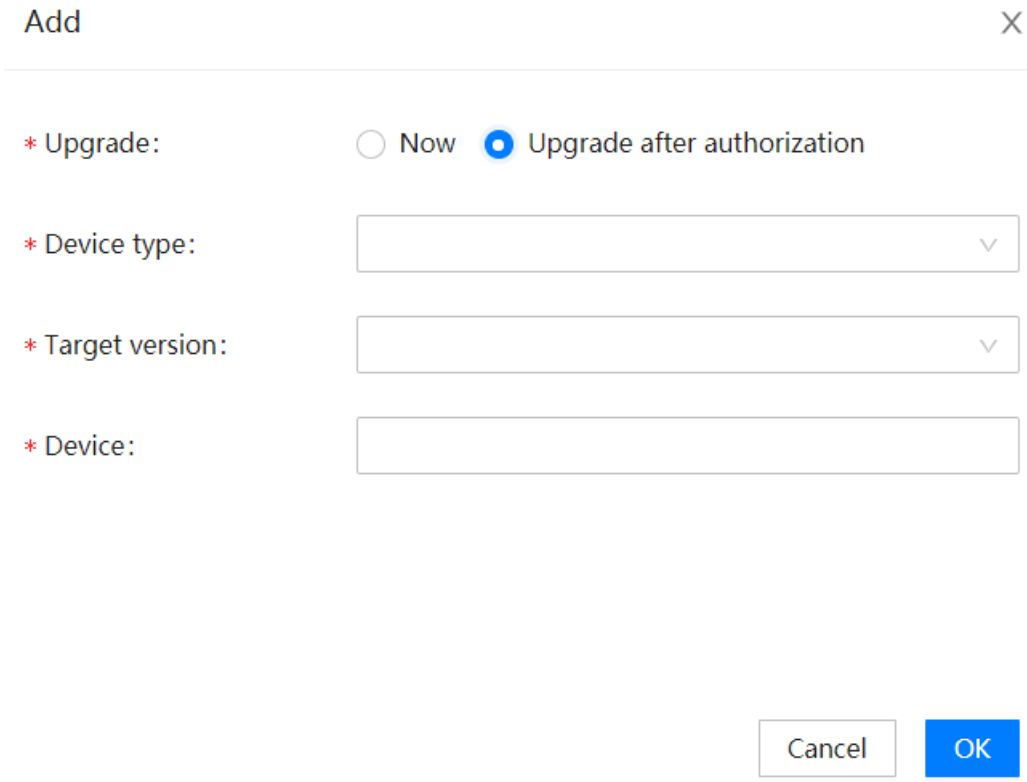


Step 2 Set **Upgrade Mode**, **Device type**, **Target version**, and **Device selection**, and click **Confirm** to upgrade the devices.

NOTE

If the update after confirmation mode is selected, the device can be updated only after the user's consent is obtained.

Figure 6-19 Device upgrade



----End

6.4 Updating the Device List

When a device connected to the Smart Dongle is deleted or replaced, you need to update the plant device information on the **Device Management** page.

Prerequisites

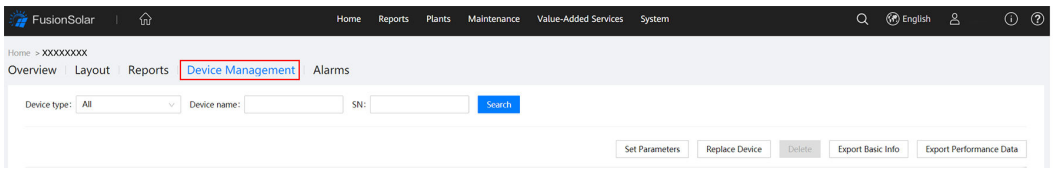
The PV plant to be updated communicates properly with the FusionSolar Smart PV Management System.

Procedure

Step 1 On the home page of the management system, select the plant to be modified from the plant list.

Step 2 On the **Device Management** page, select the target device, and then delete or replace the device.

Figure 6-20 Device management



NOTE

Replacing inverters does not affect the total energy yield of the PV plant.

----End

6.5 Replacing the Smart Dongle and the Master Inverter

6.5.1 Replacing the Smart Dongle

Replacing a Faulty Smart Dongle with a Smart Dongle of the Same Model

NOTE

If SDongleA-01, SDongleA-03, or SDongleA-05 is faulty, only SDongleA of the same model can be used to replace it.

Step 1 Remove the faulty Smart Dongle.

Step 2 Replace the SIM card. (Perform this step when the 4G communication mode is used.)

- If the purchased Smart Dongle has a built-in SIM card, replace the Smart Dongle without replacing the SIM card.
- If the purchased Smart Dongle does not have a built-in SIM card, use the SIM card in the faulty Smart Dongle.

Step 3 Install a new Smart Dongle onto the inverter where the faulty Smart Dongle was installed.

Step 4 Set the password for logging in to the WLAN. (Perform this step when the WLAN communication mode is used.)

----End

Replacing a Faulty Smart Mobile-4G with an SDongleA-03

NOTE

- Replacing a Faulty Smart Mobile-4G-CN with an SDongleA-03-CN.
- Replacing a Faulty Smart Mobile-4G-EU with an SDongleA-03-EU.

Step 1 Check that the software version of the master inverter supports the SDongleA-03. If the software version does not support the SDongleA-03, upgrade the software version of the master inverter.

Step 2 Remove the faulty Smart Dongle.

Step 3 Replace the SIM card. (Perform this step when the 4G communication mode is used.)

- If the purchased Smart Dongle has a built-in SIM card, replace the Smart Dongle without replacing the SIM card.

- If the purchased Smart Dongle does not have a built-in SIM card, use the SIM card in the faulty Smart Dongle.

Step 4 Set the password for logging in to the WLAN. (Perform this step when the WLAN communication mode is used.)

----End

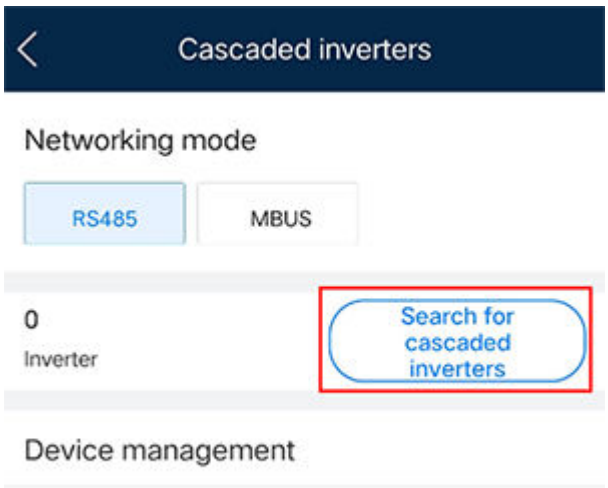
6.5.2 Replacing the Master Inverter

Step 1 When the MBUS is used for networking, use the app to change the cascading mode of the original master inverter to RS485 through **Quick settings**.

NOTE

Tap **Search for Cascaded Inverters** and exit after 5s.

Figure 6-21 Setting inverter cascading



Step 2 Remove the Smart Dongle and install it on the new master inverter.

Step 3 Set up a site and commission the new master inverter.

----End

6.6 Troubleshooting Common Issues

Table 6-7 Common faults and troubleshooting measures

Fault	Cause	Troubleshooting
Huawei FusionSolar Smart PV Management System shows that the communication with the inverter is interrupted.	1. The RS485 cables among inverters are loose or disconnected. 2. The PV string is not properly connected, and the inverter has no DC input. 3. The baud rate or RS485 address of the inverter is changed. 4. An inverter is replaced. 5. The inverter has been removed. 6. The Smart Dongle is faulty.	1. Check that the RS485 cables among inverters are properly connected and tightened. 2. Check that the inverter is correctly connected and power on the inverter. 3. Check that the baud rate and RS485 address of the inverter are set correctly. 4. Check whether any inverter has been replaced. If yes, search for the new inverter on the management system. 5. If an inverter has been removed, search for inverters again on the management system. 6. Replace the Smart Dongle.
The SN of the Smart Dongle cannot be identified by the FusionSolar app.	The bar code is damaged and cannot be scanned.	Manually enter the SN on the **Add Device** screen on the FusionSolar app.
The devices connected to the Smart Dongle are not connected to the Huawei FusionSolar Smart PV Management System properly.	1. Check whether the inverter software version meets the requirements. If not, upgrade the inverter to a specified version or later. 2. Check that the RS485 communications cables are connected properly. 3. Check that the RS485 communications parameters of the inverter are set correctly. 4. Check that the inverter communications parameters are correctly set.	If the inverters cannot be detected after troubleshooting, the Smart Dongle is faulty. Contact Huawei technical support.

Fault	Cause	Troubleshooting
After the Smart Dongle is replaced, the connection to the management system using the original SIM card fails.	The SIM card is bound to the original Smart Dongle.	Contact the carrier of the SIM card to unbind the SIM card from the Smart Dongle.

7 Acronyms and Abbreviations

A	
app	Application
L	
LCD	liquid crystal display
S	
SN	Serial Number
U	
USB	Universal Serial Bus

