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FusionSolar Commercial & Industrial Smart PV Solution Technical Training (PV Only)



Issue: 01

Date: 2022-09-16

Digital PV Solution for Upgraded Safety & Better Experience



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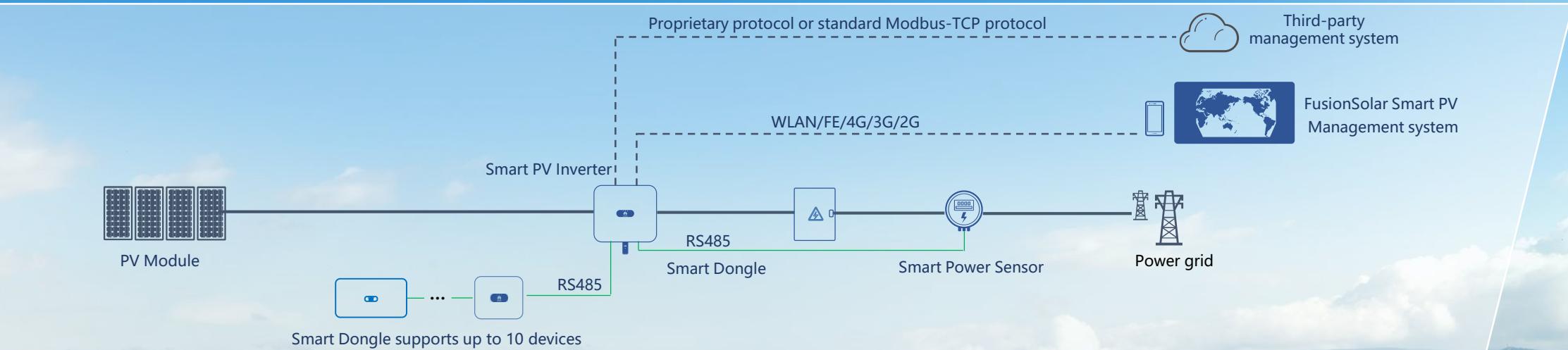
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1. Smart Dongle Networking



Smart PV Inverter
SUN2000-12/15/17/20/25KTL-M
SUN2000-12/15/17/20KTL-M2

Smart Dongle
(Smart Dongle-WLAN-FE)
SDongleA-05

Smart Power Sensor
DTSU666-H 250 A/50 mA
DTSU666-H 100 A
DTSU666-HW

Monitoring Portal
FusionSolar Cloud & APP

Smart PV Inverter
SUN2000-
29.9/30/36/40KTL-M3

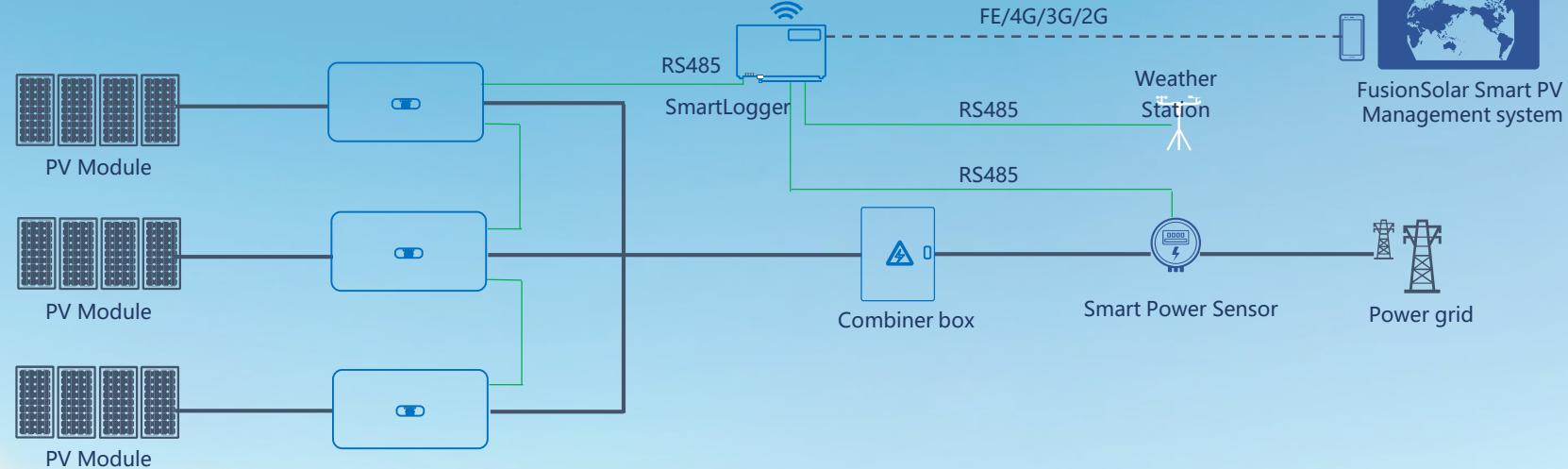
Smart Dongle
(Smart Dongle-4G)
SDongleA-03

Smart PV Optimizer
SUN2000-600W-P
SUN2000-450W-P2

Smart PV Inverter
SUN2000-50KTL-M3

Rooftops of schools, hospitals,
factories, shopping malls, etc

2. SmartLogger Networking



Smart PV Inverter
SUN2000-12/15/17/20/25KTL-M5
SUN2000-12/15/17/20KTL-M2

SmartLogger
SmartLogger3000A

Smart Power Sensor
DTSU666-H 250 A/50 mA
DTSU666-H 100 A
DTSU666-HW

Monitoring Portal
FusionSolar Cloud & APP

Smart PV Inverter
SUN2000-29.9/30/36/
40KTL-M3

Smart PV Optimizer
SUN2000-600W-P
SUN2000-450W-P2

Smart PV Inverter
SUN2000-50KTL-M3

Rooftops of schools, hospitals,
factories, shopping malls, etc

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Maintenance and Troubleshooting

1. FusionSolar Distributed Inverter



SUN2000-12/15/17/20KTL-M2
(Three-phase inverter)

MPPT/Inputs: 2/4

Local commissioning:

- Built-in WLAN

Communication:

- Smart Dongle-WLAN-FE (optional)
- Smart Dongle-4G (optional)
- SmartLogger3000A (optional)

AFCI: supported

PID Recovery: supported

Cooling mode: natural convection

Optimizer Adaptation: supported

DI Control Interface: supported



SUN2000-12/15/17/20/25KTL-M5
(Three-phase inverter)

MPPT/Inputs: 2/4

Local commissioning:

- Built-in WLAN

Communication:

- Smart Dongle-4G (optional)
- Smart Dongle-WLAN-FE (optional)
- SmartLogger3000A (optional)

AFCI: supported

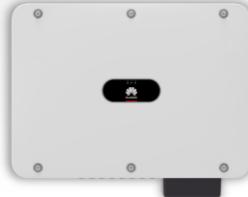
PID Recovery: supported

DI Control Interface: supported

Parallel system: supported

Cooling mode: smart air cooling

Optimizer: supported



SUN2000-50KTL-M3
(Three-phase inverter)

MPPT/Inputs: 4/8

Local commissioning:

- Built-in WLAN

Communication:

- Smart Dongle-WLAN-FE (optional)
- Smart Dongle-4G (optional)
- SmartLogger3000A (optional)

AFCI: supported

PID Recovery: supported

DI Control Interface: Supported

Parallel system: supported

Cooling mode: smart air cooling

Optimizer: only MERC-1300W/1100W-P are supported. (1-to-2 optimizers, to be delivered on September 30, 2022).



SUN2000-29.9/30/36/40KTL-M3
(Three-phase inverter)

MPPT/Inputs: 4/8

Local commissioning:

- Built-in WLAN

Communication:

- Smart Dongle-WLAN-FE (optional)
- Smart Dongle-4G (optional)
- SmartLogger3000A (optional)

AFCI: supported

PID Recovery: supported

DI Control Interface: Supported

Parallel system: supported

Cooling mode: natural convection

Optimizer: supported

2. Communication Modules



Smart Dongle-WLAN-FE

- Model: SDongleA-05
- Dual-system feature: differentiated by BOM number. Only 02314DVF supports access to two management systems at the same time
- Supports a maximum of 10 devices
- Provides a plug & play USB interface for connecting to inverters for monitoring through WLAN or Fast Ethernet



Smart Dongle-4G

- Model: SDongleA-03
- Dual-system feature: does not support access to two management systems at the same time.
- Supports a maximum of 10 devices
- Provides a plug & play USB interface for connecting to inverters for monitoring through 4G

Recommended Monthly Traffic for SIM Card Purchases

Inverters	Without a power sensor or energy storage	10 MB + 4 MB x Number of inverters
	With a power sensor	10 MB + 7 MB x Number of inverters
With Smart PV Optimizers		Inverter data usage + 2 MB + 0.2 MB x Number of Smart PV Optimizers

Traffic Support

- Device performance data can be refreshed every 5 minutes.
- The Dongle logs, inverter logs can be exported monthly. The Dongle and inverters can be upgraded monthly.



SmartLogger3000A

- Supports a maximum of 80 inverters
- Communication with inverters:
 - ✓ RS485
 - ✓ AC MBUS (isolation transformer)
- Communication with the cloud:
 - ✓ Ethernet
 - ✓ 4G via built-in 4G module
- Local commissioning:
 - ✓ WebUI via Ethernet
 - ✓ App via built-in WLAN
- Power reduction interface for inverter power control
- Digital & Analog IO for EMI integration

3. Optimizer



Optimizer Model	Inverter Model
SUN2000-600W-P	SUN2000-12/15/17/20KTL-M2
SUN2000-450W-P2	SUN2000-12/15/17/20/25KTL-M5
	SUN2000-29.9/30/36/40KTL-M3

Key Feature	SUN2000-600W-P SUN2000-450W-P2
Output voltage before pairing with the inverter	The output voltage is 0 V by default.
Resistance checking	Supported. The output impedance is 1 kΩ (±10%).
Module-level monitoring	Yes
Module-level shutdown (Full configuration)	Yes
Rapid shutdown (Full configuration)	Yes
Long PV string design	Yes
Physical layout image recognition	Yes
Disconnection locating	Yes

4. Smart Power Sensor



**Smart Power Sensor
DTSU666-HW (Three-Phase)**

- Connects to an inverter over RS485
- Bi-directional meter, which can collect data of feed-in power and purchased power
- Import/Export of meter readings for export limitation functionality
- The precision of the current transformer (CT) provided by the customer should be not lower than class 0.5. The current on the secondary side should be 1 A or 5 A. The CT is used when the current is greater than 250 A.



**Smart Power Sensor
DTSU666-H 250 A/50 mA (Three-Phase)
DTSU666-H 100 A/50 mA (Three-Phase)**

- Connects to an inverter over RS485
- Bi-directional meter, which can collect data of feed-in power and purchased power
- Import/Export of meter readings for export limitation functionality
- Current transformer included

5. FusionSolar App, WebUI, and Smart PV Management System



FusionSolar App (Local & Remote)

- Supports inverter commissioning and plant registration on the management system
- Auto-detection of system devices
- Allows user to register a PV plant by scanning any device in the PV plant



WebUI

- Local commissioning of SmartLogger3000A
- Ethernet connection between SmartLogger3000A and PC



FusionSolar Smart PV Management System

- Unified address <https://intl.fusionsolar.huawei.com>
- Real-time energy flow and energy balance
- Smart I-V Curve Diagnosis
- Demo site available for all

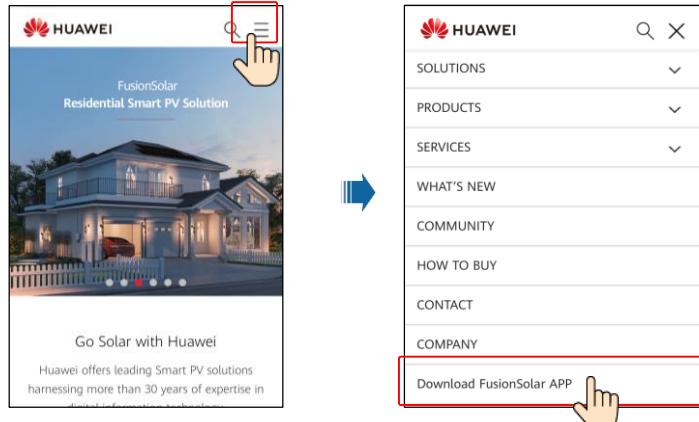
Downloading the FusionSolar App

Method 1: Download and install the app from the app store.

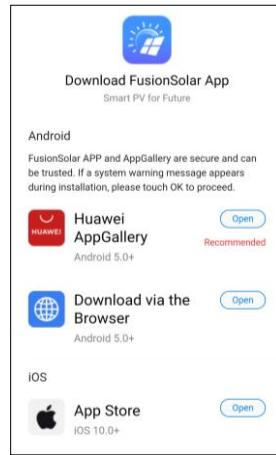
- Huawei phone users: Search for *FusionSolar* in Huawei AppGallery.
- iPhone users: Search for *FusionSolar* in the App Store.
- Other mobile phone users: Select method 2 or 3.



Method 2: Visit <https://solar.huawei.com> using a browser on your mobile phone to download and install the app.



Method 3: Scan the QR code to download and install the app.



Users who select method 2 or 3 can select the download method based on the mobile phone type.

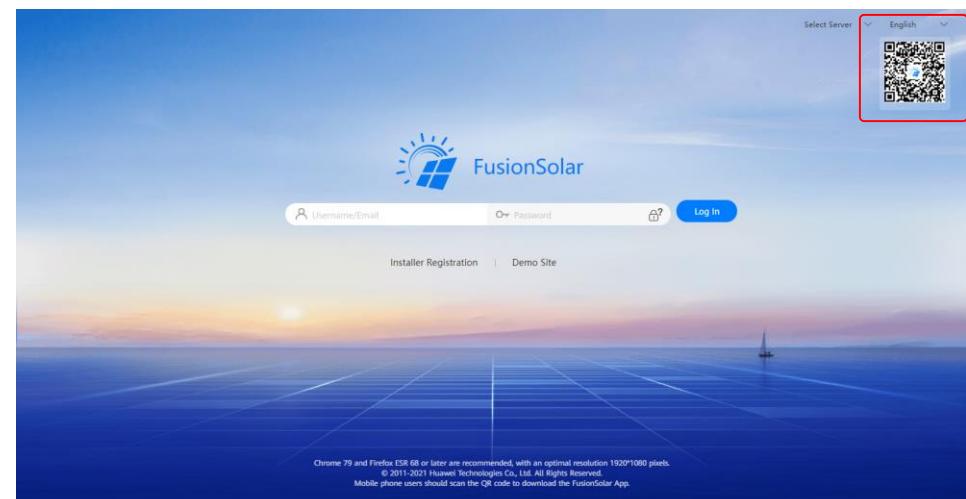
- Huawei mobile phone users: Download from Huawei AppGallery.
- Non-Huawei phone users: Download on a browser.
- iPhone users: Download from the App Store.

Note:

When you select **Download via the Browser**, if a security warning message is displayed indicating that the app is from an external source, tap **ALLOW**.

Accessing the FusionSolar SmartPVMS (Cloud)

<https://intl.fusionsolar.huawei.com>



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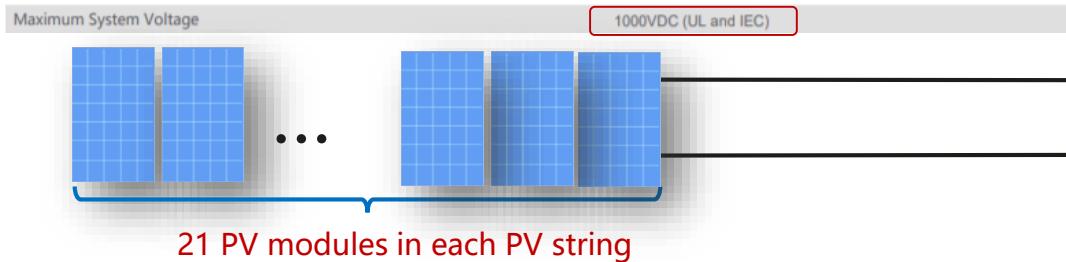
3. (Optional) Optimizer

Comparison Between Normal and Long String Design

PV String Design in the Scenario Without Optimizers

Technical Specification	SUN2000-3KTL-M1	SUN2000-4KTL-M1	SUN2000-5KTL-M1	SUN2000-6KTL-M1	SUN2000-8KTL-M1	SUN2000-10KTL-M1
Input (PV)						
Recommended max. PV power ¹	4,500 Wp	6,000 Wp	7,500 Wp	9,000 Wp	12,000 Wp	15,000 Wp
Max. input voltage ²			1,100 V			
Operating voltage range ³			140 V ~ 980 V			
Start-up voltage			200 V			
Rated input voltage			600 V ²⁹¹			

Refer to JKM300M-60/1000 V datasheet



Maximum number of PV modules in each PV string:

Three-phase scenario: $1000 \text{ V}/(39.1 \text{ V} \times K) \approx 21$

Use the JKM300M-60/1000 V as an example. K is the ambient temperature correction factor.

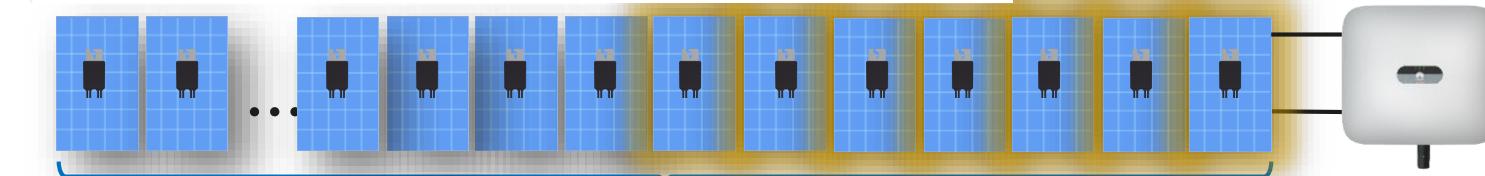
$K = 1 + (\text{Local lowest temperature} - 25^\circ\text{C}) \times \text{PV module temperature correction factor}$

Local lowest temperature = -20°C ; PV module temperature correction coefficient = -0.38%

PV String Design in the Scenario with Full Configuration of Optimizers

For details, see the SUN2000-600W-P brochure.

Long String Design (Full Optimizer)	SUN2000-2-6KTL-L1	SUN2000-3-10KTL-M1	SUN2000-12-20KTL-M2	SUN2000-30-40KTL-M3
Minimum optimizer number per string ⁴	4	6	6	6
Maximum optimizer number per string	25	35	35	25
Maximum DC power per string	6,000 W	10,000 W	12,000 W	12,000 W



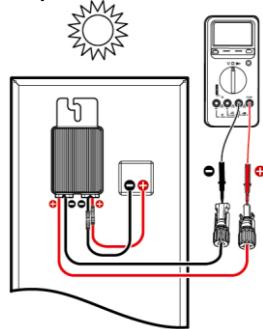
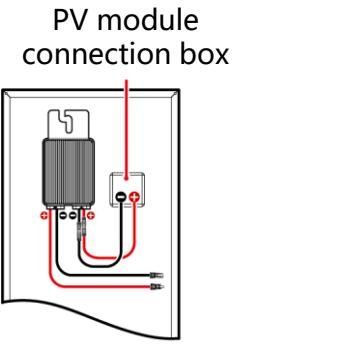
Maximum number of PV modules in each PV string:

Three-phase: $10000 \text{ W}/300 \text{ W} \approx 33$

Use the JKM300M-60/1000 V as an example.

Optimizer Connection

1. Connect the optimizer input power cables.
2. Connect the positive probe of the multimeter to the positive output terminal of an optimizer and the negative probe to the negative output terminal. Check the output voltage and resistance of every optimizer.

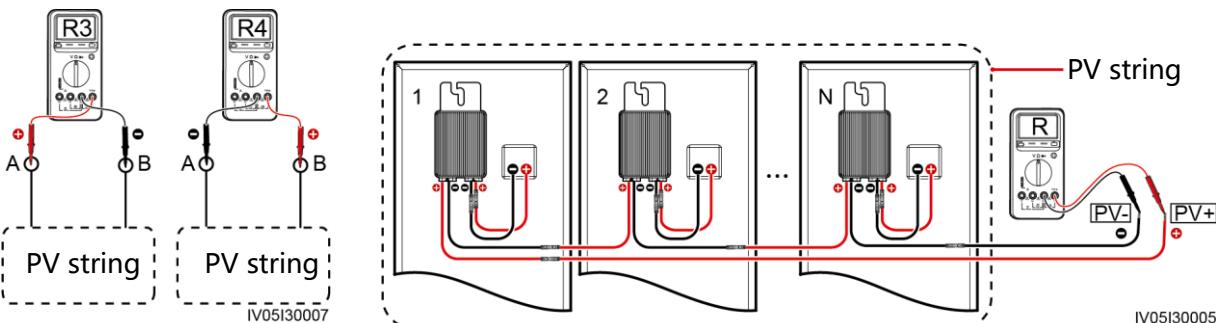


Note:

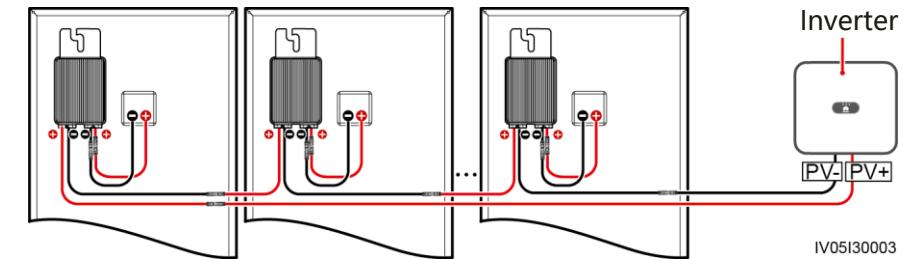
The resistance measurement range of the multimeter affects the accuracy of measured string output resistance. If the resistance measurement range of the multimeter is too large, the measured string output resistance may be greater than $N \times 1.1$ kilohms. Select the lowest resistance measurement range that meets the requirements.

3. After checking that the optimizers are normal, connect the optimizer output cables. When the irradiance is adequate, check that the resistance of the PV strings is the number of optimizers multiplied by $1\text{ k}\Omega$ ($\pm 10\%$).

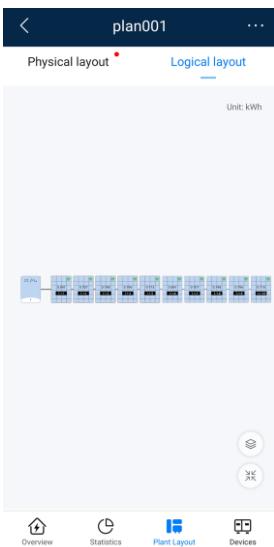
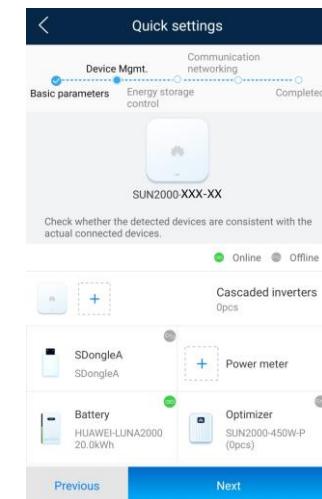
Before connecting cables to PV strings and inverters, determine the positive and negative poles of the PV strings and prepare labels to the positive and negative poles for the cables. **The positive resistance is greater than the negative resistance:** If R_4 is less than R_3 , A is the positive cable of the PV string, and B is the negative cable of the PV string. If R_3 is less than R_4 , B is the positive cable of the PV string and A is the negative cable of the PV string. Prepare cable labels correctly.



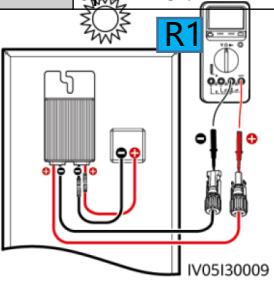
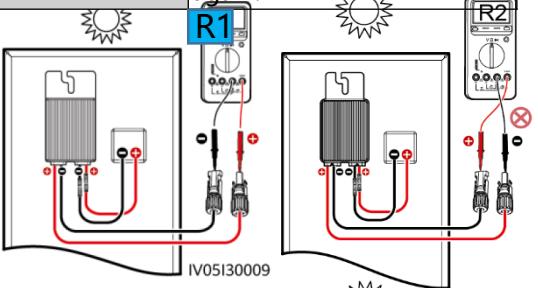
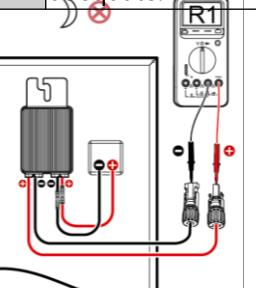
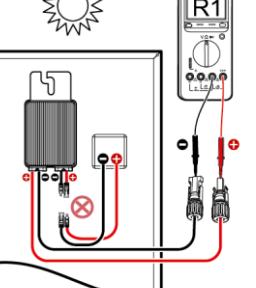
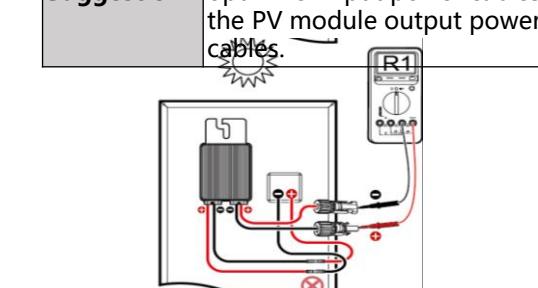
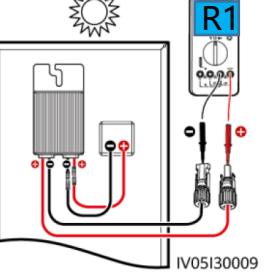
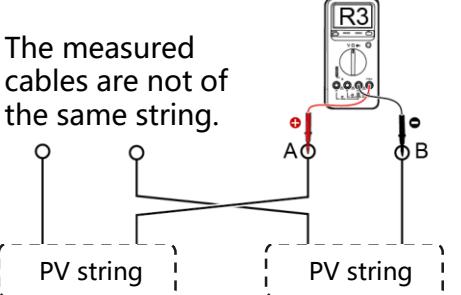
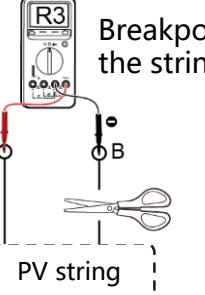
4. Connect cables between PV strings and the inverter.



5. After power-on, start optimizer search through the setup wizard on the app to check the number of optimizers and whether they are running properly.



Troubleshooting Optimizer Resistance Exceptions

Resistance Value	R1 < 0.9 kΩ	Resistance Value	0.9 kΩ < R2 < R1 < 1.1 kΩ	Resistance Value	1.1 kΩ < R1	Resistance Value	100 kΩ < R1	Resistance Value	100 kΩ < R1
Cause	If the probes of the multimeter are connected correctly, the optimizer is faulty.	Cause	The probes of the multimeter are connected reversely.	Cause	The irradiance is low.	Cause	The optimizer input power cables are not connected.	Cause	The optimizer output power cables are connected to the PV module output power cables.
Suggestion	Replace the optimizer.	Suggestion	Connect the probes correctly and measure again.	Suggestion	Measure the resistance when the irradiance is adequate.	Suggestion	Connect the optimizer input power cables.	Suggestion	Correct the optimizer cable connections. Connect the optimizer input power cables to the PV module output power cables.
									
IV05I30009	IV05I30009	IV05I30009	IV05I30009	IV05I30009	IV05I30009	IV05I30009	IV05I30009	IV05I30006	IV05I30006
6	Resistance Value 1.1 kΩ < R1	Resistance Value R3 is infinite (the voltage is 0 V).	7	Resistance Value R1 is infinite (the voltage is not 0).					
Cause	If the causes in 3, 4, and 5 do not apply, the optimizer is faulty.	Cause	<ul style="list-style-type: none"> The measured cables are not of the same string. Breakpoints exist in the string. 	Cause	In the partial configuration scenario, some PV modules are not connected to optimizers.				
Suggestion	Replace the optimizer.	Suggestion	<ul style="list-style-type: none"> Check that the two measured cables are of the same string and measure again. Use the dichotomy: Disconnect the PV string from the middle and measure the resistance of the two halves. Repeat this step for each part of the string until the fault is located. 	Suggestion	Check optimizer cable connections in the string.				
			<p>The measured cables are not of the same string.</p> 		<p>Breakpoints exist in the string.</p> 				

Reverse String Connection in the Optimizer Full Configuration Scenario

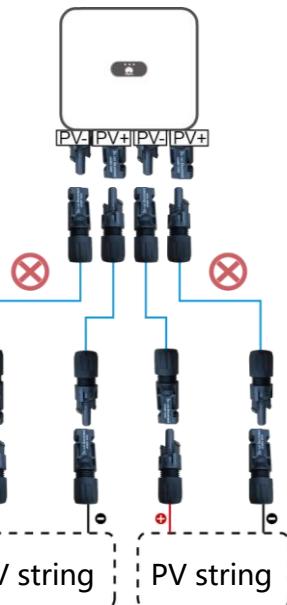
Cause: The extension cables with the same connectors at both ends are connected reversely.



In the following four cases, prepare terminals correctly and reconnect the cables:

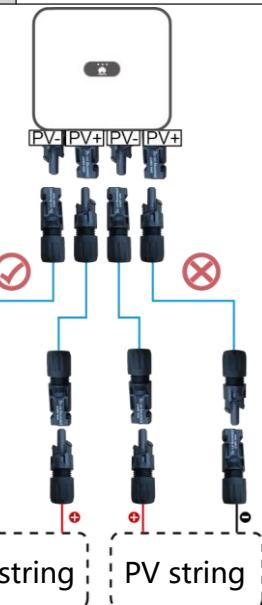
- ① All strings are connected reversely**

Fault	All strings are connected reversely
Symptom	The networking is normal, the voltages of all PV strings are low and cannot be adjusted, and the inverter is in the state of irradiance detection.
Alarm	Inverter alarm: abnormal PV module configuration (ID = 3)



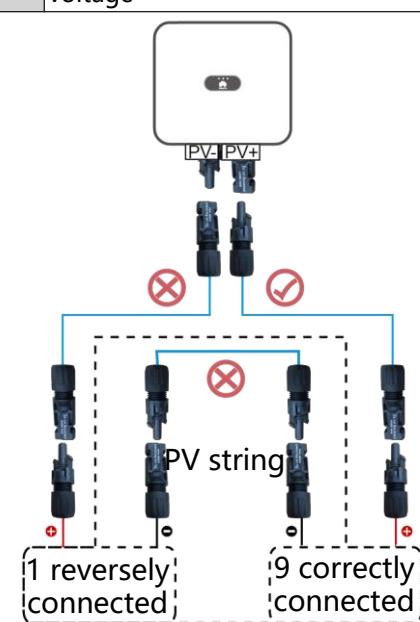
- ② Some strings are connected reversely**

Fault	Some strings are connected reversely
Symptom	The networking is normal, with a backfeed current from the faulty PV string to the inverter.
Alarm	Inverter alarm: PV string reversed (ID = PV string number)



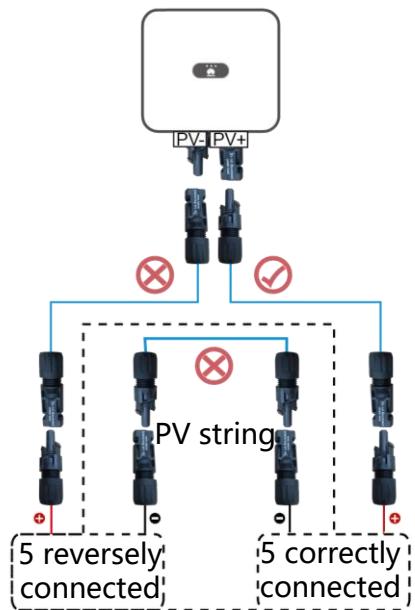
- ③ Some optimizers in the string are connected reversely. ①**

Fault	Voltage during correct connection – Voltage during reserve connection > Minimum voltage for inverter startup
Symptom	The networking is normal. After the inverter is connected to the power grid, the abnormal PV strings can output power.
Alarm	Optimizer alarm: abnormal output voltage



- ④ Some optimizers in the string are connected reversely. ②**

Fault	Voltage during correct connection – Voltage during reserve connection < Minimum voltage for inverter startup
Symptom	The networking is normal. After the inverter is connected to the power grid, the abnormal PV strings cannot work.
Alarm	Optimizer alarm: abnormal output voltage



4. (Optional)Smart Power Sensor

The Smart Power Sensor can measure the input and output power for grid connection with limited power. Use the Smart Power Sensor only when there is requirements for the power at the grid-connection point.

DTSU666-H 250 A/50 mA, DTSU666-H 100

Three-Phase Four-Wire AC Power Cable	
AC Power Distribution Box (PDB)	DTSU666-H Port
AC PDB (L1)	3
AC PDB (L2)	6
AC PDB (L3)	9
AC PDB (N)	10

Three-Phase Four-Wire CT		
CT Installation Position	CT Port	DTSU666-H Port
AC PDB (L1)	IA*	13
	IA	14
AC PDB (L2)	IB*	16
	IB	17
AC PDB (L3)	IC*	19
	IC	21

Note: The arrow direction of the CT must be the same as that in the left figure.

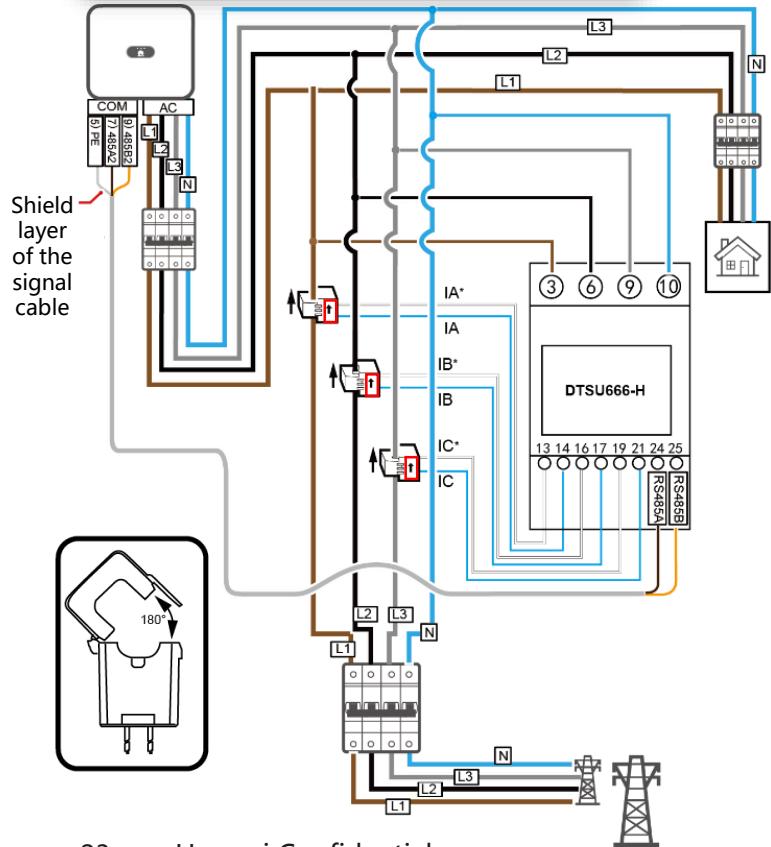
Three-Phase Three-Wire AC Power Cable	
AC PDB	DTSU666-H Port
AC PDB (L1)	3
AC PDB (L2)	10
AC PDB (L3)	9

Note: If the DTSU666-H 250 A/50 mA Smart Power Sensor is connected to the inverter in three-phase three-wire mode, connect a phase wire to the Ub (10) port on the Smart Power Sensor.

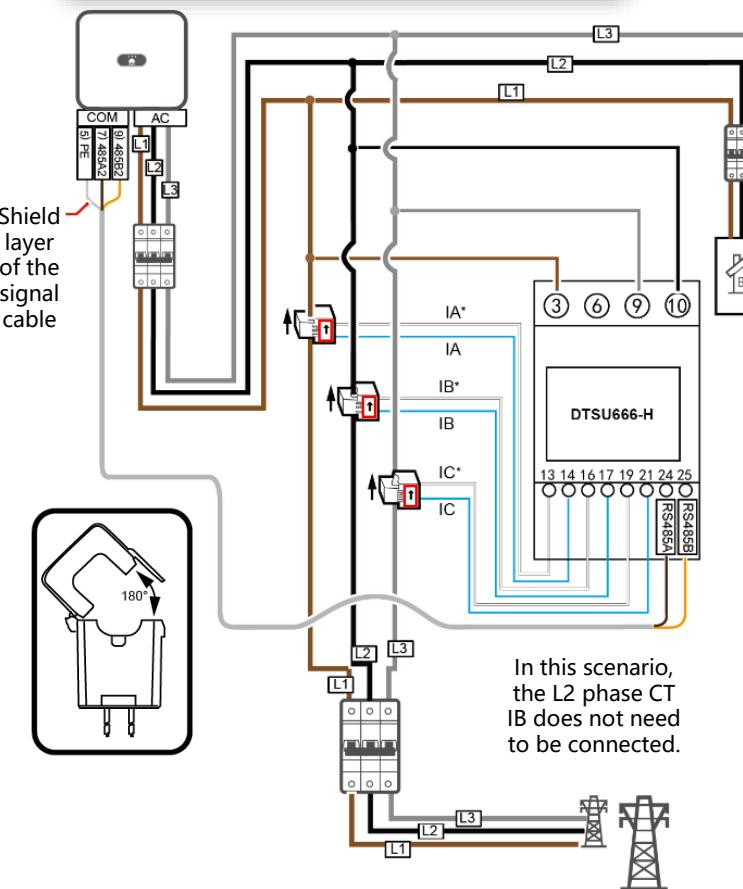
Three-Phase Three-Wire CT		
CT Installation Position	CT Port	DTSU666-H Port
AC PDB (L1)	IA*	13
	IA	14
AC PDB (L2)	IB*	16
	IB	17
AC PDB (L3)	IC*	19
	IC	21

Note: The arrow direction of the CT must be the same as that in the left figure.

Three-phase four-wire



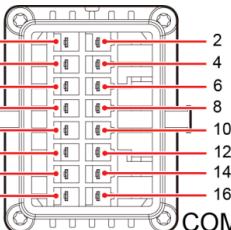
Three-phase three-wire



SUN200-12/15/17/20KTL-M2, SUN2000-29.9/30/36/40KTL-M3, SUN2000-50KTL-M3

RS485 Signal Cable

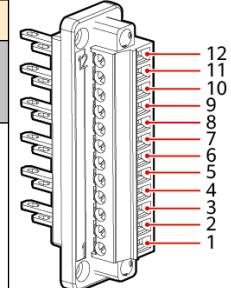
DTSU666-H Pin	Inverter COM Port Pin	Definition	Function	Description
-	5	PE	Shielding ground	N/A
24	7	485A2	RS485 differential signal+	Used to connect to an RS485 signal port on a Smart Power Sensor for export limitation.
25	9	485B2	RS485 differential signal-	Used to connect to an RS485 signal port on a Smart Power Sensor for export limitation.



SUN200-12/15/17/20/25KTL-M5

RS485 Signal Cable

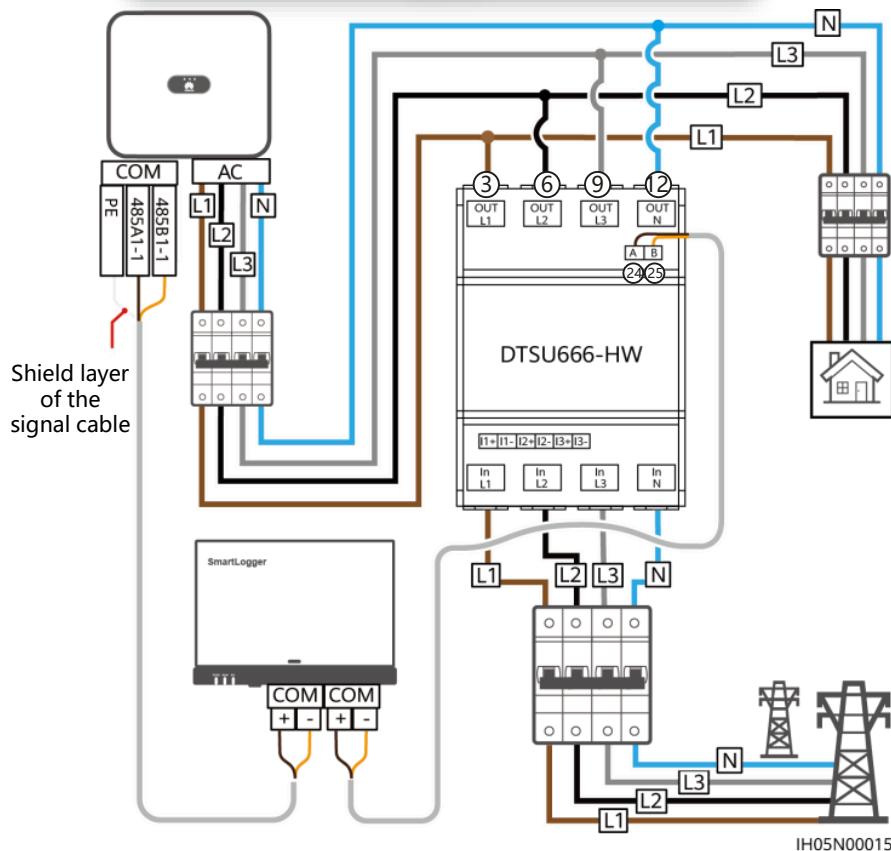
DTSU666-H Pin	Inverter COM Port Pin	Definition	Function	Description
24	11	485A2	RS485 differential signal+	Used to connect to an RS485 signal port on a Smart Power Sensor for export limitation.
25	12	485B2	RS485 differential signal-	Used to connect to an RS485 signal port on a Smart Power Sensor for export limitation.



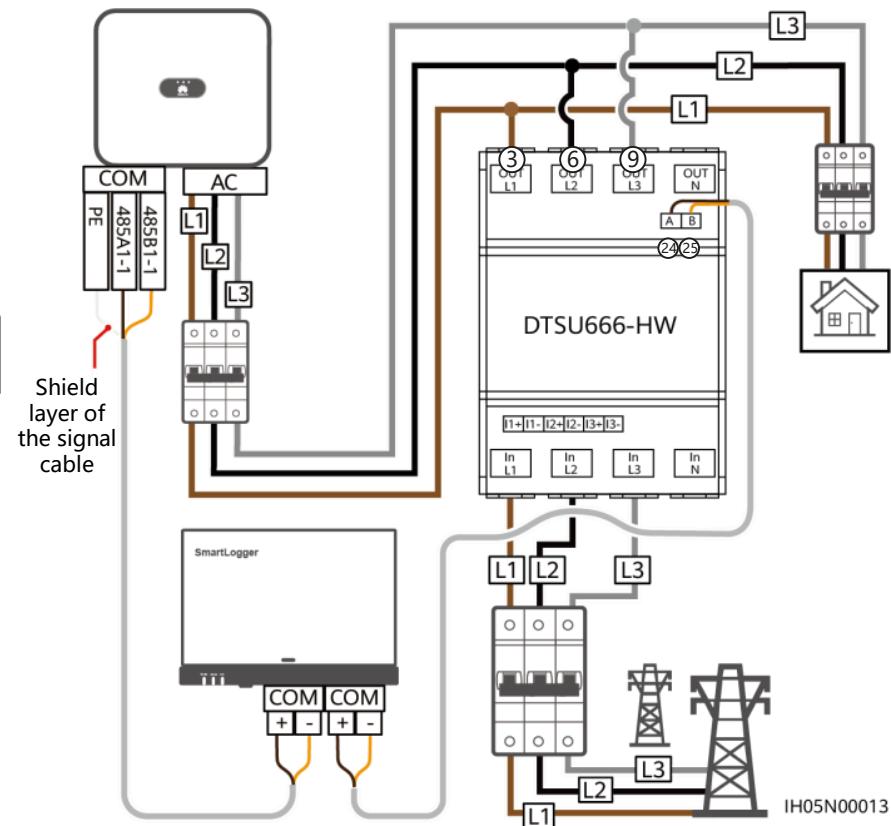
- Current and voltage direct connection (current ≤ 80 A, line voltage ≤ 500 V)

SmartLogger Networking

DTSU666-HW three-phase four-wire



DTSU666-HW three-phase three-wire



Three-Phase Four-Wire AC Power Cable

AC PDB	DTSU666-H Port
AC PDB (L1)	3
AC PDB (L2)	6
AC PDB (L3)	9
AC PDB (N)	12

Three-Phase Three-Wire AC Power Cable

AC PDB	DTSU666-H Port
AC PDB (L1)	3
AC PDB (L2)	6
AC PDB (L3)	9

RS485 Signal Cable

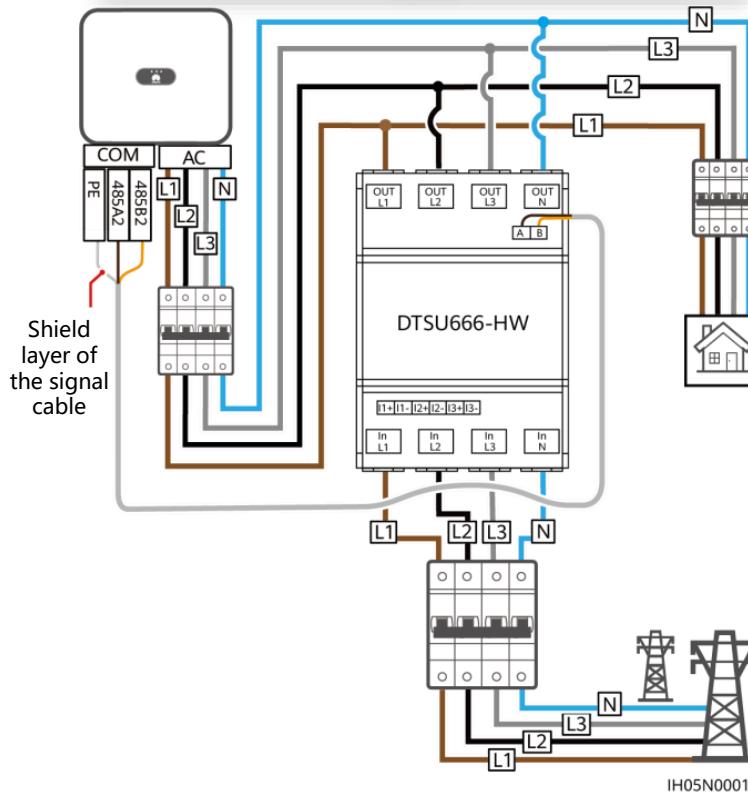
DTSU666 Pin	SmartLogger COM2 Port Pin	Definition	Function	Description
24	+	485A2	RS485 differential signal+	Used to connect to an RS485 signal port on a Smart Power Sensor for export limitation.
25	-	485B2	RS485 differential signal-	

Smart Dongle Networking

Three-Phase Four-Wire AC Power Cable

AC PDB	DTSU666-H Port
AC PDB (L1)	3
AC PDB (L2)	6
AC PDB (L3)	9
AC PDB (N)	12

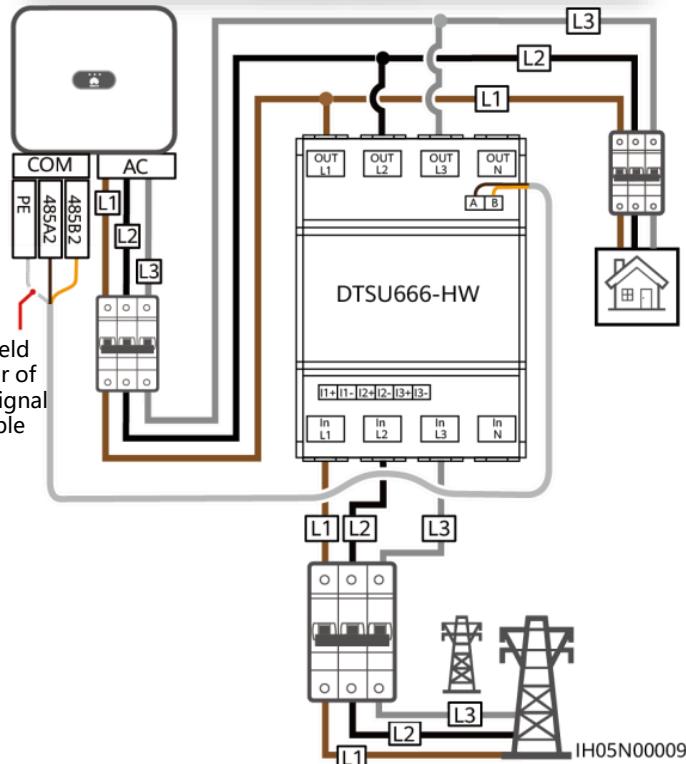
DTSU666-HW three-phase four-wire



Three-Phase Three-Wire AC Power Cable

AC PDB	DTSU666-H Port
AC PDB (L1)	3
AC PDB (L2)	6
AC PDB (L3)	9

DTSU666-HW three-phase three-wire



SUN200-12/15/17/20KTL-M2, SUN2000-29.9/30/36/40KTL-M3, SUN2000-50KTL-M3

RS485 Signal Cable

DTSU666 HW Pin	Inverter COM Port Pin	Definition	Function	Description
-	5	PE	Shielding ground	N/A
24	7	485A2	RS485 differential signal +	Used to connect to an RS485 signal port on a Smart Power Sensor for export limitation.
25	9	485B2	RS485 differential signal -	Used to connect to an RS485 signal port on a Smart Power Sensor for export limitation.

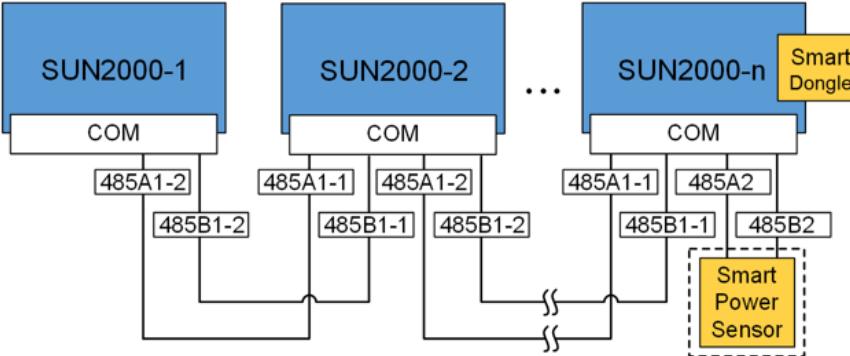
SUN200-12/15/17/20/25KTL-M5

RS485 Signal Cable

DTSU666 HW Pin	Inverter COM Port Pin	Definition	Function	Description
24	11	485A2	RS485 differential signal +	Used to connect to an RS485 signal port on a Smart Power Sensor for export limitation.
25	12	485B2	RS485 differential signal -	Used to connect to an RS485 signal port on a Smart Power Sensor for export limitation.

5. Inverter Cascading

Smart Dongle Networking Scenario

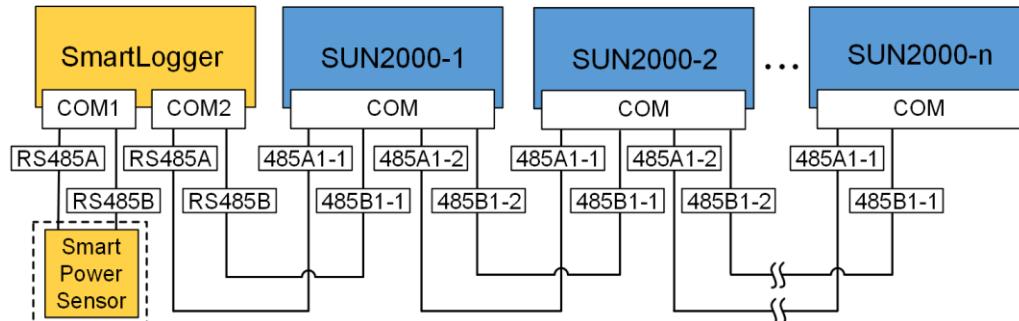


Port Pin Definition		Function	Description
SUN2000-12-20KTL-M2; SUN2000-30/36/40KTL-M3; SUN2000-50KTL-M3	SUN2000-12/15/17/20/25K TL-M5		
1: 485A1-1	9: 485A1	RS485 differential signal+	Used to cascade inverters.
3: 485B1-1	10: 485B1	RS485 differential signal-	
2: 485A1-2	-	RS485 differential signal+	
4: 485B1-2	-	RS485 differential signal-	
7: 485A2	11: 485A2	RS485 differential signal+	Used to connect to an RS485 signal port on a Smart Power Sensor for export limitation.
9: 485B2	12: 485B2	RS485 differential signal-	

NOTE

- In the Smart Dongle networking scenario, the SmartLogger cannot be connected.
- The Smart Power Sensor is necessary for export limitation.
- The Smart Dongle and Smart Power Sensor must be connected to the same inverter.

SmartLogger Networking Scenario



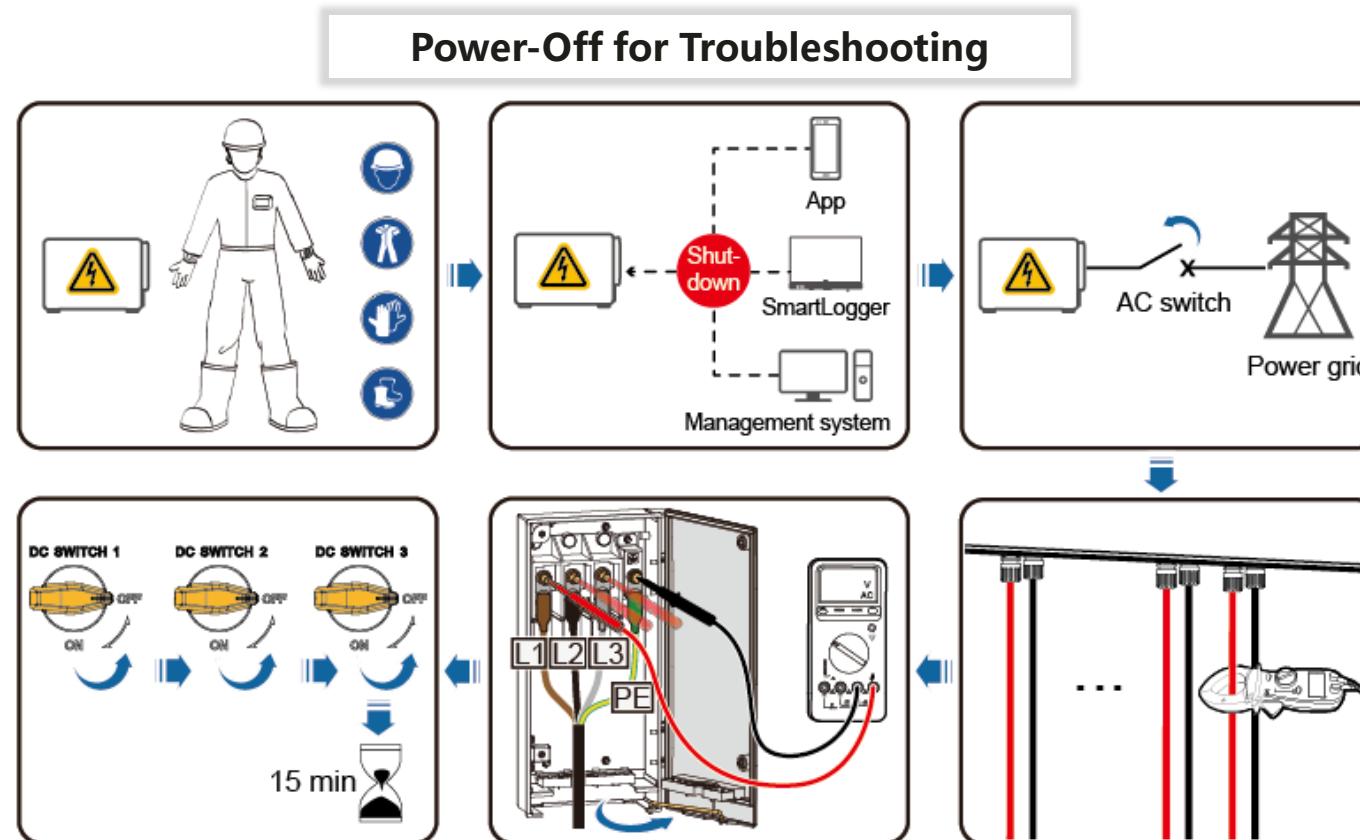
NOTE

- In the SmartLogger networking scenario, the Smart Dongle cannot be connected.
- A maximum of 80 inverters can be connected to a single SmartLogger. You are advised to connect fewer than 30 devices to each RS485 route.
- The Smart Power Sensor is necessary for export limitation. Select a Smart Power Sensor according to the project requirements.
- To ensure the system response speed, it is recommended that the Smart Power Sensor be connected to a COM port other than the inverter COM port.

Port Pin Definition		Function	Description
SUN2000-12-20KTL-M2; SUN2000-30/36/40KTL-M3; SUN2000-50KTL-M3	SUN2000-15/17/20/25KTL-M5		
1: 485A1-1	9: 485A1	RS485 differential signal+	Used to cascade inverters or connect to the RS485 signal port on the SmartLogger.
3: 485B1-1	10: 485B1	RS485 differential signal-	
2: 485A1-2	-	RS485 differential signal+	
4: 485B1-2	-	RS485 differential signal-	

6. Installation Troubleshooting

If polarity of the DC input power cable is reversed and the DC switch is ON, do not turn off the DC switch immediately or unplug positive and negative connectors. The inverter may be damaged if you do not follow the instruction. This damage is not covered under any warranty or service agreement. 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 string to the inverter.



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1. Commissioning Video



FusionSola
r

FusionSolar App (Local & Remote)

Website:

<https://support.huawei.com/enterprise/zh/doc/EDOC1100165057>

QR code:



WebUI

Website:

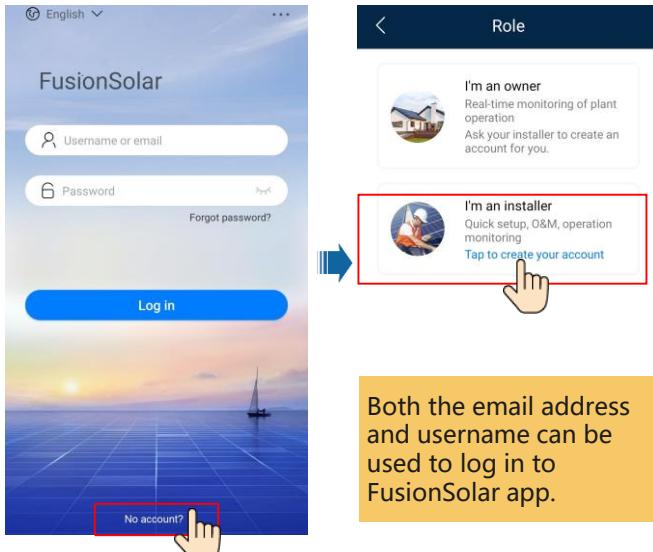
<https://support.huawei.com/enterprise/zh/doc/EDOC1100127591>

QR code:



2. Registering an Installer Account (Optional, for Installers Without an Account)

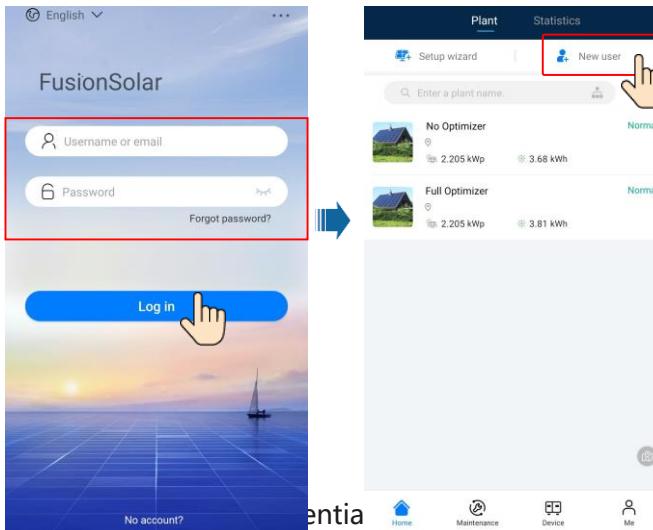
- Create the first installer account. This will also generate a domain that is named after the company name.



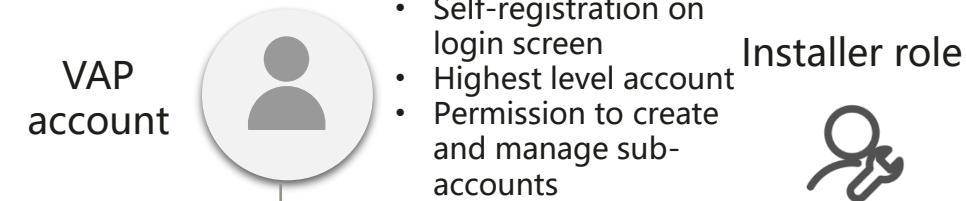
The screenshot shows a "Role" selection screen. It has two options: "I'm an owner" and "I'm an installer". The "I'm an installer" option is highlighted with a red box and a hand icon pointing to it. Below this, there is a note: "Both the email address and username can be used to log in to FusionSolar app." A yellow callout box contains this text.

The screenshot shows the "Installer registration" screen. It includes fields for "Company name", "Email address", "Username", "Verification code", "Password", and "Confirm password". There is a note at the top: "Note: If your company has registered an account in the system, you do not need to register again. Contact the administrator to add the registered account to the user list." A checkbox for accepting terms and privacy policy is present, followed by a "REGISTER" button with a hand icon pointing to it.

- To create multiple installer accounts for the same company, log in to the FusionSolar app and tap **New User**.



The screenshot shows the "New user" creation screen. It includes fields for "Company", "Role" (set to "Installer"), "Plant", "Username", "Password", "Photo", "Phone", and "Email". A checkbox for "Owner's authorization obtained" is present at the bottom. A note at the bottom states: "If the content you entered involves third-party personal information, obtain authorization in advance." A yellow callout box contains the text: "Installer role: PV plant home page, PV plant view, device management, report management, smart operation and maintenance, system settings". A "Cancel" button and an "OK" button with a hand icon pointing to it are at the bottom.



- Self-registration on login screen
- Highest level account
- Permission to create and manage sub-accounts



- Installer role



- Installer role



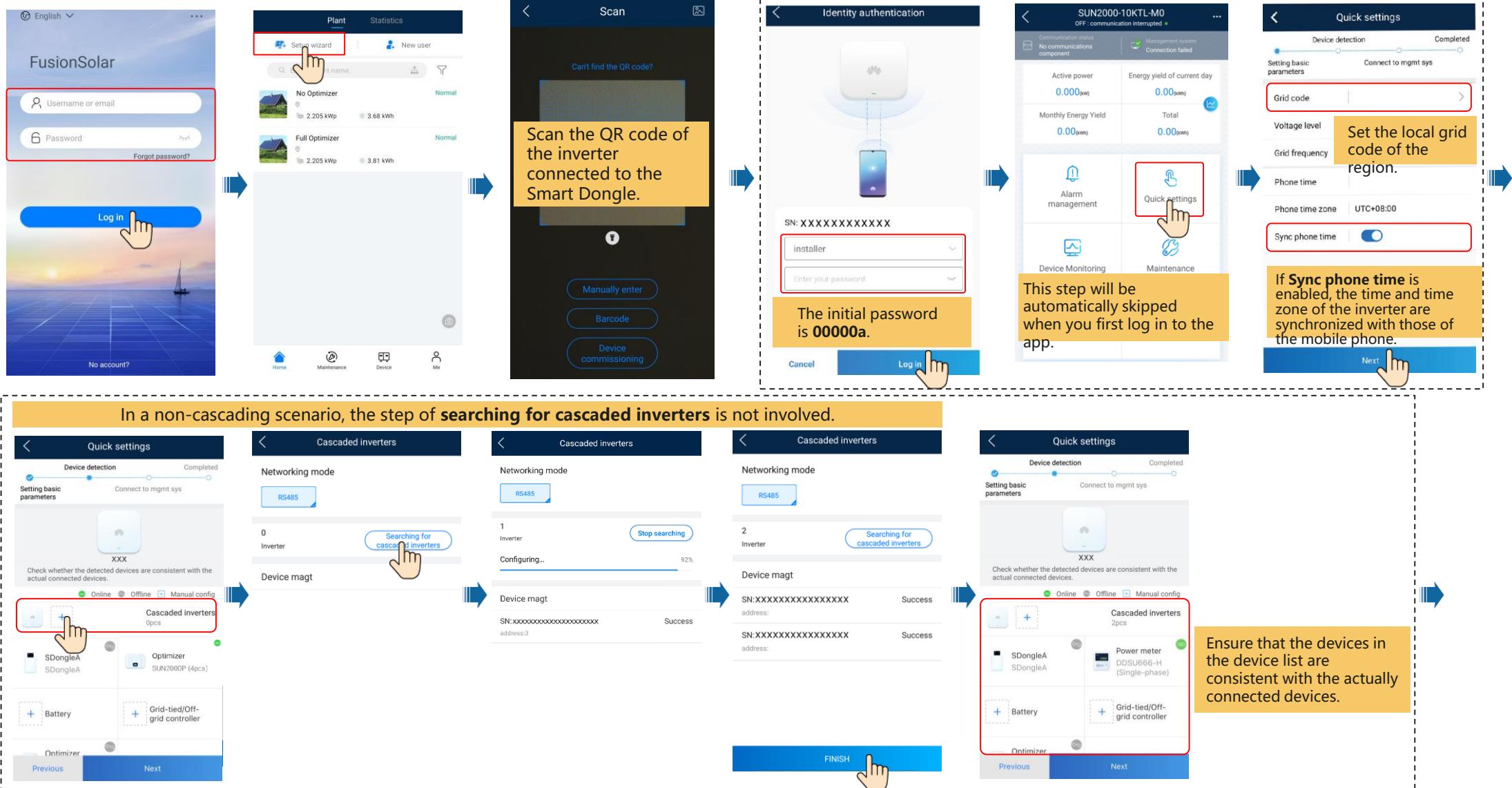
- Owner role



A new user created by an installer user must use their **Username** for the first login. Email addresses cannot be used for the first login. An email address can be used for login only after it is verified.

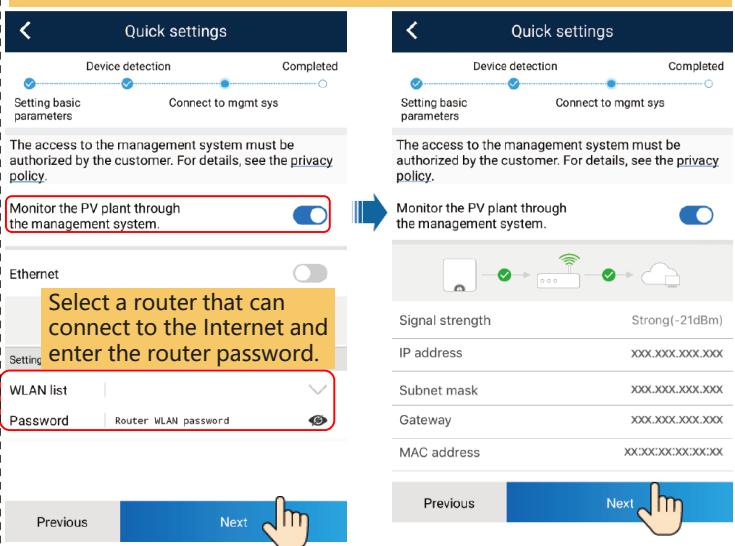
3. Smart Dongle Commissioning

Commissioning and Creating a Plant

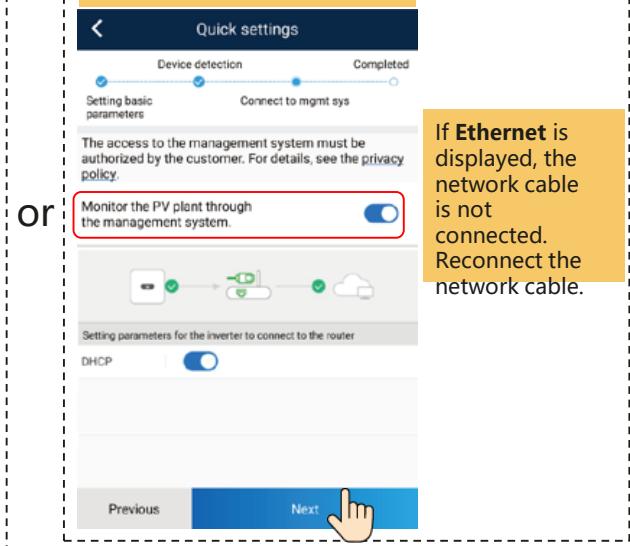


Select the corresponding communication settings based on the Smart Dongle.

WLAN communication



FE communication

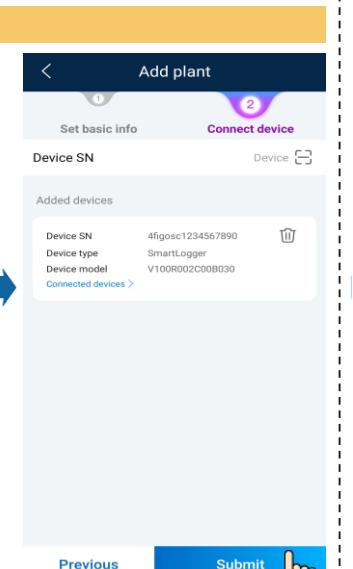
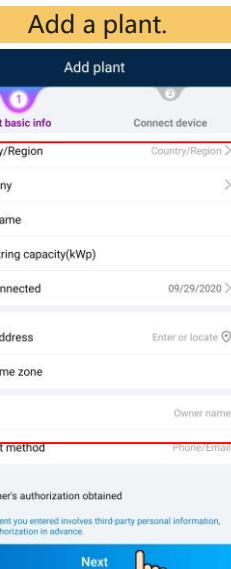
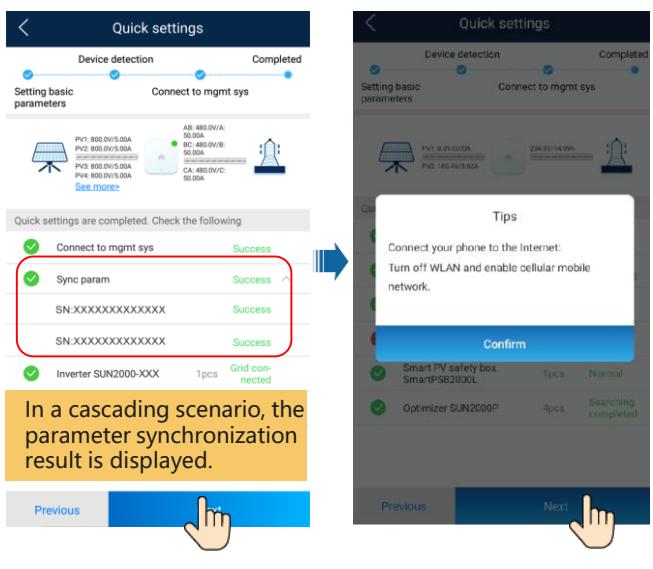


4G communication

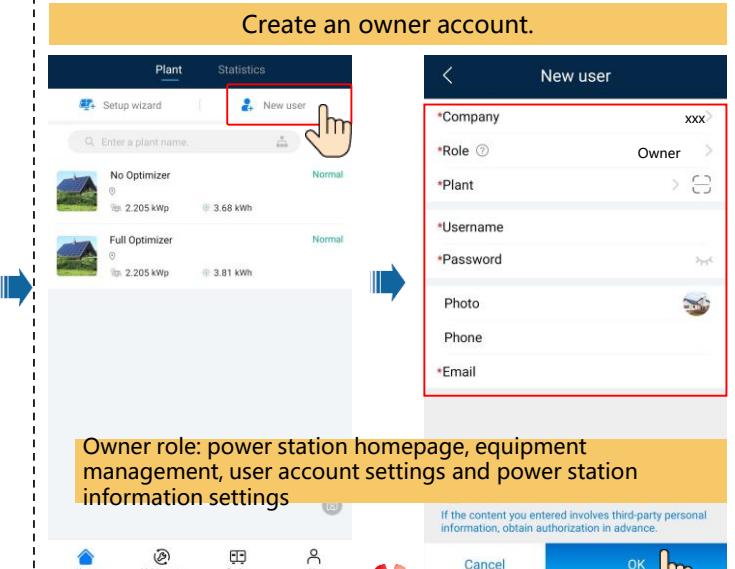
Parameter	Description
APN mode	• Set SIM card parameters. Obtain the parameters from the SIM card carrier.
APN	• When APN mode is set to Automatic , APN , APN dialup number , APN user name , and APN user password are not displayed. When APN mode is set to Manual , APN-related parameters are displayed. You can set the parameters.
APN dialup number	
APN user name	
APN user password	
PIN	<ul style="list-style-type: none"> The PIN code is usually at the back of a SIM card. If the automatic dialing is successful, 4G parameters are not displayed.

If **Ethernet** is displayed, the network cable is not connected. Reconnect the network cable.

or



Create an owner account.



4. SmartLogger Commissioning

Method 1: FusionSolar App

- Before connecting to the app, ensure that the WLAN function has been enabled on the SmartLogger. By default, the WLAN function is available within 4 hours after the SmartLogger is powered on. In other cases, hold down the RST button (for 1s to 3s) to enable the WLAN function.

RST Operation	Function
Hold down the button for 1s to 3s.	When WLAN is set to OFF in idle state , hold down the RST button for 1s to 3s to power on the WLAN module. The alarm/maintenance indicator (ALM) then blinks green fast for 2 minutes (other indicators are off) and the SmartLogger waits for connecting to the app. If the app fails to be connected, the WLAN module is automatically powered off after it is powered on for 4 hours.
Hold down the button for more than 60s.	Within 3 minutes after the SmartLogger is powered on and restarted, hold down the RST button for more than 60s to restart the SmartLogger and restore factory settings.

- Set **Date&Time** and **Power Meter** for the SmartLogger.

The flowchart illustrates the commissioning process:

- FusionSolar App Home Screen:** Log in with credentials (Username or email, Password).
- Setup wizard:** Select "Scan" to scan the QR code of the Smart Dongle.
- Identity authentication:** Enter the installer's password to log in.
- SmartLogger3000 Settings:** Set quick parameters like basic parameters, communication networking, and sync phone time.
- Final Step:** Ensure devices are consistent with actual connected devices.

Key steps highlighted with red boxes and arrows:

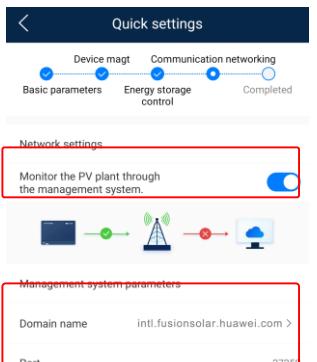
- Log in to the FusionSolar app.
- Start the setup wizard.
- Scan the QR code of the Smart Dongle.
- Enter the password for identity authentication.
- Configure quick settings on the SmartLogger3000 screen.
- Check the "Sync phone time" setting.
- Final step: Ensure devices are consistent with actual connected devices.

Annotations provide additional instructions:

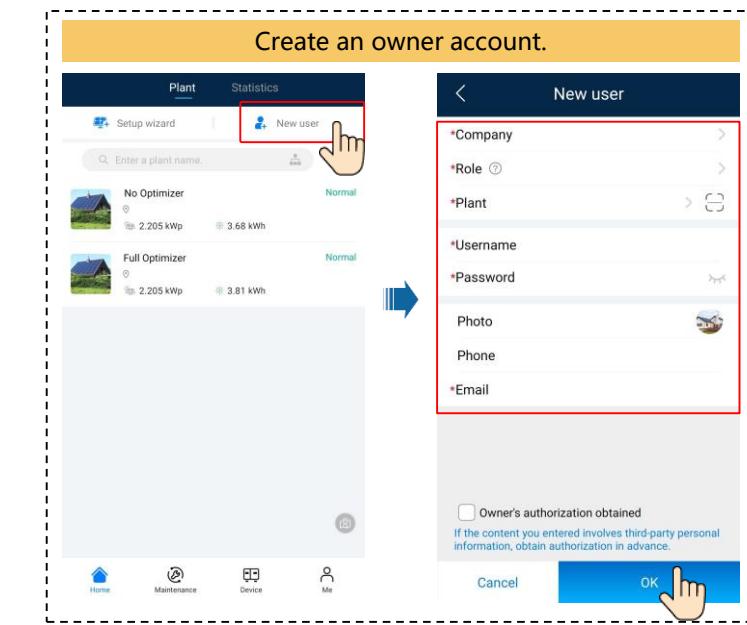
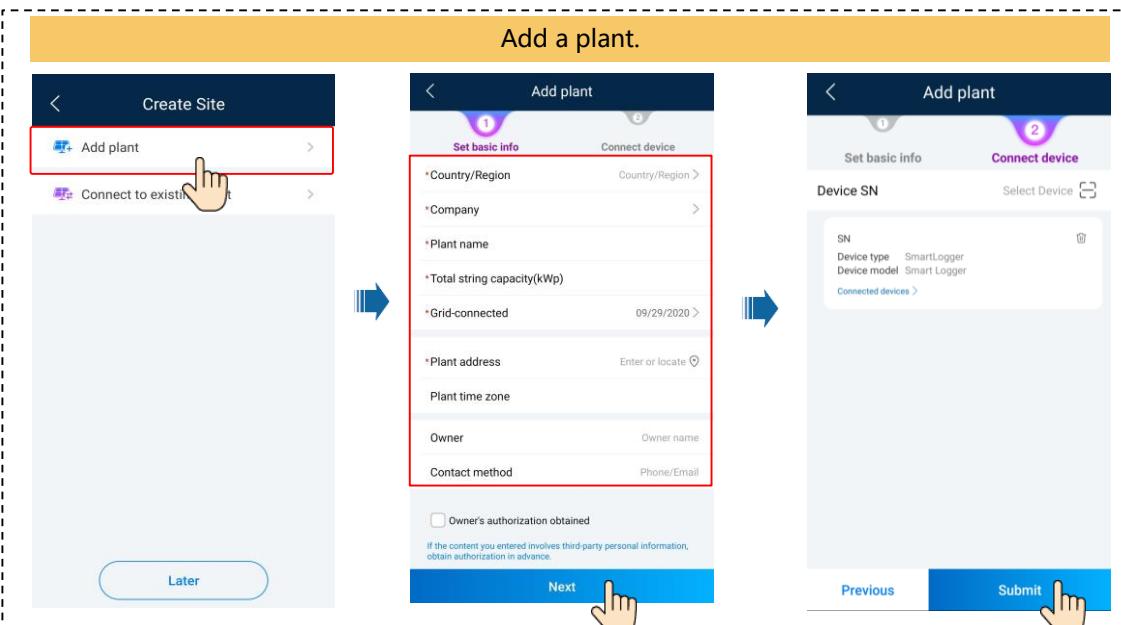
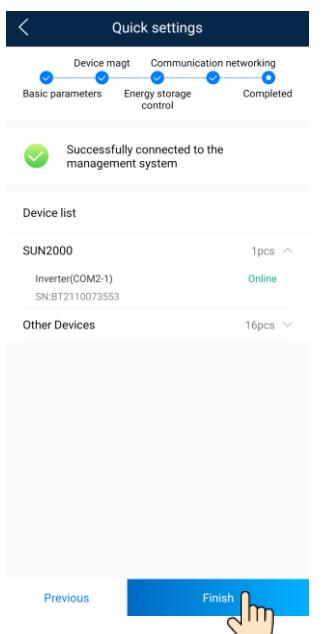
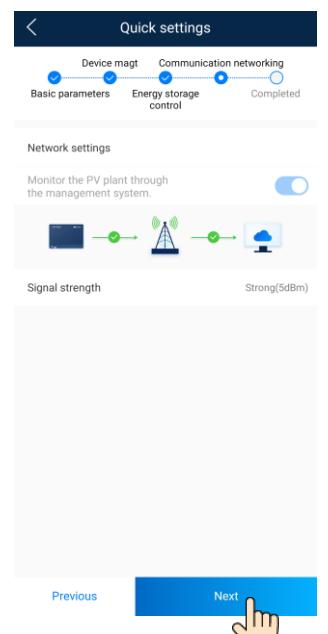
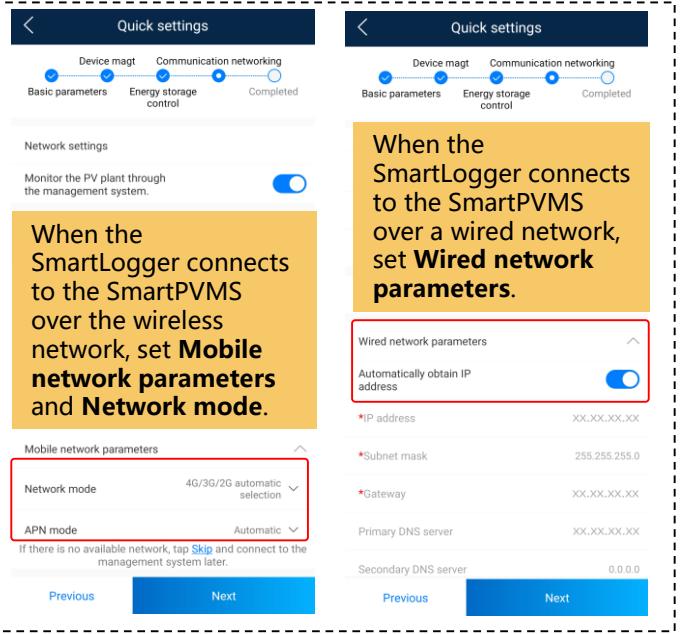
- The initial password is **00000a**.
- If Sync phone time is enabled, the time and time zone of the inverter are synchronized with those of the mobile.
- Ensure that the devices are consistent with the actual connected device.



Indicator	Status	Meaning
ALM	Blinking green slowly (on for 1s and then off for 1s)	Local maintenance is in progress.
	Blinking green fast (on for 0.125s and then off for 0.125s)	Local maintenance fails or the connection to the app is to be set up.
	Steady green	Local maintenance succeeded.



Enabled Monitor the PV plant through the management system. Set the Domain name to intl.fusionsolar.huawei.com and Port number to 27250.



Method 2: WebUI

- Set the IP address for the PC on the same network segment as the SmartLogger IP address.



- When the IP address of the WAN port is on the 192.168.8.1–192.168.8.255 network segment, the IP address of the LAN port is automatically switched to 192.168.3.10, and the default gateway is 192.168.3.1. If the connection port is a LAN port, adjust the network configuration of the PC accordingly.
- It is recommended that the PC be connected to the LAN port.

- Enter <https://XX.XX.XX.XX>(XX.XX.XX.XX is the IP address of the SmartLogger) in the address box of a browser. If you log in to the WebUI for the first time, a security risk warning is displayed. Click **Continue to this website**.

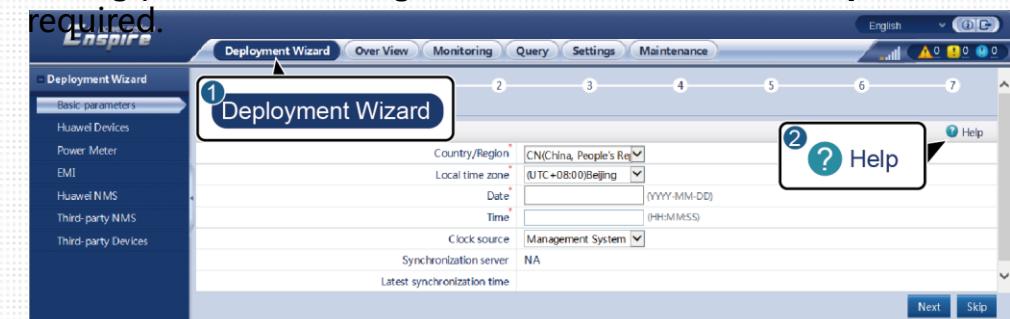
- Log in to the WebUI.

Parameter	Description
Language	Set this parameter as required.
User Name	Select admin .
Password	<ul style="list-style-type: none"> The initial password is Changeme. Use the initial password upon first power-on and change it immediately after login. If you enter incorrect passwords for five consecutive times in 5 minutes, your account will be locked out. Try again 10 minutes later.

Port	IP Settings	SmartLogger Default Value	PC Setting Example
LAN port	IP address	192.168.8.10	192.168.8.11
	Subnet mask	255.255.255.0	255.255.255.0
	Default gateway	192.168.8.1	192.168.8.1
WAN port	IP address	192.168.0.10	192.168.0.11
	Subnet mask	255.255.255.0	255.255.255.0
	Default gateway	192.168.0.1	192.168.0.1

- On the **Deployment Wizard** page, set parameters as prompted. For details, see **Help** on the page.

During parameter setting, click **Previous**, **Next**, or **Skip** as required.



- After the parameters are configured, click **Finish**.

6. Enter the Huawei Hosting Cloud address

<https://intl.fusionsolar.huawei.com> in the address box of a browser. Log in to the Huawei Hosting Cloud. If no account or password is available, create an account.



7. Create a PV plant.

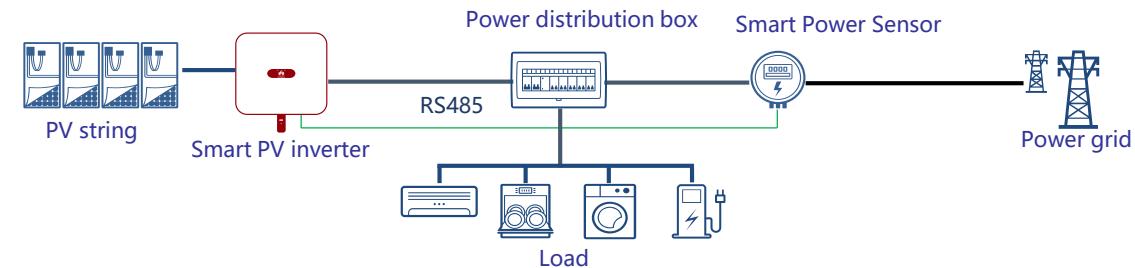
Plant name	Plant name	Region	Region	Device type	All	Total string capacity	All	Grid connection date	Start date	End date	Search	Reset	Add Plant
Status	Plant Image	Plant Name	Region	Region	Device type	Total String Capacity (kWp)	Optimizer Quantity	Battery	Weather	Current Power (kW)	Specific Energy (kWh/kWp)	Yield Today (kWh)	Total Yield (kWh)
●		111a	China mainl...	2021-05-10	All	0.000	--	--	--	0.00	0.00	0.00	0.00
●		111a	China mainl...	2021-05-10	All	0.000	--	--	--	0.00	0.00	0.00	0.00
●		111a	China mainl...	2021-05-10	All	0.000	--	--	--	0.00	0.00	0.00	0.00

8. Enter the basic information, access device, string configuration, and electricity price configuration based on the site requirements. Click **Save**. The PV plant is successfully created.

Enter the SN and name of the SmartLogger. After the SmartLogger is added, the inverters and Smart Power Sensor/power meter connected to the SmartLogger are automatically added.

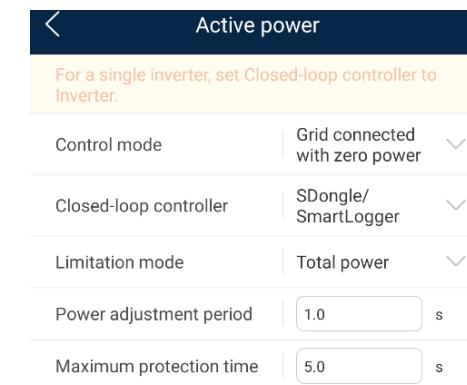
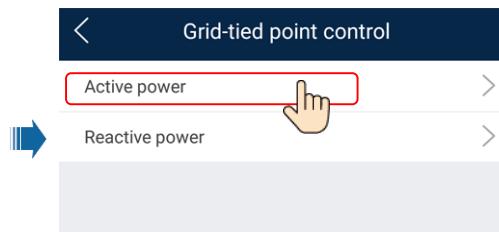
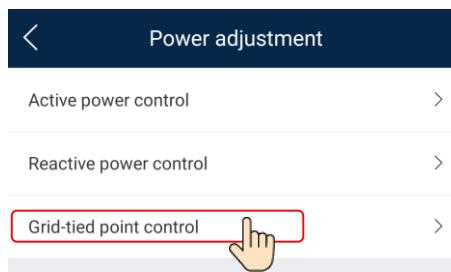
6. Setting Parameters for Limited Power Grid Connection

- Regulations on grid connection vary by country. In some countries, if the grid-connection point is not controlled, the regulations may be violated. Grid-connection point control can limit or reduce the output power of the PV system to ensure that the output power is within the allowed range.
- The Smart Power Sensor connects to the inverter through RS485 for output power management and power limiting control. It is a necessary component for zero-power and limited power grid connection. When installing the Smart Power Sensor, note the following rules:
 - The Smart Power Sensor and its CT must be installed on the home side of the power grid.
 - The CT arrow direction is from the power grid to the home power distribution box.
 - The CT signal cable and the RS485 communications cable to the inverter should be connected in the correct sequence.
 - If the installation or cable connection is incorrect, the measured current and direction are incorrect, affecting power control.



Export Limitation Setting

- Log in to the FusionSolar app.
- On the home screen, choose **Power adjustment > Grid-tied point control > Active power**, and set parameters for limited power grid connection.
 - For a single inverter, set **Closed-loop controller** to **Inverter**. The duration of export limitation is less than 2s.
 - For multiple inverters, **Closed-loop controller** can only be set to **SDongle/SmartLogger**. The duration of export limitation is less than 5s.



SmartLogger Networking

When the Smart Power Sensor meter is connected to the SmartLogger, the RS485 cable of the power meter needs to be connected to the COM port of the SmartLogger. In the SmartLogger networking scenario, the duration of export limitation is less than 2s. You can commission in either of the following ways:

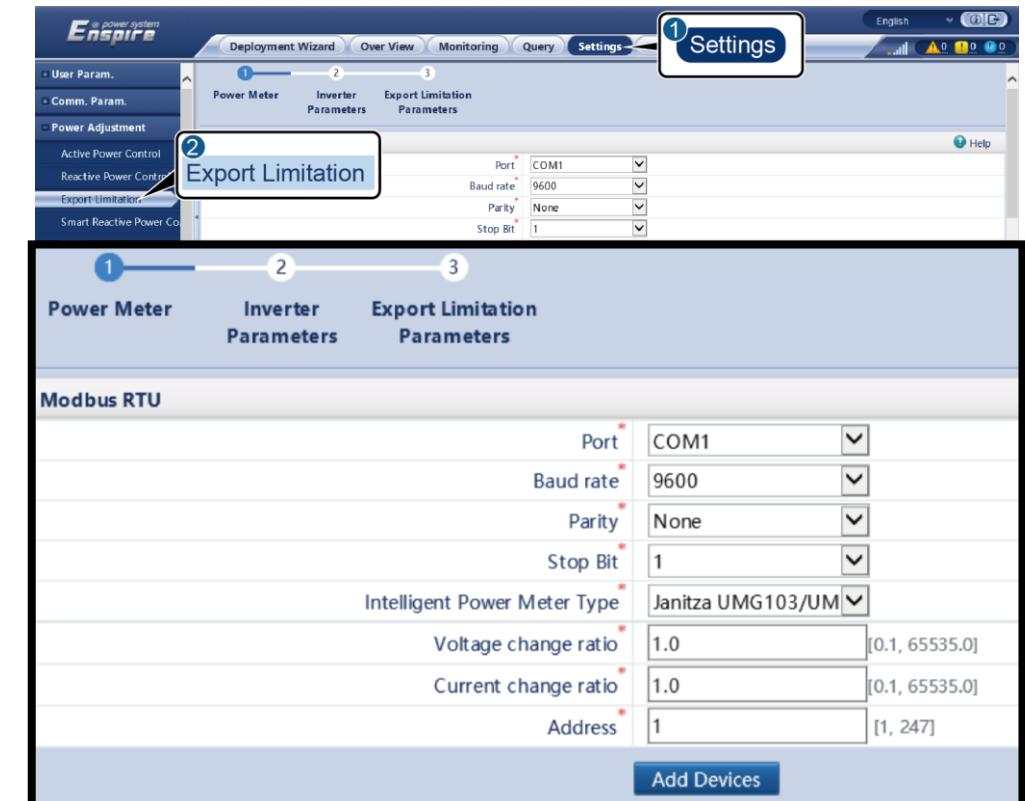
- **FusionSolar app**

1. Log in to the FusionSolar app.
2. On the home screen, choose **Power adjustment > Active power control**, and enable **Active power control**, set parameters for limited power grid connection.



- **SmartLogger WebUI**

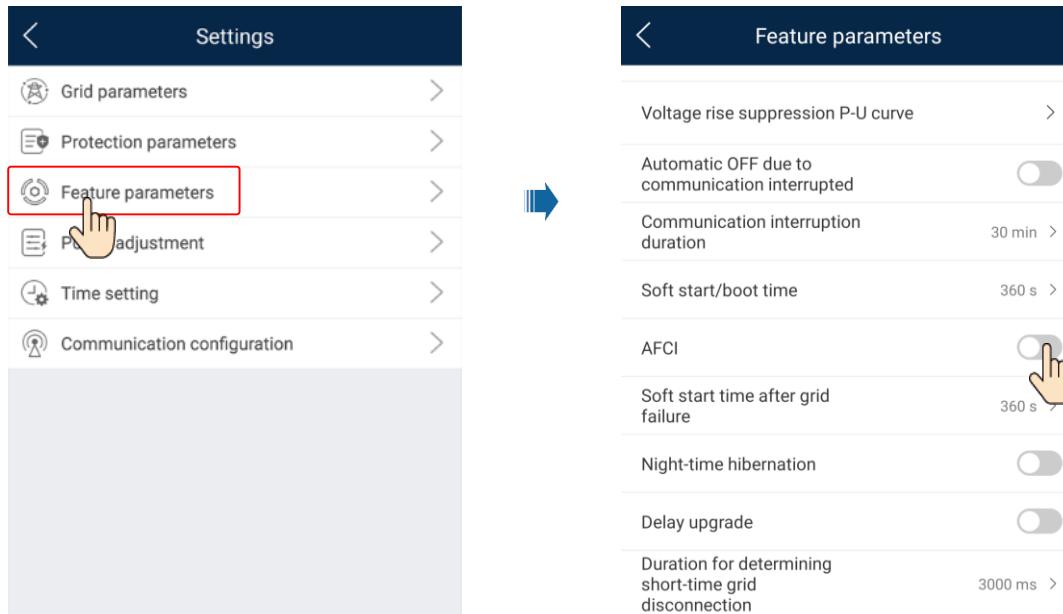
1. Enter <https://XX.XX.XX.XX> in the address box of a browser, and log in to the WebUI.
XX.XX.XX.XX represents the SmartLogger IP address, which is 192.168.0.10 (WAN) or 192.168.8.10 (LAN) by default.
2. Set parameters as prompted. For details, click **Help** on the page.



7. AFCI

Description

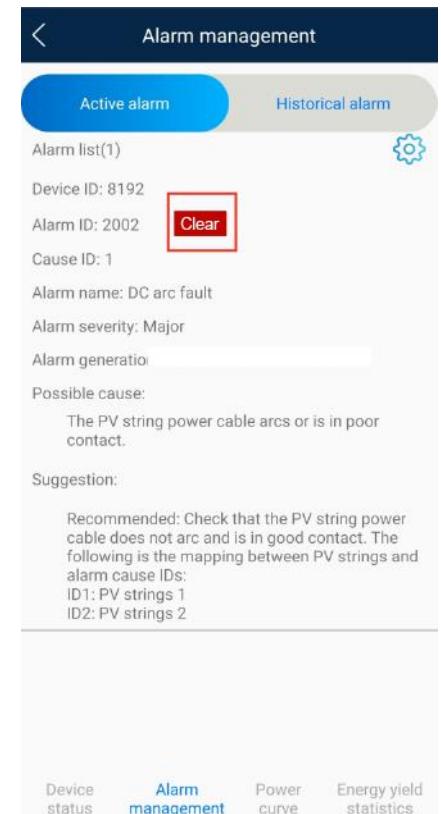
If PV modules or cables are incorrectly connected or damaged, electric arcs may be generated, which may cause fire. Huawei inverters provide unique arc detection in compliance with UL1699B-2018 to ensure the safety of users' lives and property. This function is enabled by default. The inverter automatically detects arc faults. To disable this function, log in to the FusionSolar app, enter the **Device commissioning** screen, choose **Settings > Feature parameters**, and disable **AFCI**.



Alarms Clearing

The AFCI function involves the DC arc fault alarm. The inverter has the AFCI alarm automatic clearance mechanism. If an alarm is triggered for less than five times within 24 hours, the inverter automatically clears the alarm. If the alarm is triggered for more than five times within 24 hours, the inverter locks for protection. You need to manually clear the alarm on the inverter so that it can work properly.

Log in to the FusionSolar app and choose **Me > Device commissioning**. On the **Device commissioning** screen, connect and log in to the inverter that generates the AFCI alarm, tap **Alarm management**, and tap **Clear** on the right of the DC arc fault alarm to clear the alarm.



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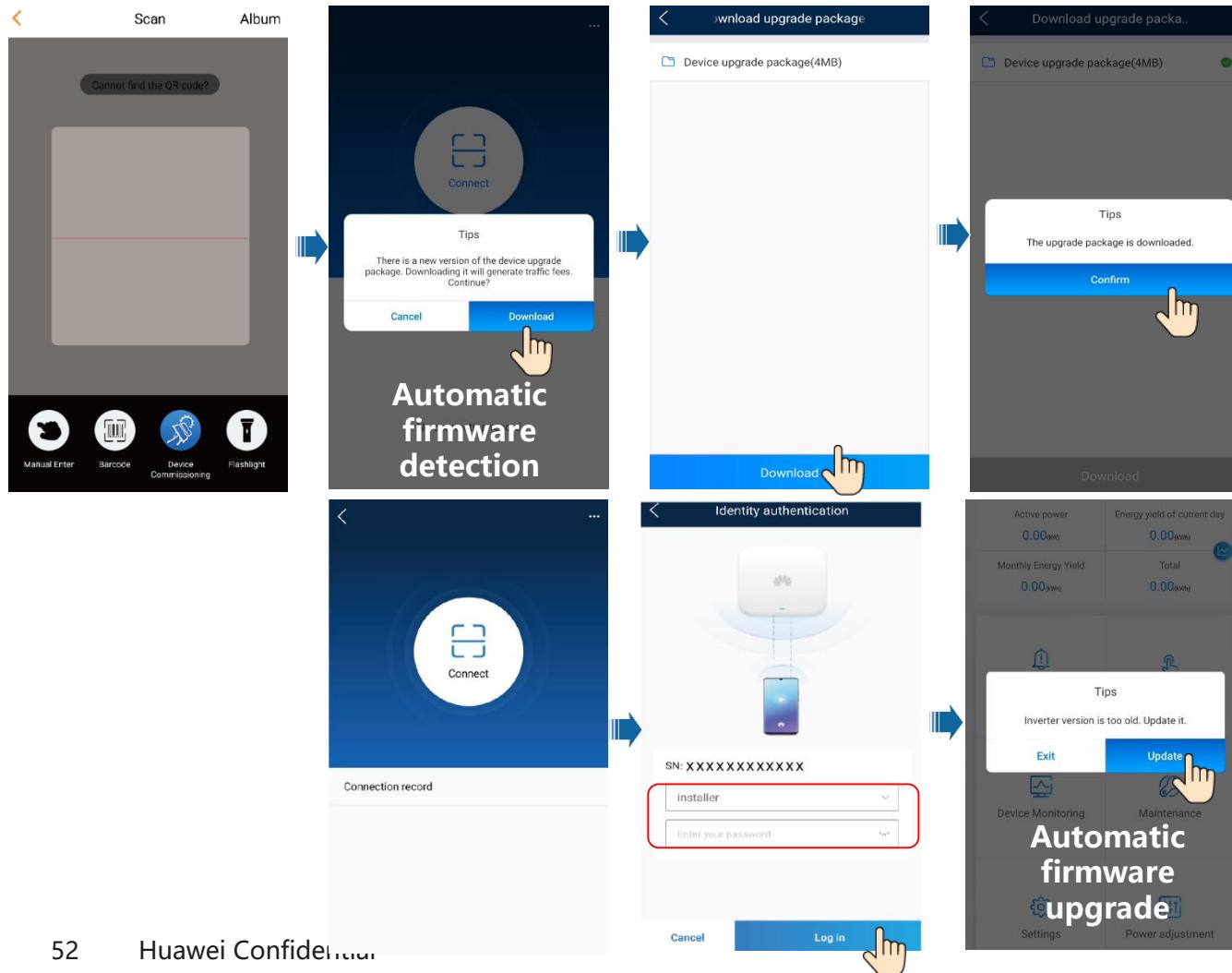
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Troubleshooting

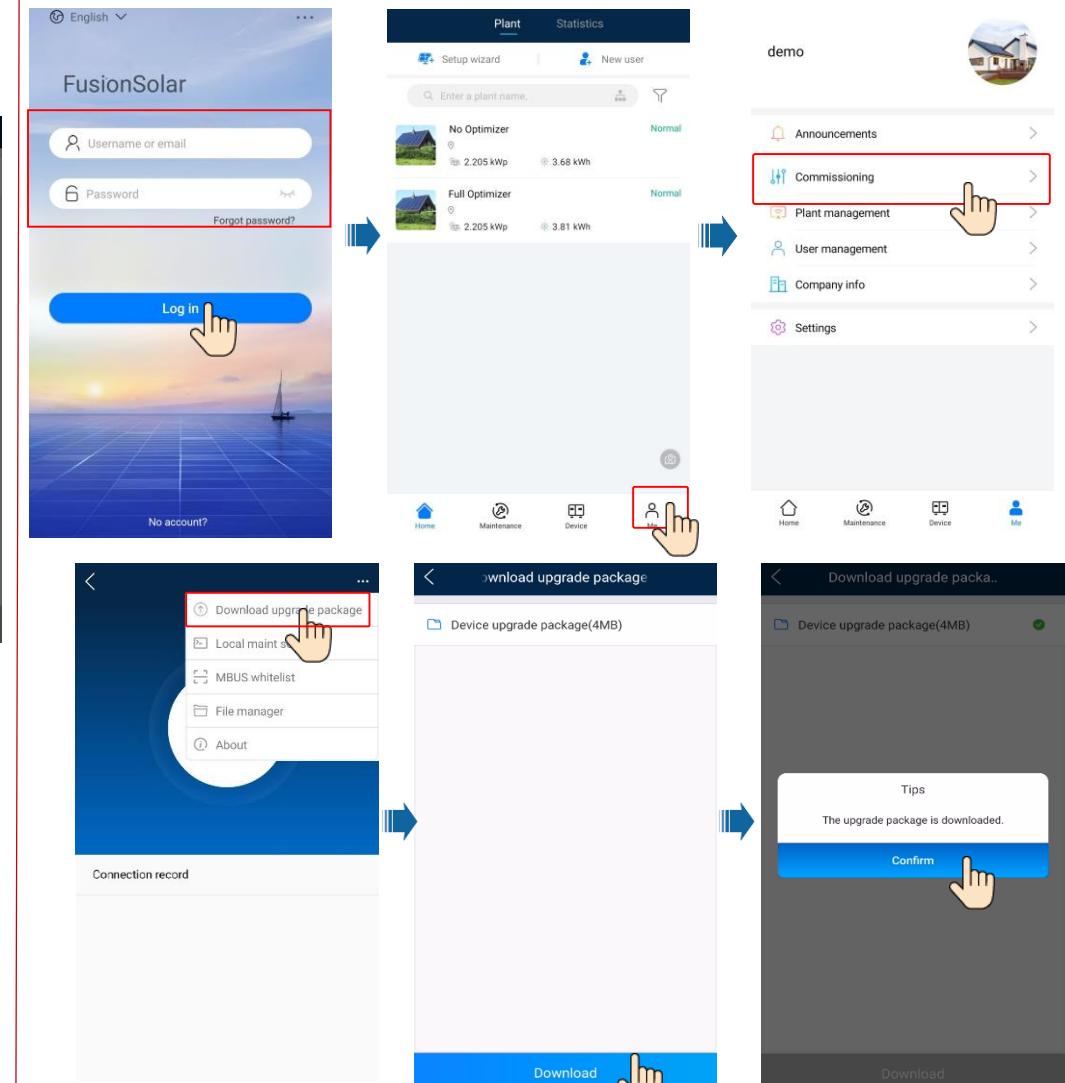
1. Upgrading Devices

Inverter

Method 1: Auto firmware detection and upgrade during setup wizard when Internet is available



Method 2: Manual firmware downloading



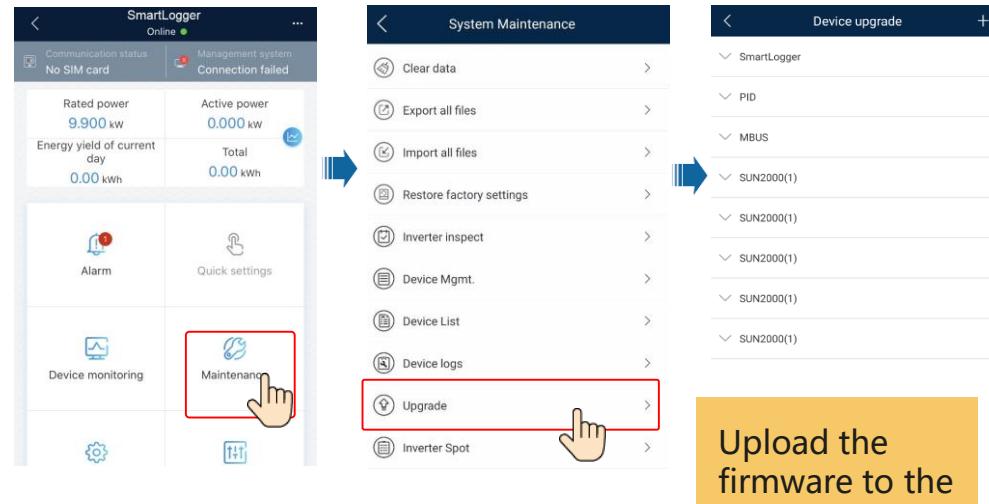
SmartLogger

Obtain the latest firmware from Support-E:

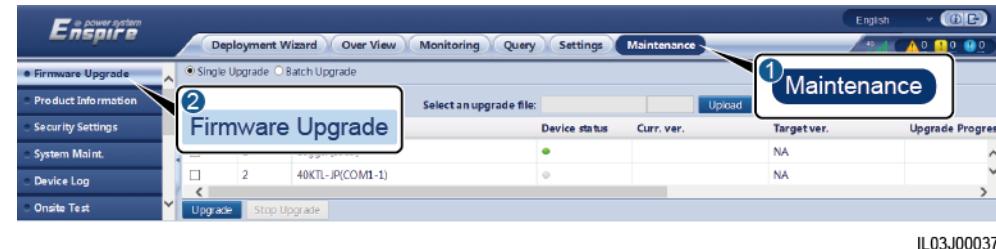
<https://support.huawei.com/enterprise/en/software/index.html>.

If you do not have the download permission, contact the distributor to obtain the latest firmware.

Insert the USB flash drive that stores the firmware into the USB port on the SmartLogger.



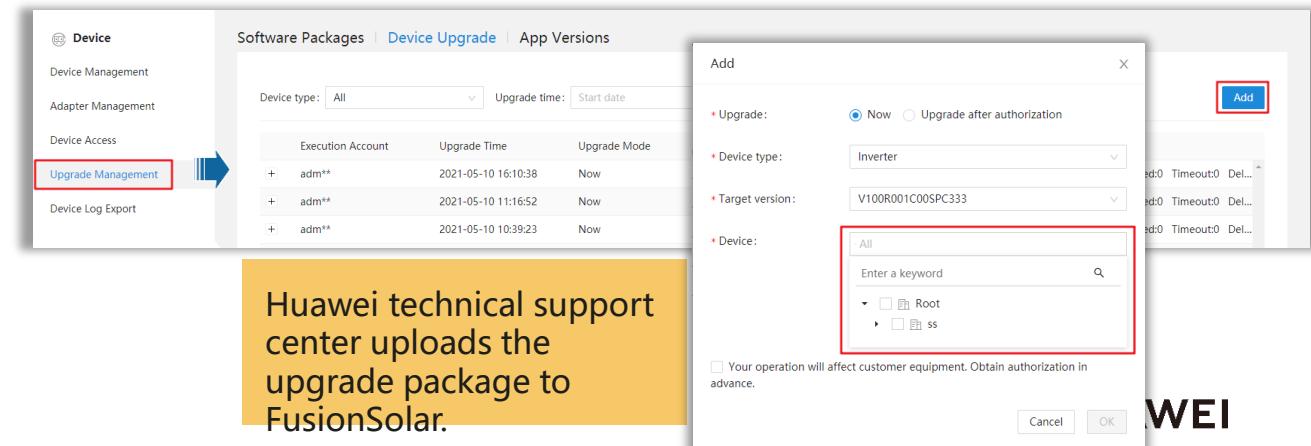
Upgrade device by SmartLogger WebUI: Upgrade the firmware of the SmartLogger or inverter over the WebUI.



Upload the firmware to the laptop.

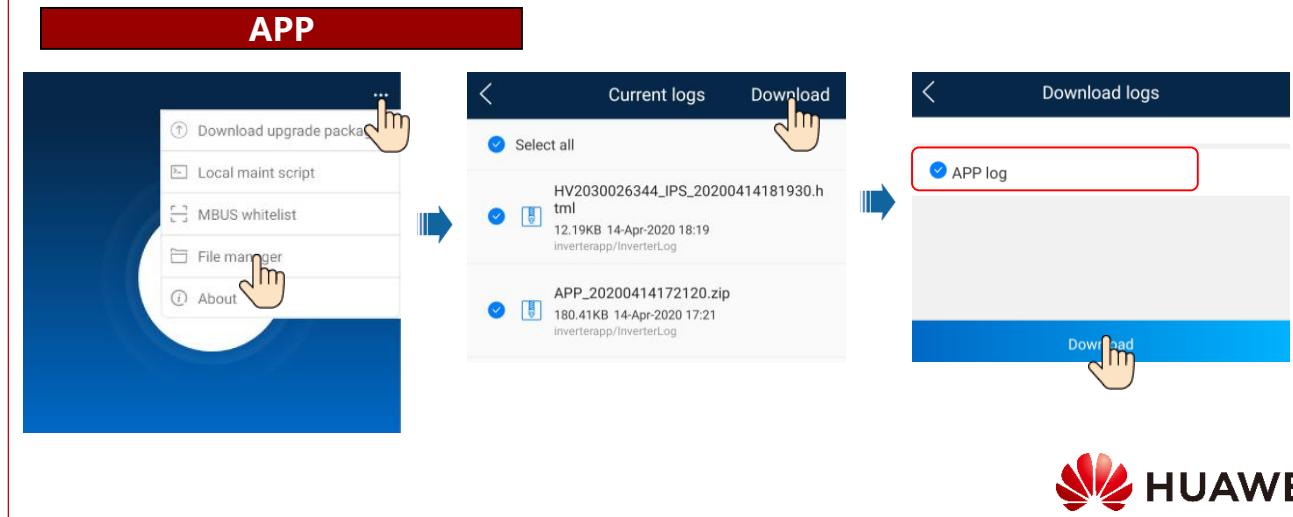
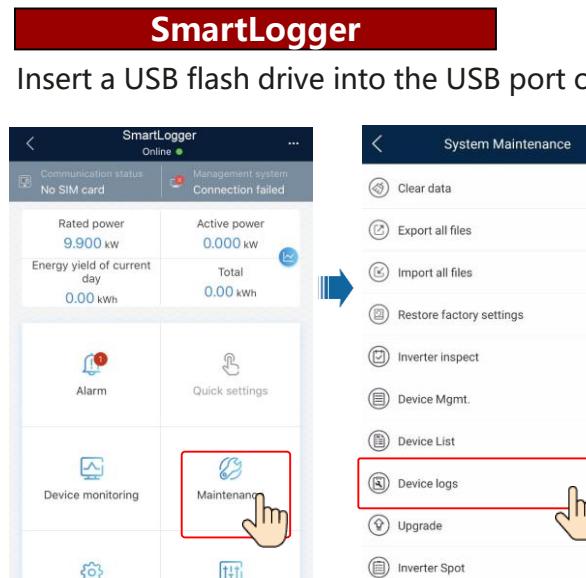
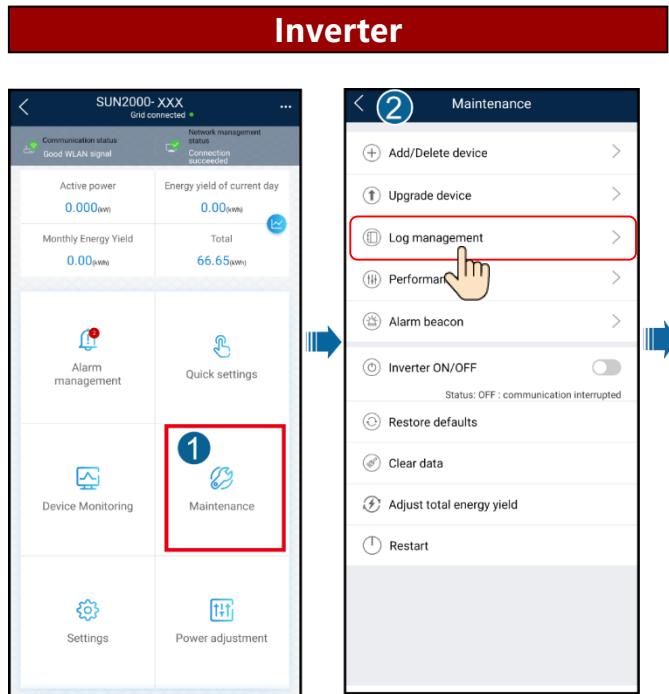
Option	Function	Operation Description
Single Upgrade	Upgrade a device of any type. NOTE The Single Upgrade mode does not apply to two or more types of device at a time. For example, you cannot select both SUN2000 and SmartLogger .	<ol style="list-style-type: none">Select the upgrade package and click Upload.Select the device that requires a firmware upgrade.Click Upgrade.
Batch Upgrade	Upgrade inverters in batches.	<ol style="list-style-type: none">Select the upgrade package and click Upload.Click Upgrade.

Upgrade device by FusionSolar WebUI: Upgrade the firmware of the SmartLogger, Smart Dongle, and inverter over the WebUI.



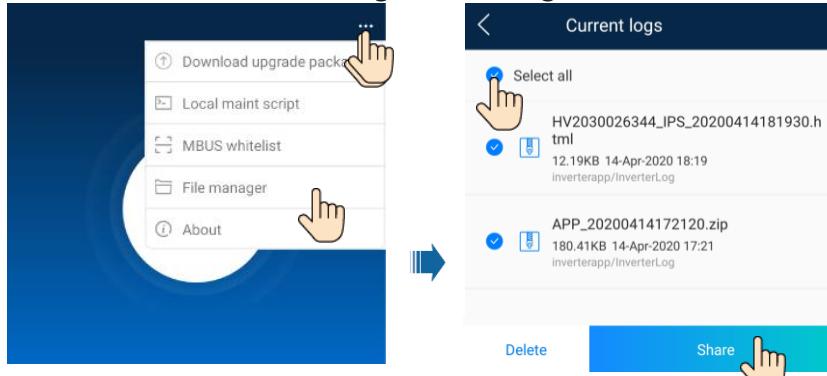
2. Exporting Device Logs

Export device logs by app: You can tap **Log management** or **Device Logs** to export operation logs.

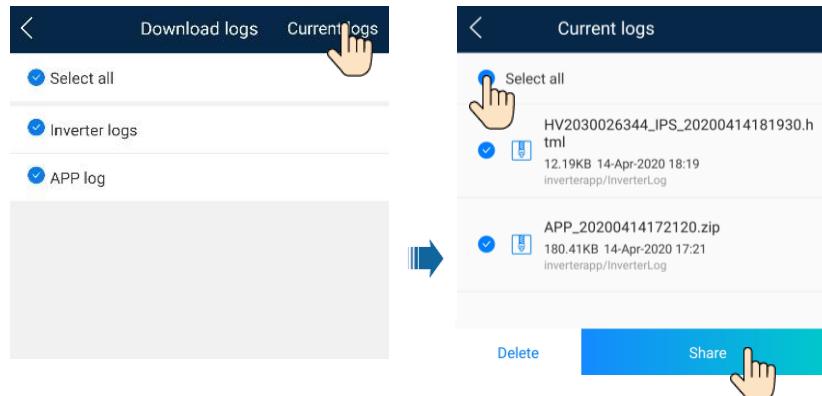


Sharing logs

Method 1: Share files through file management.



Method 2: Share logs through log management



Export device logs by SmartLogger WebUI: Select the device whose logs are to be exported and click **Export Log**.

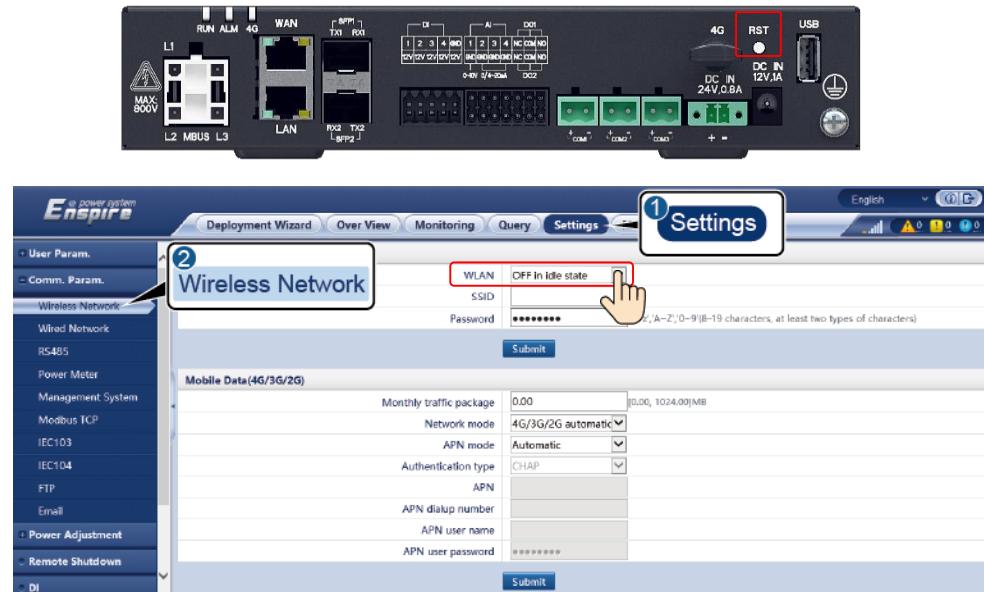


Logs of two or more types of devices cannot be exported at a time. For example, you cannot select both SUN2000 and SmartLogger.
Logs can be exported for a maximum of five devices of the same type at a time.

3. WLAN Connection Failure

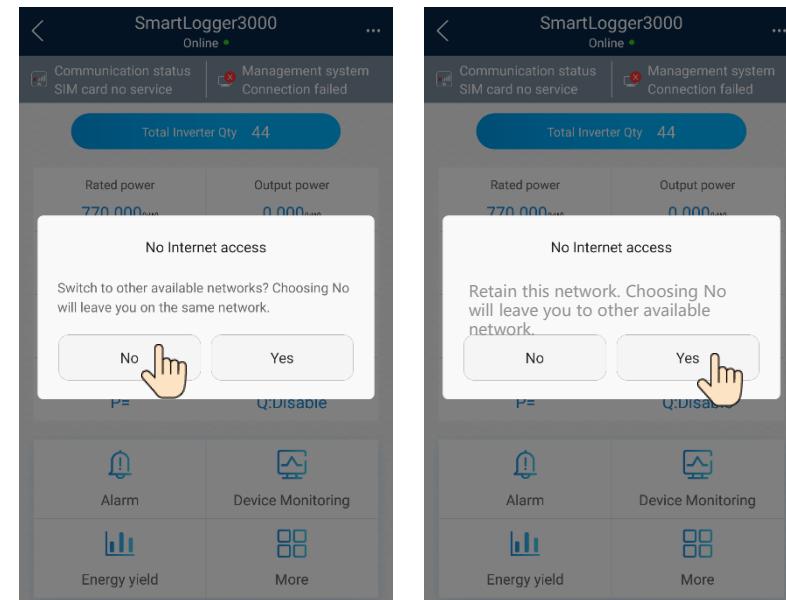
1. The WLAN hotspot is automatically disabled if it is not used for a long time after connection.

Hold down the RST button (for 1s to 3s) to enable the WLAN function.



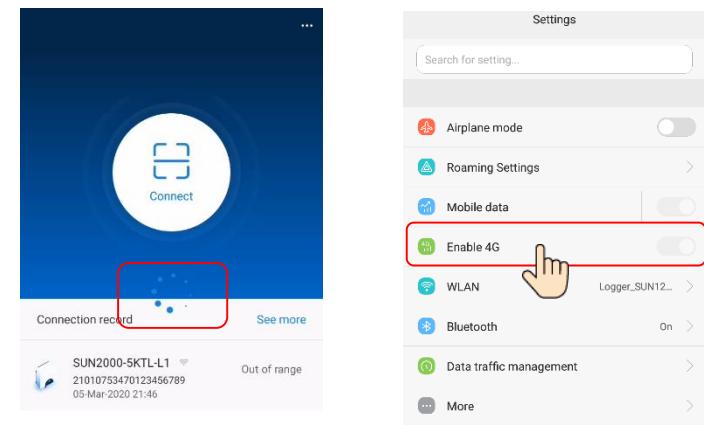
- By default, **WLAN** is set to **OFF in idle state**.
- When **WLAN** is set to **OFF in idle state**, the WLAN function is available within 4 hours after the SmartLogger is powered on. In other cases, hold down the RST button (for 1s to 3s) to enable the WLAN function.
- If **WLAN** is set to **Always OFF**, choose **Settings > Wireless Network** on the SmartLogger WebUI and set **WLAN** to **Always ON** or **OFF in idle state**.

2. Select the correct option for the WLAN not to access the Internet.



If the setting is incorrect, forget the WLAN network from the WLAN list in the phone system and reconnect to the network. The screen varies depending on the phone model.

3. If the device is connected to the WLAN but the device cannot be accessed, disable the 4G network and reconnect to the device.



4. Resetting Passwords

If you forget the WLAN connection password or user login password, you need to reset the password. The WLAN name, WLAN connection password, user login password, router parameters, and management system parameters are restored to factory settings.

1. Ensure that the SUN2000 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 SUN2000 to OFF. If the SUN2000 connects to batteries, turn off the battery switch. Wait until all the LED indicators on the SUN2000 panel turn off.
 - b. Turn on the AC switch, set the DC switch to ON, and wait for about 90s. Ensure that the indicator is blinking green slowly.
 - c. Turn off the AC switch and set the DC switch to OFF. Wait until all LED indicators on the SUN2000 panel are off.
 - d. Turn on the AC switch and set the DC switch to ON. Wait until all indicators on the solar inverter panel blink and turn off 30 seconds later.
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 SUN2000 and connect to the app.
 - c. On the login screen, set a new login password and log in to the app.
4. Set router and management system parameters to implement remote management.

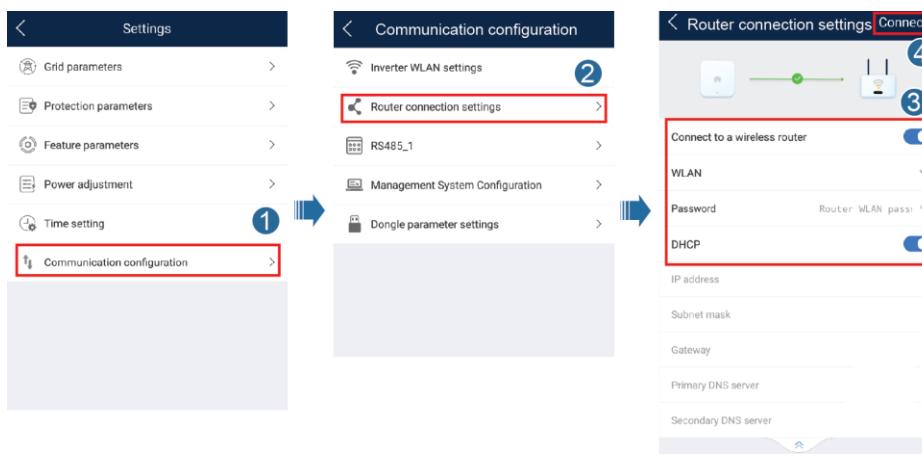
Resetting a user password

Log in to the FusionSolar app and go to the **Device commissioning** screen. On the password setting screen that is displayed, set the user password.



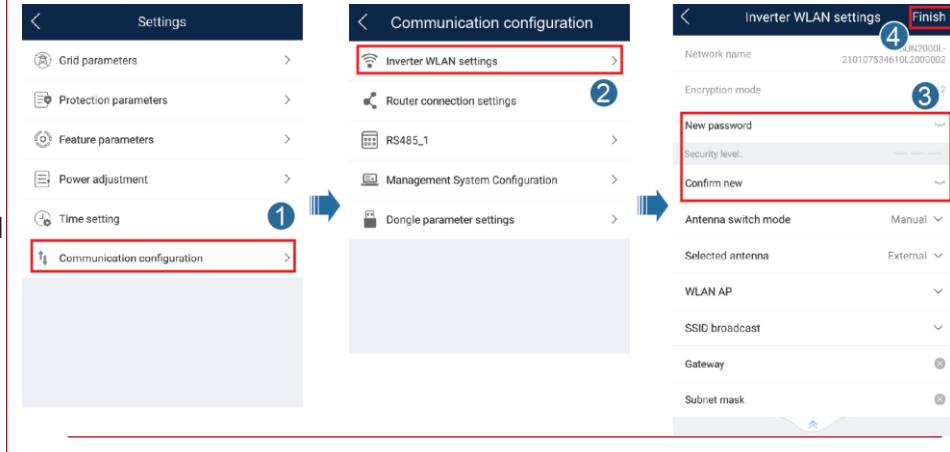
Resetting router parameters

Log in to the FusionSolar app, choose **Device commissioning > Settings > Communication configuration > Router connection settings**, and set router parameters.



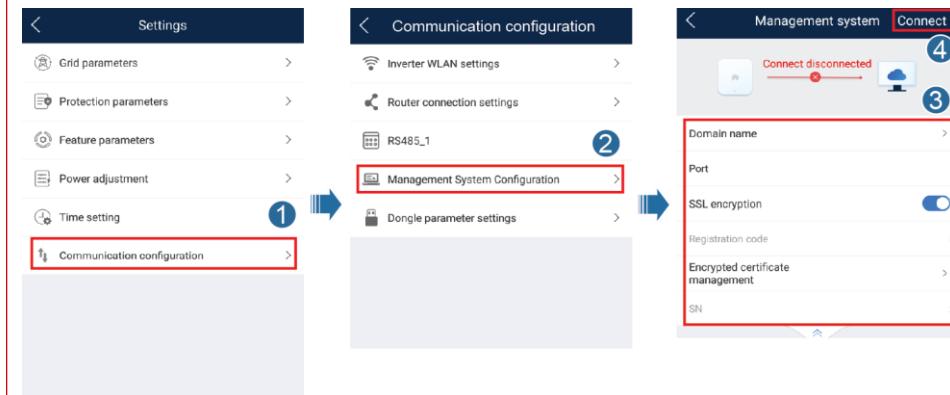
Resetting the WLAN password

Log in to the FusionSolar app, choose **Device commissioning > Settings > Communication configuration > Inverter WLAN settings**, and reset the WLAN password.



Resetting management system parameters

Log in to the FusionSolar app, choose **Device commissioning > Settings > Communication configuration > Management System Configuration**, and set management system parameters.



Thank you.

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