FusionSolar App

Quick Guide (SmartLogger5000B and SmartMGC5000B)

Issue 02

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About This Document

Purpose

This document describes how to use the FusionSolar app to perform deployment and commissioning on the SmartLogger5000B and SmartMGC5000B, and provides answers to frequently asked questions (FAQs) and troubleshooting methods.

Statement

In this document, LUNA only refers to a specific model of Huawei Smart String Grid Forming ESS.

Intended Audience

This document is intended for owners and installers.

Symbol Conventions

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

Symbol	Description
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.

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Symbol	Description
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

Issue	Date	Change Description
02	2026-01-30	Added genset parameters in sections "Quick Settings", "Seamless Switching in On/Off-Grid Scenarios", and "Off-Grid Scenario."
01	2025-10-25	This issue is the first official release.

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1 Downloading and Installing the App

NOTICE

The mobile phone operating system must be Android 8.0, iOS 13.0, or later. (iPhone 6 or later is supported for the iOS version.)

Download Method 1

Search for FusionSolar in the app store on your phone and download and install it.

NOTE

Currently, it is available on App Store, Huawei AppGallery, Samsung Galaxy Store, Xiaomi GetApps, OPPO APP Market, and vivo V-Appstore.



Download Method 2

Scan the QR code to download the app.



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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**.

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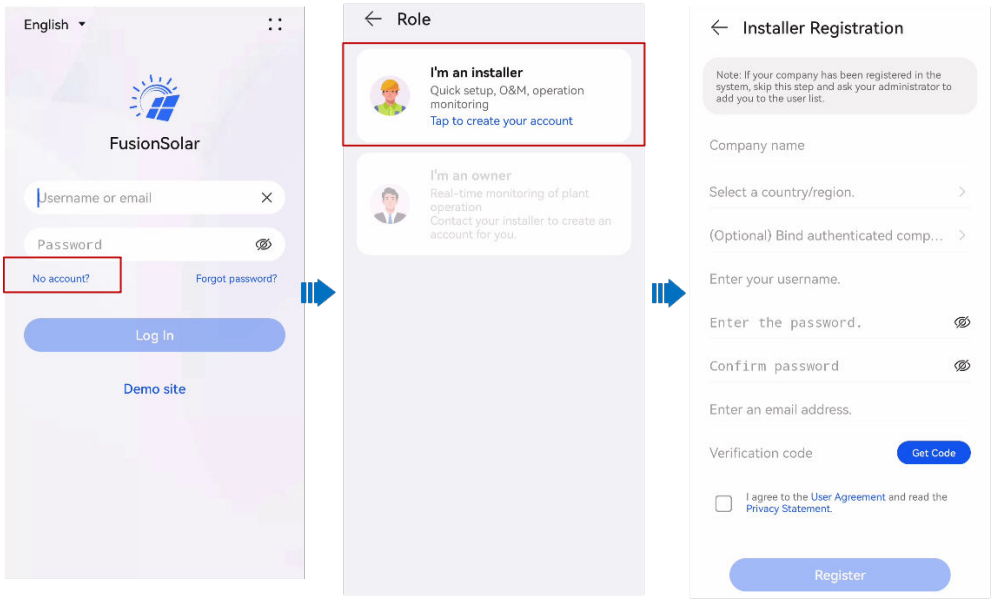
2 Registering the Company's First Installer Account

Context

- When you register the first installer account, a company is registered in the FusionSolar.

Procedure

1. On the app login screen, tap **No account?**.
2. On the **Role** screen, tap **I'm an installer** and complete the registration as prompted.



NOTE

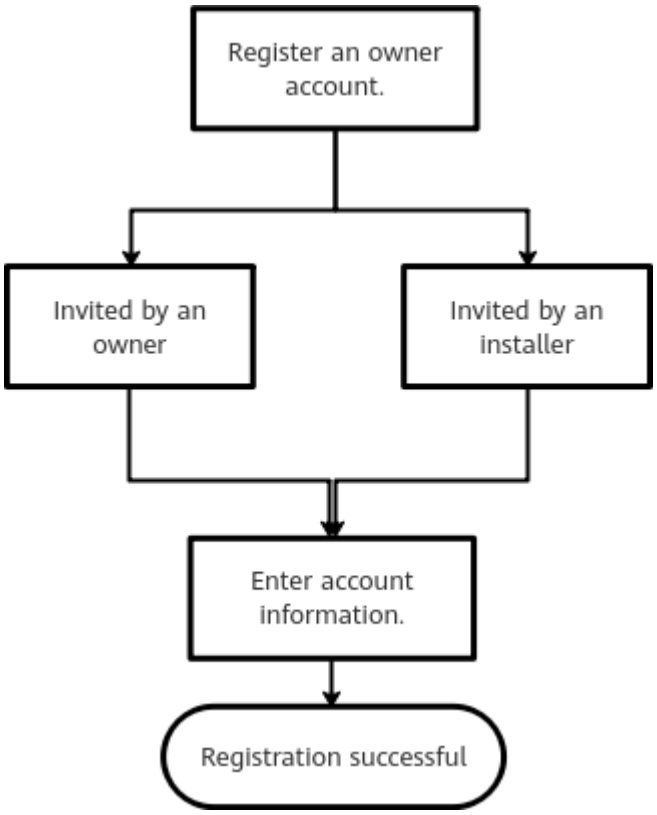
If your company has been registered in the installer community, tap **Bind Authenticated Company**, enter the company ID in the installer community, and associate the company registered in the installer community with the company in the management system. This motivates installers to participate in activities such as in-kind incentives and bonus point redemption in the installer community.

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3 Registering an Installer/Owner Account

3.1 Registering an Owner Account

Figure 3-1 Registration procedure



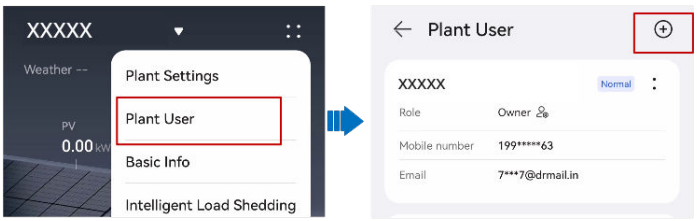
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Invited by an Owner

NOTE

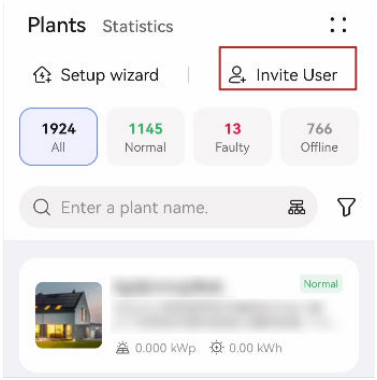
- Owners who have the **Plant User** permission can invite others to register as owners to jointly manage the plant.
- Only owners can be invited to register accounts and bind the current plant. Owners cannot invite installers to register.

1. Log in to the app as an owner.
2. On the **Home** screen, choose **::** > **Plant User**.
3. On the **Plant User** screen, tap **+** in the upper right corner.



Invited by an Installer

1. Log in to the app as an installer.
2. Tap **Invite User** on the **Home** screen.



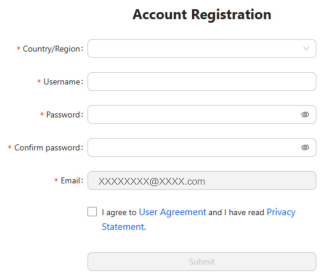
NOTE

- Before inviting an owner to register, ensure that the owner's plant has been created. Otherwise, the invitation cannot be completed.
- The first owner who registers an account in the plant will have the **Plant User** operation permission of the plant. The owner can invite other owners to register accounts and unbind other owners from the plant.

Specifying Account Information

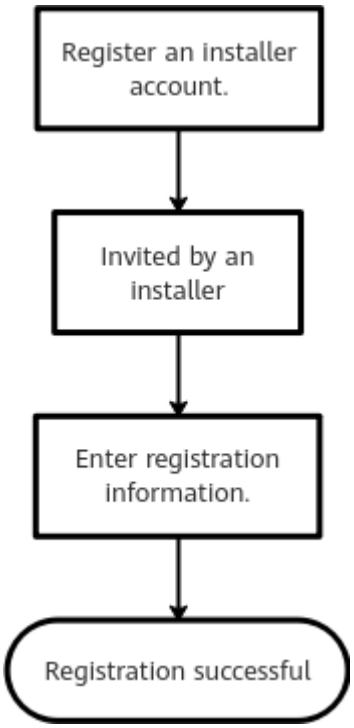
After receiving a registration invitation, open the registration link and complete the registration as prompted.

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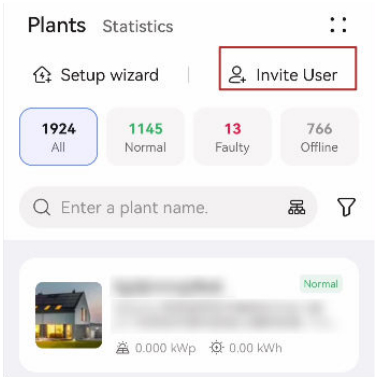
3.2 Registering an Installer Account

Figure 3-2 Registration procedure



Invited by an Installer

1. Log in to the app as an installer.
2. Tap **Invite User** on the **Home** screen.



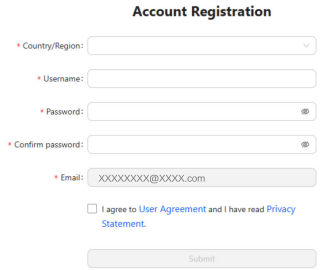
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NOTE

If only the plant is associated during plant association information setting, the installer who is invited for registration can manage only the associated plant and cannot create new plants. If a company is associated, the installer can manage all the plants under the associated company and can create new plants.

Specifying Account Information

After receiving a registration invitation, open the registration link and complete the registration as prompted.



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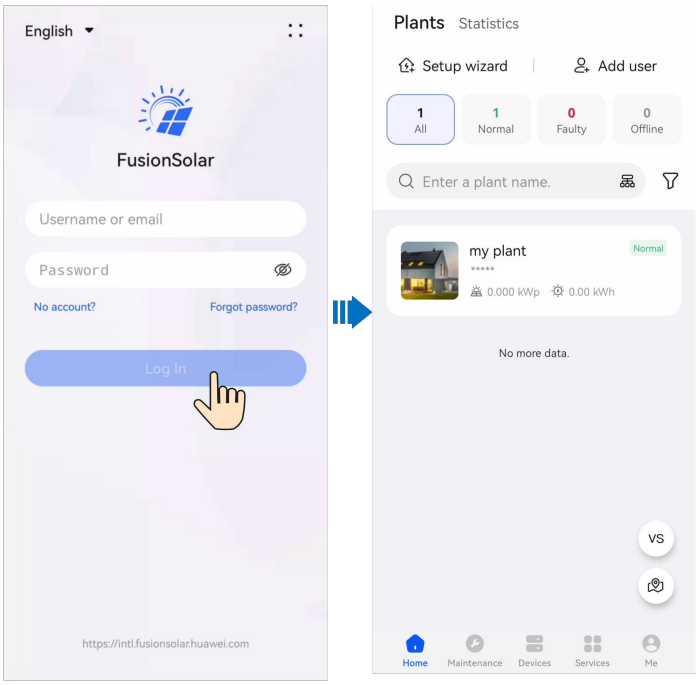
4 Logging In to and Out of the App

After the app is correctly installed on a mobile phone, you can access the management system through the app.

Logging In to the App

1. On the mobile device, tap the app icon to access the login screen.
2. On the app login screen, enter the account information and tap **Log In**.

Figure 4-1 Login



NOTE

- If a new user logs in to the app for the first time or a user logs in to the app for the first time after the password is reset, change the login password as prompted.
- If a user enters incorrect passwords for five consecutive times within 5 minutes, the account will be locked for 30 minutes. The user can log in gain after the lockout period expires or contact the installer or administrator to unlock the account.
- To ensure account security, protect the password by changing it periodically, and keep it secure. Your password might be stolen or cracked if it is left unchanged for extended periods. In these cases, the Company shall not be liable for any loss.

Logging Out of the App

1. On the home screen, tap **Me**.
2. Tap **Settings** > **Log out** on the **Me** screen.

5 Device Commissioning (SmartLogger/SmartMGC)

5.1 Preparations Before Deployment

5.1.1 Setting ESS Startup Authorization

Prerequisites

- Before connecting to the WLAN of the ESS, ensure that the ESS is powered on and the WLAN is enabled.
- The WLAN function has been enabled on the mobile phone.
- Keep the mobile phone within 5 m away from the device. Otherwise, the communication signal quality between the app and the device may be affected.

Procedure

Figure 5-1 ESS startup authorization procedure



1. Obtaining a verification code:
   a. Log in to the FusionSolar app, scan the WLAN QR code on the ESS, and **connect to the WLAN of the ESS**.

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NOTE

- The WLAN name of a product consists of "Device name-Product SN." (The last six digits of the WLAN name of some products are the same as the last six digits of the product SN.)
- For the first connection to the device WLAN, log in with the initial password. You can obtain the initial WLAN password from the label on the device.
- To ensure account security, protect the password by changing it periodically, and keep it secure. Your password might be stolen or cracked if it is left unchanged for extended periods. If a password is lost, devices cannot be accessed. In these cases, the Company shall not be liable for any loss.
- If the login screen is not displayed after you scan the QR code, check whether your phone is correctly connected to the device WLAN. If not, manually select and connect to the WLAN.
- If the message **This WLAN network has no Internet access. Connect anyway?** is displayed when you connect to the built-in WLAN, tap **CONNECT**. Otherwise, you cannot log in to the system. The actual UI and messages may vary with mobile phones.
- If the WLAN of the ESS cannot be found or the connection fails, press the WiFi button for 1s to 6s to start the WLAN module:

b. Log in to the local commissioning screen of the ESS as the **installer** user, and obtain **Verification code**.

NOTE

- Set the password as prompted at the first login.
- To ensure account security, protect the password by changing it periodically, and keep it secure.

2. Apply for the **Startup password** using the **Verification code**.

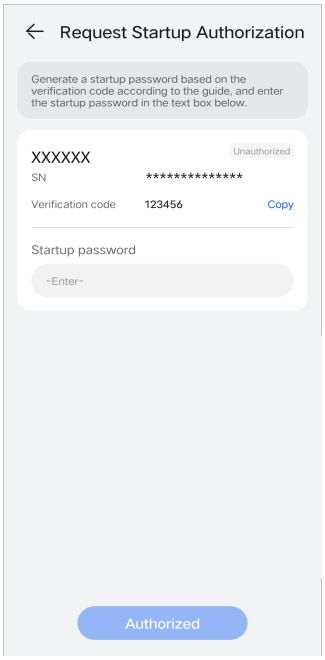
NOTE

- To apply for the **Startup password**, contact the device vendor or its authorized supervision service provider on the Power-Partner app.
- The Power-Partner app is used only for ESS startup authorization. The app mentioned in the following content is the FusionSolar app.

3. Use the app to scan the WLAN QR code on the ESS to log in to the local commissioning screen of the ESS as the **installer** user, enter the **Startup password**, and tap **Authorized**.

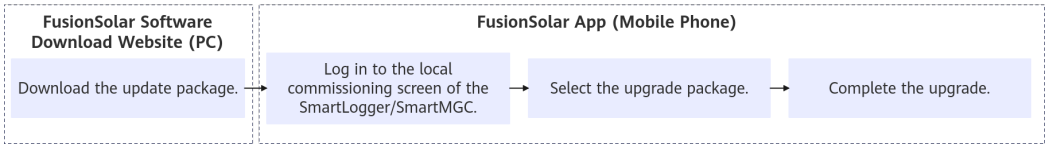
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Figure 5-2 ESS startup authorization



5.1.2 Updating the Software Version

Figure 5-3 Device update procedure



Downloading the Update Package (from the FusionSolar Software Download Website)

1. Log in to the **FusionSolar Software Download** website using the product customer account on a PC and download the latest software packages of the SmartLogger (or SmartMGC), ESS, and inverter.

   NOTE

   - To ensure the integrity of the downloaded software, download the digital signatures in PGP and CMS formats provided by Huawei after downloading the software packages from the website, and verify the digital signatures.
   - For details about how to register an account for **FusionSolar Software Download**, see **Registration Guide**. For details about how to upgrade the account permission, see **Huawei Enterprise Technical Support Website: How to upgrade to a customer account?**

2. After downloading the software packages from the website, import them from the PC to the mobile phone where the upgrade is to be performed.

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Updating the Device Version (FusionSolar App)

1. Log in to the FusionSolar app and scan the WLAN QR code on the SmartLogger (or SmartMGC) to **connect to the WLAN of the SmartLogger (or SmartMGC)**.
2. Log in to the local commissioning screen of the SmartLogger (or SmartMGC) and choose **Maintenance** > **Upgrade**.

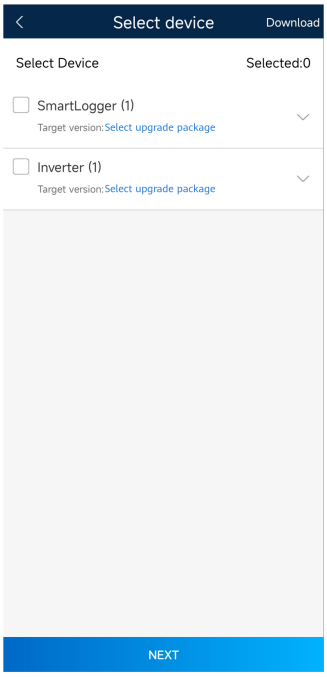
   NOTE

   - Set the password as prompted at the first login.
   - To ensure account security, protect the password by changing it periodically, and keep it secure.
3. Tap **Select Update Package** under the title of the device to be updated on the **Select device** screen, and select the update package as prompted.

   NOTE

   How to select the update package:
   - iOS mobile phone: After downloading the update package from the website and storing it on the mobile phone, hold down the file to share it to the FusionSolar app. Then the update package is directly displayed on the screen for selecting the update package.
   - Android mobile phone: Choose **Select upgrade package** > **From a local directory** to access the phone folder and manually select the update package.
4. Tap **Finish** to return to the **Select device** screen.
5. Select the device with the update package imported, tap **Next**, and update the device as prompted.

Figure 5-4 Device update

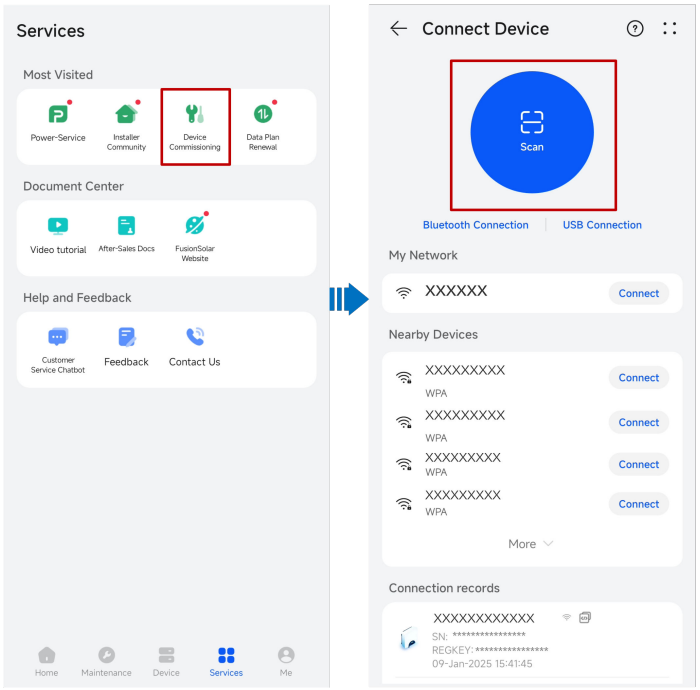


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5.2 Quick Settings

1. Tap **Device Commissioning** on the **Services** screen, scan the QR code on the SmartLogger (or SmartMGC), and connect to the WLAN of the device as prompted.

   Figure 5-5 Connecting to device WLAN



   NOTE

   - The WLAN name of the device consists of "device name-device SN".
   - For the first connection, log in with the initial password. You can obtain the initial WLAN password from the device label, that is, the characters following "PSW".
   - Ensure account security by changing the password periodically. Your password might be stolen or cracked if it is left unchanged for extended periods. If a password is lost, the device cannot be accessed. In these cases, the Company shall not be liable for any loss.
   - If the login screen is not displayed after you scan the QR code, check whether your phone is correctly connected to the device WLAN. If not, manually select and connect to the WLAN.
   - If **This WLAN network has no Internet access. Connect anyway?** message is displayed when you connect to the built-in WLAN, tap **CONNECT**. Otherwise, you cannot log in to the system. The actual UI and messages may vary with mobile phones.
   - If the WLAN of the SmartLogger (or SmartMGC) cannot be found or the connection fails, press the RST button for 1s to 3s to start the WLAN module. After the COM indicator keeps steady on for 2 minutes, you can connect the app to the device WLAN.

2. Log in to the local commissioning screen as the **Installer** user and access **Quick Settings**.

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NOTE

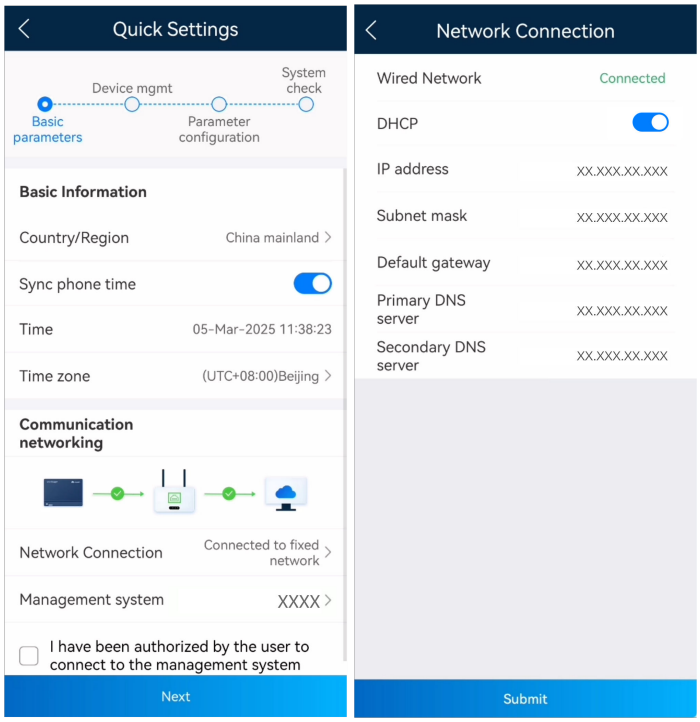
- Set the password as prompted at the first login.
- To ensure account security, protect the password by changing it periodically, and keep it secure.

3. Perform deployment and commissioning in the quick settings.
   - **Basic parameters**

     NOTE

     Ensure that the router supports the 2.4 GHz frequency band and covers the device location. Otherwise, the device cannot connect to the router, and the communication between the device and the management system will be abnormal.

Figure 5-6 Basic parameters



- **Network Connection**:

  After the **Quick Settings** screen is displayed, the system automatically connects to the network (for connecting to the management system). Tap the option area on the right of **Network Connection** to set related parameters of **Wired Network** or **Mobile network**.

  NOTE

  - If the automatic network connection fails, check whether the network cable has been connected or the SIM card has been installed.

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Table 5-1 Network connection parameters

Connection Method	Description
Wired Network	The WAN port of the SmartLogger (or SmartMGC) supports IP address obtaining using DHCP and automatic registration. If the router does not support DHCP, disable DHCP and manually assign an IP address.
Mobile network	**Network mode**: Set this parameter based on the SIM card network mode.
	APN mode: The default value is **Automatic**. If Internet access using dial-up is not supported in **Automatic** mode, set this parameter to **Manual**. In this case, set the parameters related to the SIM card with the information obtained from the carrier.

- **Management system**: The system automatically displays the default domain name. Tap the option area on the right of **Management system** and set related parameters as required. Select **I have been authorized by the user to connect to the management system.** and tap **Next** to connect to the management system.

Table 5-2 Management system connection parameters

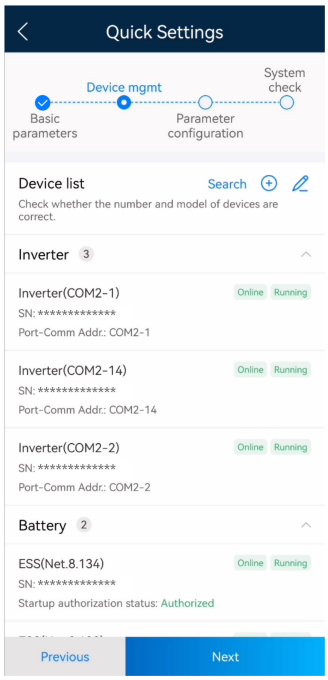
Parameter	Description
Domain Name	Set the IP address or domain name. Domain name: intl.fusionsolar.huawei.com
Third-party EMS Parameters	To connect a third-party management system, select a protocol based on the third-party management system protocol.

– **Device Management**

- Tap **Search** to discover the device. Auto discovery does not apply to third-party devices, such as the EMI and power meter. You need to tap **+** to add them manually.
- If the inverter is networked through MBUS, tap **MBUS whitelist** to set the inverter SN list.

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Figure 5-7 Device management



– **Parameter configuration**

Figure 5-8 Parameter configuration

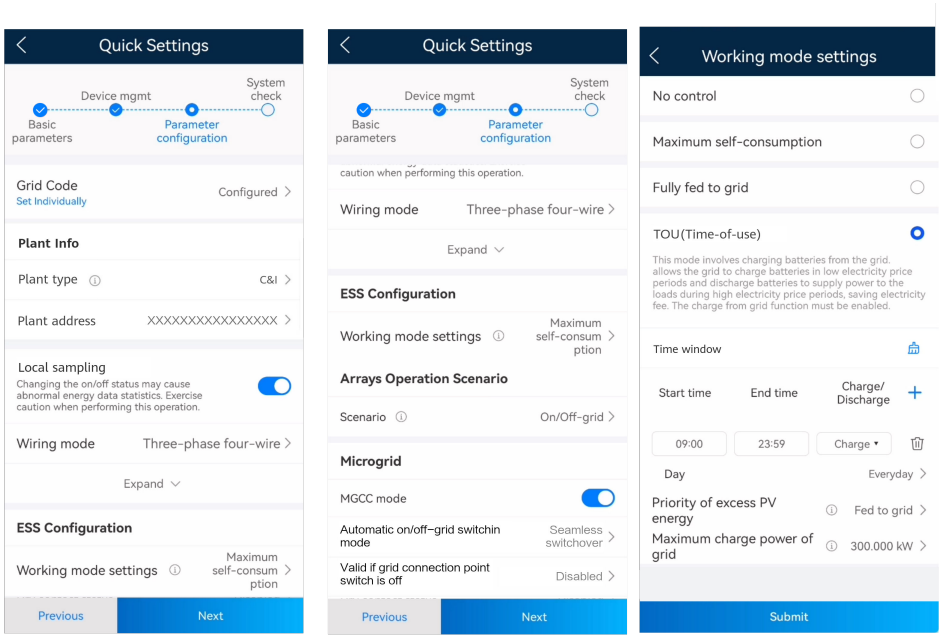


Table 5-3 Basic configuration

Category	Parameter	Description
Grid Code	**Grid Code**	Select the local grid code.
Plant Info	**Plant type**	Set it to **C&I**.

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Category	Parameter	Description
	Plant postal code	**Plant postal code** is displayed when **Plant type** is set to **C&I**, the mobile phone is not connected to the Internet or it is connected to the Internet but the location function of the app is not enabled. Set this parameter to the actual postal code of the plant.
	Plant address	**Plant address** is displayed when **Plant type** is set to **C&I**. Set this parameter to the address of the plant.
ESS Configuration	**Working mode settings**	For details about the ESS working modes, see **ESS Settings**. • On-grid operation: Set this parameter to **Maximum self-consumption**, **TOU (Time-of-use)**, or **TOU (Fixed power)** based on the actual application scenario. **TOU (Fixed power)** applies only to the ESS-only system, and **No control** applies only to the commissioning scenario. • Off-grid operation: Set this parameter to **No control**.
Arrays Operation Scenario	**Scenario**	• In the on-grid scenario, set this parameter to **On-grid**. The PV+ESS system can operate in on-grid mode only, which requires a normal grid supply and proper connection of PV and ESS devices to the grid. The PV+ESS system cannot operate in off-grid mode. • In the off-grid scenario, set this parameter to **Off-grid**. The PV+ESS system forms an independent microgrid to supply power to loads and does not need the grid supply. • In the **Seamless switchover** or **Seamed switching** scenario, set **On/Off-grid**. The PV+ESS system can run in on-grid or off-grid mode. The system supports bidirectional switching between the two modes. The grid supply is required in this scenario.

NOTE

Only the SmartMGC5000B supports the microgrid scenario.

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Table 5-4 Grid connection point sampling configuration

Parameter	Description
Local sampling	Set whether to enable **Local sampling**. After it is enabled, it can be used as a grid connection point meter with CT and PT sampling cables connected.
Wiring mode	This parameter is displayed when **Local sampling** is enabled. Set **Output mode** based on the actual cable connection.
Primary voltage of grid PT(V)	This parameter is displayed when **Local sampling** is enabled. The voltage is collected through the U_AC1 port. • If no PT is used, the primary and secondary voltages on the power grid side are set based on the rated voltage on the power grid side. • If a PT is used, the primary and secondary voltages on the power grid side are set based on the actual specifications of the PT.
Secondary voltage of grid PT(V)	
Primary voltage of microgrid PT(V)	This parameter is displayed when **Local sampling** is enabled. The voltage is collected through the U_AC2 port. • If PT sampling is unavailable, set the primary and secondary voltages on the microgrid side based on the actual rated voltage on the microgrid side. • If PT sampling is available, set the primary and secondary voltages on the microgrid side based on the actual specifications of the PT.
Secondary voltage of microgrid PT(V)	
Primary current of CT(A)	This parameter is displayed when **Local sampling** is enabled. The CT is connected to the I_AC port to collect current data. Set these parameters based on the actual specifications of the CT.
Secondary current of CT(A)	
CT wiring direction	Select the CT wiring direction based on the actual cable connection.

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Table 5-5 Microgrid parameters

Category	Parameter	Description	Remarks
Microgrid	**MGCC mode**	This parameter is disabled by default. Enable this parameter in the microgrid scenario. If **MGCC mode** is enabled, Modbus TCP, IEC 104, and GOOSE settings will be disabled. The SmartMGC will not respond to scheduling commands from the EMS. (Set the battery control working mode to **Charge/ Discharge based on grid dispatch** and set **Active power control mode** under **Power adjustment** to **Remote communication scheduling**.) Enable this parameter only when the EMS is not required. If you forcibly enable **MGCC mode** and the Modbus TCP, IEC 104, and GOOSE settings, the microgrid may be unstable.	This parameter is displayed when **Scenario** is set to **On/Off-grid** or **Off-grid**.
	Automatic on/off-grid switching mode	• **Not controlled**: The system does not perform any operation. The user manually controls on/off-grid switching. • **Seamed switching**: The system automatically switches off the circuit breaker at the grid connection point and performs the corresponding sequence control process. This switching mode usually takes a certain period of time and may result in a short-time power supply interruption. • **Seamless switching**: The system can quickly complete the on/off-grid switching without causing a power supply interruption. If rapid on/off-grid switching is required, set **Status of rapid power loss detection**[1] to **Enable**.	This parameter is displayed when **Scenario** is set to **On/Off-grid** and **MGCC mode** is enabled.
[1]: You can choose **Set** > **Microgrid Parameters** > **On/Off-Grid Switching** to set this parameter.			

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- In the microgrid scenario, if **Scenario** is set to **On/Off-grid**, **MGCC mode** is enabled, and **Automatic on/off-grid switching mode** is set to **Seamed switching**, the parameters are described as follows.

Table 5-6 Microgrid parameters (seamed switchover mode)

Category	Parameter	Description	Remarks
Microgrid	**Seamed on/off-grid switching mode**	This parameter is displayed when **Automatic on/off-grid switching mode** is set to **Seamed switching**. Set this parameter to **Automatic** or **Manual**.	-
	Valid if grid connection point switch is off	• If the switch-off terminal (NO) or switch-on terminal (NC) of the circuit breaker at the grid connection point is connected, set this parameter to **Enabled**. If the switch-off terminal (NC) or switch-on terminal (NO) of the circuit breaker at the grid connection point is connected, set this parameter to **Enabled**. • System cable connections: – DI4 (HV): reports the Off state of the switch at the grid connection point. – DO7 (HV): turns on the switch at the grid connection point. – DO8 (HV): turns off the switch at the grid connection point (fast port); needs to connect to the DC power supply. – DO4 (HV): turns off the switch at the grid connection point (common port); supports the DC or AC power supply.	This parameter is displayed when **Scenario** is set to **On/Off-grid** and **MGCC mode** is enabled.

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- In the microgrid scenario, if **Scenario** is set to **On/Off-grid**, **MGCC mode** is enabled, and **Automatic on/off-grid switching mode** is set to **Seamless switchover**, the parameters are described as follows.

Table 5-7 Microgrid parameters (seamless switchover mode)

Category	Parameter	Description	Remarks
Microgrid	**Valid if grid connection point switch is off**	• If the switch-off terminal (NO) or switch-on terminal (NC) of the circuit breaker at the grid connection point is connected, set this parameter to **Enabled**. If the switch-off terminal (NC) or switch-on terminal (NO) of the circuit breaker at the grid connection point is connected, set this parameter to **Enabled**. • System cable connections: – DI4 (HV): reports the Off state of the switch at the grid connection point. – DO7 (HV): turns on the switch at the grid connection point. – DO8 (HV): turns off the switch at the grid connection point (fast port); needs to connect to the DC power supply. – DO4 (HV): turns off the switch at the grid connection point (common port); supports the DC or AC power supply.	This parameter is displayed when **Scenario** is set to **On/Off-grid** and **MGCC mode** is enabled.
Genset control	**Genset control**	Set whether to enable **Genset control**. If the genset needs to be directly controlled, set this parameter to **Enable**.	This parameter is displayed when **Automatic on/off-grid switching mode** is set to **Seamless switchover**.

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Category	Parameter	Description	Remarks
	Genset control mode	Set this parameter based on the genset startup/shutdown control mode. ● Pulse: – DO5 (HV): starts the genset. – DO6 (HV): shuts down the genset. ● Level: – DO5 (HV): starts the genset at high level. – DO6 (HV): shuts down the genset at low level.	This parameter is displayed when **Genset control** is enabled.
	Genset rated active power (kW)	Set the rated active power of the genset. **NOTE** Ensure that the value is the same as the rated active power on the genset nameplate.	This parameter is displayed when **Genset control** is set to **Enable** and **Automatic on/off-grid switching mode** is set to **Seamless switchover**.
	Valid if grid-side switch is off	● Set this parameter to **Disabled** or **Enabled**. If the grid-side switch-on terminal of the transfer switch is connected, set this parameter to **Disabled**. If the grid-side switch-off terminal of the transfer switch is connected, set this parameter to **Enabled**. ● DI1 (HV): grid-side switch-off status feedback.	This parameter is displayed when **Genset control** is enabled.

Category	Parameter	Description	Remarks
	Valid if genset-side switch is off	• Set this parameter to **Disabled** or **Enabled**. If the genset-side switch-on terminal of the transfer switch is connected, set this parameter to **Disabled**. If the genset-side switch-off terminal of the transfer switch is connected, set this parameter to **Enabled**. • DI2 (HV): genset-side switch-off status feedback.	
	Valid if grid power recovers	• Set this parameter to **Disabled** or **Enabled**. If the normally open (NO) terminal of the power failure detection relay is connected, set this parameter to **Disabled**. If the normally closed (NC) terminal of the power failure detection relay is connected, set this parameter to **Enabled**. • DI3 (HV): grid power recovery status feedback.	

- In the microgrid scenario, if **Scenario** is set to **Off-grid** and **MGCC mode** is enabled, the parameters are described as follows:

Table 5-8 Microgrid parameters (off-grid mode)

Category	Parameter	Description	Remarks
Genset control	**Genset control**	Set whether to enable **Genset control**. If the genset needs to be directly controlled, set this parameter to **Enable**.	This parameter is displayed when **Scenario** is set to **Off-grid** and **MGCC mode** is enabled.

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Category	Parameter	Description	Remarks
	Genset control mode	Set this parameter based on the genset startup/shutdown control mode. • Pulse: – DO5 (HV): starts the genset. – DO6 (HV): shuts down the genset. • Level: – DO5 (HV): starts the genset at high level. – DO6 (HV): shuts down the genset at low level.	This parameter is displayed when **Genset control** is enabled.
	Genset rated active power (kW)	Set the rated active power of the genset. **NOTE** Ensure that the value is the same as the rated active power on the genset nameplate.	This parameter is displayed when **Genset control** is enabled.
	Transfer switch	• Set whether the transfer switch is connected. • System cable connections: – DI4 (HV): reports the Off state of the transfer switch. – DO7 (HV): turns on the transfer switch. – DO8 (HV): turns off the transfer switch.	This parameter is displayed when **Scenario** is set to **Off-grid** and **MGCC mode** is enabled.
	Valid if transfer switch is off	Set this parameter to **Disabled** or **Enabled**. If the switch-on terminal of the transfer switch is connected, set this parameter to **Disabled**. If the switch-off terminal of the transfer switch is connected, set this parameter to **Enabled**.	This parameter is displayed when **Scenario** is set to **Off-grid** and **MGCC mode** is enabled.

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Category	Parameter	Description	Remarks
Load control	**Critical load switch**	• Specifies whether the critical load switch is connected. • System cable connections: – DI1 (HV): reports the Off state of the critical load switch. – DO1 (HV): turns on the critical load switch. – DO2 (HV): turns off the critical load switch.	This parameter is displayed when **Scenario** is set to **Off-grid** and **MGCC mode** is enabled.
	Valid if critical load switch is off	• If the switch-off terminal (NO) or switch-on terminal (NC) of the circuit breaker at the grid connection point is connected, set this parameter to **Enabled**. If the switch-off terminal (NC) or switch-on terminal (NO) of the circuit breaker at the grid connection point is connected, set this parameter to **Enabled**. • System cable connections: – DI4 (HV): reports the Off state of the switch at the grid connection point. – DO7 (HV): turns on the switch at the grid connection point. – DO8 (HV): turns off the switch at the grid connection point (fast port); needs to connect to the DC power supply. – DO4 (HV): turns off the switch at the grid connection point (common port); supports the DC or AC power supply.	

Category	Parameter	Description	Remarks
	Minor load switch	• Specifies whether the minor load switch is connected. • System cable connections: – DI2 (HV): reports the Off state of the minor load switch. – DO3 (HV): turns on the minor load switch. – DO4 (HV): turns off the minor load switch.	
	Valid if minor load switch is off	Set this parameter to **Disabled** or **Enabled**. Set this parameter to **Disabled** if the switch-on terminal of the minor load switch is connected. Set this parameter to **Enabled** if the switch-off terminal of the minor load switch is connected.	
	Common load switch	• Specifies whether the common load switch is connected. • System cable connections: – DI3 (HV): reports the Off state of the common load switch. – DO5 (HV): turns on the common load switch. – DO6 (HV): turns off the common load switch.	This parameter is displayed when **Genset control** is disabled.
	Valid if common load switch is off	Set this parameter to **Disabled** or **Enabled**. Set this parameter to **Disabled** if the switch-on terminal of the common load switch is connected. Set this parameter to **Enabled** if the switch-off terminal of the common load switch is connected.	

– **System check**

After the current screen is displayed, the system automatically checks **Networking status**, **Alarm status**, **Device status**, and **Version check**. After the check is complete, you can tap **Check Again** to perform the

check again. You need to tap **Start test** to trigger **Connection Test**. After the check is complete, you can tap **Try Again** to perform the check again.

Figure 5-9 System check

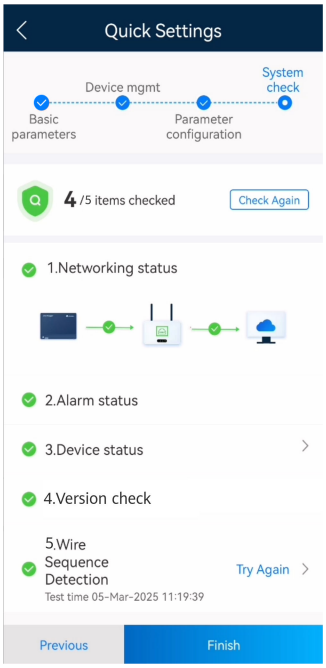


Table 5-9 System check

Check Type	Description
Networking status	Check whether the management system is successfully connected and whether the mobile network signal is weak.
Alarm status	Check whether there are active alarms.
Device status	Check whether **Running status** is set to **Faulty** or **communication status** is set to **Offline**.
Version check	Check whether all devices in the device list need to be updated. **NOTE** After the update is complete, you can return to the **System check** screen to continue the deployment. However, if the SmartLogger (or SmartMGC) is restarted during the update, the app will be disconnected from the WLAN of the device. As a result, the deployment cannot continue.

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Check Type	Description
Connection Test	Check whether the communication between devices is normal, whether the PT/CT cable connection and the A/B/C wire sequences of the PCS AC cables are normal, and identify possible faults. You can identify and rectify faults by viewing rectification suggestions to ensure that the system runs properly. **NOTE** • This function applies only to the C&I Hybrid Cooling Grid Forming ESS and is displayed in the scenario with multiple cabinets. • In the off-grid scenario, ensure that the load has been disconnected and then perform **Connection Test**. In the on-grid scenario, connection check is required only in the zero feed-in scenario with three-phase imbalance phase-level power control.

4. Tap **Finish**, perform **Array Startup/Shutdown** as required, and then commission the functions and features as required.

   NOTE

   - After you tap **Next**, if the search for optimizers is still ongoing, you can wait on the current screen as prompted or tap **Skip** to complete the deployment while the search for optimizers continues on the backend. You can view the search progress in the round progress chart on the screen.
   - If a message is displayed indicating that the software version needs to be updated, tap **Update**. If the device restarts after the update, the app will be disconnected from the WLAN of the device. Tap **Exit** to exit the local commissioning screen and disconnect from the WLAN of the device.

5. Set and confirm the following parameters after the deployment is complete.
   a. Set **Output mode** for the inverter and ESS.
      - Inverter: Tap **Device monitoring**, select the inverter, choose **Set** > **Grid parameters**, and set **Output mode** based on the actual cable connection mode of the inverter.
      - ESS: Tap **Device monitoring**, select the ESS, choose **Set** > **Power Parameters** > **Grid parameters**, and set **Output mode** of the ESS to **Three-phase four-wire**.

      NOTICE

      In the **Off-grid** scenario, disconnect the load, enable **Black Start**, and then set **Output mode**.

   b. Check whether **Grid code** of the ESS are correctly set. If not, correct it.
      - Tap **Device monitoring**, select the ESS, and choose **Settings** > **Power Parameters** > **Grid parameters**. Check the **Grid code** parameter and configure the local grid code as required.

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5.3 Microgrid Control

NOTE

Only the SmartMGC5000B supports the microgrid scenario.

5.3.1 Seamed Switching in On/Off-Grid Scenarios

1. **Connect a device**. On the home screen, choose **Quick Settings**. In the **Parameter configuration** step, set **Scenario** to **On/Off-grid**.
2. After **MGCC mode** is enabled, choose **Settings** > **Microgrid Parameters**, select **Microgrid**, and set basic microgrid parameters.

Table 5-10 Basic parameters

Parameter	Description
Automatic on/off-grid switching mode	Set this parameter to **Seamed switching**.
Seamed on/off-grid switching mode	This parameter is displayed when **Automatic on/off-grid switching mode** is set to **Seamed switching**. Set this parameter to **Automatic** or **Manual**.

Table 5-11 Connection settings

Parameter	Description
Valid if grid connection point switch is off	• If the switch-off terminal (NO) or switch-on terminal (NC) of the circuit breaker at the grid connection point is connected, set this parameter to **Enabled**. If the switch-off terminal (NC) or switch-on terminal (NO) of the circuit breaker at the grid connection point is connected, set this parameter to **Enabled**. • System cable connections: – DI4 (HV): reports the Off state of the switch at the grid connection point. – DO7 (HV): turns on the switch at the grid connection point. – DO8 (HV): turns off the switch at the grid connection point (fast port); needs to connect to the DC power supply. – DO4 (HV): turns off the switch at the grid connection point (common port); supports the DC or AC power supply.

3. Choose **Settings** > **Microgrid Parameters**, select **Scheduling Control**, and set related parameters.

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Table 5-12 Scheduling control

Category	Parameter	Description	Remarks
Control Policy Configuration	**Max. SOC for charging on/off-grid ESS**	Maximum SOC for charge in off-grid state in seamed switching scenarios.	-
	Min. SOC for discharging on/off-grid ESS	Minimum SOC for discharge in off-grid state in seamed switching scenarios.	-
	Min PV voltage for black start (V)	After the irradiance recovers, the inverter PV voltage increases. If the PV1 voltage of an inverter is greater than or equal to the value of this parameter, the black start may be started.	-
	Minimum estimated power for black start	Before setting this parameter, ensure that the southbound inverter supports irradiance estimation. Set this parameter to a percentage of the ESS rated power. The default value is 10% of the ESS rated power. When the irradiance is restored, if the estimated PV output power of the inverter is greater than the minimum estimated power for the black start, the black start is automatically performed.	-
Power Backup Control	**Off-grid power backup**	Enable this parameter to enable the off-grid power backup function. When the SOC is ≤ **Min. SOC for off-grid power backup**, the ESS stops discharging to maintain sufficient power for off-grid operation.	-
	Min. SOC for off-grid power backup (%)	Set **Min. SOC for off-grid power backup** in on-grid mode. The default value is 40%. The value range is [20, 90]%. The precision of the minimum SOC for off-grid power backup is 1%.	This parameter is displayed when **Off-grid power backup** is enabled.
	Prioritize off-grid power backup	When this parameter is enabled, if the ESS SOC is less than or equal to the off-grid backup power SOC minus 3%, the ESS is preferentially charged from the PV power or grid power.	

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Category	Parameter	Description	Remarks
	Draw power from grid for off-grid power backup	Specifies whether to obtain power from the grid for off-grid power backup.	This parameter is displayed when **Prioritize off-grid power backup** is enabled.
	Charge power for off-grid power backup (kW)	Specifies the power for charging the ESS by the grid for off-grid power backup. The default value is 100 kW. The value range is [0.0, 50000.0].	This parameter is displayed when **Draw power from grid for off-grid power backup** is enabled.

NOTE

Array end-of-charge SOC > **Max. SOC for charging on/off-grid ESS** ≥ **Backup power SOC for capacity control** ≥ **Min. SOC for off-grid power backup** > **Min. SOC for discharging on/off-grid ESS** > **Array end-of-discharge SOC**. You can choose **Settings** > **Power adjustment** > **Energy storage control** to set **Array end-of-discharge SOC**, **Array end-of-charge SOC**, and **Backup power SOC for capacity control**.

4. On the **Microgrid Parameters** screen, select **On/Off-Grid Switching** and set related parameters.

Table 5-13 On/Off-grid switching

Category	Parameter	Description
On/Off-grid switching configuration	**Auto switching to on-grid**	• Enable: If the mains voltage is stable, the system automatically switches from off-grid to on-grid after the synchronization of the SmartMGC is successful. • Disable: The function of automatic switching from off-grid to on-grid is disabled.
	Setting value of high voltage (%)	Specifies the allowed error range of the mains voltage. The default value is 90%. If the voltage is within [Setting value of high voltage, 110]% of the rated voltage, the voltage is considered stable.
	Continuous power available for (s)	Specifies the minimum time for which the mains voltage remains stable.
	Manual on/off-grid switching	Set **On-grid** or **Off-grid** as required.

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5. On the **Microgrid Parameters** screen, select **On/Off-Grid Switching** and set related parameters.

Table 5-14 Advanced control configuration

Parameter	Description
Automatic black start after irradiance restoration	Specifies whether to enable automatic black start after the irradiance is restored. • Enable: During off-grid operation, automatic black start is performed when the irradiance recovers. • Disable: Automatic black start is not performed when the irradiance recovers.
Automatic PCS recovery	Specifies whether to enable automatic recovery after the PCS is shut down abnormally. • Enable: During off-grid operation, when the SmartMGC detects that the PCS shuts down abnormally and causes microgrid power failure, the SmartMGC automatically attempts to black start to restore the power supply. • Disable: When the PCS shuts down abnormally, the SmartMGC does not perform automatic black start.
Automatic black start retries upon PCS fault	This parameter is displayed when **Automatic PCS recovery** is enabled. Set **Automatic black start retries upon PCS fault**.

6. On the **Microgrid Parameters** screen, select **Black Start** to view the black start status or manually initiate the black start.

NOTICE

In off-grid scenarios, it is recommended that the SOC during ESS charging/discharging in the scenario where the microgrid control is implemented by the SmartLogger range from 5% to 95% to ensure that the black start function works properly.

Table 5-15 Black start

Parameter	Description
Current Battery SOC	Specifies the real-time SOC of the ESS. If the SOC is too low, black start may fail.

Automatic black start

If the current ESS SOC is higher than the minimum ESS SOC required for black start, automatic black start is triggered if certain conditions are met.

– When **Scenario** is set to **On/Off-grid**, **MGCC mode** is enabled, and the on/off-grid switching mode is set to Auto, black start is automatically

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triggered if the plant is switched from on-grid to off-grid operation due to mains outage.

- When **Scenario** is set to **On/Off-grid**, **MGCC mode** is enabled, and the on/off-grid switching mode is set to Manual, black start is automatically triggered if you turn off the on/off-grid switch locally to switch the plant from on-grid to off-grid operation manually.
- When **MGCC mode** is set to Enable and **Automatic PCS recovery** is enabled, if the voltage on the PCS AC side is abnormal (less than 30% of the rated voltage on the PCS AC side) and the PCS is shut down abnormally, black start is automatically triggered.
- When **Scenario** is set to **Off-grid** and **MGCC mode** is enabled, if the solar irradiance recovers for inverters, turn off the load switch and then the black start is automatically triggered.

Manual black start

a. Check that the real-time ESS SOC is greater than or equal to 3%.

b. Tap **Black Start** to complete the manual black start.

NOTE

If the current ESS SOC is less than 3%, the black start may fail. You are advised to perform the black start when the solar irradiance is sufficient.

5.3.2 Seamless Switching in On/Off-Grid Scenarios

1. **Connect a device**. On the home screen, choose **Quick Settings**. In the **Parameter configuration** step, set **Scenario** to **On/Off-grid**.
2. After **MGCC mode** is enabled, choose **Settings** > **Microgrid Parameters**, select **Microgrid**, and set basic microgrid parameters.

Table 5-16 Basic parameters

Parameter	Description
Automatic on/off-grid switching mode	Set this parameter to **Seamless switchover**.

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Table 5-17 Connection settings

Parameter	Description	Remarks
Valid if grid connection point switch is off	• If the switch-off terminal (NO) or switch-on terminal (NC) of the circuit breaker at the grid connection point is connected, set this parameter to **Enabled**. If the switch-off terminal (NC) or switch-on terminal (NO) of the circuit breaker at the grid connection point is connected, set this parameter to **Enabled**. • System cable connections: – DI4 (HV): reports the Off state of the switch at the grid connection point. – DO7 (HV): turns on the switch at the grid connection point. – DO8 (HV): turns off the switch at the grid connection point (fast port); needs to connect to the DC power supply. – DO4 (HV): turns off the switch at the grid connection point (common port); supports the DC or AC power supply.	-
Genset control	Set whether to enable **Genset control**. If the genset needs to be directly controlled, set this parameter to **Enable**.	This parameter is displayed when **Automatic on/off-grid switching mode** is set to **Seamless switchover**.
Genset control mode	Set this parameter based on the genset startup/shutdown control mode. • Pulse: – DO5 (HV): starts the genset. – DO6 (HV): shuts down the genset. • Level: – DO5 (HV): starts the genset at high level. – DO6 (HV): shuts down the genset at low level.	This parameter is displayed when **Genset control** is enabled.
ESS SOC threshold for shutting down genset (%)	When the battery SOC is higher than **Genset control**, the genset shuts down.	This parameter is displayed when **Genset control** is enabled and **Automatic on/off-grid switching mode** is set to **Seamless switchover**.
Max. genset output power ratio (%)	Ratio of the actual output power of the genset to the rated power, which indicates the genset load rate.	

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Parameter	Description	Remarks
Genset rated active power (kW)	Set the rated active power of the genset. **NOTE** Ensure that the value is the same as the rated active power on the genset nameplate.	
Genset startup/ shutdown determination time (min)	Total duration from the time when the system detects the start or shutdown condition (for example, the SOC reaches the threshold) to the time when the genset starts or shuts down. **NOTE** After the genset startup or shutdown command is delivered, if the genset fails to start or shut down when **Genset startup/shutdown determination time** is reached, a genset startup or shutdown failure alarm is reported.	
ESS SOC threshold for starting up genset (%)	When the battery SOC is lower than **ESS SOC threshold for starting up genset**, the genset starts up.	
Valid if grid-side switch is off	• Set this parameter to **Disabled** or **Enabled**. If the grid-side switch-on terminal of the transfer switch is connected, set this parameter to **Disabled**. If the grid-side switch-off terminal of the transfer switch is connected, set this parameter to **Enabled**. • DI1 (HV): grid-side switch-off status feedback.	This parameter is displayed when **Genset control** is enabled.
Valid if genset-side switch is off	• Set this parameter to **Disabled** or **Enabled**. If the genset-side switch-on terminal of the transfer switch is connected, set this parameter to **Disabled**. If the genset-side switch-off terminal of the transfer switch is connected, set this parameter to **Enabled**. • DI2 (HV): genset-side switch-off status feedback.	
Valid if grid power recovers	• Set this parameter to **Disabled** or **Enabled**. If the normally open (NO) terminal of the power failure detection relay is connected, set this parameter to **Disabled**. If the normally closed (NC) terminal of the power failure detection relay is connected, set this parameter to **Enabled**. • DI3 (HV): grid power recovery status feedback.	

3. Choose **Settings** > **Microgrid Parameters**, select **Scheduling Control**, and set related parameters.

Table 5-18 Scheduling control

Category	Parameter	Description	Remarks
Control Policy Configuration	**Max. SOC for charging on/off-grid ESS**	Maximum SOC for charge in on/off-grid state in seamless switching scenarios.	-
	Min. SOC for discharging on/off-grid ESS	Minimum SOC for discharge in on/off-grid state in seamless switching scenarios.	-
	Min PV voltage for black start (V)	After the irradiance recovers, the inverter PV voltage increases. If the PV1 voltage of an inverter is greater than or equal to the value of this parameter, the black start may be started.	-
	Minimum estimated power for black start	Before setting this parameter, ensure that the southbound inverter supports irradiance estimation. Set this parameter to a percentage of the ESS rated power. The default value is 10% of the ESS rated power. When the irradiance is restored, if the estimated PV output power of the inverter is greater than the minimum estimated power for the black start, the black start is automatically performed.	-
Power Backup Control	**Off-grid power backup**	Enable this parameter to enable the off-grid power backup function. When the SOC is ≤ **Min. SOC for off-grid power backup**, the ESS stops discharging to maintain sufficient power for off-grid operation.	-
	Min. SOC for off-grid power backup (%)	Set **Min. SOC for off-grid power backup** in on-grid mode. The default value is 40%. The value range is [20, 90]%. The precision of the minimum SOC for off-grid power backup is 1%.	This parameter is displayed when **Off-grid power backup** is enabled.

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Category	Parameter	Description	Remarks
	Prioritize off-grid power backup	When this parameter is enabled, if the ESS SOC is less than or equal to the off-grid backup power SOC minus 3%, the ESS is preferentially charged from the PV power or grid power.	
	Draw power from grid for off-grid power backup	Specifies whether to obtain power from the grid for off-grid power backup.	This parameter is displayed when **Prioritize off-grid power backup** is enabled.
	Charge power for off-grid power backup (kW)	Specifies the power for charging the ESS by the grid for off-grid power backup. The default value is 100 kW. The value range is [0.0, 50000.0].	This parameter is displayed when **Draw power from grid for off-grid power backup** is enabled.

NOTE

Array end-of-charge SOC > **Max. SOC for charging on/off-grid ESS** ≥ **Backup power SOC for capacity control** ≥ **Min. SOC for off-grid power backup** > **Min. SOC for discharging on/off-grid ESS** > **Array end-of-discharge SOC**. You can choose **Settings** > **Power adjustment** > **Energy storage control** to set **Array end-of-discharge SOC**, **Array end-of-charge SOC**, and **Backup power SOC for capacity control**.

4. On the **Microgrid Parameters** screen, select **On/Off-Grid Switching** and set related parameters.

Table 5-19 On/Off-grid switching

Category	Parameter	Description
On/Off-grid switching configuration	**Auto switching to on-grid**	• Enable: If the mains voltage is stable, the system automatically switches from off-grid to on-grid after the synchronization of the SmartMGC is successful. • Disable: The function of automatic switching from off-grid to on-grid is disabled.

Category	Parameter	Description
	Setting value of high voltage (%)	Specifies the allowed error range of the mains voltage. The default value is 90%. If the voltage is within [Setting value of high voltage, 110]% of the rated voltage, the voltage is considered stable.
	Continuous power available for (s)	Specifies the minimum time for which the mains voltage remains stable.
	Max switching time (s)	Specifies the maximum duration for switching from off-grid to on-grid. The value of this parameter must be greater than the duration for the synchronization check of the SmartMGC.
	Manual on/off-grid switching	Set **On-grid** or **Off-grid** as required.

5. On the **Microgrid Parameters** screen, select **Advanced Control Configuration** and set related parameters.

Table 5-20 Advanced control configuration (on/off-grid)

Category	Parameter	Description	Remarks
Control policy	**Automatic black start after irradiance restoration**	Specifies whether to enable automatic black start after the irradiance is restored. ● Enable: During off-grid operation, automatic black start is performed when the irradiance recovers. ● Disable: Automatic black start is not performed when the irradiance recovers.	-

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Category	Parameter	Description	Remarks
	Automatic PCS recovery	Specifies whether to enable automatic recovery after the PCS is shut down abnormally. • Enable: During off-grid operation, when the SmartMGC detects that the PCS shuts down abnormally and causes microgrid power failure, the SmartMGC automatically attempts to black start to restore the power supply. • Disable: When the PCS shuts down abnormally, the SmartMGC does not perform automatic black start.	-
	Automatic black start retries upon PCS fault	This parameter is displayed when **Automatic PCS recovery** is enabled. Set **Automatic black start retries upon PCS fault**.	-
On/Off-Grid Switching	**Timeout interval for seamless switching from on-grid to off-grid**(s)	Maximum timeout interval for the system to perform seamless switching from on-grid to off-grid mode in the on/off-grid scenario. If the switching duration exceeds the specified time, the switching process is considered as a failure, and the system exits the switching process.	This parameter is displayed when **Automatic on/off-grid switching mode** is set to **Seamless switchover**.
	Apparent power threshold for seamless switching from on-grid to off-grid(%)	In the on/off-grid scenario, when the system performs seamless switching from on-grid to off-grid mode, if the apparent power of the point of interconnection (POI) is less than the value of **Apparent power threshold for seamless switching from on-grid to off-grid**, the SmartMGC delivers a tripping command to disconnect the switch at the POI.	

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Category	Parameter	Description	Remarks
	Synchronization mode	Control mode of synchronous switch-on when the system performs seamless switching from off-grid to on-grid mode in the on/off-grid scenario. • **Rapid synchronization check**: This mode has a high switch-on success rate. • **High-precision synchronization**: This mode can reduce the impact during switch-on.	
	Synchronization check mode	Check mode of synchronization check and switch-on when the system performs seamless switching from off-grid to on-grid mode in the on/off-grid scenario. • **Three-phase synchronization check**: The system checks the voltage and frequency of each of phases A, B, and C. • **Single-phase synchronization check**: The system checks only the voltage and frequency of phase A.	
	Switch closing duration (lead angle in synchronization check)(ms)	Duration for the POI circuit breaker to be switched on, which is used to determine synchronization check and switch-on.	
	Synchronization voltage difference threshold(%)	One of the conditions for synchronization check and switch-on is that the difference between the grid voltage and the microgrid voltage must be less than **Synchronization voltage difference threshold**.	

Category	Parameter	Description	Remarks
	Synchronization frequency difference threshold(Hz)	One of the conditions for synchronization check and switch-on is that the frequency difference between the grid voltage and the microgrid voltage must be less than **Synchronization frequency difference threshold**.	
	Synchronization phase difference threshold(°)	One of the conditions for synchronization check and switch-on is that the phase difference between the grid voltage and the microgrid voltage must be less than **Synchronization phase difference threshold**.	
	Rapid power loss detection	This parameter is disabled by default. If fast on/off-grid switching is required, enable this parameter. **NOTE** If **Rapid power loss detection** is enabled, the system can quickly switch between on-grid and off-grid modes. However, the system may switch to the off-grid mode when the grid power fluctuates. Exercise caution when enabling this parameter.	
	Threshold for triggering rapid power loss detection	This parameter specifies the threshold for triggering rapid power loss detection.	This parameter is displayed when **Rapid power loss detection** is enabled.

6. On the **Microgrid Parameters** screen, select **Black Start** to view the black start status or manually initiate the black start.

NOTICE

In off-grid scenarios, it is recommended that the SOC during ESS charging/discharging in the scenario where the microgrid control is implemented by the SmartLogger range from 5% to 95% to ensure that the black start function works properly.

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Table 5-21 Black start

Parameter	Description
Current Battery SOC	Specifies the real-time SOC of the ESS. If the SOC is too low, black start may fail.

Automatic black start

If the current ESS SOC is higher than the minimum ESS SOC required for black start, automatic black start is triggered if certain conditions are met.

- When **Scenario** is set to **On/Off-grid**, **MGCC mode** is enabled, and the on/off-grid switching mode is set to Auto, black start is automatically triggered if the plant is switched from on-grid to off-grid operation due to mains outage.
- When **Scenario** is set to **On/Off-grid**, **MGCC mode** is enabled, and the on/off-grid switching mode is set to Manual, black start is automatically triggered if you turn off the on/off-grid switch locally to switch the plant from on-grid to off-grid operation manually.
- When **MGCC mode** is set to Enable and **Automatic PCS recovery** is enabled, if the voltage on the PCS AC side is abnormal (less than 30% of the rated voltage on the PCS AC side) and the PCS is shut down abnormally, black start is automatically triggered.
- When **Scenario** is set to **Off-grid** and **MGCC mode** is enabled, if the solar irradiance recovers for inverters, turn off the load switch and then the black start is automatically triggered.

Manual black start

a. Check that the real-time ESS SOC is greater than or equal to 3%.

b. Tap **Black Start** to complete the manual black start.

NOTE

If the current ESS SOC is less than 3%, the black start may fail. You are advised to perform the black start when the solar irradiance is sufficient.

5.3.3 Off-Grid Scenario

1. Connect a device. On the home screen, choose **Quick Settings**. In the **Parameter configuration** step, set **Scenario** to **Off-grid**.
2. After **MGCC mode** is enabled, choose **Settings** > **Microgrid Parameters**, select **Microgrid**, and set basic microgrid parameters.

Table 5-22 Connection settings

Parameter	Description	Remarks
Genset control	Set whether to enable **Genset control**. If the genset needs to be directly controlled, set this parameter to **Enable**.	-

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Parameter	Description	Remarks
Genset control mode	Set this parameter based on the genset startup/shutdown control mode. • Pulse: – DO5 (HV): starts the genset. – DO6 (HV): shuts down the genset. • Level: – DO5 (HV): starts the genset at high level. – DO6 (HV): shuts down the genset at low level.	This parameter is displayed when **Genset control** is enabled.
ESS SOC threshold for shutting down genset (%)	When the battery SOC is higher than **Genset control**, the genset shuts down.	This parameter is displayed when **Genset control** is enabled.
Max. genset output power ratio (%)	Ratio of the actual output power of the genset to the rated power, which indicates the genset load rate.	
Genset rated active power (kW)	Set the rated active power of the genset. **NOTE** Ensure that the value is the same as the rated active power on the genset nameplate.	
Genset startup/ shutdown determination time (min)	Total duration from the time when the system detects the start or shutdown condition (for example, the SOC reaches the threshold) to the time when the genset starts or shuts down. **NOTE** After the genset startup or shutdown command is delivered, if the genset fails to start or shut down when **Genset startup/shutdown determination time** is reached, a genset startup or shutdown failure alarm is reported.	
ESS SOC threshold for starting up genset (%)	When the battery SOC is lower than **ESS SOC threshold for starting up genset**, the genset starts up.	
Transfer switch	• Set whether the transfer switch is connected. • System cable connections: – DI4 (HV): reports the Off state of the transfer switch. – DO7 (HV): turns on the transfer switch. – DO8 (HV): turns off the transfer switch.	-

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Parameter	Description	Remarks
Valid if transfer switch is off	Set this parameter to **Disabled** or **Enabled**. If the switch-on terminal of the transfer switch is connected, set this parameter to **Disabled**. If the switch-off terminal of the transfer switch is connected, set this parameter to **Enabled**.	-
Critical load switch	• Specifies whether the critical load switch is connected. • System cable connections: – DI1 (HV): reports the Off state of the critical load switch. – DO1 (HV): turns on the critical load switch. – DO2 (HV): turns off the critical load switch.	-
Valid if critical load switch is off	Set this parameter to **Disabled** or **Enabled**. Set this parameter to **Disabled** if the switch-on terminal of the major load switch is connected. Set this parameter to **Enabled** if the switch-off terminal of the major load switch is connected.	-
Minor load switch	• Specifies whether the minor load switch is connected. • System cable connections: – DI2 (HV): reports the Off state of the minor load switch. – DO3 (HV): turns on the minor load switch. – DO4 (HV): turns off the minor load switch.	-
Valid if minor load switch is off	Set this parameter to **Disabled** or **Enabled**. Set this parameter to **Disabled** if the switch-on terminal of the minor load switch is connected. Set this parameter to **Enabled** if the switch-off terminal of the minor load switch is connected.	-

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Parameter	Description	Remarks
Common load switch	• Specifies whether the common load switch is connected. • System cable connections: – DI3 (HV): reports the Off state of the common load switch. – DO5 (HV): turns on the common load switch. – DO6 (HV): turns off the common load switch.	This parameter is displayed when **Genset control** is disabled.
Valid if common load switch is off	Set this parameter to **Disabled** or **Enabled**. Set this parameter to **Disabled** if the switch-on terminal of the common load switch is connected. Set this parameter to **Enabled** if the switch-off terminal of the common load switch is connected.	

3. Choose **Settings** > **Microgrid Parameters**, select **Scheduling Control**, and set related parameters.

Table 5-23 Scheduling control

Category	Parameter	Description	Remarks
Control Policy Configuration	**Max. SOC for charging off-grid ESS**	Set the maximum SOC for charge in off-grid mode. The default value is 95%. Set the parameter based on the actual situation. To ensure reliable operations of the microgrid, the recommended value range is [85, 98] and this parameter must be ≤ (**Array end-of-charge SOC** – 2%).	-

Category	Parameter	Description	Remarks
	Min. SOC for discharging off-grid ESS	Set the minimum SOC for discharge in off-grid mode. The default value is 5%. Set the parameter based on the actual situation. To ensure reliable operations of the microgrid, the recommended value range is [5, 15] and this parameter must be ≥ (**Array end-of-discharge SOC** + 2%).	-
	Min PV voltage for black start (V)	After the irradiance recovers, the inverter PV voltage increases. If the PV1 voltage of an inverter is greater than or equal to the value of this parameter, the black start may be started.	-
	Minimum estimated power for black start	Before setting this parameter, ensure that the southbound inverter supports irradiance estimation. Set this parameter to a percentage of the ESS rated power. The default value is 10% of the ESS rated power. When the irradiance is restored, if the estimated PV output power of the inverter is greater than the minimum estimated power for the black start, the black start is automatically performed.	-

Category	Parameter	Description	Remarks
Power Backup Control	**SOC for turning on critical load switch**	When the array SOC is greater than or equal to the value, the critical load switch is turned on.	• These parameters are displayed when the critical load switch is connected. • **SOC for turning on critical load switch** > **SOC for turning off critical load switch**
	SOC for turning off critical load switch	When the array SOC is less than or equal to the value, the critical load switch is turned off.	
	SOC for turning on minor load switch	When the array SOC is greater than or equal to the value, the minor load switch is turned on.	• These parameters are displayed when the minor load switch is connected. • **SOC for turning on minor load switch** > **SOC for turning off minor load switch**
	SOC for turning off minor load switch	When the array SOC is less than or equal to the value, the minor load switch is turned off.	
	SOC for turning on common load switch	When the array SOC is greater than or equal to the value, the common load switch is turned on.	• These parameters are displayed when the common load switch is connected. • **SOC for turning on common load switch** > **SOC for turning off common load switch**
	SOC for turning off common load switch	When the array SOC is less than or equal to the value, the common load switch is turned off.	

NOTE

- **Array end-of-charge SOC** > **Max. SOC for charging off-grid ESS** > **SOC for turning on critical load switch** > **Min. SOC for discharging off-grid ESS** > **Array end-of-discharge SOC**. You can choose **Settings** > **Power adjustment** > **Energy storage control** to set **Array end-of-discharge SOC** and **Array end-of-charge SOC**.
- **SOC for turning on critical load switch** < **SOC for turning on minor load switch** < **SOC for turning on common load switch**.
- **SOC for turning off critical load switch** < **SOC for turning off minor load switch** < **SOC for turning off common load switch**

4. On the **Microgrid Parameters** screen, select **Advanced Control Configuration** and set related parameters.

Table 5-24 Microgrid configuration (off-grid scenario)

Parameter	Description
Automatic load connection/shedding	Set whether to enable **Automatic load connection/shedding**. When you manually operate the load switch, this function is temporarily locked. This function can be restored only after this parameter is enabled or the black start is successful.
Automatic black start after irradiance restoration	Specifies whether to enable automatic black start after the irradiance is restored. • Enable: During off-grid operation, automatic black start is performed when the irradiance recovers. • Disable: Automatic black start is not performed when the irradiance recovers.
PV charging upon black start	This parameter is displayed only when **Critical load switch**, **Minor load switch**, or **Common load switch** is enabled. Set whether to enable **PV charging upon black start**. If the real-time SOC of the ESS is too low, black start may fail. If this parameter is enabled, black start can be attempted when the sunlight is sufficient.
Automatic PCS recovery	Specifies whether to enable automatic recovery after the PCS is shut down abnormally. • Enable: During off-grid operation, when the SmartMGC detects that the PCS shuts down abnormally and causes microgrid power failure, the SmartMGC automatically attempts to black start to restore the power supply. • Disable: When the PCS shuts down abnormally, the SmartMGC does not perform automatic black start.
Automatic black start retries upon PCS fault	This parameter is displayed when **Automatic PCS recovery** is enabled. Set **Automatic black start retries upon PCS fault**.

5. On the **Microgrid Parameters** screen, select **Black Start** to view the black start status or manually initiate the black start.

NOTICE

In off-grid scenarios, it is recommended that the SOC during ESS charging/discharging in the scenario where the microgrid control is implemented by the SmartLogger range from 5% to 95% to ensure that the black start function works properly.

Table 5-25 Black start

Parameter	Description
Current Battery SOC	Specifies the real-time SOC of the ESS. If the SOC is too low, black start may fail.

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Automatic black start

If the current ESS SOC is higher than the minimum ESS SOC required for black start, automatic black start is triggered if certain conditions are met.

- When **Scenario** is set to **On/Off-grid**, **MGCC mode** is enabled, and the on/off-grid switching mode is set to Auto, black start is automatically triggered if the plant is switched from on-grid to off-grid operation due to mains outage.
- When **Scenario** is set to **On/Off-grid**, **MGCC mode** is enabled, and the on/off-grid switching mode is set to Manual, black start is automatically triggered if you turn off the on/off-grid switch locally to switch the plant from on-grid to off-grid operation manually.
- When **MGCC mode** is set to Enable and **Automatic PCS recovery** is enabled, if the voltage on the PCS AC side is abnormal (less than 30% of the rated voltage on the PCS AC side) and the PCS is shut down abnormally, black start is automatically triggered.
- When **Scenario** is set to **Off-grid** and **MGCC mode** is enabled, if the solar irradiance recovers for inverters, turn off the load switch and then the black start is automatically triggered.

Manual black start

a. Check that the real-time ESS SOC is greater than or equal to 3%.

b. Tap **Black Start** to complete the manual black start.

NOTE

If the current ESS SOC is less than 3%, the black start may fail. You are advised to perform the black start when the solar irradiance is sufficient.

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6 Connecting to a Plant

After the device commissioning is complete, log in to the FusionSolar app as the installer and tap **Setup wizard** on the home screen.

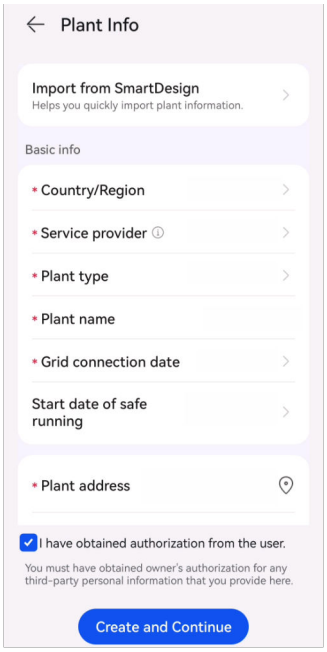
Scan the QR code on the device and connect the device to the plant as prompted.

6.1 Creating a Plant

1. If no plant has been created, tap **Add plant**.
2. Tap **Plant Info** and enter the basic plant information.
   - If a plant scheme has been designed on the FusionSolar SmartDesign before plant deployment, you can tap **Import from SmartDesign** to import the basic information about the corresponding plant from the SmartDesign.
   - If no plant scheme has ever been designed, enter the basic plant information as prompted.
   - Plant owner: Enter the email address of the plant owner to bind the plant to the owner account. (If the owner has not registered an account, the system will automatically send a registration invitation email to the owner after the plant is created.)

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Figure 6-1 Plant information

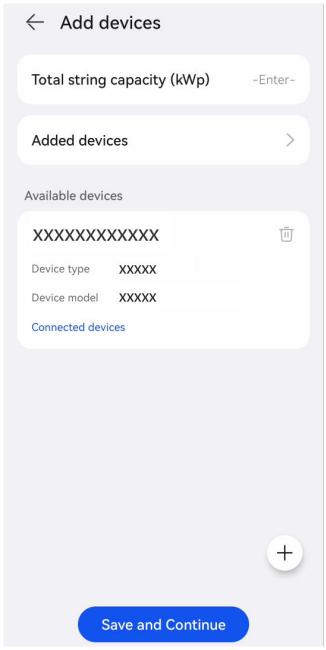


3. Tap **Create and Continue**.
4. On the screen for adding devices, view the added devices.
   - If multiple devices need to be connected to the same plant, tap **+** to scan the QR codes of the devices and add the devices one by one.

     NOTE

     The devices to be added must have been commissioned.
   - After the devices are added, tap **Total string capacity** and enter the total string capacity of the plant.

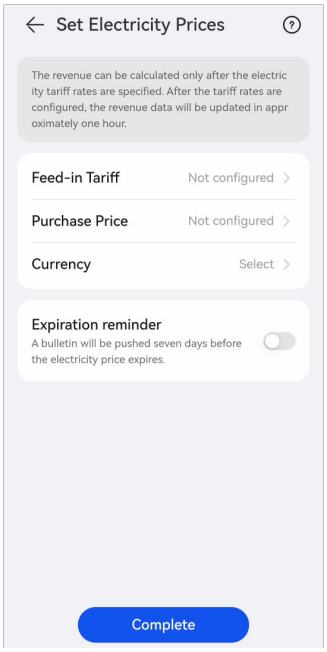
Figure 6-2 Adding devices



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5. Tap **Save and Continue**.
6. Set the feed-in tariff, purchase price, and revenue unit (currency) of the plant as electricity price inputs for revenue calculation.

Figure 6-3 Setting electricity prices



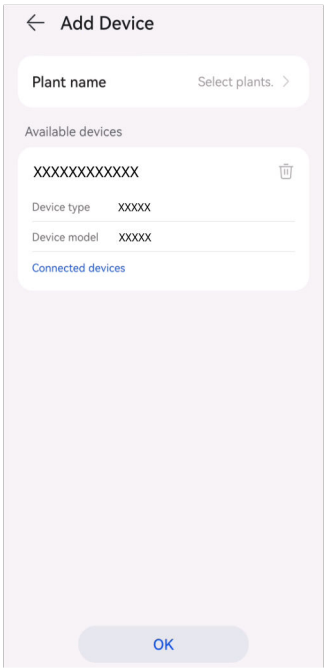
7. Tap **Complete**.

6.2 Connecting to an Existing Plant

1. If a plant has been created, tap **Connect to existing plant**.
2. Select the plant to be bound.
3. Tap **OK** to complete the binding.

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Figure 6-4 Adding devices



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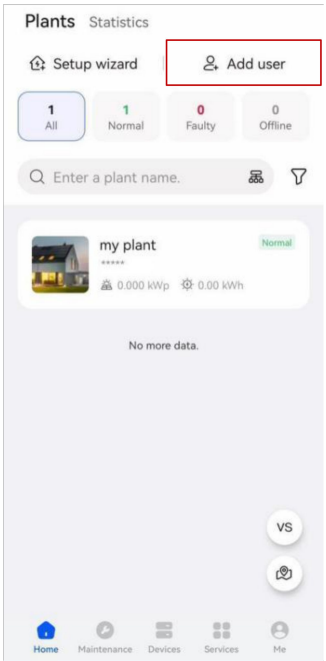
7 Creating an Owner Account or Installer Account (in Japan and Australia)

When creating a user, ensure that the plant to be associated with is available. If your company has created a plant, you can directly create a user and associate the user to the plant. If your company has not created a plant, create a plant and then add a user. For details, see **6 Connecting to a Plant**.

Creating an Owner User

1. Choose **Home** > **Plants**, tap **Add user** and create a user account as prompted.

Figure 7-1 Adding a user



NOTE

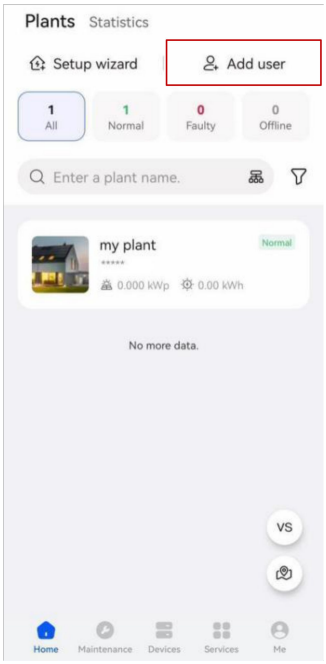
After an account is created, the system sends a notification to the entered email address. Then the user can use the received username and password to log in to the FusionSolar SmartPVMS or FusionSolar app.

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Creating an Installer User

1. Choose **Home** > **Plants**, tap **Add user** and create a user account as prompted.

Figure 7-2 Adding a user



NOTE

- For a new user who is assigned the **Installer** role, if the user is associated with only plants, the installer can manage the associated plants within the permission of the role but cannot create a plant. If the installer is associated with a company, the installer can manage all plants of the associated company and has the permission to create plants.
- After an account is created, the system sends a notification to the entered email address. Then the user can use the received username and password to log in to the FusionSolar SmartPVMS or FusionSolar app.

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8 Connecting to a Charger

In the C&I on-grid scenario, if a charger needs to be connected to the network, connect the charger to the SmartLogger (or SmartMGC) to complete device commissioning first, and then to the FusionSolar SmartPVMS to create a PV plant. For details, see the following instructions.

8.1 Huawei-Developed AC Charger

NOTE

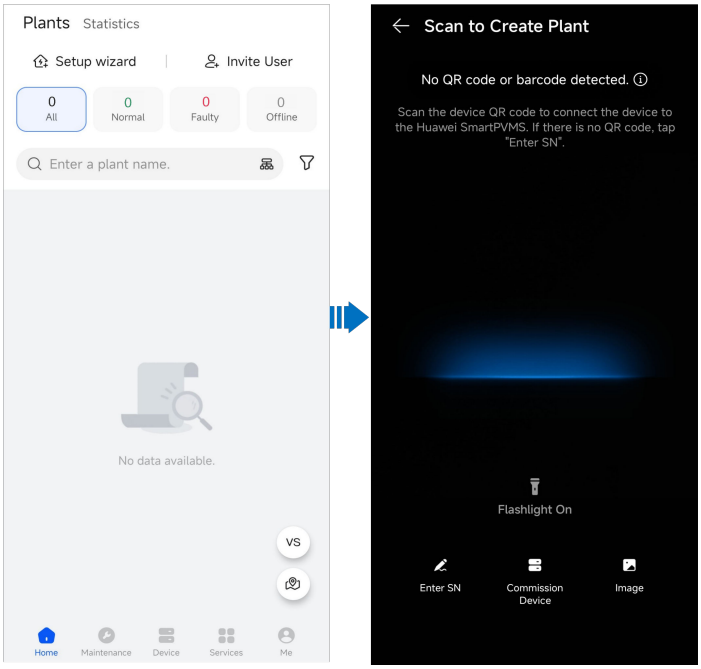
If multiple chargers need to be connected, repeat the following commissioning and connection procedures.

8.1.1 Commissioning a Charger

1. Log in to the FusionSolar app as an installer, tap **Setup wizard** on the **Home** screen, scan the QR code on the charger, and connect to the device WLAN as prompted.

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Figure 8-1 Scanning a QR code to create a plant



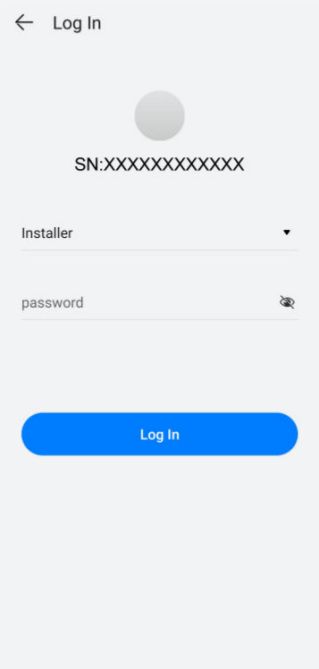
NOTE

- The last six digits of the device WLAN name are the same as the last six digits of the device SN.
- Use the initial password for the first connection. You can obtain the initial WLAN password from the label on the device.
- Ensure account security by changing the password periodically. Your password might be stolen or cracked if it is left unchanged for extended periods. If a password is lost, the device cannot be accessed. In these cases, the Company shall not be liable for any loss.
- If the login screen is not displayed after you scan the QR code, check whether your phone is correctly connected to the device WLAN. If not, manually select and connect to the WLAN.
- If **This WLAN network has no Internet access. Connect anyway?** message is displayed when you connect to the built-in WLAN, tap **CONNECT**. Otherwise, you cannot log in to the system. The actual UI and messages may vary with mobile phones.

2. Log in to the app as the **Installer** user.

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Figure 8-2 Local login



NOTE

- Use the initial password for the first login. The initial password is **Changeme**. Change the password as prompted after login.
- Ensure account security by changing the password periodically. Your password might be stolen or cracked if it is left unchanged for extended periods. If a password is lost, the device cannot be accessed. In these cases, the Company shall not be liable for any loss.

3. Commission the device according to the wizard procedure.

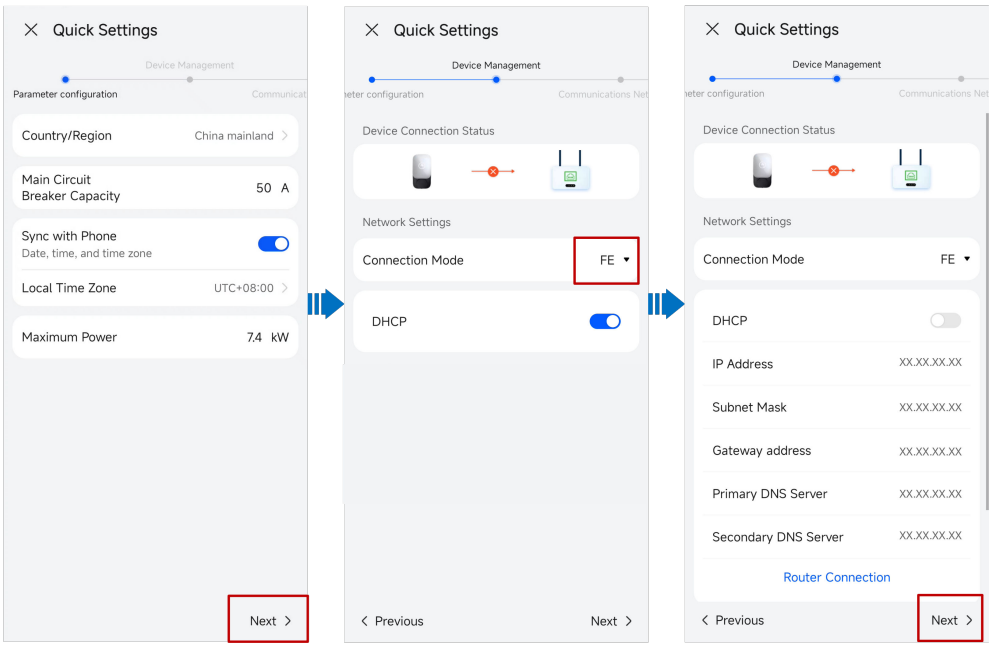
Table 8-1 Parameter configuration

Category	Parameter	Description
Parameter configuration	**Main Circuit Breaker Capacity**	Used for home appliance overload protection. Set the rated current of the main circuit breaker as required. **NOTE** Set the capacity of the main circuit breaker as required. If the set value is greater than the actual capacity, the circuit breaker trips due to overcurrent. If the set value is less than the actual capacity, the charger cannot work.
	Maximum Power	Set the maximum charge power, which cannot be greater than the rated charge power of the charger.

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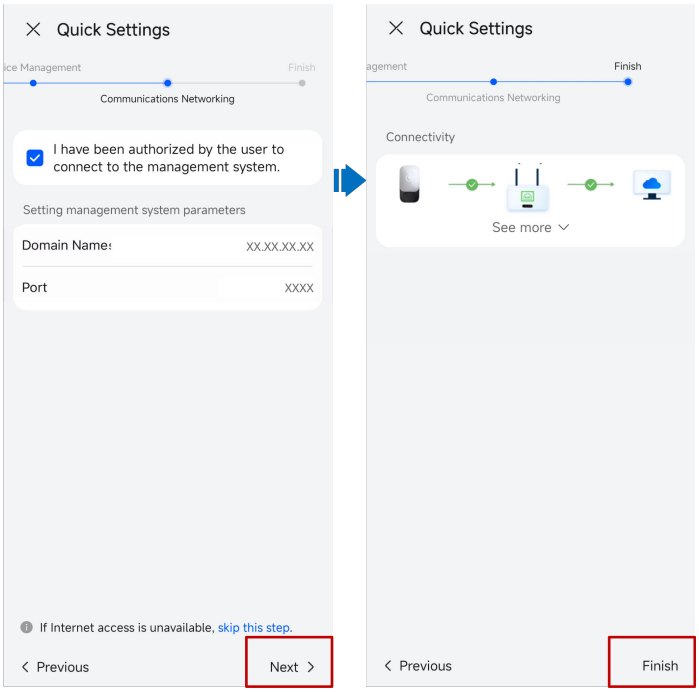
Category	Parameter	Description
Device management > Network Settings	**Connection Mode**	• When the FE port of the charger is directly connected to the router, set **Connection Mode** to **FE**. • When this parameter is set to **FE**, DHCP is enabled by default. In this case, the router automatically allocates an IP address to the charger. If the router does not support DHCP, disable DHCP and manually allocate an IP address. Enter the IP address as prompted and tap **Router Connection**.
Communication networking	**Setting management system parameters**	• Select **I have been authorized by the user to connect to the management system.**. • Management system domain name: solarcharge.opowercloud.huawei.com • Port number: 31220

Figure 8-3 Parameter configuration and device management



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Figure 8-4 Communication networking



4. Tap **Finish** and **connect the charger to a plant** as prompted.

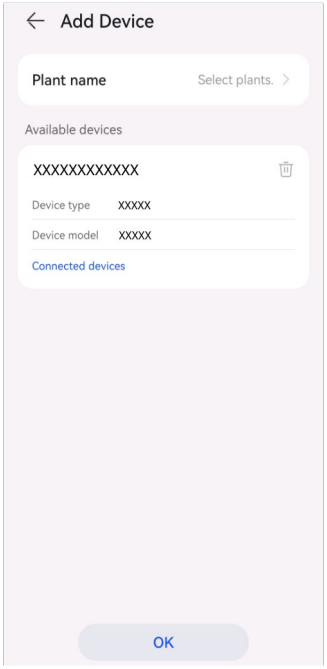
8.1.2 Connecting a Charger to a Plant

NOTE

Select the new plant connected to the SmartLogger (or SmartMGC) for binding.

1. If a plant has been created, tap **Connect to existing plant**.
2. Select the plant to be bound.
3. Tap **OK** to complete the binding.

Figure 8-5 Adding devices



8.2 Huawei-Developed DC Charger

Prerequisites

- Connect the power unit of Huawei DC charger to the SmartLogger (or SmartMGC) over FE.
- Use the Antohill app to log in to the power unit commissioning screen, choose **Maintenance** > **Energy Management System**, and set the following parameters.

Parameter	Description
Connection	Set it to  (enabled).
IP Address	Enter the IP address of the LAN port of the SmartLogger (or SmartMGC).
Port Number	1507
Networking Mode	Set it to FE (Ethernet connection).
Security Authentication	Set it to  (disabled).

- After the charger commissioning is complete, add the charger to the plant on the FusionSolar SmartPVMS using the IP address.

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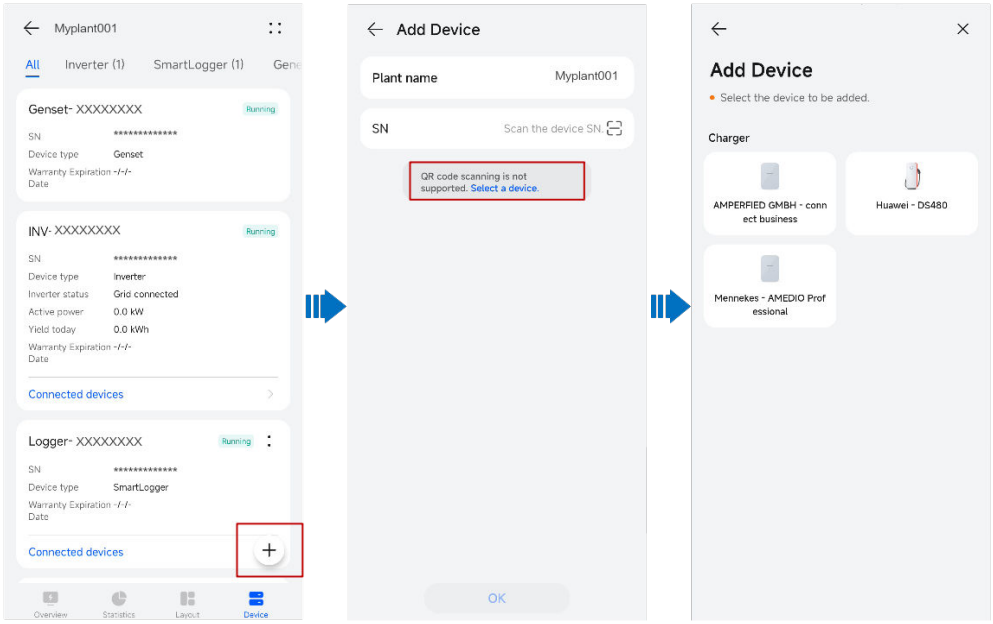
NOTE

Before connection, obtain the IP address of the power unit.

Connecting the Charger to a Plant

1. Log in to the FusionSolar app and select the plant where the charger is to be connected.
2. Tap **+** on the **Device** screen.
3. Tap **Select a device**.
4. Tap the card of the charger model to be added.

Figure 8-6 Connecting to the charger



5. Enter the IP address of the charger and tap **Add**.
6. After the charger is added successfully, tap **OK**.

8.3 Third-Party Charger

Prerequisites

- The charger is connected to the SmartLogger (or SmartMGC) in the same router or LAN over FE.
- The Modbus TCP function has been enabled by referring to the charger user manual. The DHCP function of the charger is disabled, and the IP address is manually configured.
- After the charger commissioning is complete, add the charger to the plant on the FusionSolar SmartPVMS using the IP address or SN.

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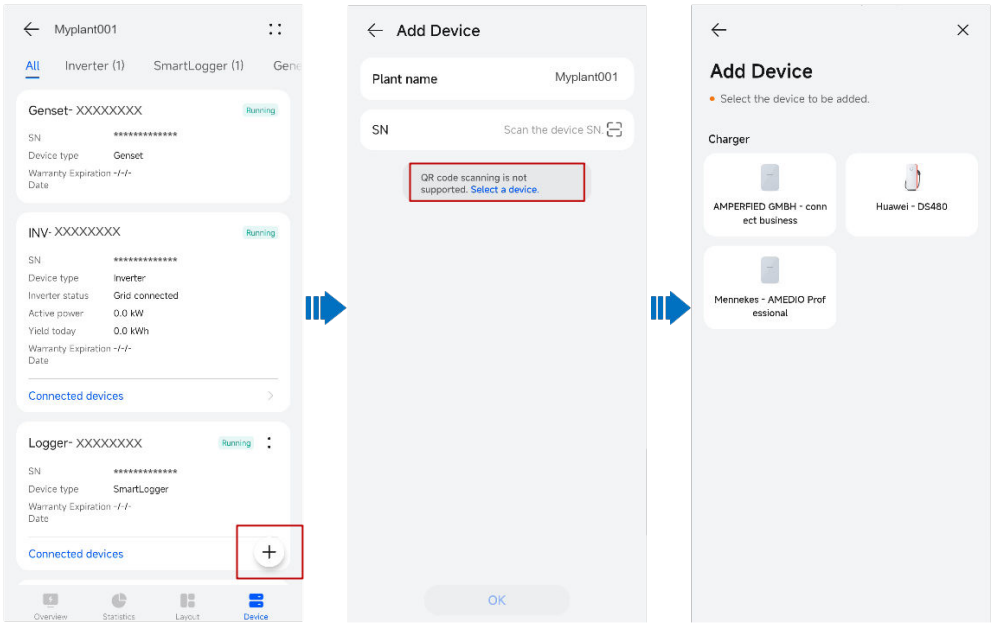
NOTE

- Before connection, obtain the IP address or SN of the charger.
- If multiple chargers need to be connected, record the IP address or SN of each charger.

Connecting the Charger to a Plant

1. Log in to the FusionSolar app and select the plant where the charger is to be connected.
2. Tap **+** on the **Device** screen.
3. Tap **Select a device**.
4. Tap the card of the charger model to be added.

Figure 8-7 Connecting to the charger



5. Enter the IP address or SN of the charger and tap **Add**.
   (You can tap **Add by SN** or **Add by IP address** to switch the adding mode.)
6. After the charger is added successfully, tap **OK**.

NOTE

If multiple chargers need to be connected, repeat the preceding commissioning and connection procedures.

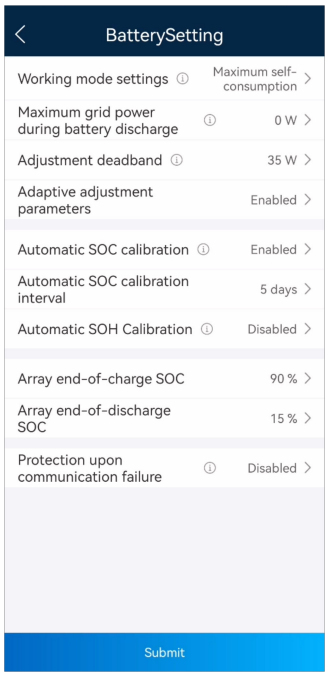
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9 Commissioning Functions

9.1 ESS Settings

Connect to a device, choose **Power adjustment** > **BatterySetting** on the home screen, and set related parameters.

Figure 9-1 ESS settings



NOTE

The **Fully fed to grid** mode is not supported in C&I or utility-scale scenarios.

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No Control

The SmartLogger (or SmartMGC) directly delivers the external scheduling power limit. No other power scheduling control is performed. The power is automatically controlled by the device.

Table 9-1 Parameters for the no control mode

Parameter	Description
Working mode settings	Set the parameter to **No Control**.
Automatic SOC calibration	• Enable: Automatic charge and discharge calibration is allowed for battery racks. The ESS periodically calibrates the SOC rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. • Disable: Automatic charge and discharge calibration is not performed for battery racks.
Automatic SOC calibration interval	This parameter is displayed when **Automatic SOC calibration** is enabled. Set the automatic SOC calibration interval.
Automatic SOH calibration	• Enable: The ESS periodically calibrates the SOH rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. Then, the battery capacity will be calculated. The charge and discharge response will be affected during the calibration. During SOH calibration, you are advised to wait for 30 to 60 minutes after the system is fully charged and after the discharge is complete if you want to manually send a switching command. • Disable: Automatic SOH calibration is not performed for battery racks.
Array end-of-charge SOC	The default value is 100%. The default value is recommended. Set this parameter as required.
Array end-of-discharge SOC	The default value is 5%. The default value is recommended. Set this parameter as required.
Protection upon communication failure	Specifies whether to enable protection against communication disconnection.

Maximum Self-Consumption

- The max. self-consumption mode applies to scenarios where the PV ratio is high (PV power is sufficient for loads and the surplus power is used to charge the ESS) and the electricity price is high (the FIT subsidy is low or unavailable).
- PV power is preferentially supplied to loads, and the surplus power is used to charge the ESS. If the ESS is fully charged or is being charged at full power, the surplus power is fed to the grid. When PV power is insufficient or no PV

power can be generated at night, the ESS discharges power to loads. This improves the self-consumption rate and energy self-sufficiency rate, and reduces electricity costs. The grid cannot charge the ESS but can supply power to loads.

- The SmartLogger (or SmartMGC) performs ESS scheduling based on the external scheduling power limit and the preceding policies.

Table 9-2 Parameters for maximum self-consumption mode

Parameter	Description
Working mode settings	Set this parameter to **Maximum self-consumption**.
Maximum grid power during battery discharge (W)	Set the grid power threshold at the grid connection point for loads when the load power is greater than the PV power.
Adjustment deadband	Specifies the adjustment threshold of active power. The ESS performs adjustment only if the detected power change exceeds the value. If the power change is less than the value, the system does not perform adjustment.
Adaptive adjustment parameters	Enable or disable **Adaptive adjustment parameters**.
Automatic SOC calibration	• Enable: Automatic charge and discharge calibration is allowed for battery racks. The ESS periodically calibrates the SOC rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. • Disable: Automatic charge and discharge calibration is not performed for battery racks.
Automatic SOC calibration interval	This parameter is displayed when **Automatic SOC calibration** is enabled. Set the automatic SOC calibration interval.
Automatic SOH calibration	• Enable: The ESS periodically calibrates the SOH rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. Then, the battery capacity will be calculated. The charge and discharge response will be affected during the calibration. During SOH calibration, you are advised to wait for 30 to 60 minutes after the system is fully charged and after the discharge is complete if you want to manually send a switching command. • Disable: Automatic SOH calibration is not performed for battery racks.
Array end-of-charge SOC	The default value is 100%. The default value is recommended. Set this parameter as required.
Array end-of-discharge SOC	The default value is 5%. The default value is recommended. Set this parameter as required.

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Parameter	Description
Protection upon communication failure	Specifies whether to enable protection against communication disconnection.

TOU (Time-of-Use)

- This function is applicable to PV+ESS systems and ESS-only systems in scenarios where electricity prices during peak and off-peak hours are different and grid connection point information is available. During off-peak hours, the grid supplies power to charge the ESS. During peak hours, the ESS discharges energy to loads.
- You can manually set the charge and discharge time segments. For example, if you set the low electricity price period at night as the charge period, the system charges the ESS at the maximum power during the charge period. If you set the high electricity price period as the discharge period, the ESS can discharge only during the discharge period based on the actual load power, reducing electricity costs.
- In this mode, grid power can be used to charge the ESS or power the loads. This mode is prohibited in countries where grid power is not allowed to charge the ESS.
- The SmartLogger (or SmartMGC) performs ESS scheduling based on the external scheduling power limit and the preceding policies.

Table 9-3 TOU mode parameters

Parameter	Description
Working mode settings	Set **TOU (Time-of-use)**.
Start time	Set the charge/discharge time. You can set a maximum of 14 time segments, which cannot overlap. The total duration of all time segments cannot exceed 24 hours (one day). During the charge period, the grid can charge the ESS. During the discharge period, the ESS can supply power to the loads. In other time segments, the ESS does not discharge power. The PV system and grid supply power to loads, and the PV system can charge the ESS.
End Time	
Charge/Discharge	
Day	
Priority of excess PV energy	• **Fed to grid**: When the PV power is greater than the load power, the surplus PV power is preferentially fed to the power grid. If the surplus PV power reaches the maximum feed-in power allowed by the grid, the remaining surplus PV power is used to charge the ESS. This setting is applicable to the scenario where the FIT is higher than the electricity purchase price and the grid cannot charge the ESS. • **Charge**: When the PV power is greater than the load power, the surplus PV power is used to charge the ESS. After the maximum charge power is reached or the ESS is fully charged, the surplus PV power is fed to the grid.

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Parameter	Description
Maximum charge power of grid (kW)	Maximum power for the grid to charge the ESS.
Maximum grid power during battery discharge (W)	Threshold for triggering the grid connection point to obtain power from the grid. This parameter is set to prevent the ESS output power from fluctuating repeatedly near the limit when the load power increases.
Adjustment deadband	Specifies the adjustment threshold of active power. The ESS performs adjustment only if the detected power change exceeds the value. If the power change is less than the value, the system does not perform adjustment.
Adaptive adjustment parameters	Enable or disable **Adaptive adjustment parameters**.
Automatic SOC calibration	• Enable: Automatic charge and discharge calibration is allowed for battery racks. The ESS periodically calibrates the SOC rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. • Disable: Automatic charge and discharge calibration is not performed for battery racks.
Automatic SOC calibration interval	This parameter is displayed when **Automatic SOC calibration** is enabled. Set the automatic SOC calibration interval.
Automatic SOH calibration	• Enable: The ESS periodically calibrates the SOH rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. Then, the battery capacity will be calculated. The charge and discharge response will be affected during the calibration. During SOH calibration, you are advised to wait for 30 to 60 minutes after the system is fully charged and after the discharge is complete if you want to manually send a switching command. • Disable: Automatic SOH calibration is not performed for battery racks.
Array end-of-charge SOC	The default value is 100%. The default value is recommended. Set this parameter as required.
Array end-of-discharge SOC	The default value is 5%. The default value is recommended. Set this parameter as required.
Protection upon communication failure	Specifies whether to enable protection against communication disconnection.

Charge/Discharge Based on Grid Dispatch

- Charge/Discharge based on grid dispatch applies to the scenario where a third-party EMS controls energy scheduling. When this function is used, the

active power control mode must be changed to **Remote communication scheduling**.

- The purpose of discharge based on grid dispatch is to meet the active power dispatch target value at the grid connection point. The PV energy yield is preferred. If the PV energy yield is insufficient, the ESS discharges energy to the power grid based on the active power target value. If the PV energy yield is sufficient, power is output to the power grid based on the maximum active power target value, and the surplus PV energy is used for ESS charging.
- The purpose of charge based on grid dispatch is to meet the active power dispatch target value at the grid connection point. If the ESS charging power is insufficient, the grid charges the ESS as much as possible. If the ESS still has surplus power when the scheduling target value is met, the PV energy is used to charge the ESS.

Table 9-4 Parameters for charge/discharge based on grid dispatch

Parameter	Description
Working mode settings	Set this parameter to **Charge/Discharge based on grid dispatch**.
Charge/Discharge time window function	This parameter is disabled by default. The default value is recommended. Set this parameter as required. You can set the time segments of charge forbidden, discharge forbidden, charge, and discharge only after the charge/discharge window control is enabled for charge/discharge based on grid dispatch.
Start time	This parameter is displayed when **Charge/Discharge time window function** is enabled. Specify the charge and discharge power for different time segments. You can set a maximum of 14 time segments, which cannot overlap. The total duration of all time segments cannot exceed 24 hours (one day).
End Time	
Charge/Discharge	
Day	
Charge Power	
Discharge power	
Adaptive adjustment parameters	Enable or disable **Adaptive adjustment parameters**.
Derate when approaching array end-of-charge/discharge SOC	This parameter is disabled by default. If this parameter is enabled, automatic derating is performed when the SOC difference between racks in the array is greater than this value.
Automatic SOC calibration	• Enable: Automatic charge and discharge calibration is allowed for battery racks. The ESS periodically calibrates the SOC rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. • Disable: Automatic charge and discharge calibration is not performed for battery racks.
Automatic SOC calibration interval	This parameter is displayed when **Automatic SOC calibration** is enabled. Set the automatic SOC calibration interval.

Parameter	Description
Automatic SOH calibration	• Enable: The ESS periodically calibrates the SOH rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. Then, the battery capacity will be calculated. The charge and discharge response will be affected during the calibration. During SOH calibration, you are advised to wait for 30 to 60 minutes after the system is fully charged and after the discharge is complete if you want to manually send a switching command. • Disable: Automatic SOH calibration is not performed for battery racks.
Array end-of-charge SOC	The default value is 100%. The default value is recommended. Set this parameter as required.
Array end-of-discharge SOC	The default value is 5%. The default value is recommended. Set this parameter as required.
Protection upon communication failure	Specifies whether to enable protection against communication disconnection.

TOU (Fixed Power)

- This mode applies to the ESS-only system where electricity prices at peak and off-peak hours are different and power meters are unavailable.
- You can manually set the charge and discharge time segments. For example, if you set the low electricity price period at night as the charge time, the system charges the ESS at the fixed power during the charge time. If you set the high electricity price period as the discharge time, the ESS can discharge only during the discharge time at the fixed power, reducing electricity costs.
- The SmartLogger (or SmartMGC) performs ESS dispatch based on the external dispatch power limit and the preceding policies.
- In this mode, grid power can be used to charge the ESS or power the loads. This mode is prohibited in countries where grid power is not allowed to charge the ESS.

  NOTE

  When the system can obtain the grid connection point information, the upper limits of ESS charge and discharge power is controlled based on the restrictions of the grid connection point. If the system cannot obtain the grid connection point information, the ESS charge and discharge are controlled based on the fixed power configured for this control mode.

Table 9-5 Parameters for TOU (fixed power) mode

Parameter	Description
Working mode settings	Set this parameter to **TOU (Fixed power)**.

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Parameter	Description
Start time	Set the charge/discharge time. You can set a maximum of 14 time segments, which cannot overlap. The total duration of all time segments cannot exceed 24 hours (one day). During the charge period, the grid can charge the ESS. During the discharge period, the ESS can supply power to the loads. In other time segments, the ESS does not discharge power. The PV system and grid supply power to loads, and the PV system can charge the ESS.
End Time	
Charge/Discharge	
Day	
Charge Power	
Discharge power	
Automatic SOC calibration	• Enable: Automatic charge and discharge calibration is allowed for battery racks. The ESS periodically calibrates the SOC rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. • Disable: Automatic charge and discharge calibration is not performed for battery racks.
Automatic SOC calibration interval	This parameter is displayed when **Automatic SOC calibration** is enabled. Set the automatic SOC calibration interval.
Automatic SOH calibration	• Enable: The ESS periodically calibrates the SOH rack by rack. During the calibration, the end-of-charge SOC and end-of-discharge SOC settings will be overridden so that the ESS can be fully charged or discharged. Then, the battery capacity will be calculated. The charge and discharge response will be affected during the calibration. During SOH calibration, you are advised to wait for 30 to 60 minutes after the system is fully charged and after the discharge is complete if you want to manually send a switching command. • Disable: Automatic SOH calibration is not performed for battery racks.
Array end-of-charge SOC	The default value is 100%. The default value is recommended. Set this parameter as required.
Array end-of-discharge SOC	The default value is 5%. The default value is recommended. Set this parameter as required.
Protection upon communication failure	Specifies whether to enable protection against communication disconnection.

9.2 Capacity Control

Function Description

- Peak shaving limits the maximum peak power at the grid connection point. In some areas, electricity fees depend on both electricity usage and peak demand. **Peak Shaving** allows you to lower the peak power purchased from

the grid during peak hours, thereby reducing electricity fees. **Peak Shaving** applies to areas that have peak demand charges. **Peak Shaving** can be used only with the **Maximum self-consumption** or **TOU (Time of use)** mode. This function allows you to lower the peak power purchased from the grid during peak hours, thereby reducing electricity fees.

- Capacity control limits the peak current at the grid connection point. If the capacity of the transformer or switch at the grid connection point is limited, this function ensures that the electric current purchased from or sold to the grid does not exceed the maximum peak current at the grid connection point. This control is essential because if the electric current exceeds the maximum peak current, it may trigger the system's overcurrent protection mechanism, potentially causing the transformer to trip.

Procedure

Connect to a device, choose **Power adjustment** > **Capacity Control** on the home screen, and set related parameters.

Figure 9-2 Capacity Control

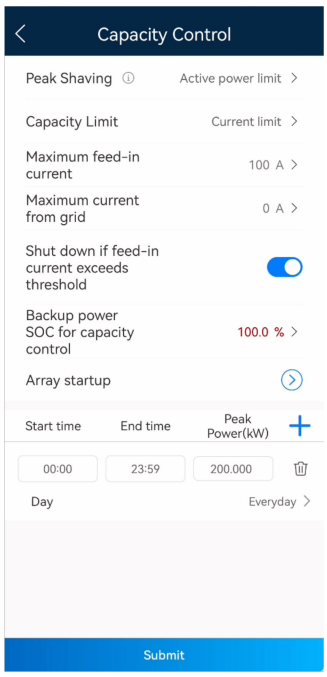


Table 9-6 Capacity control

Parameter	Description	Remarks
Peak Shaving	• **No Control**: disables this function. • **Active power limit**: The active power purchased from the grid cannot exceed the preset capacity limit. • **Apparent power limit**: The apparent power purchased from the grid cannot exceed the preset capacity limit.	-

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Parameter	Description	Remarks
Capacity Limit	• **No Control**: disables this function. • **Current limit**: The current of electricity purchased from or sold to the grid cannot exceed the preset current limit.	-
Maximum feed-in current (A)	Specifies the maximum feed-in current. If the maximum feed-in current is not adjusted to a value within the range limit within 15s, the inverter will shut down and report an alarm.	This parameter is displayed when **Capacity Limit** is set to **Current limit**.
Maximum current from grid (A)	Specifies the maximum current from grid.	
Shut down if feed-in current exceeds threshold	After this parameter is enabled, the array will be forcibly shut down for 4 hours if the feed-in current exceeds the threshold. You are advised to use this parameter following the UK's G100 standard. **NOTE** If the inverter shuts down because the feed-in current adjustment is not complete within the specified timeframe, the user needs to manually start the inverter. By default, the user needs to wait for at least 4 hours before manually starting the inverter.	This parameter is displayed when **Capacity Limit** is set to **Current limit**.
Backup power SOC for capacity control	The reserved power, which is used for capacity control, ensures that the ESS can meet capacity control requirements. The value of this parameter affects the peak shaving capability. A larger value indicates a stronger peak shaving capability.	This parameter is displayed when **Peak Shaving** is set to **Active power limit** or **Apparent power limit**, or when **Capacity Limit** is set to **Current limit**.
Array startup	Specifies the startup of devices in the array.	This parameter is displayed when **Shut down if feed-in current exceeds threshold** is enabled.
Start time	Specifies the maximum peak power in different time segments. The peak power is configured based on electricity prices in different time segments. You are advised to set the peak power to a low value when the electricity price is high. A maximum of 14 time segments can be set. The time segments cannot overlap.	This parameter is displayed when **Peak Shaving** is set to **Active power limit** or **Apparent power limit**.
End Time		
Peak Power (kW)		
Day		

NOTICE

The **Capacity Limit** function does not take effect during the update of the SmartLogger (or SmartMGC) and ESS.

NOTE

- If the capacity limit is met 24 hours a day, the ratio of the ESS to the load power must be properly set to ensure that the ESS has sufficient capacity to meet the capacity limit.
- When the capacity limit function is enabled in **TOU (Time of use)** mode, the charge/discharge time set in **TOU (Time of use)** mode must cover 24 hours of a day. Capacity limit is not supported in non-charge/discharge time.
- The overload capability of transformers, power distribution switches, and cables must be greater than the sum of the maximum charge current and maximum load current of the ESS.

9.3 Unbinding from the Management System

You can locally operate **Unbind Management System** to unbind a plant device from the Huawei management system. After the unbinding, the device can be bound to the new plant.

Procedure

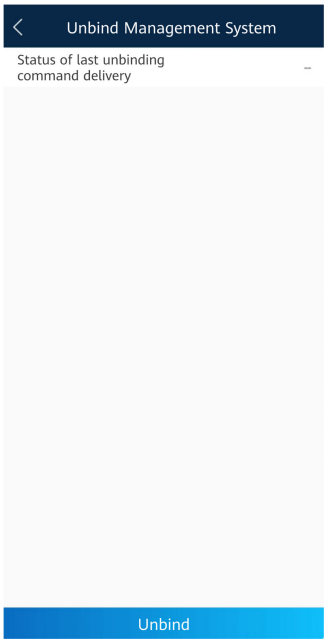
1. **Connect to the SmartLogger (or SmartMGC)** and log in to the local commissioning screen of the device.
   - Installer: Choose **Maintenance** > **Unbind Management System** on the home screen.
   - User: Choose **Set** > **Management system parameters** > **Unbind Management System** on the home screen.
2. Tap **Unbind** and complete the unbinding as prompted.

   NOTE

   - After the SmartLogger (or SmartMGC) is successfully connected to the Huawei management system, you can perform the unbinding.
   - After the unbinding is successful, the device connected to the plant will be deleted. You can use a device registration code to bind the device to a new plant and then commission the device again. For details, see **11.4 How Do I Obtain a Registration Code?** and **6 Connecting to a Plant**
   - After the unbinding, related data stored in the Huawei management system cannot be migrated.

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Figure 9-3 Unbinding from the management system



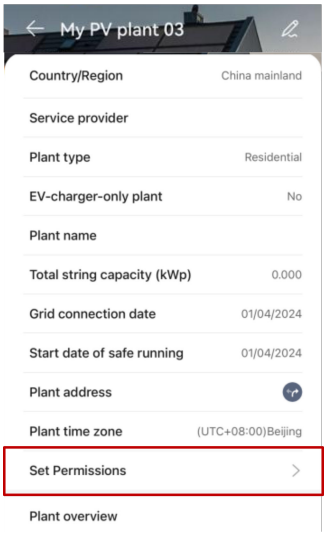
10 Plant Security Management

10.1 Plant Permission Settings

When devices in the plant need to be remotely maintained, the owner can enable or disable the plant operation permission for the installer in permission settings.

1. Log in to the FusionSolar app as the **Owner**.
2. Choose **::** > **Basic Info** on the plant home screen.
3. In the lower part of **Basic Info**, tap **Set Permissions**.
4. Enable or disable the plant operation permission as required.

Figure 10-1 Setting permissions



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10.2 Setting the Password for Logging In to the Local Commissioning Screen

Context

After a new device is powered on for the first time or factory settings are restored, the password for logging in to the local commissioning screen of the device is in initial settings. You need to connect to the device and log in to the local commissioning screen to set the password.

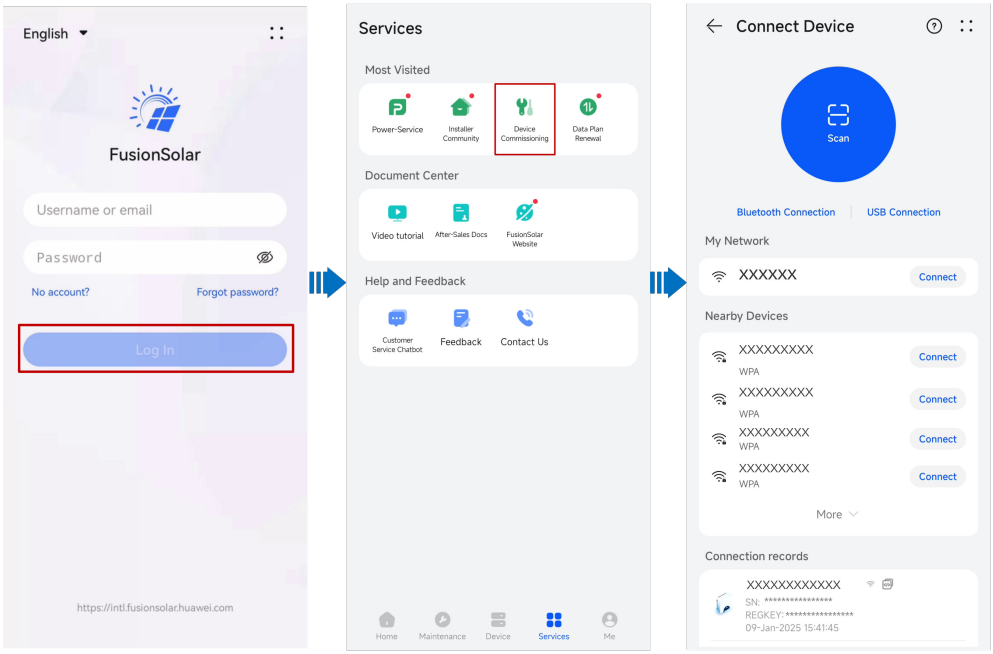
NOTICE

- After completing the deployment settings, the installer should remind the owner to access the local commissioning screen of the device and set the login password of the owner account as prompted.
- Ensure account security by changing the password periodically. Your password might be stolen or cracked if it is left unchanged for extended periods. If a password is lost, the device cannot be accessed. In these cases, the Company shall not be liable for any loss.

Procedure

1. Log in to the app and choose **Services** > **Device Commissioning**.
2. Connect to the device WLAN as prompted.

Figure 10-2 Connecting to devices



3. Select a login user and set the login password as prompted.

NOTE

- The WLAN name of a product consists of "Device name-Product SN." (The last six digits of the WLAN name of some products are the same as the last six digits of the product SN.)
- For the first connection, log in with the initial password. You can obtain the initial WLAN password from the label on the device.
- If the message **This WLAN network has no Internet access. Connect anyway?** is displayed when you connect to the built-in WLAN, tap **CONNECT**. Otherwise, you cannot log in to the system. The actual UI and messages may vary with mobile phones.
- If the login screen is not displayed after you scan the QR code, check whether your phone is correctly connected to the device WLAN. If not, manually select and connect to the WLAN.

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11 FAQs

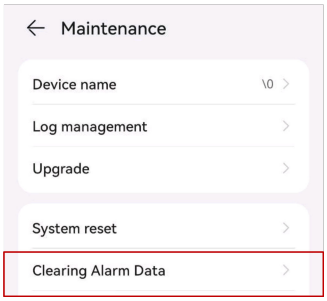
11.1 How Do I Clear an Alarm?

NOTE

- If you choose **Clear alarm data** on the ESS, you must reset alarms on the management system and choose **Clear alarms** on the SmartLogger (or SmartMGC). Otherwise, the alarm information collected by the management system and SmartLogger (or SmartMGC) will be different from that collected by the ESS.

- ESS
  a. Log in to the local commissioning screen of the ESS as the **Installer** user.
  b. Choose **Maintenance** > **Clear alarm data** and clear data as prompted.

  Figure 11-1 Maintenance

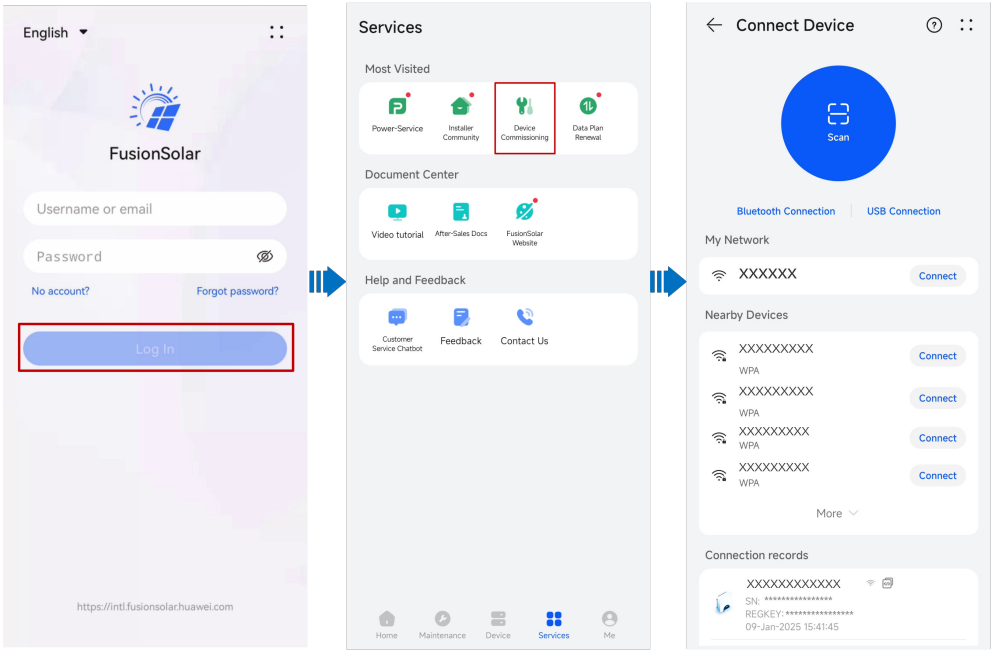


11.2 How Do I Navigate to the Device Local Commissioning Screen?

1. Log in to the app and choose **Services** > **Device Commissioning**.
2. Connect to the device WLAN as prompted.

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Figure 11-2 Connecting to devices



NOTE

- The WLAN name of the device consists of "device name-device SN".
- For the first connection, log in with the initial password. You can obtain the initial WLAN password from the device label, that is, the characters following "PSW".
- Ensure account security by changing the password periodically. Your password might be stolen or cracked if it is left unchanged for extended periods. If a password is lost, the device cannot be accessed. In these cases, the Company shall not be liable for any loss.
- If the login screen is not displayed after you scan the QR code, check whether your phone is correctly connected to the device WLAN. If not, manually select and connect to the WLAN.
- If **This WLAN network has no Internet access. Connect anyway?** message is displayed when you connect to the built-in WLAN, tap **CONNECT**. Otherwise, you cannot log in to the system. The actual UI and messages may vary with mobile phones.
- If the WLAN of the SmartLogger (or SmartMGC) cannot be found or the connection fails, press the RST button for 1s to 3s to start the WLAN module. After the COM indicator keeps steady on for 2 minutes, you can connect the app to the device WLAN.

3. Select a login user, enter the login password, and tap **Log in**.

NOTE

- Set the password as prompted at the first login.
- After logging out, wait for 60 seconds before logging in to the app as another user. Otherwise, the login will fail.
- To ensure account security, protect the password by changing it periodically, and keep it secure.

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11.3 What Should I Do If the Device Is Disconnected from the App When I Switch the Local Commissioning Screen to the Background?

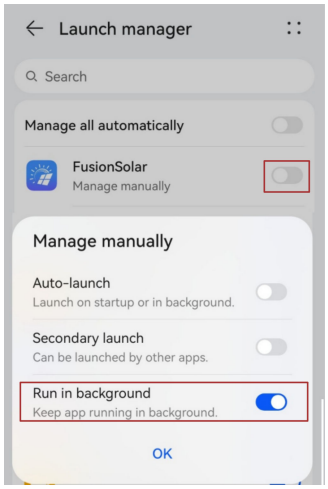
Symptom

During local commissioning, you may need to switch the app to the background (for example, uploading an upgrade package, uploading a photo, or scanning a QR code for WLAN connection). When you switch back to the app screen, a message is displayed, indicating that the device is disconnected from the app and you need to log in again.

Solution

1. Tap **Settings** > **Apps & services**, and choose **App launch**.
2. Tap **Manage manually** > **Run in background** for the FusionSolar app.

Figure 11-3 Run in background



NOTE

The menu name may vary with mobile phone brands.

11.4 How Do I Obtain a Registration Code?

Context

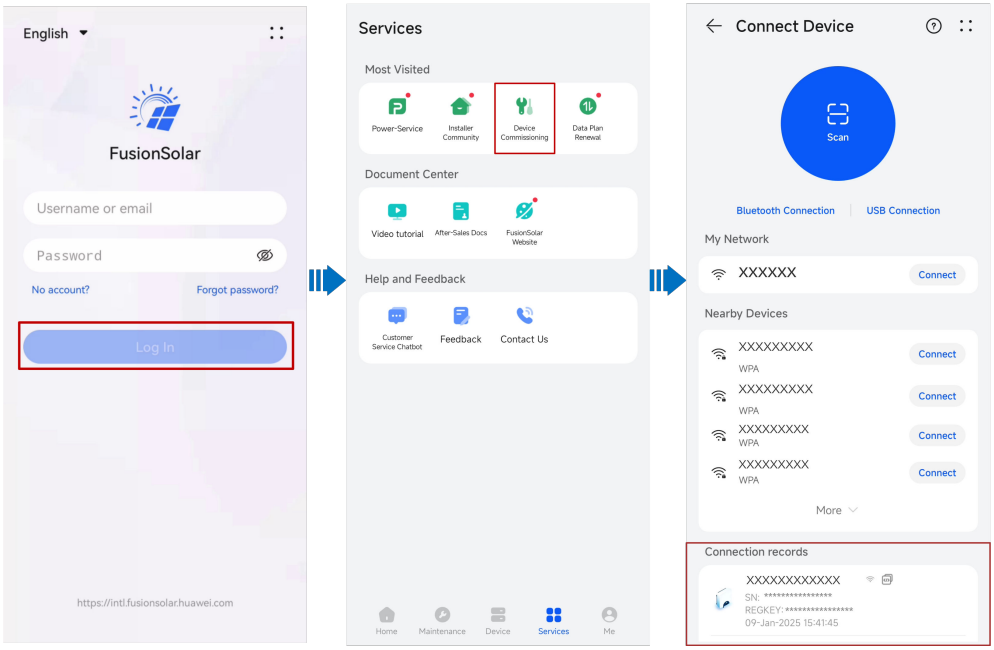
If devices are connected to the management system through the SmartLogger (or SmartMGC), you need to enter the registration code when binding a plant.

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Procedure

1. Log in to the app and choose **Services** > **Device Commissioning**.

   Figure 11-4 Connecting to devices



2. On the connection record screen, select the connection record of the target device and tap  to copy the registration code and device information.

11.5 Domain Name List of Management Systems

NOTE

The list is subject to change.

Table 11-1 Domain names of management systems

Domain Name	Data Type	Scenario
intl.fusionsolar.huawei.com	Public IP address	Global domain name of FusionSolar SmartPVMS **NOTE** Compatible with the original domain name **cn.fusionsolar.huawei.com** in Chinese mainland
au7.fusionsolar.huawei.com	Public IP address	Domain name of Australia single-node server
eu5.fusionsolar.huawei.com	Public IP address	Domain name of FusionSolar SmartPVMS in Europe
intlobt.fusionsolar.huawei.com	Public IP address	Domain name of FusionSolar SmartPVMS in Europe

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Domain Name	Data Type	Scenario
jp5.fusionsolar.huawei.com	Public IP address	Domain name of FusionSolar SmartPVMS in Japan
la5.fusionsolar.huawei.com	Public IP address	Domain name of FusionSolar SmartPVMS in Latin America
sg5.fusionsolar.huawei.com	Public IP address	Domain name of FusionSolar SmartPVMS in Asia Pacific and Australia **NOTE** Compatible with the original domain name **kr5.fusionsolar.huawei.com** in South Korea
region01eu5.fusionsolar.huawei.com	Public IP address	Server domain name of FusionSolar SmartPVMS in European cluster 1
region02eu5.fusionsolar.huawei.com	Public IP address	Server domain name of FusionSolar SmartPVMS in European cluster 2
region03eu5.fusionsolar.huawei.com	Public IP address	Server domain name of FusionSolar SmartPVMS in European cluster 3
region04eu5.fusionsolar.huawei.com	Public IP address	Server domain name of FusionSolar SmartPVMS in European cluster 4
region05eu5.fusionsolar.huawei.com	Public IP address	Server domain name of FusionSolar SmartPVMS in European cluster 5
neteco.alsoenergy.com	Public IP address	Domain name of partner's management system
re-ene.kyuden.co.jp	Public IP address	Domain name of the remote output control server of Kyushu Electric Power Company
re-ene.yonden.co.jp	Public IP address	Domain name of the remote output control server of Shikoku Electric Power Company
au1.fusionsolar.huawei.com	Public IP address	Domain name of FusionSolar SmartPVMS in Australia
br1.fusionsolar.huawei.com	Public IP address	Domain name of FusionSolar SmartPVMS in Brazil
pvms01cn.fusionsolar.huawei.com pvmspro01cn.fusionsolar.huawei.com	Public IP address	Domain names for whole-county rollout projects in Chinese mainland

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