LUNA2000-(107-241) Series Commercial and Industrial Hybrid Cooling Grid Forming ESS Solution

User Manual (On-Grid, SmartMGC5000B and SmartLogger5000B)

Issue 05

Date 2026-03-30

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About This Document

Purpose

This document describes the networking architecture, communication logic, and operation and maintenance (O&M) methods of the commercial and industrial (C&I) on-grid energy storage solution, as well as the installation, cable connection, check and preparation before power-on, system power-on commissioning, power-off, and power-on operations.

The safety precautions, product introduction, site selection requirements, and maintenance information of the devices involved in the solution are described in the user manuals or maintenance manuals of the corresponding devices. For details, see **C Reference Documents**.

"Grid forming" refers to grid forming operation in off-grid mode. This document describes the networking application in on-grid mode.

Statement

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

In this document, MERC only refers to a specific model of Huawei Smart PV Optimizer.

Intended Audience

This document is intended for:

- Technical support engineers
- Hardware installation engineers
- Commissioning engineers

Symbol Conventions

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

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

Change History

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

Issue 05 (2026-03-30)

Updated **1.1.1 ESS-Only System**.

Updated **1.1.2 PV+ESS**.

Updated **1.1.3 PV+ESS+Charger System**.

Updated **1.3 Technical Specifications**.

Updated **2 O&M Methods**.

Updated **5.1 On-Grid ESS-Only System**.

Updated **5.2 On-Grid PV+ESS System**.

Updated **6.2 Preparations and WebUI Login**.

Updated **6.3.1 Setting ESS Startup Authorization**.

Updated **6.3.2 Upgrading the Software Version**.

Updated **A Meter Cable Connection and Parameter Settings**.

Updated **C Reference Documents**.

Issue 04 (2025-01-08)

Updated **1.1 Networking Architecture**.

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Updated **1.2 Communication Logic**.

Updated **6.4 Commissioning Using the Deployment Wizard**.

Issue 03 (2025-12-08)

Updated **1.1.1 ESS-Only System**.

Updated **1.1.2 PV+ESS**.

Updated **3 Installation and Cable Connection**.

Updated **6.4 Commissioning Using the Deployment Wizard**.

Issue 02 (2025-10-25)

Updated **1.1 Networking Architecture**.

Updated **3 Installation and Cable Connection**.

Updated **6.3 Preparations Before Deployment**.

Added **6.6 Connecting a Charger (on the App)**.

Added **6.7 Connecting a Charger (on the WebUI)**.

Updated **A Meter Cable Connection and Parameter Settings**.

Issue 01 (2025-09-01)

This issue is used for first office application (FOA).

Contents

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1 Solution Introduction

1.1 Networking Architecture

The C&I on-grid energy storage solution has two networking architectures: ESS-only and PV+ESS. If a charger is available, configure the PV+ESS+charger on-grid system networking based on the charger type.

1.1.1 ESS-Only System

The ESS-only system is mainly used for peak staggering and peak shaving at the grid connection point through scheduled charge and discharge. Fixed-power charge and discharge without meters is supported. **Figure 1-1** and **Figure 1-2** show the networking architecture of the ESS-only system. **Table 1-1** lists the components.

Figure 1-1 Networking architecture of the ESS-only system (direct sampling by the data collector)

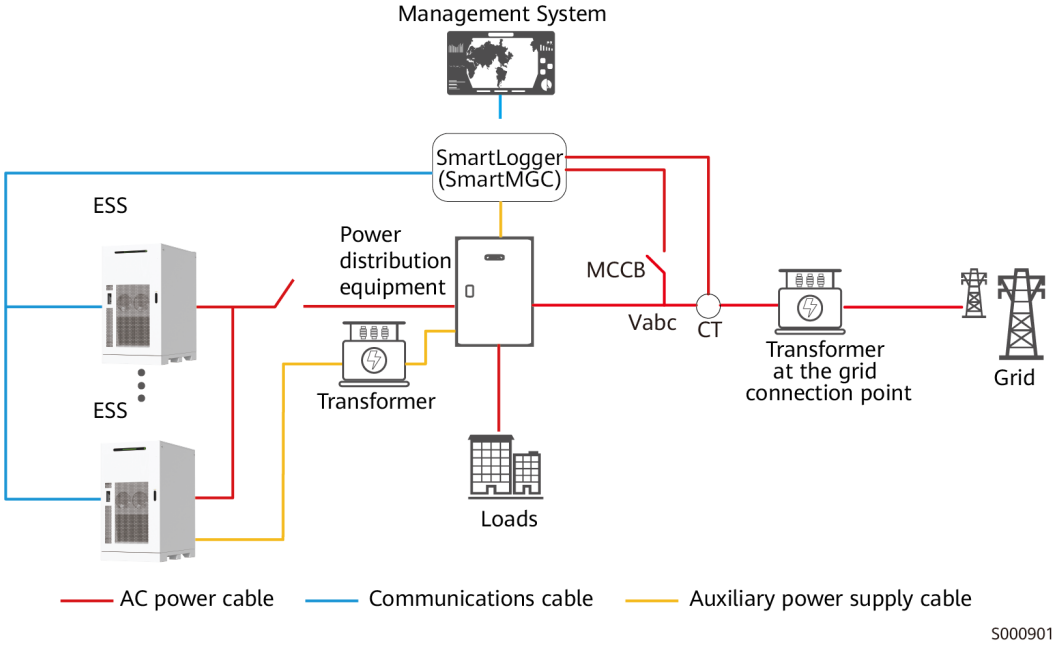

Figure 1-2 Networking architecture of the ESS-only system (a power meter configured)

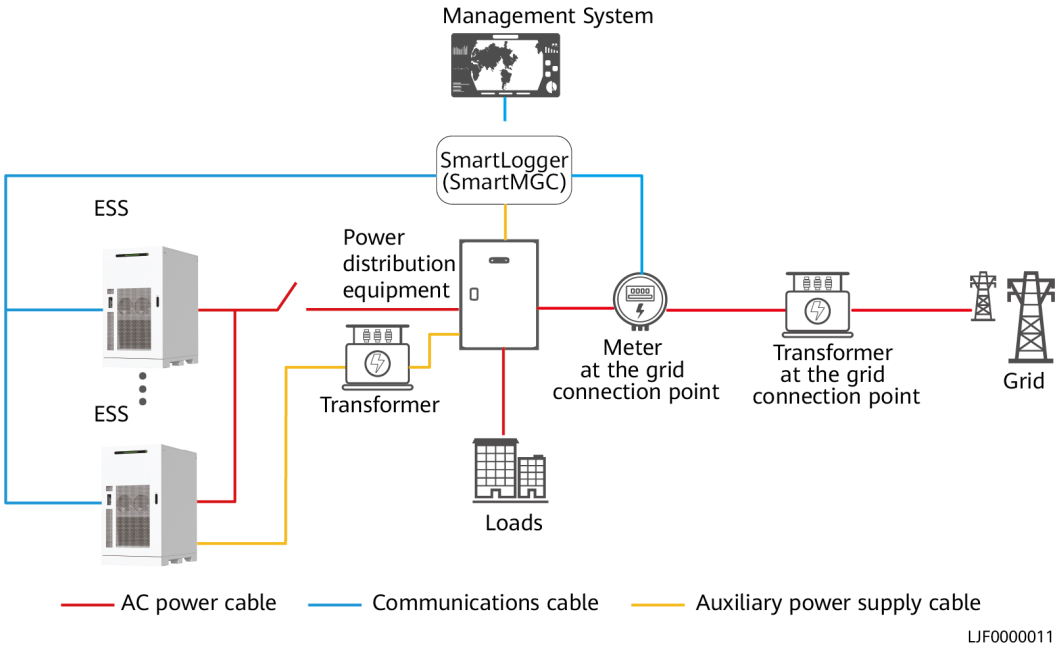

Table 1-1 Components of the ESS-only system

Name	Model/Specifications	Quantity	Remarks
Smart String Grid Forming Energy Storage System (ESS)	• LUNA2000-241-2S1 • LUNA2000-215-2S10 • LUNA2000-215-2S11 • LUNA2000-161-2S11 • LUNA2000-107-1S11	≤ 50	Purchased from the Company. One SmartLogger (or SmartMGC) can connect to a maximum of 50 ESSs.
Data collector	• SmartLogger5000B • SmartMGC5000B	1	Purchased from the Company.
SmartModule	SmartModule1000A01	Depending on the actual networking architecture	Purchased from the Company (optional). Used with the data collector.

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Name	Model/Specifications	Quantity	Remarks
Meter at the grid connection point	• DTSU666-HW • YDS60-80 • DHSU1079-ZT • DTSU71C	1	Purchased from the Company. You can either select the SmartLogger5000B/ SmartMGC5000B (which includes the function of current and voltage direct sampling at the grid connection point) or configure a power meter. • If the direct sampling function of the data collector is used, the data collector shall be installed in the power distribution cabinet at the grid connection point, and the molded case circuit breaker (MCCB) and current transformer (CT) shall be configured. • The rated current on the secondary side of the CT is 5 A, and the accuracy class is ≥ 0.5. If higher accuracy is required, the recommended accuracy class is ≥ 0.5S.
Management system	-	1	The Company's software is required. Install the app and then complete the deployment settings on the app.

Name	Model/Specifications	Quantity	Remarks
Power distribution equipment	Specifications of the circuit breaker connected to the ESS: three-phase AC switch, rated voltage ≥ 380 V AC (depending on the actual grid voltage level), rated current 250 A, leakage current > 1 A. The power distribution cabinet connected to the ESS must be equipped with a surge protective device (SPD).	1	Prepared by the customer.
Transformer	• Auxiliary transformer that converts the grid voltage to 220 V • Transformer capacity: 5 kVA x N (quantity of ESSs)	Depending on the actual networking architecture	Prepared by the customer (optional). If the rated grid voltage is 420 V, 440 V, or 480 V, an auxiliary transformer is required for the grid to convert the grid voltage to a 220 V single-phase power supply.
Transformer at the grid connection point	The voltage level depends on the actual grid voltage.	1	Prepared by the customer (optional).

1.1.2 PV+ESS

The PV+ESS system is mainly used for maximum PV self-consumption as well as peak staggering and peak shaving at the grid connection point. **Figure 1-3** and **Figure 1-4** show the networking architecture of the PV+ESS system. **Table 1-2** lists the components.

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Figure 1-3 Networking architecture of the PV+ESS system (direct sampling by the data collector)

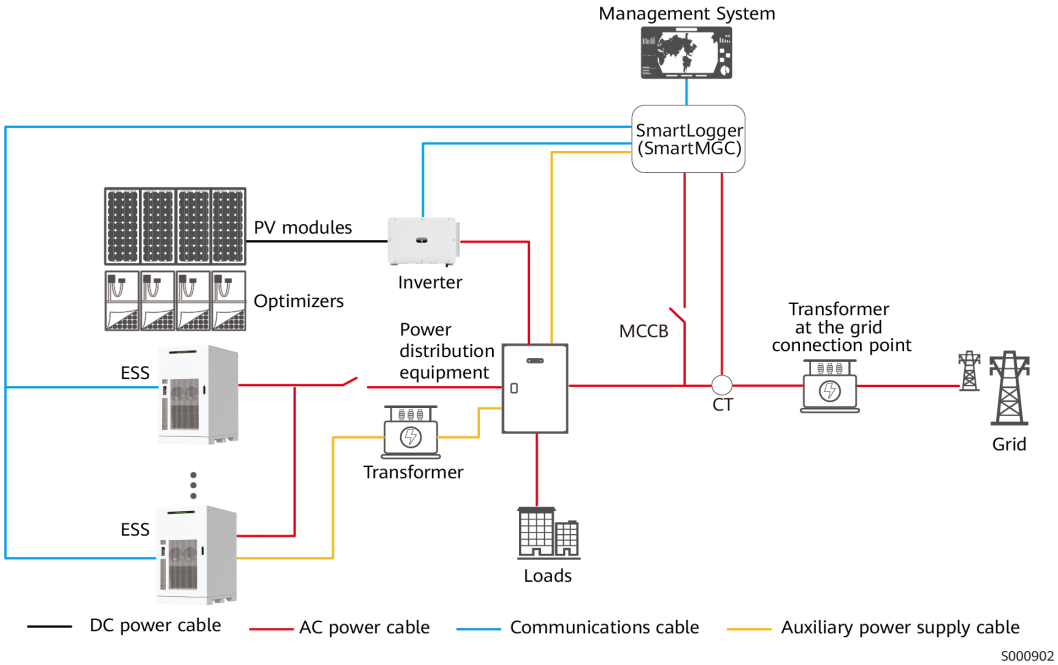

Figure 1-4 Networking architecture of the PV+ESS system (a power meter configured)

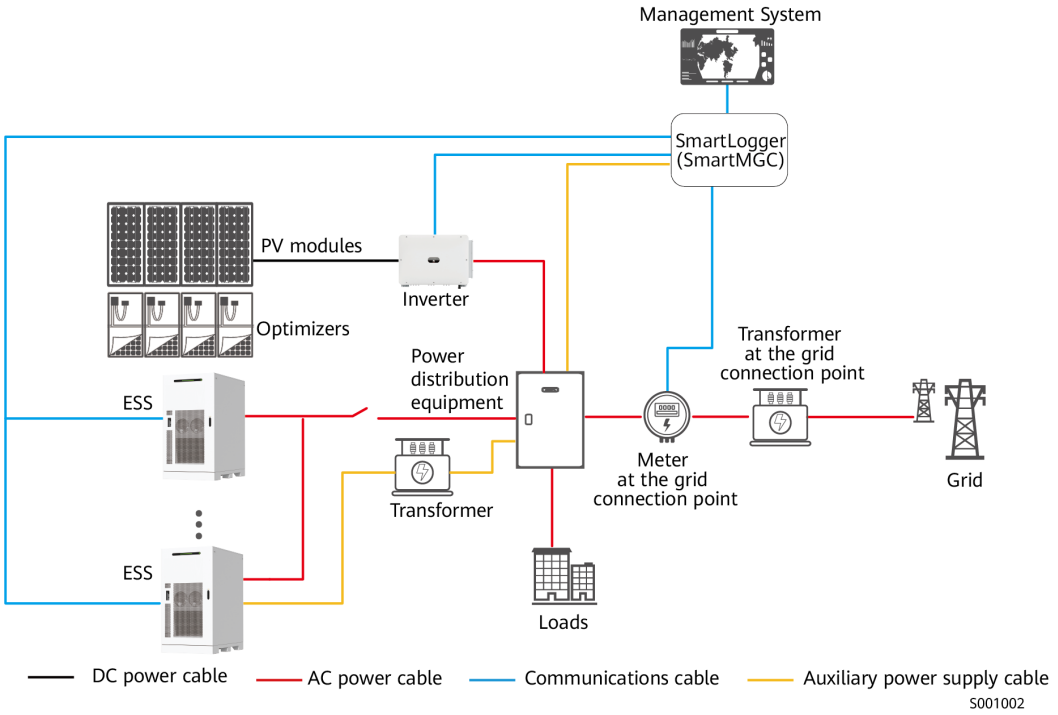

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Table 1-2 Components of the PV+ESS system

Name	Model/Specifications	Quantity	Remarks
Smart String Grid Forming Energy Storage System (ESS)	• LUNA2000-241-2S1 • LUNA2000-215-2S10 • LUNA2000-215-2S11 • LUNA2000-161-2S11 • LUNA2000-107-1S11	≤ 20	Purchased from the Company.

Name	Model/Specifications	Quantity	Remarks
Smart PV inverter (inverter)	• SUN2000-30K-MC0 • SUN2000-40K-MC0 • SUN2000-50K-MC0 • SUN2000-29.9KTL-M3 • SUN2000-30KTL-M3 • SUN2000-33KTL-NH • SUN2000-36KTL-M3 • SUN2000-40KTL-M3 • SUN2000-40KTL-NH • SUN2000-50KTL-M3 • SUN2000-50KTL-ZHM3 • SUN2000-50KTL-NHM3 • SUN2000-50KTL-M0 • SUN2000-50KTL-JPM0 • SUN2000-60KTL-M0 • SUN2000-60KTL-JPM0 • SUN2000-75KTL-M1 • SUN2000-100KTL-M1 • SUN2000-100KTL-M2 • SUN2000-110KTL-M2 • SUN2000-110KTL-INM0 • SUN2000-111KTL-NHM0 • SUN2000-115KTL-M2	≤ 30	Purchased from the Company.

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Name	Model/Specifications	Quantity	Remarks
	• SUN2000-50K-MGL0-BR • SUN2000-50K-MGL0 • SUN2000-75K-MGL0-BR • SUN2000-80K-MGL0 • SUN2000-150K-MG0-ZH • SUN2000-150K-MG0 • SUN5000-150K-MG0-ZH • SUN5000-150K-MG0		
Smart PV Optimizer (SUN2000P)	• SUN2000-450W-P2 • SUN2000-600W-P • MERC-1300W-P • MERC-1100W-P	Depending on the actual quantity of PV modules	Purchased from the Company (optional). • SUN2000-29.9KTL-M3, SUN2000-30KTL-M3, SUN2000-33KTL-NH, SUN2000-36KTL-M3, SUN2000-40KTL-M3, and SUN2000-40KTL-NH support the SUN2000P. • SUN2000-50KTL-ZHM3/M3/NHM3 supports only MERC-1300W-P or MERC-1100W-P. • MERC-1300W-P or MERC-1100W-P is mandatory for SUN5000-150K-MG0/MG0-ZH.

Name	Model/Specifications	Quantity	Remarks
Data collector	• SmartLogger5000B • SmartMGC5000B	1	Purchased from the Company.
Meter at the grid connection point	• DTSU666-HW • YDS60-80 • DHSU1079-ZT • DTSU71C	1	Purchased from the Company. You can either select the SmartLogger5000B/ SmartMGC5000B (which includes the function of current and voltage direct sampling at the grid connection point) or configure a power meter. • If the direct sampling function of the data collector is used, the data collector shall be installed in the power distribution cabinet at the grid connection point, and the molded case circuit breaker (MCCB) and current transformer (CT) shall be configured. • The rated current on the secondary side of the CT is 5 A, and the accuracy class is ≥ 0.5. If higher accuracy is required, the recommended accuracy class is ≥ 0.5S.

Name	Model/Specifications	Quantity	Remarks
Management system	-	1	The Company's software is required. Install the app and then complete the deployment settings on the app.
Power distribution equipment	Specifications of the circuit breaker connected to the ESS: three-phase AC switch, rated voltage ≥ 380 V AC (depending on the actual power grid voltage level), rated current 250 A	1	Prepared by the customer.
Transformer	• Auxiliary transformer that converts the grid voltage to 220 V • Transformer capacity: 5 kVA x N (quantity of ESSs)	Depending on the actual networking architecture	Prepared by the customer (optional). If the rated grid voltage is 420 V, 440 V, or 480 V, an auxiliary transformer is required for the grid to convert the grid voltage to a 220 V single-phase power supply.
Transformer at the grid connection point	The voltage level depends on the actual grid voltage.	1	Prepared by the customer (optional).

1.1.3 PV+ESS+Charger System

Third-party chargers or the Company's DC chargers or AC chargers are supported. For details about chargers, see **Table 1-3**. For details about other devices involved in the networking, see **Table 1-2**.

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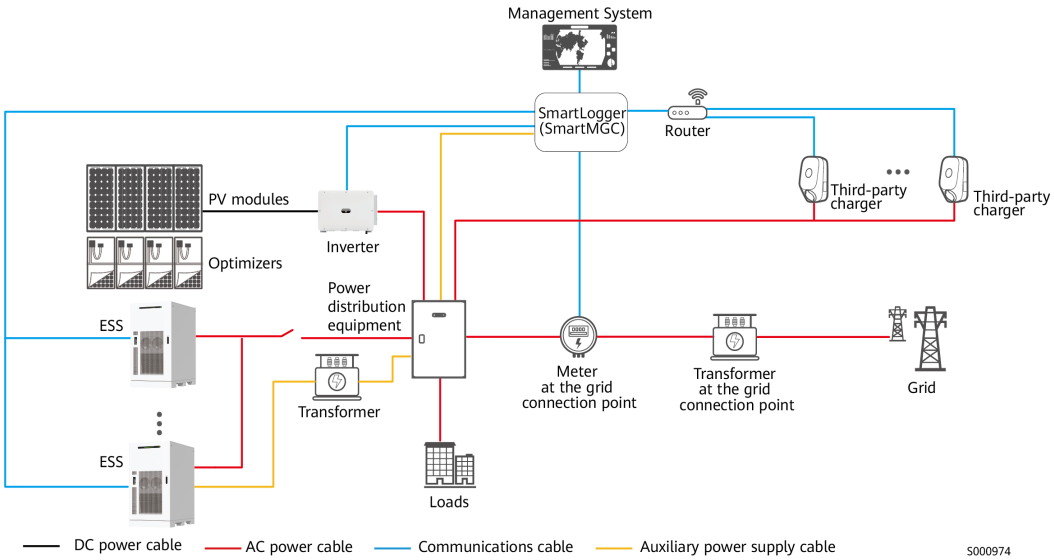
Table 1-3 Charger type description

Charger Type	Model	Quantity	Remarks
Third-party charger	• MENNEKES (model: AMEDIO Professional-22kW) • AMPERFIED GMBH (model: Connect.business-11kW)	≤ 15	-
DC charger	FusionCharge DS480-720 kW series	≤ 4 (power unit)	For DC chargers, the Antohill app is used for deployment and the AntoEco is used for O&M.
AC charger	SCharger-22KT-S0	≤ 15	AC chargers cannot connect to the data collector, but can connect to the FusionSolar SmartPVMS through a router.

Third-Party Charger

- A charger connects to the data collector through FE communication. If multiple chargers are used, they need to connect to the data collector through a router.
- You can view the charger power data, energy data, and charging status (charger control is not supported).
- For details about how to connect chargers, see the charger user manual.

Figure 1-5 PV+ESS+charger on-grid system (third-party charger)



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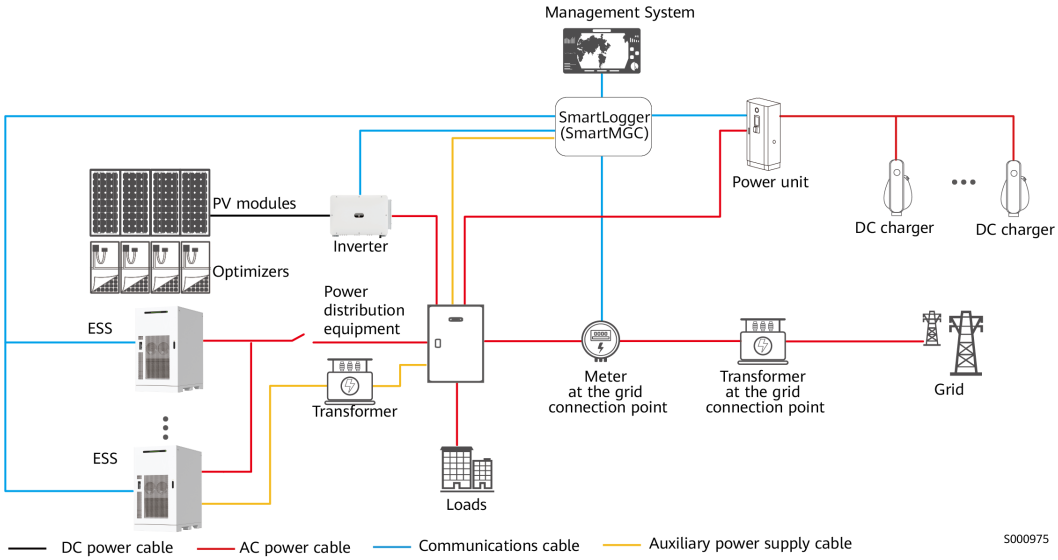
DC Charger

- A charger connects to the data collector through FE communication.
- You can view the charger power data, energy data, and charging status (charger control is not supported).
- For DC chargers, the Antohill app is used for deployment and the AntoEco is used for O&M.

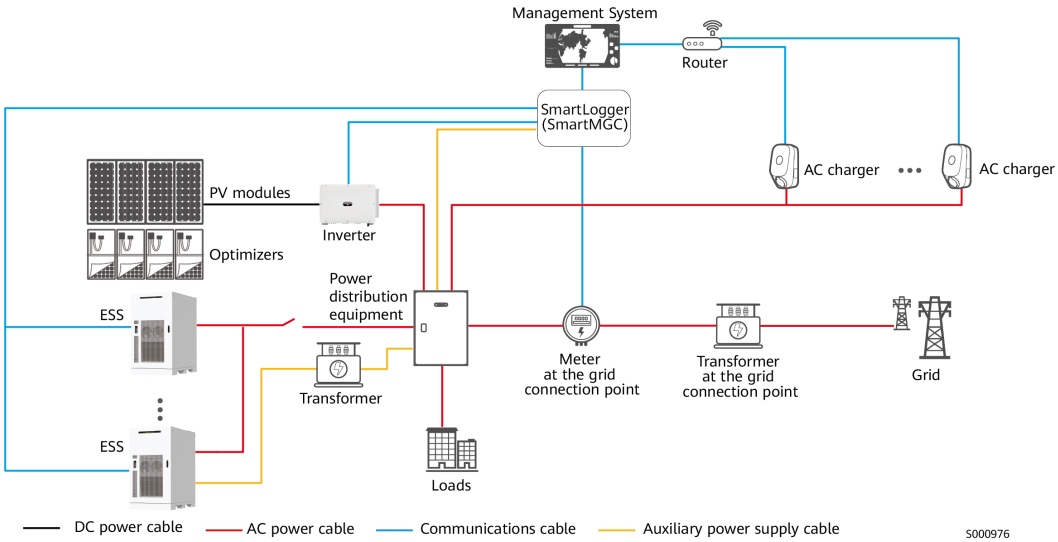
Figure 1-6 PV+ESS+charger on-grid system (DC charger)



AC Charger

- AC chargers cannot connect to the data collector, but can connect to the management system through a router.
- You can view the charger power data, energy data, and charging status (charger control is not supported).

Figure 1-7 PV+ESS+charger on-grid system (AC charger)



1.2 Communication Logic

One SmartLogger (or SmartMGC) manages multiple ESSs and inverters, and one meter to form an array. Intra-array:

- The inverters communicate with the SmartLogger (or SmartMGC) over RS485 or MBUS.
- The meter communicates with the SmartLogger (or SmartMGC) over RS485.
- The ESSs communicate with the SmartLogger (or SmartMGC) over FE in star or ring topology.

Maximum communication distance of the SmartLogger (or SmartMGC):

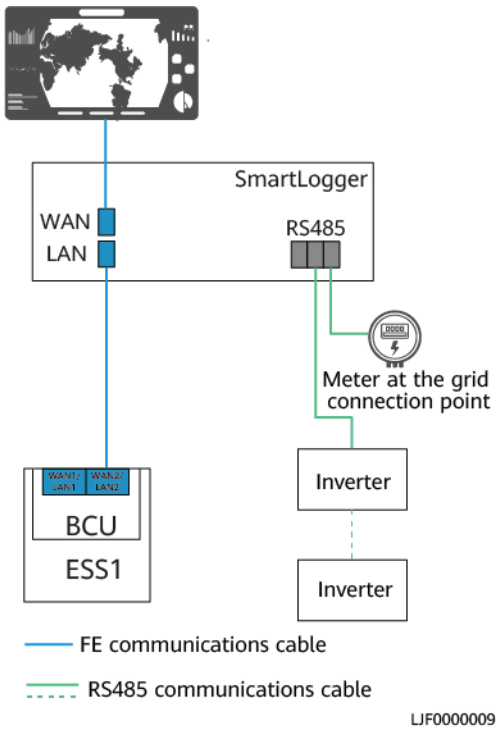
- RS485: 1000 m
- FE: 100 m

Select any of the following topologies based on the quantities of ESSs in the array and the deployment of optical fibers.

Typical Scenario 1: SmartLogger+ESS FE Star Topology (One ESS)

In this scenario, the SmartLogger5000B is configured. In the scenario with one ESS, the SmartLogger can be installed inside the ESS.

Figure 1-8 SmartLogger+ESS FE star topology



Typical Scenario 2: SmartMGC+ESS FE Ring Topology (2–20 ESSs)

In this scenario, the SmartMGC5000B is configured.

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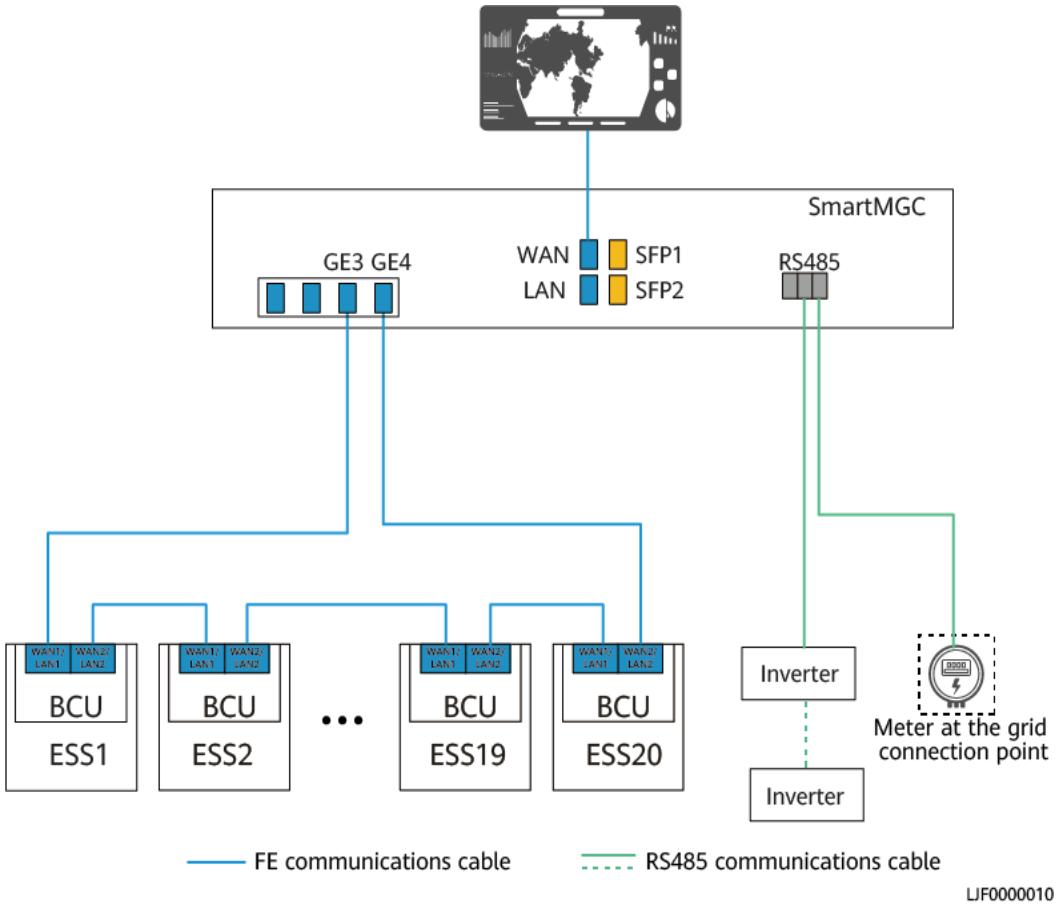
- One FE ring network in the PV+ESS system supports a maximum of 20 ESSs.
- One SmartMGC in the PV+ESS system supports a maximum of 20 ESSs.
- The ESSs are connected through FE communications ports (WAN1/LAN1 and WAN2/LAN2).

NOTICE

If the ESS FE ring topology is implemented, the ESS must be connected to the GE3 and GE4 ports of the SmartMGC. Otherwise, the SmartMGC cannot communicate with the ESS properly.

Figure 1-9 (2–20 ESSs) SmartMGC+ESS FE ring topology (the devices in the dotted boxes are optional)



Typical Scenario 3: SmartMGC+ESS Fiber Ring Topology (2–20 ESSs)

In this scenario, the SmartMGC5000B is configured.

- One fiber ring network supports a maximum of 20 ESSs.
- One SmartMGC in the PV+ESS system supports a maximum of 20 ESSs.
- The ESSs are connected through optical fiber ports (TX1-SFP1-RX1 and RX2-SFP1-TX2).

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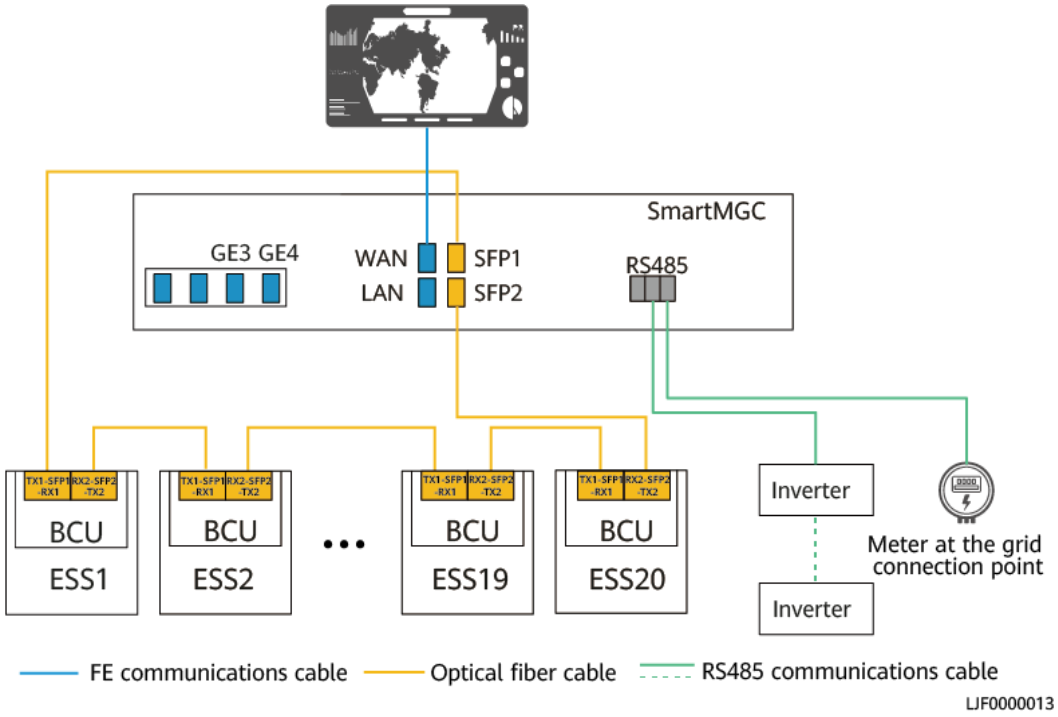
Figure 1-10 (2–20 ESSs) SmartMGC+ESS fiber ring topology (the devices in the dotted boxes are optional)



Typical Scenario 4: SmartMGC+ESS FE Ring Topology (20–40 ESSs)

In this scenario, the SmartMGC5000B is configured.

- This scenario applies only to the ESS-only system.
- In this scenario, the SmartModule shall be configured.
- One ring network supports a maximum of 20 ESSs.
- The ESSs are connected through FE communications ports (WAN1/LAN1 and WAN2/LAN2).

NOTICE

- If the ESS FE ring topology is implemented through the SmartMGC, the ESSs must be connected to the GE3 and GE4 ports of the SmartMGC. Otherwise, the SmartMGC cannot communicate with the ESSs properly.
- If the ESS FE ring topology is implemented through the SmartModule, the ESSs must be connected to the GE2 and GE3 ports of the SmartModule. Otherwise, the SmartMGC cannot communicate with the ESSs properly.

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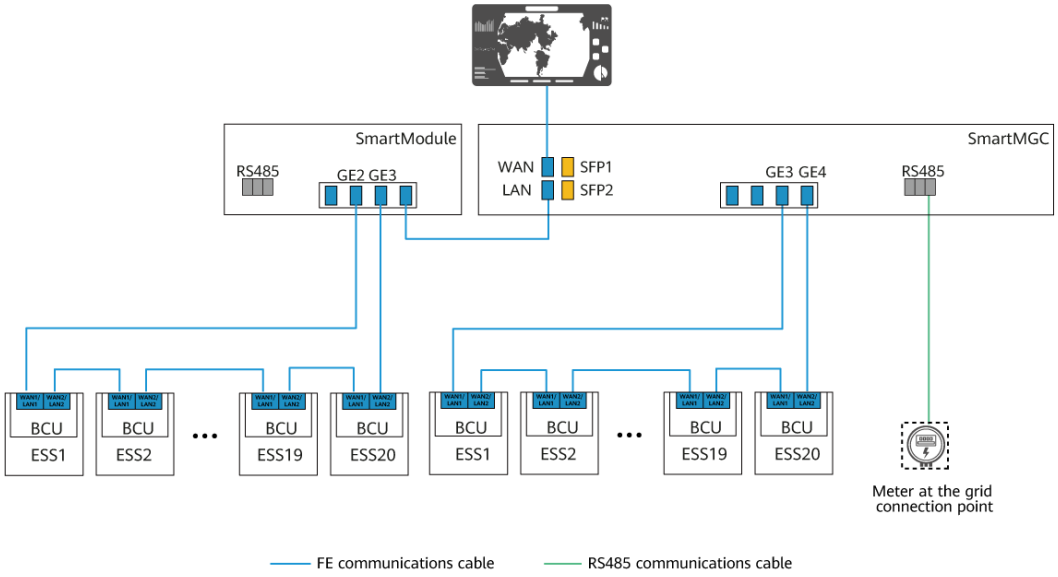
Figure 1-11 (20–40 ESSs) SmartMGC+ESS FE ring topology (the devices in the dotted boxes are optional)

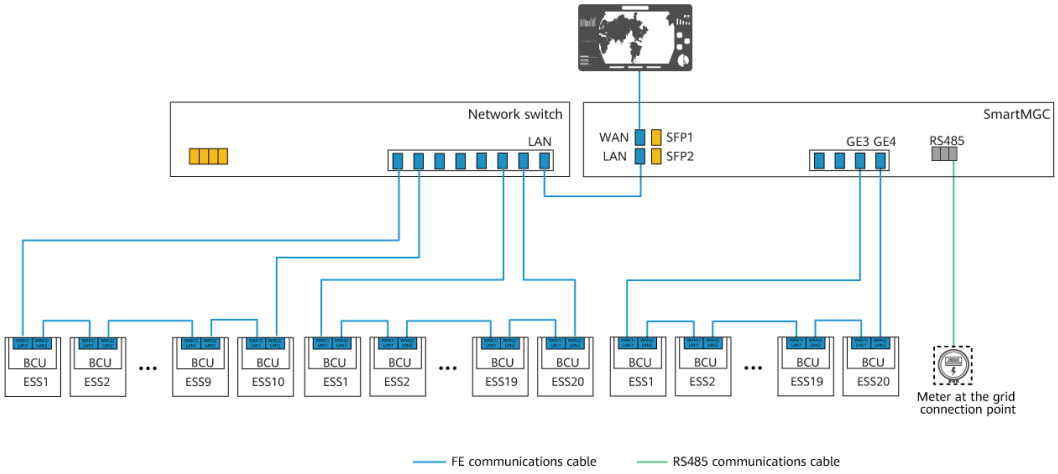


Typical Scenario 5: SmartMGC+ESS FE Ring Topology (40–50 ESSs)

In this scenario, the SmartMGC5000B is configured.

- This scenario applies only to the ESS-only system.
- In this scenario, network switches shall be configured.
- One ring network supports a maximum of 20 ESSs.
- The ESSs are connected through FE communications ports (WAN1/LAN1 and WAN2/LAN2).

Figure 1-12 (40–50 ESSs) SmartMGC+ESS FE ring topology (the devices in the dotted boxes are optional)



1.3 Technical Specifications

Function	Technical Specifications	Remarks
Parallel connection of multiple devices	In the PV+ESS system, one SmartLogger (or SmartMGC) supports a maximum of 20 ESSs and 30 inverters connected in parallel.	-
PV+ESS low-voltage coupling	• Low-voltage coupling of the ESS and inverter is supported. • The cable length from the ESS and the inverter to the power distribution cabinet shall be greater than or equal to 5 m, respectively.	For details about the supported inverter models, see **Table 1-2**.
ESS health diagnosis	Supported	This feature needs to be used in the management system.
Design tool	Supported	-
ESS safety black box	Supported	-

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Function		Technical Specifications	Remarks
On-grid scheduling feature	Maximum self-consumption	Supported	• Maximum self-consumption (PV+ESS scenario) • TOU (PV+ESS or ESS-only scenario in which the electricity prices in peak and off-peak hours are different and the system uses a power meter or a combination of potential transformer and current transformer) • TOU (fixed power) (PV+ESS scenario or ESS-only scenario in which the electricity prices in peak and off-peak hours are different and no power meter is available) • Charge/Discharge based on dispatch (third-party controller scenario)
	TOU	Supported	
	TOU (fixed power)	Supported	
	Charge/Discharge based on grid dispatch	Supported	
	Demand limit	Supported	This feature can be used together with maximum self-consumption/TOU.
	Capacity limit	Supported	This feature can be used together with maximum self-consumption/TOU.
	Limited feed-in (including zero feed-in)	Supported	This feature can be used together with maximum self-consumption/TOU and capacity/demand control.

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Function		Technical Specifications	Remarks
	Phase-level power limit control	Supported	This feature can be enabled only in export limitation mode. This feature can be used together with maximum self-consumption/TOU and capacity/demand control.

2 O&M Methods

Table 2-1 O&M methods

O&M Method	Description	Main Application Scenario	Reference Document
SmartLogger (or SmartMGC) WebUI	A PC is connected to the SmartLogger (or SmartMGC) to manage the ESSs, inverters, and the meter in the array.	Grid connection control	• **SmartMGC5000 User Manual** • **SmartLogger5000B User Manual**
Management system	The management system is deployed on a public network. It displays the current and historical running status of power plants and supports intelligent alarm reporting, analysis, diagnosis, and O&M.	Viewing plant information and managing devices at a site after deployment and commissioning	-

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3 Installation and Cable Connection

This section describes the process, precautions, and connection relationships for installing devices and connecting cables in the solution. For details, see the user manuals or quick guides of the corresponding devices. To obtain the documents, see **C Reference Documents**.

NOTICE

- For the TN-S, TN-C, TN-C-S, and TT systems, the neutral wires of the ESS and inverter must be connected to the power grid, and the neutral wire of the power grid must be grounded.
- For the three-phase three-wire (including the IT system) system or when the grid voltage level does not match the ESS, the ESS is connected to the isolation transformer in three-phase four-wire mode, and then the isolation transformer is connected to the power grid. The neutral point of the isolation transformer (on the ESS side) must be grounded.
- If the neutral wire of the system is not grounded, the **PCS Grounding Abnormal** alarm will be triggered during on/off-grid switching or off-grid black start, causing the ESS to shut down for protection.
- The power distribution and electrical connections of the PV+ESS system must comply with the installation regulations of the devices and the country or region where the devices are located.

Step 1 Install the ESSs.

Ensure that the foundation levelness meets the requirements (height difference ≤ 3 mm). For details about the site selection requirements, see **HUAWEI LUNA2000-(107-215) Series Commercial and Industrial Hybrid Cooling Grid Forming ESS User Manual**.

Step 2 Install the PE cables.

- The ground point outside the ESS must be connected.
- To enhance the corrosion resistance of a ground terminal, you are advised to apply silicone grease or paint on it after connecting a PE cable.

Step 3 Install the AC power cables.

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AC power cables must be connected in the correct phase sequence. Ensure that the phase sequence of the AC power cables of the ESS is consistent with that of the isolation transformer and power grid. Otherwise, the system may fail to run properly.

Step 4 Install the communications cables.

For the cable connections, see **Communication Logic**.

Step 5 (Optional) Install the inverters and SUN2000P.

Step 6 (Optional) Install the meter.

Step 7 Install the SmartLogger (or SmartMGC).

----End

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4 Check and Preparation Before Power-On

Step 1 Perform the check before power-on by referring to section "Check Before Power-On" in the user manual of each device.

Step 2 Check whether the phase sequence of the AC power cables between the ESS and the power distribution equipment is consistent. If not, adjust the wiring sequence of the AC power cables.

Step 3 Check the switch status.

1. Ensure that the switches on both sides of the power distribution equipment are turned off.
2. Ensure that the switch between the ESS AC side and the power distribution equipment is turned off, and the switch between the inverter AC side and the power distribution equipment is turned off.

Step 4 Perform acceptance tests for the ESS thermal runaway suppression system.

⚠ CAUTION

You can perform system power-on and commissioning only after the acceptance tests for the ESS thermal runaway suppression system are passed.

1. Remove foreign objects from the ESS, collect auxiliary materials, and take away flammable objects such as cardboards.
2. Log in to the SmartLogger (or SmartMGC) WebUI. The following alarms shall not be generated. If any of the following alarms is generated, clear the alarm according to the alarm handling suggestions:
   - 3884 Smoke Detector Alarm
   - 3890 Heat Detector Alarm
   - 3885 High Concentration of Combustible Gas
   - 3886 Combustible Gas Detector Communication Failed
   - 3887 Combustible Gas Detector Faulty
   - 3888 Temperature and Humidity Sensor Communication Failed
   - 3889 Temperature and Humidity Sensor Faulty

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- 3893 Fire Alarm
- 3931 Fire Suppression System Alarm

----End

5 System Power-On

DANGER

Wear insulated gloves and use insulated tools to prevent electric shocks or short circuits.

CAUTION

During the power-on procedure, monitor the system for faults. If you detect any faults, power off the ESS, rectify the faults, and then continue with the procedure.

5.1 On-Grid ESS-Only System

Figure 5-1 Power-on process of the on-grid ESS-only system

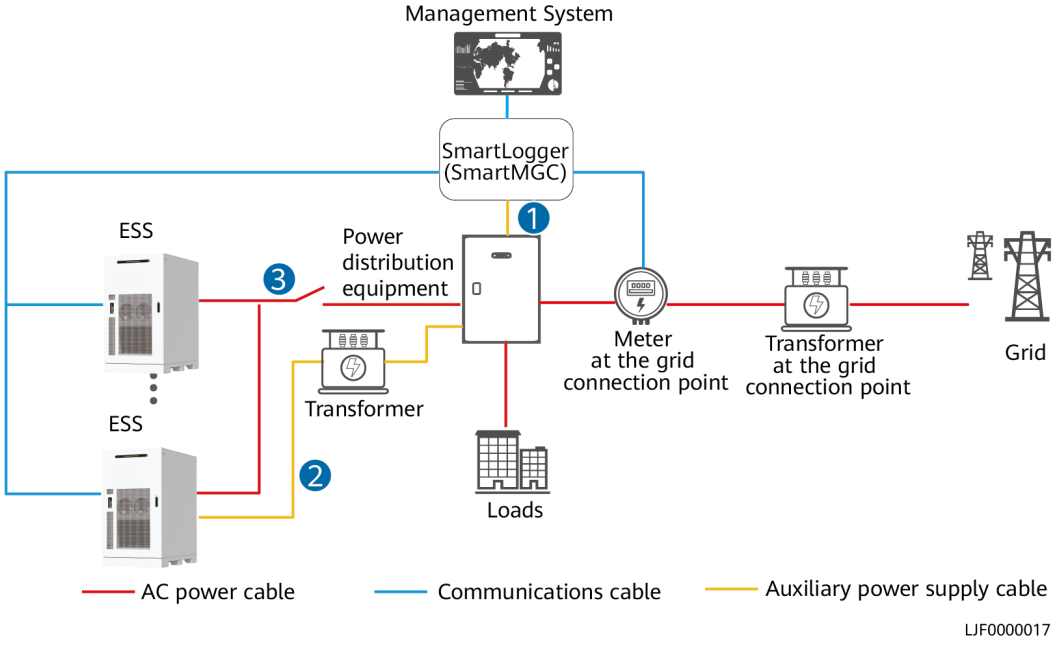

Table 5-1 Power-on process description of the on-grid ESS-only system

Step	Task	Power-On Operation
1	Powering on the SmartLogger (or SmartMGC) auxiliary power supply	1. Turn on the SmartLogger (or SmartMGC) power switch on the power distribution equipment side. 2. Turn on the switch on the SmartLogger (or SmartMGC) side.
2	Powering on the ESS auxiliary power supply (for LTMS and other devices)	For details, see **Power-On Operations**.
3	Powering on the ESS AC side	
Note: For details about the switch layout and operations of the devices prepared by the customer, see the documents provided by the vendors.		

5.2 On-Grid PV+ESS System

Figure 5-2 Power-on process of the on-grid PV+ESS system

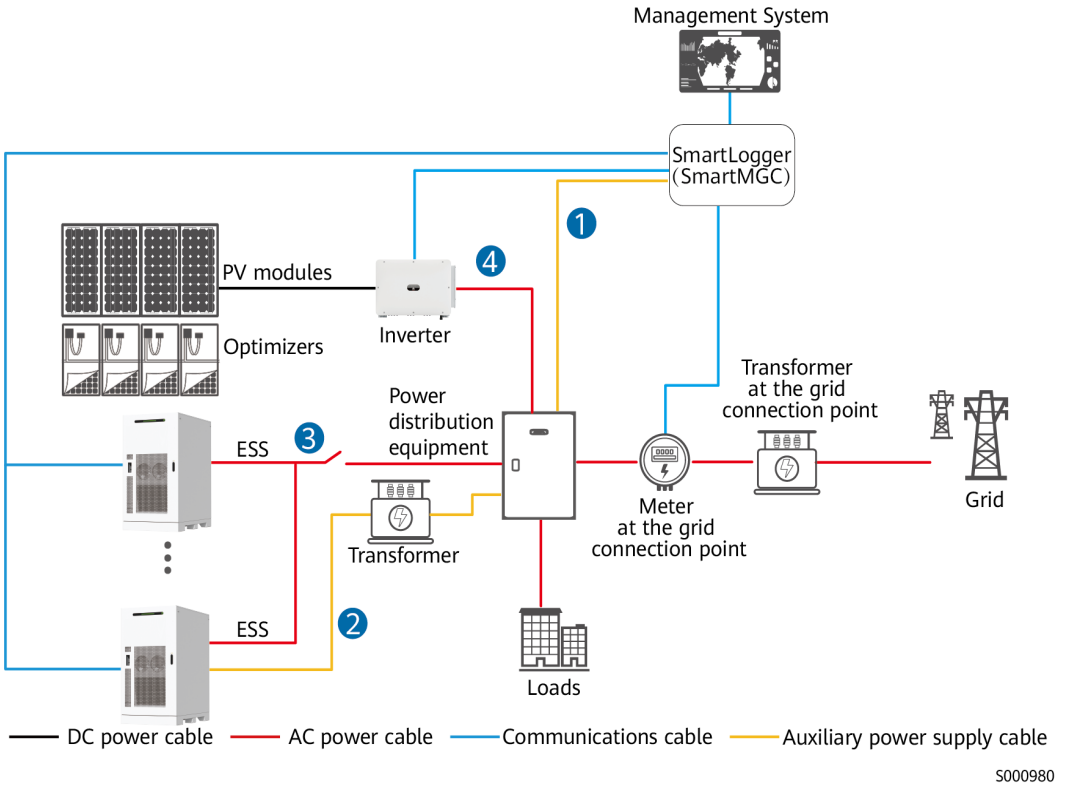

Table 5-2 Power-on process description of the on-grid PV+ESS system

Step	Task	Power-On Operation
1	Powering on the SmartLogger (or SmartMGC) auxiliary power supply	1. Turn on the SmartLogger (or SmartMGC) power switch on the power distribution equipment side. 2. Turn on the switch on the SmartLogger (or SmartMGC) side.
2	Powering on the ESS auxiliary power supply (for LTMS and other devices)	For details, see **Power-On Operations**.
3	Powering on the ESS AC side	
4	Powering on the inverter	**Select a power-on method based on the inverter model.** **Method 1:** 1. Set the DC SWITCH to ON. When you hear a click, the switch is completely turned on. 2. Check that the indicators are not steady red. **Method 2:** 1. Set the DC SWITCH 1 (MAIN SWITCH) to ON. When you hear a click, the switch is completely turned on. 2. Check the status of the PV connection indicator. If it is steady green, set DC SWITCH 2 and DC SWITCH 3 to ON. 3. Check that other indicators are not steady red.
Note: For details about the switch layout and operations of the devices prepared by the customer, see the documents provided by the vendors.		

6 System Commissioning

CAUTION

During the power-on procedure, monitor the system for faults. If you detect any faults, power off the ESS, rectify the faults, and then continue with the procedure.

6.1 Deployment Process

You are advised to perform deployment and commissioning and set the mode based on the specific scenario.

Table 6-1 On-grid scenario

Scenario	Operation
ESS-only	1. Prepare for the deployment (on the app). For details, see **6.3 Preparations Before Deployment**. 2. Complete the commissioning according to the deployment wizard (on the app). For details, see **6.4 Commissioning Using the Deployment Wizard**. 3. (Optional) Complete the ESS commissioning (on the WebUI) based on the application scenario and requirements. For details, see **6.5 ESS Commissioning**.
PV+ESS	

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Scenario	Operation
PV+ESS+charger	1. Prepare for the deployment (on the app). For details, see **6.3 Preparations Before Deployment**. 2. Complete the commissioning according to the deployment wizard (on the app). For details, see **6.4 Commissioning Using the Deployment Wizard**. 3. (Optional) Complete the ESS commissioning (on the WebUI) based on the application scenario and requirements. For details, see **6.5 ESS Commissioning**. 4. Connect the chargers (on the app or WebUI as required). For details, see **6.6 Connecting a Charger (on the App)** or **6.7 Connecting a Charger (on the WebUI)**.

6.2 Preparations and WebUI Login

For details, see the app quick guide, **SmartMGC5000 User Manual**, and **SmartLogger5000B User Manual**.

6.3 Preparations Before Deployment

6.3.1 Setting ESS Startup Authorization

Prerequisites

- Install devices and connect cables according to the site selection requirements and cable installation sections in the ESS user manual. If these requirements are not met, the startup authorization code may not be issued. As a result, the ESS cannot be started.
- 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.

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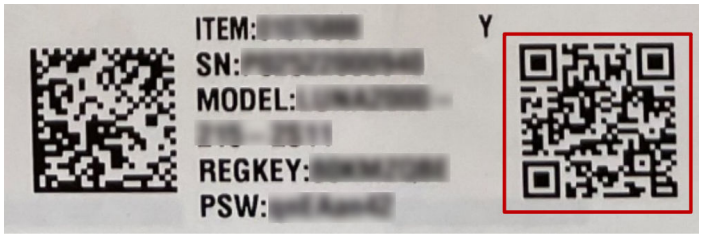
Procedure

Figure 6-1 ESS startup authorization procedure

1. Obtaining a verification code:
   a. Log in to the app, scan the WLAN QR code on the ESS (the QR code on the right of the SN on the device), and **connect to the WLAN of the ESS**.

      Figure 6-2 QR code example (for reference only; the actual QR code on the device prevails)

      NOTE

      - 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.
      - 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. The WLAN name of the device consists of "device name-SN".
      - 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.

2. Apply for **Startup password**.

   To apply for the **Startup password**, contact the device vendor or its authorized supervision service provider on the Power-Partner app.

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3. Enter the **Startup password** to complete the ESS startup authorization.

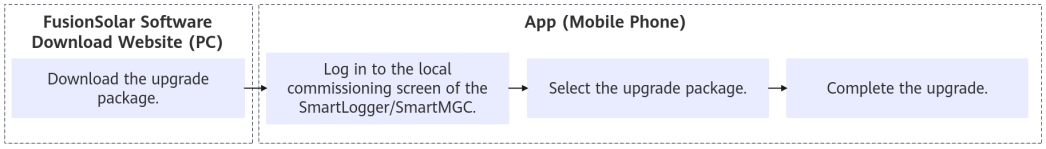
   Use the app to scan the WLAN QR code on the ESS to log in to the local commissioning screen of the ESS as the **installer** user, enter the **Startup password**, and tap **Authorized**.

NOTE

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.

6.3.2 Upgrading the Software Version

Figure 6-3 Device upgrade procedure



Downloading the Upgrade 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 protect software integrity, mitigate the risk of software package implantation or tampering, and enhance software supply chain safety, you are advised to install **ICS Lite** on your PC, which can automatically verify the digital signature of the software package.

   Table 6-2 Software download path

Device	Path
SmartLogger	**SmartLogger5000B**
ESS	**LUNA2000B**

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.

Upgrading the Device Version (App)

1. Log in to the app, scan the WLAN QR code on the SmartLogger (or SmartMGC), and **connect to the WLAN of the SmartMGC or SmartLogger**.
2. Log in to the local commissioning screen of the SmartLogger (or SmartMGC) and choose **Maintenance** > **Upgrade**.
3. Tap **Select upgrade package** under the title of the device to be upgraded on the **Select device** screen, and select the upgrade package as prompted.

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NOTE

How to select the upgrade package:

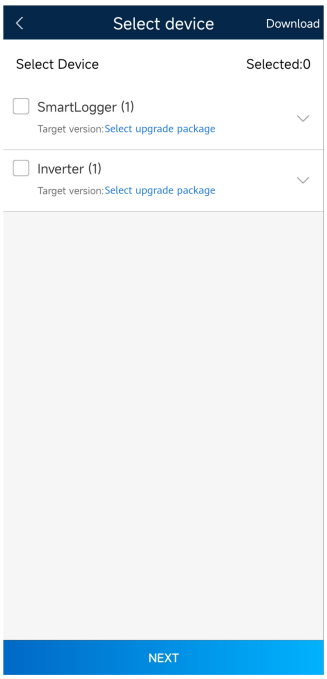
- iOS mobile phone: After downloading the upgrade package from the website and storing it on the mobile phone, hold down the file to share it to the app. Then the upgrade package is directly displayed on the screen for selecting the upgrade package.
- Android mobile phone: Choose **Select upgrade package** > **From a local directory** to access the phone folder and manually select the upgrade package.

4. Tap **Finish** to return to the **Select device** screen.
5. Select the device with the upgrade package imported, tap **NEXT**, and upgrade the device as prompted.

NOTE

If the device is upgraded successfully, the current version will be updated to the target version. If the upgrade fails, check whether the upgrade package downloaded and uploaded to the app is correct, and perform operations as prompted.

Figure 6-4 Device upgrade

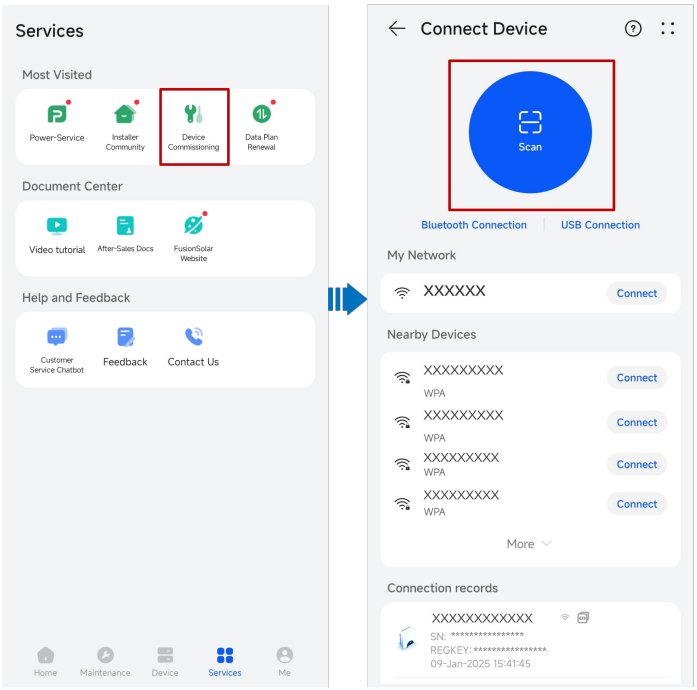


6.4 Commissioning Using the Deployment Wizard

Connecting Devices

Step 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 6-5 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.

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

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.

----End

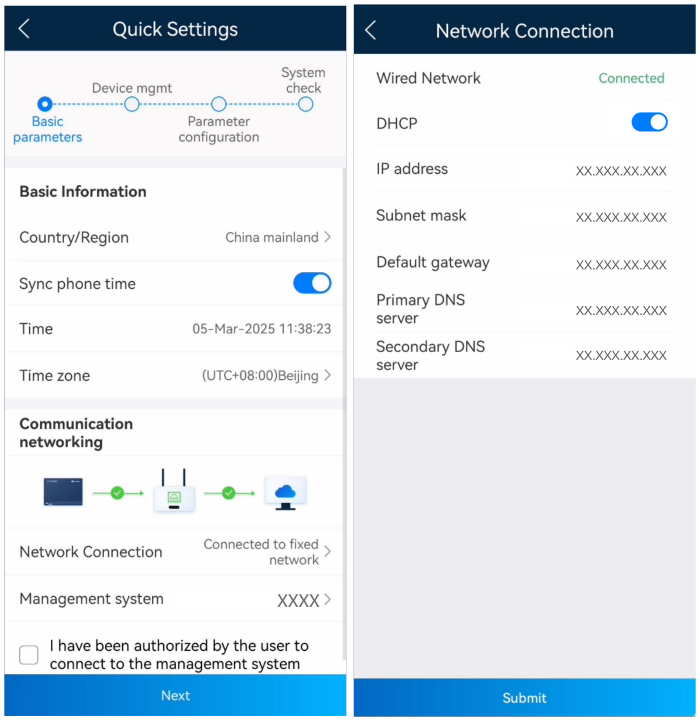
Commissioning Using the Deployment Wizard

Step 1 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 6-6 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.

Table 6-3 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.

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Connection Method	Description
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 6-4 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.

Step 2 Device Management

- Tap **Search** to discover the device. Auto discovery does not apply to third-party whitelisted devices, such as the EMI and power meter. You need to tap **+** to add them manually. For details about the supported EMI and power meter models, see the **SmartMGC5000 User Manual** and **SmartLogger5000B User Manual**.

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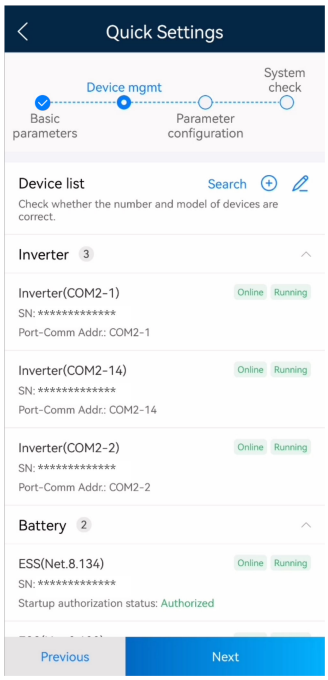
Figure 6-7 Device management



Step 3 Parameter configuration

Figure 6-8 Parameter configuration

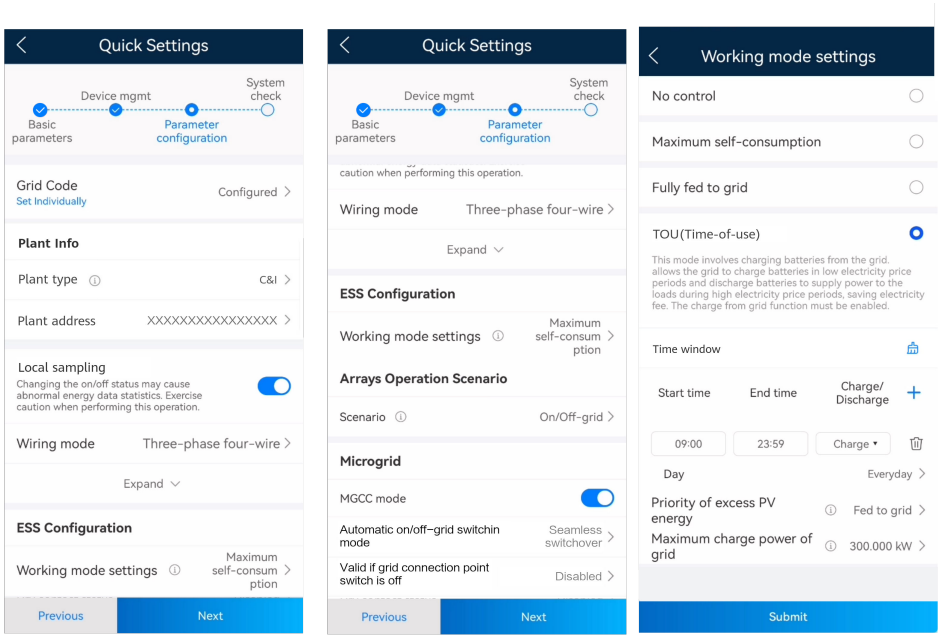


Table 6-5 Basic configuration

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

Category	Parameter	Description
	Plant postal code	Set this parameter to the local 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**	Set this parameter to **Maximum self-consumption**, **Time-of-use (TOU)**, 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.)
Arrays Operation Scenario	**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.

Table 6-6 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. Voltage is sampled 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)	

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Parameter	Description
CT wiring direction	Select the CT wiring direction based on the actual cable connection.

Step 4 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 6-9 System check

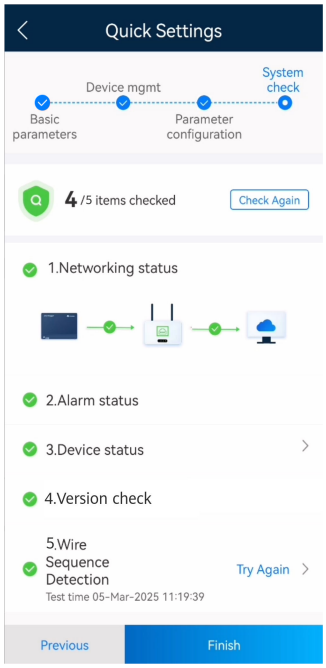

Table 6-7 System check

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.

Step 5 Tap **Finish**, set **Array Startup/Shutdown** as required, and perform function commissioning as required.

Step 6 Set and confirm the following parameters after the deployment is complete.

- 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**.
- 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.

----End

6.5 ESS Commissioning

NOTE

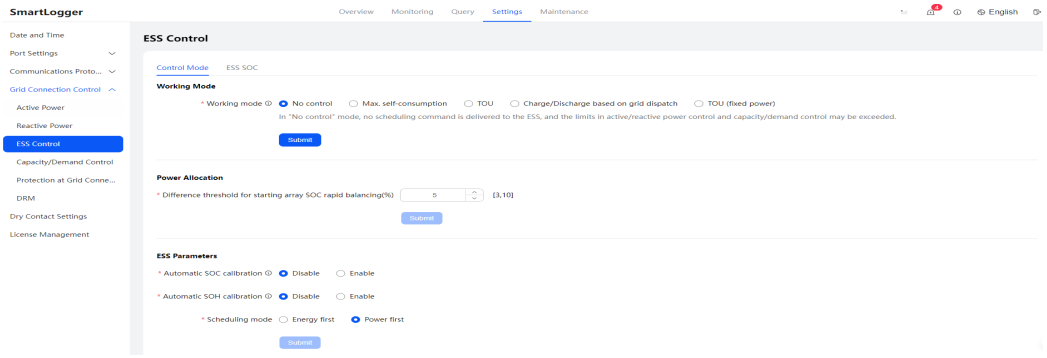
Perform the ESS commissioning on the WebUI.

6.5.1 Working Mode

The on-grid ESS has the following ESS control working modes: no control, maximum self-consumption, TOU, charge/discharge based on grid dispatch, and TOU (fixed power).

Choose **Settings** > **Grid Connection Control** > **ESS Control** and set parameters such as the ESS control working mode.

Figure 6-10 Working mode



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. The no control mode is used only for commissioning.

Maximum Self-Consumption

- This mode applies to PV+ESS systems in scenarios where the PV-to-ESS ratio is high, the PV power generated is adequate for loads, the electricity price is high, and the feed-in-tariff (FIT) subsidy is low or unavailable.
- PV power is preferentially supplied to loads, and the surplus PV power is used to charge the ESS. If the ESS is fully charged or being charged at full power, the surplus PV power is fed to the power grid. The grid cannot charge the ESS but can supply power to loads.
  - PV energy supply priority: load > ESS > power grid
  - Load power consumption priority: PV > ESS > power grid
- Example of maximum self-consumption (ESS capacity: 800 kWh/400 kW)

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Figure 6-11 Example of maximum self-consumption

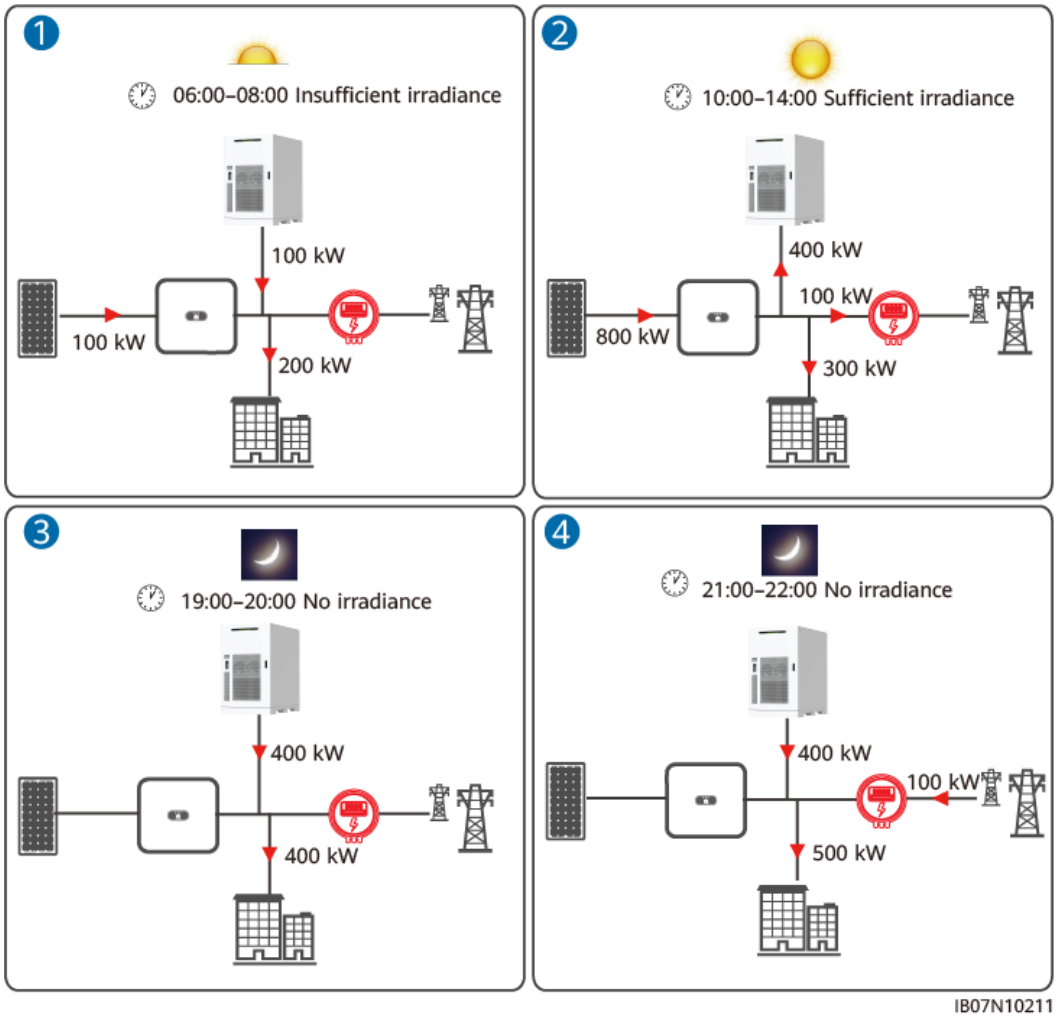

Table 6-8 Running parameters for maximum self-consumption

Parameter	Description
Working Mode	Set this parameter to **Max. self-consumption**.
Maximum grid power during battery discharge	Specifies the grid power threshold at the grid connection point for loads when the load power is greater than the PV power. When the power purchased from the grid exceeds the preset threshold, the ESS starts discharging. The default value is 0. For example, if this parameter is set to 50 W and the load power is 40 W, 40 W power is purchased from the grid and the ESS does not discharge. If the load power is 100 W, 50 W power is purchased from the grid and the ESS discharge power is 50 W.

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Parameter	Description
Adjustment deadband	Specifies the precision of the grid power at the grid connection point. This parameter affects the power value range for purchasing electricity at the grid connection point. If the actual grid power threshold at the grid connection point is within this range: [**Maximum grid power during battery discharge** – **Adjustment deadband**, **Maximum grid power during battery discharge** + **Adjustment deadband**], the requirement for purchasing electricity at the grid connection point is met.

TOU

- This mode applies to PV+ESS or ESS-only systems in scenarios where the price difference is large between peak and off-peak hours and power meters are used. During off-peak hours, the grid supplies power to charge the ESS. During peak hours, the ESS discharges to supply power to loads.
- In this mode, at least one charge or discharge period for the ESS needs to be set. 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 this period. If you set the high electricity price period as the discharge period, the ESS can discharge energy only during the discharge period based on the actual load power, reducing electricity costs.
- In some countries, the grid is not allowed to charge the ESS. In this case, this mode cannot be used.
- Example of TOU (ESS capacity: 800 kWh/400 kW; **Max. self-consumption** set to **Enable**)

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Figure 6-12 Example of TOU

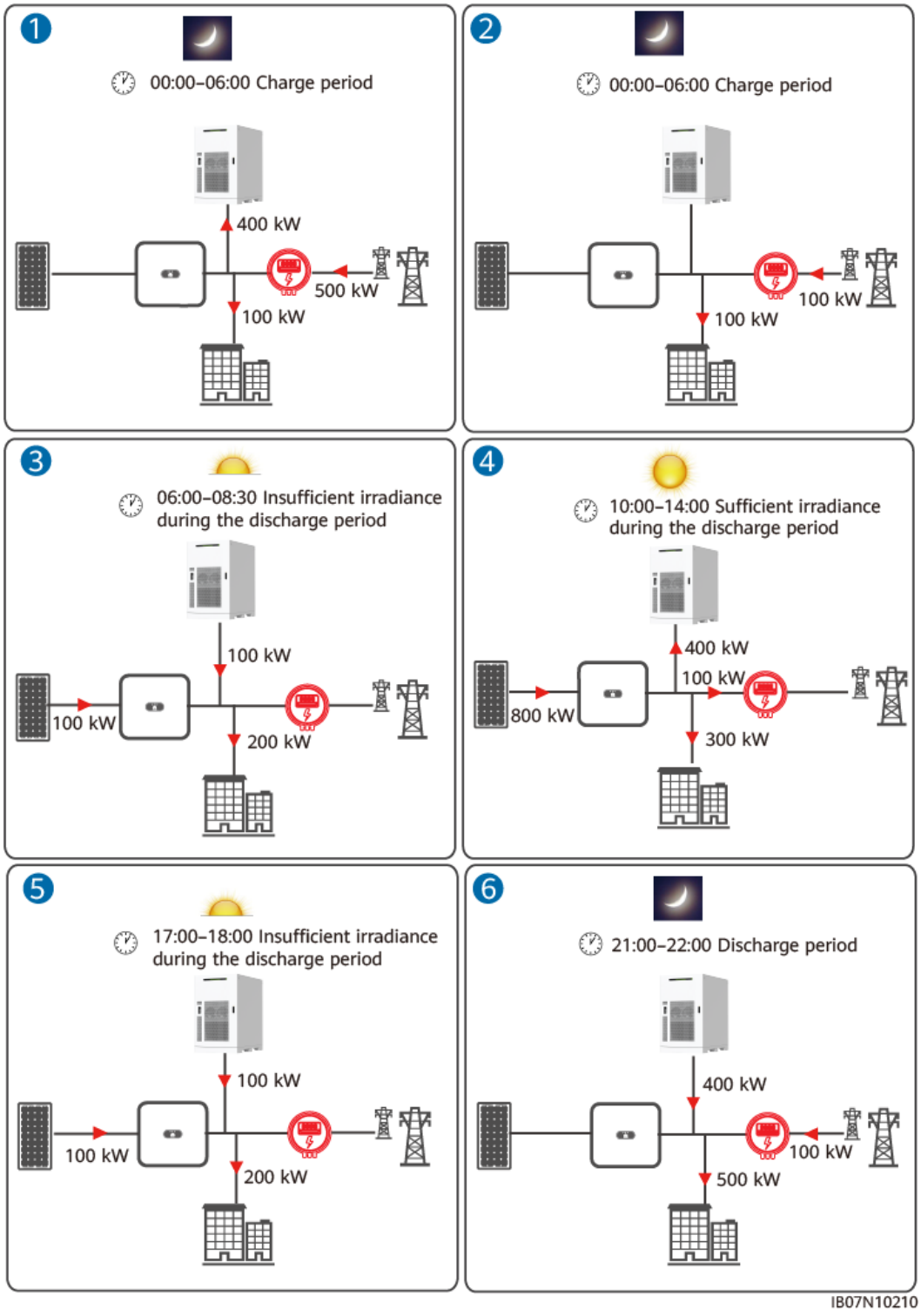

Table 6-9 Running parameters for TOU

Parameter	Description
Working Mode	Set this parameter to **TOU**.

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Parameter	Description
Max. self-consumption	Set this parameter to **Enable** when TOU and maximum self-consumption are used together.
Maximum grid power during battery discharge	Specifies the grid power threshold at the grid connection point for loads when the load power is greater than the PV power. When the power purchased from the grid exceeds the preset threshold, the ESS starts discharging. The default value is 0. For example, if this parameter is set to 50 W and the load power is 40 W, 40 W power is purchased from the grid and the ESS does not discharge. If the load power is 100 W, 50 W power is purchased from the grid and the ESS discharge power is 50 W.
Adjustment deadband	Specifies the precision of the grid power at the grid connection point. This parameter affects the power value range for purchasing electricity at the grid connection point. If the actual grid power threshold at the grid connection point is within this range: [**Maximum grid power during battery discharge** – **Adjustment deadband**, **Maximum grid power during battery discharge** + **Adjustment deadband**], the requirement for purchasing electricity at the grid connection point is met.
Start and End Time	Set the start time and end time of charge and discharge. A maximum of 14 time segments can be set. The time segments cannot overlap.
Charge/Discharge	
Interval	
Maximum charge power from AC	Maximum charge power allowed by the grid. The value is determined by the local grid company. If there is no requirement, the value is the maximum charge power of the ESS by default.

Table 6-10 Charge/Discharge time window

Charge/ Discharge Time Window	Charge	Fed to Grid
Discharge time window	The ESS can discharge power. When the PV power is greater than the load power, the ESS can be charged with the PV power but cannot be charged from the power grid. When the PV power is lower than the load power, the ESS can discharge power to loads but cannot feed power to the power grid. ● PV energy supply priority: load > ESS > power grid ● Load power consumption priority: PV > ESS > power grid	The ESS can discharge power. When the PV power is greater than the load power, the surplus PV power is fed to the power grid. If the surplus PV power cannot be fully fed to the power grid due to feed-in power limit, the ESS can be charged with the surplus PV power but cannot be charged from the power grid. When the PV power is lower than the load power, the ESS can discharge power to loads but cannot feed power to the power grid. ● PV energy supply priority: load > power grid > ESS ● Load power consumption priority: PV > ESS > power grid
Charge time window	The ESS can be charged but cannot discharge. The PV power is preferentially charged to the ESS. If the PV power is insufficient, the ESS is charged from the power grid. ● PV energy supply priority: ESS > load > power grid ● Load power consumption priority: PV > power grid	The ESS can be charged but cannot discharge. The PV power is preferentially charged to the ESS. If the PV power is insufficient, the ESS is charged from the power grid. ● PV energy supply priority: ESS > load > power grid ● Load power consumption priority: PV > power grid

Charge/ Discharge Time Window	Charge	Fed to Grid
Non-charge/ discharge time window	The ESS cannot discharge or be charged from the power grid. However, when the PV power is greater than the load power, the surplus PV power can be charged to the ESS. ● PV energy supply priority: load > ESS > power grid ● Load power consumption priority: PV > power grid	The ESS cannot discharge or be charged from the power grid. However, when the PV power is greater than the load power, the surplus PV power is preferentially fed to the 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. ● PV energy supply priority: load > power grid > ESS ● Load power consumption priority: PV > power grid

Charge/Discharge Based on Grid Dispatch

- This mode applies to scenarios where the northbound controller delivers active power dispatch commands.
- The purpose of discharge based on grid dispatch is to meet the active power dispatch target value at the grid connection point. PV energy is preferred. If the generated PV energy is insufficient, the ESS discharges energy and the energy is fed to the grid based on the active power dispatch target value. If the generated PV energy is sufficient, the energy is fed to the grid based on the active power dispatch target value, and the surplus PV energy is used to charge the ESS.
- 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 charge power is insufficient or the Smart PCS limits the power, the grid charges the ESS with the maximum capability. If the ESS is not fully charged when the dispatch target value is met, the PV energy is used to charge the ESS.

Table 6-11 Running parameters for charge/discharge based on grid dispatch

Parameter	Description
Working Mode	Set this parameter to **Charge/Discharge based on grid dispatch**.

Parameter	Description
Start and End Time	Set the start time, end time, and power of non-charge, non-discharge, charge, and discharge time segments. A maximum of 14 time segments can be set. The time segments cannot overlap.
Charge/Discharge	
Charge/Discharge Power	
Interval	

TOU (Fixed Power)

- This mode applies to ESS-only systems in scenarios where the price difference is large between peak and off-peak hours and no power meters are used. During off-peak hours, the grid supplies power to charge the ESS. During peak hours, the ESS discharges to supply power to loads.
- In this mode, at least one charge or discharge period for the ESS needs to be set. For example, if you set the low electricity price period at night as the charge period, the system charges the ESS at the fixed power during this period. If you set the high electricity price period as the discharge period, the ESS can discharge energy only during the discharge period at the fixed power, reducing electricity costs.
- In some countries, the grid is not allowed to charge the ESS. In this case, this mode cannot be used.

Table 6-12 Running parameters for TOU (fixed power)

Parameter	Description
Working Mode	Set this parameter to **TOU (fixed power)**.
Start and End Time	Set the start time and end time of charge and discharge. A maximum of 14 time segments can be set. The time segments cannot overlap. • Discharge time window: The ESS discharges at the fixed power. • Charge time window: The ESS is charged at the fixed power. • Non-charge/discharge time window: The ESS cannot be charged or discharge power.
Charge/ Discharge	
Interval	

6.5.2 Scheduling Mode

Context

To meet the requirements for mixed use of ESSs with different C-rates in C&I scenarios, power needs to be allocated based on different scheduling modes.

Procedure

Choose **Settings** > **Grid Connection Control** > **ESS Control** and set the ESS scheduling mode in the **ESS Parameters** area.

Table 6-13 Scheduling mode parameters

Parameter	Description
Scheduling mode	The default value is **Energy first**. • **Energy first**: If ESSs with different C-rates are used together in C&I scenarios, the power is allocated based on the minimum C-rate of all ESSs in the array. If LUNA2000-107-1S11 (C-rate: 1C) and LUNA2000-215-2S10 (C-rate: 0.5C) are used together, the charge/discharge power of the array does not exceed 162 kW. • **Power first**: If ESSs with different C-rates are used together in C&I scenarios, the power is allocated based on the C-rate of each ESS. If LUNA2000-107-1S11 (C-rate: 1C) and LUNA2000-215-2S10 (C-rate: 0.5C) are used together, the charge/discharge power of the array does not exceed 216 kW, the power of LUNA2000-107KWH-1H1 may be completely discharged first, and the charge/discharge power of the array may decrease. In addition, the system might collapse in off-grid operation.

6.5.3 Capacity/Demand Limit

Context

- **Demand limit** is designed to limit the peak power at the grid connection point. In some areas, electricity fees depend on both electricity usage and peak power. The **Demand limit** function allows you to lower the peak power purchased from the grid during peak hours, reducing electricity fees. **Demand limit** applies to areas that have peak demand charges. The demand limit function allows you to lower the peak power purchased from the grid only in **Max. self-consumption** or **TOU** mode during peak hours, reducing electricity fees.
- **Capacity limit** is designed to limit the maximum peak current at the grid connection point. By doing so, it 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.

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NOTICE

- The **Capacity limit** function is unavailable during the SmartLogger (or SmartMGC) and ESS upgrade. After the upgrade is complete, this function will be automatically restored.
- The closed-loop response time of capacity/demand limit is 5 seconds, and the current is less than or equal to twice the maximum overload capability of the device (the 5-second current limit value determined based on the inverse time characteristic of the MCCB). When the current exceeds twice the maximum overload capability, the MCCB trips for protection.

Procedure

Choose **Settings** > **Grid Connection Control** > **Capacity/Demand Control** and set related parameters.

Table 6-14 Capacity/Demand control parameters

Parameter	Description
Demand limit	• **No control**: The demand limit function is disabled. • **Active power limit**: The active power purchased from the grid cannot exceed the limit. • **Apparent power limit**: The apparent power purchased from the grid cannot exceed the limit.
Capacity limit	• **No control**: The capacity limit function is disabled. • **Current limit**: The current of electricity purchased from or sold to the grid cannot exceed the preset current limit.
Maximum feed-in current	Specifies the maximum peak current at the grid connection point. The default value is 30000 A. Set this parameter based on the maximum peak current for power purchase or sales at the grid connection point.
Maximum current from grid	
Backup power SOC for capacity/demand control	Specifies the backup power SOC for capacity/demand control. The value of this parameter affects the peak shaving capability. A larger value indicates a stronger peak shaving capability.
Start and End Time	• Set the peak power based on the start time and end time. 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.
Maximum Peak Power	
Repeat	

6.5.4 Multi-mode Overlay

Multi-mode overlay is a combination of multiple on-grid scheduling policies.

Combination 1: Maximum Self-Consumption + Capacity/Demand Control

Step 1 Choose **Settings** > **Grid Connection Control** > **ESS Control** and set **Working Mode** to **Max. self-consumption**. For details about how to set other parameters, see **Maximum Self-Consumption**.

Step 2 Choose **Settings** > **Grid Connection Control** > **Capacity/Demand Control** and set parameters by referring to **Capacity/Demand Limit**.

----End

Combination 2: TOU + Maximum Self-Consumption

Step 1 Choose **Settings** > **Grid Connection Control** > **ESS Control** and set **Working Mode** to **TOU**.

Step 2 Set **Max. self-consumption** to **Enable**. For details about how to set other parameters, see **TOU**.

----End

Combination 3: TOU + Maximum Self-Consumption + Capacity/Demand Control

Step 1 Choose **Settings** > **Grid Connection Control** > **ESS Control** and set **Working Mode** to **TOU**.

Step 2 Set **Max. self-consumption** to **Enable**. For details about how to set other parameters, see **TOU**.

Step 3 Choose **Settings** > **Grid Connection Control** > **Capacity/Demand Control** and set parameters by referring to **Capacity/Demand Limit**.

----End

Combination 4: TOU + Capacity/Demand Control

Step 1 Choose **Settings** > **Grid Connection Control** > **ESS Control** and set **Working Mode** to **TOU**.

Step 2 Set **Max. self-consumption** to **Disable**. For details about how to set other parameters, see **TOU**.

Step 3 Choose **Settings** > **Grid Connection Control** > **Capacity/Demand Control** and set parameters by referring to **Capacity/Demand Limit**.

----End

6.6 Connecting a Charger (on the App)

In the on-grid scenario, if a charger needs to be connected to the network, connect the charger to the SmartLogger (or SmartMGC) to complete device

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commissioning first, and then to the management system to create a PV plant. For details, see the following instructions.

6.6.1 AC Charger Developed by the Company

NOTE

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

6.6.1.1 Commissioning a Charger

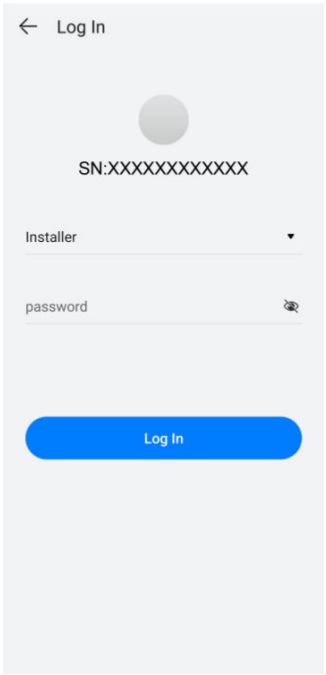
1. Log in to the app as an installer, tap **Setup wizard** on the **Home** screen, scan the QR code on the charger, and connect to the device WLAN as prompted.

   NOTE

   - The last six digits of the device WLAN name are the same as the last six digits of the device SN.
   -
   - 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.

Figure 6-13 Local login



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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 6-15 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.
Device management > **Network Settings**	**Connection method**	• 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**	Set the domain name and port number of the management system. • **Domain name**: Set the IP address of the management system. • **Port**: Set the port number based on the domain name. The default port number is 31220. • Select **I have been authorized by the user to connect to the management system.**.

Figure 6-14 Parameter configuration and device management

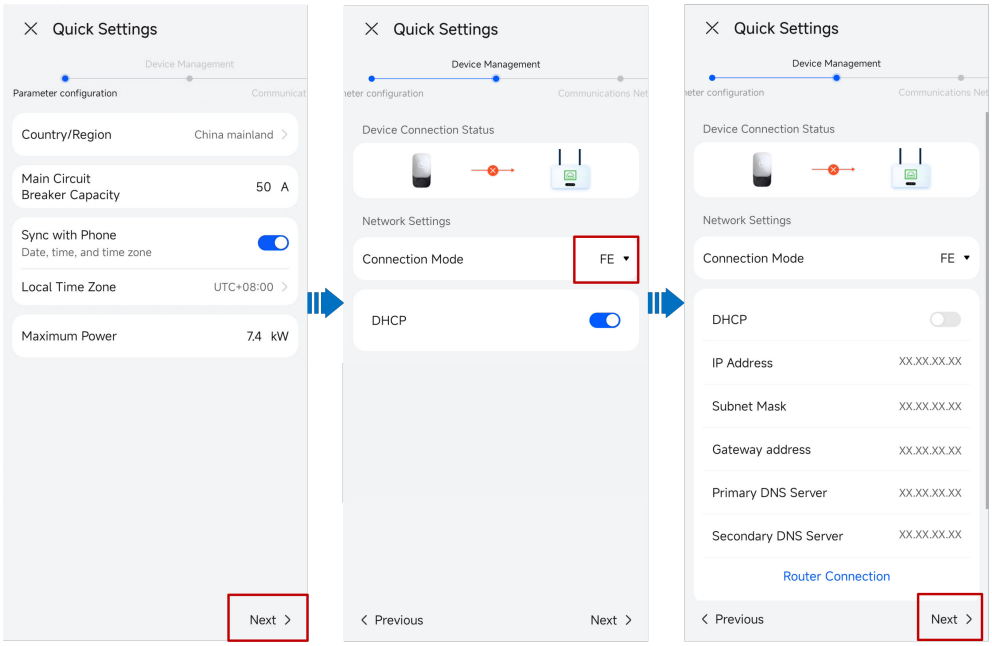
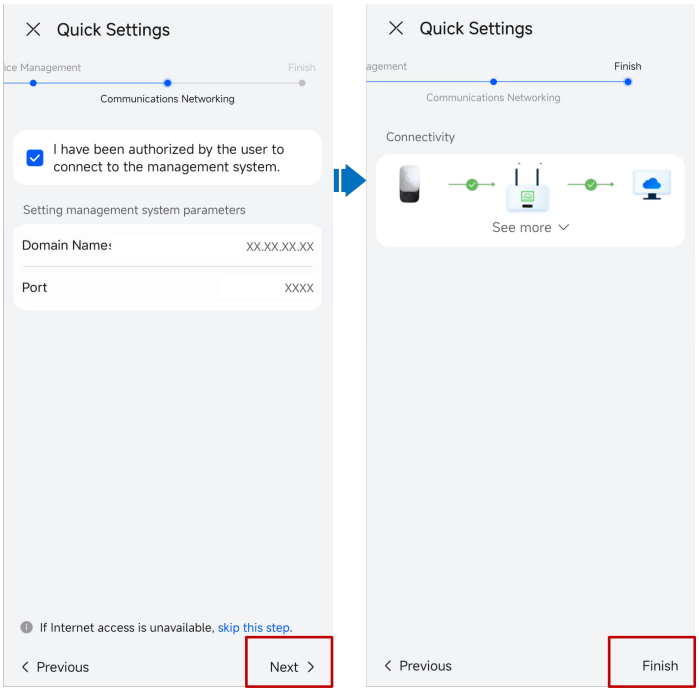


Figure 6-15 Communication networking



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

6.6.1.2 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 **Confirm** to complete the binding.

6.6.2 DC Charger Developed by the Company

1. Connect the power unit of a DC charger to the SmartLogger (or SmartMGC) over FE.
2. Commission the power unit by referring to the DC charging system app commissioning guide and remember the IP address of the power unit.

   NOTE

   You can obtain the IP address of the power unit by referring to the **Parameter configuration** step in **Quick Settings** or by configuring the **O&M** > **FE Networking Configuration**.
3. 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).

4. Log in to the app and select the plant where the charger is to be connected.
5. Tap **+** on the **Device** screen.
6. Tap **Select a device**.
7. Tap the card of the charger model to be added.
8. Enter the IP address of the charger and tap **Add**.
9. After the charger is added successfully, tap **OK**.

6.6.3 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.

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- After the charger commissioning is complete, add the charger to the plant on the management system using the IP address or SN.

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 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.
5. Enter the IP address or SN of the charger and tap **Log in**.
   (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.

6.7 Connecting a Charger (on the WebUI)

The WebUI applies to the DC chargers of the Company and third-party chargers. You can add or delete a charger, and view the basic information about a charger.

6.7.1 Huawei-Developed DC Charger

Prerequisites

Connecting to a Charger

Choose **Maintenance** > **Device Access** > **Add**, add a charger based on the charger model, and set related parameters.

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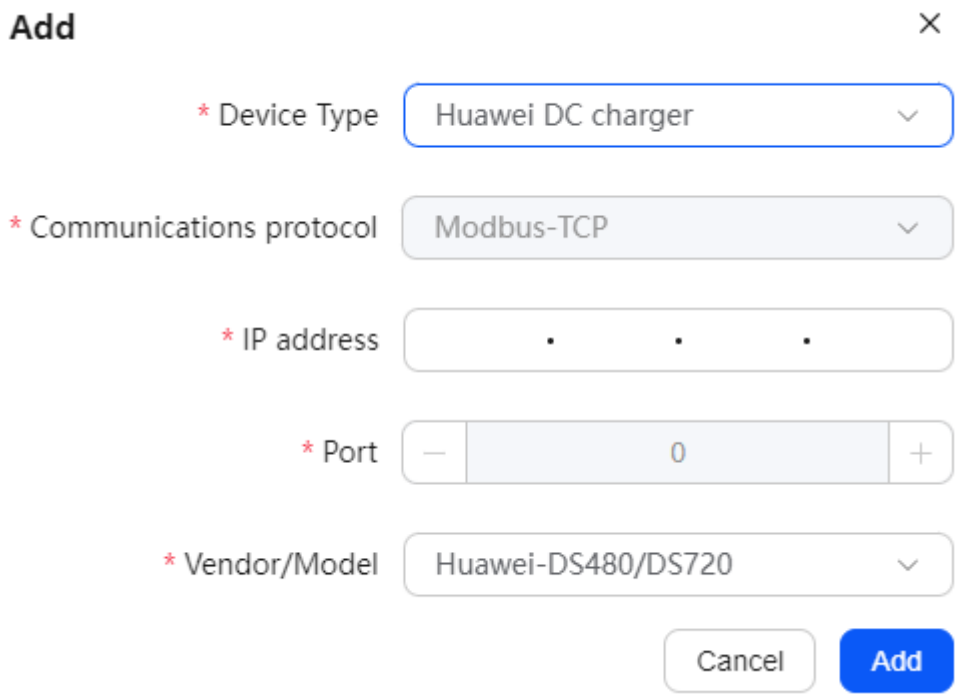
Figure 6-16 Charger parameters



6.7.2 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.

Connecting to a Charger

Choose **Maintenance** > **Device Access** > **Add**, add a charger based on the charger model, and set related parameters. Set **Port** based on the actual port of the charger.

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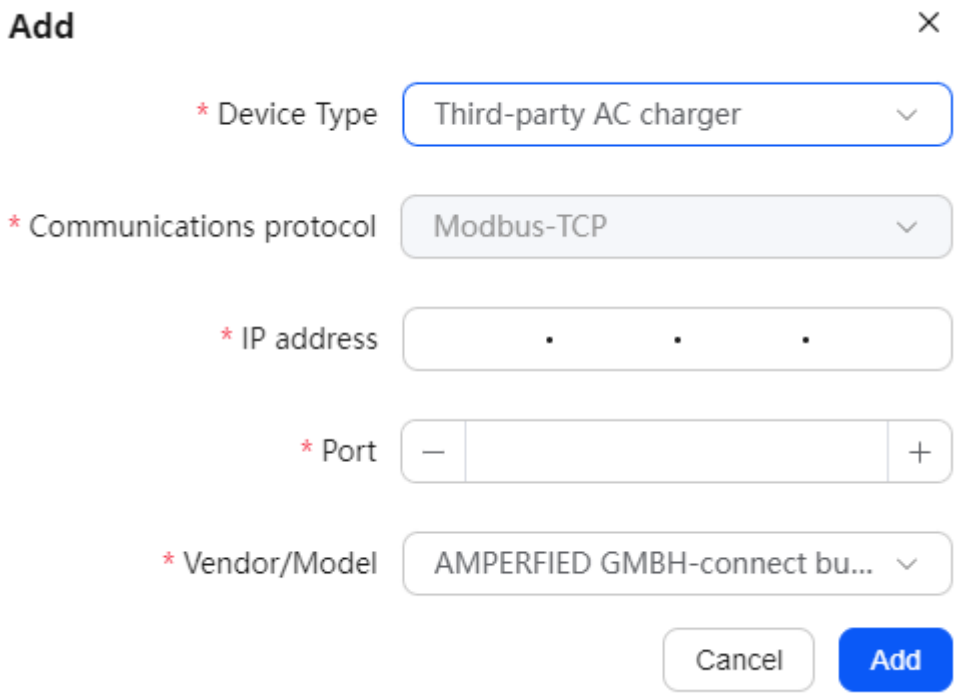
Figure 6-17 Charger parameters



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7 System Power-Off

If you need to power off the system during maintenance, use the SmartLogger/SmartMGC to power off the system.

Step 1 Send a shutdown command. Log in to the SmartLogger/SmartMGC WebUI.

1. Choose **Maintenance** > **Device Management** > **Startup/Shutdown** and select the devices to be shut down.
2. Click **Shut Down** and click **Selected devices** from the drop-down list to shut down the devices.

Step 2 Power off the devices: Turn off the main power switches and then the auxiliary power switches of the devices by referring to the operations of **Power on the device** in the reverse order.

DANGER

Wear insulated gloves and use insulated tools to prevent electric shocks or short circuits.

NOTE

To prevent local operations on switches during subsequent power-on, you are advised not to turn off the auxiliary power switches.

----End

A Meter Cable Connection and Parameter Settings

Meter Cable Connection Position

The meter at the grid connection point must be connected to the metering point where the customer purchases electricity.

Figure A-1 Example of the correct cable connection position

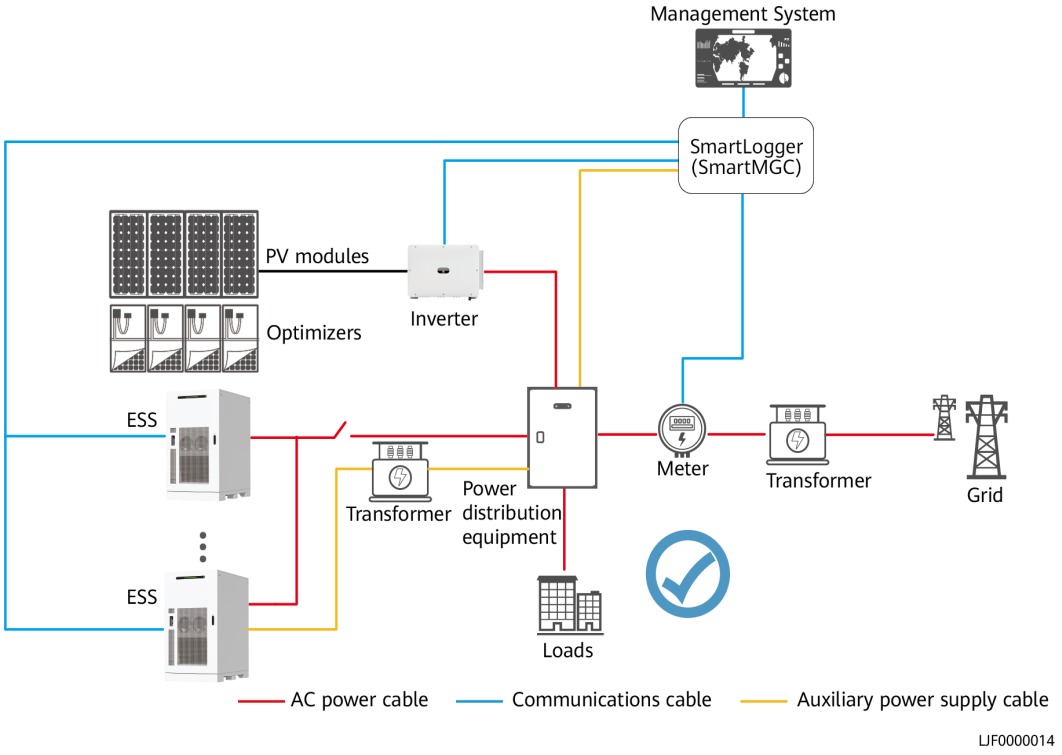

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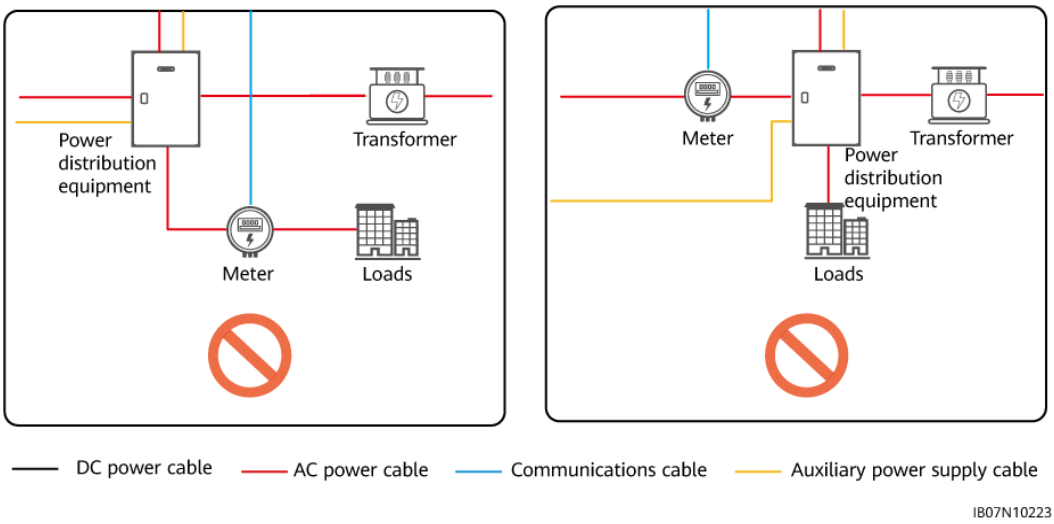
Figure A-2 Examples of incorrect cable connection positions



Meter Cable Connection Description

When the meter is connected correctly, the power flows from the grid to the load. For details about correct meter connection, see **Figure A-3** and **Figure A-4**.

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Figure A-3 Example 1 of correct meter connection

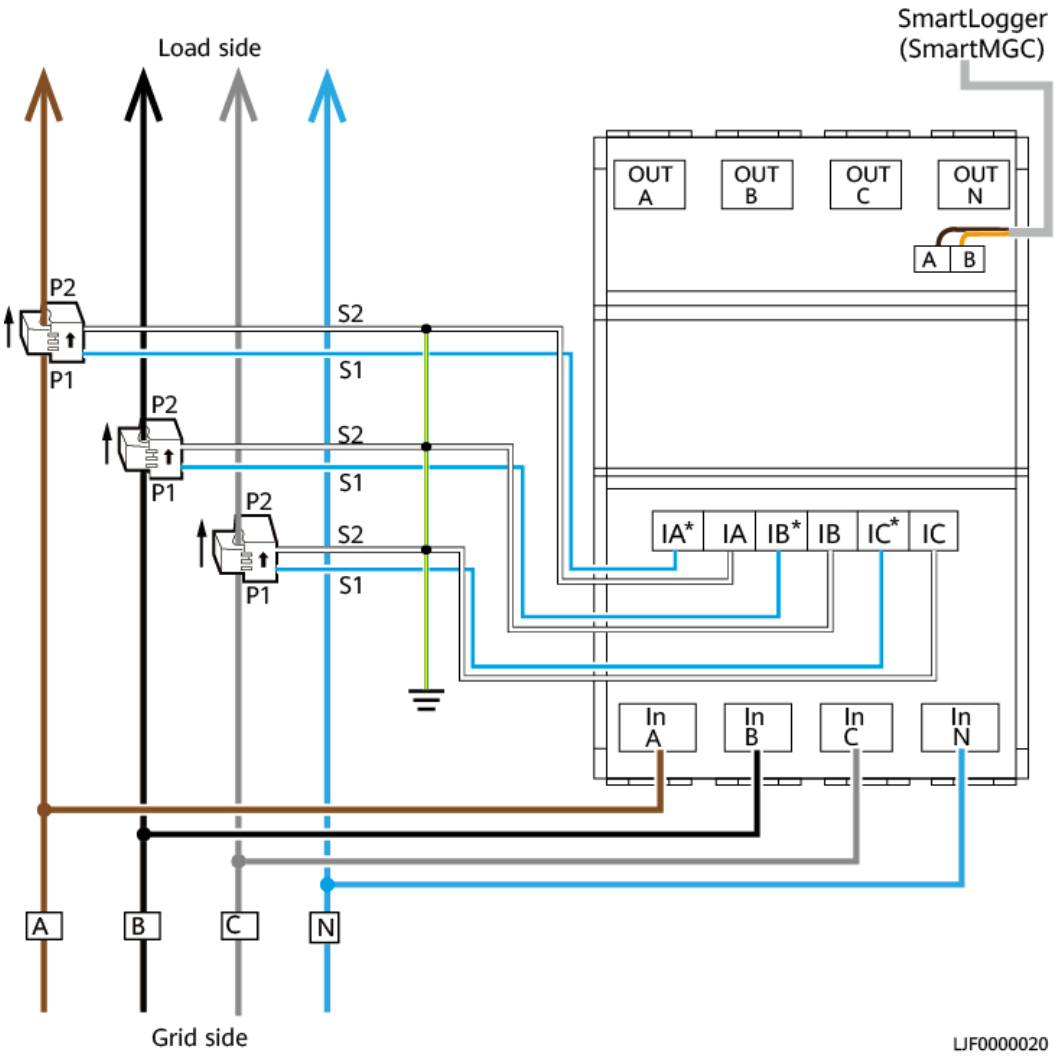
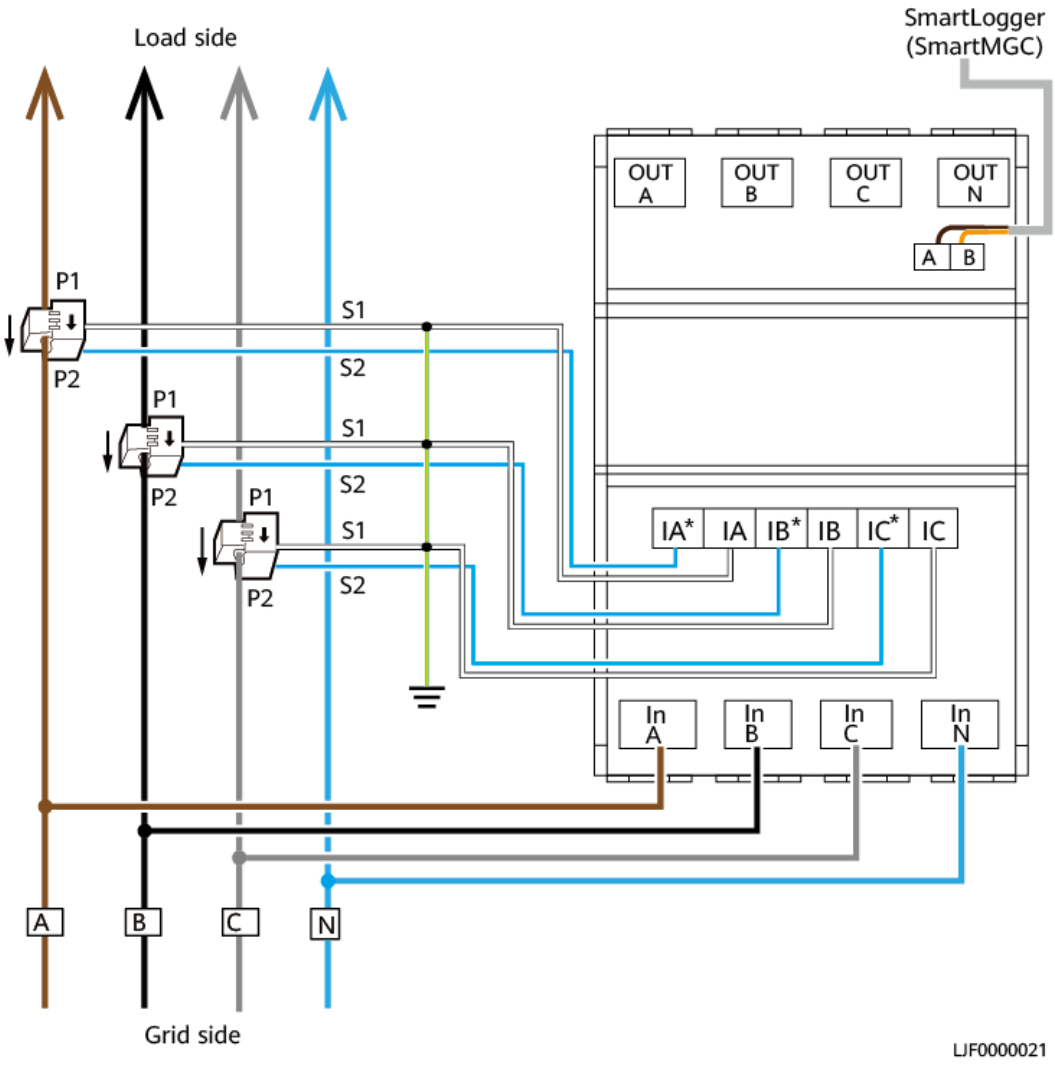


Figure A-4 Example 2 of correct meter connection



Meter Parameter Settings

Step 1 Log in to the WebUI, choose **Maintenance** > **Device Access** > **Add**, and add a meter.

Table A-1 Basic parameters

Parameter	Description
Device Type	Set this parameter to **Modbus meter**.

Parameter	Description
Voltage ratio **Current ratio**	• Set this parameter to **1** if the meter uploads the primary value. • Set this parameter based on the actual transformer ratio if the meter uploads the secondary value. • If both the meter and the SmartLogger (or SmartMGC) support the settings of the voltage ratio and current ratio, you can only set them either on the meter or the SmartLogger (or SmartMGC). You are advised to set these parameters on the meter. • Examples: – Scenario 1: When the voltage of the grid connection point is 400 V, the power meter must be connected to a current transformer (CT), and the CT ratio is 400:5. ▪ Set the voltage ratio of the power meter to 1. ▪ Set the current ratio of the power meter to 80. – Scenario 2: When the voltage of the grid connection point is 10 kV, the power meter must be connected to both the CT and potential transformer (PT). The CT ratio is 400:5, and the PT ratio is 10000:100. ▪ Set the voltage ratio of the power meter to 100. ▪ Set the current ratio of the power meter to 80. **NOTE** • The DTSU666-HW and YDS60-80 support a CT ratio range of 1–6553 and a PT ratio range of 0.1–999.9. • If the power meter connects to a transformer, set **SPEC** of the power meter to **0**, indicating that the power meter connects to the system through a transformer. • If **Limited feed-in** is set to **Single-phase power**, the meter must collect the current and voltage of each phase independently.
Meter usage	Set this parameter to **Feed-in meter**. Each array allows only one feed-in meter to be connected.
Vendor/Model	• If the power meter model is DTSU666-HW, select **DTSU666-HW**. • If the power meter model is YDS60-80, select **YADA-YDS60-80**. • If the power meter model is DHSU1079-ZT, select **DHSU1079-ZT**. • If the power meter model is DTSU71C, select **DTSU71C**.

Parameter	Description
[1]: If the meter is connected in the reverse direction and the management system can correctly display the real-time data of the meter, the management system supports reverse meter connection.	

Step 2 Choose **Monitoring** > **METER** > **Running Parameters**, set **Meter access direction**, and click **Settings**.

Table A-2 Running parameters

Parameter	Description
Meter access direction	Set this parameter to **Positive**. **NOTICE** Cables must be connected to the meter in correct polarities. If the cables are reversely connected, power off the meter, rectify the physical cable connection, and then set **Meter access direction** to **Positive**.

----End

B Connecting to a Device on the App

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

   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.

C Reference Documents

Device	Document
ESS	• HUAWEI LUNA2000-(107-241) Series Commercial and Industrial Hybrid Cooling Grid Forming ESS User Manual • HUAWEI LUNA2000-(107-241) Series Commercial and Industrial Hybrid Cooling Grid Forming ESS Quick Guide

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Device	Document
Inverter	• SUN2000-(20KTL, 29.9KTL, 30KTL, 36KTL, 40KTL)-M3 Series User Manual • SUN2000-(20KTL, 29.9KTL, 30KTL, 36KTL, 40KTL)-M3 Series Quick Guide • SUN2000-(20KTL-M3, 33KTL-NH, 40KTL-NH) User Manual • SUN2000-(20KTL-M3, 33KTL-NH, 40KTL-NH) Quick Guide • SUN2000-(50KTL-ZHM3, 50KTL-M3, 50KTL-BRM3) User Manual • SUN2000-(50KTL-ZHM3, 50KTL-M3, 50KTL-BRM3) Quick Guide • SUN2000-50KTL-NHM3 User Manual • SUN2000-50KTL-NHM3 Quick Guide • SUN2000-(50KTL, 60KTL, 65KTL)-M0 User Manual • SUN2000-(50KTL, 60KTL, 65KTL)-M0 Quick Guide • SUN2000-(50KTL-JPM0, 50KTL-JPM1, 63KTL-JPM0) User Manual • SUN2000-(50KTL-JPM0, 50KTL-JPM1, 63KTL-JPM0) Quick Guide • SUN2000-(75KTL, 100KTL, 110KTL, 125KTL) Series User Manual • SUN2000-(75KTL, 100KTL, 110KTL, 125KTL) Series Quick Guide • SUN2000-(75KTL-M1, 100KTL-M2, 110KTL-M2, 115KTL-M2) User Manual • SUN2000-(100KTL, 110KTL)-M2 Quick Guide (STAUBLI) • SUN2000-(75KTL-M1, 100KTL-M2, 110KTL-M2, 115KTL-M2) Quick Guide (Amphenol) • SUN2000-111KTL-NHM0 User Manual (large current) • SUN2000-111KTL-NHM0 Quick Guide (large current) • SUN2000-(50K, 75K, 80K, 150K)-MG Series User Manual • SUN2000-(50K, 75K, 80K, 150K)-MG Series Quick Guide • SUN5000-(150K-MG0-ZH,150K-MG0) User Manual • SUN5000-(150K-MG0-ZH, 150K-MG0) Quick Guide • SUN2000-50K-MC0 User Manual

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Device	Document
	• **SUN2000-50K-MC0 Quick Guide** • **SUN2000-(30K, 40K)-MC0 Series User Manual** • **SUN2000-(30K, 40K)-MC0 Series Quick Guide**
SUN2000P	• **HUAWEI MERC-(1300W, 1100W)-P Smart PV Optimizer User Manual** • **HUAWEI MERC-(1300W, 1100W)-P Smart PV Optimizer Quick Guide** • **SUN2000 Smart PV Optimizer User Manual** • **SUN2000-(600W-P, 450W-P2) Smart PV Optimizer Quick Guide** • **SUN2000-450W-P Smart PV Optimizer Quick Guide**
SmartLogger/ SmartMGC	• **SmartMGC5000 User Manual** • **SmartMGC5000 Quick Guide** • **SmartLogger5000B User Manual** • **SmartLogger5000 Quick Guide**
Power meter	• **DTSU666-HW Smart Power Sensor Quick Guide** • **YDS60-80 Smart Power Sensor Quick Guide** • **DTSU71C Smart Power Sensor Quick Guide** • **DHSU1079-ZT Smart Power Sensor Quick Guide**

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D Digital Power Customer Service

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E Contact Information

If you have any questions about this product, please contact us.

https://digitalpower.huawei.com

Path: **About Us** > **Contact Us** > **Service Hotlines**

To ensure faster and better services, we kindly request your assistance in providing the following information:

- Model
- Serial number (SN)
- Software version
- Alarm ID or name
- Brief description of the fault symptom

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NOTE

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F Acronyms and Abbreviations

C

CT	current transformer

D

DHCP	Dynamic Host Configuration Protocol

E

EMS	energy management system
ESS	energy storage system

F

FE	fast Ethernet

M

MCCB	molded case circuit breaker

P

PCS	power control system
PT	potential transformer

S

SFP	small form-factor pluggable
SOC	state of charge
SOH	state of health

T

TOU	time-of-use pricing
TCP	Transmission Control Protocol